OE CHARACTERIZATION
AND COST ANALYSIS REPORT
for
Fort Bliss: Castner Range

U.S. Army Engineering and Support Center
Huntsville

Revision: Final

May 1998

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EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

ES1 Castner Range is currently a 7,081 acre tract of land located northwest of the Fort Bliss cantonment in El Paso, Texas. The western boundary of the site borders the Franklin Mountains State Park. The United States Army used Castner Range from 1926 until 1966 for the live fire of small arms, assault weapons, and field and air defense artillery. The land has lain fallow since live fire exercises ceased and has reverted back to a state more representative of the natural Chihuahuan ecosystem of the region. The Army has determined that Castner Range is excess property which is no longer needed to support the mission of Fort Bliss.

ES2 Previous Ordnance and Explosive (OE) studies have confirmed that unexploded ordnance exists on site posing risk to members of the public who frequently disregard the warning signs and use the land for recreational activities. Risk modeling indicates the current exposure risk to the public is from 13,229 to 79,053 annual exposures. An exposure is defined as a person coming into the proximity of an unexploded ordnance item. In its current state, which is complicated by the fact that the adjacent properties are currently being developed, the property could be classified as an attractive nuisance because it invites unauthorized entry into a hazardous area. As a result of the adjacent growth, there is an increased potential liability for personal injury. In a restored state, however, the Government can release the lands excess to its needs while future non-DoD owners can develop the land or protect the unique example of the natural ecosystem that it provides.

ES3 This document evaluates five alternatives for mitigating the risk at Castner Range so that the property can be transferred to non-DoD uses whether for public or private use. The alternatives are:

1. No further action,
2. Institutional controls,
3. Removal of surface unexploded ordnance,
4. Removal of unexploded ordnance items to a depth of one foot, and
5. Removal of unexploded ordnance items to a depth of four feet.

ES4 The alternatives are evaluated against the selection criteria of effectiveness, implementability, and cost for two future land use scenarios. Scenario 1 involves transferring the entire site to the Texas Parks and Wildlife Department for an annex to the Franklin Mountains State Park. Under scenario 2, the eastern plain area would be retained by Fort Bliss for leasing to commercial/residential development, while the western mountainous area would be transferred to the Texas Parks and Wildlife Department for inclusion in the Franklin Mountains State Park. Figure ES-1 presents a map of Castner Range and depicts the areas that are evaluated under the two future land use scenarios. Table ES-1 provides a summary of the comparative analysis for the alternatives that were retained as viable solutions for Castner Range. The data presented in the table is for each alternative analyzed as a stand alone risk reduction measure. The alternative to perform removal of OE items to a depth of 4 feet was not retained in the analysis because no OE items were found at a depth from 1 to 4 feet. Therefore, there is no statistical basis for additional benefit gained by excavating deeper than 1 foot.

Table ES-1
Summary of Comparative Analysis

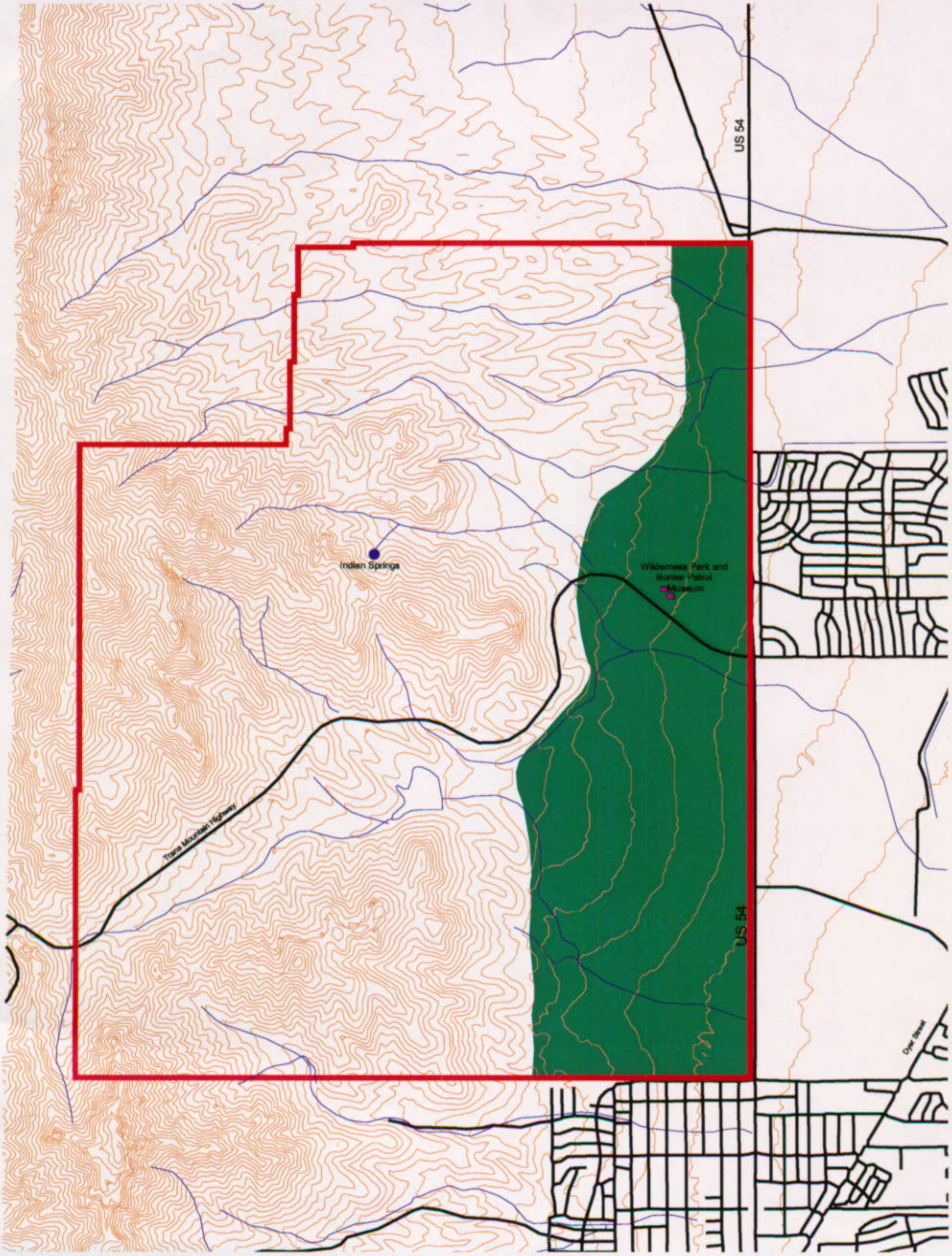
	No Further Action	Institutional Control	Removal of Surface OE Items	Removal of OE Items to a Depth of One Foot
Effectiveness	No	Yes	Yes	Yes
Implementability		Low	High	Medium
Capital cost		$194,000	$18,900,000 - $20,000,000	$38,600,000 - $39,000,000
Operating Cost (per year)	Potentially high cost from injury liability	$13,250	none expected	none expected

ES5 The results of the alternative analysis indicate that surface clearance is the alternative that provides significant risk reduction to an anticipated range of 620 to 3,699 annual exposures. This significant reduction of the current risk can be realized with a high degree of confidence as surface clearance is highly effective and easy to implement at a cost which is far less than subsurface clearance. It is recommended that a small allowance be included in the budget and clearance plans for limited subsurface clearance in drainage areas where storm water erosion may deposit soil and cover OE items.

ES6 It is recommended that surface clearance be performed over most of Castner Range where surface clearance is necessary and feasible. This will significantly reduce the presence of ordnance from locations with significant numbers of future users. The feasible areas include the eastern region which is fairly flat, as well as the mountain valleys, ridges, and side slopes that are accessible by foot. Inaccessible areas will include steep valley walls, cliff areas, and sheer rock outcrops. Surface clearance is not recommended in one study zone where no UXO or OE scrap were found during previous investigations. In addition to surface clearance, an educational institutional control

Figure ES - 1

Future Landuse Scenarios



Zone to be modeled as sutiable for residential or commercial development (1932 acres)

Note: The whole Range should be modeled as a park

N

0.25 0 0.25 Miles

FT BLISS - CASTNER RANGE
EL PASO, TEXAS
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program should be implemented to mitigate risk associated with subsurface and surface UXO in the areas that do not receive surface clearance. It is recommended that the institutional control program include deed restriction, signage, printed media, classroom education, and exhibits/displays.

ES7 It is estimated that the total cost of implementing the combination of the surface clearance and institutional control alternative will be approximately $14,000,000 to $15,000,000. This value includes an estimated $115,000 cost to initiate the institutional control program. The institutional control program is anticipated to incur a subsequent annual operating cost of $9,000.

ES8 It is recommended that the entire site be transferred to the State of Texas Parks and Wildlife Department for an annex to the Franklin Mountains State Park. The Park system is very interested in annexing all of Castner Range because the eastern portion is a unique high prairie grassland which is uncommon due to commercial/residential development in El Paso. The existence of Castner Range has preserved an impressive natural corridor from the crest of the Franklin Mountains to its foothills and provides a unique opportunity to experience the natural ecosystem of the area in close proximity to the population center of El Paso, Texas. In addition, the City of El Paso's 2010 Land Use Plan includes Castner Range as a part of the Franklin Mountains State Park because they realize that the tract of land is very desirable for the Park, and feel that there is more than adequate land within the immediate proximity of El Paso for growth into the next century.

SECTION 1

SECTION 1
INTRODUCTION

1.0 GENERAL BACKGROUND

1.0.1 Castner Range was a 8,328 acre site located on the Fort Bliss Military Reservation. Fort Bliss Military Reservation is a United States Army post located in Texas and New Mexico. The southern boundary of Fort Bliss is located within El Paso Texas, and the northern boundary borders the White Sands Missile Range in New Mexico. Figure 1.0-1 presents a map depicting the location of Fort Bliss and the specific location of Castner Range within Fort Bliss. The Department of the Army used Castner Range for live fire of small arms, assault weapons, and field and air defense artillery between 1926 and 1966.

1.0.2 Fort Bliss acquired approximately 3,500 acres specifically as an ordnance firing area in 1926. An additional 4,800 acres (approximate) was purchased in 1939 and Castner Range grew to its final size of 8,328 acres. Figure 1.0-2 presents a map of the Castner Range showing the current boundaries. Live fire operations were ended in 1966, and the land lay inactive until 1971. The Army and the City of El Paso conducted surface sweeping of 1,247 acres in 1971 so that they could be returned to the Public (see Figure 2.1-1). These returned lands have subsequently been developed into commercial and residential areas, a community college, and public parks. The remaining 7,081 acres of Castner Range remain in control of the Department of the Army. Figure 1.0-3 presents a historical timeline for Castner Range.

1.0.3 Previous studies as well as Ordnance and Explosives (OE) clearance of small portions of the remaining 7,081 acres have confirmed the presence of OE at the site. As the growth of El Paso continues, Castner Range is now bordered by a populated area to the northeast and southeast with easy access from two major highways traversing the range. The western boundary of the range is the Franklin Mountains State Park. Franklin Mountains State Park is the only urban wilderness area in the United States. The range is not fenced, but warning signs are posted along the boundaries. The public routinely disregards the warning signs and uses the range for recreational activities including hiking, mountain biking, off-road vehicle use, and rock climbing. The current signage and local educational institutional controls have had minimal effect on keeping people out of the range boundaries. Castner Range is generally perceived as an extension of the state park and has been used as such by the public for over 30 years. This results in a potential unsafe situation for members of the public.

Figure 1.0 - 1
General Location Map

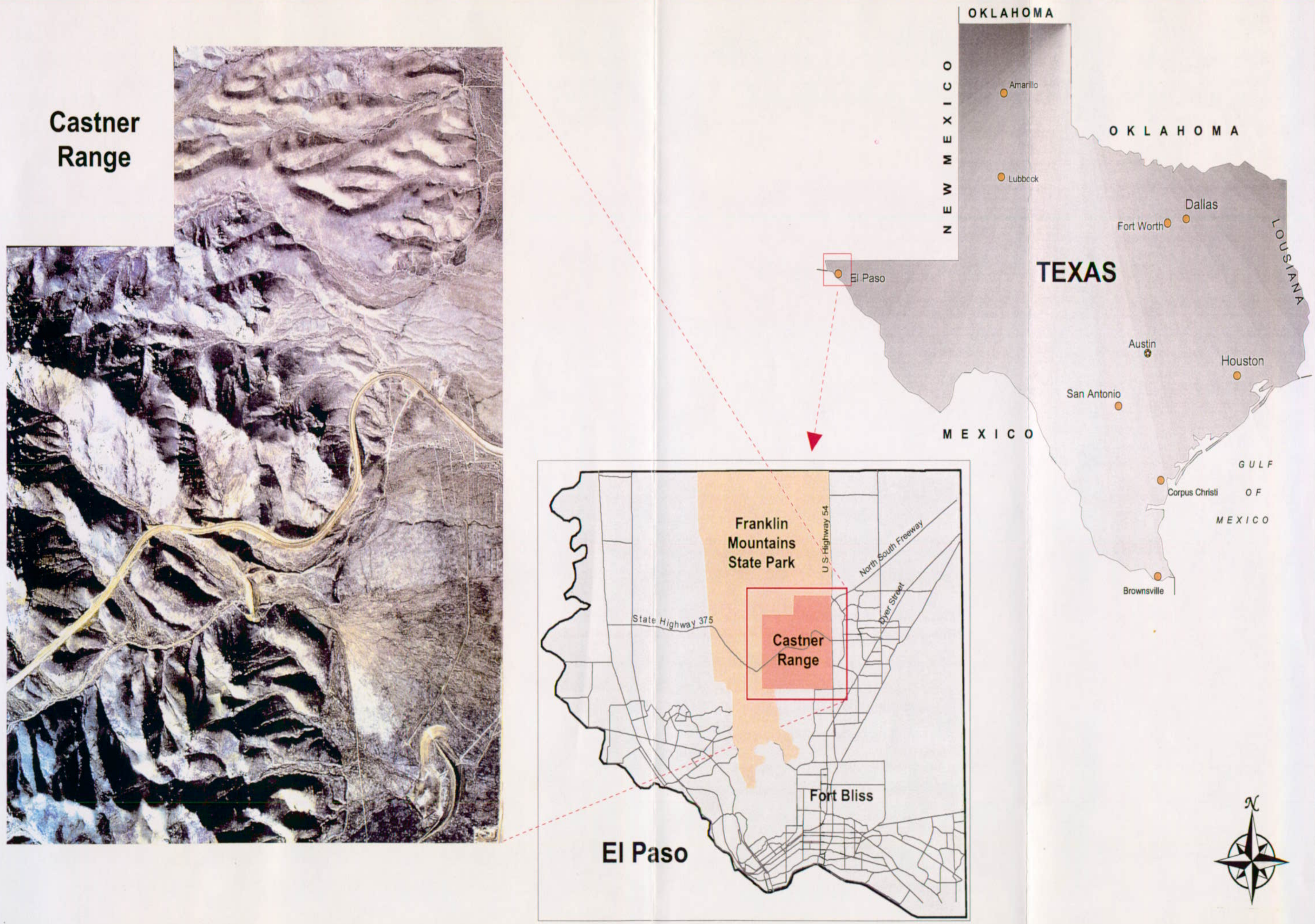

Figure 1.0 - 2

Current Boundry of Castner Range

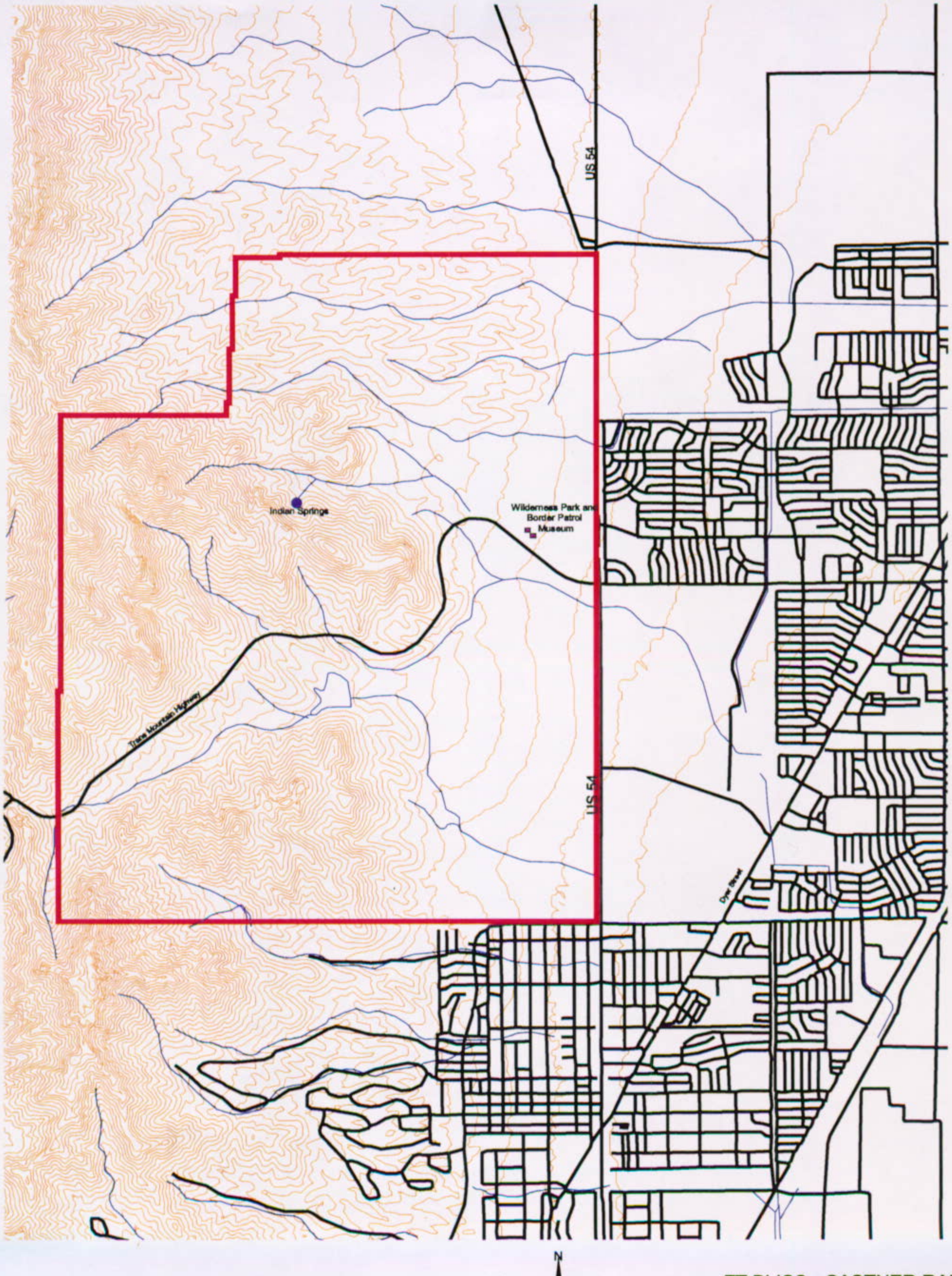

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Figure 1.0-3
Castner Range Timeline

1920's

1926 - Range established by acquisition of 3500 acres.

1930's

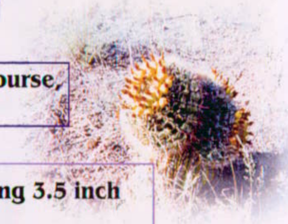
1930 - Commence using heavy artillery.

1939 - Purchase of additional 4800 acres (Total of 8,328 acres)

Pre World War II - Rifle ranges in use. Probable field artillery and air defense artillery use. Operations using smoke munitions.

1940's

1943 - Sixteen ranges identified. Mortar range, moving target course, field artillery in use.



World War II - Rifle ranges in use. Probable field artillery and air defense artillery use. Operations using smoke munitions.

1950's

1955 - Twenty-seven ranges in use including 3.5 inch rocket and demolition ranges.

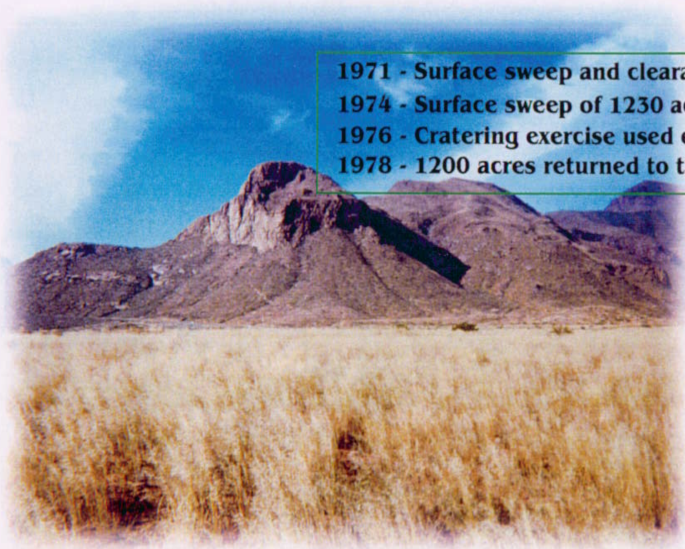
Off-base 75 mm detonation results in 3 deaths.

Vietnam War - Close combat "Vietnam Village" constructed for training

1960's

1963 - Boy Scouts found hiking to old artillery impact area (no injuries)
1966 - Organized weapons firing at Castner discontinued
1962 - Off-base 2.36 inch rocket detonation results in one death.

1970's



1971 - Surface sweep and clearance of 200 acreas.
1974 - Surface sweep of 1230 acres.
1976 - Cratering exercise used explosives to create ground excavations.
1978 - 1200 acres returned to the Public.

1980's

1980 - Surface sweep of roadsides.
1981 - Surface sweep of roadside to museum site.

1990's

1994 - Site visit by Fort Bliss and Corps of Engineers personnel followed by UXO field investigations of 6,700 acres to identify remaining OE.

1995 - Additional field investigations of 569 acres for UXO characterization.

1997 - Field investigations of 467 acres for UXO characterization.

1.0.4 In its current condition and location adjacent to a rapidly developing urban area, the property could be classified as an attractive nuisance because it invites unauthorized entry into a hazardous area. As a result, these circumstances increase potential liability for personal injury. In a restored state, however, the Government can release the land that is excess to its needs. Future non-DoD owners can then develop or protect a unique natural resource and enhance the public good in the use of this valuable property. The potential future uses of this land include extending the Franklin Mountains State Park and development for residential, commercial, and public purposes.

1.0.5 Castner Range is property which is no longer needed to support the mission of Fort Bliss. The Department of the Army has determined that the site is excess. Fort Bliss is required to determine the level of clearance that will be required prior to releasing the land and is also responsible for preparing an unexploded ordnance (UXO) clearance plan. The Department of the Army and the Department of Defense Explosives Safety Board (DDESB) approves the UXO clearance plan. The Department of the Army provides funding to perform the clearance. The U.S. Army Corps of Engineers performs the UXO clearance and places any restrictions on the use of the land based upon the level of clearance. Once the property is cleared for release, the U.S. Army Corps of Engineers offers the land to other Federal Agencies, i.e., DoD, DoE, Bureau of Land Management. If no Federal Agency requests the land, then the General Services Administration (GSA) oversees the distribution of the land by the following process:

- The GSA offers the land to the state and local governments.
- If the state and local governments refuse the land, the GSA makes the land available to the public for sale (commercial or residential - based on clearance restrictions).

1.0.6 Fort Bliss would receive 50 percent of the proceeds if the land is sold to a Federal Agency, or to a state or local government. Fort Bliss would not receive any financial return if the land is transferred at no cost to a Federal Agency or to a state or local government. If the land is sold on the open market, Fort Bliss would receive at least 50 percent of the proceeds. The policy of returning at least 50 percent of the sale proceeds to the installation (Fort Bliss) stipulates that the money be used strictly for facility maintenance and repair or for environmental restoration. Fort Bliss could also lease the land, and receive at least 50 percent of the proceeds. It is possible that Fort Bliss could receive 100 percent of the leasing proceeds (with Department of the Army approval). The primary reason for including residential and commercial development (of at least a portion of Castner Range) in the land use alternatives as this would provide funding for repair and maintenance or for environmental restoration over a period of many years. The State of Texas is very interested in acquiring Castner Range for an extension of the Franklin Mountains State Park. The Franklin Mountains State Park was created in 1979 by an act of the Texas Legislature. The legislation allows Franklin Mountains State Park to include any portion of Castner Range that the Army is willing to convey to the Texas Parks and Wildlife Department through the excess land process (Texas Parks and Wildlife Department, 1993). The Texas Parks and Wildlife Department is not required to acquire this land; its acquisition and subsequent boundary changes to the Franklin

Mountains State Park are contingent upon what the Army wishes to convey. The issue of unexploded ordnance must be addressed (see Section 1.2) before any portion of Castner Range can be transferred to the State of Texas for use as a state park.

1.0.7 In 1976, the Wilderness Park Museum was constructed within Castner Range by the City of El Paso. The museum contains exhibits on the history and natural setting of the Chihauhaun Desert ecosystem. A museum dedicated to the history of the US Border Patrol was constructed adjacent to the Wilderness Park Museum. The fact that museums have been constructed in Castner Range and are currently open for public use, promotes the park future land use alternative.

1.0.8 This document provides an OE Characterization Report and Cost Analysis based upon:

- Determination of the nature and extent of OE contamination at the site through a review of previous site investigations;
- Analysis of the risk posed by the remaining OE hazards present at the site;
- Identification and development of OE removal alternatives including clearance costs;
- Screening of OE removal alternatives; and
- A comparative analysis of the remaining OE removal alternatives.

1.0.9 The results of these tasks and recommendations for the follow-on OE removal are included in this report.

1.1 PURPOSE

The purpose of this project is to evaluate the results of past OE investigations at the Castner Range to determine the feasibility, cost, and risk to the public from potential OE removal alternatives. The objective of this project is to implement the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) non-time critical removal action process to recommend a feasible and cost effective OE removal alternative that meets acceptable levels of protection to human health with respect to the intended future land use.

1.2 REGULATORY ANALYSIS AND ASSESSMENT OF APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

1.2.1 The Castner Range OE Characterization project has been performed by the US Army Corps of Engineers (USACE) under the Defense Environmental Restoration Program (DERP), 10 USC 2701-2707, and under Section 104 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Under these regulations, the Secretary of Defense is authorized to conduct response actions at sites that were contaminated while under the jurisdiction of the Department of Defense (DoD) or its predecessor agencies. Because this project falls under CERCLA, a general exemption exists for the administrative requirements of other state and local permits. This exemption is found in the NCP at 40 CFR 300.400(e). Nevertheless, every effort was made to comply with the intent of all applicable federal, state, and local permit requirements.

1.2.2 This OE Characterization and Cost Analysis Report is prepared pursuant to the EPA "guidance on Conducting Non-Time Critical Removal Actions Under CERCLA" (EPA/540-R-93-057). CERCLA and the NCP define removal actions as:

> "the cleanup or removal of released hazardous substances from the environment, such actions as may necessarily be taken in the event of the threat of release of hazardous substances into the environment, such actions as may be necessary to monitor, assess, and evaluate the release or threat of release of hazardous substances, the disposal of removed material, or the taking of such other actions as may be necessary to prevent, minimize, or mitigate damage to the public health or welfare or to the environment, which may otherwise result from a release or threat of release."

1.2.3 The U.S. Environmental Protection Agency (USEPA) has categorized removal actions in three ways: emergency, time-critical, and non-time-critical based on the type of situation, the urgency and threat of the release or potential release, and the subsequent time frame in which the action must be initiated. Emergency and time-critical removal actions respond to releases requiring action within six months; non-time-critical removal actions respond to releases requiring action that can start later than six months after the determination that a response is necessary. It has been determined that the OE characterization at Castner Range is non-time critical because the areas are currently under administrative control and the risk is low regarding an immediate threat or danger to members of the public. In order to recommend an appropriate OE removal solution, alternatives are identified and analyzed for cost, effectiveness, and implementability.

1.2.4 The administrative requirements for compliance with state and local regulations will generally not factor into this investigation because of the general CERCLA exemption. However, the spirit of these regulations will be followed through close coordination with local regulatory agencies to ensure they are fully informed as to the nature of the work being conducted on the site and the need to comply with any local regulatory requirements.

1.2.5 Section 121(d)(1) of CERCLA, as amended by the Superfund Amendments and Reauthorization Act (SARA), requires that remedial actions must attain a degree of cleanup that assures the safety of human health and protection of the environment. Moreover, all potential Applicable or Relevant and Appropriate Requirements (ARARs) must be outlined. ARARs include federal standards, requirements, criteria, and limitations under state environmental or facility siting regulations that are more stringent than federal standards.

1.2.6 Although the requirements of CERCLA Section 121 generally apply as a matter of law only to remedial actions, USEPA's policy for removal actions is that ARARs will be identified and attained to the extent practicable. Three factors are applied to determine whether identifying and attaining ARARs is practical in a particular removal situation. These factors include:

- The exigencies of the situation;
- The scope of the removal action to be taken; and
- The effect of ARAR attainment on the statutory limits for removal action duration and cost.

1.2.7 ARARs are identified on a site-specific basis and involve a two-part analysis: first, a determination is made whether a given requirement is applicable; then if it is not applicable, a determination is made whether it is nevertheless both relevant and appropriate. When this analysis results in a determination that a requirement is both relevant and appropriate, such a requirement must be complied with to the same degree as if it were applicable.

1.2.8 "Applicable" requirements are those cleanup standards, control standards, and other substantive environmental protection requirements, criteria, or limitations promulgated under federal or state law that specifically address a hazardous substance, pollutant or contaminant, remedial action, location, or other circumstance at a remedial action site. 'Relevant and appropriate" requirements are cleanup standards, control standards, and the substantive environmental protection requirements, criteria, or limitations promulgated under federal or state law that, while not "applicable" to ordnance, a remedial action, the location, or other circumstance at a remedial action site, address problems or situations sufficiently similar to those encountered at a site to where their use is well-suited.

1.3 IDENTIFIED ARARS

The USEPA has identified three categories of ARARs: chemical-specific, location-specific, and action-specific. According to the NCP, chemical-specific ARARs are usually health or risk-based numerical values that establish the acceptable amount of concentration of a chemical that may remain in, or be discharged to, the ambient environment. Location-specific ARARs generally are restrictions placed upon the concentration of hazardous substances or the conduct of activities solely because they are in special locations. Some examples of special locations include flood plains, wetlands, historic places, and sensitive ecosystems or habitats. Action-specific ARARs are usually technology or activity-based requirements or limitations placed on actions taken with respect to hazardous wastes, or requirements to conduct certain actions to address particular circumstances at a site. Non-promulgated advisories or guidance documents issued by federal or state governments do not have the status of potential ARARs. However, these 'to be considered" criteria (TBC) may be used in determining the necessary level of cleanup for human safety and protection of the environment. Potential ARARs and TBCs for the Castner Range OE project are listed in Table 1.3-1 and discussed in the following paragraphs.

Table 1.3-1
Potential ARARs For OE Removal
Castner Range

Activity	ARAR/TBC	Citation	Applicability or Relevance
Chemical-Specific			
None			
Location-Specific			
Location of an action within an area where it may cause irreparable harm, loss or destruction of significant artifacts or historic landmarks	National Historic Preservation Act	36 CFR Part 65, and 800	During removal action, any material that may be considered historical will be reported pursuant to requirements
	Protection of Wetlands	33 CFR 320 et. seq. Executive Order 11988	Requires action to be taken to minimize loss or degradation of wetlands.
	Endangered Species Act	16 USC δ 1531 et. seq.	Requires that authorized actions do not jeopardize the continued existence of endangered or threatened species, or their habitats.
	American Indian Religious Freedom Act (AIRFA)	42 USC 1996	Requires consultation with Native Americans about traditional religious and cultural sites on Army lands to protect and provide access to such sites
	Native American Graves Protection and Repatriation Act (NAGPRA)	43 CFR Part 10	Requires consultation with Native Americans prior to the excavation of ancestral remains and related objects to establish appropriate disposition of these items

Table 1.3 -1 (Continued)
Potential ARARs For OE Removal
Castner Range

Activity	ARAR/TBC	Citation	Applicability or Relevance
Location-Specific			
	Protection of Archaeological Resources	43 CFR Part 7 (also: 36 CFR Part 296, 32 CFR Part 229, and 18 CFR Part 1312 - same regulations)	Requires a permit to excavate, remove, or otherwise alter any archaeological resource
	Preservation of American Antiquities	43 CFR Part 3	Requires a permit for the examination of ruins, excavation of archaeological sites, and gathering of objects of antiquity
Action-Specific			
Future Land Use	Environmental Effects of Army actions	AR 200-2 (NEPA-40 CFR 1500-1508)	An Environmental Assessment (EA) or an Environmental Impact Statement (EIS) would be required to ensure that commercial or residential development would not have an adverse impact on the environment.
Excavation	Dept. of Army Ammunition and Explosive Safety Standards	AR 385-64	TBC that establishes army standards for locating, handling, and disposing of munitions.
	Department of Defense Ordnance Safety Standards	DoD 6055.9-STD	Requires specialized personnel be employed in the detection, removal, and disposal of OE.

1.3.1 Chemical-Specific ARARs

No chemical-specific ARARs or TBCs have been identified for the OE removal action at Castner Range because only the removal of OE is being considered in this OE Characterization and Cost Analysis report. Ordnance activities rarely result in chemical contamination of the environment because the chemicals contained in an explosive are by design consumed during the explosion (detonation). Residual contamination that may have occurred due to ordnance burial, detonation, or disposal is not included in the scope of this OE Characterization and Cost Analysis Report. Chemicals that may be contained within unexploded ordnance are addressed through the action-specific DoD requirements for removal and disposal of ordnance items.

1.3.2 Location-Specific ARARs

There are seven potential location-specific ARARs pertaining to the removal action at Castner Range. These include the National Historic Preservation Act, Protection of Wetlands, Endangered Species Act, American Indians Religious Freedom Act, Native American Graves Protection and Repatriation Act, Protection of Archaeological Resources, and Preservation of American Antiquities.

1.3.3 Action-Specific ARARs

1.3.3.1 The National Environmental Policy Act (NEPA) regulation as implemented by Army Regulation 200-2 entitled 'Environmental Effects of Army Actions" is applicable to future land use alternatives that involve developing the site for commercial or residential purposes which could result in environmental impacts. If the site is left in its natural state for use as a park, then this ARAR could be covered by a categorical exclusion which exists for actions in support of other agencies/organizations involving community participation projects where that agency/organization is the proponent for that action. The clearance and removal of OE materials from the site is also covered by a categorical exclusion applicable for land regeneration activities of native trees and vegetation including site preparation. Fort Bliss will be required to prepare and submit a Record of Environmental Consideration to the Department of the Army describing the proposed action and justifying the use of the categorical exclusion.

1.3.3.2 One action-specific TBC, Army regulation AR 385-64, requires that safety measures be taken for the handling of explosive ordnance. Moreover, DoD 6055.9-STD requires that specialized personnel be employed to detect, remove, and dispose of ordnance. This standard also defines safety precautions and procedures for the detonation or disposal of ordnance.

1.4 REPORT ORGANIZATION

This report is composed of six additional sections. Section 2, Site Characterization, describes the historical use of the site and identifies the regional and local characteristics of the site. Section 3, Identification of OE Clearance Scope, Goals, and Objectives, identifies the goals and objectives of the project and proposes a schedule for the turnover of the excess property. Section 4, Identification and Analysis of OE Clearance Alternatives, discusses the general means used to detect and clear OE materials and describes the specific alternatives under evaluation for the clearance of Castner Range. Section 5, Comparative Analysis of OE Clearance Alternatives identifies the rationale used to evaluate the OE clearance alternatives and compares the alternatives in accordance with the rationale. Section 6, Recommended OE Clearance Alternative presents the results of the comparative analysis for the OE clearance of Castner Range. Section 7, presents the references that were used to gain information for preparing the document.

SECTION 2

SECTION 2
SITE CHARACTERIZATION

2.1 SITE DESCRIPTION AND BACKGROUND

2.1.1 General

2.1.1.1 Fort Bliss was originally a combat garrison and as such had artillery units assigned to the post. To accommodate the need for a nearby ordnance range, Fort Bliss began the acquisition of the Castner Range in 1926. The first portion of land was acquired in 1926 and consisted of approximately 3,500 acres. Further expansion of Fort Bliss required increasing the size of Castner Range. In 1939 an additional 4,800 acres of land was purchased increasing the final size of Castner Range to 8,328 acres. The size of Castner Range remained unchanged until 1971 when the GSA transferred approximately 1,247 acres to the city of El Paso. The remaining acreage (approximately 7,081 acres) is still under control of the DoD.

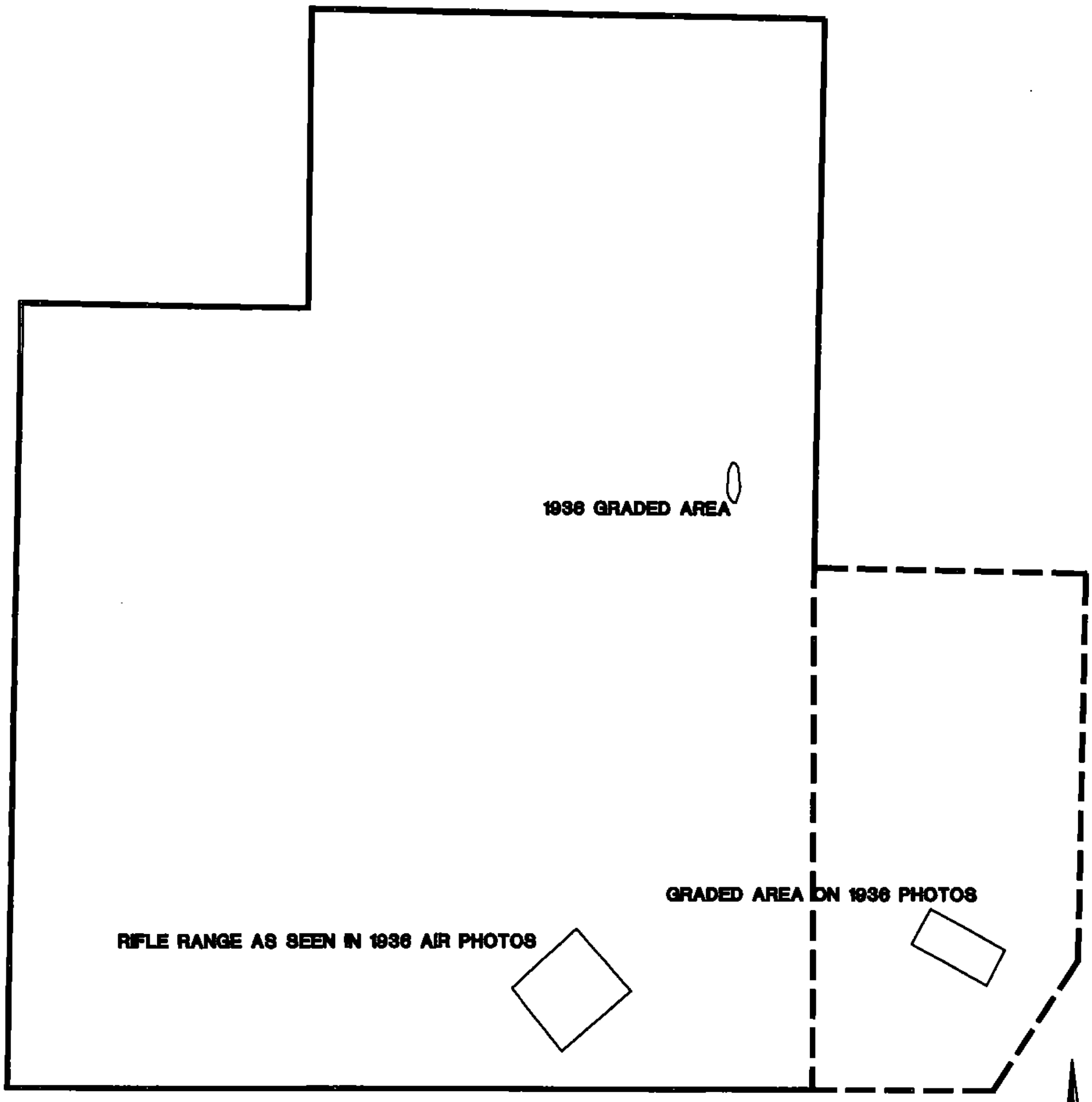
2.1.1.2 As home of the Army's Air Defense School, Fort Bliss was heavily involved in training personnel in the use of various air defense weapons during the period that Castner Range was active. It can be anticipated that any type of air defense artillery may have been used, demonstrated, or disposed of at Castner Range. The following sections provide a general discussion concerning the past uses of Castner Range.

2.1.2 Pre-World War II Era

2.1.2.1 Information on activities conducted at Castner Range prior to World War II is limited. Documents indicate that after the first purchase of land, Castner Range consisted of four rifle ranges located in the south central boundary of the range. Aerial photographs from 1936 showed the locations of these rifle ranges and also showed several graded areas that may have been artillery firing points (Archives Search Report, 1994). Following the purchase of additional land in 1939, additional firing ranges were constructed.

2.1.2.2 In addition to live fire exercises conducted at the various ranges, documents indicate that the range was probably used for firepower demonstrations prior to World War II. Documents from the VIII Corps Chemical Officer also indicate an experiment in retrograde operations where units of Fort Bliss conducted a retrograde movement through the Franklin Mountains at Mackilligan's Canyon using new smoke munitions to cover movements (Archive Search Report, 1994). This indicates that there may have been use agreements for training operations in an area adjacent to Castner Range that were independent of range operations and may not have been confined to what is currently government owned property. Figure 2.1-1 provides the locations for the activity sites during the 1930's that have been verified.

Figure 2.1-1
History of Castner Range in the 1930's



1,247 Acres Cleared and Transfered to El Paso in 1971.

Note:

Historical Range Information from Archives Search Report.

Locations digitized from historical photographs.

Figures are not to scale.

2.1.3 World War II Era Ranges

2.1.3.1 During World War II a number of small arms firing ranges were developed in the southeast section of Castner Range. Generally all of these ranges, except one, fired towards the west. The one exception was a .30 and .45 caliber course located in the southeast quadrant of the intersection of the present North-South Highway and the eastern extension of the Trans Mountain Highway. Range maps from the World War II era (1943) identified 16 separate ranges within Castner Range. Although most of the ranges were small arms ranges, two were identified as 37 millimeter (mm) subcaliber ranges and one was identified as a mortar range. Two other ranges were identified as moving target and field firing courses with no munitions types specified. In addition to the small arms courses, there were also at least 4, and possibly 7 artillery firing points. These firing points were all located in the eastern portion of the range and fired to the west or southwest. Some of these range locations were identified on maps and drawings, while others were interpreted from aerial photographs. No documentation of Castner Range impact areas exists prior to 1953, however, unexploded ordnance found at various locations include: .22 caliber, .30 caliber, .45 caliber; 3.5-inch rockets; rifle and hand grenades; 4.2-inch mortars; 81 mm mortars; 3-inch, 37, 40, 75, 90, and 105 mm projectiles. The 16 ranges and their uses are presented below in Table 2.1-1.

Table 2.1-1
World War II Era Firing Ranges

Range 1	Rifle
Range 2	.30 Caliber Machine Gun
Range 3	Rifle
Range 4	Rifle
Range 5	Rifle
Range 6	.30 and .50 caliber machine gun
Range 7	Pistol
Range 8	.30 caliber machine gun
Range 9	37 mm sub caliber
Range 10	.22 caliber landscape
Range 11	Rifle - .30 caliber
Range 12	Gravity course moving target
Range 13	Field firing course
Range 14	Submachine gun/shotgun
Range 15	Mortar
Range 28	.22 caliber aerial target

Note: Data Source - Archives Search Report

2.1.3.2 Documents and maps from the World War II era do not indicate the presence of any grenade courses at Castner Range. The grenade courses during this period of use were shown either on the Fort Bliss base proper or at the Winifree's Nose Range, located southeast of Fort Bliss. A report from the Commander of Fort Bliss dated May 11, 1971 states that the western mountainous portions of the range had been used during the 1930s and 1940s for large artillery impact areas.

2.1.3.3 Another potential source of OE on Castner Range resulted from experiments conducted as part of Project Sphinx. This project was conducted during World War II and was focused on developing methods of attacking Japanese Cave-Type fortifications. At Fort Bliss, experiments were conducted using air defense artillery (40mm and 90mm HE rounds) in a direct fire mode to attack and attempt to close cave openings (Archive Search Report, 1994). Information presented in the Archive Search Report (ASR) concerning Project Sphinx was taken from a Trip Report dated July 7, 1945 from Brigadier General R.H. Van Volkenburgh. This Trip Report does not identify Castner Range as the location of the tests, but the Franklin Mountains would provide terrain conducive to this type of test. Figure 2.1-2 presents a map depicting locations of known range activities in the 1940's.

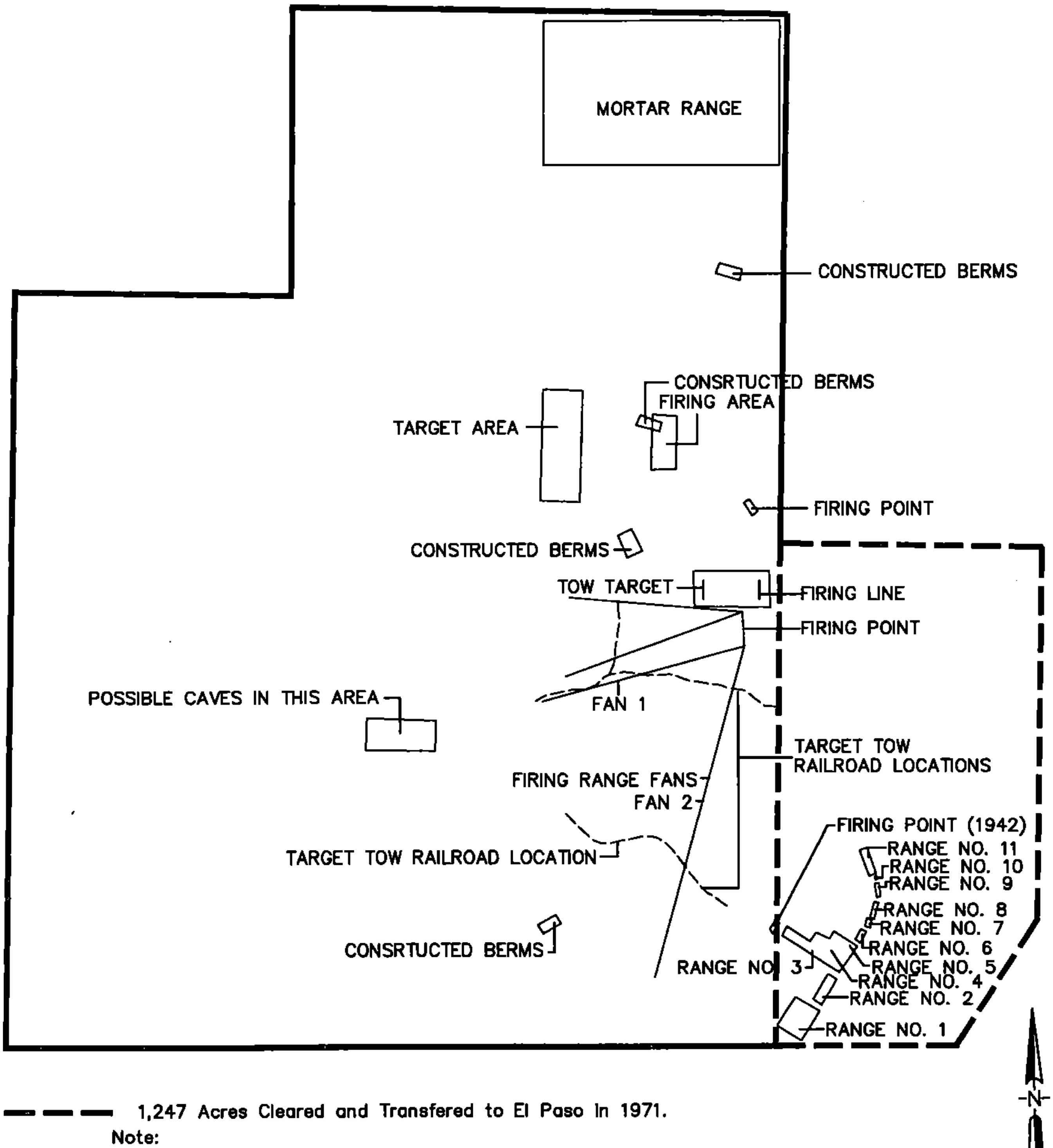
2.1.4 Post World War II Ranges (1947 through 1950s)

2.1.4.1 Army Military Service maps from 1947 and 1948 identify firing ranges located in the southeast area of Castner Range in addition to a firing range and a demolition area in the northeast portion. Range firing fans from 1953, reportedly for 3.5-inch rockets and grenades, show firing points located along the eastern edge of the range using the Franklin Mountains as a backdrop.

2.1.4.2 A 1955 report indicates that 27 ranges existed at Castner Range. These ranges were again predominantly small arms ranges with the exceptions of Range 16 which was listed as a 3.5-inch rocket range, Range 18 which was listed as a hand grenade course, (dummy) and the rifle grenade course (live and dummy), Range 19 which was listed as a rifle grenade practice and live grenade course, Range 20 which was listed as a live hand grenade range, and Range 26 which was listed as a demolition range. The post World War II era ranges and their uses are listed below on Table 2.1-2. Many of the ranges are identified as being renovated in 1954 with most of the small arms ranges remaining in the same locations as the pre World War II era small arms ranges.

2.1.4.3 In addition to the live fire exercises conducted at Castner Range, explosives were also used for rock quarrying operations in 1958. Some of the rock faces of the Franklin Mountains were blasted with explosives packed in small diameter drilled holes to produce fragmented rock. The fragmented rock was crushed by the 273rd Engineer Detachment for use in construction activities. Figure 2.1-3 presents a map depicting locations of known range activities in the 1950's.

Figure 2.1-2
History of Castner Range in the 1940's

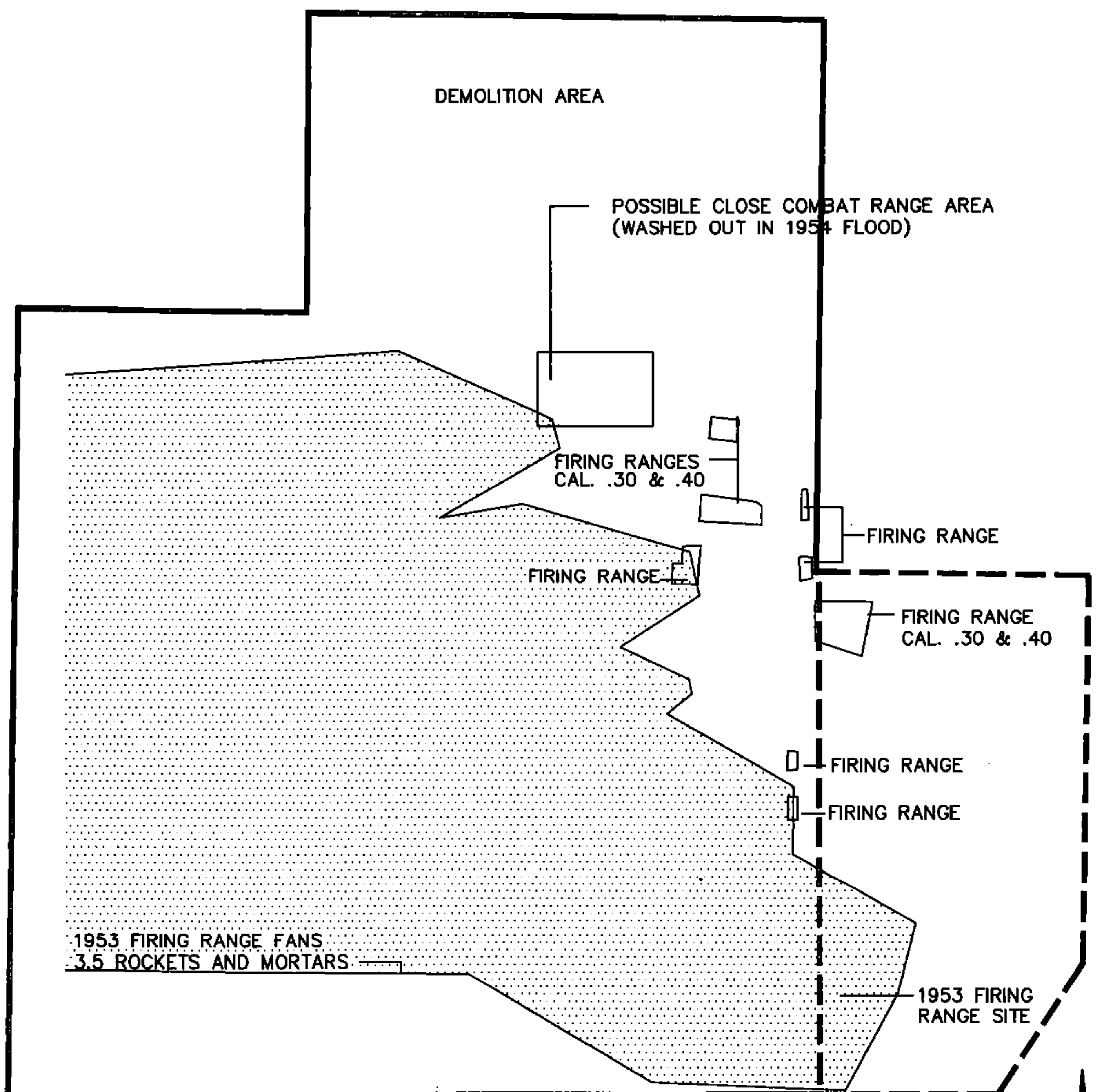


1,247 Acres Cleared and Transfered to El Paso in 1971.

Note:

Historical Information from Archives Search Report.
Locations digitized from historical photographs.
Figures are not to scale.

Figure 2.1-3
History of Castner Range in the 1950s



1,247 Acres Cleared and Transfered to El Paso in 1971.

Shaded Area Indicates Firing Range Fans for 3.5" Rockets and Mortars.

Note:
Historical Information from Archives Search Report. (Range Numbers Are Unknown)
Locations digitized from historical photographs.
Figures are not to scale.

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Table 2.1-2
Post World War II Era Firing Ranges

Range 1	Known Distance (KD) 100 and 200 yards
Range 2	KD 100, 200, and 300 yards
Ranges 3 and 4	Unknown
Range 5	KD 100, 200, and 300 yards
Range 6	KD 100, 200, and 300 yards (unsatisfactory condition)
Range 7	KD 100, 200, and 300 yards
Range 8	1,000-inch and landscape (unsatisfactory condition)
Range 9	Pistol - 15, 25, and 50 yards
Range 10 and 11	1,000-inch and landscape
Range 12	Infiltration
Range 13	Individual day training (barbwire entanglements)
Range 14	3.5-inch practice rocket only course, target - stationary tank
Range 14A & 14B	500-inch machine gun
Range 14C	Attack course
Range 15	1,000-inch and landscape (unsatisfactory condition)
Range 16	3.5-inch rocket launcher
Range 17	KD 225 yards instead of 500 yards
Range 17A	Unknown
Range 18	Hand grenade-dummy practice, dummy and live rifle grenade course, 20 firing points, impact area
Range 19	Rifle grenade-practice, live grenade course, 10 throwing revetments
Range 20	Hand grenade-live
Range 23-25	Close combat (unsatisfactory-ranges washed out in 1954 flood
Range 26	Demolition (consisted of a number of pits for demolition's)

Note: Data Source - Archives Search Report

2.1.5 1960s Ranges

2.1.5.1 Documents from 1961 indicate that a series of firing ranges were located along the eastern edge of Castner Range. This complex was identified as Trainfire I and included 8 live firing courses and 10 target detection courses. These ranges were generally located in the same areas as previous ranges. Rifle and other small arms were the only firing operations specified for these ranges. Live munitions were not used at the target detection courses.

2.1.5.2 Also in the 1960s, a close combat range (Vietnam Village) was constructed on 20 acres near the site of the former demolition range. Documentation of the types of ordnance and operations conducted at the Vietnam Village at Castner Range are not available, however, Vietnam Village ranges encountered at other installations often involved operations which used live hand grenades, bulk explosives, and explosive booby-traps (Archive Search Report, 1994).

2.1.5.3 In 1966 all organized weapons firing was discontinued at Castner Range. Live fire operations were transferred to the newly constructed Meyer Range complex. The range was used at least once more after 1966 for a cratering exercise conducted in 1976. During the cratering exercise, 15 and 40 pound shaped charges were used to create ground excavations. These exercises were conducted in the area of the museum and the demolition range. Figure 2.1-4 presents a map depicting locations of known range activities in the 1960's.

2.1.6 Site Location

Castner Range is located north of the city of El Paso, Texas in El Paso County (see Figure 1.0-1). Castner Range is bordered by the Franklin Mountains State Park to the northwest, west and southwest; by Highway 54 to the east; and by a residential and business district to the southeast and a predominantly undeveloped area to the northeast. Development is beginning to occur in the area immediately Northeast of Castner Range. Castner Range is bisected by the Trans Mountain Highway which traverses the north-south trending Franklin Mountains Range from east to west and also provides access to the Franklin Mountains State Park.

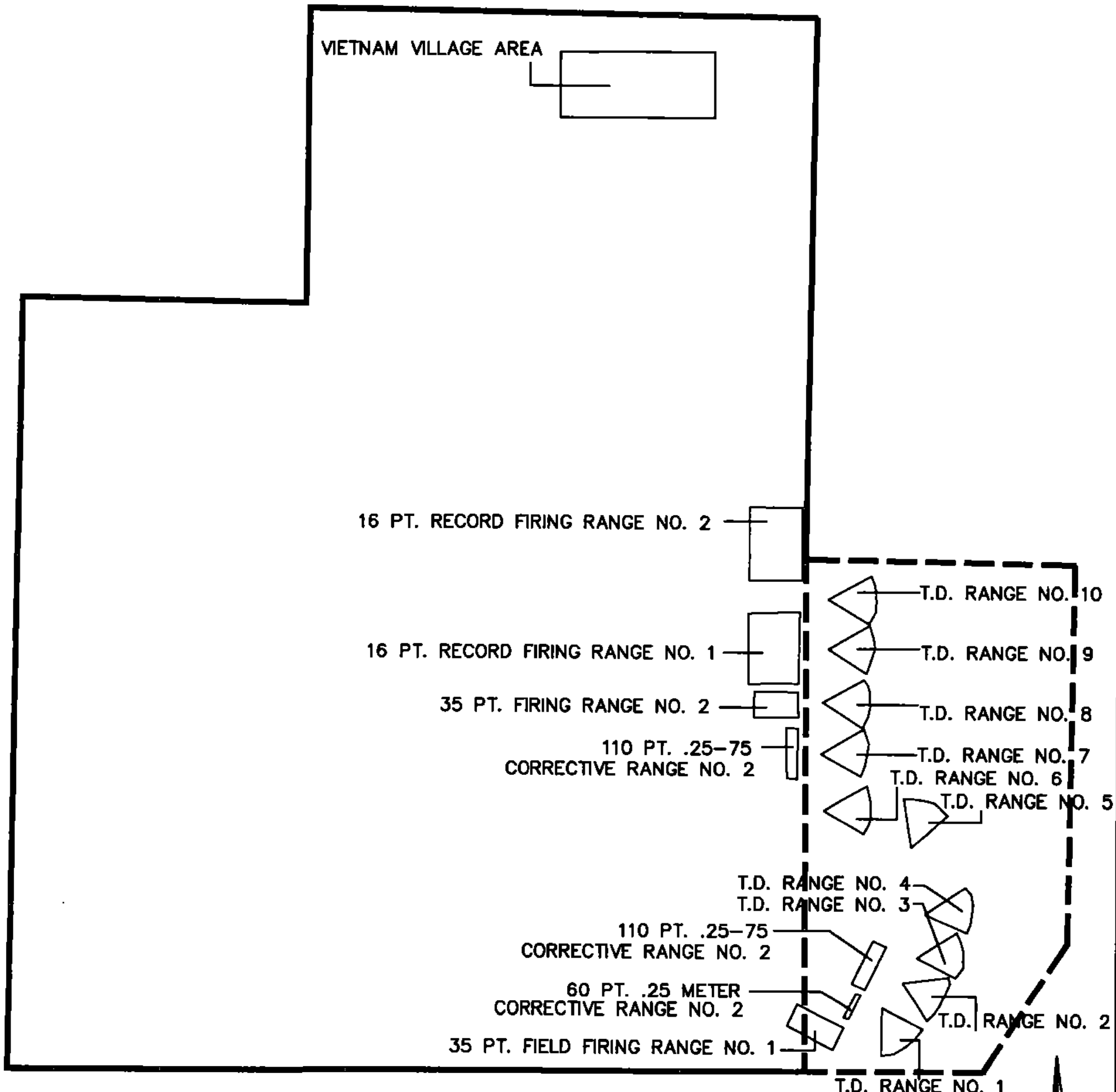
2.1.7 Operational Status

Live fire operations were suspended at Castner Range in 1966. In 1971, the Army declared 1,247 acres as excess. Of the 1,247 acres, various parcels were transferred by the GSA to the City of El Paso, the University of Texas at El Paso (UTEP), the EPCC, and the EPISD. Portions of this land was also sold to developers and 58 acres were retained by Fort Bliss for use as a recreational area. The remaining 7,081 acre portion of Castner Range, under control of the DoD, has been declared as excess and the Army is now seeking to dispose of the remaining acreage. The range, although posted with signs identifying the area as hazardous, is frequently visited by civilians for recreational purposes. Improvements made to the remaining portion of the range include the multi-lane Trans Mountain Highway, a natural history museum, a border patrol museum, major stormwater impoundments, the Texas Department of Transportation Facility, and part of the new North-South Highway.

2.1.8 Meteorology

The climate of the study area is characterized by an abundance of sunshine throughout all of the year, high daytime and comfortable night summer temperatures, very low humidity, scanty rainfall and a relatively mild winter season (ASR, 1994). The climatic

Figure 2.1-4
History of Castner Range in the 1960s



1,247 Acres Cleared and Transfered to El Paso in 1971.

Note:
Historical Information from Archives Search Report.
Locations digitized from historical photographs.
Figures are not to scale.

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data collected at El Paso, Texas for the period of 1963-1992 shows an average annual precipitation of 8.74 inches. Approximately 68 percent of this amount falls in June through October. The heaviest rainfall in a 24 hour period is around 16.8 inches. The average annual temperature for the area is about 64°F and the extremes vary from 112°F to -8°F (ASR, 1994) with a recent record high of 114° F in 1996. Summarized climatic and wind data for El Paso, Texas are shown in Tables 2.1-3 and 2.1-4, respectively.

