

Arco Naval Proving Ground

Historic American Landscape Survey (HALS)

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Pacific Guns on the Plain

In 1942 the U.S. Navy acquired 172,494.65 acres of the Snake River Plain in south east Idaho to construct the Arco Naval Proving Ground (NPG; USACE 1998: 10). The Arco NPG was constructed to meet the demands of the Naval Ordnance Plant (NOP) in Pocatello where 3 to 16-inch caliber guns from the Pacific Fleet were refurbished, following the redistribution of operational support after the attack on Pearl Harbor in 1941 (USACE 1998, 10; Stacy 2000). The Arco NPG was formed, in part, by a firing range running 30 miles to the north east and approximately 9 miles wide at its terminus, large enough to test the accuracy of the re-refilled large caliber naval guns (figure 4.a; INL CRMO 2013). The first gun was fired on 20th November 1943 from emplacements at the Proofing Area, located on the south west end of the range (figure 1 ; USACE 1998: 10). The Proofing Area, together with a Residential Area for the civilian and military personnel who worked at the NPG, as well as their families, came to be known as Scoville (Stacy 2000). The buildings and structures that remain from the Scoville era are currently found within the Central Facilities Area (CFA) of the Idaho National Laboratory (INL), a Department of Energy (DOE) site encompassing the entire original Arco NPG facility and beyond. The significant role the Arco NPG played in the pacific campaign lead to the designation of the World War II Scoville buildings as DOE "Signature Properties" in 2004 (INL CRMO 2013), including the Command Officer's Quarters (CF-607), Garage (CF-632), Marine Barracks (CF-606), Officer's Quarters (CF-613), and Proofing Area (CF-633). The proposed decommissioning and demolition of these historic properties at CFA has prompted the commissioning of a Historic American Landscape Survey (HALS) report as part of a mitigation program for the removal of World War II era Scoville.

The landscape in and around Arco NPG was not limited to the testing of naval guns, however, and during World War II areas adjacent to the facility were approved for use as two high altitude bombing ranges for the Army Air Base Corps based in Pocatello. The Arco High Altitude Bombing range was located to the south west of the Proofing Area and used by B24 Liberator aircraft. The Twin Buttes Bombing Range, around 15 miles to the west of the Proofing Area, was used by B-17 bomber crews who dropped sand-filled practice bombs, which were also used at the Arco High Altitude Bombing Range (DOE ID 2002). During the period between 1944 and 1946, while the Arco NPG was in operation, explosives safety testing was conducted at various scales within the boundaries of the original U.S. Navy land acquisition for the Arco NPG. One of the largest of these tests detonated 250,000 lbs. of explosives in a replica Army storage Igloo on August 29th 1945 to establish safe distance standards for munitions storage and barracks buildings (Army-Navy Explosives Board 1945). Other tests included railcar detonations, barrier wall tests, and scale model igloo tests designed at one tenth the original scale to replicate the effects on surrounding scale storage structures (USACE 1998). Together, the test structures, associated instrumentation and the blast craters themselves have left a significant impact on the landscape in the area occupied by the INL today. As such, the HALS encompasses the breath of activity that was undertaken at the Arco NPG and data collection is currently ongoing for the report.

Methods for Mapping

A major component of the HALS report is the production landscape maps, presenting the site of historic interest both as it exists at present and in the past. The mapping of the Arco NPG landscape is being conducted through a combination of documentary research, field recording of landscape features, and digital representation in ESR's ArcMap 10.2, prior to completion of the final map sheets in Adobe Illustrator CS6 to meet standards outlined by the HALS drawing guidelines (Jaeger Company 2004). The Arco NPG, high altitude bombing ranges and munitions testing sites present landscape features and structures on numerous scales across the current INL site and, once identified, a variety of methods were used to collect location, structure and condition data for the features. These methods include review of **historic maps and drawings, historical reports and documents, current and historic aerial imagery, and field reconnaissance and Global Positioning System (GPS)** recording. This combination of methods aims to create a digital landscape dataset compiled in a geographic information system (GIS) that will not only allow the creation of map documents for the HALS report but also serve as a resource to inform future cultural resource management decisions.

