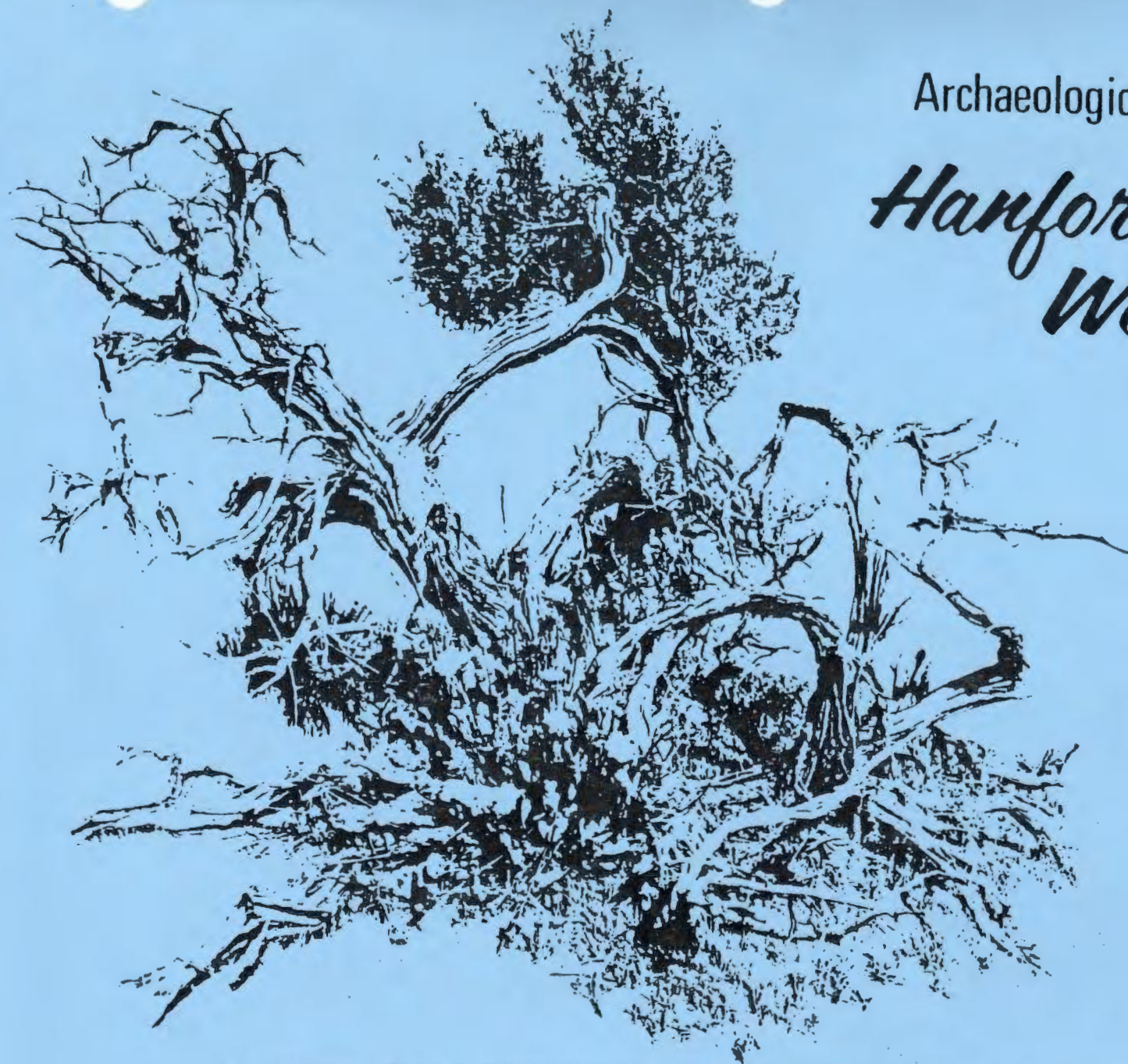


R-316

Archaeological Reconnaissance

Hanford Atomic Works



U.S. ATOMIC ENERGY COMMISSION • NATIONAL PARK SERVICE • WASHINGTON STATE UNIVERSITY

NPR-DEIS-R-316

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ARCHAEOLOGICAL RECONNAISSANCE

HANFORD ATOMIC WORKS

BY

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NATIONAL PARK SERVICE

U.S. ATOMIC ENERGY COMMISSION

WASHINGTON STATE UNIVERSITY

1968

PREFACE

Archaeological reconnaissance of the Hanford Atomic Works was undertaken by Mr. David G. Rice, Laboratory of Anthropology, Washington State University, for the U.S. Atomic Energy Commission, and at the request of the National Park Service. The work was carried out in two phases between 17 June 1968 and 16 October 1968 under National Park Service Contract Purchase Orders #940-487 and #940-82.

This project came about as part of a growing interest of the U.S. Atomic Energy Commission in documenting and preserving American Indian antiquities relative to present and future construction programs. During the fall and winter of 1967 an archaeological reconnaissance of the proposed Ben Franklin Reservoir Area along the Columbia River was conducted for the U.S. Army, Corps of Engineers, on lands owned and controlled by the U.S. Atomic Energy Commission (Rice 1968). The present work is intended to assess the archaeological resources on the remainder of the Hanford Works.

ACKNOWLEDGMENTS

Arrangements for the reconnaissance were made between Mr. Norman G. Fuller, Director of Property Division, U.S. Atomic Energy Commission, Richland Operations Office, and Mr. Paul J.F. Schumacher, Chief of Archaeological Research, Western Region, National Park Service, San Francisco Service Center. The Writer is indebted to both Mr. Fuller, who served as advisor and contract administrator on project, and to Mr. Schumacher, who generously supported the work from the start.

Mr. Frank C. Leonhardy, Staff Archaeologist, Department of Anthropology, Washington State University, administered the contract with the National Park Service.

