Battle Area Complex Surface Danger Zone Archaeological Site Monitoring, Donnelly Training Area

Annual Report 2010 and 2011

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By

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LIST OF ACRONYMS

AHRS – Alaska Heritage Resource Survey
ANC – Anchorage
APE – Area of Potential Effect
ARPA – Archaeological Resources Protection Act
ATV – All Terrain Vehicles
BAX – Battle Area Complex
BP – Years before Present
CACTF-Command Action Center Tactical Facility
CEMML – Center for Environmental Management of Military Lands
CM-Centimeter
cm BS – Centimeters below Surface
CMT – Culturally Modified Tree
DEM – Digital Elevation Model
DOE – Determination of Eligibility
DTA – Donnelly Training Area
FAI – Fairbanks
FP – Firing Point
FRA – Fort Richardson
FS – Field Sample
FWA – Fort Wainwright
ICRMP – Integrated Cultural Resources Management Plan
ITAM – Integrated Training Area Management
LA-ICP-MS – laser ablation inductively coupled plasma mass spectrometry
m – Meter
mm – Millimeter
MASL – Meters above Sea Level
MOUT –Military Operations on Urban Terrain
MRE – Meal-Ready-to-Eat
NHPA – National Historic Preservation Act
NRHP – National Register of Historic Places
SDZ – Surface Danger Zone
SFAC – Soldier Family Assistance Center
SHPO – State Historic Preservation Officer
TARP – Training Area Restoration Plan
TFTA – Tanana Flats Training Area
UAC – Urban Assault Course
USAG – U. S. Army Garrison
USARAK – U. S. Army Alaska
USARAL – U. S. Army Alaska (historic)
USGS – U. S. Geological Survey
UTM – Universal Transverse Mercator
UXO – Unexploded Ordinance
WT – Warrior in Transition

XRF – X-ray fluorescence
XBD – Big Delta
XMH – Mt. Hayes
YTA – Yukon Training Area

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1.0 INTRODUCTION

On February 5, 2010, the U.S. Army Garrison Fort Wainwright (USAG FWA) entered into a Programmatic Agreement (PA; FWA-PA-1003) with the Alaska State Historical Preservation Officer (SHPO) to monitor 131 prehistoric archaeological sites within the Battle Area Complex (BAX) Surface Danger Zone (SDZ) in order to continue a finding of “no adverse effect” to said sites. Live-fire training activities began on the BAX in June of 2010. Archaeological site monitoring activities began during the same month and continued through the present. This report will detail the findings of monitoring activities for the period of June 2010 to May 2012.

Site monitoring was conducted following procedures defined in *U.S. Army Alaska's Monitoring and Data Recovery Plan for Cultural Resources within the Battle Area Complex Surface Danger Zone*, *Fort Wainwright*, *Donnelly Training Area*, *2009* (Robertson 2009).

Archaeological field crews, comprised of employees of Colorado State University’s Center for Environmental Management of Military Lands (CEMML), monitored sites in areas potentially impacted (directly and indirectly) by the live-fire training activities. Three crews of two to three archaeologists conducted the fieldwork.

1.1 BAX and Undertaking

The BAX is a live-fire range constructed by U.S. Army Alaska (USARAK) and USAG FWA on lands at Fort Wainwright’s Donnelly Training Area (DTA) (Figure 1). With the transformation of the Army’s Alaska-based 176th Light Infantry Brigade to the 176th Stryker Brigade in 2003, USARAK and USAG FWA needed new ranges to meet the needs of Stryker vehicle-mounted weapon systems. The largest of these new ranges is termed the BAX. The BAX is designed for gunnery training of crew-served, vehicle-mounted weapons systems and dismounted infantry platoon tactical live-fire operations (Table 1).

Table 1. BAX weapons systems

Weapons System	Description
Small Arms	Man portable, individual, and crew-served weapons systems used mainly against personnel and lightly armored equipment. Ammunition for small arms includes all ammunition up to and including 40 mm.
Artillery/ Indirect Fire Systems	Self-propelled, man-packed or towed, large caliber (60 mm or larger) tube-launched or rocket-propelled munitions.
Vehicle	A weapon that is integral to the vehicle on which it is mounted and intended for use from the vehicle (i.e., the MK-19 40 mm automatic grenade launcher on the Stryker or the main gun (105 mm) on the mobile gun system).

Primary features of the BAX include course roads, stationary armor targets, moving armor targets, stationary infantry targets, moving infantry targets, machine gun bunkers and breaching obstacles. In addition to the range, the BAX includes an after-action review facility, ammunition breakdown building, ammunition loading dock, operations/storage building, arctic latrines, bleacher enclosure, bivouac, unit staging area, covered mess area, building information systems, electric service, water and septic system, storm drainage and general site improvements.

The BAX undertaking consists of two components, both of which warranted consideration under stipulations provided in Section 106 of the National Historic Preservation Act: (1) construction of the BAX (Figure 2); and (2) the establishment of a safety buffer area known as a "Surface Danger Zone (SDZ)" downrange of the BAX (Figure 3).

For the purposes of implementing a cultural resource management strategy, it is important to emphasize the difference between the BAX and the BAX SDZ. The BAX includes the maneuver areas, firing points and targets that will be utilized for training (Figure 2). The BAX SDZ is an area of risk that extends lengthwise from the firing point to the ultimate ballistic distance or maximum range of munitions utilized at the range (Figure 3). No construction or training activities associated with the BAX will occur within the BAX SDZ. No targets will be located in the BAX SDZ. Essentially, the BAX SDZ is a downrange safety buffer zone that covers the maximum distance stray rounds may travel, established for the purposes of protecting human health and safety.

Establishing the SDZ is simply a matter of restricting access to downrange areas of risk associated with the BAX. Establishment of the BAX SDZ is mandated by the possibility of stray rounds resulting from live-fire exercises in the BAX. SDZs are created to ensure the safety of the public and military personal. They represent where rounds could potentially go in extreme circumstances. They do not indicate where rounds will most likely go; rather, they buffer all possible places where they could go in a completely flat landscape (which the BAX SDZ is not). Different calibers and different munitions have different effective and maximum ranges. Thus, the BAX SDZ is a composite SDZ that incorporates the SDZs from all the different types of munitions that will be used—from 5.56 mm to 105 mm.

The BAX SDZ is an irregular, fan-shaped area roughly 12 km north to south and 12 km east to west at its widest point (Figure 3). It entails 23,741 acres found on the USGS Mount Hayes D-4 topographic map.

The assessment of effects of live-fire exercises in the BAX is presented in Section 5.0 of Robertson (2009:23-39). In short, it was determined that, although the sites are downrange of a live-fire training area, the potential for adverse effects from stray rounds was low to non-existent: (1) local topography will protect the sites, (2) target placement was deliberately coordinated to prevent stray rounds, and (3) the types of weapons systems used (e.g. non-explosive and short-range rounds) minimize the potential for damage to the sites.

Survey for the construction footprints of the BAX was conducted in 2002 and 2003 (Hedman et al. 2003; Robertson et al. 2004). Site evaluations and determinations of eligibility (DOEs) for listing in the National Register of Historic Places were conducted in 2004 and 2005 (NRHP) (Raymond-Yakoubian and Robertson 2005; Robertson et al. 2006). On March 17, 2006, USARAK released the BAX/CACTF Supplemental Draft EIS, and USAG FWA and the Alaska State Historic Preservation Officer (SHPO) entered into Section 106 consultation to mitigate adverse effects of the BAX undertaking, resulting in a Memorandum of Agreement (AK-MOA-227).

There were originally 136 archaeological sites identified within the entire BAX Area of Potential Effect (APE), which consists of the range and SDZ. Five of these sites—XMH-00290, XMH-00873, XMH-00874, XMH-00877 and XMH-01160— are located in the BAX construction footprint. Four of these—XMH-00290, XMH-00873, XMH-00877, and XMH-01160—were determined ineligible for listing in the NRHP. Mitigation of adverse effects, consisting of an archaeological excavation to recover data from XMH-00874, began in July 2006 and was completed in 2007. The mitigation agreement is detailed in the MOA between USAG FWA and the SHPO signed on July 12, 2006. Section 106 requirements have been completed for the construction footprint of the BAX.