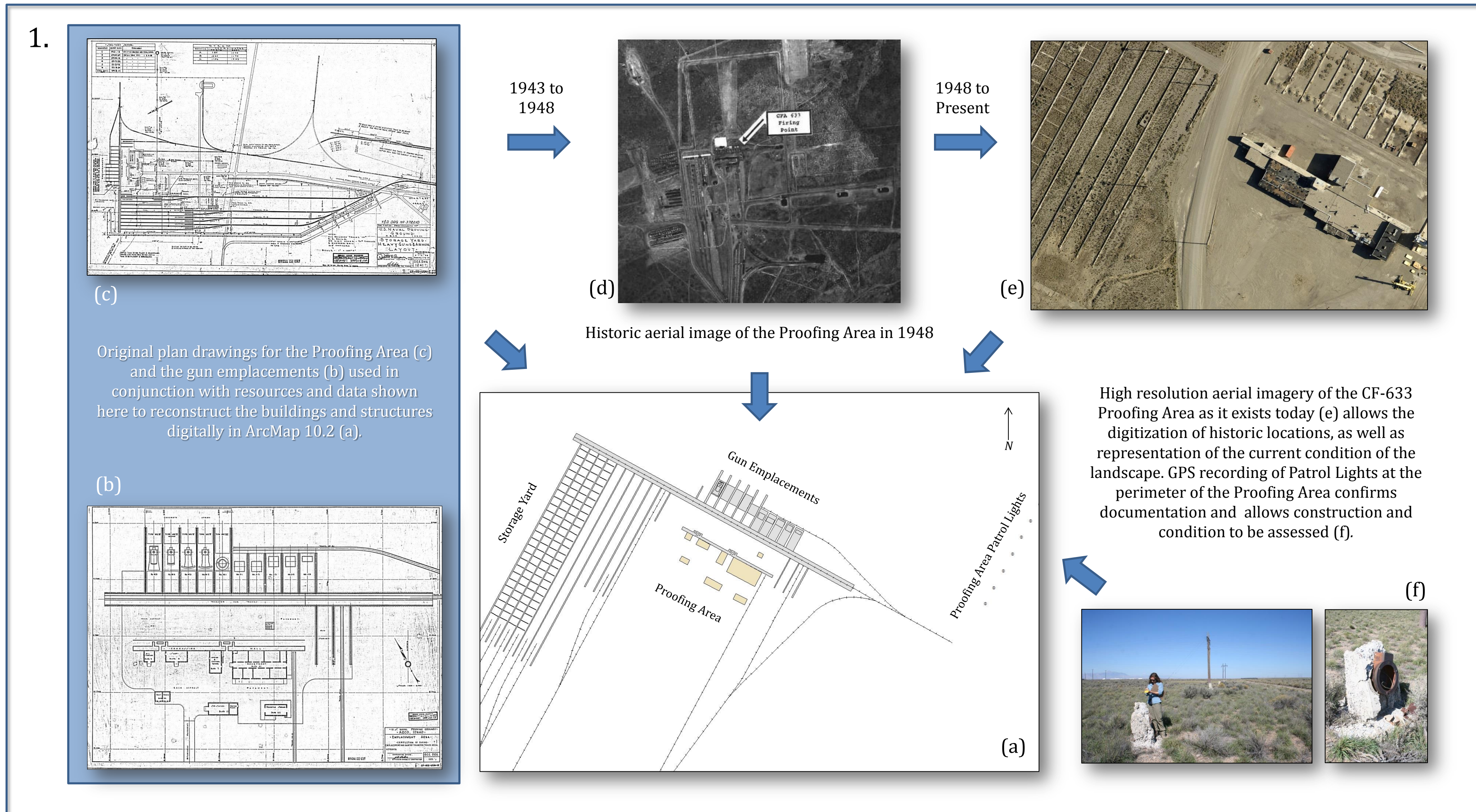


Figure 1. (above) Resources and methods used in the research of the Arco NPG landscape. (a) Image from ArcMap of the Proofing Area showing layers for the Proofing Area buildings, structures, railroad tracks and patrol road light locations. (b) Original plan drawing for the emplacement area of the Arco NPG (United States Department of the Navy c.1942a). (c) Original plan drawing for the Proofing Area at the Arco NPG, including emplacement and storage areas, as well as locations of patrol road and lights no longer on the landscape (United States Department of the Navy c.1942b). (d) Aerial photograph of the Proofing Area taken 15th October 1948 (USACE 1998: K-1). (e) Recent high resolution aerial imagery of the Proofing Area. (f) Images of the patrol road lights recorded with GPS and detail of the light.

