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SOAPSTONE USE IN THE WALLACE RESERVOIR

DANIEL THORNTON ELLIOTT

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SOAPSTONE USE IN THE WALLACE RESERVOIR:

A TOOL FOR INTERPRETING PREHISTORY

by

Daniel Thorton Elliott

WALLACE RESERVOIR PROJECT CONTRIBUTION NUMBER 5

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PREFACE

This report was originally written as a thesis in anthropology and submitted to the Graduate Faculty of the University of Georgia in partial fulfillment of the requirements for the degree of Masters of Arts. It is herein reproduced with only minor editorial changes as Contribution Number 5 of the University of Georgia Wallace Reservoir Archaeological Project. The archaeological material upon which this report is based was derived largely from the Ongoing Survey conducted within the Wallace Reservoir pool between July 15, 1977 and October 1, 1978. For this reason, the report should be considered as one part of the final report for the Ongoing Survey authorized in Appendix 1 of the Archaeological Salvage Agreement between the University of Georgia and the Georgia Power Company.

David J. Hally
Principal Investigator

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Acknowledgements

This research was not an individual effort but rather the product of several years of archeological salvage work directed by the University of Georgia. The tears spilt for the ravaged forest lands, destroyed for the construction of beautiful Lake Oconee, helped to provide the hydro-electric power to run the electric typewriter with which this thesis was written, and for this I am thankful.

Special thanks go to Dr. Paul Fish who provided me with the data for this research. Dr. Fish's information recovery design came as a refreshing innovation to southeastern archeology and it served as a kick in the pants for traditional perceptions of southeastern settlement patterns.

Special thanks to Dr. Stephen Kowalewski who provided theoretical insight and encouraged me to think big. Thanks also to Dr. Art Murphy and Dr. David Hally for their much needed constructive criticism.

I would especially like to thank my parents for implanting my soul with the desire to learn and the practical skills enabling me to learn.

Deep thanks to little Mouseface who, along with me, learned to love the beautiful land destroyed so that this thesis might become a reality.

And alas, finally, I would like to thank the thousands of unsung heroes whose encouragement to "think soapstone" fueled my motivation.

CHAPTER I

The Problem

The major task of this thesis is to identify the exchange mechanisms operating during the Late Archaic period in the central Georgia piedmont. The study of economic exchange mechanisms operating in non-centralized societies remains in a state of infancy. Detailed spatial analyses are vital if these mechanisms are to be understood. Previous archeological studies of exchange have primarily concentrated their attention on the regional level of analysis. One reason for this regional bias is that the data for adequately discussing local exchange has not been available in the past. Archeologists, however, can and should recognize the importance of exchange within communities and between a community and its immediate neighbors. Dealing with the problem spatially at a scale intermediate between the site and the region permits a view of prehistory which may not be evident at the site or regional level.

One area where spatial analysis at the local level can be applied is the Late Archaic sites in the central Georgia piedmont. The Late Archaic period remains to be well defined in terms of social organization, subsistence patterns, and economic exchange mechanisms (Dragoo, 1976). These topics can be studied from a spatial perspective focusing in on the local level. Inferences concerning cultural processes can be made from the spatial artifact patterns.

The distributional patterns of a particular exchange item, soapstone, will provide the basic framework for the identification of certain Late Archaic exchange processes. The reasons for selecting this particular raw material for study are many. Soapstone was heavily utilized during the Late Archaic in the central Georgia piedmont. Prehistoric use of soapstone is confined primarily to this period and soapstone vessels are diagnostic of the Late Archaic period. Soapstone artifacts, due to their durable nature, are well preserved in the archeological record. Soapstone outcrops and quarries can be precisely located and represent an immobile raw material source invaluable for the measurement of distributional patterns. Soapstone outcrops and artifacts are abundant in the central Georgia piedmont. In one segment of the central Georgia piedmont, they have been the subject of intensive archeological research.

Numerous archeological surveys in Greene, Morgan, Putnam, and Hancock Counties, Georgia, over the past decade have resulted in the identification of approximately 350 archeological sites containing soapstone artifacts. These surveys have also identified at least four soapstone quarries and several other soapstone outcrops which may have been quarried. Utilizing the data obtained from these surveys, hypotheses regarding Late Archaic exchange and social organization can be formulated and tested. By observing the spatial relationships between soapstone artifacts on archeological sites and the known soapstone outcrops, the social processes responsible for patterning in the distribution of soapstone artifacts might be better understood.

Most of the elements exchanged in a cultural system cannot be directly traced to a source after the participants in the system are dead. Only a few artifact types, i.e. certain kinds of lithic materials, can be accurately traced to their sources. Soapstone is amenable to artifact source tracing techniques currently in use, including neutron activation analysis (Allen 1975). This technique can conceivably allow the archeologist to identify with a fair degree of reliability the outcrop from which a particular artifact originated.

Much has been written about the Late Archaic period of the eastern United States; and a great deal has been written about the economies of primitive societies, but very little has been written specifically about Late Archaic economic exchange mechanisms. That which has been written on the subject deals with the macro-regional picture of long distance trade of exotic items (Ford and Webb 1949:107; Winters 1969a:219). These exotic, long distance trade items obviously represent a small fraction of the total material items in any given Late Archaic exchange network. Among primitive societies, the bulk of exchanged material goods occurs at the local or tribal level (Sillitoe 1978; White and Modjeska 1978), yet the community unit has been largely overlooked in southeastern archeology. Archeologists have studied individual sites out of the context of the wider social community of which they are a part. More areas need to be sufficiently studies so that economic exchange at the local level can be quantitatively examined.

Economic exchange mechanisms operating in primitive societies are an important research topic in current anthropological discussions. This research has been both archeological and ethno-archeological in nature. No ethnographic data exists concerning the Late Archaic of the eastern United States. This require that data collection pertaining to the Late Archaic be limited to archeological recovery. The Late Archaic does possess some advantages relating to primitive exchange in that the Late Archaic is completely unaffected by modern market systems. The Late Archaic is a pristine example of primitive exchange with which ethnographic examples of primitive exchange can be compared.

Definitions

Soapstone - Soapstone is a talcose, metamorphic rock which is found throughout the piedmont region of the eastern United States. A map of the counties in Georgia containing soapstone is shown on Figure 1 (Chidester, Engel, and Wright 1964; Hopkins 1914). Soapstone occurs in outcrops of varying size and ranges in color from pink to dark green. Certain qualities possessed by this rock make it a favorable material for human use. The talc in soapstone allows the stone to be easily carved and formed into various items. The structure and mineral content of soapstone provides heat retention properties that make the stone useful for cooking purposes. The prehistoric artifacts made from soapstone include bowls, pipes, ornaments, and other items.

Late Archaic period - The Late Archaic period in the eastern United States spans the period, 4000-1000 B.C. In many respects, the material culture appears homogeneous during this period throughout the eastern United States (Turnbaugh 1975). Diagnostic artifacts include broadstem points, soapstone vessels, perforated stones, and fiber-tempered pottery. Some of the better known Late Archaic sites contain large deposits of freshwater or marine shells (Claflin 1931; Bullen and Greene 1970; Ritchie 1969; Stoltman 1974; Winters 1969b). Caldwell identifies man's adaptation to the environment during the Late Archaic as "Primary forest efficiency" in which human utilized a wide variety of wild flora and fauna. A keen awareness of the available native resources enabled Late

Archaic peoples to achieve an optimal balance with the environment. This balance was made possible by exploiting a wide diversity of available resources on a seasonal round (Caldwell 1958:15).

Surface sites - Years of erosive agricultural practices in the Georgia piedmont have obliterated much of the material remains of the Late Archaic cultures (Trimble 1969). A majority of the sites on the ridgeslopes and ridgetops have been so badly eroded that their artifacts are found at or near the ground surface. This thesis utilizes data from many such surface sites. The importance of studying badly disturbed surface sites has been recognized in archeology, but the full potential of surface site research has yet to be realized.

Economic exchange mechanism - The mechanisms by which items are exchanged within a society vary according to the level of socio-political complexity. Three mechanisms, reciprocity, redistribution, and market exchange, have been identified by anthropologists. One or more of these mechanisms appear to be operating in every society. These exchange mechanisms are discussed in greater detail in the next chapter (Polanyi 1957:250).

Fall-off - When artifact frequency is plotted against distance from the artifact source. a fall-off graph is obtained. This graph usually shows a tendency for the amount of artifacts to decrease with increasing distance from the artifact source (Renfrew 1977:97). The study of the fall-off graphs for soapstone artifacts in the central Georgia piedmont provides much of the analytical basis for this thesis.

Supply zone - Renfrew distinguishes between a supply zone and the area beyond the supply zone in his study of obsidian fall-off. The area within 200 to 300 km from the source constitutes the supply zone. According to Renfrew, the supply zone is characterized by internal trade with a high frequency of interaction (Renfrew 1975:46-47).

Negative gravity - An anomaly in the gravity fall-off is referred to as negative gravity. Factors creating negative gravity include redistributional centers and neighboring source outcrops.

Level of socio-cultural integration - The degree of complexity in the political organization of a cultural group is highly variable throughout the world. The typing of societies based on their social organization is discussed in the next chapter.

CHAPTER II

Theoretical Framework

Economic processes among human groups involving exchange of items have been categorized into three broad categories. All three of these mechanisms may not be present in any given society. The presence or absence of a particular exchange mechanism may be loosely correlated with the society's level of socio-cultural integration.

Polanyi defines these three exchange mechanisms as follows:

> "Reciprocity denotes movements between correlative points of symmetrical groupings; redistribution designates appropriational movements toward a center and out of it again; exchange refers here to vice movements taking place as between 'hands' under a market system (Polanyi 1957:250)."

Reciprocity is found in all societies regardless of the level of socio-cultural integration. Redistribution does not appear to be common among bands and tribes. According to Service:

> "Specialization in production and redistribution of produce occur sporadically and ephemerally in both bands and tribes. The great change at the chiefdom level is that specialization and redistribution are no longer merely adjunctive to a few particular endeavors, but continuously characterize a large part of the activity of the society (Service 1971:134)."

Market exchange occurs among societies of state level organization. Reciprocity and redistribution also occur among state level societies.

Band, tribe, chiefdom, and state are typological classifications of societies based on their social organization. These groupings have distinct characteristics which can often be recognized by observing the economic exchange mechanisms in operation (Service 1971:173).

The level of complexity in social organization is a continuum. Service's typology of the levels of socio-cultural complexity represents arbitrary groupings along this continuum. Certain societies might possess traits attributed to both bands and tribes and would defy pigeonholing into one of Service's categories. Service's typology is useful in dealing with broad differences in complexity, but is less useful in making finer distinctions between borderline cases, and it tells us little about variability.

Socio-cultural integration among Late Archaic societies is generally believed to be below the chiefdom level. Using Service's typology with certain reservations, the identification of redistribution centers in the archeological record might be used as evidence supporting the existence of prehistoric chiefdoms as Service conceives such societies.

Human groups during the Late Archaic are perceived as semi-sedentary bands exploiting a wide range of wild plant and animal foods (Caldwell 1958:9-12). Recent evidence suggests that a limited amount of incipient agriculture was also being practiced during this time period but the prime emphasis was on extracting wild foods from the environment (Asch n.d.). Shell middens, rock quarries, hunting camps, and base camps are all known for the Late Archaic period. The 'seasonal round' model is frequently used to explain this diversity of Late Archaic site types.

In describing Late Archaic settlements in Pennsylvania, Turnbaugh states:

> "The archeological implications of small scattered sites suggest that social organization may have been based on small units, possibly families or, more probably, bands. Settlements appear to have shifted about within a circumscribed territory; in fact, artifact distribution patterns indicate that a drainage basin or similar natural

> unit may have been the standard range of these groups. There must have been intensive utilization of varied resources within these small exploitation territories (Turnbaugh 1975:56)."

Use of soapstone in the eastern United States was most intense during the Late Archaic; certain artifact types, i.e. bowls, are primarily confined to this period (Turnbaugh 1975). The widespread occurrence of soapstone quarries and soapstone artifacts suggests that soapstone was a significant raw material in the material culture of the Late Archaic.

The different exchange mechanisms may be recognized by spatial analysis of soapstone artifacts when the artifact amounts are quantitatively plotted against the distance from the artifact source. Renfrew has shown how the amount of obsidian artifacts tend to fall off with increasing distance from the source for his Near Eastern obsidian data. Renfrew attributes this fall-off pattern to down-the-line reciprocal obsidian trade. The model developed by Renfrew is geared towards a discussion of long distance trade. The fall-off for the first 200 to 300 km is very gradual and Renfrew refers to this 'plateau' portion of the fall-off graph as the supply zone. Beyond the supply zone, the fall-off accelerates rapidly until reaching a level of minimal importance at a distance of approximately 600 km from the obsidian source. This fall-off of obsidian is a normal gravity fall-off. Research with obsidian data in Mexico has shown that central place redistribution areas can create negative gravity anomalies for the normal gravity fall-off (Sidrys 1977:97).

Soapstone artifacts should produce a similar normal gravity fall-off unless negative gravity is created by a redistributive center. Such a center would pull artifacts further from the source than would be possible with reciprocal trade (Renfrew 1977:77). A redistributive type of exchange system should reflect this type of organization not only at the major redistributive centers, but also at the community level. The present thesis examines soapstone exchange for a small segment of what Renfrew calls a supply zone in an attempt to locate evidence of redistributional exchange organization at the local level.

Archeological Background

Scientific interest in Late Archaic soapstone use began in the latter part of the 19th Century. Articles from this time period consist of quarry descriptions, descriptions of procurement technology, and artifact descriptions (Haynes 1883; Holmes 1890; Holmes 1897; Putnam 1878). Holmes describes the quarrying techniques for a soapstone quarry in the Potomac region:

> "When a sufficient area of the solid stone had been uncovered, the workmen proceeded with pick and chisel to detach such portions as were desired. If this surface happened to be uneven, the projections or convexities were utilized, and the cutting was not difficult; if the rock was massive and thesurface flat, a circular groove was cut, outlining the mass to be removed, and the cutting was continued until a depth was reached corresponding to the height of the utensil to be made; then, by undercutting, the nucleus was detached or so far severed that it could be broken off by means of sledges or levers. If the stone happened to be laminated, a circular groove was cut through at right angles to the bedding, and the discoid mass was removed without the need of undercutting. If the conditions were favorable, a second disc was cut adjoining the first, and then a third, and so on, pretty much as the housewife cuts up the thin layer of dough in biscuit making (Holmes 1897:108-109)."

The tools used for quarrying range from very crude picks to grooved axe-like tools. The quarry products included vessels, pipes, 'sinkers', ceremonial stones, and ornaments (Holmes 1897:109-111). In describing soapstone vessel forms, Holmes states:

> "A prevailing shape in the Potomac-Chesapeake region is an oblong basin with ear-like projections or handles at the ends. The largest specimens are about 25 inches in length. The width is often hardly more than half the length, and the depth averages perhaps one-half the width... Other forms approach more nearly a circular outline, as viewed from above, and these usually have greater depth (Holmes 1897:110)."

Quarry pits are frequently referred to in the literature. These depressions adjacent to the outcropping boulders may have been dug in order to obtain softer soapstone (Holmes 1897:107).

Our knowledge of soapstone quarrying technology has not greatly increased since Holmes' study of soapstone quarries in the Potomac region. Although quarrying activity may have been more concentrated at some outcrops, the quarrying technology for all of the Late Archaic soapstone bowl quarries appears essentially uniform. However, the permanence of occupation near the soapstone quarries seems to vary considerably. Regarding Late Archaic settlement around soapstone quarries in Pennsylvania, Witthoft notes:

> "For several miles around the outcrops, debris from the soapstone industry is scattered on camps where soapstone vessels were made. The debris includes rejected and broken roughed out vessels, sherds from nearly finished vessels, soapstone blocks, sawed pieces of soapstone, occasional drilled soapstone blocks, and whole or broken quarry picks. These sites do not have any quantity of flint or rhyolite chips, and other tools of any sort, including spearpoints, are extremely rare on these camps. The people who quarried the soapstone did not live here, but only stayed long enough to dig out and shape up the soapstone, and left almost no tools except the picks behind them. Judging by the sherds from vessels broken in process, the pots were finished at camps near the outcrop, and rarely carried away as blanks (Witthoft 1971:177)."

The data from the Wallace Reservoir in the Georgia piedmont indicate that all soapstone quarry areas do not fit this description. In the Wallace area, there is much evidence for a wider range of activities being carried out near Late Archaic soapstone quarries. The difference probably relates to the environmental location of each quarry; soapstone outcrops near food rich zones may have been exploited on a more permanent basis.

Soapstone outcrops are abundant throughout the eastern United States and many quarries have been examined from an archeological point of view (Bullen 1940a; Bullen 1940b; Crozier 1939; Dickens and Carnes n.d.; Dunn 1945; Ferguson n.d.; Kelly 1969; Lowman and Wheatley 1970; Luckenbach, Allen and Holland 1975; Overton 1969; Sheldon n.d.; Wauchope 1966; Wilkins 1964; Wright, A.J. 1971).

Ripley Bullen excavated portions of a soapstone quarry in Massachusetts and recovered quarry tools, broken soapstone artifacts, and soapstone debris in a stratified context (Bullen 1940a; Bullen 1940b). Bullen concluded that this quarry had been worked for a long period of time, but not long enough for significant changes to occur in the form of the quarry tools (Bullen 1940b:159). Bullen reports that at least four vessel types were manufactured at this quarry including rectangular and round vessels with variations in handle forms (Bullen 1940a:105; Bullen 1940b:159).

Crozier reports on a soapstone quarry in Pennsylvania which had numerous quarry pits, whole and broken vessel fragments, and quarry tools. Vessels from this quarry range from rectangular forms with lug handles to round forms with no handles. These vessels range in size from small cups to large vessels weighing 150 pounds (Crozier 1939:12-14).

In the 25 square mile Soapstone Ridge area of suburban Atlanta, at least 17 quarry sites have been identified. Also found by surface survey were 23 workshop sites which consist of scatters of bowl fragments. The actual nature of these workshop sites is not understood. Three basic vessel forms have been identified from the Soapstone Ridge area, including round, conical, and elongated rectangular forms with lug handles. Evidence of quarrying includes shallow depressions, discarded unfinished vessel fragments, whole vessels, vessel snap-off scars, and broken vessels still attached to the boulders. A few pick tools made of schist, which vary in size and form, have also been recovered. Dickens feels confident that bone or antler chisels were also used in the manufacture of these vessels, but no such tools have been found (Dickens and Carnes n.d.:3-6).

Excavations made at a soapstone quarry in Rhode Island revealed some differences from the quarries reported by Bullen and Dickens. Dunn reports that nothing similar to the quarry picks reported from other quarries. Dunn does report finding flake tools and hammerstones at the site as well as bowl fragments and pipe fragments. Although vessels of various sizes and shapes were found, the predominate form appears to have lug handles. The pipes produced at the site were of the platform and elbow types. This suggests that use of the quarry site may not have been limited to the Late Archaic period (Dunn 1945:50-52).

Several soapstone quarries have been reported in South Carolina (Kelly 1969; Lowman and Wheatley 1970; Overton 1969; Ferguson n.d.). These outcrops occur in a linear pattern on a Northeast-Southwest trend. The quarries examined by Ferguson contain large boulders, concentrations of soapstone debitage, and bowl preform fragments in various stages of production. Ferguson also notes the evidence of historic soapstone quarrying for tombstones and vessels. The techniques employed in the initial quarrying process at the South Carolina quarries are similar to those described by Holmes (1897:109) and Bushnell (1939:474). As with other quarries, few bowls in the finished state were found at the quarry site proper. Ferguson suggests that the bowls may have been finished among streams near the quarry deposits, since the stream sands could be used for scouring the insides of the vessel (Ferguson n.d.:1-6).

The South Carolina quarries three main groups of materials: quarry products, quarry tools, and associated cultural material. The vessels range in size from a bowl 12 cm in diameter to a bowl 48 cm in diameter. The quarry tools include grooved axes and quartzite chopper tools. The associated cultural artifacts include Savannah River projectile points of Late Archaic age and Middle Archaic projectile points (Coe 1964:37, 44; Ferguson n.d.:6-7).

Sheldon describes a soapstone quarry in West Georgia, where, in addition to vessels, atl-atl weights were apparently manufactured (Sheldon n.d.). Soapstone atl-atl weights are not restricted to the Late Archaic and many may date to the Middle Archaic period (Coe 1964:52).

Wauchope reports a soapstone quarry and workshop in Wilkes County, Georgia, northeast of the Wallace Reservoir. This quarry contained many soapstone vessels, both broken and partially completed, perforated slabs, and other objects (Wauchope 1966:430).

Other soapstone quarries in Georgia outside of the study are include a quarry in Jackson County, a quarry in Greene County just north of Union Point, and a quarry in Union County in northeast Georgia. The quarry in Union County, 9Un15, consists of several boulders with evidence of vessel manufacture, depressions adjacent to the boulders, discarded broken and unfinished vessels, and quarry tools. The tools recovered include a grooved axe and a large axe-like sledge made of soapstone. The boulders exhibit vessel snap-off scars, mushroom-like protuberances of vessels broken during removal from the boulder, and non-functional carvings. The quarry site is located less than one mile from the abundant petroglyphs at Track Rock.

The quarry near Union Point in Greene County has not been visited by the author but is said to contain numerous boulders with quarrying scars as well as discarded broken and unfinished vessel fragments (Armour personal communication). There is also some evidence of historic soapstone use near this quarry.

From this brief review of aboriginal soapstone quarries in the eastern United States, some generalizations can be made. While it is clear that soapstone vessels were not the only items quarried, vessel quarrying leaves the most abundant evidence at the quarry sites. Stone picks and axes were utilized in the quarrying process and indirect evidence suggests that materials such as bone, wood, or antler may also have been utilized. A variety of vessel forms were manufactured and this variation appears consistently throughout the eastern United States. It is not unusual for two or more vessel forms to be found at one quarry. It is not yet clear whether this variation is temporal or functional.

Finished products are not usually found at the quarries themselves. This suggests that the products were probably worked to a near finished state at the quarry and carried elsewhere for finishing. Many quarries occur on steep slopes unsuitable for habitation and it seems likely that the tedious work of finishing the vessels and other items was accomplished at nearby campsites.

Recent research has been aimed at questions involving spatial analyses of soapstone artifact distributions with regards to the source outcrop (Allen 1975; Luckenbach, Allen and Holland 1975; Luckenbach, Holland and Allen 1975). Neutron activation sourcing techniques have shown that soapstone vessels were traveling distances greater than 150 km in Virginia during the Late Archaic. Some soapstone artifacts from the Virginia coastal plain have been traced to sources in the Virginia piedmont. This exchange was probably conducted with the aid of water transportation, since many of the sites involved are in the same drainage system (Luckenbach, Allen, and Holland 1975:184). Soapstone has been recognized as a long distance trade item at many sites where the stone does not occur naturally (Ford and Webb 1956; Bullen 1972; Ford, Phillips, and Haag 1955; Snow n.d.; Stoltman 1972; Struever and Houart 1972; Webb, C.H. 1943; Webb, C.H. 1968).

Soapstone artifacts are known at sites in the Georgia coastal plain. The Georgia piedmont soapstone outcrops may have provided these artifacts. Artifacts from the coastal plain include vessel fragments, perforated stones, ornaments, pipes, and other objects (Moore 1897; Gordy n.d.; Snow n.d.; Williams 1968; Stoltman 1974; Ferguson and Widmer 1976; Smith personal communication; Trowell personal communication; Blanton personal communication). The distribution of soapstone outcrops, quarries, and artifacts in Georgia is shown on Figures 1-3.

Specific artifact types are not evenly distributed throughout the state. Soapstone vessels are of a more widespread distribution in the Georgia coastal plain than are perforated stones. Soapstone perforated stones are most abundantly known from the Savannah River region (Claflin 1931; Jones 1873; Stoltman 1974) but these artifacts are also

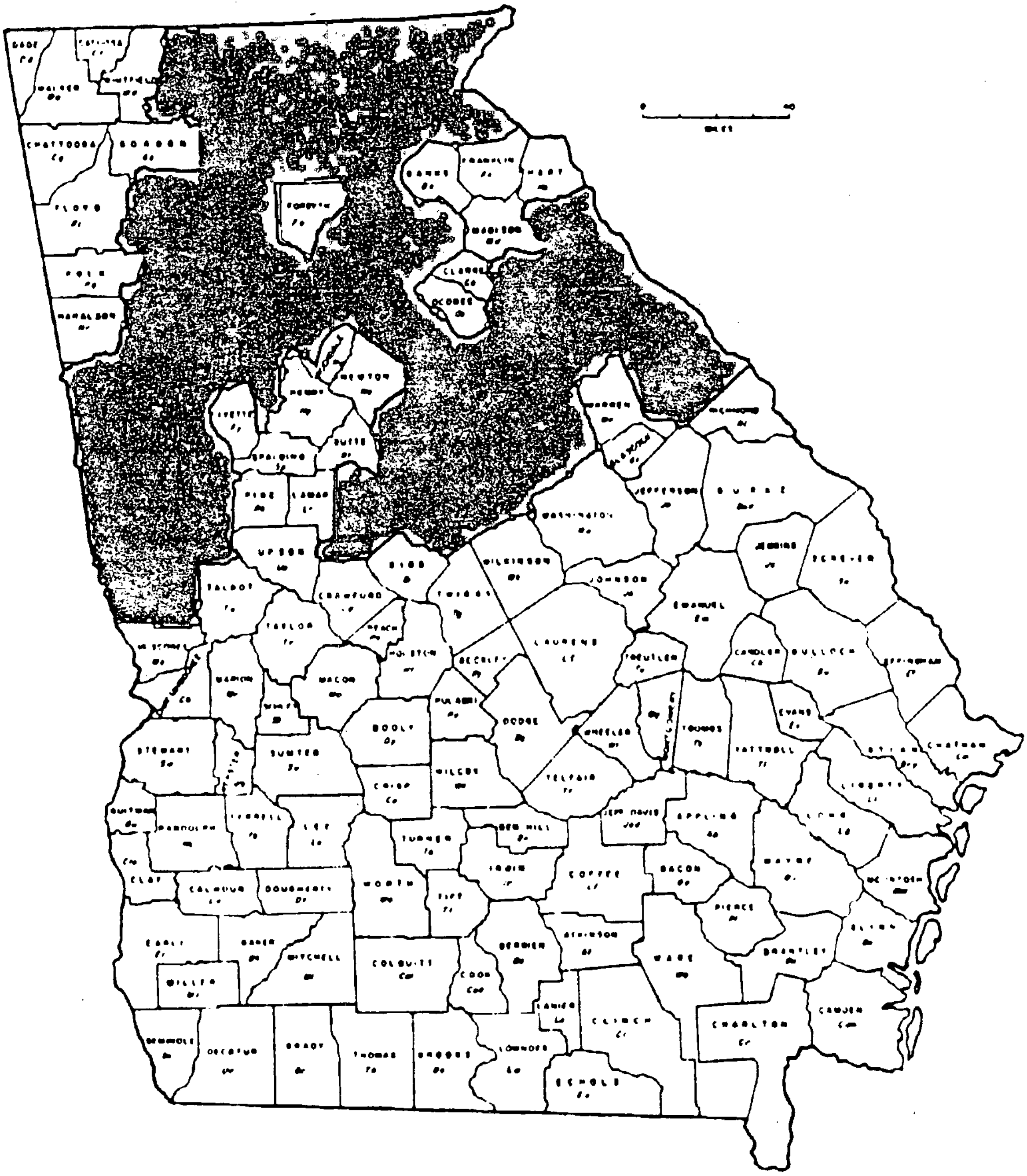

Figure 1. Counties in Georgia containing outcrops of soapstone (shaded).

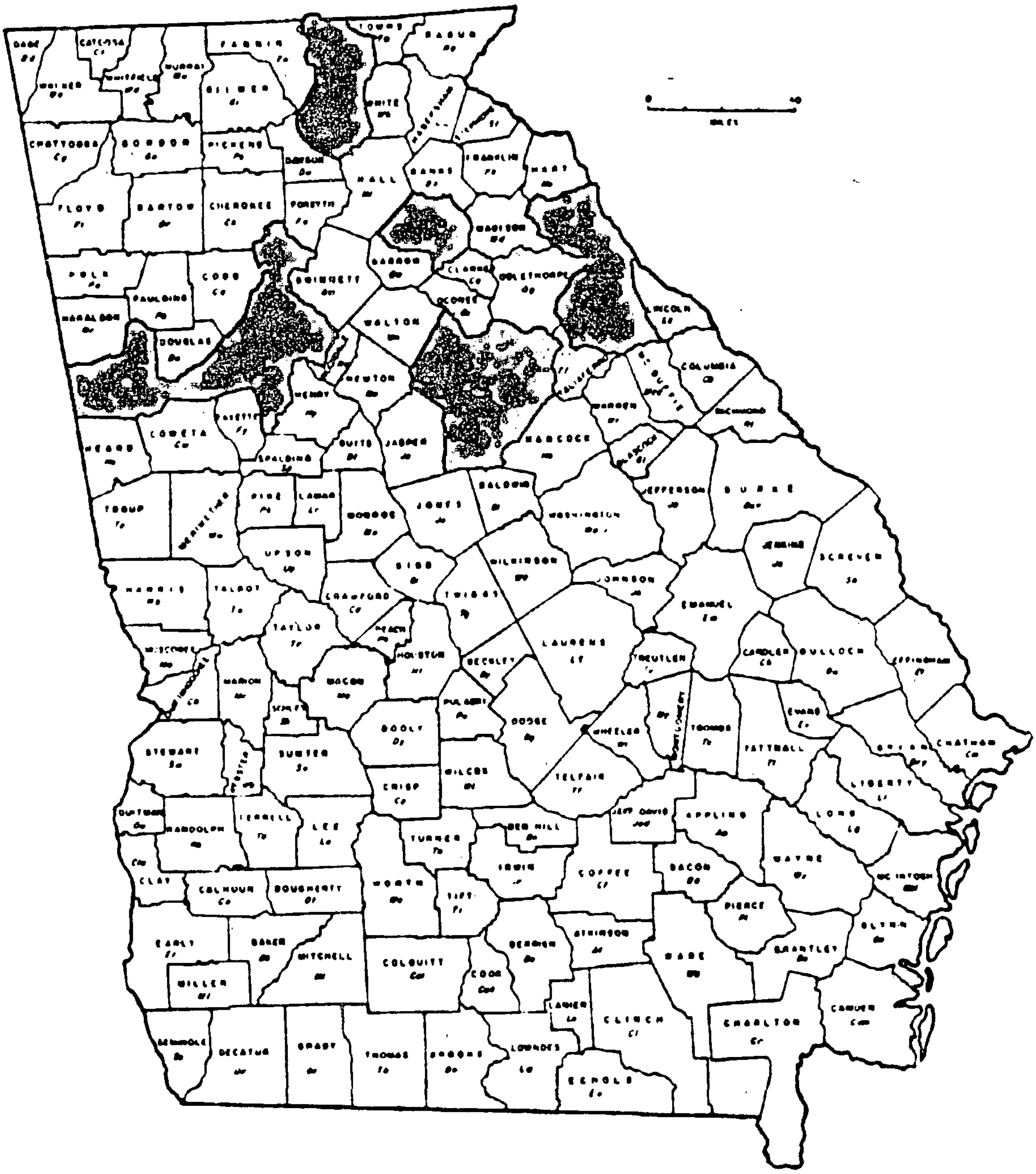

Figure 2. Counties in Georgia containing known aboriginal soapstone quarries (shaded).

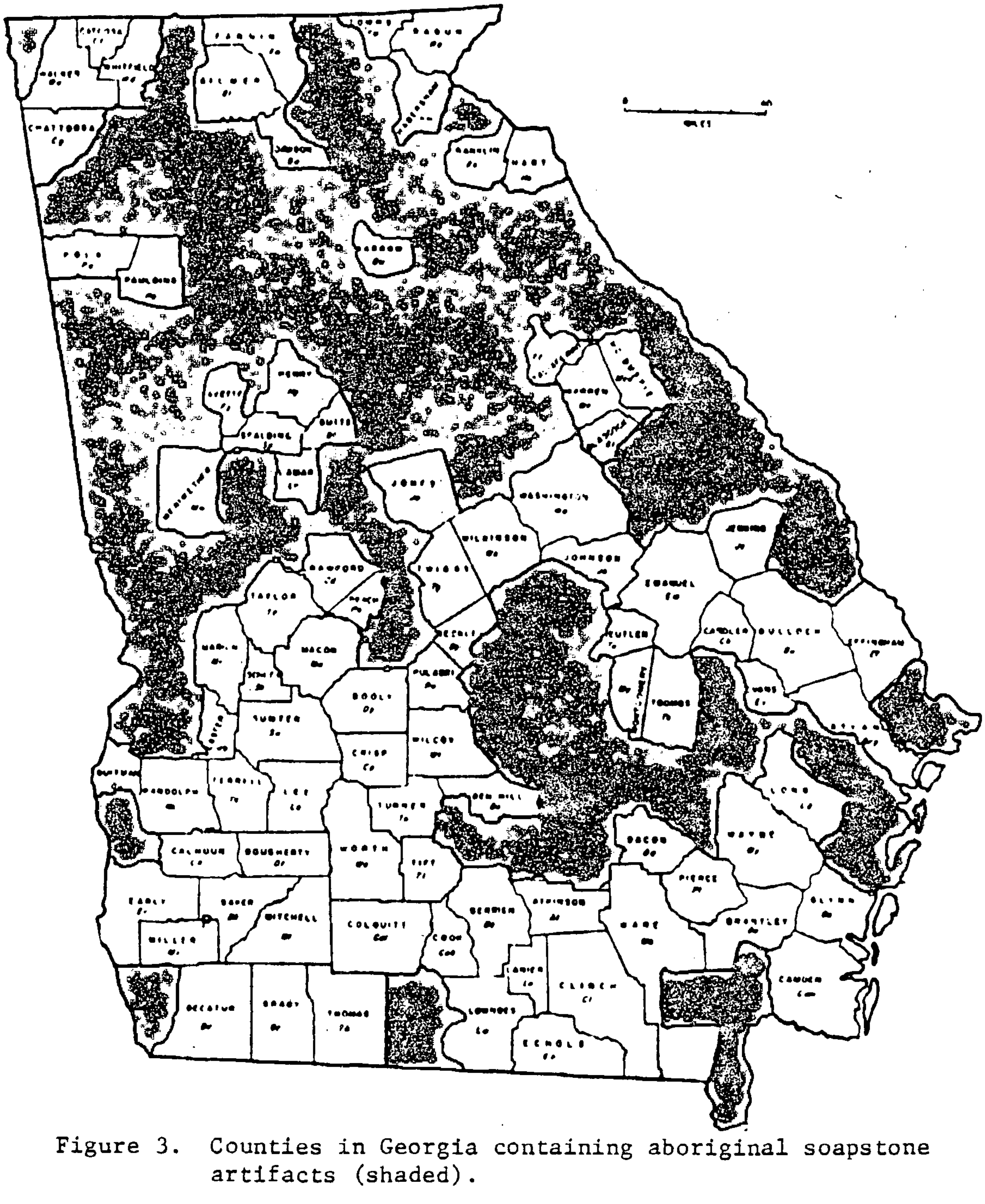

Figure 3. Counties in Georgia containing aboriginal soapstone artifacts (shaded).

abundant in the Wallace Reservoir. Snow reports perforates stones from sites in the Ocmulgee Big Bend region of south Central Georgia (Snow n.d.:11). The distribution of perforated stones may be limited to eastern Georgia as none are reported from west Georgia. Soapstone perforated stones are generally considered to be Late Archaic and the function of the artifacts is under debate. This artifact type was abundant at the Stallings Island site, whereas soapstone vessels were not present. Other sites in the vicinity of Stallings Island contain both perforated stones and vessel fragments (Williams 1968:189; Ferguson and Widmer 1976).

Soapstone vessel fragments have been found at sites along the major rivers in the Georgia coastal plain and along the Georgia coast. Soapstone vessel fragments occur as far south as Florida and are well represented in the Poverty Point region of Louisiana, Mississippi, and Arkansas (Bullen 1976; Ford and Webb 1956; Ford, Phillips and Haas 1955; Webb, C.H. 1968; Webb, C.H. 1977). Webb reports that vessels or fragments of soapstone have been found at nine Poverty Point sites in Louisiana, at eleven sites in Mississippi, and at three sites in Arkansas (Webb, C.H. 1977:35) (Figure 4).

The amount of soapstone present at sites long distances from where it occurs naturally is low except in the Poverty Point area. Webb estimates roughly the number of soapstone vessels used at the Poverty Point site to be in the thousands (Webb, C.H. 1977:36). The nearest known outcrop to the Poverty Point site is located in central Arkansas approximately 300 km distant (Branner 1927:246-247; Chidester, Engel and Wright 1964: map inset). Ford and Webb attribute the soapstone artifacts at Poverty Point to a south Appalachian source. They note that:

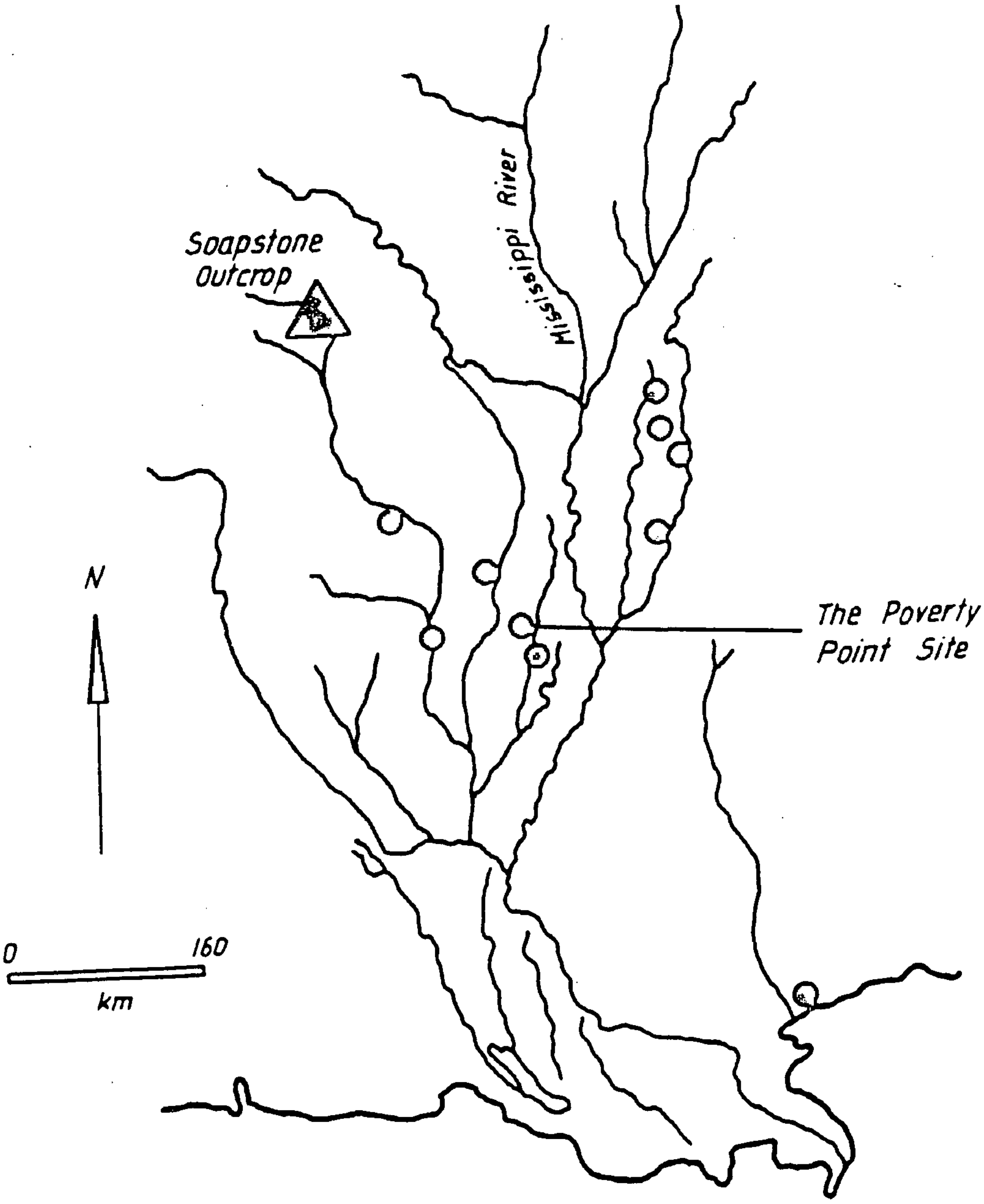

Figure 4 . Poverty Point soapstone sherd sites in relation to the nearest known soapstone outcrops (Adapted from Webb, C.H. 1968:399).

> "Much more distant by river travel were the materials from the southern Appalachians of North Carolina, Tennessee, and northern Alabama. Although only 400 to 500 miles in airline distance from Poverty Point, these regions were at least three times the distance by Ohio-Tennessee River travel. Yet enormous weights of steatite were almost certainly secured here (Ford and Webb 1956:126)."

Mineralogical studies of soapstone artifacts from the Poverty Point area tentatively indicate that the Arkansas deposits were not the source of the artifacts (Webb, C.H. 1977:35). The amount of soapstone transported to the Poverty Point area would suggest a well organized trading network controlled by a relatively complex form of social organization.

Soapstone artifacts recovered in the Wallace Reservoir in Georgia include vessels, atl-atl weights, perforated stones, notched stones, gorgets, pitted stones, pipes, waste fragments, and historic artifacts. Most of the soapstone artifacts from the Wallace area are broken; this fact may be due to preservation factors or it may be due to intensive artifact use. Only one, nearly complete, finished vessel was recovered from the area. This vessel, recovered from excavations at site 9Ge145, had been broken into many pieces. Portions of the vessel were coated with soot indicating that the vessel had been heavily used.

Soapstone vessels used as grave offerings are reported in New York, Massachusetts, and Alabama (Ritchie 1969; Webb and Dejarnette 1948; Lord 1962:21-24). Although no Late Archaic burials were located in the Wallace Reservoir, a fact probably attributable to poor preservation, it does not seem unlikely that some stone bowls were used as grave goods.

Historic Use of Soapstone

At many outcrops in the eastern United States, soapstone was quarried commercially (Vail 1909:791). Hopkins reports the local use of soapstone for door-steps and fire-places near the study area (Hopkins 1914:294). There is no reported commercial soapstone quarrying activity in the study area; archeological evidence from the reservoir indicates that the local demand for the stone may have been significant in historic times. Several chimneys constructed of soapstone were located in the reservoir. These chimneys were located near the soapstone outcrops. Soapstone rocks were also observed in rockpiles in the reservoir possibly a result of field clearing in historic times.

One large slab of soapstone recovered from a historic house site exhibited dynamite drill holes. The use of dynamite to procure soapstone would suggest that some of the local outcrops may have been greatly disturbed. In several cases outcrops were altered significantly by bulldozer activity consequently obliterating any evidence of quarrying at the outcrop.

A recent survey of amateur artifact collections in the study area revealed a number of soapstone artifacts including sherds, perforated stones, pipes, effigies, atl-atl weights, and plummets. Amateur collectors are an important factor in discussions of soapstone artifact distribution. Cylindrical pieces of soapstone were recovered during excavations at the 19th Century Curtwright textile mill, 9Ge37, in the Wallace Reservoir. According to Al Bartovics, the mill site archeologist, these objects were used as dressing rollers in the textile mill. It is not known if these objects were procured from local outcrops.

Historic disturbance of aboriginal soapstone artifacts and quarries has been significant in the study area. This is unfortunate, but enough data exist for an adequate discussion of aboriginal soapstone use in the study area.

Related Examples of Exchange

Soapstone occurs naturally at many locations in California (Chidester, Engel and Wright 1964: map inset); some of these outcrops were quarried by California Indian tribes (Kroeber 1925; Heizer and Treganza 1967). Ethnographic records exist pertaining to the exchange of soapstone between tribal groups in California (Davis, J.T. 1966).

Soapstone vessels, beads, and other items were traded distances greater than 100 km overland in California even in situations where soapstone outcrops were nearer to the receiver than the tribal group providing the soapstone artifact (Figure 5). Clearly, the nearest source is not necessarily the utilized source among tribal groups. People sometimes traded for items with distant tribes rather than manufacture the objects themselves from locally available outcrops. In this situation social considerations function to override geographical distance in the exchange of soapstone items. The maintenance of social ties among tribal groups can be of more importance than other considerations such as the energy expended to obtain material items. The groups living near the outcrops may not know of the existence of the outcrop or they may be denied access by other controlling tribes. A combination of factors probably determines whether or not a group utilizes a nearby soapstone outcrop, suggesting that caution be exercised in the interpretation of even the simplist-seeming relationships.

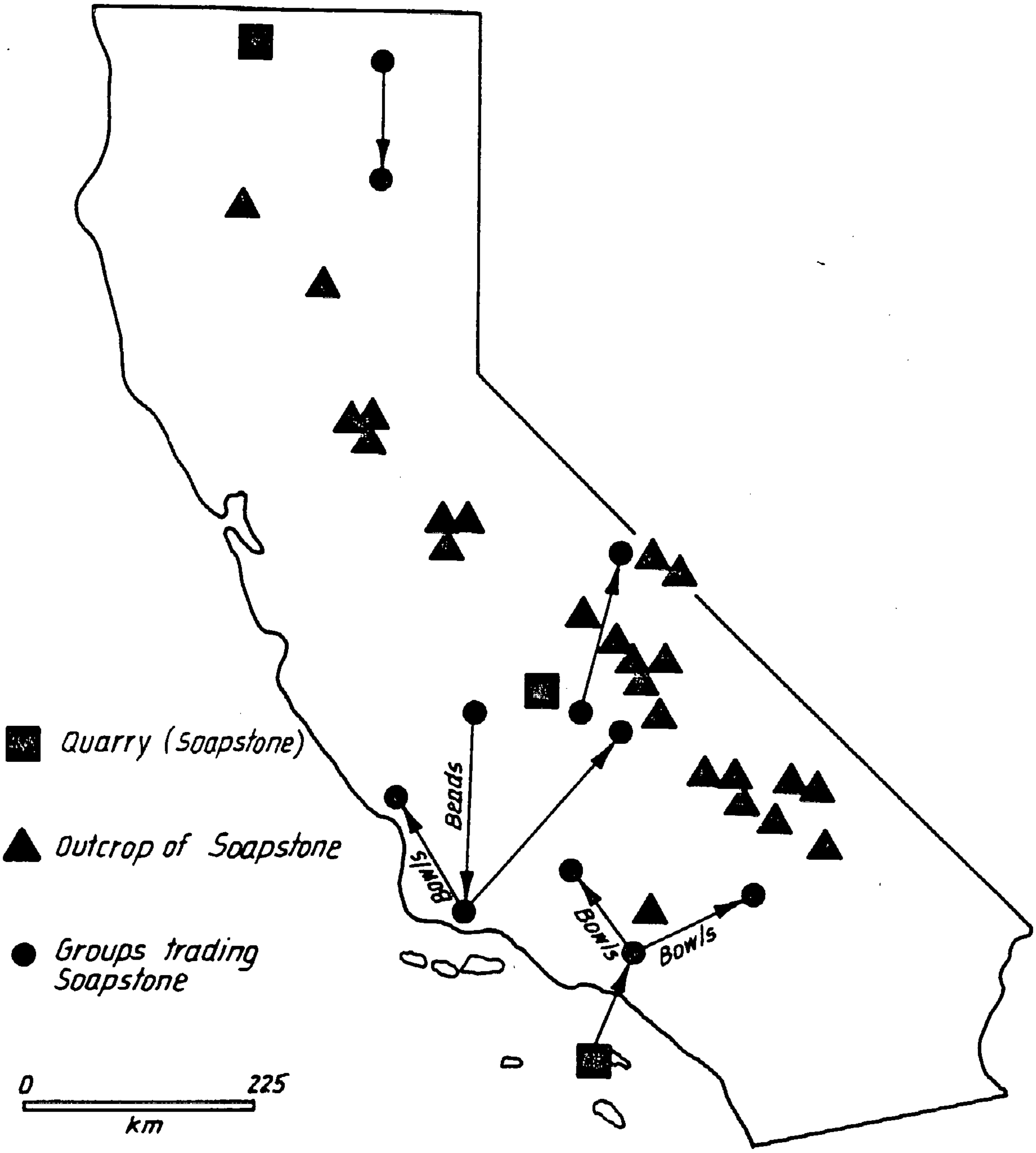

Figure 5. Soapstone trade in California.

