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FINAL PRELIMINARY ASSESSMENT REPORT OUTLYING LANDING FIELD BRONSON NAS
PENSACOLA FL
08/01/2009
MALCOLM PIRNIE

**FINAL
PRELIMINARY ASSESSMENT
OUTLYING LANDING FIELD BRONSON –
NAVAL AIR STATION PENSACOLA, FLORIDA**

August 2009

Prepared for:

NAVAL FACILITIES ENGINEERING COMMAND, SOUTHEAST
Building 903, Naval Air Station, Jacksonville
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Prepared by:

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31 August 2009

Mr. John D. Schoolfield
Remedial Project Manager
SOUTHNAVFACENGCOM
NAS Jacksonville Building 903
Jacksonville, FL 32212

Re: Final Preliminary Assessment for OLF Bronson
Naval Air Station Pensacola, Pensacola, Florida
Navy Preliminary Assessments on MRP Sites
Contract N62472-02-D-1300

Dear Mr. Schoolfield:

Malcolm Pirnie, Inc. is pleased to provide to the Naval Facilities Engineering Command, Southeast this **Final Preliminary Assessment (PA) Report for Outlying Landing Field Bronson at the Naval Air Station (NAS) Pensacola**. This final PA report includes our findings for one munitions response site located at OLF Bronson. Responses to comments received on the Draft Final Preliminary Assessment Report have been incorporated into the final report and a Response to Comments table is included in the front pocket of the report binder for reference.

An electronic copy of the report [a set of two compact discs (CDs)] has also been included in the front pocket of each report binder. The first CD contains the report text, figures, tables, maps, and reference documents. The second CD contains an interactive map file, GIS data, and ArcReader installation and use instructions. Please note that I have also sent copies of the report, under separate cover, to Ms. Tracie Belanos, Florida Department of Environmental Protection, and Mr. Greg Fraley, United States Environmental Protection Agency. Please feel free to call me at 813-242-7208 or e-mail me at dnavon@pirnie.com with any questions you may have regarding this document.

Very truly yours,

MALCOLM PIRNIE, INC.

Daria Navon
Project Manager

cc: G. Campbell, NAS Pensacola
Enclosures
0474-155





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31 August 2009

Mr. Greg Fraley
United States Environmental Protection Agency
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Ms. Tracie Bolanos
Florida Department of Environmental Protection
Technical Review Section
MS 4535
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Re: Final Preliminary Assessment for OLF Bronson
Naval Air Station Pensacola, Pensacola, Florida
Navy Preliminary Assessments on MRP Sites
Contract N62472-02-D-1300

Dear Mr. Fraley and Ms. Bolanos:

On behalf of the U.S. Navy, and at the request of Mr. John Schoolfield (Naval Facilities Engineering Command, Southeast), Malcolm Pirnie, Inc. is pleased to provide this **Final Preliminary Assessment (PA) Report for Outlying Landing Field Bronson at the Naval Air Station (NAS) Pensacola**. This final PA report includes our findings for one munitions response sites located at OLF Bronson. Responses to comments received on the Draft Final Preliminary Assessment Report have been incorporated into the final report and a Response to Comments table is included in the front pocket of the report binder for reference.

An electronic copy of the report [a set of two compact discs (CDs)] has also been included in the front pocket of each report binder. The first CD contains the report text, figures, tables, maps, and reference documents. The second CD contains an interactive map file, GIS data, and ArcReader installation and use instructions. We greatly appreciated your time, assistance, and input on this project. Please feel free to contact John or me [813-242-7208 or e-mail me at dnavon@pirnie.com] with any questions you may have regarding this document.





Mr. Greg Fraley, USEPA
Ms. Tracie Bolanos, FDEP
31 August 2009
Page 2 of 2

Very truly yours,
MALCOLM PIRNIE, INC.

A handwritten signature in black ink, appearing to read "Daria Navon".

Daria Navon
Project Manager

cc: J. Schoolfield, NAVFAC SE
G. Campbell, NAS Pensacola

Enclosures
0474-155

**Final Preliminary Assessment Report for Naval Air Station Pensacola
Response to Stakeholder Comments
Florida Department of Environmental Protection**

Comment No.	Comment	Response
<i>Florida Department of Environmental Protection Comments</i>		
1	<p>General Comment: The Department thinks it is premature to concur with the recommendation for No Further Action (NFA) for the Chevalier Field Machine Gun Range and the Chevalier Field Pistol Range sites at this time. Naval Air Station Pensacola (NAS Pensacola) assumed these sites would qualify for NFA because both of these sites are now located under a building and a parking lot. The Department recommends that NAS Pensacola conduct an assessment to determine if contamination is present or absent at these sites. Depending on the results of the assessment appropriate restoration alternatives should be proposed. It is possible that assessment results may provide a basis for an NFA proposal or an NFA with controls.</p>	<p>The Navy agrees to perform additional evaluations of these sites to determine if adequate information can be assembled to develop a consensus for a NFA determination.</p>
2	<p>General Comment: The Department thinks it is premature to concur with the recommendation for NFA for the National Cemetery Gunnery Area North site. NAS Pensacola has stated that data collected during the remedial investigation for Operable Unit 1 demonstrates that this site does not have contamination in the groundwater or soil that would show that this site has any contamination normally found at a MC or MEC site. The Department would like to be provided the technical data that supports this conclusion prior to considering any remedial options for this site.</p>	<p>The area where the former impact berms were located for the National Cemetery Gunnery Area North ranges is located within Site 24 of Operable Unit (OU) 13 (see Map 5.7-2). A Record of Decision (ROD) was issued for OU 13 on 10 August, 2006 . The ROD states that no action is necessary for OU 13 soil, and land use controls were implemented to restrict groundwater use of the surficial zone of the sand-and-gravel aquifer until cleanup levels are met. Please see Attachment 1 to these responses for a summary of technical data that support the no further action recommendation.</p>

**Final Preliminary Assessment Report for Naval Air Station Pensacola
Response to Stakeholder Comments
Florida Department of Environmental Protection**

Comment No.	Comment	Response
3	General Comment: The possibility of contaminated soil leaching into the groundwater needs to be discussed. Leachability and groundwater contamination need to be taken into consideration with the geology found at these sites. Please refer to Chapter 62-780.680(2) Florida Administrative Code (F.A.C.), for guidance on this matter.	Leachability and groundwater contamination is addressed in the Conceptual Site Model (CSM) developed for each site in the report. Specifically, groundwater contamination and leachability are discussed in the CSMs under Section 5.x.7 Contaminant Migration Route and Section 5.x.11 Conceptual Site Model (x represents the second level heading number).
4	General Comment: There is no one site inspection process that fits all Munitions Response Sites (MRPs). Uniform Federal Policy Sampling and Analysis Plans (UFP SAPS) for each site should be done on a case by case basis. The more that is known about the site the less sampling that is needed during this stage. More extensive composite sampling and discrete sampling (at the same time) may be appropriate at some sites (when less is known about the site); fewer biased soil samples can be collected in a grid pattern or from a firing arch pattern if enough information (historical and otherwise) is known about these sites; for example, location of the site perimeter.	The Navy plans to conduct SIs at the sites as the next step under the MRP. Based on the information presented in the PA Report, enough data was collected to indicate that the sites will require further investigation. While the PA report provides historical and current information regarding the sites, it was not the Navy's intent to convey site specific recommendations regarding the next course of action in this report. As such, the Department's comments regarding these sites will be taken into consideration during scoping of the SI.
5	General Comment: The contaminants of concern (COCs) to be analyzed in the surface, subsurface soil and groundwater will be determined on a case by case basis for the munitions constituents (MC) and munitions and explosives of concern (MEC) sites. If adequate historical documentation is able to be provided the Department is willing to take this information into consideration when determining	The Navy plans to conduct SIs at the sites as the next step under the MRP. Based on the information presented in the PA Report, enough data was collected to indicate that the sites will require further investigation. While the PA report provides historical and

**Final Preliminary Assessment Report for Naval Air Station Pensacola
Response to Stakeholder Comments
Florida Department of Environmental Protection**

Comment No.	Comment	Response
	<p>the COCs to be sampled. Historical information is limited for the site the Department would like to recommend sampling for the following COCs , but not limited to, for MC and MEC sites:</p> <ul style="list-style-type: none"> • Lead • Arsenic • Zinc • Antimony • Copper, and • Tin • Polynuclear Aromatic Hydrocarbons (PAHs) • Explosives 	<p>current information regarding the sites, it was not the Navy's intent to convey site specific recommendations regarding the next course of action in this report. As such, the Department's comments regarding these sites will be taken into consideration during scoping of the SI.</p>
6	<p>General Comment: Please refer to attached tables which will explain the COCs to be sampled at these sites: Table 2 which explains the different sites and what the Department thinks is the appropriate COCs to sample for these sites. Table 2A, entitled, "Target Analyte List for Explosives by LCIMS" which lists the explosives that should be included as a COC and the appropriate method for laboratory analysis. Table 28, entitled, "Target Analyte List for Inorganics by ICPIMS" which lists the metals that should be included as a COC and the appropriate method for laboratory analysis.</p>	<p>The Navy plans to conduct SIs at the sites as the next step under the MRP. Based on the information presented in the PA Report, enough data was collected to indicate that the sites will require further investigation. While the PA report provides historical and current information regarding the sites, it was not the Navy's intent to convey site specific recommendations regarding the next course of action in this report. As such, the Department's comments regarding these sites will be taken into consideration during scoping of the SI.</p>

**Final Preliminary Assessment Report for Naval Air Station Pensacola
Response to Stakeholder Comments
Florida Department of Environmental Protection**

Comment No.	Comment	Response
7	<p>General Comment: The Department would like to note that we are concerned with the MC sites that do not have "skeet" in the title and would like to see as much information as possible that confirms this site was never a skeet range. If NAS Pensacola is unable to provide this information the Department would like to recommend that the soil be sampled for PAHs in the appropriate place on the range.</p>	<p>During the Preliminary Assessment, a comprehensive review of historical documentation for NAS Pensacola was conducted as detailed in Section 4.0. Based on the historical research, interviews conducted from site personnel, and site observations made during the Preliminary Assessment, there is no evidence that any sites other than those already designated as skeet ranges were used as skeet ranges. Therefore, PAHs are not anticipated to be present at those sites and are not included as MC of concern in the PA reports. During the Site Investigation work plan development, the MC sampling plan may be further refined if needed.</p>
8	<p>General Comment: FDEP reserves the right to provide additional comments on any future documents as needed, and reserves the right to change the approach with any additional information obtained for these sites.</p>	<p>We understand that FDEP retains the right to comment on any additional information.</p>

Attachment 1
Final Preliminary Assessment Report for Naval Air Station Pensacola
Response to Stakeholder Comments
Florida Department of Environmental Protection

The purpose of this attachment is to provide supplemental information to address Florida Department of Environmental Protection (FDEP) comment #2 on the Draft Final Preliminary Assessment, Additional Areas of Concern, Naval Air Station (NAS) Pensacola (dated November 2008):

General Comment: The Department thinks it is premature to concur with the recommendation for NFA for the National Cemetery Gunnery Area North site. NAS Pensacola has stated that data collected during the remedial investigation for Operable Unit 1 demonstrates that this site does not have contamination in the groundwater or soil that would show that this site has any contamination normally found at a MC or MEC site. The Department would like to be provided the technical data that supports this conclusion prior to considering any remedial options for this site.

Much of the area within the boundary of the National Cemetery Gunnery Area North site is overlapped by Installation Restoration Program (IRP) Site 24, which is part of Operable Unit (OU) 13. Site 24 overlaps the area where the former backstop berm for the National Cemetery Gunnery Area North ranges was located (please see Map 5.7-2 in the NAS Pensacola Preliminary Assessment report). This is the area where munitions constituents present from former range activities would be expected to be located, because nearly all of the bullets fired from the former ranges would have been captured by the backstop berm.

Previous Site Investigations

Site 24 was used to mix DDT with diesel fuel for mosquito control from the early 1950s until the early 1960s. DDT, reportedly spilled in the mixing area while being transferred from drums to spray tanks, may have contaminated soil and groundwater. Several environmental investigations have been performed for Site 24, as summarized below:

- Ecology and Environment (E&E; 1991) – A Phase I screening investigation of Site 24 was completed by E&E to identify areas and potential contaminants of concern. Lead, total recoverable petroleum hydrocarbons (TRPH), polynuclear aromatic hydrocarbons (PAHs), and the carbamate pesticide fluometuron were detected in soil. Metals, tetrachloroethene (PCE), and the carbamate pesticide methomyl were detected in groundwater. As a result, additional assessment was recommended for Site 24.
- EnSafe, Inc. (1996) – EnSafe, Inc. performed field investigations from 1995 through 1997 at OU13. A RI report summarizing the site investigations was submitted in August 1997, and a FS was submitted in May 1998.

- EnSafe, Inc. (1999) – Based on the RI review, additional information was deemed necessary to complete the OU 13 investigation. Supplemental field investigations were performed in March to May 1999 to further evaluate shallow soil and groundwater quality in the northernmost portion of Site 24. EnSafe submitted a Focused Feasibility Study Report for OU 13 on May 3, 2000.

Nature and Extent of Contamination at Site 24

The nature and extent of soil and groundwater contamination are summarized in the Record of Decision (ROD) for OU 13 (TetraTech, 2006). To evaluate the nature and extent of contamination in surface soil, the concentration of each detected compound was compared to FDEP's residential and industrial soil cleanup target levels (SCTLs) listed in Rule 62-777 F.A.C. Subsurface soil was compared to FDEP SCTLs in Rule 62-777 for the protection of groundwater. Groundwater values were compared to USEPA primary and secondary maximum contaminant levels (MCLs and SMCLs, respectively) and Florida Groundwater Cleanup Target Levels (GCTLs) in Rule 62-777. In addition, detected values for inorganic compounds in soil and groundwater were compared to site reference concentrations (RCs) that were developed specifically for NAS Pensacola. If detected concentrations were below the RCs, they are considered to be naturally occurring.

Soil

As presented in the ROD (TetraTech, 2006), only one metal, arsenic, exceeded its SCTL (2.1 mg/kg) at two locations on Site 24 (both locations along John Tower Road). Concentrations ranged from 2.8 mg/kg to 3.1 mg/kg. There were no lead exceedances in any of the soil samples collected from Site 24 (approximately 30 soil sampling locations).

Groundwater

Iron and manganese exceeded GCTLs and RC in shallow groundwater at Site 24. These exceedances were attributed to fertilizer application, which commonly contains water-soluble forms of these inorganics as essential nutrients. Metal fragments were found in the subsurface soil north of Building 3678, indicating that Site 8 fill activities extended to Site 24. Sporadic antimony, cadmium, nickel, and thallium exceedances in shallow groundwater are attributed to metal-alloy debris disposal at Site 8 and/or site 24. No exceedances of lead were reported in shallow groundwater (fifteen wells sampled).

Selected Remedy

In accordance with the ROD, the selected remedy for OU 13 was No Action for soil and land use controls (LUCs) with monitoring for groundwater. The groundwater LUCs restrict groundwater use of the surficial zone of the Sand-and-Gravel aquifer. Although concentrations of contaminants in on-site groundwater exceed remedial goals, these concentrations decrease before reaching the OU 13 boundary; therefore, under current and planned site uses, the groundwater exposure pathway is incomplete (TetraTech, 2006).

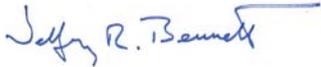
Conclusions

There were no exceedances of lead, the primary munition constituent of concern for small arms ranges, in soil or groundwater at Site 24. Given that the Site 24 area has been extensively studied, and that land use controls are already in place for groundwater in this area, we recommend that No Further Action is required at the National Cemetery Gunnery Area North site.

**FINAL
PRELIMINARY ASSESSMENT
OUTLYING LANDING FIELD BRONSON –
NAVAL AIR STATION PENSACOLA, FLORIDA**

DoD Contract Number: N62472-02-D-1300

Reviewed and Approved by:



Jeffrey R. Bennett, P.E., BCEE
Program Officer
Malcolm Pirnie, Inc.



Daria Navon, P.E.
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Malcolm Pirnie, Inc. prepared this report at the direction of Naval Facilities Engineering Command Atlantic. This document should be used only with the approval of Naval Facilities Engineering Command Atlantic. This report is based, in part, on information provided in other documents and is subject to the limitations and qualifications presented in the referenced documents.

August 2009

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ACRONYMS

Army	United States Army
AR	Army Regulation
ATSDR	Agency for Toxic Substances and Disease Registry
bgs	below ground surface
BRAC	Base Realignment and Closure
bsl	below sea level
CD	Compact Disc
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CSM	Conceptual Site Model
DERP	Defense Environmental Restoration Program
DMM	Discarded Military Munitions
DoD	Department of Defense
ECUA	Emerald Coast Utilities Authority
EO	Explosive Ordnance
EOC	Explosives of Concern
FAS	Floridan Aquifer System
FDEP	Florida Department of Environmental Protection
FGS	Florida Geological Survey
ft ² /day	feet squared per day
FUDS	Formerly Used Defense Site
FY	Fiscal Year
GCTL	Groundwater Cleanup Target Level
gpm	gallons per minute
GMD	Growth Management Department
IAS	Intermediate Aquifer System
ICRMP	Integrated Cultural Resources Management Plan
INRMP	Integrated Natural Resources Management Plan
ITRC	Interstate Technology and Regulatory Council
MC	Munitions Constituents
MEC	Munitions and Explosives of Concern
mg/L	milligrams per liter

mm	millimeter
MRP	Munitions Response Program
msl	mean sea level
MWR	Morale, Welfare, and Recreation
NAAS	Naval Auxiliary Air Station
NAS	Naval Air Station
NAVFAC	Naval Facilities Engineering Command
Navy	United States Navy
NEESA	Naval Energy and Environmental Support Activity
NETPDTC	Naval Education and Training Professional Development and Technology Center
NRHP	National Register of Historic Places
NTTC	Naval Technical Training Center
NWFWMD	Northwest Florida Water Management District
OLF	Outlying Landing Field
PA	Preliminary Assessment
PAH	polycyclic aromatic hydrocarbon
PWC	Public Works Center
RG	Record Group
SARA	Superfund Amendments and Reauthorization Act
SDZ	Surface Danger Zone
SE	Southeast
TM	Technical Manual
U.S.	United States
USACE	United States Army Corps of Engineers
U.S.C.	United States Code
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WWI	World War I
WWII	World War II

FINAL PRELIMINARY ASSESSMENT

°F	degrees Fahrenheit
%	percent

GLOSSARY OF TERMS

Base Realignment and Closure (BRAC) – A Department of Defense (DoD) program that focuses on compliance and cleanup efforts at military installations undergoing closure or re-alignment, as authorized by Congress in four rounds of base closures for 1988, 1991, 1993, and 1995. (Defense Environmental Restoration Program [DERP] Management Guidance, September 2001)

Closed Range – A range that has been taken out of service as a range and that either has been put to new uses that are incompatible with range activities or is not considered by the military to be a potential range area. A closed range is still under the control of a DoD component. (DERP Management Guidance, September 2001)

Defense Site – All locations that are or were owned by, leased to, or otherwise possessed or used by the DoD. The term does not include any operational range, operating storage or manufacturing facility, or facility that is used or was permitted for the treatment or disposal of military munitions. (10 United States Code [U.S.C.] 2710(e)(1))

Discarded Military Munitions (DMM) – Military munitions that have been abandoned without proper disposal or removed from storage in a military magazine or other storage area for the purpose of disposal. The term does not include unexploded ordnance, military munitions that are being held for future use or planned disposal, or military munitions that have been properly disposed consistent with applicable environmental laws and regulations. (10 U.S.C. 2710(e)(2))

Explosive Ordnance Disposal (EOD) – The detection, identification, field evaluation, rendering-safe, recovery, and final disposal of unexploded explosive ordnance. It may also include the rendering-safe and/or disposal of explosive ordnance (EO) that has become hazardous by damage or deterioration, when disposal of such EO requires techniques, procedures, or equipment that exceeds the normal requirements for routine disposal. (Naval Operations Instruction 8027.1G, 14 February 1992)

Explosives Safety – A condition where operational capability and readiness, personnel, property, and the environment are protected from the unacceptable effects of an ammunition or explosives mishap. (DoD Directive 6055.9, July 1996)

Formerly Used Defense Site (FUDS) – Real property that was formerly owned by, leased by, possessed by, or otherwise under the jurisdiction of the Secretary of Defense or the components (including governmental entities that are the legal predecessors of the DoD or the components) and those real properties where accountability rested with the DoD, but where activities at the property were conducted by contractors (i.e., government-owned, contractor-operated properties) that were transferred from DoD control prior to 17 October 1986. The status of a site as a FUDS is irrespective of current ownership or current responsibility within the federal government. (DERP Management Guidance, September 2001)

Munitions Constituents (MC) – Any materials originating from unexploded ordnance, DMM, or other military munitions, including explosive and non-explosive materials, and emission, degradation, or breakdown elements of such ordnance or munitions. (10 U.S.C. 2710 (e)(3))

Munitions and Explosives of Concern (MEC) – This term, which distinguishes specific categories of military munitions that may pose unique explosives safety risks, means unexploded ordnance, DMM, or MC (e.g., trinitrotoluene, hexogen) present in high enough concentrations to pose an explosive hazard. (OUSD (AT&L), 18 December 2003)

Operational Range – A range that is under the jurisdiction, custody, or control of the Secretary of Defense and that is used for range activities or, although not currently being used for range activities, that is still considered by the Secretary to be a range and has not been put to a new use that is incompatible with range activities. (10 U.S.C. 101(e)(3))

Other than Operational Range – This term encompasses closed, transferred, and transferring ranges.