Table 2.1-3
Climatological Data For El Paso, Texas

Month	Record		Temperature (°F) Monthly			Precipitation (in) Monthly		
	High	Low	Max	Min	Mean	Max	Min	Mean
JAN	80	-8	57.2	31.8	44.5	1.84	.00	.44
FEB	83	8	62.6	35.9	43.3	1.69	.00	.41
MAR	89	14	69.3	41.8	55.6	2.26	T	.33
APR	98	23	77.8	49.6	63.7	1.42	.00	.25
MAY	104	31	86.1	58.1	72.1	4.22	T	.37
JUN	114	46	94.6	66.8	80.7	3.18	T	.62
JUL	112	57	94.1	69.7	81.9	5.52	.04	1.67
AUG	108	56	92.1	68.3	80.2	5.57	T	1.53
SEP	104	41	86.9	62.5	74.7	6.68	T	1.31
OCT	96	25	77.9	51.1	64.5	4.31	.00	.81
NOV	87	1	65.7	39.0	52.3	1.63	.00	.44
DEC	80	5	57.5	32.6	45.0	3.29	.00	.56
YEAR	112	-8	76.8	50.6	63.7	6.68	.00	8.74
YEARS OF RECORD	53	53	30	30	30	30	30	30

Table 2.1-4
Wind Data For El Paso, Texas

Month	Prevailing Direction	Wind Speed (mph) Mean	Peak Gust	
JAN	N	8.3	47	(W)
FEB	N	9.1	60	(W)
MAR	WSW	11.0	59	(SW)
APR	WSW	11.0	55	(W)
MAY	WSW	10.3	48	(SW)
JUN	S	9.3	48	(N)
JUL	SSE	8.3	55	(S)
AUG	S	7.7	48	(SE)
SEP	S	7.6	46	(SW)
OCT	N	7.5	52	(W)
NOV	N	8.0	49	(W)
DEC	N	7.9	43	(W)
ANNUAL	N	8.8	60	(W)
YEARS OF RECORD		50	9	

2.1.9 Physiography and Topography

2.1.9.1 The general area of Fort Bliss is considered part of the basin-and-range province, extending in an arc from Trans-Pecos Texas, southern New Mexico, and northern Chihuahua, westward into Arizona and southeastern California, then northward between the Sierra Nevada and Rocky Mountains through Nevada, northeastern California, and western Utah into southern Oregon and Idaho. The Basin and Range represents an extensional zone where the continental crust has been stretched, resulting in widespread normal faulting. The region is characterized by north-south trending, block faulted mountain ranges separated by linear, graben defined basins. These structural basins formed closed, internally drained sediment traps that were the site of tremendous deposition from the flanking ranges during the Cenozoic period. Although drainage is now partially integrated by the through-flowing Rio Grande River and its tributaries, several of the basins remain internally drained.

2.1.9.2 Principal landforms in the regions include the Tularosa and Hueco Basins, which represent two adjoining graben valleys, and a number of block-faulted mountain ranges and highlands flanking the valley floors. The two principal ranges flanking the Fort Bliss Castner Range area are the Franklin Mountains to the west and the Hueco Mountains to the east. Other principal ranges flanking the Tularosa/Hueco Basin to the west are the Juarez Mountains, located south of the Franklin Mountains, and the Organ and San Andres Mountains located north of the Franklin Mountains. Other principal ranges on the eastern side of the Basins include the Sacramento and Otero Mesa Mountains. Elevations on Castner Range vary from approximately 3,900 feet above mean sea level (ft-msl) along the eastern portion of the range to approximately 7,100 ft-msl along the northwest border of the range.

2.1.10 Regional Geology

2.1.10.1 The present geological framework of the El Paso area was established in the middle to late Cenozoic Period (Alvarez and Buckner, 1980). During this period, the geologic framework of the El Paso area was primarily controlled by the Rio Grande Rift which resulted in a series of grabens, or down dropped basins (Ashworth, 1990). The upland areas flanking the basins on the west represent complex normal faulting and smaller scale thrust faulting of westward-dipping Precambrian and Paleozoic rocks, with some outcrops of later Cretaceous age strata and intrusive igneous rocks of Tertiary age (Abbott). On the eastern side of the basins, the Hueco Mountains, Otero Mesa, and the Sacramento Mountains rise abruptly from the basin floor. The Sacramento and Hueco ranges also represent relatively complex block faulting, but dip primarily to the east. Otero Mesa, which lies between the Sacramento and Hueco ranges, also dips gently to the east, but exhibits no complex internal faulting (Abbott). Outcrops in the east also range in age from Precambrian to Tertiary. Outcrops in the flanking uplands to the west and southwest in Chihuahua, Mexico are outcrops of Cretaceous rocks. These rocks and those further north and northwest in New Mexico were the source material for the Tertiary and Quaternary alluvial sediments which fill the basins and are referred to as bolson deposits (Alvarez and Buckner, 1980).

2.1.10.2 Basins in El Paso County, formed by normal block faulting, include the Hueco and Mesilla basins. The Hueco basin is located on the eastern side of the Franklin Mountains and the Mesilla basin is located west of the Franklin Mountains. These block faulted grabens are asymmetrical due to the downward displacement being greater on one side of the basin than the other (Ashworth, 1990).

2.1.10.3 North of the Hueco Basin is the Tularosa Basin. These basins form a continuous valley that is oriented primarily north-south in the Tularosa Basin and turns northwest-southeast in the Hueco Basin. The divide between the two basins consists of a subtle topographic rise. Occasionally the Tularosa Basin is treated as part of the Hueco Basin, however, the two basins are structurally distinct and should be considered separate entities. Intrusive igneous rocks associated with the Laramide Orogeny protrude above the basin floor in places (Abbott). Notable intrusives include the Jarilla Mountains in the southern Tularosa Basin and rocks of Hueco Tanks State Park in the northeast Hueco Basin. Small fault block hills are common on the margin of the valleys, however, the basins are dominated by broad, gently sloping alluvial fans and fan piedmonts that spread out from the surrounding mountains and flat, dune-mantled basin floors broken by numerous small extant and relict playas (Abbott).

2.1.10.4 The Hueco Basin is infilled with up to 9,000 feet of clastic material, most of which remains unexamined except through remote means such as seismic and gravity investigation. The maximum thickness (approximately 9,000 feet) occurs within a deep structural trough paralleling the east side of the Franklin Mountains (Ashworth, 1990). Although the deep-basin fill is relatively poorly understood, two formations are identified in the upper basin fill. The older and thicker of these formations is termed the Fort Hancock Formation. It is composed primarily of lacustrine and alluvial fan deposits consisting of clay and silts with very little fluvial deposition evident, suggesting that it accumulated in a closed basin (Abbott). In the Tularosa Basin, the deeper basin deposits are typically referred to as the Santa Fe group, although these deposits are sometimes correlated with the Fort Hancock formation or the Rincon Valley and Hayner Ranch formations in the Jornada-Rincon-Palomas basins. The upper deposits in the Hueco Basin are termed the Camp Rice formation, which underlie the surface of the basin floor and associated fan-piedmont surfaces on the margin of the basin (Abbott). The Camp Rice formation deposits formed when the closed basins were successfully breached and the Rio Grande became a through-flowing stream in southern New Mexico. As the Camp Rice basin floor rapidly aggraded, the more slowly accreting alluvial piedmont deposits on the basin margins were buried by the expanding level basin floor. Camp Rice sediments have been dated to the late Pliocene to early Pleistocene and consist of silt, sand, gravel, and caliche. Basin thickness and sediment grain size generally decrease in an easterly direction across the basin (Abbott).

2.1.11 Soils

A soil survey conducted by the U.S. Department of Agriculture in cooperation with the Texas Agricultural Experiment Station of El Paso County identified eight soil associations within the county. The eight soil associations consist of the Hueco-Wink, Bluepoint, Harkey-Glendale, Delnorte-Canutio, Wink-Simona-Mimbres, Limestone

Rock Land-Lozier, Turney-Berino, and the Igneous Rock Land-Limestone Rock Land Association (Jaco, 1971). Of the eight soil associations identified within El Paso County, two are common to the Castner Range area, the Delnorte-Canutio Association and the Igneous Rock Land-Limestone Rock Land Association. Each of the two soil associations are described below. The soils in Castner Range are generally very shallow composed of rocky materials lying on bedrock. Due to the amount of exposed rocks and the soil structure at Castner Range, it is not likely that ordnance would have penetrated deep into the soils. Therefore, it is not likely that much subsurface OE will be present on the Castner Range. The exception to this generalization is in drainage areas where erosion and soil deposition could result in thicker finer-grained soils.

2.1.11.1 Delnorte-Canutio Association

2.1.11.1.1 The Delnorte-Canutio Association is characterized by nearly level to steep soils that are either shallow or very shallow over caliche or deep and gravelly throughout. This association occurs mainly on the foot slopes of the Franklin Mountains but also lie in or near arroyos and alluvial fans below the Franklin Mountains. The Delnorte-Canutio Association has a total area of approximately 63,700 acres, or 9 percent of the county. Approximately 55 percent of the acreage is Delnorte soils, 18 percent is Canutio soils, and 27 percent is minor soils (Jaco, 1971).

2.1.11.1.2 The Delnorte soils, which occupy most of the higher and steeper areas, typically have a surface layer of pinkish-gray, calcareous very gravelly loam approximately 6-inches thick. This is underlain by strongly cemented or indurated caliche approximately 24 inches thick. Below the caliche, soil conditions consist of gravelly fine sand (Jaco, 1971).

2.1.11.1.3 The Canutio soils lie in arroyos and on alluvial fans between the hills. They are deep, nearly level to sloping soils that are calcareous very gravelly sandy loam throughout. Minor soils consist of the Bluepoint, Agustin, and Pajarito and occur in small areas at lower elevations (Jaco, 1971).

2.1.11.2 Igneous Rock Land-Limestone Rock Land Association

2.1.11.2.1 The Igneous Rock Land-Limestone Rock Land Association is characterized by very steep areas of igneous and limestone rocks and stoney soils. This association forms the Franklin Mountains in the western part of El Paso County. Elevations in this area range from approximately 4,000 ft-msl at the base of the mountains to 7,100 feet at the top of North Franklin Mountains. The Igneous Rock Land-Limestone Rock Land Association has a total area of approximately 29,000 acres, or 4 percent of the county. Approximately 52 percent of the total acreage is Igneous rock land and the adjacent Brewster soils, and 46 percent is Limestone rock land and the adjacent Lozier soils. Small areas of Delnorte and Canutio soils make up the remaining 2 percent (Jaco, 1971).

2.1.11.2.2 Igneous rock land consists mostly of granite, monzanite, and rhyolite rocks that have nearly vertical slopes. The Brewster soils typically have a dark reddish-gray, non calcareous stony loam surface layer that is approximately 10 inches thick and is underlain by granite (Jaco, 1971).

2.1.11.2.3 Limestone rock land is made up of very steep to almost vertical layers of limestone, together with some sandstone. Typically, the Lozier soils have a surface layer of pinkish-gray, calcareous stony loam that is about 5 inches thick over limestone (Jaco, 1971).

2.1.12 Surrounding Land Use and Populations

The Castner Range of Fort Bliss is located north of the city of El Paso, Texas in El Paso County. The city of El Paso is culturally and economically diverse.

2.1.12.1 Surrounding Land Use

2.1.12.1.1 The El Paso community has numerous centers of activity such as four major shopping malls, an amusement park, water slide park, Abraham Theater Symphony, Science Museum, numerous schools and colleges, a U.S. Courthouse, and various recreational parks located throughout the community.

2.1.12.1.2 El Paso is an economicly diverse community. The community supports apparel manufacturing, consumer appliance manufacturing, medical supplies manufacturing, retail and service industries, petroleum and mining industries, and local military installations.

2.1.12.1.3 The largest employers are: U.S. Army, Levi Strauss and Company, clothing manufacturers; Columbia Health Care System; Wrangler, clothing manufacturers; Lee Company, clothing manufacturers; and Wal-mart, retail outlet.

2.1.12.1.4 Development in the El Paso area includes residential dwellings, business parks, oil refineries, and infrastructure construction.

2.1.12.2 Population

2.1.12.2.1 According to the U.S. Department of Commerce Bureau of the Census (1990 statistics), El Paso has a population of 513,342 within the city and a population of 591,610 people within the county. The population density was 2,149.9 persons per square mile for the city and 583.4 persons per square mile for the county. In the City of El Paso, 31.9 percent of the population was under 18 years of age, 8.7 percent was over 65 years of age, and the median age was 28.7 years of age. The population statistics for the City of El Paso and El Paso County are presented in Table 2.1-5.

Table 2.1-5
Population Statistics

City: El Paso	County: El Paso
Area: 239.7 sq. mi.	Area: 1,014 sq. mi.
Population: 515,342	Population: 591,610
Density: 2,149.9 persons per sq. mi.	Density: 583.4 persons per sq. mi.

2.1.12.2.2 The work force of El Paso County, based on the number of establishments, is broken down into the following: manufacturing, 21.5 percent; non-manufacturing, 72.7 percent; agriculture, 0.3 percent; and other non-agriculture, 5.5 percent.

2.1.12.2.3 Housing in El Paso is composed of both single and multi-family homes. There are approximately 168,625 housing units with a median value of $58,500.

2.1.13 Ecosystems

Castner Range has remained largely in its natural state since 1966 when live fire exercises ceased. Few biological studies have been conducted on the range since the land has remained inactive to Fort Bliss activities. Castner Range now supports a diverse Chihuahuan ecosystem.

2.1.13.1 Vegetation

2.1.13.1.1 Castner Range lies in the Chihuahuan ecosystem. The elevation varies from approximately 3,900 feet above mean sea level to approximately 7,100 feet above mean sea level. The variation in elevation results in a considerable variance in the available precipitation. Differences in available precipitation are expressed biologically as a variety of vegetational communities. The boundaries of these communities are not always distinct, and the elevational, topographic, hydrologic, and soil factors create a "patchwork quilt of vegetation."

2.1.13.1.2 The primary vegetation communities include:

- Agave-Lechuguilla community
- Alluvial fan-creosote bush community
- Draw-yucca grassland community

2.1.13.1.3 The mountainous areas are characterized by the Agave-Lechuguilla community. Lechuguilla forms dense clonal clumps on colluvial slopes, ridges, and benches of hills and mountains. This community also extends down slope onto erosional piedmont surfaces dropping out at the juncture where deposition prevails over erosion on the lower toeslopes of alluvial plains. The predominant species occurring in the Agave-Lechuguilla community are acacia (Acacia var.), lechuguilla (Bouteloua), sotol (Dasylirion wheeleri), Ocotillo (Fouquieria splendens), and catclaw mimosa (Mimosa quadrivalvis var.). The soils in these communities are rocky and shallow.

2.1.13.1.4 The alluvial fan-creosote bush community occurs on the alluvial fans of the Franklin Mountains. The vegetation is characterized by the presence of creosote bush (Larrea tridentata), whitehorn (Acacia constricta), Tarbush (Flourensia cernua), Spanish Sword yucca (Yucca torreyi), broom snake weed (Xanthrocephalum microcephalum), and Agave (Lechugilla). Grasses are absent to rare, and if present, basal coverage is quite low (less than 0.5 percent). The soil in the alluvial fan-creosote bush community is generally quite thin from 1 to 30 centimeters in depth. Arroyos and drainage areas are moister than other areas and support different vegetation types including Desert Willow (Chilopsis linearis), Apache Plume (Falluqia) and little leaf sumac (paradoxa).

2.1.13.1.5 The draw-yucca grassland community occurs in the gentle sloping areas adjacent to highway 54. The soils in these areas are generally deeper (ranging to 50 centimeters) and have relatively greater silt and clay content than soils in the alluvial fan-creosote bush community. Grass and shrub species diversity and coverage is high. Gramma grasses are the dominant species (Bouteloua spp.) with 3-awns (Aristida spp.) and dropseeds (Sporobolus) being common. Yucca elata is common, as are all-thorn (Koeberlina spinosa), chollo (Cylindropuntia spp.), Mormon tea (Ephedra trifurca), and Apache plume (Fallugia paradoxa).

2.1.13.2 Wildlife

Castner Range provides habitat for a diverse association of wildlife. The major mammal species are listed on Table 2.1-6. Many Bird species reside in Castner Range or migrate through the area in moving between winter and summer grounds. Table 2.1-7 presents a listing of the bird species that are frequently observed during at least part of the year. There are also numerous reptile species that inhabit Castner Range. Table 2.1-8 provides a list of the reptile and amphibian species that have been observed, or are thought to be present at Castner Range.

Table 2.1-6
Major Common Mammals
Inhabiting Castner Range

Common Name	Scientific Name
Mule Deer	Odocoileus hemionus
Barbary Sheep (introduced)	Capra ibex
Mountain Lion	Felis concolor
Coyote	Canis latrans
Bobcat	Lynx rufus
Grey Fox	Urocyon cinereoargenteus
Kit Fox	Vulpes macrotis
Badger	Taxidea taxus
Skunk	Mephitis mephitis
Cottontail Rabbit	Sylvilagus floridanus
Black-tailed Jackrabbit	Lepus californicus
Ring Tail	Bassariscus astutus

Source: Archives Search Report, Fort Bliss, Castner Range (U.S. Army Corps of Engineers, St. Louis District, 1994).

Table 2.1-7
Bird Species
Observed at Castner Range

Common Name	Scientific Name
Turkey Vulture	Cathartes aura
Osprey	Pandion haliaetus
Northern Harrier	Circus cyaneus
Sharp-shinned Hawk	Accipiter striatus
Copper's Hawk	Accipiter gentilis
Swainson's Hawk	Buteo swainsoni
Red Tailed Hawk	Buteo jamaicensis
Golden Eagle	Aquila chrysaetos
American Kestrel	Falco sparverius
Sealed Quail	Callipepla squamata
Gambel's Quail	Lophortyx gambelii
Common Moorhen	Gallinula chloropus
American Coot	Fulica americana
Kill Deer	Charadrius vociferus
Black-necked Stilt	Himantopus mexicanus
American Avocet	Recurvirostra americana
Least Sandpiper	Calidris minutilla
Rock Dove	Columbia livia
White-winged Dove	Zenaida asiatica
Mourning Dove	Zenaida macroura
Greater Roadrunner	Geococcyx californianus
Western Screech Owl	Otus trichopsis
Great Horned Owl	Bubo virginianus
Western Burrowing Owl	Athene cunicularia
White-throated Swift	Aeronautes saxatalis
Black-chinned Hummingbird	Archilochus alexandri
Ladder-backed Woodpecker	Picoides scalaris
Say's Phoebe	Sayornis saya
Western Kingbird	Tyrannus verticalis
Barn Swallow	Hirundo rustica
Chihuahuan Raven	Corvus cryptoleucus
Verdin	Auriparus flaviceps
White-breasted Nuthatch	Sitta carolinensis
Cactus Wren	Campylorhynchus brunneicapillus

**Table 2.1-7 (Continued)
Bird Species
Observed at Castner Range**

Common Name	Scientific Name
Rock Wren	Salpinctes obsoletus
Canyon Wren	Catherpes mexicanus
Bewick's Wren	Thryomanes bewickii
Western Bluebird	Sialia mexicana
Mountain Bluebird	Sialia currucoides
Northern Mockingbird	Mimus polyglottos
Crissal Thrasher	Toxostoma dorsale
American Pipit	Anthus rubescens
Loggerhead Shrike	Lanius ludovicianus
European Starling	Sturnus vulgaris
Yellow-rumped Warbler	Dendroica coronata
Black-throated Gray Warbler	Dendroica nigrescens
Pyrrhuloxia	Cardinalis sinuatus
Blue Grosbeak	Guiraca caerulea
Spotted Towhee	Pipilo maculatus
Rufous-crowned Sparrow	Aimophila carpalis
Chipping Sparrow	Spizella passerina
Brewer's Sparrow	Spizella breweri
Black-throated Sparrow	Amphispiza bilineata
Savannah Sparrow	Passerculus sandwichensis
Song Sparrow	Melospiza melodia
Lincoln's Sparrow	Melospiza lincolnii
White-crowned Sparrow	Zonotrichia leucophrys
Western Meadowlark	Sturnella neglecta
Great-tailed Grackle	Quiscalus mexicanus
Scott's Oriole	Icterus parisorum
House Finch	Carpodacus mexicanus
House Sparrow	Passer domesticus

Source: Department of Defense and the National Fish and Wildlife Foundation, Checklist of Birds, Fort Bliss, Texas.

Table 2.1-8
Reptile and Amphibian Species
Inhabiting Castner Range

Common Name	Scientific Name
Amphibians	
Great Plains Toad	Bufo cognatus
Western Green Toad	Bufo debilis insidior
Red Spotted Toad	Bufo punctatus
Couch's Spadefoot	Scaphiopus couchii
New Mexico Spadefoot	Spea (scaphiopus) multiplicata
Reptiles	
Lizards	
Chihuahuan Spotted Whiptail	Cnemidophorous exanguis
Trans-Pecos Striped Whiptail	Cnemidophorous inornatus heptagramommus
Western Marbled Whiptail	Cnemidophorous marmoratus marmoratus
New Mexico Whiptail	Cnemidophorous neomexicanus
Colorado Checkered Whiptail	Cnemidophorous tesselatus
Desert Grassland Whiptail	Cnemidophorous uniparens
Southwestern Earless Lizard	Cophosaurus texanus scitulus
Chihuahuan Collared Lizard	Crotaphytus collaris fuscus
Great Plains Skinks	Eumeces obsoletus
Longnose Leopard Lizard	Gambelia wislizenii wislizenii
Speckled Earless Lizard	Holbrookia maculata appoximans
Northern Earless Lizard	Holbrookia maculata maculata
Texas Horned Lizard	Phrynosoma cornutum
Short Horned Lizard	Phynosoma douglasii
Roundtail Horned Lizard	Phrynosoma modestum
Twin-spotted Spiny Lizard	Sceloporus magister bimaculosus
Crevice Spiny Lizard	Sceloporus poinsettii poinsettii
Southern Prairie Lizard	Sceloporus undulatus consobrinus
Lined Tree Lizard	Urosaurus ornatus linearis
Desert Side-blotched Lizard	Uta stansburiana stejnegeri
Turtles	
Desert Box Turtle	Terrapene ornata luteola
Ornate Box Turtle	Terrapene ornata ornata

**Table 2.1-8 (Continued)
Reptile and Amphibian Species
Inhabiting Castner Range**

Common Name	Scientific Name
Snakes	
Kansas Glossy Snake	Arizona elegans elegans
Trans-Pecos Rat Snake	Bogertophis (Elaphe) subocularis
Regal Ringneck	Diadophis punctatus regalis
Great Plains Rat Snake	Elaphe gutatta emoryi
Western Hooknose Snake	Gyalopion canum
Mexican Hognose Snake	Heterdon nasicus kennerlyi
Plains Hognose Snake	Heterdon nasicus nasicus
Texas Night Snake	Hypsiglena torquata jani
Spotted Night Snake	Hypsiglena torquata ochrorhyncha
New Mexico Blind Snake	Leptotyphlops dulcis dissectus
Trans-Pecos Blind Snake	Leptotyphlops humilis segregus
Smooth Green Snake	Liochlorophis (opheodrys) vernalis
Western Coachwhip	Masticophis flagellum testaceus
Striped Whipsnake	Masticophis (flagellum) taeniatus
Sonoran Gopher Snake	Pituophis catenifer affinis
Bullsnake	Pituophis catenifer sayi
Texas Longnose Snake	Rhinocheilus lecontei tessellatus
Big Bend Patchnose Snake	Salvadora deserticola
Mountain Patchnose Snake	Salvadora grahamiae grahamiae
Ground Snake	Sonora semiannulata
Southwestern Blackhead Snake	Tantilla hobartsmithi
Western Blackneck Garter Snake	Thamnophis cyrtopsis cyrotopsis
Lined Snake	Tropidoclonion lineatum
Desert Kingsnake	Lampropeltis getula splendida
Western Diamondback Rattlesnake	Crotalus atrox
Rock Rattlesnake	Crotalus lepidus
Banded Rock Rattlesnake	Crotalus lepidus klauberi
Prairie Rattlesnake	Crotalus viridis viridis
Texas Lyre Snake	Trimorphodon biscutatus vilkinsonii

Source: An Annotated Bibliography and Natural History Database of the Amphibians and Reptiles of Fort Bliss, Texas (Bashore, Bell, and King, 1996)

2.1.13.3 Threatened and Endangered Species

2.1.13.3.1 The U.S. Fish and Wildlife Service has indicated that the following listed threatened and endangered species may be present in the vicinity of Castner Range: Northern aplomado falcon (Falco femoralis septentrionalis), American peregrin falcon (Falco peregrinus anatum), Sneed pincushion cactus (Coryphantha sneedii var. sneedii), Mexican spotted owl (Strix occidentalis lucida), Southwestern willowflycatcher (Empidonax traillii extimus), Bald eagle (Haliaeetus leucocephalus), and Rio Grande silvery minnow (Hybognathus amarus). Federal candidate species include: the Mountain plover (Charadrius montanus). Species of special concern include: Ferruginous hawk (Buteo regalis), White-faced ibis (Plegadis chihi), Texas horned lizard (Phrynosoma cornutum), Arizona black-tailed prairie dog (Crynomys lodovicianus arizonensis), Baird's sparrow (Ammodramus bairdi), Western burrowing owl (Speotyto Cunicularia hypugaea), Conchos pupfish (Cyprinodon eximius), Blotched gambusia (Gambusia senilis), Rio Grande darter (Etheostoma grahami), Franklin Mountains talussnail (Sonerella metcalfi), Hueco rock-daisy (Perityle huecoensis), Alamo beard tongue (Penstemon alamoensis), sand sacahuista (Nolina arenicola), Sand prickly pear (Opuntia arenaria), Desert night-blooming cereus (Cereus greggii greggii), Nodding cliff-daisy (Perityle cernua), Smooth figwort (Scrophularia laevis), Standley's Whitlow-grass (Druba standleyi), and Goosefoot (Chenopodium cycloides).

2.1.13.3.2 The Texas Parks and Wildlife Department has identified several speciesf of special concern known to occur in the vicinity of Fort Bliss. They include: Sneed pincushion cactus (Coryphantha sneedii var sneedii), endangered; Texas horned lizard (Phrynosoma cornutum), threatened; Mountain short-horned lizard (Phrynosoma douglasi hernandezi), threatened; and Texas lyre snake (Trimorphodon biscutatus vilkinsoni), threatened (Martin-Bashore, 1997)..

2.1.13.3.3 Castner Range does not provide suitable habitat for many of the threatened and endangered species that may be present in El Paso County. There is very little surface water on Castner Range. Therefore, there is no habitat for the Rio Grande silvery minnow (Hybognathus amarus), Conchos pupfish (Cyprinodon eximius), Blotched gambosia (Gambusia senilis), Rio Grande darter (Etheostoma grahami), and the White-faced ibis (Plegadis chihi). Castner Range does not provide suitable feeding and/or nesting habitat for the Mexican spotted owl (Strix occidentalis lucida), Ferruginous hawk (Buteoregalis), Southwestern willow flycatcher (Empidonax trailli extimus), Bald eagle (Haliaeetus leucocephalus), Northern aplomado falcon (Falco femoralis septentrionalis), and the American peregrin falcon (Falco peregrinus anatum). The Arizona black-tailed praire dog (Crynomys lodovicianus arizonensis) does not inhabit Castner Range. Castner Range does not provide suitable habitat for the Sneed pincushion cactus (Coryphantha sneedii var. sneedii).

2.1.13.3.4 It is uncertain whether the Franklin Mountains talussnail (Sonerella metcalfi), Hueco rock-daisy (Nolina arenicola), Alama beard tongue (Penstemon alamoensis), sand sacahuista (Nolina arenicola), or Mountain short-horned lizard (Phynosoma douglasi hernandezi) exist at Castner Range.

2.1.13.3.5 Suitable habitat exists for the following species of special concern that are thought to inhabit Castnĕr Range:

- Sand prickly pear (Opuntia arenaria) (special concern)
- Desert night-blooming cereus (Cereus greggii greggii) (special concern)
- Texas horned lizard (Phrynosoma cornutum) (special concern)
- Texas lyre snake (Trimorphodon biscutatus Vilkinsoni) (special concern)
- Western burrowing owl (Speotyto cunicularia hypugaea) (special concern)

2.1.14 Archaeological and Historical Resources

2.1.14.1 Castner Range contains numerous archaeological and historical resources that date as far back as Paleo-Indian, Archaic, and historic Indian groups, in addition to historic properties. The El Paso Archaeological Society has performed most of the surveys which have identified the archaeological sites. A general summary of the history of these groups is provided below.

2.1.14.2 The Paleo-Indian complex lasted from about 8000 B.C. to 4000 B.C. Groups were nomadic as survival was dependent on the hunting of big game such as mammoth, horse, bison, and camel. The local Folsom and Cody traditions are identified as having belonged to this sequence. With disappearance of the big game resource the Paleo-Indians transitioned to a subsistence base of intensive collecting supplemented by hunting and gardening. This period is called the Archaic and roughly dates from 4000 B.C. to 1000 A.D. Within this time frame a local variant came into existence and is classified as the Hueco Phase, 300 B.C. to 100 A.D. The Hueco Phase is characterized by rock shelter habitation, open campsites, and rudimentary surface shelters of wood, brush, and earth. Initial plant food processing by bedrock mortars (Figure 2.1-5) is also ascribed to this period. The principal weapon and hunting device in use at the time is believed to have been the atlatl as these items have been recovered from Hueco Phase and other Archaic sites. This popular tool probably lasted from the Paleo-Indian era up to the phase following the Hueco—the Mesilla, 900 A.D. to 1200 A.D. The development of this sequence came about through a number of significant developments:

- The initial domestication of plant foods;
- The introduction and subsequent improvement of various pottery types;
- Adoption of a semi-subsurface dwelling unit (pit house) which was less susceptible to environmental weathering factors; and
- Formation of villages.

2.1.14.3 Recent evidence supports a third time/cultural unit known as the Dona Ana Phase (1100 A.D. to 1200 A.D.). The pit house gave way to a sturdier, erosion-resistant surface structure made from jacal/adobe. Architectural features common to both pit house and the later pueblo are found incorporated together. In addition the groups in the Dona Ana Phase established an agricultural base through the introduction of corn and the control of surface water resources. Cultural contact from other geographical areas is evident by the types of pottery appearing in the phase. A change in social complexity, which is not yet clearly understood, occurred sometime between 1200-1250 A.D., a prelude to the El Paso Phase. A fourth unit is the El Paso Phase, 1200 A.D. to 1450 A.D., merited by the classic weather-resistant, one-story, contiguous room pueblo and a host of standardized, high-quality artifact assemblages. The El Paso Phase populations were principally dependent upon agriculture for their food resources. During this time prehispanic cultural development peaked and then began a slackening process due to various suspected environmental and social pressures.

2.1.14.4 Early historic Indian and Hispanic sites of the Entrada period are hard to identify and thus interpretation has been limited to ethnographic data and pottery fragments. Numerous later Indian, Hispanic, and Anglo sites have been recognized.

2.1.14.5 Historic properties from the 20th century include mining remnants and structures built and used by the U.S. Army.

2.1.14.6 The most common archaeological artifacts that have been found are: bedrock mortars where plant foods (predominantly mesquite beans) were processed by milling or grinding (Figure 2.1-5), rock shelters; rock art and pottery. Table 2.1-9 presents a summary and description of known archaeological sites that have been identified on Castner Range. The El Paso Archaeological Society recommended that the White Rock Shelter area and the Indian Springs Canyon be set aside as an Archaeological Site District due to the diversity of sites and artifacts. The White Rock shelter area is suspected to have been used as far back as 3,000 B.C. on up to 1,250 A.D.

2.1.14.7 Twentieth century historic properties on Castner Range include: stone foundations, remnants of the moving target rail systems, mining remnants, a heleograph site, military firing berms, and ranching remnants.

2.2 PREVIOUS ORDNANCE AND EXPLOSIVE INVESTIGATIONS

Several organized ordnance investigations have been conducted at Castner Range during the period of 1971 through 1997.

2.2.1 Historical Investigations

2.2.1.1 In September 1971 personnel from Fort Bliss conducted a surface investigation of approximately 200 acres. During the investigation forty ordnance and explosive (OE) items were found. These items included: seven 75mm shrapnel rounds; one 40mm HE round; two 37mm HE rounds; twenty two 37mm AP projectiles, and; eight various inert round components. All of the rounds discovered during the investigation were removed from the area and destroyed (Archive Search Report, 1994).

2.2.1.2 During the period of 8 April 1974 to 7 May 1974, Fort Bliss personnel conducted a surface sweep of 1,230 acres of Castner Range located east of the North-South Highway (Highway 54). The surface sweep consisted of 104 individuals systematically walking the entire investigation area. The only munitions found were 1 white phosphorous 4.2-inch mortar round and 4, 40 mm HE rounds. A statement of

Figure 2.1-5
Bedrock Mortars

J:\732231\fig2-5.pm65

Table 2.1-9
Archaeological Sites Identified on Castner Range

El Paso Archaeological Society Designation	Site and Artifact Description	Estimated Period	El Paso Archaeological Society Recommendation (1976)
31.106.3 23/FS I/	Four bedrock mortars average size 22cm diameter x 21cm depth in a granite outcrop. Site area 8 meters (N-S) x 8 meters (E-W). No datable artifacts present. Medium proximity to Wilderness Park Museum.	Archaic suggested	Additional survey is needed for other possible activity areas in vicinity; protect and preserve.
31.106 3.24/FS2/	Four bedrock mortars average size 21cm diameter x 21cm depth in a granite outcrop. Site area 15 meters (N-S) x 8 meters (E-W). No datable artifacts present. Close proximity to Wilderness Park Museum.	Archaic suggested	Immediate area should be examined for any middens covered by overburden; protect and preserve.
31.106 3.92/FS2A/	Eleven bedrock mortars average size 21cm diameter x 25cm depth in a granite out-crop. Site area 22 meters (N-S) x 13 meters (E-W). Possible shelter (buried or destroyed by military activity), lithic debris (1000+), two fire hearths, deep midden, no pottery or other datable artifacts, diverse ecological zone, close proximity to Wilderness Park Museum.	Archaic suggested	Protect and preserve; test excavation needed to determine activity specific areas and artifact assemblages; can be utilized in conjunction with WP Museum interpretive program.
31.106. 3.25/FS3/	Flat grinding surface (food processing) in the shape of a metate 15.2cm x 30.5cm and a shallow bedrock mortar 12.7cm diameter x 3cm depth in a granite outcrop. Site area 50 meters (N-S) x 200 meters (E-W). Some small plain and painted pottery sherds (10-100) and worked lithics (10-100). Close proximity to Wilderness Park Museum.	Post-Hueco Phase	Site area should be thoroughly examined for excavatable middens and additional activity specific areas and artifact assemblages.
31.106. 3.26/FS4/	Large ridge above Indian Springs Canyon on which several flakes and cores and one possible chert drill fragment were noted. Site area 141,500 sq. meters.	Undetermined	Area needs to be more thoroughly investigated to determine activity specific areas and artifact assemblages.
31.106.	Two bedrock mortars average size 20cm diamter x 11cm depth on a granite boulder in Indian Springs Canyon. Site area 31 sq. meters. Midden present, no surface lithics, pottery or other datable artifacts. Medium proximity to Wilderness Park Museum.	Archaic suggested	Midden should be test excavated and additional survey of general site area should be conducted; protect and preserve.

Table 2.1-9 (Continued)
Archaeological Sites Identified on Castner Range

El Paso Archaeological Society Designation	Site and Artifact Description	Estimated Period	El Paso Archaeological Society Recommendation (1976)
31.106. 3.30/FS6/	One bedrock mortar on a granite boulder in Indian Springs Canyon. Size 19cm diameter x 2cm depth. Site area 4 sq. meters. No other artifacts or midden present. Medium proximity to Wilderness Park Museum.	Undetermined	None.
31.106. 3.31.1 and 2/ FS 7A, B	Two circular, walled surface structures with entrance ways. Near Indian Springs. 7A diameter 5 meters x 45cm average wall height. Site area 7A 42.9 sq. meters, 7B 27.3 sq. meters. Interior fill, no artifacts, medium proximity to Wilderness Park Museum.	Undetermined	Interiors of structures have excavatable fills that should be tested to determine site type/function.
31.106. 3.32.1 and2/ FS 8A, B	Historic complex consisting of two conical cement/cobble huts built over the active and inactive locations of Indian Springs. Said to have been built by late Edgar Park of El Paso. 8B has one horizontal mineral explorative (prospect) shaft nearby. Site area 8A 324.8 sq. meters, 8B 632 sq. meters. No artifacts noted. Large amounts of modern trash. Diverse ecological zone. Medium proximity to Wilderness Park Museum.	Ca. 1930	Protect and preserve; additional historic literature research needed; can be used in conjunction with Wilderness Park Museum interpretive program.
31.106. 3.15/FS 9/EPAS-49	Large archaeological site having evidence of long-term occupation. At least 20 observable bedrock mortars on large granite boulders and bedrock mass, avg. feature size 23.8cm diameter x 27.9cm depth. Numerous red, white, yellow, and black pictographs (100-1000) under boulder/shelters. Plain and painted pottery (1000+), firecracked rock, arrowhead and dart projectile points, and other lithic debris present (1000+). Some excavation by the El Paso Archaeological Society. Site area 10,00 sq. meters, deep extensive midden, diverse ecological zone. Close proximity to Wilderness Park Museum via Trans-Mountain Road.	Archaic through El Paso Phase	Protect and preserve; needs additional excavation, analysis, and recording of rock art; can be used in conjunction with Wilderness Park Museum interpretive/ educational program.

Table 2.1-9 (Continued)
Archaeological Sites Identified on Castner Range

El Paso Archaeological Society Designation	Site and Artifact Description	Estimated Period	El Paso Archaeological Society Recommendation (1976)
31.106. 3.16/FS 10/EPAS44	Petroglyph site (10-100) in upper Fusselman Canyon. Site area 76 sq. meters. No other cultural features or artifacts noted. Originally surveyed by El Paso Archaeological Society. Medium proximity to Wilderness Park Museum via Trans-Mountain Road.	Figures indicate El Paso Phase	Protect and preserve (some figures have been used as shooting targets); can be utilized in conjunction with Wilderness Park Museum interpretive/educational program.
31.106. 3.29/FS 11/EPAS may have site no. Mortar site #	Four bedrock mortars, average size 19cm diameter x 22cm depth, on 2 granite boulders are imbedded in the fill of Trans-Mountain Rd. after having been displaced from original pit house site by road construction crew. Present site area 38 sq. meters. Original site is 350 meters south of FS 9 on saddle of a low ridge. Close proximity to Wilderness Park Museum via Trans-Mountain Road.	Mesilla to Dona Ana Phase	Investigate original site for excavatable middens and/or activity specific areas and artifact assemblages; protect and preserve; can be used in conjunction with Wilderness Park Museum interpretive/educational program.
31.106. 3.28.1 to 6/FS 12 A to F	Historic complex of six mineral explorative/entry sites with associated historic artifacts. Medium proximity to Wilderness Park Museum via Trans-Mountain Road.	Ca.1920-1940	Examination of geologic resources to determine purpose of sites. Supplementary to this, literary research on factors such as original ownership, product demand, purpose of sites, technology invovled, etc., is needed.
31.106. 3.33.1 2, 3/FS 13ABC	An historic/prehistoric complex consisting of a bedrock mortar size 15cm diameter x 6cm depth, a cement/cobble dam 10 meters length x 1 meter avg. ht., and a small midden at the lower spring site and a cement/cobble dam 1.5 meters length x .5 meter avg. ht., at the upper active spring site of Whispering Springs Canyon. No other cultural features or artifacts noted. Diverse ecological zone. Large amounts of modern trash observed. Far proximity to Wilderness Park Museum via Trans-Mountain Road.	Prehistoric undetermined; historic early 20th Century	Small midden at lower spring site is excavatable and should be tested to determine temporal placement and artifact assemblages; protect and preserve.
31.106. 3.93/FS16	Complex of three natural shallow caves and 2 historic mineral explorative/entry shafts. Historic tin cans and pure quartz crystals noted. Near summit of Indian Peak-difficult access.	Ca.1930	None

**Table 2.1-9 (Continued)
Archaeological Sites Identified on Castner Range**

El Paso Archaeological Society Designation	Site and Artifact Description	Estimated Period	El Paso Archaeological Society Recommendation (1976)
31.106. 3.93/FS16	24 bedrock mortars avg. size 23.3cm diameter x 28cm depth on granite outcrop. Area of site 19 meters (N-S) x 22 meters (E-W). Numerous worked lithics-cores, blades, flakes, debitage noted on surface of 2 possible middens (lithics 1000+). No pottery or other datable cultural material noted. Diverse ecological zone. Near War Highway 11 (Northgate-Southgate Roads) but far from Wilderness Park Museum.	Archaic suggested	Protect and preserve, possible midden areas test excavated for cultural indicators; area should be surveyed for additional activity specific areas and aratifact assemblages; can be used in conjunciton with Wilderness Park Museum interpretive/educational program.
31.106. 3.93/FS18	A large, clearly delimited lithic resource/manufacture/camp site with about 10 fire hearths and 3 probable rock middens. Site area is an extensive, deep midden. Site area roughly circular 97 meters (E-W) x 105 meters (N-S) and from .5 to 1 meter depth. No pottery or other datable artifacts noted. Lithic estimate 1000+. Observed numerous cores, flakes, blades, worked parent material, and other debitage debris. Site defined by vegetative pattern. Very far proximity to Wilderness Park Museum; difficult access by vehicle.	Archaic suggested	Site is unique with respect to type and elevation relative to other sites located both in and out of reservation boundaries. Should be test excavated to determine cultural/temporal indicators and activity specific areas; protect and preserve.

clearance was issued for this tract indicating that this land had been given a careful surface/visual search and has been cleared of all explosives reasonably possible to detect (ASR, 1994).

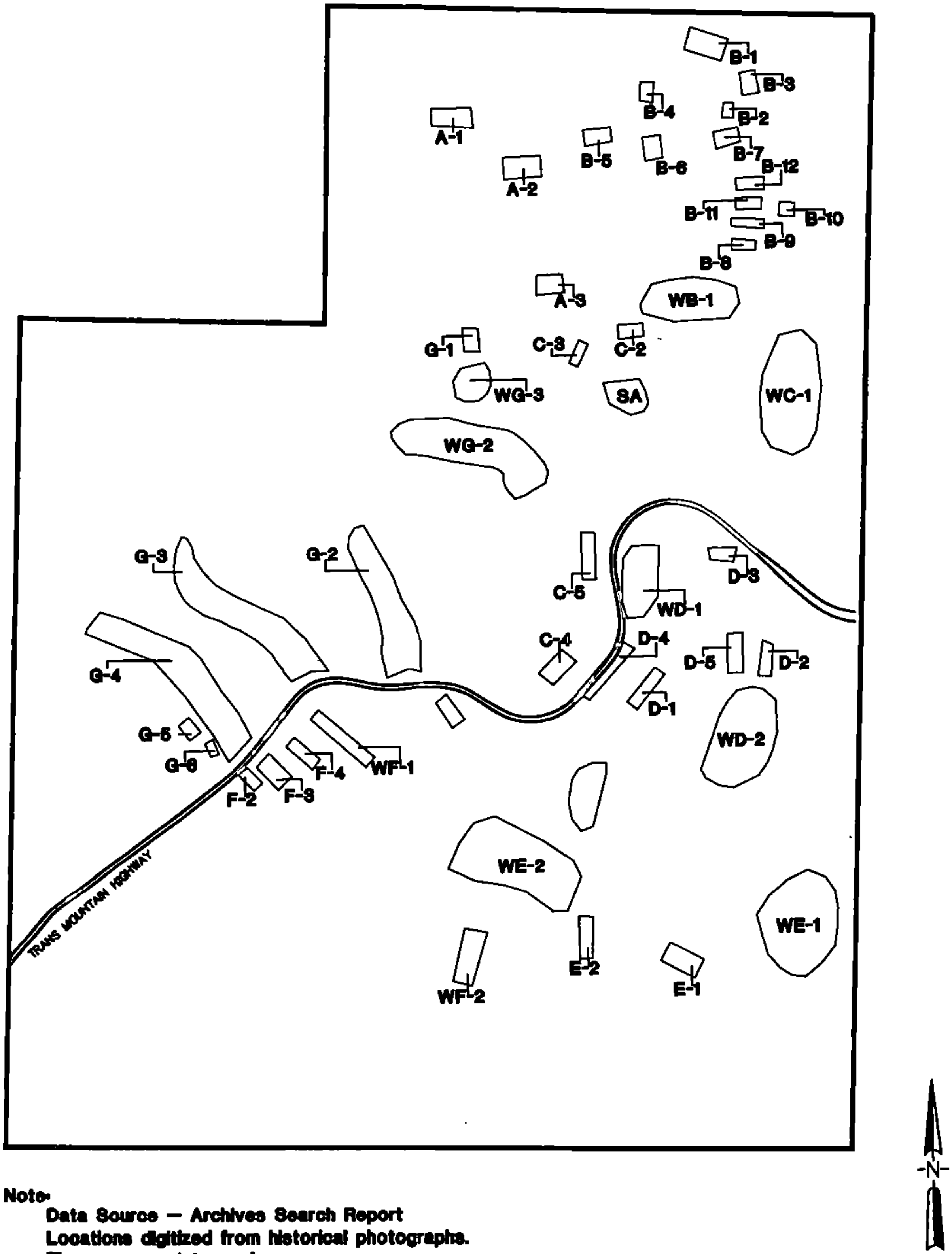
2.2.1.3 In January 1975, the Engineer Studies Group of the Department of the Army, Chief of Engineers Office prepared a report concerning the OE contamination of Castner Range. Their analysis divided the range into 6 areas (A-F) based on previous use and potential for contamination. Areas A and B had been surfaced swept by Fort Bliss personnel in 1974 and were being turned over to GSA for disposal to the city of El Paso. The Engineer Studies Group concluded that there was not enough historical data on Castner Range to either qualitatively and quantitatively define the extent of contamination. The available range overlays, which dated back to 1953, did not show firing points or impact areas for the types of ordnance known to have been fired. This determination was made by Explosive Ordnance Demolition (EOD) personnel who identified certain ordnance items found during clearance which were not recorded in range records. The report also concluded that range surveys indicated that the steep easterly slopes of the Franklin Mountains were used as a backstop for large caliber weapons, but precise impact areas could not be defined. Because of the general lack of accurate information and the discovery of UXO over the entire expanse of the range, the Engineers Study Group Report concluded that the entire range must be considered impacted (ASR, 1994).

2.2.1.4 In December 1979 and early 1980 the Army conducted a surface sweep for ordnance along the Trans Mountain Highway right-of-way and along a portion of the North-South Highway right-of-way. During the sweep 49 OE items were removed from the area. OE items consisted of six M52 fuzes; one pop flare; fourteen 37mm shot rounds, twelve 75mm illumination rounds, five 75mm HE rounds, three 7.62mm blanks; two 7.62mm ball; one 57mm HE; one 40mm duster; three powder train time fuzes, and; one stokes mortar. The officer in charge of the investigation recommended that the area be limited to surface use only because of the large number of items found in the relatively small area searched (Archive Search Report, 1994).

2.2.2 EHSI Investigation

2.2.2.1 The next major ordnance sweep at Castner Range was conducted by Environmental Hazards Specialists International, Inc. (EHSI) from July 11, 1994 to July 22, 1994. EHSI conducted a preliminary site assessment of eight areas (A through H) to identify possible areas of OE contamination. Approximately 6,700 total acres were investigated during the project. Seven hundred-twenty acres were covered using either standard EOD Surface Search Procedures including grids and search lanes (327 acres) or traversed on foot and visually swept (393 acres). The remaining acreage was randomly covered on foot or on all terrain vehicles (ATVs). EHSI estimated that a minimum of 45 to 50 percent of the total area was covered during the investigation. The locations of each of the areas investigated are presented on Figure 2.2-1. Geographical site coordinates were obtained using a Magellan GPS NA 5000DX global positioning satellite system and are presented in Table 2.2-1. UXO and OE items located in each area are presented in Table 2.2-2.

Figure 2.2-1
Approximate Location of the EHSI Study Areas



Note-
Data Source — Archives Search Report
Locations digitized from historical photographs.
Figures are not to scale.

I:COE-HUNT/CASTNER/TABLES/CADD/YSURVEY

PARSONS ENGINEERING SCIENCE, INC.

Table 2.2-1
EHSI Investigation - July 1994
Geographical Coordinates and Size of Areas Investigated
OE Characterization Report - Castner Range

Area	Size (Acres)	UTM Grids*	Latitude/ Longitude	Comment
A-1	6.8	3532693N 361740E	31-55.304N 106-27.747W	Demo Pits
A-2	6.8	3532440N 361875E	31-55.168N 106-27.659W	
B-1	8.5	3533199N 362915E	31-55.586N 106-27.006W	
WB-1	26.2	NA	NA	
B-2	6.8	3532879N 363010E	31-55.414N 106-26.882W	
B-3	5.7	3532938N 363107E	31-55.446N 106-26.882W	
B-4	5.7	3532895N 362489E	31-55.418N 106-27.273W	
B-5	6.8	3532639N 362197E	31-55.278N 106-27.457W	
B-6	6.8	3532599N 362450E	31-55.258N 106-27.296W	
B-7	6.8	3532642N 362991E	31-55.285N 106-26.953W	
B-8	6.8	3532007N 363118E	31-54.942N 106-26.867W	
B-9	6.8	3532113N 363156E	31-55.046N 106-26.844W	
B-10	6.8	3532197N 363256E	31-55.046N 106-26.781W	
B-11	6.8	3532251N 361138E	31-55.075N 106-26.856W	
B-12	6.8	3532341N 363168E	31-55.124N 106-26.838W	
C-1	6.8	3531711N 362809E	31-57.780N 106-27.060W	
WC-1	63.1	NA	NA	
C-2	6.8	3531589N 362430E	31-54.711N 106-27.300W	
C-3	6.8	3531361N 362091E	31-54.585N 106-27.513W	
C-4	6.8	3520590N 361841E	31-53.625N 106-27.656W	Point is Centered in Canyon
C-5	6.8	3530273N	31-53.997N	

i:\coe-hunt\castner\tables\ehsicoor.xls

Table 2.2-1
EHSI Investigation - July 1994
Geographical Coordinates and Size of Areas Investigated
OE Characterization Report - Castner Range

Area	Size (Acres)	UTM Grids*	Latitude/ Longitude	Comment
		362179E	106-27.448W	
SA		3531221N	31-54.510N	Tar Spill Area
		362147E	106-27.476W	
D-1	6.8	3529621N	31-53.647N	
		362510E	106-27.232W	—
WD-1	27.6	NA	NA	
WD-2	55	NA	NA	
D-2	6.8	2529754N	31-53.722N	
		362909E	106-26.980W	
D-3	6.8	3530299N	31-54.017N	
		362994E	106-26.931W	
D-4	10.3	3529693N	31-53.685N	
		362324E	106-27.351W	
D-5	6.8	3529783N	31-53.737N	
		362781E	106-27.062W	
E-1	6.8	2527940N	31-52.739N	
		362791E	106-27.040W	
WE-1	68.9	NA	NA	
E-2	6.8	3528062N	31-52.801N	
		362183E	106-27.426W	
WE-2	53	NA	NA	
E-3	6.8	3527695N	31-52.601N	
		362004E	106-27.537W	
WE-3	18.4	NA	NA	
F-1	2.2	3529268N	31-58.448N	
		361404E	106-27.930W	
WF-1	13.8	NA	NA	
F-2	3.4	2528920N	31-53.251N	
		360284E	106-28.638W	
WF-2	10.1	NA	NA	
F-3	3.4	3528890N	31-53.236N	
		360451E	106-28.532W	
F-4	4	3529021N	31-53.308N	
		360546E	106-28.473W	
G-1	6.8	3531487N	31-54.650N	

Table 2.2-1
EHSI Invistigation - July 1994
Geographical Coordinates and Size of Areas Investigated
OE Characterization Report - Castner Range

Area	Size (Acres)	UTM Grids*	Latitude/ Longitude	Comment
		361547E	106-27.859W	
WG-1	2.8	NA	NA	
G-2.1	14	3529505N 361190E	31-53.574N 106-28.068W	South End of Canyon
G-2.2		3530251N 360923E	31-53.976N 106-28.244W	North End of Canyon
WG-2	46.6	NA	NA	
G-3.1	32	3529498N 360617E	31-53.567N 106-28.432W	South End of Canyon
G-3.2		3530280N 359821E	31-53.984N 106-28.944W	North End of Canyon
WG-3	8.3	NA	NA	
G-4.1	32	3529143N 360251E	31-53.372N 106-28.661W	South End of Canyon
G-4.2		3529838N 359240E	31-53.740N 106-29.308W	North End of Canyon
G-5	5.7	3529199N 359886E	31-53.399N 106-28.893W	
G-6	11.7	3529197N 360129E	31-53.400N 106-28.739W	
WG-2.1	46.6	3530547N 361792E	31-54.143N 106-27.696W	South End of Search Area
WG-2.2		3530881N 361351E	31-54.320N 106-27.978W	Middle of Search Area
WG-2.3		3530940N 360997E	31-54.350N 106-28.203W	North End of Search Area

* - UTM = Universal Transverse Mercator Ticks, Zone 13 as indicated on Def. Map. Agency Map 3106-433, North Franklin Mountain, Texas.
NA - Global Positioning Sattelite readings not taken in these areas due to their size.
Data Source - Archives Search Report

Table 2.2-2
EHSI Investigation - 1994
OEW/UXO Located in Search Areas
OE Characterization Report - Castner Range

Area	Size (Acres)	UXO Located	OEW Located
A-1	6.8	(1) 40mm Projectile	Fragments from 4.2" mortars, 40mm, 37mm Heavy wall/thin wall frags (unidentified) Aluminum frags Expended fuze lighters, explosive containers Small arms casings
A-2	6.8	None	Heavy case munitions fragment
A-3	NA	None	None
B-1	8.5	(1) 40mm Projectile	(5) .37mm AP projectiles (4) .90mm projectiles, inert (7) rifle grenade tail sections (1) 3.5" rocket motor, empty (4) 3.5" rocket nose caps, empty (3) mechanical time fuzes, expended (3) base fuzes, expended (57) .30 cal casings, empty (83) .50 cal casings, empty (2) hand grenade spoons (1) pressure release booby trap device, expended (100+) frags from large projectiles (100+) frags from small caliber projectiles
B-2	6.8	None	small arms casings, empty
B-3	5.7	None	(1) 60mm mortar tail fin assembly (1) point detonating fuze, expended heavy case frags
B-4	5.7	None	(3) 60mm tail fin assembly 5.56mm, .30 cal, 7.62mm casings heavy case frags
B-5	6.8	None	(1) hand grenade fuze, fired (1) hand grenade spoon assorted small arms casings (5) heavy frag pieces
B-6	6.8	None	assorted small arms casings
B-7	6.8	None	assorted small arms casings
B-8	6.8	None	None
B-9	6.8	None	None
B-10	6.8	None	unidentified fragments
B-11	6.8	None	None

Table 2.2-2
EHSI Investigation - 1994
OEW/UXO Located in Search Areas
OE Characterization Report - Castner Range

Area	Size (Acres)	UXO Located	OEW Located
B-12	6.8	None	None
WB-1	26.2	None	small arms casings
C-1	6.8	None	(83) .30 cal casings (6) .50 cal bullets
C-2	6.8	(2) 2.36" bazooka rounds	(5) 2.26" bazooka training rounds (470) .30 cal casings (89) .50 cal bullets numerous grenade pins and spoons
C-3	6.8	(2) 2.36" bazooka rounds	(10) 2.36" rifle grenade training rounds (18) rifle grenade tail sections (1) rifle grenade flare, empty (2) flare fins (8) hand grenade fuzes, expended (1) frag from WP grenade
C-4	6.8	(2) 57mm HE projectile (1) 75mm HE projectile	(8) 37mm AP projectiles (1) 4.2" mortar, expended (18) nose fuzes, expended (86) .30 cal bullets (61) .50 cal bullets heavy and thin walled frags
C-5	6.8	None	None
WC-1	63.1	None	small arms casings
D-1	6.8	None	(95) PD fuzes, expended (20) 37mm AP projectiles (15) 40mm AP projectiles (50) 3.5" rocket nose cones (12) 3.5" rocket tail fin assembly (30) hand grenade fuzes, fired (4) parachute flare hand launchers, empty (500+) assorted small arms casings (1000+) .30 cal and .50 cal bullets frags from WP grenades (200+) heavy wall frags (200+) thin walled frags
D-2	6.8	None	(75) .50 cal bullets (6) .30 cal bullets (1) grenade fuze, fired (14) .30 cal belt links thin walled projectile frags

Table 2.2-2
EHSI Investigation - 1994
OEW/UXO Located in Search Areas
OE Characterization Report - Castner Range

Area	Size (Acres)	UXO Located	OEW Located
D-3	6.8	None	small arms casings
D-4	10.3	None	(2) 37mm AP projectiles light cased frags
D-5	6.8	None	small arms casings, light cased frags
WD-1	27.6	None	None
WD-2	55	None	small arms casings
E-1	6.8	None	(16) 7.62mm blanks, fired (23) .50 cal bullets (106) .30 cal bullets (12) small frags
E-2	6.8	None	(2) 37mm training projectiles, inert (8) .50 cal bullets (12) .30 cal bullets light and heavy cased frags
E-3	6.8	None	(9) .50 cal bullets (13) .30 cal bullets light and heavy cased frags
WE-1	68.9	None	small amount of unspecified OEW
WE-2	53	None	small amount of unspecified OEW
WE-3	18.4	None	(2) 75mm projectiles, empty 37mm and 40mm projectile frags
F-1	2.2	None	unspecified frags
F-2	3.4	None	unspecified frags
F-3	3.4	None	unspecified frags
F-4	4	None	unspecified frags
WF-1	13.8	None	unspecified frags
WF-2	10.1	None	None
G-1	6.8	None	(4) 37mm AP projectiles (46) .30 cal bullets (21) .50 cal bullets (1) rifle grenade fin light and heavy cased frags, grenade spoons
G-2	14	None	(1) 37mm AP projectile
G-3	32	None	small amounts of unspecified OEW

Table 2.2-2
EHSI Investigation - 1994
OEW/UXO Located in Search Areas
OE Characterization Report - Castner Range

Area	Size (Acres)	UXO Located	OEW Located
G-4	32	None	small amounts of unspecified OEW
G-5	5.7	None	small amounts of unspecified OEW
WG-1	2.8	None	small amounts of unspecified OEW
G-6	11.7	None	(5) 37mm projectile, empty
WG-2	46.6	(1) 40mm HE projectile (1) 57mm HE projectile	(3) 37 mm AP projectile (6) 60mm mortar tail fin assembly (13) 2.36" bazooka mortars/fin assembly, fired (4) 3.5" rocket motors/fin assembly, fired large amounts of .30 and .50 cal casings light and heavy cased fragments

AP - armor piercing
Cal - caliber
Frags - fragments
HE - high explosive
mm - millimeter
OEW - ordnance and explosive waste
UXO - unexploded ordnance.
WP - white phosphorous
Data Source - Archives Search Report

2.2.2.2 Based on the review of sweep reports and the type of UXO/OE encountered, EHSI recommended that two types of clearance be completed. The areas that received impacts from light cased ordnance (2.36-inch and 3.5-inch bazooka rounds, small arms munitions) were recommended for a surface clearance and subsurface clearance to a depth of 6-inches. Areas that received impacts from the heavier cased artillery rounds were recommended for a surface and subsurface clearance to a depth of three feet.

2.2.3 UXB Investigation

From May 1995 through October 1995, UXB International, Inc. (UXB) conducted a surface and subsurface detection and removal project in areas where the potential for encountering OE was suspected. UXB's investigation consisted of clearing 569.44 acres and was conducted in areas designated as Area 1, Area A, Area B, Area C, Area D, and Area D South. The location of these areas are presented on Figure 2.2-2. A surface clearance and 10 percent subsurface selective sampling was conducted in Area 1 to a depth of one foot. Surface clearances only were conducted in Area A, B, C, D, and D South. During the investigation conducted by UXB, visual and geophysical investigation techniques were utilized. Visual searches were conducted by using Explosive Ordnance Reconnaissance (EOR) methods. UXB personnel visually scanned the surface terrain to locate surface ordnance or evidence suggesting the presence of subsurface ordnance. Geophysical searches were conducted using Schonstedt GA-52 or GA-72 Magnetometers. The Schonstedt GA-52/72 magnetometers are passive dual flux gate instruments used for detecting ferrous metal items. The locators are portable hand held units that use two flux gate magnetometers, aligned and mounted a fixed distance apart, to detect changes in the earth's ambient magnetic field caused by ferrous metal. These magnetometers were also used during visual searches when vegetation in the search area obstructed visual search techniques. Results of the investigations performed in each area are discussed below.

2.2.3.1 Area 1

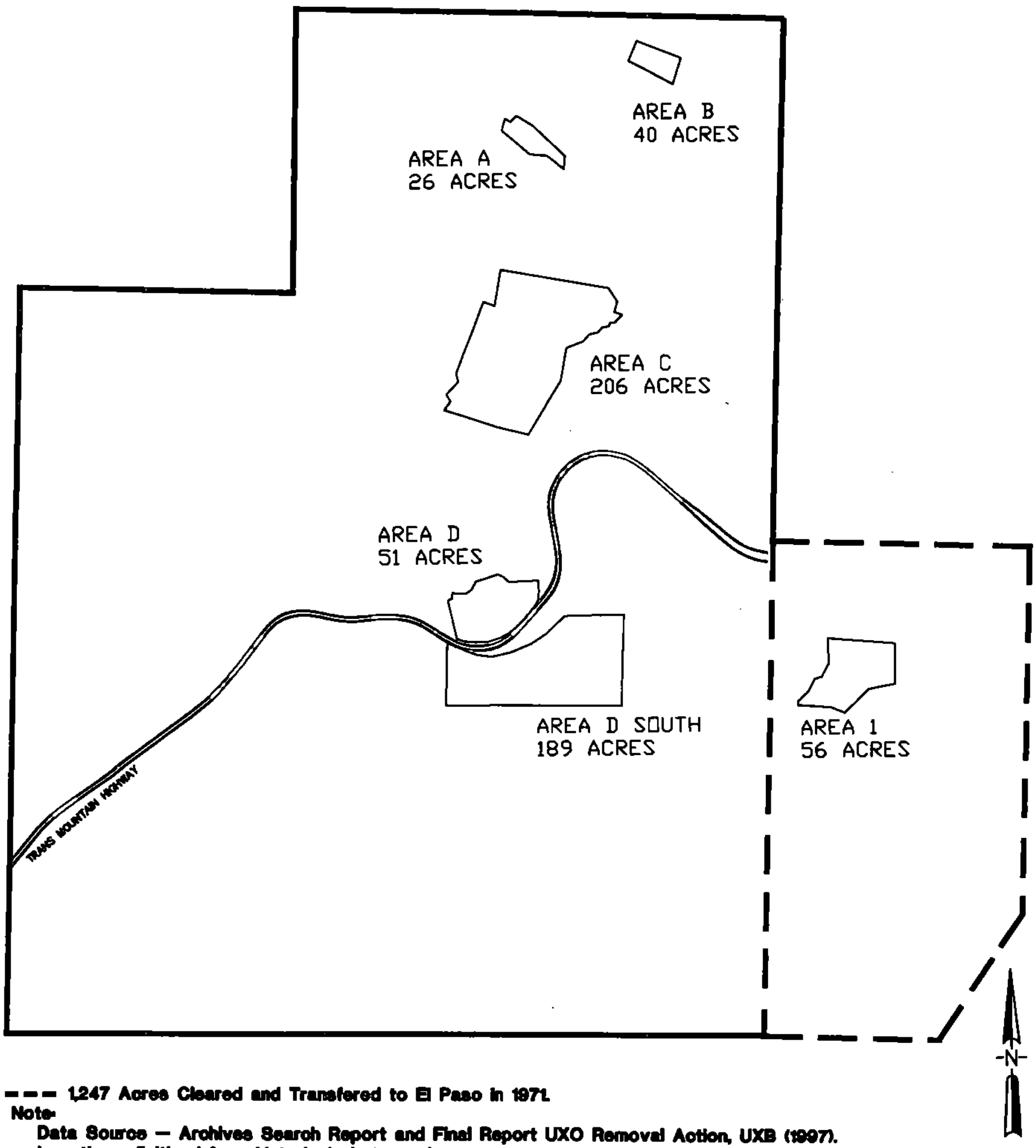
2.2.3.1.1 Investigation activities conducted in the 56 acre Area 1 consisted of a 100 percent surface clearance and a 10 percent subsurface selective sampling to a depth of one foot. During the investigation, 244 grids were surface cleared, 26 grids were excavated, and 10,309 excavations were conducted. One clip of 30 caliber ball ammunition and 13 pounds of OE related scrap were cleared from Area 1.