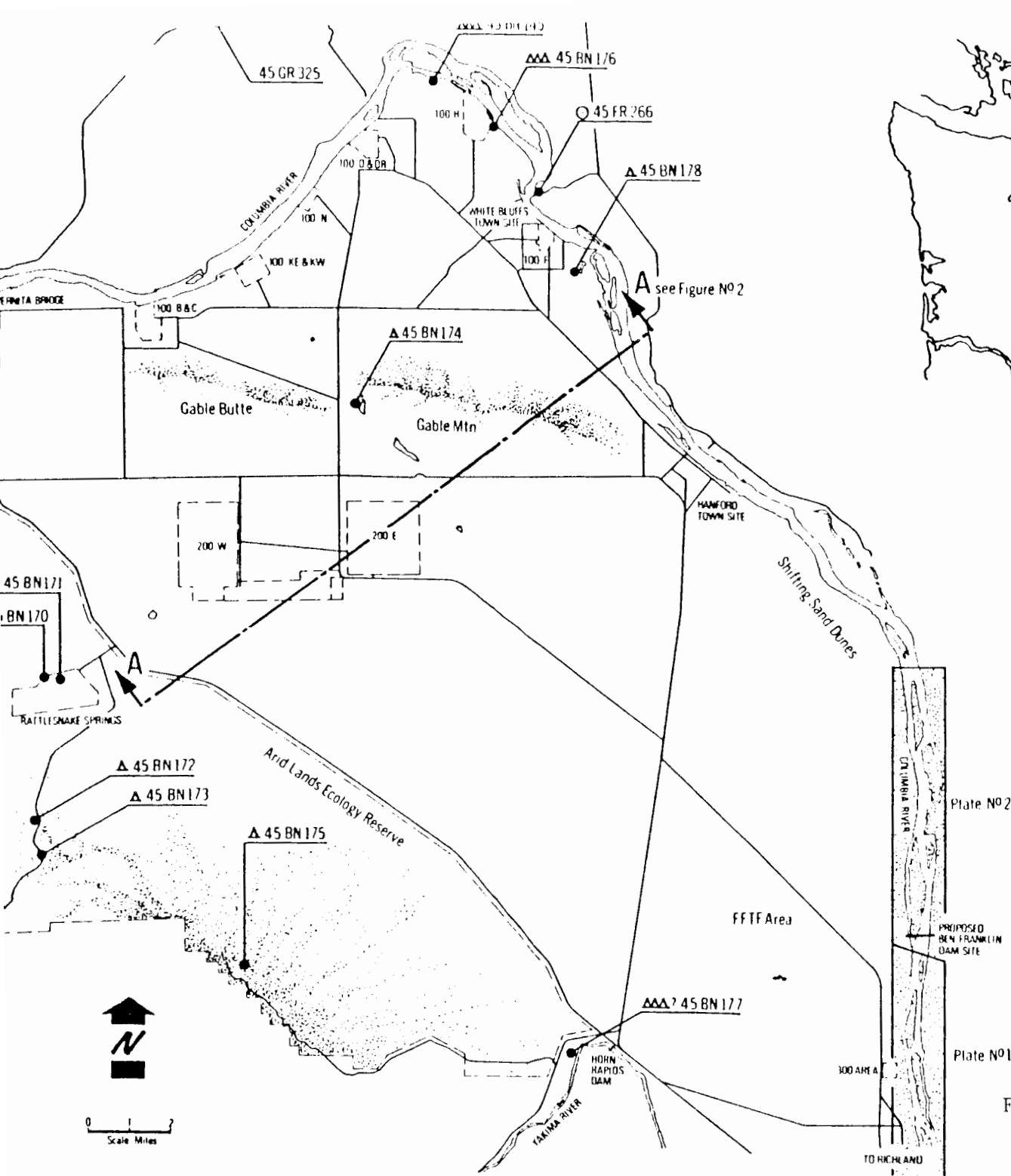
The U.S. Atomic Energy Commission, Richland Operations Office, provided ultimate cooperation and guidance throughout the project. Property Division, Mr. N.G. Fuller, Director, afforded every possible assistance in expediting the reconnaissance and preparation of the final report. Mr. E.A. Palmer, Mr. C.P. Smith, Mr. F.C. Robinson, Mr. R.F. Hart, and Mrs. L.A. Brown were especially helpful in arranging for use of vehicles and other special services. Mr. R.S. Ewing provided office supplies for preparation of this report. Security Division, Mr. F.J. McHale, Director, was of invaluable assistance in providing passes, keys, maps, and other special assistance. Mr. O.R. Simpson, Mr. Wm. George, Mr. H.J. Newton, and Mr. B.J. Rokkan were always most helpful. Mr. H. E. Anderson is to be thanked for his many historical insights and other information relating to the Hanford-White Bluffs area. Mr. G.R. Yesberger, Health and Safety Division, was helpful in pointing out health and safety procedures on project. Mr. P.G. Rhoades, Health and Safety Division, provided a tour of burial areas for radioactive waste materials. Mr. D.J. Zachary, Health and Safety Division, was of assistance in securing a vehicle operator's license. Mrs. N.W. Fraser, Laboratory and University Division, introduced personnel connected with current construction programs. Mr. L.C. Brazley, Laboratory and University Division, provided a plan of the new biology building at the 300 area. Mr. J.L. Rhoades, Laboratory and University Division, helped to provide access into the Hanford townsite. Mr. M.L. Elkins, Engineering and Construction Division, discussed borrow locations and present construction activities.

Several individuals among the prime contractors for the U.S. Atomic Energy Commission are acknowledged for their cooperation and assistance in this project. Personnel of Battelle-Northwest, Pacific Northwest Laboratory, were especially cooperative. Mr. R.E. Brown spent

time in the field with the writer and supplied much geological information relevant to the Hanford Works area. Dr. D.W. Pearce provided maps of the Arid Lands Ecology Reserve and outlined the organization behind its administration. Mr. S.H. Woodcock provided a key to the Hanford townsite. Mr. W.C. Mace supplied the photograph for Plate 7. Mr. W.C. Hanson noted several site locations and suggested sources for historical data. Mr. S.S. Compton Vitro-Hanford Engineering Services, pointed out several site locations and supplied archaeological materials for examination. Mr. Barney S. Flora, Vitro-Hanford Engineering Services, provided an up-dated map of the project area and was of invaluable assistance in preparing the final report, in particular Figures 1 and 2 and Plates 1 and 2. Mr. Don J. Brown, Atlantic Richfield Hanford Company, is thanked for his interest in the project and for a lecture tour designed to stimulate interest in archaeological research. Mr. Gordon E. Towne, ITT Federal Support Services, suggested several archaeological localities to the writer.

Others who contributed to the overall effort of the reconnaissance include Mr. Click Relander, Yakima, who kindly provided the photographs for Plates 3-6 and offered many historical insights; Mr. Charles M. Nelson, Department of Anthropology, University of California at Berkeley, who assisted with the fieldwork; and Mr. E.S. Groves, Department of Physics, University of Pennsylvania, who assisted with the fieldwork. Mr. A.W. Borden, Benton City, pointed out historical and ethnographic sites on the project and was most helpful in precisely locating them. At last, the writer is especially indebted to the families of Mr. Barney S. Flora, Mr. Harold R. Twehus, and Mr. E.M. Woodruff, for moral support, food and lodging, and for personal favors too numerous to list.

The cover was designed by Mr. B.S. Flora, adapted from a photograph by Mr. S.G. Getchell.



Location

Legend

- ▲ Camp Site
- ▲▲ Housepit Site
- ▲▲ ? Possible Housepit Site
- ⊙ Historical Site

Figure 1. Map of the Hanford Atomic Works with archaeological site locations and localities plotted.

INTRODUCTION

The U.S. Atomic Energy Commission's Hanford Works was established in 1943. It is located in the south central part of Washington State and occupies approximately 640 square miles in the Pasco Basin portion of the Columbia Plateau (see Figure 1). At the present time the project is divided into two parts, separated by the northwest-southeast trending State Highway 240: The 100 area reactors, the 200 area chemical separations plants, and the 300 area laboratories are located to the north and east; the Arid Lands Ecology Reserve, administered jointly by the Commission and Battelle-Northwest, is located to the south and west.

Climate and Vegetation

The altitude of the project area ranges from about 350 feet along the Columbia River to almost 3,500 feet at the top of Rattlesnake Mountain. Average annual precipitation ranges from less than 10 inches along the river to 10-20 inches at the summit of Rattlesnake, and in both cases 68% of the annual precipitation falls during the winter months from October through March (Daubenmire 1942: 57). Average annual temperature along the Columbia is about 55 degrees F., with average monthly extremes ranging from 29 degrees F. in January to 76 degrees F. in August (U.S. Department of Commerce, Weather Bureau).