Range – A designated land or water area set aside, managed, and used for range activities of the DoD. Ranges include firing lines and positions, maneuver areas, firing lanes, test pads, detonation pads, impact areas, electronic scoring sites, buffer zones with restricted access and exclusionary areas, and airspace areas designated for military use in accordance with regulations

and procedures prescribed by the Administrator of the Federal Aviation Administration. (10 U.S.C. 101(e)(3))

Transferred Range – A property formerly used as a military range that is no longer under military control and had been leased by the DoD, transferred, or returned from the DoD to another entity, including federal entities. This includes a range that is no longer under military control but was used under the terms of a withdrawal, executive order, special-use permit or authorization, right-of-way, public land order, or other instrument issued by the federal land manager. (DERP Management Guidance, September 2001)

Transferring Range – A range that is proposed to be transferred or returned from the DoD to another entity, including federal entities. This includes a range that is used under the terms of a withdrawal, executive order, act of Congress, special-use permit or authorization, right-of-way, public land order, or other instrument issued by the federal land manager or property owner. An operational or closed range will not be considered a “transferring range” until the transfer is imminent. (DERP Management Guidance, September 2001)

Unexploded Ordnance – Military munitions that have been primed, fused, armed, or otherwise prepared for action; have been fired, dropped, launched, projected, or placed in such a manner as to constitute a hazard to operations, installations, personnel, or material; and remain unexploded either by malfunction, design, or any other cause. (10 U.S.C. 101(e)(5))

EXECUTIVE SUMMARY

The Department of Defense (DoD) has established the Military Munitions Response Program (MRP) under the Defense Environmental Restoration Program to address munitions and explosives of concern (MEC) (including unexploded ordnance and discarded military munitions) and munitions constituents (MC) at other than operational military ranges and other sites. Closed, transferred, and transferring military ranges and sites not located on an operational range are considered other than operational. This report addresses other than operational ranges and sites at an active installation. It may include transferring and/or transferred ranges and munitions disposal sites associated with an active installation if they are not included in the Base Realignment and Closure or Formerly Used Defense Sites programs.

This report represents a Preliminary Assessment (PA) for the Outlying Landing Field (OLF) Bronson, a tenant of Naval Air Station (NAS) Pensacola, located in Escambia County, Florida. The DoD, United States Navy, and United States Environmental Protection Agency guidance for conducting and documenting PAs were followed and tailored, where appropriate, to address the unique aspects of MEC and MC.

NAS Pensacola is located in the northwest portion of the Florida Panhandle, approximately 13 miles south of Interstate 10 and five miles west of the city of Pensacola. Constructed in 1826, it was the world's first NAS and is known as the "Cradle of Naval Aviation." The NAS Pensacola complex covers 8,423 acres, including NAS Pensacola, Outlying Landing Field Bronson, Corry Station, Saufley Field, and Lexington Terrace Housing. The installation's mission is to "fully support the operational and training missions of tenants assigned; enhancing the readiness of the U.S. Navy, its sister armed services and other customers."

OLF Bronson is a 950-acre airfield that was in operation from 1942 to 1950. The site is located on the east side of Perdido Bay, approximately five miles west of Pensacola, Florida and about one mile east of the Alabama border. Located on OLF Bronson are four abandoned airstrips and the remains of old support buildings for the airfield. The only current employees at OLF Bronson are Morale, Welfare, and Recreation personnel who operate a campground and perform minor maintenance of the facility (Public Works Center, 1997).

In 2007, a PA was performed under the MRP for NAS Pensacola (Malcolm Pirnie, Inc., 2007). As a result of this PA, the OLF Bronson Skeet Range and Pistol Range were identified as areas of interest. These ranges are the subject of this PA.

The OLF Bronson Skeet Range is located approximately 400 feet to the southeast of OLF Bronson Runway 4 and approximately 500 feet to the west of Runway 36. The Skeet Range can be seen on historical maps dated 1943, 1944, 1946, 1948, and 1949, and is mentioned in a 1945 historical document obtained from the National Archives that summarizes activities and facilities for NAS Pensacola. A skeet range house used for storage (Building 1145) and four structures that appear to be high/low skeet houses were also denoted on these historical maps, indicating that this was a multiple field skeet range with up to three fields. Munitions use was limited to small arms ammunition, typically 12-gauge, 16-gauge, and 20-gauge shotgun rounds and .410-caliber ammunition.

According to historical maps, the earthen berm for the OLF Bronson Pistol Range is located approximately 200 feet south of the OLF Bronson Skeet Range, and measures approximately 330 feet long, eight feet high, and 90 feet wide., The berm is denoted as a “butt” and is depicted on historical maps dated 1943, 1944, 1946, 1948, and 1949. A 1945 historical document identified the Pistol Range as a 75-foot by 150-foot pistol range with 31 stations. Munitions use was limited to small arms ammunition, typically .22-, .38-, and .45-caliber and 9-millimeter rounds.

1. INTRODUCTION

The Department of Defense (DoD) has established the Military Munitions Response Program under the Defense Environmental Restoration Program (DERP) to address munitions and explosives of concern (MEC) (including unexploded ordnance and discarded military munitions) and munitions constituents (MC) at other than operational military ranges and other sites. Closed, transferred, and transferring military ranges and sites not located on an operational range are considered other than operational. This report addresses other than operational ranges and sites at an active installation. It may include transferring and/or transferred ranges and munitions disposal sites associated with an active installation if they are not included in the Base Realignment and Closure (BRAC) or Formerly Used Defense Sites programs.

The DoD and the United States (U.S.) Navy (Navy) are currently establishing policy and guidance for munitions response actions under the Navy Munitions Response Program (MRP). However, key program drivers developed to date conclude that munitions response actions will be conducted under the process outlined in the National Contingency Plan (40 Code of Federal Regulations 300), as authorized by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, 42 United States Code (U.S.C.) 9605, and amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), Pub. L. 99-499 (hereinafter CERCLA). In accordance with Executive Order 12580, DoD is the lead agency for actions taken under the authority of CERCLA at DoD installations. This report represents a Preliminary Assessment (PA) for Outlying Landing Field (OLF) Bronson, located in Escambia County, Florida. The DoD, Navy, and U.S. Environmental Protection Agency (USEPA) guidance for conducting and documenting PAs were followed and tailored, where appropriate, to address the unique aspects of MEC and MC.

This PA report is organized into the following sections:

- [Section 1](#) – Introduction
- [Section 2](#) – Installation Background
- [Section 3](#) – Physical and Environmental Characteristics
- [Section 4](#) – Summary of Data Collection Effort
- [Section 5](#) – Site Characteristics

The following supporting information is appended to this PA report:

- References ([Appendix A](#))
- Project Source Data – General ([Appendix B](#))
- Project Source Data – Site-Specific ([Appendix C](#))
- Ordnance Technical Data Sheets ([Appendix D](#))

Two interactive compact discs (CDs) are included with this report. The first CD includes electronic files of the report text, tables, and figures; appendices; and project source data. The second CD includes interactive Geographic Information System maps of the installation and sites.

1.1. Purpose

This PA summarizes the history of munitions use for the following former ranges located at OLF Bronson, within the NAS Pensacola complex: OLF Bronson Skeet Range and Pistol Range. The PA provides an assessment of the current conditions with respect to MEC and MC. The PA provides the necessary information for Navy and regulatory decision-makers to: 1) eliminate from further consideration those MEC sites that pose minimal or no threat to public health or the environment; 2) differentiate MEC sites that may not require further munitions response actions from those that will require further investigation and/or munitions response actions; 3) determine if an imminent explosives safety hazard from MEC is present that warrants an accelerated response action; and 4) determine if an imminent hazard from MC to human health or the environment is present and warrants an accelerated response action.

1.2. Programmatic Framework

The regulatory structure for managing Navy MRP sites is guided by a complex mixture of federal, state, and local laws, as well as DoD and Navy regulations and guidance, and provides the necessary information for Navy decision-makers. The key legislation, policy, and guidance directing the program includes, but is not limited to, the following:

Management Guidance for the Defense Environmental Restoration Program (DERP) - (September 2001)

The DERP Management Guidance establishes an MRP element for MEC and MC defense sites. The history of DERP dates back to the SARA of 1986¹. The scope of the DERP is defined in 10 U.S.C. §2701(b), which states that the:

Goals of the program shall include the following: ... (1) The identification, investigation, research and development, and cleanup of contamination from hazardous substances, and pollutants and contaminants. (2) Correction of other environmental damage (such as detection and disposal of unexploded ordnance) which creates an imminent and substantial endangerment to the public health or welfare or to the environment ...

National Defense Authorization Act (Fiscal Year [FY] 02) (Sections 311-312)

Sections 311-312 of the National Defense Authorization Act of FY02 reinforced the DoD's 2001 DERP Management Guidance by tasking the DoD to develop and maintain an inventory of defense sites that are known or suspected to contain MEC and MC. Section 311 requires the DoD to develop a protocol for prioritizing defense sites for response activities in consultation with the states and tribes. Section 312 requires the DoD to create a separate program element to ensure that the DoD can identify and track munitions response funding.

The September 2001 Management Guidance for the DERP and the 2002 National Defense Authorization Act, described above, established the MRP. The DoD provides program guidance and methods for conducting a baseline inventory of defense sites containing, or potentially containing, MEC and/or MC. The Navy baseline inventory of sites was completed in FY02 and was used to establish the sites where PAs are needed to further evaluate the potential for MEC and MC.

1.3. Project Management

This PA has been coordinated and managed by Naval Facilities Engineering Command (NAVFAC) Atlantic. NAVFAC Atlantic performs engineering functions for Navy installations throughout the U.S. and is the program manager for this PA. Malcolm Pirnie, Inc. has been contracted to prepare this PA. NAVFAC Southeast (SE) provides technical guidance and

¹ SARA was signed into law on October 17, 1986, and amended the CERCLA of 1980, 42 U.S.C. §9601 et seq. Related sections in Title 10 of the U.S.C. (10 U.S.C. §§2702-2710 and §§2810-2811) further define the program.

management for environmental projects at NAS Pensacola. The Navy Remedial Project Manager from NAVFAC SE and the installation point of contact for NAS Pensacola provided valuable information and assistance throughout the PA data collection process.

1.4. PA Approach

The CERCLA implementing guidance, which was prepared for sites contaminated with hazardous substances, describes the PA as a limited-scope investigation based upon existing and available data. However, the guidance also states that the PA process developed under CERCLA is not equally applicable to all sites and all contaminants and that variation from the guidance may be necessary. Sites containing MEC are prime examples of sites where the generic CERCLA process is incomplete. Unique explosives safety issues associated with MEC cannot be assessed solely with the parameters developed for chemical and hazardous waste contaminants. While this PA generally follows CERCLA guidance, certain elements of the report have been tailored to address the unique explosives safety aspects of MEC.

The PA process for each of the sites involves collecting and reviewing existing and available information about the site. Data collection activities include off-site and on-site research and interviews. The process also includes a visual survey to assess physical evidence that might indicate the presence of MEC (e.g., discarded munitions items, ordnance penetration holes, and scarred trees) and MC (e.g., ground scarring, stressed vegetation, chemical residue) at the site. The Malcolm Pirnie data collection team conducted the on-site portion of the data collection and the visual survey for OLF Bronson on 28 November through 30 November 2007.

This PA is inclusive and makes use of all available data relating to munitions use at OLF Bronson, including historical records, field data, anecdotal evidence, interviews with site personnel, and professional knowledge and experience. It is based, in part, on information provided in documents referenced in [Appendix A](#) and is subject to the limitations and qualifications presented in the referenced documents.

2. INSTALLATION BACKGROUND

The following sections provide general information about NAS Pensacola and OLF Bronson, including their locations and settings; a brief history of the installation and OLF; missions over time; and a history of munitions related training, storage, and usage.

2.1. Location and Setting

NAS Pensacola is located in the northwest panhandle of Florida in Escambia County, 13 miles south of Interstate 10 and five miles west of the city of Pensacola. The NAS Pensacola complex covers 8,423 acres total, 5,800 acres of which are used for the main installation, while the remaining 2,623 acres are used for areas that include OLF Bronson, Corry Station, Saufley Field, and the Lexington Terrace Housing (Growth Management



Department [GMD], 2003).

Figure 2.1-1: Aerial Photograph of NAS Pensacola Complex

The NAS Pensacola complex is

bordered by Perdido Bay to the north and west, Big Lagoon to the southwest, and Pensacola Bay to the south and east (see [Figure 2.1-1](#)). Bayou Grande intersects the complex in the southeast portion, directly to the north of Sherman Field and Chevalier Field.

The area surrounding OLF Bronson is sparsely populated. The eastern portion of the property contains the abandoned airfield, forested areas, and a relatively large beaver pond, while the western portion is part of the Blue Angels Recreation Park (Integrated Natural Resource Management Plan [INRMP], 2001). Wetland/swamp habitats comprise the southern portion of the property. Most of the surrounding areas are either wetlands, forested areas, or the waters of Perdido Bay or Tarkiln Bayou. [Map 2.1-1](#) provides a topographic map that shows the general layout of OLF Bronson, as well as the locations of the site discussed in this PA report.

**Preliminary Assessment
Naval Air Station Pensacola, Florida**

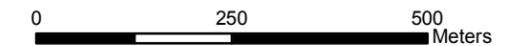


**MALCOLM
PIRNIE**

**Map 2.1-1
Area Location Map
OLF Bronson**

Legend

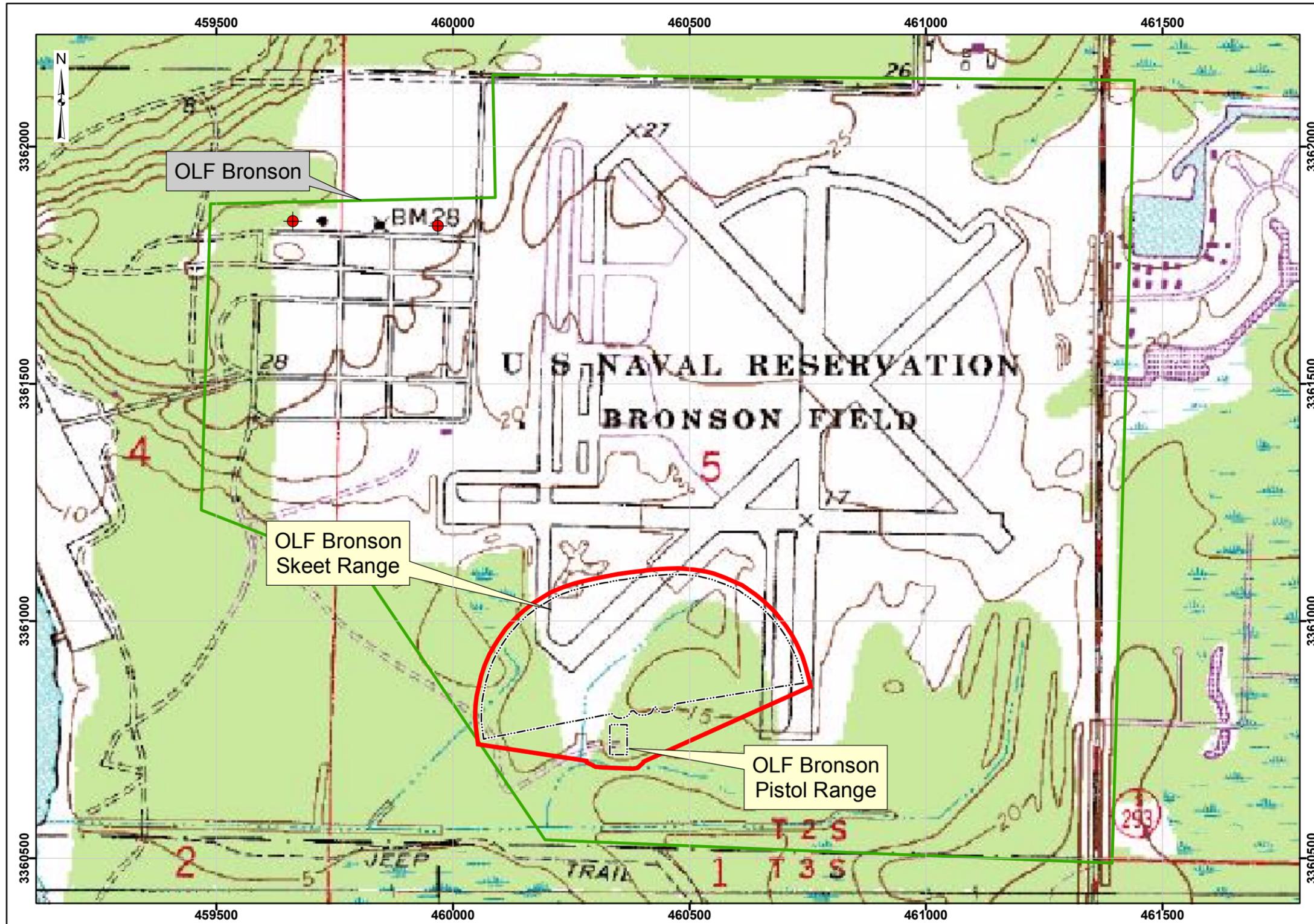
-  Installation Boundary
-  Range Boundary
-  Site Boundary
-  Production Wells



Data Source: USGS, 7.5 Minute Series Topographic Survey, Teraserver 2007

Coordinate System: UTM Zone 16N
Datum: NAD83
Units: meters

Contract: N62472-02-D-1300
Edition: Final Preliminary Assessment
Date: August 2009



2.2. Installation History

The establishment of an aviation training station in Pensacola was recommended to the Secretary of the Navy in 1913, and NAS Pensacola was constructed in the vicinity of the abandoned U.S. Navy Yard and Station in 1914. The installation was the first NAS in the world and is now considered the “Cradle of Naval Aviation.” The primary mission of NAS Pensacola is the training of student aviators, as well as to “fully support the operational and training missions of tenants assigned; enhancing the readiness of the U.S. Navy, its sister armed services, and other customers.”

While NAS Pensacola became the hub of air training activities through WWI and WWII, its growing aviation program required the additions of the following OLFs: Naval Auxiliary Air Station (NAAS) Saufley Field in 1940, NAAS Ellyson Field in 1941, NAAS Barin Field and NAAS Bronson Field in 1942, and NAAS Corry Field in 1943. NAAS Barin Field was partially decommissioned in 1962 and currently belongs to the NAS Whiting Field complex of OLFs. NAAS Ellyson Field became a NAS in 1968; however, it was decommissioned in 1973 and subsequently claimed by the Naval Education and Training Professional Development and Technology Center (NETPDTC). Once the NETPDTC moved to Saufley Field in 1979, NAS Ellyson Field was quickly declared excess and fully decommissioned. The remaining auxiliary airfields currently remain part of the NAS Pensacola complex of OLFs.

OLF Bronson is a 950-acre airfield that was in operation from 1942 to 1950. The site is located on the east side of Perdido Bay, approximately five miles west of Pensacola, Florida and about one mile east of the Alabama border. When the airfield was built in 1942, it was called NAAS Tarkiln Field, and was designed to train Navy dive bomber and fighter pilots. In January 1943, seaplane training began at NAAS Tarkiln Field, as well. In 1944, NAAS Tarkiln Field was renamed NAAS Bronson Field in honor of Lt. Clarence Bronson Naval Aviator No. 15, who lost his life in a premature bomb explosion at Indian Head, Maryland. NAAS Bronson Field had four active 4,000-foot runways, as well as a seaplane ramp located on the shore of Perdido Bay. In 1946, NAAS Bronson Field was decommissioned to OLF Bronson. When the airfield was closed in late 1950, the runways were still used for touch and go landings and for helicopter training (Naval Energy and Environmental Support Activity [NEESA], 1992). After 1950, base dismantling activities were conducted and by 1968, all buildings located at OLF Bronson were razed. Currently, OLF Bronson is the location of the Blue Angel Recreation Park, and is

predominantly made up of grass and forested areas, the four airstrips that are now inactive and abandoned, and the remains of several support buildings. The old seaplane ramp is currently used as a parking/storage area for campers of the Blue Angel Campground, located approximately half a mile to the west of the airfield, along Perdido Bay. According to a 1992 PA conducted at OLF Bronson, the area is also used by Combat Support Squadron 16 helicopters for training (NEESA, 1992). Personnel at the former airfield include Morale, Welfare, and Recreation (MWR) employees who operate the campground, conduct minor maintenance at the facility, and teach sailing and windsurfing.