As with the case of the Mainland Chumash tribe of California, soapstone items were both traded away and traded for. The Chumash made soapstone vessels and other items and traded these items to the Salinan and Tubatulabal tribes. This trade was conducted overland over 100 km with the Salinan and over 200 km with the Tubatulabal. Soapstone outcrops and aboriginal quarries were much closer to the Tubatulabal than to the Chumash tribe. The Chumash, in turn, received soapstone beads from the Yokuts, located over 100 km north, in exchange for shells, shell beads, and other items (Davis, J.T. 1966:32). The Chumash possibly obtained the soapstone used for manufacturing vessels from the soapstone quarries on Santa Catalina Island off the California coast (Kroeber 1925:629).

That the Chumash were trading for soapstone beads which they themselves could have easily manufactured suggests the items traded were not as important as the social aspect of the exchange.

Sillitoe observes among the New Guinea tribes that not all items are traded away from the source. Although the main current of traded items is away from the source, some items move against the flow back towards the source (Sillitoe 1978:265). The economics of tribal groups place emphasis on the social needs of the group rather than concentrating on a more efficient use of energy in raw material procurement.

In New Guinea, external trade has been shown not to be a major way in which people actually acquire foreign goods. Among the Wola, most non-local axes were acquired through inheritance and only 5.6% were acquired through purchase (Sillitoe 1978:266). The raw material for the axes was not available locally to the Wola tribe and the same is true for the Duna tribe. Among the Duna, most men do not acquire their axes through external trade although the axes are originally brought to the area by external trade (White and Modjeska 1978:279).

Itmes such as axes are treasured and curated among the tribes of New Guinea and these durable artifacts enjoyed a long use-life. A similar long use-life may have been enjoyed by soapstone vessels in the present study area. A longer use-life of an artifact creates further complexity in the analysis of the spatial distributions. With the movement of artifacts after the initial act of external trade, a degree of "randomness" is introduced to the spatial distribution. Over time, however, the main flow of soapstone artifacts should be away from the source. It is likely that soapstone vessels in the Wallace Reservoir experienced considerable movement between initial manufacture and final deposition.

Considerable work has been done concerning axe trade in Australia, including studies of artifact fall-off and raw material sourcing (McBryde and Watchman 1976; McBryde 1978). Quantitative measurements of axe distance fall-offs in Australia have produced some interesting results. The graphs show anomalies which would not be expected if reciprocal exchange were the sole exchange mechanism. McBryde suggests that such variations in distance decay could be clues to the existence of redistributional centers (McBryde 1978:359).

Sourcing techniques were applied to five axe quarries in Australia by McBryde, who summarizes the results of the study in these words:

> "The Howqua and Jallukar quarries are the only sites to have strictly limited or local distributions. The analysis has also shown that there is an anomaly in the fall-off for the material from the three major sources located in the Western District at distances of 200 to 300 kilometers from the central Victorian sources and from 100 to 150

> from the Hopkins River outcrops. Examples from the Berrambool quarry... align themselves along the Hopkins River to the south of the quarry, suggesting that this served as a line of communication (McBryde 1978:360-361)."

Australian social organization was at the tribal level prior to European contact, but these tribes were not self sufficient, isolated entities. They were interconnected by a network of exchange systems based on social, ritual, and utilitarian needs (McBryde and Watchman 1976:163). Redistributional points would indicate a kind of exchange not expected under traditional anthropological assumptions about societal types.

Soapstone vessels were also in use among the early state societies in Iran; the use of soapstone by a state level society creates distinctive spatial patterns of artifact distribution. Soapstone artifacts are found on almost every site in Mesopotamia of Early Dynastic II-III date. No evidence exists indicating that soapstone was quarried in Mesopotamia. The bulk of manufactured soapstone items in Mesopotamia are thought to come from the Tepe Yahya region in southeastern Iran. It appears that all soapstone items exported to Mesopotamia were in finished form. The vessel production at Tepe Yahya quarries filled a distant western demand and there was apparently little demand for the items in the vicinity of the quarry. Habitation sites near the quarries contain very small amounts of soapstone (Lamberg-Karlovsky 1975:351-356).

This constrasts sharply with the Wallace area Late Archaic soapstone use in which many different outcrops were being exploited and finished items were used in the vicinity of the quarries at habitation sites. This clearly shows the difference between patterns produced by a market exchange system and that produced by a less specialized system.

Although some vessels may have been produced in the Wallace area to meet distant demands, it appears that much of the production in the Wallace Reservoir satisfied local demands.

Considering these various examples of exchange helps to place the Wallace data in proper perspective. Soapstone artifacts are traded along distances among tribal groups. The nature of this exchange does not correspond in an easily predictable way to the geographical distribution of soapstone outcrops. Simply because a tribe lives close to a soapstone quarry does not mean they will exploit it. Rather, in many cases, they prefer to get their soapstone from other tribal groups. This serves to maintain social ties between tribes and allows interaction between tribes under the guise of trade. Trade, as with the Kula trade, does not always result in the exchange of needed items (Malinowski 1961). Direct energy expenditure considerations, whether to trade for soapstone or to obtain it independently, do not always appear to be the predominant concern among all societies.

With the Wallace data, the exchange of soapstone artifacts to strengthen social ties should create a homogenous background 'hum' on the soapstone artifact spatial distributions over time. Despite this background hum, the bulk of soapstone artifacts should tend to flow away from the quarries. The curation and long use-life of soapstone objects should also create 'noise' on the soapstone spatial distributions over time.

McBryde's research indicates that redistributional areas can be identified from the distribution of lithic artifacts. If such a redistributional pattern is present in the Wallace area, then this pattern should be recognizable from the spatial distribution of soapstone artifacts. The soapstone data from Iran strongly suggests that different forms of exchange create distinct spatial artifact patterns. If such patterns exist with the Wallace soapstone data, hopefully these patterns will be recognizable at the community level.

CHAPTER III

The Study Area

The study area selected for this research includes the Wallace Reservoir basin and the surrounding uplands of central Georgia. This includes portions of Greene, Putnam, Morgan, and Hancock Counties, in the Oconee-Apalachee River drainage system (Figure 6). The area is located entirely within the piedmont physiographic province of Georgia, which is characterized by saprolitic metamorphic and igneous rocks, saprolitic soils, gently rolling ridges dissected by a dendritic drainage pattern, and a mixed pine-hardwood forest supporting a variety of plant and animal life. The area has been severely eroded by years of careless agricultural techniques; modern man has probably greatly changed the region from the pre-European environmental state. Trimble attributes much of the sediments in the area's floodplains to culturally accelerated erosion caused by overfarming in historic times (Trimble 1969).

Siegel examined the physiographic morphology of the Wallace Reservoir basin and determined that the valley could be divided into four major divisions (Siegel n.d.) (Figure 7). The first division starts at the dam and goes upstream as far as the upstream end of Long Shoals. In this section of the river valley, the river is broad, shallow, rocky, and filled with islands and the valley walls are tall and steep. The uplands in this section are characterized by large

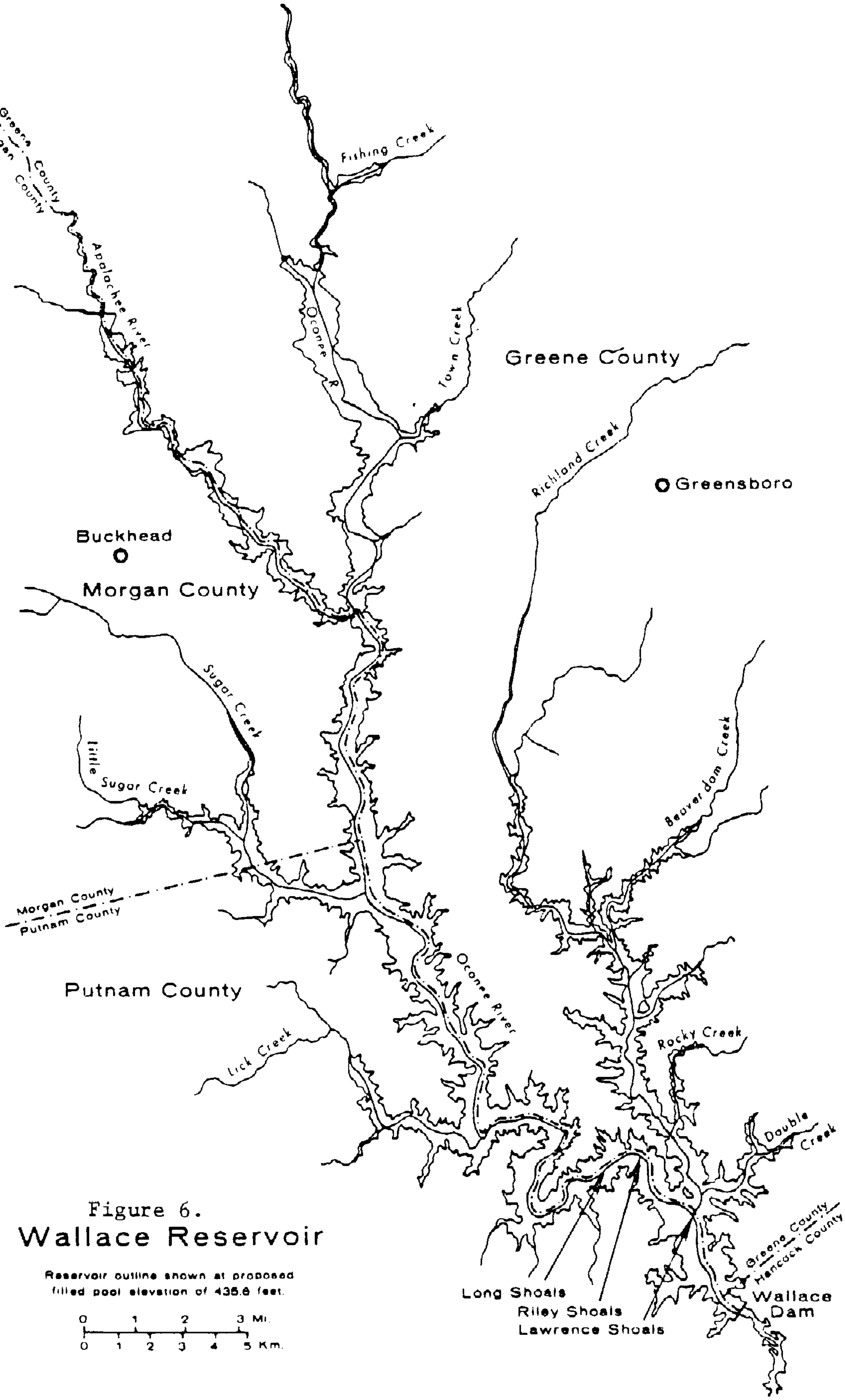

Figure 6.
Wallace Reservoir

Reservoir outline shown at proposed filled pool elevation of 435.6 feet.

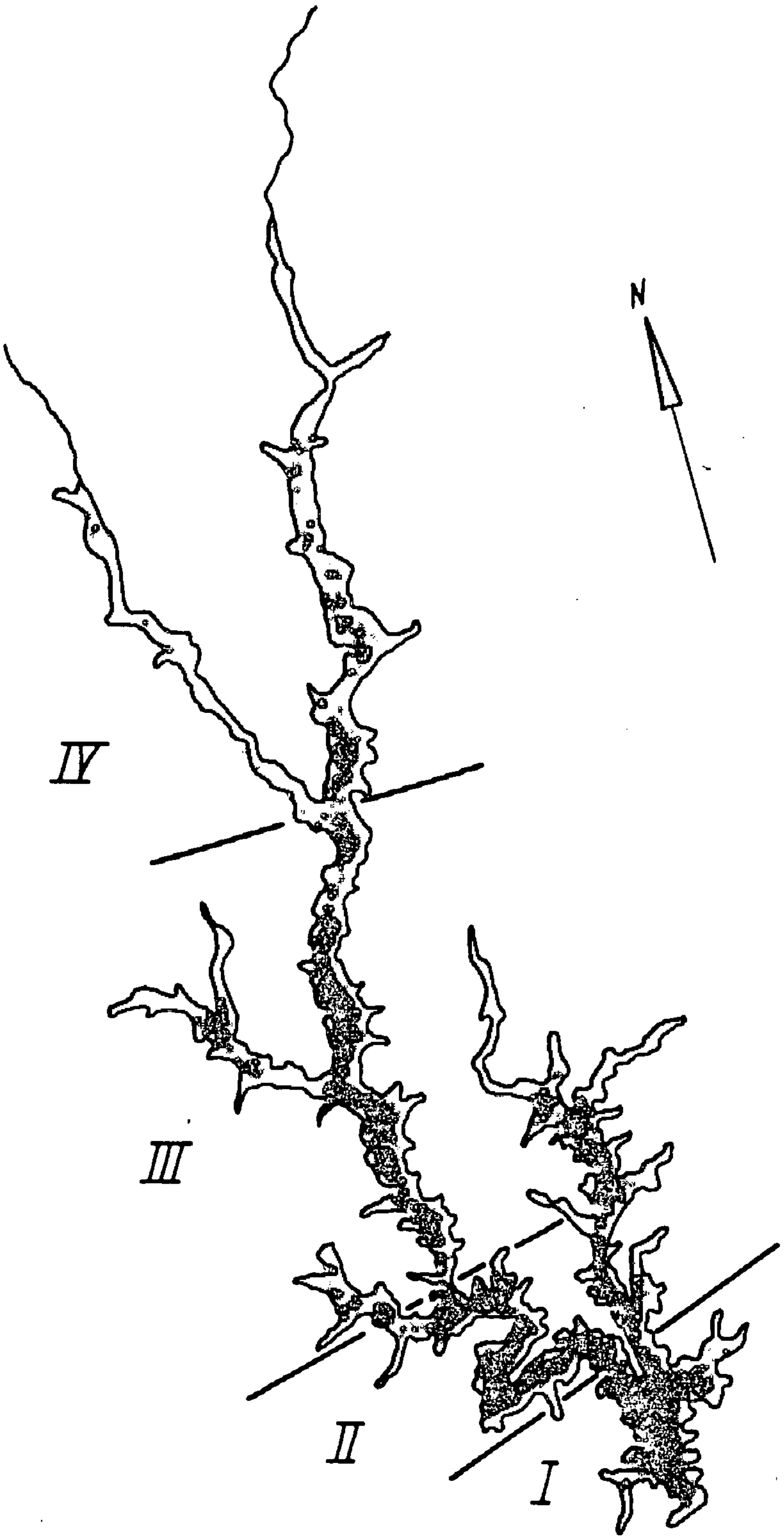

Figure 7. Gecmorphological divisions of the river valley.

granite outcroppings; very little floodplain exists in this division of the river valley.

The second division runs from the end of Long Shoals to about 2.3 km southwest of the Georgia Highway 44 river crossing. In this division, the river has formed a deep, fairly broad river valley. Occasional shoals are found in the generally narrow floodplain and the form of the river is somewhat controlled structurally by the underlying rock. The river in this section contains long, straight stretches interupted by sharp curves. Wide, tall levees are found in this section along with broad terraces, which are prime locations for prehistoric settlement.

The third division runs from the upper end of the second division to the confluence of the Oconee and Appalachee Rivers. In this section the river is broad and it meanders from side to side within the floodplain. Large levees are common as are large backswamp areas.

The fourth division runs from the Oconee/Appalachee confluence to the upper end of the reservoir. In this section, the floodplain is swampier than in the other sections and the river meanders extensively as evidenced by frequent channel scars and fossil levees in the floodplain. Terraces exist in this section but are generally outside the reservoir basin (Siegel n.d.:1-5).

These geomorphological divisions of the river valley were important to humans for several reasons. Diverse resources would be available in the shoal areas and in the non-shoal areas. The differences in the valley floor would provide a diversity of potential habitation sites, i.e. levees, terraces. In the northern end of the reservoir, the floodplain is much wider than in the southern end and the northern end would be better suited for agriculture. The size and shape of levees would determine, in part, the type of settlement located there. Backwater swamps and areas prone to flooding would affect settlement as well as food procurement activity.

Geological Research

Many soapstone outcrops have been located in the Piedmont and Blue Ridge Mountain regions of Georgia (Hopkins 1914; Chidester, Engel, and Wright 1964; Pickering 1976) and these outcrops are found along a general northeast to soutwest trend. Geologists generally deal with rock deposits on a much larger scale than in required for a study of local source exploitation. Many of the smaller outcrops have been ignored during geologic mapping. As a case in point, of the twelve outcrops located by archeological survey in the Wallace Reservoir, only two had previously been identified by geologists working in the area. The Wallace data suggests that small unmapped outcrops may be more abundant in the piedmont than previously thought. Archeological survey indicates aboriginal quarrying was done at many of these small outcrops.

With the exception of the research by Davis (Davis, G. n.d.), no geological research has been conducted in the Wallace Reservoir regarding soapstone outcrops. Several theses and other reports have been written relating to soapstone outcrops in the surrounding upland areas of Greene, Morgan, Putnam, and Hancock Counties (Hopkins 1914; Medlin and Hurst 1967; Myers 1968; Lawton 1969; Humphrey 1970; Libby 1971). The soapstone outcrops described in these reports are all too far from the study area for adequate comparisons to be made with the reservoir artifact data.

At least one of these outcrops was quarried aboriginally, the outcrop near Union Point, and although none of the geological sources mention aboriginal quarrying, this should not be taken to mean that no such activity took place.

Davis's research (Davis, G. n.d.) examines a fault line that cuts across the Wallace Reservoir slightly north of the Oconee/Appalachee confluence on a northeast to southwest trend. Davis believes that outcrops of soapstone are not likely to be found in the area north of this fault line, but that they can occur virtually anywhere south of it. Davis bases this assertion on the nature of the predominate rock types he observed on either side of the fault line. Both sides contain gneisses but the northern side is more saprolitic.

Davis, who found two of the outcrops also recorded by the archeological survey, noted that soapstone was likely to outcrop on a northeast/southwest trending line. Hopkins recognized this trend, but he noted that little work had been done on the portion of this band in the Wallace area (Hopkins 1914:294). The archeological data are thus more detailed and comprehensive than any of the geological studies in the region.

Archeological Survey

The study area has been extensively surveyed in the past decade by archeologists (DePratter n.d.). Over 300 archeological sites have been identified and systematically sampled in the survey area. The sites used in the spatial analysis are only those sites for which systematically controlled surface collections were made. By limiting the analysis to these surface collections, between site comparisons are more reliable.

Approximately 6819 hectares were systematically surveyed for surface sites in the Wallace Reservoir and surrounding uplands. The majority of this surveyed land was in the reservoir basin and only a very small sample of the uplands was examined. Ground surface visibility was excellent throughout much of the reservoir basin due to the clearing of vegetation from the floodpool prior to reservoir filling. Figure 8 shows the location of the maps found in Appendix A. Table 1 shows the exact area surveyed within each of these maps. Survey activities were coordinated with the clearing activities so that a maximum amount of area could be covered. Clearing was accomplished by the use of large bulldozers; the bulldozers pushed trees and other vegetation into piles, after which the piles were burned and buried. The scraping of the topsoil, the uprooting of trees, and the burial of the burned debris exposed many surface sites, buried sites, and buried feature remnants.

In the heavily alluviated portions of the reservoir, the northern end, the debris burying process unearthed many subsurface sites which would have otherwise given no surface indications. A systematic subsurface backhoe survey was also conducted along four selected transects, one transect for each geomorphological division, and this survey succeeded in locating many other sites not visible on the surface.

In addition to the intensive survey work done in the reservoir basin, several upland locations were surveyed for surface sites. Plowed fields and recently logged areas were systematically covered for archeological sites. The upland area varied in the percentage of

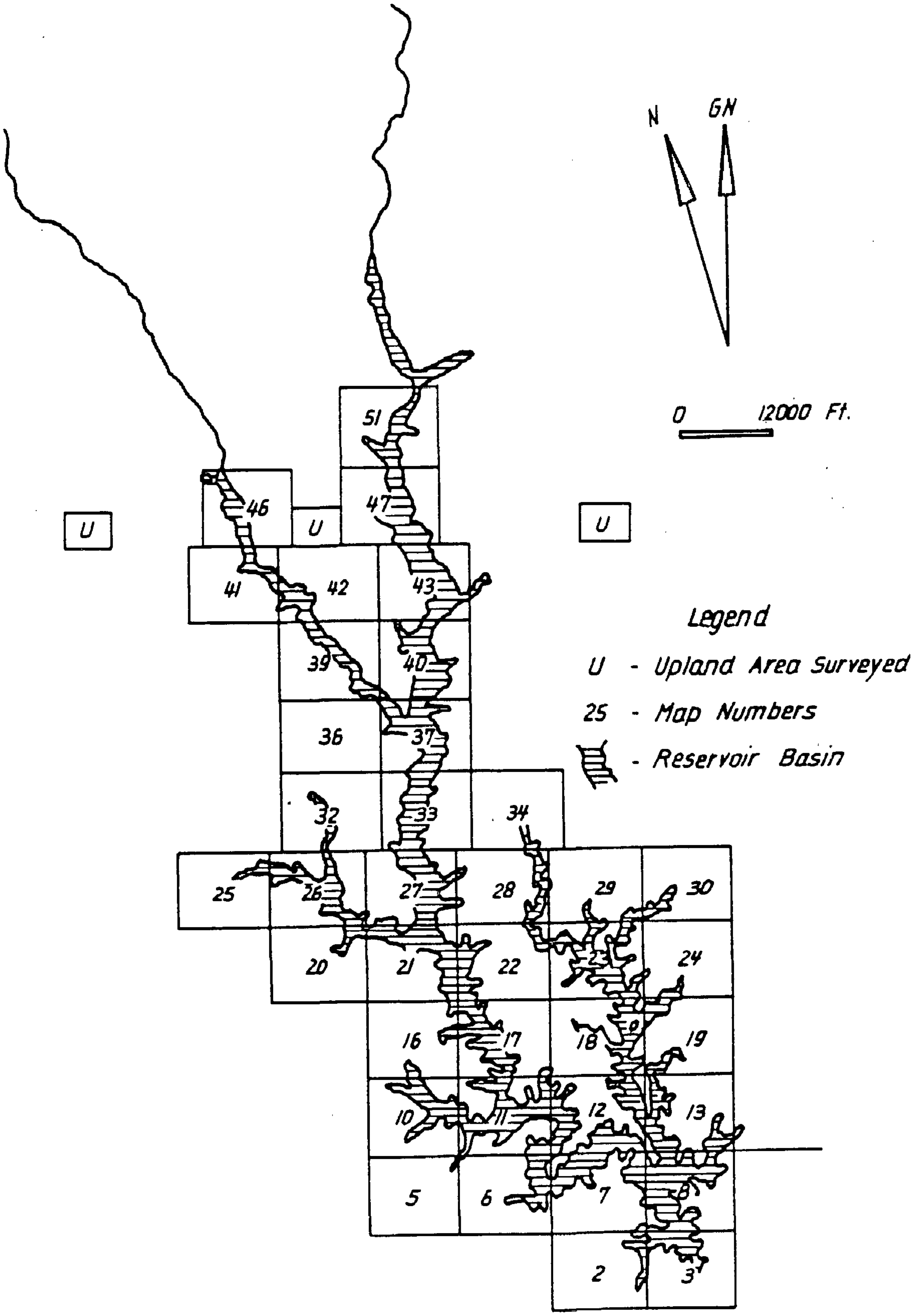

Figure 8. Lake Wallace area.

TABLE 1

Total Area Systematically Surveyed by Surface Reconnaissance

Map #	# of Hectares Covered	Map #	# of Hectares Covered
2	26.38	27	316.85
3	182.82	28	80.25
5	.75	29	21.55
6	166.47	30	67.63
7	334.06	32	32.33
8	729.97	33	270.89
10	150.86	34	.75
11	495.84	36	17.09
12	338.89	37	302.47
13	210.32	39	74.69
14	7.43	40	276.84
16	112.96	41	40.50
17	320.31	42	74.69
18	245.25	43	287.98
19	76.18	46	46.82
20	43.10	47	206.23
21	415.44	51	25.00
22	32.49	Isolated Upland Area	240.60
23	278.69		
24	19.69		
25	3.72	TOTAL	6819.82
26	245.04		

ground visibility; but the survey procedure was of a standardized format throughout the study area.

The systematic procedure of surface survey began with a visual walking inspection of the exposed ground surface, with crew members spaced at 15 meter intervals. Upon encountering artifactual material, the site was judged for artifact density. If preliminary visual inspection indicated an isolate artifact or low density scatter, 10 items or less, the site was classed as an artifact occurrence. If the site contained more than 10 artifacts, the area was designated as an archeological site. Where possible the sites were collected by surveyors walking across the site at three meter intervals. Ideally, the surveyors picked up all the artifacts encountered within these three meter transects. Ten meter diameter density collections were made at many of the sites; within these circle, all artifacts were collected providing a better estimate of artifact density. A small portion of these surface sites was also tested by the backhoe team. Collections at some of the sites were less controlled, especially at sites where weed growth reduced ground visibility. The survey was designed to locate all medium to high density surface sites within the survey area.

Survey teams recorded site location, site size, site topography, distance to important resource, degree of slope, site stratigraphy, and distinct component areas within the site. A majority of the surface sites located were multi-component.

A total of 284 surface sites contained soapstone artifacts. All of the soapstone artifacts were weighed and categorized in the laboratory. Pertinent information about sites with soapstone are included in Table 2 and in Appendix D. Maps showing the soapstone artifact bearing sites, soapstone outcrops, soapstone quarries, and surveyed area are included in Appendix A.

Late Archaic soapstone-bearing sites are found on all four geomorphological divisions of the reservoir (Figure 7), and are located on levees, terraces, fossil levees, ridgeslopes, islands, and ridgetops. Soapstone artifacts represent a significant element in the material culture of the Wallace Reservoir occupation. Soapstone artifacts were found on 21% of the systematically collected surface sites and on 36% of the systematically sampled subsurface sites. Although most of these sites had only one or two soapstone items, a number of non-quarry sites were found which had 40 to 50 soapstone items per site.

Soapstone vessels and other items were being quarried at small outcrops in the study area. Two actual quarry sites were located, but quarrying is strongly suggested by the soapstone artifact clusters around several of the other outcrops. A great many soapstone artifacts were being quarried, utilized, and discarded all throughout the study area.

The Temporal Position of Wallace Reservoir Soapstone Use

Excavations at 9Pm205, a stratified, multi-component site, revealed a Middle Archaic level stratigraphically lower than the soapstone bearing strata. Many diagnostic artifacts were recovered from the surface sites and the relationship between these diagnostic artifacts and soapstone artifacts is shown in Table 2. The unknown stemmed categories on this table refer to stemmed point types not identified temporally. For the purposes of this thesis, the contemporaneity of

TABLE 2

Table Showing the Number of Systematically Collected Surface Sites in the Wallace Study Area with Certain Diagnostic Artifact Associations

	Soap Sherds	Perf. Stones	Atl-Atl	Fiber Temp.	Sites w/ Soapstone	TOTAL
Soapstone Sherds	--	18	10	23	152	152
Perforated Stones	18	--	3	4	38	38
Atl-Atl Weights	10	3	--	2	16	16
Fiber-Tempered Pottery	23	4	2	--	25	50
Late Archaic Points	57	17	9	19	92	190
Middle Archaic Points	86	21	12	31	158	443
Woodland Points	36	7	4	16	61	178
Unk. Type 1 Large Stem Points	101	25	9	35	--	--
Unk. Type 2 Small Stem Points	72	21	12	22	--	--
TOTAL	152	38	16	50	284	Total of 1379 systematically recorded surface sites.

soapstone vessel, soapstone perforated stone, and fiber-tempered pottery use are assumed.

Some Environmental Associations

The association of Late Archaic perforated stones and fiber-tempered pottery in freshwater shell middens observed in the Savannah River region does not appear in the Wallace area. Fresh water mussels were not a significant element of Late Archaic subsistence in the Wallace area. Mussel shell is present at Late Woodland and Mississippian sites in the Wallace area and this suggests that poor preservation does not account for the absence of shell at Late Archaic sites.

Sites with soapstone generally cluster around the rivers and larger creeks in the study area; Late Archaic artifacts occur sparsely away from the riverine environment. Rivers and creeks probably served several purposes for the Late Archaic peoples. The floodplains are rich in plant and animal life. The riverine areas would be suitable for agriculture. The practice of agriculture in combination with the hunting and gathering of riverine resources could be a major reason why these areas were preferred for Late Archaic settlement. The possibility that Late Archaic people engaged in some form of agriculture in the study area is evidenced by the recovery of several charred squash seed fragments from a Late Archaic site, 9Pm212. Elsewhere, Asch reports finding squash seeds in Late Archaic contexts at the Koster site and at the Carlston Annis site (Asch n.d.).

In addition to providing a subsistence base, the rivers and creeks probably served as routes of communication and exchange in Late Archaic society. Social interaction and exchange of soapstone artifacts could be greatly intensified with the aid of water travel. There is adequate evidence to show that Late Archaic groups had the technology for canoe travel. Canoes, of the dugout form, have been found in Late Archaic contexts in Ohio (Brose 1977) and in Florida (Bullen and Brooks 1967). Less energy would be required to transport a soapstone object a given distance by canoe than by overland transport. Overland trails were probably also important in Late Archaic soapstone transportation. Goff has traced many of the aboriginal trading paths in Georgia (Goff 1955). Two of these trails pass through the study area perpendicular to the flow of the rivers. It is not known if these trails were in existence during the Late Archaic but these potential transportation routes should be considered in a discussion of Late Archaic exchange.

A general picture of the study area has been presented describing the environment, geology, and archeology of the area to serve as background for the Late Archaic exchange study. This background information should provide the reader with a better understanding of the following spatial analyses.

CHAPTER IV

Data Analysis

Soapstone artifacts from all of the systematically collected surface sites were weighed in grams and categorized as to artifact type. The artifact categories include sherds, perforated stones, atl-atl weights, waste fragments, unidentified worked fragments, and other formal ground stone items. The raw data are included in Appendix D.

Hypothesis

One hypothesis will be tested in this thesis. The testing of this hypothesis is necessary in order to solve the problem defined in Chapter 1. The hypothesis states:

> At the local level, the amount of soapstone will decrease with increasing distance from the source; any negative gravity anomalies in the fall-off curves are attributable to complicating factors such as redistributive centers. "Normal" fall-off would be consistent with relatively simple exchange mechanisms, while anomalous distributions would mean more complex exchange requiring further investigation. Speaking loosely, I expect that "normal" fall-off would reinforce the widely held belief that Late Archaic social groups were integrated at the band or tribal, rather than the chiefdom, level of sociopolitical organization.

Testing the Hypothesis

In order to identify any evidence of redistribution in the spatial distribution of soapstone artifacts, it was necessary to devise a system of experimentation that would best suit the conditions of the data. Since there are several soapstone outcrops in the study area, measurements would have to be on such a scale that the area between outcrops could be adequately examined, while at the same time, the number of soapstone artifacts within each spatial unit would have to be large enough to show the expected variability. Acknowledging that changes in the size of the spatial intervals can produce different results, several interval widths were used. Initially, fall-off was measured by 1200 ft intervals in concentric circle bands radiating out from the soapstone outcrops. Dealing with the data on this scale proved to be of little utility because the sample size in many of the bands was too small, and the fall-off graphs were very erratic. The band width was then doubled to 2400 ft intervals. The 2400 ft intervals was determined, after careful consideration, to be an effective spatial scale for measuring soapstone fall-off with distance from the source. The sensitivity at this scale was adequate enough to show gradual definite changes in soapstone use intensity over space. Experimentation with band intervals of 4800 ft did not show the changes over space as well as the 2400 ft intervals. Even with the 2400 ft width there were still problems created by low sample size.

In order to compensate for the problem of chance recovery of artifacts due to artifact depositional factors at a single site, variable readings for several sites within each band were averaged together. By doing this anomalies reflecting site formation processes or other disturbances, rather than social processes, might be smoothed out. Soapstone artifacts from a single site could represent the product of a single event and only by averaging several sites together can one obtain an accurate indicator of systematic patterns.

Fall-off graphs, based on the variable readings within each interval band, were drawn for the two known soapstone quarries, 9Pm338 and 9Ge263, and for seven soapstone outcrops without definite quarrying evidence. Concentric circles were superimposed onto the maps seen in Appendix A and all of the systematically collected surface sites falling within each 2400 ft interval were recorded. Due to the shape of the reservoir and the limited survey work done in the upland regions of the survey area, the sampling was heavily biased towards the riverine setting.

Those bands with less than three soapstone sites were considered to be low sample sizes. Bands with extremely low sample sizes are indiciated on the fall-off graphs by the letter "L". Anomalies created in the bands of low sample size should probably be ignored.

Initially, the recording of the fall-off from one outcrop was terminated upon reaching a neighboring soapstone quarry. Eventually this measurement was extended further for some of the quarries. After measuring the fall-off for the concentric bands, the circles were divided into quadrants for four of the outcrops (Figure 9). By using this method, interference from adjacent quarries could be tuned out. One of the problems with the quadrant method is that the sample size near the outcrop is often very low due to the small size of the innermost band. One should realize this and concentrate mainly on the area beyond the first two bands when studying these graphs.

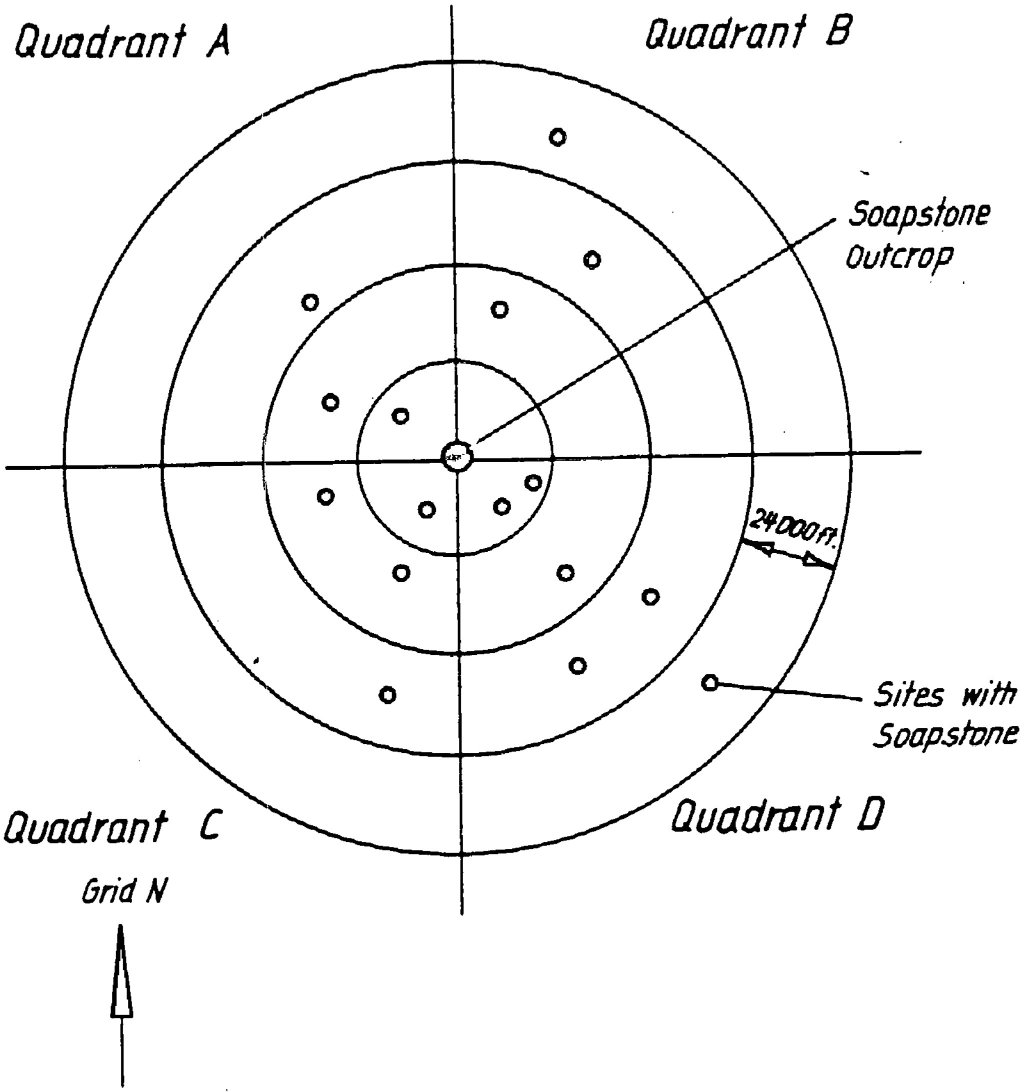

Figure 9. Sample of concentric circle bands measured for fall-off.

Two variables were monitored for fall-off from the outcrops. The variables are soapstone sherd amount and average soapstone weight. The average weight of soapstone artifacts for the sites containing soapstone, within each band, produced the readings for the weight fall-off graphs. In the fall-off measurement, all sites with soapstone were considered, regardless of cultural affiliation. In the soapstone sherd fall-off measurements, only those sites with soapstone vessel sherds were used in the average calculations. This set of graphs show the average number of soapstone sherds for those sites having soapstone sherds. Weight is more easily quantified than other variables, and it is a more concrete indicator of the actual amount of soapstone used. Vessel sherds, on the other hand, have the advantage in that they are diagnostic artifacts of the Late Archaic period.

By measuring fall-off for two distinct variables, the differences between the two sets of fall-off measurements can be compared to each other. The fall-off graphs for the different quarries and outcrops can be compared with each other and any emerging patterns can be identified.

The graphs are presented in histogram form for all of the outcrops within the reservoir. These graphs are included in Appendix B. For the purpose of testing the hypothesis, the fall-off of one specific soapstone quarry, 9Ge263, will be discussed in detail. The presentation of one single test case is primarily for the sake of clarity and to prevent the reader from becoming confused. The fall-off graphs for 9Ge263 are shown on Figures 10 through 15. Comments on the distribution of soapstone around other quarries and outcrops are made following the initial test.

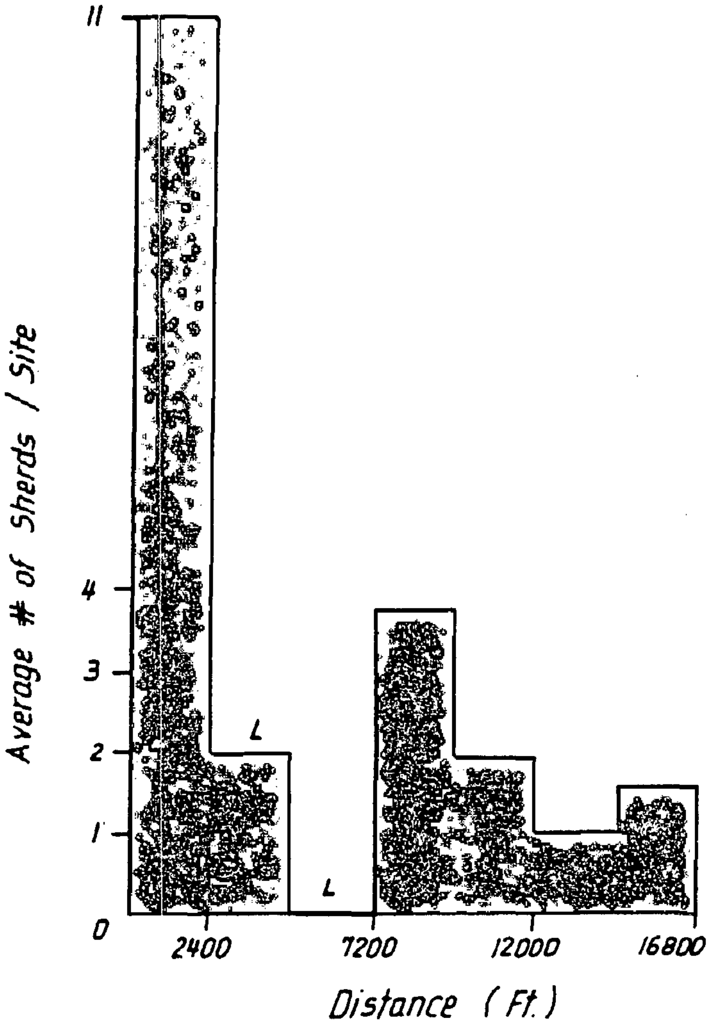

Figure 10. Soapstone sherd fall-off from the soapstone quarry located on Map 28, grid square 4, (9Ge263).

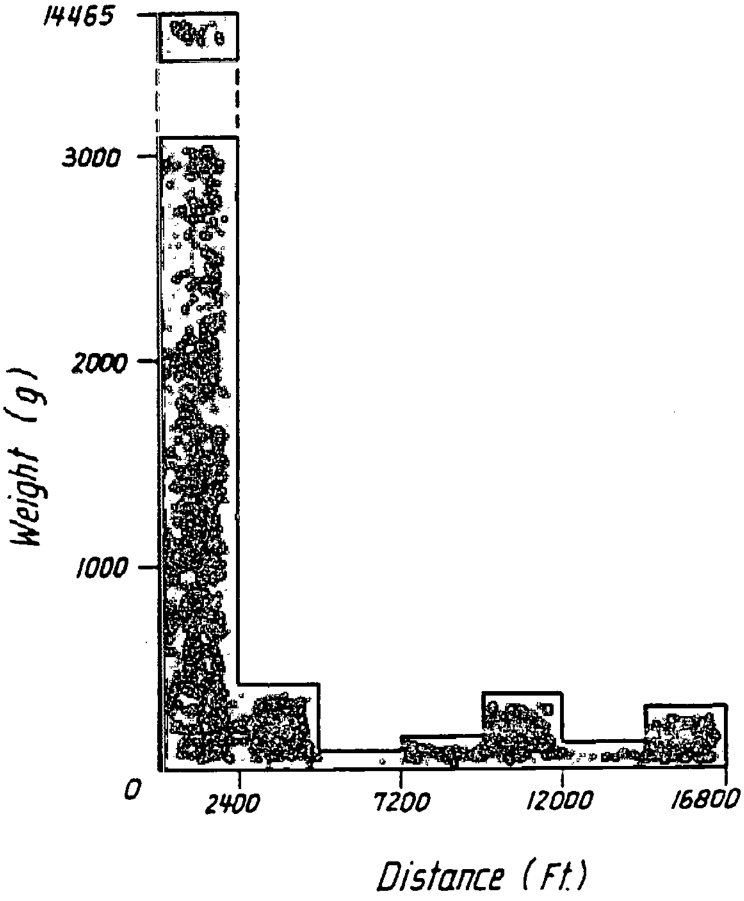

Figure 11. Plot of the soapstone weight/ distance relationship for the soapstone quarry located on Map 28, grid square 4, (9Ge263).

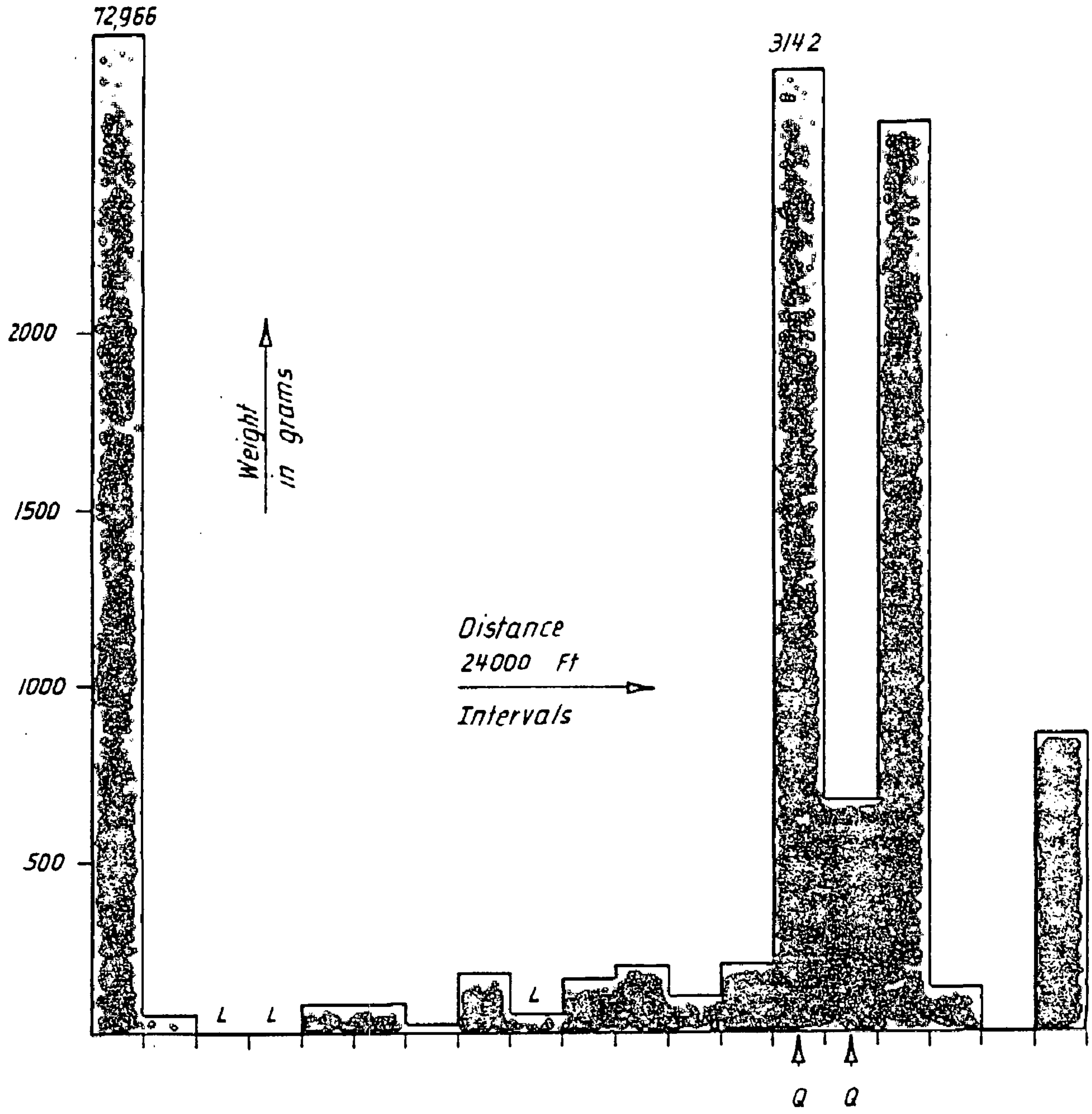

Figure 12. Plot of the soapstone weight/ distance relationship for the soapstone quarry, 9Ge263, quadrant A.

