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ARCHEOLOGICAL SURVEY: A HANDBOOK

Ruth Mathews, Mary Jo Galindo, Diamond Kapanday Barrera
TEXAS ARCHEOLOGICAL SOCIETY

Table of Contents

Table of Figures

Field Methods

Archeological survey is both exploration and discovery.

Background Research

The very first step to any archeological survey is the background research into the proposed project area. A search of historic and current aerial photographs and topographic maps (Figure 1) and a review of land ownership over time. An in-depth study of the project area will help you to understand what sorts of archeology, terrain, structures, and/or vegetation you may encounter. Understanding local geology, geography, hydrology, and meteorology is essential when planning your survey especially if subsurface investigations are involved. Exploring the cultural and environmental history of the area is helpful when trying to determine the natural from the built landscape.

Interpreting the terrain is very important. Maps and other images are very important tools for surveyors.

When looking at the terrain of your project area on the USGS topographic map, you must ask yourself, “would I live on that 70% slope?”

The answer to that question is no.

The likelihood of the average human, past or present, occupying or even traversing such an environment is slim. We humans prefer to stick to 0 to 20% or flat terrain to gently rising or undulating. There are exceptions to this as with all things, but here, in the Texas Hill Country, those exceptions are rare. You may find artifacts on narrow shelves at the base of steep slopes. This is most likely the result of site mobility through colluvial actions. The actual site is most likely to be at the top of the hill.

Humans tend to inhabit a place that will provide them with their defined needs. All humans need water, shelter, and food. It is how they provide for these that differ over time and between groups. Hunter/gather needs are different from the needs of agriculturalists and agriculturalists needs differ from an industrialist.

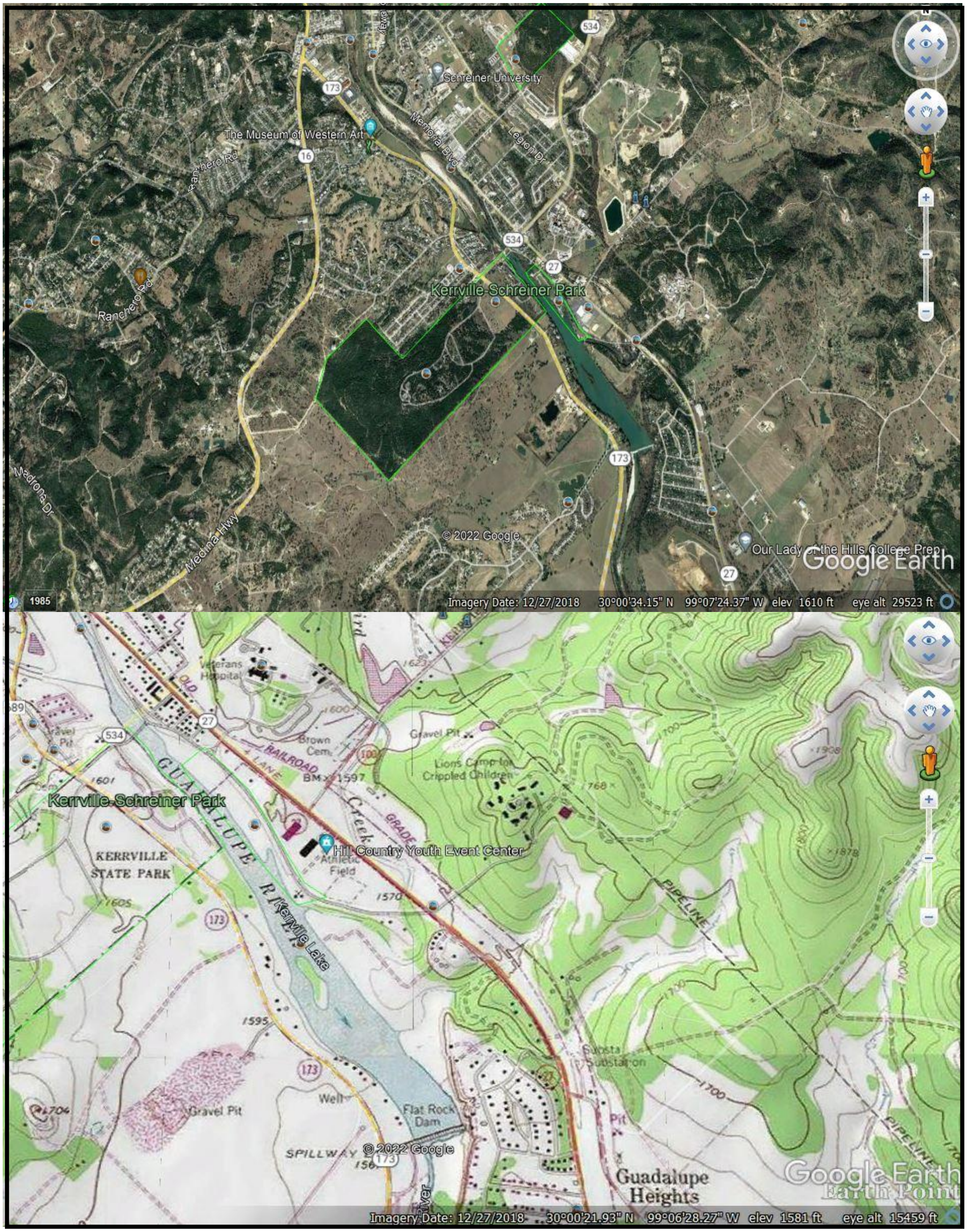


Figure 1. Examples of aerial photograph and USGS Topographic map

Lesson 1

How to read a USGS topographic map

Knowing how to read a USGS topographic map will help you to understand what you are up against. Knowing the geography and the environmental situation will help prepare you for the field by answering questions like:

1. What is the likelihood of encountering cultural resources? Do the maps show structures, bends in the river just below a low, long flat terrace? Are there areas that have a greater potential to sustain humans? Are there high-probability areas?
2. How difficult will it be to get to the project area? Can you walk there or do you need to hire a helicopter to drop you into the area.
3. How hard will it be to wrestle any information from the ground. Is the dirt sand or clay?
4. How deeply buried are the potential resources? Is the area prone to massive depositional flooding events? Do you need a long-handled shovel, or will a short-handled shovel suffice? Do you need a shovel at all? Do you need a backhoe?
5. What sorts of supplies will you need and how should you dress? Will you need to pack a full day's water supply, food, snake guards, brush chaps; carry a machete?

What do those lines and symbols mean (Figure 2)?

