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**Experimental Stabilization of a Looter Pit at the Goat Island "Campsite,"
a Prehistoric Archaeological Site,
in the Town of Red Hook, Dutchess County, New York**

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PREFACE

When former New York State Archaeologist R. Funk (1992) reviewed the archaeological site files at the New York State Museum a decade ago, he found 30 sites listed in the Tivoli Bays area. Scientific study at some of these sites has helped archaeologists and students to piece together the 10,000-year history of the area. (For a list of documents that have resulted from archaeological research in the Tivoli Bays area, refer to the References Cited/Bibliography of this report.) If research is to continue, protection of these archaeological sites from illegal digging is critical.

The Tivoli Bays area sites are on private and public land. Those on private, Bard College, land have received some protection from the fact that C. Lindner (e.g., 1992, 2002) has been conducting research and field schools there for 13 years, thus maintaining a presence. The sites on public land warrant protection in that they are part of an area that has been deemed significant by federal and state entities. For example, the site that is the subject of this report is not only in the Hudson River National Estuarine Research Reserve and the Mid-Hudson Historic Shorelands Scenic Area, but also in an Historic District on the National Register of Historic Places, as well as in a National Historic Landmark District. These designations given by state and federal governments signal the areas are important to our cultural and natural heritage, but they afford no practical protection in terms of an authorized daily presence or patrol to ensure that harm to archaeological sites is not done.

INTRODUCTION

For my Master's thesis (Burns 1997), I conducted a cultural resource management study at Magdalen Island (earlier known as Goat Island) in the Hudson River at Tivoli North Bay, Dutchess County (see the United States Geological Survey, Saugerties, New York, 1963, 7.5 minute topographic map). Owned by the New York State Department of Environmental Conservation, the island contains three important archaeological sites professionally excavated in 1939 by Dr. Mary Butler, director of the Hudson Valley Archaeological Survey for Vassar College (Chilton 1992, 1994; Williams 1989). One of the sites, which Butler called the "Campsite," already had evidence of looters' (unscientific excavators') pits when her excavation took place (see Fig. 1).

With almost 200 holes in an area of approximately 0.8 acre (Burns 1997), the Campsite continues to be threatened as looting activities proceed there. New York laws are not strong enough to deter treasure hunters, or artifact collectors, from digging up sites. Warning signs do not appear to be the answer; signs could probably be used effectively with patrolling, however (Nickens 1993).

During work on my thesis, I researched stabilization strategies that could deter looters as well as lessen soil erosion at the Campsite. My goal was to conserve the site for the future when archaeological methods will improve and research questions will be different.

As far as stabilization strategies go, filling looter holes with material such as sterile sand in order to prevent further damage has been done at some archaeological sites. The Campsite at Goat Island seemed a likely candidate for just such an effort for several reasons. First, as I explained earlier, protection should be afforded a site that is in an area deemed significant by state and federal entities. Second, in spite of the damage inflicted on it, the site continues to yield important information. From my thesis work, I demonstrated that intact deposits of soil can still be found. During testing in the summer of 1995, these deposits yielded a projectile point, as well as ecofacts

(small, cultural remains such as charred wood, nutshells, seeds, fish bones) that can help us interpret people's early interaction with the environment. Third, adding fill to the looter pits could arrest erosion which is damaging the sides of many older pits and destroying any intact deposits of soil. Fourth, filling the holes could serve to deter further looting at the site.

This report is a summary of the information gathered during six visits to the island, first to stabilize the looter pit and then to monitor its progress. Five interim reports are on file at the Hudson River National Estuarine Research Reserve offices, Bard College Field Station, Annandale-on-Hudson, New York.

STABILIZATION

When funding was made available, Lindner and I began making plans to perform a pilot stabilization project at the Campsite. We applied to the Department of Environmental Conservation for, and received, a "Temporary Revocable Permit for the Use of State Lands" dated July 25, 2000 and with an expiration of July 2002.

From my thesis research, I knew that the potential materials for protective site burial included sterile sand, geotextile (fine-mesh filter fabric), and chain link fencing (see Fig. 2). I also needed a watercraft to haul the materials to the island. Thanks to DEC and Bard College, the materials were donated. John Harrington, DEC Region 3 Operations Supervisor, supplied the geotextile and chain link fencing. Bard College's Buildings and Grounds Department agreed to supply as much road sand as needed.

