A Survey of Tar and Pitch Production Sites in the Francis Marion National Forest: Part I

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Abstract

For approximately 200 years, from the early eighteenth century through the early twentieth century, the area now encompassed by the Francis Marion National Forest yielded vast amounts of naval stores. The best archaeological evidence for naval stores production in the Forest are tar and pitch production sites. While the tar kilns and pitch pits are easily visible surface features, the laborers' (tar burners') camps are ephemeral, and rarely identified. This research focuses on establishing a database of tar kiln sites in the Francis Marion National Forest and an evaluation of current field methods. New perspectives are discussed which may aid with chronological placement and a better understanding of site layout and activity areas.

Introduction

The Francis Marion National Forest (FMNF) is located in Charleston and Berkeley counties, South Carolina (Figure 1). It was established in 1936 and today encompasses over 250,000 acres. For approximately 200 years, from the early eighteenth century through the early twentieth century, the area now encompassed by the FMNF yielded vast amounts of naval stores. Naval stores (tar, pitch, and turpentine) were essential for ship construction during the age of sail and wooden construction. As a result of numerous archaeological surveys by Forest Service personnel and professional cultural resource management (CRM) firms, many archaeological sites associated with the naval stores industry have been recorded in the FMNF. The best archaeological evidence for naval stores production in the FMNF are tar and pitch production sites. Typically, these sites are identified by a single above-ground feature: the remains of a tar kiln. While the tar kilns and pitch pits are easily visible surface features, the laborers' (tar burners') camps are ephemeral, and rarely identified. This is largely due to a virtual lack of associated artifacts being recovered. After decades of recording and evaluating tar kiln sites in the FMNF, there is a general expectation that not much is found at tar kiln sites and they have been relegated to a somewhat boring and uninformative limbo.