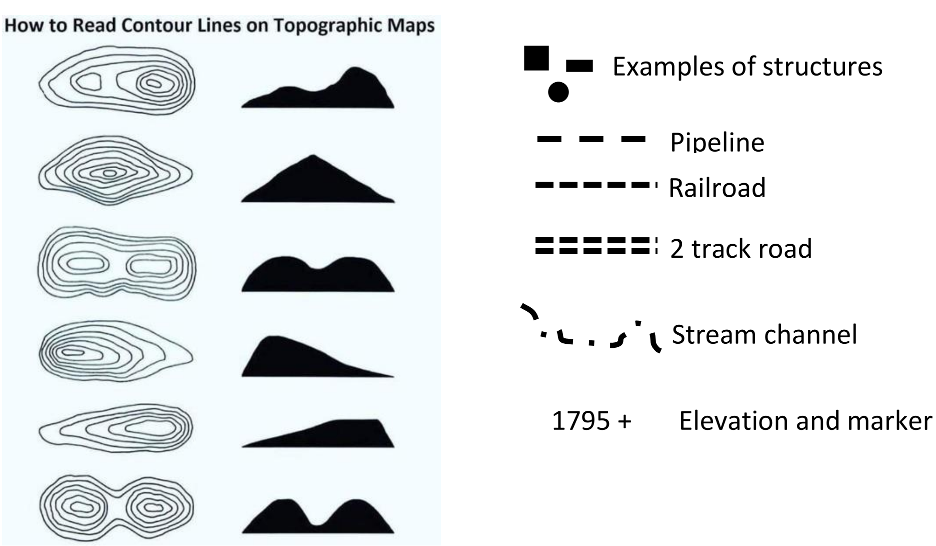


Figure 2. Examples of topographic lines and symbols.

You will have to know the history of the place you are surveying. You will want to know how the land has been used over time. What have humans done to project area that would have compromised earlier cultural evidence? What types of artifacts do you expect to find?

Types of Artifacts

Artifacts – are any object made by humans that can be physically removed from the site such as pottery shards, projectile points, clay balls, glass, nails, historic ceramic, etc.

Ecofacts - are organic materials found at an archaeological site that carry archeological significance. They are natural objects found alongside artifacts or features, such as animal bones, charcoal, living plants, and pollens.

Features – are objects made by human that cannot be removed from the site such as burned rock middens, hearths, pit houses, tee pee rings, foundations, root cellars, corrals, and so forth.

Landscapes – modifications, irregularities, the presence of invasive species, or ornamental landscape elements.

Why are we looking for artifacts?

Despite popular belief a survey is not conducted to find arrowheads. Survey is the first step in the archeological process. Survey is exploration and discovery. It has either a positive or negative outcome. Either way it provides vital information about the archeology of an area and the people that lived in it. Artifacts are not collected for the sake of the artifact, but rather each artifact serves as an interpretive tool to help archeologists piece together the lives of the people that inhabited the place through time.

How do you look for it?

Each surveyor will be equipped with a backpack that contains a simple compass, trowel, a clip board with appropriate forms, pencils, sharpies, and a ruler and protractor (Figure 3). If it is a pedestrian survey the surveyor will also carry a metric tape measure, gloves, a shovel and a ¼ inch hardware mesh screen.

An imaginary grid is laid out over the entire survey area. The grid should be oriented as best as possible on a North/East grid (Figure 4). Geography and property boundaries can get in the way of this method. Sometimes it is better to set your compass to the same orientation as a property or natural boundary. Within that survey area, surveyors are lined up on a base line which is perpendicular to the orientation to be traveled. Each surveyor is a specified distance from the adjacent surveyor. This distance can vary from 5 to 30 meters. Set your compass to the required orientation. All surveyors leave the baseline at the same time and travel at the same pace while maintaining the appropriate distance from fellow surveyors. As you walk along, following the given orientation, you will attempt to locate, record, and collect archeological evidence. Depending on the environment, geography, and/or geology you may have to systematically shovel test the area. You will maintain the given orientation until you come to the end of the transect. The base line at the end of the transects is usually a fence line, a road, or a natural impasse. At this point everyone will turn 90 degrees, move down, turn back towards the other base line, and return at an orientation that is 180^{o} from the previous orientation. This maneuver is repeated until the entire property, or that portion of the property has been surveyed.

Another method used for vastly disturbed or impenetrable properties is to seek high probability areas and orient directly to these locations. An understood premise in survey is go from the known towards the unknown.

Harry Shafer et al. (1975) gave us a method for seeking cultural sites in the Big Thicket. The Texas Big Thicket is an area that has been vastly disturbed by the timber and oil exploration business. Many acres have been majorly impacted by the creation of pine plantations to feed the ever-growing lumber business. Other areas of the aptly named Big Thicket are impenetrable. Shafer et al's high probability model declared "the ideal terrain" is ridges at the confluence of creeks or along river bluffs and terraces. Because I had the daunting task to survey 179 acres of the thicket I added to that method extraneous bodies of water; slews, bayous, extinct and existing oxbows, and adjacent to lesser streams.

Lay out a topographic map of the project area. Look for the above mentioned geographic features. Create a fixed point at a known location.

From that location situate your compass on the quadrangle and then select the orientation to the feature(s).

For an example.

Your start location is the side of a two track road; easy to get to and not far from your destination. On the map, line your compass up N/S;E/W with the center of compass at your origin. On the map, from the side of that road you see that there is an existing oxbow at 32 degrees and 200 meters from your established origin.

In the field go to the location you set as your origin. Set your compass to 32^0, move your body around and make sure the red arrow is pointing north Set out to locate your oxbow; keeping track of your paces. At 224 paces (or whatever your pace ratio is) you should encounter the oxbow.

Now what?

Because ground surface visibility in the thicket is not good shovel tests will have to be excavated. Pair up and line up along the edge of the oxbow with a shovel and a screen. If no archeology is encountered within 30 m of the oxbow then head to the next probable area.