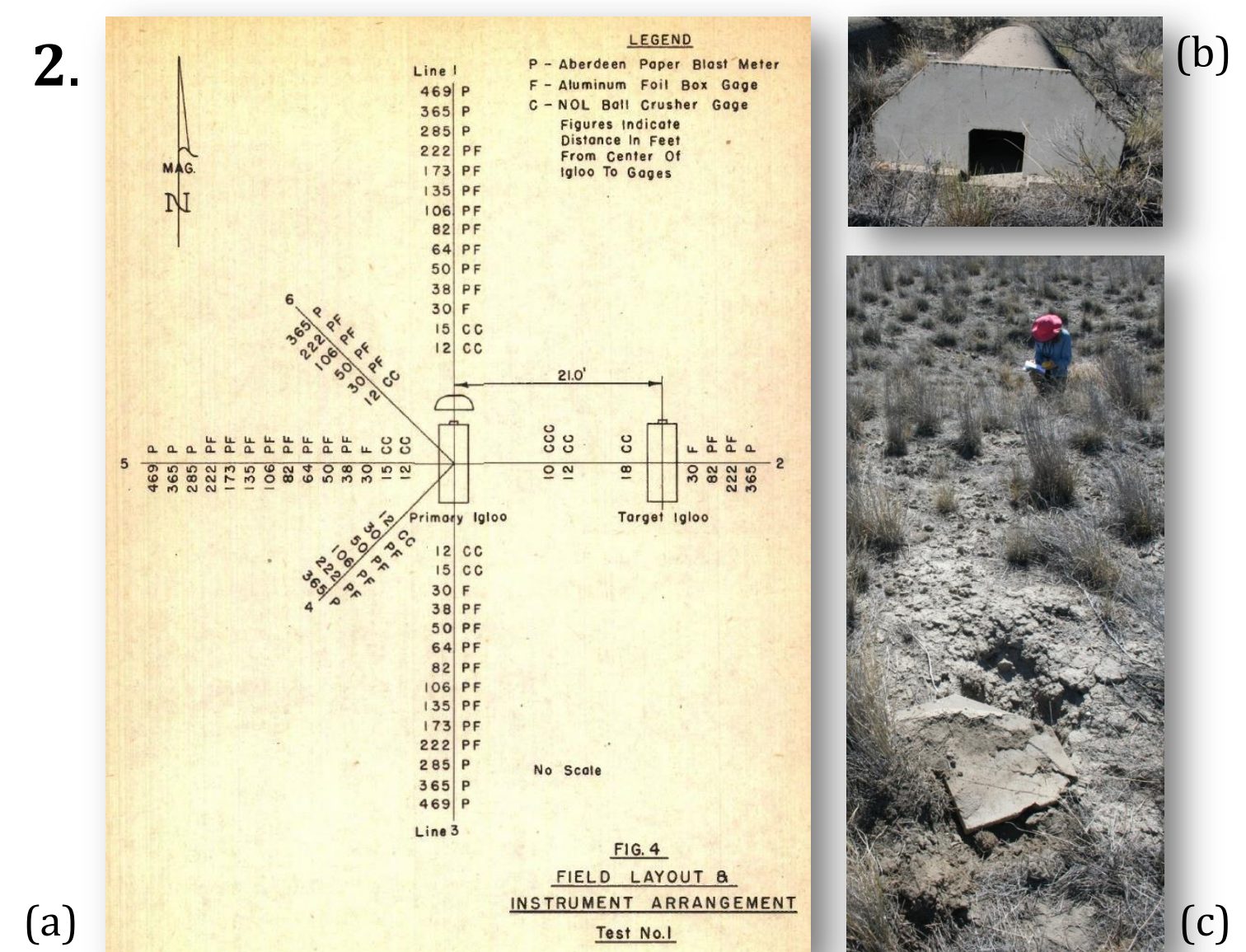


Figure 2. (above) Scale model igloos (Army-Navy Explosives Safety Board 1947). (a) Diagram of experimental design for one of the scale model igloo tests showing instrumentation layout. (b) Extant scale model igloo still present near the original test site. (c) Remains of scale model igloo in the foreground with crater recording in progress behind.