Vegetation on the Hanford Project is characteristically xerophytic and is typified by plant communities belonging to the Artemisia-Agropyron vegetation zone (Daubenmire 1942: 61-64).

Geology of the Area

There are five major stratigraphic units found on the Hanford Project (Jones and Deacon 1966: 2). These are in ascending order the Yakima Basalt Formation, the Ringold Formation, Palouse Soil, unconsolidated glacio-fluvial sediments, and recent deposits. Touchet Beds are present and included as a phase of

the glacio-fluvial sediments. Figure 2 is a geologic cross-section of the project area which shows the relationships of these units. The Yakima basalt is the basal stratigraphic unit in the section, but rises to the surface to form Gable Butte and Gable Mountain. The Ringold Formation is obscured by overlying sediments on the west side of the Columbia, but is exposed in the White Bluffs on the east side of the river. The Palouse Soil is not represented in the section since a major unconformity is present between the Ringold and glacio-fluvial sediments. The glacio-fluvial deposits are derived from both the Columbia River and the floods which formed the channeled scablands during the late Pleistocene. Touchet Beds are lake sediments which are equivalent to the upper portion of the glacio-fluvial sequence and which lie between altitudes of about 400 and 1,150 feet; they have been radiocarbon dated in one locality at about 13,000 years old. Recent windblown materials, colluvium and alluvium, cap the previous units in varying thicknesses. At least three volcanic ash deposits are among these recent materials, including the Glacier Peak ash (12-13,000 years old and associated with lacustrine sediments), the Mt. Mazama ash (6600-6900 years old), and a more recent

but unidentified ash, possibly from Mt. St. Helens or Mr. Rainier (R.E. Brown, personal communication).

In the past, several large-scale floods swelled the level of the Columbia far above its present level (Richmond, Fryxell, Neff, and Weis 1965). R.E. Brown (personal communication) has recognized evidence for at least three of these floods: one possibly 18-22,000 years ago at about 1250 feet, one about 12,000 years ago at 850-900 feet, and one about 8,000 years ago at approximately 500 feet. The significance of these floods for archaeology is to limit the maximum ages of undisturbed sites found at lower elevations. Clearly, sites can be more recent than the limiting dates established. Also, it is possible that cultural materials can be earlier than the limiting dates if they have been deflated, redeposited, or silted-in. In terms of the data at hand, this means that undisturbed archaeological sites found from the edge of the Columbia River at about 350 feet up to an elevation of about 500 feet cannot be earlier than approximately 8,000 years, and undisturbed sites found between 500 feet and 850 feet cannot be earlier than about 12,000 years. Sites found between 850 and 1250 feet could be as early as 18-22,000 years, and sites above 1250 feet have no clear maximum limits to their ages.

Of further geological interest is the occurrence of a fused tuff bed at a contact between basalt flows in Snively Canyon (R.E. Brown, personal communication; Brown 1968), and in the surrounding area generally (Schmincke 1967). The composition and general appearance of fused tuff is very much like opaque obsidian. Obsidian flakes and artifacts found in Washington are generally assumed to have been items of trade derived from obsidian sources in Oregon. Undoubtedly many artifacts thought to be obsidian are fused tuff and thus are derived locally rather than as trade commodities.

Evidence that fused tuff was exploited by the Indians can be cited from the vicinity of American Falls, Idaho, where a cache of projectile point "blanks" was found that included nine specimens manufactured from an obsidian welded tuff from the Walcott formation (Pavesic 1966: 54). More immediate evidence includes a well-rounded nodule of fused tuff found at 45GR318, a camp site located 0.5 miles downstream from Vernita Bridge on the north bank of the Columbia. Thus, there is evidence to suggest that the inhabitants of the area utilized local deposits of fused tuff as well as obsidian derived from trade.

Ethnohistory of the Area

Historically, the Lewis and Clark Expedition (1805-06) marks the time of first white contact with the area now included in the Hanford Project. Lewis and Clark called the people that they encountered in the area the Sokulks, a name possibly derived from a root-food referred to as skolkol (Relander 1956: 28). These people are more commonly known as the Wanapam, or River People, and they traditionally occupied the banks of the Columbia River from Vantage to Pasco.

The Wanapam way of life was based upon an almost continual search for seasonal subsistence resources. Many small seasonal camp sites were scattered along the river during the spring, summer, and fall. Larger, more stable settlements were located at Priest Rapids and Richland during the winter. This way of life persisted up to the time of the establishment of the Hanford Atomic Works in 1943.

Plate 3, a photograph taken in the 1930's, shows a seasonal Wanapam encampment just downstream from present-day 100-H area (see Figure 1, site 45BN176). According to Mr. A.W. Borden, a native of White Bluffs who lived in the house in the background of Plate 3, the Indians came to this locality every year in September and October to fish. They made tule matting for lodges and storage containers (see Plate 4). When they left the area for Priest Rapids each year they would store their lodge poles on a wooden scaffold (see Plate 5) higher on the river bank and cache dried fish, canoes, and other possessions nearby (see Plate 6), safe from the floodwaters of the spring run-off, until their return. Click Belander (1956:305) identifies this exact place as y'yownow (Make Dry Salmon), the place where the Wanapam salmon drying racks were built. He also reports the caches which were dug to store fish, long hemp lines and nets, stone sinkers, and other items. Here, too, three of the last four dugout canoes were kept, but two of them washed away in high water. The third was taken to Richland where it was displayed in front of Lewis and Clark Grade School until it became so weathered and defaced that it was removed to the dump. According to Belander the site at 45BN176 was one of the main Wanapam seasonal camps until evacuation became necessary when the Hanford Project was established.

According to the estimate of Lewis and Clark in 1805 the Wanapam numbered about 3,000 individuals (Gibbs 1855). Today there are a mere handful of Wanapam living at Priest Rapids and on the Yakima Reservation.

Following Lewis and Clark were David Thompson in 1811 and a host of Hudson's Bay Company fur traders thereafter, including Ross Cox and Alexander Ross among others. In 1853 the first wagon train, the Longmire Party, passed through the project area. Between 1853-54 the U.S. Army Corps of Engineers conducted surveys to map and document the Indian trails and mountain passes and to recommend the most feasible routes for a railroad to the Pacific.

During the period of the Yakima Indian War (1855-58) a military Depot Camp was maintained on the east bank of the Columbia at White Bluffs (see Figure 1, site 45FR266). One of the buildings dating from this period remains intact (see Plate 7). Reportedly it was used as a blacksmith shop. After 1858 the old Depot Camp served as a trading post for the Indians until the white settlers became numerous.

White settlers began appearing in the 1860's and 1870's. In 1878 Lorenzo Perkins and his wife, White Bluffs homesteaders, were killed by Indians near Rattlesnake Springs (see Figure 1, site 45BN170). In 1880 the White Bluffs ferry was established, and in the following years many homesteads sprang up in the Hanford-White Bluffs area and on the Wahluke Slope. White Bluffs was founded in 1907. In 1908 post offices were opened at White Bluffs, Wahluke, Haven, and Mitchell. Hanford was opened to homesteaders in 1909. Finally, in 1943 the Manhattan District of the U.S. Army Corps of Engineers began evacuation of the area and the Hanford Project came into existence.