2.2.3.1.2 Investigation Area 1 was located outside the current boundary of Castner Range, within the 1,247 acres declared a excess in 1971. This area is outside of the scope of work for clearing the remaining 7,081 acres of Castner Range.

2.2.3.2 Area A

Investigation activities conducted at Area A consisted of a 100 percent surface clearance of the 26.25 acres contained within the site. Thirty UXO items and 155 pounds of OE related scrap were removed from the 62 grids surface cleared in Area A.

Figure 2.2-2
Approximate Location of the UXB Study Areas



- - - 1,247 Acres Cleared and Transfered to El Paso in 1971.

Note:
Data Source — Archives Search Report and Final Report UXO Removal Action, UXB (1997).
Locations digitized from historical photographs.
Figures are not to scale.

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2.2.3.3 Area B

Investigation activities conducted at Area B consisted of a 100 percent surface clearance of the 40 acres contained within the site. Sixty six UXO items and 854 pounds of OE related scrap were removed from the 96 grids surfaced cleared in Area B.

2.2.3.4 Area C

Investigation activities conducted at Area C consisted of a 100 percent surface clearance of the 206.25 acres contained within the site. Area C was rocky with gravely soil and consisted of rolling hills, ravines, and steep slopes rising up into the mountains. Sixty one UXO items and 2,038 pounds of OE related scrap were removed from the 416 grids surface cleared in Area C.

2.2.3.5 Area D

Investigation activities conducted at Area D consisted of a 100 percent surface clearance of the 51 acres contained within the site. Area D is referred to as the bowl and is located in a small valley with steep slopes rising into the mountains. Thirty UXO items and 419 pounds of OE related scrap were removed from the 109 grids surface cleared in Area D.

2.2.3.6 Area D South

2.2.3.6.1 Investigation activities conducted at Area D South consisted of a 100 percent surface clearance of the 189.4 acres contained within the site. Seventy two UXO items and 2,076.5 pounds of OE related scrap were removed from the 324 grids surface cleared in Area D South.

2.2.3.6.2 A summary of the UXO items recovered from each area investigated is presented in Table 2.2-3. The area investigated, type of UXO, and the grid location of each UXO item identified is presented in Table 2.2-4.

2.2.4 CMS Investigation

2.2.4.1 The most recent investigation conducted at Castner Range was performed by CMS Environmental, Inc. during the period of October 1996 through May 1997. CMS began the investigation by preparing a grid layout and surveying the site based on a control monument established near the Wilderness Park Museum on the Trans Mountain Highway. Location, grid layout, and surveying of the site was accomplished by CMS using a Real Time Global Positioning System (RT/GPS). For this investigation, CMS divided Castner Range into 11 zones based on accessibility by the public, terrain type, vegetation, soil type, and historical use while active. These zones are presented on Figure 2.2-3.

Table 2.2-3
UXB Investigation - 1995
Type of UXO Recovered
OE Characterization Report - Castner Range

UXO Type	Area 1	Area A	Area B	Area C	Area D	Area D South	Total
30 Cal Ball Ammo (in M1 Mag)	18						18
30 Cal Mags (live primers)						2	2
50 Cal Ball Ammo			2				2
20 mm Projectile HE		11	2			6	19
20 mm Projectile HE (w/o fuze)						2	2
30 mm Projectile HE			1				1
37 mm Projectile HE		2		3	2	3	10
37 mm Projectile HE (base fuze)						4	4
37 mm Projectile HE (dummy fuze)						2	2
37 mm Projectile HE (w/o fuze-residue)						1	1
37 mm Projectile HE (w/o fuze)						1	1
37 mm Projectile APHE						2	2
37 mm Projectile Practice (Demil)						2	2
40 mm Projectile HE		10	3		1	3	17
40 mm Projectile HE (w/o fuze)			1			1	2
40 mm fuze						1	1
57 mm Projectile HE		3		1	2	2	8
57 mm Projectile HE (w/o fuze)						1	1
75 mm Projectile HE		1		1	15	3	20
75 mm Projectile HE (w/o fuze)					2	2	4
75 mm Projectile HE (partial-w/o fuze)						1	1
75 mm Projectile Shrapnel (w/o fuze)						2	2
75 mm Projectile Shot (w/o fuze)						1	1
105 mm Projectile HE (w/o fuze)					1		1
60 mm Mortar HE				1			1
3" Stokes Mortar HE					4	9	13
3" Stokes Mortar HE (w/o fuze)						3	3
3" Stokes Mortar HE (w/ nose plug)						13	13
2.36" Rocket				25			25
2.36" Rocket Warhead (only)				1			1
WP Grenade (cocked striker)						1	1
Rifle Grenade				1			1
Rifle Grenade (M9A1)		1					1
Rifle Grenade fuze			1				1
Rifle Grenade Det				1			1
Grenade fuzes			30				30
Grenade fuze (primer only)				1			1
Grenade fuze Practice (Demil)						1	1
Grenade fuze Mk 2				1			1
Grenade Simulator						1	1
M18 Smoke Grenade (green)				1			1
Star Cluster				2			2
Parachute Flare		1					1
M48 PD fuzes			2		2		4
PD fuze			1				1

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Table 2.2-3
UXB Investigation - 1995
Type of UXO Recovered
OE Characterization Report - Castner Range

UXO Type	Area 1	Area A	Area B	Area C	Area D	Area D South	Total
Base fuzes			14				14
fuzes			5				5
M51-A5 fuze					1	1	2
Mech Time fuze - M502			1	1			2
Mech Time fuze			1				1
VT fuze			1			—	1
Mine fuze		1					1
Booster HE						1	1
Blasting Cap (w/ adapter)			1				1
Electric Blasting Caps				21			21
Total	**18**	**30**	**66**	**61**	**30**	**72**	**277**

Table 2.2-4
UXB Investigation - 1995
Grid Location of UXO
OE Characterization Report - Castner Range

Area	Type of UXO	Quantity	Grid Location
Area 1	30 cal Ball Ammunition	18	R48
Area A	57 mm Projectile HE	1	C24
	Rifle Grenade (M9A1)	1	D20
	40 mm Projectile HE	1	G20
	20 mm Projectile HE	1	J24
	40 mm Projectile HE	1	J24
	20 mm Projectile HE	1	K24
	20 mm Projectile HE	1	L24
	20 mm Projectile HE	1	N24
	37 mm Projectile HE	1	N24
	75 mm Projectile HE	1	N24
	20 mm Projectile HE	1	P20
	40 mm Projectile HE	2	P20
	40 mm Projectile HE	1	P24
	57 mm Projectile HE	1	P24
	40 mm Projectile HE	1	P26
	20 mm Projectile HE	2	Q24
	40 mm Projectile HE	1	Q24
	Parachute Flare	1	R22
	Mine Fuze	1	R22
	40 mm Projectile HE	1	R22
	57 mm Projectile HE	1	R22
	20 mm Projectile HE	2	R24
	40 mm Projectile HE	1	R26
	40 mm Projectile HE	1	S20
	37 mm Projectile HE	1	S22
	20 mm Projectile HE	1	T22
	20 mm Projectile HE	1	T24
Area B	Blasting Cap (w/ adaptor)	1	A20
	50 cal Small Arms	2	C20
	Fuzes	5	C22
	40 mm Projectile HE (w/o Fuze)	1	D19
	20 mm Projectile HE	1	D20
	Base Fuzes	14	E22
	M48 Fuze	2	E22
	20 mm Projectile HE	1	G20
	30 mm Projectile HE	1	G20
	PD Fuze	1	G20
	Rifle Grenade Fuze	1	G24
	40 mm Projectile HE	1	H20
	40 mm Projectile HE	1	J22
	Mech Time Fuze M502	1	N17

Table 2.2-4
UXB Investigation - 1995
Grid Location of UXO
OE Characterization Report - Castner Range

Area	Type of UXO	Quantity	Grid Location
Area B (continued)	VT Fuze	1	P17
	Mech Time Fuze	1	P20
	40 mm Projectile HE	1	Q19
	Grenade Fuzes	30	Q19
Area C	2.36" Rocket	1	A70
	2.36" Rocket	1	A76
	2.36" Rocket	1	B84
	2.36" Rocket	1	C74
	Electric Blasting Cap	21	D70
	2.36" Rocket	1	D76
	2.36" Rocket	1	G56
	60 mm Mortar HE	1	I56
	2.36" Rocket	1	K76
	Star Cluster	1	K80
	37 mm Projectile HE	1	L56
	75 mm Projectile HE	1	L86
	37 mm Projectile HE	1	M56
	57 mm Projectile HE	1	M72
	37 mm Projectile HE	1	N56
	2.36" Rocket	1	O66
	M18 Smoke Grenade (green)	1	R62
	Rifle Grenade	1	S64
	2.36" Rocket Warhead	1	AA72
	2.36" Rocket	1	AA74
	Star Cluster	1	AA74
	2.36" Rocket	1	AA76
	Grenade Fuze (primer only)	1	AB74
	2.36" Rocket	2	AB82
	Rifle Grenade Det	1	AE74
	2.36" Rocket	1	AE80
	2.36" Rocket	1	AF80
	2.36" Rocket	1	AF84
	2.36" Rocket	1	AH82
	2.36" Rocket	2	AI80
	2.36" Rocket	2	AJ80
	2.36" Rocket	1	AJ82
	Mech Time Fuze	1	AJ84
	2.36" Rocket	1	AK82
	2.36" Rocket	1	AL78
	MK2 Grenade Fuze	1	AL86
	2.36" Rocket	1	AM80
	2.36" Rocket	1	AN78

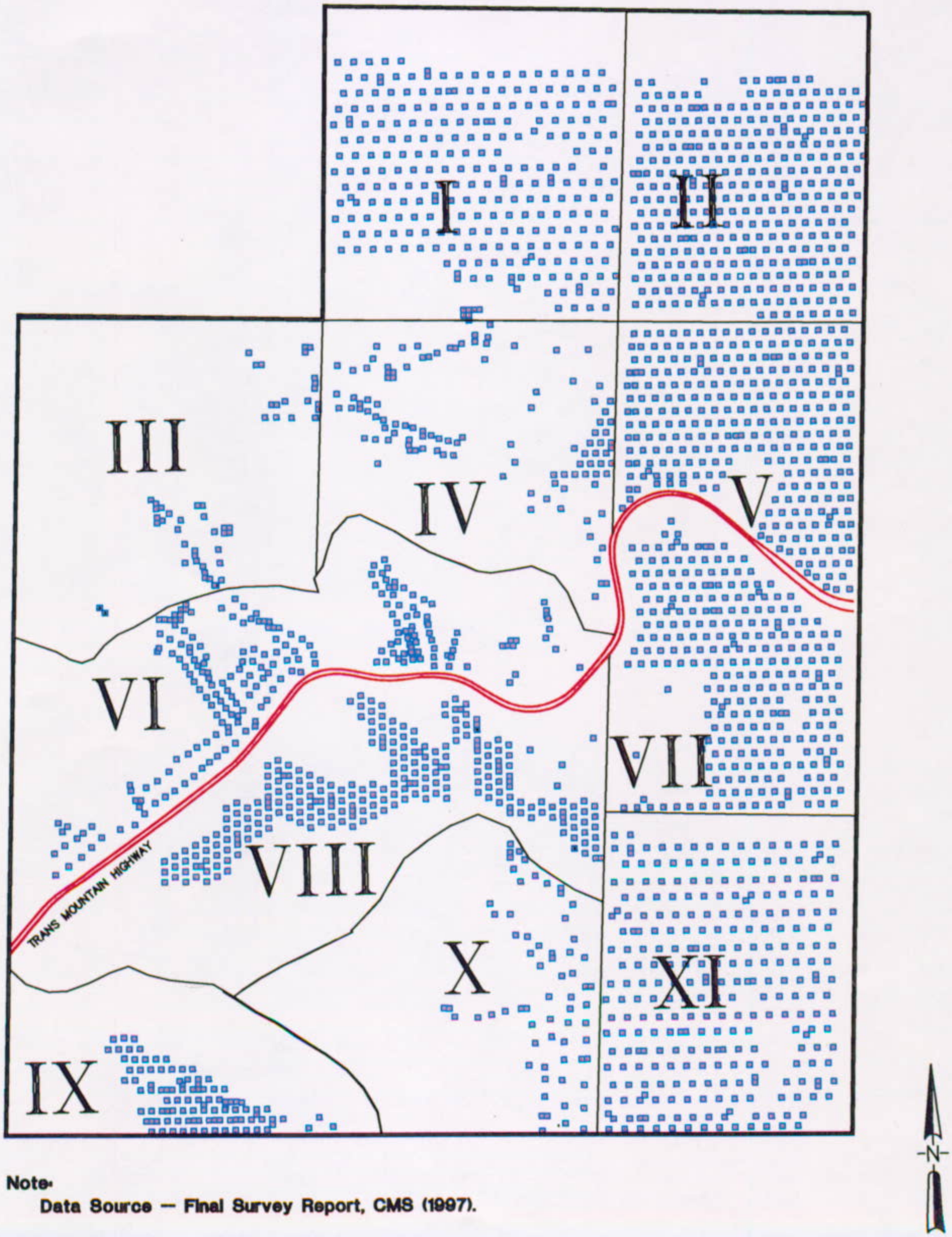
Table 2.2-4
UXB Investigation - 1995
Grid Location of UXO
OE Characterization Report - Castner Range

Area	Type of UXO	Quantity	Grid Location
Area D	3" Stokes Mortar	1	D22
	57 mm Projectile HE	1	D26
	75 mm Projectile HE	1	E28
	75 mm Projectile HE	1	F22
	3" Stokes Mortar	1	F22
	75 mm Projectile HE	1	G20
	3" Stokes Mortar	1	G22
	75 mm Projectile HE (w/o fuze)	1	H19
	75 mm Projectile HE	1	H20
	105 mm Projectile HE (w/o fuze)	1	J20
	40 mm Projectile HE	1	J22
	M48 Series Fuze	1	J22
	75 mm Projectile HE	1	J30
	75 mm Projectile HE (w/o fuze)	1	K20
	75 mm Projectile HE	1	K22
	75 mm Projectile HE	1	K28
	57 mm Projectile HE	1	L26
	37 mm Projectile HE	1	L28
	75 mm Projectile HE	1	M22
	3" Stokes Mortar	1	M22
	M51-A5 Fuze	1	M24
	75 mm Projectile HE	1	P24
	75 mm Projectile HE	1	P28
	75 mm Projectile HE	1	Q24
	75 mm Projectile HE	1	Q30
	75 mm Projectile HE	1	R22
	75 mm Projectile HE	1	R26
	75 mm Projectile HE	1	R30
	37 mm Projectile HE	1	S26
	M48 Series Fuze	1	T24
Area D South	75 mm Projectile HE (partial-no fuze)	1	B6
	37 mm Projectile APHE	1	B10
	75 mm Projectile Shrapnel (w/o fuze)	1	C16
	75 mm Projectile HE	1	D8
	Booster HE	1	D14
	20 mm Projectile HE	1	E8
	40 mm Projectile HE	1	F10
	57 mm Projectile HE	1	F12
	75 mm Projectile HE	1	G8
	3" Stokes Mortar	6	G12
	3" Stokes Mortar (w/nose plug)	12	G12
	75 mm Projectile HE (w/o fuze)	1	G16
	20 mm Projectile HE	1	G16

Table 2.2-4
UXB Investigation - 1995
Grid Location of UXO
OE Characterization Report - Castner Range

Area	Type of UXO	Quantity	Grid Location
	75 mm Projectile Shrapnel (no fuze)	1	H6
Area D South (continued)	37 mm Projectile HE (base fuze)	1	H6
	3" Stokes Mortar (no fuze)	1	H12
	75 mm Projectile (no fuze/with shot)	1	H14
	40 mm Projectile (no fuze)	1	K12
	75 mm projectile (no fuze)	1	L16
	20 mm projectile (no fuze)	1	M14
	3" Stokes Mortar (w/nose plug)	1	S6
	57 mm Projectile HE	1	S16
	40 mm Projectile HE	1	AC12
	3" Stokes Mortar	1	AD20
	37 mm Projectile (w/dummy fuze)	1	AG6
	20 mm Projectile HE	1	AG14
	3" Stokes Mortar	1	AG20
	3" Stokes Mortar (w/o fuze)	1	AG20
	75 mm Projectile HE	1	AG22
	37 mm Projectile HE (w/base fuze)	1	AH4
	37 mm Projectile HE	1	AH8
	20 mm Projectile HE	1	AH14
	3" Stokes Mortar	2	AH20
	37 mm Projectile HE	1	AJ8
	M51-A5 Fuze	1	AJ12
	57 mm Projectile HE (w/o fuze)	1	AK22
	37 mm Projectile HE (w/base fuze)	1	AL4
	37 mm Projectile HE	1	AL10
	20 mm Projectile HE	1	AL14
	20 mm Projectile HE (w/o fuze)	1	AL14
	WP Grenade (w/cocked striker)	1	AL20
	3" Stokes Mortar (w/o fuze)	1	AL22
	37 mm Projectile (w/dummy fuze)	1	AM4
	40 mm Projectile HE	1	AM14
	37 mm Projectile HE (residue w/o fuze)	1	AN4
	37 mm Projectile APHE	1	AN8
	Grenade Fuze-Practice (demil)	1	AN20
	Grenade Simulator	1	AN22
	30 Cal Magazines (live primers)	2	AN22
	20 mm Projectile HE	1	AP16
	40 mm Fuze	1	AQ16
	37 mm Projectile HE (w/o fuze)	1	AR4
	37 mm Projectile Practice (demil)	1	AR4
	37 mm Projectile HE (w/base fuze)	2	AT2
	37 mm Projectile Practice (demil)	1	AU8

Figure 2.2-3
Location of the CMS Study Areas



Note:
Data Source — Final Survey Report, CMS (1997).

100' X 100' Study Area

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2.2.4.2 A 100% surface sampling was conducted in 2,035 100 X 100 foot grids dispersed throughout the 11 zones. The area surface sampled consisted of approximately 467 acres. Surface sampling activities were conducted using the sweep line method. The location of UXO and OE items detected during the sweep were recorded on grid sweep sheets for incorporation into a database utilized to estimate the concentration of surface UXO remaining on Castner Range. UXO and OE items were found in nine of the eleven zones. A summary of the grid locations and surface OE items found is presented in Table 2.2-5. Zones III and IX were the only two zones where no UXO items were found. Ordnance fragments were found in all of the zones with the exception of Zone IX. Figures 2.1-1, 2.1-2,2.1-3,and 2.1-4 specify that there were no known ranges in Zone IX. Only one known firing fan for 3.5 inch rockets and mortars was found to potentially impact Zone IX. However, this firing fan only covers a small portion of Zone IX. No OE items related to 3.5 inch rockets and mortars were found in Zone IX or the three zones bordering Zone IX. This indicates that Zone IX may not have been impacted by activities at Castner Range. There were no known firing ranges in Zone III. A small number of ordnance fragments were found in Zone III and the only known firing fan that covered part of this zone was the 3.5 inch rockets and mortars. The impact to Zone III from military operations is expected to be minimal.

2.2.4.3 Subsurface sampling was conducted to a depth of 2 feet in 172 of the 2,035 grids established during the investigation. The grids for subsurface sampling were selected to ensure both spatial and random sampling. The grids were also selected based on the location of surface contamination detected to ensure the likelihood of finding anomalies (CMS, Inc., 1997). To accomplish the subsurface sampling action, CMS utilized the SiteStats/GridStats statistical analysis program. QuantiTech was contracted by CEHNC to provide the program, training, and technical support to CMS personnel. During the subsurface sampling investigation, magnetometers were used to locate subsurface anomalies. The anomalies were flagged and each grid was divided into 32 equally sized sub-grids. The anomalies were excavated in a random pattern established by the GridStats program. Anomalies were excavated until the program was able to establish the homogeneity (or lack thereof) of UXO within the grid. One subsurface OE item (3.5" rocket, motor only) was encountered and recovered during the subsurface sampling activities. The grid, grid location, and subsurface item description is presented in Table 2.2-6. Results of the subsurface sampling activities are summarized in Table 2.2-7.

2.2.4.4 During the CMS investigation, a total of 2,770 pounds of OE scrap was turned over to the Defense Reutilization and Marketing Office, Fort Bliss, Texas. A summary of the OE scrap removed by zone is presented in Table 2.2-8.

2.2.4.5 Figure 2.2-4 provides a summary of the locations that were surveyed by EHSI, UXB, and CMS. Plate 2.2-1 presents a Geographic Information System (GIS) based map of Castner Range depicting the topography of the site and the location of the CMS survey grids.

Table 2.2-5
CMS Investigation - October 1996 through May 1997
Summary of Surface OE Items
OE Characterization Report - Castner Range

Grid Number	Northing	Easting	Quantity	Description
1-126	10713974	396969	1	40mm projectile, cartridge w/primer only
1-156	10714564	395369	1	81mm mortar, tail boom w/primer only
1-177	10714878	396076	2	40mm projectile, cartridge w/primer only
1-247	10716068	395596	1	40mm projectile, HE, MKII
1-264	10716359	395367	1	M52 fuze
1-276	10716858	393666	1	40mm projectile, HE, MKII
2-4	10712055	400755	1	Trip flare
2-48	10712707	398782	1	Grenade fuze
2-117	10713710	399037	1	Grenade fuze
2-117	10713717	399033	1	Firing Device, M1 pressure release, w/base coupling
2-129	10713980	397880	1	Ground signal, hand launched (slap flare)
2-314	10716435	400400	1	Grenade, MK II training
2-158	10714235	400880	1	Trip flare
4-30	10709046	395086	1	60mm mortar, HE
5-140	10709700	399030	1	Grenade fuze
5-142	10709715	399310	1	Grenade fuze
6-80	10703622	388727	1	40mm projectile, HE, MK II
6-132	10705065	390708	1	75mm projectile, HE, MK I
7-2	10702580	397407	1	37mm projectile, HE, M63
7-8	10702322	398922	1	105mm projectile, HE
7-160	10704827	398757	1	Electric blasting cap
7-185	10705097	400662	1	40mm projectile, HE, MK II
8-27	10701786	396245	1	37mm projectile, HE M54
8-27	10701763	396175	1	75mm projectile, shrapnel, MK II
8-57	10702463	395574	1	75mm projectile, shrapnel, MK II
8-92	10703446	394860	1	37mm projectile, HE M54
8-108	10704106	394410	1	57mm projectile, recoilless rifle, HE
8-151	10704066	393065	1	75mm projectile, HE
8-199	10702873	391606	1	37mm projectile, HE, M54
8-202	10702641	391420	1	37mm projectile, HE, M54
8-275	10701571	389060	1	37mm projectile, HE, M54
10-8	10699163	396378	1	105mm projectile, HE
10-8	10699173	396333	1	37mm projectile, HE, M63
10-10	10696309	396519	1	37mm projectile, HE, M54
10-29	10698964	395627	1	105mm projectile, HE
10-65	10701152	395790	1	75mm projectile, HE, MM I
10-69	10701456	395298	1	75mm projectile, HE, MK I
10-70	10701692	395043	1	75mm projectile, HE
10-72	10701889	394999	1	37mm projectile, HE, M63
11-131	10698944	399839	1	37mm projectile, HE, M63
11-168	10699824	397759	1	37mm projectile, HE, M63
11-171	10699808	398640	1	37mm projectile, HE, M63
11-196	10700491	397512	1	37mm projectile, HE, M63
11-207	10700519	400889	1	105mm projectile, HE, w/M48A2 fuze
11-252	10701744	396914	1	4.2" mortar, WP, burster tube only

Table 2.2-6
CMS Investigation - October 1996 through May 1997
Summary of Subsurface OE Items
OE Characterization Report - Castner Range

Grid Number	Northing	Easting	Quantity	Description
4-190	10710579	395416	1	3.5" rocket, motor only

Table 2.2-7
CMS Investigation - October 1996 through May 1997
Summary of Subsurface OE Items
OE Characterization Report - Castner Range

Zone Number	Number of Grids Sampled	Number of Anomalies Excavated	Number of UXO Found	Characterization Conclusions
1	17	305	0	Homogeneous
2 & 5	21	814	0	Homogeneous
3	15	35	0	Homogeneous
4	17	292	1	Homogeneous
6	17	73	0	Homogeneous
7	21	291	0	Homogeneous
8	23	314	0	Homogeneous
9	15	21	0	Homogeneous
10 & 11	26	283	0	Homogeneous

Notes:

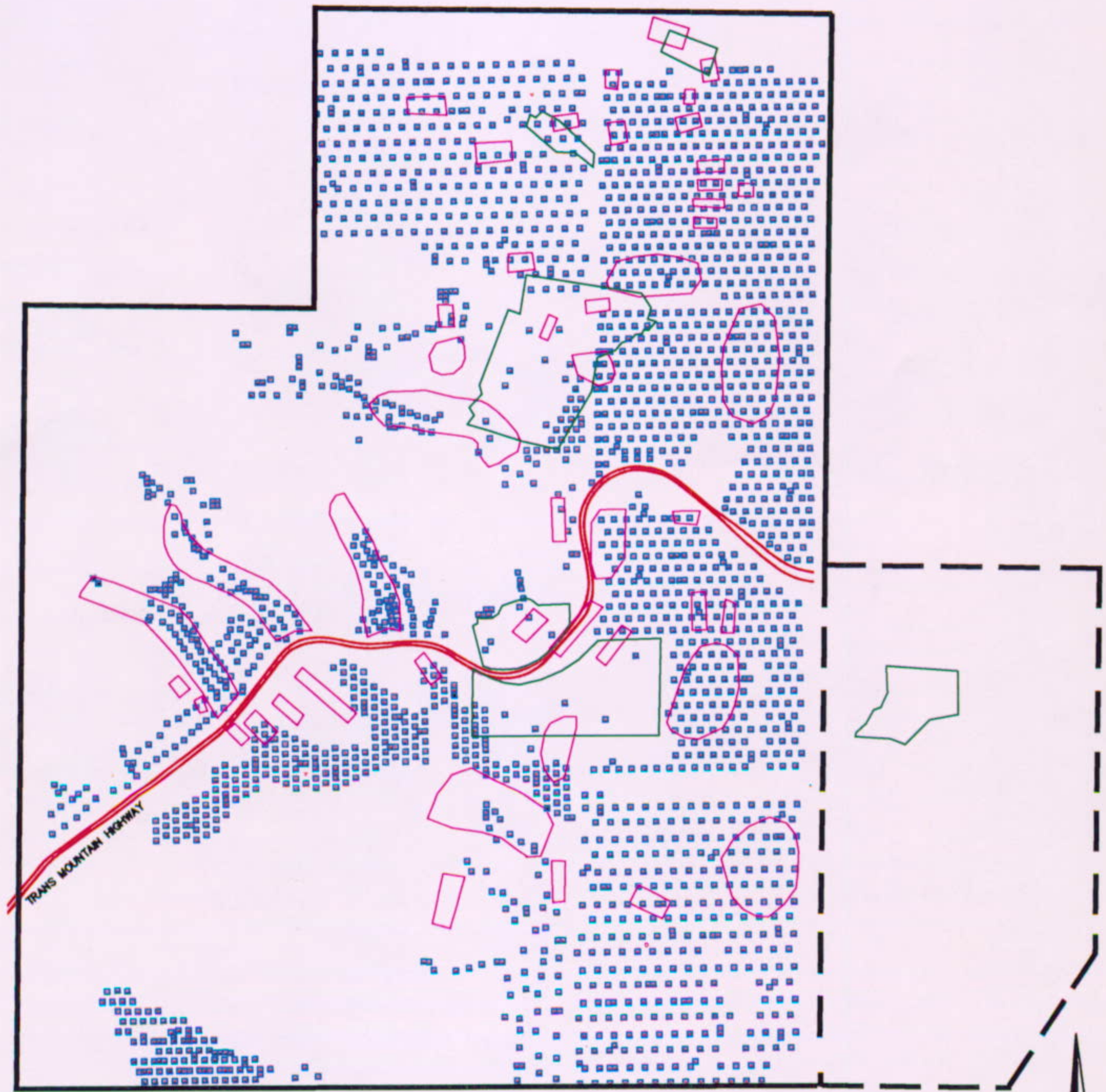
Homogeneous - The Site Stats program used by CMS assessed that a sufficient number of grids were sampled to conclude that each zone can be expected to have a density of UXO remaining that is consistent with the sample findings.

Data Source - CMS Final Survey Report, 1997.

Table 2.2-8
CMS Investigation - October 1996 through May 1997
Summary of OE Scrap Removed
OE Characterization Report - Castner Range

Zone Number	Scrap Removed (lbs)
1	380
2	844
3	45
4	210
5	170
6	95
7	260
8	230
9	1
10	85
11	450

Figure 2.2-4
Summary of the Study Areas



- - - 1,247 Acres Cleared and Transfered to El Pason in 1971.

CMS Investigation Areas.

Magenta Outlined Areas Denote EHSI Investigations Areas.

Green Outlined Areas Denote UXB Investigation Areas.

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2.2.5 Previous Future Land Use Study

Congressman Richard White organized an Ad Hoc Committee in 1971 for the purpose of evaluating future land use alternatives for Castner Range. The committee had approximately 36 members representing the major population elements and interest groups in the El Paso area. The committee recommended a planned development of the Castner Range by the City of El Paso to promote the following elements:

Preservation of Wilderness Areas;

Protection of the Mountain Ecology;

Educational Facilities;

Medical Facilities;

Recreational Facilities;

Mass Transit Facilities;

Low and Moderate Income Housing;

Access to Local Government; and

A Sense of Community in a Growing Urban Area.

The committee had 976 Acres approved for public facilities of which many were implemented such as, flood control (Fusselman Dam System), North-South Freeway (Route 54), and the Trans-Mountain Road. They also proposed to use 6,428 acres for facilities such as, wilderness park, 2 public school complexes, community college, county-district hospital-medical complex, mental health facility, zoological park, golf course, mass transit terminal, low and moderate income housing, driver training facility, government plaza, and a linear park. It should be noted that some of these facilities, such as the community college and residencies, have been constructed in the easternmost region of Castner Range that was previously released. This OE Characterization and Cost Analysis Report evaluates the remaining excess areas of Castner Range with respect to the future land use alternatives of a wilderness park or commercial/residential development. In fact, the area that the 1971 Ad Hoc Committee determined to be feasible for commercial/residential development correlates almost exactly to the area that this report evaluates for potential commercial/residential development (see Section 2.3.2).

2.3 STREAMLINED RISK EVALUATION

2.3.1 This streamlined risk evaluation presents a summary of the Ordnance and Explosives Cost-Effectiveness Risk Tool (OECert) results. The OECert system was developed to assess the public risk due to ordnance at formerly used military training and defense sites. The methodology has been applied to over 30 OE sites throughout the United States.

2.3.2 There are two future land use scenarios being considered for Castner Range. Scenario 1 involves deeding the entire site to the State of Texas as an annex to the Franklin Mountains State Park. Under scenario 2, the eastern flat area of Castner Range would be retained by Fort Bliss for commercial/residential development, and the western mountainous areas of Castner Range would be deeded to the State of Texas for an annex to the Franklin Mountains State Park. The OECert analysis was performed on eleven separate zones at Castner Range based on the zones established in the 1995 study by CMS (Figure 2.2-3). For the evaluation of scenario 2, the eleven zones are grouped into two regions based on geography and potential land use. Region 1 consists of the eastern portions of zones 2, 5 and 7 plus all of zone 11. This region includes the relatively flat eastern areas of Castner Range, where commercial/residential development is a potentially viable future land use. Region 2 includes the western areas within the Franklin Mountains where the only future land use being considered is an extension of the Franklin Mountains State Park (CMS zones 1, 3, 4, 6, 8, 9, 10, and the western portion of zone 2, 5, and 7). The locations of the two regions are shown in Figure 2.3-1. Region 1 is approximately 1,932 acres. This region of Castner Range was also considered in 1971 to be feasible for commercial/residential development by the Ad Hoc Committee (Section 2.2.5). Region 2 is approximately 5,149 acres. Because Scenario 1 involves using all of the land at Castner Range in the same manner (conversion to a park), the summary below for Scenario 1 presents the results for the entire range based on the 11 CMS identified zones (Figure 2.2-3). For Scenario 2 the results for each region are presented.

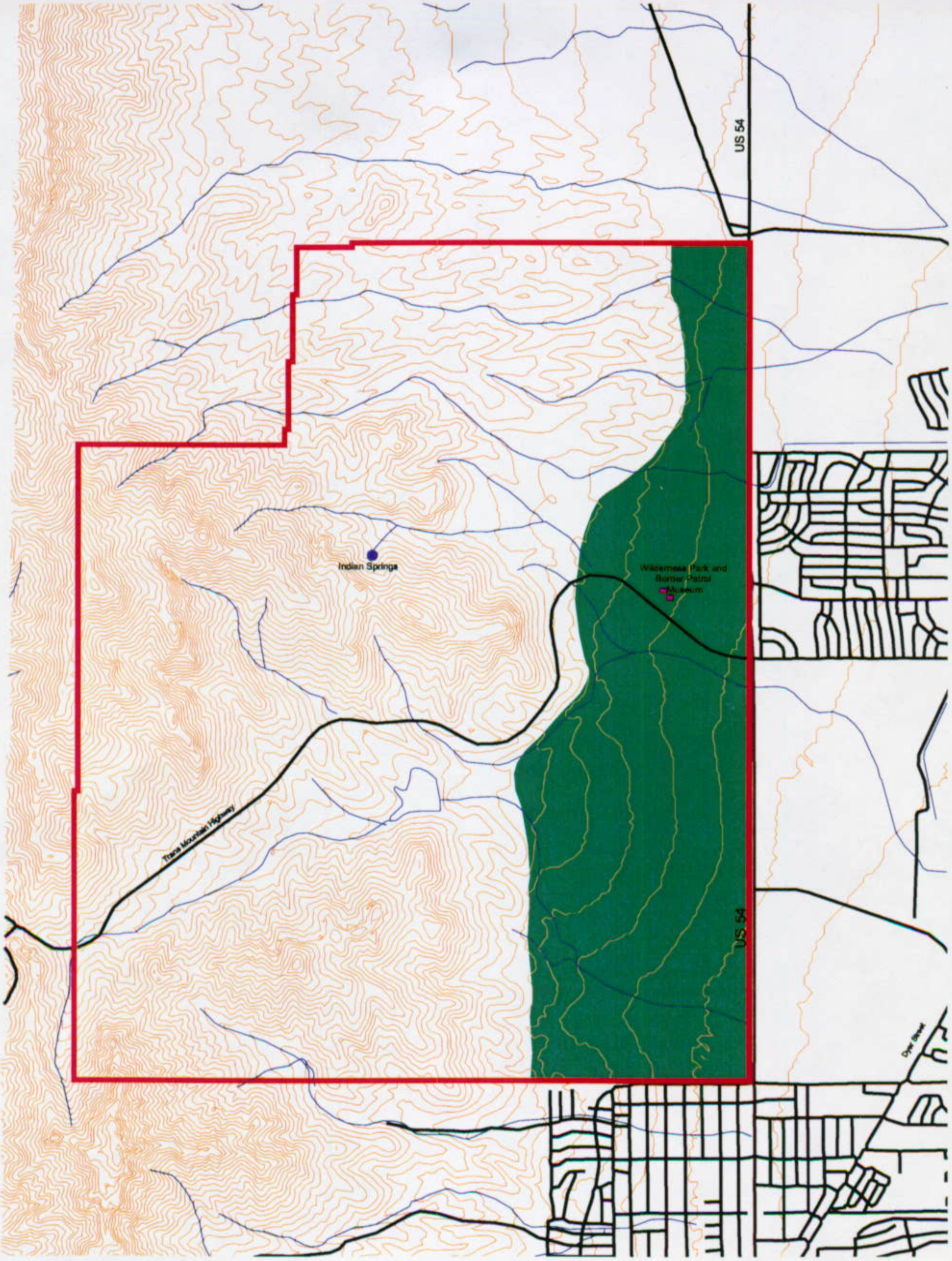
2.3.3 The detailed OECert analysis is presented in Appendix A.

2.3.4 OECert Summary

2.3.4.1 The OECert methodology is designed to prioritize the removal efforts for a set of OE-contaminated sites and to determine a quantitative risk of public and individual exposure to OE at each site. An exposure, as defined by OECert methodology, is based on the proximity of an individual to UXO. This proximity can also be described as the "shadow" of the individual as it crosses over a UXO item. For an exposure to occur, the individual does not have to specifically touch or know the item is present (QuantiTech, Inc., 1998). The OECert model addresses both surface and subsurface exposures. The activities for a site determine the type and amount of surface coverage and subsurface intrusion by the participant. For example, hiking is an activity that has no intrusion component, whereas child play is an activity that includes both surface and subsurface intrusion components. The prioritization is based on a cost-effectiveness measure, defined as the maximum risk reduction achieved for each dollar spent on the removal effort. The public exposures to OE used in OECert result from individuals performing specific activities (both recreational and occupational) within OE contaminated areas. The expected number of surface OE exposures per participant in an area is dependent on the OE density, the proportion of OE on the surface, and the activity participant's exposure area (the area traversed by an individual while performing an activity). The expected number of subsurface OE exposures per participant in a zone is dependent on the OE density, the proportion of OE beneath the surface of the ground, the density

Figure 2.3 - 1

Future Landuse Scenarios



Zone to be modeled as sutiable for residential or commercial development (1932 acres)

Note: The whole Range should be modeled as a park

N

0.25 0 0.25 Miles

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distribution of the subsurface OE, and the area associated with an activity performed in a zone.

2.3.4.2 The calculation of the total expected number of exposures to OE at a site follows a step-by-step process. First, for each zone, the expected number of exposures for a single individual participating in a specific activity is calculated. Second, the number of individuals that are expected to participate annually in that activity on the site is determined based on the demographics surrounding the site and the activity participation. The two values are combined to give the total annual number of exposures expected to occur for participants in the identified activity. These calculations are performed for each activity that has been determined to be performed at the site. The values for the expected number of exposures resulting from participation in each activity are then added together to yield the overall risk value for the site. Table 2.3-1 summarizes the activities and participation expected under scenario 1 (entire area converted into a park). Table 2.3-2 summarizes the activities and participation expected under scenario 2 (eastern portion developed for commercial/residential use and the western portion converted to a park).

2.3.5 OECert Results

2.3.5.1 During the CMS investigation of the 11 identified zones (Figure 2.2-3), surface UXO was found in all zones except for 3 and 9. Subsurface UXO was only found in zone 4. In the cases where no UXO was found in either the surface or subsurface, inferential statistical techniques were used to estimate ordnance contamination. Table 2.3-3 provides a summary of the calculated UXO density ranges. The calculation is performed by determining the density of ordnance which would provide a 90% probability that the actual sampling effort would have found at least one UXO item. This calculated density is then used to complete the OECert analysis for a maximum density value. A value of zero UXO items is also used to establish a lower limit. The risk is then presented as a range with a 90% confidence. Therefore, the OECert process will always result in an upper bound of UXO density greater than zero, even if no UXO actually exists at the site. Therefore, consideration must be given to whether or not the area investigated has an actual potential for the presence of UXO.

Table 2.3-1 - Scenario 1 Activity Participation

Activity	Site Population	Times/Year (OECert)	Total Participation
Child Play (Park Areas)	76	6	456
Child Play (Residential)	102	235	23,970
Hiking	9,386	13.4	125,773
Mountain Biking	3,225	38.5	124,163
Picnicking	275	6	1,650
Surveying	N/A	N/A	1 *
Construction	N/A	N/A	1 *

* 1 participant assumed for construction and surveying

Table 2.3-2 - Scenario 2 Activity Participation

Activity	Site Population	Times/Year (OECert)	Total Participation
Child Play (Park Areas)	48	6	288
Child Play (Residential)	552	235	129,720
Hiking	6,032	13.4	80,829
Mountain Biking	2,074	38.5	79,849
Picnicking	176	6	1,056
Short Cuts	443	104	46,072
Surveying	N/A	N/A	1 *
Construction	N/A	N/A	1 *

* - 1 participant assumed for construction and surveying

2.3.5.2 The 90 percent confidence ranges for densities of UXO calculated for each zone at Castner Range is summarized in Table 2.3-3.

UXO Density

Table 2.3-3 UXO Density Ranges
(90% Confidence Level)

Zone	Surface Density Range (UXO per Acre)	Subsurface Density Range (UXO per Acre)
1	0.03 - 0.20	0.00 - 0.55
2 and 5	0.00 - 0.16	0.00 - 0.45
3	0.00 - 0.08	0.00 - 0.60
4	0.00 - 0.06	0.00 - 0.70
6	0.00 - 0.11	0.00 - 0.55
7	0.00 - 0.11	0.00 - 0.45
8	0.056 - 0.22	0.00 - 0.41
9	0.00 - 0.10	0.00 - 0.61
10 and 11	0.09 - 0.29	0.00 - 0.37

2.3.5.3 Because less subsurface sampling was completed than surface sampling, the 90 percent confidence interval for subsurface UXO density is higher than for surface density. This results in higher upper limits for the subsurface densities for each zone with the exception of Zone 3. Based on the nature of the soils at the site, it is considered highly unlikely that the actual subsurface UXO density is greater than the surface density. Therefore, the subsurface densities used for completion of the OECert analysis are considered to be highly conservative. Because significantly more surface sampling was completed, the data presented for surface UXO densities has a higher confidence level and smaller 90 percent confidence range.

2.3.5.4 Based on the above UXO density estimates, the number of expected annual exposures was calculated for each zone at Castner Range. An exposure is defined as an individual coming into close proximity to a UXO item. The exposure numbers do not represent accidental detonation of UXO items. The expected annual exposures for Regions 1 and 2, as well as the entire Castner Range are summarized below.

2.3.5.5 The total expected annual exposures for Castner Range under Scenario 1 based on the current conditions ranged from 13,229 to 79,053. For scenario 2, the total expected annual exposures in Region 1 ranged from 4,513 to 28,491. For Region 2 the total expected annual exposures under Scenario 2 was 6,332 to 44,174. The total expected annual exposures for Castner Range under Scenario 2 is 10,845 to 72,665.

2.3.5.6 The current risk from accidental detonation for the entire range was also calculated. An estimate for the total number of deaths and/or injuries over twenty years was calculated to be between 0.4547 for the lower UXO density estimate and 0.8245 for the upper UXO density estimate under Scenario 1. For Scenario 2 the total was estimate ranged from 0.4413 to 0.7886. In both cases it is expected that less than one accidental detonation will occur in a 20 year period.

SECTION 3

SECTION 3
IDENTIFICATION OF OE CLEARANCE SCOPE, GOALS, AND OBJECTIVES

3.1 OE CLEARANCE GOALS

The goal of this non-time-critical removal action is to reduce the explosive threat posed by OE items that potentially remain within Castner Range. This goal will be achieved by minimizing the public's exposure to these potential OE items. This goal corresponds to Section 300.415 (b)(2)(vi) of the NCP which identifies the "threat of fire or explosion" as a factor to be considered in determining the appropriateness of a removal action.

3.2 OE CLEARANCE OBJECTIVES

3.2.1 A number of factors must be considered when establishing specific objectives for a removal action. To be implementable, the objectives must be able to meet the requirements set forth in the ARARs, while still being realistic and achievable in terms of cost. To attain the goal of reducing the explosive threat posed by the potential for OE items remaining within Castner Range, the objectives identified must be effective, implementable, and economical. The criteria of effectiveness, implementability and cost will be used to evaluate the potential removal actions for the site in accordance with the protocols established in USEPA's *Guidance on Conducting Non-Time-Critical Removal Actions Under CERCLA* (August 1993).

3.2.2 The objectives established for this removal action will guide the development of alternatives within Castner Range and focus the comparison of acceptable removal action alternatives, if warranted. These objectives will also assist in clarifying the goal of minimizing the explosive risk and achieving an acceptable level of protection to the public and environment. These objectives include:

- Identify the degree and extent of OE contamination;
- Evaluate the effectiveness of various removal alternatives;
- Determine the ability to implement various removal alternatives; and
- Determine the cost to implement the various removal alternatives.

3.3 STATUTORY LIMITS

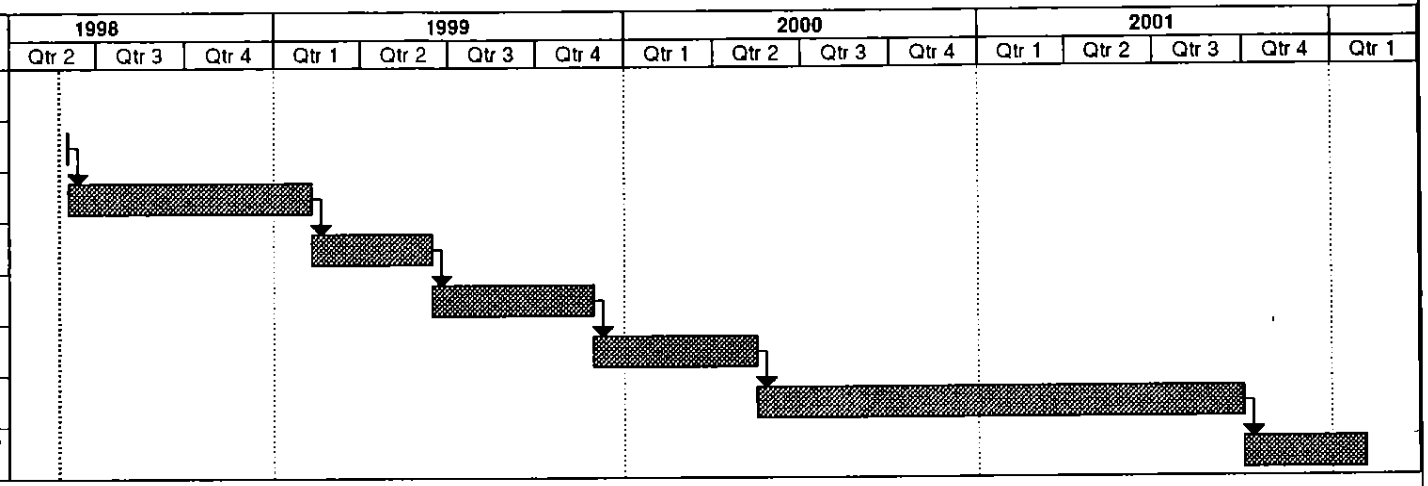
Statutory limits exist for responding to releases under Section 104 of CERCLA. These limits set a $2 million ceiling on Superfund-financed removal actions and a twelve-month time limit on implementing those removal actions. However, these limits do not apply to removal actions authorized under CERCLA Section 104(b) that are not financed by Superfund. As a result, the Castner Range OE removal action being examined in this OE Characterization and Cost Analysis report does not have any statutory fiscal or timeframe limitations set by CERCLA. However, there are funding limitations for the project based on the budget available and on the large number of OE-contaminated sites located throughout the country that must compete for these funds based on a "worst-first" funding criteria. The DERP may provide an option for funding in the future. However, competition for funding from other sites would be high.

3.4 SCHEDULE

Figure 3.4-1 presents a planning level schedule for determining the appropriate future land use for Castner Range and for establishing a project to perform the associated clearance required. The schedule also provides a planning estimate for performing the OE clearance and turning Castner Range over to new stewards. It is estimated that Castner Range could be transferred to a new steward in the first quarter of the year 2002.

Figure 3.4-1
Schedule for Castner Range Turnover

ID	Task Name	Duration
1		
2	Submit Final OE Char. Report	1d
3	Army Select & Develops Proj.	180d
4	Public Review and Comment	90d
5	Procure Clearance Contract	120d
6	Prepare & Approve Workplan	120d
7	OE Clearance	360d
8	Acceptance & Turnover	90d



Project: Castner Range
Date: March 1998

Task
Progress
Milestone
Summary
Rolled Up Task
Rolled Up Milestone
Rolled Up Progress

SECTION 4

SECTION 4
IDENTIFICATION AND ANALYSIS OF OE CLEARANCE ALTERNATIVES

This section identifies and describes the various methods used to detect, remove, and dispose of OE. The OE clearance alternatives for Castner Range are also identified and described in regards to how they will be implemented upon selection. This section also identifies the selection criteria and provides an evaluation of how each alternative meets the selection criteria.

4.1 IDENTIFICATION AND DESCRIPTION OF OE CLEARANCE TECHNOLOGIES

Various technologies and approaches exist for the clearance of OE. An OE clearance operation falls into three distinct areas: detection, recovery, and disposal. A discussion of the techniques used in each of these areas is presented in the following paragraphs.

4.1.1 OE Detection

4.1.1.1 The detection of OE includes those methods and instruments that can be used to locate OE. The selection of the best technology depends on the properties of the OE to be located, including whether the ordnance is found on the surface or below the surface, and the characteristics of the location where the OE is located, such as soil type, topography, vegetation, and geology.

4.1.1.2 Detection technologies have two basic forms. One form, visual searching, has been successfully used on a number of sites where OE is located on the ground surface. When performing a visual search of a site, the area to be searched is divided into five-foot lanes which are then systematically inspected for OE. A metal detector is sometimes used to supplement the visual search in areas where ground vegetation may conceal OE. Typically, any OE found during these searches is flagged or marked on a grid sheet for later removal.

4.1.1.3 The other form of OE detection, geophysics, includes a family of detection instruments designed to locate OE. This family of instruments includes magnetic instruments, electromagnetic instruments, and ground penetrating radar. Each piece of equipment has its own inherent advantages and disadvantages based on its operating characteristics, making the selection of the type of geophysical instrument paramount to the survey success. Nevertheless, geophysics is the most cost-effective method of conducting OE surveys. The equipment designed for OE geophysical surveys is lightweight, easily maintained, and very effective. However, there are limitations to geophysics. Geophysical equipment cannot usually distinguish OE items from other metallic objects located below the surface. "Cultural interference," such as underground utility lines, construction debris, or metal bearing rock, can deliver a signature to the equipment similar to OE. Therefore, it is necessary for the geophysical survey team to carefully document any known cultural interference prior to beginning the survey. Another limitation to the equipment is that metallic objects have to be much larger when at greater depths so that the geophysical equipment can obtain a reading. For instance, in the case of the EM31 (an electromagnetic instrument) its magnetic field can extend to a depth of 18 feet. However, 50% of its signal strength is used in the first foot of material below the ground surface.

4.1.2 OE Recovery

4.1.2.1 Once a site has been surveyed by either visual or geophysical means, the recovery of OE can begin. OE recovery operations can take the form of a surface-only clearance, an intrusive (subsurface) clearance, or a combination of the two methods. The decision on the appropriate level of clearance operation is based on the nature and extent of the OE contamination as well as the intended future use of the site.

4.1.2.2 During a surface clearance operation, exposed OE or suspected OE items are identified during the detection phase. The OE items are then inspected, collected (if possible), and transported to a designated area for cataloging and eventual disposal. If it is determined during the OE inspection that the item cannot be safely moved, then it may be necessary to destroy the OE item in place.

4.1.2.3 During a subsurface clearance operation, buried OE items or suspected OE identified by the geophysical survey or other detection methods requires excavation for removal. Because the actual nature of the buried OE item cannot be determined without it being uncovered, non-essential personnel evacuations are necessary, as well as, perhaps, the use of engineering controls to ensure the safety of the operation. The excavation of the OE item then takes place with either hand tools or mechanical equipment depending on the suspected depth of the object. Once the OE item has been exposed, it is then inspected, collected (if possible), and transported to a designated area for cataloging and eventual disposal. If it is determined during the OE inspection that the item cannot be safely moved, then it may be necessary to destroy the OE item in place.

4.1.2.4 Evacuations are sometimes necessary when conducting intrusive investigations to minimize the risk of the operation. An evacuation area is calculated by CEHNC based on the potential explosive force that could be encountered during an excavation. An evacuation distance is then calculated to ensure that all non-essential personnel are outside of that distance during the conduct of the excavation. Engineering controls can be developed to reduce this evacuation distance; however, evacuations may be required in any future OE investigation at Castner Range if excavations take place close to any inhabited areas and engineering controls cannot be developed to reduce the exclusion zone to preclude the need to evacuate. Every possible option will be explored to minimize potential evacuations with the exception of compromising public safety. Due to the remoteness of Castner Range, it is unlikely that many evacuations will be necessary during OE clearance operations. The areas where evacuations might be required are along the northeast and southeast boundaries where there are public residencies, and in the vicinity of the museums. However, the trans-mountain highway and/or Highway 54 could be closed during in-place demolition activities.

4.1.3 OE Disposal

4.1.3.1 Disposal of recovered OE items at Castner Range can take one of two forms, remote, on-site demolition and disposal, or in-place demolition and disposal. The decision regarding which of these techniques to use is based on the risk involved in employing the disposal option, as determined by the specific area's characteristics and the nature of the OE items recovered.

4.1.3.2 If an OE item is recovered in close proximity to occupied buildings, such as the museums, it may not be possible to safely destroy the OE item in place. In this instance, the OE item can be moved to a remote part of the project site where demolition and disposal can safely take place. A countercharge can be used to destroy the OE item or the OE item can be burned as a means of destruction. Burning an OE item is not as desirable as a countercharge, however, as the burning can produce secondary explosions or the item may not be completely destroyed, thus leaving the OE item in a more dangerous state than it was originally. Engineering controls, such as sandbag mounds and sandbag walls over and around the OE item, are often used to minimize the blast effects when an OE item is destroyed in this manner.

4.1.3.3 Alternatively, an OE item may be destroyed in place. This technique is typically employed when the OE item cannot be safely moved to a remote location. When employing this technique, procedures similar to those described above are used that will detonate the OE item or apply sufficient pressure and heat to neutralize the hazard. When this technique is employed, engineering controls such as sandbag mounds and sandbag walls over and around the OE item are often used to minimize the blast effects.

4.2 IDENTIFICATION AND DESCRIPTION OF OE CLEARANCE ALTERNATIVES

The alternatives identified in this section have been selected based on the results of the investigations conducted to date as well as available OE detection and disposal technology. Each alternative, if implemented, must have the ability to achieve the removal action objectives. For the removal action at Castner Range, five alternatives have been developed:

- no further action;
- institutional controls;
- removal of surface OE items;
- removal of OE items to a depth of one foot; and
- removal of OE items to a depth of four feet.

No remedial measure, even using the best available technology, can completely remove all OE risk within Castner Range. Yet, all of the remedial measures being considered for the site will reduce the risks posed by inadvertent ordnance detonation, resulting in a reduction of the OE risk. It may also be feasible and appropriate to combine some of the alternatives to optimize the safe transition of the site to a future land use.

4.2.1 No Further Action

Alternative 1, if selected, would take no further action in regards to detecting, clearing, and disposing of any potential OE. No further action would involve the continued use of Castner Range in its current condition. This alternative can be implemented if the potential exposure and hazards from OE are compatible with current conditions and operations in the area as well as the removal action objectives such that there is a very low risk to human health. Implementation of this alternative would be dependent upon the results of the risk analysis. If the risk analysis results indicate a low risk for an occasional user, then the site may be turned over for use as a park without any OE removal. If the plains area has a low risk for a commercial/residential user, then that portion of Castner Range may be used for commercial or residential development without OE clearance. Implementation of the no further action alternative would result in the Army turning over the site with no improvements or OE clearance work. The Army could place restrictions on the use of the property based upon the results of the risk analysis. For example, the site could be turned over for use as a park with no further action, but there could be a restriction preventing commercial or residential development.

4.2.2 Institutional Controls and Analysis

The institutional controls alternative (alternative 2), if selected, would provide a means for the Army to prevent access to Castner Range or a portion of the range if it were not possible or practicable to clear OE from the site. Examples of potential institutional controls include fences, warning signs, educational programs, and deed restrictions. The institutional control alternative could be implemented as a stand alone alternative, or may be implemented in conjunction with another selected alternative to ensure that restrictions on future land use are followed. For example, it may be necessary to fence off an area within a future park that has a high quantity of OE which is inaccessible to clear. Another example is that an educational program may be required to warn the public that the Castner Range portion of the Franklin Mountains State Park was once a live firing range where visitors could find OE items. The educational program would provide guidance on safety and prudent actions should a visitor to the park discover OE material. The following discussion presents details of an institutional analysis that was conducted for Castner Range. The detailed report is included as Appendix B.

4.2.2.1 Purpose

Institutional controls rely on the existing powers and authorities of other government agencies to protect the public at large from OE risks. Instead of direct removal of the OE from the site, these plans rely on behavior modification and access control strategies to reduce or eliminate OE risk. This analysis documents which government agencies have jurisdiction over Castner Range and assesses their capability and willingness to assert control which would protect the public at large from explosives hazards. This report also documents the obligation of the government, corporate or private landholders of OE contaminated lands to protect citizens from safety hazards under the law.

4.2.2.2 Methodology

This detailed analysis of institutional control alternatives has been prepared in accordance with guidance developed by the Huntsville Division, Army Corps of Engineers. This analysis supports the development of institutional control alternative plans of action. Institutional control relies upon the existing powers, authorities, and cooperation of local, state, and federal government agencies to protect the public from ordnance risk. Instead of removing ordnance from the site, these plans rely on behavior modification and access control strategies to reduce ordnance risk. For these strategies to be successful, the cooperation of local and state authorities and private interests is required.

4.2.2.3 Institutional Control Alternatives

4.2.2.3.1 Risks related to ordnance contamination may be managed through conventional removals, access control, public awareness programs, or a combination of strategies. It is important to understand that the risk associated with ordnance contamination is associated with three causative factors that if completely avoided would prevent an ordnance-related accident. These three factors are: presence, access, and behavior. If there is no presence of ordnance on the site (none located on site), then there is no possibility of an ordnance-related accident. If ordnance exists onsite, but people do not have access, then there will be no accident. Even if ordnance exists onsite and people have access to the ordnance, if their behavior is appropriate, then there will be no accident. An accident requires all three events or circumstances to be present. No accident will happen if any one causative factor is missing. Each factor provides the basis for a separate implementation strategy. Access control and behavior modification through public awareness are institutional controls. The general institutional control alternatives analyzed in this report include:

- Access Control,
- Notice,
- Printed Media,
- Classroom Education,
- Audio Visual Media,
- Exhibits/Displays,
- Internet Web Site, and
- Ad Hoc Committee.

4.2.2.3.2 Behavior modification relies on the personal responsibility of the site user. Even if the ordnance exists and there is open access to it, there is no risk if the behavior is appropriate. For behavior to be appropriate, one must understand the situation and voluntarily react in a responsible manner. The power of the federal government is limited in any situation where local enforcement is available. Therefore, the local authorities must be convinced that the risks are sufficient to warrant their participation. The concept of behavior modification through public awareness extends to agencies that have jurisdiction over the site. Some behaviors that must be modified may belong to the local government. Raising public awareness for the hazards that exist within Castner Range can be facilitated in a variety of ways, as will be discussed in the following paragraphs. Modification of one's behavior through public awareness is essentially an education/information process and can include notices (such as deed notifications/restrictions, notifications during property transfers, and notification during permitting), education classes (including ordnance identification, safety presentations to various audiences, preparation of packages for administrative and public officials), printed media (including brochures and news articles), visual media (including videotapes and local television programs), exhibits/displays, and creation of an Ad hoc committee.

4.2.2.3.3 Discussions of alternatives and the recommendations presented in this report are based on the assumption that informing and educating the public to the potential risks associated with the ordnance remaining on Castner Range will reduce the possibility of injury. However, it is also understood that public awareness may incite a reverse reaction in a small segment of the population that may view the dangerous handling of ordnance as an adventure. There are many instances where removal of surface or subsurface ordnance is the appropriate and recommended alternative for reduction of the risk associated with ordnance contamination. Removal produces a condition where there is less ordnance onsite. If human behavior is the same before and after the removal, then the risk is substantially reduced. However, if the removal results in a behavior that is less cautious or less informed than the behavior prior to removal, then a situation exists where some risk may be intensified. Therefore, it is recommended that any removal action at Castner Range be augmented with behavior modification strategies/alternatives, which includes education and information programs.

4.2.2.3.4 **Access Control**. Access control limits the use of the contaminated property. This can be accomplished by implementing various restrictions or dedicating the property to compatible use. The target strategy is to remove the human element from the chain of events that could lead to an accident. Access control can be facilitated in the form of signage, fencing, land-use restrictions, and/or regulatory control.

4.2.2.3.4.1 **Signage**. Sign posting is typically completed to inform people that entry is prohibited or that activities within the property are restricted in some manner. Defiance of these restrictions may be subject to disciplinary legal action. Signage is typically one element of a plan that uses the concept of respect for property rights. Trespass laws are the key element of enforcement and cooperation between landholders, law enforcement, and the general public. These laws are encouraged by other elements of the plan. The link between not trespassing and explosive safety must be made. Signs informing the public of potential dangers could be created and posted around the area to prevent or discourage entry. Signage is only effective with the cooperation of local officials and the community together with the funding and technical support from the federal government. The federal government owns all of the property within Castner Range. Warning signs currently exist along the perimeter of Castner Range. These signs state:

WARNING ● DANGER FORMER ARTILLERY FIRING RANGE NO TRESPASSING
Unexploded projectiles or missiles are dangerous. The handling or removal of such ammunition and any other items by unauthorized personnel is prohibited. Violators will be prosecuted under penalities provided by law. Do not remove plants or rocks.

4.2.2.3.4.2 **Fencing**. As with signage, fencing is typically one element of a plan that uses the concept of respect for property rights. Trespass laws are the key element of enforcement and cooperation between landholders, law enforcement, and the general public. These laws are encouraged by other elements of the plan. The link between not trespassing and explosive safety must be made. Fences provide a physical barrier to inadvertent entry. Therefore, it may be easier to enforce trespass strictures. Fencing is only effective with the cooperation of local officials and the community with funding and technical support from the federal government. The federal government owns all of the property at Castner Range. There are no fences at the perimeter or within Castner Range.

4.2.2.3.4.3 **Land Use Restrictions and Regulatory Control**. There are no zoning or land use restrictions within Castner Range. There is little opportunity to limit access through the regulatory control process. Behavior modification can be facilitated through land use controls. Planning boards and zoning commissions have the authority based on state or local law to restrict uses of property in the public interest. Eliminating ordnance contaminated property from unrestricted development may be prudent and beneficial. However, within the majority of Castner Range there are no zoning or land-use restrictions.

4.2.2.3.5 **Notice**. Appropriate notice can exert a strong influence on one's behavior. When notice of ordnance contamination is given, it can affect the expectations of potential users. Appropriate uses can be sought, and the land may still be used for economic gain. However, the contamination must be considered in the design and use of any site improvements or activities. Notices can be placed on a property in at least three ways: deed notification/restriction, notification during any property transfers, and notification during any permitting process. The property within Castner Range has never been sold and is still owned entirely by the federal government. Any future reuse of the land would be subject to the GSA excess land process. The exception to this process may be the potential leasing of portions of the land for development. In either instance, future use of the land may be restricted through the three notice methods.

4.2.2.3.5.1 **Deed Notifications/Restrictions**. Notifications of ordnance contamination and restrictions of use could be placed on the deeds of any properties that are made available for use either through the government excess process or if the Army leases parcels for development.

4.2.2.3.5.2 **Notification During Property Transfers**. In general, property owners have a responsibility to protect the public from dangers associated with their property. In the case of the excessing or leasing of ordnance contaminated property, a liability exists that should be disclosed to prospective buyers or lessors. It may be prudent for a lending institution or bank regulatory agency to consider this factor when lending money on ordnance-contaminated property. Prior to placing a notification on a property transaction, one should obtain a legal rendering.

4.2.2.3.5.3 **Notification During Permitting**. Typically controls are in place to protect property owners and their neighbors through approvals or permits required to develop properties in certain ways. Approvals generally ensure that proper notice is given, reasonable plans consider the presence of endangered species, wetlands, or other concerns, and that the land is being developed for an appropriate use. Permits combine all of the benefits of approvals and get a legally binding commitment for certain behavior. The assumption that permits can be revoked for cause provides enforcement under local authority.