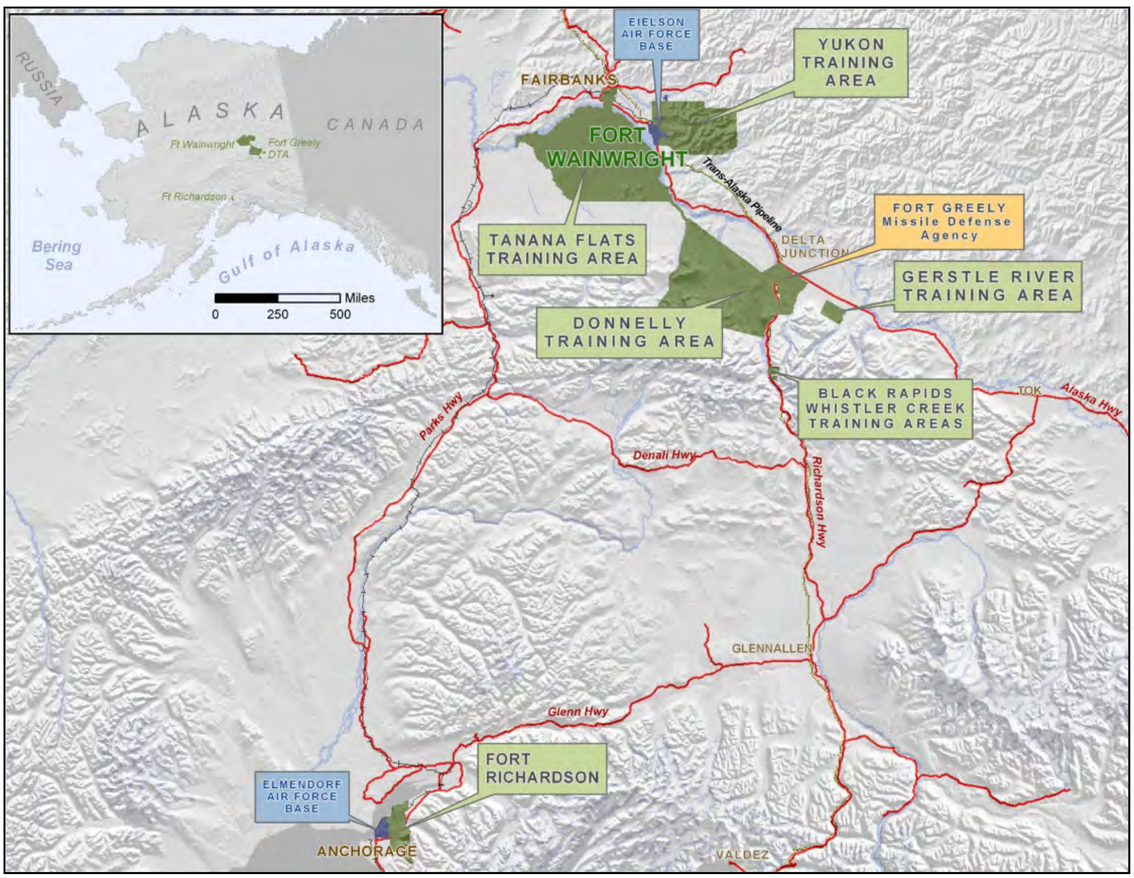

Figure 1. Location of Fort Wainwright, Alaska

Section 106 consultation for the establishment of the SDZ began in March 2006. There are no archaeological sites located in the direct line-of-fire for BAX targets. However, there are 131 archaeological sites downrange within the SDZ. USAG FWA and the Alaska SHPO determined that application of the Criteria for Adverse Effect [36 CFR 800.5(a)] indicates a conditional "no adverse effect" finding for 131 archaeological sites located within the boundaries of the SDZ. USAG FWA recognizes the remote possibility of stray round impacts to archaeological sites located downrange from the BAX within the SDZ. The finding of "no adverse effect" was conditioned upon an ongoing, comprehensive monitoring strategy to ensure that there would in fact be no adverse effects to archaeological sites located within the SDZ due to stray round impacts including any of the following: (1) physical destruction or damage to all or part of an archaeological site, (2) alteration of all or part of an archaeological site, (3) change in the character of an archaeological site, or (4) damage to the integrity of an archaeological site. The second agreement, FWA-PA-1003, was entered into to formalize the comprehensive monitoring strategy and to fulfill USAG FWA's Section 106 responsibilities.

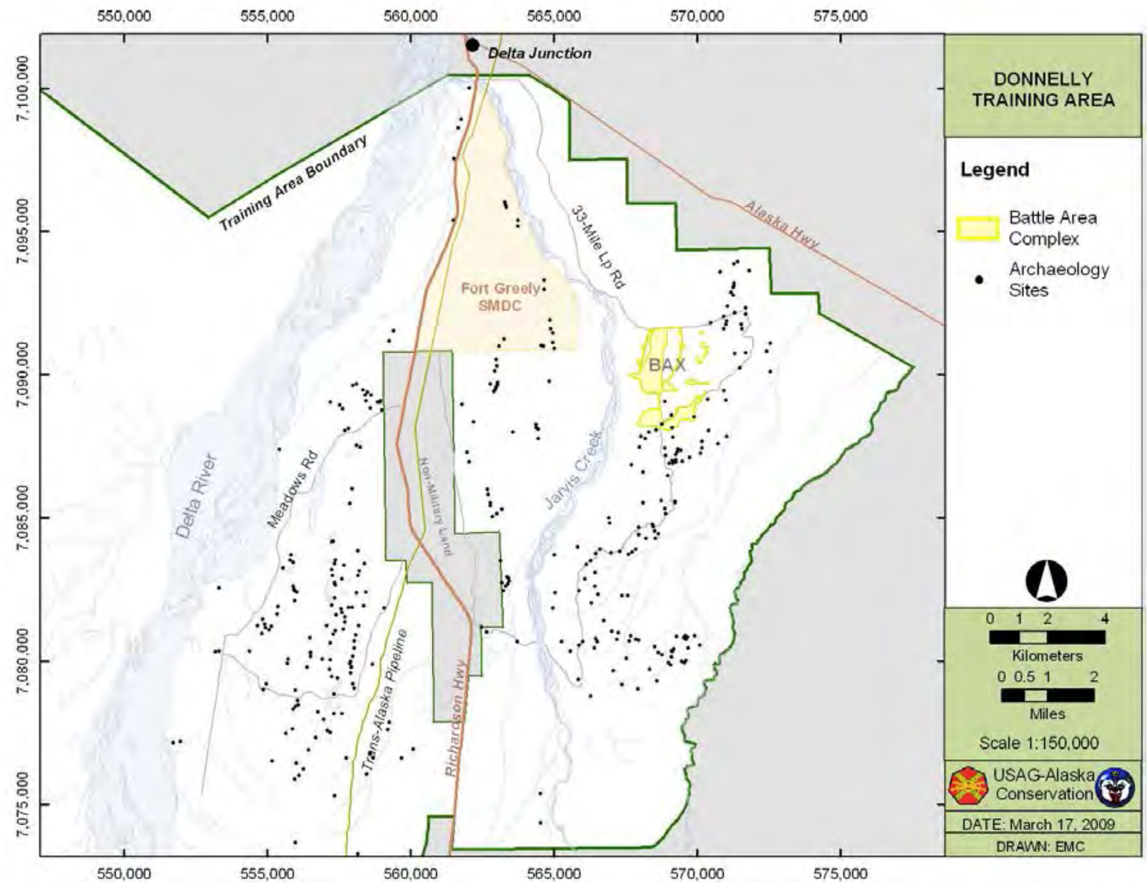

Figure 2. The location of BAX in eastern DTA

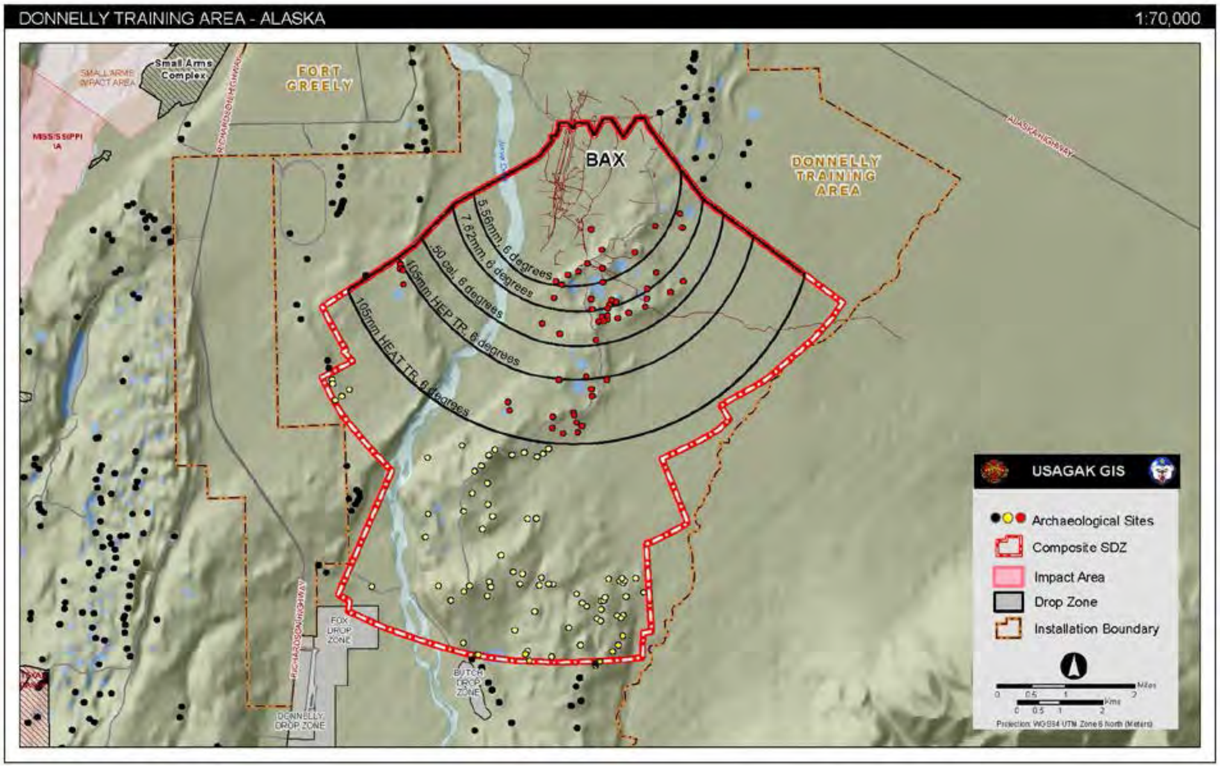

Figure 3. BAX SDZ

1.2 Setting & Environment

The Donnelly Training Area (DTA) is located in central Alaska, north of the Alaska Range in the Tanana River Valley (Figure 1). The post lies 120 miles south of the Arctic Circle near the city of Delta Junction. DTA consists of the West and East training areas and three outlying training sites: Gerstle River Training Area, Black Rapids Training Area, and Whistler Creek Rock Climbing Area. DTA West is an 894-square-mile parcel bounded by the Delta River to the east and the Little Delta River to the west. It covers approximately 571,995 acres. The East Training Area is an 81-square-mile parcel stretching east of the Delta River to Granite Creek. It covers approximately 51,590 acres.

DTA has the northern continental climate of Interior Alaska, which is characterized by short, moderate summers; long, cold winters; and low precipitation and humidity. Weather is influenced by mountain ranges on three sides that form an effective barrier to the flow of warm, moist maritime air during most of the year. Surrounding upland areas tend to aid drainage and the settling of cold arctic air into the Tanana Valley lowlands (Natural Resources Branch 2001).

The Alaska Meteorological Team (AMT) at the Central Meteorological Observatory, Fort Greely and Donnelly Training Area, monitors weather at the post. Average monthly temperatures range from -6.4ºF in January to 60.0ºF in July, with an average annual temperature of 27.4ºF. The record low temperature is -63ºF, and the record high is 92ºF. The average frost-free period is 95-100 days (based on 27 years of AMT data).

Prevailing winds are from the east-southeast from September through March and from the west, southwest, or south from April through August. Average wind velocity is 8.2 miles per hour (mph). The greatest wind speeds occur during winter, with a high of 104 mph recorded in the month of February. Winds are 5 mph or less only 13.6 percent of the time, and wind speeds greater than 60 mph have been recorded in every month. Thunderstorms are infrequent and occur only during summer (based on 20 years of AMT data) (Natural Resources Branch 2001).

Average annual precipitation is 11.12 inches, which falls over 90.4 days, mostly during summer and early fall. Average monthly precipitation ranges from a low of 0.24 inches in April to a high of 2.38 inches in June. Average annual snowfall is 40.5 inches, with a record 99.7 inches in 1945 (based on 27 years of AMT data) (Natural Resources Branch 2001).