Previous Archaeology in the Area

Prior to 1943 the only archaeological work in the area was that conducted at Wahluke by H.W. Krieger of the U.S. National Museum (Krieger 1928). After 1943 archaeological work amounted to nil until the archaeological reconnaissance of the proposed Ben Franklin Reservoir area (Rice 1968). Of the 105 sites recorded in the reservoir area about 85 sites fall within the boundaries of the Hanford Project.

Archaeological work in adjacent areas has been summarized elsewhere by Rice (1968: 2).

Other Related Studies in the Area

Research on the Arid Lands Ecology Reserve (known as "Project ALE" and located in the southwestern portion of the Hanford Works) is jointly administered by the Commission and Battelle-Northwest. Studies in this area primarily emphasize the ecology of plant and animal communities, but also include geological and climatological research. In the future, archaeological and paleontological researches may also be included. At least the archaeological reconnaissance suggests considerable potential for such studies.

THE RECONNAISSANCE

Except for the area of the proposed Ben Franklin Reservoir (Rice 1968), the Hanford Atomic Project has never been officially surveyed for archaeological resources. Since 1943 the area of the project has been restricted to the public so that the sites reported here have not been as susceptible to destruction from relic collectors as sites outside the area. These sites are, however, subject to disturbance or destruction by construction projects, road improvements, power transmission line maintenance, borrow pits, and the like. This reconnaissance was conducted in order to document archaeological site locations so that disturbance or destruction can be minimized. Where destruction of a site is inevitable, and the site is recommended for test excavation (see the Site Index and Table 1), then funds should be provided for salvage. This should be done sufficiently in advance of construction activities so that there are no delays.

Field Methodology

Survey work was carried out on a full-time basis between 17 June and 16 October 1968. During this time a large portion of the 640 square miles comprising the reservation was covered on foot and by automobile. The objective of the survey was to determine the numbers, extent and quality of any archaeological, paleontological or historical sites located on the reservation. In most cases this was possible solely on the basis of surface examination, but in some cases test excavation was required.

Identification of Sites and Localities

Archaeological sites are those areas containing evidence of man's habitation or activity, and may be identified by concentrations of fire-cracked rock from cooking fires, flaking detritus, bone and shell, or artifacts. In some cases structural remains such as housepits or cache pits define sites, but for the most part they consist of concentrations of camp rock. Sites also include areas of specific utilization such as burial sites, fishing stations, or flaking floors; often they represent a combination of these uses as indicated in Table 1.

Archaeological localities are large areas over which small scatterings of cultural materials occur. In all cases these finds are limited to the surface.

SUMMARY OF FINDINGS

The following is a summary of the findings of the reconnaissance. It is presented according to the priorities for covering the area. General observations about the sites encountered are then discussed.

Area Priorities and Coverage of the Reconnaissance

First priority was given to specific areas proposed for construction in the near future.

The first area covered was the Northern Pacific Railroad right-of-way on Wahluke Slope. The proposed railroad branch line between Mesa and Mattawa will run parallel to State Highway 11-A and 800 feet south of it. The line will run for a total of 13.5 miles on Commission lands. This entire length was traversed, revealing several flaking floors on small knolls at the western end of project lands (see Figure 1, site 45GR325).

The general locality of the proposed FFTF (Fast Flux Test Facility) reactor (Sec. 17, 18 and 20, T.11N., R.28E., W.1/2) was thoroughly examined. The rolling, sand-capped, gravel hills found in this area failed to disclose evidence for archaeological materials.

The site of the new biology building southeast of the 300 area was examined and yielded evidence for an archaeological site along the river bank (see Plate 1, site 45BN106). Since construction will begin soon an effort was made to salvage portions of the site before that time.

Second priority was given to burial sites

for solid and liquid wastes and radioactive contaminants.

Existing burial sites in the 100 areas, 200 areas, and the 300 area were visited and checked for antiquities. None of these areas contained archaeological sites. Some archaeological sites along the river, however, may be affected by low-count radioactive contaminants carried by water seepage and effluents from the 100 areas. Examples include 45BN135 at 100-F area, and 45BN149, 45BN150, and 45BN151 between 100-N and 100-K reactors (see Rice 1968 for site locations). While it may be possible to excavate these sites, organic materials recovered such as charcoal and shell probably will not be suitable for radio-carbon analysis. Future burial areas for radioactive contaminants will be located on the 200 area plateau, and current burial sites in other parts of the reservation are gradually being terminated in order to expedite this shift. No evidence for archaeological sites was encountered on the plateau around the 200 areas.

Water cooling ponds north of the 200-E area were also visited. The pond located closest to 200-E area contains plutonium particles discharged from the 200 areas and is too hazardous from a health and safety standpoint to consider for archaeological reconnaissance. A second pond, called Honey Lake, adjoins a small archaeological site (see Figure 1,

site 45BH174).

Third priority was given to areas adjacent to the Columbia River that are likely for industrial development.

Areas adjacent to but outside of the proposed Ben Franklin Reservoir area were examined from North Richland to Vernita Bridge. Between North Richland and the shifting sand dunes 14 sites were recorded. These are located on Plates 1 and 2. Between the west bank of the Columbia opposite Ringold Flat and the Hanford townsite a number of wind-deflated camps were observed (the Shifting Dunes Locality). Between Hanford townsite and Vernita Bridge the lands away from the river are constituted by old gravel river terraces capped by a thin mantle of fine unconsolidated material, including water deposited Mazama ash. This part of the reconnaissance was void of archaeological finds with the exception of the black sand dune area just west of the 100-F area slough (see Figure 1, site 45BH178).

Last priority was given to remaining portions of the reservation.

The western segment of Gable Butte was traversed and found to contain scattered surface indications of aboriginal use (see Figure 1, Gable Butte; and Plate 8).

Likewise, the eastern and western portions of Gable Mountain were examined and found to yield surface finds (see Figure 1, Gable Mountain).

Five archaeological sites were recorded

on the Arid Lands Ecology Reserve (see Figure 1, sites 45BH170-173, 175). These sites are not the result of an exhaustive examination of ALE lands, but they are representative of the kinds of sites that can be found on the reserve. Plate 9 shows the general character of the ALE lands.

The Number and Type of Sites Recorded

In all, the reconnaissance documented 26 archaeological sites. These include several overlapping types of sites such as open camp sites, ethnographically reported camp sites, flaking floors, fishing stations, and a historic site (see Rice 1968: 21-22 for the identifying criteria of these site types). Table 1 summarizes the number and types of sites. In addition, three localities were recorded which are too large and generalized to be recorded as sites.

Patterns of Site Locations

Most of the archaeological sites on the Hanford Project are found along the lower terraces of the Columbia River. These sites tend to be long and narrow, following the river bank, and seem to occur at rapids or eddies where both fish resources and driftwood for fires must have been more plentiful. Away from the river habitation sites are much less common and are directly linked to the availability of water resources, such as springs or small streams. On Project ALE lands, for instance, it can be expected that small sites will occur at springs, at the confluence of small streams, sheltered banks along streams, and at the mouths of major canyons.