Even though I had the necessary materials for the project, I was not able to solve the logistical problem of hauling the sand to a location where it could be loaded onto a boat and then off-loaded on the island. Procuring a suitable boat also proved much too difficult. The watercraft would have to have a shallow draft, such as a barge, in order for it to be pulled up close enough to the island to off-load or else a walkway would need to be constructed from the watercraft to the shore. Appropriate docking locations are not available on the island or nearby mainland.

In October 2000, Lindner and I decided to scale back our plan. Instead of the original proposal of stabilizing the pits in an area approximately 16 x 50 feet, which would require a huge amount of sand and a suitable boat, we would stabilize only two medium-size pits. The pits we chose were close to fresh digging noted by Red Hook resident Maynard Ham on his visit to the site July 23, 2000. The backdirt (earth removed from the pit and dumped next to it) from the illegal digging would be used to fill the two pits: the new one, that Ham had noted, and an old one earmarked for stabilization. This strategy obviated the need to haul sand to the site.

We received permission to perform the amended project from Pat Vissering, Senior Wildlife Biologist/DEC, on November 30, 2000, and waited for warm weather to return in order to perform the work. On May 25, 2001, Lindner and I canoed to the island and began the stabilization work. There was enough recent looters' backdirt to fill only one pit, so the old pit became our test of the stabilization (see Fig. 1).

In my first report dated August 9, 2001, to P. Vissering, B. Blair, C. Vandrei, and C. Lindner, I gave a detailed account of the work performed and included photographs of the process. A shortened version follows:

- * Survey the flora growing in the pit.
- * Remove the leaf litter and topsoil, by hand, and store on a tarp.
- * Choose 4 points on the north, south, east, and west edges of the pit that represent the widest expanse across the pit from south to north and west to east. Measure depths of fill across the pit from the southern to the northern point and from the western to eastern point.
- * Clip the deep-rooted plants to a level even with the surfaces surrounding the pit (see Fig. 3).
- * Line the pit with geotextile and anchor it on the edges with rocks.
- * Shovel backdirt onto the geotextile.
- * Place the chain link fence on top of the backdirt and overlap any extra geotextile around the edge of the fence and anchor it with stones (see Fig. 4).
- * Cover the fencing with the topsoil, leaf litter, and flora that had been stored.
- * Remeasure depths across the pit from south to north and from west to east (see Fig. 5; Tables 1, 2).

MONITORING THE STABILIZATION

Our plan had been to monitor the site monthly, weather permitting. After the stabilization work on May 25, 2001, I went back to the island to check on the site five times. After each visit, I wrote a follow-up report to Pat Vissering and others, as follows:

<u>To Goat Island</u>	<u>Work</u>	<u>Report / Date</u>
May 25, 2001	perform stabilization	#1 / Aug. 9, 2001
Aug. 5, 2001	monitor and measure	#2 / Aug. 29, 2001
Oct. 2, 2001	monitor	#3 / Oct. 13, 2001
Dec. 16, 2001	monitor	#4 / Dec. 17, 2001
May 11, 2002	monitor	#5 / May 17, 2002
June 18, 2002	monitor and measure	Final / July 31, 2002

Monitoring shows the stabilization work has remained basically intact during the 13 months since it was performed. The pit is blending in well with its surroundings and has become vegetated with forbs common on the island: Dutchman's Breeches (*Dicentra cucullaria*) and Garlic Mustard (*Alliaria petiolata*) were growing there when I monitored the site on May 11, 2002. The only problem encountered was that the geotextile fabric became exposed in several areas where it overlapped the chain link fence at the pit's edge (see Figs. 6, 7; Table 3); the exposures were caused naturally, by erosion and, once, possibly by pulling (see Report #2, Aug. 29, 2001). During all visits, except in Dec. 2001, I found this had happened and each time I covered the exposed fabric with all-purpose sand, which I had brought by canoe, and leaves.

Depth measurements south to north and west to east across the stabilized pit show the fill shifted only slightly from May 2001 to June 2002 (see Fig. 5; Tables 1, 2). Several factors probably contributed to this. At measurement points 0, 20, 98, and 118 in. of the west to east profile, sand to cover exposed geotextile added 1.5 in. or less to the thickness of fill in those areas. At measurement points 0, 79, and 91 in. of the south to north profile, there was no change. At all the other measurement points of the south to north profile, and at 39, 59, and 79 in. of the west to east profile, the soil used to fill the pit has settled and compacted over time causing a slight decrease in thickness of fill; at 59 in. west to east and north to south, the subsidence is 1.5 in., but nowhere is the decrease in thickness more than that. Beyond these considerations, Lindner and I recognize that in the process of taking the measurements three times -- May and August 2001, and June 2002 -- we developed a more precise way of measuring; this, too, could account for the small discrepancies in thickness.