4.2.2.3.6 **Printed Media**. Ordnance awareness, respect for the risk involved, and reinforcement of the message are key ingredients in minimizing the risk associated with ordnance contamination. One of the major avenues available to facilitate this awareness and understanding is through printed media, in the form of brochures, fact sheets, newspaper articles, and other information packages. The opportunity to disseminate information through the printed media is readily available and can be easily facilitated. The current residents within the region should be aware of ordnance contamination within Castner Range. However, since trespassing on the property occurs daily, area residents should be reminded of the ordnance contamination on a regular basis so that they will be aware of the potential hazard. Also, providing information to new residents, visitors, or others not currently aware of the situation of primary importance. The addition, reinforcement, and augmentation of current knowledge is desirable in order to keep the realization of ordnance contamination and the potential hazards in the minds of people at all times.

4.2.2.3.6.1 **Brochures/Fact Sheets**. Brochures and/or fact sheets can be produced that describe the history of Castner Range, how to identify ordnance, safety procedures associated with the proper handling/avoidance of ordnance items, instructions for dealing with ordnance if encountered, and telephone numbers to contact if ordnance is encountered or if questions need to be answered. These brochures could be produced by USACE, but should also include local sponsorship and ownership. These brochures could be distributed as follows:

- Direct mail to all area residents in the City and County.
- Enclosed in tax bills.
- Enclosed in power bills.

- Enclosed as flyer in local press.
- Included in Chamber of Commerce literature.
- Provided to the public at the Wilderness Park Museum.
- Provided to hotels, motels, and other tourist attractions.
- Provided through educational systems to all students in the region.
- Provided to all recreational groups/clubs.
- Provided to all professional groups/clubs.
- Provided to all civic groups/clubs.
- Provided to all military personnel.

4.2.2.3.6.2 **Newspaper Articles/Interviews**. Newspaper articles and interviews with local residents, the USACE, and other institutions can be printed to further educate the public concerning the ordnance contamination at Castner Range. These articles can be very informative, can effectively reduce the risk of improper handling of ordnance, and can be presented in a positive manner. Articles have been previously published in the local newspapers. Many of the residents of the region lived and worked in the area when Castner Range was active. Interviews with these people would add interest to newspaper articles.

4.2.2.3.6.3 **Information Packages for Public Officials**. Generally, the public is aware of the ordnance contamination at Castner Range. However, the location and extent of the contamination is unknown, and this information is not readily available through the public officials. An information package produced by USACE (possibly from maps currently available and reproducible from the OE Characterization Report and Cost Analysis) defining primary areas of concern would be valuable for the public officials. Recommended maps would include the boundary of the former site. Another valuable piece of information that should be included in the information package would be an abstract of studies completed to date. This abstract should include a brief history of Castner Range, areas of greatest concern, types and potential danger of the ordnance discovered, USACE contacts, and other contacts to discuss safety concerns.

4.2.2.3.7 **Classroom Education**. Public awareness can be facilitated through the classroom. Although the public generally understands that ordnance exists within Castner Range, they do not have the necessary training to properly identify and avoid ordnance if encountered. A properly educated public is more likely to make correct decisions related to the safe and proper precautions of found ordnance. Classroom education can be offered in two major categories: ordnance identification and safety.

4.2.2.3.7.1 **Ordnance Identification**. Although everybody that enters Castner Range needs to be aware of the potential risk associated with ordnance, it may not be necessary for everybody to be trained in ordnance identification. The basic message should be not to touch anything that looks like ordnance, shrapnel, or any other unidentified material. However, it may be prudent to properly educate public officials and institutions that will play a role within the future use of Castner Range. Ordnance identification classes would be valuable for the following institutions: City of El Paso, El Paso County, Fort Bliss, the Wilderness Park Museum, and the El Paso Public School system. In addition, the Texas Department of Public Services, Highway Department, and the Parks and Wildlife Department may also benefit from ordnance identification classes. Ordnance identification classes are conducted at various times and locations around the nation. It may be possible to schedule classes and transport public officials to these classes; although this could be costly and time consuming. USACE may wish to consider experts in the detection and identification of ordnance to the area to provide the education. An ideal opportunity to provide ordnance identification classes would be in conjunction with a scheduled removal action. Videos could be made by ordnance experts, and these videos could be made available to public officials to view at their leisure.

4.2.2.3.7.2 **Ordnance Safety**. The affected public should be educated about the potential dangers associated with ordnance and should understand the safety procedures to follow should they encounter any suspected ordnance item. Safety presentations should be made to all public and private primary and secondary schools in the region. Also ordnance safety courses could be offered by the Parks and Wildlife Department and the City of El Paso through the Wilderness Park Museum and Fort Bliss.

4.2.2.3.8 **Audio Visual Media**. Ordnance awareness, respect for the risk involved, and reinforcement of the message are key ingredients in minimizing the risk associated with ordnance contamination. One of the major avenues available to facilitate this awareness and understanding is through visual media, in the form of videotape programs for use during presentations and for broadcast on local television stations. The opportunity to disseminate information through the visual media is readily available and can be easily facilitated. Most of the current residents of the region should already be aware of the ordnance contamination at Castner Range. However, providing additional information to new residents, visitors, or others not currently aware of the full extent of the situation is beneficial. Also, reinforcement and augmentation of the current knowledge can be valuable.

4.2.2.3.8.1 **Videotapes**. Professional quality videos can be produced that describe the history of Castner Range, how to identify ordnance, safety procedures associated with avoidance of ordnance items, instructions for dealing with ordnance if encountered, and telephone numbers to contact if ordnance is encountered or if questions need to be answered. The videos can be produced by USACE, but should include interviews with local citizens, local sponsorship, and local ownership. Videotapes can be produced to be shown in classrooms throughout the region. Copies should also be provided to local libraries, colleges and universities, the City of El Paso, El Paso County, and the Wilderness Park Museum. These institutions could make the videotapes a part of permanent exhibits/displays.

4.2.2.3.8.2 **Television**. Local television stations would provide excellent local access of programs about Castner Range, the presence of ordnance, how to identify ordnance, safety procedures associated with avoidance of ordnance items, instructions for dealing with ordnance if encountered, and telephone numbers to contact if ordnance is encountered or if questions need to be answered. All television stations are anxious to provide local information reporting and programming. It is suggested that the television programs include interviews with USACE personnel, local residents, and others who have knowledge of the history and understanding of the ordnance at Castner Range. To be most effective, the length of the television program would be approximately 30 minutes; however, a shorter version of the videotape (5 to 7 minutes) could be produced to educate the public through short segments on public television. Therefore, two different videos may be advisable.

4.2.2.3.9 **Exhibits/Displays**. Placing exhibits/displays in museums or other areas where the public will be exposed to educational information can be an effective method of raising and preserving general awareness and educating the public on the possible risk associated with the ordnance at Castner Range. The most logical location for this display is the Wilderness Park Museum. Other locations exist within the city and county where a display would receive exposure and would aid in informing and educating the public about the possible risk associated with ordnance. Some of these locations include City Hall, the County Courthouse, Fort Bliss, the University of Texas at El Paso, and bank and other institution lobbies. Also, a mobile display could be prepared to be moved from one location to another to obtain exposure to the maximum number of potentially affected people. This mobile display could be exhibited at many locations throughout the region including those listed above.

4.2.2.3.10 **Internet Web Site**. The creation of a Web Page on the Internet could be very effective method of raising and preserving general awareness and educating the public about Castner Range. The Web Page could be designed to include the history of Castner Range and the region, and sites of historical significance, ecological significance, flora and fauna. The fact that ordnance exists on the site would be explained as well as how to identify ordnance, safety procedures associated with avoidance of ordnance items, instructions for dealing with ordnance if encountered, and telephone numbers to contact if ordnance is encountered or if questions need to be answered. The Texas Parks and Wildlife department may also add Castner Range to their Web Site concerning the Franklin Mountains State Park.

4.2.2.3.11 **Ad Hoc Committee**. Creation of an ad hoc committee, composed of influential members of the community and a representative from the USACE, would serve as a mechanism for facilitating implementation of the original recommendations and for ensuring reinforcement of these recommendations. Additionally, the overall effectiveness of each of the in-place alternatives can be analyzed regularly, and other methods of modifying behavior through public awareness can be evaluated.

4.2.2.4 Acceptance of Joint Responsibility

4.2.2.4.1 The primary agencies with responsibility to implement an institutional control alternative are the Department of the Army and the State of Texas Department of Parks and Wildlife. The city of El Paso would have secondary responsibility. Under a commercial/residential land use scenario the Department of the Army would have total responsibility because the control of the property would be fully retained by Fort Bliss.

4.2.2.4.2 Shared responsibility would be required for any areas transferred to the State of Texas Department of Parks and Wildlife. The State of Texas Department of Parks and Wildlife would need to work together with the Army to develop and distribute printed materials and training courses. The City of El Paso would play a consulting/advisary role in the implementation of printed materials and training courses.

4.2.2.4.3 The State of Texas Department of Parks and Wildlife would be responsible for following any deed restrictions placed on the property, and the Department of the Army would be responsible for conducting any future OE surveys or clearance if a land improvement project were needed, or if an OE item were discovered.

4.2.2.5 Technical Capability

The Department of the Army at Fort Bliss and the State of Texas Department of Parks and Wildlife have the technical resources and capabilities to implement institutional control alternatives at Castner Range. Both departments have access to legal council to negotiate and complete property transfers and deed restrictions. Both departments are experienced with public relations and preparation/distribution of printed informative materials and training courses. It is likely that the Franklin Mountains Wilderness Coalition would also be involved with the public awareness aspects of institutional control alternatives associated with the park future land use alternative.

4.2.2.6 Intergovernmental relationships

The primary agencies that would be involved in implementing the institutional control alternatives are both government agencies that have worked together in the past since the western edge of Castner Range is the boundary of the Franklin Mountains State Park.

4.2.2.7 Stability

Both the Department of the Army and the State of Texas Parks and Wildlife Department are government agencies with long term stability.

4.2.2.8 Funding Sources

The source of funding to implement institutional controls at Castner Range would come from government sources. Fort Bliss would fund aspects of institutional control programs such as deed restrictions, fencing, and signage that they are responsible for, and the Texas Department of Parks and Wildlife would be responsible for funding actions that would establish and retain community awareness programs.

4.2.3 Removal of Surface OE Items

4.2.3.1 Alternative 3, if selected, would include the surface clearance of all OE and OE-related items from the site. This alternative would be required if the risk analysis indicates that there is a moderate to high risk to the public from exposure to OE on the ground surface of Castner Range and a low risk of exposure to subsurface OE. This alternative would be acceptable for use on land that was going to be used either for the Franklin Mountains State Park, or for commercial/residential development. A land surveyor would establish control points for a grid system that would cover the area.

Where required, brush clearing crews would clear enough undergrowth so that the surface clearance crews could adequately perform their work. Where possible, brush clearing would be reserved for areas where the future land use is for commercial or residential development. Brush clearing should be limited to only those areas that are inaccessible to the UXO clearing crew or where geophysical equipment can not be used without adequate brush clearing. In areas where the future land use is for the Franklin Mountains State Park, brush clearing would not be used because the vegetation in this environment would be slow to re-establish. Therefore, metal detection devices would be relied upon because they would be less damaging to the natural ecosystem than brush clearance. Surface OE clearance would be completed by experienced UXO-qualified personnel who would visually search the ground surface for any OE. In addition, UXO-qualified personnel would also use metal detection devices to ensure that any OE items that may exist on or within the top 6 inches of existing ground cover are located during the sweep. The UXO-qualified personnel would perform their sweep in lanes five feet wide, or some other comparable width depending on the sweep reach of the type of metal detection equipment used, to ensure complete surface coverage. All potential OE contacts on the ground surface (up to 6 inches below the surface) would then be identified.

4.2.3.2 Any OE item located during the sweep would be inspected to ensure its stability. During this inspection, a determination would be made whether any uncovered OE items could be moved based on an Explosive Ordnance Reconnaissance (EOR). If a determination is made through the EOR that the OE item is not safe to move, then the object would be destroyed in place, otherwise, the item would be removed to a remote location for onsite destruction and disposal. If necessary, engineering controls would be used to minimize the need for evacuation of the public. All inert OE items or other OE-related scrap would be removed from the area and transported off-site for disposal.

4.2.3.3 Occasionally, OE items have been found on a site after previous clearance activities were performed. This is not likely to be a problem at Castner Range because the soils are thin, and are very rocky such that almost no OE has been found below the ground surface. However, there are areas where erosion has deposited thicker lenses of softer soils. These areas may have to be periodically visually surveyed, if this alternative is selected.

4.2.4 Removal of OE Items to a Depth of One Foot

4.2.4.1 Alternative 4, if selected, would include the surface clearance of all OE and OE-related items (as specified in Alternative 3) with the addition of subsurface clearance of OE items that can be located to a depth of one foot below the ground surface. This alternative would be implemented if the risk to the public from surface OE is moderate or high and the risk is also moderate or high from OE located at a depth not to exceed one foot. This alternative would be reserved for the plains area if the land were to be used for commercial or residential development. This alternative would not be acceptable for land that was going to be turned over to the Franklin Mountains State Park since the natural ecosystem would be disturbed in the areas affected by the subsurface OE clearance. A land surveying and brush clearing operation would be necessary as described in Alternative 3. This alternative would consist of two phases, an investigation phase and a subsurface clearance phase. Both phases of this alternative will be performed by experienced UXO-qualified personnel who have received the Army's specific Explosive Ordnance Disposal (EOD) training at the Indian Head facility.

4.2.4.2 During the investigation phase, a metal detection device would be used to perform the surface sweep which is also capable of performing the subsurface survey. In this way, both the surface and subsurface surveys could be performed simultaneously saving the government time and money. The primary difference in performing this kind of survey over that described in Alternative 3 is that instead of relying primarily on visual identification and near surface detection, a marking/locating system must be used to be able to relocate the subsurface anomaly at a later date to intrusively investigate it. All surface anomalies uncovered during the performance of the survey would be immediately identified and removed/disposed from the area to ensure that only subsurface anomalies remain.

4.2.4.3 The second phase to this approach includes the intrusive investigation of all subsurface metallic anomalies identified during the metal detection survey to determine their exact nature. During this intrusive investigation, phased engineering controls may have to be used to reduce the evacuation distance that would be required during the conduct of these investigations. Evacuation distances are determined by CEHNC based on the "maximum credible event" (MCE) or worst case scenario of the potential detonation of an ordnance item that could be found at the site. All non-essential personnel would be evacuated at this distance from the excavated area based on the MCE to maximize the safety of the operation. Once the intrusive investigations begin, each anomaly will be excavated in six-inch depth increments. If the item causing the magnetic reading has not been identified within the first foot below the ground surface, then the excavation will cease and the excavated area will be returned to its original state.

4.2.5 Removal of OE Items to a Depth of Four Feet

4.2.5.1 Alternative 5 would include the surface clearance of all OE and OE-related items from the entire site in the same manner as detailed in Alternative 4 except that subsurface clearance of anomalies will be performed to a depth of four feet below ground surface. This alternative would be implemented if there is a moderate to high risk to the public from surface OE and OE located at depths up to four feet. This alternative would be reserved for the plains area if it would be developed for commercial or residential future land use. This would not be an acceptable alternative for land that was going to be turned over to the Franklin Mountains State Park since the natural ecosystem would be disturbed in the areas affected by the subsurface clearance. This type of clearance operation must be performed by experienced UXO-qualified personnel. The steps used in conducting this type of survey would be the same as those outlined in Alternative 4. The only difference in the conduct of the operation would occur during the intrusive investigation phase of the operation where the excavations would be conducted to a depth of four feet rather than the one foot depth used in Alternative 4.

4.3 IDENTIFICATION OF SELECTION CRITERIA FOR OE CLEARANCE ALTERNATIVE EVALUATION

Each OE Clearance Alternative is evaluated according to the selection criteria of effectiveness, implementability, and cost. Figure 4.3-1 presents a summary of the OE clearance alternatives selection criteria. The following paragraphs define and describe each selection criteria that were used to evaluate the OE clearance alternatives.

4.3.1 Effectiveness

4.3.1.1 Effectiveness is the threshold criteria. The following two components of effectiveness are mandatory requirements which must be satisfied in order for an OE clearance alternative to be selected:

(1) **Protection of human health and the environment** is the ability of the OE clearance alternative to adequately reduce the risk of inadvertent detonation which could injure members of the public.

(2) **Compliance with ARARs** is the ability of the OE clearance alternative to satisfy the requirements specified in the list of ARARs.

4.3.1.2 An OE clearance alternative must be effective at protecting human health and the environment and comply with the ARARs in order to be selected for implementation.

4.3.2 Implementability

Implementability is a primary balancing criteria which is used to compare the major trade offs between the OE clearance alternatives. Implementability is the technical and administrative services required to implement an OE clearance alternative. Each OE clearance alternative was assessed to determine the ease or difficulty of implementation by considering the following factors:

(1) **Technical feasibility**, including technical difficulties and uncertainties associated with the detection and clearance operations;

(2) **Reliability** of the detection and clearance techniques;

(3) **Environmental impacts** resulting from the OE detection and clearance; and

(4) **Ease of administering** the OE detection and clearance.

4.3.3 Cost

Cost is a primary balancing criteria which is also used to compare the major trade offs between the OE clearance alternatives. Cost is the amount of funds required to conduct the OE clearance alternatives. Each OE clearance alternative was assessed to determine the capital and operating costs that would be required:

(1) **Capital Costs** are the OE detection, clearance, and disposal cost.

(2) **Operating Costs** are any costs for long term administrative controls, educational awareness programs, or future OE detection activities.

Figure 4.3-1
OE Clearance Alternative
Selection Criteria

Threshold Criteria	Effectiveness - Protection of Human Health and the Environment - Compliance with ARARs
Primary Balancing Criteria	Implementability - Technical Feasibility - Reliability - Environrmental Impacts - Ease of Administering Cost - Capital Cost - Operating Cost

4.4 ANALYSIS OF OE CLEARANCE ALTERNATIVES

The following discussion provides an analysis of each OE clearance alternative identified in Section 4.2, except Alternative 5 (clearance to a depth of four feet), with respect to the selection criteria specified in Section 4.3. Scenario 1 is to transfer the entire site to the Texas Parks and Wildlife Department for an annex to the Franklin Mountains State Park. Scenario 2 divides Castner Range into two regions. Region 1 includes eastern portions of zones 2, 5, and 7 and all of zone 11 from the CMS study (Figure 2.2-3). This region includes the relatively flat areas of Castner Range, where surface and subsurface clearance is feasible and commercial/residential development is a feasible future land use. Region 2 includes the remaining portions from the CMS study of Castner Range. The second region represents the areas within the Franklin Mountains where the feasibility of OE clearance is significantly reduced and turning the land over to the Franklin Mountains State Park is the only feasible future land use scenario. Table 4.4.7 at the end of this section presents a summary of the analysis of OE clearance alternatives.

4.4.1 No Further Action

4.4.1.1 Effectiveness.

4.4.1.1.1 The distribution of remaining OE items and the results of the risk analysis indicate that the no further action alternative will not provide adequate protection of human health and the environment for either a park or commercial/residential development. The current risk at Castner Range would continue to exist at the estimated levels presented in Section 2 which are summarized in Table 4.4-1.

Table 4.4.1
No Further Action Risk Summary

Scenario	Region	Predicted Annual Exposures
Scenario 1	Entire Site, Park	13,229 to 79,053
Scenario 2	Region 1 Commercial/Residential Development	4,513 to 28,491
Scenario 2	Region 2 Park	6,332 to 44,174
Scenario 2	Combined Regions	10,845 to 72,665

The annual predicted exposures under Scenario 1 would be 13,229 to 79,053, and 10,845 to 72,665 for Scenario 2. The no further action alternative will be carried through the analysis to act as a baseline for alternative comparison purposes.

4.4.1.1.2 The no further action alternative could be implemented in compliance with the location specific ARARs identified in Section 1. The Army would be required to consult with the native American tribal counsels in compliance with the American Indian Religious Freedom Act and the Native American Graves Protection and Repatriation Act to identify if there are any sacred religious or burial grounds within Castner Range and develop a plan to protect these areas for native Americans. Studies would be required to identify sensitive, rare, and endangered species, and archaeological/historical artifacts/sites and assess the impacts to these resources from commercial/residential development. These studies would not be required to satisfy the NEPA regulation if the land is deeded to the State of Texas for an extension of the Franklin Mountains State Park. A permit would be required to excavate or remove any archaeological resources pursuant to the Protection of Archaeological Resources Act, as well as the Preservation of American Antiquities Act.

4.4.1.2 Implementability

It is technically feasible to implement the no further action alternative as implementation would be the future extension of the operation as it currently exists. Restrictions would have to be placed on the site preventing any intrusive archaeological investigations and land improvements or developments without specifically performing OE clearance on the construction sites. The reliability of the OE detection and clearance would not be applicable to this alternative since these actions would not be performed and the warning signs could remain as they currently exist. There would be no impacts to the environment from implementing this alternative. This alternative could be easy to implement from a technical standpoint since it is the continuation of the status quo. However, this alternative could be difficult to implement from the State of Texas and public perception point of view due to the risk associated with the increased number of visitors to the site. In addition, because of known ordnance present on the site, the no action alternative may prevent the release of property to future land users.

4.4.1.3 Cost

The capital costs associated with the creation of a park would be low for the no further action alternative since there would be no OE clearance costs. However, the operating costs may be high due to the Army's liability for responding to OE items found by the public and the potential for liability if any member of the public was involved in an accidental detonation.

4.4.2 Institutional Control

All the institutional control alternatives could be implemented for both land use scenarios in a manner which would be protective to human health and the environment, and be in compliance with the identified ARARs. The Army would be required to consult with the native American tribal counsels in compliance with the American Indian Religious Freedom Act and the Native American Graves Protection and Repatriation Act to identify if there are any sacred religious or burial grounds within Castner Range and develop a plan to protect these areas for native Americans. Studies would be required to identify sensitive, rare, and endangered species, and archaeological/historical artifacts/sites and assess the impacts to these resources from commercial/residential development. These studies would not be required to satisfy the NEPA regulation if the land is deeded to the State of Texas for an extension of the Franklin Mountains State Park. A permit would be required to excavate or remove any archaeological resources pursuant to the Protection of Archaeological Resources Act, as well as the Preservation of American Antiquities Act. The following sections provide an analysis of each institutional control alternative with respect to effectiveness, implementability, and cost. The exposure risks associated with this alternative are the same as for the no further action alternative because ordnance will not be removed. However, the goal of institutional controls is to influence the public's behavior thereby limiting the number of annual exposures and preventing accidental detonation. Table 4.4.2 presents a summary of the institutional control alternative analysis.

4.4.2.1 Access Control

4.4.2.1.1 Effectiveness

Signs and fencing should be a minor element of plans that promote respect for property rights. Fencing, if implementable, would be effective in reducing the risk of exposure to ordnance contamination, but it would also restrict the future use of the area to be fenced. Fencing the entire perimeter would be virtually impossible because of the size of the range and mountainous terrain. Fencing may be implementable in some areas of the perimeter and interior of Castner Range, but the implementability, and therefore the effectiveness, of the fencing would be limited. Signs have been posted for many years. These signs restrict access and warn of the danger of ordnance. Based upon information gathered from the interview phase of this effort, the public pays little attention to these signs and has utilized Castner Range for recreational purposes since its use as a range was discontinued in 1966. There are currently no zoning or land use restrictions within Castner Range. If such restrictions were placed on the land, it is doubtful that they would be effective in preventing trespassing.

4.4.2.1.2 Implementability

To install a fence to restrict access to the easily accessible areas of Castner Range will require the preparation of a survey and analysis of the perimeter areas to determine where the most accessible areas are located and how they could be fenced to restrict access. As noted above, fencing this entire area is not implementable. The erection of fencing around some areas of the range could be implemented, but its effectiveness would be limited. The posting of signs has already been implemented around the perimeter of Castner Range and along the Trans Mountain Highway. Land use restrictions and regulatory controls could be imposed on the range area, but these restrictions would do little to prevent the use of Castner Range.

4.4.2.1.3 Cost

A cost for installing a fence was not developed because of the limitation on the implementability of this alternative. Expansion of the existing signage is expected to cost approximately $25,000 for the entire range. Annual maintenance and/or replacement of signs is not expected to cost more than 5% of the initial cost, or $1,250 per year.

4.4.2.2 Notice

4.4.2.2.1 Effectiveness

A notice can be placed on the deed or lease agreement to notify the owner/lessor of the potential for ordnance contamination within the property. Notice on a property transaction can also be effective. Adding notification during the permitting process would effectively reinforce the message for those that will be developing the property. Therefore, all three methods of providing notice are somewhat effective.

4.4.2.2.2 Implementability

Placing notice on deeds (either during the time of the property transfer or before) should be implementable, but the legality must be further investigated before implementation. If deemed legal, USACE will need to draft language to be added to deeds and present this information to the El Paso County Clerk before any land sales or leases are completed on Castner Range. This information must also be made available to the banks and other lending institutions. Providing a mechanism for adding notification during the permitting process for any development on Castner Range should be implementable.

4.4.2.2.3 Cost

The cost associated with placing notice would be minimal, assuming there are no legal problems associated with this alternative.

4.4.2.3 Printed Media

4.4.2.3.1 Effectiveness

Providing information via printed media would be a very effective method of modifying behavior by educating the public concerning the presence of ordnance within Castner Range. Production and dissemination of brochures/fact sheets, newspaper articles and interviews, and the production and distribution of information packages for public officials would all be very effective institutional controls. Taking advantage of the avenues for distribution of the brochures/fact sheets would effectively educate the public on a one-time basis. However, to be fully effective over an extended period of time, the message must be reinforced. Redistribution of originally produced printed media that has been updated as necessary is recommended at regularly scheduled intervals.

4.4.2.3.2 Implementability

Providing information via printed media is easily implementable. With USACE providing the funding and producing the brochures, fact sheets, and information packages, local institutions would readily agree to assist in distribution of the information. To provide information via printed media, USACE must first produce the brochure/fact sheet. This can be executed directly by USACE or through a contractor with experience in the production of communications vehicles for public education programs. Distribution can be facilitated by mailing the printed materials directly to all residents of the City of El Paso and El Paso County. Support from local institutions and volunteer groups will be needed to disseminate the information to all of the effected parties.

4.4.2.3.3 Cost

The estimated cost to produce an original professional quality brochure/fact sheet, newspaper interview, and information package is approximately $20,000. The cost to copy and distribute the printed media would depend on the number of copies to be distributed. Assuming 10,000 mailings at $1 each (including cost to copy the brochure and postage), plus production of 10,000 brochures/fact sheets at $0.50 each (assuming two-color reproduction) for distribution to the various institutions that will make them available to the public, plus 50 information packages at $20 each to be provided to the public officials, the total cost to implement the information via printed media alternative would be $36,000. The estimated annual cost to reinforce the message (assuming bi-annual mailings, providing an additional 1,000 brochures per year, and the labor associated with periodic editing and updating of the brochures/fact sheets) is $5,000.

4.4.2.4 Classroom Education

4.4.2.4.1 Effectiveness

Providing education through the classroom would be a very effective method of modifying behavior by informing the public and public officials concerning the presence of ordnance at Castner Range and how to safely deal with the situation. Ordnance identification and ordnance safety classes/education would be very effective institutional controls. However, to be fully effective over a period of time, the message must be reinforced. Ordnance identification classes should be conducted on a regularly scheduled basis (possibly every 2 to 3 years) and ordnance safety should be incorporated as a regular part of the current classes.

4.4.2.4.2 Implementability

4.4.2.4.2.1 Providing classroom education should be easily implementable. With USACE or the State of Texas Parks and Wildlife Department providing the funding and the educational information package, local institutions should agree to participate and support the program. The most difficult part of the process will be coordinating efforts with an ordnance expert who will be retained to educate public officials in ordnance identification and scheduling the maximum number of public officials per class. Implementation will be most easily facilitated during a time when an ordnance expert is scheduled to be onsite for a removal action.

4.4.2.4.2.2 To facilitate the classroom education alternative, USACE and/or the State of Texas Parks and Wildlife Department must first contact all institutions that are willing to assist in the ordnance safety education process and make information available to them. As a minimum, local institutions and groups should be contacted and efforts should be coordinated with them. USACE must also retain the services of ordnance experts, who have been trained in the proper identification and handling of ordnance. There are many firms that specialize in this area with individuals who have prepared and presented ordnance identification classes in the past. Ideally, the contractor that is awarded the site cleanup contract would be able to assist in this ordnance identification process. As an alternative to coordination of all classroom education through the USACE, this work can be executed via a contract professional with experience in the production and facilitation of education and information programs.

4.4.2.4.3 Cost

The estimated cost to retain the services of an ordnance expert (including preparation, classroom training time, travel, and per diem) to provide ordnance identification education is approximately $5,000. The estimated cost to provide the necessary information and to assist the institutions that are willing to include ordnance safety into their current education process is approximately $5,000. The total estimated cost to implement the classroom education alternative would be $10,000. The estimated annual cost to reinforce the classroom education process (assuming ordnance identification classes once every 3 years and periodic update and supplementing of the information concerning ordnance safety) is approximately $3,000 per year.

4.4.2.5 Audio Visual Media

4.4.2.5.1 Effectiveness

Providing information using visual media would be an effective method of modifying behavior by educating the public concerning the presence of ordnance at Castner Range. Production and dissemination of videotapes and presentation of the message over local television would be effective institutional controls. The visual media is becoming one of the most popular formats for educating the public. Taking advantage of the available avenues for presenting the visual media would be effective. However, the message must be reinforced. Frequent and regularly scheduled re-broadcast of the original television presentation is recommended. Periodic updating of the videotapes is recommended to ensure the accuracy and timeliness of the information presented. Additional footage and editing of the original videotapes may be required every 2 to 3 years.

4.4.2.5.2 Implementability

Providing information via the visual media should be easily implementable. With USACE and/or the State of Texas Parks and Wildlife Department providing the funding and producing the videotapes, local television stations should readily agree to assist in distribution of the information. To provide information via visual media, USACE and/or the State of Texas Parks and Wildlife Department must first produce the videotapes. This can be executed directly by USACE or through a contract professional with experience in the production of public information and education programs. Support from the local television stations and other organizations and institutions will be needed for broadcast of the videotapes and to make them readily available to the public.

4.4.2.5.3 Cost

The estimated cost to produce a professional quality 30-minute videotape for television broadcast and a 5- to 7-minute videotape for distribution to the local institutions and the community is approximately $100,000. The estimated cost to copy and distribute videotapes to various institutions and to television stations would depend on the number of copies needed. However, assuming 50 copies at $20 each (including the cost of the videotape, dubbing, and postage) the cost would be approximately $1,000. Therefore, the total estimated cost to implement the information via visual media alternative would be $101,000. The estimated annual cost to reinforce the message (assuming updating of the video tape once every 3 years at a cost of $5,000 per update and distributing of additional/updated videos) would be $2,000 per year.

4.4.2.6 Exhibits/Displays

4.4.2.6.1 Effectiveness

The presentation of information through exhibits/displays is an effective method of modifying behavior by educating the public concerning the presence of ordnance at Castner Range. Production of displays and presenting them in museums and other areas of high public exposure would be an effective institutional control. The more people that visit a museum or area where the information is displayed, the more effective is the alternative. At the present time, providing information about ordnance would be most effective at the Wilderness Park Museum and through the use of a mobile display at various locations. Taking advantage of the available avenues for presentation and viewing of the displays would be effective. However, the message must be reinforced. Updating of the displays is recommended periodically to ensure the accuracy and timeliness of the information presented.

4.4.2.6.2 Implementability

Providing information via exhibits and mobile displays should be implementable. With USACE providing the funding and producing the displays, the local institutions would only have to agree to provide space. No difficulty is anticipated in adding a display to the current Information Center; however, transport and relocation of the mobile display to the various locations will require additional coordination and effort. To provide information via museum exhibits, USACE must first produce the displays. This can be executed directly by USACE or through a contract professional with experience in the production of public information and education programs. Cooperation from the City of El Paso, Fort Bliss, and the Texas Parks and Wildlife Department will be needed to provide the space at the Wilderness Park Museum. Support will be needed by one of the local institutions, possibly from the City of El Paso, to assist in displaying and relocating the mobile display.

4.4.2.6.3 Cost

The estimated cost to prepare a permanent museum display at the Wilderness Park Museum is approximately $4,000. The estimated cost to purchase a mobile exhibit and properly design and prepare it for display is $6,000. Therefore, the cost to prepare one permanent and one mobile display is $10,000. The estimated annual cost to update and reinforce the message on the displays is $1,000 per year.

4.4.2.7 Internet Web Site

4.4.2.7.1 Effectiveness

The internet web page would be less effective than some of the other alternatives in facilitating public awareness. However, it would be the very effective in presenting in-depth information about Castner Range and the presence of ordnance and safety precautions to avoid an ordnance mishap.

4.4.2.7.2 Implementability

Creation of a web site should be implementable. USACE could provide the funding and oversee the design of a web site that would provide the information that should be included in such a site. If Castner Range is ultimately deeded as an expansion of the Franklin Mountains State Park, the Web Site could be about the park as a whole with the ordnance information included and areas where ordnance may be located identified. To create a web site USACE should coordinate with Fort Bliss, the Franklin Mountains State Park staff, and the Texas Parks and Wildlife Department. There are advertising professionals in the El Paso region who could be contracted to prepare the web page and establish it on the Internet. A web page could be established at a Fort Bliss or a Texas Parks and Wildlife address.

4.4.2.7.3 Cost

The cost to design a web site vary from $50.00 to $150 per hour. Assume that the design would require 100 hours at $100.00 per hour for a total design cost of $10,000. Minimal annual maintenance fees may be associated with a web site.

4.4.2.8 Ad Hoc Committee

4.4.2.8.1 Effectiveness

The ad hoc committee, in itself, would be less effective than some of the other alternatives in facilitating public awareness. However, it would be the most effective mechanism for ensuring implementation of the other recommended alternatives. Under the park land use scenario, the Franklin Mountains Wilderness Coalition may adopt some responsibilities that an ad hoc committee would hold in their charter.

4.4.2.8.2 Implementability

Creation of an ad hoc committee should be easily implementable. There is significant public interest in the future of and potential public use of Castner Range. To create an ad hoc committee, USACE must contact influential members of the community and form the committee. Meeting rooms and a stenographer must be secured. It is suggested that a minimum of 2 meetings be conducted the first year and at least one per year thereafter.

4.4.2.8.3 Cost

The members of the ad hoc committee would not be paid for their time. Therefore, the estimated cost to implement this alternative would be approximately $2,000 for the first year and $1,000 for each subsequent year. The costs would include retaining services of a stenographer to record meeting minutes, plus cost associated with purchase of stationary, copying, telephone calls, and other miscellaneous expenses.

Table 4.4.2
Summary of Institutional Control Alternatives

Alternative	Effectiveness	Implementability	Initial Capital Cost	Annual Operating Cost
Access Control - Fencing - Signage - Land Use Restrictions and Regulatory Control	- Effective by restricting access, use, and development - Effectively reinforces warnings as long as they continue to be maintained - No zoning and land use restrictions	- Not Implementable - Implementable - Not Implementable	Not Determined $25,000 (expansion of existing) Not Applicable	Not Determined $1,250 -Not Applicable
Notice - Deed Notification - At Property Transfer - At Permitting	Effective	Implementable, but entire property will probably be in public ownership	Minimal	Minimal
Printed Media - Brochures/Fact Sheets - Newspaper Articles - Information Packages	Very Effective	Easily implementable	$36,000	$5,000
Classroom Education - Ordnance Identification - Ordnance Safety	Very Effective	Easily implementable	$10,000	$3,000
Audio Visual Media - Videotapes - Television	Effective	Easily implementable	$101,000	$2,000
Exhibits/Displays	Effective	Implementable, coordination needed to relocate display	$10,000	$1,000
Internet Web Site	Effective	Implementable, coordination needed	$10,000	Minimal
Ad Hoc Committee	Effective means of ensuring implementation of other alternatives	Easily implementable	$2,000	$1,000
Total Costs			**$194,000**	**$13,250**

4.4.3 Removal of Surface OE Items

4.4.3.1 Effectiveness

4.4.3.1.1 The surface clearance of OE items would provide protection for human health and the environment for areas to be established as a park. The estimated annual exposures for Castner Range under Scenario 1 would decline from the no-action range of 13,229 to 79,053 to a surface removal range of 620 to 3,699.

4.4.3.1.2 The surface clearance of OE items would also provide protection of human health and the environment for areas that would be used for commercial/residential development. For Region 1, under scenario 2 the estimated annual exposures would decline from the no-action range of 4,513 to 28,491 down to a surface clearance range of 226 to 1,676. For Region 2, the estimated annual exposures under the residential scenario would decline from the no action level of 6,332 to 44,174 to a surface clearance estimated range of 294 to 2,061. The total estimated annual exposures for Castner Range after surface clearance under scenario 2 is 520 to 3,737.

Table 4.4.3
Surface Clearance Risk Summary

Scenario	Region	Predicted Annual Exposures
Scenario 1	Entire Site, Park	620 to 3,699
Scenario 2	Region 1 Commercial/Residential Development	226 to 1,676
Scenario 2	Region 2 Park	294 to 2,061
Scenario 2	Combined Regions	520 to 3,737

4.4.3.1.3 The surface clearance alternative could be implemented in compliance with the location specific ARARs identified in Section 1. The Army would be required to consult with the native American tribal counsels in compliance with the American Indian Religious Freedom Act and the Native American Graves Protection and Repatriation Act to identify if there are any sacred religious or burial grounds within Castner Range and develop a plan to protect these areas for native Americans. Studies would be required to identify sensitive, rare, and endangered species, and archaeological/ historical artifacts and assess the threat or impacts to these resources from commercial/residential development. These studies would not be required to satisfy the NEPA regulations if the land is transferred to the State of Texas for an extension of the Franklin Mountains State Park. A permit would be required to excavate or remove any archaeological resources pursuant to the Protection of Archaeological Resources Act, as well as the Preservation of American Antiquities Act.

4.4.3.2 Implementability

It is technically feasible to implement the surface OE clearance alternative throughout most of the site. The areas where surface clearance is not feasible are the steep slopes and sheer rock faces in the mountainous areas. These areas have a lower probability of containing OE materials (due to the grade), and the number of park visitors active in these areas will also be lower than in other more traversable areas. Restrictions may need to be placed on the property specifying that the land could not be developed for commercial or residential uses without undergoing additional OE subsurface detection and clearance. However, the amount of subsurface risk detailed in the OECert analysis is low, and further clearance may not be justified. In the areas designated for park use, there would be little or no brush clearance so as to prevent environmental impacts. Brush could be cleared from areas designated for commercial or residential development as long as erosion control measures were taken. Brush clearing could be performed to 6 inches above ground, therefore giving the vegetation an opportunity to recover and limiting the site's exposure to erosion. This alternative would be implemented without major complications, and surface clearance techniques are very reliable since it is the easiest to detect surface lying objects. Administratively, surface clearance would meet the goals of the US Army in reducing risk in a cost effective manner and the Franklin Mountains State Park representatives have expressed interest in only surface clearance to minimize potential impact to the natural environment.

4.4.3.3 Cost

4.4.3.3.1 The CMS Final Survey Report included costs for the OE Contamination Survey completed at Castner Range. This cost was used as a basis for estimating the cost required for implementation of a surface clearance remedial action at Castner Range. The cost items included in this baseline were site visit and work plan preparation, surveying and mapping, OE contamination survey, turn-in of recovered inert ordnance and OE related scrap, quality control and final report. The total cost for these tasks was approximately $1,067,000. Surface sampling was completed by CMS over approximately 467 acres. Subsurface sampling to a depth of not more than two feet was also completed over 39 acres. Clearance to a depth of approximately two feet typically costs up to two times as much as surface clearance. Therefore, the cost of surface clearance was estimated to be approximately $2,100 per acre. The cost per acre used for final estimates was increased slightly because final site clearance will cover significantly more acres where the terrain will be more difficult to clear. Therefore, the final estimate for surface clearance costs was $2,250 per acre. These cost estimates are consistent with typical costs found for other UXO sites, considering the difficult site conditions.

4.4.3.3.2 The costs associated with the surface clearance alternative are summarized in Table 4.4.4. The cost to clear the remaining uncleared 6,614 acres (i.e., 7081 - 467 = 6614) is $14,900,000. The cost of surface clearance over the entire 7,081 acres at Castner Range is estimated to be $16,000,000. The total cost for preliminary permitting and approval was estimated to be $504,000. Lastly, contractor and DoD project management and other indirect costs were estimated to be twenty percent of the clearance costs or $3,200,000. Therefore, the range for the total estimated cost for surface clearance is $18,900,000 to $20,000,000.

Table 4.4.4 - Surface Clearance Costs

Cost Category	Cost Item	Cost
Preliminary Permitting and Approval		
	Archaeology/ Historical Survey	$200,000
	Historical Review of Survey Results	$15,000
	Natural Resource Survey	$264,000
	Interaction with Tribal Nations	$25,000
Site Clearance		
	Surface Clearance	$14,900,000 - $16,000,000
Additional Costs		
	Management and Training	$3,200,000
TOTAL		**$18,900,000 - $20,000,000**

4.4.3.3.3 No significant annual costs are associated with this alternative. However, because no alternative can provide 100 percent reduction in future exposures, occasional costs may be incurred as a result of the discovery of additional UXO related items.

4.4.4 Removal of OE Items to a Depth of One Foot

4.4.4.1 Effectiveness

4.4.4.1.1 The clearance of OE items to a depth of one foot would provide additional protection of human health and the environment for areas to be used for either a park or commercial/residential purposes. However, the additional protection provided under either scenario is very slight compared to the protection provided by surface clearance alone. Table 4.4.5 provides a summary of the exposure risk for this alternative.

Table 4.4.5
One Foot Clearance Risk Summary

Scenario	Region	Predicted Annual Exposures
Scenario 1	Entire Site, Park	620 to 3,687
Scenario 2	Region 1 Commercial/Residential Development	226 to 1,433
Scenario 2	Region 2 Park	294 to 2,053
Scenario 2	Combined Retions	520 to 3,486

4.4.4.1.2 Under scenario 1, the expected annual exposures for Castner Range would decline from the surface clearance level of 620 to 3,699 down to a one foot clearance estimate of 620 to 3,687. Therefore, the lower bound of the expected exposures has not declined at all and the upper bound has declined by 0.3 percent.

4.4.4.1.3 The clearance of OE items to a depth of one foot would also provide protection of human health and the environment under the scenario 2. Again, however, the reduction in exposures is only slight compared to the reduction achieved by surface clearance alone. For Region 1, under scenario 2 the estimated annual exposures would decline from the surface clearance range of 226 to 1,676 down to one foot clearance range of 226 to 1,433. The lower bound did not decrease and the upper bound decreased by 14 percent. For Region 2 the estimated annual exposures declined from the surface clearance range of 294 to 2,061 down to the one foot clearance range of 294 to 2,053. The lower bound again did not decrease and the upper bound decreased by 0.4 percent. The range for total estimated annual exposures for Castner Range under Scenario 2 after one foot clearance is 520 to 3,486.

4.4.4.1.4 The clearance to one foot alternative could be implemented in compliance with the location specific ARARs identified in Section 1. The Army would be required to consult with the native American tribal counsels in compliance with the American Indian Religious Freedom Act and the Native American Graves Protection and Repatriation Act to identify if there are any sacred religious or burial grounds within Castner range and develop a plan to protect these areas for native Americans. Studies would be required to identify sensitive, rare, and endangered species, and archaeological/ historical artifacts and assess the threat or impacts to these resources from commercial/residential development. These studies would not be required to satisfy the NEPA regulations if the land is transferred to the State of Texas for an extension of the Franklin Mountains State Park. A permit would be required to excavate or remove any archaeological resources pursuant to the Protection of Archaeological Resources Act, as well as the Preservation of American Antiquities Act.

4.4.4.2 Implementability

It is technically feasible to implement the one foot OE clearance alternative throughout most of the site. The areas where clearance to one foot is not feasible are the steep slopes and sheer rock faces in the mountainous regions where it is difficult to access and the soils are very thin. These areas have a lower probability of containing OE materials (due to the grade), and the number of park visitors active in these areas will also be lower than in other more traversable areas. In the areas designated for park use, the brush clearance would be minimized as practicable to areas where subsurface OE is detected so as to prevent environmental impacts. Brush could be cleared from areas designated for commercial or residential development as long as erosion control measures were taken and brush cutters were escorted by OED trained specialists. Brush clearing could be performed to 6 inches above ground, therefore giving the vegetation an opportunity to recover and limiting the site's exposure to erosion. This alternative would be implemented without major complications, and near-surface clearance techniques are very reliable since it is relatively easy to detect near-surface lying objects. Administratively, clearance to one foot would likely exceed the goals of the US Army in reducing risk at an increased cost over surface clearance. In addition, the Franklin Mountains State Park representatives have expressed interest in only surface clearance due to the potential impacts to the natural environment from excavation.

4.4.4.3 Cost

4.4.4.3.1 The CMS Final Survey Report included costs for the OE Contamination Survey completed at Castner Range. This cost was used as a basis for estimating the cost required for implementation of a subsurface clearance (1-foot depth) remedial action at Castner Range. Subsurface sampling was performed by CMS over approximately 39 acres. The cost of subsurface investigation at other UXO sites typically range from 1.5 to 2 times the cost of surface investigation. Due to the steep rugged terrain at Castner Range, the upper limit of 2.0 was selected as a reasonable conservative value for this estimate. Therefore, the estimated cost of subsurface clearance is $4,500 per acre.

4.4.4.3.2 The costs associated with the one foot clearance alternative are summarized in Table 4.4.6. The cost to clear the remaining uncleared 7,042 acres (i.e., 7081-39=7042) is $31,700,000. The cost of surface clearance over the entire 7,081 acres at Castner Range is estimated to be $32,000,000. The total cost for preliminary permitting and approval was estimated to be $504,000. Lastly, contractor and DoD project management and other indirect costs were estimated to be twenty percent of the clearance costs or $6,400,000. Therefore, the range for the total estimated cost for surface clearance is $38,600,000 to $39,000,000.

4.4.4.3.3 No significant annual costs are associated with this alternative. However, because no alternative can provide 100 percent reduction in future exposures, occasional costs may be incurred as a result of the discovery of additional UXO related items.

Table 4.4.6 - One Foot Clearance Costs

Cost Category	Cost Item	Cost
Preliminary Permitting and Approval	Archaeology/ Historical Survey	$200,000
	Historical Review of Survey Results	$15,000
	Natural Resource Survey	$264,000
	Interaction with Tribal Nations	$25,000
Site Clearance	One Foot Clearance	$31,700,000 - $32,000,000
Additional Costs	Management and Training	$6,400,000
TOTAL		**$38,600,000 - $39,000,000**

4.4.5 Removal of OE Items to a Depth of Four Feet

Alternative 5 was considered in the risk analysis. Based on the results of the risk analysis, no reduction in risk was found for Alternative 5 when compared to Alternative 4. In each of the 11 zones of Castner Range, the number of expected annual exposures for various activities after clearance to four feet was equal to the expected annual exposures after clearance to one foot. The reason for this is that no OE was found between depths of one foot and four feet in any of the studies. Therefore, subsurface clearance to a depth of four feet was not found to provide any additional protection beyond the protection provided by clearance to one foot. Therefore, Alternative 5 was not retained for further detailed consideration.

Table 4.4.7
Summary of OE Clearance Alternatives Analysis

Selection Criteria	Alternative 1 No Further Action	Alternative 2 Institutional Controls	Alternative 3 Removal of Surface OE Items	Alternative 4 Removal of OE Items to a Depth of One Foot
Effectiveness				
(1) Protection of Human Health and the Environment	Not Protective: Risk analysis indicates that the risk to the public is from 13,229 to 79,053 annual exposures from a park and from 10,845 to 72,665 annual exposures from residential or commercial development.	Protective: Site related risk not decreased. Provides protection by limiting the number of annual exposures.	Protective: Risk analysis indicates that the risk to the public is 620 to 3,699 annual exposures from a park and 520 to 3,737 annual exposures from commercial/residential development.	Protective: Risk analysis indicates that the risk to the public is 620 to 3,687 annual exposures from a park and 520 to 3,486 annual exposures from commercial/residential development.
(2) Compliance with ARARs	Can be implemented to comply with ARARs.	Can be implemented to comply with ARARs.	Can be implemented to comply with ARARs.	Can be implemented to comply with ARARs.

Table 4.4.7 (Continued)
Summary of OE Clearance Alternatives Analysis

Selection Criteria	Alternative 1 No Further Action	Alternative 2 Institutional Controls	Alternative 3 Removal of Surface OE Items	Alternative 4 Removal of OE Items to a Depth of One Foot
Implementability				
(1) Technical Feasibility	Implementation would require land use restrictions, educational programs, and warning signs.	Implementation would require land use restrictions, educational programs, and warning signs.	Implementable in all areas except sheer rock faces and very steep topography.	Implementable in all areas except sheer rock faces, areas of shallow soil, and very steep topography.
(2) Reliability	Not applicable due to no OE clearance actions.	Not applicable due to no OE clearance actions. Public education and warnings have limited reliability as not everybody who uses the site will receive the information.	Surface OE detection and clearance are very reliable	OE detection and clearance to a depth of one foot is reliable.
(3) Environmental Impacts	No Environmental Impacts	No Environmental Impacts	Minimal Environmental Impacts	Minimal Environmental Impacts from shallow excavation.
(4) Ease of Administering	Could be difficult to administer due to the risk to the public and the associated liabilities.	Could be difficult to administer due to the risk to the public and the associated liabilities.	No anticipated administrative issues. During implementation there will be contracting, permitting, and project oversight activities.	No anticipated administrative issues. During implementation there will be contracting, permitting, and project oversight activiteis.

Table 4.4.7 (Continued)
Summary of OE Clearance Alternatives Analysis

Selection Criteria	Alternative 1 No Further Action	Alternative 2 Institutional Controls	Alternative 3 Removal of Surface OE Items	Alternative 4 Removal of OE Items to a Depth of One Foot
Cost				
(1) Capital Cost	None	$194,000	$18,900,000 - $20,000,000	$38,600,000 - $39,000,000
(2) Operating Costs	None - Potential for future costs due to item discovery and future liability	$13,250	None - Some potential future costs due to item discovery	None - Some potential future costs due to item discovery

SECTION 5

SECTION 5
COMPARATIVE ANALYSIS OF OE CLEARANCE ALTERNATIVES

The purpose of this section is to compare each of the OE clearance alternatives against each other with respect to the selection criteria presented in Section 4.0. The goal of the comparative analysis is to identify the clearance alternatives that meet the threshold criteria and best fulfill the primary balancing criteria.

5.1 SELECTION METHODOLOGY

For the threshold criteria, each alternative was assigned a "yes" or a "no" depending on whether the alternative would be protective of human health and the environment and would comply with the identified ARARs. A clearance alternative must meet these threshold criteria (i.e., "yes") in order to be retained for further consideration. For the balancing criteria, each OE clearance alternative was scored either a "high", "medium", or "low" corresponding to how well the alternative meets the objectives of each criterion. The evaluation results for each criterion were compared in order to rank the OE clearance alternatives for recommendation.

5.2 COMPARATIVE ANALYSIS

The following paragraphs compare the four retained OE clearance alternatives against each other with respect to the specific selection criteria.

5.2.1 Effectiveness

5.2.1.1 Effectiveness is the threshold criteria such that an OE clearance alternative must be protective of human health and the environment, and comply with the ARARs in order to be considered for recommendation. Alternative 1, no further action, was determined to not adequately protect human health and the environment based on the risk analysis presented in Section 2. The other alternatives were considered to be protective of human health and the environment because either the sites would be restricted from access or the remaining OE items would be removed. Therefore, the no further action alternative received a "no" score, and all the other OE clearance alternatives received a "yes" score.

5.2.1.2 All of the alternatives could be implemented to comply with the ARARs. Therefore, each of the OE clearance alternatives received a "yes" score. Based on the results of this analysis, only the no further action alternative failed the effectiveness evaluation and is not carried forward as a potential alternative for Castner Range.

5.2.2 Implementability

5.2.2.1 Technical Feasibility

5.2.2.1.1 The institutional control alternative is technically feasible. Difficulties associated with this alternative include the legal interactions between the US Army, State of Texas Parks and Wildlife Department, and the public regarding the terms of the access and use restrictions. Any issues associated with the legal interactions have a high probability of being successfully negotiated because the involved parties are likely to be in agreement with the future land use for this site. Therefore, implementability of this alternative is high.

5.2.2.1.2 The removal of surface OE items can be implemented in the field because no excavation equipment is required and the detection and clearance process uses proven techniques. However, implementing surface clearance is more difficult than implementing institutional controls because the field work associated with clearance is difficult. This criteria therefore received a medium score.

5.2.2.1.3 The removal of OE items to a depth of one foot can be implemented in the field because the required excavation equipment is hand tools and the depth of excavation is not anticipated to be problematic. However, it is more difficult than surface clearance due to the excavation requirements. This criteria therefore received a low score.

5.2.2.2 Reliability

5.2.2.2.1 The reliability of the institutional control alternative is generally considered to be low as it is unknown whether the access or land use restrictions will be effective at minimizing members of the public from exposure to OE items. The uncertainties associated with the feasibility and liability of the institutional control alternative are considered to be the worst in comparison to the other alternatives where OE items are detected and removed.

5.2.2.2.2 The reliability of surface clearance is high because the detection equipment is efficient at detecting metallic OE items at the ground surface, and the operator can also visually inspect the area being cleared. The uncertainties associated with this alternative are minimal for areas where clearance is performed. The uncertainty exists in areas where access for clearance crews is difficult or impossible due to the grade of the natural topography. The liability in these areas is reduced however because these are areas that will be rarely visited by members of the public.

5.2.2.2.3 The reliability of clearance to a depth of one foot received a medium score because the detection equipment effectiveness decreases with depth due to the distance between the OE item and the detection unit. The detection equipment is reliable at one foot however because the depth is shallow. There is less assistance by the operators visual inspection. The uncertainties associated with this alternative are minimal for areas where clearance is performed. The uncertainty exists in areas where access for clearance crews is difficult or impossible due to the grade of the natural topography. The liability in these areas is reduced however because these are areas that will be rarely visited by members of the public.

5.2.2.3 Environmental impacts

5.2.2.3.1 The environmental impacts from the institutional control alternative are considered to be minimal. Therefore, this criteria received a high score.

5.2.2.3.2 The environmental impacts from the clearance of surface OE items alternative are also considered to be minimal since there would be no excavation for OE items at depth. This assumes that no brush clearing would be required prior to surface clearance. This criteria also received a high score.

5.2.2.3.3 The environmental impacts from the clearance of OE items to a depth of one foot received a medium score because areas would be disturbed by excavation. Investigation of the site indicated a low density of OE items over most of the site. Therefore, environmental disturbance would not likely be significant as the excavations would be shallow and spread out.

5.2.2.4 Ease of Administering

5.2.2.4.1 Administering the institutional controls alternative may be complicated due to the legal interactions between the US Army, the State of Texas Parks and Wildlife Department, and the public. Deed restrictions, access controls, and educational programs would have to be agreed upon, developed, and a funding mechanism would have to be developed and extended into the future. Due to the long term needs of this alternative, the criterion received a low score.

5.2.2.4.2 The surface clearance and clearance to a depth of one foot alternatives received medium scores because they are considered to be equal with respect to the ease of administering at Castner Range. Some land use restrictions could be required for each of these OE Clearance alternatives. The legal interactions that would result from potential land use restrictions are the cause of the medium score.

5.2.3 Cost

5.2.3.1 Capital Cost

5.2.3.1.1 The institutional control alternative has the lowest capital cost which leads to a high score.

5.2.3.1.2 The removal of surface OE items alternative has an estimated capital cost that exceeds the institutional control capital cost estimate, but is less than the alternative with clearance of OE items at a depth of one foot. Therefore, this alternative earns a medium score.

5.2.3.1.3 The cost estimate for the removal of OE items to a depth of one foot alternative is higher than the estimate for the removal of surface OE items. Therefore, the removal of OE items to a depth of one foot received a low score.

5.2.3.2 Operating Costs

5.2.3.2.1 The institutional control alternative received a low score for this criterion because this alternative had the highest operating cost estimate.

5.2.3.2.2 The other two alternatives earned a high score for this criterion because routine annual operating cost are not expected for either of these alternatives.

5.2.3.3 Life Cycle Cost

5.2.3.3.1 The initial capital costs and annual maintenance costs were used to determine a 30-year life cycle cost for each alternative. For the surface and subsurface clearing alternative, the upper bound of the capital cost range was used for these calculations. A 6% discount rate was used for these calculations.

5.2.3.3.2 The institutional controls alternative has a 30-year life cycle cost of $376,000. This cost was given a high score.

5.2.3.3.3 The surface clearance alternative has a 30-year life cycle cost of $20,000,000. Because there are no annual operating costs expected for the clearance alternatives, the life cycle cost for each alternative is equal to the capital cost. This cost was given a medium score.

5.2.3.3.4 The subsurface clearance alternative has a 30-year life cycle cost of $39,000,000. Because there are no annual operating costs expected for the clearance alternatives, the life cycle cost for each alternative is equal to the capital cost. This cost was given a low score.

5.2.4 Results

5.2.4.1 Table 5.2-1 presents a summary of the OE clearance alternatives with both a ranking (e.g., high, medium, low) and a score for each criterion. The scores assigned to each ranking were: high = 3; medium = 2; low = 1. Based on this scoring, the alternatives are ranked as follows:

1. Removal of Surface OE items (12),
2. Removal of OE items to a depth of one foot (11), and
3. Institutional controls (8),

5.2.4.2 Based upon this analysis, surface clearance is implementable and is the most desirable means of reducing the risk to OE items at Castner Range.

Table 5.2-1
Summary of OE Clearance Alternatives Analysis

Evaluation Criteria	Alternative 1 No Further Action	Alternative 2 Institutional Controls	Alternative 3 Removal of Surface OE Items	Alternative 4 Removal of OE Items to a Depth of One Foot
Effectiveness				
(1) Protection of Human Health and the Environment	No	Yes	Yes	Yes
(2) Compliance with ARARs	Yes	Yes	Yes	Yes
Meet Threshold criteria?	No	Yes	Yes	Yes
Implementability				
(1) Technical Feasibility		High (3)	Medium (2)	Low (1)
(2) Reliability		Low (1)	High (3)	Medium (2)
(3) Environmental Impacts		High (3)	High (3)	Medium (2)
(4) Ease of Administering		Low (1)	Medium (2)	Medium (2)
Cost				
(1) Capital Cost		High	Medium	Low
(2) Operating Cost		Low	High	High
(3) Life Cycle Cost		High (3)	Medium (2)	Low (1)
TOTAL SCORE		11	12	8

High = Most desirable condition
Low = Least desirable condition

SECTION 6

SECTION 6
RECOMMENDATIONS AND CONCLUSIONS

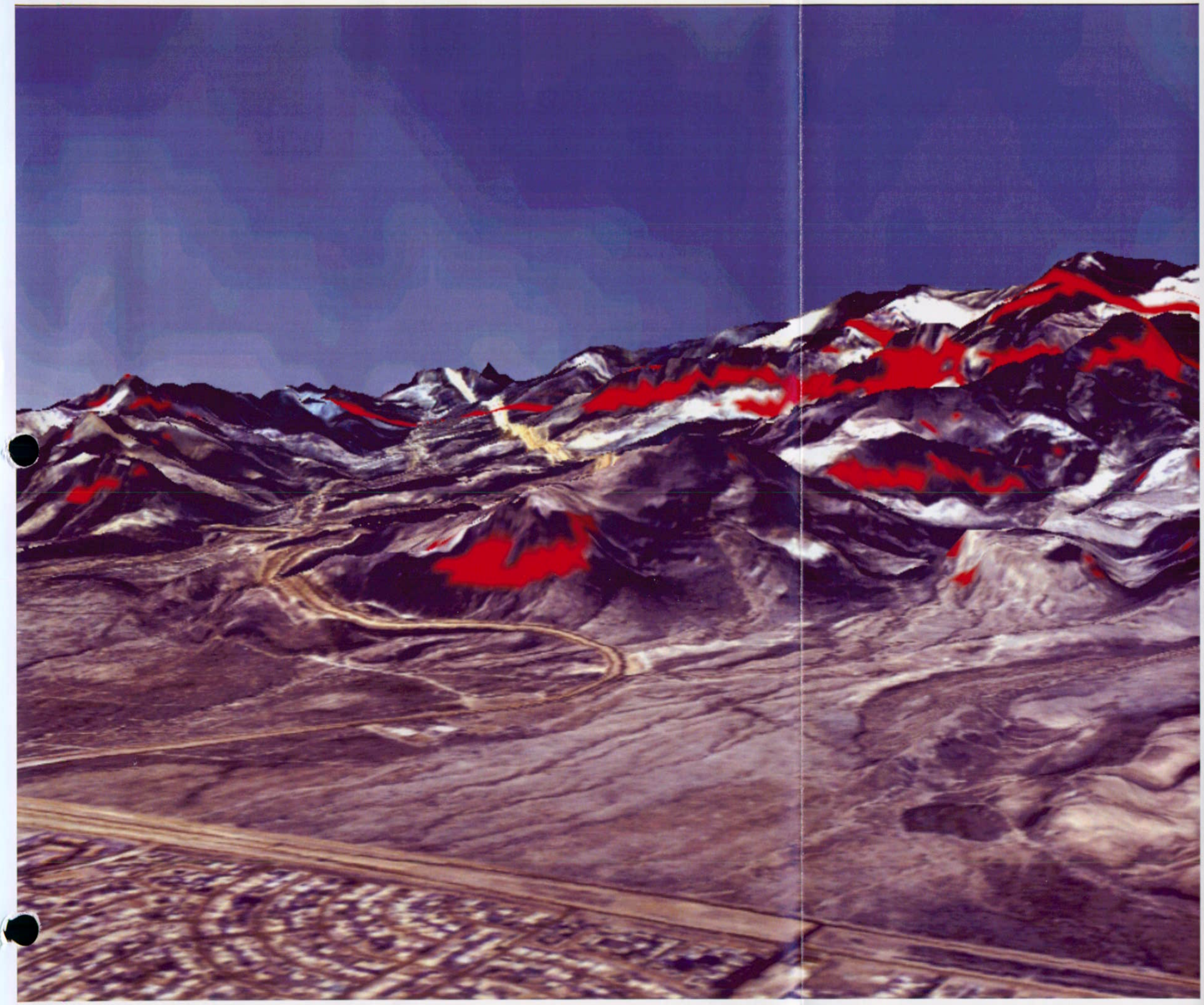
It is recommended that a combination of surface clearance, potential minor subsurface clearance, and institutional controls be implemented at Castner Range with a subsequent offer of the site to the State of Texas to extend the Franklin Mountain State Park. Most of the Castner Range should be surface cleared prior to offering the land as excess. Clearance is required to significantly reduce the risk to future users of the site. In addition to surface clearance of most accessible areas, an institutional control program should be established including deed restrictions, education and notification. Surface clearance is the easiest OE detection and removal action that can be implemented. Surface clearance offers a high probability that the risk of human exposure to OE items will be significantly reduced. Some OE items may remain in inaccessible areas after completion of the surface clearance action. Institutional controls are an effective method to prevent accidents by controlling future construction projects, educating the public with respect to appropriate use of the site, and by modifying behavior with awareness and appropriate warnings. Subsurface clearance may prove to be necessary in some areas near arroyos where OE may have been deposited and covered by flood waters. The result of the combination of risk reduction alternatives will be to remove the majority of OE items, and reduce the probability of OE related accidents through property control measures and behavior modification.