Table 2.2-1 provides a summary of the significant events in the history of NAS Pensacola and OLF Bronson.

Table 2.2-1: NAS Pensacola and OLF Bronson Timeline of Significant Events	
Time Period	Significant Events
1826	Construction of the U.S. Navy Yard and Station begins. Activities at the U.S. Navy Yard and Station primarily focus on suppression of the slave trade and piracy in the Gulf of Mexico and the Caribbean Sea.
1862	Confederate troops occupy the U.S. Navy Yard and Station during the Civil War. Fearing capture by Union forces, Confederate troops retreat from the U.S. Navy Yard and Station and destroy most of the facilities.
1906	Many of the structures that were rebuilt at the U.S. Navy Yard and Station following the Civil War are destroyed by a hurricane and tidal wave.
1911	The U.S. Navy Yard and Station is decommissioned.
1913	Establishment of an aviation training station in Pensacola is recommended to Secretary of the Navy Josephus Daniels.
1914	NAS Pensacola is established at the abandoned U.S. Navy Yard and Station.
1942	The Navy acquires 640 acres, plus 26 adjoining acres on Perdido Bay; the Navy acquires an airport in Foley, Alabama, plus 650 acres of adjoining property and commissions NAAS Barin Field, 23 miles west of NAS Pensacola; NAAS Tarkiln Field (later known as Bronson Field) is built to train Navy dive bomber and fighter pilots.
1944	NAAS Tarkiln Field is renamed NAAS Bronson Field in honor of Lt. Clarence Bronson, Naval Aviator No. 15, who lost his life in a premature bomb explosion at Indian Head, Maryland.

Table 2.2-1: NAS Pensacola and OLF Bronson Timeline of Significant Events	
Time Period	Significant Events
1946	NAAS Bronson Field is decommissioned to OLF Bronson.
1950	OLF Bronson is closed as an active airfield.
1971	NAS Pensacola is chosen as the Chief of Naval Education and Training headquarters.
2008	The NAS Pensacola complex includes NAS Pensacola, OLF Bronson, Corry Station, Saufley Field, and Lexington Terrace Housing.

2.3. Munitions Related Training/Storage/Usage

Based on information included in the Navy MRP PA for NAS Pensacola (Malcolm Pirnie, Inc., 2007), information obtained from archival records, and data collected during the site visit, the following other than operational ranges/sites were associated with OLF Bronson to support the installation mission of NAS Pensacola:

The **OLF Bronson Skeet Range** is located approximately 400 feet to the southeast of Bronson Field Runway 4 and approximately 500 feet to the west of Runway 36. This Skeet Range can be seen on historical maps dated 1943, 1944, 1946, 1948, and 1949, and is mentioned in a 1945 historical document obtained from the National Archives that summarizes activities and facilities for NAS Pensacola. A skeet range house used for storage (Building 1145) and four structures that appear to be high/low skeet houses were also denoted on these historical maps, indicating that this was a multiple field skeet range with up to three fields. Building 1145 was purchased by St. Anne's Catholic Chapel of Pensacola in July 1948 and was approved for demolition on 8 June 1950. No evidence of these buildings was observed. Fragments of clay targets were identified in the northwestern and northeastern corners of the Skeet Range, as well as northwest of the range area. Munitions use was limited to small arms ammunition, typically 12-gauge, 16-gauge, and 20-gauge shotgun rounds and .410-caliber ammunition.

According to historical maps and visual observation, the earthen berm for the **OLF Bronson Pistol Range** is located approximately 200 feet south of the Bronson Field Skeet Range, and measures approximately 330 feet long, eight feet high, and 90 feet wide. The berm is denoted as a "butt" and is depicted on historical maps dated 1943, 1944, 1946, 1948, and 1949. A 1945 historical document identified the Pistol Range as a 75-foot by 150-foot pistol range with 31

stations. The former range area is overgrown and not in use by the installation. Munitions use was limited to small arms ammunition, typically .22-, .38-, and .45-caliber and 9-millimeter (mm) rounds.

Four pintle mounts were also observed approximately 100 feet north of the Pistol Range berm; however, no historical documents were identified that linked the pintle mounts to either the Skeet Range or Pistol Range.

3. PHYSICAL AND ENVIRONMENTAL CHARACTERISTICS

The following sections provide general information for the OLF Bronson, including climate, topography, geology, soil and vegetation types, hydrology, hydrogeology, cultural and natural resources, and endangered species.

3.1. Climate

The climate at OLF Bronson is humid, sub-tropical and is characterized by short, mild winters and long, warm summers. The average monthly temperature in the wintertime is 54 degrees Fahrenheit (°F), while the average monthly temperature in the summertime is 80°F. The average annual temperature is 68°F (NEESA, 1992). There is an average of nine freezes per year; however, temperatures in the area rarely fall below 15°F - 20°F. Winds are controlled by the Atlantic Bermuda High Pressure area and ocean-land heating differentials. Southerly winds from the Bermuda High warm the land during summer days, resulting in amplified sea breezes. As land masses cool, the sea breeze reverses to a land breeze. The net effect is a clockwise rotation of surface wind every 24 hours during the summer season. During the winter season, the influence of the Bermuda High is negligible, and northerly winds prevail, (NEESA, 1983).

The average annual precipitation totals around 62 inches or less, with the wettest month being July, which has an average precipitation of 7.2 inches, and the driest month being November, which has an average precipitation of 3.4 inches. Snowfall rarely occurs, and hailstorms infrequently occur in very restricted areas (NEESA, 1992). Rainfall is well-distributed, but peaks during the months of April through September when 55 percent (%) of the annual rainfall occurs. Summer rain occurs in near-daily showers and thunderstorms over small areas, followed by broader areas of light rains in the winter. Infrequent rain events with moderate to high precipitation occur during the spring and fall seasons. Severe weather includes thunderstorms, tornadoes, tropical storms, and hurricanes. Hurricane season is June through November; however, the greatest frequency of hurricanes in the Gulf of Mexico occurs between August and October. The Florida Panhandle averages one hurricane every 17 years and is impacted by fringe effects of hurricanes every 5 years. The last hurricanes to affect the Pensacola area were Hurricanes Erin and Opal in 1995, Hurricane Ivan in 2004, and hurricanes Dennis and Katrina in 2005.

3.2. Topography

The NAS Pensacola complex resides in the Coastal Lowland topographic division of the Coastal Plain physiographic division of the U.S. The Coastal Lowlands consist of relatively undissected, nearly level plains that lie less than 100 feet above mean sea level (msl). Elevations at OLF Bronson range from 20 to 30 feet above msl along a northwestern terrace on the property to sea level along the western portion of the property. With a few exceptions along the northwest corner of OLF Bronson, topography is level to gently sloping.

3.3. Geology

The surface deposits of the NAS Pensacola complex are characterized by unconsolidated sands with minor amounts of clay and organics. According to the 1983 Initial Assessment Study of NAS Pensacola and a 1984 publication by the Florida Geological Survey (FGS), 11 formations underlie the region (NEESA, 1983; FGS, 1994). [Table 3.3-1](#) describes each formation in ascending order for this region of Florida.

Table 3.3-1: Geologic Formations Beneath the NAS Pensacola Complex	
Geologic Formation	Description
Hatchetigbee Formation	Located 1,270-2,730 feet below sea level (bsl); 220-420 feet thick Characterized by predominantly gray to dark gray, silty micaceous clay that is fossiliferous and calcareous with little pyrite.
Tallahatta Formation	Located 1,040-2,230 feet bsl; 170-foot minimum thickness below Pensacola Characterized by predominantly hard, light gray, calcareous shale and siltstone with interbeds of gray limestone and fine to pebbly sand.
Lisbon Equivalent	Located 510-2,090 feet bsl; 345-600 feet thick Characterized by dark gray to very light-grayish cream shaley limestone, with a 60- to 90-foot thick lower shale zone.
Ocala Group	Located 290-1,940 feet bsl; 90-235 feet thick Upper portion consists of a light gray limestone, which trends to a chalky white limestone that is predominant in the NAS Pensacola region; highly fossiliferous consisting mostly of large foraminifers and other fossils.
Bucatunna Clay Member, Byram	Located 200-1,760 feet bsl; 45-215 feet thick Characterized by dark gray, soft, calcareous, silty to sandy clay with

Table 3.3-1: Geologic Formations Beneath the NAS Pensacola Complex	
Geologic Formation	Description
Formation	occasional flecks of carbonized wood and little pyrite.
Chickasawhay Limestone	Located 1,030-1,312 feet below ground surface (bgs); 30-130 feet thick Characterized by gray to light gray, hard, highly porous limestone and dolomitic limestone interbedded with light brown, hard, dolomitic limestone with porosity varying from vesicular to fractured. Also contains some interbedding with dolomite of a distinctive sugary texture.
Tampa Formation	Located 0-20 feet bgs; maximum thickness of 270 feet Characterized by hard, light gray to grayish-white beds of clay.
Pensacola Clay	Located 135-1,000 feet bsl; 380-1,000 feet thick Characterized by dark to light-gray clay, which grades into a clayey siltstone in the NAS Pensacola region. Upper formation contains mollusk shells and thick shell beds in southern Escambia County.
Miocene Coarse Clastics	Located 70-470 bgs; 70 to 500 feet thick Characterized by light brown to light gray, poorly sorted, fine to very coarse sand and granules of small pebbles of quarts. Distinctive feature is the large portion of shell beds of minute mollusks that comprise a large portion of the formation.
Citronelle Formation and undifferentiated terrace deposits	Located 50-55 feet bgs; approximately 400 feet thick Comprised of quartz sand containing lenses, beds, and stringers of clay and gravel. Distinctive feature is limonite-cemented sandstone (“hardpan”), which occurs throughout.
Undifferentiated surface deposits	Located 0-50 feet bgs Comprised of unconsolidated sands with minor amounts of clay and organics.

3.4. Soil and Vegetation Types

According to the 2004 Soil Survey for Escambia County by the U.S. Department of Agriculture (USDA), soils immediately surrounding OLF Bronson are generally loamy, friable, loose sand that have somewhat poor drainage. The areas to the south and southwest of the airfield are characterized by poorly-drained sandy soils and muck, and the areas to the north and northwest are characterized by loose sand with excessive drainage.

Table 3.4-1 presents the sedimentary depositional environments that are found at the NAS Pensacola complex, as discussed in the 1983 Initial Assessment Study, and Table 3.4-2 describes the consequent surface soil complexes, as outlined in the 2004 Escambia County Soil Survey (NEESA 1983; USDA, 2004).

Table 3.4-1: Depositional Environments Found at NAS Pensacola Complex	
Soil Complex	Description
Alluvial	Silty loam to sand textures; gray to black depending on amount of organic matter; variable internal drainage; very slow surface runoff
Tidal Marsh	Coastal areas often covered by saltwater or brackish water at high tide; includes tidal flats that are barren due to salt; includes mixed sand, silt, clay, and various quantities of organic matter
Coastal Beach	Comprised of sand deposited along the coast by wave action; very thin layers of organic matter present in locations where ponding occurs for months at a time (i.e., depressions)
Swamp	Mixture of soils and materials varying in color, texture, composition, and thickness of layers; organic matter of varying thickness

Table 3.4-2: Surface Soil Complexes Found at OLF Bronson	
Soil Complex	Description
Croatan Soil	Very deep, very poorly-drained soil found in depressions of coastal lowlands; moderate permeability and very high water yield capacity; black muck
Foxworth Sand (0% to 5% slopes)	Very deep, moderately well-drained sandy soil found in nearly-level low ridges and knolls of coastal lowlands; rapid permeability and low water yield capacity; dark brown sand
Hurricane Sand (0% to 5% slopes)	Very deep, somewhat poorly-drained soil found in nearly-level positions on low ridges and knolls in coastal lowlands; moderately-rapid permeability and very low water yield capacity; very dark grayish brown sand
Lakeland Sand (0% to 5% slopes)	Very deep, excessively-drained sandy soil found in nearly-level summits and shoulder slopes of broad ridges; rapid permeability and very low water yield capacity; dark grayish-brown sand
Leon Sand	Very deep, poorly-drained sandy soil found in coastal

Table 3.4-2: Surface Soil Complexes Found at OLF Bronson	
Soil Complex	Description
	lowlands; moderately-slow permeability and low water yield capacity; dark gray sand
Pickney Sand	Very deep, very poorly-drained sandy soil found in coastal lowlands; rapid permeability and low water yield capacity; black sand
Pottsburg Sand	Poorly-drained soil found in flatwoods; moderate permeability and low water yield capacity; very dark grayish-brown sand

OLF Bronson is covered by paved runways surrounded by grassy fields, wooded areas, wetlands, and Perdido Bay.

Several plant species listed as threatened or endangered by state or federal agencies have been observed at OLF Bronson, and are further discussed in [Section 3.8](#) of this PA.

3.5. Hydrology

OLF Bronson consists of generally flat terrain with surface drainage flowing by way of sheet flow towards a large wetland area located to the south and southwest. The wetlands area drains into Perdido Bay, located approximately 0.75 miles to the west of the site, and Tarkiln Bayou, located approximately 0.37 miles south of the site. A small, unnamed stream and a beaver pond are located in the southeastern portion of OLF Bronson. Swampy areas exist in the south-central portion of OLF Bronson, as well as in the extreme northwest and northeast corners. There are no known major surface water consumptive uses within the area.

3.6. Hydrogeology

The NAS Pensacola complex is directly underlain by the Sand-and-Gravel Aquifer, which is primarily composed of fine- to coarse-grained sands and gravels with varying percentages of clay. In Florida, it is the primary source of water for Santa Rosa and Escambia counties. Over 99% of potable, agricultural, and industrial water in the region is obtained from the Sand-and-Gravel Aquifer. Potable water is mainly supplied to OLF Bronson via a production well located in the northwestern portion of the property (Navy Public Works Center [PWC], 1997). An additional

source of potable water is a well field located at NTTC Corry Station, which is located about 1.5 miles west of Pensacola and 2.5 miles north of NAS Pensacola (Agency for Toxic Substances and Disease Registry [ATSDR], 2006). The OLF Bronson and NTTC Corry Station production wells withdraw from the Sand-and-Gravel Aquifer. There are no known public wells within 1/8 mile down-gradient of the site. Also, there are no well head protection areas at or down-gradient of the site.

The Sand-and-Gravel Aquifer thickens across the Florida panhandle from east to west, and extends from the ground surface (water table) down to depths ranging from approximately 200 to 330 feet bgs (Northwest Florida Water Management District [NFWFMD], 2001; ATSDR, 2006). For the most part, the Sand-and-Gravel Aquifer is composed of interbedded layers of sand and gravel; however, clay beds and lenses are also common throughout the aquifer and form local semi-confining units (U.S. Geological Survey [USGS], 1990). Water in the aquifer is under unconfined conditions where the clay beds are thin or absent, and is under artesian conditions where such beds are thick. Recharge to the Sand-and-Gravel aquifer occurs from percolation and infiltration of local precipitation, which generally moves downward for primary discharge to streams, bays, sounds, or the coastlines (USGS, 1990). Because of surficial recharge to the aquifer, its susceptibility to contamination is high, particularly in the surficial zone. An example of contamination to the surficial zone is a site near Pensacola, where creosote waste products from a wood-preserving plant have been detected in large portions of the zone (USGS, 1990).

The Sand-and-Gravel Aquifer is informally subdivided into the surficial zone, the low permeability zone, and the main producing zone. The low permeability zone acts as a semi-confining layer that restricts the vertical flow of groundwater between the surficial zone and the main producing zone, which is used as the main source of drinking water throughout the area (NFWFMD, 2001). Yields of up to 1,000 gallons per minute (gpm) have been reported for wells completed in the surficial zone, and aquifer test data have shown transmissivities of 11,000 square feet per day (ft²/day). For the main producing zone, yields of more than 1,000 gpm are commonly reported for wells completed in this zone, and results of aquifer tests have shown transmissivities of as much as 20,000 ft²/day.

Potable water is found throughout the Sand-and-Gravel Aquifer, as its virtually insoluble, quartz-rich composition results in total dissolved solid concentrations below 50 milligrams per liter

(mg/L). Chloride concentrations are generally less than 50 mg/L; however, in some coastal regions concentrations are as high as 1,000 mg/L. Dissolved iron concentrations vary locally, with some areas having concentrations up to 4,300 micrograms per liter.

The Sand-and-Gravel Aquifer overlies a sequence of predominately fine-grained sediments representing the Intermediate Aquifer System (IAS), which overlies Florida's largest producing aquifer, the Floridan Aquifer System (FAS). The confining nature of the IAS serves to restrict the exchange of water between the Sand-and-Gravel Aquifer and the FAS; therefore, for this investigation only the Sand-and-Gravel Aquifer will be discussed (NFWFMD, 2001).

Two production wells (#1 and #2) were installed in the early 1940s in the northwestern portion of OLF Bronson (Navy PWC, 1997). Well depths range from 245 to 248 feet bgs, and operation capacity is up to 750 gpm. The wells at OLF Bronson are currently operated by Emerald Coast Utility Authority (ECUA) (formerly known as Escambia County Utilities Authority) and are permitted by the NFWFMD to supply water to OLF Bronson and other areas of southeastern Escambia County (Navy PWC, 1997; ECUA, personal communication). Well #2 was taken out of service in June 1995, and no contamination has been identified in either well to date. Information from monitoring of the NTTC Corry Station production wells in a 1992 PA of NTTC Corry Station showed the pesticide, dieldrin, at concentrations above Florida Department of Environmental Protection (FDEP) acceptable levels. Elevated levels of the pesticide were concluded to be due to nearby urban and residential fertilization.

3.7. Cultural and Natural Resources

The NAS Pensacola complex is located within the state of Florida, Perdido Bay, and Pensacola Bay Ecosystem Management Areas. Approximately 17 miles of the complex is located along the coastlines of Bayou Grande, Pensacola Bay, Perdido Bay, or the Intracoastal Waterway at the entrance to the Gulf of Mexico.

The southwest portion of the NAS Pensacola complex along the shoreline of Big Lagoon has been designated by the GMD as a protected area based on its recreational value and beach-dune natural communities (GMD, 2003). The NAS Pensacola complex has 950.4 acres of wetland areas, 600 acres of which are located at OLF Bronson. In May of 1991, a wetland inventory and classification was conducted for OLF Bronson (INRMP, 2001). The inventory showed that the

wetlands consisted of a mixture of forested, scrub/shrub, and emergent wetlands. Although OLF Bronson is along the shore of Perdido Bay, there were no estuarine wetlands identified during the inventory. A majority of the wetland acreage is concentrated along the southern and eastern boundaries of OLF Bronson, while the wetlands in the interior of OLF Bronson are isolated and small relative to the periphery wetlands.

In 1995 and 1996, the Pensacola Archeology Lab conducted Phase I and Phase II archaeological investigations at the Blue Angel Recreation Park, located in the western portion of OLF Bronson. The subsequent investigative report, prepared in 1997, documented the relocation of two previously recorded archaeological sites and identified one new site (HHM, 2004). These sites are listed in [Table 3.7-1](#). One of the sites (8ES1391) and two associated isolated artifact finds were determined ineligible for the National Register of Historic Places (NRHP) listing and required no further investigation. The field assessments were performed in accordance with the Florida state guidelines for cultural resource studies.

Table 3.7-1: Recorded Archeological Resources at OLF Bronson

Site Number/Name	Site Findings	NRHP Status
8ES1390	Ceramic artifacts and architectural features (Second Spanish Colonial/British period/Early American/Late 19 th and Early 20 th Century)	Potentially Eligible
8ES1391	Artifact scatter (prehistoric and historic)	Not Eligible
8ES2246	Ceramic shards & midden-stained sediment deposits (Weeden Island I & II/Prehistoric non-ceramic/American 19 th and 20 th Century)	Potentially Eligible

3.8. Endangered and Special Status Species

Protected species that are known to, or have the potential to, inhabit OLF Bronson based upon April 2007 data from the U.S. Fish and Wildlife Service (USFWS), the 2001 INRMP, and a 1992 PA of OLF Bronson are listed in [Table 3.8-1](#).