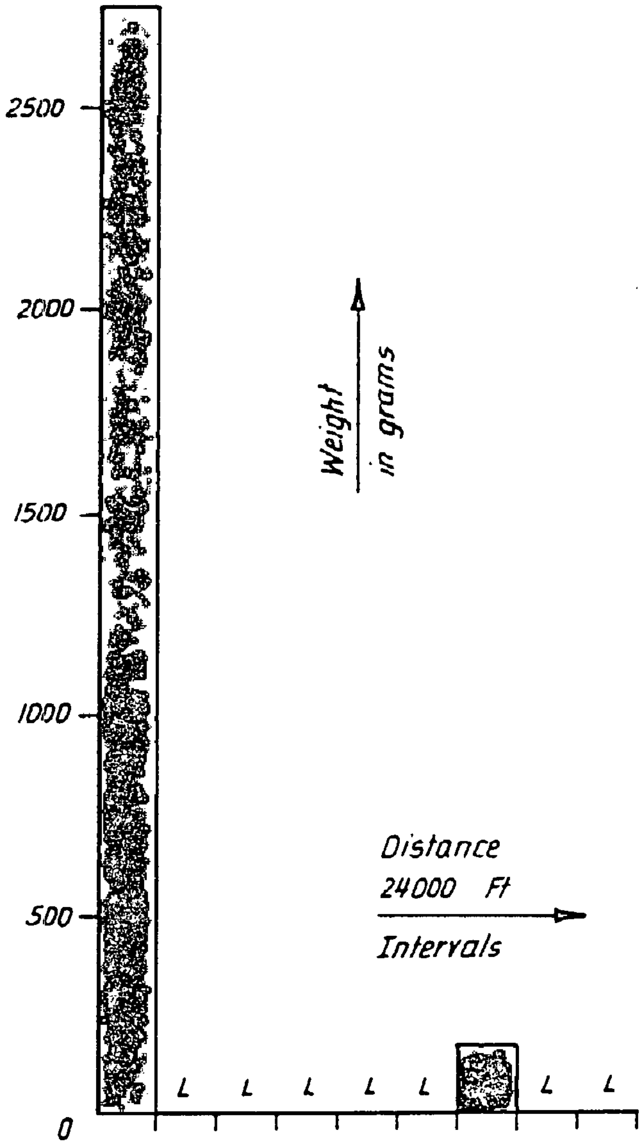

Figure 13. Plot of the soapstone weight/ distance relationship for the soapstone quarry, 9Ge263, quadrant B.

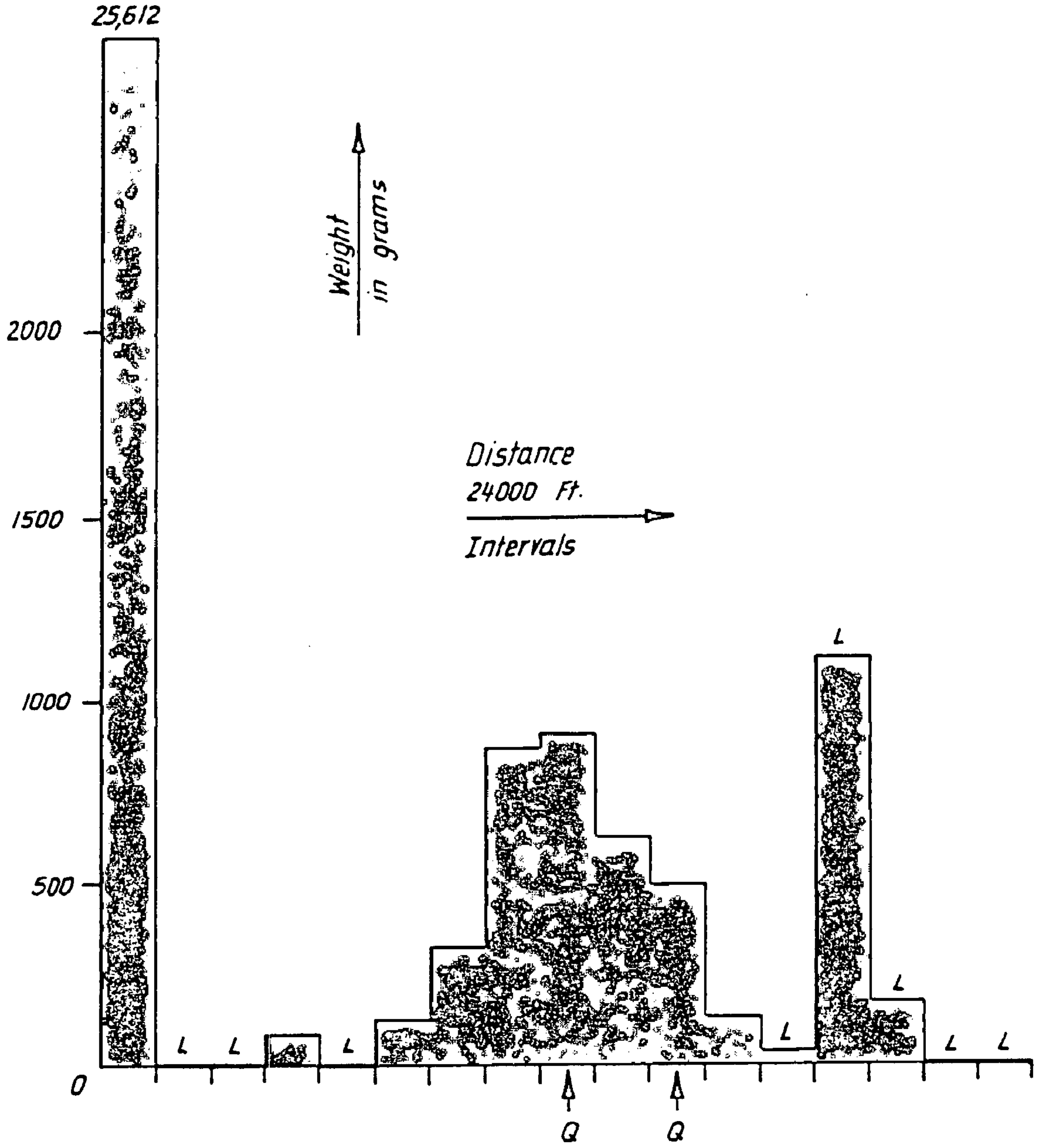

Figure 14. Plot of the soapstone weight/ distance relationship for the soapstone quarry, 9Ge263, quadrant C.

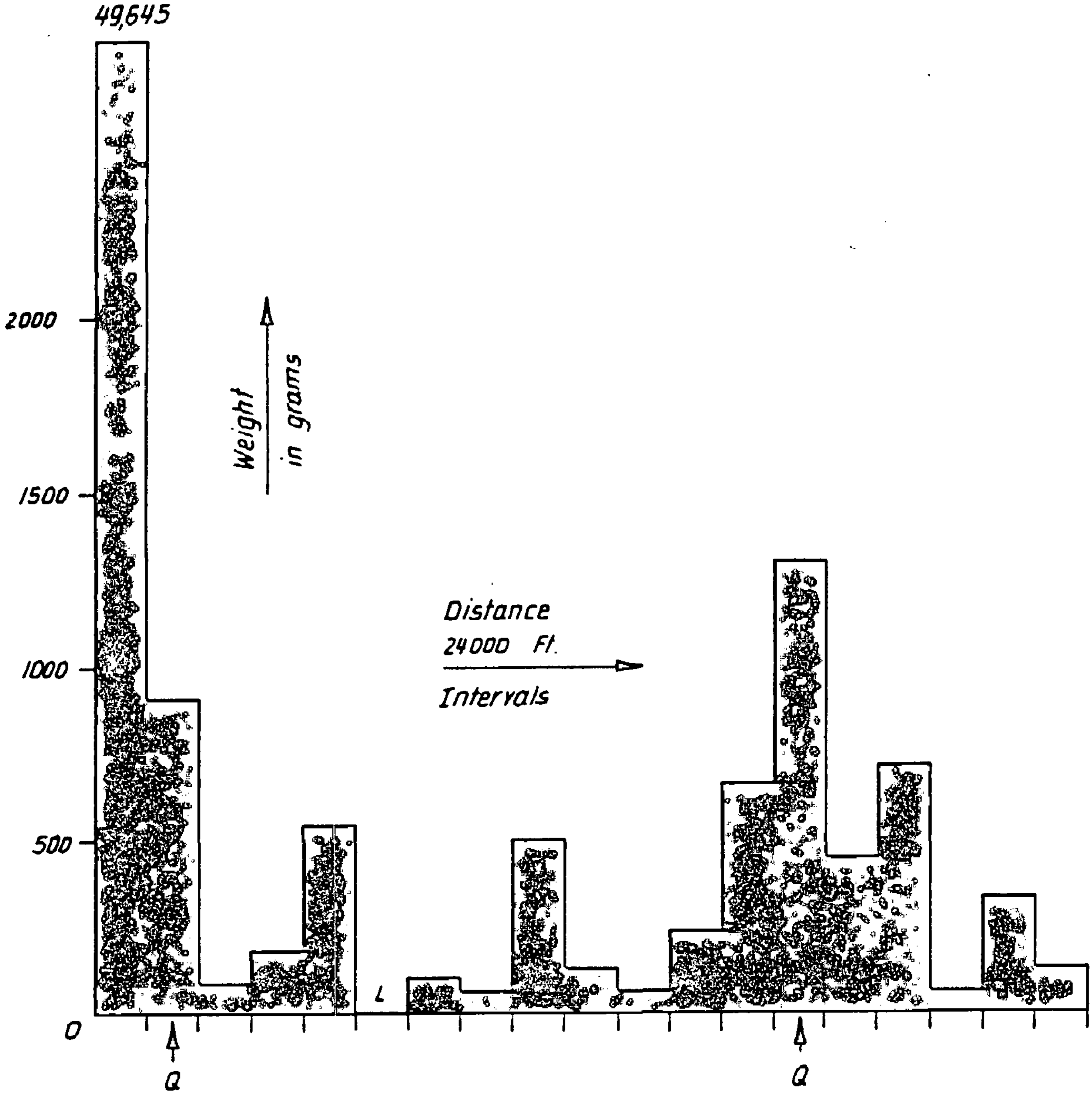

Figure 15. Plot of the soapstone weight/ distance relationship for the soapstone quarry, 9Ge263, quadrant D.

No significant negative gravity anomalies were observed in the soapstone fall-off measurements for the Late Archaic soapstone bowl quarry, 9Ge263 within the area examined. Negative gravity anomalies were present in these fall-off graphs but the anomalies occur as the measured band intervals approach a competing soapstone outcrop and/or quarry. This inference in the fall-off graphs is more apparent when the fall-off is handled by quadrants and the directional source of the negative gravity can be pinpointed (Figures 12, 124, and 15). In three quadrants, a soapstone outcrop is located several kilometers from site 9Ge263 and all three quandrants showed the negative gravity created by these outcrops. A fourth quadrant, Quadrant B, had no outcrop and consequently, the fall-off graph contained no anomalies.

On these fall-off graphs, the band at which one encounters a competing outcrop is marked by the letter "Q". No significant peaks occur in the 9Ge263 fall-off graphs prior to the occurrence of any "Q".

Figure 16 shows the spatial relationship between 9Ge263 and other archeological sites in the immediate vicinity. Site 9Ge263 is also shown on Map 28 in Appendix A.

The fall-off graphs for the other definite quarry site, 9Pm338, located on Map 7 in Appendix A with the fall-off graphs in Appendix B, are quite similar to the fall-offs for quarry site 9Ge263. Soapstone amounts decline greatly within one mile of the quarry site. Specialized activity is indicated at the quarry site itself with little evidence of habitation. The major activity at the quarry site itself was primary reduction of soapstone bowl blanks. The bowls were probably finished at nearby Late Archaic habitation sites.

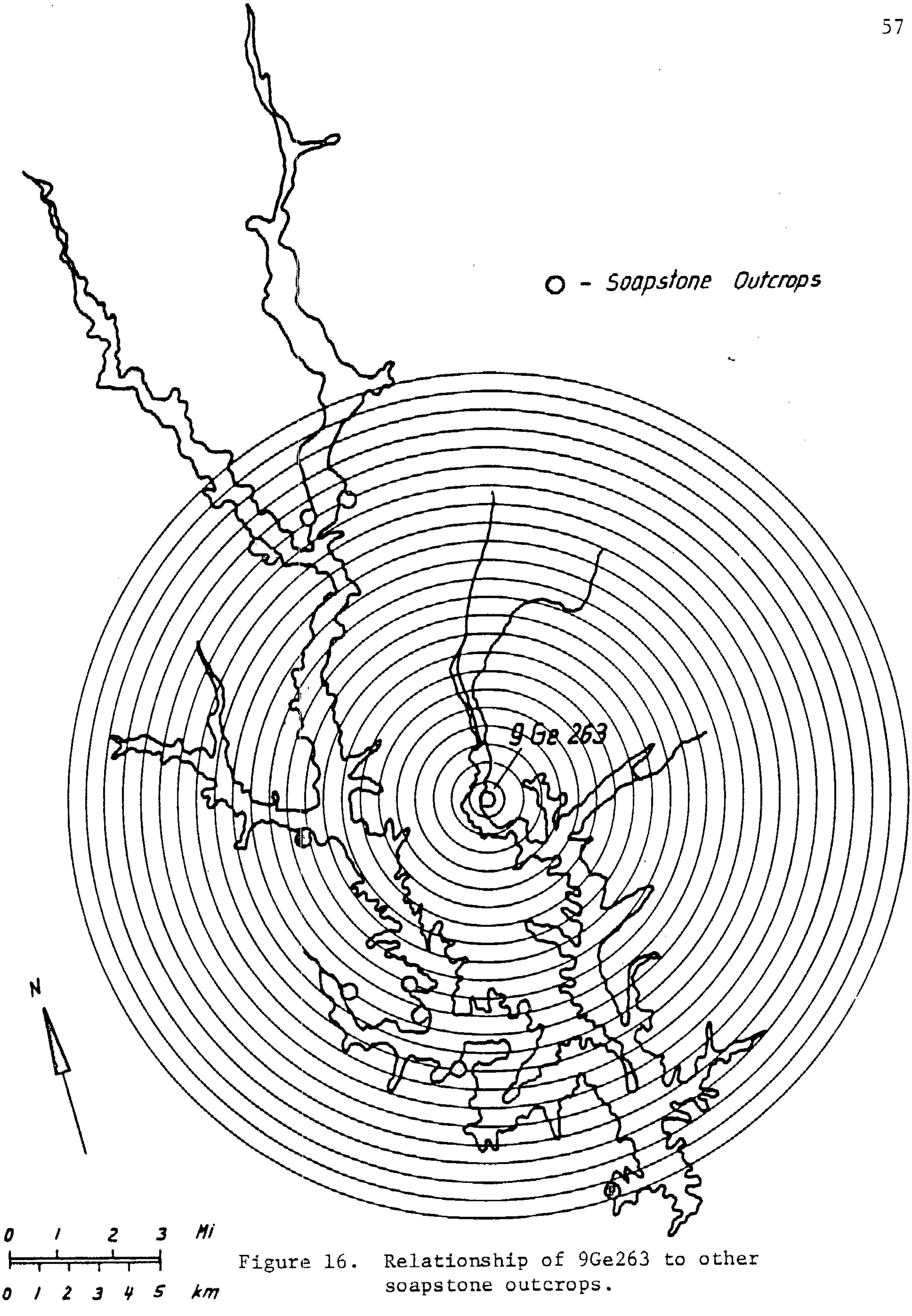

Figure 16. Relationship of 9Ge263 to other soapstone outcrops.

Soapstone quarrying is strongly suggested from the fall-off graphs of two other outcrops. One outcrop is located on Map 11 in Appendix A. The fall-off graphs for this outcrop, located in Appendix B, indicate a normal gravity fall-off dropping off rapidly beyond the first mile. Several possible Late Archaic village sites occur near this outcrop. This outcrop had been badly bulldozed by tree farming operations.

A series of badly disturbed outcrops were located in the vicinity of Swords, Georgia, located on Map 36 in Appendix A. The fall-off graphs for these outcrops, found in Appendix B, also indicate a normal fall-off. For these outcrops the bulk of soapstone artifacts fall-off within a mile and one half. Late Archaic village sites are abundant in this area but unfortunately the survey coverage in this area was somewhat uneven. One site, 9Mg73, located adjacent to these soapstone outcrops was extensively excavated but few soapstone artifacts other than unworked hunks were found. Several test excavations were made at the soapstone outcrops but these tests yielded almost no cultural information. The outcrop had been so badly bulldozed that all traces of quarrying were gone.

None of the other soapstone outcrops measured for artifact fall-off exhibited normal fall-off curves. Whether or not these outcrops had been quarried could not be determined from fall-off analysis.

Based on these experiments, no evidence was found to support the idea that a redistributive center was in operation in the Wallace Reservoir during the Late Archaic. There is thus no evidence to support the model of redistributive chiefdoms during the Late Archaic in Georgia.

CHAPTER V

Interpretations

Not all of the eleven soapstone outcrops in the Wallace Reservoir exhibited definite quarrying evidence. In some cases, the outcrops were badly disturbed by bulldozers, thereby obliterating the direct evidence of quarrying. Other outcrops may also have quarried sporadically, thus creating a minimum amount of quarrying evidence. Historic exploitation of some outcrops may have further erased aboriginal quarrying evidence. The poorer quality soapstone outcrops may have ignored by Late Archaic peoples in favor of outcrops containing more desirable stone.

Judging from the abundance of soapstone outcrops found in the Wallace Reservoir basin, it is reasonable to expect many additional soapstone outcrops in the unsurveyed surrounding uplands. Archeological reconnaisance in the future may reveal additional evidence of soapstone quarries in the uplands; this would round out our perception of Late Archaic resource procurement in the Georgia piedmont.

Assuming a hunting and gathering subsistence supplemented by incipient agriculture, the riverine areas in the Wallace area probably supported year-round occupation during Late Archaic times. No direct evidence of permanent Late Archaic structures have been found in the study area. Many of the Late Archaic sites in the study area possess a wide variety of artifact types and this diversity of artifact types indirectly suggests that a wide range of activities at the site. The greater the range of activities occurring at the site, the longer the timespan of site occupation.

Excavations at 9Pm205, a Late Archaic site on a levee in the Wallace Reservoir, revealed a wide range of activities. Chipped stone tools and debris indicate tools were manufactured, used, and maintained at the site. The presence of soapstone vessels, fiber-tempered pottery, and rock hearths indicate food preparation and consumption. Perforated stones, bannerstones, and a stone pipe fragment attest to the other activities. The sheer abundance of materials at 9Pm205 suggest the site was the scene of much activity during the Late Archaic.

The artifact collections from many Late Archaic surface sites in the study area also suggest a wide range of activities. Sites with high soapstone artifact diversity also have a high diversity of non-soapstone Late Archaic artifacts such as nutting stones, manos, chipped stone tools and stone axes. The surface sites with high soapstone artifact diversity are predominately located near soapstone outcrops in the study area. This suggests that Late Archaic people were concentrated at village sites near the soapstone resources that they were exploiting.

Although a higher diversity of soapstone artifact types occurs at Late Archaic sites near the soapstone outcrops, it is not clearly evidence of craft specialization. The sites with high soapstone artifact diversity also have a high diverstiy of other artifact types, probably meaning that although there was emphasis on soapstone at these sites, other activities were also occurring. A more appropriate interpretation of the Wallace data would be that specialization may have occurred with soapstone artifact manufacture, but the degree of specialization was not so great that the system was able to support full time craft specialist groups. Small social groups involved in soapstone manufacture also pursued other subsistence tasks.

Territorial control of California rock quarries by various Indian tribes (Heizer and Treganza 1967:300) makes it reasonable to suggest that Late Archaic people also had some form of territorial controls for soapstone quarries. The controls may not have been so strict as to deny others access to the lithic resource, but may have been of a more symbolic nature, whereby the users of the quarries were required to obtain permission to mine the quarries, thus acknowledging ownership of the quarry by the controlling group.

The Wallace data suggest that soapstone bowls were worked to a near finished state at habitation sites near the soapstone quarries. There were no thick, unfinished soapstone vessels or large unworked hunks found more than one half mile from a soapstone outcrop in the Wallace area. The actual activity at the soapstone quarries themselves is apparently limited to primary reduction of the soapstone bowl preforms. Few other activities are evidenced at the quarries. The axe/pick tools used to quarry the soapstone bowls, however, are found at Late Archaic sites throughout the study area. These tools were probably multi-functional, serving not only for quarrying soapstone, but also for chopping trees. Consequently, the distribution of these artifact types would not be an accurate reflection of soapstone quarrying. In the Wallace Reservoir area, the majority of soapstone artifacts were manufactured at permanent or semi-permanent habitation sites near soapstone outcrops. The analysis presented here suggests a soapstone "economy" not inconsistent with a model of reciprocal exchange.

Evidence from Late Archaic sites in the Poverty Point region point to an exchange system involving processes more complex than simple reciprocity. The influence of the Poverty Point exchange network may not have extended as far east as Georgia. The relationship between the two regions needs to be examined more closely.

Although the favorable riverine habitat made semi-sedentary occupation possible in the Wallace area, the permanent occupation of other soapstone outcrop localities in Georgia may not have been possible. Quarries in less hospitable subsistence settings, such as quarry site 9Un15 in the mountains of north Georgia, may have only been visited temporarily. Any evidence of permanent occupation near quarry sites in less favorable environmental settings might be taken as evidence that these sites were occupied by craft specialists whose subsistence needs were supplemented in part by other segments of the social system.

Conclusions

A chart showing the model of soapstone artifact flow indicated by the Wallace Reservoir data is shown in Figure 17. This model shows the bulk of soapstone being carried to the nearby village sites and then filtering out to the villages peripheral to the outcrop areas. The distribution map of soapstone sherds reflects the concentration of soapstone at the nearby villages and a decline in sherds as distance from the outcrops increase (Figure 18). As the model shows, the flow of artifacts can be two-way, that is, more distant groups may have acquired soasptone from these outcrops by direct acquisition, but the bulk of artifact flow was from the outcrops to the nearby habitation sites. In a sense, these nearby habitation sites may represent

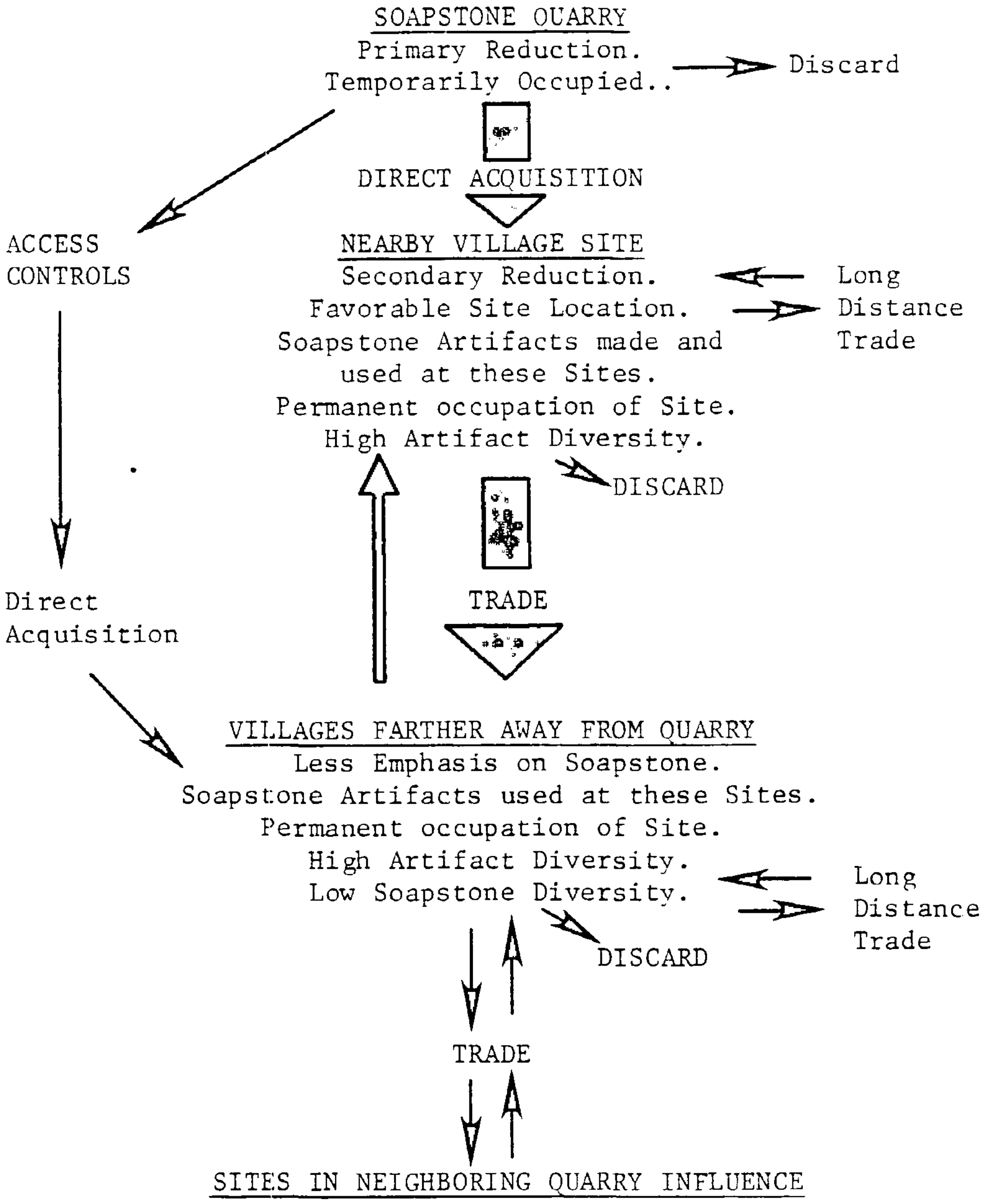

Figure 17. A MODEL OF SOAPSTONE ARTIFACT FLOW IN THE WALLACE AREA.

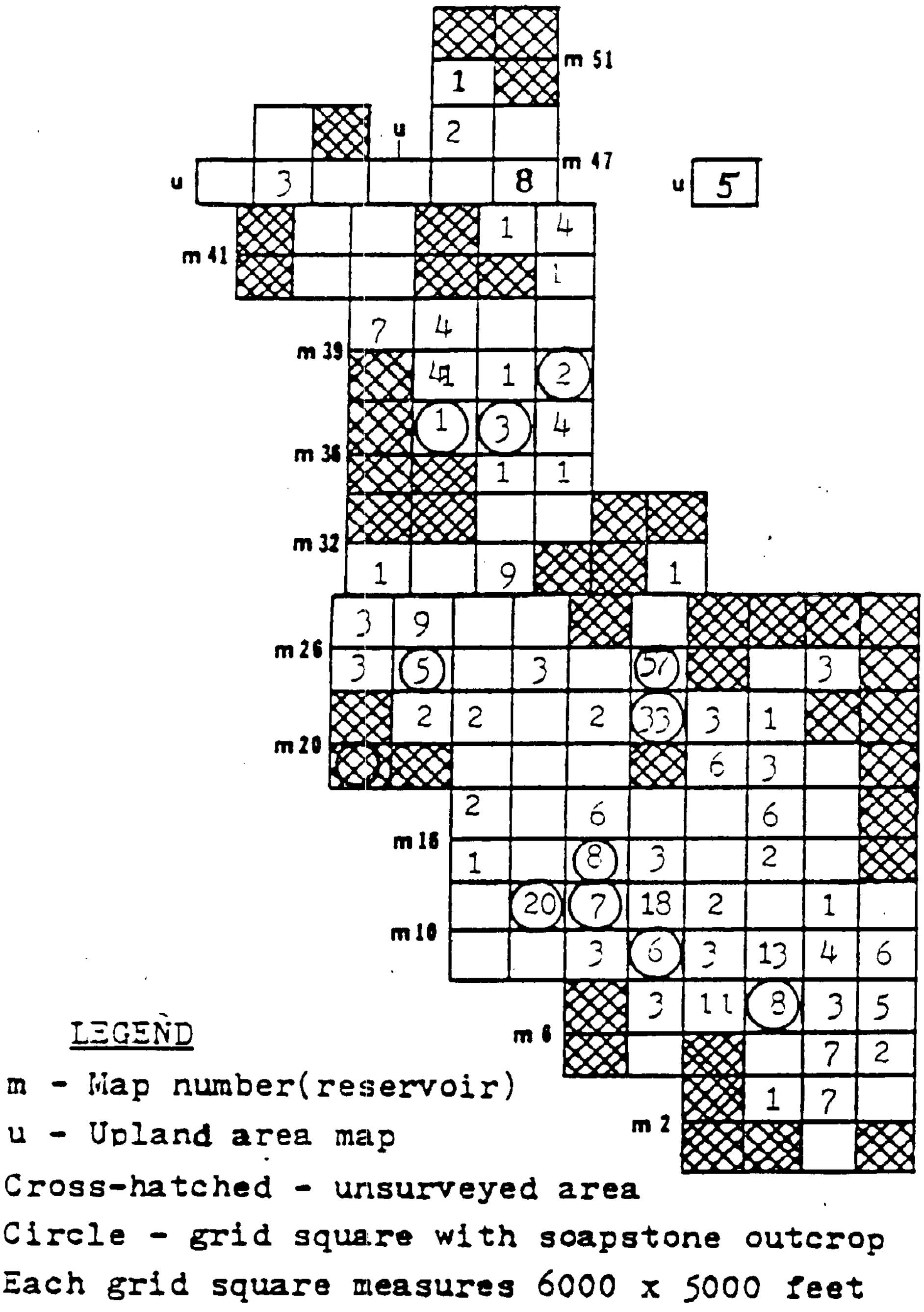

Figure 18. Total amount of soapstone sherds within each grid square.

redistribution centers. Neutron activation could help clarify this problem by identifying the source of soapstone artifacts from the village sites near the quarries. If the village sites contained artifacts from several different outcrops, this might indicate that these sites did serve as redistribution sites rather than simply distribution sites in a reciprocal exchange system. Perhaps raw material types other than soapstone, for example chert, should be used to solve this problem. Late Archaic inhabitants of the study area were using quartz, chert, diabase, rhyolite, and other lithic resources for their chipped stone tools. Of these resources, only chert is not locally available. The importance of possible trade in chert and soapstone between the piedmont and the coastal plain should be studied quantiatively. Perhaps it served largely to strengthen social bonds rather than supplying an actual economic need for these lithic resources. With abundant local stone in the piedmont, Late Archaic people did not actually need chert for their survival. A quantitative study of the distribution of chert at Late Archaic sites may reveal spatial patterns that could provide insight into the nature of Late Archaic exchange systems.

From this research it is apparent that soapstone artifacts do create distinct spatial patterns in the archeological record. Interpretations about Late Archaic life can be made from these patterns. Clearly, soapstone is a useful archeological tool which has been underutilized by archeologists in the southeast. Future research should be designed with the potential utility of soapstone data in mind.

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1978 Acquirers, Users, Finders, Losers: The Use Axe Blades make of the Duna. *Mankind*, 11:276-287.

Wood, W. D., and Hally, D. J.
1975 An Archaeological Survey of Highway Relocation Project No. 27 of Georgia Power Company's Wallace Reservoir. Copy on file with the State Archaeologist and the Georgia Power Company.

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1971 An Aboriginal Quarry in Tallapoosa County. Journal of the Alabama Academy of Science, 45(1):17-21.

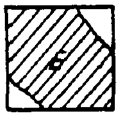
Wright, G. A.
1969 Obsidian Analysis and Prehistoric Near Eastern Trade, 7500-3500 B.C. Museum of Anthropology, Michigan University, Anthropological Papers, 37.

APPENDIX A

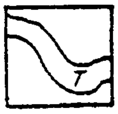
THE SITE MAPS

LEGEND FOR THE SOAPSTONE SITE MAPS

- Soapstone artifact site. The number designations include state site numbers, upland survey field site designations, subsurface survey designation, and North and South surface survey designations.
  The upland survey sites are indicated by the prefix "U". The subsurface survey sites are indicated by the prefix "H". The South surface survey team sites are indicated by a number with no prefix. The North surface survey team sites are indicated by the prefixes "SC", "SN", and "SS".

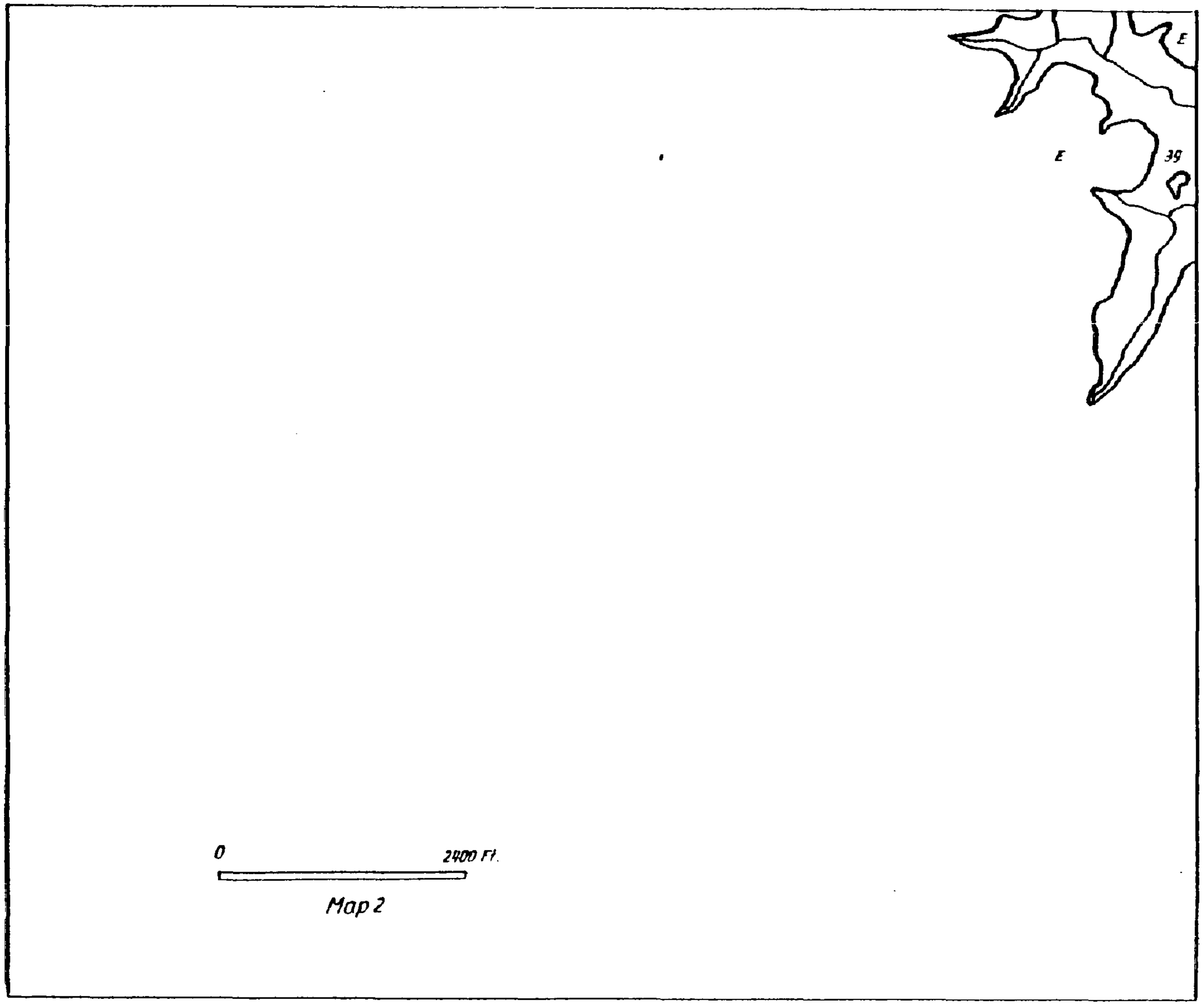


- denotes unsurveyed areas within the Wallace Reservoir basin. These areas were not surveyed for various reasons including vegetative cover and lack of time and money for survey.

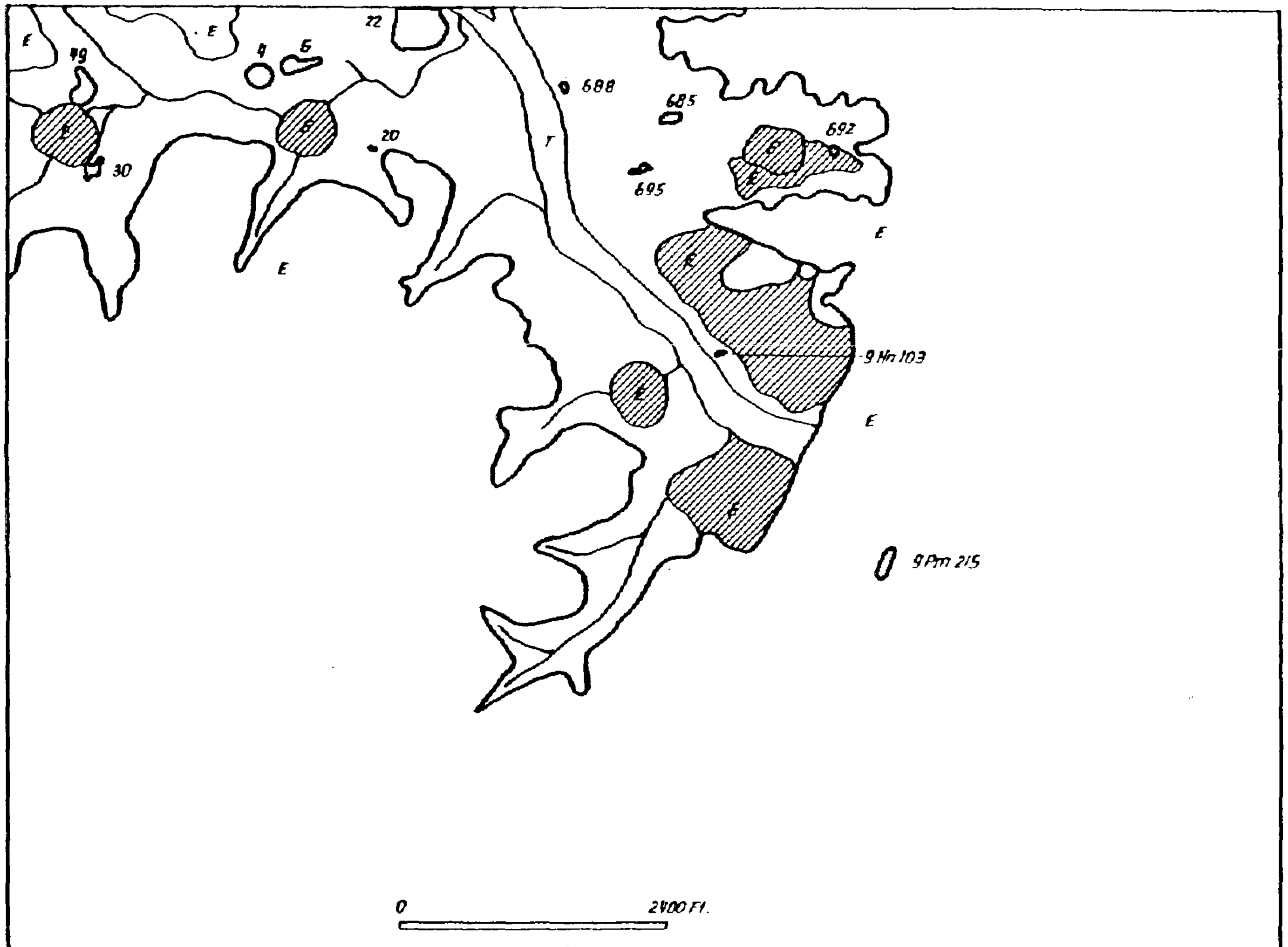


- denotes bodies of water. This includes lakes, small creeks, and rivers. Intermittant streams and ancient meander scars are indicated by dotted lines.

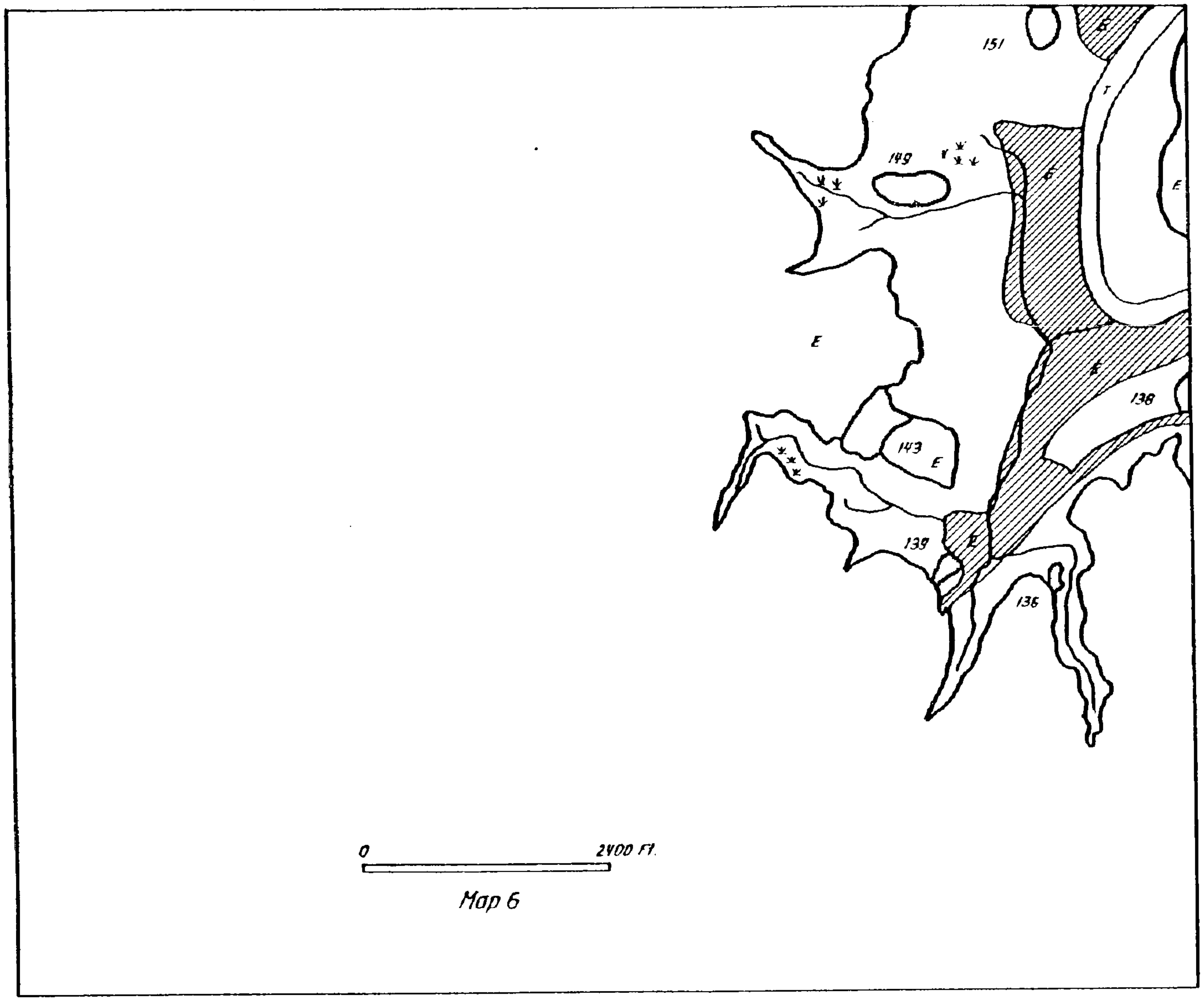
The limits of the areas covered by systematic survey are indicated by a heavy black line. This includes areas in the Wallace Reservoir and areas in the surrounding uplands.



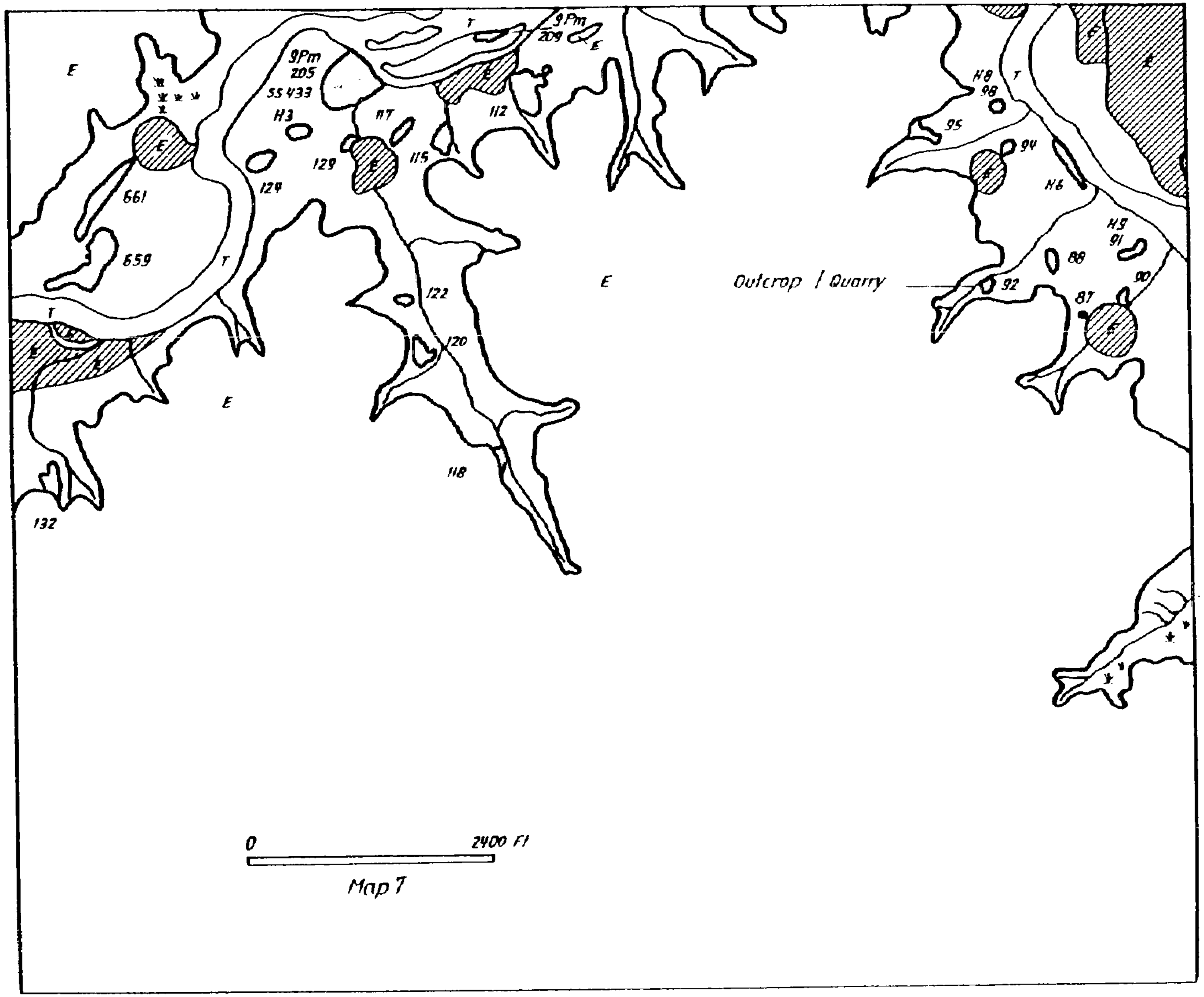
Map 2


E
49
E
4
5
22
688
685
692
20
30
T
695
E
E
E
9 Mn 103
E
E
E
9 Pm 215
0
2400 Ft.