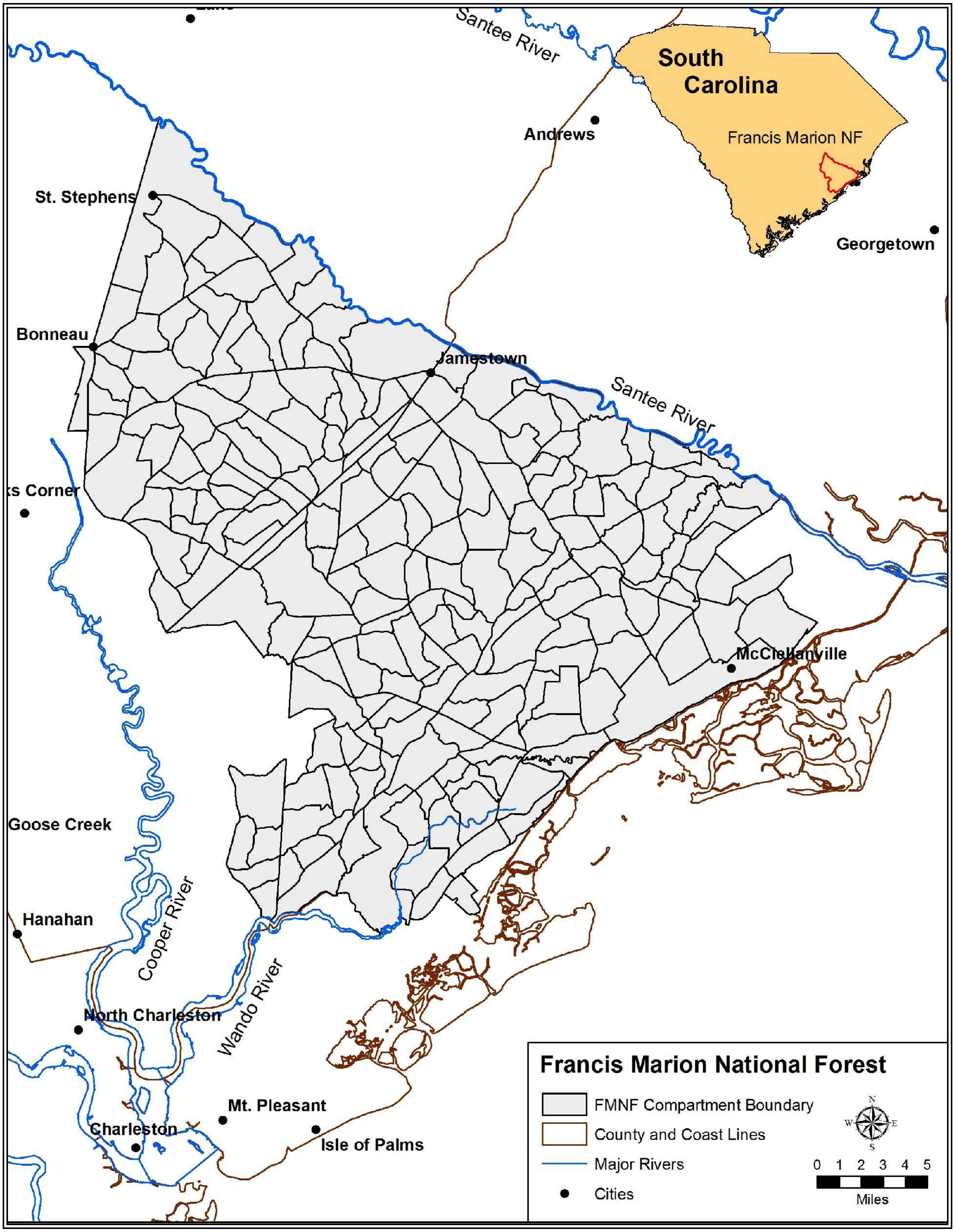

Figure 1. Map showing the location of Francis Marion National Forest.

Background

Much has been said and written about the history of the naval stores industry of the Carolinas (e.g., Gamble 1921; Harmon and Snedeker 1997; Hart 1986; Williams 1935; and others). For the purposes of this discussion, a brief summary is presented below.

The naval stores industry in the Carolinas has a beginning date of about 1705. Before this time, most tar and pitch used by the Royal Navy and the vast British merchant fleet was supplied by Sweden. However, by 1703 access to this trade was denied. To remedy the loss of their primary naval stores supplier, the British turned to their American colonies. In 1705, to stimulate the colonial production of naval stores, the British government offered a bounty (10 s per barrel) for the production of tar and pitch (Williams 1935). Because of the vast expanses of longleaf pine (*Pinus palustris*) in the coastal plain of North and South Carolina, this region became the center of naval stores production for the British Empire, and eventually a young United States of America.

A tar kiln is a simple earth-oven made for baking pine wood. It has a clay lined basin at the bottom, with a drainage pipe/tube leading from the center of the basin to a collection reservoir/pit along its margin (Figure 2). As the pine wood is baked, the sap "sweats" out as tar, drains down to the prepared basin, flows through the pipe/tube into the collection reservoir/pit, then the tar is dipped or drained into barrels for transportation. If the tar is further processed on site to make pitch, a simple circular clay lined pit was typically used to further cook the tar into pitch. Figures 3-6 show historic images of some tar kiln activities.