Table 3.8-1: Summary of Protected Species Known or Potentially Found within OLF Bronson	
Ecological Receptors	Species
Federal Endangered	Wood stork (<i>Mycteria americana</i>), red-cockaded woodpecker (<i>Picoides borealis</i>)
Federal Threatened	Eastern indigo snake (<i>Drymarchon corais couperi</i>), bald eagle (<i>Haliaeetus leucocephalus</i>)
State Endangered	Arctic peregrine falcon (<i>Falco peregrinus tundrius</i>), wood stork (<i>Mycteria americana</i>), trailing arbutus (<i>Epigaea repens</i>), panhandle lily (<i>Lilium iridollae</i>), primrose-flower butterwort (<i>Pinguicula primulifolia</i>), orange azalea (<i>Rhododendron austrinum</i>), white-top pitcher plant (<i>Sarracenia leucophylla</i>), silky camellia (<i>Stewartia malacodendron</i>)
State Threatened	Eastern indigo snake (<i>Drymarchon corais couperi</i>), bald eagle (<i>Haliaeetus leucocephalus</i>), Florida black bear (<i>Ursus americanus floridanus</i>), spoon-leaved sundew (<i>Drosera intermedia</i>), heartleaf (<i>Hexastylis arifolia</i>), mountain laurel (<i>Kalmia latifolia</i>), southern red lily (<i>Lilium catesbaei</i>), Chapman’s butterwort (<i>Pinguicula planifolia</i>), large-leaved jointweed (<i>Polygonella macrophylla</i>), parrot pitcher plant (<i>Sarracenia psittacina</i>), decumbant pitcher plant (<i>Sarracenia purpurea</i>), Harper’s yellow-eyed grass (<i>Xyris scabrifolia</i>)
State Species of Special Concern	Alligator snapping turtle (<i>Macrolemys temminckii</i>), Osprey (<i>Pandion haliaetus</i>), gopher tortoise (<i>Gopherus polyphemus</i>), snowy egret (<i>Egretta thula</i>), Little blue heron (<i>Egretta caerulea</i>), American alligator (<i>Alligator mississippiensis</i>), Saltmarsh topminnow (<i>Fundulus jenkinsi</i>)

Wood storks breed in lowland forested wetland communities, where they build large stick nests in the forest trees. Although there is the potential for these birds to inhabit the site due to the on-site wetland habitat, they have not been observed at the Skeet Range and Pistol Range to date.

The red-cockaded woodpecker utilizes cavities of live, old growth pine trees for roosting and nesting, and is considered a potential inhabitant of OLF Bronson. Because the site is abundant

with pines, there is the potential that this bird could inhabit the site; however, there have been none observed at the Skeet Range and Pistol Range to date.

Bald eagles nest in areas along river systems, reservoirs, or lake shores with large, tall (40-foot to 120-foot) trees for nesting and roosting. Nests are usually located within 1 mile of water and are often located on the edge between forest and marsh or water. Bald eagles have been identified as potentially occurring at or in the vicinity of OLF Bronson. Because of the site's proximity to Tarkiln Bayou located to the south, and because most of the site contains forests with tall trees and wetland habitats, there is potential for encountering this species at the Skeet Range and Pistol Range.

Peregrine falcons live mostly along mountain ranges, river valleys, and coastlines, and often hunt along the barrier islands on the Atlantic and Gulf of Mexico Coasts. The peregrine falcon nest is typically a hole dug in earthen material such as gravel, predominantly on cliff ledges; however, occasionally peregrines will nest in a tree cavity or with a stick nest. Although this species has been identified as potentially occurring at OLF Bronson, there is little potential for encountering this species at the Skeet Range and Pistol Range as the site is not located on a barrier island or coastline and contains no cliff ledges.

The little blue heron typically inhabits sub-tropical swamps, and has been observed in aquatic habitats at OLF Bronson. Because of the wetland/swamp habitat at the site, there is potential for encountering this bird species at the Skeet Range and Pistol Range.

The snowy egret inhabits aquatic areas such as large inland and coastal wetlands, and has been observed in aquatic habitats at OLF Bronson. Because of the wetland/swamp habitat at the site, there is potential for encountering this bird species at the Skeet Range and Pistol Range.

The osprey can be found in a variety of aquatic habitats and prefers to nest near shallow water with abundant fish. The species has been identified in near shore waters of OLF Bronson, as well as Perdido Bay. Due to the sites proximity to near shore waters and Perdido Bay, as well as the on-site water bodies, there is the potential that the species would be encountered at the Skeet Range and Pistol Range.

The Florida black bear prefers densely vegetated areas, and is suspected to inhabit certain areas of OLF Bronson. Although the site could potentially serve as a Florida black bear habitat due to its thick vegetation, no indication of their inhabitation has been observed to date.

Alligator snapping turtles inhabit southern U.S water bodies, and have been identified in blackwater streams of OLF Bronson. Due to on-site water bodies, there is potential for encountering this species at the Skeet Range and Pistol Range.

Gopher tortoises are native to the coastal plains of the U.S. and typically build dens in sandy ridges. At OLF Bronson, they have been identified in remnant sand dunes and pine plantations. The potential for their occurrence at the Pistol Range is low due to the lack of sand dunes and the existence of on-site wetland and swamp habitats that would inhibit den burrowing; however, due to the areas of dry land and the pine communities within the Skeet Range, there is some potential that the species could be encountered.

The eastern indigo snake use a wide variety of habitats during the year, but are almost always associated with the gopher tortoises and the sandy ridges they inhabit, as indigos often share the gopher's den during hot or cold weather. Since there are no sandy ridges located at the Pistol Range for gopher tortoises to inhabit, there is little potential for encountering an eastern indigo snake, as well; however, due to the areas of dry land and the pine communities within the Skeet Range that provide sufficient habitat for gopher tortoises, there is potential for encountering the indigo here, as well.

American alligators live in wetland habitats of the southeastern U.S., and have been identified in various aquatic habitats on OLF Bronson. Due to the on-site wetlands, there is a strong potential for species' occurrence at the Skeet Range and Pistol Range.

The saltmarsh topminnow lives in estuaries, coastal marshes, and backwater sloughs including shallow tidal meanders. The species has been identified as potentially occurring at OLF Bronson; however, the site is not connected to the coastal system and is therefore not conducive to the species' habitat. Therefore, the species is not likely to occur at the Skeet Range and Pistol Range.

The trailing arbutus is a terrestrial, low-spreading shrub with fragrant, pink to white flower petals that prefers bluffs and sloped or mixed hardwood forests. The species has been identified as potentially occurring at OLF Bronson; however, none have been officially identified at OLF Bronson to date. The site has low-lying topography which reduces the potential of encountering the species; however, because the site contains mixed hardwood forests, there is some potential that the species would be encountered at the Skeet Range and Pistol Range.

Panhandle lilies are perennial forbs/herbs that can be found in palustrine environments like baygalls, dome swamp edges, mucky soils, or seepage slopes, or in the terrestrial environment of blackwater stream banks. Due to the swampy conditions at the site, there is potential for encountering the species at the Skeet Range and Pistol Range, although none have been identified at OLF Bronson to date.

Orange azaleas have large orange flower petals and can be found in terrestrial, palustrine, or riverine environments such as slope, bottomland, or upland mixed forests, as well as seepage banks. Although the species has been identified as potentially occurring at OLF Bronson, none have been officially identified at the site to date. Due to the presence of mixed forests on site, there is some potential that orange azaleas will be encountered at the Skeet Range and Pistol Range.

The white-top pitcher plant is a palustrine species with large leaves up to 35 inches. This species is often found in wet prairies, seepage slopes, baygall edges, and ditches. The white-top pitcher plant has been observed at OLF Bronson in baygalls/seepages, streams/slopes, wet prairies, depression marshes, blackwater stream edges, and pine plantations. Due to the presence of many of these aquatic habitats at the site, there is potential for encountering the species at the Skeet Range and Pistol Range.

The silky camellia is a large, open-branched shrub growing up to 10 feet tall that prefers acidic soils and environments such as baygalls or slope and upland mixed forests. The species has been identified as potentially occurring at OLF Bronson; however, none have been officially identified to date. Because the site is mostly a wetland/swamp and wetland/bottomland mixed forest, there is little potential for encountering the silky camellia at the Skeet Range and Pistol Range.

The spoon-leaved sundew is a carnivorous species that can be found in lacustrine (i.e., sinkhole lake edges), palustrine (i.e., seepage slopes, depression marshes, and wet flatwoods), and riverine (i.e., seepage stream banks and drainage ditches) environments. The species has been identified at OLF Bronson in seepage slopes/baygalls, wet prairies, depressions, marshes, and blackwater stream edges. Due to the presence of many of these aquatic habitats at the site, there is potential for encountering the spoon-leaved sundew at the Skeet Range and Pistol Range.

The heartleaf and mountain laurel plant species are typically found in seepage stream banks and slope forests of riverine and terrestrial environments. Although the species has been identified as potentially occurring at OLF Bronson, none have been officially identified to date. There is little potential of encountering the species at the Skeet Range and Pistol Range because the site is mostly a wetland/swamp and wetland/bottomland mixed forest environment.

Chapman's butterworts are a carnivorous, palustrine plant species with leaves that appear deep red in the sunlight and flowers that are white to pale pink. They are found in wet flatwood forests, seepage slopes, bogs, dome swamps, or ditches, and have been officially identified in wet prairies and pine plantations at OLF Bronson. Because many of these habitats are located on-site, there is potential for encountering the species at the Skeet Range and Pistol Range.

The southern red lily is a palustrine and terrestrial plant species that is usually found amongst grasses within wet prairies, wet or mesic flatwood forests, or seepage slopes. It has been observed in wet prairies at OLF Bronson, and is likely to occur at the Skeet Range and Pistol Range due to the presence of wetland forests at the site.

The carnivorous parrot and decumbent pitcher plants are a palustrine plant species that are typically found in wet prairies, seepage slopes, bogs, baygall edges, ditches, or wet flatwood forests. The species have been observed in baygalls/seepage streams, wet prairies, pine plantations, seepage slopes, blackwater stream edges, and depression marshes at OLF Bronson, and there is potential for encountering the species at the Skeet Range and Pistol Range due to the wetland/swamp and wetland/bottomland forest environment at the site.

The terrestrial large-leaved jointweed is a small, perennial, slender shrub that can be found within or on the ridges of sand pine or oak scrubs. This species has not been identified at OLF Bronson

to date, and is not likely to occur at the Skeet Range and Pistol Range due to lack of typical habitat.

Harper's yellow-eyed grasses are perennial forbs/herbs with three yellow flower petals that open in the afternoon. The palustrine plant species prefer seepage slopes, wet prairies, or bogs, and have been identified at OLF Bronson in clear zones and wet prairies. Due to the wetland/swamp habitat at the site, there is potential for encountering this species at the Skeet Range and Pistol Range.

4. SUMMARY OF DATA COLLECTION EFFORT

Five primary sources of information were researched as part of the data collection effort for this PA. The sources of data include the following:

- 1) Historical archives
- 2) Personal interviews
- 3) Installation data repositories
- 4) Visual survey observations
- 5) Off-site data sources and repositories, such as local libraries and museums

These five sources of data are discussed below, along with their relative application to this PA.

4.1. Historical Archive Repositories (Off-Site)

The data collection team reviewed archival records located at the National Archives in College Park, Maryland, and Washington DC, as well as records located at the Naval Historical Center in Washington DC, and regional archives in Pensacola, Florida. The data collection team researched the following records and record groups (RGs) for documents relating to munitions usage at NAS Pensacola. An asterisk (*) indicates the material was photocopied.

Textual Records:

RG 18, Army Air Forces

- Entry 168 (NM53), Central Decimal Files, 1917-38, Boxes 2319*, 2320
- Entry 292 (NM53), Unclassified Decimal Files, 1942-44, Box 1488
- Entry 294, Bulky Files, 1942-44, Boxes 839, 931
- Entry 295, Project Files, Camps and Forts, 1939-42, Box 1017*

RG 38, Chief of Naval Operations

- Entry 1 (NM63), Name and Subject Index, 1942-43, Boxes 34, 42
- Entry 1 (NM63), Name and Subject Index, 1943-44, Boxes 77, 78, 86, 87
- Entry 2 (NM63), General Correspondence, 1942-43, Box 132
- Entry 2 (NM63), General Correspondence, 1943-44, Boxes 256*, 277
- Entry 2 (NM63), General Correspondence, 1944-45, Boxes 702, 713, 719, 743

RG 51, Bureau of the Budget

- Entry 149-A, War Projects Unit, General Records, Boxes 30, 42, 45, 46, 59-61
- Entry 149-B, Inspection Reports, Boxes 45, 232*, 233*, 427

RG 71, Bureau of Yards and Docks

- Entry 24-A (UD), Unprocessed Naval Property Case Files, Box 19
- Entry 1001, Naval Property Case Files, Boxes 300, 301*, 302*, 303*, 304, 305, 306*, 307*, 308, 309, 310*, 311, 312*, 313, 314*, 315*, 316*, 317*, 318*, 319*, 320*
- Entry1016, Land Acquisition Receipt, 1940-43, Box 1
- Entry1017, Land Purchase Progress Reports, 1942-45, Box 1
- Entry1019, Miscellaneous Reports Land Investigations, Boxes 1-4
- Entry 1030, Army Facilities Acquired, 1944-45, Box 1
- Entry 1037, Lease Files, Boxes 1*, 2-33

RG 72, Bureau of Aeronautics:

- Entry 17-A, Confidential General Correspondence, 1922-44, Box 1158*
- Entry 62B,(NM52), General Correspondence, 1943-45, Boxes 3378*, 3379*, 3450, 3461
- Entry 62B (NM52), General Correspondence, 1946, Boxes 424, 489
- Entry 62B (NM52), General Correspondences, 1947, Boxes 382, 383*, 384, 385
- Entry 67 (NM52), Confidential Correspondence, 1922-24, Box 1202*
- Entry 67 (NM52), Confidential Correspondence, 1945-47, Boxes 285, 300, 653, 654
- Entry 1001-A, Unclassified General Correspondence, 1948-49, Boxes 384*, 385*, 386, 387, 388*, 389*
- Entry 1001-B, Unclassified General Correspondence, 1950, Boxes 204*, 205*, 206
- Entry 1001-C, Unclassified General Correspondence, 1951, Boxes 169*, 170*, 171
- Entry 1001-E, Unclassified General Correspondence, 1953, Boxes 248*, 249*
- Entry 1001-F, Unclassified General Correspondence, 1954, Boxes 184*, 202, 209*, 210*
- Entry 1001-G, Unclassified General Correspondence, 1955, Boxes 225*, 226*
- Entry 1001-H, Unclassified General Correspondence, 1956, Boxes 214*, 215*
- Entry 1001-I, Unclassified General Correspondence, 1957, Boxes 217, 218
- Entry 1001-J, Unclassified General Correspondence, 1958, Boxes 154, 168, 169*
- Entry 1001-K, Unclassified General Correspondence, 1959, Boxes 145, 156*, 157

RG 74, Bureau of Ordnance:

- Entry 25-I, General Correspondence, 1942, Confidential, Boxes 200, 201*, 209

- Entry 25-J, General Correspondence, 1942, Restricted, Boxes 429*, 430*, 449, 455
- Entry 25-M, General Correspondence, 1943, Confidential, Boxes 364, 375, 386
- Entry 25-O, General Correspondence, 1943, Restricted, Boxes 461*, 514
- Entry 25-U, General Correspondence, 1944, Confidential, Boxes 500, 527, 549
- Entry 25-V, General Correspondence, 1944, Restricted, Boxes 821*, 871, 911, 912
- Entry 1002A (1529), Construction and Procurement Subject Files, 1945, Boxes 1195*, 1282
- Entry 1002B (4444), Construction and Procurement Subject Files, 1946, Boxes 253, 278, 286
- Entry 1002C (5595), Construction and Procurement Subject Files, 1947, Boxes 189*, 203, 208
- Entry 1003A (A1), General Correspondence, Unclassified and Confidential, 1948, Boxes 572*, 586
- Entry 1003A (A1), General Correspondence, Unclassified and Confidential, 1949, Box 572

RG 80, General Records of Department of Navy, 1798-1947

- Entry 156 MM (A-1), Name and Subject Index 1944-1945, Boxes 1-20
- Entry 255 (PC31), Reports from Shore Establishments, Boxes 33, 47, 154, 170, 182, 192
- Entry 256 (PC-31), Index to Reports from Shore Establishments, 1943-1944, Boxes 1-3

RG 121, Public Buildings Service

- Entry 13, Real Property, Box 2*

RG 127, USMC

- Entry 37 (UD-WW), Correspondence, 1975, Box 22
- Entry 50 (UD-UP), Real Estate Legal Correspondence File, 1918-76, Boxes 1-12
- Entry 62 (UD-WW), Correspondence, 1967, Box 27
- Entry 83 (UD-WW), Fleet Marine Correspondence, 1957-58, Box 1
- Entry 86 (UD-WW), Fleet Marine Correspondence, 1957, Box 1
- Entry 93, Facilities and Services, 1938-75, Boxes 1-3
- Entry 102 (UD-WW), General Correspondence, 1950-58, Boxes 267-271

RG 165, War Department General and Special Staffs

- Entry 310, Historical Files, 1900-41, Boxes 1, 354

RG 225, Joint Army and Navy Boards and Committees

- Entry 6, Army/Navy Munitions Board, 1942, Boxes 1-4

- Entry 7, Army-Navy Munitions Board Correspondence, 1943-45, Boxes 1-5

RG 269, General Services Administration

- Entry 5(UD), Administrator's General Subject File, 1962-64, Box 19

RG 270, War Assets Administration

- Entry 3, Office of Information, 1946-49, Boxes 87*, 88
- Entry 9, Subject File, Central Office of Real Property, 1946-49, Boxes 67-70, 86

RG 291, Federal Property Resources Service

- Entry 1 (UD-WW), Real Property Disposal Case Files, Boxes 72*, 74, 75, 80, 81
- Entry 5 (A1), Real Property Disposal Case Files, 1949-62, Boxes 46*, 47, 48, 51-53
- Entry 6, (UD-WW), 1970-71, Box 9

RG 330, Office of Secretary of Defense

- Entry 5, 1995 BRAC Commission, Boxes 10*, 35, 87, 112*, 179, 188*, 192, 193, 217, 255-257
- Entry 7, 2005-2006 BRAC Commission, Box 32

RG 334, Records of Interservice Agencies

- Entry 15, Armed Services Explosives Safety Board, Explosion Reports, 1939-48, Boxes 1, 4, 18, 19

RG 384, Office of Navy Material

- Entry 9 (UD-UP), Historical Files 1968-1976, Box 1
- Entry 42 (UD-UP), Naval Shore Establishments 1951-1957, Box 2
- Entry 53 (UD-UP), Alphabetical Subject Files, Boxes 1-3
- Entry 54, Subject Files 1952-1953, Boxes 1-6

RG 428, General Records of Department of Navy 1947

- Entry 1, Confidential Correspondence, Naval Operations, 1948, Box 1117
- Entry 2, Formerly Classified General Correspondence of Deputy Chief of Naval Operations 1948-1951, Boxes 539, 575, 604, 967, 971
- Entry 234, Central Subject Files, Office of Information, 1940-58, Boxes 4, 33
- Entry 240 (UD-WW), Industrial Relations Subject File, 1947, Boxes 4, 8
- Entry 272 (UD-WW), Industrial Relations subject File, 1948, Boxes 3-5, 7

RG 429, Federal Property Council

- Entry 12, Central Real Property Surveys, Boxes 65-A*, 68*, 69*, 72*
- Entry 16, Central Subject File, Boxes 21*, 23-25

Cartographic Records:

RG 23, Coast and Geodetic Survey

- Folders for Charts 1265*

RG 37, Hydrographic Office

- Hydrographic Charts

RG 38, Chief of Naval Operations

- Plans of Major Navy Yards

RG 57, USGS

- 7.5 Minute Quads: Ft. Barrancas*, Gulf Breeze, Pensacola, West Pensacola, Oriole Beach

RG 71, Bureau of Yards and Docks

- Maps for facilities 800*, 805
- Series II microfilm, Reels 621*, 622*, 629*, 631*, 634*, 1385*

RG 77, Chief of Engineers

- AMS, V-747:3544*; V-847: 3544*
- Fortification Map Files, Drawers, 77, 78*, 80*, 128, 254
- War Department Map Collection, 33-Florida
- Real Estate Division, Ft. Pickens (Pensacola)*

RG 92, Quartermaster General

- Blueprint File, Ft. Barrancas*
- General Bound Volumes of Plans, U.S., 1904-05, Ft. Pickens*

RG 94, National Defense Board

- Enclosures to Report 418*

RG 385, Naval Facilities Engineering Command, 1917-1989

- Restricted Access, Architectural and Engineering Plans, Boxes S-6, S-7, S-8, S-22, S-44, S-45, S-46, S-49, S-53*

Aerial Photos:

RG 145, ASCS

- Cans 1284*, 1286, ON30457, ON30458, ON37513*, ON37514, ON37516*, ON37517*

Still Photos:

RG 71, General Records of Bureau of Yards and Docks

- Entry 71-CA
- Entry 71-CB

- Entry 71-CF
- Entry 71-CP
- Entry 71-GS

RG 80-CF, General Records of Department of Navy

- Boxes 96*, 97*

RG 80-G, General Records of Department of Navy

- Boxes 114*, 171*, 198*, 264, 268, 270, 283, 411*, 485, 530*, 691*, 1110, 1203*, 1896*, 1900*, 1910*, 1930, 1943*, 1954*, 1971*, 1972, 1973, 1974*, 1976*, 1989*, 1995*, 2380, 2624

RG 428, General Records of Department of Navy

- Entry 428-GX
- Entry 428-GXA

The archive data search produced no documents that specifically described munitions-related activities at OLF Bronson. Archival maps provided information about the areas of the site where the ranges are located, including the general layout, location, and number of structures and improvements in these areas over time.

