Abstract

The University of Wyoming, National Park Service, and Wyoming State Archaeologist's Office initiated area of Fort Laramie National Historic Site, using a variety of geophysical instruments, including fluxgate magnetometer, soil resistance meter and

testing occurring in 2003.

Introduction

This geophysical remote sensing survey and evaluative test excavation project was proposed to correct a major deficiency in the cultural resource data base for Fort

Laramie. A traditional surface "Class 3" survey is not effective for inventory and evaluation of buried resources. At Fort Laramie, features not visible on the surface are known to exist and modern landscaping and activities have hidden them. Since 1994, the NPS and Wyoming State Archaeologist's Office have been involved in several research projects to identify these resources using GIS and geophysical remote sensing. These projects have identified structural and other features (usually dumps) that are not visible on the present ground surface. The 2002 field season continued geophysical investigations completing nearly 75% of the fort area with the gradiometer survey and 19% of resistance survey. This poster displays the surveyed areas around the hospital from the 2002 field season and discusses the methodological processes involved in the data collection.

Geophysical Investigations

at Fort Laramie National Historic Site

soil conductance meter, to identify subsurface historic (and possibly prehistoric) features not visible on the ground surface. Not all soil areas of the fort are amenable to the latter two instruments, and they are being used several factors restricted the survey. The as conditions are proper. Between the three instruments, at least two will be magnetic survey was able to covered the most 1280-

use over most of the area to be investigated. It will take two summers (2002 and 2003) to complete the geophysical survey, with some limited Several features (military, homesteader, and Park Service) were identified during the 2002 field season. Many of these were known se 2500 Milion to exist from the historic or photographic record, but their exact location was unknown. Upon completion of the threeyear project, there should be a better understanding of the archaeology of Fort Laramie useful for interpretation and planning at this national historic site.

A Geophysical Survey at Fort Laramie National Historic Site, Wyoming UNIVERSITY OF WYOMING

Presented by Molly Boeka Cannon, Danny Walker, Steve DeVore, and Joe Cheshire



Interpretations and **Future Research**

an intensive geophysical survey in 2002 of the main A Joint Effort of the National Park Service-Midwest Archeological Center with the University of Wyoming and the Wyoming State Archaeologist's Office

Goals and Accomplishments For 2002 Field Season

The 2002 field season had hoped to complete the geophysical survey of all three instruments. However, 1300-

ground. The resistance survey was inhibited by dry soil conditions and 1260extremely compact sediments. conductivity survey was limited to a two 1240week period limiting the coverage at the fort. The area covered at Fort Laramie 1220-National Historic Site by geophysical surveys during 2002 greatly increased the 1200overall coverage. While several areas had been surveyed in previous years, these 1180were related to small Cultural Resource Management projects and the areas 1160covered were limited by those projects. Future field seasons will eventually provide 1140geophysical coverage over at least 800 20x20 meter grids, or 322,000 square 1120-

Discussion of the **Resistence Survey**

Like the magnetic survey, the resistance survey was conducted at half and whole meter traverse intervals. There were major problems with the resistance meter survey because of the lack of

ground moisture due to the drought in Goshen County. Ground moisture is critical for proper data collection with this machine. While several areas were surveyed, the 1260 data show little to no small " scale features. Also related to the lack of moisture was a common inability to make ground/electrical contact between the mobile probes and the ground during survey. While average time for resistance surveying a

20x20 meter grid is 45

Discussion of the **Conductivity Survey**

This area was part of the original fur trade and early military cemetery at Fort Laramie. Today, several depressions around the

Hospital are believed to be grave locations. In addition, three graves were discovered during the National Park Service's stabilization of a portion of the Hospital wall. The Hospital consists of standing ruins in addition to fallen wall blocks. North of the Hospital, the location c the Stewards' Quarters was identified in the Lonductivity data. The defensive trenchworks

there appears to have been little recent disturbance to military features around the Hospital and Married Non-commissioned Officers Quarters. Homesteader Period features in this area also appear to have been relatively undisturbed. Perhaps the least disturbed feature in this area is the 1834-1862 cemetery lying around and

under the Hospital and Hospital Orderly Based on the 2002 and other investigations, it appears a major portion of this cemetery is intact and must be considered a significant resource to the interpretation of Fort