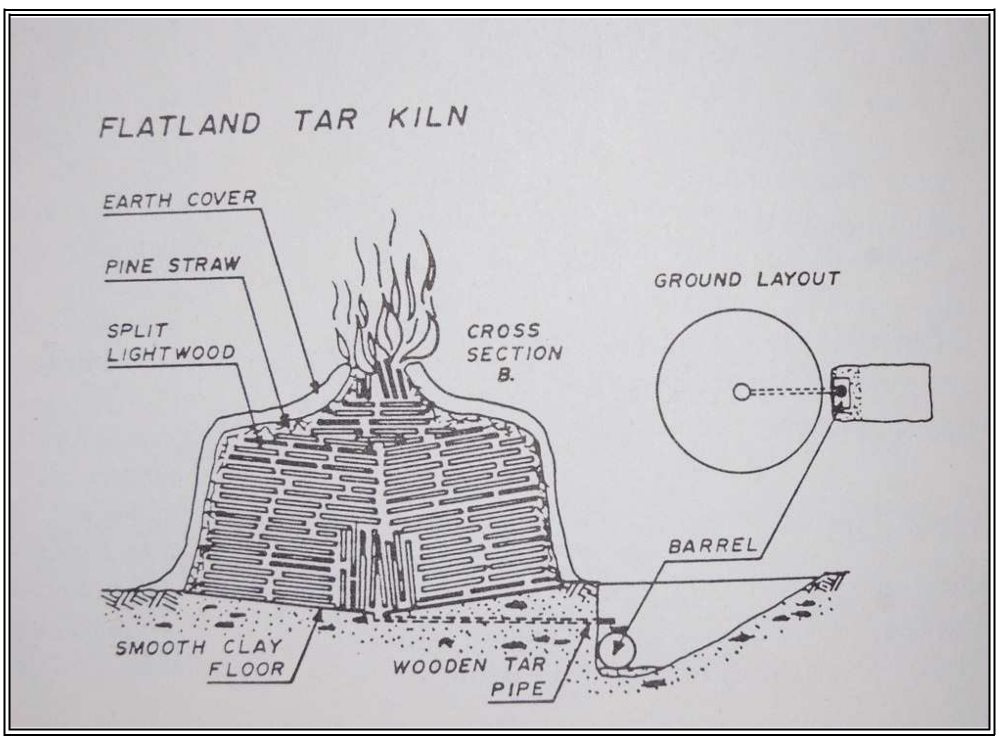

Figure 2. Sketch of tar kiln cross-section and plan view (Combes 1974:10).

Figure 3. Sketch showing early stage of construction at a tar kiln.

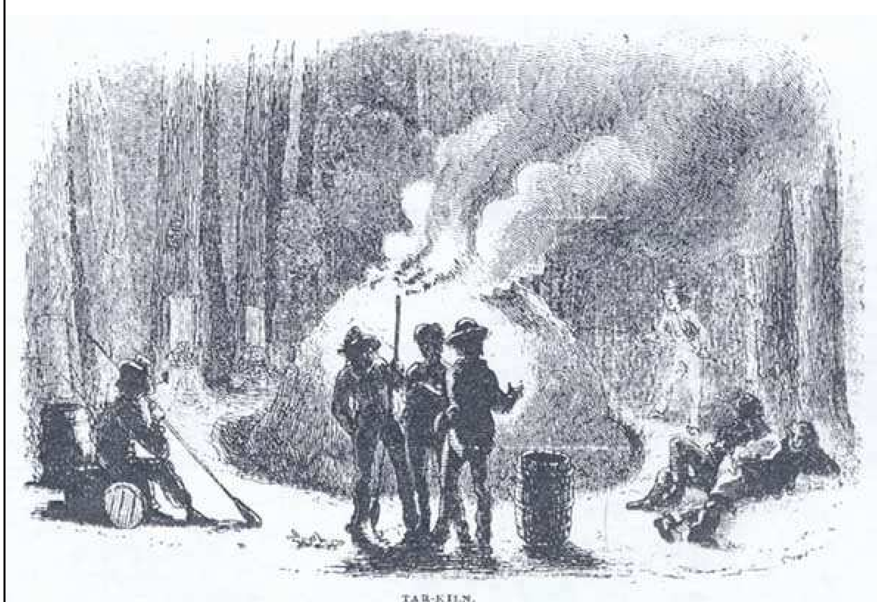

Figure 4. Sketch of tar burners around a tar kiln.

Figure 5. Part of a stereoview slide showing a tar kiln in operation.

Figure 6. Post card showing a tar kiln in operation.

Tar and Pitch Production Site Inventory

In association with work conducted by Archaeological Consultants of the Carolinas, Inc. (ACC), for the United States Department of Agriculture (USDA), Forest Service, I have reviewed over 300 archaeological reports of investigations conducted in the FMNF. Eighty of these reports have some level of discussion of tar kilns based on survey data. In 1987, Harmon and Snedeker quoted Forest Service Archaeologict Robert Wise as commenting that there were about 100 tar kiln sites in the FMNF. Between then and 2010, an additional 70 tar kiln sites were recorded, bringing the total to about 170 tar kiln sites. Based on my review, there are presently 207 tar kiln sites listed with the SCIAA Archaeological Site Files in the FMNF. In addition to those with official state site numbers, there are approximately 50 additional tar kiln sites that have only temporary site numbers or whose locations were plotted in project reports but they were not recorded.

Figure 7 shows the distribution of all officially recorded tar kiln sites in the FMNF. As shown in this figure, the central part of the forest has relatively fewer sites than elsewhere. Large Carolina bays and swamps such as Walleye Bay, Hellhole Bay, and Wambaw Swamp occupy much of these areas, and likely account for at least some of the sparseness of sites here. Of these, only one report (Hart 1986) has a discussion of intensive excavations, at the Limerick Tar Kiln site (38BK472).