4.2. Personal Interviews

Malcolm Pirnie's data collection team interviewed the following personnel for information relating to munitions use and history of the ranges at OLF Bronson. The interviews were conducted during the initial site visit for the NAS Pensacola PA in January 2007, as well as the site visit for this PA conducted in November 2007.

Ms. Pamela Boudreaux, Cultural Resource Manager, NAVFAC SE PWC Pensacola (interviewed during both site visits)- Ms. Boudreaux has been employed by NASP for 11 years and has been the Cultural Resource Manager for four years. Ms. Boudreaux provided the data collection team with a copy of the Integrated Cultural Resources Management Plan (ICRMP).

Mr. Chuck Brevik, Real Property Management, NAVFAC SE PWC Pensacola (interviewed during January 2007 site visit for NAS Pensacola PA) - Mr. Brevik has been employed at NASP for three years and was previously employed at NAS Whiting Field for three years. Mr. Brevik provided the data collection team with information regarding property acquisition dates and property boundaries.

Mr. Gregory Campbell, Environmental Engineer, NAS Pensacola Environmental Department (interviewed during both site visits) – Mr. Campbell is the primary point of contact at NASP. Mr. Campbell provided the data collection team with access to various documents and coordinated the site visits and interviews.

Mr. Jim Kane, Deputy Public Works Officer (interviewed during November 2007 site visit for this PA) –Mr. Kane provided general information regarding NAS Pensacola.

Mr. Rick Kensell, Map Repository Manager, Del-Jen, Inc. (interviewed during November 2007 site visit for this PA) –Mr. Kensell assisted the data collection team with finding historical maps of OLF Bronson.

Mr. Steve Ward, Real Property Management (interviewed during November 2007 site visit for this PA) –Mr. Ward provided the data collection team with real property information for NAS Pensacola, including maps showing historical land parcel transfers for NAS Pensacola.

Mr. Harry White, NASP Public Affairs Officer (interviewed during January 2007 site visit for NAS Pensacola PA) – Mr. White has been employed at NAS Pensacola since 1989. Mr. White provided the data collection team with contact information for former NAS Pensacola personnel who may be able to provide information on munitions use at the installation.

4.3. On-Site Data Repositories

Several environmental reports and related documents were available from the PWC. Site closure documents for other sites at OLF Bronson and the ICRMP were also available. Installation-specific information obtained during the records search was helpful in developing general physical profiles regarding the areas where the sites are located. The documents, as well as interviews with installation personnel and observations made during the visual survey, served as the primary sources of site-specific information for this PA.

4.4. Visual Survey

The data collection team conducted a visual survey of each range as part of the data collection effort for the PA. The purpose of the visual survey was to identify MEC and ordnance-related materials (e.g., expended rounds, fragmentation, range debris, old targets), evidence of MC (e.g., ground scarring, stressed vegetation, chemical residue), and/or surface features (e.g., firing points, targets, buildings) that could provide additional information to aid in the characterization of the site. The visual survey was also used to enhance, augment, or confirm the archival data and, in some cases, provide new data to the team. A description of the areas surveyed and the results of the survey are provided in [Section 5](#).

The type of range and weapons known or suspected to have been used on the site drove the materials and/or features that the data collection team looked for during the visual survey. For the OLF Bronson Skeet Range and Pistol Range, the data collection team looked for features such as evidence of former firing lines, target stands, backstop berms, range houses, clay target fragments, and expended small arms ammunition (i.e., bullets and/or bullet fragments). Approximately 15% of the Skeet Range was walked and 30% of the remaining range boundary was observed, while approximately 10% of the Pistol Range was walked and 50% was observed. A handheld Global Positioning System receiver was used to track and capture location data, and photographs were taken to document observations made.

4.5. Off-Site Data Sources

The data collection team visited the National Museum of Naval Aviation at NAS Pensacola to obtain additional historical information regarding the former ranges. Several historical documents were examined; however, none of the documents available for review pertained to munitions usage at OLF Bronson.

5. SITE CHARACTERISTICS

The following sections provide site-specific information about the PA site located at OLF Bronson that is the focus of this PA report, including history and site description, land use, access controls and restrictions, visual survey observations and results, contaminant migration routes, and potential receptors.

5.1. OLF Bronson Skeet Range and Pistol Range

5.1.1. History and Site Description

The **OLF Bronson Skeet Range** is located approximately 400 feet to the southeast of OLF Bronson Runway 4 and approximately 500 feet to the west of Runway 36. The total acreage within the range boundary designated for the OLF Bronson Skeet Range is approximately 38.9 acres, and includes the Skeet Range boundary, as well as its Surface Danger Zone (SDZ). Evidence of the former range was observed during a visual site survey conducted between 23 and 25 January 2007 for a separate PA for NAS Pensacola that included the OLF Bronson Firing Range (observations made during the site visit for this PA are described later). Evidence consisted of clay target fragments occurring in varying densities along the ground surface of the wooded area throughout the site. The OLF Bronson Skeet Range can be seen on historical maps dated 1943, 1944, 1946, 1948, and 1949, and is mentioned in a 1945 historical document that summarizes activities and facilities for NAS Pensacola, obtained from the National Archives (unknown, 1945). A skeet range house used for storage (Building 1145) and four structures that appear to be high/low skeet houses were also denoted on these historical maps (see [Figure 5.1-1](#)), indicating that this was a multiple field skeet range with up to three fields. Building 1145 is denoted as “Range House” on the historical maps dated 1943 and 1944 and as “Range House (Skeet)” on the historical maps dated 1946, 1948, and 1949. Building 1145 was purchased by St. Anne’s Catholic Chapel of Pensacola in July 1948 and was approved for demolition on 8 June 1950. No evidence of these buildings was observed during the visual site survey conducted in January of 2007. No additional information regarding munitions use associated with this range was obtained during the archival data search or site survey activities; however, typical munitions used at skeet ranges include 12-gauge, 16-gauge, and 20-gauge shotgun rounds and .410-caliber ammunition.

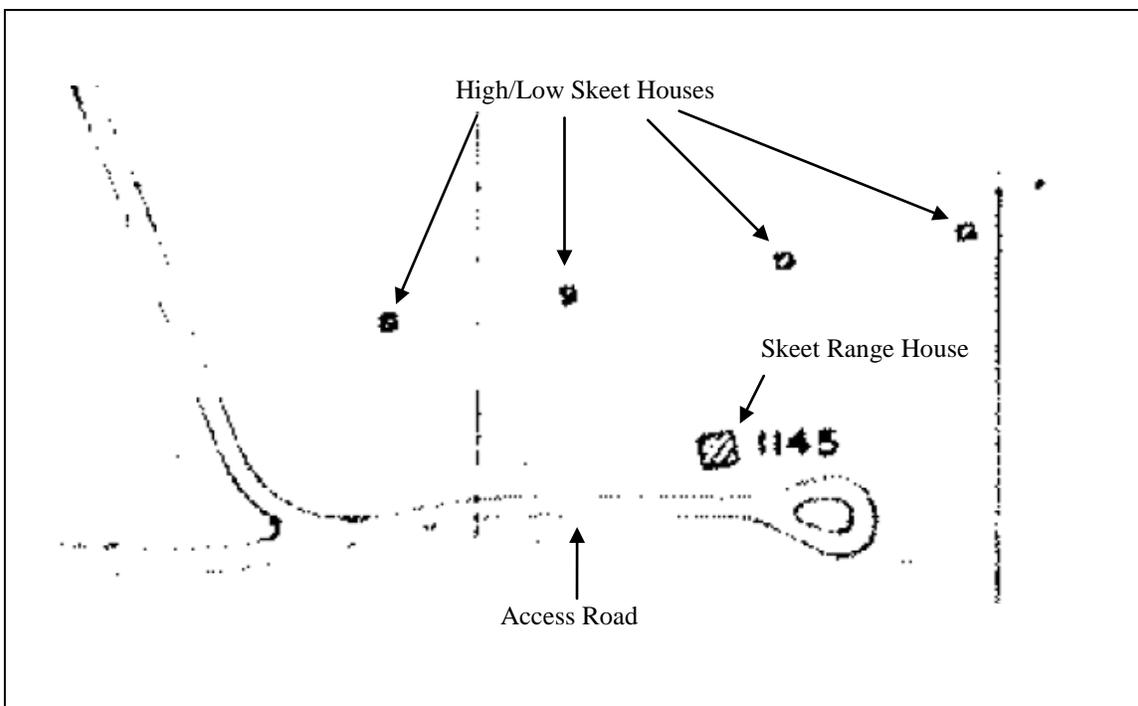


Figure 5.1-1: Building 1145 (skeet range house) and four high/low skeet houses for Skeet Range, according to 1949 map of OLF Bronson

A skeet range is defined by the *Navy Programming Guide* of 1958 (referenced as NAVAER 00-100-504) as “...an outdoor practice facility to train military personnel in the principles of leading, timing, and firing on flying targets” (Navy, 1958). According to this document, along with U.S. Army (Army) Regulation (AR) 750-10 of May 1939 – January 1944, Technical Manual (TM) 9-855 of August 1944 & November 1951, and the *Army Range Inventory, Data Collector Instructions* of 2001, a skeet range should be located in open country with no development (Army, 1939-1944; Army, 1944 & 1951; USACE, 2001). Skeet ranges would consist of one or more shooting fields positioned side by side, with each shooting field laid out in a semi-circle with a 63-foot radius, as displayed in [Figure 5.1-2](#). A typical skeet range would, at a minimum, consist of two trap

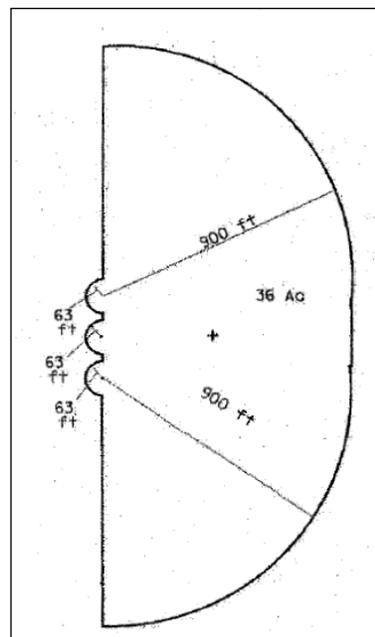


Figure 5.1-2: Typical SDZ for Multiple Field Skeet Range (USACE, 2001).

houses and five individual firing stations or positions, ammunition, and a service shed or locker. These documents also recommended that skeet ranges have a SDZ consisting of a 900-foot radius from the shooting field (see Figure 5.1-2), and a control shelter and storage place for clay targets. Skeet range trap houses are described as high and low towers, which are normally of wood, concrete, or brick construction.

A separate berm was observed during the visual site survey conducted in January of 2007 for the OLF Bronson Firing Range. After discovering a historical document dated 1945 during the archival data search, this berm was determined to be associated with a previously unidentified pistol range, with dimensions of 75 feet by 150 feet, as shown in Figure 5.1-3. The range boundary for the **OLF Bronson Pistol Range** encompasses the 75-foot by 150-foot range area, as well as the backstop berm, resulting in a 1.25-acre range boundary. The berm for the OLF Bronson Pistol Range is located approximately 200 feet south of the OLF Bronson Skeet Range, and measures approximately 330 feet long, 8 feet high, and 90 feet wide. The berm is denoted as a “butt” and is

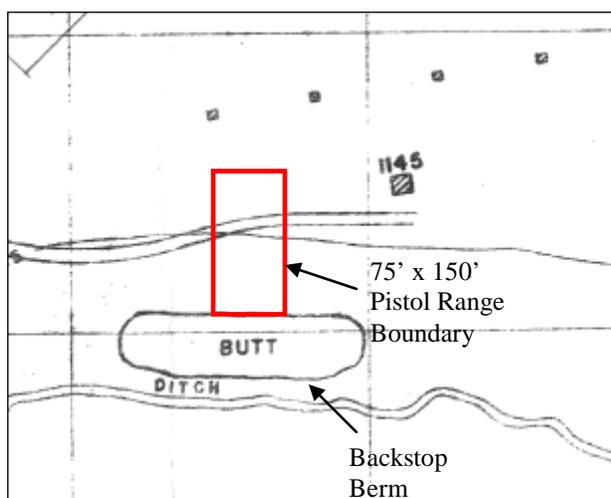


Figure 5.1-3: 75-foot by 150-foot Pistol Range area according to the 1945 historical document, as well as the backstop berm for the OLF Bronson Pistol Range, according to the 1943 map of Bronson Field.

depicted on historical maps obtained from the National Archives dated 1943, 1944, 1946, 1948, and 1949. No additional information regarding munitions use associated with this range was obtained during the archival data search or site survey activities; however, typical munitions used at pistol ranges include .22-, .38-, and .45-caliber, and 9-mm rounds.

A pistol range is recognized as a small arms range in NAVAER 00-100-504 and is defined as “...an area, either indoor or outdoor, for practice firing of small arms, particularly the .38 or .45 caliber pistol and the .22 and .30 caliber rifles.” According to NAVAER 00-100-504, AR 750-10, and TM 9-855, a typical pistol range was approximately 90 feet wide by 150 feet deep; however, these dimensions could vary depending on site-specific configuration (Army, 1939-

1944; Army, 1944 & 1951; Navy, 1958). The small arms range was comprised of the firing line(s), target area, and an area behind the firing line(s) that included the ammunition issue point and administrative area. A five degree angle of fire extended from the firing line down-range a distance of 4,800 feet, with an additional 25 degree safety fan (on both sides) extending down-range 3,600 feet. The SDZ (see Figure 5.1-4), which included the down-range hazard area and the safety fan, was roughly diamond-shaped and contained approximately 224 acres.

The site boundary for the OLF Bronson Pistol Range, which includes approximately 1.25 acres, encompasses the firing lines, target area, and backstop berm. Although the typical SDZ associated with a pistol range includes 224 acres, the area where the majority of the bullets and bullet fragments associated with the range would be found is greatly reduced due to the former presence of the backstop berm. Given the configuration of the backstop berm, it would have been effective at containing the majority of bullets and bullet fragments. While there is the potential that stray bullets could be found beyond the backstop berm, only a few items would be distributed across a large area.

Four pintle mounts were also observed approximately 100 feet north of the Pistol Range berm during the January 2007 site survey; however, no historical documents were identified that linked the pintle mounts to either the Skeet Range or Pistol Range. Previous assessments of OLF Bronson have been conducted and include a 1992 PA, a 1997 Site Assessment Report, a 1997 Contamination Assessment Report, and a 2001 Site Characterization Report Investigation, all of which did not discuss the Skeet Range or Pistol Range currently being investigated in this PA.

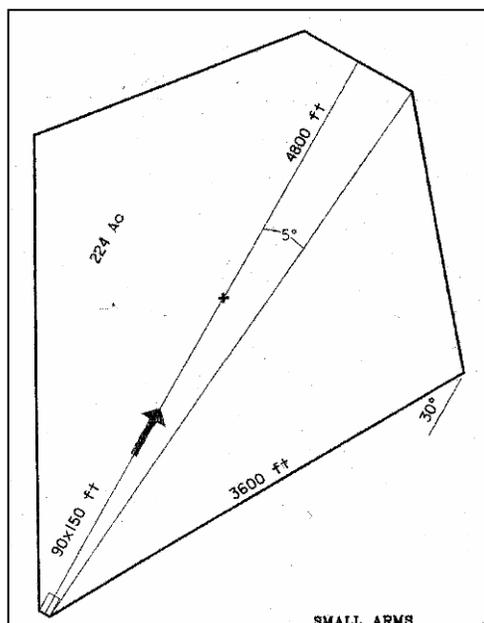


Figure 5.1-4: Typical SDZ for Pistol Range (USACE, 2001).

This PA addresses the area within the site boundary (approximately 47.6 acres), which includes the range boundaries for the OLF Bronson Skeet Range and Pistol Range, as well as any excess

area between the two former ranges; therefore, the sum of the acreage within the range boundaries is less than the total acreage within the site boundary.

5.1.1.1. Topography

The topography of a skeet range is an important factor when examining the impact area and shot fall zone. If shots are fired on a downhill slope, the actual shot fall zones could be considerably larger than the standard skeet range (Interstate Technology and Regulatory Council [ITRC], 2005).

The Skeet Range and Pistol Range are located within a swampy, wetland area of OLF Bronson. As stated in [Section 3.2](#), aside from the backstop berm, topography is level to gently sloping at the Skeet Range and Pistol Range; therefore, shot fall zones were likely contained in the SDZs and there were no downhill slope impacts. Aside from infiltration into the underlying surficial groundwater zone, the wetlands area drains by way of sheet flow into Perdido Bay, located approximately 0.75 miles to the west of the site, and Tarkiln Bayou, located approximately 0.37 miles to the south of the site.

5.1.1.2. Geology

The surface deposits of the Skeet Range and Pistol Range are characterized by unconsolidated sands with minor amounts of clay and organics. There are 11 geologic formations that underlie the region and former ranges. [Table 3.3-1](#) of [Section 3.3](#) describes each formation in ascending order for this region of Florida.

5.1.1.3. Soil and Vegetation Types

Organic material and clay adsorb MC, such as lead, and remove it from water. Organic carbon in anoxic conditions may reduce oxidized forms of lead into lead sulfides, which remain relatively immobile in anoxic environments; therefore, thicker organic-rich soil covers (e.g., leaf and peat cover) generally result in lower concentrations of lead in groundwater or pore moisture in soils.

Soils at the OLF Bronson Skeet Range and Pistol Range are characterized by poorly-drained sandy soils and muck (USDA, 2004). Surface sediments at the Skeet Range and Pistol Range

contain the Hurricane and Pottsburg sands, as well as the Croatab Muck Depressional. Additional information on these soil complexes is located in [Section 3.4](#).

The area surrounding the Skeet Range and Pistol Range is predominantly wooded and supports a wide variety of plant species typical of humid subtropical climates. Slash (*Pinus elliottii*) and longleaf pines (*Pinus palustris*) are the most abundant species in the area. Along with the pines, trees such as oaks (*Quercus Spp.*), willows (*Salix Spp.*), magnolias (*Magnolia Spp.*), hickories (*Carya Spp.*), and gums (various genera) grow naturally in the area.

Several plant species listed as threatened or endangered by state or federal agencies have been observed at OLF Bronson, and are further discussed in [Section 3.8](#) of this PA.

5.1.1.4. Hydrology

Surface drainage from OLF Bronson flows to the wetlands area in the south and southwest portions of the property, where the Skeet Range and Pistol Range are located. The wetlands area drains by way of sheet flow into Perdido Bay, located approximately 0.75 miles to the west of the site, and Tarkiln Bayou, located approximately 0.37 miles to the south of the site. Swampy areas also exist where the Skeet Range and Pistol Range are located. There are no known major surface water consumptive uses within the area.

5.1.1.5. Hydrogeology

The Skeet Range and Pistol Range are directly underlain by the Sand-and-Gravel Aquifer, which is primarily composed of fine- to coarse-grained sands and gravels with varying percentages of clay. Potable water is mainly supplied to OLF Bronson via a production well located in the northwestern portion of the property. An additional source of potable water is a well field located at NTTC Corry Station. The OLF Bronson and NTTC Corry Station production wells withdraw from the Sand-and-Gravel Aquifer. The confining nature within the Sand-and-Gravel Aquifer serves to restrict the exchange of water between the surficial and main producing zones (NFWMD, 2001). Groundwater flows south and southwest in every zone of the aquifer system where the Skeet Range and Pistol Range are located. Further information on hydrogeology in the area is discussed in [Section 3.6](#).

Depth to groundwater at the Skeet Range and Pistol Range is approximately two feet bgs. Information from monitoring wells installed in September and November of 1999 for a Site Characterization Report, and located just to the northwest and up-gradient of the former ranges, showed no acetone, volatile organic carbons, semi-volatile organic carbons, or inorganics at concentrations above FDEP Groundwater Cleanup Target Levels (GCTLs). There are no monitoring wells located down-gradient of the Skeet Range and Trap Range.

5.1.1.6. Cultural and Natural Resources

The Skeet Range and Pistol Range are located within the 600 acres of wetlands located at OLF Bronson. No cultural resources have been identified to date at the Skeet Range and Pistol Range. [Section 3.7](#) of this PA provides further information of cultural and natural resources at OLF Bronson.

5.1.1.7. Endangered and Special Status Species

Threatened, endangered, and special status species identified as potentially occurring at or in the vicinity of OLF Bronson are discussed in [Section 3.8](#). No species have been officially identified at the site; however, several of the species listed as threatened, endangered, or of concern by state or federal agencies have been officially observed in various areas of OLF Bronson (INRMP, 2001). These species include: little blue heron, snowy egret, osprey, alligator snapping turtle, gopher tortoise, American alligator, saltmarsh topminnow, trailing arbutus, spoon-leaved sundew, southern red lily, Chapman's butterwort, orange azalea, white-top pitcher plant, parrot pitcher plant, decumbent pitcher plant, and Harper's yellow-eyed grasses. Of all species discussed in [Section 3.8](#), those that have the potential to occur at the Skeet Range and Pistol Range include: wood stork, red cockaded woodpecker, bald eagle, little blue heron, snowy egret, osprey, Florida black bear, alligator snapping turtle, gopher tortoise, eastern indigo snake, American alligator, trailing arbutus, panhandle lily, orange azalea, white-top pitcher plant, spoon-leaved sundew, Chapman's butterwort, southern red lily, parrot pitcher plant, decumbent pitcher plant, and Harper's yellow-eyed grass.