Figure 3. Surveyor’s Tool

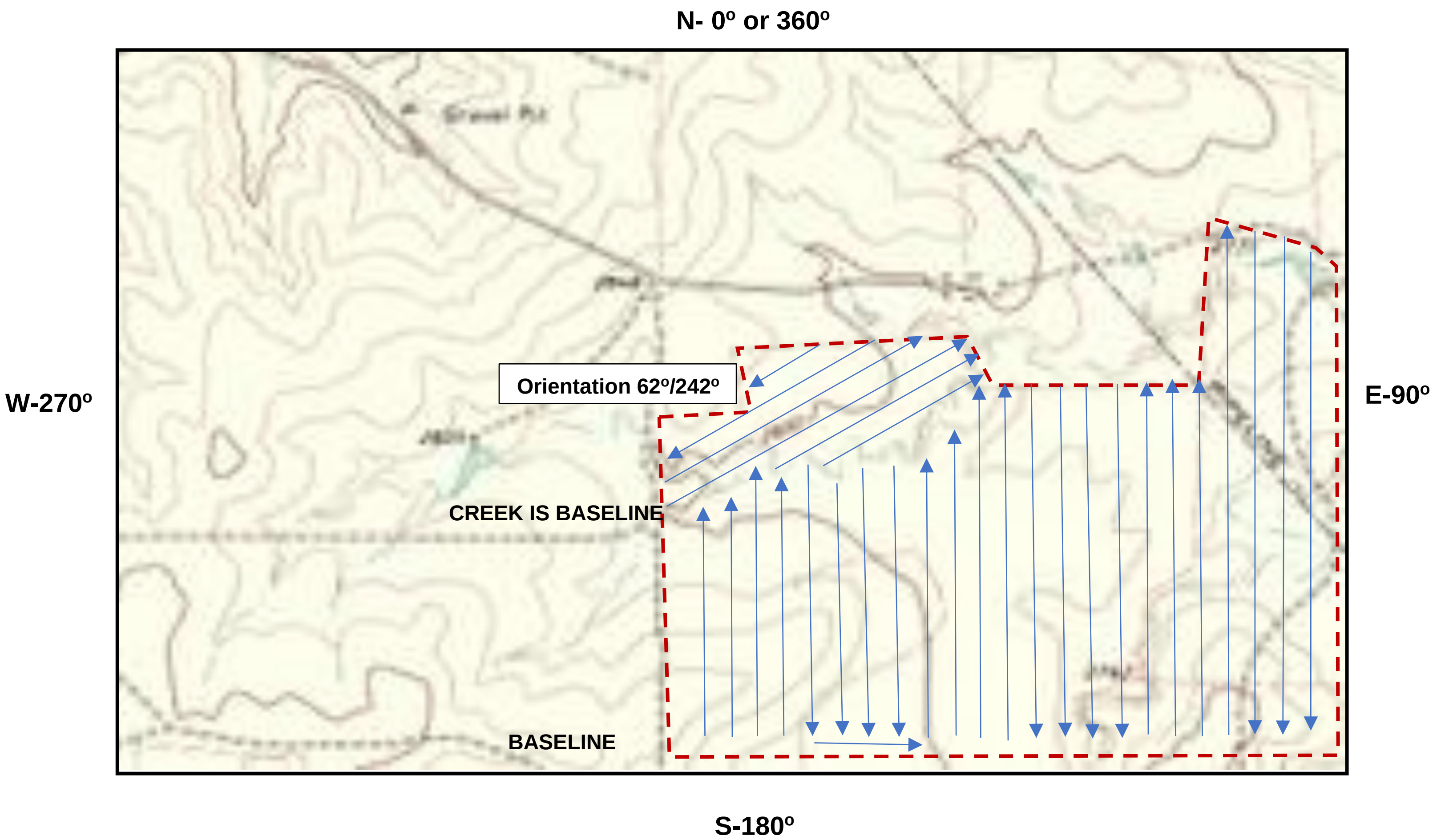
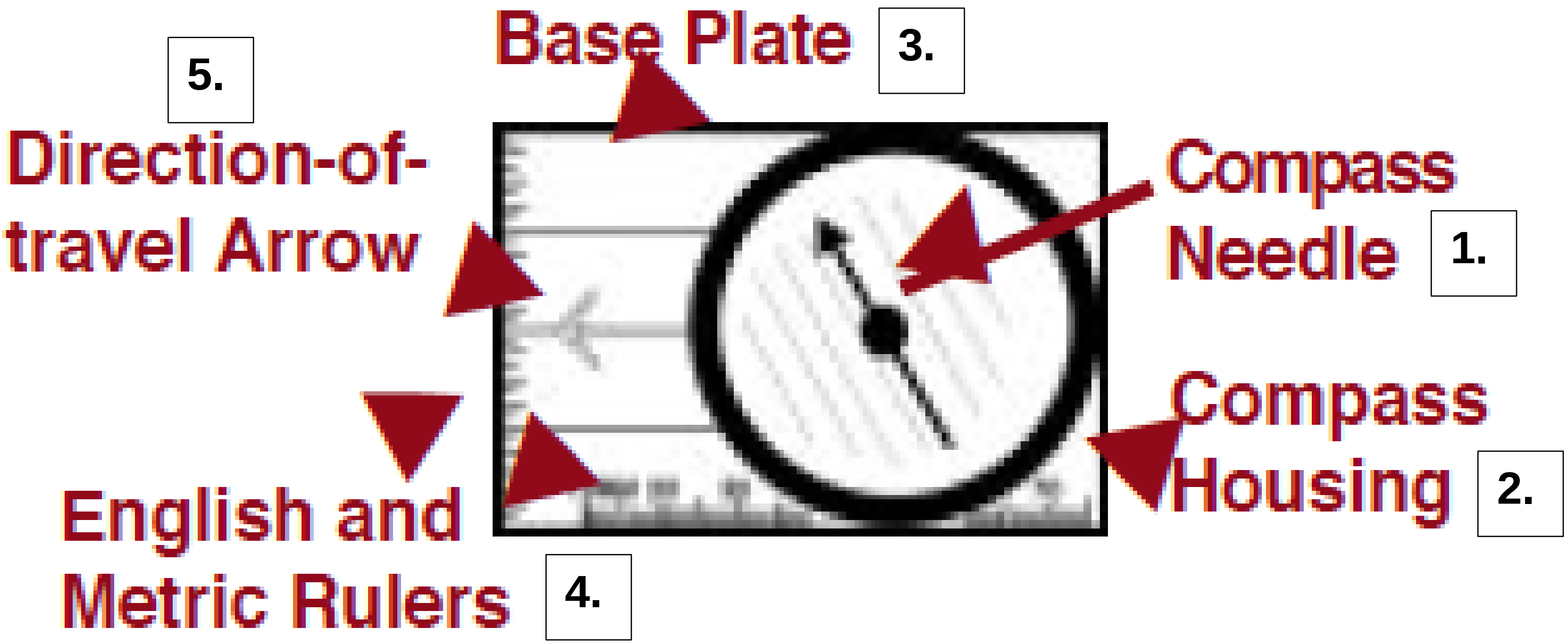


Figure 4. Pedestrian Block Survey. Easy access to baseline on property boundary. North/South Transects (Orientations 0º/180º)to creek and property boundary. Because creek flows in a general northeast direction, transects are established to follow the ridgelines

<u>LESSON 2</u>

Compass

A compass has several basic parts.



L2 Figure 1. Compass components

Compass Component descriptions:

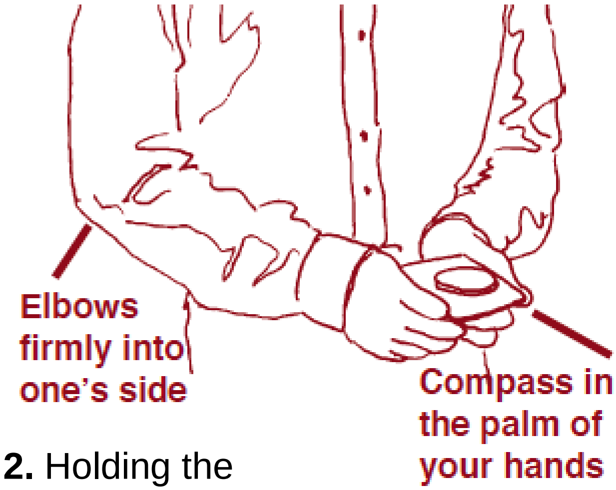
1. The compass needle, often red and black or red and white, always points toward the Earth’s magnetic north pole. This magnetic needle floats freely if the compass is held level (parallel to the ground).
2. The compass housing has numbers, tick marks, and letters. The numbers run from 0 to 360, representing the number of degrees in a circle. The letters N, S, E, and W represent north, south, east, and west.
3. The base plate has a direction-of-travel arrow. You point the direction-of-travel arrow in the direction you want to travel.
4. Some compasses have inches and/or millimeters marked on the edge of the compass. These are used with a map scale to determine the distance between two points.
5. The direction of travel arrow will be the orientation of the surveyor’s transect.