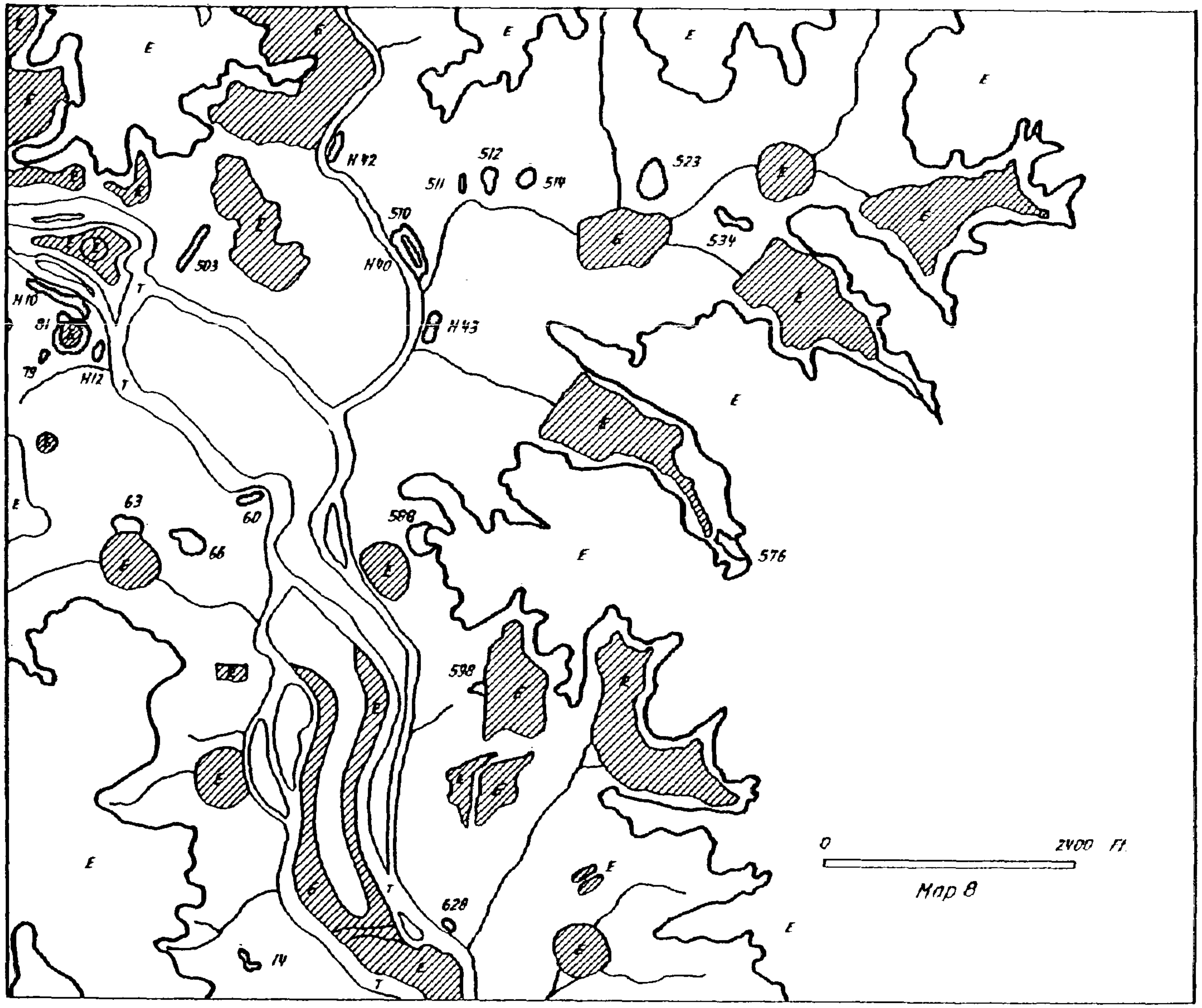
Map 3

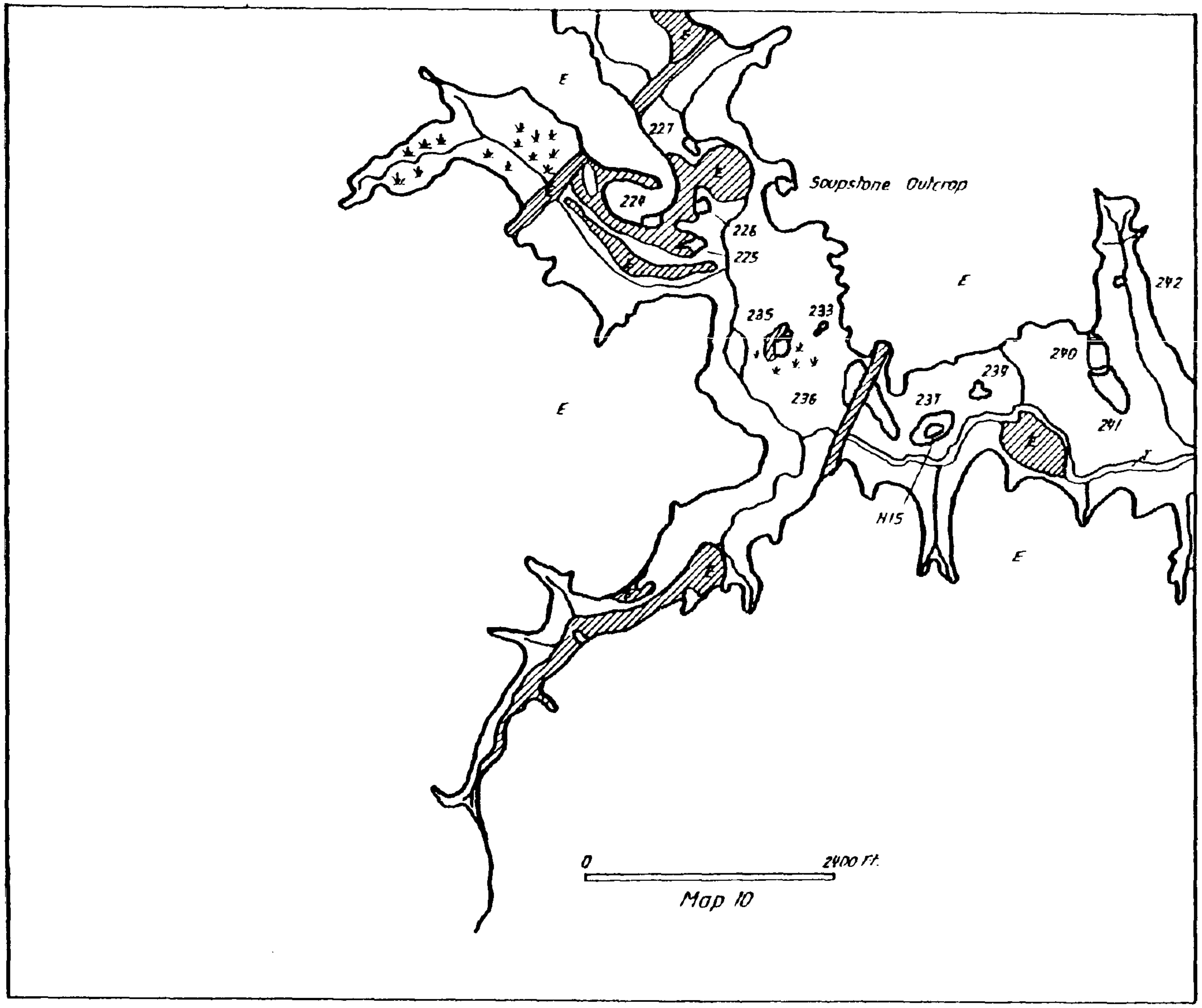


Map 6

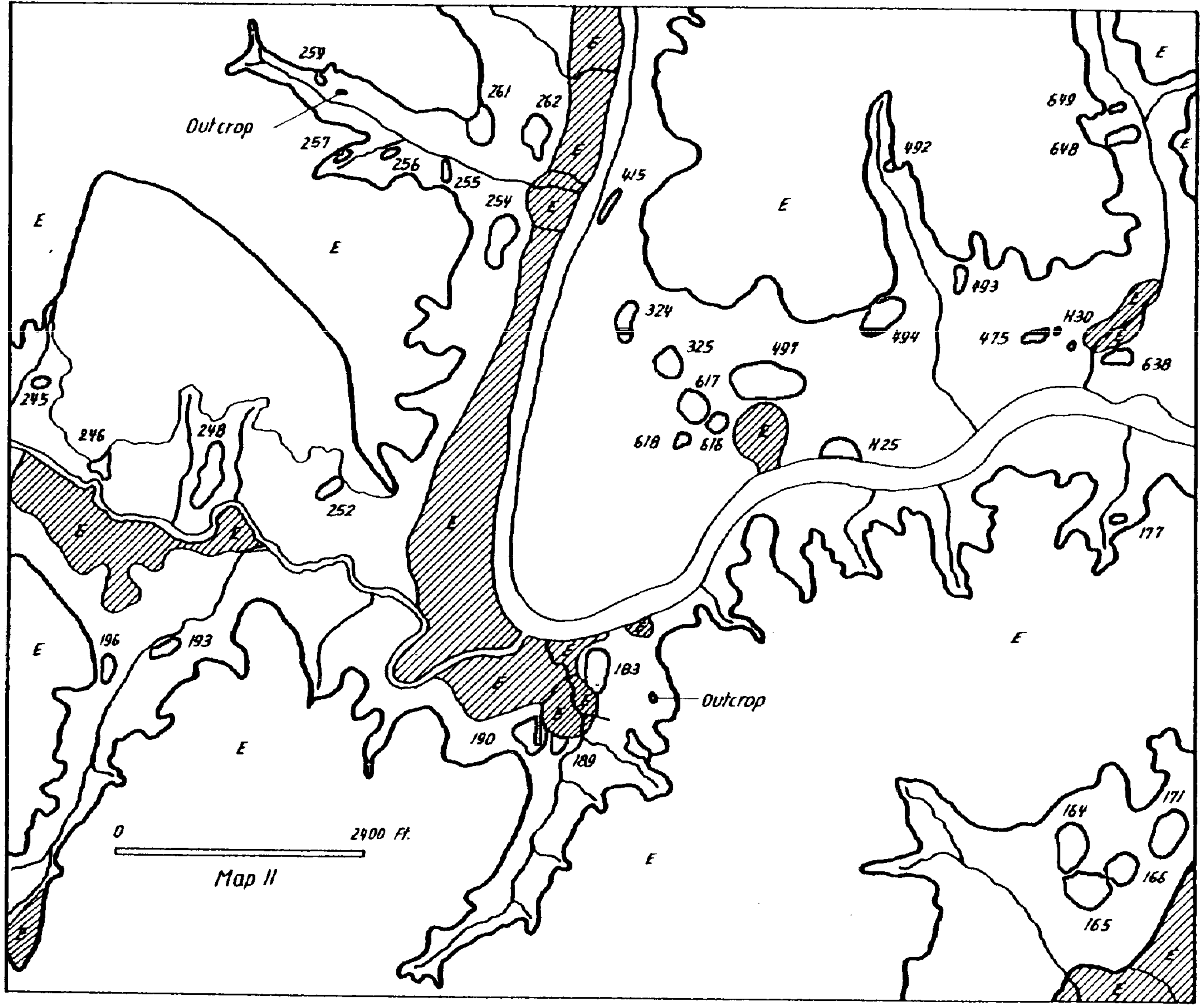

E
9Pm
205
SS 433
H3
117
115
112
9Pm
209
T
124
129
661
659
T
E
122
120
118
132
Outcrop / Quarry
H8
98
95
94
H6
H9
91
88
92
87
90
0
2400 Ft

Map 7

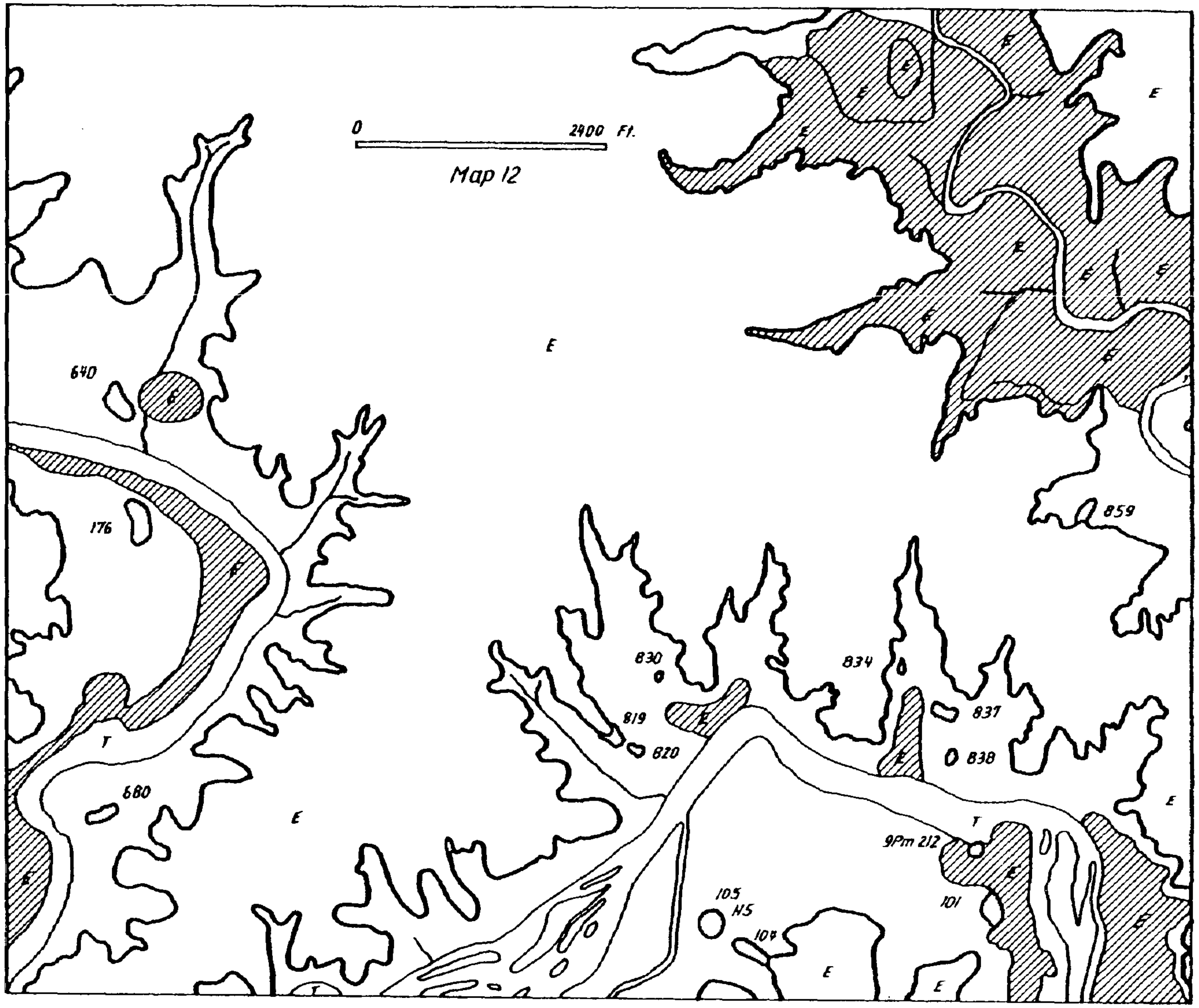
H42
511
512
514
523
534
510
H40
503
H43
H10
81
79
H12
T
63
60
66
588
576
598
628
14
E
G
0
2400 Ft.
Map 8


E
227
Soapstone Outcrop
224
226
225
235
233
236
E
237
239
240
241
242
H15
E
E
0
2400 Ft.

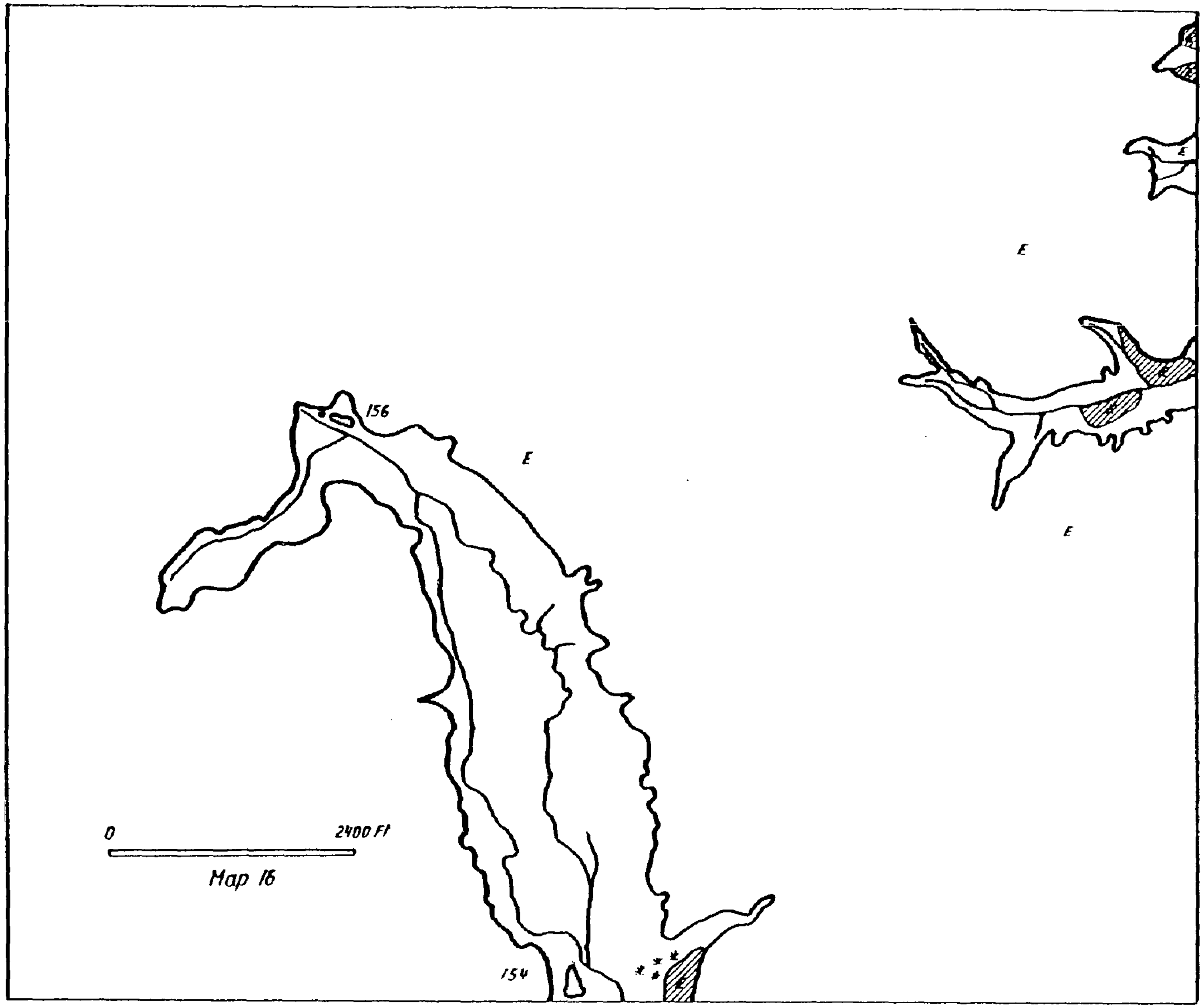
Map 10


259
Outcrop
261
262
257
256
255
254
415
492
649
648
E
493
430
475
638
324
325
491
494
617
618
616
425
177
252
248
245
246
196
193
183
Outcrop
190
189
0
2400 Ft.
164
171
166
165

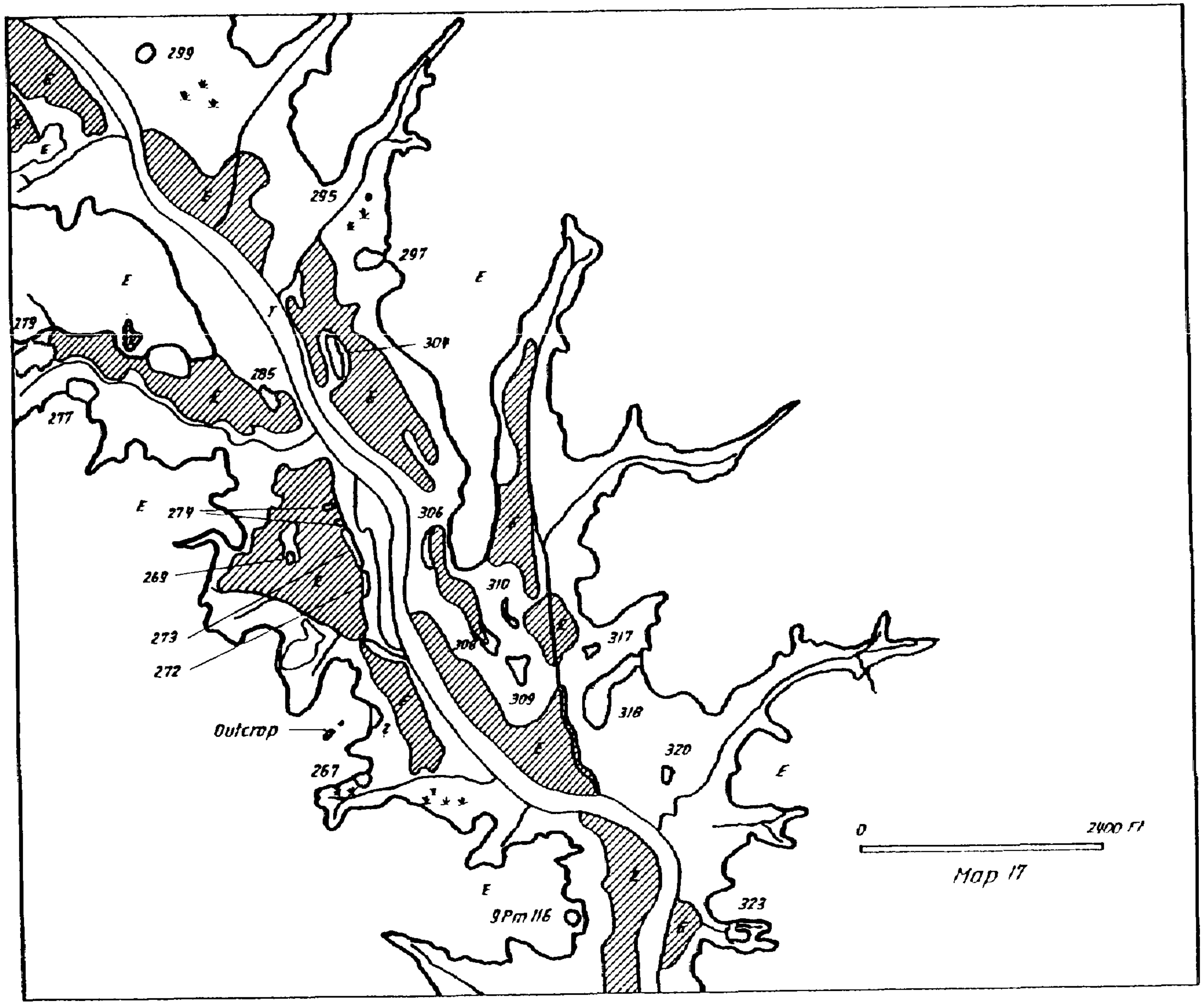
Map II


0
2400 Ft.
Map 12
E
E
E
E
E
E
E
E
E
E
E
E
E
E
E
E
E
T
T
T
640
176
680
859
830
834
837
838
819
820
9Pm 212
101
105
HS
104


0
2400 Ft.
Map 13
720
E
732
E
9Be 106
750
753
768
E
E
E
E
E
536
537
542
813
815
808
823
825
E
E
E
E
E
E

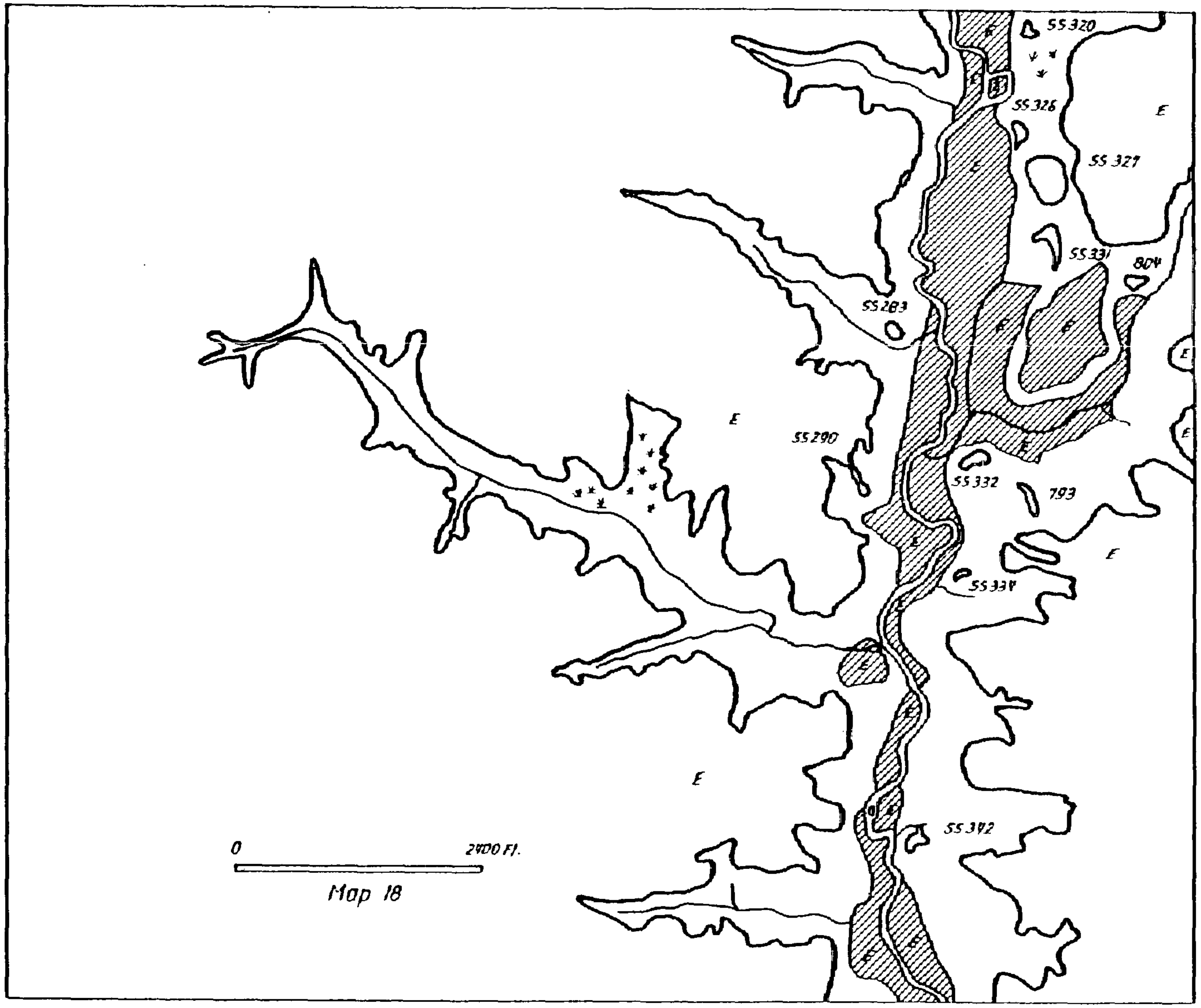


Map 16



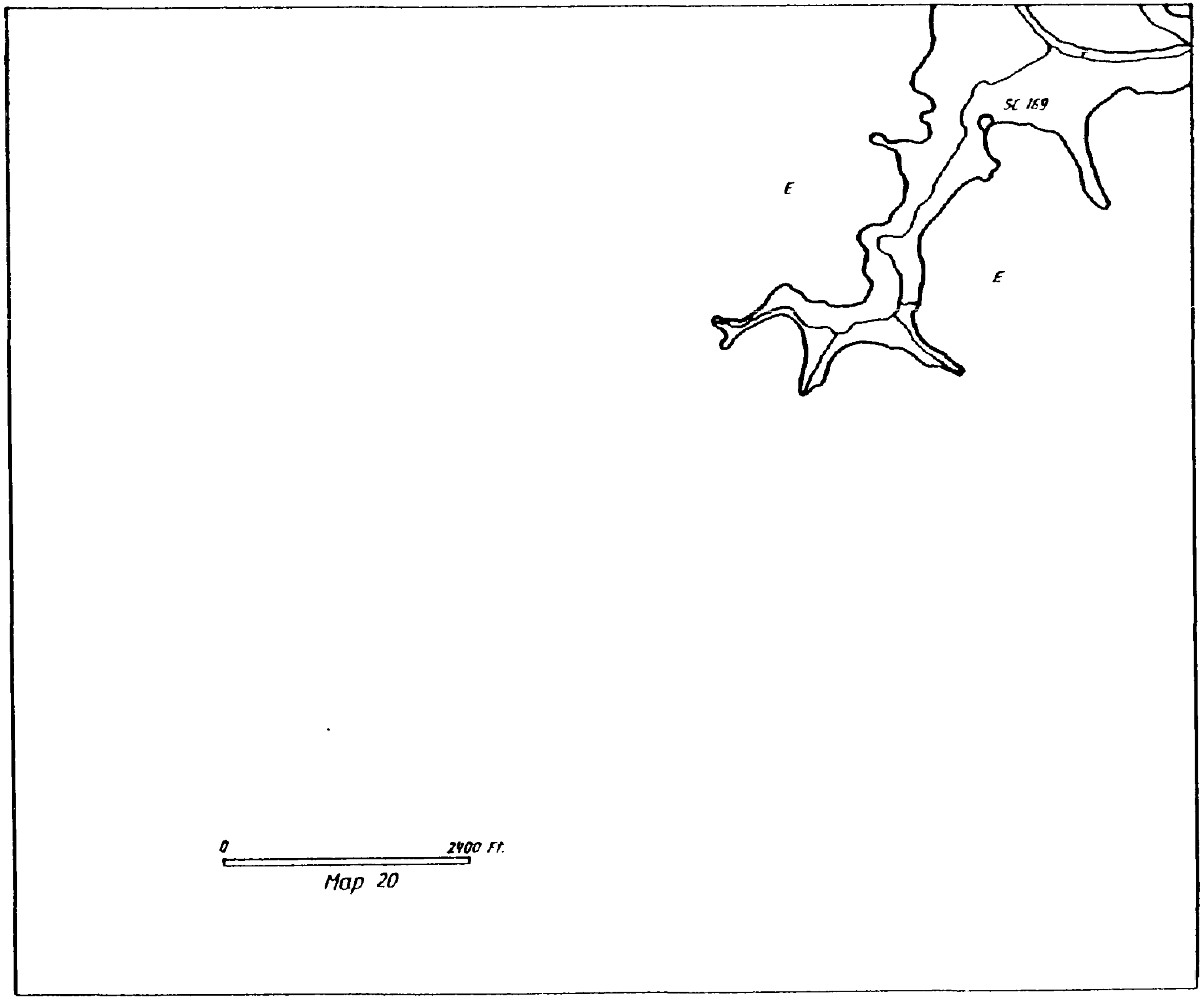
Map 17

299
295
297
E
304
279
285
277
T
E
274
306
268
310
273
308
317
272
309
318
Outcrop
320
267
E
0
2400 FT
E
9Pm116
323

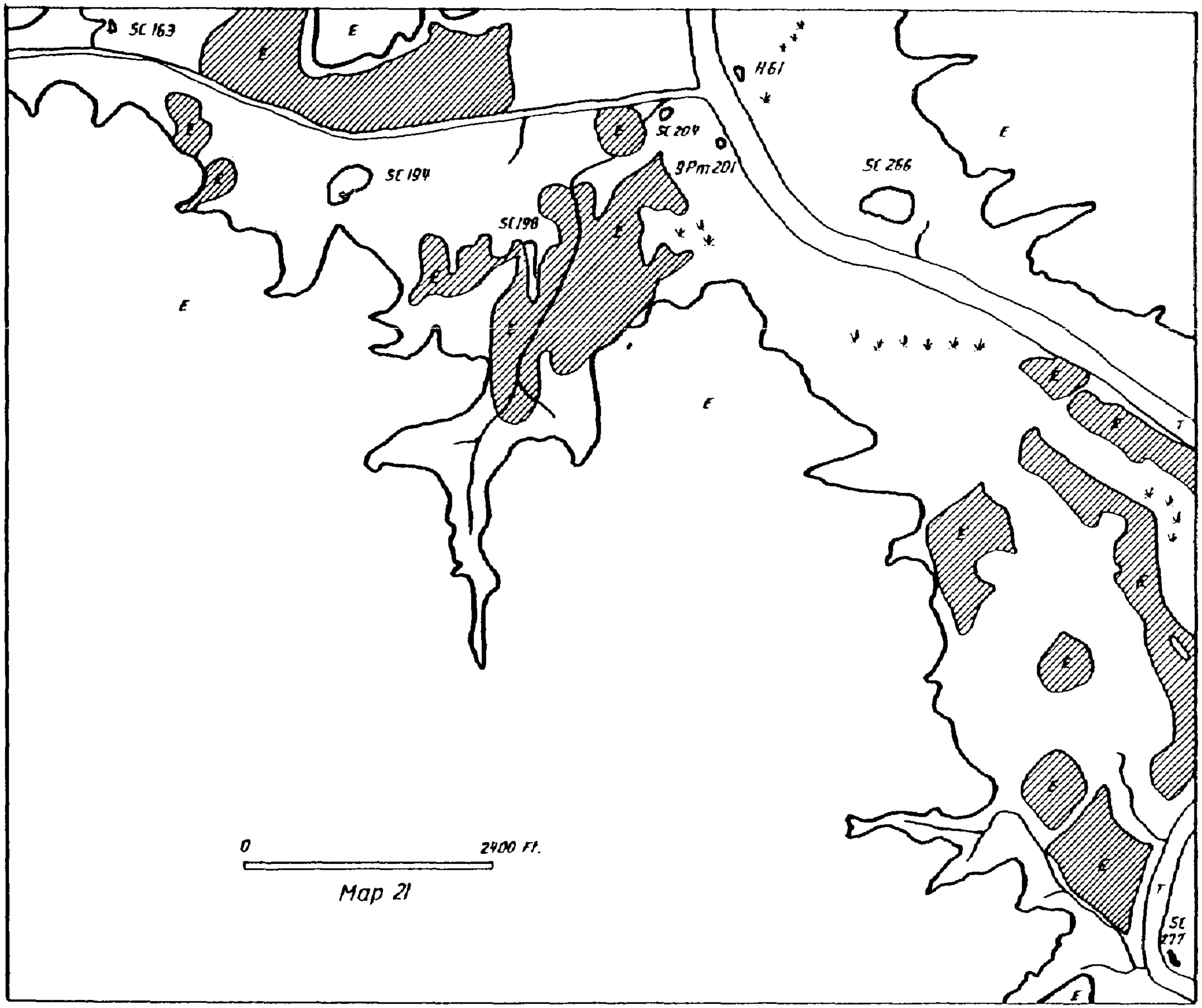

SS 320
SS 326
E
SS 327
SS 331
804
SS 283
E
E
SS 290
SS 332
793
E
SS 334
E
SS 342
0
2400 Ft.

Map 18

Map 19



Map 20



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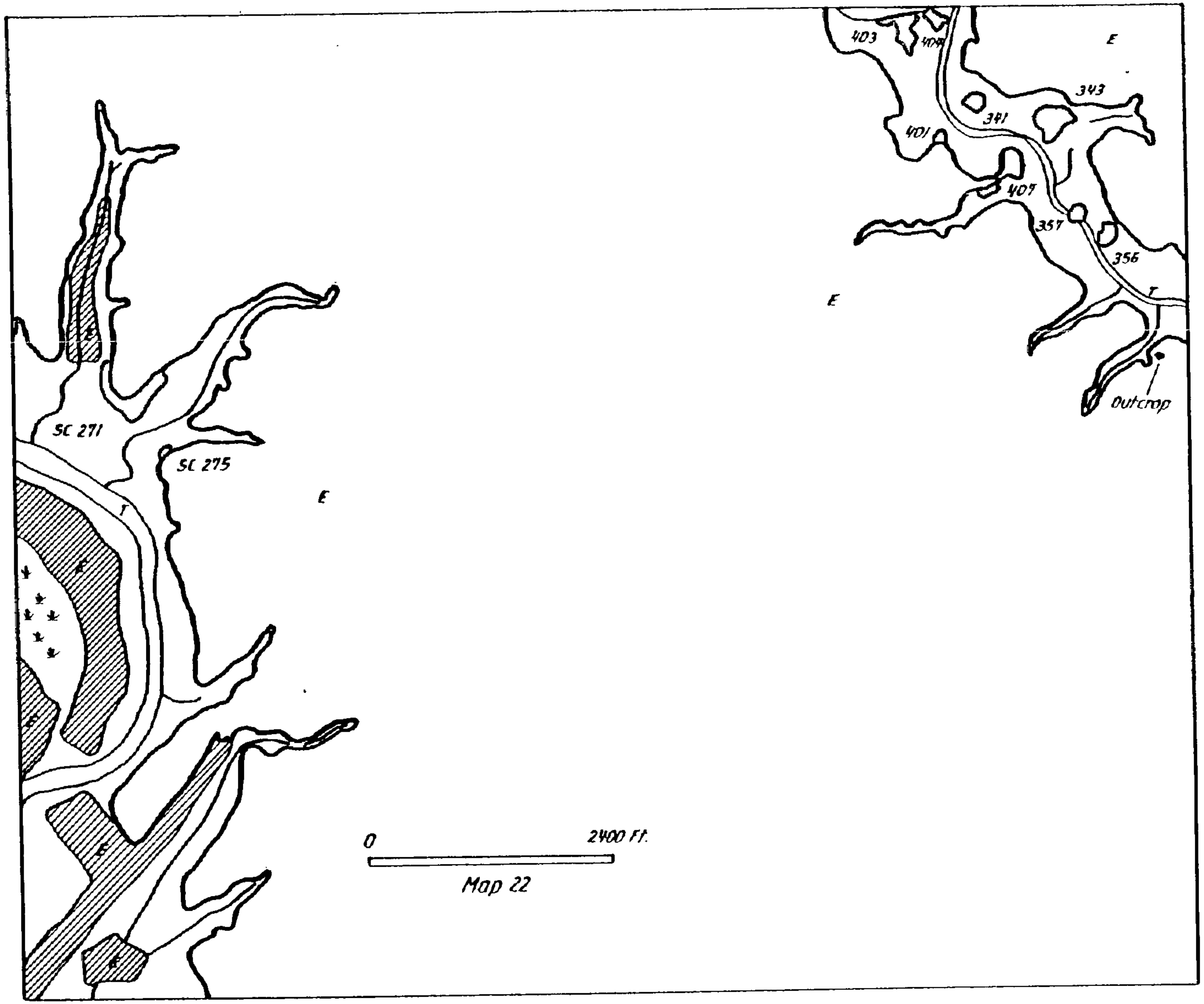
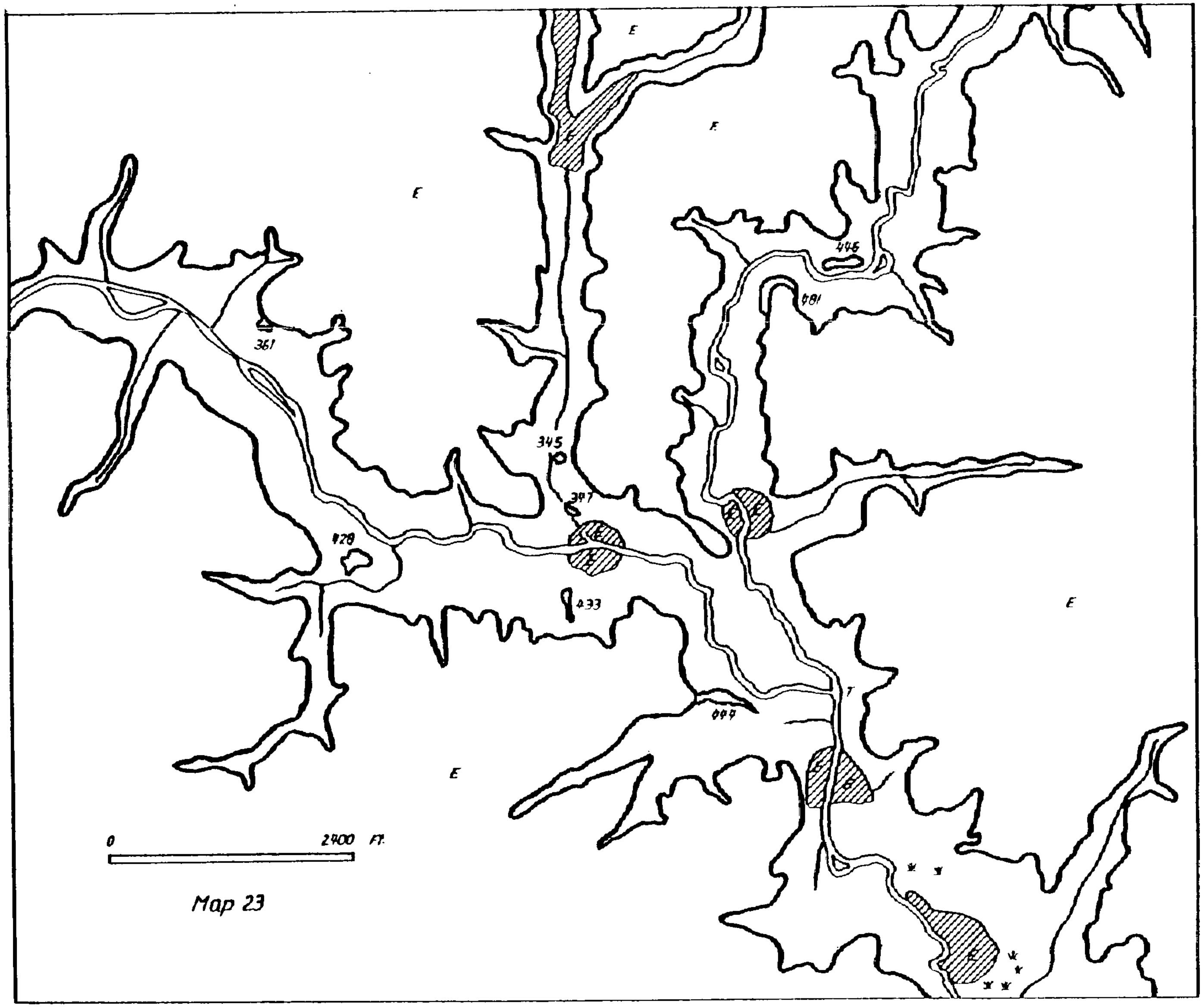

403
404
401
341
343
407
357
356
T
E
E
Outcrop
SC 271
SC 275
T
E
E
E
E
E
0
2400 Ft.