1.3 Prehistoric Context

Interior Alaska has been continuously inhabited for the last 14,000 years, and evidence of this continuum of human activity has been preserved within and around FWA's training lands. Interior Alaska's ice-free status during the last glacial period provided a corridor connecting the Bering Land Bridge and eastern Asia to North America. This allowed small bands of nomadic peoples to colonize Alaska and the rest of the continent and began a period of habitation in Interior Alaska that has persisted through the entire Holocene, the arrival of European traders in the late 1810s, the Klondike gold rush of the late 19th and early 20th centuries, and the military development of the Interior during the middle of the 20th century. FWA's cantonment and training lands comprise a vast and still relatively unsurveyed region with areas of high potential for yielding evidence of this activity.

Alaska has long been regarded as the gateway to the Americas and has held archaeological interest as the possible location for the oldest archaeological sites in the New World. This is due to more than Alaska's proximity to Asia and ice-free condition at the end of the Pleistocene. Similarities between archaeological assemblages in Siberia and Alaska and the discovery of lanceolate projectile points in the muck deposits around Fairbanks in the early 1900s (which bore a resemblance to Clovis points of some antiquity in the American Southwest) also sparked interest in Alaska as a source area for all Native Americans.

After initial colonization, archaeologists generally divide Interior Alaska's prehistory into three broad archaeological themes: the Paleoarctic Tradition (12,000-6,000 years ago[1]), the Northern Archaic Tradition (6,000-1,000 years ago), and the Athabaskan Tradition (1,300-800 years ago) (Potter 2008). Archeological materials from these cultures are generally limited to lithic artifacts such as projectile points, cutting tools, scrapers, waste flakes from tool manufacturing, faunal remains, and hearths.

Reconstructions of paleoecological evidence suggest that the end of the Pleistocene was marked by a warming trend in Interior Alaska that may have contributed to initial colonization of the area (Bigelow and Powers 2001). Several sites in areas surrounding Army lands demonstrate that people began living in Interior Alaska 14,000 years ago. Significant sites in the Tanana Valley dating between 14,000-12,000 years ago include Healy Lake (Bigelow and Powers 2001), Walker Road (Bigelow and Powers 2001), Swan Point (Bigelow and Powers 2001), Mead

[1] All dates are given in calendar years *before present*.

(Bigelow and Powers 2001), and Broken Mammoth (Bigelow and Powers 2001). There are no sites in Alaska, however, that predate the oldest sites in the contiguous United States, nor do Alaska's oldest sites resemble the Clovis culture (Bigelow and Powers 2001). The Younger Dryas cooling event from 13,000-12,000 years ago (Bigelow and Powers 2001) may have led to a temporary population decline (Potter 2008) in the Interior before permanent colonization. The Paleoarctic Tradition is a term now generally used by archaeologists to refer to the earliest settled people known from all over Alaska. It was originally defined by Anderson[2] (Anderson 1968, 1970) as the earliest microblade-using tradition in the American Arctic, with a proposed relationship to northeast Asian late Pleistocene cultures based on similarities in these distinctive artifact types. Archaeological evidence indicates that early settlers camped on terraces, lakeshores, buttes, and bluffs. By using these locations on high ground, they could locate and track prey that included large mammals such as mammoth and bison. Evidence from the Upward Sun River Site, located just 5 km southeast of TFTA, for example, demonstrates that hunter-gatherers in Interior Alaska were concentrating on bison and wapiti at the end of the Pleistocene (The Upward Sun River Site is also known for one of the earliest burials in the Americas. [Potter 2008; Potter et al. 2008; Potter et al. 2011]). It is likely that the treeless environment and nomadic nature of these peoples had a direct impact on the kinds of tools they fashioned. Stone, bone, antler, and ivory provided the most abundant material for manufacturing weapons and cutting tools. Artifacts typically associated with this culture include small stone microblades, microblade cores, bifacial projectile points, and unifacial scraping tools.

In Interior Alaska, this tradition historically included two cultural divisions called the Nenana and Denali complexes. The Nenana Complex was identified by Powers and Hoffecker from sites in the Nenana Valley (Powers and Hoffecker 1989). This complex began approximately 11,000 years ago with an artifact assemblage that included triangular or teardrop-shaped, bifacially worked projectile points ("Chindadn" points [Cook 1969; 1975; Holmes and Cook 1999]); large unifacial chopper-like tools; and flake tools. The Nenana Complex is defined as lacking microblades, microblade cores and burins and was proposed to predate the microblade-rich Denali Complex. Many Nenana Complex archaeological sites are located in the Tanana Valley, adjacent to FWA training lands (Broken Mammoth [Holmes 1996; Yesner et al. 1999], Chugwater [Lively 1996], Donnelly Ridge [West 1967; 1996, Donnelly Ridge is located in DTA], Healy Lake [Cook 1989], Mead [Holmes 2007] and Swan Point [Holmes et al. 1996; Holmes 1998; 2007]).

The Denali Complex, dated roughly to 10,500 to 8,000 years ago, was originally defined by West (West 1967; 1975) and includes distinctive wedge-shaped microblade cores, core tablets and their derivative microblades, large blades, biconvex bifacial knives, certain end-scraper forms, and burins. West later defined the Denali Complex as a regional variant of the American Paleoarctic Tradition (West 1981). Denali sites in the vicinity of FWA's training lands include Mt. Hayes (West 1996), Swan Point (Holmes et al. 1996; Holmes 1998, 2007), and Gerstle River (Potter 2001). At least one site in TFTA (XMH-2043) has also been dated to this period.

The relationship between the proposed Nenana and Denali complexes is as of yet unresolved. As discussed above, some researchers view the Nenana Complex as a bifacial industry that predates the microblade-based Denali Complex. However, current research at sites such as Swan Point

[2] Anderson called it the "American Palaeoarctic Tradition," but most researchers use the shortened version.

and Broken Mammoth indicates that microblades and burins were used by the earliest known cultures in Interior Alaska, with a later co-occurrence with Chindadn points—the defining artifact type of the Nenana Complex. Although some archaeologists still believe that there is a cultural distinction between the Nenana and Denali complexes (e.g., Dumond 2001), the general understanding from Interior Alaskan archaeologists is that there is a behavioral explanation for the presence or absence of microblades in different assemblages (Holmes 2001; Potter 2008; Yesner and Pearson 2002). Moreover, both Nenana and Denali technology persist in central Alaska throughout the Holocene (Bever 2006).

Site density declined in the areas around FWA in the early Holocene, suggesting a slight depopulation during a period of climate change that initiated the widespread establishment of spruce forests (Potter 2008). The boreal forest in Interior Alaska was established by 8,000 years ago (Bigelow and Powers 2001). Sites from this time period are less well publicized than the older sites, but include Houdini Creek (circa 8,600 years old), Hurricane Bluff (c. 9,800 years old), Lucky Strike (c. 8,500 years old), Gerstle River (c. 10,000 years old), and the Campus Site (c. 7,700 years old) (Pearson and Powers 2001; Potter et al. 2007; Potter 2008). Bison, wapiti, and birds were the most important subsistence game during this period (Potter 2007, 2008).

Site density increased again after about 6,000 years ago in Interior Alaska (Potter 2008). This population increase coincides roughly with the Northern Archaic Tradition and the appearance of side-notched projectile points. Anderson originally defined the Northern Archaic Tradition to specifically address notched point-bearing stratigraphic horizons that did not contain microblades at the Onion Portage site in northern Alaska (Anderson 1968). Alaskan notched points were generally similar to Archaic-age dart points in the contiguous United States. Time has shown middle Holocene assemblages in Alaska to be quite diverse, however, and it is questionable whether this trait is related to southern forms or if it is a reliable indicator of cultural affiliation (Clark 1992; Cook and and Gillespie 1986). Artifact assemblages associated with this culture can vary but generally contain myriad tools ranging from bifacial knives and microblades to end scrapers and side-notched points. Middle Holocene hunter-gatherers had a subsistence economy focused on seasonally abundant game including caribou, fish, and moose (Potter 2008). Notched point assemblages occur in many sites in Interior Alaska, including over one dozen on Army lands (XBD-277, XMH-277, XMH-283, XMH-303, XMH-309, XMH-874, XMH-950, XMH-1130, XMH-1168, XMH-1300, Robertson et al. 2004, Raymond-Yakoubian and Robertson 2005.) Several sites (XBD-270, XMH-915, XMH-925), including the excavated Banjo Lake site in DTA (XMH-874), have also produced middle Holocene dates from hearth charcoal. The 6,300-6,700-year-old dates from Banjo Lake were also associated with a microblade component (Robertson et al. 2008).

Utilization of microblade and burin-based industries appears to continue through the middle and late Holocene in Interior Alaska (Esdale 2008; Potter 2004). By the late Holocene, archaeologists see a shift from seasonal large mammal hunting with a nomadic lifestyle to a focus on seasonally over-abundant resources, use of storage, and more permanent settlements (Potter 2008b). Artifact assemblages do not drastically change until the last millennium of the Holocene when microblades disappear from the archaeological record (Potter 2008).

Linguistic evidence suggests that the Athabaskan culture may have appeared in the Tanana Valley as early as 2,500 years ago. Through ethnography, oral history, and a broad array of cultural items, much has been learned about Athabaskan culture and history in the region. Artifacts associated with the Athabaskan culture are exceptionally diverse and include bone and antler projectile points, fishhooks, beads, buttons, birch bark trays, and bone gaming pieces. In the Upper Tanana region, copper was available and used in addition to the traditional material types to manufacture tools such as knives, projectile points, awls, ornaments, and axes (Clark 1981). A late prehistoric Athabaskan occupation is recognized at several sites in and around FWA's training lands (Andrews 1975; Andrews 1987; Cook 1989; Mishler 1986; Sheppard et al. 1991; Shinkwin 1979; Yarborough 1978). Of particular interest in this regard is a copper projectile point recently found in a buried context at DTA (XBD-272) (Robertson et al. 2009).

The Athabaskan Tradition includes late prehistoric and proto-historic cultures generally believed to be the ancestors of Athabascan tribes who currently inhabit Interior Alaska. Excavated Athabaskan sites are rare, but the limited body of evidence allows for several generalizations. Raw material usage was reorganized in the Athabaskan Tradition, which de-emphasized stone tool-making and increased the emphasis on the manufacture of items from native copper and organic materials (Dixon 1985). Assemblages include ground and pecked stone artifacts and an increased use of expedient tools. There was a broadening and diversifying of the resource base at this time to include small mammal and freshwater marine animals such as fish and mollusks (McFadyen Clark 1981; McFadyen Clark 1996; Ream 1986; Sheppard et al. 1991; Shinkwin 1979). Athabaskan sites tend to occur in resource-rich areas near lakes, streams and rivers, and are generally characterized by large house pit and cache pit features. Proto-historic Athabaskan assemblages include Euro-American trade goods such as glass beads and iron implements. Sites of this time period reflect an increased reliance on outside trade and include log cabins co-occurring with traditional house pits, as well as a change in site location to maximize trading opportunities (Andrews 1975; Andrews 1977; Andrews 1987; McFadyen Clark 1981; VanStone and Goddard 1981).