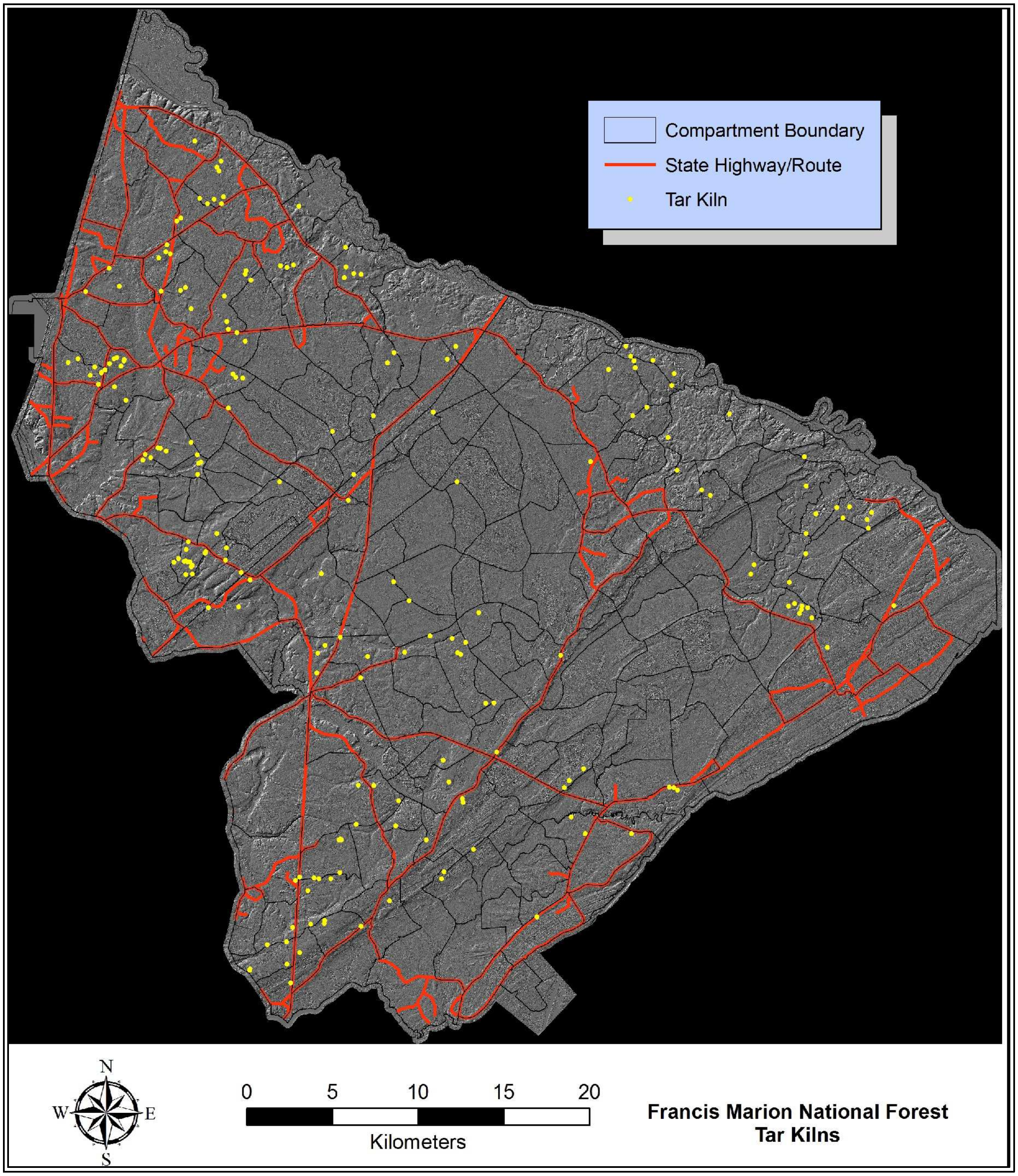

Figure 7. LiDAR image showing the distribution of tar kiln sites in Francis Marion National Forest.

A New Perspective on Field Methods

For decades, site discovery and evaluation methods for tar and pitch production sites have not changed. When locating and evaluating tar kiln sites, we use the same methodology as used at other types of archaeological sites. Sites are located using a standard 30 meter interval pedestrian survey, with shovel tests or grid point locations being spaced at 30 meter intervals. The sites are then sometimes evaluated by excavating closer interval shovel tests (typically a 10 or 15 meter interval grid) or judgmental shovel test grid in hopes of locating associated artifacts and activity areas. This method of site discovery is ineffective for tar kiln identification, and the end result is that we are missing a lot of tar kin sites, and the ones located are producing very little useful data. As noted above, artifacts are virtually never recovered and we have yet to identify other means of dating these features.