Based on the 2002 geophysical data, when

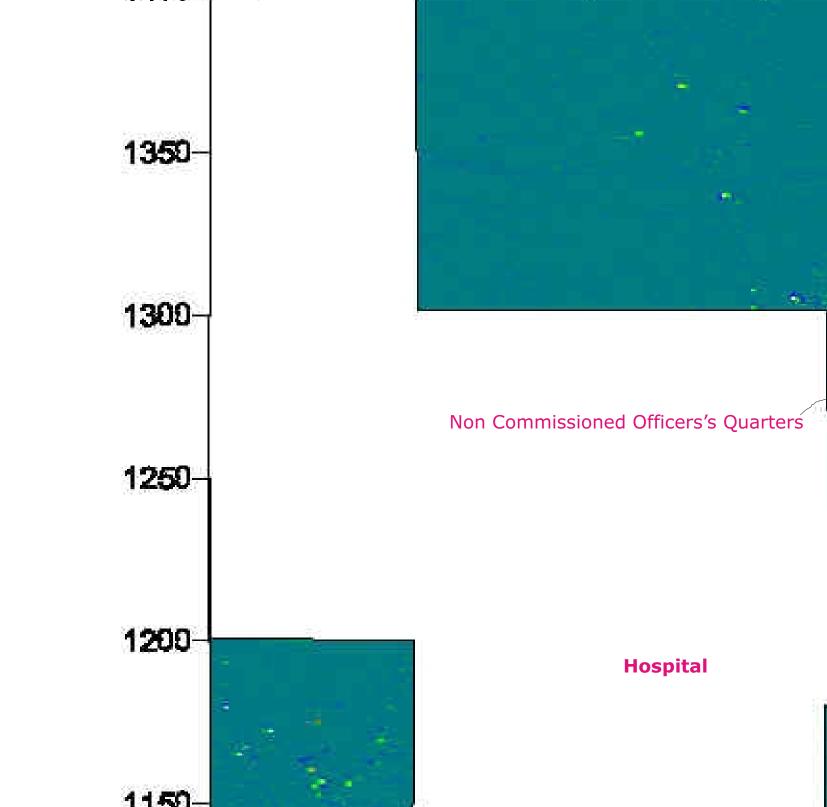
combined with previous geophysical study results,