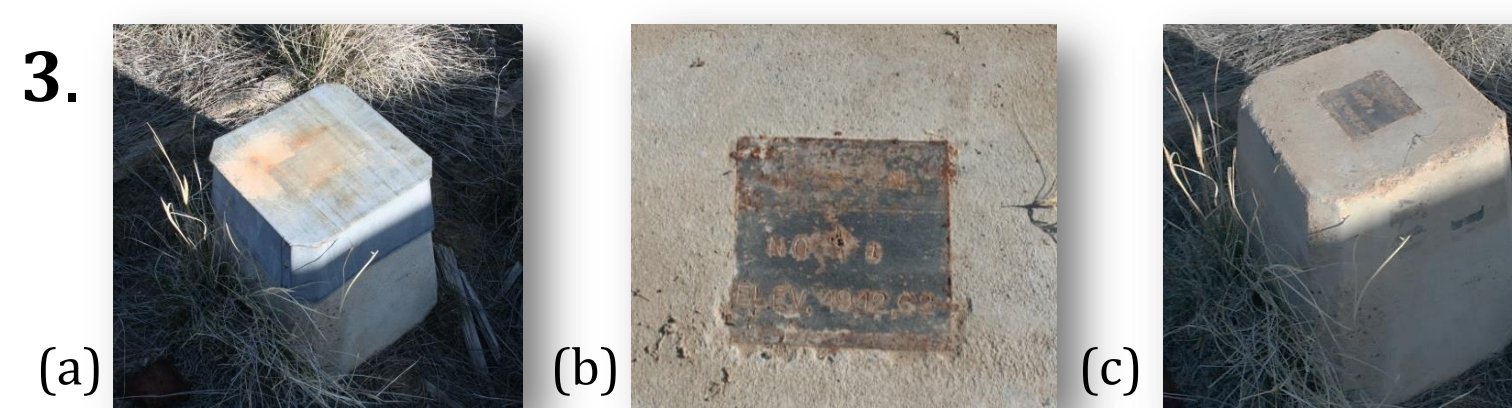


Figure 3. (above) USN Monument Marker No. 1. (a) Monument marker and metal cap painted with "11". (b) Metal plate on top of the monument marker showing elevation. (c) Elevation painted on marker visible under cap.

Historic Maps and Drawings

The examination of original plans, maps and architectural drawings for the Arco NPG has established the boundaries of the facility (defined by PLSS data), the firing range fan, and the layout and construction of the buildings at the Proofing and Residential Areas. (see Figure 1. b & c). The original maps identified previously unrecorded features such as U.S. Navy (USN) monuments marking the East Monument Line and West Monument Line roads (figure 3), which delineate the firing range fan and lighting structures marking the original patrol boundary of the Proofing Area. (figure 1. f) The plan drawing provide the location of previously demolished buildings, rails, and roads in both the Residential and Proofing Areas (figure 1.a).

Historic Reports and Documents

Technical papers published by the Army-Navy Explosives Safety Board (1945 & 1947) outline the experimental design and results of the igloo tests conducted at the Arco NPG; although exact geographic references are not included for scale model tests, description of crater size and test structure aid in location (figure 2.a). U.S. Army and Navy Record searches (Wyle 1993 & USACE 1998) provide correspondence and administrative records for the activities conducted at the Arco NPG. Again, locations for tests are not always explicit but provide information to guide further landscape investigation.

Historic and Current Aerial Imagery

The use of historic imagery from 1948-1949 provides a method to identify built features in the landscape and cross reference with the information gathered from historic documentation, in particular any plan drawings dating prior to construction. The current aerial imagery, including high resolution photography, is used in ArcMap 10.2 to digitize landscape features directly and accurately, as well as inform the current condition of the structure (figure 1.e). Both current and historic imagery are used as a prospection tool to identify possible locations for tests described in the historic reports and documentation.