6.1 RECOMMENDED OE RISK REDUCTION ALTERNATIVE

6.1.1 It is recommended that surface clearance be performed over most areas of Castner Range. This will significantly reduce the presence of ordnance from locations with the highest anticipated number of future users. The portion of Castner Range recommended for surface clearance is identified by the parameters of necessary and feasible. The feasible areas include the eastern zones from the CMS study (2, 5, 7, and 11) that are relatively flat, and the accessible areas of the mountainous zones (1, 3, 4, 6, 8, and 10). Accessible areas include valley floors, side slopes, and ridges that can be traversed on foot without endangering the clearance personnel. Inaccessible areas include steep valley walls, cliff areas and sheer rock outcrops. To provide a conservative basis for cost estimating, it was assumed that areas with a zero to 40 percent topographic slope could be accessible for surface clearance, as well as by future recreational users. The actual slope conditions may be revised based on site specific accessibility and personnel safety. Analysis of the site GIS model indicates that approximately 139 acres have a topographic slope that exceeds 40 percent. Figure 6.1-1 provides a digital elevation model of Castner Range depicting the areas where the slope exceeds 40 percent. Surface clearance is necessary in all zones except Zone 9. Zone 9 does not require surface

Figure 6.1 - 1

Areas Greater Than 40 Degrees Slope for Castner Range



Right: Red indicates areas of Castner Range with a slope greater than 40 degrees, totaling 139 acres.

Above: Red indicates Castner Range, and areas with a slope greater than 40 degrees. Yellow indicates the areas that will not be cleared because no UXO or scrap were found, totaling 285 acres.

Revisions			
Symbol:		Date:	Approved:
	Final	5/20/98	

CASTNER RANGE PARSONS ENGINEERING SCIENCES INC.	U.S. ARMY CORPS OF ENGINEERS HUNTSVILLE CENTER

Designed by: Kriste Wilson Elia	FORT BLISS: CASTNER RANGE EL PASO EL PASO COUNTY TEXAS		
Drawn by: Kriste Wilson Elia			
Checked by: Phil Nixon		Sheet number: 1	Project #: 732231
Submitted by: Phil Nixon	Date: 5/15/98 File: castner 3-d.img	1 of 1	

clearance because there were no UXO items or OE scrap found in that zone. Therefore, the exposure estimates for Zone 9 are based on inferential statistics as discussed in Section 2. Zone 9 exhibits one of the lowest predicted UXO density estimates in comparison to other Zones on the site. It is believed that the OECert exposure calculations may be conservative based on the fact that the estimated density is low and that no scrap was found in Zone 9. Also, the only identified firing fans which cover Zone 9 are those for 3.5 inch rockets. No OE from 3.5 inch rockets was found in any Zone adjacent to Zone 9. Zone 3 was considered for removal from the surface clearance requirement because no UXO items were found in Zone 3. However, OE scrap was found in Zone 3 and the firing fan for the 3.5 inch rockets extends over most of Zone III. Therefore, the results of the OECert modeling are considered to be reasonable, and the recommendation for surface clearance in Zone 3 is retained. However, it is recommended that a phased approach to surface clearance be taken in Zone 3. Clearance activities should commence at the eastern boundary of Zone 3 (closest to the firing areas) and work towards the western portion of the zone. If the density of the OE found is at or below the estimate from the OECert analysis after approximately 10 percent of the zone has been cleared, then clearance of Zone 3 may be stopped. At the estimated OE density, the exposure risk is very low. The OECert estimated density for Zone 3 is 0.0 to 0.08 items per acre at the surface, and 0.0 to 0.6 items per acre in the subsurface. The area of Zone 9 which is not recommended for surface clearance is 285 acres. The total area of Castner Range which is not recommended for surface clearance is 424 acres.

6.1.1.1 It is recommended that an allowance be included in the cost estimate for performing a small amount of subsurface clearance to a depth of one foot in specific drainage areas where stormwater erosion could deposit soils on top of OE items. This would provide a contingency fund for making decisions in the field during clearance activities. It is estimated that less than 5 percent of the Castner Range site is effected by erosional deposits. Using the 5 percent for cost estimating provides a conservative allowance. Therefore cost estimates for Castner Range clearance include subsurface clearance of 354 acres of erosional deposits.

6.1.1.2 It is noted that this recommendation does not substantiate the recommendation made in 1994 by ESHI to clear OE to a depth of 3 feet. The results of the OECert risk analysis (including additional data from the CMS study) indicate that the additional risk reduction from subsurface clearance is minimal, whereas the cost of subsurface clearance is significant both in terms of monetary costs and potential environmental disruptions. The recommended future site owner would prefer that only surface clearance be performed to minimize the environmental impacts.

6.1.2 After the clearance is completed, the uncleared inaccessible areas (139 acres) may have a greater density of OE items than the cleared areas. However, the risk of exposure is minimal because few people will venture into the relatively inaccessible (rugged), uncleared areas were the slope is greater than 40 percent. The residual exposure risk that remains at Castner Range after the OE clearance actions are complete should be mitigated through the establishment of institutional controls, which were describe in Section 4 as an OE clearance alternative. The institutional controls are intended to control access and influence appropriate behavior so that OE related accidents are avoided. The most appropriate institutional controls to implement in conjunction with surface clearance are provided below.

6.1.2.1 It is recommended that deed restrictions be placed on the site such that any land improvements or intrusive archaeological investigations must be preceded by subsurface clearance in the area where the intended project will be implemented. Such clearance should extend to the depth of proposed construction activities. This restriction should prevent construction of a structure, playground, picnic area, trail, campground or other land improvement until a subsurface survey/clearance is performed. Also, commercial or residential building should be restricted until subsurface survey/clearance is performed to the depth of excavation in the construction area and to a depth of one foot in any areas of high public use.

6.1.2.2 It is also recommended that an educational program be initiated and perpetuated to enhance public awareness of the potential for exposure to OE items, and to teach the public the proper response behavior if an OE item is encountered. Institutional control is the best method to mitigate the risk of any OE items that may exist outside the boundaries of Castner Range from any historical training operations, or from members of the public who might have found and removed an item. The educational awareness program should consist of the following components:

1. Signage,
2. Printed media,
3. Classroom education, and
4. Exhibits/displays.

6.1.2.2.1 Signs should be created and posted at trail heads camping and picnic areas, and other public areas in the park warning visitors that OE items may still exist in rugged areas that were not cleared. The sign should advise visitors not to touch OE items, but to mark the general location so the item can be found again, and provide a telephone number to call in the event of an OE finding. The telephone number should be a 24-hour, 7-day service with access to trained respondents at Fort Bliss.

6.1.2.2.2 Printed media such as pamphlets, brochures, or fact sheets should be developed and made available at the museums, park areas, and at public facilities such as libraries and El Paso information centers. The materials should describe the history of Castner Range, show pictures of what OE items look like, and provide response actions including contacting the 24-hour telephone hot line if an OE item is discovered. Distribution of printed materials directly to members of the community could be by one or more of the following methods:

- Direct mailing to area residents,
- Enclosed in tax bills,
- Enclosed in power bills,
- Enclosed as flyers in the local newspaper,
- Included with Chamber of Commerce literature, and
- Mailings to recreational clubs and groups that could use the park.

6.1.2.2.3 Classroom education for the following institutions would provide an accessible knowledge base about OE issues:

- City of El Paso officials,
- Franklin Mountains State Park employees,
- Wilderness Park Museum employees, and
- El Paso school system.

This knowledge base would be available through these institutions. These agencies may require the knowledge to respond appropriately to actual discovery of OE. In addition, the school system offers an opportunity to educate the future community leaders.

Classroom education throughout grades K-12 would be useful to provide OE information to one of the larger user groups and future leaders. Classroom materials could consist of videotapes/lectures pertaining to OE identification (taped during clearance activities) and procedures for how to respond if an OE item is identified.

6.1.2.2.4 A display should be developed at the Wilderness Park Museum showing the types of OE items that have been found to allow the public to identify OE items if encountered in the Castner Range area. The display should also provide warnings about handling any materials which are found and appropriate response to discovering OE.

6.1.3 It is anticipated that the cost of implementing this combination of the surface clearance and institutional control alternatives will be less than the anticipated cost of the full surface clearance alternative presented in Section 4. The cost to clear the site will be reduced from what was presented in Section 4 due to the recommendation to take no clearance action in Zone 9, and the inaccessible areas which will not be cleared. In addition, some areas have already been cleared. The previous OE investigations have cleared approximately 467 acres, and there are 424 acres which will not be cleared.

Therefore, approximately 6,190 acres will require surface clearance. At a cost of approximately $2,100 per acre for surface clearance, it is estimated that the cost of clearing the recommended 6,190 acres is $12,999,000. The allowance for clearing as many as 354 acres to a one foot depth is $1,593,000 based on the estimated cost of $4,500 per acre The costs associated with implementing the recommended institutional controls will be less than the costs presented for a full scale program in Section 4. It is anticipated that at least $115,000 would be necessary to implement the public awareness and educational institutional controls with approximately $9,000 needed to update the program annually. Therefore, the total estimated capital cost for the recommended alternative is approximately $14,707,000, with an annual operating cost estimated at $9,000.

6.2 RECOMMENDED FUTURE LAND USE

6.2.1 The recommended combination of surface clearance with institutional controls can be successfully implemented for the commercial/residential development of the eastern portion of Castner Range as well as for deeding the property to the State of Texas for expanding the Franklin Mountains State Park. It is recommended that the entire 7,081 remaining acres of Castner Range be transferred to the State of Texas Parks and Wildlife Department for the purpose of expanding the Franklin Mountains State Park. This recommendation is supported by the following facts.

6.2.2 The Franklin Mountains State Park is the only designated urban wilderness area in the United States. The park is comprised predominantly of mountain ecosystems. The eastern flat portion of Castner Range is a unique high prairie grassland which is uncommon due to urbanization of the prairie grasslands in the El Paso region. Some of the unique attributes of the high prairie grassland include:

1. Castner Range has, by default, preserved an impressive natural corridor from the crest of the Franklin Mountains to its foothills and remains a vignette of an earlier era;
2. It is an alluvial fan which retains much of its natural condition;
3. It is an environment for the southwestern Barrel Cactus which is an uncommon plant species;
4. Annexing this portion of Castner Range would enhance the ecosystem diversity of the Franklin Mountains State Park;
5. The Trans-Mountain Highway will retain its appeal as a scenic drive; and
6. The Wilderness Park Museum can be directly linked to a major metropolitan state park.

6.2.3 The State of Texas Parks and Wildlife Department is very interested in obtaining Castner Range. The U.S. Army has tried to transfer Castner Range to the State of Texas, but the transaction was stopped because OE clearance had not been performed. The Charter for the Franklin Mountains State Park has been amended such that Castner Range can be easily annexed. The Franklin Mountains State Park master plan includes Castner Range as a component of the park. This is already evident in that the Wilderness Park Museum has already been built in the flat region of Castner Range.

6.2.4 The City of El Paso's 2010 Land Use Plan includes Castner Range as a part of the Franklin Mountains State Park. The City of El Paso is not currently considering developing the eastern portion of Castner Range for commercial/residential use, because emphasis is being placed on downtown revitalization. The city has a major downtown revitalization program underway to enhance access and utilization of downtown facilities. There is a Civic Center in Downtown El Paso that includes a Convention and Performing Arts Center that is currently being expanded, a children's museum, and an art museum. The City of El Paso is not currently interested in developing cultural attractions in the area of Castner Range. The City of El Paso has indicated that there is more than adequate land within the immediate proximity of the existing urbanized area to provide for growth well into the next century. The expansion of Franklin Mountain State Park to include the mountains, alluvial fan and high prairie grassland of Castner Range would provide a significant natural area to complement the urban growth and revitalization of El Paso.

6.3 IMPLEMENTATION

6.3.1 Following approval and authorization of the plan by the U.S. Army, (which may involve public participation) the recommended clearance strategy for Castner Range should be implemented in a stepwise fashion. The first step towards implementation should include the preparation of a workplan for the clearance of OE items and the development of the institutional controls program. These workplans should provide details of the clearance activities and institutional controls presented in Section 4 such that a contractor can be procured to perform OE clearance, and the U.S. Army (Fort Bliss), State of Texas, and community members can begin to initiate institutional controls. Following development and approval of the workplans, OE clearance activities should be undertaken as step two of the implementation.

6.3.2 Step three should be the preparation of institutional controls through written documents, inter-agency agreements, legal covenants on the property, and preparation of educational curricula, printed media, signage and displays. This step may be performed concurrently with the clearance activities.

6.3.3 Steps four and five involve the implementation of institutional controls and the transfer of excess lands. These steps may be performed concurrently. However, the land transfer should not be performed until step four is in progress.

SECTION 7

SECTION 7
REFERENCES

Abbott, J.T., Date Unknown, Fort Bliss Research Design (Draft), TRC Mariah Associates, Inc.

Alvarez, J.B., and Buckner, A.W., 1980, Ground-Water Development in the El Paso Region, Texas, with Emphasis on the Resources of the Lower El Paso Valley: Texas Department of Water Resources Report 246.

Ashworth, J.B., 1990, Evaluation of Ground-Water Resources in El Paso County, Texas: Texas Water Development Board Report 324.

Bilbo, Michael, 1976, A High Elevation Archaeology Survey of Castner Range, Fort Bliss, Texas, El Paso Archaeological Society.

CMS Environmental, Inc. 1997, Final Survey Report - Castner Range, Fort Bliss, Texas.

Department of Defense and the National Fish and Wildlife Foundation, Checklist of Birds, Fort Bliss, Texas.

Jaco, H.B., 1971, Soil Survey of El Paso County, Texas, U.S. Department of Agriculture Soil Conservation Service in Cooperation with the Texas Agriculture Experiment Station.

Martin-Bashore, Tessa E., 1997, Phase I: Study of Species Composition, Diversity, and Relative Abundance of Reptiles and Amphibians From Six Vegetative Community Associations on Otero Mesa, McGregor Range, Fort Bliss.

Martin-Bashore, Tessa E., King, Carrie L., and Bell, D. Earl, 1996, An Annotated Bibliography and Natural History Database of the Amphibians and Reptiles of Fort Bliss, Texas.

QuantiTech, Inc., 1998, Castner Range Area OECert Analysis Report.

Texas Parks and Wildlife Department, 1993, Franklin Mountains, State Park Management Plan.

USACE, 1994, Archives Search Report, Fort Bliss: Castner Range.

UXB International, Inc., 1997, Final Report for Castner Range, Fort Bliss, Texas - Unexploded Ordnance (UXO) Removal Action. Prepared for the U.S. Army Corps of Engineers, Huntsville, Alabama.

APPENDIX A

APPENDIX A

OE*CERT* ANALYSIS REPORT

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CASTNER RANGE
OE*Cert* ANALYSIS
FINAL REPORT

For Parsons Engineering Science, Inc.

TECHNICAL REPORT 98R025

Contract Number: DACA87-95-D-0018
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21 May 1998

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FINAL REPORT

1.0 INTRODUCTION

QuantiTech, Inc., was contracted by Parsons Engineering Science, Inc. (Parsons ES) to apply the Ordnance and Explosives Cost-Effectiveness Risk Tool (OE*Cert*) to evaluate the risk due to ordnance and explosives (OE) at Castner Range, Texas. OE*Cert* was developed by QuantiTech and the U.S. Army Engineering and Support Center, Huntsville (USAESCH) to assess the public risk due to ordnance at formerly used military training and defense sites. The methodology has undergone numerous peer reviews, has been the focus of several conference presentations, and has been applied at over 30 OE sites across the United States by QuantiTech.

During this risk analysis, QuantiTech evaluated the number of exposures by members of the public to unexploded ordnance (UXO). Expected future land uses and activities, expected amounts of remaining unexploded surface ordnance, and expected amounts of remaining unexploded subsurface ordnance are key factors in the assessment. These input parameters were developed using site-specific data following a USAESCH approved methodology. The expected amount of unexploded surface and subsurface ordnance located at Castner Range was based on an evaluation of the site-specific sampling data taking into account the estimated site sweep efficiency. QuantiTech compared the risk measures estimated for Castner Range to other types of risks experienced by the general population to provide a sense of the magnitude of the OE risk at the site relative to common risks.

2.0 APPLICATION OF OE*Cert*

There are two general categories of sites OE*Cert* considers when estimating risk, "dispersed" sites and "localized" sites. "Dispersed" sites are defined as sites contaminated with UXO as the result of training activities, accidents, kick-outs surrounding the open burning/open detonation of ordnance, etc. The ordnance located at "dispersed" sites is generally assumed to have undergone some force (i.e., firing, burning, or attempted detonation) that should have caused the ordnance item to function as intended. A defining characteristic regarding "dispersed" sites is that they can be broken down into sub-areas, or sectors, that exhibit a homogeneous dispersion of ordnance and similar terrain features. The term homogeneous ordnance dispersion indicates that, within a sector having this characteristic, ordnance is randomly located over the entire area. Establishing a homogeneous ordnance distribution is required to appropriately apply the OE*Cert* "dispersed" risk-estimating methodology.

"Localized" sites are defined as sites contaminated with UXO as the result of depot activities, burial of ordnance, etc. Ordnance at localized sites may be found in large quantities such as stockpiles or trenches or in small quantities such as abandoned ordnance items. Generally, no assumptions are made regarding the dispersion of localized areas within a site, but sampling is performed to attain some level of certainty that there are no remaining large localized areas at the site once site sampling and investigation has been completed.

Castner Range best fits the definition of a "dispersed" site. Statistical tests were performed using as inputs all the collected sampling data, site investigation data, and historical ordnance finds. The results of the statistical tests established the expected distribution of any ordnance items for the overall area of Castner Range as homogeneous. Details of the homogeneity test employed by QuantiTech in this analysis are detailed in Appendix A.

OE*Cert* measures risk by quantifying how often people are exposed to UXO when participating in commonly performed activities at a site, e.g., child play, hiking, etc. A UXO exposure, as defined by OE*Cert* methodology, is based on the proximity of an individual to UXO. This proximity can also be described as the "shadow" of the individual as it crosses over a UXO item. Each OE*Cert* activity has a proximity, or shadow area, estimated based on its statistical path width. For example, hiking has a 2-foot path width or proximity measured along the distance the individual travels. The individual does not have to specifically touch or know the item is present for an exposure to occur. Estimating exposures in this way yields a conservative estimate of exposures. It is important to note that OE*Cert* estimates exposures only, not ordnance-related accidents. The presence of ordnance exposures does not necessarily indicate that an incident or injury will occur. A comparative risk analysis, included in Section 4.2, provides the translation of accumulated exposures to the chance of injury or death.

The activities for a site are descriptive of the type and amount of surface coverage and subsurface intrusion by the participant. For example, child play is an activity that includes surface coverage (the child roaming the area) and a small amount of subsurface intrusion (digging or playing near loose soil). Hiking is an example of an OE*Cert* activity that only has a surface component (there is no subsurface intrusion assumed for persons taking hikes). The rationale for allocating surface area and subsurface area for each activity is more thoroughly documented in Version E of the Ordnance and Explosives Cost-Effectiveness Risk Tool, dated 31 August 1995.

The number of participants in activities is based on a detailed review of the site land use along with the demographics of the surrounding community. The land use review and demographic data collection is specifically tailored to the site under analysis. If it is known how many participants will access a site, then the specific number of participants can be substituted for demographic data. The OE*Cert* methodology incorporates detailed parameters for recreational activity and age group participation based on factors extracted from the American Sports Analysis Summary Report, 1992. This document provides participation statistics for a myriad of recreational activities broken down by age group and geographic region.

Public exposure results from individuals performing specific activities (both recreational and occupational) within UXO-contaminated areas. The expected number of surface UXO exposures per participant in an area is dependent on UXO density, the proportion of UXO on the surface of the ground, and the participant's exposure area for each specific activity (the area traversed by an individual while performing an activity). The expected number of subsurface UXO exposures per participant in an area is dependent on the UXO density, the proportion of UXO beneath the surface of the ground, the depth distribution of the subsurface UXO, and the associated area in which an activity is performed.

The calculation of the total expected number of UXO exposures at a site follows a step-by-step process. First, for each area, the expected number of exposures for a single individual participating in each activity is calculated. Second, the number of individuals that are expected to participate annually in that activity on the site is quantified based on the demographics (e.g., population) surrounding the site and activity participation data. It is important to note that each time a person participates in an activity, the overall number of participants is increased by one (i.e., if an individual hikes through a site 10 times in a year, then that individual accounts for 10 entrants to the site, not just 1). The individual exposure number and the number of participants are then combined as shown in the following relationship yielding the total annual number of exposures expected to occur for participants in the activity that was identified:

E[Activity Exposures] = E[exposures for single participant] • E[annual participants].

These calculations are then performed for each activity occurring at the site. The values for the expected number of exposures resulting from participation in each activity are summed to yield the overall risk value for the site as follows:

$$E[\text{Total Exposures}] = \sum^{\text{all activities}} E[\text{Activity Exposures}]$$

3.0 UXO CHARACTERIZATION OF CASTNER RANGE, TEXAS

3.1 SITE CHARACTERIZATION

Castner Range is located west of El Paso, Texas and borders the Franklin Mountain State Park. The site is owned by the U.S. Army and was used as a firing range by Fort Bliss. The analysis area for this risk assessment consisted of approximately 7081 acres of currently undeveloped land. The site was used for military training for approximately 50 years, and evidence of OE items was found in every sector of the analysis area. OE*Cert* methodology was used to calculate exposures at Castner Range for several removal alternatives. These alternatives include No Action, surface removal of UXO, removal of UXO to a depth of 1 foot, and removal of UXO to a depth of 4 feet. The sweep efficiency factors used in this assessment are detailed in Appendix B.

Two land use scenarios were considered for this risk assessment. Scenario I assumed that the entire analysis area was turned over for public use as part of Franklin Mountain State Park. This "turned over" area would comprise approximately 26% of the resulting total State Park area. Scenario II assumed that approximately 1200 acres on the eastern side of the analysis area were developed as a residential area with the remaining mountainous acres becoming part of the Franklin Mountain State Park. The number of entrants to the site under each scenario was based on a subset of the El Paso population considering the proposed amount of residential development and the use of the site area as part of the much larger Franklin Mountain State Park. Specific parameters were derived using standard OE*Cert* methodology.

The activities expected to occur under each sector and the expected number of participants in each activity were based on standard OE*Cert* methodology as documented in Version E of the OE*Cert* Final Report, dated 31 August 1995, and on information provided by Parsons Engineering Science personnel. Table 3.1-1 provides a summary of the base case activities and participation for Scenario I and Table 3.1-2 provides a summary of the base case activities and participation for Scenario II. It is important to note that the column titled "Site Population" contains the numbers that indicate the subset of the total El Paso population that is expected to participate in the given risk activity. Risk assessment is based on the participation numbers listed in the column titled "Total Participation." It should be noted that residential child playing occurs under each scenario due to residential developments that currently exist on the northern and southern boundaries of Castner Range. Surveying and construction activities under Scenario I include work for land improvements such as trail construction or picnic area construction. Construction under Scenario II includes building homes to grade with shallow land excavation. Short cutting was included as a Scenario II activity to account for residents finding the most efficient path between two locations.

Table 3.1-1. Participation Breakout: Scenario I

Activity	Site Population	Times/Year (OE*Cert*)	Total Participation
Child Play (Park Areas)	76	6	456
Child Play (Residential)	102	235	23,970
Hiking	9,386	13.4	125,773
Mountain Biking	3,225	38.5	124,163
Picnicking	275	6	1,650
Surveying	N/A	N/A	1*
Construction	N/A	N/A	1*

(*Note: One participant is assumed when construction and surveying are present)

Table 3.1-2. Participation Breakout: Scenario II

Activity	Site Population	Times/Year (OE*Cert*)	Total Participation
Child Play (Park Areas)	48	6	288
Child Play (Residential)	552	235	129,720
Hiking	6,032	13.4	80,829
Mountain Biking	2,074	38.5	79,849
Picnicking	176	6	1,056
Short Cuts	443	104	46,072
Surveying	N/A	N/A	1*
Construction	N/A	N/A	1*

(*Note: One participant is assumed when construction and surveying are present)

3.2 UNEXPLODED ORDNANCE CHARACTERIZATION

Unexploded ordnance characterization at Castner Range was accomplished by estimating the residual levels of both surface UXO and subsurface UXO. Site sampling at Castner Range was accomplished by application of the SiteStats/GridStats sampling methodology as prescribed in the SiteStats/GridStats Standard Operating Procedure published by USAESCH. Based on the parameters of the SiteStats/GridStats methodology, the sampling efforts at the Castner Range were determined to be sufficient to characterize any UXO remaining at the site. Therefore, this statistically rigorous sampling data was used exclusively to estimate potential UXO contamination. During site sampling, surface UXO was found in all Zones except Zones 3 and 9. Subsurface UXO was only found in Zone 4 during site sampling.

Two types of statistical methods were used to estimate surface and subsurface ordnance contamination levels at Castner Range. In situations where no UXO was found, inferential rather than descriptive statistical techniques were applied (See Appendix C). For surface UXO, this situation is the case for Zones 3 and 9; and for subsurface UXO, this situation is the case for Zones 1, 2, 3, 5, 6, 7, 8, 9, 10, and 11 at Castner Range. Assessment of surface density and subsurface density for the applicable sectors where no UXO was found was based on a "power curve" analysis utilizing the hypergeometric statistical distribution. This analysis yields a probabilistic density estimate. This estimate is interpreted as the density limit (i.e., total number of surface or subsurface UXO items "x" in the sector) at which there is a 90% probability that, given the amount of sampling that occurred in the sector, at least one UXO item would have been found. For example, 11.5 acres were surface sampled in Zone 3 with no UXO items being found. The "power curve" analysis for this zone yielded a probabilistic density estimate of 0.08 UXO per acre, or 3.2 total surface UXO, (See Table 3.2-1). If the actual number of surface UXO items in Zone 3 were greater than 3.2 (0.08/acre), then 90% of the time at least one UXO item should have been found during sampling of 11.5 acres.

The calculated probabilistic density estimate for each sector was used as the appropriate (either surface or subsurface) maximum density input for OE*Cert* exposure calculations. Since no UXO items were found during sampling in zones where this technique was applied, 0 UXO items per acre was also input to OE*Cert* so that a range of expected exposures could be determined. Therefore, it follows that there is 90% confidence in the assertion that the exposures calculated by OE*Cert* based on this density range is representative of the upper and lower limit on exposures that can be expected in the zone due to either surface or subsurface UXO.

The assessment of surface and subsurface UXO density in zones where UXO was found was based on a confidence interval approach. The calculated bounds can be interpreted as upper and lower bounds on the density estimate. A 90% confidence interval was selected and calculated indicating that there is a 90% probability that the true surface or subsurface UXO density for the sector lies between these bounds. The UXO densities associated with the upper and lower confidence limits were input to OE*Cert* so that a range of expected exposures could be determined. The confidence interval approach was used to calculate surface density ranges in Zones 1, 2, 4, 5, 6, 7, 8, 10, and 11 and the subsurface density range for Zone 4. The methodologies used to calculate the probabilistic upper density estimates and the confidence intervals used in this risk assessment are discussed in greater detail in Appendix C. Table 3.2-1 shows the surface and subsurface density ranges calculated and used as the basis for OE*Cert* exposure calculations.

Table 3.2-1. Castner Range UXO Density Estimates

Zone	Surface Density Range (UXO per Acre)	Subsurface Density Range (UXO per Acre)
1	0.03 - 0.20	0.00 - 0.55
2 and 5*	0.00 - 0.16	0.00 - 0.45
3	0.00 - 0.08	0.00 - 0.60
4	0.00 - 0.06	0.00 - 0.70
6	0.00 - 0.11	0.00 - 0.55
7	0.00 - 0.11	0.00 - 0.45
8	0.056 - 0.22	0.00 - 0.41
9	0.00 - 0.10	0.00 - 0.61
10 and 11*	0.09 - 0.29	0.00 - 0.37

*Note: Zones 2 and 5 and Zones 10 and 11 were merged during the site sampling.

There was neither UXO nor any evidence of OE items found during sampling in any zones at a depth greater than one-foot. Therefore, for risk assessment purposes, any subsurface UXO estimated to be present in any zones was assumed to be between the surface and one-foot.

4.0 RISK ASSESSMENT PROCESS

4.1 EXPOSURE CALCULATIONS

The dispersed site OE*Cert* methodology was used to estimate exposures at Castner Range. This risk estimating methodology is presented in greater detail in Appendix D. The SiteStats methodology and the statistical test detailed in Appendix A concluded that the ordnance distribution of the expected UXO in each zone was homogeneous.

The surface activities expected to occur at Castner Range under Scenario I include hiking, mountain biking, and surveying. The surface activities expected to occur at Castner Range under Scenario II include hiking, mountain biking, short cutting, and surveying. These activities are assumed to have no ground intrusive component, and therefore participants in these activities may only be exposed to ordnance items located on the surface. The subsurface activities expected to occur at Castner Range under Scenarios I and II include child playing, picnicking, and construction. Each of these subsurface activities involves some ground intrusion, and therefore participants in these activities may be exposed to both surface and subsurface UXO items.

Based on the current population and activity assumptions, between 13,229 and 79,053 annual exposures to UXO can be expected at Castner Range under Scenario I and between 10,845 and 72,665 exposures can be expected under Scenario II. These ranges of values are reflective of the different density cases evaluated at the site. The range of exposures is higher under Scenario I than under Scenario II due to the reduction in the area available for hiking and mountain biking. Since a significant proportion of any expected UXO remaining at the Castner Range is expected to be surface UXO, hiking and mountain biking are the two highest exposure producing activities. These two activities are expected to cause relatively large numbers of exposures because each activity causes a large amount of area to be covered relative to other activities. Although exposures due to construction and child playing do increase under Scenario II, this increase is not sufficient to offset the decrease in hiking and mountain biking exposures. Table 4.1-1 shows the Base Case expected annual exposure range calculated, by zone, for each density case and removal option for Castner Range under Scenario I. Table 4.1-2 shows the Base Case expected annual exposure range calculated, by zone, for each density case and removal option for Castner Range under Scenario II. It is important to note that the zones delineated under Scenario II differ slightly from the zones identified in Scenario I. This difference was caused by either all or part of a zone identified in Scenario I being developed as a residential area in Scenario II. Under Scenario II, Zones 2 and 5 and Zone 7 were partially developed (the residential portion of the zone is identified by the "b") and Zone 11 was completely developed. Appendix E presents a complete list of exposures for each zone and scenario broken out by activity.

Table 4.1-1. Total Expected Annual Exposures: Castner Range Scenario I (Including Construction)

Area	No Action	After Surface Removal	After 1 Foot Removal	After 4 Foot Removal
Zone 1	2245 - 14757	113 - 741	113 - 740	113 - 740
Zone 2 & 5	0 - 16156	0 - 812	0 - 809	0 - 809
Zone 3	0 - 299	0 - 16	0 - 15	0 - 15
Zone 4	0 - 1096	0 - 56	0 - 55	0 - 55
Zone 6	0 - 1935	0 - 99	0 - 98	0 - 98
Zone 7	0 - 6419	0 - 326	0 - 324	0 - 324
Zone 8	2597 - 10376	131 - 522	131 - 522	131 - 522
Zone 9	0 - 706	0 - 37	0 - 36	0 - 36
Zone 10 & 11	8387 - 27309	421 - 1369	421 - 1367	421 - 1367
SITE TOTAL	**13229 - 79053**	**665 - 3978**	**665 - 3966**	**665 - 3966**

Table 4.1-2. Total Expected Annual Exposures: Castner Range Scenario II (Including Construction)

Area	No Action	After Surface Removal	After 1 Foot Removal	After 4 Foot Removal
Zone 1	2245 - 14757	113 - 741	113 - 740	113 - 740
Zone 2 & 5a	0 - 8314	0 - 421	0 - 419	0 - 419
Zone 2 & 5b	0 - 8012	0 - 491	0 - 404	0 - 404
Zone 3	0 - 299	0 - 16	0 - 15	0 - 15
Zone 4	0 - 1096	0 - 56	0 - 55	0 - 55
Zone 6	0 - 1935	0 - 99	0 - 99	0 - 98
Zone 7a	0 - 1840	0 - 94	0 - 93	0 - 93
Zone 7b	0 - 5675	0 - 373	0 - 287	0 - 287
Zone 8	2597 - 10376	131 - 522	131 - 522	131 - 522
Zone 9	0 - 706	0 - 37	0 - 36	0 - 36
Zone 10	1490 - 4851	75 - 245	75 - 244	75 - 244
Zone 11	4513 - 14804	226 - 812	226 - 742	226 - 742
SITE TOTAL	**10845 - 72665**	**545 - 3907**	**545 - 3656**	**545 - 3656**

Several factors contribute to add different amounts of uncertainty to the estimation of exposures for Castner Range. The sweep efficiency and the residual ordnance densities resulting from the application of that efficiency value cause one level of uncertainty. This uncertainty was accounted for by using density ranges rather than point estimates for exposure calculations. The population and activity participation data used causes another level of uncertainty. The Base Case risk estimates shown in Tables 4.1-1 and 4.1-2 reflect the expected exposures resulting from the number of people expected to enter the site in the next year and the level of construction reasonably expected to occur in each sector for each land use scenario.

To account for the uncertainty associated with the population values, the OE*Cert* methodology was also exercised over a range of population values with the construction area remaining constant. This process involved evaluating risk for Castner Range assuming the population was to double, then triple, and so on. Population numbers were increased in this manner from twice the currently assumed level to ten times the current values providing 10 exposure scenarios. Figure 4.1-1 shows the range of expected exposures from the base case to ten times the base case for land use under Scenario I. Figure 4.1-2 shows the range of expected exposures from the base case to ten times the base case for land use under Scenario II. The exposure estimates for each of the ten scenarios shown in the figures are presented in Appendix F.

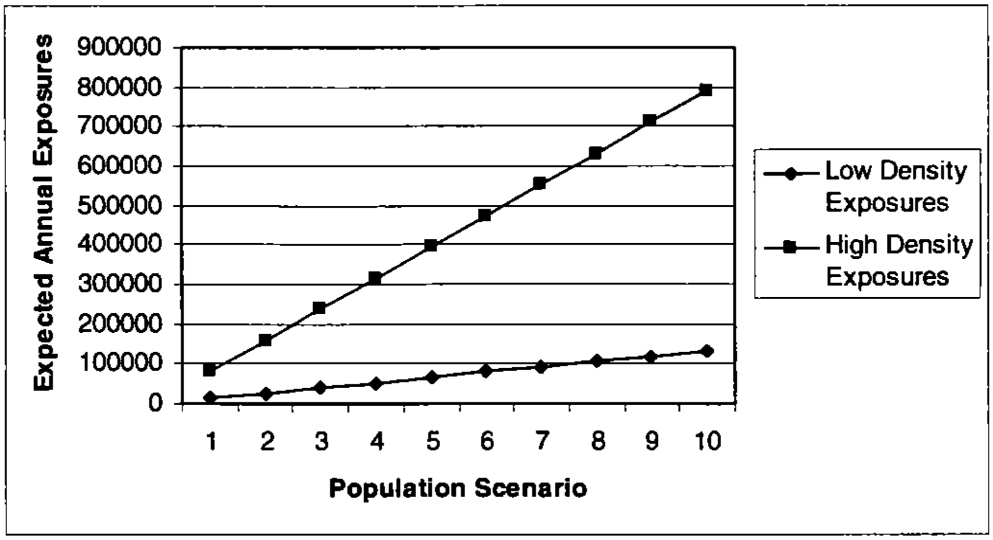

Figure 4.1-1. Expected Exposure Range Scenario I (Base Case to 10 Times Base Case)

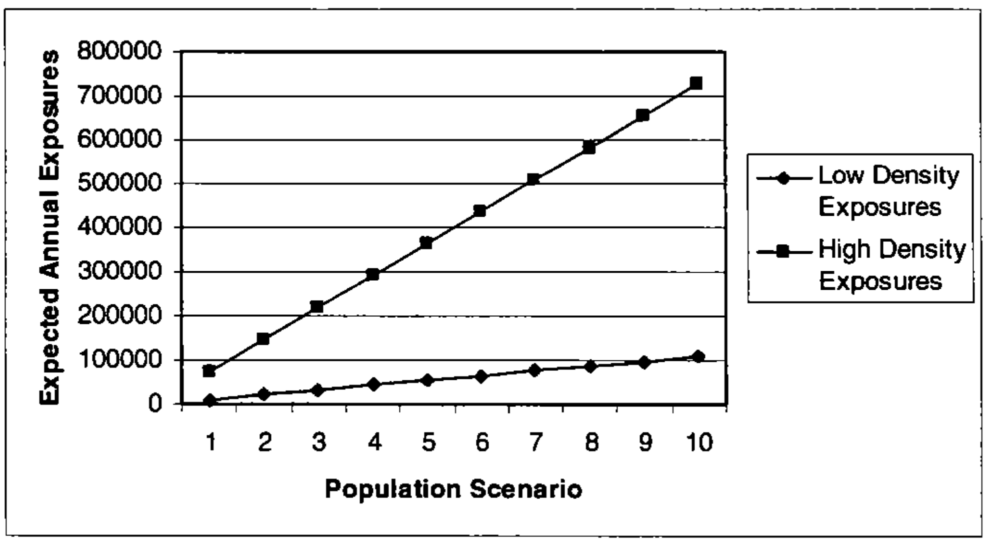

Figure 4.1-2. Expected Exposure Range Scenario II (Base Case to 10 Times Base Case)

4.2 COMPARATIVE RISK

An appropriate first step in the comparative risk process for Castner Range is to compare the number of expected annual exposures based on both the high and lower density case with the expected annual UXO exposures calculated at other sites where OE*Cert* has been applied. Table 4.2-1 lists Castner Range along with other sites ordered from lowest to highest expected annual exposures. The estimated UXO exposures for each site are based on OE*Cert* analysis results using the "No Removal Action" scenario. For details and supporting data concerning site activities and individual probabilities of UXO exposures, the specific site OE*Cert* report should be reviewed.

Table 4.2-1. Site Comparison of Expected Ordnance and Explosives Public Risk Exposures - No Action

Range	Site (Annual Expected Exposures)	
0 - 500	Adak, AK (0 density)	(0)
	Buckley Field Zone 3, CO (0 Density)	(0)
	Buckley Field Zone 2, CO (Lower Probabilistic Estimate)	(0)
	Adak, AK (Probabilistic Estimate)	(1.4)
	Diamond Springs Road Area, MN (Upper Sweep Efficiency Scenario)	(7.4)
	Salton Sea Test Base, CA	(25)
	Camp Greene, NC	(26)
	Camp Grant, IL	(41)
	Nansemond Army Depot, VA	(49)
	Diamond Springs Road Area, MN (Lower Sweep Efficiency Scenario)	(49.4)
	Pantex Ordnance Plant, TX	(60)
	Dutch Harbor, AK	(90)
	Camp Croft OOU6, SC	(105)
	Buckley Field Zone 1, CO (Lower Probabilistic Estimate)	(110)
	Baywood Park, CA	(143)
	Illinois Ordnance Plant, IL	(310)
	Buckley Field Zone 3, CO (Upper Probabilistic Estimate)	(395)
	Fort Monroe, VA	(356)
501 - 15,000	Fort Ord EE/CA Phase I Sites, CA	(723)
	Attu, AK	(2,007)
	Buckley Field Zone 2, CO (Upper Probabilistic Estimate)	(2,079)
	Raritan Arsenal, NJ	(3,598)
	Duck Target Facility, NC	(6,563)
	Buckley Field Zone 1, CO (Upper Probabilistic Estimate)	(10,973)
	Castner Range, TX (Low Density)	**(10,845-13,229)**
	Motlow Range, TN	(14,277)
15,001 - 300,000	**Castner Range, TX (High Density)**	**(72,665-79,053)**
	Dolly Sods, WV	(90,859)
	Culebra Island NWR, PR	(117,930)
	Camp Claiborne, LA	(286,396)
> 300,000	Southwest Proving Ground, AR	(449,906)
	Sioux Army Depot, NE	(2,125,955)

To better understand the exposure numbers estimated for Castner Range, they are placed in the same context as and compared to common risks. To accomplish this, QuantiTech and USAESCH developed a comparative risk analysis process whereby the probability of injury or death of a member of a specific community as the result of everyday occurrences is calculated and expanded over a 20-year time period. The probability of injury or death as the result of an ordnance related exposure over a 20-year time period is also calculated for the same community. These probability measures are placed on a list in descending order of likelihood so that perspective can be gained regarding the relative risk of injury due to ordnance versus common activities. Figure 4.2-1 presents a list of common risk activities as well as the risk associated with the accumulated UXO exposures at Castner Range for land use Scenarios I and II.

- **Comparative Risk Analysis - Injuries and Deaths**
- **515,342 Population Base in Site Area**
- **13,229 or 79,053 Annual UXO Exposures Calculated by OE*Cert* High and Low Density Base Case Scenario I**
- **10,845 or 72,665 Annual UXO Exposures Calculated by OE*Cert* High and Low Density Base Case Scenario II**

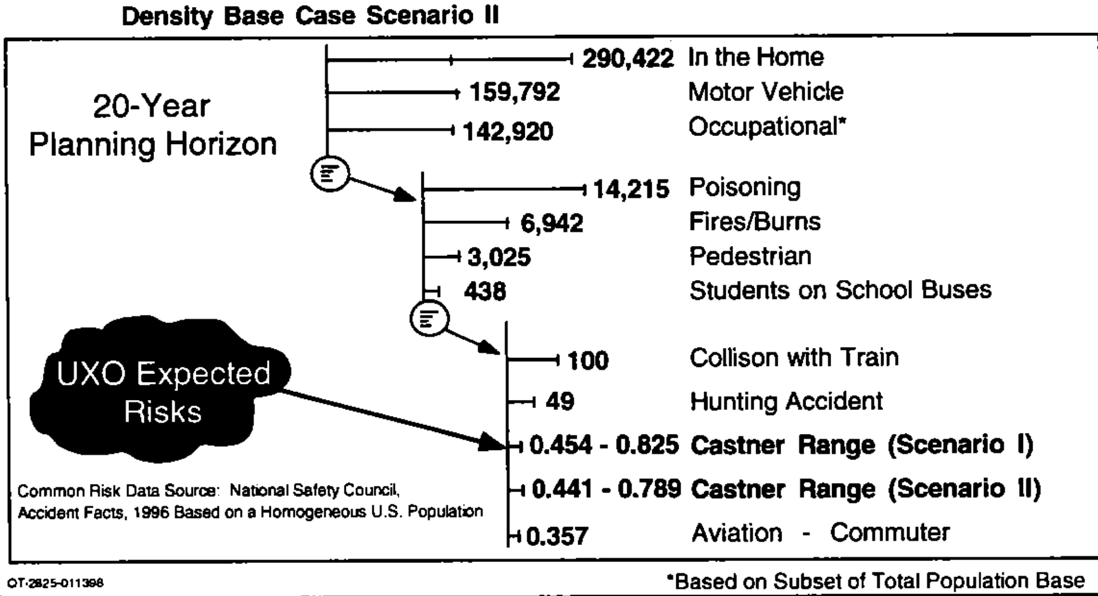

Figure 4.2-1. Castner Range Comparative 20-Year Risk Estimate – Injuries and Deaths

The activities used in the common risk list were selected based on the assumption that the public in everyday life at Castner Range and in the surrounding community may experience them. The number of UXO related injuries or deaths expected for Scenario I (0.454 – 0.825) and Scenario II (0.441 – 0.789) as shown in Figure 4.2-1 were calculated using data from 18 UXO contaminated sites. Using OE*Cert* calculated exposures and an estimate of the average time between accidents (in years), a statistical comparison was performed to predict the relationship between expected injuries/deaths and the expected number of annual UXO exposures at a site. The form of the regression is shown in Appendix G. In the case of Castner Range, the results show that, with the estimated level of expected annual UXO exposures, it is very unlikely that an injury or death due to UXO exposure can be expected in the next 20 years. Further details on the comparative risk results and methods are contained in Appendix G.

5.0 CONCLUSION

The results of the OE*Cert* analysis indicate that between 13,229 and 79,053 exposures to UXO can be expected per year at Castner Range under Scenario I and between 10,845 and 72,665 exposures to UXO can be expected under Scenario II. This range of exposures is based on the current population surrounding the site, the activities (including construction) that may be expected to occur, and the residual ordnance density of the site resulting from the estimated range of UXO density and the applied sweep efficiency. It is important to note that OE*Cert* estimates exposures only, not ordnance related accidents. The presence of ordnance exposures does not necessarily indicate that an incident or injury will or will not occur.

The comparative risk analysis for Castner Range shows that, relative to other common activities, the expected number of injuries or deaths due to UXO exposure under both land use scenarios, is estimated to be slightly higher than the chance of injury or death due to commuter aviation for citizens of the city of El Paso. Both the OE*Cert* assessment and the comparative risk analysis utilized conservative population and activity assumptions, and both presented results over a range of ordnance density estimates. The sensitivity of UXO exposure calculations to population increases was also estimated by executing the OE*Cert* Methodology over a range of population inputs.

The level of ordnance exposures and comparative risk estimated for Castner Range places this site in the moderate category in terms of estimated residual risk as compared to other sites that have undergone OE*Cert* analysis and comparative risk analysis. This is attributable to the relatively high number of people expected to enter the site to participate in recreational activities. The results of OE*Cert* also show that approximately 95% of the expected exposures can be removed by performing a surface removal action at the site.

APPENDIX A

SITESTATS/GRIDSTATS RESULTS SUMMARY

APPENDIX A

SITESTATS/GRIDSTATS RESULTS SUMMARY

This appendix documents QuantiTech's SiteStats/GridStats support provided during the Fort Bliss Castner Range intrusive OE investigation and sampling. During the course of the sampling, QuantiTech provided both phone support and off-line SiteStats/GridStats analysis to assist the CMS field staff at Castner Range. An initial site visit was made to train the CMS staff in the operation and procedures for SiteStats/GridStats.

The grid sampling and associated SiteStats analysis indicate that a sufficient number of grids were sampled in each of the sectors at Castner Range to establish a basis for both site and individual sector characterization. Table A-1 in this appendix summarizes the number of grids sampled during the intrusive investigation along with the findings and sector characterization conclusion. OE intrusive sampling grids in each of the sectors were selected to: 1) ensure both spatial and random grid sampling, 2) investigate areas of likely OE (based on visual and historical evidence), and 3) provide statistical sampling confidence for the sector characterization. One subsurface UXO item was found in Sector 4. The QuantiTech analysis utilized grid sampling field sheets and also a UXO summary table provided by CMS at the conclusion of sampling.

Table A-1. Intrusive Sampling Summary

Sector	Estimated Sector Available Area (acres)	Number of Grids Required for SiteStats Characterization	Number of Grids Sampled (100' X 100')	Number of Subsurface OE (UXO) Items Found	Characterization Conclusion
1	746	17	17 (3.9 ac)	0	Homogeneous
2 & 5	953	19	21 (4.8 ac)	0	Homogeneous
3	40	15	15 (3.4 ac)	0	Homogeneous
4	198	14	17 (3.9 ac)	1	Homogeneous
6	175	17	17 (3.9 ac)	0	Homogeneous
7	576	21	21 (4.8 ac)	0	Homogeneous
8	462	17	23 (5.3 ac)	0	Homogeneous
9	70	14	15 (3.4 ac)	0	Homogeneous
10 & 11	756	19	26 (6.0 ac)	0	Homogeneous

During the progress of sampling in each sector, QuantiTech evaluated the grid sampling results and performed a SiteStats assessment to confirm that a sufficient number of grids were sampled. SiteStats was also operated at the site by the CMS staff. Coordination between CMS and QuantiTech continued throughout the intrusive sampling efforts. The homogeneous characterization conclusion indicates that each sector can be expected to have a consistent density of UXO remaining throughout the sector as found during the sampling. Since no subsurface UXO items were found in all but one sector, this assessment provides statistical confidence that the potential for any significant density of subsurface UXO remaining is very small.

CMS completed a surface OE investigation prior to the OE subsurface investigation. Table A-2 summarizes the surface UXO found. UXO items were found in seven of the nine sectors. Using the number of grids 100% investigated and the number of hazardous OE items found during each sector investigation, an estimation of the remaining OE items was made.

Table A-2. Surface Sampling Summary

Sector	Number of 100' X 100' Grids Surface Investigated	Number of Surface UXO Items Found
1	263 (60.4 ac)	7
2 & 5	588(135.0 ac)	9
3	50 (11.5 ac)	0
4	210 (48.2 ac)	1
6	212 (48.7 ac)	2
7	316 (72.5 ac)	4
8	280 (64.3 ac)	9
9	86 (19.7 ac)	0
10 & 11	316 (72.5 ac)	14

APPENDIX B

SWEEP EFFICIENCIES

APPENDIX B

SWEEP EFFICIENCIES

The sweep efficiency parameters used in quantifying the reduction in OE*Cert* risk exposures for selected removal alternatives were provided by the U.S. Army Engineering and Support Center, Huntsville (USAESCH). Tables B-1 and B-2 summarize the initial ordnance sweep efficiencies and mean sweep efficiencies that were used in this analysis.

Table B-1. Sweep Efficiencies $\eta(y)$ (%)

Ordnance	$\eta(y)$				
	Depth				
	0 ft	1 ft	2 ft	4 ft	10 ft
37 mm	95	85	50	5	0
75 mm	95	90	75	50	0
155 mm	95	95	90	65	1
500# Bomb	95	100	100	90	25

Table B-2. Mean Sweep Efficiencies (%)

Y (Depth)	$\eta(y)$
0	0.95
(0 – 1)	0.923
(1 – 2)	0.762
(2 – 4)	0.348
(4 – 6)	0.2
(6 – 8)	0.1
(8 – 10)	0.05

APPENDIX C

PROBABILISTIC DENSITY ESTIMATION METHODOLOGY

APPENDIX C

PROBABILISTIC DENSITY ESTIMATION METHODOLOGY

C.1 STATISTICAL BACKGROUND

A primary focus of statistics is to summarize or describe numerical data. Another focus of statistical analysis, however, is making generalizations, or inference, about a population based on a thorough examination of a sample. The former area is known as descriptive statistics and the latter as inferential statistics. The methodology employed to calculate the probabilistic density estimate used in risk estimations for Castner Range uses techniques from both of these branches of statistics.

C.2 APPLICATION OF DESCRIPTIVE STATISTICS

The area of statistical analysis known as descriptive statistics includes methods of describing sets of numerical data. The application of descriptive statistical techniques is appropriate when certain parameters of the population (i.e., mean, variance, etc.) are known or can be approximated. At Castner Range, the average number (mean) of expected UXO items per grid can be approximated in zones where UXO was found during sampling using descriptive statistics techniques. Justification for applying descriptive statistics to these zones is based on the Central Limit Theorem.

The Central Limit Theorem states that as the size of the sample collected becomes large, the sampling distribution of the sample means tends toward a normal distribution with the population mean equal to the sample mean. In other words, if the sample size is sufficient, the true population mean and variance can be approximated by the sample mean and variance. When this is true, several types of descriptive statistical techniques may be applied to describe the population based on the data collected during sampling.

At Castner Range, no subsurface UXO items were found during the grid sampling in Zones 1, 2 and 5, 3, 6, 7, 8, 9, and 10 and 11; therefore, probabilistic subsurface density estimates for these zones were based solely on the inferential statistics techniques described in the following section of this appendix. No surface UXO items were found during the grid sampling in Zones 3 and 9; therefore, probabilistic surface density estimates for these zones were also based solely on inferential statistical techniques. However, several zones at Castner Range contained grids where UXO items were found during sampling. Therefore, descriptive techniques were applied to estimate UXO density in these zones. The data pertaining to Zone 1 surface sampling will be used to provide a generic example of how descriptive statistics techniques were applied to calculate the probabilistic density estimates used by OE*Cert* in risk calculations. The total zone area of Zone 1 is equivalent to 3250 100' by 100' grids. Within this zone, sample grids were selected and sampled. An area equivalent to 263 100' by 100' grids was surface sampled. This surface sampling resulted in two UXO items being discovered in one grid, one UXO item being found in five other grids, and zero UXO items being discovered in the other 257 grids. This sample size is sufficiently large to allow application of the Central Limit Theorem to calculate the parameters of the sample data and approximate the parameters of the population. Table C.2-1 presents the parameters calculated from the sample data.

Table C.2-1. Zone 1 Sample Data Parameters

Sample Mean	Sample Variance	Sample Standard Deviation
0.027 UXO/Grid	0.034 UXO/Grid	0.183 UXO/Grid

These sample parameters were used as the basis for applying the descriptive statistics technique of confidence intervals. A confidence interval is simply an upper and lower limit about a point, with an associated preset level of confidence that the population value will fall between these calculated limits. In the example of Zone 1, the sample mean was used to approximate the population mean. Procedures based on the Student t distribution were then applied to determine a 90% confidence interval about the sample mean. (*Note: the Student t distribution is appropriate because the population variance is unknown and must be approximated by the sample variance). Table C.2-2 presents the confidence interval calculated for the Zone 1 surface density. Interpreting this confidence interval, it can be stated that there is a 90% probability that the population mean (e.g., the average number of UXO items per grid in the zone) is between 0.197 UXO/Acre and 0.035 UXO/Acre assuming UXO are distributed homogeneously throughout the zone.

Table C.2-2. Zone 1 UXO Confidence Limits

Confidence Level	Upper Limit	Lower Limit
90%	0.197 UXO/Acre	0.035 UXO/Acre

C.3 APPLICATION OF INFERENTIAL STATISTICS

Inferential statistics is appropriate with making generalizations about a population based on the thorough examination of a sample drawn from that population. It is quite reasonable to expect that some samples taken from the population may deviate considerably from population parameters. Therefore, there needs to be some way to assess the quality of the generalizations made about a population. This need is especially evident at Castner Range due to the public safety concerns related to potential UXO contamination.

When using statistical methods to access ordnance contamination levels, the situation where no UXO is found in a zone requires the application of inferential rather than descriptive statistical techniques. In this case, an assessment of ordnance density can be based on a "power curve" analysis, utilizing the hypergeometric statistical distribution. Specifically, the probability of finding no ordnance items in a sample of grids from the zone, given that the UXO density is no greater than a certain level for the zone, is calculated for various zone density values.

This method is appropriate for all zones at Castner Range where sampling efforts did not result in the discovery of any UXO items. The application of "power curves" to Zone 2 and 5 subsurface sampling data is presented as an example. The total area of this zone is the equivalent of 4151 100' by 100' grids. From this population, sample grids were selected and sampled. An area equivalent to 21 100' by 100' grids was subsurface sampled. This sampling resulted in no subsurface ordnance items being discovered. The question then becomes, given the amount of area that has been sampled, what density level (i.e., "x" number of UXO items) may be established such that there is approximately 90% confidence that there are no more than "x" UXO items remaining in the zone. The hypergeometric probability that 21 grids could be sampled with no UXO items being found, given that the actual UXO density of the zone is greater than 0.45 UXO items per acre, is equal to 0.0995. Thus, if the true density of the zone was 0.45 UXO items per acre, 90% of the time ($1-0.0995 \approx 0.90$) at least one UXO item would have been found in a sample of this size. For Zone 2 and 5, this value of 0.45 UXO items per acre is equivalent to a total of 431 UXO items in the zone. Therefore, the statistical conclusion could also be stated that 90% of the time ($1-0.0995 \approx 0.90$) at least one UXO item would have been found in a sample of 21 grids if there were more than 431 UXO items in the zone.

APPENDIX D

OE*Cert* EXPOSURE ESTIMATING DESCRIPTION AND EXAMPLE

APPENDIX D

OE*Cert* EXPOSURE ESTIMATING DESCRIPTION AND EXAMPLE

D.1 OE*Cert* EXPOSURE ESTIMATING DESCRIPTION

Public exposure to both surface and subsurface UXO items is characterized by a Poisson process. The Poisson distribution is considered appropriate since it is believed that the sectors delineated, via appropriate sampling techniques, exhibit homogeneously distributed UXO. This homogeneous distribution of UXO allows the passage of participants through the site to be characterized as a Poisson process.

The public exposures result from individuals performing specific activities (both recreational and occupational) within UXO-contaminated areas. The expected number of surface UXO exposures per participant in a sector is dependent on UXO density, the proportion of UXO on the surface of the ground, and the activity participant's exposure area (the area traversed by an individual while performing an activity). The expected number of subsurface UXO exposures per participant in a sector is dependent on the UXO density, the proportion of UXO beneath the surface of the ground, the density distribution of the subsurface UXO, and the intrusive area associated with an activity performed in the sector.

The calculation of the total expected number of exposures to UXO at a site follows a step-by-step process. This process is explained in detail in Version E of the Ordnance and Explosives Cost-Effectiveness Risk Tool (OE*Cert*) Final Report, dated 31 August 1995. First, for each sector, the expected number of exposures for a single individual participating in a specific activity is calculated. Second, the number of individuals that are expected to participate annually in that activity on the site is determined based on the demographics (e.g., population) surrounding the site and activity participation data. The two values are combined as shown in the following relationship to give the total annual number of exposures expected to occur for participants in the activity that was identified.

$$E[\text{Activity Exposures}] = E[\text{exposures for single participant}] \bullet E[\text{annual participants}]$$

These calculations are then performed for each activity occurring at the Formerly Used Defense Sites (FUDS). The values for the expected number of exposures resulting from participation in each activity are summed to yield the overall exposure value for the site.

$$E[\text{Total Exposures}] = \sum^{\text{all activities}} E[\text{Activity Exposures}].$$

D.2 OE*Cert* EXAMPLE

Calculating Exposure for Short Cuts at Castner Range (Zone 11; Scenario II, Lower Density Estimate)

The exposures associated with taking a short cut at Castner Range involves the calculation of surface exposures. The number of exposures to ordnance for a single individual taking a short cut is calculated by multiplying the UXO density by the effective area. The effective area is defined as the minimum of the sector area and the area that an individual covers while taking a short cut. The resulting value for a single individual exposure is called mu (μ).

To find mu for a density of 0.09 UXO/acre, first find the overall density per square foot for all depths:

density/acre = *0.09* UXO/*acre*

density/sq ft = *0.09/43,560 sq ft*

= *0.00000207* UXO/*sq ft*

Then find the density on the surface by multiplying the overall density by 100%, which is the proportion of the ordnance within the surface area for short cuts as calculated from the sampling data:

surface density = *0.00000207* UXO/*sq ft* • *1.0*

= *0.00000207* UXO/*sq ft*

Finally, calculate mu by multiplying the surface density by the surface effective area (9,549 ft^2).

μ = *0.00000207* UXO/*sq ft* • *9,549 sq ft*

μ = *0.01976643*

The expected number of exposures for short cuts is found by multiplying the mu value by the total number of annual participants. The expected number of exposures for 1 foot and 4 foot removals is the same as the expected number of exposures for surface removal because a short cut is a surface only activity (i.e., it is non-intrusive).

The mu value is also used to calculate the probability of an exposure for a single individual. This is done by substituting the mu value into the following equation for calculating probability:

$p(Exp) = 1 - e^{-\mu}$

$p(Exp) = 1 - e^{-0.01976643}$

$p(Exp) = 1 - 0.980428$

$p(Exp) = 0.019572$

The expected annual exposures while taking a short cut are shown in Table D-1. The following assumptions were made: density equals 0.09 UXO/acre and 15,274 annual participants in short cutting. Note that these exposures are calculated from the low UXO density expected in the zone and are shown only to illustrate the mathematical calculations. Complete exposure calculation results are provided in Appendix E.

Table D-1. Expected Exposures for All Short Cut Participants in Zone 11, Annually

Removal Option	Expected Exposures
No Removal Action	301
Surface Removal	15
1 Foot Removal	15
4 Foot Removal	15

APPENDIX E

RISK ESTIMATES

APPENDIX E

RISK ESTIMATES

The estimates provided in this analysis include expected annual exposures to UXO by members of the public and the probability of exposure per individual participating in a particular activity. An expected annual exposure is defined by the OE*Cert* methodology as a participant in an activity being in the proximity of ordnance, with or without knowledge of the presence of ordnance. The probability of an individual exposure is defined as follows: If an individual is participating in an activity under analysis in the OE area, what is the probability that the individual will experience at least one exposure to at least one UXO item in a single year?

Table E-1 shows the Scenario I expected annual exposures to UXO by members of the public in each area for each removal option. Table E-2 shows the Scenario II expected annual exposures to UXO by members of the public in each area for each removal option. These values can be thought of as the "risk to many" since it considers the annual entrants to Castner Range. The expected annual exposures per area reflected in Table E-1 and E-2 are the sum of all expected exposures for each activity occurring in each area.

The "no action" alternative reflects the current site conditions. Surface removal provides a surface sweep of OE items with a 95% efficiency. A one foot removal provides an ordnance sweep of those items just below the surface down to one foot at 92.3% efficiency. For the one foot option, the surface is not considered to be swept again. Appendix C provides further details about the sweep efficiencies used in the analysis.

Each area at Castner Range has an estimated ordnance density, identified activities, and an estimate of public participation as described in this report and appendices. Exposure calculations consider the surface area covered during an activity and the subsurface intrusion area of the activity (if one exists). Generally, areas with many activities and many public participants in an area identified as having UXO will have many exposures.

Table E-1. Total Expected Annual Exposures: Castner Range Scenario I (Including Construction)

Area	No Action	After Surface Removal	After 1 Foot Removal	After 4 Foot Removal
Zone 1	2245 - 14757	113 - 741	113 - 740	113 - 740
Zone 2 & 5	0 - 16156	0 - 812	0 - 809	0 - 809
Zone 3	0 - 299	0 - 16	0 - 15	0 - 15
Zone 4	0 - 1096	0 - 56	0 - 55	0 - 55
Zone 6	0 - 1935	0 - 99	0 - 98	0 - 98
Zone 7	0 - 6419	0 - 326	0 - 324	0 - 324
Zone 8	2597 - 10376	113 - 522	113 - 522	113 - 522
Zone 9	0 - 706	0 - 37	0 - 36	0 - 36
Zone 10 & 11	8387 - 27309	421 - 1369	421 - 1367	421 - 1367
SITE TOTAL	**13229 - 79053**	**665 - 3978**	**665 - 3966**	**665 - 3966**

Table E-2. Total Expected Annual Exposures: Castner Range Scenario II (Including Construction)

Area	No Action	After Surface Removal	After 1 Foot Removal	After 4 Foot Removal
Zone 1	2245 - 14757	113 - 741	113 - 740	113 - 740
Zone 2 & 5a	0 - 8314	0 - 421	0 - 419	0 - 419
Zone 2 & 5b	0 - 8012	0 - 491	0 - 404	0 - 404
Zone 3	0 - 299	0 - 16	0 - 15	0 - 15
Zone 4	0 - 1096	0 - 56	0 - 55	0 - 55
Zone 6	0 - 1935	0 - 99	0 - 99	0 - 98
Zone 7a	0 - 1840	0 - 94	0 - 93	0 - 93
Zone 7b	0 - 5675	0 - 373	0 - 287	0 - 287
Zone 8	2597 - 10376	131 - 522	131 - 522	131 - 522
Zone 9	0 - 706	0 - 37	0 - 36	0 - 36
Zone 10	1490 - 4851	75 - 245	75 - 244	75 - 244
Zone 11	4513 - 14804	226 - 812	226 - 742	226 - 742
SITE TOTAL	**10845 - 72665**	**545 - 3907**	**545 - 3656**	**545 - 3656**

Table E-3 shows Scenario I probability of individual exposure measures for each area for each removal alternative. Table E-4 shows Scenario II probability of individual exposure measures for each area for each removal alternative. The values displayed provide the probability that an individual participating in an activity in the area (row) will be exposed to at least one UXO item in a single visit if the removal option (column) is implemented (e.g., 1/1 indicates that an individual is exposed during each visit/activity; 1/15 indicates exposure only once in 15 visits/activity). This measure can be thought of as the "risk to an individual" because it does not consider the annual participants in activities at Castner Range, but considers only a single participant. The worst case activity is summarized in these tables. Mountain Biking is the worst case activity for all zones under Scenario I. Mountain Biking causes more exposures than hiking even though there are fewer participants because, on average, a mountain biker covers nearly two times the surface area of a hiker in the same zone. Child Play is the worst case activity under Scenario II for Zones 2 and 5b, 7b, and 11, and Mountain Biking remains the worst case activity for all other zones under Scenario II.