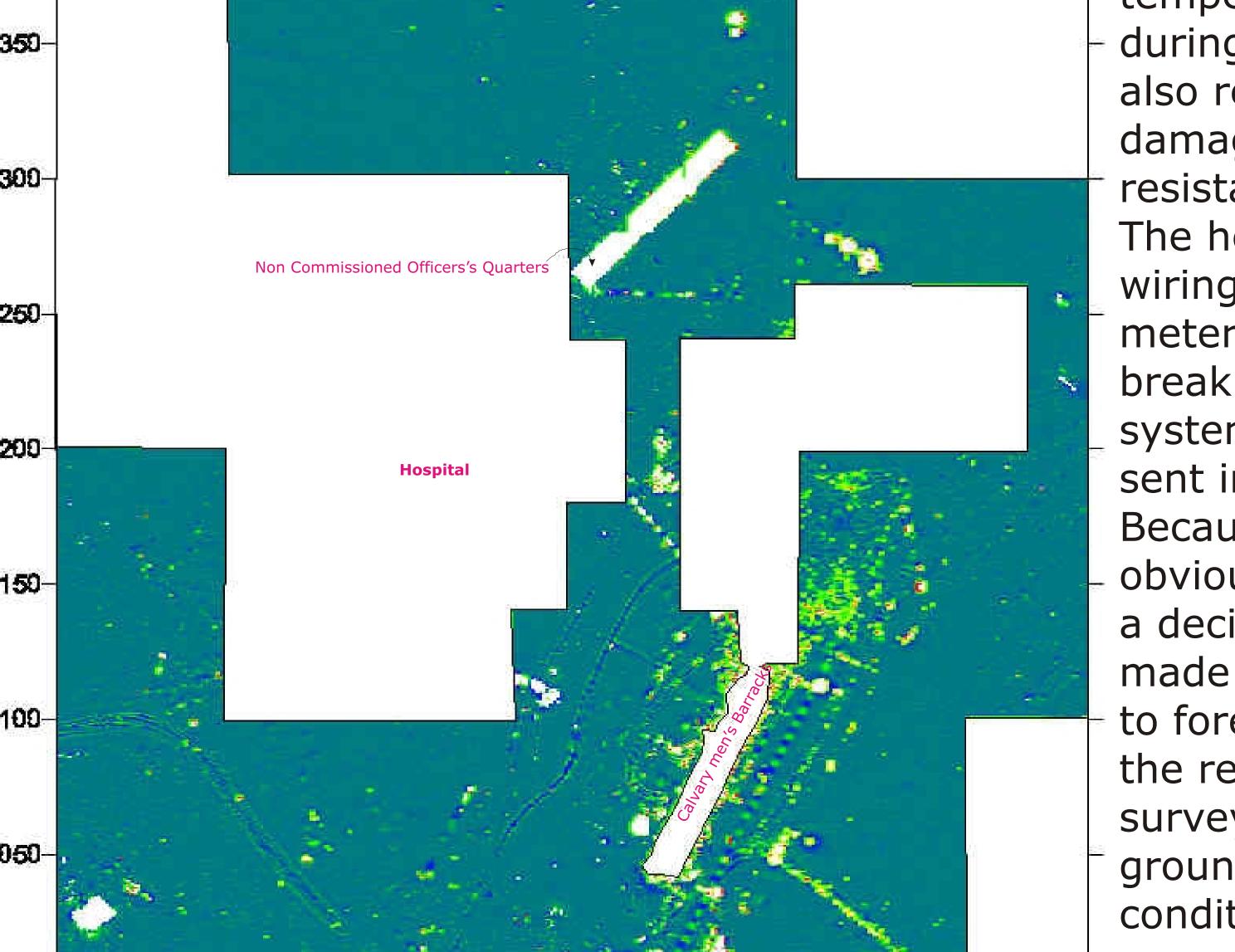
However, the area northeast of the Cavalry Barracks has been highly impacted by both Homesteader and National Park Service activities. In fact, ten 20x20 meter grid units were not surveyed in this area during the 2002 field work because of this disturbance (an additional 1.5 20x20 meter grids were not surveyed in 1997 for the same reason in this area). The park staffs parking lot, three modern buildings and several access roads have disturbed this area to the extent magnetometer and conductance surveys