5.1.2. Visual Survey Observations and Results

Visual surveys of the OLF Bronson Skeet Range and Pistol Range were conducted on 29 November 2007 during the site visit for the initial NAS Pensacola PA. Malcolm Pirnie team members Ms. Susan Burnett, Ms. Angela Nolan, and Mr. Dan Hains were present. The purpose

of the visual surveys was to identify any MEC-related materials (e.g., expended rounds, fragmentation, range debris, or old targets), evidence of MC (ground scarring, stressed vegetation, or chemical residue), or surface features that could provide additional information to aid in the characterization of the site.

The visual surveys consisted of walking the perimeter of the former ranges to determine the presence/absence of MEC and MC along the periphery of the site. The team walked the areas at the site best corresponding to the former locations of the firing positions, target area, and backstop berm. The majority of the region where the Skeet Range and Pistol range are located is covered with thick brush and mature trees, and a wetland



Figure 5.1-5: View of OLF Bronson wetlands with berm in background

habitat in the southern portion of the area where the Pistol Range is located. A shallow drainage channel runs north to south across the western portion of the site, and there are no structures on site or in the immediate vicinity. Fragments of clay targets were observed in the northwestern and northeastern corners of the OLF Bronson Skeet Range. Fragments were also observed



Figure 5.1-6 – View of pintle mount

northwest of the range area. The OLF Bronson Pistol Range has a vegetated earthen berm located to the south of the Skeet Range. The berm was observed during the visual survey; however, it was inaccessible due to standing water and thick vegetation in the wetlands (see [Figure 5.1-5](#)). Four pintle mounts were observed approximately 100 feet to the north of the berm. [Figure 5.1-6](#) displays one of these pintle mounts. No historical documentation has been discovered that links

the pintle mounts to either the Skeet Range or Pistol Range. No MEC, munitions debris, or bullets/bullet fragments were observed during the visual survey, and no structures exist at the site or in the immediate vicinity. A visual depiction of the site reconnaissance is provided on [Map 5.1-1](#) located at the end of [Section 5](#). Additional range/site details are illustrated on [Map 5.1-2](#), also located at the end of [Section 5](#).

5.1.3. Munitions and Munitions-Related Materials Associated with the Site

This section describes the munitions or munitions-related materials known or suspected to be at the site, including the types and estimated maximum penetration depths. This includes both MEC and non-hazardous munitions related scrap (e.g., fragmentation, base plates, inert mortar fins). Potential ordnance concentration areas are presented, along with a discussion on the presence of special consideration ordnance.

Munitions use at the Skeet Range was likely restricted to 12-gauge, 16-gauge, and 20-gauge shotgun rounds and .410-caliber ammunition, while munitions use at the Pistol Range, which was used for small arms weapons training, was likely restricted to .22-caliber, .38-caliber, .45-caliber, and 9-mm ammunition. The exact quantity of ammunition deployed or fired at the former ranges is unknown. Firing records were not available, and there is no defensible method of determining the amount of ammunition potentially fired at the ranges.

Ordnance technical data sheets for the various small arms ammunition listed above are included in [Appendix D](#). Based on the information obtained during the data collection process, other munitions types, including special consideration munitions (e.g., chemical warfare materiel filled munitions, electrically-fuzed munitions, and/or depleted uranium-associated munitions), are not known or suspected to have been used at the site.

5.1.4. MEC Presence

The entire site has been subdivided and categorized into one of three levels of MEC presence, including: Known MEC Areas, Suspected MEC Areas, and Areas Not Expected to Contain

MEC, to indicate that MEC are known or are suspected to be at the site. The MEC presence is discussed below. [Map 5.1-3](#) illustrates the munitions characterization of the OLF Bronson Skeet Range and Pistol Range and is provided at the end of [Section 5](#).

5.1.4.1. Known MEC Areas

Because the site was used only as a skeet range and/or pistol range, there is no historical or known evidence of explosives used at the site; therefore, there is no evidence of MEC. As such, there are no known MEC areas associated with the site.

5.1.4.2. Suspected MEC Areas

There are no suspected MEC areas associated with the site.

5.1.4.3. Areas Not Suspected to Contain MEC

Based on observations made and data collected during the PA process, the 47.6-acre site is not suspected to contain MEC.

5.1.5. *Ordnance Penetration Estimates*

The depth to which munitions penetrate below the ground surface depends on many factors, including the type of soil, the angle of impact, the size of the munitions, the velocity at impact, and site-specific environmental conditions. Over the years, the DoD has studied and modeled munitions penetration depths and has issued various guidance and technical documents on the subject. For the purposes of this PA, maximum probable penetration depths are estimated for the Pistol Range following guidance listed in the latest draft (July 2002) of the DoD Directive on explosives safety issued by the DoD Explosives Safety Board (*DoD Directive 6055.9 [DoD Ammunition and Explosives Safety Standards]*). The directive refers to *TM 5.855.1* and *NAVFAC P-1080*.

Technical documents apply to air dropped and indirect fire weapons and do not apply to skeet ranges; however, by design, skeet ammunition is dispersed as pellets over a small area in the direction of fire. According to the 1958 Navy Programming Guide, the minimum SDZ for a skeet

range is 900 feet. Pellets dispersed from a shotgun would be deposited on the ground surface well within this zone and would not penetrate the ground surface unless disturbed.

By design, a pistol range (small arms range) is a directed fire training range and normally has a backstop (impact) berm located behind the target area that receives/contains the projectiles (bullets) expended on the range. Depending on berm composition, the penetration depths into the backstop berm range from surface to 12 inches. Because the range was designed such that small arms ammunition was fired toward targets and retained on site by the backstop berm, expended rounds are not expected to have penetrated the ground surface or accumulated beyond the former location of the backstop berm. Because the backstop berm at the Pistol Range was an earthen berm, the majority of the ammunition fired at the targets and the berm were retained in the berm.

For small arms ranges, the ITRC has prepared *Characterization and Remediation of Soils at Closed Small Arms Firing Ranges*, dated January 2003, to provide information on the general layout of small arms ranges, as well as information on areas that may be impacted by MC and/or MEC as a result of range use and the characteristics of the munitions used. According to the ITRC guidance, the penetration depth of small arms on the range floor is one foot or less. The document states that rounds that impact the range floor are typically a flat trajectory that fell short of or missed the target or those resulting from ricochet, and these fragments are usually found within the top six inches of soil.

5.1.6. MC

The primary MC of concern associated with small arms ammunition used at a skeet range or pistol range is lead. Metallic lead is insoluble in water, but in the geochemical environment of most ranges it may slowly convert to other oxidized forms. Depending on the environment (e.g., soil characteristics, pH, and organic matter present), oxidation products can become mobile. However, lead mobility is effectively controlled by adsorption under the majority of conditions found on small arms ranges. In general, an exponential decline in lead concentrations has been observed in very short vertical distances due to adsorption or exchange reactions with clays, metal oxides, or organic matter in the soil (ITRC, 2003). As such, lead mobility is not likely to be an issue at most ranges.

Other MC may include antimony, arsenic, copper, nickel, zinc, and constituents associated with black or smokeless powder. However, these constituents are less likely to be of concern since they are either present in the shotgun and small arms ammunition in only minor amounts/concentrations or are typically consumed when the shotgun round is fired. Because clay targets were identified at the Skeet Range, polycyclic aromatic hydrocarbons (PAHs) associated with the targets may also be present at the site. For skeet ranges, the area where the clay targets and lead shot typically accumulated during the active life of the range extended from the firing arc to approximately 600 feet in the general direction of fire. Clay targets typically would be found within the first 300 feet, and lead shot would be found from 300 feet to 600 feet from the firing arcs. The highest densities of clay fragments were observed around the central and easternmost firing arcs at the OLF Bronson Skeet Range.

PAHs present in clay targets tend to be tightly bound in the petroleum pitch and limestone matrix of the target and are not readily available to the environment. In addition, the clay targets contain low solubility, high molecular weight PAHs that are not likely to effectively leach into the surrounding soils. Based on discussions with installation personnel, surface soil sampling at the OLF Bronson Skeet Range and Pistol Range has not occurred. Information obtained from monitoring wells installed to the northwest and up-gradient of the site showed no MC above FDEP GCTLs. A review of Installation Restoration Program documents indicates that no groundwater monitoring wells have been installed down-gradient of the site (Navy PWC, 1997, 1998, 2001).

5.1.7. Contaminant Migration Routes

Migration of MC from the OLF Bronson Skeet Range and Pistol Range may occur naturally due to soil erosion, surface runoff, infiltration and leaching, or plant/animal uptake. Minimal human activity occurs at the site (e.g., hiking and camping), all of which would not likely result in MC migration. No future intrusive environmental investigations or underground utility installations have been identified for the site. Biota constructing burrows at the site could provide an MC migration route from the surface soils into the subsurface. MC in surface water/sediment may also bioaccumulate, and biota and trespassers/hikers that may catch and consume fish could potentially be exposed to MC through the food chain. The presence of on-site surface water bodies, high soil moisture, and high vegetative cover, inhibits the generation and transport of dust; therefore, air migration of contaminants is not expected. Due to the shallow nature of

groundwater at the site and the fact that recharge to the underlying aquifer occurs through local precipitation, MC migration into groundwater may occur.

5.1.8. Receptors

Potential receptors at the Skeet Range and Pistol Range include human and ecological receptors possibly contacting and disturbing or removing soil impacted by the lead bullets, bullet fragments, or clay target fragments at the site. Potential human receptors include Navy personnel (including MWR employees and members of Combat Support Squadron 16), visitors (including off-duty Navy personnel), off-site workers/residents, and trespassers/hikers. Potential ecological receptors include common flora and fauna, such as small mammals (i.e., foxes, bears, and squirrels), reptiles (e.g., snakes), birds, and terrestrial plants. Aquatic ecological receptors in nearby surface water may include various species of fish, amphibians, and aquatic/wetland vegetation. Potential ecological receptors also include species that are threatened, endangered, or of concern by state and federal agencies that have the potential to inhabit the site, some of which have been officially observed at OLF Bronson. These species include: wood stork, red cockaded woodpecker, bald eagle, little blue heron, snowy egret, osprey, Florida black bear, alligator snapping turtle, gopher tortoise, eastern indigo snake, American alligator, trailing arbutus, panhandle lily, orange azalea, white-top pitcher plant, spoon-leaved sundew, Chapman's butterwort, southern red lily, parrot pitcher plant, decumbent pitcher plant, and Harper's yellow-eyed grass.

Human receptors may come into direct contact with MC while performing training exercises (Navy personnel involved with Combat Support Squadron 16 helicopter training), or while performing recreational activities such as camping, hiking, or fishing (visitors and Navy personnel working at the MWR facility; trespasser/hikers). In addition, off-site workers/residents located in small residential communities within 1,000 yards and down-gradient of the site could potentially be exposed to MC in groundwater. Ecological receptors may come into direct contact with MC in surface water/sediment, surface soil, subsurface soil, and groundwater while foraging or burrowing, or through root systems positioned in surface soils. Ecological and human receptors may also come into contact with MC that has been incorporated into the food chain (bioaccumulated in plants and small animals).

5.1.8.1. Nearby Populations

OLF Bronson is located in Escambia County, FL, which has a population density of approximately 444.7 people per square mile and a reported population of 294,410, per the 2000 U.S. Census. Approximately 14,720 civilian and military personnel are employed at NAS Pensacola (INRMP, 2001). The area surrounding the installation is primarily undeveloped, with some small areas used for residential purposes.

5.1.8.2. Buildings Near/Within Site

There are no buildings on or near the OLF Bronson Skeet Range and Pistol Range. An earthen berm approximately 330 feet in length, 90 feet in width, and eight feet high is the only remaining structure located at the site. Two inactive runways are located 600 to 700 feet to the north of the berm.

5.1.8.3. Utilities On/Near Site

No utilities were identified at or in the vicinity of the OLF Bronson Skeet Range and Pistol Range.

5.1.9. Land Use

The Skeet Range and Pistol Range are currently closed and have no designated land uses. Two inactive runways at OLF Bronson are located approximately 400 to 500 feet to the north of the Skeet Range, which are used by Combat Support Squadron 16 for helicopter training. The MWR facility is located approximately 0.73 miles to the northwest of the site.

5.1.10. Access Controls/Restrictions

The Skeet Range and Pistol Range are within the boundaries of OLF Bronson. No fence surrounds the area and the former ranges are accessible by the public; however, thick vegetation and wetland and swamp habitats limit accessibility to the majority of the former ranges.

5.1.11. Conceptual Site Model

This Conceptual Site Model (CSM) was developed following guidance documents issued by the USEPA for hazardous waste sites and the USACE for ordnance and explosives sites. Guidance documents include the USEPA's *Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA* and the *Final USACE CSM Guidance Development of Integrated Conceptual Site Models for Environmental Ordnance and Explosives Sites* (USEPA, 1988; USACE, 2002).

The CSM describes the site and its environmental setting. The CSM presents information regarding: 1) MEC and/or MC known or suspected to be at the site; 2) current and future reasonably anticipated or proposed uses of the real property; and 3) actual, potentially complete, or incomplete exposure pathways linking them. The CSM is the basis for the prioritization and remediation cost estimate.

The CSM is presented in a series of information profiles that provide information about the site. The information profiles are included in [Table 5.1-1](#).

Table 5.1-1: Conceptual Site Model Information Profiles – OLF Bronson Skeet Range		
Profile Type	Information Needs	PA Findings
Range/Site Profile	Installation Name	OLF Bronson – NAS Pensacola
	Installation Location	Escambia County, Florida
	Range/Site Name	OLF Bronson Skeet Range and Pistol Range
	Range/Site Location	OLF Bronson is located on the east side of Perdido Bay, approximately five miles west of Pensacola, Florida and about one mile east of the Alabama border. The Skeet Range and Pistol Range are located within the southern boundary of the OLF.
	Range/Site History	The ranges were shown on maps dated 1943 through 1949. No other information regarding the range histories was located.

Table 5.1-1: Conceptual Site Model Information Profiles – OLF Bronson Skeet Range		
Profile Type	Information Needs	PA Findings
	Range/Site Area and Layout	The OLF Bronson Skeet Range is located approximately 400 feet to the southeast of OLF Bronson Runway 4 and approximately 500 feet to the west of Runway 36. The berm for the OLF Bronson Pistol Range is located approximately 200 feet south of the OLF Bronson Skeet Range. The site, which includes the Skeet Range and Pistol Range, is approximately 47.6 acres.
	Range/Site Structures	A skeet range house used for storage (Building 1145) and four structures that appear to be high/low skeet houses were denoted on historical maps dating 1943 to 1949; however, no evidence of these buildings was observed during the visual site surveys conducted in January and November of 2007. The OLF Bronson Pistol Range has a large earthen berm approximately 330 feet in length, 90 feet in width, and eight feet high. No other structures exist at the site or in the immediate vicinity.
	Range/Site Boundaries	N: Thickly vegetated undeveloped area, airfield S: Wetlands, thickly vegetated undeveloped area W: Thickly vegetated undeveloped area E: Thickly vegetated undeveloped area, airfield
	Range/Site Security	The OLF Bronson Skeet Range and Pistol Range are accessible by the public; however, thick vegetation limits accessibility to the majority of the former ranges.
Munitions/Release Profile	Munitions Types	Specific ordnance types used at the ranges were not documented; however, typical small arms used for practice at skeet ranges are 12-gauge, 16-gauge, and 20-gauge shotgun rounds and .410-caliber ammunition, while .22-, .38-, and .45-caliber and 9-mm rounds are typically used at pistol ranges.
	Maximum Probability Penetration Depth	Pellets dispersed from a shotgun used at the OLF Bronson Skeet Range would be deposited on the ground surface and would not penetrate the ground surface unless disturbed. Maximum penetration depth for the backstop berm for the OLF Bronson Pistol Range is 12 inches.

Table 5.1-1: Conceptual Site Model Information Profiles – OLF Bronson Skeet Range		
Profile Type	Information Needs	PA Findings
	MEC Density	Based on historical documentation, the OLF Bronson Skeet Range and Pistol Range were used only for small arms training. MEC are not suspected to be present at the site.
	Munitions Debris	Fragments of clay targets were observed both to the northwest and northeast of the OLF Bronson Skeet Range firing arcs. No evidence of munitions debris was identified during the visual survey in the vicinity of the Pistol Range berm or pintle mounts.
	Associated Munitions Constituents	<p>The primary MC associated with small arms ammunition is lead. Other MC may include antimony, arsenic, copper, zinc and constituents associated with black and/or smokeless powder; however, these constituents are less likely to be of concern as they are either present in only minor concentrations or are typically consumed when the small arms ammunition is fired. PAHs may be present from the broken clay targets.</p> <p>No soil sampling regarding MC has been conducted at the site. Information obtained from monitoring wells installed to the northwest and up-gradient of the site showed no MC above FDEP GCTLs. A review of Installation Restoration Program documents indicates that no groundwater monitoring wells have been installed down-gradient of the site (Navy PWC, 1997, 1998, 2001).</p>
	Migration Routes/Release Mechanisms	Migration of MC from the OLF Bronson Skeet Range and Pistol Range may occur naturally due to soil erosion, surface runoff, infiltration and leaching, or through plant/animal uptake.

Table 5.1-1: Conceptual Site Model Information Profiles – OLF Bronson Skeet Range		
Profile Type	Information Needs	PA Findings
Physical Profile	Climate	The climate at OLF Bronson is humid, sub-tropical and is characterized by short, mild winters and long, warm summers. The average monthly temperature in the wintertime is 54 °F, while the average monthly temperature in the summertime is 80°F. The average annual temperature is 68°F. There is an average of nine freezes per year; however, temperatures in the area rarely fall below 15°F - 20°F. The average annual precipitation totals around 62 inches or less, with the wettest month being July, which has an average precipitation of 7.2 inches, and the driest month being November, which has an average precipitation of 3.4 inches. Severe weather includes thunderstorms, tornadoes, tropical storms, and hurricanes. Hurricane season is June through November. The last hurricanes to affect the Pensacola area were Hurricanes Erin and Opal in 1995, Hurricane Ivan in 2004, and Hurricane Dennis in 2005.
	Topography	OLF Bronson resides in the Coastal Lowland topographic division of the Coastal Plain physiographic division of the U.S. Elevation of OLF Bronson ranges from 20 to 30 feet above msl along a northwestern terrace on the property to sea level along the western portion of the property. With a few exceptions along the northwest corner of the property, topography is level to gently sloping (less than 8% slope). The Skeet Range and Pistol Range, which are located in the southern portion of OLF Bronson, are located in a relatively flat area surrounded by wetlands.

Table 5.1-1: Conceptual Site Model Information Profiles – OLF Bronson Skeet Range		
Profile Type	Information Needs	PA Findings
	Geology	<p>The Skeet Range and Pistol Range are located in the Gulf Coastal Lowlands physiographic region, which is predominantly composed of unconsolidated sands, silts, and clays. Unconsolidated sands with minor amounts of clay and organics comprise the surface deposits in the region, which are underlain by undifferentiated terrace deposits and the Citronelle Formation of Pleistocene age (FGS, 1994). These Pleistocene units are found at depths ranging from 50 to 55 feet bgs, and are approximately 400 feet in thickness, consisting of fine- to coarse-grained sand with lenses of clay and gravel (FGS, 1994). Underlying the undifferentiated terrace deposits and Citronelle Formation are Miocene coarse clastics comprised of fossiliferous sands with lenses of gravel and clay, having a thickness of approximately 500 feet (FGS, 1994).</p>
	Soil	<p>According to the Soil Survey for Escambia County, soils immediately surrounding the airfield are generally a loamy, friable, loose sand that has somewhat poor drainage (USDA, 2004). The areas to the south and southwest of the airfield, where the Skeet Range and Pistol Range are located, are characterized by poorly-drained sandy soils and muck, and the areas to the north and northwest are characterized by loose sand with excessive drainage (USDA, 2004). Surface sediments in the OLF Bronson area are classified as Croatan, Foxworth, Hurricane, Lakeland, Leon, Pickney, and Pottsburg sands, as well as Urban Land and Depressional associations (USDA, 2004). Specifically, the Skeet Range and Pistol Range contain the Hurricane and Pottsburg sands, as well as the Croatab Muck Depressional.</p>
	Hydrogeology	<p>Depth to groundwater at the Skeet Range and Pistol Range is approximately two feet bgs. Information from monitoring wells installed in September and November of 1999 for a Site Characterization Report, and located just to the northwest and up-gradient of the former ranges, showed no acetone, volatile organic carbons, semi-volatile organic carbons, or inorganics at concentrations above FDEP GCTLs (Navy PWC, 2001).</p>

Table 5.1-1: Conceptual Site Model Information Profiles – OLF Bronson Skeet Range		
Profile Type	Information Needs	PA Findings
	Hydrology	OLF Bronson drains into the wetland/swampy area where the Skeet Range and Pistol Range are located. The wetlands area drains into Perdido Bay, located approximately 0.75 miles to the west, and Tarkiln Bayou, located 0.37 miles to the south. There are no known major surface water consumptive uses within the area.
	Vegetation	The area surrounding the Skeet Range and Pistol Range is predominantly wooded, with plant species such as slash and longleaf pines, oaks, willows, magnolias, hickories, and gums.
Land Use and Exposure Profile	Current Land Use	The OLF Bronson Skeet Range and Pistol Range are currently closed and have no designated or future planned land uses.
	Current Human Receptors	Current human receptors include Navy personnel/visitors, off-site workers/residents, and trespassers/hikers. Navy personnel include individuals involved with helicopter training in the area or those working at the Morale, Welfare, and Recreation facility. Visitors may include individuals participating in recreational activities with the MWR facility. Off-site workers/residents include individuals living down-gradient of the site. Trespassers/hikers include civilian campers, hikers, or naturalists who can access the site from Perdido Bay.
	Current Activities (frequency, nature of activity)	Frequent activities are anticipated for Navy personnel/visitors and infrequent activities are expected for trespassers/hikers. Navy personnel may access the site during helicopter training or while conducting recreational activities with visitors of the MWR facility, such as camping or hiking. Trespassers/hikers may access the site to camp, fish, or explore.
	Potential Future Land Use	No change in land use is planned.
	Potential Future Human Receptors	No potential for future human receptors is anticipated beyond the current receptors, as no change in land use is planned.
	Potential Future Land Use Related Activities	No future land use related activities are anticipated.