Table E-3. Probability of Individual Exposure: Castner Range Scenario I (Excluding Construction)

Area	No Action	After Surface Removal	After 1 Foot Removal	After 4 Foot Removal
Zone 1	1/17 - 1/3	1/337 - 1/52	1/337 - 1/52	1/337 - 1/52
Zone 2 & 5	0 - 1/4	0 - 1/66	0 - 1/66	0 - 1/66
Zone 3	0 - 1/7	0 - 1/135	0 - 1/135	0 - 1/135
Zone 4	0 - 1/10	0 - 1/184	0 - 1/184	0 - 1/184
Zone 6	0 - 1/5	0 - 1/92	0 - 1/92	0 - 1/92
Zone 7	0 - 1/5	0 - 1/91	0 - 1/91	0 - 1/91
Zone 8	1/10 - 1/3	1/181 - 1/46	1/181 - 1/46	1/181 - 1/46
Zone 9	0 - 1/6	0 - 1/101	0 - 1/101	0 - 1/101
Zone 10 & 11	1/6 - 1/2	1/113 - 1/35	1/113 - 1/35	1/113 - 1/35

Table E-4. Probability of Individual Exposure: Castner Range Scenario II (Excluding Construction)

Area	No Action	After Surface Removal	After 1 Foot Removal	After 4 Foot Removal
Zone 1	1/17 - 1/3	1/337 - 1/52	1/337 - 1/52	1/337 - 1/52
Zone 2 & 5a	0 - 1/4	0 - 1/66	0 - 1/66	0 - 1/66
Zone 2 & 5b	0 - 1/6	0 - 1/119	0 - 1/119	0 - 1/119
Zone 3	0 - 1/7	0 - 1/135	0 - 1/135	0 - 1/135
Zone 4	0 - 1/10	0 - 1/184	0 - 1/184	0 - 1/184
Zone 6	0 - 1/5	0 - 1/92	0 - 1/92	0 - 1/92
Zone 7a	0 - 1/5	0 - 1/91	0 - 1/91	0 - 1/91
Zone 7b	0 - 1/9	0 - 1/166	0 - 1/166	0 - 1/166
Zone 8	1/10 - 1/3	1/181 - 1/46	1/181 - 1/46	1/181 - 1/46
Zone 9	0 - 1/6	0 - 1/101	0 - 1/101	0 - 1/101
Zone 10	1/6 - 1/2	1/113 - 1/35	1/113 - 1/35	1/113 - 1/35
Zone 11	1/11 - 1/4	1/205 - 1/63	1/205 - 1/63	1/205 - 1/63

Tables E-5 through E-13 show each activity and corresponding public exposure numbers for each area at the Castner Range under the Scenario I activities.

Table E-5. Expected Annual Exposures for Zone 1 Scenario I

Activity	No Action	After Surface Removal	After 1 Foot Removal	After 4 Foot Removal
Child Play	3 - 18	1	1	1
Hiking	854 - 5615	43 - 281	43 - 281	43 - 281
Mountain Biking	1386 - 9111	69 - 456	69 - 456	69 - 456
Picnicking	1 - 10	0 - 1	0 - 1	0 - 1
Construction	1 - 3	0 - 2	0 - 1	0 - 1

Table E-6. Expected Annual Exposures for Zones 2 & 5 Scenario I

Activity	No Action	After Surface Removal	After 1 Foot Removal	After 4 Foot Removal
Child Play	0 - 1362	0 - 68	0 - 68	0 - 68
Hiking	0 - 5634	0 - 282	0 - 282	0 - 282
Mountain Biking	0 - 9143	0 - 457	0 - 457	0 - 457
Picnicking	0 - 11	0 - 1	0 - 1	0 - 1
Construction	0 - 6	0 - 4	0 - 1	0 - 1

Table E-7. Expected Annual Exposures for Zone 3 Scenario I

Activity	No Action	After Surface Removal	After 1 Foot Removal	After 4 Foot Removal
Child Play	0 - 1	0	0	0
Hiking	0 - 114	0 - 6	0 - 6	0 - 6
Mountain Biking	0 - 183	0 - 9	0 - 9	0 - 9
Picnicking	0	0	0	0
Construction	0 - 1	0 - 1	0	0

Table E-8. Expected Annual Exposures for Zone 4 Scenario I

Activity	No Action	After Surface Removal	After 1 Foot Removal	After 4 Foot Removal
Child Play	0 - 1	0	0	0
Hiking	0 - 416	0 - 21	0 - 21	0 - 21
Mountain Biking	0 - 677	0 - 34	0 - 34	0 - 34
Picnicking	0 - 1	0 - 0	0 - 0	0 - 0
Construction	0 - 1	0 - 1	0	0

Table E-9. Expected Annual Exposures for Zone 6 Scenario I

Activity	No Action	After Surface Removal	After 1 Foot Removal	After 4 Foot Removal
Child Play	0 - 2	0 - 1	0 - 1	0 - 1
Hiking	0 - 736	0 - 37	0 - 37	0 - 37
Mountain Biking	0 - 1195	0 - 60	0 - 60	0 - 60
Picnicking	0 - 1	0	0	0
Construction	0 - 1	0 - 1	0	0

Table E-10. Expected Annual Exposures for Zone 7 Scenario I

Activity	No Action	After Surface Removal	After 1 Foot Removal	After 4 Foot Removal
Child Play	0 - 8	0 - 1	0 - 1	0 - 1
Hiking	0 - 2443	0 - 123	0 - 123	0 - 123
Mountain Biking	0 - 3961	0 - 198	0 - 198	0 – 198
Picnicking	0 - 4	0 - 1	0 - 1	0 - 1
Construction	0 - 3	0 - 3	0 - 1	0 - 1

Table E-11. Expected Annual Exposures for Zone 8 Scenario I

Activity	No Action	After Surface Removal	After 1 Foot Removal	After 4 Foot Removal
Child Play	3 - 13	1	1	1
Hiking	988 - 3947	50 - 198	50 - 198	50 - 198
Mountain Biking	1604 - 6409	80 - 321	80 - 321	80 - 321
Picnicking	1 - 5	0 - 1	0 - 1	0 - 1
Construction	1 - 2	0 - 1	0 - 1	0 - 1

Table E-12. Expected Annual Exposures for Zone 9 Scenario I

Activity	No Action	After Surface Removal	After 1 Foot Removal	After 4 Foot Removal
Child Play	0 - 1	0	0	0
Hiking	0 - 267	0 - 14	0 - 14	0 - 14
Mountain Biking	0 - 436	0 - 22	0 - 22	0 - 22
Picnicking	0 - 1	0 - 0	0 - 0	0 - 0
Construction	0 - 1	0 - 1	0 - 0	0 - 0

Table E-13. Expected Annual Exposures for Zones 10 & 11 Scenario I

Activity	No Action	After Surface Removal	After 1 Foot Removal	After 4 Foot Removal
Child Play	1571 - 5114	79 - 256	79 - 256	79 - 256
Hiking	2598 - 8458	130 - 423	130 - 423	130 - 423
Mountain Biking	4213 - 13718	211 - 686	211 - 686	211 - 686
Picnicking	4 - 14	1	1	1
Construction	1 - 5	0 - 3	0 - 1	0 - 1

Tables E-14 through E-25 show each activity and corresponding public exposure numbers for each area at the Castner Range under the Scenario II activities.

Table E-14. Expected Annual Exposures for Zone 1 Scenario II

Activity	No Action	After Surface Removal	After 1 Foot Removal	After 4 Foot Removal
Child Play	3 - 18	1	1	1
Hiking	854 - 5615	43 - 281	43 - 281	43 - 281
Mountain Biking	1386 - 9111	69 - 456	69 - 456	69 - 456
Picnicking	1 - 10	0 - 1	0 - 1	0 - 1
Construction	1 - 3	0 - 2	0 - 2	0 - 2

Table E-15. Expected Annual Exposures for Zones 2 & 5a Scenario II

Activity	No Action	After Surface Removal	After 1 Foot Removal	After 4 Foot Removal
Child Play	0 - 10	0 - 1	0 - 1	0 - 1
Hiking	0 - 3163	0 - 159	0 - 159	0 - 159
Mountain Biking	0 - 5133	0 - 257	0 - 257	0 - 257
Picnicking	0 - 5	0 - 1	0 - 1	0 - 1
Construction	0 - 3	0 - 3	0 - 1	0 - 1

Table E-16. Expected Annual Exposures for Zones 2 & 5b Scenario II

Activity	No Action	After Surface Removal	After 1 Foot Removal	After 4 Foot Removal
Child Play	0 - 7352	0 - 368	0 - 368	0 - 368
Short Cutting	0 - 532	0 - 27	0 - 27	0 - 27
Surveying	0 - 1	0	0	0
25% Construction	0 - 63	0 - 48	0 - 4	0 - 4
50% Construction	0 - 127	0 - 96	0 - 9	0 - 9

Table E-17. Expected Annual Exposures for Zone 3 Scenario II

Activity	No Action	After Surface Removal	After 1 Foot Removal	After 4 Foot Removal
Child Play	0 - 1	0	0	0
Hiking	0 - 114	0 - 6	0 - 6	0 - 6
Mountain Biking	0 - 183	0 - 9	0 - 9	0 - 9
Picnicking	0	0	0	0
Construction	0 - 1	0 - 1	0	0

Table E-18. Expected Annual Exposures for Zone 4 Scenario II

Activity	No Action	After Surface Removal	After 1 Foot Removal	After 4 Foot Removal
Child Play	0 - 1	0	0	0
Hiking	0 - 416	0 - 21	0 - 21	0 - 21
Mountain Biking	0 - 677	0 - 34	0 - 34	0 - 34
Picnicking	0 - 1	0 - 0	0 - 0	0 - 0
Construction	0 - 1	0 - 1	0	0

Table E-19. Expected Annual Exposures for Zone 6 Scenario II

Activity	No Action	After Surface Removal	After 1 Foot Removal	After 4 Foot Removal
Child Play	0 - 2	0 - 1	0 - 1	0 - 1
Hiking	0 - 736	0 - 37	0 - 37	0 - 37
Mountain Biking	0 - 1195	0 - 60	0 - 60	0 - 60
Picnicking	0 - 1	0	0	0
Construction	0 - 1	0 - 1	0	0

Table E-20. Expected Annual Exposures for Zone 7a Scenario II

Activity	No Action	After Surface Removal	After 1 Foot Removal	After 4 Foot Removal
Child Play	0 - 2	0 - 1	0 - 1	0 - 1
Hiking	0 - 699	0 - 35	0 - 35	0 - 35
Mountain Biking	0 - 1137	0 - 57	0 - 57	0 - 57
Picnicking	0 - 1	0	0	0
Construction	0 - 1	0 - 1	0	0

Table E-21. Expected Annual Exposures for Zone 7b Scenario II

Activity	No Action	After Surface Removal	After 1 Foot Removal	After 4 Foot Removal
Child Play	0 - 5188	0 - 260	0 - 260	0 - 260
Short Cutting	0 - 372	0 - 19	0 - 19	0 - 19
Surveying	0	0	0	0
25% Construction	0 - 58	0 - 47	0 - 4	0 - 4
50% Construction	0 - 115	0 - 94	0 - 8	0 - 8

Table E-22. Expected Annual Exposures for Zone 8 Scenario II

Activity	No Action	After Surface Removal	After 1 Foot Removal	After 4 Foot Removal
Child Play	3 - 13	1	1	1
Hiking	988 - 3947	50 - 198	50 - 198	50 - 198
Mountain Biking	1604 - 6409	80 - 321	80 - 321	80 - 321
Picnicking	1 - 5	0 - 1	0 - 1	0 - 1
Construction	1 - 2	0 - 1	0 - 1	0 - 1

Table E-23. Expected Annual Exposures for Zone 9 Scenario II

Activity	No Action	After Surface Removal	After 1 Foot Removal	After 4 Foot Removal
Child Play	0 - 1	0	0	0
Hiking	0 - 267	0 - 14	0 - 14	0 - 14
Mountain Biking	0 - 436	0 - 22	0 - 22	0 - 22
Picnicking	0 - 1	0 - 0	0 - 0	0 - 0
Construction	0 - 1	0 - 1	0 - 0	0 - 0

Table E-24. Expected Annual Exposures for Zone 10 Scenario II

Activity	No Action	After Surface Removal	After 1 Foot Removal	After 4 Foot Removal
Child Play	2 - 6	0 - 1	0 - 1	0 - 1
Hiking	566 - 1843	29 - 93	29 - 93	29 - 93
Mountain Biking	921 - 2999	46 - 150	46 - 150	46 - 150
Picnicking	1 - 2	0	0	0
Construction	0 - 1	0 - 1	0	0

Table E-25. Expected Annual Exposures for Zone 11 Scenario II

Activity	No Action	After Surface Removal	After 1 Foot Removal	After 4 Foot Removal
Child Play	4203 - 13686	210 - 684	210 - 684	210 - 684
Short Cutting	301 - 981	15 - 49	15 - 49	15 - 49
Surveying	0 - 1	0	0	0
25% Construction	9 - 68	1 - 40	1 - 4	1 - 4
50% Construction	19 - 136	1 - 79	1 - 9	1 - 9

Tables E-26 through E-34 show each activity and corresponding probability of individual exposure measure for each area at Castner Range under the Scenario I activities.

Table E-26. Probability of Individual Exposure for Zone 1 Scenario I

Activity	No Action	After Surface Removal	After 1 Foot Removal	After 4 Foot Removal
Child Play	1/31 - 1/5	1/614 - 1/94	1/614 - 1/94	1/614 - 1/94
Hiking	1/28 - 1/5	1/553 -1/85	1/553 -1/85	1/553 -1/85
Mountain Biking	1/17 - 1/3	1/337 - 1/52	1/337 - 1/52	1/337 - 1/52
Picnicking	1/231 - 1/33	1/4251 - 1/647	1/4251 - 1/647	1/4251 - 1/647
Construction	1/8 - 1/1	1/160 - 1/1	1/160 - 1/6	1/160 - 1/6

Table E-27. Probability of Individual Exposure for Zones 2 & 5 Scenario I

Activity	No Action	After Surface Removal	After 1 Foot Removal	After 4 Foot Removal
Child Play	0 - 1/6	0 - 1/119	0 - 1/119	0 - 1/119
Hiking	0 - 1/6	0 - 1/108	0 - 1/108	0 - 1/108
Mountain Biking	0 - 1/4	0 - 1/66	0 - 1/66	0 - 1/66
Picnicking	0 - 1/37	0 - 1/732	0 - 1/734	0 - 1/734
Construction	0 - 1/1	0 - 1/1	0 - 1/3	0 - 1/3

Table E-28. Probability of Individual Exposure for Zone 3 Scenario I

Activity	No Action	After Surface Removal	After 1 Foot Removal	After 4 Foot Removal
Child Play	0 - 1/13	0 - 1/246	0 - 1/246	0 - 1/246
Hiking	0 - 1/12	0 - 1/222	0 - 1/222	0 - 1/222
Mountain Biking	0 - 1/7	0 - 1/135	0 - 1/135	0 - 1/135
Picnicking	0 - 1/308	0 - 1/6027	0 - 1/6145	0 - 1/6145
Construction	0 - 1/8	0 - 1/9	0 - 1/97	0 - 1/97

Table E-29. Probability of Individual Exposure for Zone 4 Scenario I

Activity	No Action	After Surface Removal	After 1 Foot Removal	After 4 Foot Removal
Child Play	0 - 1/17	0 - 1/335	0 - 1/335	0 - 1/335
Hiking	0 - 1/16	0 - 1/302	0 - 1/302	0 - 1/302
Mountain Biking	0 - 1/10	0 - 1/184	0 - 1/184	0 - 1/184
Picnicking	0 - 1/213	0 - 1/4191	0 - 1/4257	0 - 1/4257
Construction	0 - 1/2	0 - 1/2	0 - 1/18	0 - 1/18

Table E-30. Probability of Individual Exposure for Zone 6 Scenario I

Activity	No Action	After Surface Removal	After 1 Foot Removal	After 4 Foot Removal
Child Play	0 - 1/9	0 - 1/167	0 - 1/168	0 - 1/168
Hiking	0 - 1/8	0 - 1/151	0 - 1/151	0 - 1/151
Mountain Biking	0 - 1/5	0 - 1/92	0 - 1/92	0 - 1/92
Picnicking	0 - 1/113	0 - 1/2233	0 - 1/2248	0 - 1/2248
Construction	0 - 1/2	0 - 1/3	0 - 1/24	0 - 1/24

Table E-31. Probability of Individual Exposure for Zone 7 Scenario I

Activity	No Action	After Surface Removal	After 1 Foot Removal	After 4 Foot Removal
Child Play	0 - 1/9	0 - 1/166	0 - 1/166	0 - 1/166
Hiking	0 - 1/8	0 - 1/150	0 - 1/150	0 - 1/150
Mountain Biking	0 - 1/5	0 - 1/91	0 - 1/91	0 - 1/91
Picnicking	0 - 1/65	0 - 1/1292	0 - 1/1296	0 - 1/1296
Construction	0 - 1/1	0 - 1/1	0 - 1/5	0 - 1/5

Table E-32. Probability of Individual Exposure for Zone 8 Scenario I

Activity	No Action	After Surface Removal	After 1 Foot Removal	After 4 Foot Removal
Child Play	1/17 - 1/5	1/329 - 1/83	1/329 - 1/83	1/329 - 1/83
Hiking	1/15 - 1/4	1/296 - 1/75	1/296 - 1/75	1/296 - 1/75
Mountain Biking	1/10- 1/3	1/181 - 1/46	1/181 - 1/46	1/181 - 1/46
Picnicking	1/143 - 1/36	1/2849 - 1/712	1/2849 - 1/713	1/2849 - 1/713
Construction	1/7 - 1/1	1/135 - 1/2	1/135 - 1/10	1/135 - 1/10

Table E-33. Probability of Individual Exposure for Zone 9 Scenario I

Activity	No Action	After Surface Removal	After 1 Foot Removal	After 4 Foot Removal
Child Play	0 - 1/10	0 - 1/184	0 - 1/184	0 - 1/184
Hiking	0 - 1/9	0 - 1/166	0 - 1/166	0 - 1/166
Mountain Biking	0 - 1/6	0 - 1/101	0 - 1/101	0 - 1/101
Picnicking	0 - 1/184	0 - 1/3625	0 - 1/3668	0 - 1/3668
Construction	0 - 1/4	0 - 1/5	0 - 1/54	0 - 1/54

Table E-34. Probability of Individual Exposure for Zones 10 & 11 Scenario I

Activity	No Action	After Surface Removal	After 1 Foot Removal	After 4 Foot Removal
Child Play	1/11 - 1/4	1/205 - 1/63	1/205 - 1/63	1/205 - 1/63
Hiking	1/10 - 1/3	1/185 - 1/57	1/185 - 1/57	1/185 - 1/57
Mountain Biking	1/6- 1/2	1/113 - 1/35	1/113 - 1/35	1/113 - 1/35
Picnicking	1/71 - 1/22	1/1408 - 1/433	1/1408 - 1/433	1/1408 - 1/433
Construction	1/2 - 1/1	1/28 - 1/1	1/28 - 1/4	1/28 - 1/4

Tables E-35 through E-46 show each activity and corresponding probability of individual exposure measure for each area at Castner Range under the Scenario II activities.

Table E-35. Probability of Individual Exposure for Zone 1 Scenario II

Activity	No Action	After Surface Removal	After 1 Foot Removal	After 4 Foot Removal
Child Play	1/31 - 1/5	1/614 - 1/94	1/614 - 1/94	1/614 - 1/94
Hiking	1/28 - 1/5	1/553 -1/85	1/553 -1/85	1/553 -1/85
Mountain Biking	1/17 - 1/3	1/337 - 1/52	1/337 - 1/52	1/337 - 1/52
Picnicking	1/231 - 1/33	1/4251 - 1/647	1/4251 - 1/647	1/4251 - 1/647
Construction	1/8 - 1/1	1/160 - 1/1	1/160 - 1/6	1/160 - 1/6

Table E-36. Probability of Individual Exposure for Zones 2 & 5a Scenario II

Activity	No Action	After Surface Removal	After 1 Foot Removal	After 4 Foot Removal
Child Play	0 - 1/6	0 - 1/119	0 - 1/119	0 - 1/119
Hiking	0 - 1/6	0 - 1/108	0 - 1/108	0 - 1/108
Mountain Biking	0 - 1/4	0 - 1/66	0 - 1/66	0 - 1/66
Picnicking	0 - 1/49	0 - 1/960	0 - 1/962	0 - 1/962
Construction	0 - 1/1	0 - 1/1	0 - 1/5	0 - 1/5

Table E-37. Probability of Individual Exposure for Zones 2 & 5b Scenario II

Activity	No Action	After Surface Removal	After 1 Foot Removal	After 4 Foot Removal
Child Play	0 - 1/6	0 - 1/119	0 - 1/119	0 - 1/119
Short Cutting	0 - 1/30	0 - 1/585	0 - 1/585	0 - 1/585
Surveying	0 - 1/10	0 - 1/930	0 - 1/930	0 - 1/930
25% Construction	0 - 1/1	0 - 1/1	0 - 1/1	0 - 1/1
50% Construction	0 - 1/1	0 - 1/1	0 - 1/1	0 - 1/1

Table E-38. Probability of Individual Exposure for Zone 3 Scenario II

Activity	No Action	After Surface Removal	After 1 Foot Removal	After 4 Foot Removal
Child Play	0 - 1/13	0 - 1/246	0 - 1/246	0 - 1/246
Hiking	0 - 1/12	0 - 1/222	0 - 1/222	0 - 1/222
Mountain Biking	0 - 1/7	0 - 1/135	0 - 1/135	0 - 1/135
Picnicking	0 - 1/308	0 - 1/6027	0 - 1/6145	0 - 1/6145
Construction	0 - 1/8	0 - 1/9	0 - 1/97	0 - 1/97

Table E-39. Probability of Individual Exposure for Zone 4 Scenario II

Activity	No Action	After Surface Removal	After 1 Foot Removal	After 4 Foot Removal
Child Play	0 - 1/17	0 - 1/335	0 - 1/335	0 - 1/335
Hiking	0 - 1/16	0 - 1/302	0 - 1/302	0 - 1/302
Mountain Biking	0 - 1/10	0 - 1/184	0 - 1/184	0 - 1/184
Picnicking	0 - 1/213	0 - 1/4191	0 - 1/4257	0 - 1/4257
Construction	0 - 1/2	0 - 1/2	0 - 1/18	0 - 1/18

Table E-40. Probability of Individual Exposure for Zone 6 Scenario II

Activity	No Action	After Surface Removal	After 1 Foot Removal	After 4 Foot Removal
Child Play	0 - 1/9	0 - 1/167	0 - 1/168	0 - 1/168
Hiking	0 - 1/8	0 - 1/151	0 - 1/151	0 - 1/151
Mountain Biking	0 - 1/5	0 - 1/92	0 - 1/92	0 - 1/92
Picnicking	0 - 1/113	0 - 1/2233	0 - 1/2248	0 - 1/2248
Construction	0 - 1/2	0 - 1/3	0 - 1/24	0 - 1/24

Table E-41. Probability of Individual Exposure for Zone 7a Scenario II

Activity	No Action	After Surface Removal	After 1 Foot Removal	After 4 Foot Removal
Child Play	0 - 1/9	0 - 1/166	0 - 1/166	0 - 1/166
Hiking	0 - 1/8	0 - 1/150	0 - 1/150	0 - 1/150
Mountain Biking	0 - 1/5	0 - 1/91	0 - 1/91	0 - 1/91
Picnicking	0 - 1/115	0 - 1/2277	0 - 1/2289	0 - 1/2289
Construction	0 - 1/2	0 - 1/2	0 - 1/15	0 - 1/15

Table E-42. Probability of Individual Exposure for Zone 7b Scenario II

Activity	No Action	After Surface Removal	After 1 Foot Removal	After 4 Foot Removal
Child Play	0 - 1/9	0 - 1/166	0 - 1/166	0 - 1/166
Short Cutting	0 - 1/42	0 - 1/822	0 - 1/822	0 - 1/822
Surveying	0 - 1/14	0 - 1/1308	0 - 1/1308	0 - 1/1308
25% Construction	0 - 1/1	0 - 1/1	0 - 1/1	0 - 1/1
50% Construction	0 - 1/1	0 - 1/1	0 - 1/1	0 - 1/1

Table E-43. Probability of Individual Exposure for Zone 8 Scenario II

Activity	No Action	After Surface Removal	After 1 Foot Removal	After 4 Foot Removal
Child Play	1/17 - 1/5	1/329 - 1/83	1/329 - 1/83	1/329 - 1/83
Hiking	1/15 - 1/4	1/296 - 1/75	1/296 - 1/75	1/296 - 1/75
Mountain Biking	1/10- 1/3	1/181 - 1/46	1/181 - 1/46	1/181 - 1/46
Picnicking	1/143 - 1/36	1/2849 - 1/712	1/2849 - 1/713	1/2849 - 1/713
Construction	1/7 - 1/1	1/135 - 1/2	1/135 - 1/10	1/135 - 1/10

Table E-44. Probability of Individual Exposure for Zone 9 Scenario II

Activity	No Action	After Surface Removal	After 1 Foot Removal	After 4 Foot Removal
Child Play	0 - 1/10	0 - 1/184	0 - 1/184	0 - 1/184
Hiking	0 - 1/9	0 - 1/166	0 - 1/166	0 - 1/166
Mountain Biking	0 - 1/6	0 - 1/101	0 - 1/101	0 - 1/101
Picnicking	0 - 1/184	0 - 1/3625	0 - 1/3668	0 - 1/3668
Construction	0 - 1/4	0 - 1/5	0 - 1/54	0 - 1/54

Table E-45. Probability of Individual Exposure for Zone 10 Scenario II

Activity	No Action	After Surface Removal	After 1 Foot Removal	After 4 Foot Removal
Child Play	1/11 - 1/4	1/205 - 1/63	1/205 - 1/63	1/205 - 1/63
Hiking	1/10 - 1/3	1/185 -1/57	1/185 -1/57	1/185 -1/57
Mountain Biking	1/6 - 1/2	1/113 - 1/35	1/113- 1/35	1/113 - 1/35
Picnicking	1/142 - 1/44	1/2827 -1/867	1/2827 -1/868	1/2827 -1/868
Construction	1/11 - 1/2	1/216 - 1/4	1/216 - 1/26	1/216 - 1/26

Table E-46. Probability of Individual Exposure for Zone 11 Scenario II

Activity	No Action	After Surface Removal	After 1 Foot Removal	After 4 Foot Removal
Child Play	1/11 - 1/4	1/205 - 1/63	1/205 - 1/63	1/205 - 1/63
Short Cutting	1/51 - 1/16	1/1014 -1/312	1/1014 -1/312	1/1014 -1/312
Surveying	1/17 - 1/5	1/1614 - 1/496	1/1614 - 1/496	1/1614 - 1/496
25% Construction	1/1 - 1/1	1/3 - 1/1	1/3 - 1/1	1/3 - 1/1
50% Construction	1/1 - 1/1	1/2 - 1/1	1/2 - 1/1	1/2 - 1/1

APPENDIX F

RISK SENSITIVITY TO INCREASES IN POPULATION

APPENDIX F

RISK SENSITIVITY TO INCREASES IN POPULATION

Table F-1. Castner Range Scenario I Exposure/Population Sensitivity

Case	Exposure Range	20 Year Injury/Death Range
Base Case Population	13,229 – 79,053	0.455 – 0.824
Two Times Base Case Population	26,458 – 158,106	0.529 – 1.269
Three Times Base Case Population	39,687 – 237,159	0.603 – 1.713
Four Times Base Case Population	52,916 – 316,212	0.678 – 2.157
Five Times Base Case Population	66,145 – 395,265	0.752 – 2.601
Six Times Base Case Population	79,374 – 474,318	0.826 – 3.045
Seven Times Base Case Population	92,603 – 553,371	0.901 – 3.489
Eight Times Base Case Population	105,832 – 632,424	0.975 – 3.933
Nine Times Base Case Population	119,061 – 711,477	1.049 – 4.378
Ten Times Base Case Population	132,290 – 790,530	1.124 – 4.822

* Note: Base Case Population is derived from the 1990 city census population of El Paso, Texas proportioned to the activities and land use proposed for Castner Range using standard OE*Cert* methodology.

Table F-2. Castner Range Scenario II Exposure/Population Sensitivity

Case	Exposure Range	20 Year Injury/Death Range
Base Case Population	10,845 - 72,665	0.441 - 0.789
Two Times Base Case Population	21,690 - 145,330	0.502 - 1.197
Three Times Base Case Population	32,535 - 217,995	0.563 - 1.605
Four Times Base Case Population	43,380 - 290,660	0.624 - 2.013
Five Times Base Case Population	54,225 - 363,325	0.685 - 2.422
Six Times Base Case Population	65,070 - 435,990	0.746 - 2.830
Seven Times Base Case Population	75,915 - 508,655	0.807 - 3.238
Eight Times Base Case Population	86,760 - 581,320	0.868 - 3.646
Nine Times Base Case Population	97,605 - 653,985	0.929 - 4.055
Ten Times Base Case Population	108,450 -726,650	0.990 - 4.463

* Note: Base Case Population is derived from the 1990 city census population of El Paso, Texas proportioned to the activities and land use proposed for Castner Range using standard OE*Cert* methodology.

APPENDIX G

COMPARATIVE RISK ASSESSMENT FOR CASTNER RANGE

APPENDIX G

COMPARATIVE RISK ASSESSMENT FOR CASTNER RANGE

This appendix presents a comparative risk assessment of UXO risks to common risks, incorporating data and OE*Cert* analyses at 18 other Formerly Used Defense Sites (FUDS) and Base Realignment and Closure (BRAC) sites. The comparative risk methodology was developed primarily to address the relative UXO risk from public use of the sites as compared to selected common everyday risks. Common risks to the public (e.g., injuries and deaths from home accidents) were quantified from several statistical sources. UXO risks at the 18 sites were estimated from demographics, land use projections, archival accident data, and site sampling. Accident data from the 18 sites was employed to develop a statistical regression equation, or predictor, of UXO accidents given estimated UXO exposures.

Each site used in the comparative risk analysis has had an assessment completed by QuantiTech based on OE*Cert* methods for calculating exposure to UXO by the public. Also during this assessment, as detailed in each site's Archive Search Report (ASR), the number of injuries and deaths that have been attributable to exposure to UXO were counted. This ASR period usually covers over 50 years of site history. The results of combining each site's OE*Cert* UXO exposure results and the number of injuries and deaths are shown graphically in Figure G-1 (marked as "Actual" in the legend). Of significant importance is that no injuries and deaths have been recorded at 15 sites where less than 100,000 OE*Cert* estimated annual UXO exposures were projected.

A curve fit to the accident data was developed using statistical regression techniques. This curve overlays the actual data shown in Figure G-1. This statistical fit to the accident data resulted in a high correlation between UXO exposures at a site and time between accidents. The values for the regression equation coefficients (a and b) along with the correlation coefficient (R) result are also shown in the figure. In the equation, x is the number of annual expected exposures to UXO while y is the projected time between accidents. Based on these results, a projection of time between accidents based on UXO exposures can be calculated.

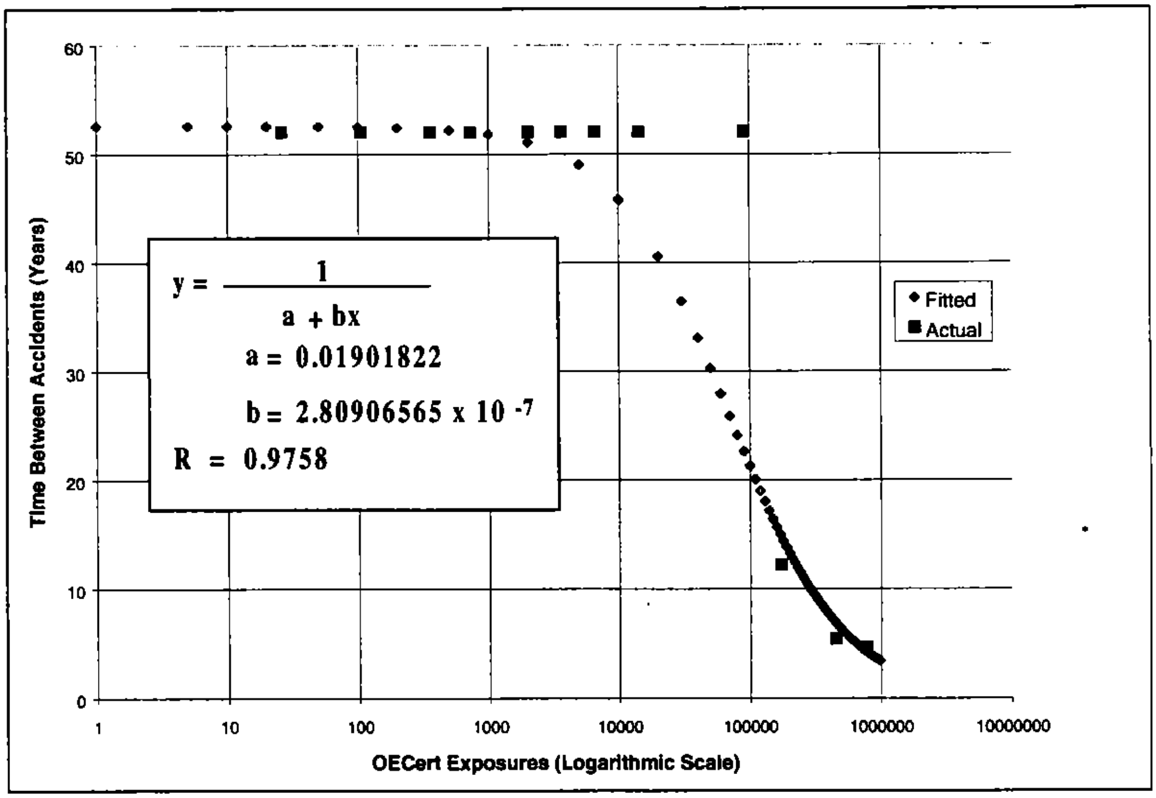

Figure G-1. Best Fit Regression – Projected Time Between Accidents with OE*Cert* Exposures

Each common risk's population basis was used to convert the total number of injuries and deaths to a chance or probability of an individual risk. Similarly, a site's chance for injury or death due to UXO exposures was also calculated using the site's population basis with the estimated number of accidents over a 20-year period. Figure G-2 provides a graphical summary of selected common risks, four example OE sites, and Castner Range results. This graph illustrates that UXO risk is very low relative to everyday common risks. Note that the comparative risk value for each site is representative of the "No Action" case. This means that these comparative risk values are appropriate for these sites in the "As Is" condition with no UXO removal actions occurring.

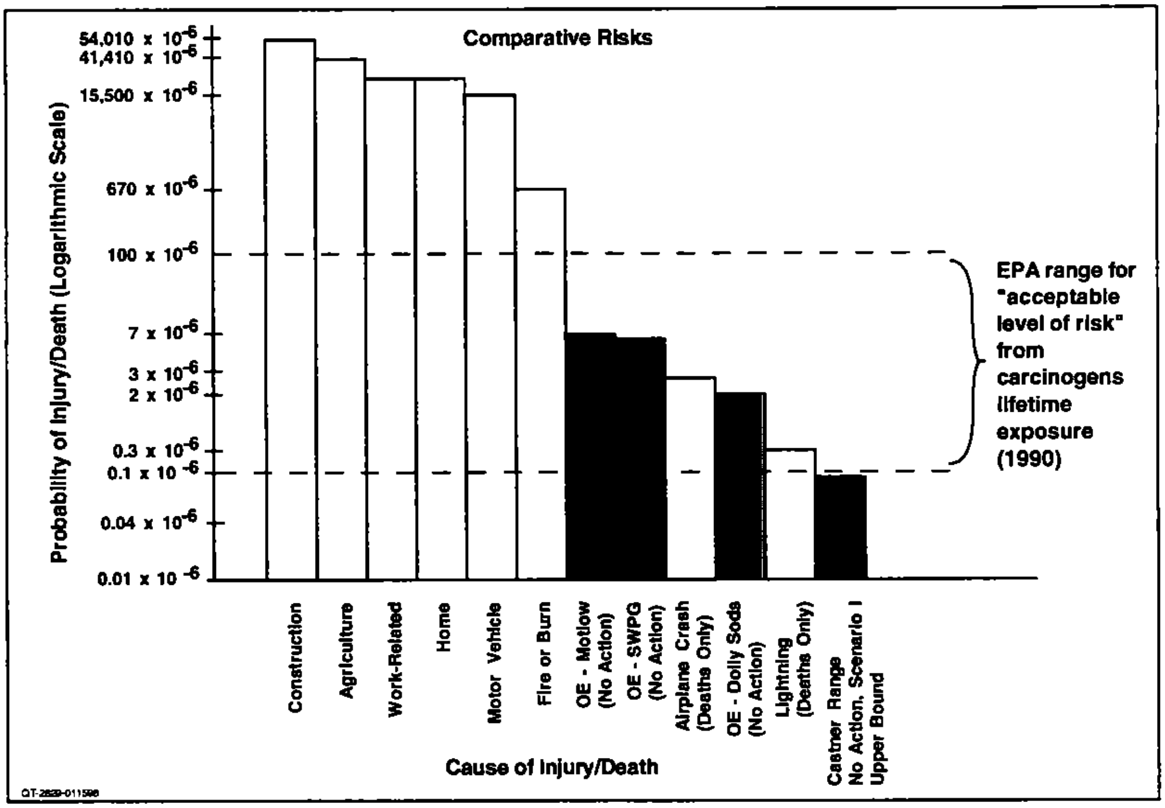

Figure G-2. Graphical Summary of Selected Comparative Risks

The following comparative risk results are injury/death projections based on the expected annual UXO exposures as calculated by OE*Cert* at Castner Range. Tables G-1, G-2, G-3, and G-4 contain the complete comparative risk lists. Tables G-1 and G-3 rank the list (to both common and UXO risks) according to the annual chance occurrence column for the "Base Case" scenario and the "Ten Times Base Case Scenario." Tables G-2 and G-4 rank the list according to the 20-year injury and death estimate column for the "Base Case" scenario and the "Ten Times Base Case Scenario." The primary difference in the ranking between the two tables is the population basis of the particular risk. Figure G-3 shows a graphic representation of the 20-year injury and death rankings.

Table G-1. Comparative Risk Ranked by Chance of Injury/Death (Base Case)

Candidates	Number of Injuries/Deaths	Activity Population Basis	El Paso City Population Basis	20 Yr Injury/ Death Estimate	Chance of Injury/Death (1 in #)
Construction industry disabling injuries	350,000	6,500,000	12,884	13,874.592	19
Transportation and public utilities industry disabling injuries	300,000	6,400,000	12,685	11,892.508	21
Agriculture industry disabling injuries	140,000	3,400,000	6,739	5,549.837	24
Mining, quarrying industry disabling injuries	20,000	600,000	1,189	792.834	30
Manufacturing industry disabling injuries	600,000	18,300,000	36,272	23,785.015	31
Trade industry disabling injuries	840,000	28,500,000	56,489	33,299.022	34
Government industry disabling injuries	550,000	18,700,000	37,065	21,802.931	34
Disabling injury from work-related accident	3,600,000	124,400,000	246,571	142,710.092	35
Injury from a home accident	7,300,000	260,000,000	515,342	289,384.354	36
Services industry disabling injuries	800,000	42,000,000	83,248	31,713.354	53
Injury from motor-vehicle accident	3,987,000	260,000,000	515,342	158,051.427	65
Injuries relating to soccer	162,115	12,500,000	24,776	6,426.513	77
Injury from venomous snake, lizard, or spider	402,000	260,000,000	515,342	15,935.960	647
Injury from poisoning by solid, liquid, gas, or vapor	348,000	260,000,000	515,342	13,795.309	747
Not wearing seatbelts (added injuries)	200,000	260,000,000	515,342	7,928.338	1,300
Injury from fire or burn	171,000	260,000,000	515,342	6,778.729	1,520
Student injuries on school bus	11,000	20,000,000	39,642	436.059	1,818
Recreational boating injuries	4,965	11,420,585	22,637	196.821	2,300
Deaths due to complications, misadventures of surgical, medical care	2,724	6,452,000	12,788	107.984	2,369
Mining, quarrying industry deaths	180	600,000	1,189	7.136	3,333
Pedestrian injury	70,000	260,000,000	515,342	2,774.918	3,714
Agriculture industry deaths	800	3,400,000	6,739	31.713	4,250
Injury from motorcycle accident	56,000	260,000,000	515,342	2,219.935	4,643
Death from motor-vehicle accident	43,900	260,000,000	515,342	1,740.270	5,923
Construction industry deaths	1,040	6,500,000	12,884	41.227	6,250
Injury from collision with a bicycle, moped, etc.	40,000	260,000,000	515,342	1,585.668	6,500
Transportation and public utilities industry deaths	850	6,400,000	12,685	33.695	7,529
Death from a home accident	26,400	260,000,000	515,342	1,046.541	9,848
Homicide	26,009	260,000,000	515,342	1,031.041	9,997
Passenger Death - Cars and taxis	21,813	260,000,000	515,342	864.704	11,919
Recreational boating fatalities	836	11,420,585	22,637	33.140	13,661
Death from accidental fall	12,600	260,000,000	515,342	499.485	20,635
Victim of a property crime	12,217	260,000,000	515,342	484.303	21,282
Death from work-related accident	5,300	124,400,000	246,571	210.101	23,472
Death from poisoning by solid, liquid, gas, or vapor	10,600	260,000,000	515,342	420.202	24,528
Manufacturing industry deaths	730	18,300,000	36,272	28.938	25,068
Not wearing seatbelts (added fatalities)	9,175	260,000,000	515,342	363.713	28,338
Injury from accidental fall	7,616	260,000,000	515,342	301.911	34,139
Government industry deaths	530	18,700,000	37,065	21.010	35,283
Pedestrian death	6,300	260,000,000	515,342	249.743	41,270
Death from drowning	4,500	260,000,000	515,342	178.388	57,778
Trade industry deaths	490	28,500,000	56,489	19.424	58,163
Services industry deaths	680	42,000,000	83,248	26.956	61,765
Death from fire or burn	4,100	260,000,000	515,342	162.531	63,415
Death from motorcycle accident	2,100	260,000,000	515,342	83.248	123,810
Injury from collision with a railroad train	2,000	260,000,000	515,342	79.283	130,000
Victim of a violent crime	1,924	260,000,000	515,342	76.271	135,135
Injury from a hunting accident	1,094	260,000,000	515,342	43.368	237,660
Death from collision with a bicycle, moped, etc.	900	260,000,000	515,342	35.678	288,889
Death from a water-transport accident	800	260,000,000	515,342	31.713	325,000
Death from airplane crash - General	732	260,000,000	515,342	29.018	355,191
Fatalities directly related to football (all high school)	4	1,472,300	2,918	0.159	368,075
Death from collision with a railroad train	500	260,000,000	515,342	19.821	520,000
Passenger Injury - Railroad trains	497	260,000,000	515,342	19.702	523,139
Student fatalities on school bus	30	20,000,000	39,642	1.189	666,667
Death from airplane crash - Large	166	260,000,000	515,342	6.581	1,566,265
Passenger Death - Scheduled airlines	159	260,000,000	515,342	6.303	1,635,220
Death from a hunting accident	107	260,000,000	515,342	4.242	2,429,907
Death from a cataclysmic storm or flood	96	260,000,000	515,342	3.806	2,708,333
Death from lightning	72	260,000,000	515,342	2.854	3,611,111
Death from a tornado	69	260,000,000	515,342	2.735	3,768,116
Death from airplane crash - On-demand	52	260,000,000	515,342	2.061	5,000,000
Death from hornet, wasp, or bee	39	260,000,000	515,342	1.546	6,666,667
Castner Range - No Action: Scenario 1, Upper			**515,342**	**0.8245**	**12,500,798**
Deaths due to dog bites	20	260,000,000	515,342	0.793	13,000,000
Castner Range - No Action: Scenario 2, Upper			**515,342**	**0.7886**	**13,069,697**
Death from a cataclysmic earth surface movement or eruption	17	260,000,000	515,342	0.674	15,294,118
Passenger Death - Buses	15	260,000,000	515,342	0.595	17,333,333
Castner Range - No Action: Scenario 1, Lower			**515,342**	**0.4547**	**22,668,006**
Castner Range - No Action: Scenario 2, Lower			**515,342**	**0.4413**	**23,356,000**
Castner Range - Surface: Scenario 1, Upper			**515,342**	**0.4027**	**25,593,491**
Castner Range - 1ft. and 4 ft.: Scenario 1, Upper			**515,342**	**0.4027**	**25,597,419**
Castner Range - Surface: Scenario 2, Upper			**515,342**	**0.4023**	**25,618,867**
Castner Range - 1ft. and 4 ft.: Scenario 2, Upper			**515,342**	**0.4009**	**25,708,979**
Castner Range - Surface, 1 ft. and 4 ft.: Scenario 1, Lower			**515,342**	**0.3841**	**26,833,709**
Castner Range - Surface, 1 ft. and 4 ft.: Scenario 2, Lower			**515,342**	**0.3834**	**26,880,891**
Death from airplane crash - Commuter	9	260,000,000	515,342	0.357	28,888,889
Death from venomous snake, lizard, or spider	9	260,000,000	515,342	0.357	28,888,889
Passenger Death - Railroad trains	5	260,000,000	515,342	0.198	52,000,000

Table G-2. Comparative Risk Ranked by 20-Year Injury/Death Estimate (Base Case)

Candidates	Number of Injuries/Deaths	Activity Population Basis	El Paso City Population Basis	20 Yr Injury/ Death Estimate	Chance of Injury/Death (1 in #)
Injury from a home accident	7,300,000	260,000,000	515,342	289,384.354	36
Injury from motor-vehicle accident	3,987,000	260,000,000	515,342	158,051.427	65
Disabling injury from work-related accident	3,600,000	124,400,000	246,571	142,710.092	35
Trade industry disabling injuries	840,000	28,500,000	56,489	33,299.022	34
Services industry disabling injuries	800,000	42,000,000	83,248	31,713.354	53
Manufacturing industry disabling injuries	600,000	18,300,000	36,272	23,785.015	31
Government industry disabling injuries	550,000	18,700,000	37,065	21,802.931	34
Injury from venomous snake, lizard, or spider	402,000	260,000,000	515,342	15,935.960	647
Construction industry disabling injuries	350,000	6,500,000	12,884	13,874.592	19
Injury from poisoning by solid, liquid, gas, or vapor	348,000	260,000,000	515,342	13,795.309	747
Transportation and public utilities industry disabling injuries	300,000	6,400,000	12,685	11,892.508	21
Not wearing seatbelts (added injuries)	200,000	260,000,000	515,342	7,928.338	1,300
Injury from fire or burn	171,000	260,000,000	515,342	6,778.729	1,520
Injuries relating to soccer	162,115	12,500,000	24,776	6,426.513	77
Agriculture industry disabling injuries	140,000	3,400,000	6,739	5,549.837	24
Pedestrian injury	70,000	260,000,000	515,342	2,774.918	3,714
Injury from motorcycle accident	56,000	260,000,000	515,342	2,219.935	4,643
Death from motor-vehicle accident	43,900	260,000,000	515,342	1,740.270	5,923
Injury from collision with a bicycle, moped, etc.	40,000	260,000,000	515,342	1,585.668	6,500
Death from a home accident	26,400	260,000,000	515,342	1,046.541	9,848
Homicide	26,009	260,000,000	515,342	1,031.041	9,997
Passenger Death - Cars and taxis	21,813	260,000,000	515,342	864.704	11,919
Mining, quarrying industry disabling injuries	20,000	600,000	1,189	792.834	30
Death from accidental fall	12,600	260,000,000	515,342	499.485	20,635
Victim of a property crime	12,217	260,000,000	515,342	484.303	21,282
Student injuries on school bus	11,000	20,000,000	39,642	436.059	1,818
Death from poisoning by solid, liquid, gas, or vapor	10,600	260,000,000	515,342	420.202	24,528
Not wearing seatbelts (added fatalities)	9,175	260,000,000	515,342	363.713	28,338
Injury from accidental fall	7,616	260,000,000	515,342	301.911	34,139
Pedestrian death	6,300	260,000,000	515,342	249.743	41,270
Death from work-related accident	5,300	124,400,000	246,571	210.101	23,472
Recreational boating injuries	4,965	11,420,585	22,637	196.821	2,300
Death from drowning	4,500	260,000,000	515,342	178.388	57,778
Death from fire or burn	4,100	260,000,000	515,342	162.531	63,415
Deaths due to complications, misadventures of surgical, medical care	2,724	6,452,000	12,788	107.984	2,369
Death from motorcycle accident	2,100	260,000,000	515,342	83.248	123,810
Injury from collision with a railroad train	2,000	260,000,000	515,342	79.283	130,000
Victim of a violent crime	1,924	260,000,000	515,342	76.271	135,135
Injury from a hunting accident	1,094	260,000,000	515,342	43.368	237,660
Construction industry deaths	1,040	6,500,000	12,884	41.227	6,250
Death from collision with a bicycle, moped, etc.	900	260,000,000	515,342	35.678	288,889
Transportation and public utilities industry deaths	850	6,400,000	12,685	33.695	7,529
Recreational boating fatalities	836	11,420,585	22,637	33.140	13,661
Death from a water-transport accident	800	260,000,000	515,342	31.713	325,000
Agriculture industry deaths	800	3,400,000	6,739	31.713	4,250
Death from airplane crash - General	732	260,000,000	515,342	29.018	355,191
Manufacturing industry deaths	730	18,300,000	36,272	28.938	25,068
Services industry deaths	680	42,000,000	83,248	26.956	61,765
Government industry deaths	530	18,700,000	37,065	21.010	35,283
Death from collision with a railroad train	500	260,000,000	515,342	19.821	520,000
Passenger Injury - Railroad trains	497	260,000,000	515,342	19.702	523,139
Trade industry deaths	490	28,500,000	56,489	19.424	58,163
Mining, quarrying industry deaths	180	600,000	1,189	7.136	3,333
Death from airplane crash - Large	166	260,000,000	515,342	6.581	1,566,265
Passenger Death - Scheduled airlines	159	260,000,000	515,342	6.303	1,635,220
Death from a hunting accident	107	260,000,000	515,342	4.242	2,429,907
Death from a cataclysmic storm or flood	96	260,000,000	515,342	3.806	2,708,333
Death from lightning	72	260,000,000	515,342	2.854	3,611,111
Death from a tornado	69	260,000,000	515,342	2.735	3,768,116
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Castner Range - No Action: Scenario 1, Upper			**515,342**	**0.8245**	**12,500,798**
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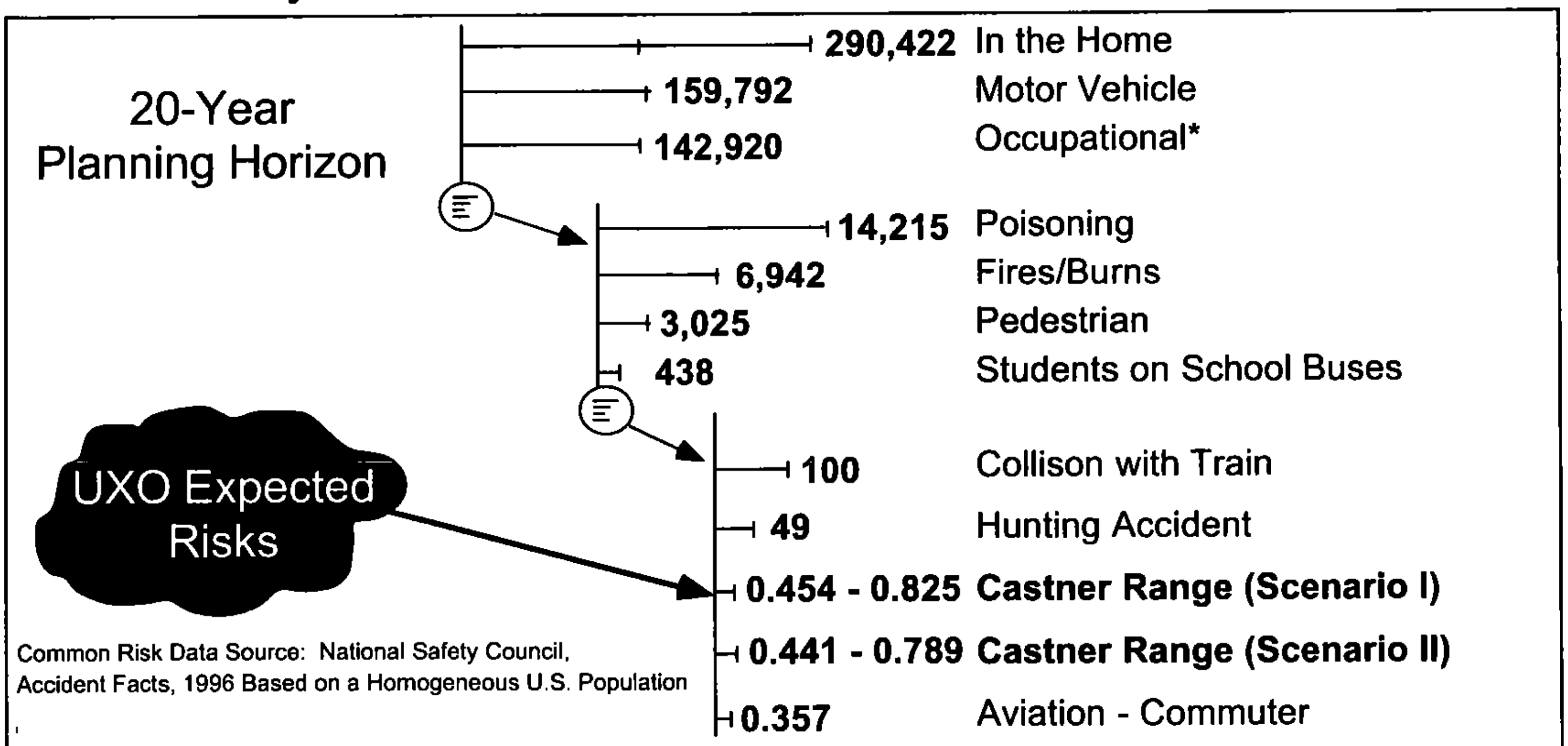
Death from venomous snake, lizard, or spider	9	260,000,000	515,342	0.357	28,888,889
Passenger Death - Railroad trains	5	260,000,000	515,342	0.198	52,000,000
Fatalities directly related to football (all high school)	4	1,472,300	2,918	0.159	368,075

- **Comparative Risk Analysis - Injuries and Deaths**
- **515,342 Population Base in Site Area**
- **13,229 or 79,053 Annual UXO Exposures Calculated by OE*Cert* High and Low Density Base Case Scenario I**
- **10,845 or 72,665 Annual UXO Exposures Calculated by OE*Cert* High and Low Density Base Case Scenario II**



QT-2825-011398

*Based on Subset of Total Population Base

Figure G-3. Castner Range Comparative 20-Year Risk Estimate - Injuries and Deaths

APPENDIX H

CASTNER RANGE BIBLIOGRAPHY

APPENDIX H

CASTNER RANGE BIBLIOGRAPHY

American Sports Data, Inc.; American Sports Analysis Summary Report, 1992.

QuantiTech, Inc. "OE*Cert* Final Report Version E". 31 August 1995.

Internet. U.S. Census Bureau. 1990 U.S. Census Data for El Paso city, Texas. http://venus.census.gov/.

QuantiTech, Inc. "Fort Ord Comparative Ordnance and Explosive Risk Final Report". 24 October 1997.

National Safety Council. (1996). <u>Accident Facts, 1996 Edition</u>. Itasca, IL: Author.

<u>Comparative Climatic Data for the United Stated Through 1991</u>, published by the National Climatic Data Center (Asheville, NC) of the National Oceanic and Atmospheric Administration.

APPENDIX B

APPENDIX B

INSTITUTIONAL ANALYSIS

INSTITUTIONAL ANALYSIS REPORT
CASTNER RANGE

FORT BLISS
EL PASO, TEXAS

Prepared for:

U.S. Army Engineering and Support Center, Huntsville

Huntsville, Alabama

Prepared by:

Parsons Harland Bartholomew & Associates, Inc.

Jacksonville, Florida

Parsons Engineering Science

Atlanta, Georgia

June 1998

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SECTION 1
PURPOSE OF STUDY

1.1 INTRODUCTION

This Institutional Analysis Report was prepared by Parsons Harland Bartholomew and Associates, Inc., together with Parsons Engineering Science, Inc. for the Department of the Army, Huntsville Division, Corps of Engineers, under contract number DACA87-95-D-0018, Task Order Y. The report is prepared to support the institutional control alternative plans for action that are included in the Castner Range OE Characterization Report and Cost Analysis. Local and state authorities that will support and exert long-term control of the institutional control measures proposed for Castner Range are presented. Each institutional control alternative is described, and the level or degree of support required for each is described.

1.2 INSTITUTIONAL CONTROLS

Institutional controls rely on the existing powers and authorities of other government agencies to protect the public at large from OE risks. Instead of direct removal of the OE from the site, these plans rely on behavior modification and access control strategies to reduce or eliminate OE risk. This analysis documents which government agencies have jurisdiction over Castner Range and assesses their capability and willingness to assert control which would protect the public at large from explosives hazards. This report also documents the obligation of the government, corporate or private landholders of OE contaminated lands to protect citizens from safety hazards under the law.

1.3 STUDY APPROACH

Parsons HBA has prepared this detailed analysis of institutional control alternatives in accordance with guidance developed by the U.S. Army Corps of Engineers Huntsville Engineering and Support Center. This analysis supports the development of institutional control alternative plans of action. Institutional control relies upon the existing powers, authorities, and cooperation of local, state, and federal government agencies to protect the public from ordnance risk. Instead of removing ordnance from the site, these plans rely on behavior modification and access control strategies to reduce ordnance risk. For these strategies to be successful, the cooperation of local and state authorities and private interests is required.

1.4 STUDY OVERVIEW

This study outlines which agencies have jurisdiction over Castner Range and assesses their capabilities and willingness to support and enforce short and long-term institutional control measures. Section 2.0 summarizes the site background, the institutional control methodology, and interviews with agencies that have site jurisdiction and/or react with current and future land users. Section 3.0 describes the proposed institutional control alternatives. The effectiveness, implementability, and cost of each alternative is discussed, and management execution, and support roles are defined. Section 4.0 presents institutional control recommendations to reduce the risk of exposure to ordnance.

SECTION 2
INSTITUTIONAL CONTROLS

2.1 SITE BACKGROUND

2.1.1 Site Description

Castner Range is located north of the Downtown El Paso, Texas in El Paso County. The range area includes 7,081 acres completely surrounded by the City of El Paso. The range is located on the eastern slopes of Franklin Mountains. The western edge of the range abuts Franklin Mountains State Park, a 24,000 acre wilderness park operated and maintained by the Texas Parks and Wildlife Department. Franklin Mountains State Park is entirely within the City of El Paso. The range is bisected by the Woodrow Bean Trans Mountain Drive. This roadway provides access through the range and Franklin Mountains State Park and interconnects the eastern and western portions of the City of El Paso. A museum and visitors center operated by the City of El Paso is located within Castner Range north of the Trans Mountain Drive near its eastern terminus. The steep mountain slopes which make up the majority of Castner Range include wide areas of exposed, stratified igneous rock with little soil. The rock consists primarily of granite, andesite, syenite and rhyolite. The lower, less sloping areas have an average 25 cm thick layer of dark reddish brown, mildly alkaline, stony, clayey soil on top of igneous rock.. The eastern edge includes gentler sloping alluvial fans composed of alluvial deposits of pale brown very gravely, sandy soil 1/2 to 1 meter in depth.

2.1.2 Site History

Castner Range was originally established in 1926 as an ordnance impact area. At that time, the range included approximately 3,528 acres. An additional 4,800 acres acquired in 1939 increased the size to 8,328 acres. In 1971, 1,247 acres were transferred to the City of El Paso, UTEP, EPCC, and EPISD reducing the range area to its present size of 7,081 acres. The range was utilized as an ordnance impact area from the time it was established until it was closed in 1966. Since 1966, access to the range has been controlled through warning signs placed along its perimeter and along the Trans-Mountain Drive. There is no fencing anywhere along the perimeter or within the range to impede access. In the early 1990's, the Army attempted to deed Castner Range to the Texas Parks and Wildlife Department as part of the Franklin Mountains State Park. The original legislation creating the park in 1979 allows the park to include whatever portion of Castner Range that the Army might convey to the Texas Parks and Wildlife Department without additional legislation. However, the law stipulates that the issue of unexploded ordnance must be addressed before any portion of Castner Range can be accepted by the State of Texas. To date, this issue has not been fully addressed. Therefore, the State has not been able to accept Castner Range.

2.1.3 Archeological / Historical Resources

Castner Range has a high probability of having numerous archeological sites because of the habitat and known Native American activities in the area. Several significant archeological sites are listed on the National Register of Historic Sites. These include rock art sites, cave/rock shelters, grinding areas, burial areas and heliograph sites. Spanish colonial era pottery has been found and there may be historic mines because tin was mined in the area. Military sites of historic significance also exist within the range boundaries. These include stone structures/foundations where carts were placed on rails as moving targets, berms created for firing and backstops, and stone structures of unknown use.

The majority of the significant historical resources in the Franklin Mountains, especially prehistoric campsites and food processing stations, are situated in the eastern foothills of the range. There may be a number of explanations for this, but one of the most important is the presence of significant surface water including Indian Springs, Apache Springs, Whispering Springs, and Mundy's Springs. These springs represent most of the permanent surface water in the Franklin Mountains. All but Mundy's Springs are located on Castner Range.

Archeological surveys conducted in the Franklin Mountains confirm that the eastern foothills are the location of the most significant archeological deposits and that the largest, most important sites tend to concentrate around the springs. Therefore, from a cultural resource conservation standpoint, it is extremely important that the foothills and mid-elevation slopes in the Castner Range be preserved in their present semi-wilderness state.

2.1.4 Ecological Resources

Castner Range is located within the Chihuahuan Desert Ecosystem. No formal survey of fauna and flora has been performed on site. However, the fauna and flora is typical of the region. The drainage areas are characterized by Desert Willow, Apace Flume and Little Leaf Sumac. The predominant plant community in the mountains is the Agave lechuguilla series including Acacia, Lechugilla, Sotol, Ocotillo and Cat Claw Mimosa. Mammalian species include mule deer, mountain lion, coyote, fox, badger, rabbit and bobcat. Also, a broad diversity of lizards and snakes are known or expected to live within the range boundaries.

2.2 METHODOLOGY

2.2.1 Response Strategies

There are three general categories of response strategies to ordnance remaining on formerly used defense sites:

- 1. Removal;
- 2. Access Control; and,
- 3. Behavior Modification.

The last two strategies are called institutional controls response strategies. These strategies require local cooperation, responsible land-use control, or police powers for enforcement. These strategies are inherently nonfederal and require a high level of community involvement. Institutions, defined as local and state governmental agencies and other organizations that can assist, are the vital element needed to implement any of the recommended institutional controls. Institutional controls, like all response plans, start with data collection, including obtaining responses to the following questions:

- What institutions hold control over the site?
- What authority do they have?
- Do they have specific responsibility in land-use control and/or public safety?
- What capabilities do they have?
- What resources do they have?
- Are they willing to play a role?

2.2.2 Analysis Methodology

The methodology used to analyze potential institutional control strategies/alternatives for reducing the risk associated with the ordnance remaining at Castner Range included the following:

- Based on knowledge of the area, discussions with USACE, and preliminary telephone calls to the various institutions, current and future users of the land were determined.
- A kick-off meeting was conducted with USACE at Fort Bliss, Texas, November 17, 1997. This meeting included a review of the process developed by USACE personnel for institutional controls and an overview of the scope of services.
- Several onsite and telephone interviews were conducted with institutions that could potentially have jurisdiction over ordnance contaminated lands and to assess their capability and willingness to assert control.
- Basic data were collected on forms provided by USACE.
- An Institutional Summary was produced for each institution selected for review.