Athabascan settlement patterns depended greatly on the availability of subsistence resources, and Interior bands lived a nomadic lifestyle. They often traversed vast areas to support themselves and spent considerable time engaged in subsistence activities. It was often necessary for bands to divide into smaller groups to find game, and preserved fish were used as a staple of the diet in addition to fresh game (Andrews 1975).

Four Athabascan linguistic and geographic groups have inhabited the Tanana Valley: the Upper Tanana, Tanacross, Tanana and Koyukon. Each group is further distinguished according to geographic location. Bands of the Tanana and Tanacross groups are historically associated with the geographic area that embodies Forts Wainwright and Greely. Salcha, Chena, Wood River, Goodpaster, and Healy Lake bands have inhabited the region since protohistoric times and possibly even prehistoric times (Andrews 1975). Use of the region varied from one band to the next. The Salcha, Chena, Goodpaster, and Wood River bands of the Tanana Athabascans and the Healy Lake band of the Tanacross Athabascans used certain parts of what are now Forts Wainwright and Greely (McKennan 1981). Several villages have been reported on or near FWA. One occupied by the Wood River band is said to have been located in the southern part of FWA but has not been found (Dixon 1980; Reynolds 1986). The Blair Lakes Archaeological District (FAI-335) on FWA may relate to the prehistory of the Athabaskan Tradition. Euro-American historic archaeological sites are also present (Gamza 1995; Phillips 1984).

1.4 Historic Context

With the beginning of Euro-American contact in Interior Alaska in the early 19th century, trade influences and influxes of new populations began to change life in the region. Land use patterns shifted from traditional indigenous uses to activities based on Euro-American economic and political systems. FWA's training lands fall within an area occupied at the time of Euro-American contact by Lower-Middle Tanana Athabascans, including bands described generally as the Salcha, Big Delta-Goodpaster, Wood River, and Chena bands (McKennan 1981; Andrews 1975; Mishler 1986). Historical accounts document traditional settlement patterns that were focused on a widely mobile season round, with the fall caribou hunt playing a pivotal role in subsistence preparations for the winter and summer activities focused at fish camps, berry and root collecting and in sheep hunting. These activities were frequently communal, with several local bands connected by common interest, geography and intermarriage. Despite anthropological attempts to define boundaries for the peoples living in the lower Tanana River Valley, natural terrain served as the only definable boundary to settlement patterns (McKennan 1981).

As Euro-American traders, miners, missionaries and explorers moved into the Tanana River Valley, the traditional life ways of local Athabascan groups were disrupted. Access to trade goods and the development of the fur trade not only affected traditional material culture, but also began to dramatically affect subsistence activities and settlement patterns. Similarly, the arrival of missionaries in the Alaskan interior profoundly influenced traditional social organization. The introduction of mission schools for Native children and the doctrine of new religious beliefs contributed to an erosion of traditional practices (McKennan 1981).

Russian fur traders began settling Interior Alaska starting in the 1810s, establishing a post at Nulato on the Yukon River and one at Taral on the Copper River. British traders established Fort Yukon in 1847. Trade goods from these posts may have passed to Tanana Athabascans and Upper Tanana Athabascans through intra-Native trade networks. Direct contact between Tanana Athabascans and white traders increased after the 1860s. With the U.S. purchase of Alaska in 1867, control of trading stations and the fur trade passed to Americans. Through the 1880s, American traders established several additional posts on the Yukon and Tanana rivers, including locations at Nuklukayet (modern-day Tanana), Belle Isle (modern-day Eagle), and Fort Yukon.

Trade goods introduced by Euro-American settlers influenced the Native lifestyle. Clothing, staples, tools, and other necessities could be obtained through trade. Guns allowed hunters to obtain game with greater efficiency. Gradually, Athabascan Native groups began to alter their traditional nomadic patterns in favor of more permanent settlements. However, while significant, this contact would not have as dramatic an impact on the region as the discovery of gold in the Interior during the last decades of the 19th century. The towns established by Euro-American settlers at the turn of the 20th century, in response to the Klondike Gold Rush and the eventual military development of the region, would rapidly and permanently change the demography and economy of Interior Alaska.

Gold strikes in the Fortymile River region, Birch Creek area, and the Canadian Klondike began drawing miners and prospectors north in the 1880s and 1890s. In response to this gold rush, E.T. Barnette established a trading post on the Chena River in 1901. The following year, prospector

Felix Pedro discovered gold nearby, and a new gold rush soon led to the founding of Fairbanks at the site of Barnette's original trading post. Most mining activities in the region occurred on creeks north of Fairbanks, with the town serving as a supply center. Agricultural and other commercial activities, such as lumber, also developed to support mining activities in the Fairbanks area. Homesteads existed on parts of what is today the Main Post of FWA as early as 1904.

In 1898, the discovery of gold in the Tanana uplands began a rush of Euro-American settlement into the Tanana River Valley. As the economic importance of the Tanana Valley increased, the need for reliable transportation routes and communication systems rose in tandem. Existing trails, such as the Bonnifield, Donnelly-Washburn and Valdez-Fairbanks trails, saw increased use and development in the first decade of the 20th century. This increase in activity also resulted in the establishment of several roadhouses and posts. In 1906, Congressional appropriations led to improvement of the Valdez-Fairbanks Trail, crossing the Alaska Range south of Delta Junction, following the Tanana River to Fairbanks. Completion of the Alaska Railroad in 1923 was followed two decades later by construction of the Alaska Highway in 1942, firmly tying the Alaskan interior to the outside.

As Fairbanks grew in the first decade of the 20th century, several agricultural homesteads were developed on lands now encompassed by sections of the FWA cantonment. These homesteads provided Fairbanks with a variety of agricultural products and wood for fuel, but were subsumed when lands were withdrawn for the creation of Ladd Field, which later became FWA (Price 2002).

Riverboats were the primary means of getting people and supplies into the Interior at the turn of the 20th century. The Fairbanks town site was located at the upper limit of navigation for stern-wheeler riverboats on the Chena River. Upriver from that point, residents navigated the river using shallow-draft boats in summer and sleds in the winter. As commerce in the area increased, roads and trails were constructed, sometimes following earlier indigenous routes. The major overland route to the coast was the Valdez-Fairbanks Trail, which began as a military trail from Valdez to Eagle in 1899.

Transportation and communication networks, including the Alaska Railroad, were developed to serve new settlements in Interior Alaska. A branch of the railroad route was extended to Fairbanks in 1904. Roadhouses along the route catered to travelers Some were located out on what are now Ft. Wainwright training lands. One property was on the Bonnifield Trail in the Tanana Flats Training Area while two roadhouses and a seasonal tent operation existed along the Donnelly-Washburn Trail in the current Donnelly Training Area. Secondary routes connected Fairbanks to the surrounding mining districts.

By 1910, most of the easily accessible placer gold deposits were exhausted, and capital-intensive technologies became necessary to extract remaining deposits. These methods were not possible with the existing transportation infrastructure. The completion of the Alaska Railroad in 1923 expanded transportation options for the region, connecting Fairbanks to Seward and making large-scale dredging operations economically feasible. Aviation also became a key component of Interior transportation, beginning in earnest in the 1920s. However, it was not until 1931 that Weeks Field, originally constructed in 1923, was officially dedicated as an airfield.

Industrialized corporate activity became the hallmark of the region's mining in the remaining years before World War II.

Development in the Alaskan interior increased dramatically with the advent of World War II and subsequent military build-up in Alaska. Of particular significance was the development of airfields near Delta Junction (Fort Greely), Fairbanks (Ladd Field, later FWA), and 26 miles southeast of Fairbanks (Eielson Air Force Base). These locations began as Lend-Lease bases and cold weather testing centers, but soon expanded with the increased need for military support during World War II and later during the Cold War.

Full historic contexts of early mining, transportation, and homesteads on FWA have been completed. These studies have determined that there are no properties eligible for the National Register under these contexts. Several village sites associated with the early contact period have been reported near FWA. One was reported near Wood River Buttes, two just northwest of the installation's boundary, and one near Fairbanks (Reynolds 1986). None have been reported or located on the Main Post.

1.5 Status of Archaeological Resources

Archaeological research on FWA training areas has resulted in numerous technical reports (Bacon 1979; Bacon and Holmes 1979; Dixon et al. 1980; Esdale and Robertson 2007; Espenshade 2010; Bradley et al. 1973; Gaines 2009; Gaines et al. 2010, 2010; Hedman et al. 2003; Higgs et al. 1999; Holmes 1979; Johnson and Bozarth 2008; Marshal 2007; Potter 2005; Potter et al. 2000; Rabich and Reger 1978; Raymond-Yakoubian 2006; Raymond-Yakoubian and Robertson 2005; Robertson 2010; Robertson et al. 2004, 2006, 2007, 2008, 2009; Staley 1993) and several scientific papers (Holmes and Anderson 1986; West 1967, 1975).

FWA and its training lands contain 636 known archaeological sites and 4 archaeological districts. Sixty sites are eligible for the National Register of Historic Properties (NRHP), 512 sites have not been evaluated, and 64 additional sites have been determined ineligible for the NRHP. Of the eligible or un-evaluated sites, 12 are historic sites and 560 are prehistoric sites.

Archaeological investigations in what is now the Donnelly Training Area began in the 1960s, when Frederick West was searching for sites related to the first Americans (West 1967). He excavated the Donnelly Ridge site (XMH-5) in 1964 and found an assemblage containing microblade core technology similar to early Holocene Denali Complex sites. Several surveys of Fort Greely and adjacent training lands in the late 1970s documented 64 new sites (Rabich and Reger 1977; Bacon 1979; Holmes 1979; Bacon and Holmes 1979). Julia Steele surveyed various locations in DTA from 1980-1983, finding four additional new sites (Steele 1980, 1980, 1982, 1982, 1983, and 1983), and Georgianne Reynolds surveyed the Donnelly Dome area in 1988, locating one more (Reynolds 1988). Investigations in DTA from 1992-2002 were by D. Staley (Staley 1993), T. Gamza (Gamza 1995), A. Higgs (Higgs et al. 1999), and D. Odess (Odess 2002). Sixteen new sites were found during this decade of fieldwork, and attempts were made to relocate old sites.