In the course of recent investigations in the FMNF, I have identified two significant tools whose use can help remedy these deficiencies: LiDAR imagery and metal detectors.

LiDAR Imagery

During a typical survey, tar kilns are not discovered by the recovery of artifacts in shovel tests, but by the observation of a circular raised earth feature and/or a collection or pitch pit. These observations can be complicated by two significant factors. First, the time of year the survey is conducted can be closely linked to the likelihood of tar kiln site discovery. During warm weather (April through the end of September) vegetation is at its thickest. Line-of-sight visibility can be extremely limited. Second, the experience level of the survey crew experience is also important. Out of region crews or inexperienced crew members may be unfamiliar with these features and either don't know to look for these features or don't recognize what they are seeing.

A new tool archaeologists can now add to their inventory which can help identify most tar kiln sites without leaving the computer screen is LiDAR imagery. LiDAR maps provide a view of even the most subtle ground relief without the interference of vegetation. The resolution available is to such a fine degree that tar kilns are readily visible. Figure 8 shows the LiDAR signature of several tar kiln sites. However, having acknowledged the usefulness of LiDAR in identifying tar kiln "signatures," ground confirmation is still necessary.

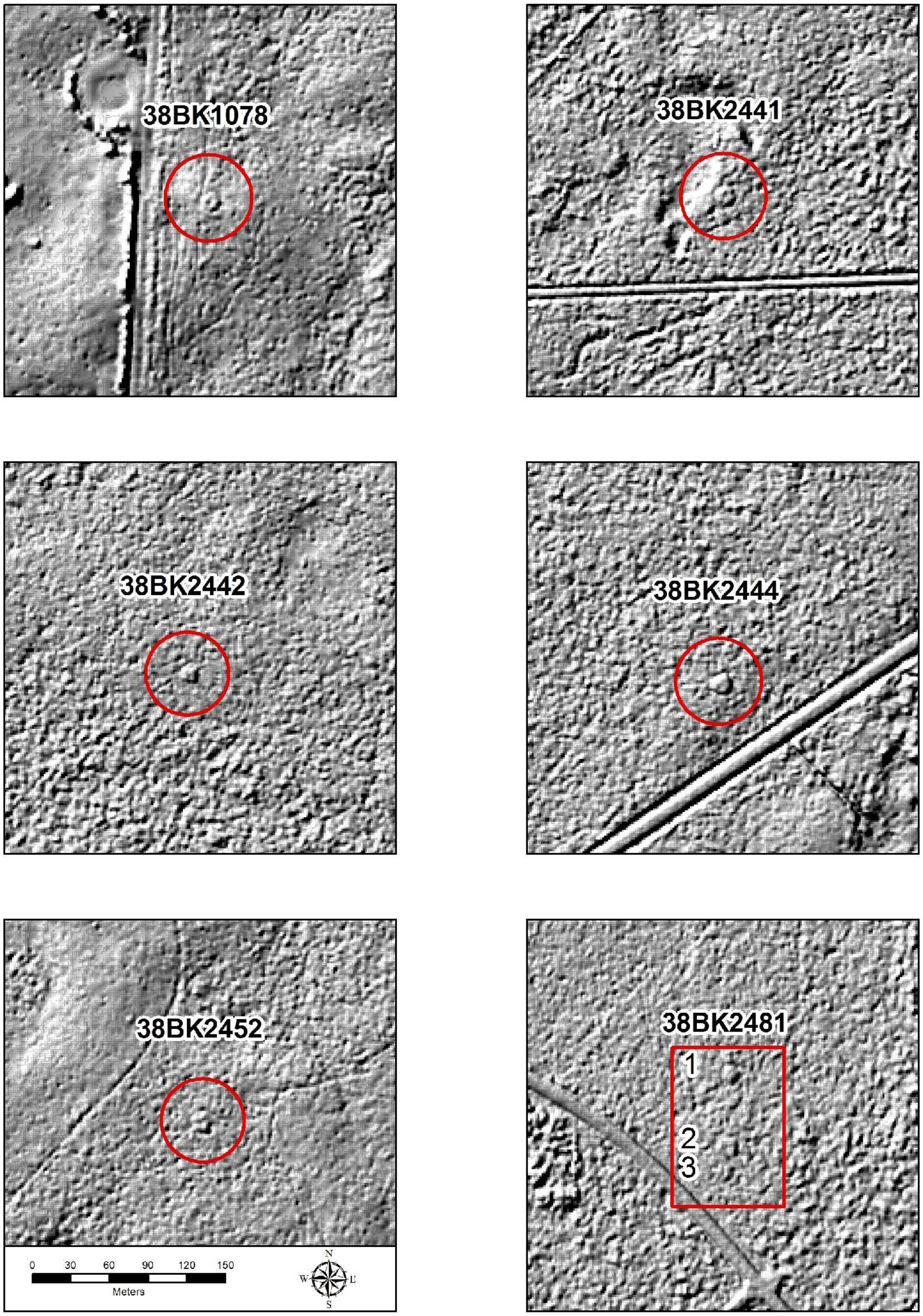