2.3 SCOPE OF WORK/SELECTION CRITERIA

2.3.1 Interview Selection

Interviews were conducted in the El Paso, Texas area during the week of November 17, 1997. Further follow-up interviews and additional information requests were made in the weeks that followed to finalize the recommendations in the report. Selection criteria used in selecting agencies for interviews and alternative development included:

- Have contact with current users of the property
- Have contact with future users of the property
- Have technical capability for access control and/or behavior modification strategies
- Can provide a variety of sources (i.e., print, visual) that would provide complete coverage/contact with users

- Can repeat the same or different strategy at a later date
- Have authority to assist in implementation of institutional controls
- Have responsibility for land-use control and/or public safety
- Expressed an ability and willingness to assist.

2.3.2 Interview Categories

Because of the past history of Castner Range, past efforts to deed the range area to the State of Texas, and proximity of the range to the Franklin Mountains State Park, interviews were conducted with the primary decision governmental agencies and other groups most directly involved in past negotiations and future decision making as to the future of Castner Range. The government and other agencies interviewed included: The U.S. Army at Fort Bliss, the City of El Paso, the Texas Parks and Wildlife Department, and the Franklin Mountains Wilderness Coalition. A total of six interviews were conducted with these four agencies

2.4 INTERVIEW SUMMARY

2.4.1 Interview Topics

Thirteen topic areas were the basis for developing a full range of institutional control alternatives. The following list defines the terms, given as a statement or a question, for these topic areas:

- Origin of Institution - What is a brief history of the organization?
- Basis of Authority -Where does the organization derive its power?
- Sunset Provision - Part of a law that requires a legislative committee to consider if a organization (or whatever was developed in the original legislation) still serves a necessary and useful purpose.
- Geographic Jurisdiction - In what geographic area does the organization have authority ?
- Public Safety Function - Does the organization the responsibility of the health and welfare of the public in the practice of its authority?
- Land-Use Control Function - Does the organization have zoning, subdivision, and planning authority within its jurisdiction?
- Financial Capability - Does the organization entity have its own funding source? Is and how much is the organization able to support the institutional controls through it own resources?
- Constraints - How comparable or how related is the mission of the organization to ordnance safety? What are the limitations for this organization to aid the various institutional controls implementation?
- Acceptance of Joint Responsibility - How willing and able is the organization to work with the USACE?

- Technical Capability - Is the technical mission similar and/or is the personnel of an organization proficient in explaining explosive ordnance history, general location and safety procedures?
- Intergovernmental Relationships. - Does this organization work with other agencies on the local, state, and federal level?
- Stability - How sure were the interviewees that their mission was going to continue into the foreseeable future?
- Funding Sources - Where are funds derived that support the organization activities?

2.4.2 Interview Results

The topic areas identified above were reviewed with the interviewees and are summarized in this section in the chronological order of the interviews. Appendix A includes a more complete discussion of the interviews, and Appendix B contains the completed institutional survey data forms.

2.4.3 U.S. Army Ft. Bliss, Properties

Interviewee:	Mr. Bill Tipton, Ft. Bliss Properties
Location:	Ft. Bliss Properties Office
Address:	Ft. Bliss, Texas
Date:	November 17, 1997

2.4.3.1 Interview Summary

The Army is considering leasing a strip of Castner Range land along Highway 54 for commercial development. The exact size of the strip is being discussed, but a strip with a depth of 600 feet was mentioned. This is the only way that Ft. Bliss can generate annual income from the reuse of Castner Range. The land would not be identified as excess and is retained by the Army and leased to a user. The revenue generated through the leasing activities would be utilized by Ft. Bliss for maintenance and environmental remediation. Although this is not standard Army procedure, the precedent was established when a tract of Ft. Bliss land was leased to the Girl Scouts of America. The government process to return excess land is as follows:

1. Installation determines that the land is excess and prepares plan to clear the UXO.
2. Department of the Army approves the plan and provides the funding to perform the clearance.
3. The USACE performs the UXO clearance and places any restrictions on the use of the land based upon the level of clearance.
4. The USACE offers the land to other federal agencies who have first right-of-refusal.

5. If the federal agencies refuse the land, then the USACE turns the land over to the GSA who then offers the land to the state and local governments for second right-of-refusal.

6. If the state and local governments refuse the land, then the GSA makes the land available to the public for sale (commercial or residential based upon the clearance restrictions).

2.4.3.2 Interview Topics

- Origin of Institution - U.S. Army.
- Basis of Authority - United States Government.
- Sunset Provisions - None.
- Geographic Jurisdiction - Ft. Bliss.
- Public Safety Function - Yes, within the military lands.
- Land-Use Control Function - Yes, within military lands.
- Financial Capability - United States Government.
- Constraints - None.
- Acceptance of Joint Responsibility - Willing to work in any capacity that is required.
- Technical Capability - Yes.
- Intergovernmental Relationships - Interacts with City of El Paso, State of Texas., Local Interest Groups.
- Stability - Yes.
- Funding Sources - United States Government

2.4.4 U.S. Army Ft. Bliss, Judge Advocate General

Interviewee: Mr. William Wilcox, JAG
Location: Judge Advocate Generals Office, Ft. Bliss
Address: Ft. Bliss, Texas
Date November 17, 1997

2.4.4.1 Interview Summary

NEPA regulations will have to be satisfied before a decision on how the land is to be used in the future can be made. The Counsel of Environmental Quality (CEQ) specifies that the Army cannot limit the options for how land can be used, but the future land use scenarios should be reasonable and appropriate. The Army does not get any financial return from land that is labeled as excess and given up. Land that is leased for commercial developers is not disposed as excess land, but is retained by the Army. Historically, the Army has not been in the business to make money from land deals. Leasing out land is not standard operating practice.

2.4.4.2 Interview Topics`

- Origin of Institution - U.S. Army.
- Basis of Authority - United States Government.
- Sunset Provisions - None.
- Geographic Jurisdiction - Ft. Bliss.
- Public Safety Function - Yes, within the military lands.
- Land-Use Control Function - Yes, within military lands.
- Financial Capability - United States Government.
- Constraints - None.
- Acceptance of Joint Responsibility - Willing to work in any capacity that is required.
- Technical Capability - Yes.
- Intergovernmental Relationships - Interacts with City of El Paso, State of Texas., Local Interest Groups.
- Stability - Yes.
- Funding Sources - United States Government

2.4.5 City of El Paso

Interviewee:	Ms. Rosemary A. Staley, Chief Planner
Location:	El Paso City Hall
Address:	2 Civic Center Plaza, 8th, El Paso, TX 79901
Date:	November 18, 1997

2.4.5.1 Interview Summary

The City of El Paso Year 2010 Land Use Projections, includes the entire Castner Range area in the major parks, recreation areas and open space land use category. The plan states that part of the Castner Range military land is proposed as an addition to the Franklin Mountains State Park. The city and county have both discussed acquiring land in the eastern plain of Castner Range for public facilities such as a coliseum, area, stadium, etc. There are no plans for this type of facility at the present time. The city has tried to focus the development of city-wide cultural activities to the downtown area. There is more than adequate land within the proximity of the existing urbanized area of El Paso to provide for growth well beyond the 2010 Comprehensive Plan envelope. The relatively small area of land included in the eastern plain within Castner Range would have minimal impact on the overall development potential of the city.

2.4.5.2 Interview Topics

- Origin of Institution - State charter
- Basis of Authority - State of Texas
- Sunset Provisions - None.

- Geographic Jurisdiction - City of El Paso, Texas
- Public Safety Function - Yes
- Land-Use Control Function - Yes.
- Financial Capability - City funds
- Constraints - Limited to City of El Paso.
- Acceptance of Joint Responsibility - Is willing to work in any capacity that is required.
- Technical Capability - No.
- Intergovernmental Relationships - Interacts with El Paso County, State of Texas., Military, Local Interest Groups.
- Stability - Yes.
- Funding Sources - City taxes

2.4.6 Franklin Mountains State Park

- Interviewee: Mr. Ronald W. Hillin,
  Assistant Park Manager
  Franklin Mountains State Park
  Location: Franklin Mountains State Park El Paso Office
  Address: P.O. Box 200, Canutillo, TX 79835
  Date: November 19, 1997

2.4.6.1 Interview Summary

The Texas Parks and Wildlife Commission wants to include all of Castner Range as part of the Franklin Mountains State Park, and has included Castner range in the future plans for the park. The state legislation establishing the state park includes the addition of all of Castner Range that the Army would deed to the state subject to ordnance cleanup. Therefore, the property could be added with no additional legislative consent. The Army tried to give the state all of Castner Range in the early 1990s, but the state could not accept the land because of the ordnance problem. The state park believes that they are the only agency able to provide the stewardship that is required to maintain the integrity of the land and its archeological and ecological sites. The state parks office does not seem to know what the Army is planning for Castner Range. They believe that the Army may deed the mountain portion of the range to the state park and retain the eastern plain for development. They believe that the eastern plain should also be deeded to the park and preserved from development because it has very individual and unique environmental characteristics that should be preserved and enhanced.

2.4.6.2 Interview Topics

- Origin of Institution - State charter
- Basis of Authority - State of Texas
- Sunset Provisions - None.

- Geographic Jurisdiction - Franklin Mountains State Park
- Public Safety Function - Yes, within the park.
- Land-Use Control Function - No.
- Financial Capability - State of Texas
- Constraints - Need training in identification and safety.
- Acceptance of Joint Responsibility - Willing to work in capacity available to state park system
- Technical Capability - Limited.
- Intergovernmental Relationships - Interacts with City of El Paso, El Paso County, State of Texas., Military
- Stability - Yes.
- Funding Sources - State taxes.

2.4.7 Texas Parks and Wildlife Department

Interviewee: Mr. George Krenzinski, Project Manager, Infrastructure
Location: Via Telephone
Address: Austin, Texas
Date: January 8, 1998

2.4.7.1 Interview Summary

The Texas Parks and Wildlife Department wants to add all of Castner Range to the existing Franklin Mountains State Park. They are particularly concerned about the eastern plain and hope that it will be included in the area ultimately offered to the State.

2.4.7.2 Interview Topics

- Origin of Institution - State charter
- Basis of Authority - State of Texas
- Sunset Provisions - None.
- Geographic Jurisdiction - State of Texas Park System
- Public Safety Function - Yes, within the park system.
- Land-Use Control Function - No.
- Financial Capability - State of Texas
- Constraints - Need training in identification and safety.
- Acceptance of Joint Responsibility - Willing to work in capacity available to state park system.
- Technical Capability - Limited.

- Intergovernmental Relationships - Interacts with City of El Paso, El Paso County, State of Texas., Military
- Stability - Yes.
- Funding Sources - State taxes.

2.4.8 Franklin Mountains Wilderness Coalition

Interviewee: Mr. John Sproul, President
Location: Via Telephone
Address: Austin, Texas
Date: January 14, 1998

2.4.8.1 Interview Summary

The Franklin Mountains Wilderness Coalition is a coalition of eighteen (18) local groups including the Chihuahuan Desert Wildlife Rescue, Desert Ratz Mountain Bike Club, District IV of Lulac, El Paso Archeological Society, El Paso Cactus and Rock Club, El Paso Herpetological Society, El Paso Native Plant Society, El Paso Sierra Club, El Paso-Pecos Audubon Society, El Paso Wilderness Preservation Committee, El Paso Women's Political Caucus, and Friends of the Franklins. The coalition was founded in the 1970's to urge the purchase and preservation of Franklin Mountains State Park. The coalition has continued to be instrumental in the preservation of the park and its environs. This group is very interested in the potential addition of Castner Range to the Franklin Mountains State Park.

2.4.8.2 Interview Topics

- Origin of Institution - Local charter
- Basis of Authority - By laws
- Sunset Provisions - None.
- Geographic Jurisdiction - None.
- Public Safety Function - None.
- Land-Use Control Function - No.
- Financial Capability - Limited.
- Constraints - Need training in identification and safety.
- Acceptance of Joint Responsibility - Willing to work provide assistance.
- Technical Capability - None.
- Intergovernmental Relationships - Interact with City of El Paso, El Paso County, State of Texas., Military
- Stability - Yes.
- Funding Sources - Dues, donations, grants

SECTION 3
INSTITUTIONAL CONTROL ALTERNATIVES

Risks related to ordnance contamination may be managed through conventional removals, access control, public awareness programs, or a combination of strategies. It is important to understand that the risk associated with ordnance contamination is associated with three causative factors that if completely avoided would prevent an ordnance-related accident. These three factors are: presence, access, and behavior. If ordnance there is no presence of ordnance on the site (none located on site, then there is no possibility of an ordnance-related accident. If ordnance exists onsite, but people do not have access, then there will be no accident. Even if ordnance exists onsite and people have access to the ordnance, if their behavior is appropriate, then there will be no accident. An accident requires all three events or circumstances to be present. No accident will happen if any one causative factor is missing. Each factor provides the basis for a separate implementation strategy. Access control and behavior modification through public awareness are institutional controls.

3.1 PUBLIC AWARENESS

Discussions of alternatives and the recommendations presented in this report are based on the assumption that informing and educating the public to the potential risks associated with the ordnance remaining on Castner Range will reduce the possibility of injury. However, it is also understood that public awareness may incite a reverse reaction to a small segment of the population that may view the dangerous handling of ordnance as an adventure.

3.1.1 Physical Removal

A strategy that engages the presence of ordnance is a removal action. Although physical removal is a means of reducing risk, it is not an institutional control alternative and will, therefore, not be discussed further in this report. Physical removal, including its effectiveness, implementability and cost are discussed in the OE Characterization Report and Cost Analysis.

3.1.2 Removal and Human Behavior

There are many instances where removal of surface or subsurface ordnance is the appropriate and recommended alternative for reduction of the risk associated with ordnance contamination. Removal produces a condition where there is less ordnance onsite. If human behavior is the same before and after the removal, then the risk is substantially reduced. However, if the removal results in a behavior that is less cautious or less informed than the behavior prior to removal, then a situation exists where some risk may be intensified. Therefore, it is recommended that any removal action at Castner Range be augmented with behavior modification strategy/alternatives, which includes education and information programs.

3.1.3 Removal Responsibility

Contracted removal actions to reduce the risk of exposure to ordnance are typically coordinated through the Army Corps of Engineers, Huntsville District. That agency is responsible for preparation and negotiation of scopes of services, fees, and schedules, and for retaining organizations skilled in the removal of ordnance to provide the removal services. Also, they are responsible for coordinating public information concerning to local government and the public at large as to the activities being performed. Day-to-day operations ate executed and managed by the contractor in accordance with a Work Plan and Health and Safety Plans, which are approved by the ACOE, Huntsville District prior to the start of work.

3.2 ACCESS CONTROL

Access control limits the use of the contaminated property. This can be accomplished by implementing various restrictions or dedicating the property to compatible use. The target strategy is to remove the human element from the chain of events that could lead to an accident. Access control can be facilitated in the form of signage, fencing, land-use restrictions, and/or regulatory control.

3.2.1 Signage

Sign posting is typically completed to inform people that entry is prohibited or that activities within the property are restricted in some manner. Defiance of these restrictions may be subject to disciplinary legal action. Signage is typically one element of a plan that uses the concept of respect for property rights. Trespass laws are the key element of enforcement and cooperation between landholders, law enforcement, and the general public. These laws are encouraged by other elements of the plan. The link between not trespassing and explosive safety must be made. Signs informing the public of potential dangers could be created and posted around the are to prevent or discourage entry. Signage is only effective with the cooperation of local officials and the community together with the funding and technical support from the federal government. The federal government owns all of the property within Castner Range. Warning signs currently exist along the perimeter of Castner Range. These signs state:

WARNING ● DANGER
FORMER
ARTILLERY FIRING RANGE
NO TRESPASSING

Unexploded projectiles or missiles are dangerous. The handling or removal of such ammunition and any other items by unauthorized personnel is prohibited. Violators will be prosecuted under penalities provided by law. Do not remove plants or rocks.

(See Figure 2-1.)

3.2.2 Fencing

As with signage, fencing is typically one element of a plan that uses the concept of respect for property rights. Trespass laws are the key element of enforcement and cooperation between landholders, law enforcement, and the general public. These laws are encouraged by other elements of the plan. The link between not trespassing and explosive safety must be made. Fences provide a physical barrier to inadvertent entry. Therefore, it may be easier to enforce trespass strictures. Fencing is only effective with the cooperation of local officials and the community with funding and technical support from the federal government. The federal government owns all of the property at Castner Range. There are no fences at the perimeter or within Castner Range.

3.2.3 Land Use Restrictions and Regulatory Control

There are no zoning or land use restrictions within Castner Range. There is little opportunity to limit access through the regulatory control process.

3.2.4 Effectiveness

Signs and fencing should be a minor element of plans that promote respect for property rights. Fencing, if implementable, would be effective in reducing the risk of exposure to ordnance contamination, but it would also restrict the future use of the area to be fenced. Fencing the entire perimeter would be virtually impossible because of the size of the range and mountainous terrain. Fencing may be implementable in some areas of the perimeter and interior of Castner Range, but the effectiveness of the fencing would be limited. Signs have been posted for many years. These signs restrict access and warn of the danger of ordnance. Based upon information gathered from the interview phase of this effort, the public pays little attention to these signs and has utilized Castner Range for recreational purposes since its use as a range was discontinued in 1966. There are currently no zoning or land use restrictions within Castner Range. If such restrictions were placed on the land, it is doubtful that they would be effective in preventing trespassing. Therefore, the various forms of access control - signage, fencing, land use restrictions and regulatory control - would not provide effective prevention of trespassing on Castner Range.

3.2.5 Implementability

The posting of signs has already been implemented around the perimeter of Castner Range and along the Trans Mountain Drive. The erection of fencing around some areas of the range could be implemented, but it's effectiveness would be limited. Land use restrictions and regulatory controls could be imposed on the range area, but these restrictions would do little to prevent the use of Castner Range.

3.2.6 Cost

A complete breakdown of costs associated with access control is presented in the OE Characterization Report and Cost Analysis.

3.2.7 Management, Execution, and Support Roles

To install a fence to restrict access to the easily accessible areas of Castner Range will require the preparation of a survey and analysis of the perimeter areas to determine where the most accessible areas are located and how they could be fenced to restrict access. Signs are already located and maintained by the Army.

3.3 PUBLIC AWARENESS PROGRAM

3.3.1 Behavior Modification

Behavior modification relies on the personal responsibility of the site user. Even if the ordnance exists and there is open access to it, there is no risk if the behavior is appropriate. For behavior to be appropriate, one must understand the situation and voluntarily react in a responsible manner. The power of the federal government is limited in any situation where local enforcement is available. Therefore, the local authorities must be convinced that the risks are sufficient to warrant their participation. The concept of behavior modification through public awareness extends to agencies that have jurisdiction over the site. Some behaviors that must be modified may belong to the local government. Raising public awareness for the hazards that exist within Castner Range can be facilitated in a variety of ways, as will be discussed in the following paragraphs. Modification of one's behavior through public awareness is essentially an education/information process and can include notice (such as deed notifications/restrictions, notifications during property transfers, and notification during permitting), education classes (including ordnance identification, safety presentations to various audiences, preparation of packages for administrative and public officials), printed media (including brochures and news articles), visual media (including videotapes and local television programs), exhibits/displays, and creation of an Ad hoc committee.

3.3.2 Land Use Controls

Behavior modification can be facilitated through land use controls. Planning boards and zoning commissions have the authority based on state or local law to restrict uses of property in the public interest. Eliminating ordnance contaminated property from unrestricted development may be prudent and beneficial. However, within the majority of Castner Range there are no zoning or land-use restrictions.

3.3.3 Notice

Appropriate notice can exert a strong influence on one's behavior. When notice of ordnance contamination is given, it can affect the expectations of potential users. Appropriate uses can be sought, and the land may still be used for economic gain. However, the contamination must be considered in the design and use of any site improvements or activities. Notices can be placed on a property in at least three ways: deed notification/restriction, notification during any property transfers, and notification during any permitting process. The property within Castner Range has never been sold and is still owned entirely by the federal government. Any future reuse of the land would be subject to the GSA excess land process. The exception to this process may be the potential leasing of portions of the land for development. In either instance, future use of the land may be restricted through the three notice methods.

3.3.3.1 Deed Notifications/Restrictions

Notifications of ordnance contamination and restrictions of use could be placed on the deeds of any properties that are made available for use either through the government excess process or if the Army leases parcels for development.

3.3.3.2 Notification During Property Transfers

In general, property owners have a responsibility to protect the public from dangers associated with their property. In the case of the excessing or leasing of ordnance contaminated property, a liability exists that should be disclosed to prospective buyers or lessors. It may be prudent for a lending institution or bank regulatory agency to consider this factor when lending money on ordnance-contaminated property. Prior to placing a notification on a property transaction, one should obtain a legal rendering.

3.3.3.3 Notification During Permitting

Typically controls are in place to protect property owners and their neighbors through approvals or permits required to develop properties in certain ways. Approvals generally ensure that proper notice is given, reasonable plans consider the presence of endangered species, wetlands, or other concerns, and that the land is being developed for an appropriate use. Permits combine all of the benefits of approvals and get a legally binding commitment for certain behavior. The assumption that permits can be revoked for cause provides enforcement under local authority.

3.3.3.4 Effectiveness

It is expected that the majority of Castner Range will be deeded to the State of Texas, Parks and Wildlife Department to be utilized as an expansion of the Franklin Mountains State Park. Some of the area may be retained by the Army and leased for development. In either case, a notice can be placed on the deed or lease agreement to notify the owner/lessor of the potential for ordnance contamination within the property. Notice on a property transaction can also be effective. Adding notification during the permitting process would effectively reinforce the message for those that will be developing the property. Therefore, all three methods of providing notice are somewhat effective.

3.3.3.5 Implementability

Placing notice on deeds (either during the time of the property transfer or before) should be implementable, but the legality must be further investigated before implementation. Providing a mechanism for adding notification during the permitting process for any development on Castner Range should be implementable.

3.3.3.6 Cost

The cost associated with placing notice would be minimal, assuming there are no legal problems associated with this alternative.

3.3.3.7 Management, Execution, and Support Roles

The legality and legal ramification of placing notice on a parcel must be determined before any action is executed. If deemed legal, USACE will need to draft language to be added to deeds and present this information to the El Paso County Clerk before any land sales or leases are completed on Castner Range. This information must also be made available to the banks and other lending institutions.

3.3.4 Printed Media

Ordnance awareness, respect for the risk involved, and reinforcement of the message are key ingredients in minimizing the risk associated with ordnance contamination. One of the major avenues available to facilitate this awareness and understanding is through printed media, in the form of brochures, fact sheets, newspaper articles, and other information packages. The opportunity to disseminate information through the printed media is readily available and can be easily facilitated. The current residents within the region should be aware of ordnance contamination within Castner Range. However, since trespassing on the property occurs daily, area residents should be reminded of the ordnance contamination of a regular basis so that they will be aware of the potential hazard. Also, providing information to new residents, visitors, or others not currently aware of the situation of primary importance. The addition, reinforcement, and augmentation of current knowledge is desirable in order to keep the realization of ordnance contamination and the potential hazards in the minds of people at all times.

3.3.4.1 Brochures/Fact Sheets

Brochures and/or fact sheets can be produced that describe the history of Castner Range, how to identify ordnance, safety procedures associated with the proper handling/avoidance of ordnance items, instructions for dealing with ordnance if encountered, and telephone numbers to contact if ordnance is encountered or if questions need to be answered. These brochures could be produced by USACE, but should also include local sponsorship and ownership. These brochures could be distributed as follows:

- Direct mail to all area residents in the City and County.
- Enclosed in tax bills.
- Enclosed in power bills.
- Enclosed as flyer in local press.
- Included in Chamber of Commerce literature.
- Provided to the public at the Wilderness Park Museum.
- Provided to hotels, motels, and other tourist attractions.

- Provided through educational systems to all students in the region.
- Provided to all recreational groups/clubs.
- Provided to all professional groups/clubs.
- Provided to all civic groups/clubs.
- Provided to all military personnel.

3.3.4.2 Newspaper Articles/Interviews

Newspaper articles and interviews with local residents, the USACE, and other institutions can be printed to further educate the public concerning the ordnance contamination at Castner Range. These articles can be very informative, can effectively reduce the risk of improper handling of ordnance, and can be presented in a positive manner. Articles have been previously published in the local newspapers. Many of the residents of the region lived and worked in the area when Castner Range was active. Interviews with these people would add interest to newspaper articles.

3.3.4.3 Information Packages for Public Officials

Generally, the public is aware of the ordnance contamination at Castner Range. However, the location and extent of the contamination is unknown, and this information is not readily available through the public officials. An information package produced by USACE (possibly from maps currently available and reproducible from the OE Characterization Report and Cost Analysis) defining primary areas of concern would be valuable for the public officials. Recommended maps would include the boundary of the former Another valuable piece of information that should be included in the information package would be an abstract of studies completed to date. This abstract should include a brief history of Castner Range, areas of greatest concern, types and potential danger of the ordnance discovered, USACE contacts, and other contacts to discuss safety concerns

3.3.4.4 Effectiveness

Providing information via printed media would be a very effective method of modifying behavior by educating the public concerning the presence of ordnance within Castner Range. Production and dissemination of brochures/fact sheets, newspaper articles and interviews, and the production and distribution of information packages for public officials would all be very effective institutional controls. Taking advantage of the avenues for distribution of the brochures/fact sheets would effectively educate the public on a one-time basis. However, to be fully effective over an extended period of time, the message must be reinforced. Redistribution of originally produced printed media that has been updated if necessary is recommended at regularly scheduled intervals.

3.3.4.5 Implementability

Providing information via printed media is easily implementable. With USACE providing the funding and producing the brochures, fact sheets, and information packages, local institutions would readily agree to assist in distribution of the information.

3.3.4.6 Cost

The estimated cost to produce an original professional quality brochure/fact sheet, newspaper interview, and information package is approximately $20,000. The cost to copy and distribute the printed media would depend on the number of copies to be distributed. Assuming 10,000 mailings at $1 each (including cost to copy the brochure and postage), plus production of 10,000 brochures/fact sheets at $0.50 each (assuming two-color reproduction) for distribution to the various institutions that will make them available to the public, plus 50 information packages at $20 each to be provided to the public officials, the total cost to implement the information via printed media alternative would be $36,000. The estimated annual cost to reinforce the message (assuming bi-annual mailings, providing an additional 1,000 brochures per year, and the labor associated with periodic editing and updating of the brochures/fact sheets) is $5,000.

3.3.4.7 Management, Execution, and Support Roles

To provide information via printed media, USACE must first produce the brochure/fact sheet. This can be executed directly by USACE or through a contractor with experience in the production of communications vehicles for public education programs. Distribution can be facilitated by mailing the printed materials directly to all residents of the City of El Paso and El Paso County. Support from local institutions and volunteer groups will be needed to disseminate the information to all of the effected parties.

3.3.5 Classroom Education

Public awareness can be facilitated through the classroom. Although the public generally understands that ordnance exists within Castner Range, they do not have the necessary training to properly identify and avoid ordnance if encountered. A properly educated public is more likely to make correct decisions related to the safe and proper precautions of found ordnance. Classroom education can be offered in two major categories: ordnance identification and safety.

3.3.5.1 Ordnance Identification

Although everybody that enters Castner Range needs to be aware of the potential risk associated with ordnance, it may not be necessary for everybody to be trained in ordnance identification. The basic message should be not to touch anything that looks like ordnance, shrapnel, or any other unidentified material. However, it may be prudent to properly educate public officials and institutions that have a role that they must provide within Castner Range. Ordnance identification classes would be valuable for the following institutions: City of El Paso, El Paso County, Ft. Bliss, the Wilderness Park Museum, and the El Paso Public School system. Ordnance identification classes are conducted at various times and locations around the nation. It may be possible to schedule classes and transport public officials to these classes; although this could be costly and time consuming. USACE may wish to consider experts in the detection and identification of ordnance to the area to provide the education. An ideal opportunity to provide ordnance identification classes would be in conjunction with a scheduled removal action. Videos could be made by ordnance experts, and these videos could be made available to public officials to view at their leisure.

3.3.5.2 Ordnance Safety

The affected public should be educated about the potential dangers associated with ordnance and should understand the safety procedures to follow should they encounter any suspected ordnance item. Safety presentations should be made to all public and private primary and secondary schools in the region. Also ordnance safety courses could be offered by the City of El Paso through the Wilderness Park Museum, and Fort Bliss.

3.3.5.3 Effectiveness

Providing education through the classroom would be a very effective method of modifying behavior by informing the public and public officials concerning the presence of ordnance at Castner Range and how to safely deal with the situation. Ordnance identification and ordnance safety classes/education would be very effective institutional controls. However, to be fully effective over a period of time, the message must be reinforced. Ordnance identification classes should be conducted on a regularly scheduled basis (possibly every 2 to 3 years) and ordnance safety should be incorporated as a regular part of the current classes.

3.3.5.4 Implementability

Providing classroom education should be easily implementable. With USACE providing the funding and the educational information package, local institutions should agree to participate and support the program. The most difficult part of the process will be coordinating efforts with an ordnance expert who will be retained to educate public officials in ordnance identification and scheduling the maximum number of public officials per class. Implementation will be most easily facilitated during a time when an ordnance expert is scheduled to be onsite for a removal action.

3.3.5.5 Cost

The estimated cost to retain the services of an ordnance expert (including preparation, classroom training time, travel, and per diem) to provide ordnance identification education is approximately $5,000. The estimated cost to provide the necessary information and to assist the institutions that are willing to include ordnance safety into their current education process is approximately $5,000. The total estimated cost to implement classroom education alternative would be $10,000. The estimated annual cost to reinforce the classroom education process (assuming ordnance identification classes once every 3 years and periodic update and supplementing of the information concerning ordnance safety) is approximately $3,000 per year.

3.3.5.6 Management, Execution, and Support Roles

To facilitate the classroom education alternative, USACE must first contact all institutions that are willing to assist in the ordnance safety education process and make information available to them. As a minimum, local institutions and groups (See Paragraph 3.3.2.1) should be contacted and efforts should be coordinated with them. USACE must also retain the services of ordnance experts, who have been trained in the proper identification and handling of ordnance. There are many firms that specialize in this area with individuals who have prepared and presented ordnance identification classes in the past. Ideally, the contractor that is awarded site cleanup contract would be able to assist in this ordnance identification process. As an alternative to coordination of all classroom education through the USACE, this work can be executed via a contract professional with experience in the production and facilitation of education and information programs.

3.3.6 Visual Media

Ordnance awareness, respect for the risk involved, and reinforcement of the message are key ingredients in minimizing the risk associated with ordnance contamination. One of the major avenues available to facilitate this awareness and understanding is through visual media, in the form of videotape programs for use during presentations and for broadcast on local television stations. The opportunity to disseminate information through the visual media is readily available and can be easily facilitated. Most of the current residents of the region should already be aware of the ordnance contamination at Castner Range. However, providing additional information to new residents, visitors, or others not currently aware of the full extent of the situation is beneficial. Also, reinforcement and augmentation of the current knowledge can be valuable.

3.3.6.1 Videotapes

Professional quality videos can be produced that describe the history of Castner Range, how to identify ordnance, safety procedures associated with avoidance of ordnance items, instructions for dealing with ordnance if encountered, and telephone numbers to contact if ordnance is encountered or if questions need to be answered. The videos can be produced by USACE, but should include interviews with local citizens, local sponsorship, and local ownership. Videotapes can be produced to be shown in classrooms throughout the region. Copies should also be provided to local libraries, colleges and universities, the City of El Paso, El Paso County, and the Wilderness Park Museum. These institutions could make the videotapes a part of permanent exhibits/displays.

3.3.6.2 Television

Local television stations would provide excellent local access of programs about Castner Range, the presence of ordnance, how to identify ordnance, safety procedures associated with avoidance of ordnance items, instructions for dealing with ordnance if encountered, and telephone numbers to contact if ordnance is encountered or if questions need to be answered. All television stations are anxious to provide local information reporting and programming. It is suggested that the television programs include interviews with USACE personnel, local residents, and others who have knowledge of the history and understanding of the ordnance at Castner Range. To be most effective, the length of the television program would be approximately 30 minutes; however, a shorter version of the videotape (5 to 7 minutes) would be produced to educate the public through the institutions and groups discussed in paragraph 3.3.4.1. Therefore, two different videos may be advisable.

3.3.6.3 Effectiveness

Providing information using visual media would be an effective method of modifying behavior by educating the public concerning the presence of ordnance at Castner Range. Production and dissemination of videotapes and presentation of the message over local television would be effective institutional controls. The visual media is becoming one of the most popular formats for educating the public. Taking advantage of the available avenues for presenting the visual media would be effective. However, the message must be reinforced. Frequent and regularly scheduled re-broadcast of the original television presentation is recommended. Periodic updating of the videotapes is recommended to ensure the accuracy and timeliness of the information presented. Additional footage and editing of the original videotapes may be required every 2 to 3 years.

3.3.6.4 Implementability

Providing information via the visual media should be easily implementable. With USACE providing the funding and producing the videotapes, local television stations should readily agree to assist in distribution of the information.

3.3.6.5 Cost

The estimated cost to produce a professional quality 30-minute videotape for television broadcast and a 5- to 7-minute videotape for distribution to the local institutions and the community is approximately $25,000. The estimated cost to copy and distribute videotapes to various institutions and to television stations would depend on the number of copies needed. However, assuming 50 copies at $20 each (including the cost of the videotape, dubbing, and postage) the cost would be approximately $1,000. Therefore, the total estimated cost to implement the information via visual media alternative would be $26,000. The estimated annual cost to reinforce the message (assuming updating of the video tape once every 3 years at a cost of $5,000 per update and distributing of additional/updated videos) would be $2,000 per year.

3.3.6.6 Management, Execution, and Support Roles

To provide information via visual media, USACE must first produce the videotapes. This can be executed directly by USACE or through a contract professional with experience in the production of public information and education programs. Support from the local television stations and other organizations and institutions will be needed for broadcast of the videotapes and to make them readily available to the public.

3.3.7 Exhibits/Displays

Placing exhibits/displays in museums or other areas where the public will be exposed to educational information can be an effective method of raising and preserving general awareness and educating the public on the possible risk associated with the ordnance at Castner Range. The most logical location for this display is the Wilderness Park Museum. Other locations exist within the city and county where a display would receive exposure and would aid in informing and educating the public about the possible risk associated with ordnance. Some of these locations include City Hall, the County Courthouse, Ft. Bliss, the University of Texas at El Paso, and bank and other institution lobbies. Also, a mobile display could be prepared to be moved from one location to another to obtain exposure to the maximum number of potentially affected people. This mobile display could be exhibited at many locations throughout the region including those listed above.

3.3.7.1 Effectiveness

The presentation of information through exhibits/displays is an effective method of modifying behavior by educating the public concerning the presence of ordnance at Castner Range. Production of displays and presenting them in museums and other areas of high public exposure would be an effective institutional control. The more people that visit a museum or area where the information is displayed, the more effective is the alternative. At the present time, providing information about ordnance would be most effective at the Wilderness Park Museum and through the use of a mobile display at various locations. Taking advantage of the available avenues for presentation and viewing of the displays would be effective. However, the message must be reinforced. Updating of the displays is recommended periodically to ensure the accuracy and timeliness of the information presented.

3.3.7.2 Implementability

Providing information via exhibits and mobile displays should be implementable. With USACE providing the finding and producing the displays, the local institutions have agreed to assist. No difficulty is anticipated in adding a display to the current Information Center; however, transport and relocation of the mobile display to the various locations will require additional coordination and effort.

3.3.7.3 Cost

The estimated cost to prepare a permanent museum display at the Wilderness Park Museum is approximately $4,000. The estimated cost to purchase a mobile exhibit and properly design and prepare it for display is $6,000. Therefore, the cost to prepare one permanent and one mobile display is $10,000.

The estimated annual cost to update and reinforce the message on the displays is $1,000 per year.

3.3.7.4 Management, Execution, and Support Roles

To provide information via museum exhibits, USACE must first produce the displays. This can be executed directly by USACE or through a contract professional with experience in the production of public information and education programs. Cooperation from the City of El Paso, Ft. Bliss, and the Texas Parks and Wildlife Department will be needed to provide the space at the Wilderness Park Museum.

Support will be needed by one of the local institutions, possibly from the City of El Paso, to assist in displaying and relocating the mobile display.

3.3.8 Internet Web Site

The creation of a Web Page on the Internet could be very effective method of raising and preserving general awareness and educating the public about Castner Range. The Web Page could be designed to include the history of Castner Range and the region, and sites of historical significance, ecological significance, flora and fauna. The fact that ordnance exists on the site would be explained as well as how to identify ordnance, safety procedures associated with avoidance of ordnance items, instructions for dealing with ordnance if encountered, and telephone numbers to contact if ordnance is encountered or if questions need to be answered.

3.3.8.1 Effectiveness

The Internet Web page would be less effective than some of the other alternatives in facilitating public awareness. However, it would be the very effective in presenting in-depth information about Castner Range and the presence of ordnance and safety precautions to avoid an ordnance mishap.

3.3.8.2 Implementability

Creation of a Web Site should be implementable. USACE could provide the funding and oversee the design of a Web Site that would provide the information that should be included in such a site. If Castner Range is ultimately deeded as an expansion of the Franklin Mountain State Park, the Web Site could be about the park as a whole with the ordnance information included and areas where ordnance may be located identified.

3.3.8.3 Cost

The cost to design a Web Site vary from $50.00 to $150 per hour. Assume that the design would require 100 hours at $100.00 per hour for a total design cost of $10,000.

3.3.8.4 Management, Execution, and Support Roles

To create a Web Site USACE should coordinate with Ft. Bliss, the Franklin Mountain State Park staff, and the Texas Parks and Wildlife Department. There are advertising professionals in the El Paso region who could be contracted to prepare the Web Page and establish it on the Internet.

3.3.9 Ad Hoc Committee

Creation of an Ad hoc committee, composed of influential members of the community and a representative from the USACE would serve as a mechanism for facilitating implementation of the original recommendations and for ensuring reinforcement of these recommendations. Additionally, the overall effectiveness of each of the in-place alternatives can be analyzed regularly, and other methods of modifying behavior through public awareness can be evaluated (see paragraph 3.3.7).

3.3.9.1 Effectiveness

The Ad hoc committee, in itself, would be less effective than some of the other alternatives in facilitating public awareness. However, it would be the most effective mechanism for ensuring implementation of the other recommended alternatives.

3.3.9.2 Implementability

Creation of an Ad hoc committee should be easily implementable. There is significant public interest in the future of and potential public use of Castner Range.

3.3.9.3 Cost

The members of the Ad hoc committee would not be paid for their time. Therefore, the estimated cost to implement this alternative would be approximately $2,000 for the first year and $1,000 for each subsequent year. The costs would include retaining services of a stenographer to record meeting minutes, plus cost associated with purchase of stationary, copying, telephone calls, and other miscellaneous expenses.

3.3.9.4 Management, Execution, and Support Roles

To create an Ad hoc committee, USACE must contact influential members of the community and form the committee. Meeting rooms and a stenographer must be secured. It is suggested that a minimum of 2 meetings be conducted the first year and at least one per year thereafter.

3.3.10 Other Methods of Behavior Modification Through Public Awareness

Although this report includes the most common, appropriate, and effective institutional controls alternatives available at this time, other methods of educating, informing, and modifying the behavior of the public currently exist and will continue to be improved upon. Other technological advances are anticipated that will result in the creation of new opportunities to improve the information/education process. Other public awareness programs not addressed in the previous sections of this report have not been fully developed and may warrant further consideration at a later date. It is imperative that USACE and the local institutions stay attuned to new and innovative methods to keep the public informed. It is likely that the recommendations presented in this report may become obsolete at some time in the future.

SECTION 4
RECOMMENDATIONS

This section includes recommended institutional control alternatives to be implemented at Castner Range. The selection of the recommended alternatives was based upon the description and evaluation of the alternatives presented in Section 3.0; discussions with USACE and institutions that have the capability, authority, and willingness to support the proposed institutional controls; and an overall knowledge of the site and conditions. The recommendations presented are intended to be implemented in all areas of Castner Range and are considered to be appropriate methods of reducing the risk to the public. The recommended institutional control alternatives are considered to be an effective complement to other removal activities at, as discussed in the OE Characterization Report.

4.1 RECOMMENDED ALTERNATIVES

Many of the institutional control alternatives are effective, implementable, and cost-effective. The Parsons Team recommends implementation of the alternatives listed below and summarized in Table 4-1.

- Printed Media: Very effective, easily implementable, and cost-effective with an initial estimated cost of $36,000 and an annual cost of $5,000 for reinforcement.
- Ad hoc committee: Effective means of ensuring implementation of the other recommended alternatives; easily implementable; and cost effective, with an initial estimated cost of $2,000 and an annual cost of $1,000.
- Classroom Education: Very effective, easily implementable, and cost-effective with an estimated initial cost of $ 10,000 and an annual cost of $3,000 for reinforcement.
- Visual Media: Effective, easily implementable, and cost-effective at an estimated initial cost of $26,000 and an annual cost of $2,000 for reinforcement.
- Exhibits/Displays: Effective, implementable (although coordination, it will be necessary to relocate the display), and cost-effective with an estimated initial cost of $ 10,000 and an annual cost of $ 1,000 for reinforcement.

4.1.1 Phasing of Alternatives

These alternatives are presented in the recommended order of importance. If only one alternative can be funded, providing information by means of printed media is recommended because this is considered to be the most effective means to reach the maximum number of potentially effected people.

4.1.2 Alternatives Not Recommended

Access control via signage, fencing and land-use restrictions are not recommended. Signage exists and has proved of limited value in preventing access. Fencing the entire range is economically and physically prohibitive. Fencing only portions that are easily accessible is not considered a viable alternative because of the ease of circumventing the fences and inability to maintain fencing. Notice (via deed notification, providing notice during property transfers, and providing notice during permitting) is of no value because the land is most likely to be deeded in its entirety to a public. The establishment of a web site on the Internet provides information only to those who access the web page and is considered of limited value.

4.1.3 Cost

The estimated total cost to implement the five recommended institutional controls alternatives is $75,900, with an annual reinforcement cost of $12,000. This does not include the labor and cost that personnel from the various institutions will spend coordinating and managing the institutional controls.

4.2 MANAGEMENT, EXECUTION AND SUPPORT ROLES

To implement any of the recommended institutional control alternatives, USACE must first provide the funding and produce the necessary media (i.e., brochures/fact sheets, videos, exhibits/displays, classroom information). Support from many of the local institutions will be needed to disseminate the information to the affected parties. Institutions that could play a major role in execution of the recommended alternatives include:

- City of El Paso;
- El Paso County;
- State of Texas, Parks and Wildlife Department;
- University of Texas at El Paso;
- El Paso Area Chamber of Commerce;
- El Paso School Board
- U.S. Army Ft. Bliss
- Tourist Commission
- Local Service Organizations;
- Local Civic Organizations
- Local. Professional Organizations,
- Local Television Stations;
- Local Radio Stations, and
- Local Newspapers.

Table 4-1
Institutional Control Alternatives

Alternative	Effectiveness	Implementability	Initial Cost	Annual Cost
Access Control · Fencing · Signage · Land Use Restrictions and Regulatory Control	· Effective by restricting access, use, and development · Effectively reinforces warnings as long as they continue to be maintained · No zoning and land use restrictions	· Not Implementable · Implementable (Existing) · Not Implementable	· Not Determined · · Not Determined · (Existing) · Not Applicable	· Not Determined · Not Determined · Not Applicable
Notice · Deed Notification · At Property Transfer · At Permitting	Not Effective	Implementable, but entire property will probably be in public ownership	Minimal	Minimal
Printed Media · Brochures/Fact Sheets · Newspaper Articles · Information Packages	Very Effective	Easily implementable	$36,000	$5,000
Classroom Education · Ordnance Identification · Ordnance Safety	Very Effective	Easily implementable	$10,000	$3,000
Visual Media · Videotapes · Television	Effective	Easily implementable	$26,000	$2,000
Exhibits/Displays	Effective	Implementable, coordination needed to relocate display	$10,000	$1,000
Ad hoc Committee	Effective means of ensuring implementation of other alternatives	Easily implementable	$2,000	$1,000

Source: Parsons HBA

APPENDIX A

MEETING MINUTES

MEETING MINUTES

November 24, 1997

Date:	November 17, 1997	File: CASTNER: MM#1
Place:	Ft. Bliss	
Attendees:	Robert Moralez, Ft. Bliss Kevin Vonfinger, Ft. Bliss Campbell Ingram, Ft. Bliss Kelly Blough, Ft. Bliss Bruce Prater, Ft. Bliss Bill Sargent, CEHNC Rob Smith, Parsons ES Greg Hedrick, Parsons ES Phil Nixon, Parsons ES	
Subject:	OE Characterization and Cost Analysis Report at Castner Range	
Prepared By:	Phil Nixon PN	

Bill Sargent kicked-off the meeting stating the accomplishments to-date at Castner Range including:

- Archive Search Report (ASR)
- Preliminary site investigation by ESHI
- Selective surface investigation by UXB
- Surface/subsurface investigation by CMS.

Mr. Sargent indicated that UXO is scattered throughout the surface of the range making the site a dangerous place for trespassers. Only one subsurface anomaly has been found. Mr. Sargent stated that the ground is very hard and rocky which is likely to explain why there is little subsurface penetration by UXO.

Parsons ES is under contract to prepare an OE Characterization and Cost Analysis report which is similar to an EECA without the public involvement and Action Description Memorandum. Fort Bliss will need to review the report and use it as a tool to help determine the appropriate end-use for the property. The alternatives that will be evaluated include:

- No action;
- Institutional control;
- Surface clearance;
- Clearance to a depth of 1 foot; and,
- Clearance to a depth of 4 feet.

Future land use was discussed. It was agreed that it is appropriate for the mountain areas to be incorporated within the existing park. It is anticipated that the state would also like the plains area so that the park includes a range of diverse habitats. However, there have been discussions that the city would like to develop a sports complex/civic center in the plains area. Fort Bliss may also elect to lease the corridor along route 54 to commercial development which would generate revenue for Fort Bliss. It was agreed that the OE Characterization and Cost Analysis report will be prepared focusing on turning the mountains over to the state as parkland, and leaving the options open for the plains area. It was discussed that only surface clearance would be required if the end land use was recreational. If the site is developed for residential or commercial uses, then subsurface clearance would require consideration as appropriate based on investigation results. It was agreed that the easiest alternative is to turn the range into a park, but transfer restrictions would be required including a public awareness program to the dangers that may exist in areas that are too inaccessible to clear. It was stated that the DOD will always be responsible for clearing any UXO that is found on Castner Range after it is turned over to other land use.

Rob Smith discussed that the Institutional Analysis component of the OE Characterization and Cost Analysis Report was intended to identify those agencies and parties of both on and off Fort Bliss that needed to be aware of and potentially involved in the release of Castner Range (in the event that the use of the land was restricted or institutionally controlled). The institutional control alternative will be identified and a cost-estimate will be prepared for its implementation. It was discussed that the groups that need to be contacted include:

- Chamber of Commerce;
- City planners and authorities;
- City/County tax assessors;
- Park service; and
- Regional Planners.

It was discussed that state level regulatory agencies may also need to be contacted.

Phil Nixon provided a list of information and data that Parsons ES needed to compile the report. The group identified key personnel that should be contacted for information:

Contact	Topic	Phone Number
Dave Hall	Historical Site Maps	(915) 568-2193
Bill Wilcox	Legal Issues	(915) 568-2821 or (915) 568-5102
Terry Bashore	Ecology (Herpetology)	(915) 568-3018
Dallas Bash	GIS (site base maps)	(915) 568-0977

Kelly Blough	Hazardous Waste sites	(915) 568-7979
Jim Bowman	Archaeology	(915) 568-6746
Vicki Hamilton	Historian	(915) 568-2774
Rafael Corral	Ecology (Botany)	(915) 568-6977
Museum Office	Photographs	Building 515B

Bill Sargent agreed to supply Parsons ES with an electronic copy of the UXB investigation report and the ESHI report. In addition, he will direct CMS to send Parsons an electronic copy of their Final investigation report that will be issued soon.

Bill Sargent indicated that Mary Young should be contacted at CEHNC for information concerning a cost model that is being developed.

MEETING MINUTES

May 23, 1998

Date:	November 17, 1997	File: CASTNER: MM#2
Place:	Ft. Bliss	
Attendees:	Bill Tipton, Ft. Bliss Properties Kelly Blough, Ft. Bliss Bill Sargent, CEHNC Rob Smith, Parsons ES Greg Hedrick, Parsons ES Phil Nixon, Parsons ES	
Subject:	OE Characterization and Cost Analysis Report at Castner Range	
Prepared By:	Phil Nixon	

The 1200 acres that were returned to the public were turned over in 1978.

The Army offered Castner Range to the state several years ago, but it was not allowed because the land had not been cleared. The strategy was put on hold because the funds were not available for clearance. However, the 40-acre parcel for the museums has been surface-cleared.

Mr. Tipton indicated that the Army is considering leasing a strip of land along highway 54 to commercial development. The revenue generated through the leasing activities would be used by Fort Bliss for maintenance and environmental projects. Mr. Tipton stated this strategy is not standard Army protocol. Typically, if land is determined to be excess, then it is returned to other federal, state, county/city, or public use. However, a tract of Fort Bliss land was leased to the girl scouts setting a precedence as to how this strategy could be implemented. The process to return excess UXO range land is as follows:

1. Fort Bliss determines that the land is excess and prepares a plan to clear the UXO.
2. The Department of the Army approves the plan and provides funding to perform the clearance.
3. The Corps of Engineers performs the UXO clearance and places any restrictions on the use of the land based upon the level of clearance.
4. The Corps of Engineers offers the land to other federal agencies who have the first right-of-refusal.
5. If the federal agencies refuse the land, then the GSA offers the land to the state and local governments for second right-of-refusal.

6. If the state or local governments refuse the land, then the GSA makes the land available to the public for sale (commercial or residential based upon the clearance restrictions).

The current base commander's tour of duty will be ending in the next six months. A decision on how to deal with Castner Range will not be made until the new commander arrives at Fort Bliss.

MEETING MINUTES

November 24, 1997

Date:	November 17, 1997	File: CASTNER: MM#3
Place:	Ft. Bliss	
Attendees:	Jean Offutt, Ft. Bliss PAO Denita Kelly, Ft. Bliss PAO Kelly Blough, Ft. Bliss Bill Sargent, CEHNC Rob Smith, Parsons ES Greg Hedrick, Parsons ES Phil Nixon, Parsons ES	
Subject:	OE Characterization and Cost Analysis Report at Castner Range	
Prepared By:	Phil Nixon PN	

Jean Offutt was briefed with respect to the OE Characterization and Cost Analysis Report. Ms. Offutt realizes that it may be easiest to turn Castner Range into a park because the Army must provide the funding for clearance prior to turning the land over to outside interests. It was discussed that the Army would be responsible to provide clearance if any UXO is discovered after the land is transferred.

It was discussed that Parsons ES needed to speak with members of the city, county, and state. Kelly Blough is concerned that the RAB members will be taken by surprise if Parsons speaks to off-site resources prior to the base briefing the RAB. It was agreed that Kelly Blough and the POA place an article in the paper discussing the investigations and OE Characterization and Cost Analysis projects at Castner Range. Kelly Blough will call each member of the RAB to inform them of the project.

It was discussed that the PAO gets numerous calls each year from members of the public who wish to hike in Castner Range. The public is generally interested in what activities occur in Castner Range. It is believed by the PAO that developers would welcome an opportunity to develop Castner Range. However, in 10 years only one Realtor has called the PAO to inquire about developing Castner Range.

MEETING MINUTES

November 24, 1997

Date:	November 18, 1997	File: CASTNER: MM#4
Place:	Ft. Bliss	
Attendees:	Bill Wilcox, Ft. Bliss JAG Kelly Blough, Ft. Bliss Rob Smith, Parsons ES Phil Nixon, Parsons ES	
Subject:	OE Characterization and Cost Analysis Report at Castner Range	
Prepared By:	Phil Nixon PN	

Bill Wilcox stated that the NEPA regulation had to be satisfied prior to a decision being made on how the land at Castner Range would be used in the future. Mr. Wilcox also indicated that the Counsel of Environmental Quality (CEQ) specifies that the Army cannot limit the options for how the land can be used, but that future land use scenarios should be reasonable and appropriate. Phil Nixon responded that the OE Characterization and Cost Analysis Report would be a document that summarizes all the information that is known about the environmental setting of Castner Range; summarize the results of the UXO investigations that have been performed; and, investigate clearance alternatives. Therefore, the OE Characterization and Cost Analysis Report will be a document that may satisfy the NEPA regulations (depending on the final future land use decision).

Phil Nixon asked about the difference in the Army's liability if the land went to the state instead of the public. Mr. Wilcox responded that the liability would not change much because the U.S. government would always be responsible to remove any UXO that is discovered (no matter who owns the land), and the U.S. government would be the main named party in any lawsuit since it has the "deepest pockets". Mr. Wilcox agreed that the Army has a tremendous liability under the current situation where the public uses the uncleared land. The warning signs are helpful in that they warn people of the potential dangers, but these signs do not restrict public access. Once cleared, the liability issue would still remain, but the potential for an incident would be reduced due to the clearance.

Mr. Wilcox indicated that the Army does not get any financial return from land that is labeled as excess and given-up. Land that is leased for commercial developers is not disposed as excess land, but is retained by the Army. Mr. Wilcox stated that historically, the Army has not been in the business to make money from land deals. Mr. Wilcox was aware of the idea to lease the land along highway 54 to commercial interests, but indicated that it was not a standard operating practice.

Mr. Wilcox closed the discussion by stating that the OE Characterization and Cost Analysis Report should be written with NEPA compliance in mind to help the Army decide how the land at Castner Range should be used.

MEETING MINUTES

November 24, 1997

Date:	November 18, 1997	File: CASTNER: MM#5
Place:	Ft. Bliss	
Attendees:	Larry Schroeder, Ft. Bliss Historian Vicki Hamilton, Ft. Bliss Historian Kelly Blough, Ft. Bliss Phil Nixon, Parsons ES	
Subject:	Historical Resources at Castner Range	
Prepared By:	Phil Nixon *PN*	

Larry Schroeder stated that a formal survey of Castner Range has not been performed because the range is inactive, but items of historic significance are known to exist at the range. The following items are military historic items known to exist on the range:

- Stone structures/foundations where rail carts were placed on the rails for moving target practice;
- Berms created for firing and backstops; and,
- Stone structure of unknown use.

These items are classified as historic and cannot be removed until the Army prepares a plan to determine if the items are significant, and how they should be handled. Results of the analysis could lead to a range of alternatives from preservation/reconstruction, (in place or in a museum) to photographing for archiving prior to removal.

Vicki Hamilton stated that the historic items at Castner Range would be considered "design landscape" items. She stated that it would be possible to scope an archaeology survey to also investigate and identify items of historic significance. The archaeologists would identify those historic items for the historians to then assess their importance. Ms. Hamilton noted that this should be performed prior to turning over the land.

MEETING MINUTES

November 24, 1997

Date:	November 18, 1997	File: CASTNER: MM#6
Place:	Ft. Bliss	
Attendees:	Jim Bowman, Ft. Bliss (Archaeology) Phil Nixon, Parsons ES	
Subject:	Archaeology at Castner Range	
Prepared By:	Phil Nixon PN	

Jim Bowman stated that there have been few formal archaeological surveys performed at Castner Range since it is inactive. However, there are known sites that are listed in the National Register. These known sites include:

- Rock art sites;
- Cave/rock shelters;
- Grinding areas;
- Burial areas; and,
- Heleograph site.

It is also possible that there are historic mines in the mountain areas as tin was mined in the Franklin Mountains.

Spanish colonial era pottery has also been found.

The site has a high probability of having numerous archaeological sites because of the habitat and known levels of Native American activities in the general area. Funding exists for a sacred site survey with the Tigua and Mescalero Apache tribes who lived in the area. Under the Native American Graves Protection and Patriation Act (NAGPPA), any sacred grounds identified by Native Americans must be protected from public access. In addition, the tribe must be consulted in the event of entry to or work on the area. In addition, all sacred items found or collected from a sacred ground must be returned to the native tribe.

Mr. Bowman indicated that a survey would need to be performed if the land was going to be excised for commercial/residential development. He also thought that the state could take the responsibility for any survey if the land was turned into a park. He mentioned that archaeological survey work could be performed concurrently with UXO clearance investigations.

A field survey would take 4-5 months with an additional 4-5 months of documentation at the conclusion of the fieldwork. This effort would cost approximately $200,000 to complete.

MEETING MINUTES

November 24, 1997

Date:	November 18, 1997	File: CASTNER: MM#7
Place:	Ft. Bliss	
Attendees:	Dr. Terry Bashore, Ft. Bliss Tess Martin-Bashore, Compa Industries Phil Nixon, Parsons ES	
Subject:	Ecology at Castner Range	
Prepared By:	Phil Nixon PN	

Tess Martin-Bashore provided a list of the reptiles and amphibians that are know or expected to live in Castner Range. Very few species surveys have been performed at Castner Range since the range is inactive. The reptile diversity is rich with respect to lizards and snakes, but a few amphibians reside in the arid climate.

MEETING MINUTES

November 24, 1997

Date:	November 19, 1997	File: CASTNER: MM#8
Place:	Ft. Bliss	
Attendees:	Rafael Corral, Ft. Bliss Phil Nixon, Parsons ES	
Subject:	Ecology of Castner Range	
Prepared By:	Phil Nixon PN	

Rafael Corral stated that a formal survey of Castner Range to identify flora and fauna species has not been performed because Castner Range is an inactive site. However, Ft. Bliss and MacGregor Range have been studied since they are active. Many of the same habitats are common to Castner Range and MacGregor Range. The Castner Range is within the Chihauhaun Desert Ecosystem with several sub-biomes including:

- Agave-Lechuguilla Community;
- Alluvial Fan-Creosote Bush Community;
- Mesquite Shrubland Community; and,
- Draw Yucca Grassland Community.

The drainage areas are characterized by Desert Willow (Chilopsis linearis), Apache Plume (Falluqia), and Little Leaf Sumac (Paradoxa). The predominant community in the mountains is the Agave Lechuguilla series including:

Acacia;

Lechuguilla;

Sotol;

Ocotillo; and,

Cat Claw Mimosa.

The Castner Range is diverse in mammalian species including:

muel deer;

mountain lion;

coyote;

fox;

badger;

rabbit; and,

bobcat.

Rafael Corral indicated that a survey should be conducted if the land is turned over. The survey would need to be performed over a one-year period to account for the seasonality of the flora and fauna. The study would require about six months for four experts and one assistant for each expert. The fully burdened cost of the experts would be $6,000 per month and $5,000 per month for the assistant. The cost of this survey would therefore be approximately $264,000.

MEETING MINUTES

November 25, 1997

Date:	November 19, 1997	File: CASTNER: MM#9
Place:	El Paso	
Attendees:	Ronald W. Hillin, Franklin Mountain State Park Rob Smith, Parsons ES	
Subject:	Castner Range OE Characterization Report	
Prepared By:	Rob Smith RS	

Mr. Hillin is employed by the Texas Parks and Wildlife Department. He functions as Park Manager under Carolina Ramos, Chief State Park System. Mr. Hillin stated that the State wants the entire 7,000+ acres. The Army tried to give the land to the State Parks Department several years ago but the State would not accept it without surface removal of OE material. He had a plan in his office that included the Castner Range as part of the Franklin Mountain State Park.

The state currently does not know what the Army is planning for Castner Range. They believe that the Army may give them the mountains and retain the eastern plain for development of city or county facilities such as a Coliseum or Stadium with the remainder sold to the public. They believe that they are the only agency able to provide the stewardship that is required to maintain the integrity of the land, and its archeological and ecological sites.

Although they want the entire range, the focus of our discussion was the eastern plain. They believe that this area may not be deeded to them, but be utilized for development. The Parks Department feels that this area has very individual and unique environmental characteristics that should be preserved and enhanced. Some of these attributes are as follows:

1. Alluvial fan which exists in natural condition with minimal destruction.
2. Only location of the Southwestern Barrel Cactus in the world.
3. Classified as a lower alluvial plain. Few have been protected in or near urban areas.
4. Unique high prairie grassland provides a natural buffer between the urban development of El Paso and the mountains and preserves and demonstrates the natural character of the terrain.
5. A historic tin mining site exists within the state park north of Castner Range. To develop it as a historic feature will require an access road that would cross the eastern plain of Castner Range.
6. Includes historically significant moving target structures.

The State Parks Department is absolutely opposed to any more than surface clearing of the site. Clearing to one (1) foot or to four (4) feet would result in destruction of natural geological formations, removal of vegetation and destruction of wildlife habitat. Franklin Mountain State Park provides a natural wilderness recreational area surrounded by the City of El Paso. It is the only urban wilderness area of its kind in the entire United States and should be preserved.

Mr. Hillin stated that the range has been used by El Paso residents for 30 years for hiking, biking and climbing. As a result there has been some destruction of the area and a great deal of graffiti. There are organized functions held on the range by various groups, many of which are advertised to the public. The current signage and local educational institutional controls have had minimal effect on keeping people out of the range boundaries. It is generally considered an extension of the state park and has been used that way by the public for more than 30 years. The erection of a fence or other attempts to further impede access to the range would be vehemently opposed by the residents of El Paso, who think that it is theirs now.

Mr. Hillin works closely with the Franklin Mountain Wilderness Coalition. This is a coalition of eighteen (18) local groups identified on the attached sheet. This coalition was founded in the 1970's to urge the purchase and preservation of the Franklin Mountain State Park. The land was purchased from 1979-1981. The coalition has continued to be instrumental in further land acquisitions and development of the park for wilderness activities. The coalition meets the 3rd Wednesday of odd months. Their next meeting is January 21 at 7 PM in the Coalition Headquarters, 800 Paisano Ave, El Paso 79905.

Mr. Hillin suggested that Parsons meet with Mr. John Sproul, President, Franklin Mountain Wilderness Coalition. We scheduled a meeting with Mr. Sproul, but he did not show up. Rob Smith said that he would write Mr. Sproul to explain what we are doing and ask him to contact members that could provide information on the flora, fauna, geological and archeological attributes of the range.

Evidently the coalition is very concerned about the lack of care that the Army has provided to the land and the possibility that the eastern plain will be developed. They do not maintain a relationship with the Army and rumors of what may happen to the land are rampant. The membership is aging and not as active politically as they were. The coalition would like for Parsons or the COE, or the Army to attend their January meeting to tell them what we are doing. They are opposed to any cleaning of the site that would include digging.

The Franklin Mountain Wilderness Coalition could be a excellent source of information about Castner Range. The El Paso Archeological Society, Cactus and Rock Club, Herpetology Society, Native Plant Society, Sierra Club, Audubon Society and Wilderness Preservation Committee all have information about the area that correspond to their particular interests. With an introduction by Mr. Sproul, we could have access to these groups.

Rob Smith left a Castner Range Institutional Data Survey Form for Mr. Hillin to complete and return to me.

MEETING MINUTES

November 24, 1997

Date:	November 18, 1997	File: CASTNER: MM#10
Place:	El Paso	
Attendees:	Rosemary A. Staley, AICP Rob Smith, Parsons ES	
Subject	Castner Range OE Characterization Report	
Prepared By:	Rob Smith	

Ms. Staley is responsible for various current and future planning for the City of El Paso. Castner Range is outside the city limits of El Paso, with the city completely surrounding it. She provided me with a copy of the El Paso 2010 Land Use Plan that includes the Castner Range as a part of the Franklin Mountain State Park. All of the current Castner range area is included, including the eastern alluvial plain. She also provided me with 2010 Comprehensive Plan entitled, "The Plan for El Paso", prepared in 1988.

Rob Smith asked Ms. Staley if she felt that there was development demand for the eastern plain. She said that both the city and the county have discussed acquiring the land for public facilities such as a coliseum, arena, stadium, etc. There are no plans for facilities of this type at the present time nor are any being discussed. There is a Civic Center Downtown that includes a Convention and Performing Arts Center that is currently being expanded, a children's museum, and an art museum . There is a major downtown revitalization program underway at this time to enhance access and utilization of these facilities. Since the city has tried to focus the development of city-wide cultural activities to the downtown area, the construction of a cultural facility on the eastern plain of Castner Range would constitute a major change in this policy.