To use the compass (Figure 2), you need to hold it steady and keep it away from metal. Place the compass in the palm of one hand and place that hand in the palm of your other hand. Pull your elbows firmly into your side or hold them completely away from your body. The point is to keep the compass level and as steady as possible. Some compasses will have a fish eye level (Figure 3). These compasses are more difficult to operate while on survey because you must maintain the bubble in the fish eye in order to obtain an accurate reading. Fish eye compasses are best for mapping sites.

Since the compass needle is sensitive to metal, remove metal belt buckles, rings, and watches, and stay away from metal fences, automobiles, etc., to eliminate false readings.

While holding the compass level, point the direction-of-travel arrow in the direction you want to travel. Then turn the compass housing until the compass needle aligns with the arrow marks drawn on the bottom of the compass. Remember, the colored end of the compass needle points north. Now move so that you are looking straight ahead in the direction in which you want to travel. Be sure that the magnetic needle still points north.

To keep from straying too far to the left or right of direction-of-travel, pick an object as far away as possible to align with. Stop occasionally to make sure you are headed in the correct direction. Keep repeating this process to stay on course.



L2 Figure 2. Holding the Compass

L2 Figure 3. Compass with fish eye level.

The Survey

There are essentially two types of survey, the random reconnaissance survey and the methodological pedestrian survey.

Reconnaissance Survey

The Description

A reconnaissance survey is a general look around. It is usually a low budget approach that includes searching for and locating medium to high probability areas as seen on a topographic map and/or aerial photographs or heard about by word of mouth. Surveyors in this case go directly to that indicated area, and the surface is inspected and possibly collected.

The Method

The surface inspection of the indicated area should be methodological. The chosen area can be broken down into a N/E grid and surveyors walk the imaginary gridlines or transects. When an artifact is encountered on the surface, they can give it an approximate two-point provenience; a northing and an easting. A quick hand drawn field map is produced in the field, and photographs are taken.

This method is old school, but it is something you need to know. GPS technology today can align and mark the discovered artifact with the earth's northing and easting or longitude and latitude directly onto the electronic USGS topographic map. There will be times, though, when satellites or internet will not be available.

Many of the early to mid-twentieth century federal salvage archeology projects for large highways, dams and reservoirs, airports and shipping depots were all reconnaissance surveys. The project areas were massive, the budgets were small, and archeologists were scarce. These surveyors usually went straight to areas known to contain cultural material or to high probability areas, areas that are believed to have supported prehistoric cultural activity.

Upon completion of the Reconnaissance survey the information gathered from the survey is considered, and if the inspected surface area appears to be extensive and significant, then archeologists may return to perform a methodological pedestrian survey, or they may just decide to excavate depending on circumstance.

Reasons for excavation include:

1. The site is in danger of being destroyed by construction.
2. The site is in danger of being destroyed by erosion; gully or sheet wash or wind.
3. The presence of unusual or technically interesting surface artifacts that may lead to the solution of an age-old archeological problem.
4. To retrieve or preserve data that is endangered by vandals.
5. Despite the 4 above reasons to excavate, no excavation should occur unless there is a plan to disseminate the gathered data and preserve the artifacts.

Methodological Pedestrian Survey

Description

This type of field survey is more labor intensive, involves more equipment and people, requires more field preparation and is more costly.

Method

A Methodological Pedestrian Survey is not random or selective. See Figure 3.

There are two types of pedestrian survey.

1) Linear survey – a single swath of land, usually no wider than 100 m, that includes things like pipelines, highway right of ways, and electric power line transects.
2) Block area survey – A large tract of land

Pedestrian surveys almost always include shovel tests.

Shovel Testing

What is a shovel test (Figure 5)?

A shovel test is a miniature excavation unit. The hole can be square or round. The surface shape doesn’t matter. Shovel tests measure the number of artifacts by volume. It is the below ground shape that matters.

The sides of the shovel test, or the shaft, should be vertical to the horizontal ground surface.

Shovel tests do not look like an ice cream cone. They look like a cylinder or a rectangle.

Shovel tests usually have 30 to 50 cm diameters, and are excavated in 5, 10, or 20 cm arbitrary levels or by stratigraphic levels.

All levels are sifted through ¼ inch hardware cloth for minimum artifact recovery.