CONCLUSION

Our goal was to test a stabilization method on a looter pit at the Campsite on Goat Island in an effort to determine whether the method would deter further illegal digging of the pit as well as stop erosion. The strategy was successful. The only problem is that the all-purpose sand, used to cover up areas where the geotextile became exposed, continues to erode off of the geotextile, although not as badly as the first time I noticed it on Aug. 5, 2001. Perhaps in the future a finer sterile soil (silt with clay) could be mixed with the sand to make it hold better.

Looting continues at the Campsite (see Fig. 8). In Reports #2 and 3, I included notes and photos of the newer areas of disturbance. Of equal concern are the older pits that continue to weather and erode; these actions cause damage to intact soils. As illustration, Figure 9 of this report is a photo of a particularly large, older pit next to the stabilized pit that is the subject of this report.

Also of concern is the continuing evidence of human-caused fires on the island. In a memo dated August 9, 2001 to Vissering, I wrote my observations of fire damage to the west side of the island on a reconnaissance I made there three days earlier; I also sent her photos of the damage (see Fig. 10). During the June 18, 2002 trip to monitor the site, Lindner and I walked down toward the south end of the island and came upon a fire-ring and a large, crudely-constructed bench (see Fig. 11). I alerted Blair and, on June 25, 2002, gave her a hand-drawn map and photos of the bench and fire-ring. In a phone conversation on July 3, 2002, Blair informed me that DEC Assistant Forest Ranger Don Miller had removed the bench and ring.

Since D. Miller is a seasonal ranger and is responsible for patrolling the entire Tivoli Bays Wildlife Management Area (1,800 acres), he usually has time to patrol the island only once or twice a month. Daily patrolling would be ideal, but is probably unrealistic. It is important to think of other ways to try and deter looters.

My experience conducting thesis research at the Campsite during two field seasons when I was there almost daily, and during which there was no new illegal digging, reinforces the idea that a responsible presence there can be a deterrent. In Report #5 (May 17, 2002), Lindner and I proposed creating signage to show continuing presence at the site. We proposed this wording:

***Please do not dig or remove surface artifacts.
Research is currently underway to preserve this
prehistoric site in accord with scientific principles.
Hudson River National Estuarine Research Reserve***

B. Blair informed me June 24, 2002 that our proposed signage was accepted when discussed at a recent management meeting concerning the Tivoli Bays and that it would be implemented in the future.

Future efforts to save the Goat Island Campsite should include the following:

1. mapping the approximately 200 looter pits and mounds in order to create a complete baseline; right now, I am probably the only person who can recognize when a pit is recent.
2. burying the entire Campsite to save it for the future when archaeological methods and research questions will be different.
3. more patrolling.

In conclusion, the Campsite is an extremely rich site; unfortunately, we know this because looters continue to find it attractive. Despite the damage inflicted on it, the site continues to contain important environmental information, such as ecofacts, which I discuss in my Master's thesis. Such remains could help us to learn more about the condition of the Hudson River in prehistoric times and people's connection with it.

ACKNOWLEDGMENTS

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Table 1. SOUTH to NORTH. Thickness (in inches) of fill above looter's pit at regular intervals on the south to north transect across pit from edge to edge. The thickness shows little change -- no more than an inch-and-a-half -- from May 2001 when the fill was originally added to stabilize the pit.

<u>Points on South to North transect across pit where thickness measured</u>	<u>Thickness May 25, 2001</u>	<u>Thickness Aug. 5, 2001</u>	<u>Thickness June 18, 2002</u>
0 inches (0 cm.)	0	0	0
20 (50 cm.)	8.5	8	8
39 (100 cm.)	13	13	12.5
59 (150 cm.)	8.5	8	7
79 (200 cm.)	0	0	0
91 (230 cm.)	0	0	0

Table 2. WEST to EAST. Thickness (in inches) of fill above looter's pit at regular intervals on the west to east transect across the pit from edge to edge. The thickness shows little change -- no more than an inch-and-a-half -- from May 2001 when the fill was originally added to stabilize the pit.