Ms. Staley feels that there is more than adequate land within immediate proximity of the existing urbanized area of El Paso to provide for growth well into the next century. The 2010 plan shows that adequate land will be available long after the year 2010. The relatively small area of land included in the eastern plain on Castner Range would have little impact on the overall development potential of the city. Therefore, the city has designated the eastern plain along with the rest of Castner Range as park land.

Ms. Staley stated that one deterrent to development of the eastern slope is a fault line which lies beneath the slope and is the only active fault in the area. There has been minimal activity, and future activity is questionable. A local geotechnical firm has done some testing and analysis of the fault.

Rob Smith also asked about any city regulations pertaining to development on the mountains. The city passed a Planned Mountain District zone for all development to occur on the mountains. The zone requires planned unit development planning and review of all mountain development including geological studies and other environmental impact analysis. The zone has reduced the pressure for mountain development because it is expensive to adhere to.

Another deterrent to the development of the mountains is the intense wind that occurs in El Paso in the Spring and early summer. The winds on the mountains are extreme.

Ms. Staley said that residents of El Paso have been using Castner Range for recreational activities for over thirty (30) years. There would be a major outcry from the residents if the area was fenced or access otherwise impeded.

Ms. Staley strongly recommended that Parsons meet with a representative of Sate Parks and Wildlife.

Rob Smith left a copy of the Castner Range Institutional Data Survey Form for Ms. Staley to complete and return to Parsons.

MEETING MINUTES

November 24, 1997

Date:	November 18, 1997	File: CASTNER: MM#11
Place:	El Paso	
Attendees:	Dave Hall, Fort Bliss Greg Hedrick, Parsons ES	
Subject	Castner Range OE Characterization Report	
Prepared By:	Greg Hedrick GH	

Greg Hedrick met with Dave Hall and asked if there were any maps available of Castner Range. Mr. Hall responded that he did not have any maps showing Castner Range. He said that all of the information that he had concerning Castner Range had been turned over to Elsa during the Archives Search Report. Mr. Hall called Elsa to see if she had any information but she informed him that everything had been turned over to Kelly Blough with the Base Environmental Department.

Mr. Hall did produce a copy of the Archives Search Report and said Parsons could make copies of any of the information contained in the report. Three color 11" x 17" figures were copied from the document by Mr. Hall and given to Parsons. Two large color plates depicting the various firing ranges located within Castner Range and the time period of use for each range were also included in the document. Mr. Hall did not have the means to reproduce these color plates and said that Parsons could take them, have copies made, and return them to him at a later date.

Greg Hedrick left a copy of the Castner Range Institutional Data Survey Form for Mr. Hall to complete. Mr. Hall said that he would present the survey form to relevant parties in an upcoming meeting.

MEETING MINUTES

November 24, 1997

Date:	November 18, 1997	File: CASTNER: MM#12
Place:	El Paso	
Attendees:	Floyd M. "Twister" Geery, Fort Bliss Museum Greg Hedrick, Parsons ES	
Subject	Castner Range OE Characterization Report	
Prepared By:	Greg Hedrick G H	

Mr. Geery is the Registrar for the Fort Bliss Museum. Greg Hedrick met with Mr. Geery to inquire about information pertaining to Castner Range, particularly photographs of range operations. Mr. Geery said that he could conduct an archives search to determine if any information on Castner Range was available through the museum. Mr. Geery said that his search would include not only photographs, but also archaeological information, and plant and animal species information. Mr. Geery was knowledgeable of the archeological history of the area, but suggested we contact the El Paso Archaeological Society for more detailed information. Greg Hedrick also asked about information concerning the first release of land from Castner Range to the City of El Paso. Mr. Geery did not have any information on hand but said if Parsons could provide him with a map showing the area previously released he would look into it.

Mr. Geery said that Parsons would be able to make copies of any of the information pertaining to Castner Range as long as we supplied the paper. Mr. Geery said that if any photographs were located of Castner Range, he would prefer that they not leave Fort Bliss. Greg Hedrick asked him if he had the capability to scan photographs into a computer file but he said that at this time he did not.

Mr. Geery asked Greg Hedrick to sign the Archives Search Authorization Form. A Castner Range Institutional Data Survey Form was left with Mr. Geery to complete and return to Parsons.

MEETING MINUTES

November 24, 1997

Date:	November 19, 1997	File: CASTNER: MM#13
Place:	El Paso	
Attendees:	Dallas Bash, Fort Bliss Greg Hedrick, Parsons ES	
Subject	Castner Range OE Characterization Report	
Prepared By:	Greg Hedrick GH	

Greg Hedrick met with Mr. Bash to pick up a tape containing base map files that Chris Cirillo with Parsons ES had requested. Greg Hedrick told Mr. Bash that Mr. Cirillo had mentioned that compact discs containing aerial photographs of Castner Range were also available. Mr. Bash showed Greg Hedrick a box of compact discs but said he did not believe that any aerial photographs of Castner Range were included in the data contained on the compact discs.

APPENDIX B

INFORMATION FROM THE TEXAS PARKS AND WILDLIFE DEPARTMENT

FRANKLIN MOUNTAINS WILDERNESS COALITION

January 27, 1998

Mr. Robert P. Smith
Harland Bartholomew & Associates, Inc.
4417 Beach Boulevard, Suite 400
Jacksonville, FL 32207

Re: Castner Range

Dear Mr. Smith:

I'm glad we were finally able to make connections last week and talk about the future disposition of Castner Range. Enclosed are 4 items relating to the range:

- o Outline of Legislation of Franklin Mountains State Park, with Section 2(g) of SB 1273 attached. Section 2(g) is the statutory provision under which any portion of Castner Range conveyed to the State of Texas will automatically become part of Franklin Mountains State Park.

- o Letter dated February 9, 1994 from the Franklin Mountains Wilderness Coalition to U.S. Representative Ronald D. Coleman. This letter summarizes the Coalition's recommended Castner Range addition to the State Park. It emphasizes that the lower-elevation lands are every bit as important as the upper-elevation lands and presents possible avenues for transferring the land to the State of Texas.

- o Letter dated July 1, 1996 from the Franklin Mountains Wilderness Coalition to the El Paso City Council. This letter responded to a proposal floated by the then-mayor of El Paso to build a major sports-concert arena on the lower elevations of Castner Range. The letter emphasizes the disadvantages of such a proposal and the advantages of adding the land to the State Park.

- o One-page informational flyer dated October 1996, entitled "Outstanding Natural Features of Castner Range."

There is a lot of overlap in this material, and you may have seen some of it already. Nevertheless, I hope you find it useful. It provides a good summary of our thinking regarding Castner Range, particularly why we believe it critical to bring the lower-elevation lands into the State Park as well as the higher-elevation lands.

I look forward to meeting you when you next visit El Paso. If you have questions in the meantime, please don't hesitate to call.

Sincerely,

John Sproul

John Sproul
President
601 W. Yandell Dr. #25
El Paso, TX 79902-3867

915/545-5157 home
915/532-9645 office
915/532-4876 fax
ae494@rgfn.epcc.edu

Outline of Legislation of Franklin Mountains State Park

House Bill 867 (1979)
as amended by
Senate Bill 1273 (1981)
Senate Bill 464 (1985)
House Bill 1839 (1987)
Senate Bill 512 (1989)

(see Explanatory Notes 1 and 2)

Section		Page & Line in SB 1273	
1	Establishment of Park and juridiction of Department	1	14
	Acquisition of land (amended by SB 1273)	1	18
	Acquisition of mineral interests (added by SB 1273)	1	20
	Exception from acquisition of land (added by HB 1839) (deleted by SB 512) (see Explanatory Note 3)	(see HB 1839) (see SB 512)	
	Acquisition by leasing (added by SB 1273)	1	22
	Acquisition with money from any fund created to finance acquisition of State parks	2	4
	Funds for operation and maintenance (amended by SB 464) (see Explanatory Note 4)	(see SB 464)	
	Acquisition by condemnation	2	9
2(a)	Legal description of land included in Park (amended by SB 1273) (see Explanatory Notes 5 and 6)	2	27
2(b)	McKelligon Canyon facilities (added by SB 1273)	15	16
2(b)(1)	Road (added by SB 1273)	15	18
2(b)(2)	Dam (added by SB 1273)	18	18

2(f)(2)	Powerline (added by SB 1273)	32	11
2(g)	Portion of Castner Range (added by SB 1273)	32	17
2(h)	Tri-State Broadcasting Co. facilities (added by SB 1273)	33	4
2(h)(1)	Survey 221 (added by SB 1273)	33	7
2(h)(2)	Survey 222 (added by SB 1273)	33	23
2(i)	Missionary Radio Evangelism Inc. facilities (added by SB 1273)	34	18
2(i)(1)	Equipment building (added by SB 1273)	34	21
2(i)(2)	Microwave site (added by SB 1273)	35	21
2(j)	Missionary Radio Evangelism Inc. facilities (added by SB 1273)	36	5
2(j)(1)	Powerline (equipment building to microwave site) (added by SB 1273)	36	5
2(j)(2)	Pedestrian way (equipment building to microwave site) (added by SB 1273)	36	14
2(j)(3)	Access road to lower site of Walton Tram (added by SB 1273)	36	20
2(j)(4)	Pedestrian way (lower site of Walton Tram to equipment building) (added by SB 1273)	37	4
2(j)(5)	Power and communication lines (added by SB 1273)	37	10
2(k)	Walton Enterprises Inc. facilities (added by SB 1273)	37	13
2(k)(1)	Tower and upper tram site (added by SB 1273)	37	16
2(k)(2)	Lower tram site (added by SB 1273)	38	5

Explanatory Notes

1. In the various bills which constitute the legislation of the Park, underlined wording indicates additions and over-struck wording indicates deletions.

2. Sec. 1 of the legislation appears in Vernon's Texas Codes Annotated, Parks and Wildlife Code, Sections 22.221 thru 22.223.

3. HB 1839 (1987) amended Sec. 1 of the Park legislation so as to except from acquisition certain land of the City of El Paso (Public Service Board). SB 512 (1989) deleted such amendment. SB 512 then excluded such land from the Park by adding Sec 2(q). Thus, the exclusion of such land from the Park is now found in Sec. 2(q) rather than in Sec. 1 of the legislation.

4. SB 464 repealed the prohibition of expenditure of funds for operation and maintenance.

5. Sec. 2 of the Park legislation does not appear in Vernon's Texas Codes Annotated, Parks and Wildlife Code.

6. With regard to the legal description of the land included in the Park by Sec. 2(a), the wording "Except as otherwise provided by this section" means that the legal descriptions of the lands excluded from the Park by Secs. 2(b) thru 2(q) prevail over the legal description of the land included in the Park by Sec. 2(a). In other words, Sec. 2(a) is subordinate to Secs. 2(b) thru 2(q). In other words, Secs. 2(b) thru 2(q) in effect amend Sec. 2(a) so that those lands which would otherwise be included by Sec. 2(a) are excluded by Secs. 2(b) thru 2(q). Sec. 2(p) is a contingent exclusion.

7. SB 1273 added Sec. 2(m) so as to exclude 434 acres of A. G. McMath Survey 298 (see Attachment 2) from the Park. SB 512 amended Sec. 2(m) so as to change such reduction from 434 acres to 177 acres (see Attachment 2). SB 512 by inadvertent omission failed to provide an additional reduction of 4 acres (see Attachment 2) which are now in private ownership and are not to be a part of the Park. Such omission will be cured by legislation in 1991.

8. Sec. 2(p) will exclude 253 acres of A. G. McMath Survey 298 (see Attachment 2) from the Park if the Texas Parks and Wildlife Department does not acquire such land by purchase of title before 09-01-99.

9. Sec. 3 of SB 1273 concerns 10 acres at the top of North Franklin Peak but has become obsolete since such land has been acquired by purchase by the Texas Parks and Wildlife Department.

10. Sec. 3 of HB 867 amended Vernon's Texas Codes Annotated, Parks and Wildlife Code, Sec. 21.103(b) so as to provide for acquisition of park lands from the State, or political subdivisions thereof, by condemnation.

Attachments

1. Map of Parts of Secs. 268 and 269 in Franklin Mountains State Park (02-04-88) (1 sheet)

2. Map of 434-Acre Area of A. G. McMath Survey No. 298 (12-14-88) (1 sheet)

3. Map of Secs. 4, 9, 16, 17, and 24 in Franklin Mountains State Park (02-04-88) (2 sheets)

References

1. House Bill 867 (1979) (12 pages)

2. Senate Bill 1273 (1981) (45 pages)

3. Senate Bill 464 (1985) (Pages 1, 20, 21 and 64 only)

4. House Bill 1839 (1987) (Pages 1 thru 4 only)

5. Senate Bill 512 (1989) (11 pages)

6. Vernon's Texas Codes Annotated, Parks and Wildlife Code, Secs. 22.221 thru 22.223.

09-05-89

LeBron Hardie 915-534-6749
John Sproul 915-541-6126

Enrolled June 1, 1981
Patsy Sykes
Enrolling Clerk

S.B. No. 1273

corner.

"THENCE, North 61° 21' 36" West, 200.00 feet to a point for corner.

"THENCE, North 28° 38' 24" East, 817.81 feet to a point for corner.

"THENCE, North 25° 09' 54" West, 175.15 feet to a point of beginning;

"Said portion consisting of 2.2957 acres out of Survey No. 260 and 4.8095 acres out of Survey No. 261, containing 309,502 sq. feet, or 7.1052 acres of land, more or less; and

"(2) POWERLINE. As described in the lease recorded in Book 598, Page 1605, Film Records of El Paso County, Texas.

"If the United States ceases to use the interests granted in the above described land, the park shall consist of those interests not granted to the United States as well as those interests granted to the United States by the lease referred to in this subsection.

"(g) PORTION OF CASTNER RANGE. The Franklin Mountains State Park shall consist of whatever portion of the following described land the United States of America might convey to the State of Texas:

"Sections 25, 26, 31, 32, 33, 34, 35, and 36, Block 81, Township 1, and Sections 3, 4, and 5, Block 81, Township 2, Texas and Pacific Railway Surveys, El Paso County, Texas, excluding that certain land known as Transmountain Road, and also known as Loop 375, and more particularly described in the records of the Texas Department of Highways and Public Transportation.

"This subsection does not require the Parks and Wildlife

Department to acquire that land but merely provides a contingent boundary change to accommodate whatever portion of that land might be conveyed.

"(h) TRI-STATE BROADCASTING COMPANY FACILITIES. The Franklin Mountains State Park shall not consist of the following described land:

"(1) All that certain real property situated in El Paso County, Texas, being a portion of the E. D. Strong Survey 221, and more particularly described as follows:

"BEGINNING at 1" iron pipe recognized as the SW corner of E. D. Strong Survey 221 of May 4-12, 1926, said corner also the SW corner of the herein described tract;

"THENCE North along the West boundary of Survey 221 a distance of 3091.58' to the SW corner of El Paso Quarries (legal description, McMillan Deed 11/17/58, and County Map);

"THENCE East 2290.26' to a point in the common line of Surveys 221 and 222;

"THENCE South 3111.68' to the SE corner of Survey 221 (also SW corner of Survey 222);

"THENCE West 2286.11' to a point of beginning.

"(Excludes Electric Company ROW)

"Tract contains 155.1+ acres; and

"(2) All that certain real property situated in El Paso County, Texas, being a portion of the E. D. Strong Survey 222, and more particularly described as follows:

"Beginning at a point, said point being in the westerly boundary line of Survey 222 and said point being in the easterly

FRANKLIN MOUNTAINS WILDERNESS COALITION

February 9, 1994

Hon. Ronald D. Coleman
U.S. House of Representatives
440 Cannon House Office Building
Washington, DC 20515

Re: Castner Range

Dear Ron:

We understand the FY1994 Defense Appropriations bill includes $1.15 million to begin surface clearance of unexploded ordnance from Castner Range. We are extremely pleased with this development, and we thank you for bringing it about.

Our enthusiasm is tempered with the knowledge that, once the land becomes available for transfer from Army ownership, it becomes vulnerable. We believe lasting protection will be ensured only when the land is conveyed to the Texas Parks and Wildlife Department for Franklin Mountains State Park. We urge you to do all you can to achieve that conveyance as soon as possible.

Recommended Addition to Park

As you know, we have long recommended that most of Castner Range west of the Patriot Freeway be added to the Park (see map, Enclosure 1). The one area we believe could reasonably be excluded is a pie-shaped section in the southeast corner of the Range. Eventually, the City of El Paso plans to connect Magnetic Drive with Diana Drive via a new street through this portion of Castner Range. That street would provide a logical boundary for the Park.

Although we believe the pie-shaped section can be excluded from the Park, we do strongly recommend conveying a small parcel in it to the Texas Parks and Wildlife Department for a Park maintenance yard. A logical location would be next to the existing Texas Department of Transportation maintenance yard at the corner of the Patriot Freeway and Hondo Pass Drive. Location of the Park maintenance yard here would eliminate the need to use a more sensitive site inside the Park.

The Importance of Protecting Castner Range

It is easy for the casual observer to recognize the value of protecting the rugged middle and upper elevations of Castner Range in their natural state. The hidden springs, spectacular scenery, complex geology, productive wildlife habitat and significant archaeological sites all clearly warrant protection.

What is critical to keep in mind is that the lower-elevation lands bordering the Patriot Freeway are equally important to protect. Everywhere else surrounding the Franklins, the lower elevations have either been built on or are excluded from the Park to accommodate future development.

These lower-elevation lands are primarily alluvial fans, broad sloping landforms built of eroded material carried by water from the mountain canyons and deposited at the canyon mouths. The alluvial fans are an integral part of the total mountain environment, and Castner Range is El Paso's only opportunity to protect a meaningful example of them.

Particularly important are the biological and scenic values these lower-elevation lands on Castner Range offer:

Biodiversity. As a large natural area with a variety of unique habitats, Franklins Mountains State Park plays a critical role in maintaining the biological diversity of our region. Addition of Castner Range, particularly the lower elevations, would significantly enhance and round out the Park's biological diversity, adding plant and animal associations otherwise not well represented in the Park. One excellent example is found at the lower elevations on either side of Transmountain Road. Here, unique soils and a far west Texas location combine to support a floral assemblage that is an important Texas resource, as described in Dr. Richard Worthington's April 1983 report on the area (Enclosure 2).

Scenic Integrity. Looking west across the Castner Range from the Patriot Freeway, El Pasoans today enjoy a beautiful unobstructed view of all three mountain zones, from alluvial fan to foothill to upper slope. Nowhere else do we have the opportunity to preserve a view of this breadth and quality for future generations. A wonderful resource today, it will be a priceless treasure tomorrow.

All other areas where comparable views exist today will, in time, be developed. The mountains will grow increasingly remote behind a wall of development. If we show vision, Castner Range can remain the one place where the mountains are not remote, where, for anyone traveling the Patriot Freeway, the connection to the Franklins and their beauty will be immediate, sustained by a stunning unbroken sweep of wild land reaching from alluvial fan to ridgeline.

The Next Steps

In 1979, you spearheaded the most significant conservation achievement in El Paso's history: the creation of Franklin Mountains State Park. Including Castner Range in the Park will be an accomplishment of equal magnitude, of equally lasting value for the citizens of El Paso.

We applaud the steps you have taken thus far: getting funds appropriated to begin the clean-up of unexploded ordnance and stipulating that those funds can be used only for surface clean-up. The ball is now rolling; it is critical to keep it headed in the right direction. We encourage the following actions:

o Make clear to all concerned that the funding is for surface clean-up only and that land so cleared will be available only for park purposes.

Given that some interests see Castner Range, especially the lower elevations, only in terms of potential for future development, we fully expect efforts to circumvent the surface-clearance-only limitation on the clean-up funds. The best way to prevent such circumvention is for your office to take an active part in all preparations for the clean-up work.

We believe it will be crucial for you, as the legislator who secured the funding, to make crystal clear to all involved in planning and carrying out the clean-up both the meaning of the surface-clearance-only limitation and the reason for it: to make the land available for park purposes, not for development.

o Work actively with the Army, the General Services Administration, the Department of the Interior and the Texas Parks and Wildlife Department to prepare for a conveyance of the land to Texas Parks and Wildlife.

Under the Federal Property and Administrative Services Act of 1949 and related laws, there are at least two possible avenues for conveying the Castner Range lands to the Texas Parks and Wildlife Department for Franklin Mountains State Park.

One involves transfers for park and recreational purposes (Enclosure 3). The Administrator of the General Services Administration (GSA) can assign Castner Range to the Secretary of the Interior for disposal if the Interior Secretary recommends it as needed for a public park or recreational area. The Interior Department can then convey the land to Texas Parks and Wildlife for the Park. The Interior Secretary may convey the land at reduced or no cost, in consideration for public benefits to accrue from its use as a park.

The other avenue involves transfers for wildlife-conservation purposes (Enclosure 4). When the GSA provides notice to eligible agencies that the Castner Range land is surplus, Texas Parks and Wildlife can request it for wildlife-conservation purposes. If the Administrator of the GSA finds that it is suitable and available for such use, it may be transferred from the Department of Defense to Texas Parks and Wildlife at no cost.

Under either of these mechanisms, the earlier preparations can begin for conveying the land, the better. As U.S. Representative for our district, you are ideally situated to be the catalyst for bringing such a conveyance about.

- <u>Consider introducing legislation that would direct a conveyance of the land to Texas Parks and Wildlife</u>.

While we hope it would not happen, the mechanisms summarized above carry with them the risk that the federal agencies involved might decide not to convey Castner Range to Texas Parks and Wildlife or to convey only an inadequate portion of the area. A more certain avenue would be statutory direction from Congress to convey the land for Franklin Mountains State Park.

A precedent for such direction can be found in the Act that created the Golden Gate National Recreation Area in California. It included a provision to ensure that the Presidio, the large military installation in San Francisco, would eventually become part of the recreation area. Sec. 3(f) of that Act (86 Stat. 1299) reads:

> "When all or any substantial portion of the remainder of the Presidio is determined by the Department of Defense to be excess to its needs, such lands shall be transferred to the jurisdiction of the Secretary [of the Interior] for purposes of this Act. The Secretary shall grant a permit for continued use and occupancy for that portion of said Fort Point Coast guard Station necessary for activities of the Coast Guard."

A similar provision might be introduced for Castner Range, either as a free-standing bill or as a rider to another piece of legislation. You, of course, are a far better judge than we of the advisability of either course of action. In any event, we believe the legislative approach deserves your consideration; it would be a way to make certain Castner Range becomes part of Franklin Mountains State Park.

We greatly appreciate the long-term commitment you have shown towards protection of the Franklin Mountains. In the year 2094, El Paso will be a much larger city than it is today. All of the land available for development around Franklin Mountains State Park will be developed. Imagine the value Castner Range will have for the citizens of that time if we have the foresight in 1994 to leave all of it natural as part of the Park.

Again, many thanks for your accomplishments thus far. Please continue your good work towards securing lasting protection for Castner Range.

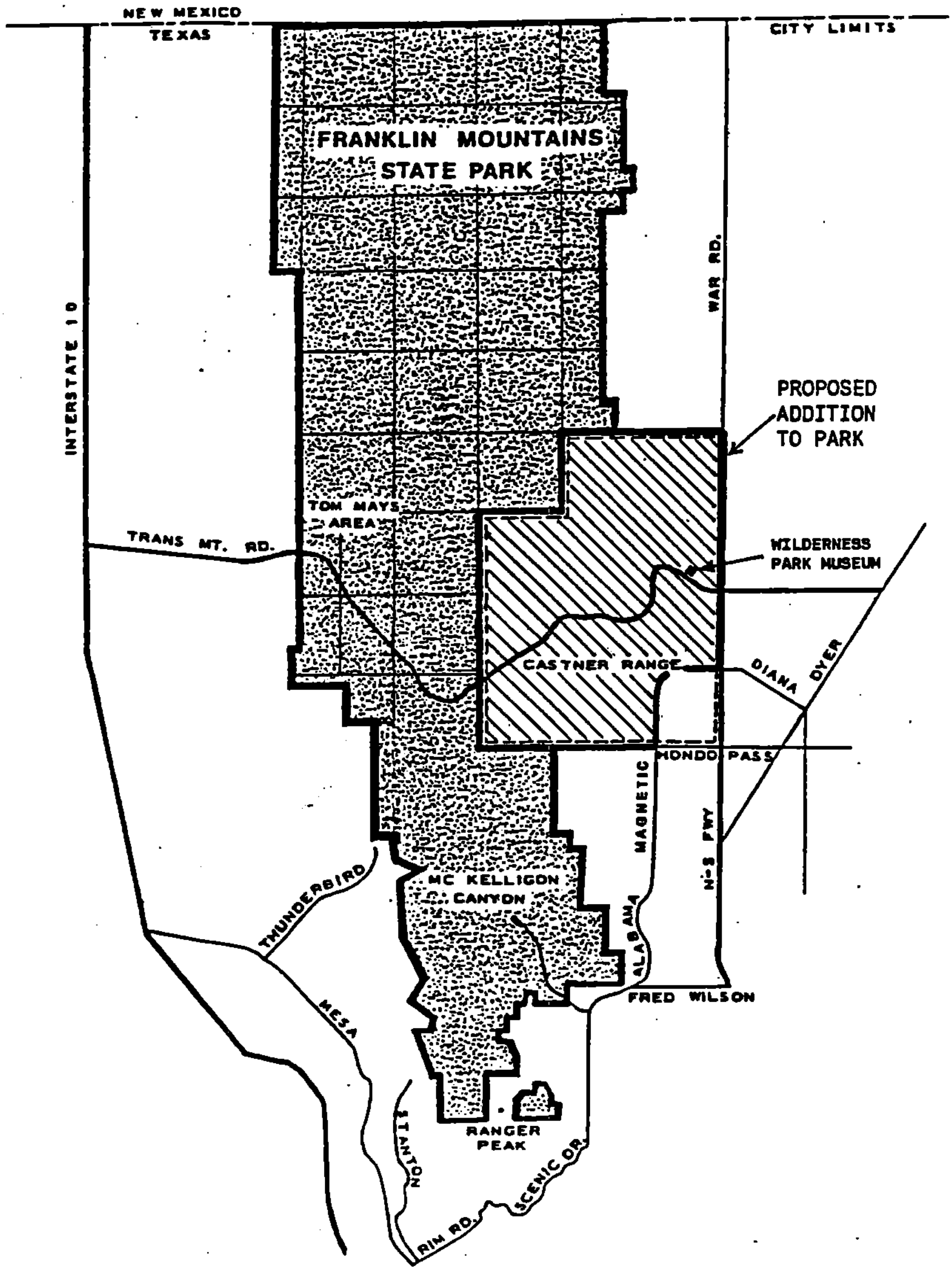
Sincerely,

John

John Sproul
President
601 W. Yandell #25
El Paso, TX 79902
915/545-5157

Enclosures:
1. Map showing recommended Castner Range addition to Park
2. Report on unique floral assemblage (Worthington 1983)
3. Portion of U.S. Code on conveyances for park or recreation purposes
4. Portion of U.S. Code on conveyances for wildlife-conservation purposes

Enclosure 1


NEW MEXICO
TEXAS
CITY LIMITS
FRANKLIN MOUNTAINS
STATE PARK
INTERSTATE 10
WAR RD.
PROPOSED
ADDITION
TO PARK
TOM MAYS
AREA
TRANS MT. RD.
WILDERNESS
PARK MUSEUM
CASTNER RANGE
DIANA
DYER
MONDO PASS
MAGNETIC
N-S FWY
THUNDERBIRD
MC KELLIGON
CANYON
ALABAMA
FRED WILSON
MESA
STANTON
RANGER
PEAK
SCENIC DR.
RIM RD.

A Unique Floral Assemblage on the Lower Slopes of the Castner Range

Portions of Castner Range on each side of Trans-Mountain Road from the North-South Freeway to the rocky slopes of the Franklin Mountains support a unique floral assemblage which is an important Texas resource. Within this narrow corridor a number of plant species occur which are the only known populations within Texas. These species are listed in the accompanying Table 1.

The most outstanding of these is the showy Mexican Goldpoppy (Eschscholzia mexicana Greene), item 4 in Table 1, which in good years, like 1983, carpets these slopes. This wildflower has been a major spring attraction in El Paso for decades. It can be seen nowhere else in Texas. Only occasional plants or small groups can be found elsewhere within the Franklin Mountains. The lower eastern slopes from about the Wilderness Park Museum to the North-South Freeway are its principal refuge where 90% of the Texas plants grow.

These lower slopes are the habitat of the Hairy-leaved Comb Bur (Pectocarya heterocarpa I. M. Johnston), item 6 in Table 1, and the Broad-nutted Comb Bur (Pectocarya platycarpa Munz and I. M. Johnston), item 7 in Table 1, inconspicuous spring wildflowers which occur nowhere else in Texas.

The reason for the uniqueness of the lower eastern slopes of the Castner Range is two-fold. First is the unique soil derived from weathered granite parent rock material. Second is the location of the Franklin Mountains in far western Texas where a number of essentially Sonoran Desert species just make it into Texas. The result is a unique assemblage of plants which must be preserved.

An analysis of the unique floral components is presented in Table 1.

Dr. Richard Worthington
April, 1983

Table 1

The unique floral components of Castner Range adjacent to Trans-Mountain Road. All of the species listed below are known within Texas only from populations in the Franklin Mountains.

Species	Common Name	Listing
(1) Bebbia juncea (Benth.) Greene	Rush Bebbia	UTRPSC
Some plants grow along Trans-Mountain Road just across from the Wilderness Park Museum.		
(2) Calycoseris wrightii Gray	White Cup-fruit	UTRPSC
Good populations occur on Castner Range, and elsewhere in the Franklin Mountains.		
(3) Cryptantha barbigera (Gray) Greene	Bearded Cryptantha	UTRPSC
Good populations occur on Castner Range and elsewhere in the Franklin Mountains.		
(4) Eschscholzia mexicana Greene	Mexican Goldpoppy	none
Almost all of the plants occur on the lower slopes of the Castner Range.		
(5) Hymenothrix wislizenii Gray	none	none
The only population in the State grows on the granite soil around the Wilderness Park Museum.		
(6) Pectocarya heterocarpa I. M. Johnston	Hairy-leaved Comb Bur	none
The only population in Texas occurs on the lower slopes from the Wilderness Park Museum to the North-South Freeway.		
(7) Pectocarya platycarpa Munz and I. M. Johnston	Broad-nutted Comb Bur	none
Same as item 6.		
(8) Porophyllum gracile Benth.	Slender Pore-leaf	UTRPSC
One of 3 known populations occurs on a lower slope across Trans-Mountain Road from the Wilderness Park Museum.		
(9) Rafinesquia neomexicana Gray	New Mexico Plumeseed	UTRPSC
Good populations occur on Castner Range and elsewhere in the Franklin Mountains.		

(10) Stephanomeria exigua Nutt. Annual Mitra none

An outstanding population occurs at about the intersection of Trans-Mountain Road and the North-South Freeway. Known elsewhere in Texas from only occasional plants at Hueco Tanks State Historical Park.

Note: UTRPSC stands for Univ. of Tex. Rare Plant Study Center.

Portion of the United States Code
Applicable to a Conveyance of Castner Range
to Franklin Mountains State Park
for Park or Recreation Purposes

TITLE 40. PUBLIC BUILDINGS, PROPERTY, AND WORKS.

§ 484. Disposal of surplus property.

(k) Disposals by Secretary of Education, Secretary of Health and Human Services, Secretary of the Interior, and Secretary of Defense

(2) Under such regulations as he may prescribe, the Administrator is authorized, in his discretion, to assign to the Secretary of the Interior for disposal, such surplus real property, including buildings, fixtures, and equipment situated thereon, as is recommended by the Secretary of the Interior as needed for use as a public park or recreation area.

(A) Subject to the disapproval of the Administrator within thirty days after notice to him by the Secretary of the Interior of a proposed transfer of property for public park or public recreational use, the Secretary of the Interior, through such officers or employees of the Department of the Interior as he may designate, may sell or lease such real property, including buildings, fixtures, and equipment situated thereon, for public park or public recreational purposes to any State, political subdivision, instrumentalities thereof, or municipality.

(B) In fixing the sale or lease value of property to be disposed of under subparagraph (A) of this paragraph, the Secretary of the Interior shall take into consideration any benefit which has accrued or may accrue to the United States from the use of such property by any such State, political subdivision, instrumentality, or municipality.

Portion of the United States Code Applicable to a Conveyance of Castner Range to Franklin Mountains State Park for Wildlife Conservation Purposes

TITLE 16. CONSERVATION.

§ 667b. **Transfer of certain real property for wildlife conservation purposes; reservation of rights.**

Upon request, real property which is under the jurisdiction or control of a Federal agency and no longer required by such agency, (1) can be utilized for wildlife conservation purposes by the agency of the State exercising administration over the wildlife resources of the State wherein the real property lies or by the Secretary of the Interior; and (2) is valuable for use for any such purpose, and which, in the determination of the Administrator of General Services, is available for such use may, notwithstanding any other provisions of law, be transferred without reimbursement or transfer of funds (with or without improvements as determined by said Administrator) by the Federal agency having jurisdiction or control of the property to

(a) such State agency if the management thereof for the conservation of wildlife relates to other than migratory birds, or

(b) to the Secretary of the Interior if the real property has particular value in carrying out the national migratory bird management program.

Any such transfer to other than the United States shall be subject to the reservation by the United States of all oil, gas, and mineral rights, and to the condition that the property shall continue to be used for wildlife conservation or other of the above-stated purposes and in the event it is no longer used for such purposes or in the event it is needed for national defense purposes title thereto shall revert to the United States.

FRANKLIN MOUNTAINS WILDERNESS COALITION

July 1, 1996

Mayor Larry Francis
Rep. Jan Sumrall
Rep. Chuy Terrazas
Rep. Chalio Acosta
Rep. Stan Roberts
Rep. Dusty Rhodes
Rep. Barbara Perez
Rep. Luis Sariñana
Rep. Raymond Telles

2 Civic Center Plaza
El Paso, TX 79999

Re: Wilderness Coalition's Proposed Castner Range Addition to Franklin Mountains State Park

Location of a Possible Sports-Concert Arena that Would Be Financed by a Bond Issue

Dear Mayor and Representatives:

The City is currently considering possible projects to include in a bond election expected to be held in 1997. One of those projects is a sports-concert arena. In the Tuesday, April 9 edition of the EL PASO TIMES (Attachment 1), Mayor Francis expressed interest in a site just west of the Patriot Freeway and just south of Trans Mountain Road. The site is in Sec. 36 of Castner Range, which is owned by the Army.

The Franklin Mountains Wilderness Coalition is not opposed to having a sports-concert arena, and we are not opposed to locating an arena in northeast El Paso, but the Coalition is strongly opposed to placing such a facility on Sec. 36 of Castner Range. It would be unnecessarily costly. It would be highly damaging to an area that, left undisturbed, is an irreplaceable community resource. And many other equally suitable, if not better, sites are available.

<u>Proposed Castner Range Addition to State Park</u>

The 11 sections of Castner Range west of the Patriot Freeway remain open space today thanks to the stewardship of the Army and the presence of unexploded artillery shells. Since the Franklin Mountains Wilderness Coalition was formed in 1978, we have recommended that most of this land be added to Franklin Mountains State Park (Attachment 2). The Coalition proposal does not include a major portion of Sec. 3 of Castner Range, in the northwest quadrant of the intersection of Hondo Pass Dr. and the freeway.

The seven westernmost sections of Castner Range are rugged middle- and high-elevation lands, not likely to be put to other uses. With regard to the four remaining sections along the Patriot Freeway (Secs. 26, 31, 36 and 3), the Coalition's proposed Castner Range Addition to the State Park is based on the following:

1. Scenic View. The Coalition proposal preserves a beautiful and unobstructed scenic view from the freeway of all three mountain zones (the steep slopes, the foothills, and the alluvial fan).

2. Foothills. The Coalition proposal preserves the beautiful foothills which cover most of Sec. 26 and parts of Secs. 31, 36, and 3.

3. Alluvial Fan. The Coalition proposal preserves a meaningful portion of the alluvial fan that covers most of Secs. 31, 36, and 3. An alluvial fan is a broad, sloping landform of eroded material that has been carried by water from a mountain canyon and deposited at the canyon mouth. In the Franklins, most of the alluvial fans have been built on or excluded from the State Park to accommodate future development. Only on Castner Range is a good example of an alluvial fan still being protected.

4. Poppies and Other Unique Plants. The Coalition proposal preserves the Mexican Goldpoppies and other plants that are found in Texas only on this alluvial fan. Attachment 3 is a paper by Dr. Richard Worthington of UTEP that describes 10 such unique plants, including the well-known Mexican Goldpoppies.

5. Scenic East Entryway. The Coalition proposal preserves the land on both sides of Trans Mountain Road, from where it leaves the freeway to where it climbs up into the steep slopes, as a scenic east entryway into the mountains.

6. Land for State and City. The Coalition proposal provides approximately 500 acres in Sec. 3 for State and City uses. One City use might be the sports-concert arena.

7. Compatibility with City's Land Use Plan. The Coalition proposal is compatible with the City's land-use plan for northeast El Paso, including the proposed joining of Magnetic Street and Diana Drive.

8. Compatibility with State Park Management Plan. The Coalition proposal is compatible with the Texas Parks and Wildlife

Department's Management Plan for Franklin Mountains State Park. In the Management Plan, the TPWD notes the importance of Castner Range as open space and states that it will pursue the option of bringing the land into the Park. The Management Plan includes Castner Range in the proposed trail system for the Park.

9. Freeway as Best Divider. The Coalition proposal takes advantage of the Patriot Freeway being the most definitive and best divider between the developed land to the east and the natural land to the west.

10. Only Surface Clearance of Unexploded Ordnance. The Coalition proposal requires only surface clearance of unexploded ordnance. The Army cannot release any of Castner Range west of the freeway to other uses until the land has been searched and cleared of unexploded artillery shells. For light surface uses, such as hiking, camping and mountain-bike riding, surface clearance is adequate. A pilot surface-clearance project is now underway on Castner Range, and costs to date have been on the order of $1,755 per acre.

    Before the land can be used for construction of a major building, however, sub-surface clearance is needed. Sub-surface clearance includes full excavation to a required depth. For a facility the size of a sports-concert arena, sub-surface clearance would cost several million dollars.

The greatest public value of Castner Range to El Paso, especially to future generations, is as open space. Castner Range offers outstanding recreational opportunities, important biological resources, and unmatched scenic beauty. The Coalition's proposed Castner Range Addition to Franklin Mountains State Park would ensure those values are protected.

Disadvantages of an Arena on Sec. 36 of Castner Range

Clearly, a sports-concert arena on Sec. 36 of Castner Range would be totally incompatible with the Coalition's proposed Castner Range Addition to the State Park. The arena would be situated in a particularly critical site and would adversely affect not only that site but also the natural beauty of much of the surrounding land.

The other major disadvantage of construction on Castner Range is cost. Sub-surface clearance of unexploded ordnance would be highly expensive. Before El Paso citizens approve a bond issue for a sports-concert arena, they will want assurances that the project is cost-effective. A project that requires spending millions of dollars for sub-surface clearance of unexploded ordnance is unlikely to gain favor with the voters, especially when that expense can be avoided by building the facility elsewhere.

Alternative Sites

El Paso has just one opportunity to protect the outstanding natural resources of Castner Range. They can't be moved elsewhere. On the other hand, many excellent alternative sites are available for a sports-concert arena. Here are just a few:

1 U.S. 54 Northeast of Castner Range. From the northeast corner of Castner Range, U.S. 54 (Patriot Freeway) veers northeast, away from the range, crossing predominately open land administered by the City's Public Service Board. There are many suitable sites for an arena along this stretch of highway, including sites at the intersections of U.S. 54 and Kenworthy, Sean Haggerty and McCombs. All offer excellent access.

2. Near Painted Dunes Desert Golf Course. The existing golf course is approximately 1 mile north of U.S. 54 on McCombs. An additional course is also under consideration for this area. A sports-concert arena could complement and enhance those facilities.

3. Land East of the Freeway Near Cohen Stadium. There are advantages to placing a new arena near Cohen Stadium. Those advantages are far greater if the stadium and the arena are on the same side of the freeway rather than opposite sides. Perhaps the most compelling advantage is with parking. The parking needed for a sports-concert arena could be reduced if the arena were near existing parking at Cohen Stadium and El Paso Community College. There are several large parcels of undeveloped land either next to Cohen Stadium or near it along Kenworthy that would be outstanding sites for an arena.

4. Castner Recreation Area. Castner Recreation Area occupies approximately 55 acres east of Cohen Stadium and west of the Skyline Optimists Park. It is an old Ft. Bliss facility that is no longer in use and that Ft. Bliss may be willing to transfer to the City. To obtain suitable access would probably require building a short road east from Kenworthy.

5. Castner Range Sec. 3. The area in Sec. 3 of Castner Range that is not part of the Coalition's proposed addition to the State Park might be an appropriate site (Attachment 2). Its major disadvantage: it also would require highly expensive sub-surface clearance of unexploded ordnance.

We hope you will agree that a site on Sec. 36 of Castner Range would not be appropriate for a sports-concert arena. If the City decides to pursue such an arena through a bond election, we urge you to include in the bond proposal a clear commitment to build the facility elsewhere.

We also hope you will agree that Castner Range will pay far greater dividends to El Paso in the long term if it remains open space. We urge you to pledge the City's full support to efforts to bring Castner Range into Franklin Mountains State Park.

In thinking about land use on Castner Range, we encourage you to put yourselves in the shoes of El Pasoans 100 years from now. By then, all other low-elevation areas where open space remains today around the Franklin Mountains will be developed.

The mountains will be almost completely isolated behind a wall of development. If we show vision, Castner Range can remain the one place where the mountains are not remote, where, for anyone traveling the Patriot Freeway, the connection to the Franklins and their beauty will be immediate, sustained by a stunning unbroken sweep of wild land reaching from alluvial fan to ridgeline.

Sincerely,

John N. Green

John Green
Vice President

5201 Garry Owen
El Paso, TX 79903
915-778-1995

Attachments

c: Hon. Ronald D. Coleman, U.S. House of Representatives
Maj. Gen. John Costello, Commanding General, Ft. Bliss
Nat Campos, Director, Planning Department, City of El Paso

El Paso Times
Tuesday, April 9, 1996

NORTHEAST: TRANS MOUNTAIN

City considers sports-entertainment arena

y Gordon Dickson
l Paso Times

The city is exploring the possi-ility of building a sports-concert ·ena across Patriot Freeway om Cohen Stadium.

The idea of a new Coliseum-·le arena thrills many El Paso-is, who see the area as a boom-g entertainment area. But city ficials say they're not sure resi-nts would be willing to pay gher property taxes to build e arena.

It could be on a possible 1997 nd election. Cities use munici-l bonds like a giant credit rd, often raising tens of mil-

■ **Commissioners:** Privatizing golf course, Coliseum debated / 1B

lions of dollars that can be repaid by taxpayers a little at a time.

"We need an arena. We need it in a location that has good access and enough space for parking," Mayor Larry Francis said.

An exact price tag for an arena similar in size to the old County Coliseum probably would exceed $20 million — but it would likely generate a million dollars a year at the gate, experts said.

Robert Natera manages a Trans Mountain Whataburger that has been packed with customers since it opened in November. He encouraged the city to pursue building an arena. "We've got lots of parking (in Northeast), a good view," he said. "It would most definitely be a good addition."

Francis said Monday the idea is worth discussing.

"When the time comes to select finalists, that one ought to be considered," he said.

The earliest practical time for a bond election would be spring 1997, city officials said.

An arena could be home to a variety of events — music, sports, children's entertainment, ice skating shows and others.

Later Monday — after county commissioners took their first step to let the private sector take over the County Coliseum — one commissioner said it might be best for the city to get involved.

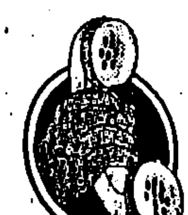
The county spends $719,000 a year at the Coliseum but takes in only about $400,000, Commissioner Dan Haggerty said.

"If the city is really serious about building a city complex, another convention center, then let's do it," Haggerty said. "Let's give them the (county's) $719,000 we would receive from the hotel-motel tax, and let's build an awesome project together."

The hotel-motel tax is like a

Please see Arena / 2A

CALL US



The city is considering building an arena in Northeast El Paso with bond money.

Please call the El Paso Times at 546-6488 between 8 a.m. and noon, and tell us if you would support the arena in a bond election.

Arena

Continued from 1A

sales tax, but it's assessed only to hotel visitors.

Other commissioners couldn't be reached for comment.

Residents who support the concept of building a new arena — possibly with 10,000 to 15,000 seats — said the Coliseum in South-Central El Paso needs to be replaced.

Even those who live and work in the South-Central area said they're not sure how much the area benefits from the Coliseum. They said many Coliseumgoers don't hang around after a show because of spotty lighting, a lack of parking and fear of crime.

"It depends on what's going on," said Martha Berry, who serves menudo at Good Luck Cafe on nearby Alameda. "When there's Mexican singers (at the Coliseum), then we get a lot (of customers). But not always."

In contrast, those supporters say a city-run arena would be a perfect addition to an area of the Northeast that already boasts:

- Cohen Stadium, open since 1990. The home of the El Paso Diablos baseball club was built with $6 million in bond money.
- New restaurants, convenience stores and a Wal-Mart.
- The Border Patrol Museum.
- Wilderness Park Museum.

The arena would be on Fort Bliss land. The city would have to buy or trade for the land.

"I don't think any kind of proposal is out of the question," Fort Bliss spokeswoman Jean Offutt said. "But ... we need to get the Loop 375 issue settled."

She was referring to Fort Bliss' agreement to swap military land (on which Loop 375 was built) for range land owned by the state east of El Paso — but the state is holding up the deal.

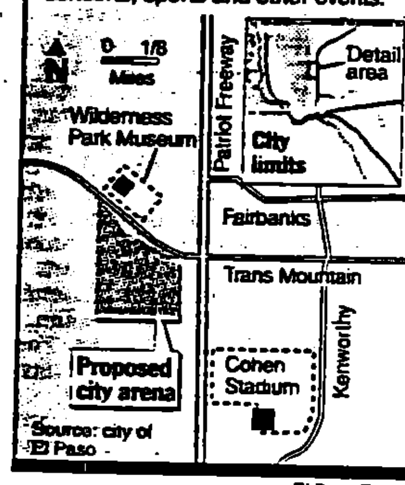
Diablos general manager Rick Parr said he was surprised to hear the Trans Mountain area was named as a possible arena site. He said the Diablos wanted that site for a ballpark in 1988, but the city and Fort Bliss said no.

But, Parr said, "It may be different players are involved. Certain things are time sensitive.

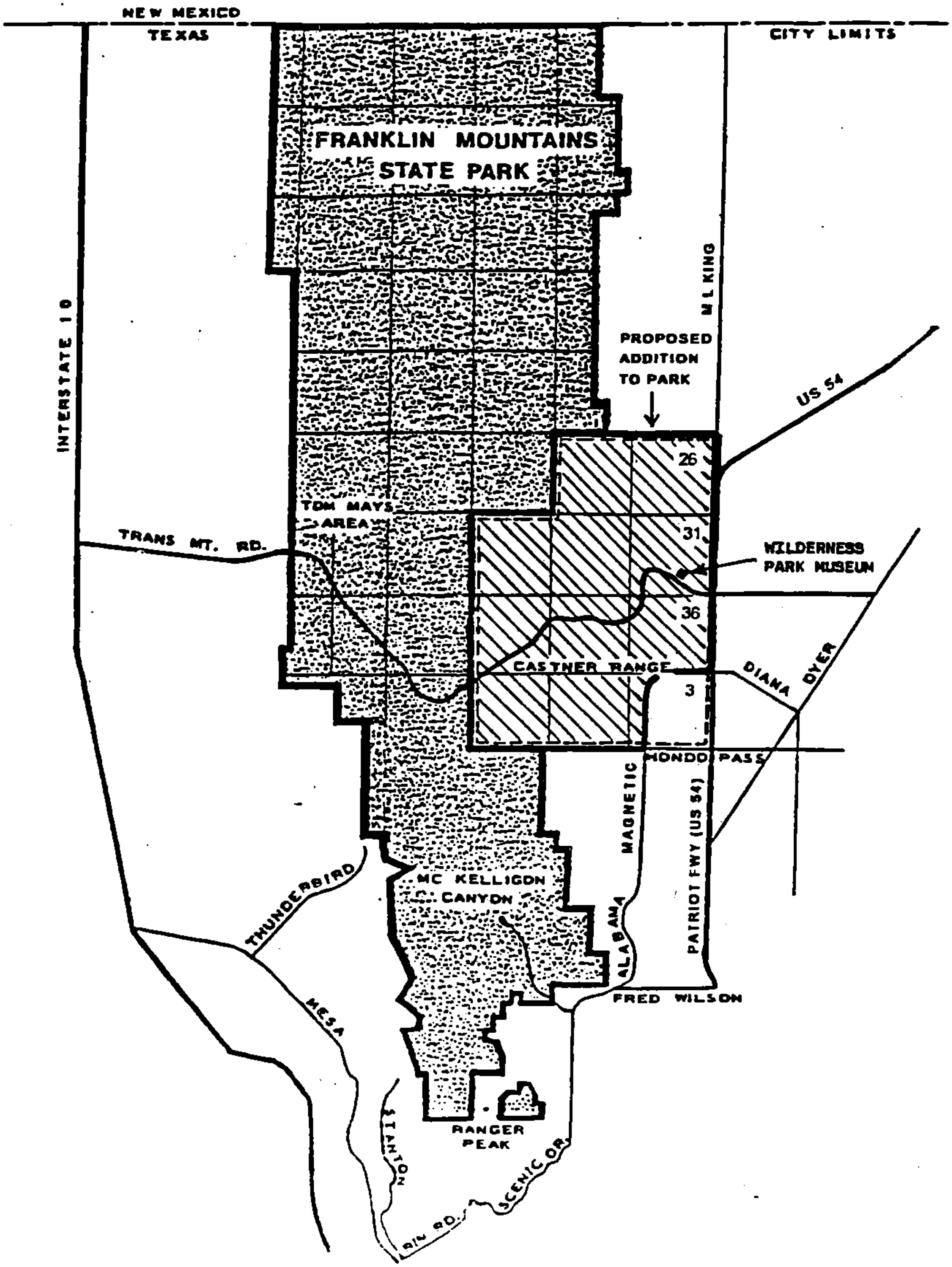
"We most certainly do need an arena. The Northeast people are winning big. It would bring more people, more awareness. You would book it solid, and it would make good money."

Arena proposal

The city is looking to the area of Patriot Freeway and Trans Mountain as a possible new arena site for concerts, sports and other events.



El Paso Times


NEW MEXICO
TEXAS
CITY LIMITS
FRANKLIN MOUNTAINS
STATE PARK
M L KING
INTERSTATE 10
PROPOSED
ADDITION
TO PARK
US 54
26
TOM MAYS
AREA
TRANS MT. RD.
31
WILDERNESS
PARK MUSEUM
36
CASTNER RANGE
DIANA
DYER
3
HONDO PASS
MAGNETIC
PATRIOT FWY (US 54)
THUNDERBIRD
MC KELLIGON
CANYON
ALABAMA
FRED WILSON
MESA
RANGER
PEAK
STANTON
SCENIC DR.

A Unique Floral Assemblage on the Lower Slopes of the Castner Range

Portions of Castner Range on each side of Trans-Mountain Road from the North-South Freeway to the rocky slopes of the Franklin Mountains support a unique floral assemblage which is an important Texas resource. Within this narrow corridor a number of plant species occur which are the only known populations within Texas. These species are listed in the accompanying Table 1.

The most outstanding of these is the showy Mexican Goldpoppy (*Eschscholzia mexicana* Greene), item 4 in Table 1, which in good years, like 1983, carpets these slopes. This wildflower has been a major spring attraction in El Paso for decades. It can be seen nowhere else in Texas. Only occasional plants or small groups can be found elsewhere within the Franklin Mountains. The lower eastern slopes from about the Wilderness Park Museum to the North-South Freeway are its principal refuge where 90% of the Texas plants grow.

These lower slopes are the habitat of the Hairy-leaved Comb Bur (*Pectocarya heterocarpa* I. M. Johnston), item 6 in Table 1, and the Broad-nutted Comb Bur (*Pectocarya platycarpa* Munz and I. M. Johnston), item 7 in Table 1, inconspicuous spring wildflowers which occur nowhere else in Texas.

The reason for the uniqueness of the lower eastern slopes of the Castner Range is two-fold. First is the unique soil derived from weathered granite parent rock material. Second is the location of the Franklin Mountains in far western Texas where a number of essentially Sonoran Desert species just make it into Texas. The result is a unique assemblage of plants which must be preserved.

An analysis of the unique floral components is presented in Table 1.

Dr. Richard Worthington
April, 1983

Table 1

The unique floral components of Castner Range adjacent to Trans-Mountain Road. All of the species listed below are known within Texas only from populations in the Franklin Mountains.

Species	Common Name	Listing
(1) <u>Bebbia</u> <u>juncea</u> (Benth.) Greene	Rush Bebbia	UTRPSC
Some plants grow along Trans-Mountain Road just across from the Wilderness Park Museum.		
(2) <u>Calycoseris</u> <u>wrightii</u> Gray	White Cup-fruit	UTRPSC
Good populations occur on Castner Range, and elsewhere in the Franklin Mountains.		
(3) <u>Cryptantha</u> <u>barbigera</u> (Gray) Greene	Bearded Cryptantha	UTRPSC
Good populations occur on Castner Range and elsewhere in the Franklin Mountains.		
(4) <u>Eschscholzia</u> <u>mexicana</u> Greene	Mexican Goldpoppy	none
Almost all of the plants occur on the lower slopes of the Castner Range.		
(5) <u>Hymenothrix</u> <u>wislizenii</u> Gray	none	none
The only population in the State grows on the granite soil around the Wilderness Park Museum.		
(6) <u>Pectocarya</u> <u>heterocarpa</u> I. M. Johnston	Hairy-leaved Comb Bur	none
The only population in Texas occurs on the lower slopes from the Wilderness Park Museum to the North-South Freeway.		
(7) <u>Pectocarya</u> <u>platycarpa</u> Munz and I. M. Johnston	Broad-nutted Comb Bur	none
Same as item 6.		
(8) <u>Porophyllum</u> <u>gracile</u> Benth.	Slender Pore-leaf	UTRPSC
One of 3 known populations occurs on a lower slope across Trans-Mountain Road from the Wilderness Park Museum.		
(9) <u>Rafinesquia</u> <u>neomexicana</u> Gray	New Mexico Plumeseed	UTRPSC
Good populations occur on Castner Range and elsewhere in the Franklin Mountains.		

(10) Stephanomeria exigua Nutt. Annual Mitra none

An outstanding population occurs at about the intersection of Trans-Mountain Road and the North-South Freeway. Known elsewhere in Texas from only occasional plants at Hueco Tanks State Historical Park.

Note: UTRPSC stands for Univ. of Tex. Rare Plant Study Center.

TEXAS
PARKS AND WILDLIFE DEPARTMENT

4200 SMITH SCHOOL ROAD • AUSTIN, TEXAS 78744 • 512-389-4800

February 24, 1998

Robert P. Smith, Vice President
Parsons Harland Bartholomew & Assoc. Inc.
4417 Beach Blvd., Suite 400
Jacksonville, Florida 32207

Dear Mr. Smith,

Concerning the Castner Range OE Characterization Report, enclosed is a copy of your survey with appropriate information provided, as requested through George Krezinski, Project Manager. There should be additional surveys forthcoming from other staff sources. Also, a copy of the Franklin Mountains State Park Management Plan is included, please note reference marks for various statements concerning the Castner Range, as they relate to its inclusion as part of the State Park.

Especially note information in the following sections:

- Management Plan Summary - page 3
- Boundary / Acquisition Issues - pages 32 & 33 (Map on page 36)
- Recreation Program - page 37
- Legislation - pages 89 & 91
- Coordination with other Agencies and Organizations - page 93 & 94

The resource issues for the Castner Range are similar to those throughout the Franklin Mountains as an outstanding example of the Chihuahuan Desert ecosystem. The Caster Range is of primary importance to our Department for it preserves an impressive natural corridor from the crest of the Franklin Mountains to its foothills, along the arroyas to the desert flatlands in the east. Those foothills and last existing alluvial plain are an important part of the Franklin Mountains and Chihuahuan Desert interpretation of its history and especially its geology. During the wet spring season the Mexican Poppy dominates this scenic area known as the Castner Range, along with other predominate plants such as the Southwestern Barrel Cactus. The Sneed Pincushion Cactus (Listed as Endangered, both Federal and State), which is found in the Castner Range has only been located in one other area of the park. The best archeological evidence in the Franklin Mountains of Native Americans and early human occupation exists on the Castner Range and it is likely to contain a number of prehistoric sites.

If the Department can be of any further assistance, contact George Krezinski at 512/389-4744 or fax at 4400.

Sincerely,

Robert L. Singleton, Jr., AIA
Project Planner

TEXAS
PARKS AND WILDLIFE DEPARTMENT
4200 Smith School Road • Austin, Texas 78744 • 512-389-4800

ANDREW SANSOM
Executive Director

March 2, 1998

Mr. Robert P. Smith
Vice President
Parsons Harland and Bartholomew & Associates, Inc.
4417 Beach Blvd., Suite 400
Jacksonville, Florida 32207

Dear Mr. Smith:

A review of the archeological literature pertaining to the Castner Range and Franklin Mountains State Park suggests that the majority of the significant cultural resources in the Franklin Mountains, especially prehistoric campsites and food processing stations, are situated in the eastern foothills of the range. There may be a number of explanations for this but certainly one of the most important is the presence of significant surface water including Indian Springs, Apache Springs, Whispering Springs, and Mundy's Springs. All but Mundy's Springs are located on the Castner Range and these springs represent most of the permanent surface water in the Franklin Mountains.

Previous archeological surveys conducted in the Franklins by myself and others since about 1970 confirm that the eastern foothills are indeed the location of most of the significant archeological deposits and that the largest, most important sites tend to concentrate around the major springs and seeps and along drainages leading downslope from the water sources. Therefore, from a cultural resource conservation standpoint it is extremely important that the foothills and mid-elevation slopes in the Castner Range be preserved in their present semi-wilderness state. The prehistoric campsites, food-processing stations (many with deep bedrock mortars), and quarries where stone raw materials were obtained, together form an intricate part of the cultural history of the El Paso area and the Hueco Bolson.

Southwestern archeologists are only now beginning to explore the relationships between foothill sites and puebloan villages found to the east in the Hueco Bolson and to the north in the Tularosa Basin. These pueblos were linked to the development of a settled village lifestyle dependent on agriculture. After about 1150 A.D. people began to congregate into larger villages along the margins of the bolson at slightly higher elevations than before and by about 1300 A.D. population densities and the mechanics of dry land farming had changed in ways not yet fully understood; however, many think these changes were related to massive changes in settlement patterns throughout the American Southwest at that time. It is essential, then, that various parts of the puzzle be preserved as part of our prehistoric past. A past which is essential to our understanding of the present and the future.

Private development of a 600-800 foot wide strip along the west side of US54 would destroy a significant part of El Paso's cultural history because these lower foothills are precisely where many of these remains are located. Additionally, such private development would create a severe visual intrusion into an otherwise pleasing semi-wilderness vista and would create a maze of unrestricted, and unobserved, public access into the remainder of the Castner Range and possibly Franklin Mountains State Park. It would be difficult to patrol the foothill zone west of the development strip and the cultural and natural resources of the area would quickly disappear. In the not too distant future, the citizens of El Paso and of Texas will thank those with enough foresight to preserve this unique urban wilderness for future generations.

Thank you for this opportunity to comment on the future of the Castner Range.

Sincerely,

J. David Ing

J. David Ing
Regional Cultural Resource Coordinator/Archeologist
P.O. Box 948
Fort Davis, Texas 79734

APPENDIX C

SURVEY FORMS

Name of Project:
Castner Range Institutional Analysis

Date: ____________
Time: ____________
Place: ____________

Part 1

1. Name of Respondent: ____________

Title: ____________

Elected: ___ Yes ___ No
Appointed: ___ Yes ___ No
Hired: ___ Yes ___ No

2. Length of time in present position: ____________

Length of time with organization: ____________

3. Name and address of organization: ____________

4. Name and address of headquarters office, if different from above:

____

5. Type of organization (check one)

___ Private Business
___ Federal Government
___ State Government
___ Local Government
___ Special District
___ Civic or Service Org.
___ Professional Society

Special Interest Group
___ Environmental
___ Recreation
___ Other

6. How many persons are employed full-time in your organization? ____________

7. How many part-time employees are on your payroll (include seasonal)? ____________

8. Approximately how many employees could be classified by the following description?

___ Managerial
___ Surveying
___ Biologist
___ Engineering
___ Accounting
___ Resource Planner
___ Attorney
___ Other

____
(specify)

9. Are any of the above skills retained by your organization in a consulting capacity?

____

10. What is the jurisdictional level of the organization?

___ National
___ State
___ Parish/County
___ Subparish/Subcounty
___ Municipal
___ Submunicipal

Name of Project: Castner Range Institutional Analysis	Date: ___ Time: ___ Place: ___

11. What geographic area(s) is(are) served by the organization? ___

12. Does your organization have a concern or responsibility for public safety and related land management?

___ Yes ___ No

(If answer is no, terminate interview)

13. Which of the following categories of work best described your organization's activities (more than one may be checked)?

___ Regulation
___ Finance
___ Operation of existing facilities
___ Maintenance of existing facilities
___ Planning new facilities
___ Engineering and/or construction
___ Enforcement
___ Basic research
___ Legislative involvement
___ Public education
___ Resource use

14. If you were to list subjects that are important to the work of your organization, which of the following would rank high?

___ Public safety
___ Recreational use of water/land resources
___ Conservation of wildlife
___ Management of resources related to water
___ Control of land use
___ Environmental preservation
___ Other

15. In terms of public safety/resource management, how important is your following clientele groups? [Rank the following: 5 (most important) to 1 (least important)

___ General Public
___ Agriculturalists
___ Small business
___ Large business
___ Recreationalists
___ Environmentalists
___ Other (specify)

16. What organizations do you regularly come in contact with during the course of work?

___

17. Rank the above to "most" - 'least' contact (5 =most, 1 =least).

5 ___
4 ___
3 ___
2 ___
1 ___

18. What specific regulations and/or rules dealing with public safety /management does your organization use?

___ Federal laws/regulations
___ Other sources
___ Agency rules/policies
___ State laws/regulations

Name of Project:
Castner Range Institutional Analysis

Date: ______________
Time: ______________
Place: ______________

19. Does your organization have jurisdiction over other organizations?

___ Yes ___ No

20. If yes, please list these organizations.

a. ______________________________

b. ______________________________

c. ______________________________

21. Please indicate if the following documents exist and if they could be made available to the Corps of Engineers. [Refer to "Interview Notes", Appendix A.

22. Who should be contacted to obtain available copies?

____

Organizations Functions and Aims

The purpose of this inquiry is to learn about the operations of the organization and its work. In order to develop a uniform analysis, the following terms will be used to describe the organization: purpose, goals, objectives, programs, and activities. The example shows how these terms might apply to an imaginary organization. These terms may or may not apply fully to your situation. this will be determined as we go along.

1 What is the overall purpose of this organization?

____

(Refer to "Interview Notes", Appendix A)

Financial and Legal Authorities

Legal Basis

1. What is the basis for the creation of your organization?

___ Federal Law
___ State Law
___ Local Law
___ Other (specify)
___ Public Charter
___ Special Act
___ Private Charter

2. What powers and/or authorities does your organization exercise?

___ Make Laws
___ Make Rules
___ Make Policy
___ Taxing Power
___ Purchase Property
___ Condemn Land
___ Make Contracts
___ Sell Bonds
___ Receive Gifts
___ Land Use Control
___ Other (specify)
___ Enforce laws