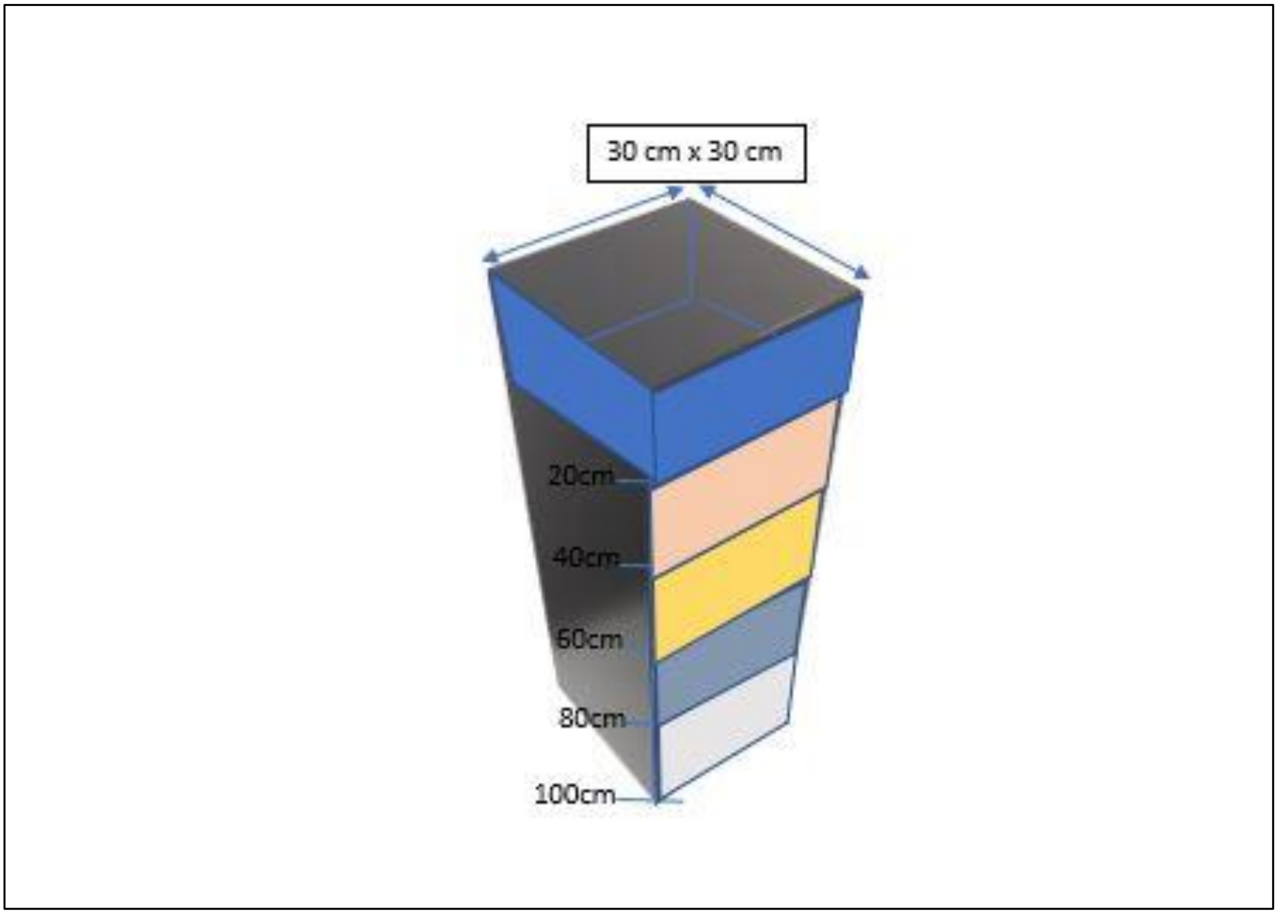


Figure 5. Example of a shovel test excavated in 20 cm arbitrary levels.

Shovel tests can be excavated by arbitrary or stratigraphic levels.

Arbitrary levels can be 5, 10, or 20 cm thick.

Stratigraphic levels or lots are excavated by soil description. An entire 100 cm deep shovel test can be one level if there are no soil changes.

All shovel tests and shovel test levels are recorded on the provided shovel test form (Figure 6).

Shovel Test Form

Admin Use Only: Pg_____of________

Project: **Date:** **Area:**

Project #: **Recorder Team:** **Site:**

SOIL KEY: Sa=Sand; SaLo=Sandy Loam; Lo=Loam; SiLo=Silty Loam; ClLo=Clay Loam; Cl=Clay

ST# ☐pos ☐neg Property/County Site #	Alluvial / Upland	Vegetation	Disturbances	Location: (relation to creeks, roads structures, etc)
	☐floodplain ☐drainage ☐terrace ☐hillslope ☐lowland ☐slope ☐fan ☐prairie GSV%__________	☐mesquite/scrub ☐cacti ☐juniper ☐vines/briar ☐grasses ST ☐tree litter ☐hardwoods ☐coniferous ☐wetland ☐other	☐eroded ☐fill ☐construction ☐grasses ST ☐plowed ☐planted pine ☐logged ☐other________	

Depth	Munsell	Soil	Inclusions%	Comments and Cultural Material – List Artifact/Count/Depth:
				Termination: ☐ basal Clay ☐ bedrock ☐ depth ☐ water table ☐other

SKETCH OR COMMENTS:

Figure 6. Example of a shovel test form

To shovel test or not to shovel test? That is the question.

There are two reasons to shovel test on a survey.

1. Ground surface visibility – If, because of ground cover, the ground surface is not visible, and the geography says there is the potential for buried artifacts then systematic shovel testing should be conducted. Systematic shovel tests are done at regular intervals along all transect lines until the potential for archeological discovery no longer exists.
2. If ground surface visibility is good and artifacts are visible on the surface. One or two random shovel tests at that site should be excavated at selected locations to determine how deep, and how thick are the archeological deposits. This information will be necessary for later site significance determinations.

Today, if you can afford it, a navigation device takes you directly to the investigation area. Surveyors span out with their smart devices and record their findings in real time. The data is shipped back to the lab electronically and the images are merged, and a 3-d image of the site's cultural and geographic setting is generated.

Site Identification -

How do you know if you have found an archeological site? Above ground features, historic and/or prehistoric, are a site. Features are usually accompanied by other site identifiers like artifacts, ecofacts and landscape. Ecofacts and landscape without features or artifacts are not necessarily a site. Five or more artifacts within a 30 m radius are usually considered a site especially if there is a diagnostic in the mix. Four or less artifacts are considered to be isolated finds and will be recorded as such.

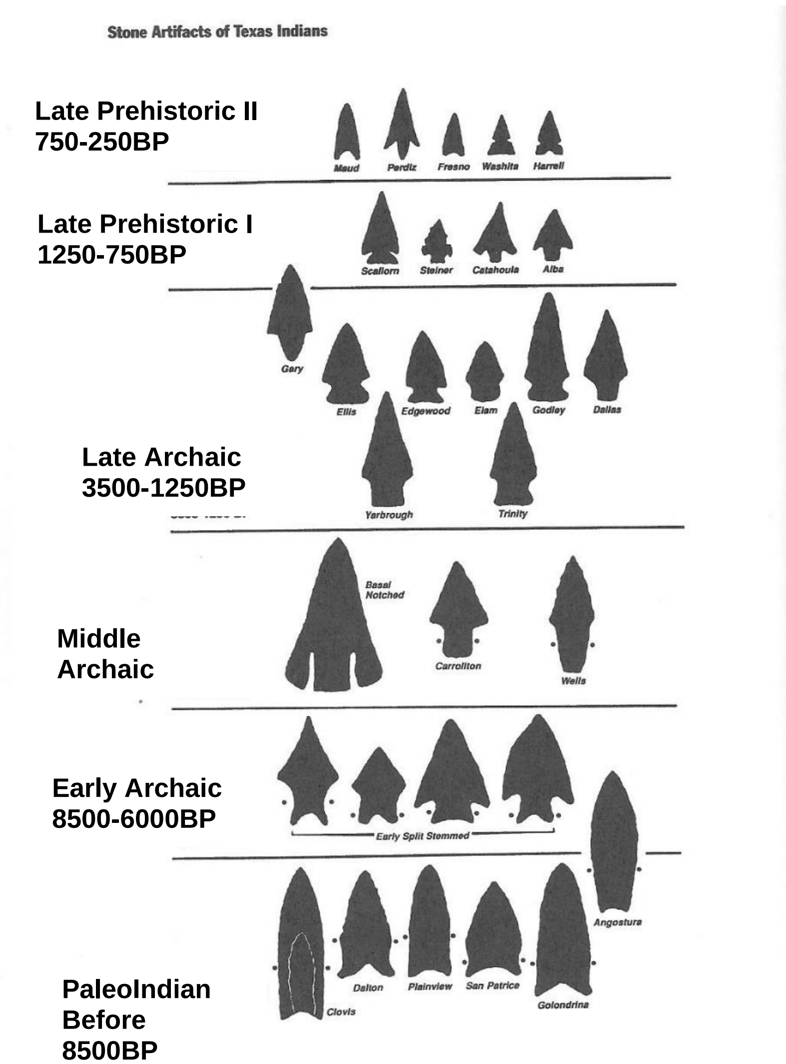
<u>LESSON 3</u>

What is a diagnostic, and why is it important?