Figure 8. LiDAR images showing tar kiln sites (Tibbetts et al. 2012).

Metal Detection Reconnaissance Survey

ACC has surveyed approximately 5,400 acres in the FMNF, and has examined 35 tar kiln sites. This corresponds to approximately one tar kiln per 154 acres. Figures 9 and 10 show a site map and photograph of a tar kiln site recorded during one of our surveys (Tibbetts et al. 2012).

We recognized early on that traditional shovel test evaluation of tar kiln sites in the FMNF, as elsewhere, yields poor results. In fact, of all the tar kiln sites recorded, only one (38BK472) had associated artifacts (two wrought nails). This translates to only 0.6 percent of tar kiln sites yielding artifacts. For this reason, we sought alternative ways to try and identify activity areas and recover diagnostic artifacts. Beginning with ACC's first project in the FMNF in 2010 (Tibbetts et al. 2011), we began conducting a metal detector "reconnaissance" at all tar and pitch production sites. This reconnaissance consisted of conducting a series of four or five concentric transects around the tar kiln, out to a distance of 20 meters from the edge of the kiln trench/ditch. While none of the 35 tar kiln sites we have recorded yielded artifacts from transect survey shovel tests, use of the metal detector resulted in artifact recovery from seven or 20 percent of the tar kiln sites. Artifacts collected at metal detector "hits" at tar kiln sites include wire nails, square nails, an axe head, a threaded bolt, a possible wrought spike, and horse harness hardware.

Figure 9. View of a tar kiln mound.