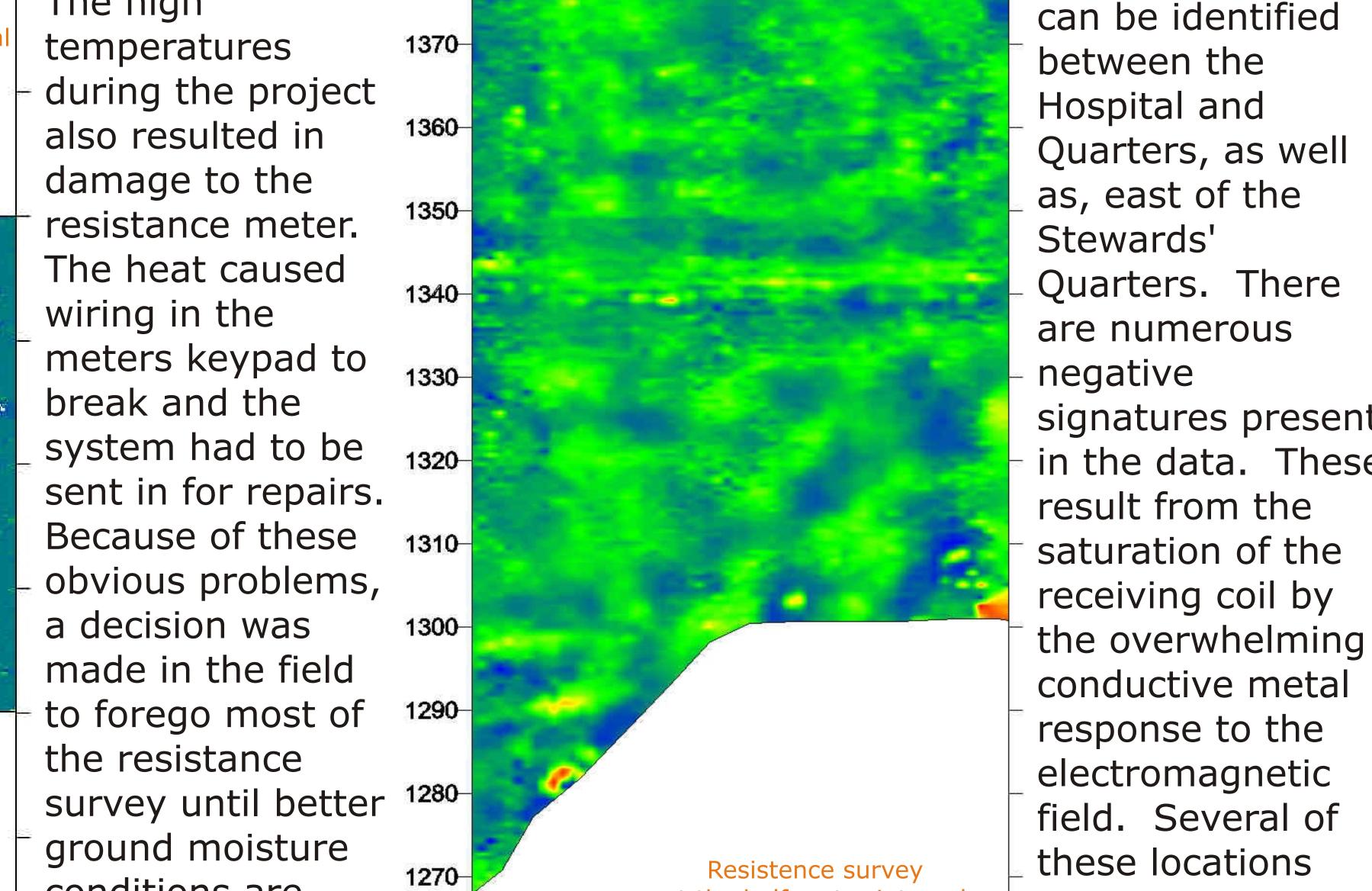
> would be impractical (because of the presence of metal buildings and artifacts, an electrical field associated with a radio antenna, and the use of iron-rich crushed rock as a gravel source for the roads and parking area). The 2003 field season will continue the geophysical investigations and ground truth anomalies via excavations and testing.