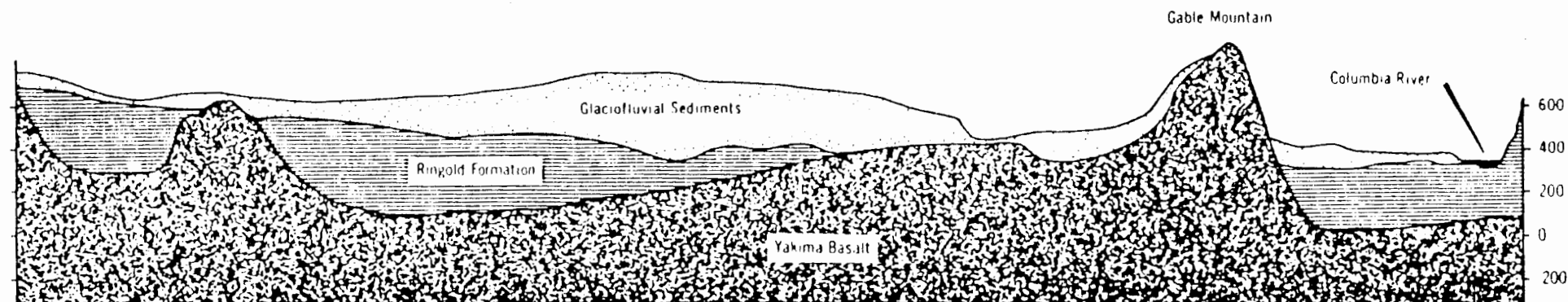


Figure 2. Geologic Cross Section of the Hanford Project taken from the base of Rattlesnake Mountain to the White Bluffs (see A-A on Figure 1). Adapted from Jones and Deacon (1966).

The connection between water resources and sites is an important observation in this area. First of all, this is one of the longest stretches of the Columbia River that does not have tributary streams of any sort. Secondly, the geologic cross section (see Figure 2) of the area reveals that away from the river subsurface materials are sufficiently permeable that their contained water is essentially unconfined and drains down to a base level adjusted to that of the Columbia River, roughly 300-400 feet beneath the highest portion of the 200 area plateau (Jones and Deacon 1966: 3). And thirdly, the topographic position of the Hanford Works is close to the base of the Pasco Basin and would be an area more critically affected by climatic changes than areas at higher elevations. This means that the Altithermal climatic phase, a period between about 6000 B.C. and 2000 B.C. which was warmer and dryer than today, must have necessitated adaptive changes in the cultural way of life of the people who inhabited the area so that they either moved out of the basin and/or led

a more intensified riverine life. These, then, are three facets of the same reason explaining why sites away from the river are rare until the Rattlesnake Hills are reached.

The Antiquity of Sites on the Hanford Works

In some cases the age of a site can be roughly determined from the styles of projectile points found there. This can be done by thoughtful comparison of the points found with points from a context that is known and dated by radiocarbon and tied to geological events. The best standard of reference in this area is the Marmes Rockshelter on the lower course of the Palouse River. At Marmes Rockshelter a sequence of projectile points has been established that spans at least 10-12,000 years (Fryxell and Daugherty 1963; R.D. Daugherty, personal communication). The basic outline of this sequence is presented in the lower half of Figure 3. The two points to the right in the top half of the figure come from the Hanford Project near Rattlesnake

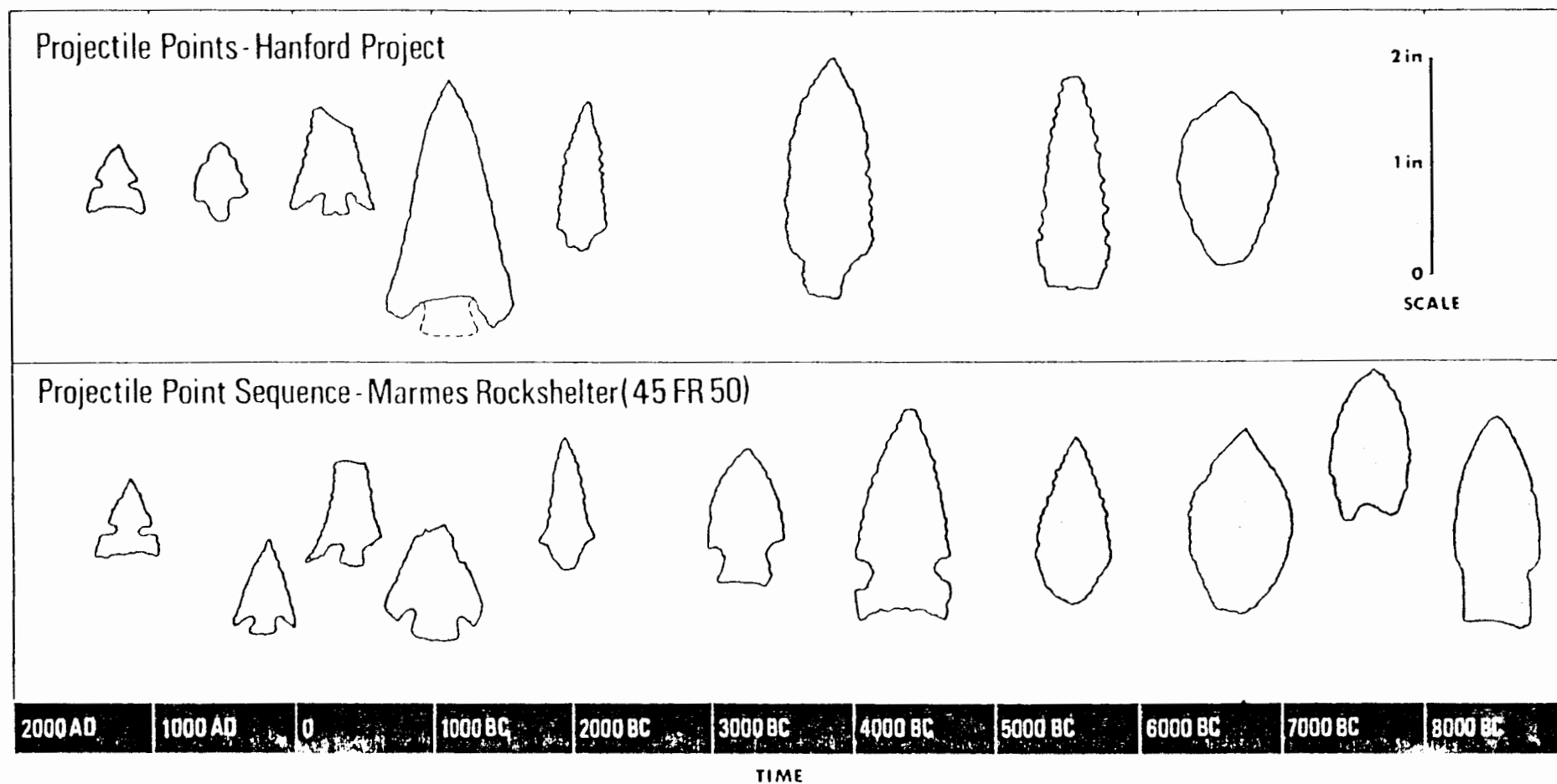


Figure 3. Projectile point sequence. The lower row illustrates the stylistic changes in projectile point forms through time at Marmes Rockshelter. The upper row shows comparable forms found on project.