Table 5.1-1: Conceptual Site Model Information Profiles – OLF Bronson Skeet Range		
Profile Type	Information Needs	PA Findings
	Zoning/Land Use Restrictions	There are no zoning/land use restrictions at the OLF Bronson Skeet Range and Pistol Range.
	Beneficial Resources	Two sites were identified as “potentially eligible” for the National Register of Historic Places in a 1995 and 1996 archaeological investigation of OLF Bronson (ICRMP, 2004). The sites contained ceramic artifacts and shards, midden stained sediment deposits, and architectural features from Pre-historic, Second Spanish Colonial, British period, Early American, and/or 19 th and 20 th Century American times. No beneficial resources were specifically located at the OLF Bronson Skeet Range or Pistol Range.
	Demographics/Zoning	The population density for Escambia County is 444.7 people/square mile (2000 Census). Approximately 14,720 civilian and military personnel are employed at NAS Pensacola (INRMP, 2001).
Ecological Profile	Habitat Type	The area surrounding the Skeet Range and Pistol Range is predominantly wooded and supports a wide variety of plant species typical of humid subtropical climates. Slash and longleaf pines are the most abundant species in the area. Along with the pines, trees such as oaks, willows, magnolias, hickories, and gums grow naturally in the area.
	Degree of Disturbance	The current and future land uses of the OLF Bronson Skeet Range and Pistol Range result in a low degree of disturbance to the habitat or ecological receptors.

Table 5.1-1: Conceptual Site Model Information Profiles – OLF Bronson Skeet Range		
Profile Type	Information Needs	PA Findings
	Ecological Receptors	<p>Terrestrial ecological receptors may include mammals (e.g., foxes, bears, and squirrels), reptiles (e.g., snakes), terrestrial plants, and a variety of bird species. Aquatic ecological receptors in nearby surface water may include various species of fish, amphibians, and aquatic/wetland vegetation.</p> <p>Species which are threatened, endangered, or of concern by state and federal agencies that have the potential to inhabit the site, some of which have been officially observed at OLF Bronson, include: wood stork, red cockaded woodpecker, bald eagle, little blue heron, snowy egret, osprey, Florida black bear, alligator snapping turtle, gopher tortoise, eastern indigo snake, American alligator, trailing arbutus, panhandle lily, orange azalea, white-top pitcher plant, spoon-leaved sundew, Chapman’s butterwort, southern red lily, parrot pitcher plant, decumbent pitcher plant, and Harper’s yellow-eyed grass.</p>
	Relationship of MEC/MC Sources to Habitat and Potential Receptors	<p>Flora may bioaccumulate MC in surface and/or subsurface soil, via plant uptake. Fauna may be exposed to MC in surface soil through ingestion, dermal contact, and inhalation or by ingesting vegetation or prey organisms that may bioaccumulate MC.</p>

A key element of the CSM is the exposure pathway analysis. For MEC, a complete or potentially complete exposure pathway must include the following components: 1) a source (e.g., locations where MEC are expected to be found); 2) access (e.g., controlled or uncontrolled access, items on the surface or within the subsurface); 3) an activity (e.g., nonintrusive grounds maintenance, intrusive construction); and 4) receptors (e.g., Navy personnel, construction workers, recreational users, authorized visitors). It is important to recognize that environmental mechanisms (e.g., erosion) and/or human intervention may result in the repositioning of MEC.

For MC, a complete or potentially complete exposure pathway must include the following components: 1) a source (e.g., locations where MC are expected to be found); 2) an exposure medium (e.g., surface soil); 3) an exposure route (e.g., dermal contact); and 4) receptors (e.g.,

Navy personnel, construction workers, recreational users, authorized visitors). If the point of exposure is not at the same location as the source, the pathway may also include a release mechanism (e.g., erosion) and a transport medium (e.g., surface water).

The potential interactions between the source and receptors are assessed differently for MEC and MC. For MEC, interaction between the potential receptors and an MEC source has two components. The receptor must have access to the source and must engage in some activity that results in contact with individual MEC items within the source area. For MC, interaction between the source and receptors involves a release mechanism for the MC, an exposure medium that contains the MC, and an exposure route that places the receptor into contact with the contaminated medium.

[Figure 5.1-7](#), included at the end of this section, provides a graphical representation of the current understanding of OLF Bronson Skeet Range and Pistol Range and identifies the exposure pathways where site receptors could come in contact with, or be impacted by, MC. Based on the information obtained during the site visit, including observations made during the visual survey and data collected during the site visit, the potential for MEC does not exist at the site and no complete exposure pathways exist for MEC; therefore, an Exposure Pathway Analysis Figure for MEC was not created. However, information obtained and visual observations indicate that the potential for MC does exist.

MC-contaminated soil represents a potential source medium, as illustrated in the MC Exposure Pathway Analysis Figure ([Figure 5.1-7](#)). Potential human receptors include Navy personnel (including MWR employees and members of Combat Support Squadron 16), visitors (including off-duty Navy personnel), off-site workers/residents, and trespassers/hikers. Potential ecological receptors include common flora and fauna, such as small mammals (i.e., foxes, bears, and squirrels), reptiles (e.g., snakes), birds, and terrestrial plants. Aquatic ecological receptors in nearby surface water may include various species of fish, amphibians, and aquatic/wetland vegetation. Potential ecological receptors also include threatened and endangered species identified at OLF Bronson, such as the trailing arbutus, heartleaf, mountain laurel, panhandle lily, large-leaved jointweed, orange azalea, white-top pitcher plant, red-flowered pitcher plant, and silky camellia. In addition to those species identified, other threatened or endangered species that

may inhabit the site include: the Eastern indigo snake, Arctic peregrine falcon, southeastern kestrel, bald eagle, wood stork, and the Florida black bear.

Because of the wetland area in the southern portion of the site, the small natural drain in the western portion of the site, and the fact that drainage flows south into Tarkiln Bayou (located approximately 651 yards to the south of the site), MC may migrate between interconnected surface water bodies and from soil to surface water/sediment through surface water runoff. Due to the fact that the adjacent airfield is used by Combat Support Squadron 16 helicopters for training, and that recreational activities such as camping or hiking occur within the area, potential receptors include Navy personnel involved in helicopter training or working at the MWR facility; visitors of the MWR facility participating in recreational activities; off-site workers/residents that may fish in Tarkiln Bayou; trespassers/hikers exploring the area; and aquatic and terrestrial biota that forage in the sediment and/or ingest surface water. Potentially complete exposure pathways exist throughout the site for biota via incidental ingestion and dermal contact, and for Navy personnel/visitors, off-site workers/residents, and hikers/trespassers via dermal contact.

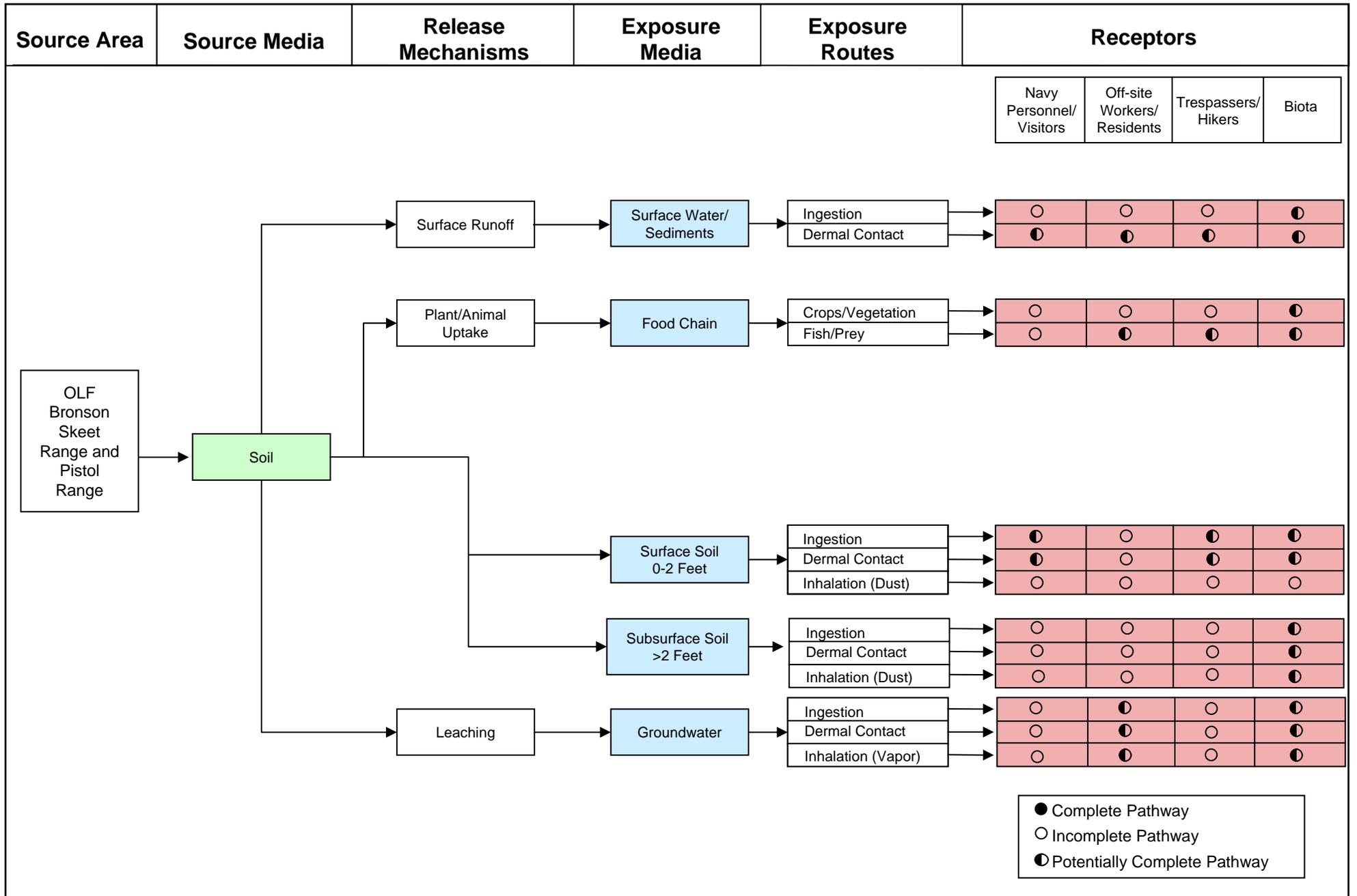
MC may be present in the surface soil at the Pistol Range from bullets that were fired around and into the Pistol Range berm. For the Skeet Range, MC may be present in the surface soil from shot fall within the range and from clay fragments. Due to the fact that the adjacent airfield is used by Combat Support Squadron 16 helicopters for training, and that recreational activities such as camping or hiking occur within the area, potential receptors include Navy personnel involved in helicopter training or working at the MWR facility; visitors of the MWR facility participating in recreational activities; trespassers/hikers exploring the area; biota that construct burrows or forage on the former ranges; and threatened or endangered plant species that may exist on site, which may have root systems in the surface soil. Potentially complete exposure pathways exist throughout the site for these receptors via incidental ingestion and dermal contact. Inhalation is not considered to be a potentially complete pathway due to the presence of on-site surface water bodies, high soil moisture, and high vegetative cover, which can inhibit the generation and transport of dust.

MC may be present in subsurface soil at both ranges due to migration from the overlying surface soil via leaching mechanisms. Biota may be exposed to MC in subsurface soil while constructing burrows; therefore, potentially complete exposure pathways exist for this receptor via incidental

ingestion and dermal contact. Inhalation is not considered to be a potentially complete pathway due to the presence of on-site surface water bodies, high soil moisture, and high vegetative cover, which can inhibit the generation and transport of dust. Since future environmental investigations and underground utility installation have not been identified or anticipated for Navy personnel, and since no digging or excavating is warranted for Navy personnel/visitors or trespassers/hikers participating in recreational activities at the site, no potentially complete pathways exist for these receptors.

Depth to groundwater at the OLF Bronson Skeet Range and Pistol Range is approximately two feet bgs. Due to the semi-confining unit within the Sand-and-Gravel Aquifer, vertical flow between the surface and the main producing zone of the aquifer, where the OLF Bronson and NTTC Corry Station production wells are located, is restricted; therefore, MC migration into the main producing zone of the Sand-and-Gravel aquifer and subsequently into the production wells at Corry Station is not likely. However, groundwater within the surficial zone of the Sand-and-Gravel Aquifer could potentially be used via private wells for consumption or irrigational purposes; therefore, groundwater exposure pathways are considered to be potentially complete for off-site receptors that are located down-gradient from the site. In addition, due to the shallow nature of groundwater at the site and the consequent ease of exposure, groundwater exposure pathways are considered to be potentially complete for burrowing biota and for any threatened or endangered plant species that may exist on site which have root systems within the saturated soil zone.

MC in soil may accumulate in plants, which can subsequently be consumed by animals foraging on the ranges or consumed by fish in on-site surface waters. Predation of prey and/or consumption of vegetation on the Skeet Range and Pistol Range, or fish in on-site surface waters, may result in bioaccumulation of MC. In addition, since the site drains into Tarkiln Bayou, located approximately 651 yards to the south, MC may accumulate in aquatic plants and fish of this surface water body, and subsequently be consumed by foraging animals or by human receptors fishing. Potentially complete exposure pathways are therefore identified for biota that may be exposed to MC through the food chain and for off-site workers/residents and trespassers/hikers who may fish in the on-site water bodies or in Tarkiln Bayou.



5.1.12. Summary

The OLF Bronson Skeet Range and Pistol Range site boundary consists of 47.6 acres. The Skeet Range is located approximately 400 feet to the southeast of OLF Bronson Runway 4 and approximately 500 feet to the west of Runway 36. The large earthen berm approximately 330 feet in length, 90 feet in width, and eight feet high that is associated with the Pistol Range is located approximately 200 feet south of the Skeet Range. The entire site, including the berm, is densely vegetated with thick brush and mature trees. Most of the site, particularly in the southern portion, is located within a wetland/swamp habitat that drains to the west into Perdido Bay, and to the south into Tarkiln Bayou. The site currently has no designated land uses or zoning; however, Navy personnel may access the site during helicopter training or while conducting recreational activities with visitors of the MWR facility, such as camping or hiking. In addition, trespassers/hikers may access the site to camp, fish, or explore.

The ranges were shown on maps dated 1943 through 1949. No other information regarding the range histories was located. A skeet range house used for storage (Building 1145) and four structures that appear to be high/low skeet houses were denoted on the historical maps; however, no evidence of these buildings was observed during the visual site surveys conducted in January and November of 2007. Aside from the large earthen berm on the former Pistol Range, no other structures exist at the site or in the immediate vicinity. The exact usage and period of operation for the ranges are unknown, and specific ordnance types used at the ranges were not documented; however, typical small arms used for practice at skeet ranges are 12-gauge, 16-gauge, and 20-gauge shotgun rounds and .410-caliber ammunition, while .22-, .38-, and .45-caliber and 9-mm rounds are typically used at pistol ranges. Fragments of clay targets were observed both to the northwest and northeast of the Skeet Range firing arcs; however, no evidence of munitions debris was identified at the Pistol Range.

Information obtained during the site visit and observations made during the visual survey provided no evidence of MEC. No bullets or bullet fragments were observed at the site. The potential for MC exists at the site, of which lead is considered the primary MC of concern. Other MC may include antimony, arsenic, copper, zinc and constituents associated with black and/or

smokeless powder; however, these constituents are less likely to be of concern as they are either present in only minor concentrations or are typically consumed when the small arms ammunition is fired.

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**MALCOLM
PIRNIE**

**Map 5.1-1
Visual Survey
OLF Bronson
Skeet Range and Pistol Range**

Legend

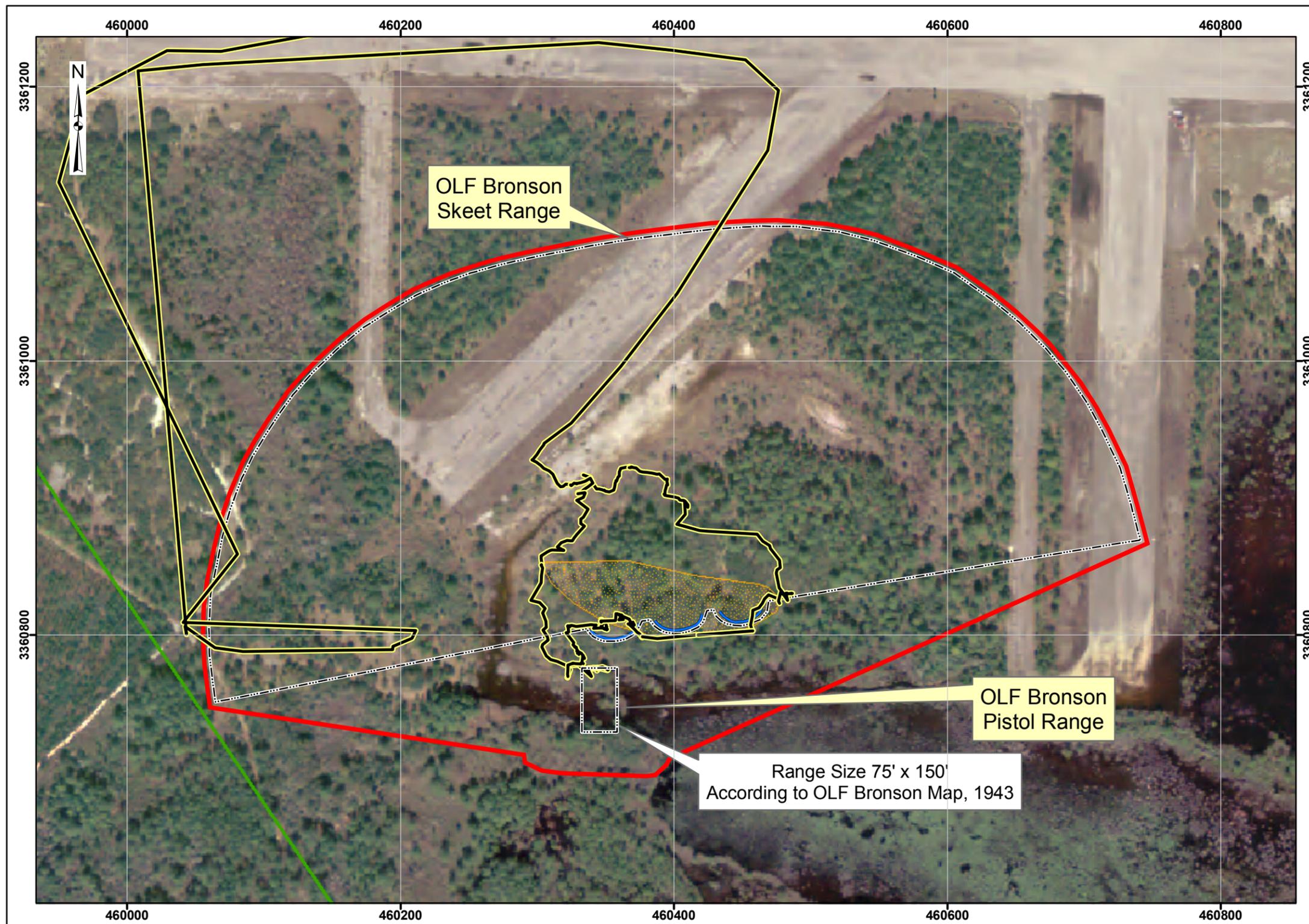
-  Installation Boundary
-  Range Boundary
-  Site Boundary
-  Firing Line
-  Site Reconnaissance
-  Clay Fragments