Map 22



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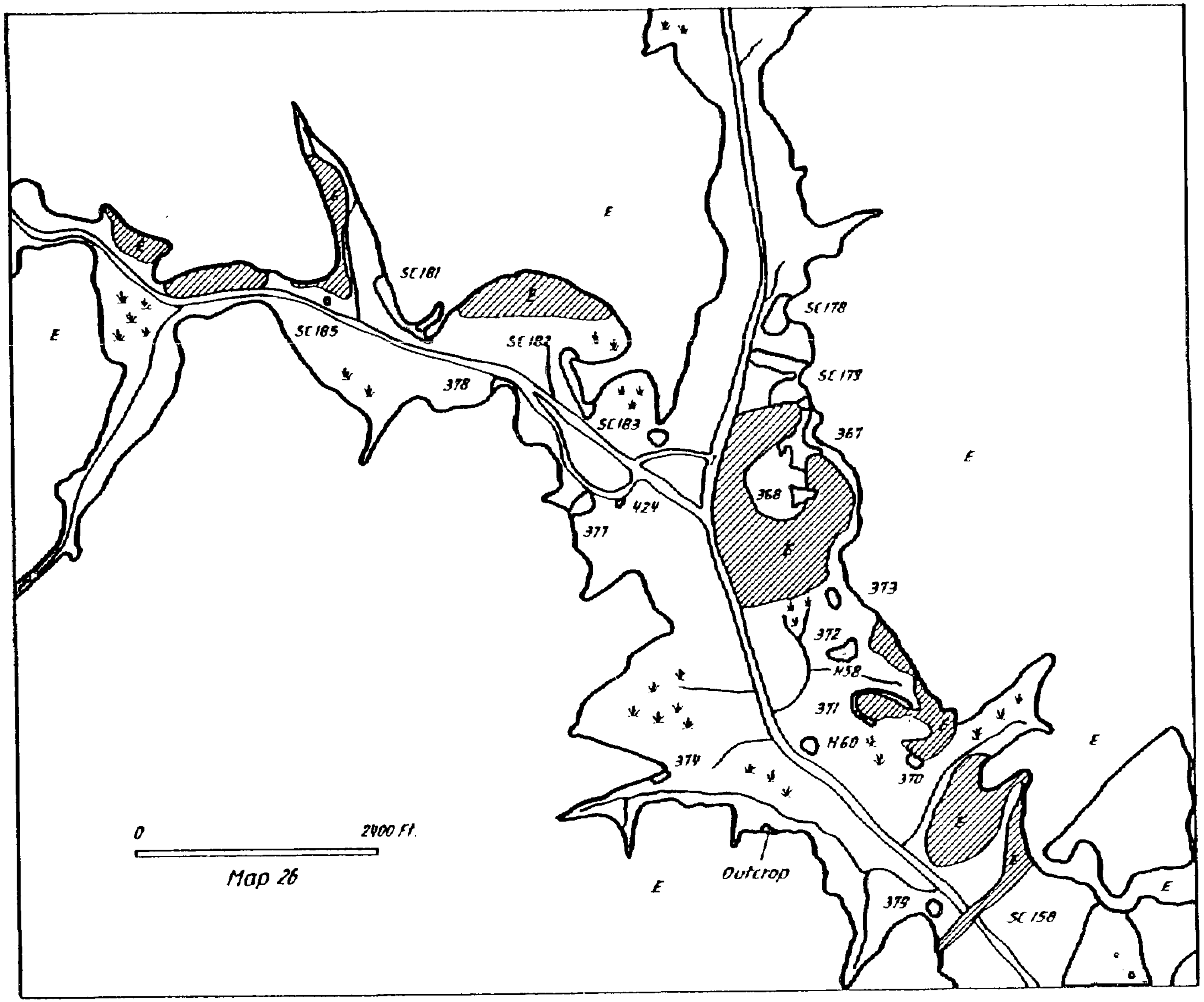
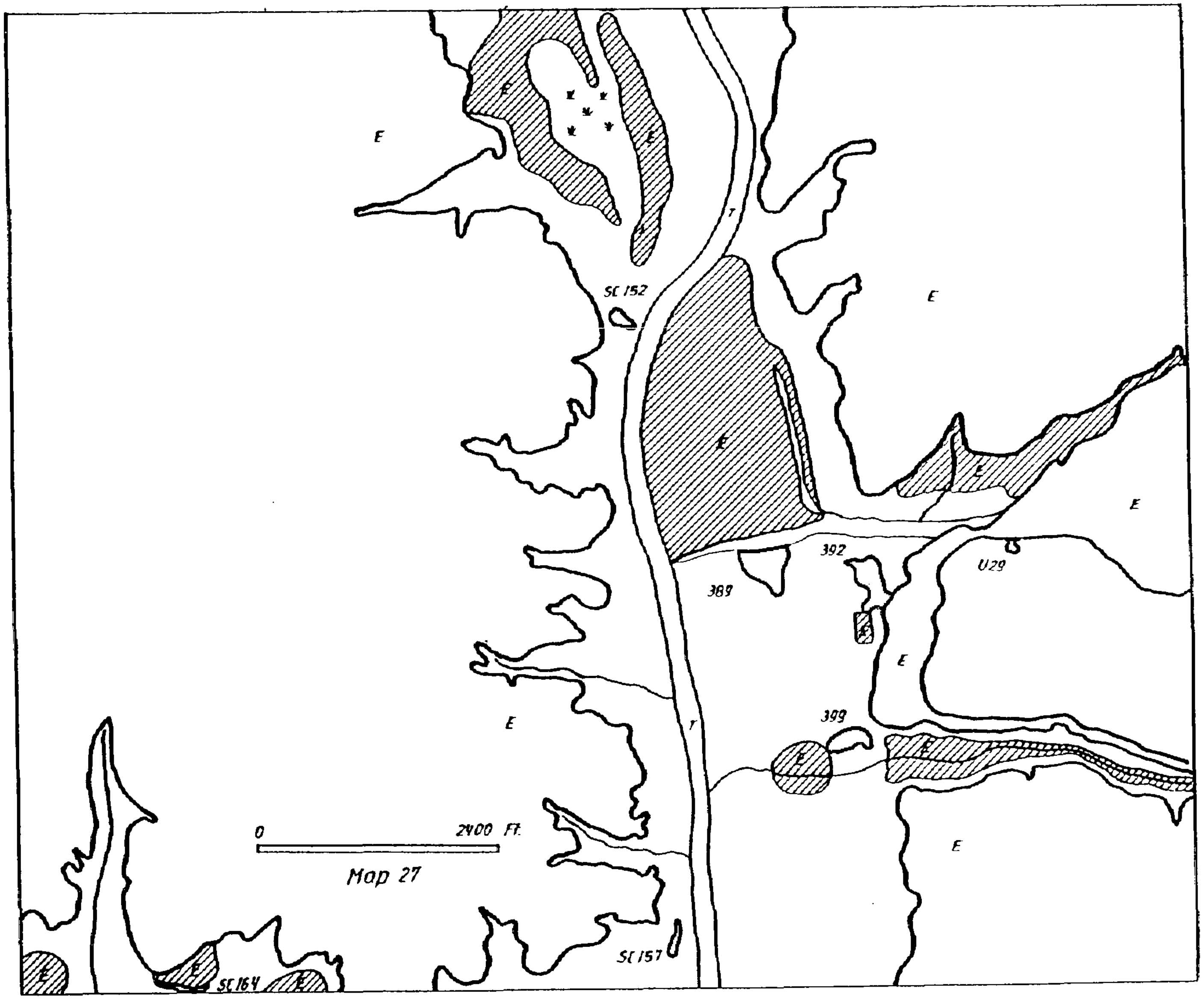


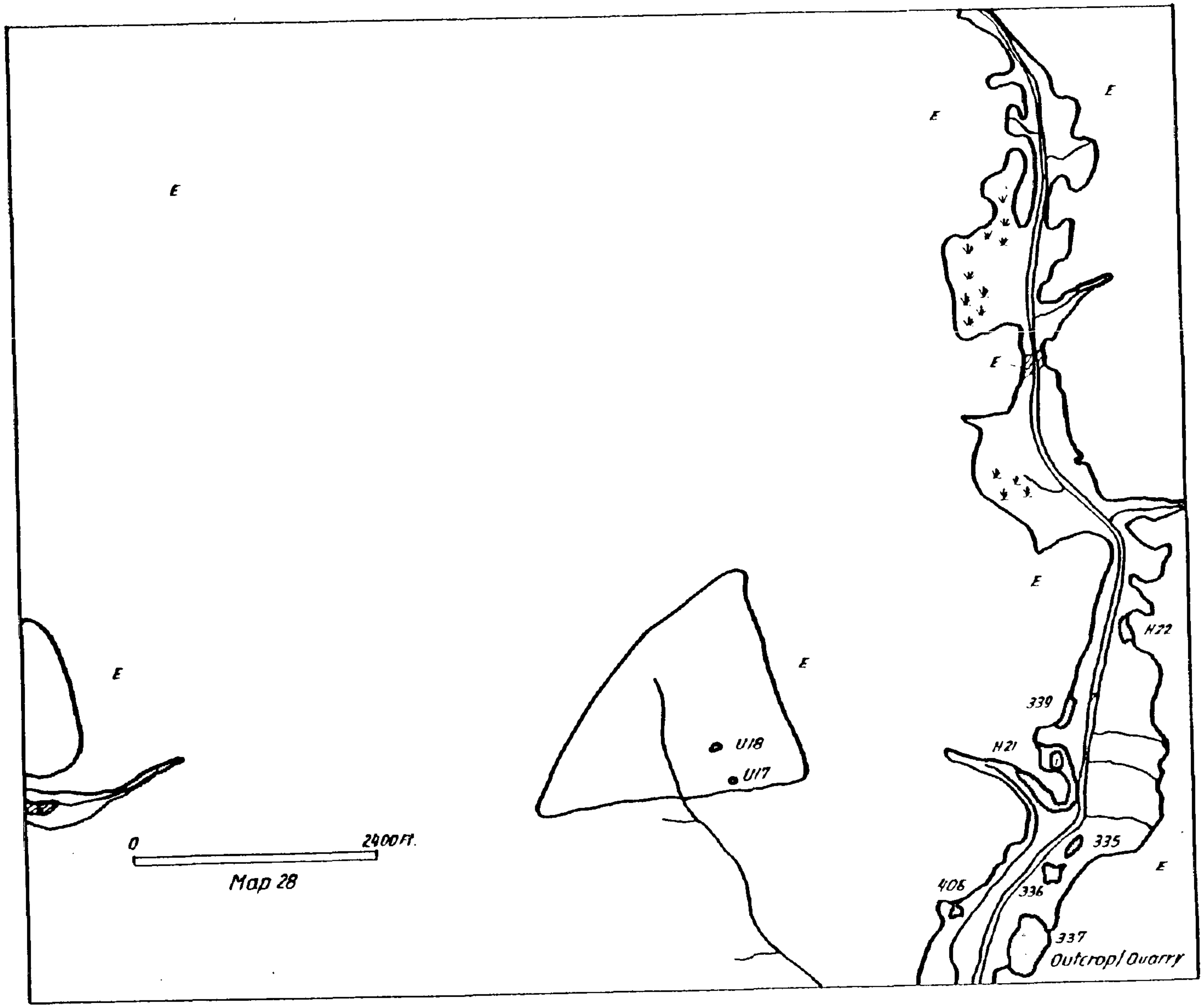
Map 26

E
SC 181
SC 178
SC 179
SC 185
SC 182
378
SC 183
367
E
368
424
377
E
373
372
H58
371
H60
374
370
E
0
2400 Ft.
Outcrop
E
379
E
SC 158
E

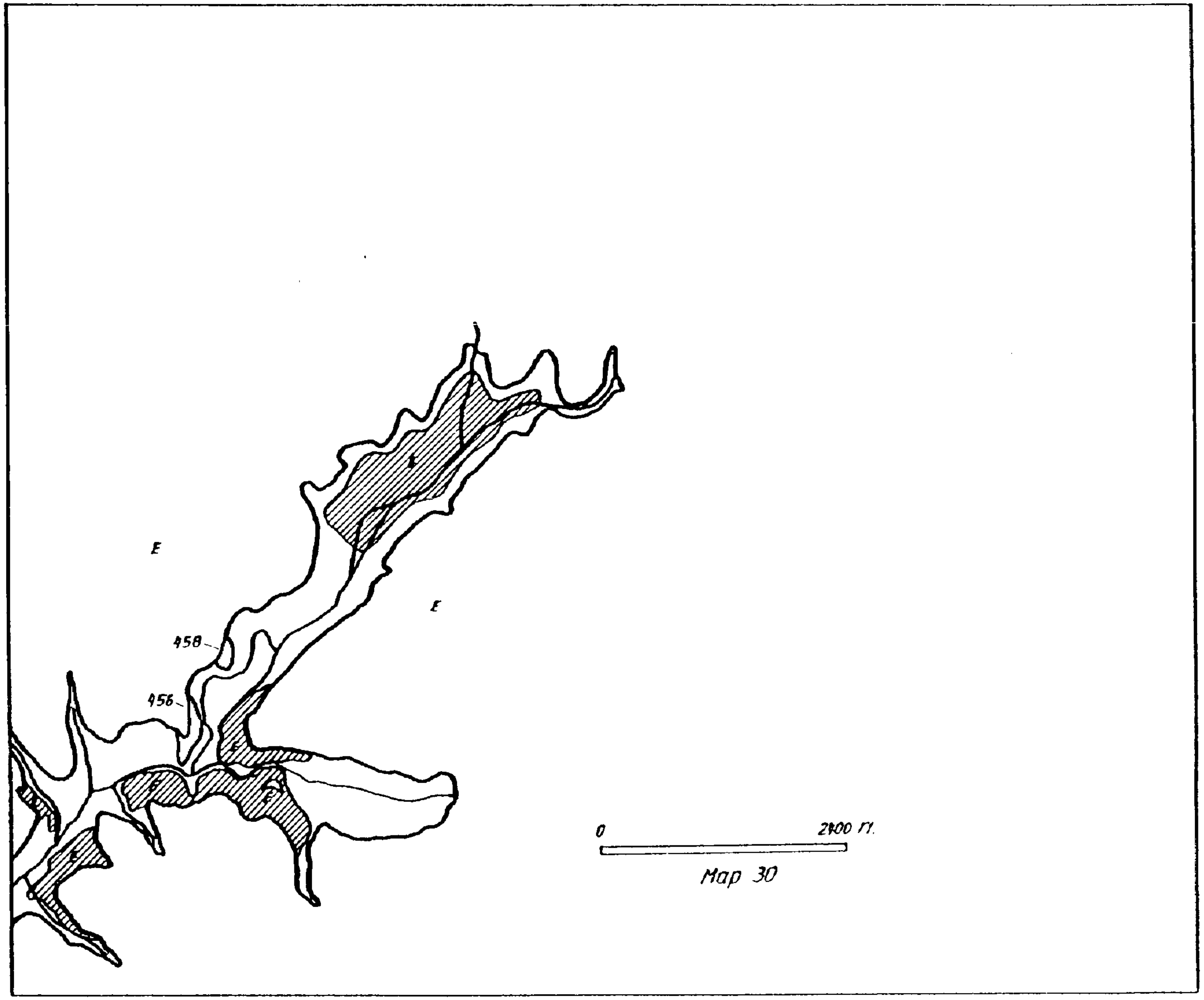


Map 27

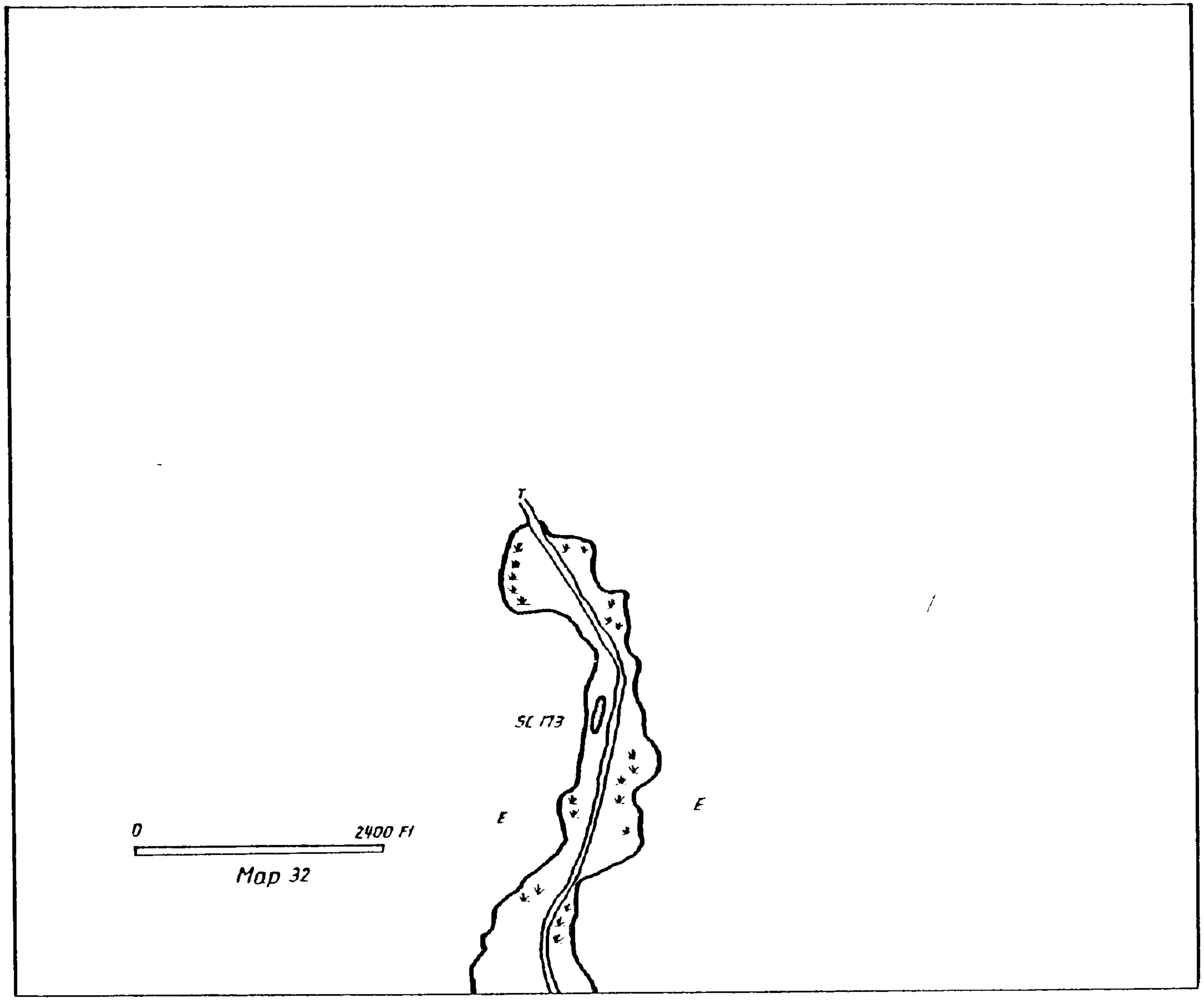
E
E
E
E
E
T
SC 152
E
E
E
392
389
U29
E
E
399
E
E
T
0
2400 FT.
E
SC 157
E
SC 164
E


E
E
E
E
E
E
E
E
E
H22
339
H21
U18
U17
335
E
406
336
337
Outcrop/Quarry
0
2400 Ft.

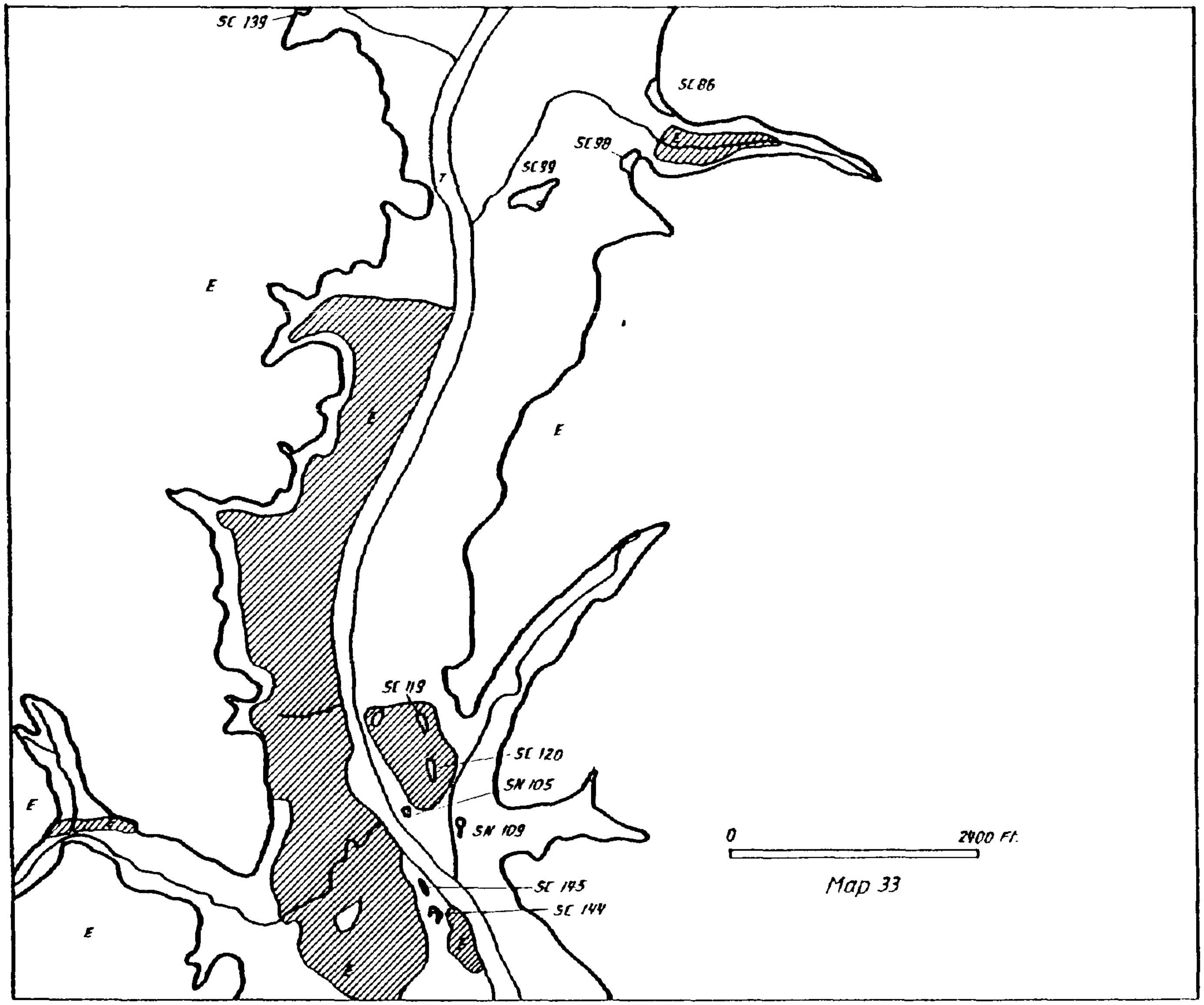
Map 28



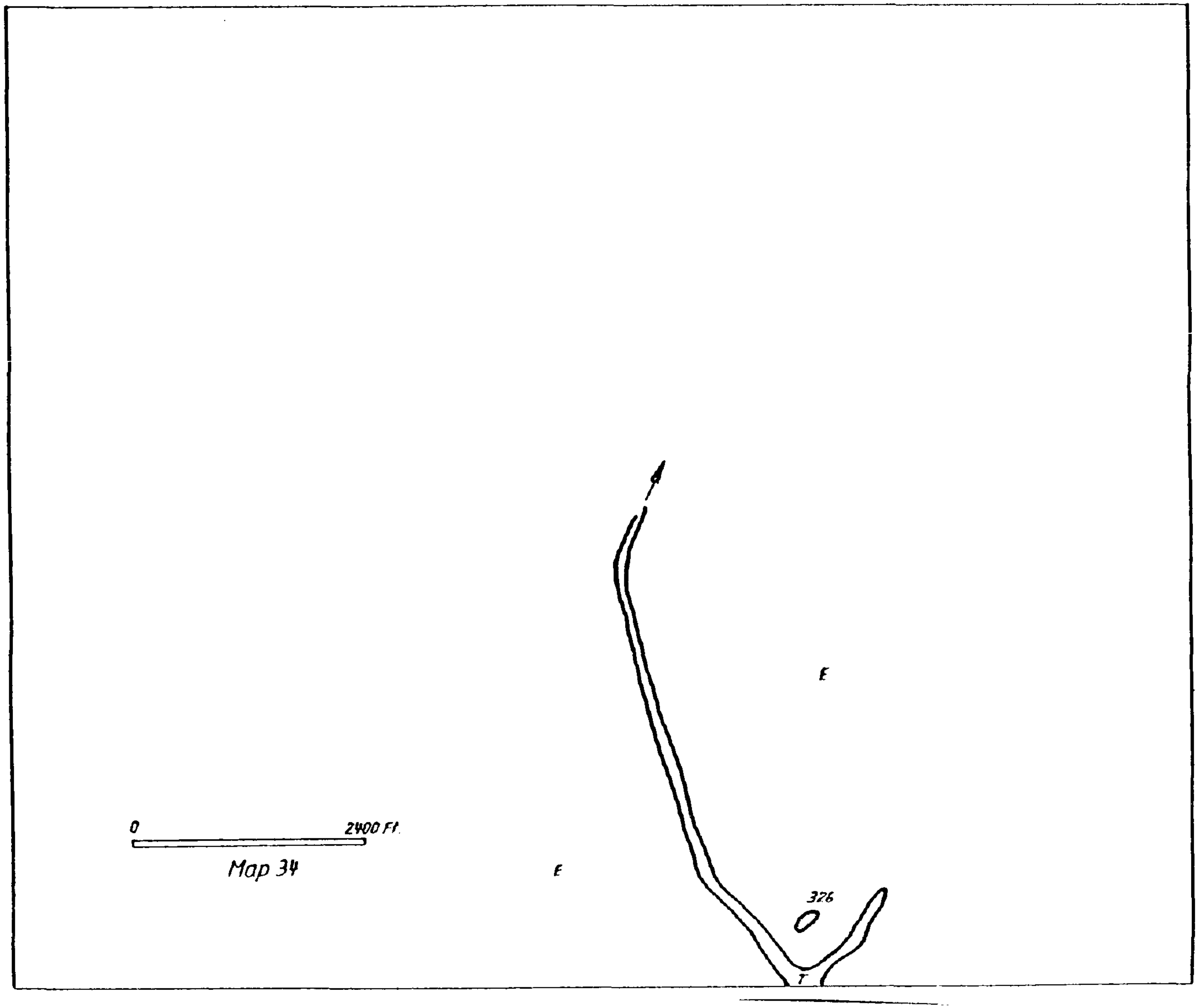
Map 30



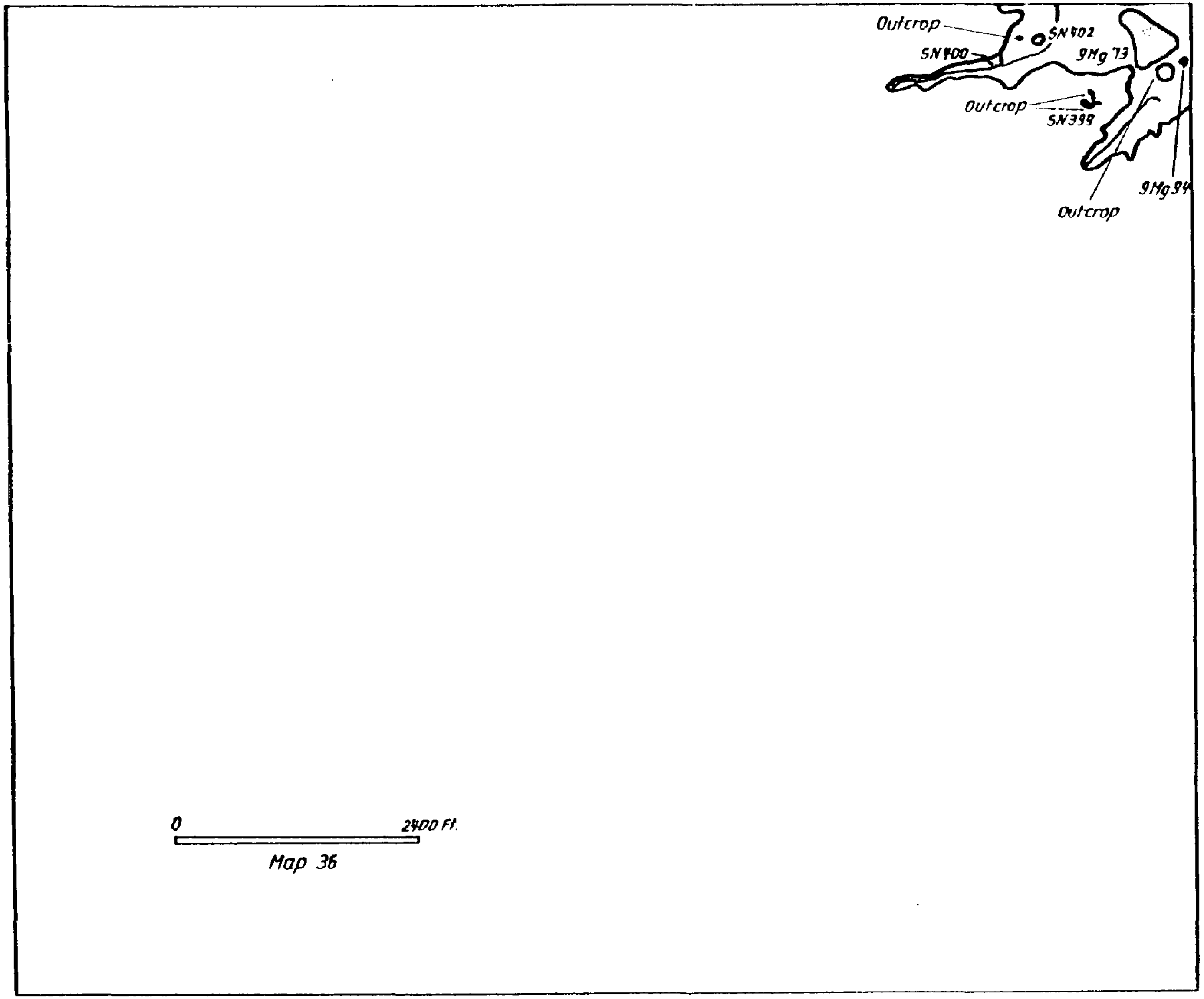
Map 32


SC 139
SC 86
SC 98
SC 99
T
E
E
E
E
E
E
SC 119
SC 120
SN 105
SN 109
SC 145
SC 144
0
2400 Ft.

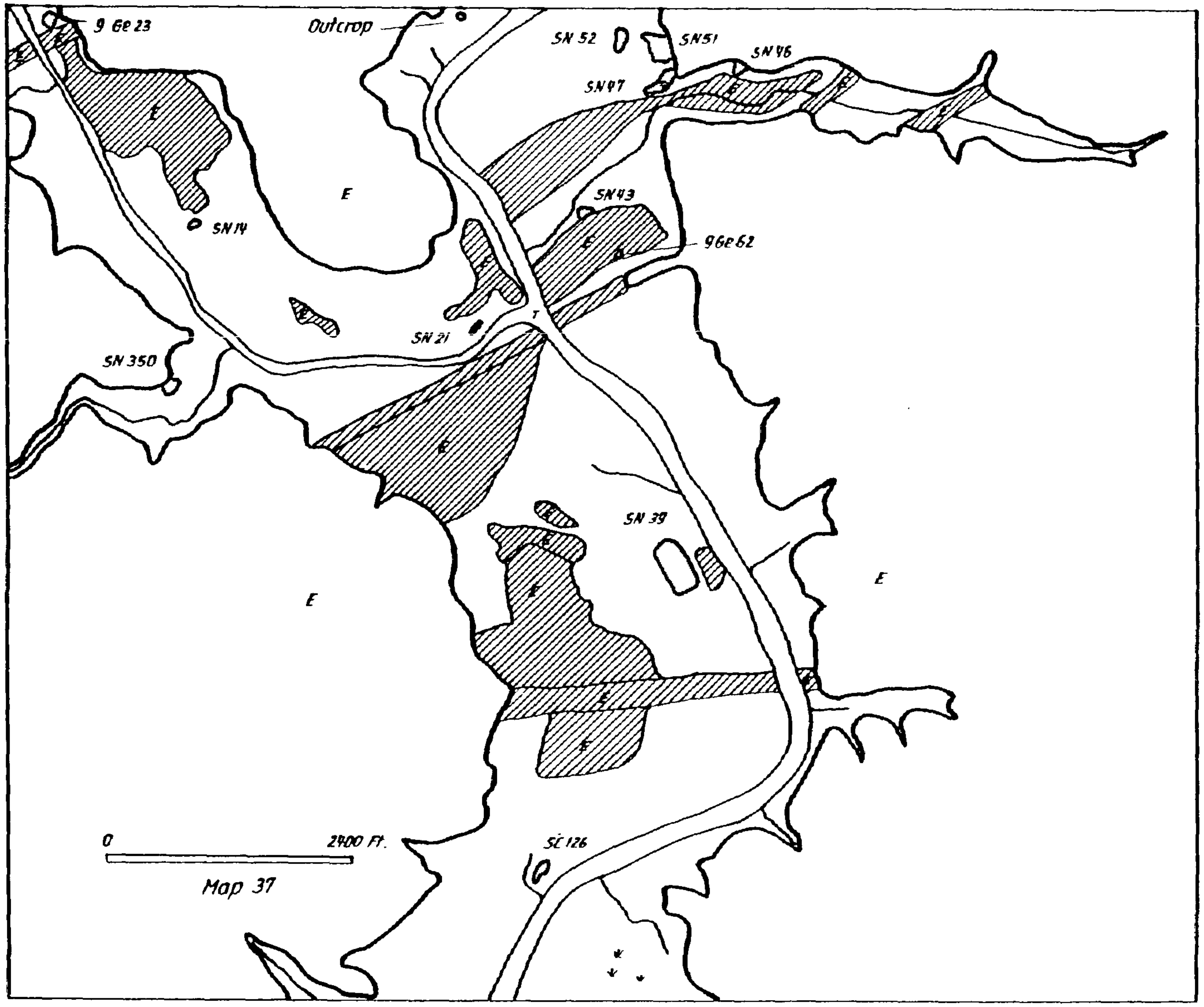
Map 33



Map 34


Outcrop
SN402
SN400
9Mg 73
Outcrop
SN399
9Mg 94
Outcrop
0
2400 Ft.

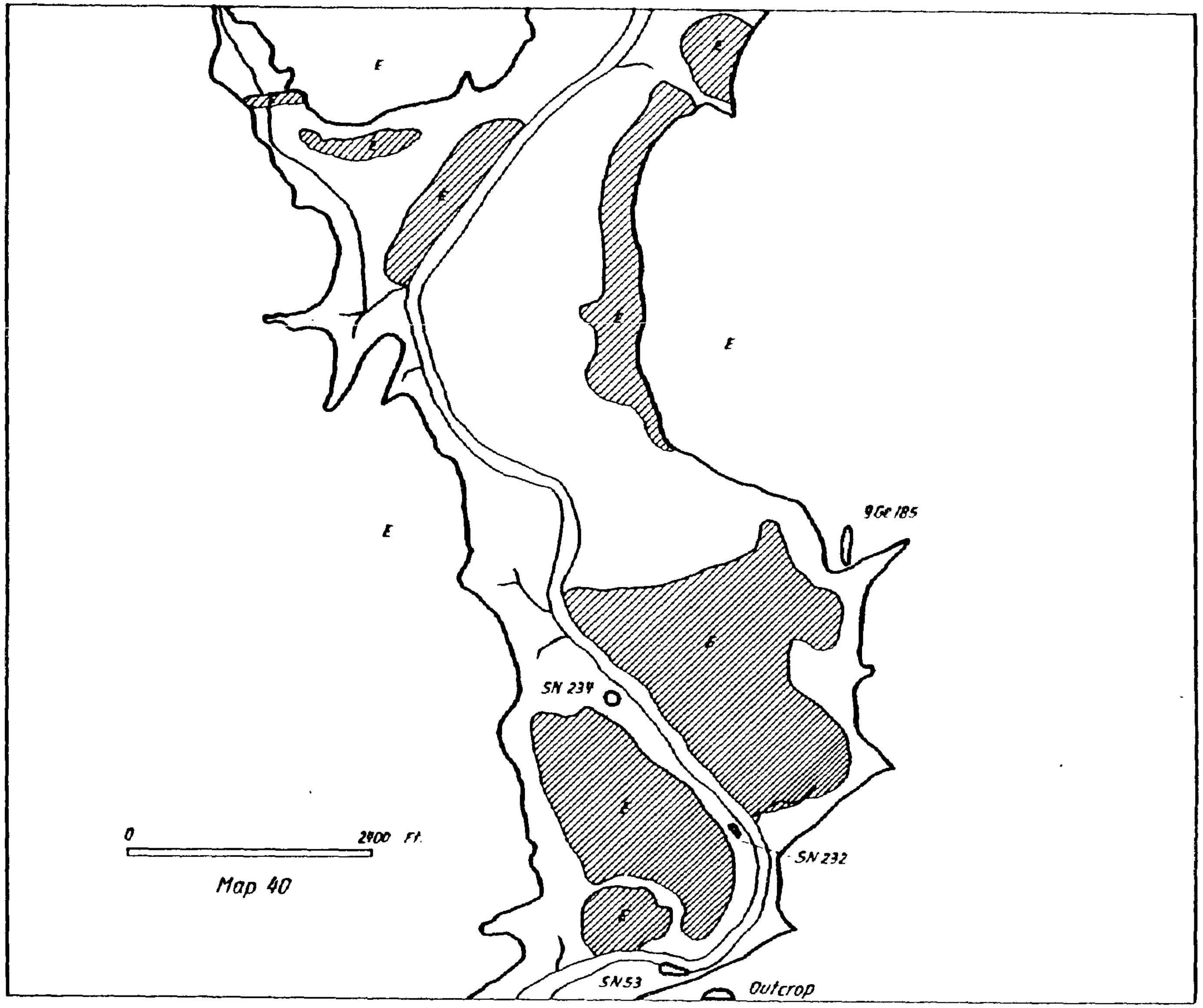
Map 36


9 Ge 23
Outcrop
SN 52
SN51
SN46
SN47
E
SN43
9Ge62
SN14
T
SN 21
SN 350
SN 39
E
SC 126
0
2400 Ft.

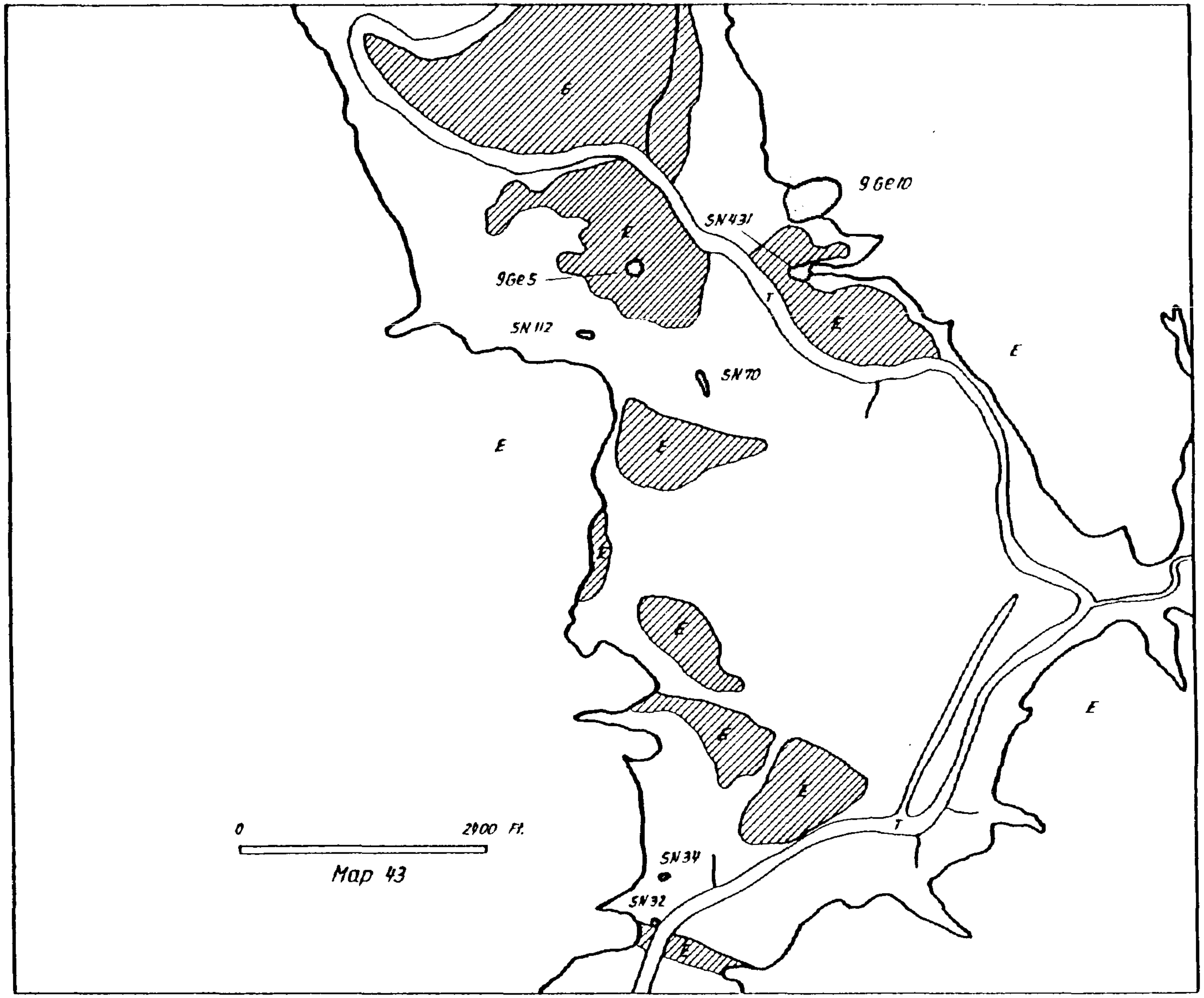
Map 37


SN 425
E
SN 410
E
SN25
SN24
SN10
E
SN9
SN11
SN22
E
SN405
SN403
SN 397
SN 396
SN407
SN 412
S.N.5
E
E
SN392
0
2400 Ft.