<u>Points on West to East transect across pit where thickness measured</u>	<u>Thickness May 25, 2001</u>	<u>Thickness Aug. 5, 2001</u>	<u>Thickness June 18, 2002</u>
0 inches (0 cm.)	0	0	0.5
20 (50 cm.)	6	6	7
39 (100 cm.)	10	9.5	9.5
59 (150 cm.)	14	13.5	12.5
79 (200 cm.)	13	12.5	12.5
98 (250 cm.)	6	5.5	7.5
118 (300 cm.)	0	0	1.5

Table 3. Number and lengths of exposed geotextile fabric detected during monitoring of the stabilized pit from Aug. 2001 to June 2002.

<u>Date Monitored</u>	<u># of exposures of geotextile</u>	<u>Lengths (in inches) of exposures</u>
Aug. 5, 2001	5	2 to 25
Oct. 2, 2001	4	3 to 6
Dec. 16, 2001	0	none
May 11, 2002	3	2.5 to 3
June 18, 2002	4	less than 6

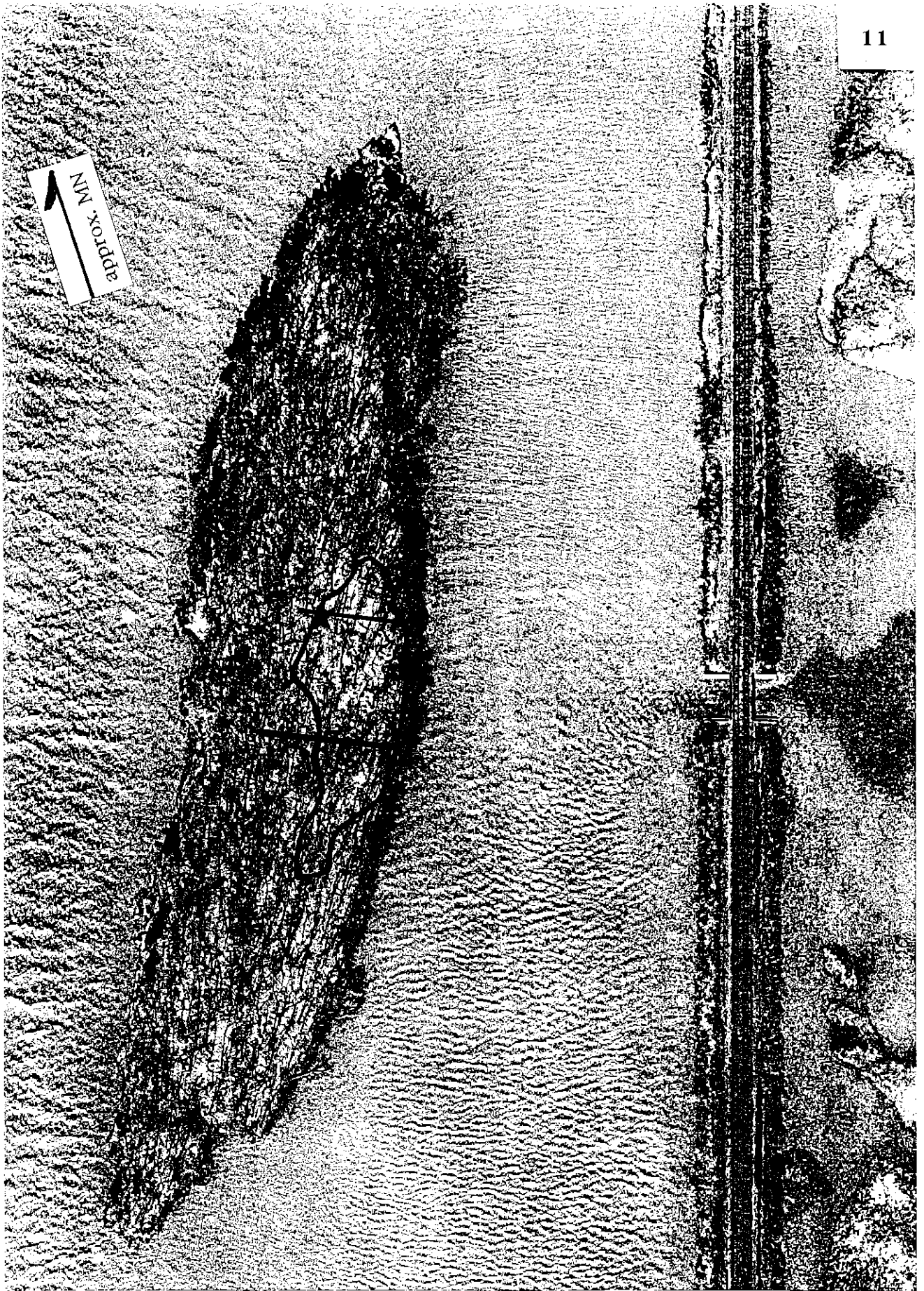
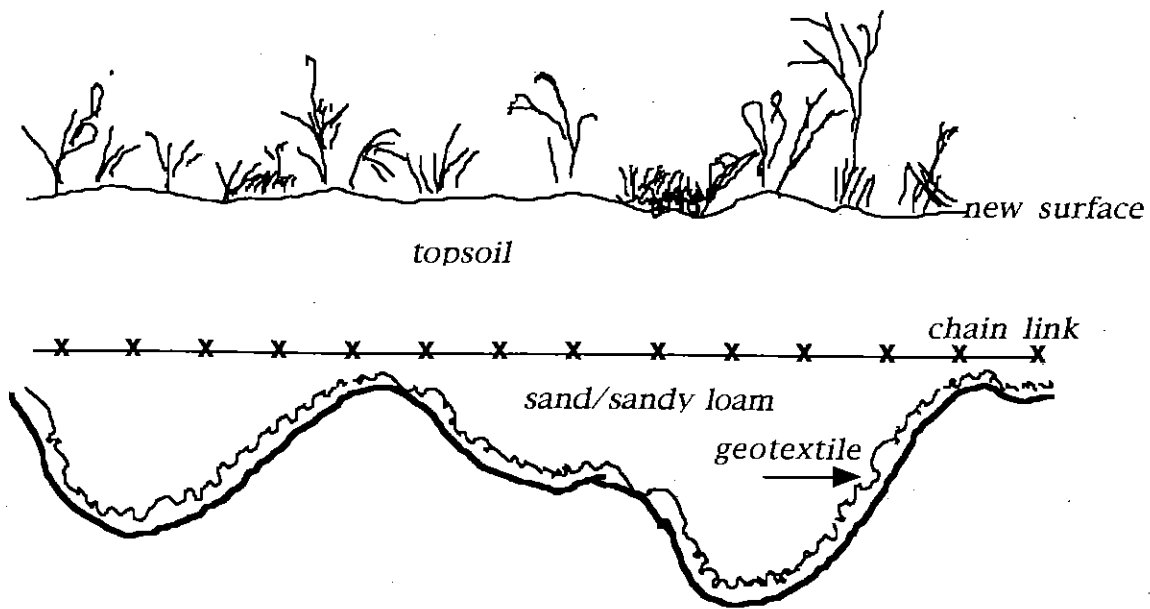