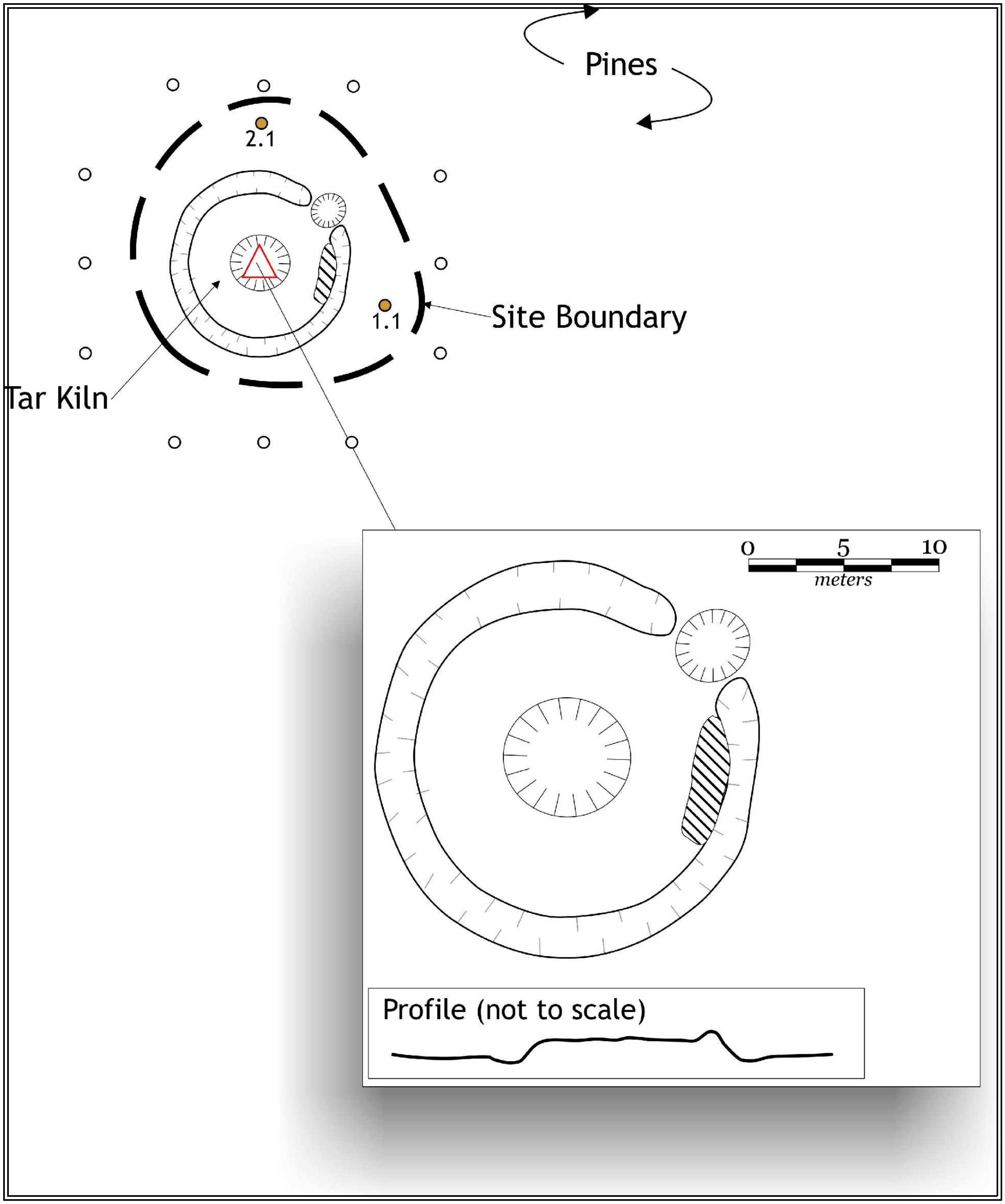

Figure 10. Site map of a tar kiln.

Discussion

There is a need to adjust our thinking away from old standard procedures to a reassessment of the needs and requirements of this specific site type. New technology (LiDAR) and modified field methods (metal detection rather than shovel testing) show great potential in aiding future research associated with tar and pitch production sites. Tar kiln sites need to be recognized as the location where of a range of activities were carried out. The actual tar production at the kiln itself was only one of numerous activities associated with this aspect of the naval stores industry. Figure 11 shows an array of activities and settings associated with tar and pitch production. The timber had to be cut and transported to the site, and further split. The kiln had to be constructed, including a drainage system from the bottom of the kiln to an adjacent drainage pit. The wood then had to be stacked in a specific manner, and covered over with brush and earth to create a large earth oven. Once the kiln was ignited, it smouldered for days and even weeks, during which time at least one “tar burner” was required to be on site 24 hours a day until the burn was completed. The tar had to be scooped or drained from the collection pit into wood barrels. These were then transported by wagon (later possibly by trucks) to a market or dock for further distribution. It is our goal to better understand this array of activities and people, rather than to just understand how a tar kiln was constructed. We think that the procedures discussed in this paper are a step in this direction.

Coming in Part II...

In the title, I note that this is Part I of the study of tar and pitch production sites in the FMNF. Part II will address other aspects needing renewed attention. For example, site maps and recorded data on these sites need to be more detailed. I suggest that tar kilns be treated as the cultural features that they are. Generally the kiln diameter is documented, but that’s about all, and even this is rarely measured, relying on paced measurements instead. I suggested that the recorded measurements include: the total diameter, ring trench width and depth, mound diameter and height, collection pit dimensions, and pitch pit dimensions (if one is present). In addition to these measurements, a kiln profile should always be drawn. The profile may provide clues about charcoal salvaging or temporal variations. These sites are so common, and so similar, a site form specific to this type of archaeological resource would be helpful in standardizing the types of data collected from the sites at the survey level of evaluation.

Issues of chronology will also be addressed in Part II. Even though no artifacts are recovered from tar kiln sites, their temporal period is often identified as: 18th century; 19th century; 18th / 19th / 20th century; and unknown historic. As Harmon and Snedeker (1997) point out, aspects such as kiln morphology, historic documents, and artifact assemblages all need to be considered when attempting to date tar and pitch production sites.

Figure 11. Mosaic of photographs showing activities associated with tar and pitch production.