Concentrated efforts to expand survey coverage of DTA East began with CEMML archaeologists in 2002. Over 200 new sites were located in the Texas Range, Donnelly Drop Zone, and Eddy Drop Zone in the first half of the decade. In 2007, one site was found in the northernmost portion of DTA West by Ben Potter and others during survey for the Alaska Railroad Northern Rail Extension Project (Potter et al. 2007). In recent years, CEMML research aimed to evaluate many known archaeological sites in DTA for inclusion in the National Register in conjunction with use of the Battle Area Complex and its surface danger zone. Sites have also been discovered during surveys for road and trail maintenance. Potential expansions into DTA West, west of the Delta River, have prompted recent surveys into new areas such as Molybdenum Ridge, where 21 new sites were discovered in 2011. Because of its remote setting, however, the archaeology of Donnelly West is still poorly understood and represents a gap in USAG FWA's inventory of cultural properties. The Cold Regions Test Center (CRTC) has also contracted with CEMML and others since the last ICRMP to survey areas in DTA West, east of the Little Delta River, and many new archaeological sites have been recorded (Espenshade 2010).

To date, 455 archaeological sites have been identified within DTA. Forty-nine sites have been found to be eligible for the National Register, and 50 were found not eligible. An additional 356 sites remain to be evaluated. Historic archaeology sites are poorly represented in this region, with only six currently known to exist. The Donnelly Ridge District (XMH-388) encompasses Denali sites identified by Frederick West, south and west of Donnelly Dome.

Despite its incomplete nature, the archaeological record known from DTA represents all of the currently recognized prehistoric cultures of the Alaskan Interior. Of significance is the role played by sites located on DTA in the definition of the Denali Complex of the American Paleoarctic Tradition (Anderson 1970; West 1967, 1981). The oldest date for human habitation at DTA is roughly 10,100 years at site XBD-00167 (Higgs et al. 1999); however, undisturbed stratigraphic deposits 12,800-12,930 years old indicate the potential for intact archaeological occupations of this age. Sites yielding Northern Archaic side-notched points are common (Robertson et al. 2004, 2005; Raymond-Yakoubian and Robertson 2005). At DTA, site XMH-874 yielded an AMS date of 5720 +/- 50 BP from hearth charcoal associated with a microblade component (Robertson et al. 2008). A late prehistoric Athabaskan occupation is recognized at several sites (e.g. Andrews 1975, 1987; Cook 1989; Mishler 1986; Sheppard et al. 1991; Shinkwin 1979; Yarborough 1978). Of particular interest in this regard is a copper projectile point recently found in a buried context at DTA at site XBD-00272 (Roberston et al. 2009). Euro-American historic archaeological sites are also present (Gamza 1995; Phillips 1984).

2.0 CULTURAL RESOURCES

The major part of the BAX SDZ was surveyed in 2003, with additional surveys during 2007. During 2006, USAG FWA decided that consideration of effects for sites in the BAX SDZ would not be included in the 2006 BAX construction MOA. This would allow USAG FWA time to conduct Phase II evaluations of sites located within the SDZ and determine possible adverse effects from munitions planned for use in the BAX. Site evaluations and determinations of eligibility (DOEs) for listing in the National Register of Historic Places (NRHP) for sites located in the BAX SDZ were conducted during 2008.

Comprehensive survey efforts undertaken by USAG FWA have identified 131 archaeological sites within the BAX SDZ (Figure 4,

Table 2). This represents one of the densest concentrations of prehistoric archaeological sites known in Alaska.

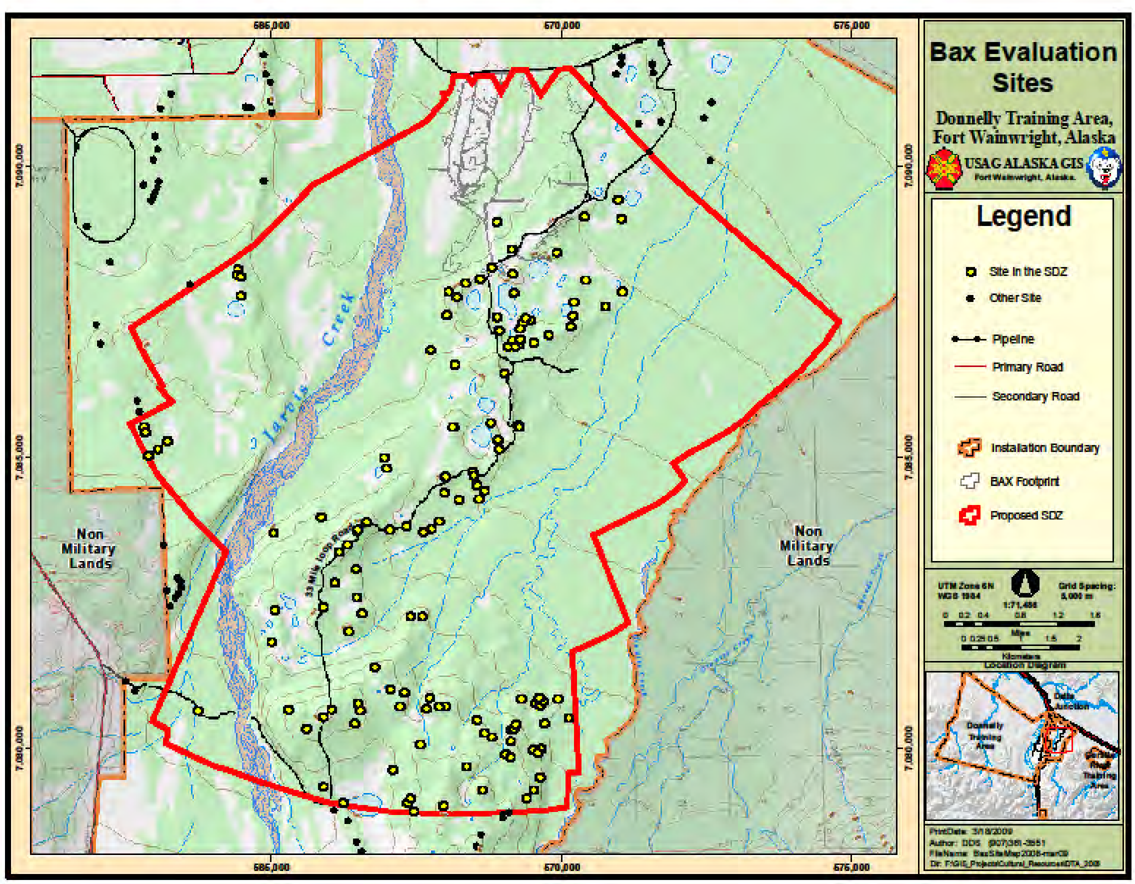

Figure 4. Location of sites in BAX SDZ

Table 2. List of archaeological sites located in the BAX SDZ

Site	Eligibility	Year of DOE	Size (m^2)	Site	Eligibility	Year of DOE	Size (m^2)
XMH-00277/00879	Eligible	2004	50	XMH-01098	Not Evaluated	2008	25
XMH-00278	Not Evaluated	2008	875	XMH-01099	Not Evaluated	2008	900
XMH-00279/00918	Eligible	2002	700	XMH-01100	Not Evaluated	2008	100
XMH-00284/00882	Eligible	2004	300	XMH-01101	Ineligible	2004	500
XMH-00292/00885	Eligible	2004	2800	XMH-01102	Ineligible	2004	25
XMH-00842	Ineligible	2004	25	XMH-01103	Ineligible	2004	350
XMH-00873	Ineligible	2002	25	XMH-01104	Not Evaluated	2008	25
XMH-00874	Eligible	2002	3400	XMH-01105	Not Evaluated	2008	400
XMH-00875	Ineligible	2002	450	XMH-01106	Not Evaluated	2008	100
XMH-00877	Ineligible	2002	10	XMH-01107	Eligible	2004	800
XMH-00878/00908	Eligible	2004	9000	XMH-01108	Not Evaluated	2008	120
XMH-00880	Ineligible	2002	0	XMH-01109	Eligible	2004	120
XMH-00881	Eligible	2002	1200	XMH-01110	Eligible	2004	100
XMH-00883	Ineligible	2002	100	XMH-01111	Not Evaluated	2008	100
XMH-00884	Ineligible	2002	25	XMH-01112	Ineligible	2004	25
XMH-00886	Not Evaluated	2002	0	XMH-01113	Ineligible	2004	100
XMH-00887	Eligible	2002	450	XMH-01114	Not Evaluated	2008	3500
XMH-00888	Ineligible	2002	100	XMH-01115/01117	Eligible	2004	3200
XMH-00889	Ineligible	2002	75	XMH-01116	Eligible	2004	450
XMH-00890	Eligible	2002	600	XMH-01118	Not Evaluated	2008	25
XMH-00891	Eligible	2002	900	XMH-01119	Not Evaluated	2008	375
XMH-00894	Not Evaluated	2008	100	XMH-01120	Not Evaluated	2008	25
XMH-00904	Eligible	2004	200	XMH-01121	Not Evaluated	2008	25
XMH-00905	Not Evaluated	2008	375	XMH-01122	Not Evaluated	2008	150
XMH-00906	Not Evaluated	2008	375	XMH-01123	Not Evaluated	2008	25
XMH-00907	Not Evaluated	2008	200	XMH-01124	Not Evaluated	2008	25
XMH-00909	Not Evaluated	2008	25	XMH-01125	Not Evaluated	2008	25
XMH-00910/00911	Not Evaluated	2008	8450	XMH-01126	Not Evaluated	2008	4800
XMH-00912	Ineligible	2004	25	XMH-01127	Ineligible	2004	100
XMH-00913	Not Evaluated	2008	0	XMH-01128	Not Evaluated	2008	120
XMH-00914	Not Evaluated	2008	300	XMH-01129	Not Evaluated	2008	120
XMH-00915	Not Evaluated	2008	9600	XMH-01130	Not Evaluated	2008	7000
XMH-00916	Ineligible	2004	0	XMH-01131	Not Evaluated	2008	0
XMH-00917	Not Evaluated	2008	120	XMH-01132	Not Evaluated	2008	800