Whenever an archeologist comes across material remains, they try to interpret their discovery. For any given artifact there are many potential explanations. All artifacts have the potential to answer questions such as, "What is it made of? How well preserved is it? Does it show signs of wear? Can residue be collected? What was it used for? Are there similar items at nearby archeological sites? There are some artifacts, however, that can provide more information than others. These artifacts are referred to as diagnostic artifacts.

Diagnostic artifacts can inform archeologists of specific time periods.

Sometimes the shape alone can tell you how old a site may be (L3 Figure 1).



L3 Figure 1. The changing shapes of projectile points through time.

Taken from, “A Field Guide to Stone Artifacts of Texas Indians.” Turner and Hester, Pp 56.

Erosion and site mobility

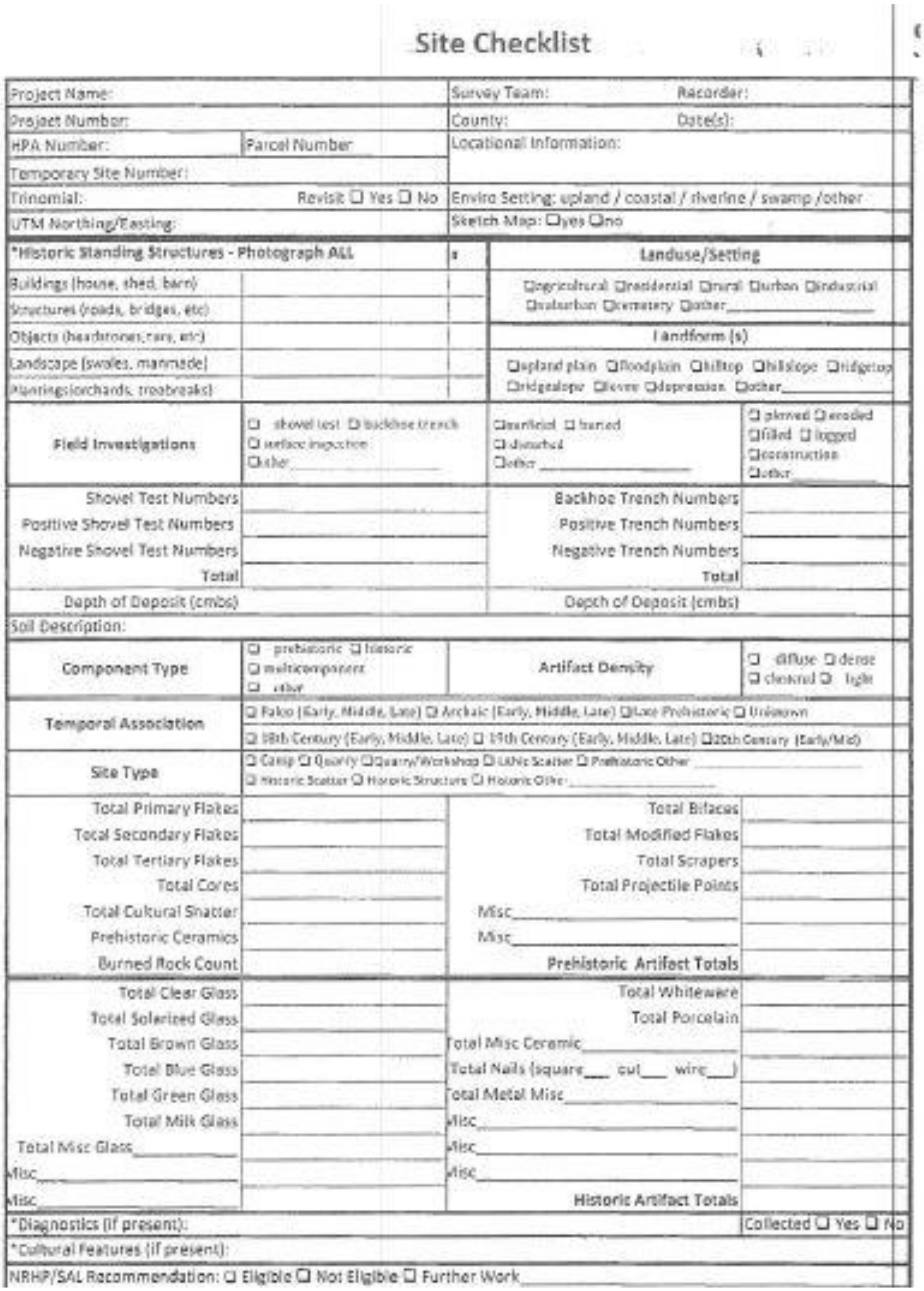
There are times when many artifacts are found in an area downslope of bulldozer or flooding activity where a known archeological site has been impacted or destroyed. Overtime the circumference of the site will expand due to slope or sheet wash erosion taking artifacts downslope during extreme hydrologic action and colluvial activity. These areas should be thoroughly inspected to understand the dynamics of the situation before calling them independent sites or insitu artifacts. The purpose of locating archeological sites is not to collect the artifacts, but rather to understand how the people spread themselves over the landscape; their settlement and land use patterns. Artifacts scattered well away from their original location by mechanical means or erosional episodes tells us very little about prehistoric land use patterns. In cases such as this try and capture the location of the original site and express in your notes that artifacts have been spread “x” number of meters from their original context.

Site Recordation

After identifying the archeological site, you must record it on a site record form obtained from the Texas Archeological Research Laboratory (L4 Figure 1). All questions on this form must be answered to the best of your ability. Many of the answers will come from the background research as well as from the site itself. After walking over the site, and maybe putting in a few shovel tests it is time to map the site. A map must be included on any site form submitted for a trinomial designation. You must also locate the site on both an aerial photograph and a USGS topographic quadrangle. Mark it with an X. The Northing and Easting or latitude and longitude of that X will be in the title of your hand drawn site map. That point will be known as the site datum.

LESSON 4

Filling out a site form.