1 1

Springs (see Figure 1, site 45BH171) and probably range in age from 4500 B.C. to 6500 B.C. These were the earliest-looking materials encountered during the reconnaissance. Points from several sites along the river fill out the recent end of the sequence, but there are many gaps.

The Archaeological Significance of the Sites

The pattern of archaeological sites on the Hanford Project reflects a basically riverine adaptation of the prehistoric peoples to the area. This places a premium on the few sites that do occur away from the river. It will be especially important to obtain any kind of material from these sites in order to precisely ascertain their age range and seasonal period of occupancy.

One of the important objectives of any future work will be to establish a local sequence similar to that suggested in Figure 3, and to document local environmental events which relate to that sequence. In this regard, there are many opportunities for cooperative research in geology and ecology with Battelle-Northwest. In short, the archaeological significance of the sites reported here is substantial.

SITE INDEX

The following is a catalog of 26 sites and three localities recorded by the reconnaissance. Figure 1 and Plates 1 and 2 indicate their locations. Table 1 summarizes the recommendations made for each site listed below.

Archaeological Sites

45BN101

This is an open camp site located on the southeastern end of the island opposite the old townsite of North Richland. (SE $\frac{1}{4}$ of the NW $\frac{1}{4}$ of Sec. 25, T.10N., R.28E., W.M.).

The site consists of concentrations of shell and camp rock. It is 100 feet long and about 50 feet wide.

Artifacts encountered include cobble tools. Surface collection is recommended.

45BN102

This is an open camp site located on the east side of the island opposite the old townsite of North Richland. (SW $\frac{1}{4}$ of the NW $\frac{1}{4}$ of Sec. 24, T.10N., R.28E., W.M.).

The site consists of concentrations of shell and camp rock, and a hearth area exposed in the river bank. It is 300 feet long and 150 feet wide.

Artifacts include cobble hammerstones and a hopper mortar.

Test excavation is recommended.

45BN103

This is an open camp site located on the northeastern end of the island opposite the old townsite of North Richland. (NW $\frac{1}{4}$ of the NW $\frac{1}{4}$ of Sec. 24, T.10N., R.28E., W.M.).

The site consists of concentrations of camp rock. It is 150 feet long and about 75 feet wide.

Artifacts encountered include cobble tools and notched pebble sinkers.

Surface collection is recommended.

45BN104

This is an open camp site located on the west bank of the Columbia at the northeastern corner of the old townsite of North Richland. (Center of the NE $\frac{1}{4}$ of Sec. 14, T.10N., R.28E., W.M.).

The site consists of scattered concentrations of camp rock along the river bank. There is also some possibility of housepits back from the bank, but this is inconclusive due to considerable disturbance from the old construction camp at North Richland. The site is 350 feet long and about 150 feet wide.

Artifacts encountered include corner-notched projectile points, scrapers, cobble hammerstones, cobble tools, and hopper mortars.

Test excavation is recommended.

45BN105

This is a possible housepit site located on a sheltered bench 1.0 miles north of the old North Richland townsite. (SW $\frac{1}{4}$ of the SE $\frac{1}{4}$ of Sec. 11, T.10N., R.28E., W.M.).

The site consists of scattered concentrations of camp rock along the river bank and may include as many as four or five housepits on the beach above the bank. The site is about 200 feet long and 150 feet wide.

Artifacts encountered include cobble tools and a hopper mortar.

Test excavation is recommended.

45BN106

This is an open camp site located immediately to the southeast of the 300 area along the river bank. The new biology building will be constructed on the bench above the bank. (Center of Sec. 11, T.10N., R.22E., W.M.).

The site consists of scattered concentrations of camp rock, flakes, and shell. It is about 400 feet long and 150 feet wide.

Artifacts encountered include stemmed projectile points, cobble tools, and hopper mortars.

No further work is recommended.

45BN145

This is an ethnographically reported camp site located on the south bank of the Columbia opposite a large island upstream from Locke Island. (NW $\frac{1}{4}$ of Sec. 12, T.14N., R.26E., W.M.).

The site consists of three or four mat lodge depressions on a gravel bar close to water's edge. Much camp rock and many flakes are scattered around the encampment. The site was reportedly last occupied about 1915.

Artifacts encountered include cobble tools, hopper mortars, a chipped stone knife, corner-notched projectile points, and a grooved net weight.

Surface collection is recommended.

45BN162

This is an open camp site located along the river bank at the 300 area. (SE $\frac{1}{4}$ of the SW $\frac{1}{4}$ of Sec. 11, T.10N., R.28E., W.M.).

The site consists of scattered concentrations of camp rock, flakes, and shell. It is about

600 feet long and 150 feet wide.

Artifacts encountered include cobble tools, notched pebble sinkers, grooved net weights, hopper mortars, a glass trade bead, and a military button.

Surface collection is recommended.

45BN163

This is a possible housepit site located on the west bank of the Columbia just opposite the lower end of the island immediately upstream from the 300 area. (E $\frac{1}{2}$ of the NW $\frac{1}{4}$ of Sec. 2, T.10N., R.28E., W.M.).

The site consists of scattered concentrations of camp rock, flakes, shell. Several hearth areas are exposed in the bank and there are five or six oval-shaped depressions strung in a line on the bench above the bank, suggesting housepits. The site is about 400 feet long and 100 feet wide.

Artifacts encountered include cobble tools, hopper mortars, and a faceted blue-glass trade bead.

Test excavation is recommended.

45BN164

This is an open camp site located on the southern end of the island just upstream from the 300 area. (Center of Sec. 2, T.10N., R.28E., W.M.).

The site consists of scattered concentrations of camp rock, flakes, and shell. It is about 250 feet long and 200 feet wide.

Artifacts encountered include cobble tools, notched pebble sinkers, and corner-notched projectile points.

Test excavation is recommended.

45BN165

This site is a fishing station located on the west bank of the Columbia about 1.0 miles north

of the 300 area. (NE $\frac{1}{4}$ of the SW $\frac{1}{4}$ of Sec. 35, T.11N., R.28E., W.M.).

The site consists of concentrations of cobble tools and notched pebble sinkers. It is about 125 feet long and 30 feet wide.

No further work is recommended.

45BN166

This is an open camp site located on the west bank of the Columbia about 1.7 miles north of the 300 area. (SW $\frac{1}{4}$ of the SE $\frac{1}{4}$ of Sec. 26, and the W $\frac{1}{2}$ of the NE $\frac{1}{4}$ of Sec. 35, T.11N., R.28E., W.M.).

The site consists of scattered concentrations of camp rock. Several hearth areas are eroding out of the bank. The site is about 300 feet long and 75 feet wide.

Artifacts encountered include cobble tools and a grooved net weight.

Test excavation is recommended.

45BN167

This is an open camp site located on the west bank of the Columbia about 2.1 miles north of the 300 area. (SW $\frac{1}{4}$ of the NE $\frac{1}{4}$ of Sec. 26, T.11N., R.28E., W.M.).

The site consists of concentrations of camp rock, flakes, and shell. Hearth areas are eroding out of the bank and it is possible that there are some filled-in housepits on the bench above the bank. The site is about 350 feet long and 100 feet wide.