XMH-00919	Not Evaluated	2004	150	XMH-01133	Not Evaluated	2008	120
XMH-00920	Eligible	2004	200	XMH-01134	Not Evaluated	2008	25
XMH-00921	Not Evaluated	2008	100	XMH-01135	Not Evaluated	2008	0
XMH-00923/00922	Not Evaluated	2008	3400	XMH-01136	Not Evaluated	2008	0
XMH-00924	Not Evaluated	2008	552	XMH-01137	Not Evaluated	2008	25
XMH-00925	Not Evaluated	2008	875	XMH-01138	Not Evaluated	2008	25
Site	**Eligibility**	**Year of DOE**	**Size (m^2)**	**Site**	**Eligibility**	**Year of DOE**	**Size (m2)**
XMH-00926	Not Evaluated	2008	150	XMH-01139	Not Evaluated	2008	25
XMH-00927	Not Evaluated	2008	100	XMH-01140	Not Evaluated	2008	120
XMH-00928	Not Evaluated	2008	800	XMH-01141	Not Evaluated	2008	120
XMH-00929	Not Evaluated	2008	1200	XMH-01144	Not Evaluated	2008	120
XMH-00945	Eligible	2004	3000	XMH-01145	Eligible	2004	1300
XMH-00983	Not Evaluated	2002	25	XMH-01146	Eligible	2004	750
XMH-01070	Not Evaluated	n/a	5	XMH-01147	Not Evaluated	2008	25
XMH-01074	Not Evaluated	2008	200	XMH-01148	Not Evaluated	2008	100
XMH-01075	Not Evaluated	2008	400	XMH-01149	Not Evaluated	2008	200
XMH-01076	Not Evaluated	2008	25	XMH-01150	Not Evaluated	2008	1184
XMH-01077	Not Evaluated	2008	100	XMH-01151	Not Evaluated	2008	900
XMH-01078	Not Evaluated	2008	120	XMH-01152	Not Evaluated	2008	100
XMH-01084	Not Evaluated	2008	25	XMH-01161	Not Evaluated	2008	25
XMH-01085	Not Evaluated	2008	25	XMH-01162	Not Evaluated	2008	150
XMH-01086	Not Evaluated	2008	25	XMH-01163	Not Evaluated	2008	140
XMH-01087	Not Evaluated	2008	100	XMH-01172	Ineligible	2004	25
XMH-01088	Not Evaluated	2008	25	XMH-01175	Not Evaluated	2008	25
XMH-01089	Not Evaluated	2008	240	XMH-01176	Not Evaluated	2008	120
XMH-01090	Not Evaluated	2008	25	XMH-01303	Eligible	2006	1400
XMH-01091	Not Evaluated	2008	100	XMH-01361	Not Evaluated		120
XMH-01092	Eligible	2004	120	XMH-01362	Not Evaluated		10
XMH-01093	Eligible	2004	100	XMH-01363	Not Evaluated		10
XMH-01094	Ineligible	2004	25	XMH-01367	Not Evaluated		40
XMH-01095/01142	Not Evaluated	2008	100	XMH-01368	Not Evaluated		100
XMH-01096	Not Evaluated	2008	100	XMH-01384	Not Evaluated		150
XMH-01097	Not Evaluated	2008	25				

3.0 MONITORING METHODOLOGY

USAG FWA has developed a site monitoring program in consultation with the Alaska SHPO to detect any possible impacts that the operation of the BAX may have on sites down range in the SDZ. In order to ensure a continued finding of "no adverse effects," USAG FWA implemented systematic, comprehensive monitoring of all sites within the SDZ. By definition, monitoring requires observation at regular intervals in order to determine status or condition. In this program, monitoring is conducted specifically to identify changes in the condition of archaeological sites or features through active field inspections. These inspections, occurring at regularly scheduled intervals, are intended to identify the nature and location of impacts, any changes to the site since last visited, and a general determination of site condition. The intensity of monitoring is correlated to the likelihood of potential site impacts resulting from BAX use. Three monitoring profiles have been created: (1) aggressive, (2) frequent, and (3) standard.

(1) *Aggressive* monitoring is conducted on the 17 sites in closest proximity to the BAX. These sites are within the 6 degree SDZs of 5.56 mm, and 7.62 mm munitions. Sites in the aggressive monitoring profile are visited six times a year for the first two years. Visits take place twice in the winter, once in the late spring after break-up, twice in the summer, and once in the fall. If no adverse effects are noted within the first two years, the monitoring schedule will be modified to three site visits per year—once in the spring after break-up, once during mid-summer, and once in the fall.

The following 17 sites will be included in the aggressive monitoring profile: XMH-00279/00918, XMH-00842, XMH-873, XMH-00875, XMH-00877, XMH-00878/00908, XMH-00904, XMH-00905, XMH-00906, XMH-00907, XMH-00909, XMH-00910/00911, XMH-00912, XMH-00914, XMH-00916, XMH-00945, and XMH-01303

(2) *Frequent* monitoring of the 35 sites located beyond the 6 degree SDZ of 5.56 mm and 7.62 mm but within the 6 degree SDZs of .50 cal. and 105 mm munitions. Sites in the frequent monitoring profile are visited three times a year for the first two years. Visits will take place once in the spring, once in the summer, and once in the fall. If no adverse effects are noted within the first two years, the monitoring schedule will be modified to two visits per year—once in the early summer and once in the fall.

The following 35 sites will be included in the frequent monitoring profile: XMH-00278, XMH-00292/00885, XMH-00886, XMH-00887, XMH-00889, XMH-00890, XMH-00891, XMH-00894, XMH-00913, XMH-00915, XMH-00917, XMH-00919, XMH-00920, XMH-00921, XMH-00923/00922, XMH-00924, XMH-00925, XMH-00926, XMH-00927, XMH-00928, XMH-00929, XMH-01074, XMH-01075, XMH-01076, XMH-01077, XMH-01085, XMH-01086, XMH-01087, XMH-01088, XMH-01092, XMH-01095/01142, XMH-01101, XMH-01102, XMH-01122, and XMH-01161

(3) *Standard* monitoring occurs on 79 sites that lie at the far end of the BAX SDZ past the 6 degree 105 mm SDZ. Sites in the standard monitoring profile will be visited once a year.

The following 79 sites will be included in the standard monitoring profile: XMH-00277/00879, XMH-00284/00882, XMH-874, XMH-00880, XMH-00881, XMH-00882, XMH-00883, XMH-00884, XMH-00888, XMH-00983, XMH-01070, XMH-01078, XMH-01084, XMH-01089, XMH-01090, XMH-01091, XMH-01093, XMH-01094 XMH-01096, XMH-01097, XMH-01098, XMH-01099, XMH-01100, XMH-01103, XMH-01104, XMH-01105, XMH-01106, XMH-01107, XMH-01108, XMH-01109, XMH-01110, XMH-01111, XMH-01112, XMH-01113, XMH-01114, XMH-01115/01117, XMH-01116, XMH-01118, XMH-01119, XMH-01120, XMH-01121, XMH-01123, XMH-01124, XMH-01125, XMH-01126, XMH-01127, XMH-01128, XMH-01129, XMH-01130, XMH-01131, XMH-01132, XMH-01133, XMH-01134, XMH-01135, XMH-01136, XMH-01137, XMH-01138, XMH-01139, XMH-01140, XMH-01141, XMH-01144, XMH-01145, XMH-01146, XMH-01147, XMH-01148, XMH-01149, XMH-01150, XMH-01151, XMH-01152, XMH-01162, XMH-01163, XMH-01172, XMH-01175, XMH-01176, XMH-01361, XMH-01362, XMH-01363, XMH-01367, XMH-01368, and XMH-01384

Site monitoring was conducted under the supervision of a person, or persons, meeting the *Secretary of the Interior's Professional Qualifications Standard*s (48 FR 44738- 44739).

A USAG FWA site monitoring form was filled out, documenting: (1) the present condition of the site; (2) the nature and character of all observable impacts to the integrity of the site; (3) extent, character and nature of any damage observed at the site; (4) the presence of new artifacts. High quality photo documentation was also be conducted. The form provided a place for logging digital photos. Photographs and previous site descriptions and maps were used to compare current conditions with those visible during previous monitoring episodes.

Data Recording

During the first visit, several photo points were established. These points will serve as fixed points of reference that will be utilized to consistently document the site over time. The number of photo points will vary by size and complexity of the site. Two to three photo points were established. More photo points were used for larger sites. Upon all subsequent visits to the site, digital photographs will be taken from each photo point.

Recorded Impacts on Cultural Resources

If an adverse effect is noticed through site monitoring, then all impacts will be recorded on the site monitoring forms. Location, extent and the nature of impacts will be recorded on site maps. Photographs and measurements will be taken of any impacts. If the impact is subsurface in nature, then the depth of the impact and associated effects to underlying strata will be assessed and recorded. Salient information, such as whether the impacts extend to cultural strata, will be recorded. Any impact to artifacts and features will also be recorded.

Reporting

Any adverse impact to the site will be reported to the SHPO directly. All findings from the monitoring will be reported in a USAG FWA annual monitoring report.

4.0 MONITORING RESULTS and RECOMMENDATION

Two cycles of monitoring were completed from June 2010 to May 2012. The 17 *aggressively* monitored sites were located and photographed five times between June 2010 and May 2011, and four times between June 2011 and May 2012. Only 9 of 12 scheduled site visits took place for two reasons. First, the BAX was only used twice during the summer/fall of 2010 and again twice during the summer/fall of 2011. Winter visits only produced photos of snow. The BAX programmatic agreement is currently being amended so that monitoring efforts more closely match the military training schedule. One of these sites, XMH-00842, was not monitored because it has never been relocated. The 35 *frequently* monitored sites were located and photographed three times between June 2010 and May 2011, and three times between June 2100 and 2012. The 179 *standard* monitored sites were located and photographed once between June 2010 and May 2011, and once between June 2100 and 2012.

Monitoring activities identified no adverse effects from live-fire training activities to the 131 prehistoric archaeological within the BAX SDZ from the period of June 2010 to May 2012. Site conditions were generally good, with little to no observed change in site integrity. Details and documentation of monitoring activities are provided in Tables 3, 4, and 5, and Appendices 1, 2, and 3.

Two effects of live-fire exercises were noted:

(1) A .50 cal slug was identified on the surface of XMH-00878/00908 on June 1, 2010. The slug was found lying on the ground surface (Figure 5). There were no effects to the ground surface noted. Given the unaltered nature of the slug, it is likely that it was a stray round that expended all of its energy before it hit the site, with no concomitant damage to natural stratigraphy or artifact-bearing deposits.

Figure 5. .50 cal slug XMH-00878/908, 6/1/10

(2) A .50 cal slug was also identified on the surface of XMH-00877 on June 16, 2011. The slug was found lying on the ground surface (

(3) Figure **6**). There were no effects to the ground surface noted. Given the unaltered nature of the slug, it is likely that it was a stray round that expended all of its energy before it hit the site, without damage to natural stratigraphy or artifact-bearing deposits.