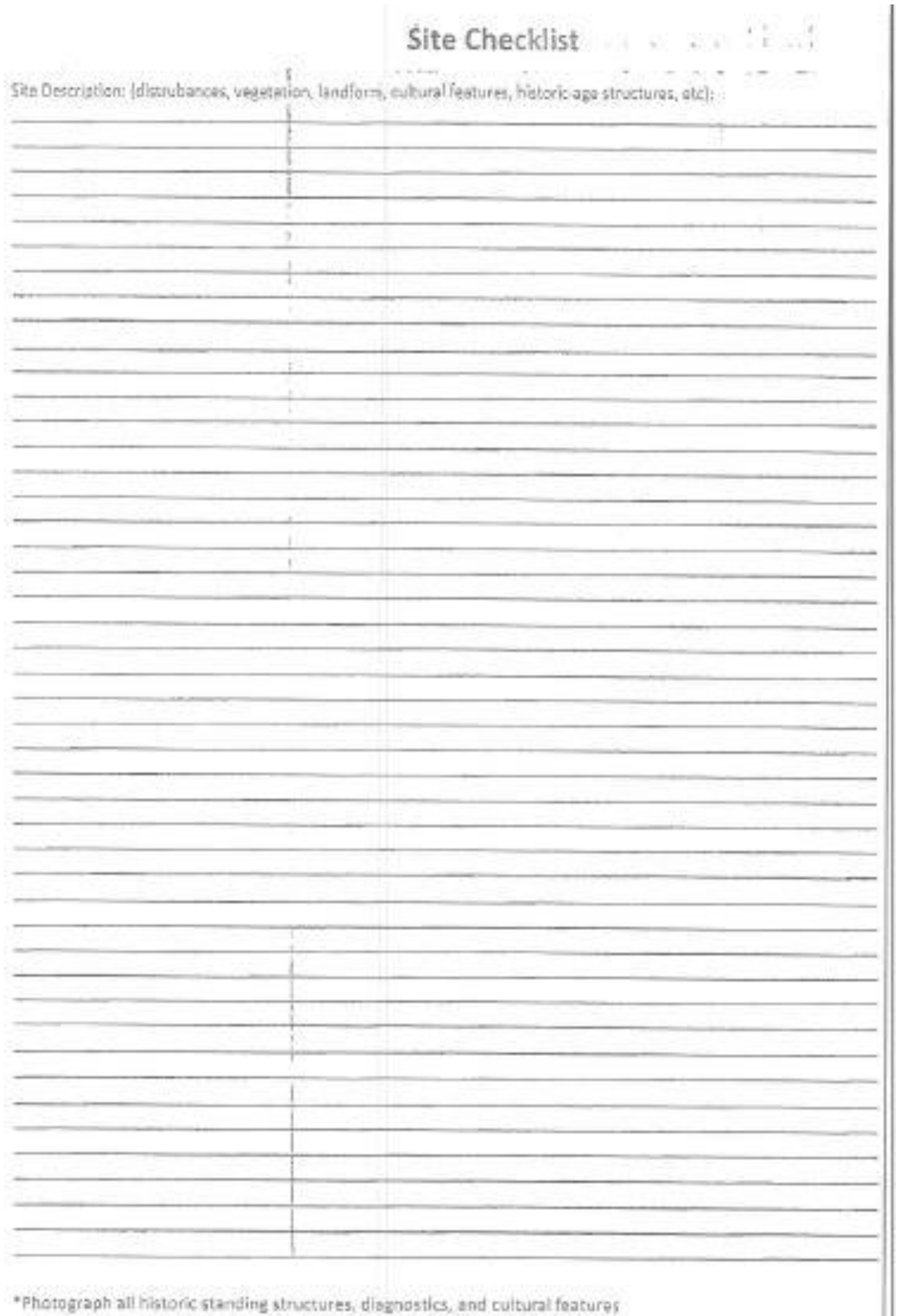


Site Checklist

Project Name:		Survey Team:	Recorder:
Project Number:		County:	Date(s):
HPA Number:	Parcel Number	Locational Information:	
Temporary Site Number:			
Trinomial:	Revisit ☐ Yes ☐ No	Enviro Setting: upland / coastal / riverine / swamp /other	
UTM Northing/Easting:		Sketch Map: ☐yes ☐no	

*Historic Standing Structures - Photograph ALL		#	Landuse/Setting	
Buildings (house, shed, barn)			☐agricultural ☐residential ☐rural ☐urban ☐industrial ☐suburban ☐cemetery ☐other____	
Structures (roads, bridges, etc)				
Objects (headstones,cars, etc)			Landform (s)	
Landscape (swales, manmade)			☐upland plain ☐floodplain ☐hilltop ☐hillslope ☐ridgetop ☐ridgeslope ☐levee ☐depression ☐other____	
Plantings (orchards, treebreaks)				
Field Investigations	☐ shovel test ☐ backhoe trench ☐ surface inspection ☐other____		☐surficial ☐ buried ☐ disturbed ☐other____	☐ plowed ☐ eroded ☐filled ☐ logged ☐construction ☐other____
Shovel Test Numbers			Backhoe Trench Numbers	
Positive Shovel Test Numbers			Positive Trench Numbers	
Negative Shovel Test Numbers			Negative Trench Numbers	
Total			Total	
Depth of Deposit (cmbs)			Depth of Deposit (cmbs)	
Soil Description:				
Component Type	☐ prehistoric ☐ historic ☐ multicomponent ☐ other		Artifact Density	☐ diffuse ☐ dense ☐ clustered ☐ light
Temporal Association	☐ Paleo (Early, Middle, Late) ☐ Archaic (Early, Middle, Late) ☐Late Prehistoric ☐ Unknown			
	☐ 18th Century (Early, Middle, Late) ☐ 19th Century (Early, Middle, Late) ☐20th Century (Early/Mid)			
Site Type	☐ Camp ☐ Quarry ☐Quarry/Workshop ☐ Lithic Scatter ☐ Prehistoric Other____ ☐ Historic Scatter ☐ Historic Structure ☐ Historic Other____			
Total Primary Flakes			Total Bifaces	
Total Secondary Flakes			Total Modified Flakes	
Total Tertiary Flakes			Total Scrapers	
Total Cores			Total Projectile Points	
Total Cultural Shatter			Misc____	
Prehistoric Ceramics			Misc____	
Burned Rock Count			Prehistoric Artifact Totals	
Total Clear Glass			Total Whiteware	
Total Solarized Glass			Total Porcelain	
Total Brown Glass			Total Misc Ceramic____	
Total Blue Glass			Total Nails (square___ cut___ wire___)	
Total Green Glass			Total Metal Misc____	
Total Milk Glass			Misc____	
Total Misc Glass____			Misc____	
Misc____			Misc____	
Misc____			Historic Artifact Totals	
*Diagnostics (if present):				Collected ☐ Yes ☐ No
*Cultural Features (if present):				
NRHP/SAL Recommendation: ☐ Eligible ☐ Not Eligible ☐ Further Work____				

L4 Figure 1, page 1. Site checklist for future site data entry


Site Checklist

Site Description: (disturbances, vegetation, landform, cultural features, historic-age structures, etc):