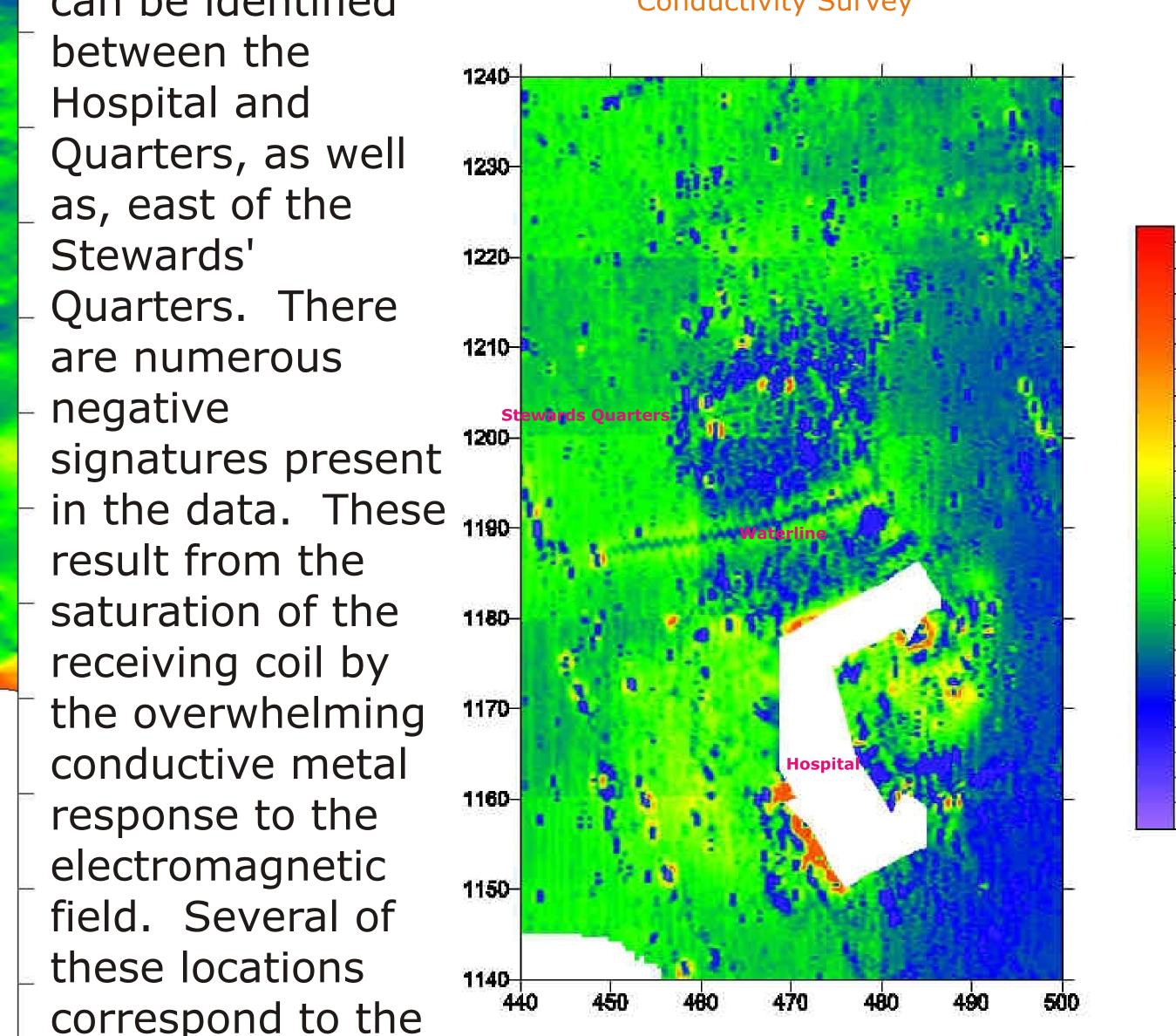
minutes, several grids during this project took up to two











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Discussion of the **Magnetic Survey**

Grids were surveyed in either half meter traverse intervals near the hospital or meter intervals across the remaining areas of the fort. 1100-Because of the potential for historic graves in the area north of the hospital half meter intervals were used. Other features visible from the magnetic survey include the old hospital located south of the standing 1950hospital visible today and windmill tank east of the hospital. feature is believed to be part of the homestead era.

conditions are present, hopefully

field. Several of these locations

suspected grave

correspond to the ⁵⁸⁰ depressions.

is also visible in the data.

Three segments of

military water lines