Figure 6. .50 cal slug XMH-00877, 6/16/11

USAG FWA determined a continued finding of “no adverse effect” to the 131 prehistoric archaeological sites located within the BAX SDZ from live-fire training activities. Some possible effects to four sites located within the BAX SDZ from a separate undertaking (road maintenance) and recreational activities were noted during the course of the monitoring program. These effects are being addressed separately from this undertaking in consultation with the SHPO and the Advisory Council. The sites that were affected are: XMH-00292/00885, XMH-00886, XMH-00891, and XMH-01161.

In conclusion, USAG FWA determined a continued finding of “no historic properties adversely affected” [36 CFR 800.5(a)] for the BAX SDZ for the period of June 2010 to May 2012, based on the results of the field observations and monitoring activities conducted during this period. This satisfies Section 106 NHPA (16 USC § 470, as amended 2000) considerations and regulations codified in 36 CFR 800 (as amended 2004) for said period. No indications of burials or other human remains were observed in the monitored sites; therefore, barring an unforeseen discovery during the undertaking, there are no further considerations expected under the Native American Graves Protection and Repatriation Act (25 U.S.C.§ 3001 *et seq*.) for said period.

Table 3. Aggressive interval monitoring sites, dates, and findings

Cycle 1 June 2010 to May 2011										
Site	**Visit 1**	**Effects**	**Visit 2**	**Effects**	**Visit 3**	**Effects**	**Visit 4**	**Effects**	**Visit 5**	**Effects**
XMH-00279/00918	6/2/10	None	7/7/10	None	8/9/10	None	12/6/10	None	1/12/11	None
XMH-00873	6/2/10	None	7/6/10	None	8/11/10	None	12/6/10	None	1/12/11	None
XMH-00875	6/2/10	None	7/7/10	None	8/9/10	None	12/6/10	None	1/12/11	None
XMH-00877	6/8/10	None	7/6/10	None	8/11/10	None	12/6/10	None	1/12/11	None
XMH-00878/00908	6/1/10	None	7/6/10	None	8/5/10	None	12/6/10	None	1/12/11	None
XMH-00904	6/7/10	None	7/6/10	None	8/12/10	None	12/6/10	None	1/12/11	None
XMH-00905	6/7/10	None	7/6/10	None	8/12/10	None	Skipped		1/14/11	None
XMH-00906	6/2/10	None	7/6/10	None	8/5/10	None	12/6/10	None	1/13/11	None
XMH-00907	6/1/10	None	7/6/10	None	8/5/10	None	12/6/10	None	1/12/11	None
XMH-00909	6/1/10	None	7/6/10	None	8/10/10	None	12/6/10	None	1/13/11	None
XMH-00910/00911	6/1/10	None	7/6/10	None	8/10/10	None	12/6/10	None	1/13/11	None
XMH-00912	6/1/10	None	7/6/10	None	8/11/10	None	12/6/10	None	1/12/11	None
XMH-00914	6/1/10	None	7/6/10	None	8/5/10	None	12/6/10	None	1/12/11	None
XMH-00916	6/3/10	None	7/7/10	None	8/11/10	None	12/6/10	None	1/12/11	None
XMH-00945	6/1/10	None	7/6/10	None	8/5/10	None	12/6/10	None	1/12/11	None
XMH-01303	6/8/10	None	7/7/10	None	8/11/10	None	12/6/10	None	1/12/11	None
XMH-00842	Not Found									

Cycle 2 June 2011 to May 2012								
Site	**Visit 1**	**Effects**	**Visit 2**	**Effects**	**Visit 3**	**Effects**	**Visit 4**	**Effects**
XMH-00279/00918	6/16/11	None	7/25/11	None	8/31/11	None	3/12/12	None
XMH-00873	Skipped		7/25/11	None	8/31/11	None	Skipped	
XMH-00875	6/16/11	None	7/25/11	None	8/31/11	None	3/12/12	None
XMH-00877	6/15/11	None	7/25/11	None	8/31/11	None	Skipped	
XMH-00878/00908	6/16/11	None	7/25/11	None	8/31/11	None	3/12/12	None
XMH-00904	6/16/11	None	8/2/11	None	8/31/11	None	Skipped	
XMH-00905	6/15/11	None	8/2/11	None	8/31/11	None	Skipped	
XMH-00906	6/15/11	None	7/25/11	None	8/31/11	None	3/12/12	None
XMH-00907	6/15/11	None	7/25/11	None	8/31/11	None	3/12/12	None
XMH-00909	6/14/11	None	7/25/11	None	8/31/11	None	3/12/12	None
XMH-00910/00911	6/15/11	None	7/25/11	None	8/31/11	None	3/12/12	None
XMH-00912	6/15/11	None	7/25/11	None	8/31/11	None	3/12/12	None

XMH-00914	6/16/11	None	7/25/11	None	8/31/11	None	Skipped	
XMH-00916	6/15/11	None	7/25/11	None	8/31/11	None	Skipped	
XMH-00945	5/24/11	None	7/25/11	None	8/31/11	None	Skipped	
XMH-01303	Skipped		7/25/11	None	8/31/11	None	3/13/12	None
XMH-00842	Not Found							

Table 4. Frequent interval monitoring sites, dates, and findings

Cycle 1 June 2010 to May 2011						
Site	**Visit 1**	**Effects**	**Visit 2**	**Effects**	**Visit 3**	**Effects**
XMH-00278	6/3/10	None	8/9/10	None	1/12/11	None
XMH-00292/00885	6/4/10	None	8/3/10	None	1/13/11	None
XMH-00886	6/4/10	None	8/3/10	None	1/13/11	None
XMH-00887	6/3/10	None	8/3/10	None	1/13/11	None
XMH-00889	6/3/10	None	8/4/10	None	1/13/11	None
XMH-00890	6/3/10	None	8/4/10	None	1/13/11	None
XMH-00891	6/8/10	None	8/4/10	None	1/13/11	None
XMH-00894	6/4/10	None	8/4/10	None	1/14/11	None
XMH-00913	6/1/10	None	8/10/10	None	1/13/11	None
XMH-00915	6/3/10	None	8/9/10	None	1/13/11	None
XMH-00917	6/2/10	None	8/9/10	None	1/13/11	None
XMH-00919	6/3/10	None	8/9/10	None	1/13/11	None
XMH-00920	6/3/10	None	8/4/10	None	1/13/11	None
XMH-00921	6/1/10	None	8/10/10	None	1/12/2011	None
XMH-00923/00922	6/2/10	None	8/5/10	None	1/12/11	None
XMH-00924	6/2/10	None	8/5/10	None	1/12/11	None
XMH-00925	6/1/10	None	8/10/10	None	1/12/11	None
XMH-00926	6/1/10	None	8/10/10	None	1/13/11	None
XMH-00927	6/2/10	None	8/5/10	None	1/13/11	None
XMH-00928	6/2/10	None	8/3/10	None	1/12/11	None
XMH-00929	6/3/10	None	8/4/10	None	1/12/11	None
XMH-01074	6/9/10	None	8/2/10	None	1/14/11	None
XMH-01075	6/9/10	None	8/2/10	None	1/14/11	None
XMH-01076	6/9/10	None	8/2/10	None	1/14/11	None
XMH-01077	6/9/10	None	8/2/10	None	1/14/11	None
XMH-01085	6/4/10	None	8/3/10	None	1/12/11	None
XMH-01086	6/4/10	None	8/3/10	None	1/12/11	None
XMH-01087	6/4/10	None	8/3/10	None	1/12/11	None
XMH-01088	6/4/10	None	8/3/10	None	1/12/11	None
XMH-01092	6/2/10	None	8/5/10	None	1/12/11	None
XMH-01095/01142	6/2/10	None	8/2/10	None	1/13/11	None
XMH-01101	6/8/10	None	8/2/10	None	1/13/11	None
XMH-01102	6/8/10	None	8/2/10	None	1/13/11	None
XMH-01122	6/3/10	None	8/4/10	None	1/13/11	None
XMH-01161	6/8/10	None	8/3/10	None	1/13/11	None
Cycle 2 June 2011 to May 2012						
Site	**Visit 1**	**Effects**	**Visit 2**	**Effects**	**Visit 3**	**Effects**
XMH-00278	6/20/11	None	9/7/11	None	3/13/12	None
XMH-00292/00885	6/20/11	Possible[1]	9/1/11	None	3/12/12	None
XMH-00886	6/21/11	Possible[2]	9/1/11	None	3/12/12	None
XMH-00887	6/21/11	None	9/1/11	None	3/13/12	None
XMH-00889	6/21/11	None	9/1/11	None	3/13/12	None
XMH-00890	6/21/11	None	9/1/11	None	3/13/12	None
XMH-00891	6/21/11	Possible[3]	9/1/11	None	3/12/12	None
XMH-00894	6/22/11	None	9/7/11	None	Skipped	

XMH-00913	6/22/11	None	9/7/11	None	3/12/12	None
XMH-00915	6/22/11	None	9/7/11	None	3/13/12	None
XMH-00917	6/22/11	None	9/7/11	None	3/12/12	None
XMH-00919	6/21/11	None	9/7/11	None	Skipped	
XMH-00920	5/24/11	None	9/7/11	None	Skipped	
XMH-00921	5/24/11	None	9/7/11	None	3/12/12	None
XMH-00923/00922	5/24/11	None	9/7/11	None	3/12/12	None
XMH-00924	5/24/11	None	9/7/11	None	3/12/12	None
XMH-00925	6/22/11	None	9/7/11	None	3/12/12	None
XMH-00926	6/22/11	None	9/7/11	None	3/12/12	None
XMH-00927	6/20/11	None	9/7/11	None	Skipped	
XMH-00928	6/21/11	None	9/1/11	None	3/12/12	None
XMH-00929	6/26/11	None	9/1/11	None	Skipped	
XMH-01074	6/26/11	None	9/6/11	None	3/13/12	None
XMH-01075	6/26/11	None	9/6/11	None	3/13/12	None
XMH-01076	6/27/11	None	9/6/11	None	3/13/12	None
XMH-01077	6/20/11	None	9/6/11	None	3/13/12	None
XMH-01085	6/20/11	None	9/6/11	None	Skipped	
XMH-01086	6/20/11	None	9/6/11	None	Skipped	
XMH-01087	6/20/11	None	9/6/11	None	Skipped	
XMH-01088	6/21/11	None	9/6/11	None	Skipped	
XMH-01092	6/20/11	None	9/7/11	None	Skipped	
XMH-01095/01142	6/20/11	None	9/6/11	None	Skipped	
XMH-01101	6/20/11	None	9/6/11	None	Skipped	
XMH-01102	6/21/11	None	9/6/11	None	Skipped	
XMH-01122	6/21/11	None	9/7/11	None	Skipped	
XMH-01161	6/16/11	Possible[2]	9/1/11	None	3/13/12	None

1- Datum missing as a result of hydro-axing over site, possible surface damage due to road grading.
2- Hydro-axing over site.
3- Recreational activities took place on site causing vegetation loss and minor surface disturbance.