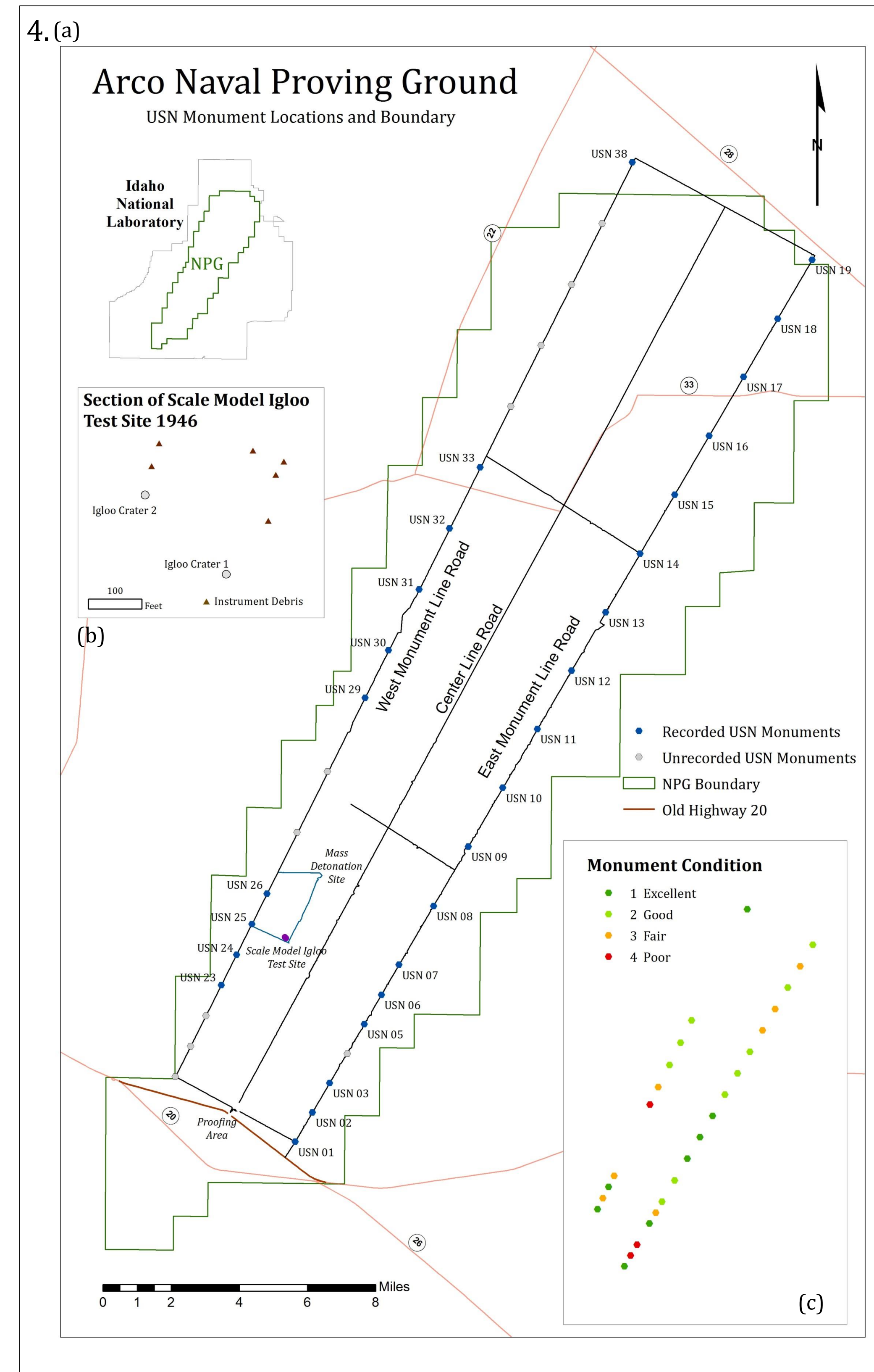
Field Reconnaissance and GPS data

Where small scale features, such as the monument markers, and possible test areas are identified in initial research stages, a field investigation is conducted to confirm the location and document the structures. GPS locations are collected with a Trimble GeoXT, GeoExplorer 2008 Series with TerraSync along photographic and written documentation of the structure is completed (figures 2 & 3). All spatial and associated data is compiled in ArcMap 10.2.

Digital History

The collation of multiple document, image and field sources in ArcMap 10.2 is creating a digitized database of the Arco NPG landscape. This spatial data allows interpretation of the landscape to be conducted through, for example, a comparison the field data and experimental design documentation of the scale model igloo tests (figure 2.b) to identify the locations of individual tests conducted (figure 4.b). The Arco NPG database not only produces a record of the landscape at the time of construction and operation but also, by attaching date information gathered during research stages for the duration of structures, a view of the landscape change that can be seen at intervals through time. Using this spatial and temporal data the HALS maps can be produced for the history of the Arco NPG. This digital database, however, is not limited to production of the HALS maps. The spatial data can also be used to access associated field data and utilized in future monitoring of the cultural landscape. This can be seen in the USN monument condition map (figure 4.c) generated from condition assessment field data.

Figure 4. (below) Arco Naval Proving Ground. (a) USN monument locations and boundary. (b) Scale model igloo craters and associated instrument debris. (c) USN monument condition map.



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