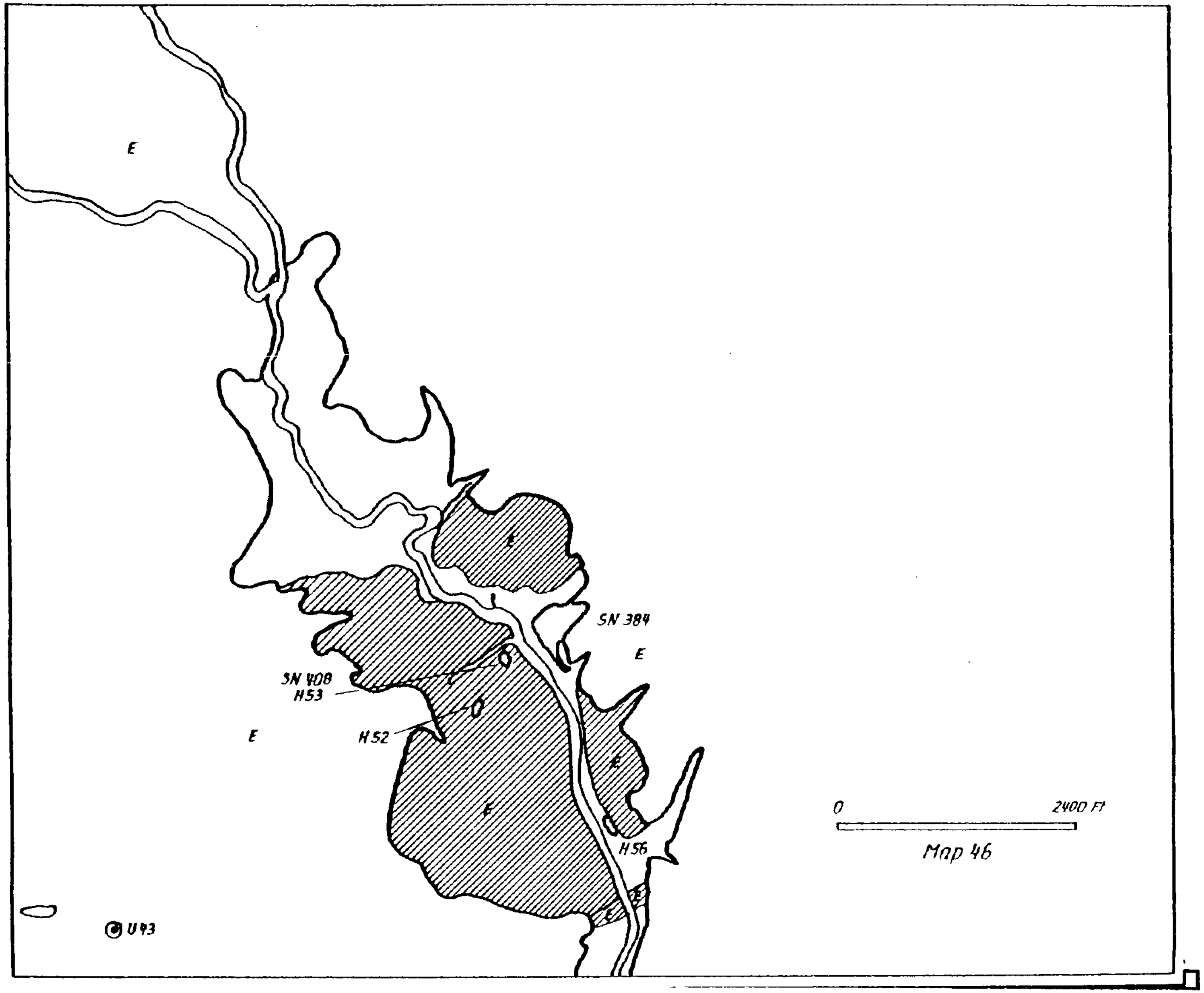
Map 39



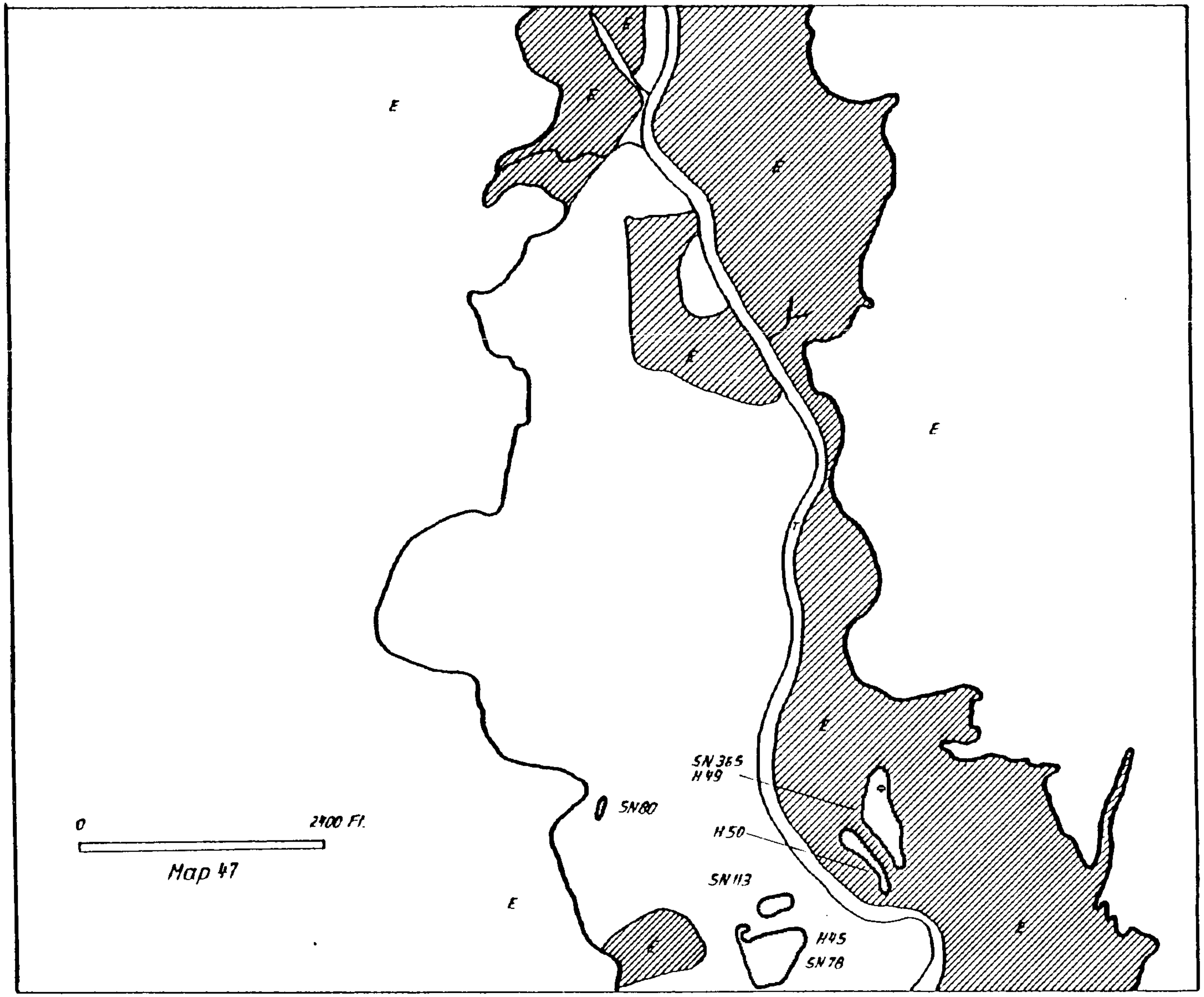
Map 40



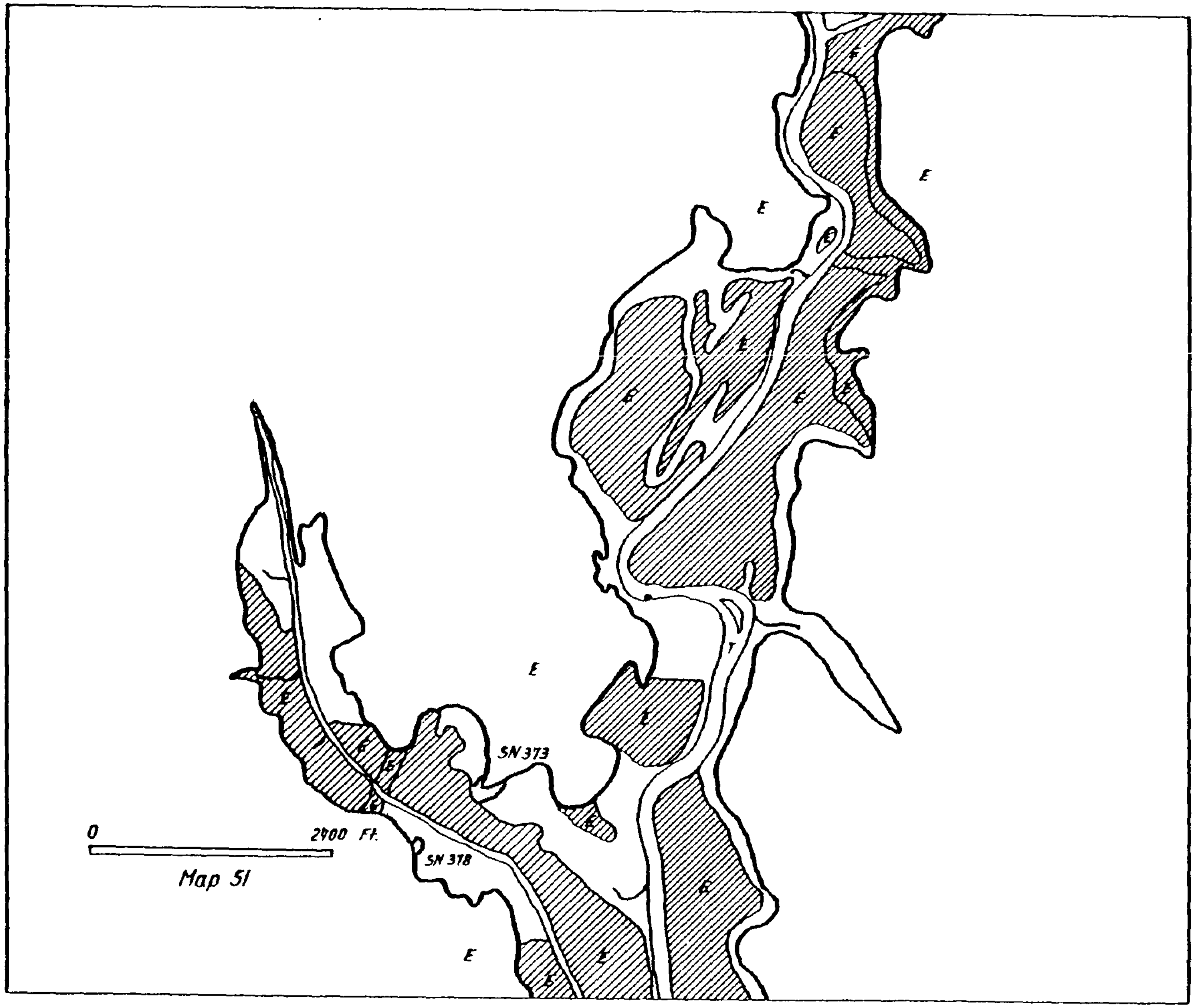
Map 43



Map 46



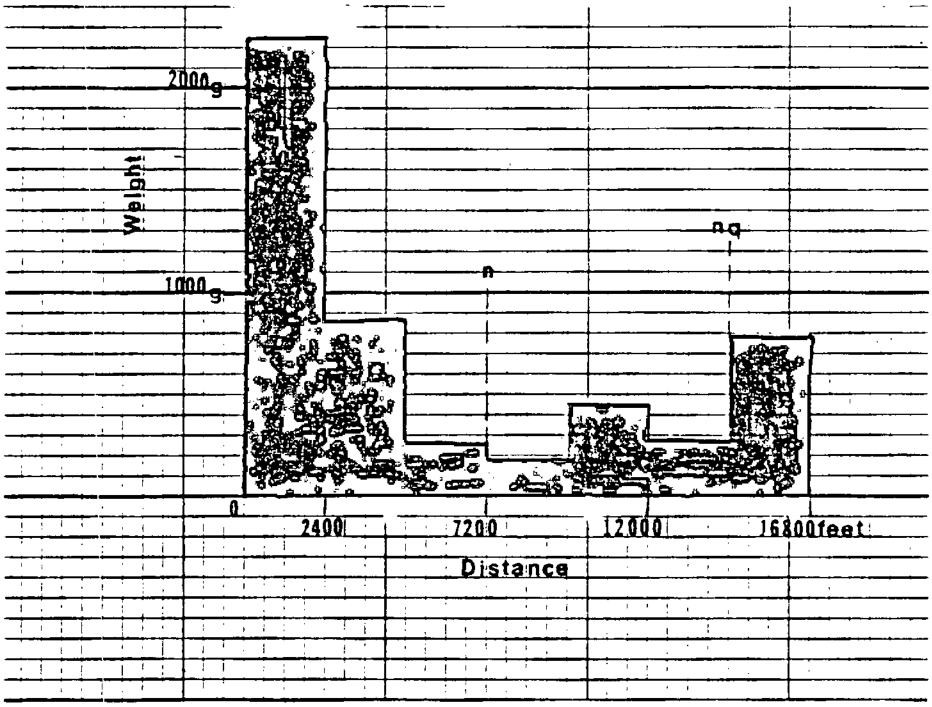
Map 47



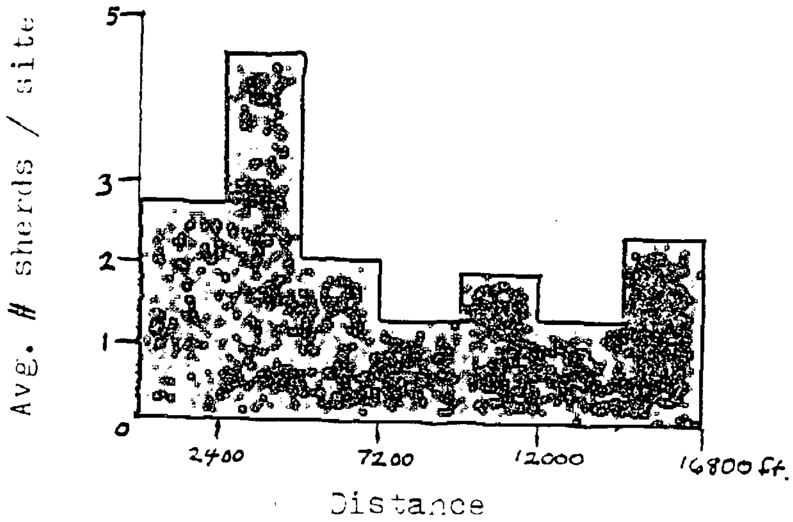
Map 51

APPENDIX B

FALL-OFF GRAPHS



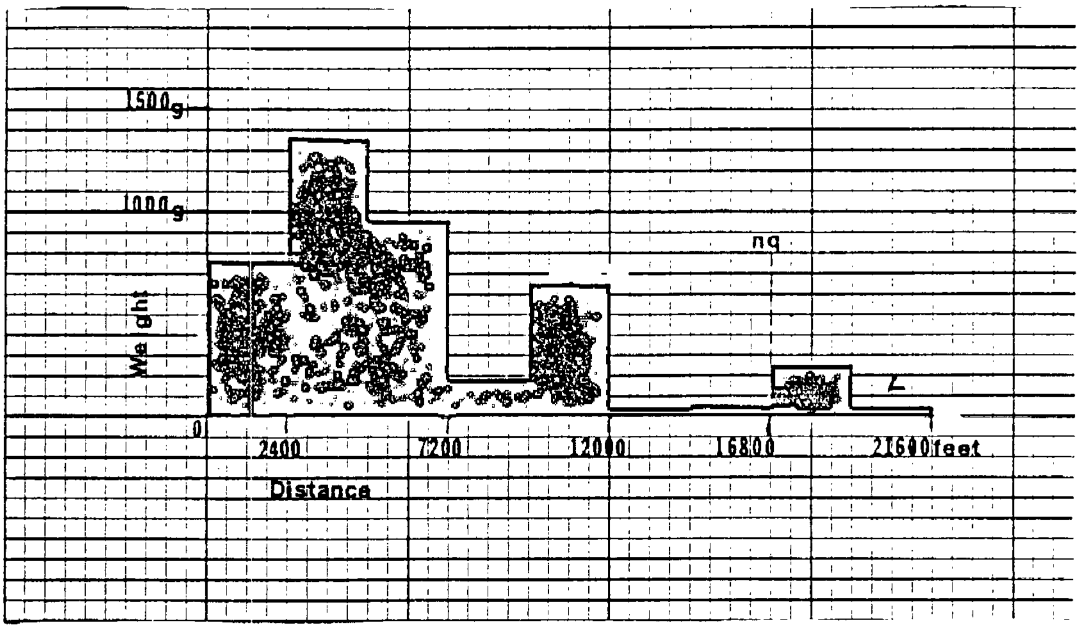
PLOT OF THE SOAPSTONE
WEIGHT / DISTANCE RELATIONSHIP
FOR THE SOAPSTONE QUARRY LOCATED ON
MAP 7, GRID SQUARE 2



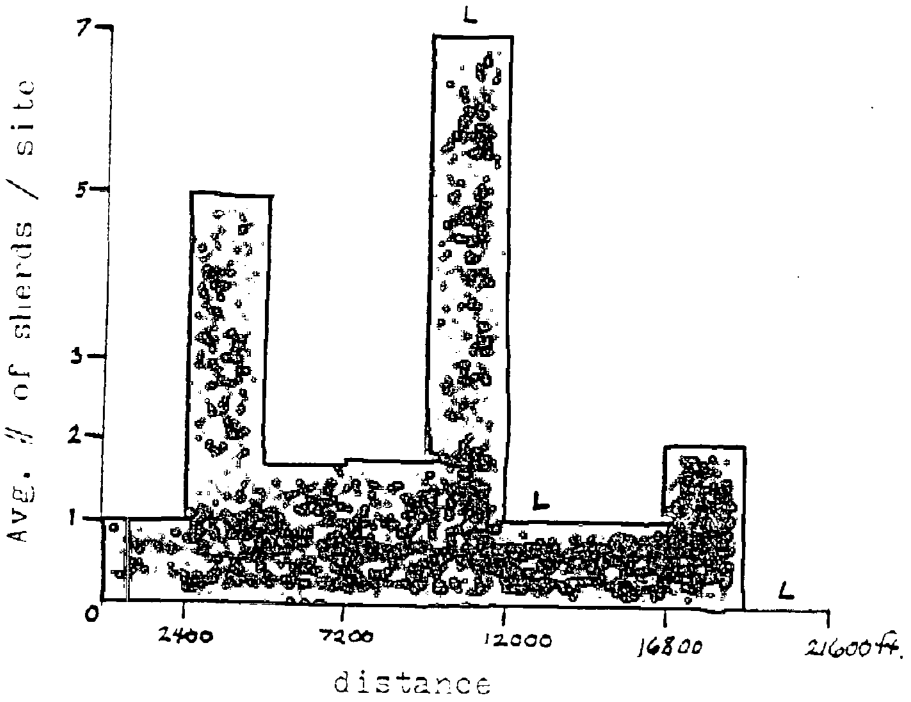
SOAPSTONE SHERD FALL-OFF FROM

THE SOAPSTONE QUARRY LOCATED ON

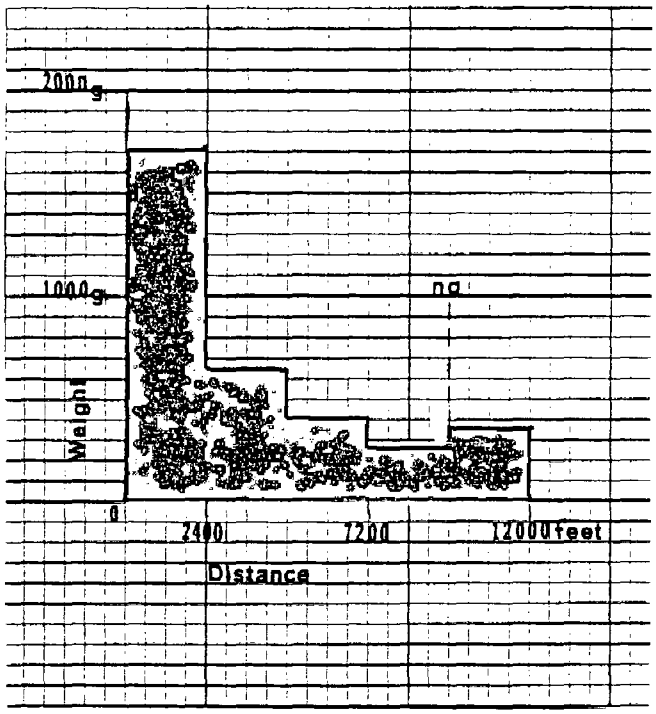
MAP 7, GRID SQUARE 2



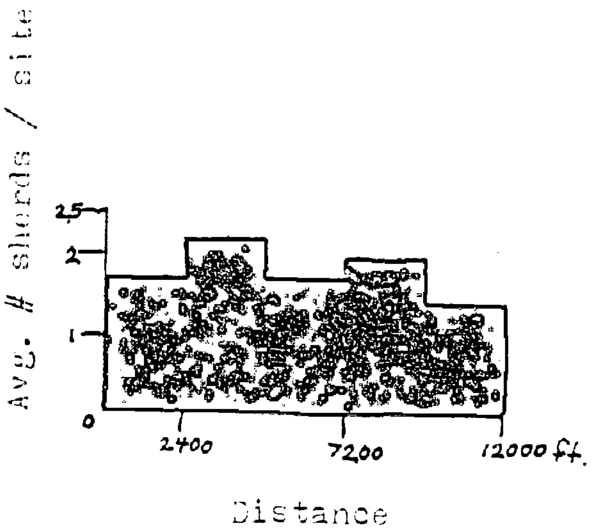
PLOT OF THE SOAPSTONE
WEIGHT / DISTANCE RELATIONSHIP
FOR THE SOAPSTONE OUTCROPS LOCATED
ON MAP 36, GRID SQUARE 2



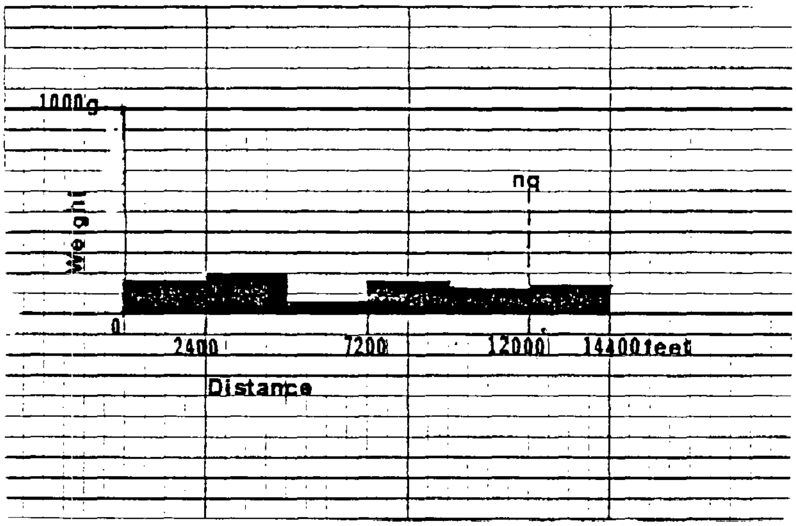
SOAPSTONE SHERD FALL-OFF FROM
THE CLUSTER OF SOAPSTONE OUTCROPS
LOCATED ON MAP 36, GRID SQUARE 2



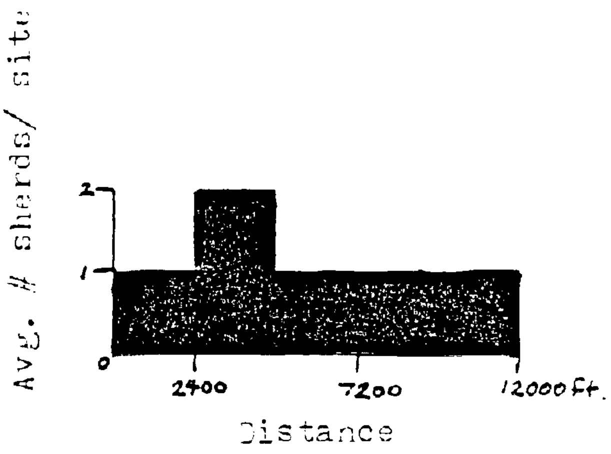
PLOT OF THE SOAPSTONE
WEIGHT / DISTANCE RELATIONSHIP
FOR THE SOAPSTONE OUTCROP LOCATED
ON MAP 11, GRID SQUARE 1



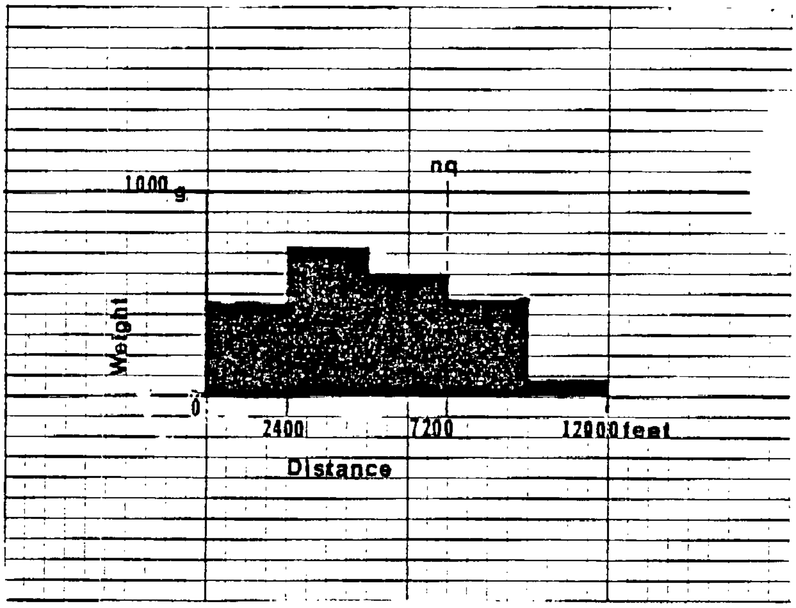
SOAPSTONE SHERD FALL-OFF FROM
THE SOAPSTONE OUTCROP LOCATED ON
MAP 11, GRID SQUARE 1



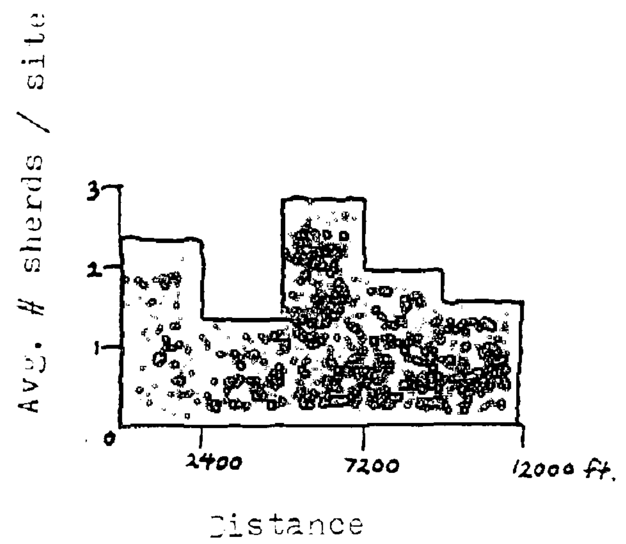
PLOT OF THE SOAPSTONE
WEIGHT / DISTANCE RELATIONSHIP
FOR THE SOAPSTONE OUTCROP LOCATED
ON MAP 26, GRID SQUARE 4.



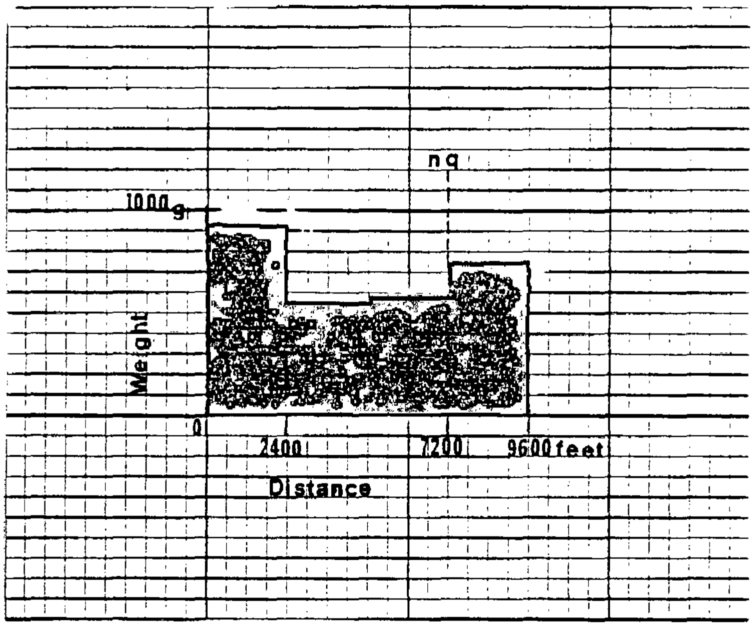
SOAPSTONE SHERD FALL-OFF FROM
THE SOAPSTONE OUTCROP LOCATED ON
MAP 26, GRID SQUARE 4



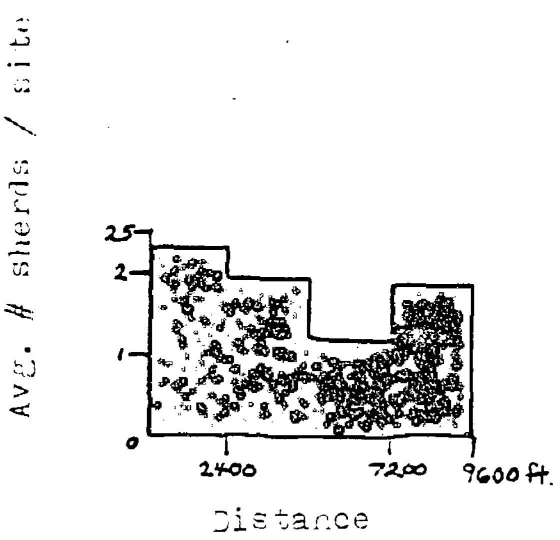
PLOT OF THE SOAPSTONE
WEIGHT / DISTANCE RELATIONSHIP
FOR THE SOAPSTONE OUTCROP LOCATED
ON MAP 17, GRID SQUARE 3



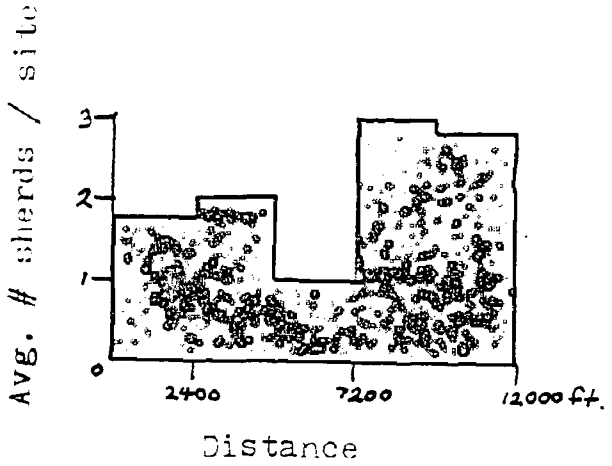
SOAPSTONE SHERD FALL-OFF FROM
THE SOAPSTONE OUTCROP LOCATED ON
MAP 17, GRID SQUARE 3



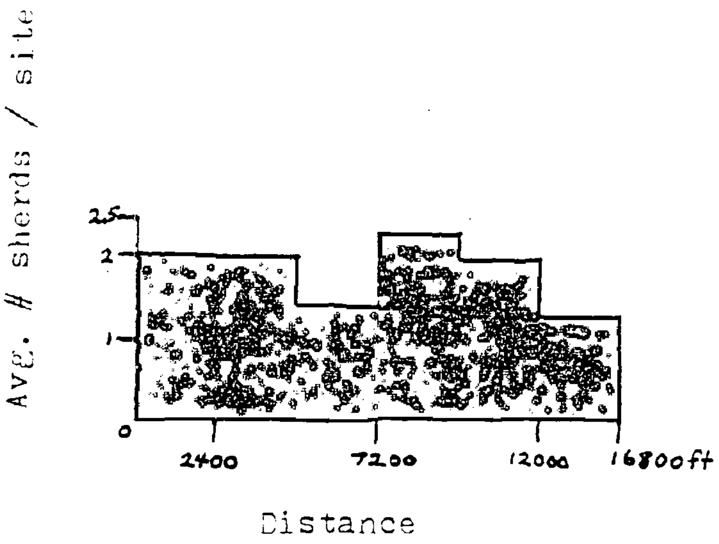
PLOT OF THE SOAPSTONE
WEIGHT /DISTANCE RELATIONSHIP
FOR THE SOAPSTONE OUTCROP LOCATED
ON MAP 11, GRID SQUARE 4



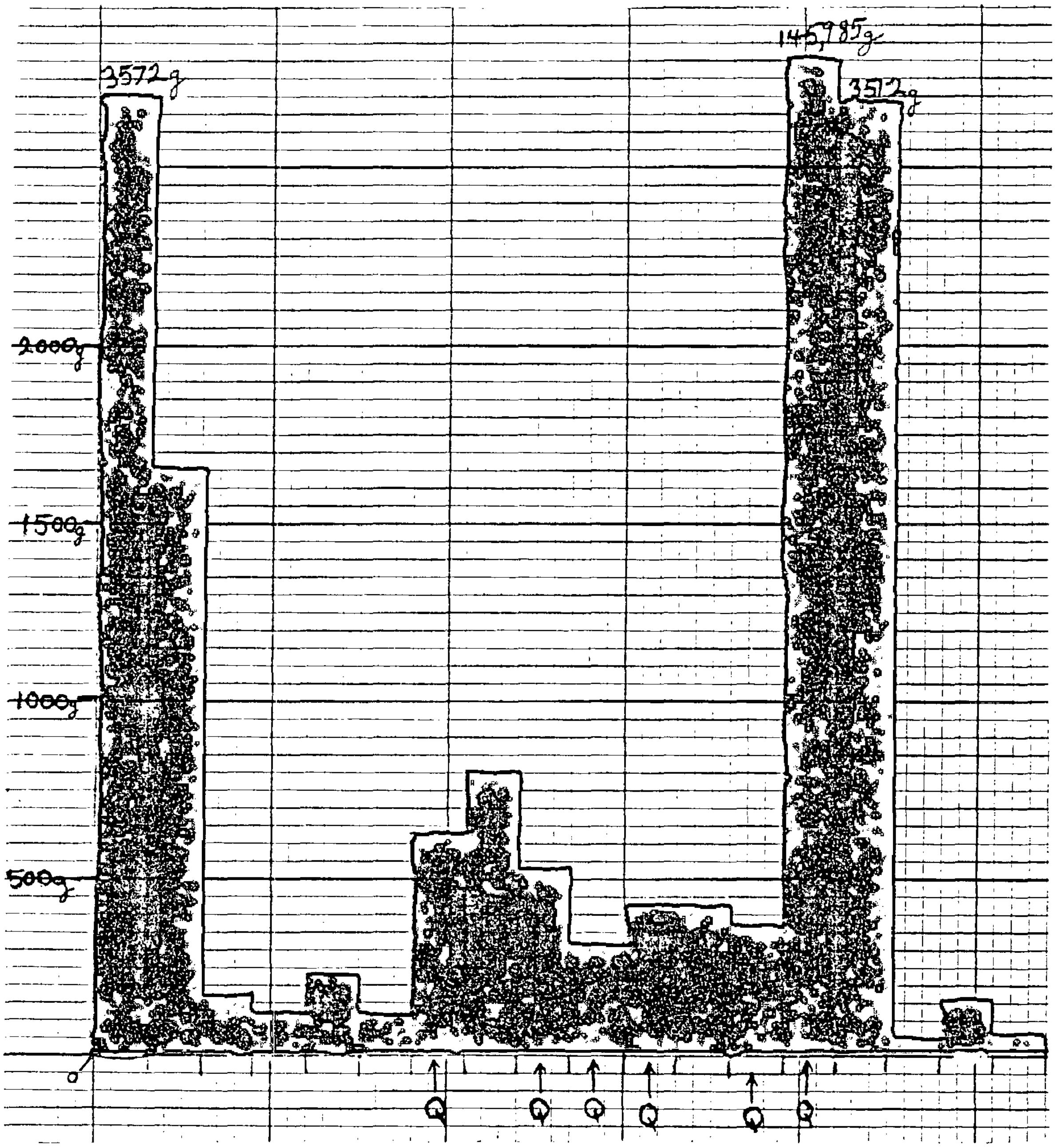
SOAPSTONE SHERD FALL-OFF FROM THE SOAPSTONE OUTCROP LOCATED ON MAP 11, GRID SQUARE 4



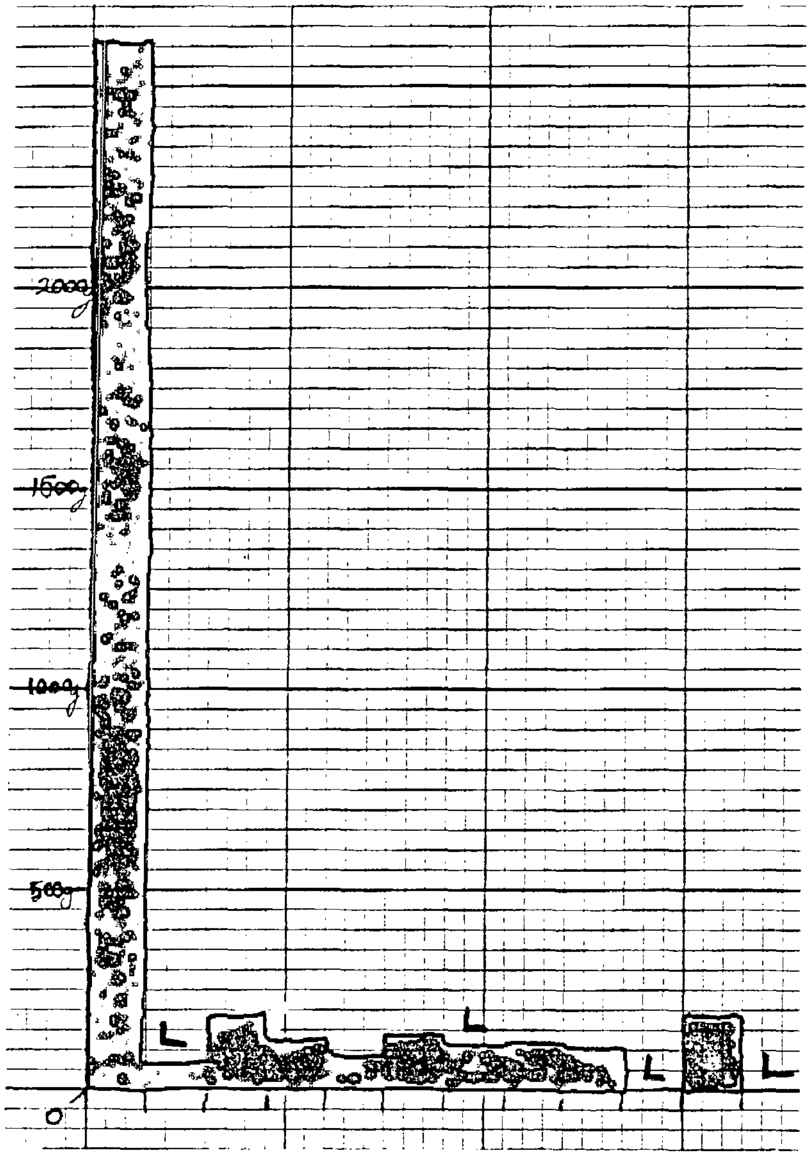
SOAPSTONE SHERD FALL-OFF FROM
THE SOAPSTONE OUTCROP LOCATED ON
MAP 40, GRID SQUARE 3 .



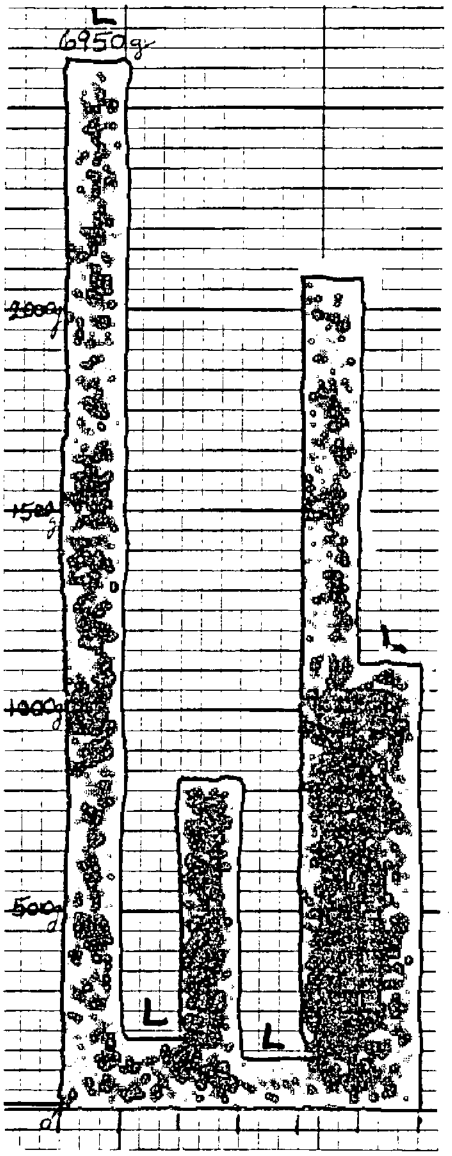
SOAPSTONE SHERD FALL-OFF FROM
THE SOAPSTONE OUTCROP LOCATED ON
MAP 10, GRID SQUARE 2



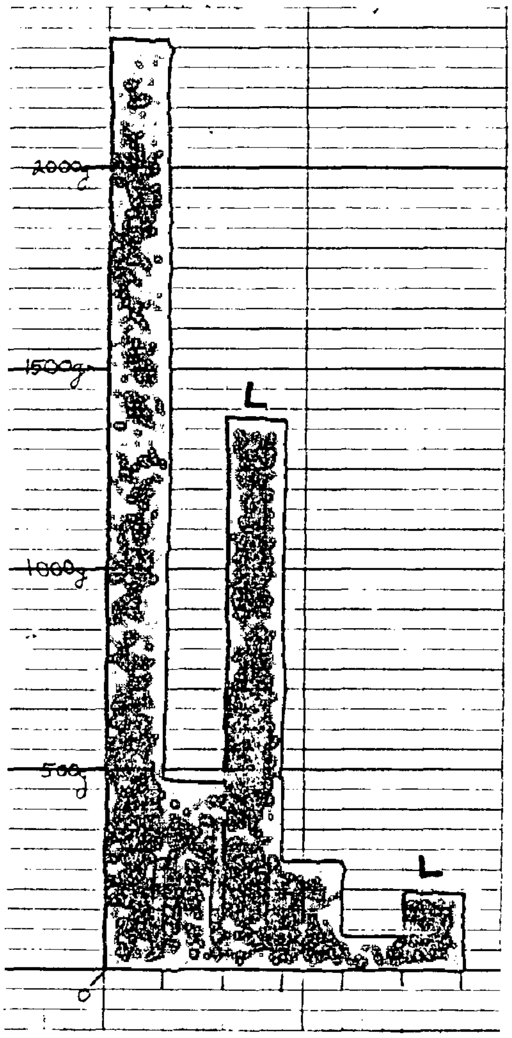
PLOT OF THE SOAPSTONE
WEIGHT / DISTANCE RELATIONSHIP
FOR THE SOAPSTONE QUARRY LOCATED ON
MAP 7, GRID SQUARE 2
QUADRANT A.



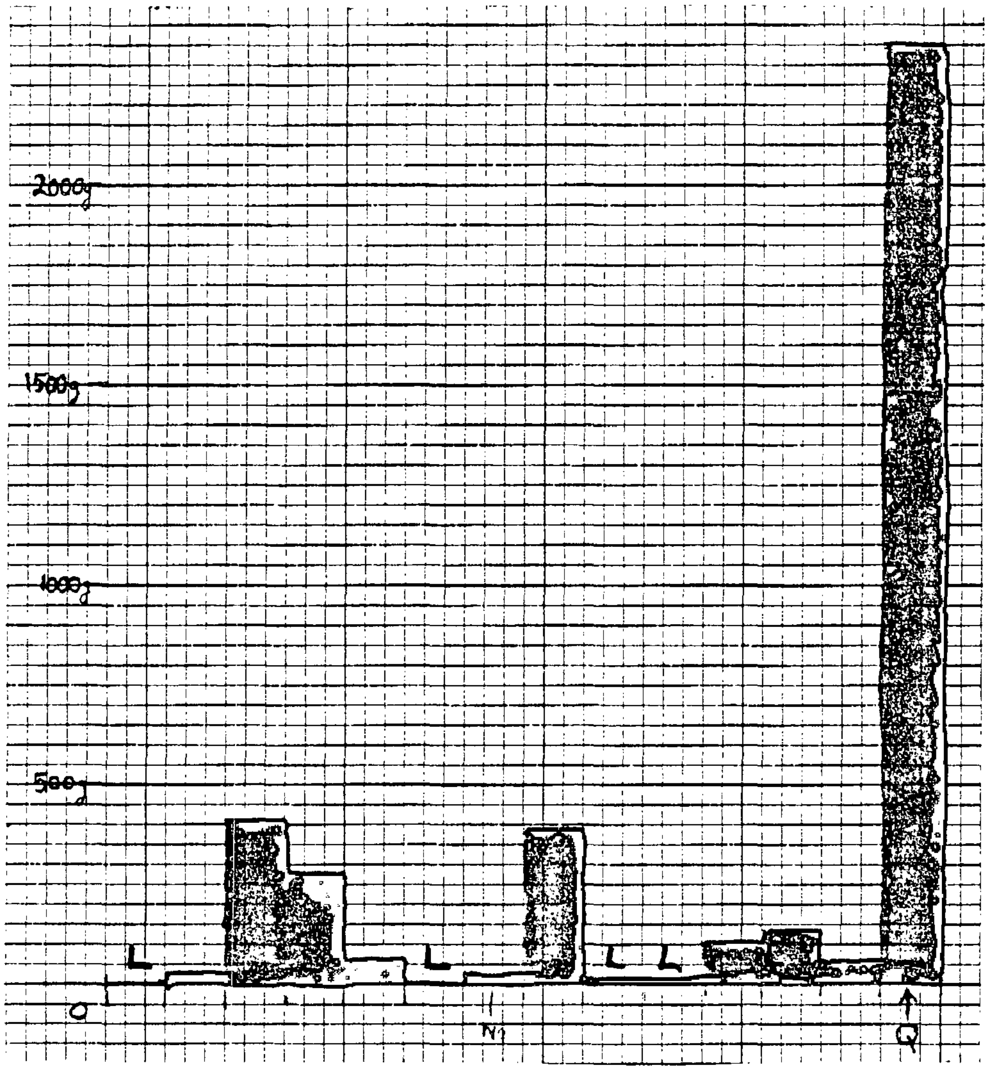
PLOT OF THE SOAPSTONE
WEIGHT / DISTANCE RELATIONSHIP
FOR THE SOAPSTONE QUARRY LOCATED ON
MAP 7, GRID SQUARE 2
QUADRANT B.



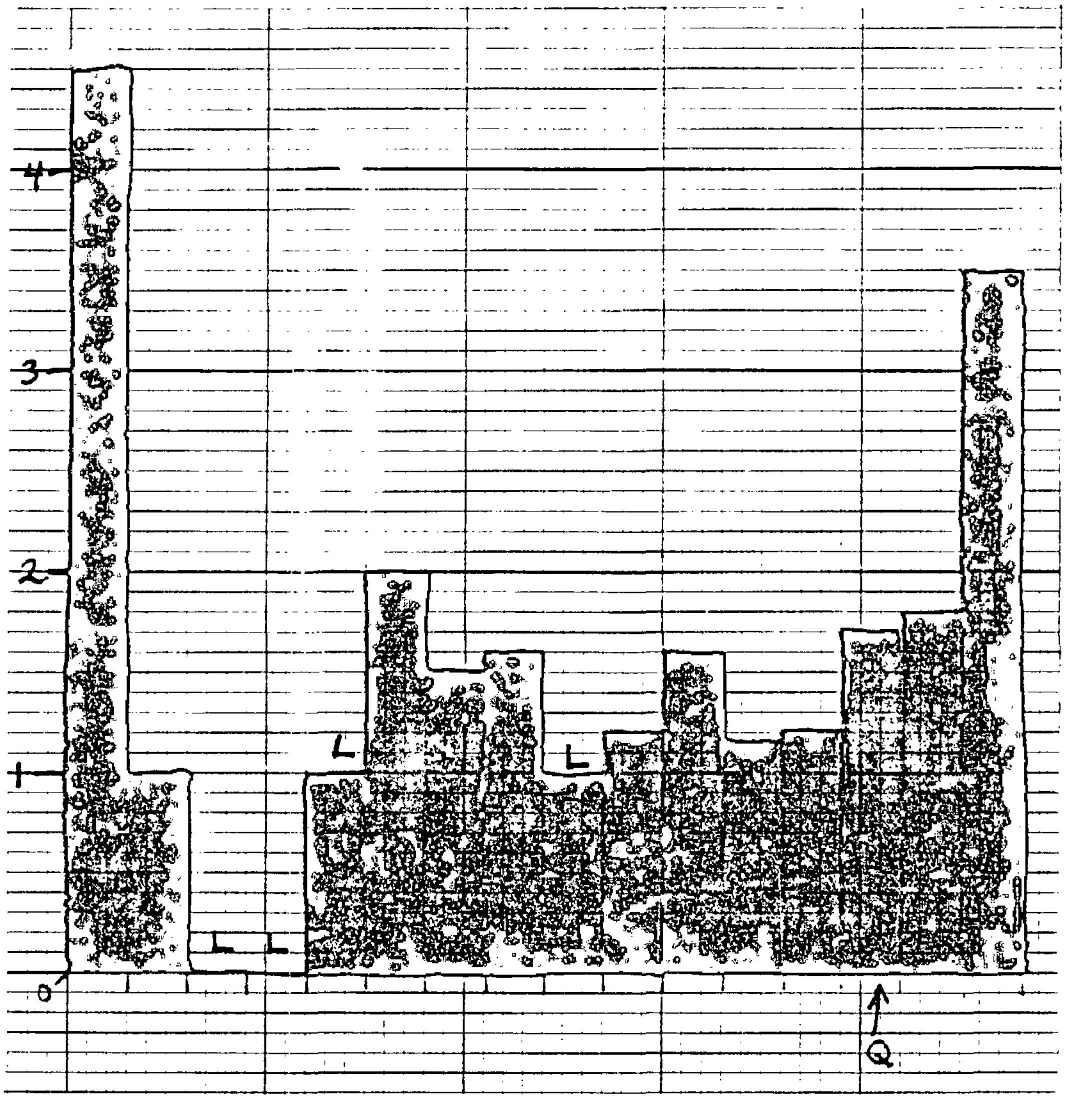
PLOT OF THE SOAPSTONE
WEIGHT / DISTANCE RELATIONSHIP
FOR THE SOAPSTONE QUARRY LOCATED ON
MAP 7, GRID SQUARE 2
QUADRANT C.



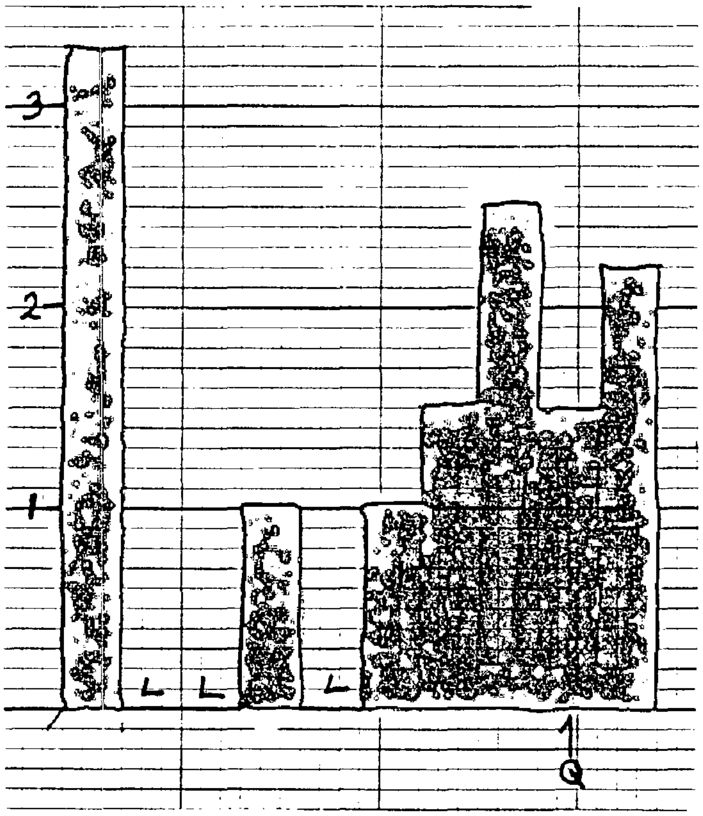
PLOT OF THE SOAPSTONE
WEIGHT / DISTANCE RELATIONSHIP
FOR THE SOAPSTONE QUARRY LOCATED ON
MAP 7, GRID SQUARE 2.
QUADRANT D.