Table 5. Standard interval monitoring sites, dates, and findings

Site	Visit 1	Effects	Site	Visit 1	Effects
Cycle 1 June 2010 to May 2011					
Site	**Visit 1**	**Effects**	**Site**	**Visit 1**	**Effects**
XMH-00277/00879	6/9/10	None	XMH-01123	6/15/10	None
XMH-00284/00882	6/4/10	None	XMH-01124	6/15/10	None
XMH-00874	6/4/10	None	XMH-01125	6/15/10	None
XMH-00880	6/8/10	None	XMH-01126	6/17/10	None
XMH-00881	6/4/10	None	XMH-01127	6/17/10	None
XMH-00883	6/4/10	None	XMH-01128	6/16/10	None
XMH-00884	6/3/10	None	XMH-01129	6/16/10	None
XMH-00888	6/3/10	None	XMH-01130	6/16/10	None
XMH-00983	6/4/10	None	XMH-01131	6/15/10	None
XMH-01070	6/9/10	None	XMH-01132	6/15/10	None
XMH-01078	6/4/10	None	XMH-01133	6/15/10	None
XMH-01084	6/10/10	None	XMH-01134	6/15/10	None
XMH-01089	6/3/10	None	XMH-01135	6/16/10	None
XMH-01090	6/3/10	None	XMH-01136	6/16/10	None
XMH-01091	6/3/10	None	XMH-01137	6/16/10	None
XMH-01093	6/7/10	None	XMH-01138	6/15/10	None
XMH-01094	6/4/10	None	XMH-01139	6/15/10	None
XMH-01096	6/4/10	None	XMH-01140	6/9/10	None
XMH-01097	6/7/10	None	XMH-01141	6/9/10	None
XMH-01098	6/8/10	None	XMH-01144	6/10/10	None
XMH-01099	6/7/10	None	XMH-01145	6/10/10	None
XMH-01100	6/7/10	None	XMH-01146	6/10/10	None
XMH-01103	6/8/10	None	XMH-01147	6/10/10	None
XMH-01104	6/8/10	None	XMH-01148	6/17/10	None
XMH-01105	6/9/10	None	XMH-01149	6/17/10	None
XMH-01106	6/8/10	None	XMH-01150	6/16/10	None
XMH-01107	6/9/10	None	XMH-01151	6/16/10	None
XMH-01108	6/8/10	None	XMH-01152	6/15/10	None
XMH-01109	6/8/10	None	XMH-01162	6/10/10	None
XMH-01110	6/7/10	None	XMH-01163	6/17/10	None
XMH-01111	6/8/10	None	XMH-01172	5/25/10	None
XMH-01112	6/9/10	None	XMH-01175	6/10/10	None
XMH-01113	6/10/10	None	XMH-01176	6/17/10	None
XMH-01114	6/10/10	None	XMH-01361	6/15/10	None
XMH-01115/01117	6/10/10	None	XMH-01362	6/17/10	None
XMH-01116	6/10/10	None	XMH-01363	6/15/10	None
XMH-01118	6/17/10	None	XMH-01367	6/16/10	None
XMH-01119	6/17/10	None	XMH-01368	6/16/10	None
XMH-01120	6/7/10	None	XMH-01384	6/16/10	None
XMH-01121	6/7/10	None			
Cycle 2 June 2011 to May 2012					
Site	**Visit 1**	**Effects**	**Site**	**Visit 1**	**Effects**
XMH-00277/00879	6/29/11	None	XMH-01123	7/14/11	None
XMH-00284/00882	6/29/11	None	XMH-01124	7/19/11	None
XMH-00874	6/16/11	None	XMH-01125	7/19/11	None

XMH-00880	6/29/11	None	XMH-01126	7/11/11	None
XMH-00881	6/29/11	None	XMH-01127	7/11/11	None
XMH-00883	6/29/11	None	XMH-01128	7/11/11	None
XMH-00884	6/29/11	None	XMH-01129	7/17/11	None
XMH-00888	6/29/11	None	XMH-01130	7/14/11	None
XMH-00983	6/29/11	None	XMH-01131	7/11/11	None
XMH-01070	7/18/11	None	XMH-01132	7/11/11	None
XMH-01078	7/18/11	None	XMH-01133	7/11/11	None
XMH-01084	7/18/11	None	XMH-01134	7/11/11	None
XMH-01089	6/18/11	None	XMH-01135	7/11/11	None
XMH-01090	6/29/11	None	XMH-01136	7/11/11	None
XMH-01091	7/18/11	None	XMH-01137	7/11/11	None
XMH-01093	7/18/11	None	XMH-01138	7/20/11	None
XMH-01094	6/29/11	None	XMH-01139	7/11/11	None
XMH-01096	7/19/11	None	XMH-01140	7/11/11	None
XMH-01097	6/29/11	None	XMH-01141	7/11/11	None
XMH-01098	6/29/11	None	XMH-01144	7/20/11	None
XMH-01099	7/19/11	None	XMH-01145	7/14/11	None
XMH-01100	6/29/11	None	XMH-01146	7/7/11	None
XMH-01103	7/19/11	None	XMH-01147	7/14/11	None
XMH-01104	7/18/11	None	XMH-01148	7/18/11	None
XMH-01105	7/18/11	None	XMH-01149	7/18/11	None
XMH-01106	6/30/11	None	XMH-01150	7/18/11	None
XMH-01107	6/30/11	None	XMH-01151	7/11/11	None
XMH-01108	6/30/11	None	XMH-01152	7/11/11	None
XMH-01109	6/30/11	None	XMH-01162	7/11/11	None
XMH-01110	6/30/11	None	XMH-01163	7/11/11	None
XMH-01111	7/18/11	None	XMH-01172	7/14/11	None
XMH-01112	7/18/11	None	XMH-01175	7/18/11	None
XMH-01113	7/18/11	None	XMH-01176	7/11/11	None
XMH-01114	7/18/11	None	XMH-01361	5/24/11	None
XMH-01115/01117	7/11/11	None	XMH-01362	7/11/11	None
XMH-01116	7/11/11	None	XMH-01363	7/14/11	None
XMH-01118	7/11/11	None	XMH-01367	7/14/11	None
XMH-01119	7/11/11	None	XMH-01368	7/14/11	None
XMH-01120	6/30/11	None	XMH-01384	7/14/11	None
XMH-01121	7/14/11	None			

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APPENDIX 1: Aggressive Interval Monitoring Site Photos (first and most recent non-winter visit)

XMH-00279/00918

Figure 7. XMH-00279, Point 1, 6/2/10 (NE)

Figure 8. XMH-00279, Point 1, 8/31/11 (E)

XMH-00842

Figure 9. XMH-00842, Point 1, 6/2/10 (E)

The site at XMH-00842 was never relocated and was no longer monitored in 2011/2012.

XMH-00873

Figure 10. XMH-00873, Point 1, 6/8/10 (E)

Figure 11. XMH-00873, Point1, 8/31/11 (E)

XMH-00875

Figure 12. XMH-00875, Point 1, 6/2/10 (NW)

Figure 13. XMH-00875, Point 1, 8/31/11 (W)

XMH-00877

Figure 14. XMH-00877, Point 1, 6/8/10 (S)

Figure 15. XMH-00877, Point 1, 8/31/11 (SW)

XMH-00878/00908

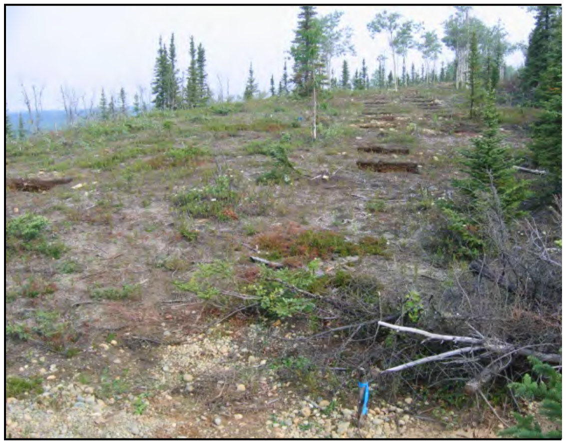

Figure 16. XMH-00878/908, Point 1, 6/1/10 (N)

Figure 17. XMH-00878/908, Point 1, 7/25/11 (N)

Figure 18. XMH-00878/908, Point 3, 6/1/10 (SW)

Figure 19. XMH-00878/908, Point 3, 7/25/11 (SW)

XMH-00904

Figure 20. XMH-00904, Point 1, 6/7/10 (NW)

Figure 21. XMH-00904, Point 1, 8/31/11 (W)

XMH-00905

Figure 22. XMH-00905, Point 1, 6/7/10 (NW)

Figure 23. XMH-00905, Point 1, 8/31/11 (N)

XMH-00906

Figure 24. XMH-00906, Point 1, 6/2/10 (N)

Figure 25. XMH-00906, Point 1, 8/31/11 (N)

XMH-00907

Figure 26. XMH-00907, Point 1, 6/1/10 (N)

Figure 27. XMH-00907, Point 1, 8/31/11 (N)

XMH-00909

Figure 28. XMH-00909, Point 1, 6/1/10 (NW)

Figure 29. XMH-00909, Point 1, 1/13/11 (SSW)

XMH-00910/XMH-00911

Figure 30. XMH-00910/911, Point 1, 6/1/10 (NNE)

Figure 31. XMH-00910/911, Point 1, 8/31/11 (N)

Figure 32. XMH-00910/911, Point 2, 6/1/10 (N)

Figure 33. XMH-00910/911, Point 2, 8/11/31 (N)

XMH-00912

XMH-00914

Figure 34. XMH-00910/911, Point 4, 6/1/10 (SW)

Figure 35. XMH-00910/911, Point 4, 8/31/11 (W)

Figure 36. XMH-00912, Point 2, 6/1/10 (NE)

Figure 37. XMH-00912, Point 2, 8/31/11 (N)

Figure 38. XMH-00914, Point 1, 6/1/10 (S)

Figure 39. XMH-00914, Point 1, 8/31/11 (S)

XMH-00916

Figure 40. XMH-00916, Point 1, 6/3/10 (SW)

Figure 41. XMH-00916, Point 1, 8/31/11 (SW)

XMH-00945

Figure 42. XMH-00945, Point 1, 6/1/10 (S)

Figure 43. XMH-00945, Point 1, 8/31/11 (S)

XMH-001303

Figure 44. XMH-001303, Point 1, 6/8/10 (W)

Figure 45. XMH-001303, Point 1, 8/31/11 (W)