Fig. 1. A red "X" marks the area where the stabilized pit is located. Adapted from: Burns 1997.



Geotextile would line the existing surface of the pits and mounds to mark the boundary.

Sand/sandy loam fill would level the pit and mound variations.

Chain link fencing would be laid over the sand above the pits to prevent digging and animal burrowing.

Topsoil would fill an area above the pits and mounds to create a new surface.

New surface would be topped with grasses, shrubs and poison ivy to lessen erosion and discourage looters.

Fig. 2. Proposal for soil burial. Redrawn from sketch by Dr. C. C. Mathewson (personal communication 1997). Adapted from: Burns 1997.



Fig. 3. The pit is ready for stabilization after the topsoil, leaf litter, and shallow-rooted flora were removed and stored. A glove, for scale, is in the bottom of the pit. Photo taken May 25, 2001, looking roughly east.



Fig. 4. To stabilize the pit, geotextile was placed as lining, then backdirt to fill, then chain link fencing with extra geotextile folded over its edge. Lindner looks on before backdirt is shoveled on top. Trowel in the pit points roughly north. Photo taken May 25, 2001.

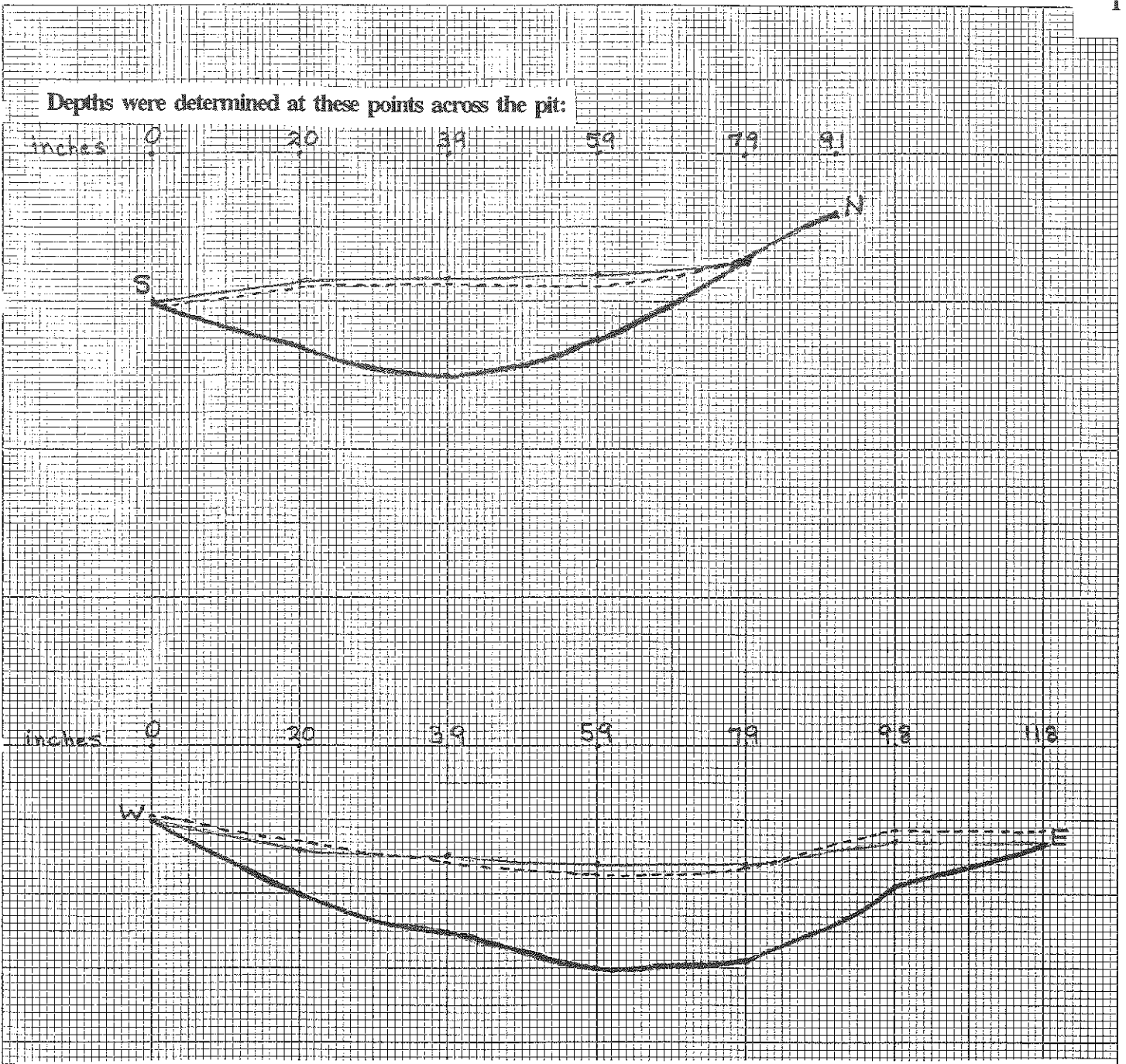


Fig. 5. Top: Profile of pit from SOUTH to NORTH

Bottom: Profile of pit from WEST to EAST

- = fill, measured June 18, 2002
- = original fill, measured May 25, 2001
- = looters' hole

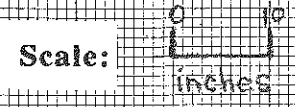




Fig. 6. At the white arrow is an example of an exposed piece of geotextile, approx. 8 in. long (tape is set at approx. 1 ft.) and located on the west edge of the stabilized pit. Photo taken Aug. 6, 2001.



Fig. 7. Orange flag tape in 4 places marks where the geotextile was exposed. Photo taken June 18, 2002, looking roughly east.



Fig. 8. An example of a new looter pit -- dug within the last two years -- is approx. 200 ft. south and east of the stabilized pit. Note the tree with a sign which reads "DON'T DIG. REMOVING ARTIFACTS IS AGAINST THE LAW." Photo taken Dec. 16, 2001, looking roughly northwest.



Fig. 9. An example of a large, older pit. C. Lindner sits in the pit to show scale; to indicate location, the red flag tape hanging in a tree above Lindner's left shoulder is near the east end of the stabilized pit. Photo taken June 18, 2002, looking roughly southwest.



Fig. 10. Fire damage to the west side of the island. A notebook marks a well-worn path. Photo taken Aug. 6, 2001, looking roughly southwest.



Fig. 11. A fire ring in front of a bench located south of the "Campsite" archaeological site. Photo taken June 18, 2002, looking roughly south.