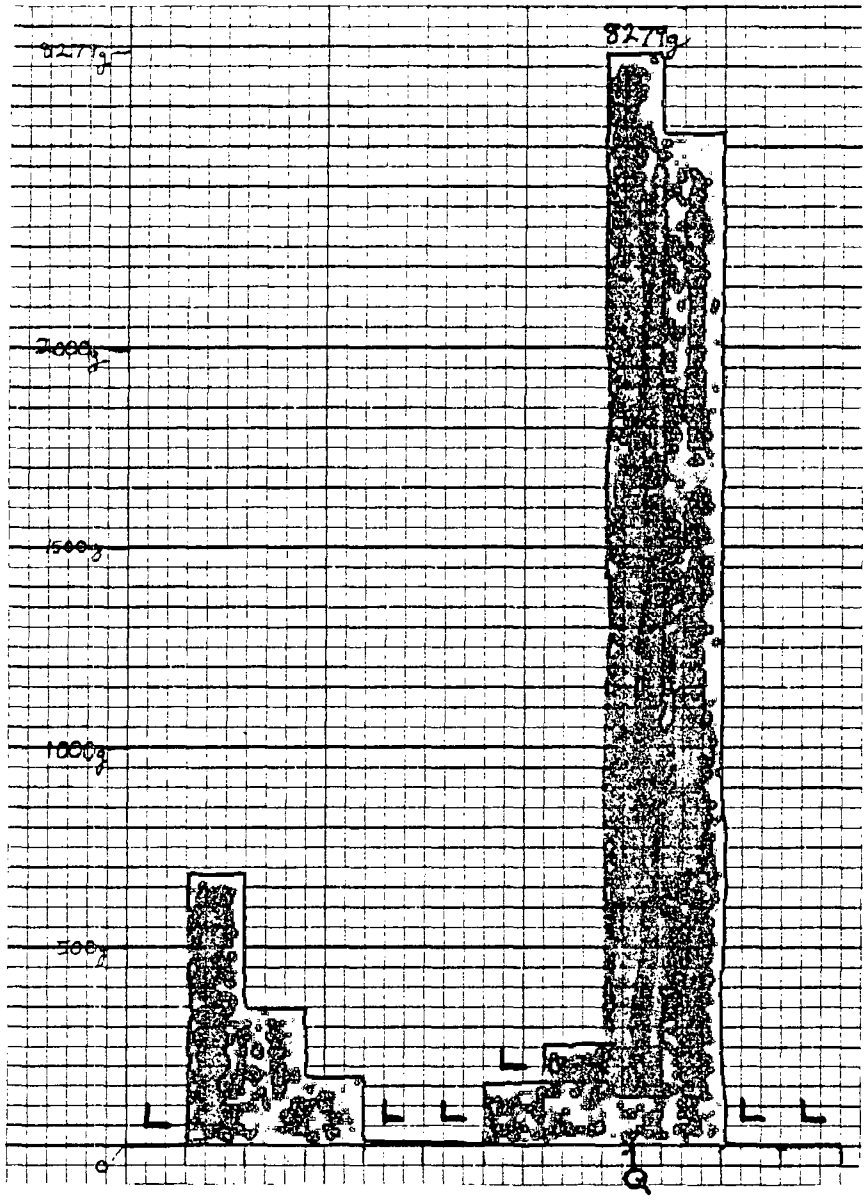
PLOT OF THE SOAPSTONE
WEIGHT / DISTANCE RELATIONSHIP
FOR THE SOAPSTONE QUARRY LOCATED ON
MAP 36, GRID SQUARE 2
QUADRANT D.



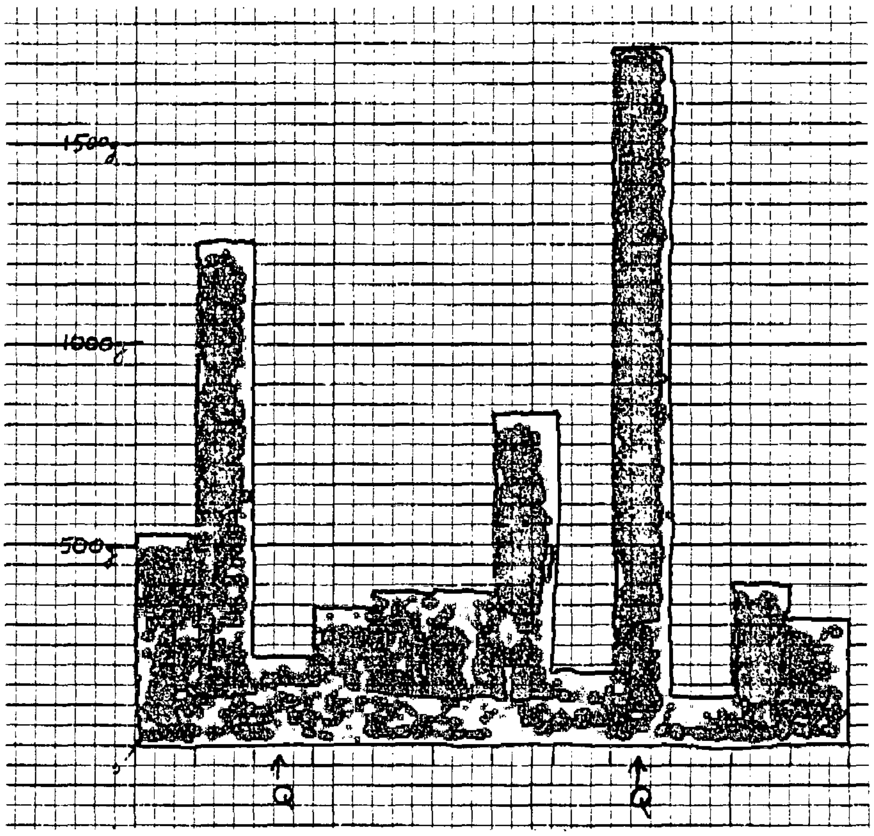
PLOT OF THE SOAPSTONE
ARTIFACT DIVERSITY / DISTANCE RELATIONSHIP
FOR THE SOAPSTONE QUARRY LOCATED ON
MAP 29, GRID SQUARE 4
QUADRANT A.



PLOT OF THE SOAPSTONE
ARTIFACT DIVERSITY / DISTANCE RELATIONSHIP
FOR THE SOAPSTONE QUARRY LOCATED ON
MAP 29, GRID SQUARE 4
QUADRANT C.



PLOT OF THE SOAPSTONE
WEIGHT / DISTANCE RELATIONSHIP
FOR THE SOAPSTONE OUTCROP LOCATED ON
MAP 11, GRID SQUARE 1
QUADRANT D.



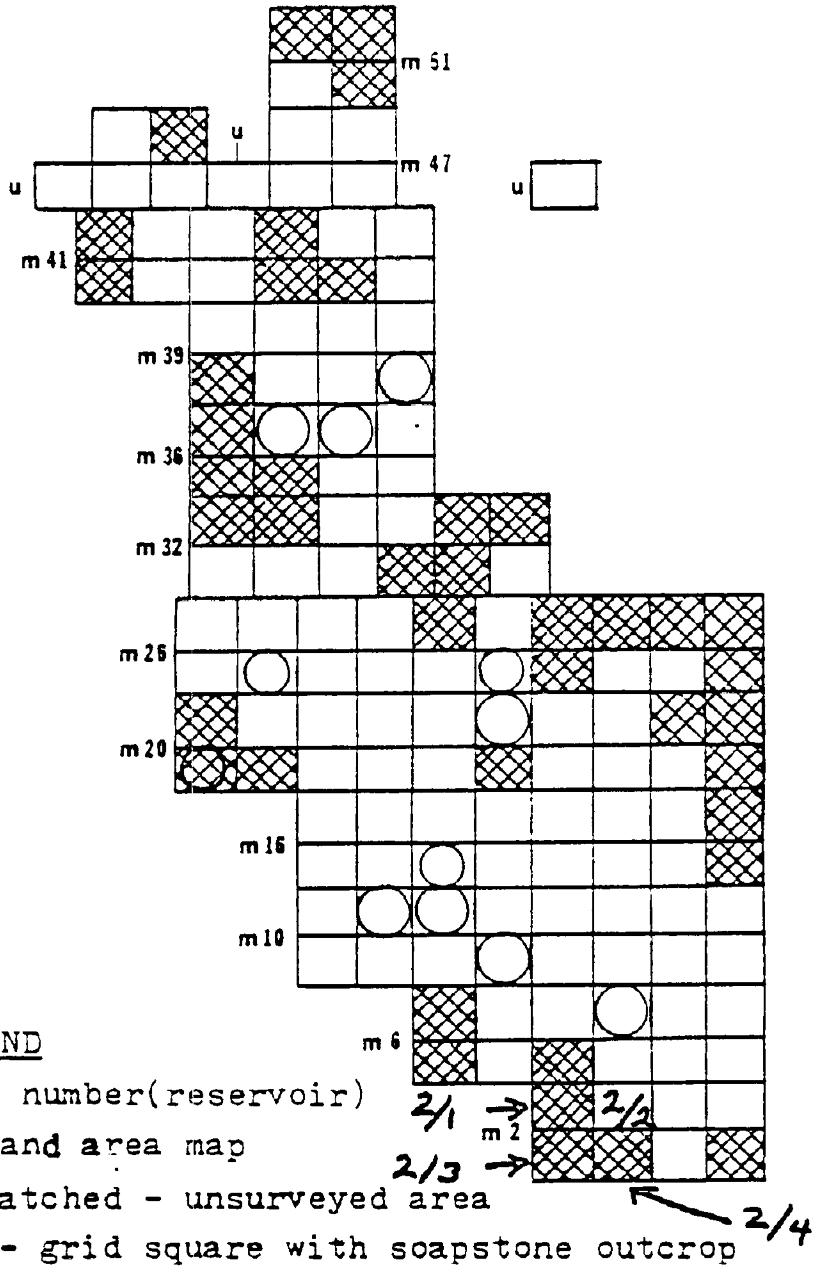
PLOT OF THE SOAPSTONE
WEIGHT / DISTANCE RELATIONSHIP
FOR THE SOAPSTONE OUTCROP LOCATED ON
MAP 11, GRID SQUARE 1
QUADRANT D.

APPENDIX C

GRID MAPS

GUIDE TO THE GRID MAPS

The grid maps used to show spatial relationships between the various soapstone variables were adapted from a preexisting grid system developed for the Wallace Reservoir maps. This series of 63 maps also serve as the base for the soapstone site maps included in the appendix of this thesis. For the grid square maps, each Wallace Reservoir map for which surface sites were systematically located was quartered. For example, Map 2 was gridded into four rectangles of equal size labeled grid squares 2/1, 2/2, 2/3, and 2/4. The numbering of these grid squares proceeds from left to right and from top to bottom. In the case of Map 2, three of the grid squares were completely unsurveyed for archeological sites. One can get an idea of how much survey was done for each grid square by looking at the soapstone site maps in the appendix. Three areas outside of the Wallace Reservoir map system were systematically surveyed for surface sites and these areas are labeled U for upland survey.

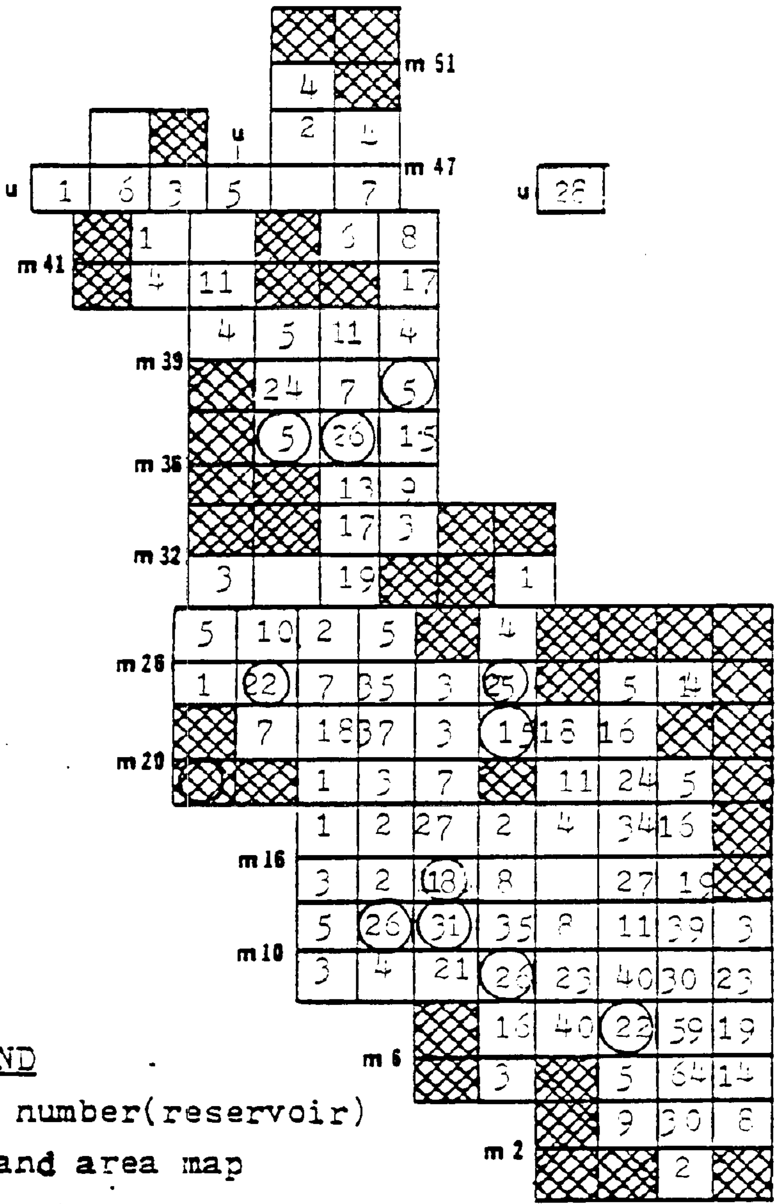


LEGEND

m - Map number(reservoir)
u - Upland area map
Cross-hatched - unsurveyed area
Circle - grid square with soapstone outcrop
Each grid square measures 6000 x 5000 feet

This map adapted from Wallace Dam Topographic Reservoir Map.

NUMBER OF SURFACE SITES



LEGEND

m - Map number(reservoir)

u - Upland area map

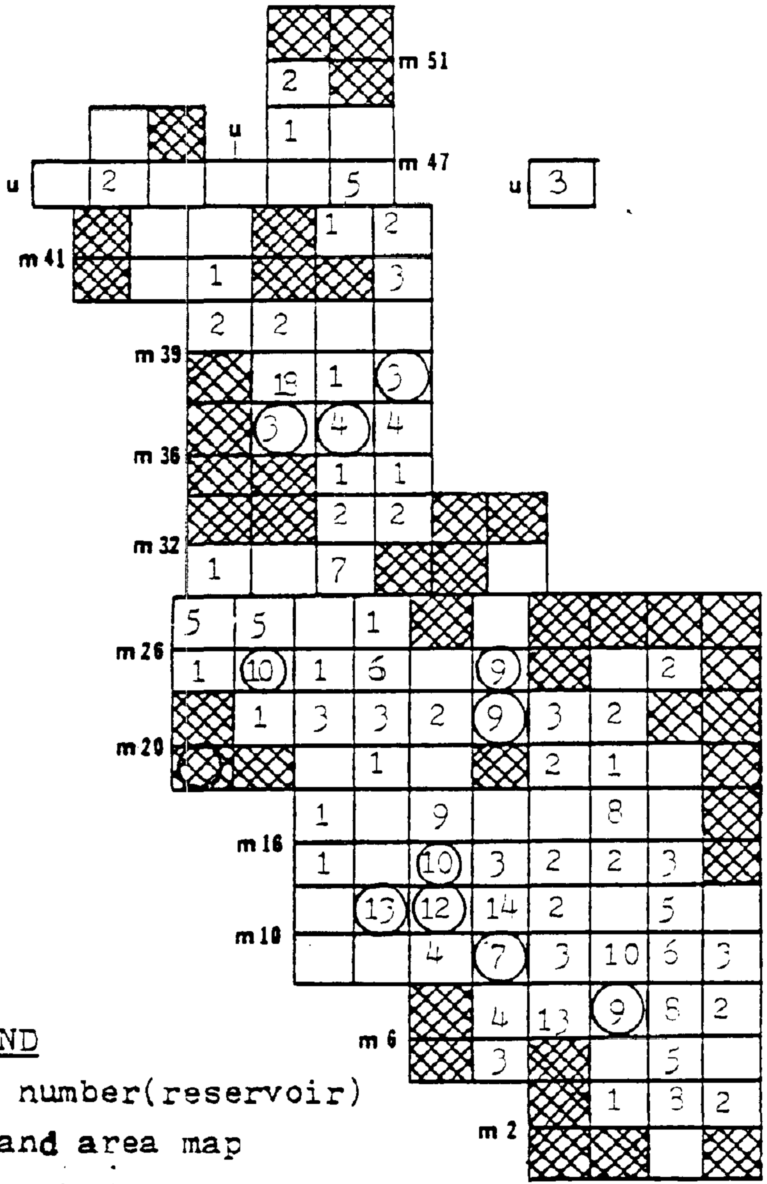
Cross-hatched - unsurveyed area

Circle - grid square with soapstone outcrop

Each grid square measures 6000 x 5000 feet

This map adapted from Wallace Dam Topographic Reservoir Map.

NUMBER OF SITES WITH SOAPSTONE



LEGEND

m - Map number(reservoir)

u - Upland area map

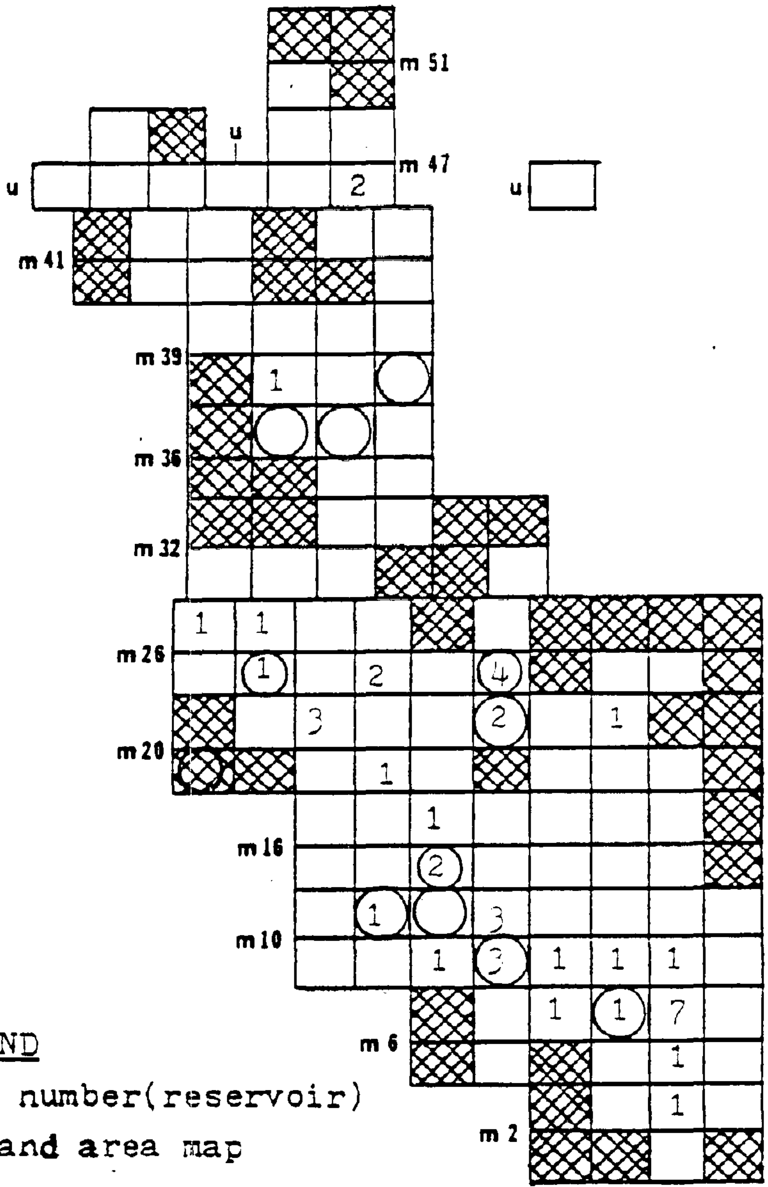
Cross-hatched - unsurveyed area

Circle - grid square with soapstone outcrop

Each grid square measures 6000 x 5000 feet

This map adapted from Wallace Dam Topographic Reservoir Map.

NUMBER OF PERFORATED STONE SITES



LEGEND

m - Map number(reservoir)

u - Upland area map

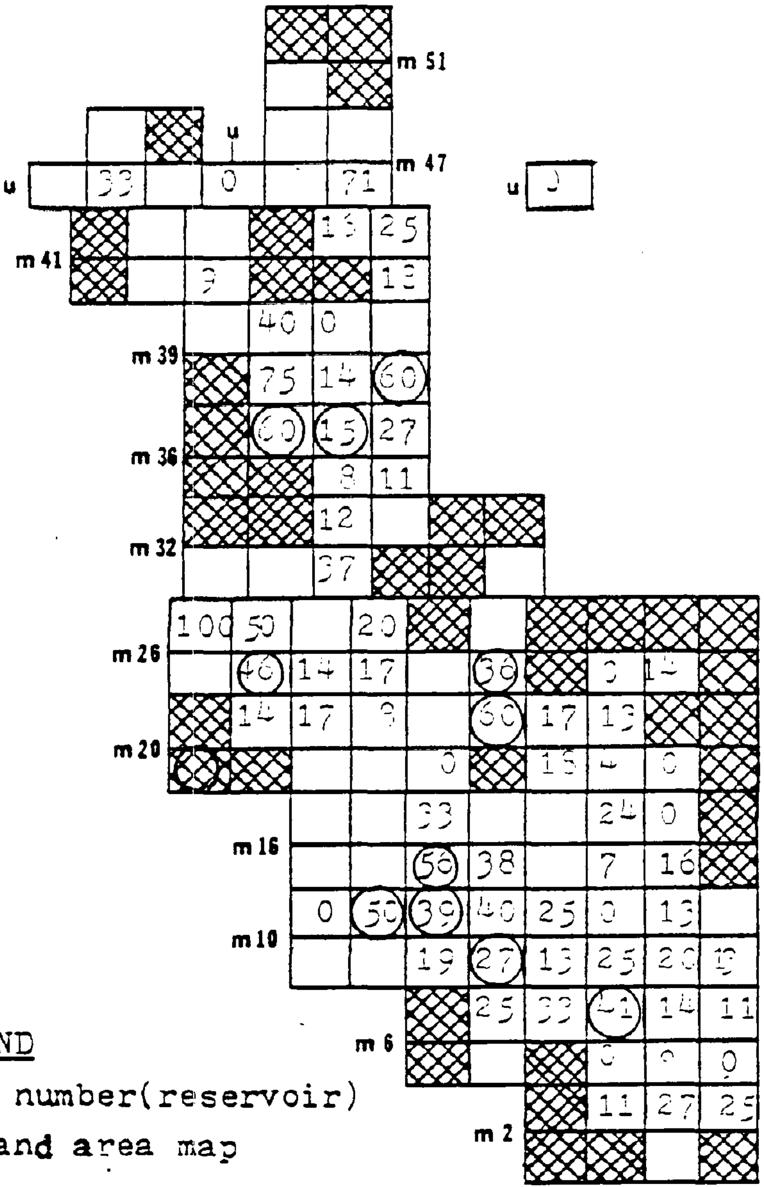
Cross-hatched - unsurveyed area

Circle - grid square with soapstone outcrop

Each grid square measures 6000 x 5000 feet

This map adapted from Wallace Dam Topographic Reservoir Map.

PERCENTAGE OF SURFACE SOAPSTONE SITES TO SURFACE SITES FOR GRID SQUARES WITH SAMPLE SIZE ABOVE FOUR SITES



LEGEND

m - Map number(reservoir)

u - Upland area map

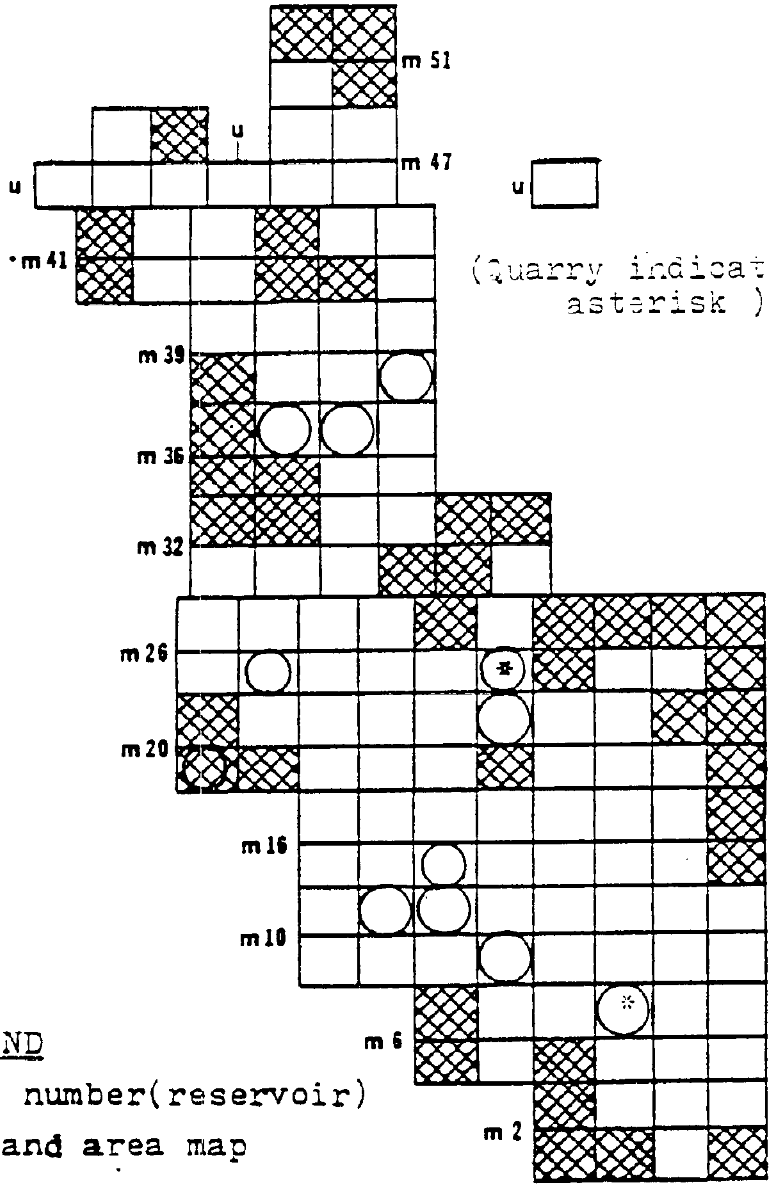
Cross-hatched - unsurveyed area

Circle - grid square with soapstone outcrop

Each grid square measures 6000 x 5000 feet

This map adapted from Wallace Dam Topographic Reservoir Map.

SOAPSTONE OUTCROPS WITH CLEAR EVIDENCE OF QUARRYING ACTIVITIES



(Quarry indicated by asterisk)

LEGEND

m - Map number(reservoir)
u - Upland area map
Cross-hatched - unsurveyed area
Circle - grid square with soapstone outcrop
Each grid square measures 6000 x 5000 feet

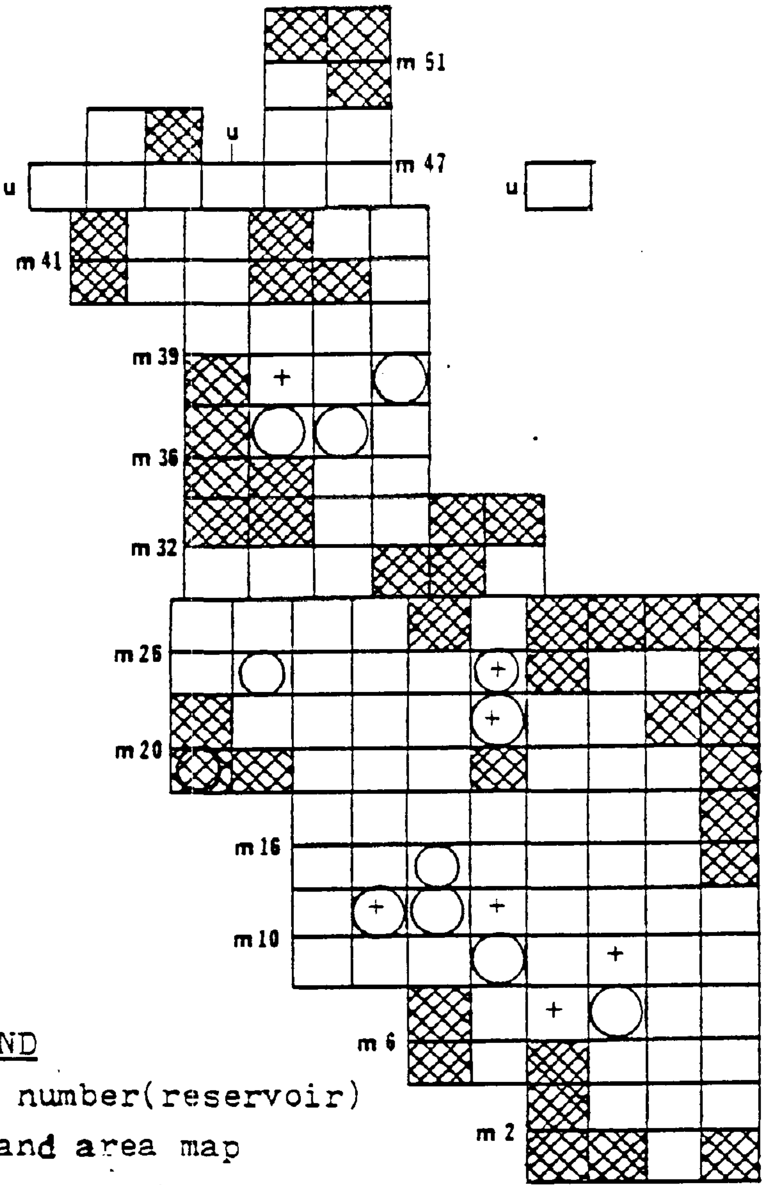
This map adapted from Wallace Dam Topographic Reservoir Map.

SITES IN

GRID SQUARES CONTAINING MORE THAN NINE

SOAPSTONE SHERDS

(INDICATED BY +)



LEGEND

m - Map number(reservoir)

u - Upland area map

Cross-hatched - unsurveyed area

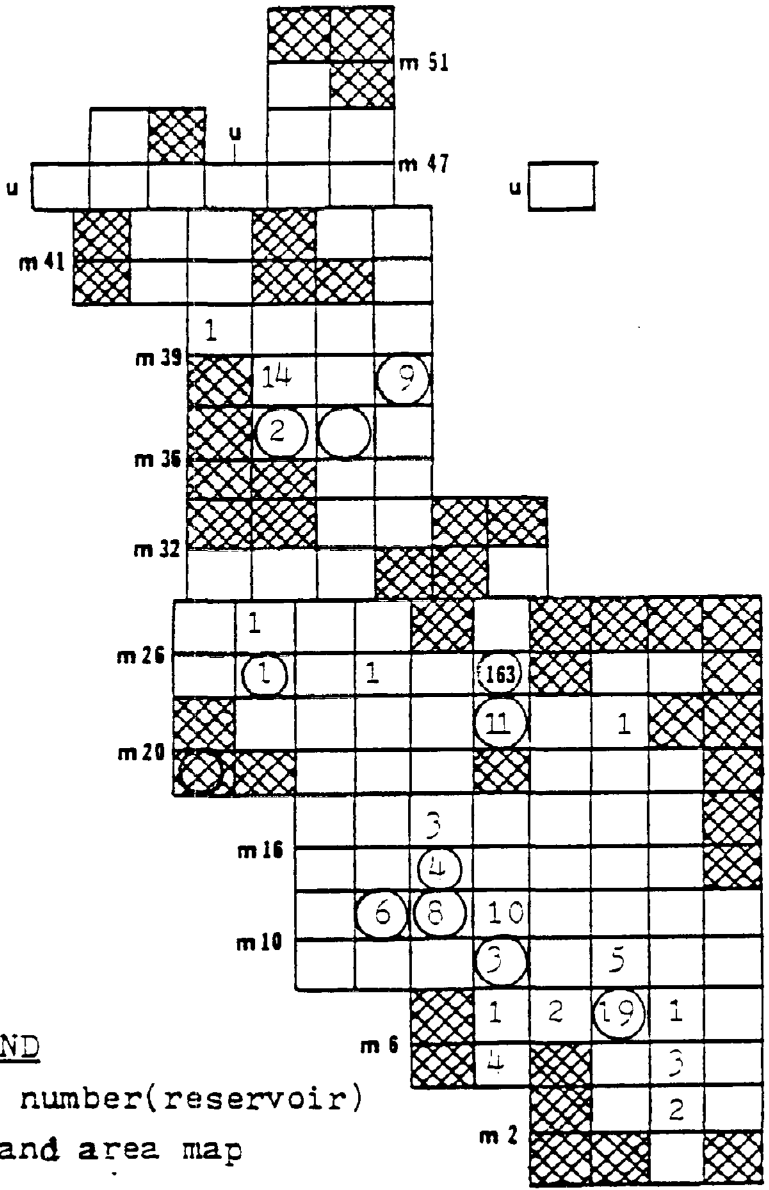
Circle - grid square with soapstone outcrop

Each grid square measures 6000 x 5000 feet

This map adapted from Wallace Dam Topographic Reservoir Map.

KILOGRAMS OF SOAPSTONE PER GRID SQUARE

(Readings below one kilogram not shown)



LEGEND

m - Map number(reservoir)

u - Upland area map

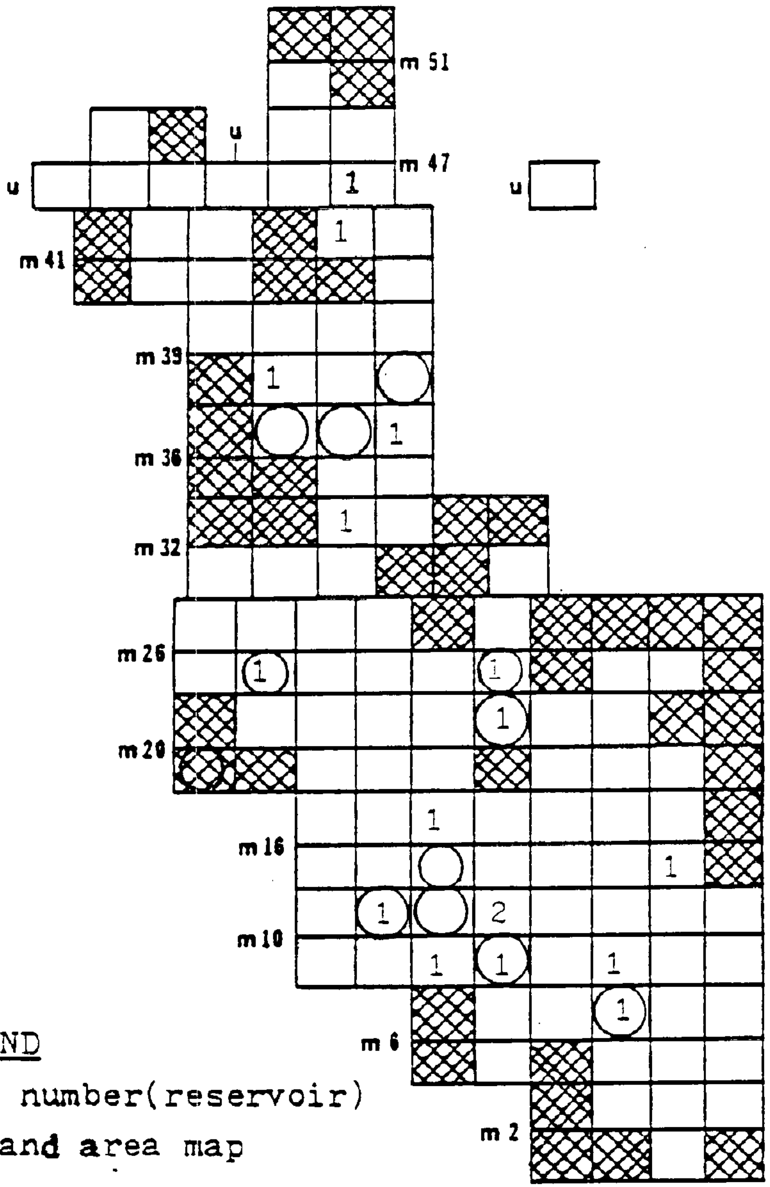
Cross-hatched - unsurveyed area

Circle - grid square with soapstone outcrop

Each grid square measures 6000 x 5000 feet

This map adapted from Wallace Dam Topographic Reservoir Map.

NUMBER OF SOAPSTONE ATL-ATL WEIGHT SITES



LEGEND

m - Map number(reservoir)

u - Upland area map

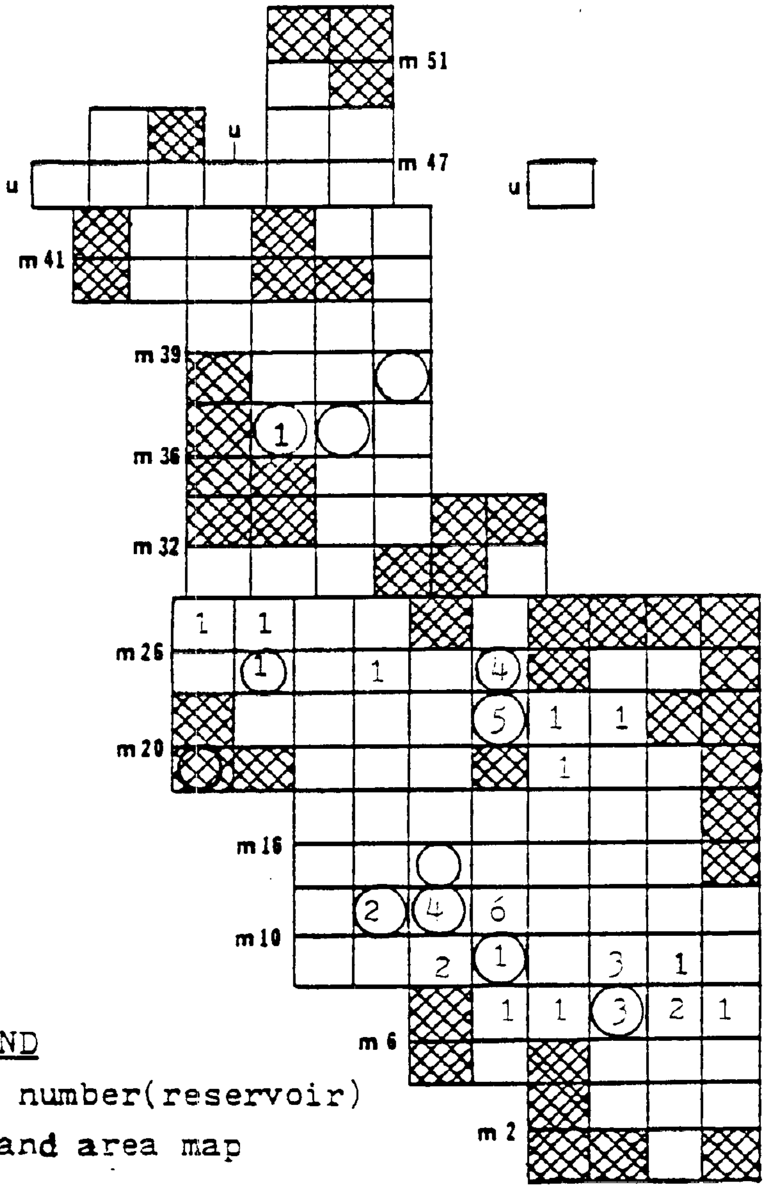
Cross-hatched - unsurveyed area

Circle - grid square with soapstone outcrop

Each grid square measures 6000 x 5000 feet

This map adapted from Wallace Dam Topographic Reservoir Map.

NUMBER OF SITES WITH SOAPSTONE PRESENT IN TEN METER DENSITY COLLECTION CIRCLE



LEGEND

m - Map number(reservoir)

u - Upland area map

Cross-hatched - unsurveyed area

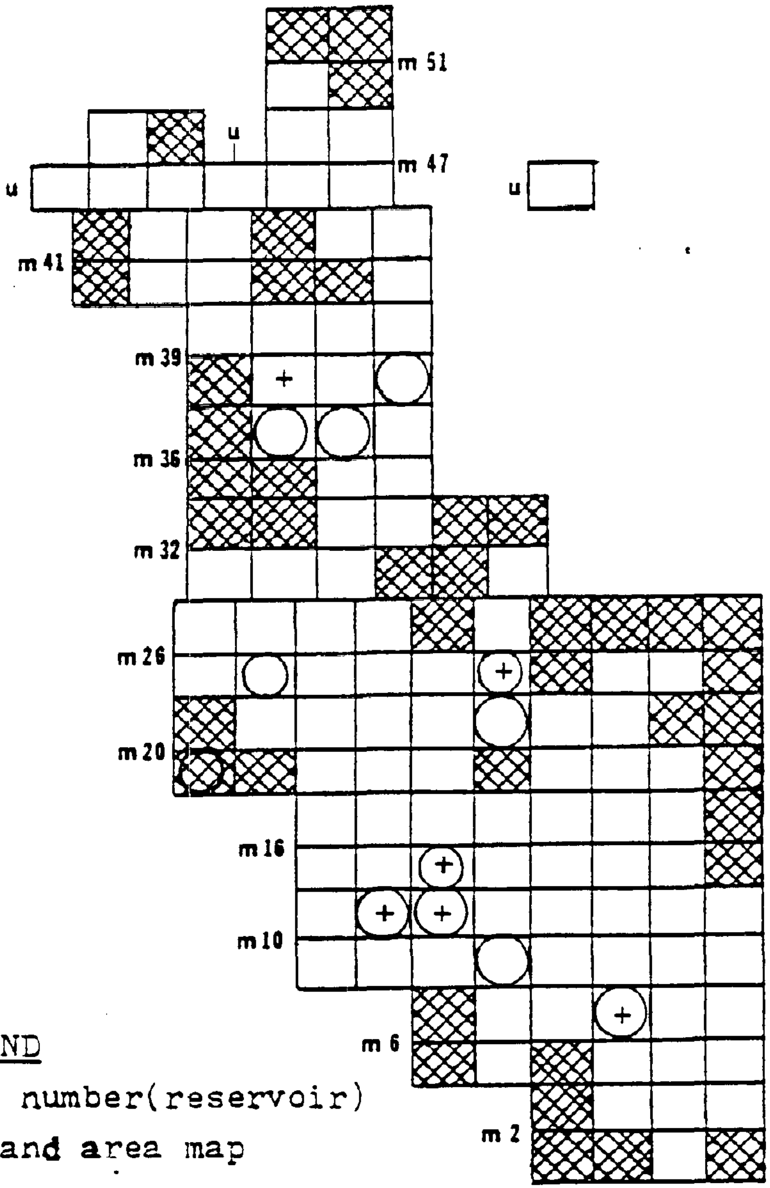
Circle - grid square with soapstone outcrop

Each grid square measures 6000 x 5000 feet

This map adapted from Wallace Dam Topographic Reservoir Map.

PRESENCE OF SITES IN GRID SQUARES WHOSE AVERAGE SOAPSTONE ARTIFACT WEIGHT EXCEEDS 1000 GRAMS

(INDICATED BY +)

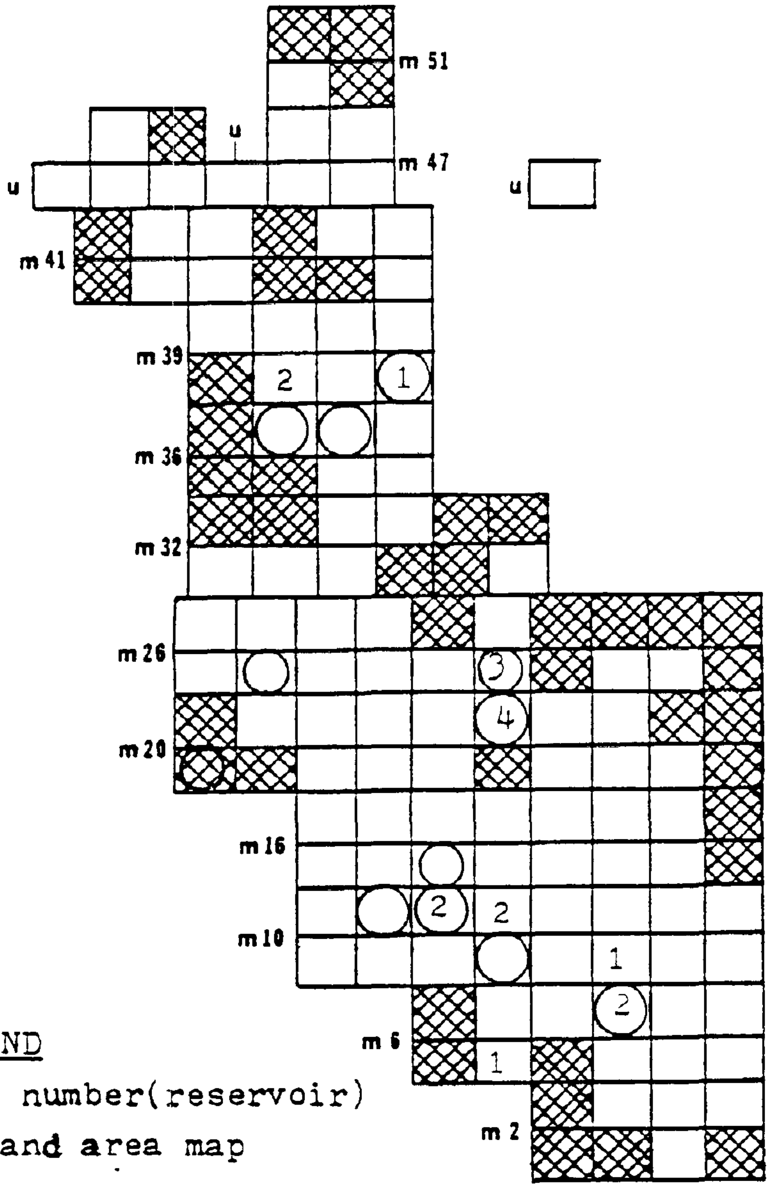


LEGEND

m - Map number(reservoir)
u - Upland area map
Cross-hatched - unsurveyed area
Circle - grid square with soapstone outcrop
Each grid square measures 6000 x 5000 feet

This map adapted from Wallace Dam Topographic Reservoir Map.