0 25 50 100
Meters

Data Source: NAS Pensacola, GIS Data, 2007
Map of Bronson Field Naval Auxiliary
Air Station Pensacola, FL Showing
Conditions on June 30, 1943

Coordinate System: UTM Zone 16N
Datum: NAD83
Units: meters

Contract: N62472-02-D-1300
Edition: Final Preliminary Assessment
Date: August 2009



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Naval Air Station Pensacola, Florida**

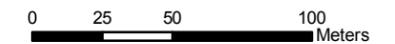


**MALCOLM
PIRNIE**

**Map 5.1-2
Range/Site Details
OLF Bronson
Skeet Range and Pistol Range**

Legend

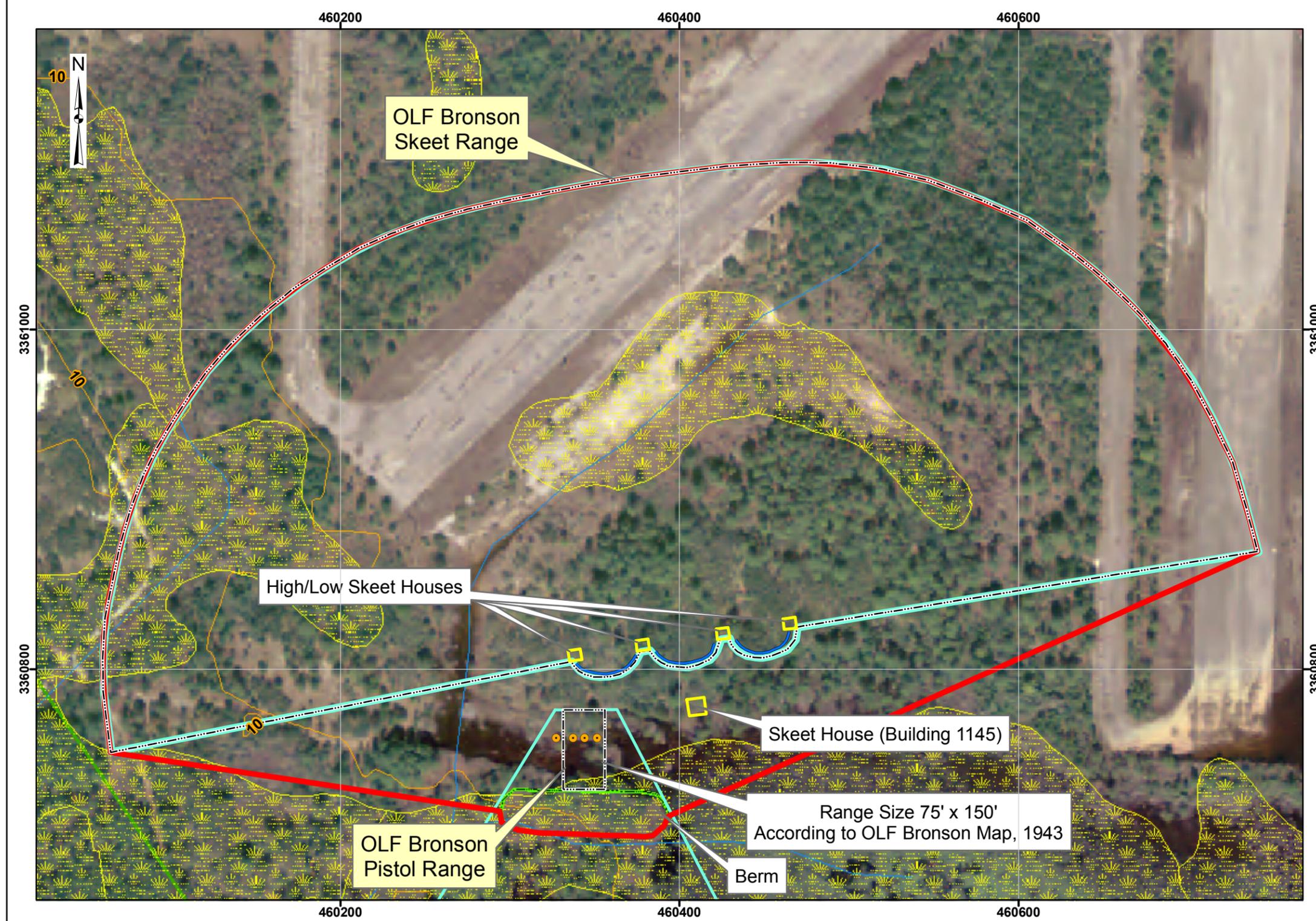
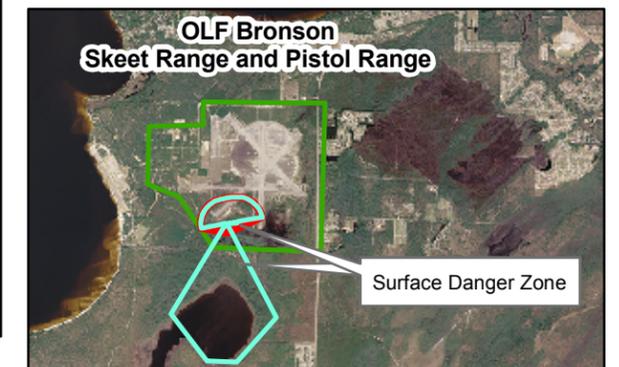
-  Installation Boundary
-  Range Boundary
-  Site Boundary
-  Surface Danger Zone
-  Historical Site Features
-  Firing Line
-  Elevation Contour (10-ft interval)
-  Streams
-  Wetlands
-  Berm
-  Pintle Mounts



Data Source: NAS Pensacola, GIS Data, 2007
Map of Bronson Field Naval Auxiliary
Air Station Pensacola, FL Showing
Conditions on June 30, 1943

Coordinate System: UTM Zone 16N
Datum: NAD83
Units: meters

Contract: N62472-02-D-1300
Edition: Final Preliminary Assessment
Date: August 2009



**Preliminary Assessment
Naval Air Station Pensacola, Florida**



**MALCOLM
PIRNIE**

**Map 5.1-3
Munitions Characterization
OLF Bronson
Skeet Range and Pistol Range**

Legend

-  Installation Boundary
-  Range Boundary
-  Site Boundary
-  Firing Line
- MEC Presence***
-  Known
-  Suspect

*There is no evidence of MEC presence as determined through historical documentation, interviews, and visual survey. Visual observations and/or historical documentation indicate that MC may be present at the site, but MC presence has not been confirmed by sampling or other means.



Data Source: NAS Pensacola, GIS Data, 2007
Map of Bronson Field Naval Auxiliary
Air Station Pensacola, FL Showing
Conditions on June 30, 1943

Coordinate System: UTM Zone 16N
Datum: NAD83
Units: meters

Contract: N62472-02-D-1300
Edition: Final Preliminary Assessment
Date: August 2009



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8 June 1950 memorandum from the Chief of the Bureau of Yards and Docks to the Commander, Naval Air Training Bases discussing the demolition and removal of 35 structures on Outlying Field, Bronson Field.

1 March 2000 letter from Florida Department of Environmental Protection to Mr. Bill Hill, requesting No Further Action for Site 100 and additional groundwater assessment for Site 102, Outlying Landing Field Bronson, Pensacola, Florida.

13 April 2001 letter from Florida Department of Environmental Protection to Mr. Bill Hill, requesting No Further Action for Site 102, Outlying Landing Field Bronson, Pensacola, Florida.

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<http://www.naspensacola.navy.mil> (Installation Information)

<http://www.pafw.com/bronson.htm> (Installation Information)

<http://www.nps.gov> (Regional Information)

<http://www.usgs.gov> (Regional Information)

<http://ns.gov.gu> (Regional Information)

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<http://geocities.com> (Regional/Demographics Information)

<http://census.gov> (Demographics Information)

<http://fws.gov> (Threatened and Endangered Species Information)

Note: The websites listed above were accessed on 7 November 2007 through 29 November 2007.

Maps

Pensacola, Florida, Bronson Field Naval Air Station, Prepared by: NAS Pensacola Department of Public Works, 30 June 1942

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August 2009

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Appendix B: Project Source Data – General

(Source Data Provided on Compact Disc)

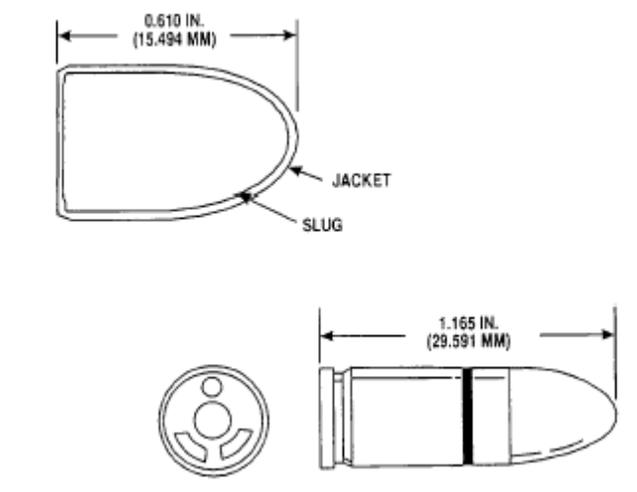
Appendix C: Project Source Data – Site-Specific

(Source Data Provided on Compact Disc)

Appendix D: Ordnance Technical Data Sheets

Ordnance Technical Data Sheet

Cartridge, 9-mm Ball, NATO, M882



Nomenclature:	Cartridge, 9-mm Ball, NATO, M882
Ordnance Family:	Small Arms
DODIC:	1305-A3
Propelling Charge:	Propellant HPC 26
Item Weight:	179 gr (6.314 oz)
Diameter:	9.00 mm (.3543 in)
Length:	29.591 mm (1.165 in)
Maximum Range:	Not provided
Fuze:	N/A

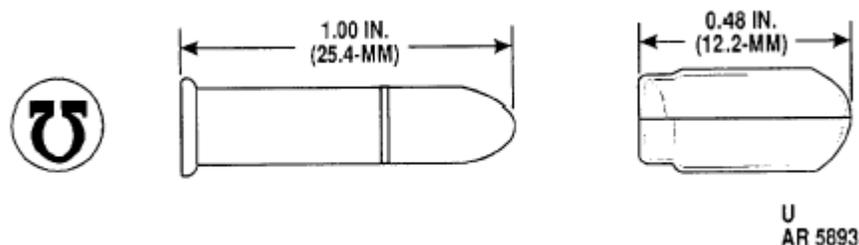
Usage: Pistol, 9mm, M9. The cartridge is intended for use against personnel.

Description: Ball Cartridge. The cartridge is identified by a plain bullet tip.

Reference: U.S. Army Technical Manual, TM 43-0001-27

Ordnance Technical Data Sheet

.22-Caliber Small Arms



Nomenclature:	.22-Caliber Small Arms Ammunition
Ordnance Family:	Small Arms
DODIC:	A086
Propelling Charge:	Single or Double Base Powder
Item Weight:	416 gr
Projectile Weight:	40.5 gr
Diameter:	.22 in
Length:	25.4 mm (1 in)
Maximum Range:	Not Provided
Fuze:	N/A

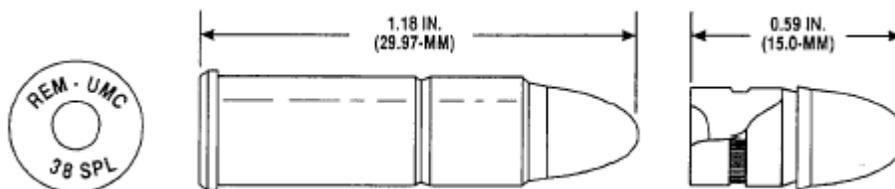
Usage: Subcaliber Rifle M2A1; Caliber .22 Rifle; Remington Models 40X and M513T; Steven's Model 416-2; Winchester Models 52 and 75; Machine Gun Trainers M3 and M4; pistols for gallery practice and training purposes. The cartridge is intended for use against small game for survival purposes.

Description: BALL Cartridge. The cartridge is identified by a plain bullet tip.

Reference: U.S. Army Technical Manual, TM 43-0001-27

Ordnance Technical Data Sheet

.38-Caliber Small Arms



Nomenclature:	.38-Caliber Small Arms Ammunition
Ordnance Family:	Small Arms
DODIC:	A408
Propelling Charge:	Single or Double Base Powder
Item Weight:	196 gr
Projectile Weight:	60.5 gr
Diameter:	.38 in
Length:	29.97 mm (1.18 in)
Maximum Range:	Not Provided
Fuze:	N/A

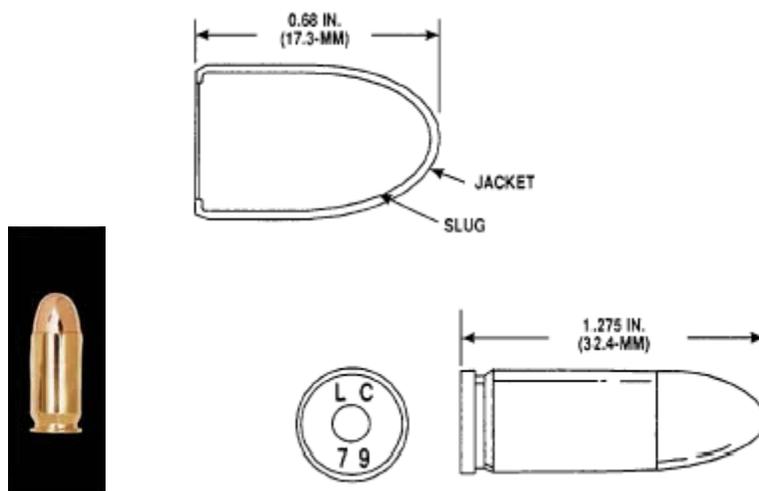
Usage: Caliber .38 weapons. The cartridge is intended for CONUS-guard or security use in caliber .38 weapons.

Description: BALL Cartridge. The cartridge is identified by a plain bullet tip.

Reference: U.S. Army Technical Manual, TM 43-0001-27

Ordnance Technical Data Sheet

Cartridge Ball, .45-Caliber, M1911



Nomenclature: Cartridge Ball, -45-Caliber, M1911
Ordnance Family: Small Arms
DODIC: 1305-A480 (NSN) 1305008922526
Propelling Charge: Propellant SR 7970
Item Weight: 332 gr (11.32 oz)
Diameter: 11.43 mm (.45 in)
Length: 32.4 mm (1.275 in)
Maximum Range: Not Provided
Fuze: N/A

Usage: Submachine Gun, Caliber .45, M3A1, and Pistol, Caliber .45, M1911A1. The cartridge is intended for use against personnel.

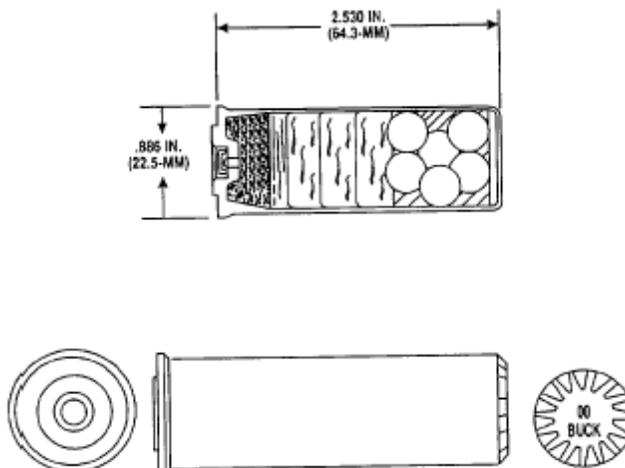
Description: BALL Cartridge. This cartridge is identified by a plain bullet tip

Reference: U.S. Army Technical Manual, TM 43-0001-27

Ordnance Technical Data Sheet

12-Gauge, Shotgun, No. 00

CARTRIDGE, 12 GAGE, SHOTGUN, NO. 00, M162



Nomenclature:	12-gauge, Shotgun, No. 00
Ordnance Family:	Small Arms
DODIC:	A011
Propelling Charge:	Smokeless Powder
Item Weight:	0.736 gr
Diameter:	22.5 mm (0.886 in)
Length:	64.3 mm (2.53 in)
Maximum Range:	Not provided
Fuze:	Percussion

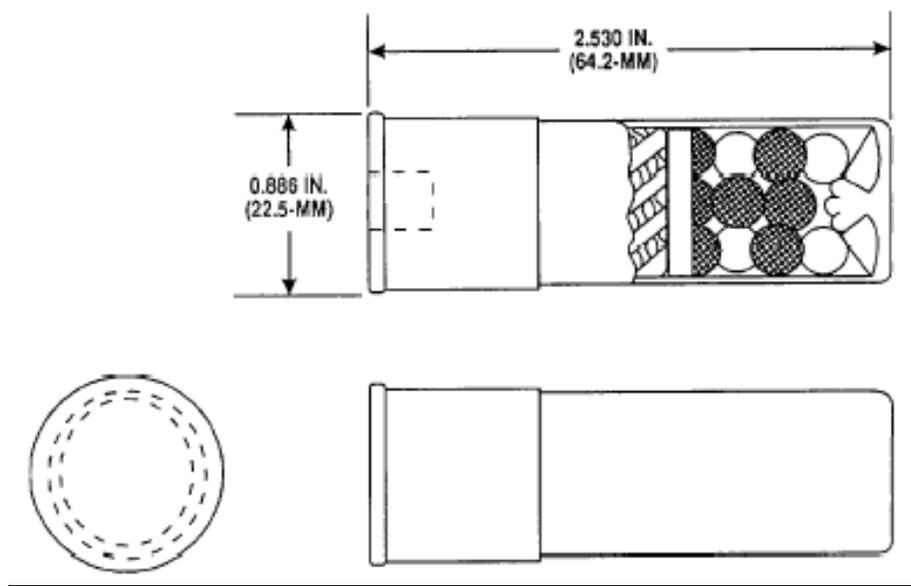
Usage: Military issue shotgun, 2-3/4 inch chamber. The cartridge is intended for guard and combat use.

Description: The cartridge case is plastic and is loaded with No. 00 commercial shot. Smokeless powder is used as the propelling charge.

Reference: U.S. Army Technical Manual, TM 9-1400-200, Ammunition General, October 1969
U.S. Army Field Manual, FM 9-13, Ammunition Handbook, January 1981

Ordnance Technical Data Sheet

Cartridge, 12-Gauge, Shotgun, No. M247



Nomenclature: 12-Gauge, Shotgun, No. M247
Ordnance Family: Small Arms
DODIC: 1305-A011
Propelling Charge: Smokeless Powder
Item Weight: 740 gr
Diameter: 22.5 mm (0.886 in)
Length: 64.2 mm (2.530 in)
Maximum Range: Not Provided
Fuze: Percussion

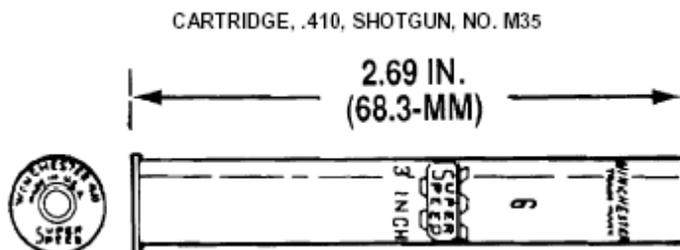
Usage: Military issue, riot-type shotgun, 20-in barrel cylinder bore. The cartridge is intended for use against small game and for riot control.

Description: The cartridge case may be paper or plastic and is loaded with No. 4 hard chilled shot. Smokeless powder is used as the propelling charge.

Reference: U.S. Army Technical Manual, TM 9-1400-200, Ammunition General, October 1969
U.S. Army Field Manual, FM 9-13, Ammunition Handbook, January 1981

Ordnance Technical Data Sheet

Cartridge, .410, Shotgun, No. M35



Nomenclature: .410, Shotgun, No. M35
Ordnance Family: Small Arms Ammunition
DODIC: 1305-A055
Propelling Charge: Smokeless Powder
Item Weight: 430 gr
Diameter: 10.4 mm (.410 in)
Length: 68.3 mm (2.69 in)
Maximum Range: Not Provided
Fuze: Percussion

Usage: Rifle/Shotgun, Caliber .22/.410 Bore, Survival, M6. The cartridge is intended for use in survival weapons against small game.

Description: The cartridge case can be paper, plastic, or aluminum and is loaded with No. 6 copper-coated lead shot. Smokeless powder is used as the propelling charge.

Reference: U.S. Army Technical Manual, TM 9-1400-200, Ammunition General, October 1969
U.S. Army Field Manual, FM 9-13, Ammunition Handbook, January 1981