Artifacts encountered include cobble tools, notched pebble sinkers, hopper mortars, a contracted-stemmed projectile point, and a blue-glass trade bead.

Test excavation is recommended.

45BN168

This is a housepit site located about

100 yards south of the lower end of Wooded Island on the west bank of the Columbia, or approximately 2.4 miles north of the 300 area. (NW $\frac{1}{4}$ of the NE $\frac{1}{4}$ of Sec. 26, T.11N., R.28E., W.M.).

The site consists of four or five housepit depressions on a bench overlooking the river. It is about 100 feet long and 50 feet wide.

No artifacts were encountered.

Test excavation is recommended.

45BN169

This is a housepit site located on a bench on the west bank of the Columbia about 0.3 miles northeast of the Benton Substation. (NW $\frac{1}{4}$ of the NE $\frac{1}{4}$ of Sec. 11, T.11N., R.28E., W.M.).

The site consists of eight to 10 housepits and shows scattered concentrations of camp rock, flakes, and shell at the base of the river bank. It is 200 feet long and 150 feet wide.

No artifacts were encountered.

Test excavation is recommended.

45BN170

This is an open camp site located at Rattlesnake Springs, which lies at the terminus of Yakima Ridge. (SE $\frac{1}{4}$ of Sec. 20, T.12N., R.25E., W.M.).

The site consists of scattered concentrations of camp rock and flakes. It is severely eroded by wind deflation and is superimposed upon geological units which contain at least three volcanic ashes. It is about 600 feet long and 400 feet wide. Historically, this is the site of the Perkins Massacre which took place on or about July 10, 1878.

No artifacts were encountered.

Test excavation is recommended.

45BN171

This is an open camp site located about 0.2 miles east of Rattlesnake Springs on the north bank of Dry Creek. (Center of the SW $\frac{1}{4}$ of Sec. 21, T.12N., R.25E., W.M.).

The site consists of small quantities of camp rock and scattered flakes. It has been severely eroded by wind deflation. The site is about 300 feet long and 150 feet wide.

Two leaf-shaped points were encountered.
Test Excavation is recommended.

45BN172

This is an open camp site located about 0.25 miles from the mouth of Snively Canyon on the east side of the road. (NW $\frac{1}{4}$ of the SW $\frac{1}{4}$ of Sec. 5, T.11N., R.25E., W.M.).

The site consists of scattered camp rock and flakes. It is about 150 feet long and equally wide.

Artifacts encountered include a corner-notched projectile point.

Test excavation is recommended.

45BN173

This is an open camp site located at the Snively Ranch. (NE $\frac{1}{4}$ of the SW $\frac{1}{4}$ of Sec. 8, T.11N., R.25E., W.M.).

The site consists of a few flakes, bone fragments, and some firecracked rock exposed in a bank to the southwest of the ranch house about 30 feet. It is about 50 feet long and 30 feet wide.

Artifacts encountered include a pestle and a piece of worked antler.

Test excavation is recommended.

45BN174

This is an open camp site located on the western side of Honey Lake, just south of the

western terminus of Gable Mountain. (SW $\frac{1}{4}$ of the NE $\frac{1}{4}$ of Sec. 22, T.13N., R.26E., W.M.).

The site consists of a concentration of camp rock and flakes. It has been severely eroded by wind deflation. The site is about 75 feet long and 50 feet wide.

Artifacts encountered include corner-notched and contracted-stemmed points, and a bifacially flaked cobble tool.

Test excavation is recommended.

45BN175

This is an open camp site located at a spring close to the summit of Rattlesnake Mountain. (SE $\frac{1}{4}$ of the SW $\frac{1}{4}$ of Sec. 30, T.11N., R.26E., W.M.).

The site consists of scattered flakes on a rather rocky surface with a small amount of fill. The site has been largely destroyed by construction of a pumphouse and bulldozing for a road and transmission line. It is about 50 feet long and 30 feet wide.

Artifacts encountered include small stemmed and corner-notched projectile points.

No further work is recommended.

45BN176

This is an ethnographically reported camp site located about 0.2 miles east of 100-H area. (NW $\frac{1}{4}$ of the SW $\frac{1}{4}$ of Sec. 17, T.14N., R.27E., W.M.).

The site consists of three or four mat lodge depressions on a gravel bar, and a cache of belongings in an adjacent bank. Much camp rock and a few flakes are scattered around the encampment. The site was last occupied about 1942.

No Artifacts were encountered.

Test excavation of the cache is recommended.

45BN177

This is an open camp site located at the old site of Columbia Camp, just west of the Horn of the Yakima River. ($SE\frac{1}{4}$ of Sec. 4, T.10N., R.27E., W.M.).

The site consists of scattered concentrations of camp rock, flakes, and shell. Along the upstream part of the site there is some possibility of housepits. The eastern end of the site has been destroyed, however, by bulldozing for a recreation area. It is about 800 feet long and 200 feet wide.

Artifacts encountered include cobble tools, corner-notched and small side-notched projectile points.

Test excavation at the west end of the site is recommended, otherwise no further work.

45BN178

This is an open camp site located on the west bank of the 100-F area slough in a sand dune. ($NE\frac{1}{4}$ of the $NE\frac{1}{4}$ of Sec. 4, T.13N., R.27E., W.M.).

The site consists of scattered concentrations of camp rock and flakes. It is about 400 feet long and 300 feet wide.

Artifacts encountered include a corner-notched projectile point.

Surface collection is recommended.

45FR266

This is a historic site located on the east bank of the Columbia opposite East White Bluffs townsite. ($E\frac{1}{2}$ of Sec. 29, T.14N., R.27E., W.M.).

The site consists of scattered concentrations of camp rock, flakes, and shell. In addition, the site is of historic interest

because of a small log house which was reportedly built in the 1850's and used as a blacksmith shop. The site is about 2000 feet long and 500 feet wide.

Artifacts encountered include cobble tools, notched pebble sinkers, pestles, small corner-notched points, glass trade beads, and a clam shell disc bead.

Test excavation of the site and preservation of the log structure is recommended.

45GR325

This site is a flaking floor located on the Wahluke Slope above the White Bluffs and south of State Highway 11-A. ($N\frac{1}{2}$ of the $NW\frac{1}{4}$ of Sec. 6, T.14N., R.26E., W.M.).

The site consists of scattered cores and chipping detritus. These have been exposed by wind deflation on the tops and sides of small knolls along Northern Pacific Railway right-of-way.

Artifacts encountered include cores and corner-notched projectile points.

No further work is recommended.

Archaeological LocalitiesGable Butte Locality

The Gable Butte locality lies a short ways to the south of 100-B and 100-K areas. It includes area in Sections 13 and 14, T.13N., R.25E., and Sections 18, 19, and 20, T.13N., R.26E., W.M.

Several flakes and rock piles were found along the top of the ridge at the western end of the locality.

Corner-notched projectile points were encountered from this locality.

Further surface examination is recommended.

Gable Mountain Locality

The Gable Mountain Locality lies to the northeast of 200-E area. It includes area in Sections 13, 14, 15, 22, 23, 24, T.13N., R.26E., and Sections 18, 19, 20, and 21, T.13N., R.27E., W.M.

Relander (1956:306) reports that this locality was one of the principal places where Indian boys and girls were sent on their spirit quests.