NUMBER OF SITES WHOSE TOTAL WEIGHT EXCEEDS 2000 GRAMS

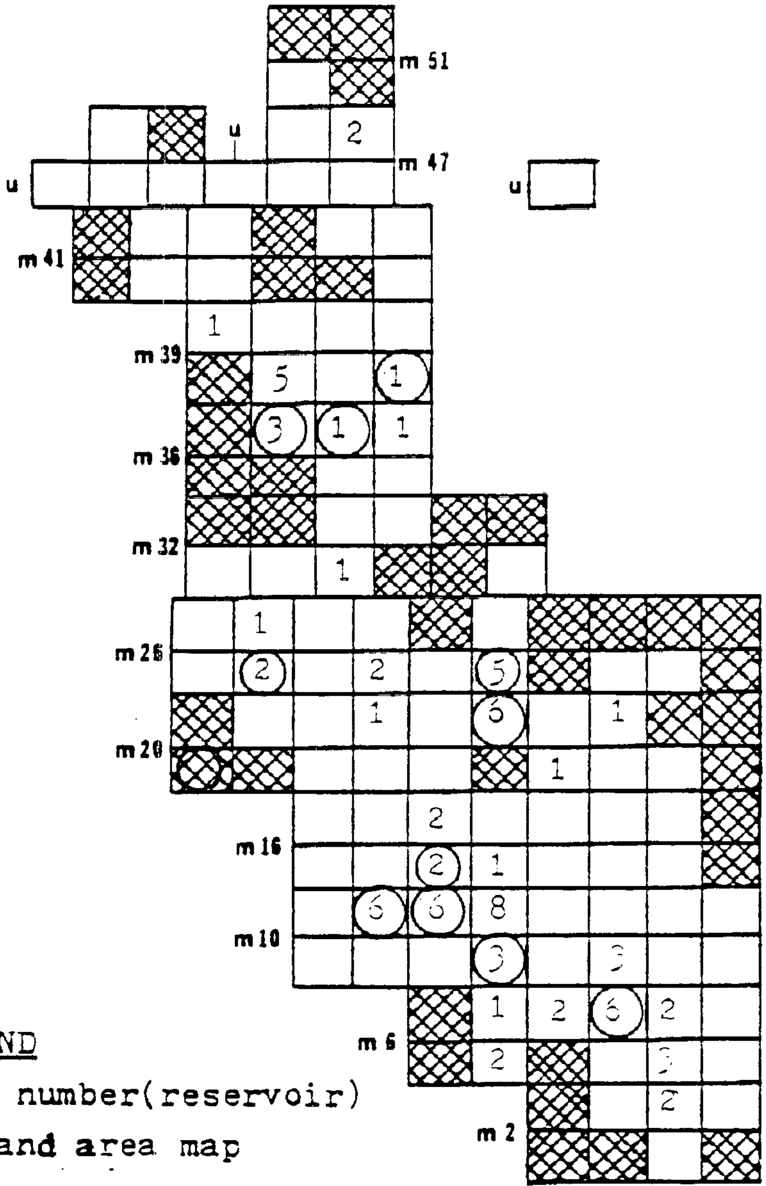


LEGEND

m - Map number(reservoir)
u - Upland area map
Cross-hatched - unsurveyed area
Circle - grid square with soapstone outcrop
Each grid square measures 6000 x 5000 feet

This map adapted from Wallace Dam Topographic Reservoir Map.

NUMBER OF CLASS 1-9 SITES



LEGEND

m - Map number(reservoir)

u - Upland area map

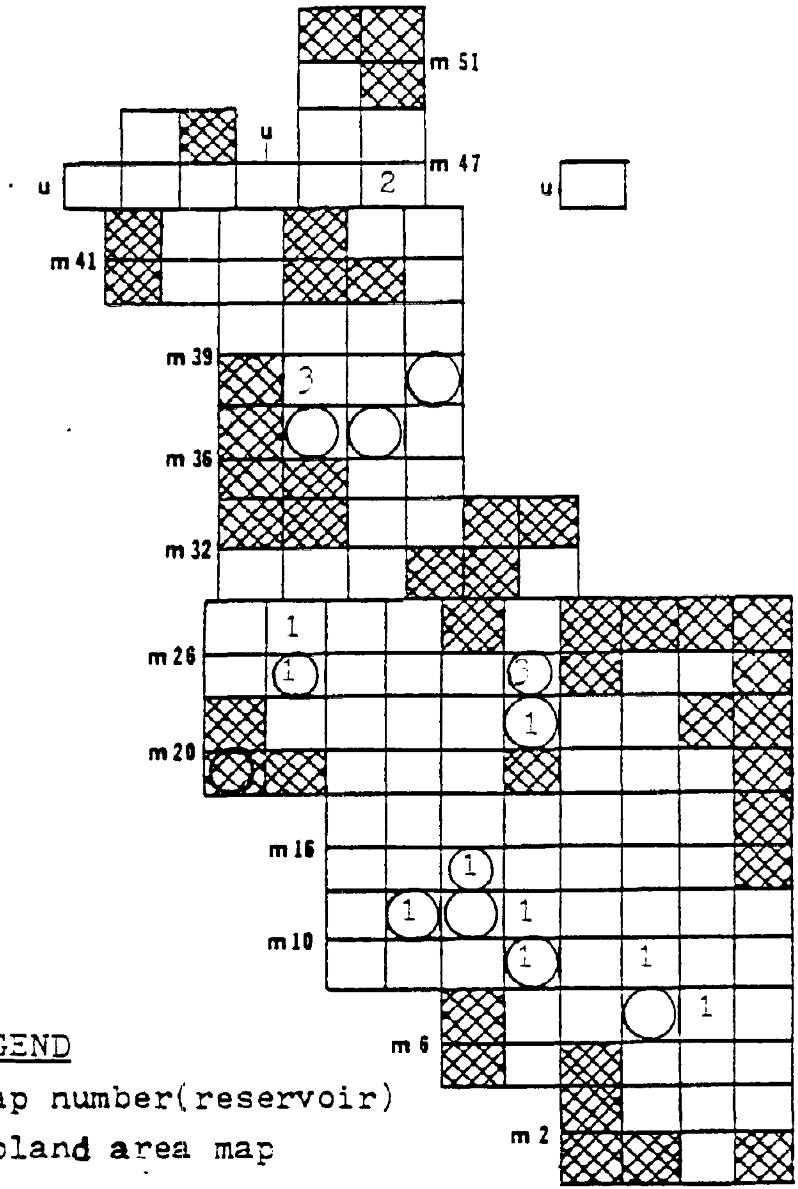
Cross-hatched - unsurveyed area

Circle - grid square with soapstone outcrop

Each grid square measures 6000 x 5000 feet

This map adapted from Wallace Dam Topographic Reservoir Map.

NUMBER OF HIGH DIVERSITY SITES
FOUR OR MORE ITEM TYPES

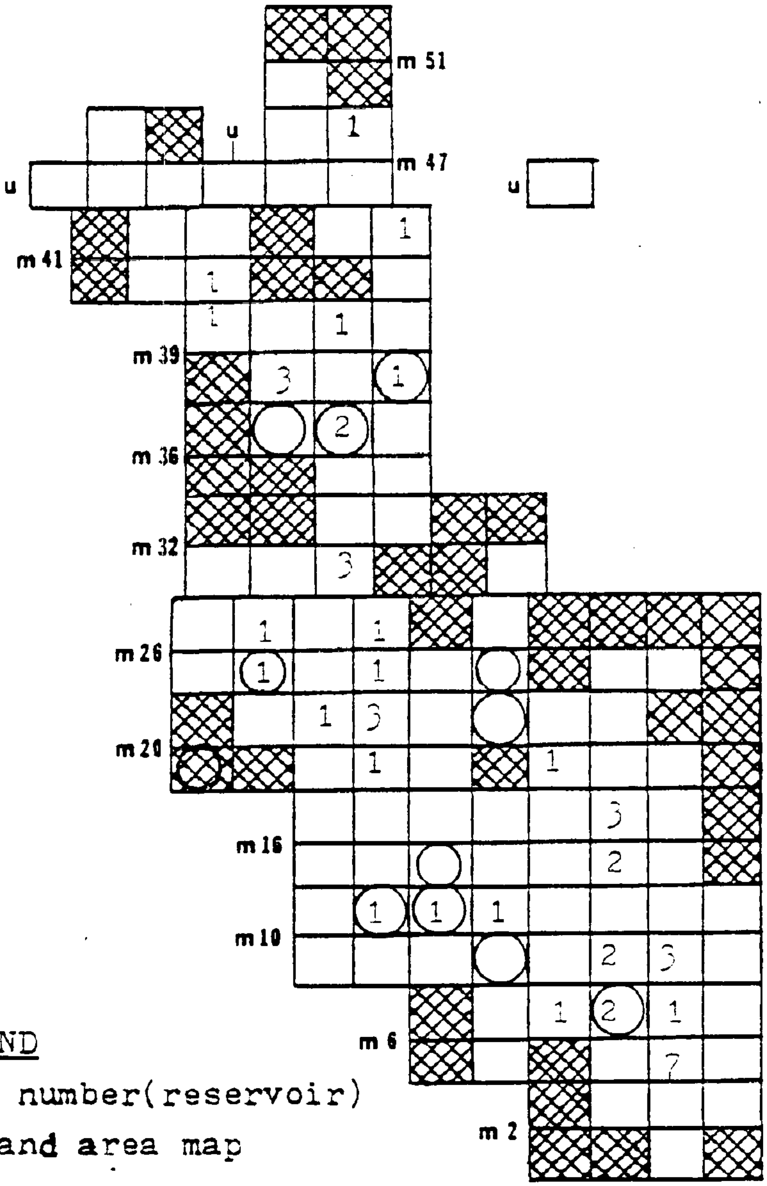


LEGEND

m - Map number(reservoir)
u - Upland area map
Cross-hatched - unsurveyed area
Circle - grid square with soapstone outcrop
Each grid square measures 6000 x 5000 feet

This map adapted from Wallace Dam Topographic Reservoir Map.

NUMBER OF FIBER TEMPERED POTTERY SITES



LEGEND

m - Map number(reservoir)

u - Upland area map

Cross-hatched - unsurveyed area

Circle - grid square with soapstone outcrop

Each grid square measures 6000 x 5000 feet

This map adapted from Wallace Dam Topographic Reservoir Map.

APPENDIX D

THE RAW DATA

SOAPSTONE DATA CODING FORMAT

LINE #	INFORMATION
1-3	Wallace Dam field site number
5	County site located in: 1) Greene 2) Putnam 3) Morgan 4) Hancock
7-10	State site number
12	Survey team making collection: 1) South team 2) North team 3) Subsurface backhoe testing 4) Upland area team 5) Other - mitigated sites and miscellaneous surface collections
13-14	Soapstone utilization intensity class number
15-19	Minimum area of site in square meters
21	Accuracy of site measurement: 1) Fully measured 2) Not fully measured
22	Systematic backhoe testing: 1) Soapstone present below surface 2) Tested but no soapstone found
23	Nature of site: 1) Surface only 2) Subsurface only 3) Surface and subsurface
25-26	Ga. Power Wallace Dam Topographic Map number
28	Grid square number within Georgia Power map:

1) Upper left quadrant
2) Upper right quadrant
3) Lower left quadrant
4) Lower right quadrant

30 Presence of fiber tempered pottery:

1) If present

31 Absence of pottery at site:

1) If applicable

32 Minimal amount of pottery present at site:

1) If applicable

33 Contents of ten meter diameter density collection:

1) If no soapstone in circle
2) If soapstone in circle

36 Distance from site to a river or larger navigable creek:

1) If less than 1/2 mile
2) If 1/2 to one mile
3) If greater than one mile

38-39 Degree of slope

41-55 Topographic feature:

1) Ridgetop
2) Ridgeslope
3) Terminal ridgeslope
4) Ridge extension finger
5) Stream terrace
6) River terrace
7) Stream levee
8) River levee
9) River floodplain
10) Creek or stream floodplain
11) Ephemeral drainage floodplain
12) Rise/knoll river floodplain
13) Rise/knoll creek floodplain
14) Rise/knoll ephemeral drainage floodplain
15) Rise or knoll

56 Unidentified large stemmed projectile points:

1) If present

57 Unidentified small stemmed projectile points:

1) If present

58 Middle Archaic projectile points:

1) If present

59 Late Archaic projectile points:

1) If present

60 Woodland triangular projectile points:

1) If present

61-66 Total site weight of soapstone in grams

67 Perforated soapstone objects:

1) If present

68 Soapstone atl-atl weights:

1) If present

69 Other formal soapstone items:

1) If present

70 Formless waste pieces of soapstone:

1) If present

71 Unidentified worked soapstone fragments:

1) If present

72-74 Total amount of soapstone items from a site

75 Average soapstone item weight:

1) If 0 to 100 grams
2) If 101 to 200 grams
3) If 201 to 300 grams
4) If 301 to 400 grams
5) If 401 to 500 grams
6) If 501 to 600 grams
7) If 601 to 700 grams
8) If 701 to 800 grams
9) If greater than 801 grams

77	Amount of functionally diverse soapstone item types present at site
79-80	Amount of soapstone vessel sherds at site

RANKING OF FOUR SOAPSTONE VARIABLES

Total soapstone item amount from site

High: Greater than 6 items
Medium: 3 to 6 items
Low: Less than 3 items

Total soapstone weight from site

High: Greater than 500 grams
Medium: 100 to 500 grams
Low: Less than 100 grams

Average item weight from site

High: Greater than 300 grams
Medium: 101 to 300 grams
Low: Less than 101 grams

Diversity of soapstone item types

High: Greater than three item types
Medium: 2 to 3 item types
Low: One item type

After ranking all sites with soapstone by these four variables, the sites were classed on a scale of one to fifteen in terms of intensity of soapstone utilization. These four soapstone variables were dealt with as a unit in an attempt to balanace out high readings on any one variable which could have been the result of a single event. These classification system seems to be somewhat successful. According to this classification system, the lower the class number, the greater the intensity of soapstone utilization at the site over time.

CLASSES OF SOAPSTONE UTILIZATION INTENSITY

CLASS #	READINGS ON VARIABLES	# OF SITES
1	HIGH, HIGH, HIGH, HIGH	2
2	HIGH, HIGH, HIGH, MEDIUM	11
3	HIGH, HIGH, HIGH, LOW	6
4	HIGH, HIGH, MEDIUM, MEDIUM	13
5	HIGH, HIGH, MEDIUM, LOW	13
6	HIGH, HIGH, LOW, LOW	11
7	HIGH, MEDIUM, MEDIUM, MEDIUM	11
8	HIGH, MEDIUM, MEDIUM, LOW	3
9	HIGH, MEDIUM, LOW, LOW	9
10	HIGH, LOW, LOW, LOW	0
11	MEDIUM, MEDIUM, MEDIUM, MEDIUM	0
12	MEDIUM, MEDIUM, MEDIUM, LOW	27
13	MEDIUM, MEDIUM, LOW, LOW	59
14	MEDIUM, LOW, LOW, LOW	26
15	LOW, LOW, LOW, LOW	106

SOUTH
TEAM

Page 1

	1	4	2	52	2	5069	1	1	3	1	1 1	1	5
	2	5	2	251	3	4685	1	1	3	1		1	5
	3	14	2	130	2	7630	1	1	2	3	1	1	5
	4	20	2	216	3	614	1	1	3	1	1		20
	5	22	2	221	3	12672	1	1	3	1	1	1	5
	6	30	2	276	6	5222	1	1	3		1	2	0
	7	39	2	285	—	4608	1	1	2	2		3	20
	8	49	2	295	2	6238	1	1	3	1		2	5
	9	63	2	309	5	4762	2	1	8	3	1 1	1	5
	10	79	2	325	9	1075	1	1	8	1	1 1	1	5
	11	81	2	131	5	11520	2 2	1	8	1		1	5
	12	87	2	333	4	300	1	1	7	2	2	1	1 3
	13	88	2	334	2	2685	1	1	7	2	1	1	2
	14	90	2	336	3	1613	1	1	7	2	1	1	3
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QUARY	16	92	2	338	2	1229	1	1	7	2	1	1	1 3
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	20	101	2	213	6	6682	2	1	2	4	1	1	3
	21	104	2	350	2	3533	2	1	2	4	1 2	1	6
	22	105	2	351	3	5146	1 1	1	2	4	2	1	3
	23	113	2	353	—	9223	1	1	7	1		1	5
	24	115	2	361	3	7139	1	1	7	1	1	1	1 3
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	27	120	2	366	2	5530	1	1	7		1	1	10
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	36	149	2	395	52	1120	1	1	6	2	1	1	2
	37	151	2	397	51	1597	1	1	6	2	1	1	0
	38	154	2	400	5	5299	1	1	6	3	1	1	5
	39	156	2	402	4	1997	2	2	6		1	4	0
	40	164	2	470	5	10445	1	1	11	4	1	1	0

Page 1a

				Line No
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282	23	2	1	8
800	24	2		9
307	14	1		10
24	11	1		11
1825	49	2	1	12
7950	244	3	3	13
216	13	1		14
552	42	2		15
6950	26	2	4	16
384	14	1		17
193	21	1		18
842	81	3		19
625	17	1		20
1207	102	4		21
3165	561	6	4	22
—	1—	1		23
131	21	2	1	24
243	51	3	1	25
79	12	1		26
452	23	2	1	27
1187	53	2	3	28
109	12	1		29
50	11	1	1	30
129	12	1		31
2465	93	1		32
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1721	92	2		34
1109	121	3	1	35
46	11	1	1	36
29	11	1	1	37
54	11	1	1	38
1011	2	1	2	39
67	2	1		40

Line No	SOUTH TEAM			Page 2
1	165 2 119	1 4 1 4362	1 1 1 1 4	1 1 5
2	166 2 412	1 1 3 8909	1 1 1 1 4	1 1 1 0
3	171 2 417	1 7 1 1 2 1 3	1 1 1 1 4	2 1 2
4	176 2 422	1 1 5 9139	1 1 1 2 1	1 1 2
5	177 2 423	1 1 4 768	1 1 1 1 4	1 1 1 5
6	183 2 429	1 2 1 2826	1 1 1 1 4	1 1 0
7	185 2 -31	1 — 3456	2 1 1 1 4	1 1 1 5
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9	190 2 436	1 1 5 0214	2 1 1 1 3	1 1 1 5
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11	196 2 422	1 1 2 4224	1 1 1 1 3	2 1 5
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13	225 2 455	1 5 3072	2 1 1 0 2	1 1
14	226 2 456	1 9 1766	2 1 1 0 2	1 2 7
15	227 2 457	1 1 5 2688	1 1 1 0 2	1 2 2 2
16	233 2 463	1 1 3 845	1 1 1 0 2	1 1 5
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18	236 2 466	1 2 1 6742	1 2 1 1 0 2 1	1 1 1
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20	239 2 469	1 1 5 1997	1 1 1 1 0 2	1 1 5
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22	241 2 471	1 1 5 1 5821	2 2 1 1 0 2	1 1 5
23	242 2 472	1 1 4 1 229	2 1 1 0 2	1 1 4
24	245 2 475	1 1 3 1 352	1 1 1 1 1	1 2 1 7
25	246 2 476	1 1 5 3379	2 1 1 1 1	1 2 1 5
26	248 2 478	1 1 4 1 231	1 1 1 1 1	1 1 1 5
27	252 2 482	1 9 2765	1 1 1 1 1	1 1 1 9
28	254 2 483	1 7 1 3078	1 1 1 1 1	1 1 5
29	255 2 484	1 1 3 2074	1 1 1 1 1	1 2 1 9
30	256 2 485	1 4 2150	1 1 1 1 1	1 2 1 5
31	257 2 486	1 1 4 5146	2 1 1 1 1	1 1 3
32	259 2 488	1 6 1766	1 1 1 1 1	1 1 2 1 0
33	261 2 490	1 2 6758	1 1 1 1 1	1 1 4
34	262 2 491	1 7 3072	1 1 1 1 1	1 1 0
35	267 2 496	1 6 1306	2 1 1 7 3	1 1 7
36	269 2 498	1 1 3 1152	2 1 1 7 3	1 1 5
37	272 2 501	1 1 4 3226	2 1 1 7 3	1 1 2
38	273 2 502	1 1 2 3840	2 1 1 7 3	1 1 0
39	277 2 504	1 4 5837	2 1 1 7 1	1 1 4
40	279 2 506	1 1 2 9984	2 1 1 7 1	1 1 5

Page 2a

1018	32	3		1
1251	21	2		2
1359	63	2		3
23	11	1	1	4
118	21	1	2	5
1037	32	5	3	6
—	1—	1	1	7
12	11	1	1	8
18	11	1		9
84	11	1	1	10
376	41	3		11
950	19	1		12
858	91	3	5	13
367	14	1		14
72	21	1	2	15
143	12	1		16
553	32	3		17
1703	92	5		18
1323	22	2	4	19
43	11	1	1	20
104	12	1		21
38	1	1	1	22
34	41	1	4	23
2010	12	1	1	24
27	11	1	1	25
138	21	1		26
366	14	1		27
1064	53	2	2	28
2017	31	1		29
1142	72	2		30
195	21	1	2	31
2550	29	1		32
2209	74	3	1	33
784	42	2		34
1220	19	1	1	35
149	12	1		36
159	21	1		37
227	22	2		38
1464	73	3	2	39
223	31	2	1	40

SOUTH
TEAM

Page 3

	1	310	1	236	3	2534	1	1	17	1	12		0
	2	317	1	243	9	613	1	1	17	1			6
	3	318	1	244	2	7030	1	1	17	3	2		2
	4	320	1	246	5	1382	2	1	17	4	1		2
	5	323	1	249	5	2995	1	1	17	4	1		5
	6	324	1	250	5	6374	1	1	11	2	2		0
	7	325	1	251	7	6632	1	1	11	2			0
	8	326	1	252	5	2227	1	1	34	4	1		0
	9	335	1	261	2	2304	1	1	28	–	2		0
	10	336	1	262	1	2533	1		28	–	2		0
QUARRY	11	337	1	263	1	4762	2	1	28	–			2
	12	339	1	265	9	1766	2		29	4	2		2
	13	340	1	266	9	4976	2		25	4	1		2
	14	341	1	267	4	2842	1	1	22	2	2		0
	15	343	1	269	–	36			22	2			
	16	345	1	271	5	998			22	1	1		5
	17	347	1	273	3	614			22	1	2		
	18	356	1	282	4	3636			22	2	1		2
	19	357	1	283	5	2381	1	1	22	2	2	1	0
	20	361	1	287	5	922	2		22				6
	21	368	2		3	1920	2	1	26	2	12		0
	22	372	3	2	2	6067	1	1	26	4			2
	23	373	3	3	5	3226		2	26	4			4
	24	374	2	525	4	1306	2	1	26	4	1		4
	25	377	3	5	3	6144	1		26	3			2
	26	378	3	6	3	2534	2		26	1	2	1	4
	27	379	2	423	3	2150	1		26	4	12		6
	28	389	1	227	4	7741	2		27	4	1 2		1
	29	392	1	302	4	2288	2	1	27	4			5
	30	399	1	307	7	2999	2		27	4			3
	31	401	1	202	3	1075	1	1	22	2	2		7
	32	403	1	202	4	8936	1	1	22	2	2		2
	33	404	1	203	3	6374	1		22	2	2		0
	34	406	1	315	5	614	1	1	23	4	2		7
	35	407	1	2 6	5	1306	2	1	22	2			20
	36	415	1	224	4	3533	2	1	11	2	1		0
	37	424	3	8	3	538	2	3	26	4	1		0
	38	428	1	225	5	4454	1	1	23	3	1		0
	39	433	1	234	3	1843	2	1	22	3	2	1	5
	40	444	1	305	4	7142	2	1	23	4			5

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409	23	1	2	1
495	15			2
1553	102	6		3
40	1	1	1	4
754	24	2	1	5
48	1			6
857	52	2		7
74	11			8
4552	63	4	2	9
1593	244	5	2	10
145985	749	8	7	11
792	42	2		12
6812	62	2	2	13
2424	222	2	7	14
2287	52	2		15
8		1		16
41	3	2	2	17
906	32	2	2	18
662	7	2		19
56	1	1		20
206	6	1	2	21
77	3	2	1	22
79	1			23
37	2	2		24
215	3		3	25
75	2	2		26
424	7	2		27
6	2	2		28
51	2	2		29
186	93	3		30
109	4		4	31
2260	212	3	7	32
2832	44	5	3	33
7	1			34
2	1	1		35
2754	102	2	7	36
169	2			37
650	7	3	2	38
	4		4	39
75	2	1	3	40

SOUTH
TEAM

Page 4

1	446	11	347	6 3840	2 1 23 2	2 1 2
2	456	11	357	113 6682	2 1 30 3	3 6
3	458	11	359	115 2381	2 1 30 3	3 5
4	475	11	376	115 2288	11 3 11 2	1 1 1 1
5	481	11	382	115 4839	2 1 23 2	1 5
6	4912	11	393	115 2150	221 111 2	1 1 4
7	4913	11	394	112 2918	1 1 111 2	2 1 7
8	4914	11	395	1 91 1750	221 111 2	1 1 4
9	4917	11	398	11 732333	1 21 111 2	1 11 3
10	503	11	403	115 4454	1 1 8 1	11 1 1 5
11	5110	11	410	115 4454	2 1 1 8 1	12 1 0
12	5111	11	411	115 1459	1 21 8 1	2 1 6
13	5112	11	412	5 3149	1 21 8 1	1 11 7
14	514	11	414	12 261 1	121 8 1	11 1 0
15	523	11	423	114 7296	1 21 8 2	1 1 0
16	534	11	434	113 4838	1 1 8 2	2 2 6
17	536	11	436	115 2995	1 1 13 4	1 3 5
18	537	11	437	1132 6803	1 1 13 4	1 2 4
19	542	11	442	115 11136	1 1 13 4	1 2 4
20	576	11	475	114 3456	2 1 8 4	2 1
21	558	11	457	1 41 4592	2 1 8 3	1 1 3
22	598	11	494	115 2074	2 1 8 3	1 1 4
23	616	11	511	1 3 2633	1 1 11 2	12 11 0
24	617	11	512	11 7 8525	11 1 11 2	1 1 0
25	618	11	513	1 2 2611	11 1 1 2	2 1 0
26	628	11	136	1 3 922	2 3 9 3	11 1 1 1
27	638	11	531	1 12 12442	1 1 11 2	11 2 1 0
28	640	11	533	1 152 7571	1 1 12 1	1 1 0
29	648	11	541	1 4 6144	1 1 1 2	2 1 2
30	649	11	542	113 2534	2 1 1 2	1 2 4
31	659	11	146	115 17971	2 1 7 1	1 0
32	661	11	550	112 9370	2 3 7 1	1 0
33	680	11	569	113 5146	2 3 12 3	11 1 1 0
34	685	11	132	115 2074	1 1 3 2	1 1 2
35	688	11	204	114 1152	2 1 3 1	11 1 1
36	692	4	110	113 25	2 1 3 2	1 1 0
37	695	1	579	113 998	1 1 3 1	1 1 6
38	703	11	586	113 2150	2 1 19 3	1 3 4
39	709	11	592	113 4608	2 1 9 3	2 5
40	716	11	599	112 6374	2 1 19 3	1 2 2

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9841	72	2	1	1
341	32	2	2	2
27	1	1	1	3
9	1	1	1	4
72	2	1		5
26	1	1		6
164	4	2		7
3201	14	1		8
665	62	3	1	9
651	1	1		10
28	1	1		11
42	1	1		12
4841	8	4	5	13
3921	4	2		14
121	2	1	2	15
265	3	1	3	16
82	1	1		17
2313	5	1	5	18
13	1	1		19
130	2	1	2	20
13971	44	2		21
113	1	1		22
24544	23	4	5	23
13351	23	3	2	24
7061	119	3		25
162	2	2	1	26
235	6	3		27
40	1	1		28
1118	72	3	2	29
2118	13	1		30
43	1	1		31
2461	31	2		32
227	13	1		33
31	1	1		34
571	3	1		35
1915	12	1		36
184	12	1		37
112	12	1		38
157	12	1		39
232	31	2		40

UNIT NO

SOUTH TEAM

Page 5

	1	720	1	603	115	2534	2	1	13				2	2
	2	732	1	613	115	4454	1	1	13	1		1	1	4
	3	750	1	633	115	4454	2	1	13	1		1	1	2
	4	753	1	636	112	1306	2	1	13	1		1	1	4
	5	768	1	651	113	1306	1	1	13	3		1	1	1
	6	793	1	676	115	3072	1	1	18	3		1	1	4
	7	504	1	687	113	5533	1	1	15	3		1	1	0
	8	808	1	691	114	3533	1	1	13	3		2	1	5
	9	813	1	696	115	998	1	1	13	3		1	1	4
	10	815	1	698	114	2150	1	1	13	3		1	1	0
	11	819	1	702	115	1075	2	1	12	4			1	2
	12	820	1	116	112	2227	1	1	12	4		2	1	0
	13	823	1	706	115	1459	1	1	13	3		1	1	1
	14	825	1	708	112	2381	1	1	13	3	1	1	1	0
	15	830	1	713	115	538	1	1	12	4	1		1	5
OUT OF	16	274	2	503	112	1382	2	1	17	3		2	1	0
SEQUENCE	17	285	2	512	113	2534	2	1	17	1		1	1	1
	18	295	1	219	113	100	1	1	17				1	7
↓	19	297	1	221	113	2765	2	1	17	1			1	0
	20	299	1	223	115	2150	1	1	17	1		1	1	0
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	22	306	1	232	112	3456	2	1	17	3		1	1	0
	23	305	1	234	112	3917	2	1	17	3			1	0
	24	309	1	235	112	4915	1	1	17	3		2	1	0
	25	367	3	110	113	2058	2	1	26	2		1	1	1
	26	370	2	112	113	1920	2	1	26	4	1		1	2
	27	371	2	522	115	5069	2	1	26	4		1	1	0
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	29	837	1	720	115	5530	1	1	12	4		1	1	0
	30	839	1	141	112	2455			12	4		1	1	0
	31	859	1	742	115	23812	1	1	12	4		1	1	4
	32	60	2	306	4	2227	1	1	18	3	1		1	5
	33	66	2	312	115	4454	1	1	18	3			1	0
	34													
	35													
	36													
	37													
	38													
	39													
	40													

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				Line No.
41	1 1	1		1
57	1 1	1		2
15	1 1	1		3
159	4	2	1	4
177	1 2	1		5
79	1 1	1		6
155	1 2	1		7
80	4 1	1		8
43	1 1	1		9
146	2	1	2	10
12	1 1	1	1	11
152	5	2	4	12
54	2	1	2	13
3501	5	3	2	14
36	1 1	1	1	15
189	3	2	2	16
111	1 2	1		17
183	1 2	1		18
163	1 2	1		19
20	2	1		20
47	2	1		21
404	4 2	1	4	22
402	2 3	2		23
472	5	2		24
175	1 2	1		25
129	1 2	1		26
10	1 1	1		27
80	1 1	1		28
35	1 1	1		29
200	5	2	3	30
20	1 1	1		31
10101	5 4	2	3	32
75	1 1	1		33
				34
				35
				36
				37
				38
				39
				40

NORTH TEAM

Page 5

1	5	1	753	2	5	1920	2 1	39	4		4
2	9	1	757	2	4	614	2 1	39	4		2
3	10	1	758	2	4	845	2 1	39	4		0
4	11	1	759	2	2	538	2 2	39	4		0
5	14	1	21	2	5	768	2 3	37	1		0
6	21	1	769	2	6	614	2 2	37	1	1	0
7	22	1	770	2	5	998	2 2	39	4		0
8	24	1	772	2	5	2304	2 1	39	4		15
9	25	1	773	2	3	500	2 1	39	2		7
10	32	1	780	2	5	300	2 2	43	4		0
11	34	1	782	2	5	768	2 1	43	4		10
12	39	3	123	2	3	16584	2 3	37	4		0
13	43	1	786	2	5	2227	2 1	37	1		7
14	46	1	789	2	5	375	2 1	37	2		10
15	47	1	790	2	2	3456	1 1	37	2		10
16	51	1	179	2	9	2147	2 1	37	2		4
17	52	1	795	2	5	2150	1 1	37	2		0
18	53	1	796	2	2	2689	2 2	40	4	1	0
19	70	1	9	2	5	1459	2 2	43	2		0
20	79	1	818	2	58	7500	2 3	47	4		0
21	80	1	821	2	5	691	2 2	47	4		3
22	56	1	827	2	3	2685	2 1	33	2		18
23	58	1	839	2	5	1766	2 1	33	2		3
24	99	1	840	2	5	9370	1 1	33	1		0
25	05	1	634	2	5	769	2 2	33	3		0
26	109	1	731	2	3	1229	1 1	33	3		0
27	112	1	784	2	4	614	2 2	43	1		0
28	113	1	794	2	3	7680	2 2 2	47	4		0
29	119	1	944	2	5	3533	2 1	33	3		0
30	120	1	945	2	5	1843	2 1	23	3		0
31	126	3	127	2	2	2074	1 2	37	3		0
32	139	3	139	2	3	450	2 1	33	1		4
33	144	3	144	2	7	768	2 2	33	3	1	0
34	145	3	145	2	4	1075	2 2	33	3	1	0
35	152	3	152	2	5	3763	2 3	27	2		5
36	157	2	527	2	2	2995	1 2	27	4		0
37	158	2	113	2	86	1286	2 1	26	4		0
38	163	2	536	2	5	768	2 2	21	1		0
39	164	2	537	2	3	2227	2 1	27	3		0
40	169	2	542	2	4	1229	2 1	20	2		1

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300	6	1	2	5	4
28	1	1	1		5
808	2	5	1	2	6
77	2	1	1	2	7
3	1	1	1		8
162	3	1	1	3	9
33	1	1	1	1	10
4	1	1	1		11
118	1	2	1	1	12
119	1	1	1	1	13
56	1	1	1		14
268	6	1	2	4	15
387	1	4	1		16
319	1	1	1		17
9376	4	7	3	1	18
32	1	1	1		19
420	9	1	5	5	20
24	1	1	1	1	21
62	3	1	1		22
4	1	1	1		23
28	1	1	1		24
9	1	1	1	1	25
5	3	1	2	2	26
49	2	1	2	1	27
1018	1	2	1	1	28
52	1	1	1	1	29
25	1	1	1	1	30
441	2	3	2	1	31
120	2	1	2		32
668	4	2	3	2	33
127	2	1	1	2	34
17	1	1	1		35
287	2	2	2		36
388	6	1	5	1	37
8	1	1	1		38
133		2	1		39
177	2	1	1	2	40

Line No. NORTH TEAM

Page

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3	179	3	161	215	3978	2	1	26	2		1		1	6
4	181	3	68	213	9062	2	1	26	1		1		1	0
5	182	3	164	215	4454	2	1	26	1		1		1	0
6	183	3	165	215	2381	1	1	26	2	1	1		1	0
7	185	3	167	215	50	2	2	26	1	1			1	0
8	194	2	550	212	7971	2	1	21	1		1		1	4
9	198	2	141	214	2304	2	1	21	1	1			1	0
10	204	2	563	215	2227	2	1	21	2	1	1		1	0
OMIT 11	225	2	564	2 6	450	2	2	21	2	1			1	0
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13	234	1	858	215	922	2	2	40	4				1	0
14	266	1	834	215	8 25	1	1	21	2		1		1	0
15	271	1	108	215	2595	2	1	22	1		1		1	0
16	275	1	821	214	300	1	1	22	1	1			1	7
17	277	1	893	213	614	2	2	21	4	1	1		1	0
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19	285	1	901	214	400	2	1	18	2		1		1	5
20	290	1	906	215	845	2	1	15	2		1		1	7
21	320	1	934	215	920	1	1	15	2		1		1	2
22	326	1	940	213	2842	1	3	18	2		1		1	0
23	327	1	941	215	5360	1	1	18	2		1		1	2
24	331	1	945	212	7273	1	3	13	2		1		1	2
25	332	1	946	211	3940	1	1	15	2	1	11		1	0
26	334	1	950	215	998	1		15	4	1	11		1	0
27	342	1	958	213	4070	1	3	18	4	1	1		1	2
28	350	3	176	215	691	1	1	37	1		11		1	3
29	373	1	981	213	1996	2	1	51	3	1			1	2
30	378	1	986	215	300	2	1	51	3	1			1	2
31	384	1	989	213	9123	2	1	46	3	1	1		1	0
32	392	3	197	212	3226	2	1	39	4		1		1	0
33	396	3	121	2 5	382	2	1	29	4	1	1		1	0
34	397	3	192	2 2	4685	2	1	39	4	1	2		1	0
35	399	3	194	2 5	922	2	1	36	2		1		1	4
36	400	3	195	2 5	691	2	1	36	2	1			1	2
37	402	3	197	2 7	998	1	1	36	2		11		1	1
38	403	3	93	2 3	1097	2	1	39	4		1		1	1
39	405	3	199	2 3	2458	2	3	39	4				1	1
40	407	3	43	213	3149	2	1	39	4				1	4

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2	586	7	4	
3	73	1	1	1
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5	11	1	1	
6	8	1	1	
7	61	1	1	1
8	212	3	3	1
9	94	2	2	
10	38	1	1	
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12	9	1	1	
13	42	1	1	1
14	58	1	1	
15	61	1	1	
16	125	2	1	2
17	150	12	1	
18	32	1	1	1
19	138	2	1	2
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21	6	1	1	
22	43	12	1	
23	19	1	1	1
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25	116	2	2	
26	47	1	1	
27	65	2	2	1
28	15	1	1	
29	139	3	1	
30	22	1	1	1
31	53	41	2	
32	292	4	2	
33	1363	14	2	
34	5296	442	4	4
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36	1250	27	2	
37	334	32	2	
38	2536	3	1	9
39	955	15	4	2
40	279	22	1	

NORTH
TEAM

Page 5

1	408	3	183	215	395	2 1 1	46	3			1	2
2	410	3	97	213	400	2 1	39	2		1	1	4
3	412	2	149	215	1 1 52	2 1	30	4	1	1	1	4
4	425	3	214	2 2 2	8570	2 3	39	1	1		1	2
5	441	1	58	213			43	2	1		1	4
6	433	2	205	2 5		1 2	7	1	1		1	0
7	365	1	948	2 2	1811	2 1 3	47	4			1	5

Page 32

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1	1		1 1	230		13	
	1		1 1 1 1	38		1 1 1	1
1 1			1 1 1 1	1689	1	1 132	5 7
			1 1 11	2019		4 1	1 4
				825	1	9 1	3 3

UPLAND SURVEY

Page 2

1	17	1	1004	415	5475		28	4		2	5
2	18	1	1005	415	6600	1	28	4		2	5
3	29	1	1016	415	6150	2	27	4	1	2	3
4	43	3	222	415	12000	2	46	2		2	2

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65	66	Line No
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Line No. OCCURRENCES

Page 10

	1	7	—	2	3	20	1	1	39	4	1	0
	2	10	—	2	6	—	2	1	39	4	1	0
	3	17	—	2	5	2	2	2	39	4	1	30
	4	22	—	2	5	5	2	1	39	4	1	1
	5	161	—	2	4	20	2	2	40	3	1	0
	6	291	—	2	5	—	2	2	47	1	1	0
	7	297	—	2	5	—	2	2	47	4	1	0
OMITTED	8	310	—	2	5	—					1	0
	9	356	—	2	3	50	2	2	33	3	1	0
	10	454	—	2	5	—	2	2	26	1	1	0
	11	528	—	2	6	—	2	2	27	4	1	0
	12	709	—	2	5	—	2	1	39	4	1	4
	13	717	—	2	5	—	1	1	39	1		9
	14	744	—	2	5	20	2	2	42	3	1	0
	15	747	—	2	3	—	2	2	43	4	1	0
	16	85	—	1	5	—	2	1	7	2	1	0
	17	135	—	1	3	20	1	1	6	4	1	5
	18	249	—	1	6	30	2	1	10	2	1	5
	19	372	—	1	5	—	1	1	17	4	1	0
	20	374	—	1	3		1	2	17	3	1	0
	21	290	—	1	3	5	1	3	22	2	1	0
	22	454	—	1	5	5	2	2	26	4	1	0
	23	460	—	1	5	3	2	1	26	4	1	5
	24	501	—	1	5	—	2	2	28	4	1	0
	25	644	—	1	5	—	21	1	8	1	1	2
	26	695	—	1	5	5	2	1	13	4	1	5
	27	774	—	1	4	—	2	1	11	1	1	0
	28	825	—	1	5	—	2	1	7	1	1	7
	29	913	—	1	5	25	2	1	13	1	1	2
	30	020	—	1	5	—	2	1	12	4	1	6
	31	038	—	1	3	—	1	1	12	3	1	5
OMITTED	32	278	—	2/1	5		1				1	
	33											
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263	22	2	1	1
1950	9	1	1	2
98	11	1	1	3
52	1	1		4
100	11	1	1	5
22	21	1	2	6
30	11		1	7
53	11		1	8
109	12			9
83	11			10
515	16	1		11
42	11	1	1	12
12	11	1		13
38	11	1	1	14
267	12	1		15
10	11	1		16
121	12	1		17
595	16	1		18
89	11	1	1	19
114	12	11	1	20
198	12	11		21
86	11	1		22
72	11	1		23
41	11	1		24
76	1	1		25
31	11	1	1	26
67	31	1		27
37	11	1	1	28
53	11	1		29
40	11	1		30
124	12	1	1	31
87	11	1	1	32
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Page 11

Line No.	excavated and other nonsys-tematic sites			* - see site excavation information		
1	*	1	5	5	43	2
2	*	1	10	5	43	2
3		1	23	5	37	1
4		1	52	5	50	1
5		1	62	5	37	2
6		1	106	5	13	1
7		1	114	5	38	2
8	*	1	145	5	53	4
9		1	185	5	40	4
10		2	13	5	—	-
11		2	28	5	—	-
12		2	39	5	—	-
13	*	2	201	5	21	2
14	*	2	205	5	17	1
15	*	2	209	5	7	1
16	*	2	212	5	112	4
17	*	2	215	5	13	4
18		2	236	5	—	-
19		2	73	5	36	2
20		2	94	5	36	2
21	693	4	103	1	2	2
22	81	2	131	1	8	1
23	265	2	116	1	17	3
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Page 12

* see excavation report

1	2	2	1	1
1 1 1 1	*	5	*	2
	1	1	1	3
	1	1	1	4
1 1	4	2		5
	1	1	1	6
1	2	1		7
1	74	2	59	8
1	2	1		9
1	1	1		10
1	2	2	2	11
1	1	1		12
1 1	51	3	34	13
1 1 1 1	*	5	*	14
1 1	*	4	*	15
1 1 1	18	4	1	16
1	2	1		17
	1	1		18
1	*	2	2	19
1	2	2	1	20
1	1	1		21
1 1	2	2		22
1	1	1		23
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SYSTEMATIC
SUBSURFACE
TESTING

Line No.

Page 2

Page 12a

41–50	51–60	61–70	71–75	76–77	78–80	Line No
		715		1		1
		3292	65	3		2
		75	3	2	1	3
		3741	32	2		4
		453	42	3		5
		1781	51	3	1	6
		10321	171	3		7
		603	62	3	3	8
		16	1	1		9
		1141	21	2		10
		1711	271	3		11
		167	12	1		12
		329	14	1		13
		68	31	1	3	14
		1651	12	1		15
		9381	151	3	1	16
		11491	341	4	7	17
		250	71	3	5	18
		26	21	1		19
		200	31	1	3	20
		26	11	1		21
		179	41	2	3	22
		473	11	3		23
		41	2	1	2	24
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Page 13

	Line No	Density Circles w/ Soapstone				
SOUTH	1	87	1	40	7	2
TEAM	2	91	1	0	7	2
	3	98	1	0	7	2
	4	104	1	5	12	4
	5	105	1	15	12	4
	6	122	1	40	7	1
	7	143	1	10	6	2
	8	171	1	15	11	4
	9					
	10	189	1	10	11	3
	11	196	1	10	11	3
	12	227	1	15	10	2
	13	235	1	15	10	2
	14	245	1	10	11	1
	15	246	1	5	11	1
	16	255	1	10	11	1
	17	256	1	5	11	1
	18					
	19	274	1	20	17	3
	20	304	1	2	17	1
	21	309	1	2	17	3
	22	310	1	2	17	1
	23	318	1	2	17	3
	24	324	1	5	11	2
	25	335	1	2	28	4
	26	336	1	5	28	4
	27	339	1	2	28	4
	28	341	1	2	22	2
	29	347	1	2	22	1
	30	357	1	5	22	2
	31	368	1	2	26	2
	32	378	1	2	26	1
	33	379	1	5	26	4
	34	389	1	10	27	4
	35	401	1	2	22	2
	36	403	1	2	22	2
weathered Area	37	404A	1	5	22	2
	38	404B	1	5	22	2
	39	406	1	10	23	4
	40	431	1	5	23	3

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						Line No
25		1	3	1		1
193		1	2	1		2
45		1	1	1		3
689	1	1	2	2		4
124	1	1	5	2	1	5
12		1	1	1		6
71		1	1	1		7
193		1	1	1		8
						9
12			1	1	1	10
3		1	1	1		11
312			1	1	1	12
372	1	1	1	1		13
200			1	1	1	14
27			1			15
190		1	2	1		16
242	1	1	2	2		17
						18
37		1	1	1		19
22		1	1	1		20
284		1	1	1		21
340			1	1	1	22
510	1	1	3	2		23
48		1	1	1		24
311			1			25
568	1	1	8	3	2	26
19		1		1		27
213	1		6	1		28
23			1	1	1	29
8	1		2	1		30
102			3	1	3	31
133		1	1	1		32
97		1	1	1		33
7	1		1	1		34
7			1	1	1	35
5	1		2	1		36
298	1	1	18	3	1	37
72	1	1	3	3	1	38
7	1		1	1		39
43			3	1	3	40

	Line No.	DENSITY CIRCLES W/ SOAPSTONE			Page 14	
	1	446	1	5	23	2
	2	493	1	2	11	2
	3	510	1	10	8	1
	4	511	1	5	8	1
	5	534	1	15	8	2
	6	616	1	2	11	2
	7	618	1	10	11	2
	8	638	1	15	111	2
	9	648	1	10	11	2
	10	809	1	40	113	3
	11	820	1	10	112	4
	12					
NORTH	13	397A	2	—	39	4
TEAM	14	397B	2	—	39	4
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Page 42

					Line No
344		2	1		1
164	1	4	2		2
218	1	1	1		3
42		1			4
012		1	1	1	5
215	1	1	1		6
127	11	3	2		7
175	111	4	3		8
10	1	1	1		9
9	1	1	1		10
24	1	1	1		11
					12
106	11	3	3	1	13
1000	11	9	2		14
					15
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Fiber tempered sites with no soapstone ON SURFACE

Page 15

	1	68	2	314	1	229	1	1	8	3	5
	2	58	2	204	1	843	1	1	9	3	3
	3	130	2	223	1	39 7	1	2	11	4	12
	4	260	2	489	1	845	1	1	11	1	0
	5	420	3	117	1	545	2	1	26	4	15
	6	505	1	405	1	225	2	3	7	22	0
	7	327	1	253	1	1920	2	1	28	2	1
	8	591	1	130	1	1459	2	1	8	3	1
	9	594	1	129	1	1536	2	1	8	3	2
	10	595	1	492	1	5453	1	1	9	3	3
	11	605	1	500	1	750	2	3	1	1	2
	12	822	1	705	1	3072	1	1	12	2	0
	13	843	1	726	1	998	1	1	2	4	1
	14	850	1	733	1	500	2	1	3	3	2
	15	581	1	480	1	2542	1	1	8	1	1
	16	12	1	760	2	200	2	1	27	1	25
	17	57	1	799	2	40	2	2	40	1	0
	18	114	1	807	2	1229	2	2	47	2	0
	19	148	3	145	2	6142	2	3	47	2	0
	20	155	2	155	2	4373	2	2	33	3	0
	21	256	1	875	2	1766	1	1	21	2	0
	22	264	1	882	2	345	2	2	21	2	0
	23	289	1	905	2	2227	1	1	18	2	3
	24	291	1	907	2	2458	2	1	18	2	5
	25	305	1	920	2	1690	2	1	18	4	4
	26	362	2	209	2	4915	2	3	12	4	0
	27	394	3	189	2	845	1	1	39	4	0
	28	420	3	209	2	3532	2	1	42	3	2
	29	422	3	211	2	1997	2	1	42	3	2
	30										
	31		1	34	5				27	2	
LOW →	32	871		——	1	25	2	1			5
DENSITY	33	9		——	2	5	2	2			3
OCCURRENCE	34	154		——	2	0	2	2			0
↓	35	290		——	2	—	2	2			0
	36										
	37										
	38										
	39										
	40										

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Line No

41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

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41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80