A corner-notched projectile point was encountered.

Further surface examination is recommended.

The Shifting Dunes Locality

The Shifting Dunes locality lies along the west bank of the Columbia opposite Ringold Flat and the lower end of Savage Island. It includes area in Sections 8, 9, 15, 16, 17, 18, 19, 20, 21, 22, 23, 26, 27, and 28, T.12N., R.28E., W.M.

This locality evidently contains numerous small camp sites that have been deflated by wind erosion and then buried by the shifting sands.

Corner- and basal-notched projectile points were encountered.

Further surface examination is recommended.

RECOMMENDATIONS

The previous sections, together with Figure 1 and Plates 1 and 2, document the locations of the 26 archaeological sites and three localities recorded by the reconnaissance. Salvage of certain of these sites is recommended when they are threatened by disturbance or destruction from construction activities. This section will summarize the sites appropriate for archaeological salvage, estimate the length of time necessary for salvage, and estimate the current cost of salvage. Salvage recommendations are estimated on a site-by-site basis so that specific sites that may be affected by construction activities can be figured into the long-range construction planning and budgeted accordingly.

Priority of Sites for Archaeological Salvage

The site index refers to sites having three orders of salvage priority: test excavation, recommended for 17 sites; surface collection, recommended for five sites; and no further work, recommended for four sites.

Test excavation is recommended where selective test pitting is required in order to answer specific questions regarding the age of a site, its extent, and/or the number of components that it contains. Surface collection is recommended where it is felt that additional field examination is required in order to obtain all possible materials. No further work is recommended where the site has been badly disturbed or destroyed.

Time Required for Archaeological Salvage

Table 1 itemizes the time in weeks required for the salvage of each site recorded. Sites recommended for surface collection are not included in the time estimate since these may be examined while test excavations are being conducted at adjacent sites.

Estimate of the Current Cost of Salvage

Salvage costs are based on the proportion of time that is required to salvage each site out of a field season of ten weeks. The size of excavation unit recommended here is a crew of six. The current basic cost to support unit is calculated by multiplying the following itemized costs by the number of weeks (expressed in tenths of a field season) required for salvage.

Test Excavation Unit. (Based on a field season of 10 weeks).

Wages: 1 Experienced graduate	
level field worker @ \$650/mo.	\$1,625
5 Experienced field	
workers @ \$450/mo.	5,625
Overhead: Computed at 50% of	
total wages	3,625
Subsistence: Calculated at	
\$3/person/day	1,350
Supplies and Materials.	100
Photographic Work	50
Report Preparation and Printing . .	300
	<hr/>
	\$12,075

SITE NUMBER	OPEN CAMP SITE	HOUSEPITS PRESENT	POSSIBLE HOUSEPITS	ETHNOGRAPHIC CAMP SITE	FISHING STATION	FLAKING FLOOR	HISTORIC SITE	TEST EXCAVATION	SURFACE COLLECTION	NO FURTHER WORK	TIME IN WEEKS REQUIRED FOR SALVAGE	ESTIMATED COST FOR SALVAGE IN 1968
	SITE TYPE							RECOMMENDATION				
45BN101	X	-	-	-	X	-	-	-	X	-	----	-----
45BN102	X	-	-	-	X	-	-	X	-	-	0.50	\$ 925
45BN103	X	-	-	-	X	-	-	-	X	-	----	-----
45BN104	X	-	X	-	X	-	-	X	-	-	0.50	900
45BN105	X	-	X	-	X	-	-	X	-	-	1.00	1,535
45BN106	X	-	-	-	X	-	-	-	-	X	----	-----
45BN145	X	X	-	X	X	X	-	-	X	-	----	-----
45BN162	X	-	-	-	X	-	-	-	X	-	----	-----
45BN163	X	-	X	-	X	-	-	X	-	-	1.00	1,535
45BN164	X	-	-	-	X	X	-	X	-	-	1.00	1,535
45BN165	-	-	-	-	X	-	-	-	-	X	----	-----
45BN166	X	-	-	-	X	-	-	X	-	-	0.50	900
45BN167	X	-	X	-	X	X	-	X	-	-	1.00	1,570
45BN168	X	X	-	-	X	-	-	X	-	-	1.00	1,570
45BN169	X	X	-	-	X	-	-	X	-	-	1.00	1,570
45BN170	X	-	-	-	-	X	-	X	-	-	1.00	1,550
45BN171	X	-	-	-	-	-	-	X	-	-	0.50	915
45BN172	X	-	-	-	-	X	-	X	-	-	0.50	950
45BN173	X	-	-	-	-	-	-	X	-	-	1.00	1,600
45BN174	X	-	-	-	-	-	-	X	-	-	0.50	850
45BN175	X	-	-	-	-	X	-	-	-	X	----	-----
45BN176	X	X	-	X	X	-	-	X	-	-	1.00	1,535
45BN177	X	-	X	-	X	-	-	X	-	-	0.50	900
45BN178	X	-	-	-	-	X	-	-	X	-	----	-----
45FR266	X	-	-	-	X	X	X	X	-	-	1.00	1,535
45GR325	-	-	-	-	-	X	-	-	-	X	----	-----
TOTALS	24	4	5	2	18	9	1	17	5	4	----	-----

TABLE 1. Summary of Site Types and Recommendations.
 An "X" mark identifies the proper categories for
 each site. Total sample equals 26 sites.

To this basic figure are added transportation costs for two pickup trucks; four-wheel drive as needed; boat operation costs where necessary; and funds for radiocarbon analysis.

The calculated salvage costs are itemized for each site in Table 1.

Further Recommendations

The three archaeological localities recorded by the reconnaissance are recommended for further surface examination. Hopefully, this work can be carried out by arrangement with the Commission through the National Park Service.

It is recommended that steps be taken to preserve the log building on the east bank of the Columbia at White Bluffs (site 45FR266). This might be done in cooperation with the Franklin County Historical Society, or other similar organizations.

If the park facility at Vernita Bridge is expanded, or if new parks are established on Commission lands, it is recommended that the specific areas of such facilities be examined by an archaeologist, as well as borrow sources used in developing them.

If the borrow pit located west of 100-B area is expanded to the east, it is recommended that site 45BN153 be salvaged (see Rice 1968: 11, and Plate No. 6 for the exact site location).

It is recommended that at some future time the Arid Lands Ecology Reserve be extensively

surveyed for archaeological resources, as it is an area that has much potential for problem-oriented archaeology. This work will have to be coordinated by the Commission and the National Park Service in cooperation with Battelle-Northwest, and in accordance with the Federal Antiquities Act (see appendix).

In the future, if any archaeological, paleontological, or historical sites or materials are encountered on the Hanford Works, it is recommended that the National Park Service, Western Regional Office, San Francisco, California, be contacted directly. (See appendix on the Federal Antiquities Act).

Concluding Statement

Archaeological reconnaissance of the Hanford Atomic Works revealed evidence for 26 sites. Of these, 17 are recommended for test excavation. Since there are so few sites away from the river in the Pasco Basin, those reported here are especially important to archaeological research. Considering, too, the amount of material available from project-linked research, these sites and the 105 sites in the proposed Ben Franklin Reservoir area offer an unparalleled opportunity for collaboration between archaeological studies and studies in ecology and geology.

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