*Photograph all historic standing structures, diagnostics, and cultural features

L4 Figure 1, page 2

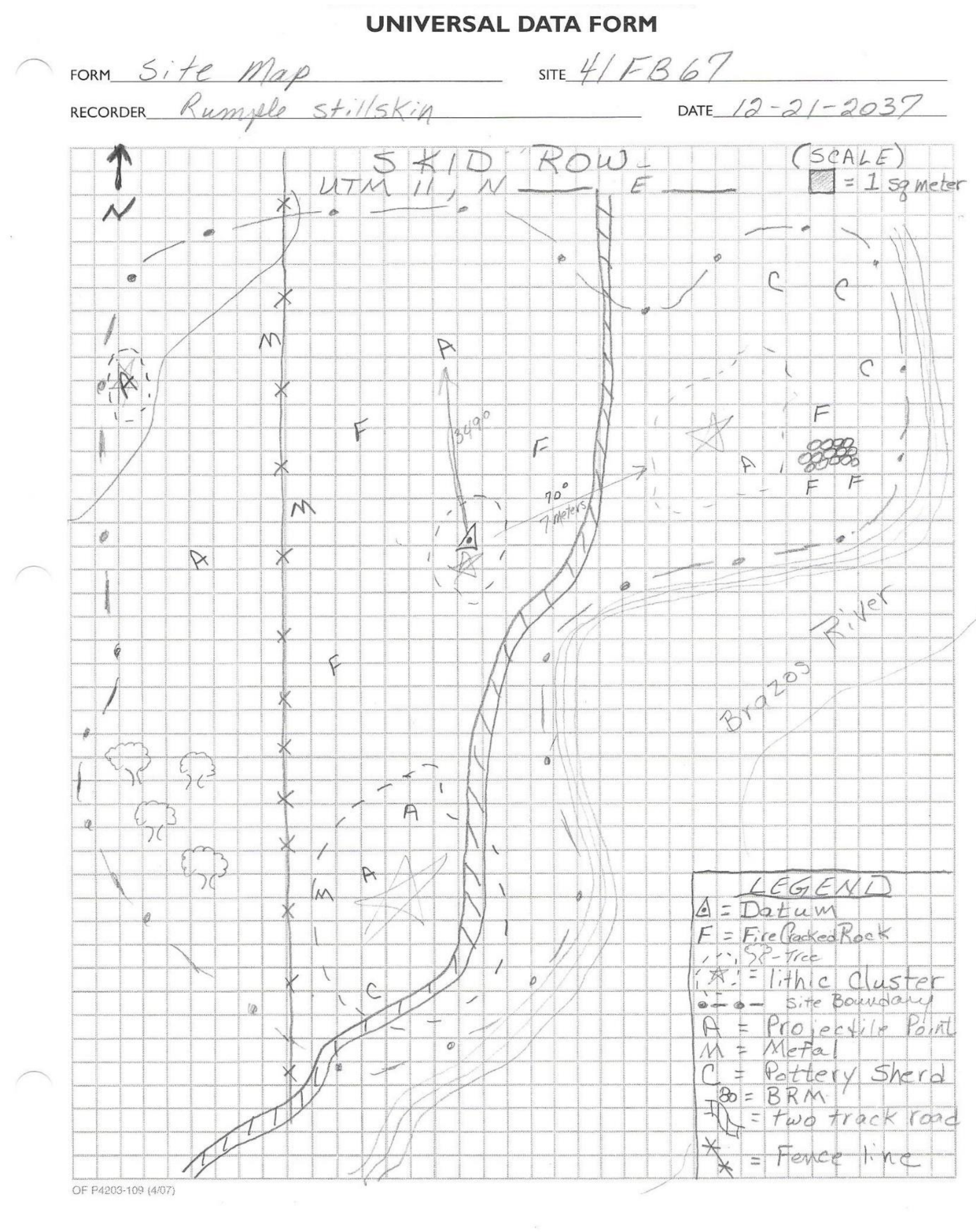
Hand Drawn Site Map

As part of the site form you will need to furnish a hand drawn map of the site.

Lesson 5

How to draw a site map (L5 Figure 1)

1) Establish an arbitrary grid and a datum which is the primary point. The Datum's location description will be a UTM that ties into the overall survey grid. All other components of the site will be associated with the datum. When placing the datum on the map, consider the scale of the site and try to locate the datum so that everything will fit on the 8X11 graph paper.
2) Give the map a title; include the UTM of the center of the site or the datum point. Example: SKID ROW, UTM 14R N0485562 E3324555.
3) Give the map a scale. Example 1 graph square = 1 m^2
4) Give the map a north arrow
5) Give the map a legend
6) Give the map an author(s)
7) After the essentials are on the map. Create an arbitrary boundary around the site. The boundary should extend 30 m out from the last known artifact. If the last known artifact was in a shovel test, there should be at least two negative shovel test 30 m out from a positive shovel test. Mapping in the site components is done by pace and compass. Pacing is a simple method of measuring linear distance by walking; beginning and ending on your dominant foot. To determine your pace, practice by walking repeatedly with a normal stride over a measured course. Pace the course several times to determine your average pace, and then use the pacing chart below to determine your distance per pace (L5 Figure 2).
8) To map in the rest of the map components, stand by the datum and point your compass at your target. Record the orientation then pace the distance from the datum to the target. Do this over, and over again until all modern features (roads, fences, buildings)and archeological discoveries are on your map. Use a straight edge ruler and protractor to move your orientations and distances from the real world to a scaled down version on a piece of graph paper.



L5 Figure 1. Example of a hand drawn site map.

Formula: 30m / 40p = 0.75m / 1p

Meters	Paces	Paces	Paces	Paces
1	1.25	0.90	0.80	0.75
2	2.50	1.80	1.60	1.50
3	3.75	2.70	2.40	2.25
4	5.00	3.60	3.20	3.00
5	6.25	4.50	4.00	3.75
6	7.50	5.30	4.80	4.50
7	8.75	6.20	5.60	5.25
8	10.00	7.10	6.40	6.00
9	11.25	8.00	7.20	6.75
10	12.50	8.90	8.00	7.50
20	25.00	17.80	16.00	15.00
30	37.50	26.70	24.00	22.50

L5 Figure 2. Pacing chart

Taking Photographs –

Take photographs of everything.

<u>Lesson 6</u>

How to take site photographs

Don’t just take photos of artifacts. Take photos of the site. When you take a photograph make sure it has some sort of context and scale. You will record all your photographs on a photo log (L6 Figure 1). Each photo will have a number, a brief description, and an orientation shot from a defined location. Inform the reviewer about the type of camera. In today’s world your smart phone works as well as any. Take lots of photos, but make sure you know how to move them efficiently to a transferable device. Photographs will provide evidence for determinations of site significance.

Photographic Log

Project: TAS Private Prop Survey 2022 **Name:** **Date:** June ______, 2022

Project Name: Tally Ho Ranch **Camera Type:** **Crew Chief:**

Trinomial Perm. Photo No.	Perm. Site No.	Temp. Site No.	County	Tract No.	Shot #	Description	Dir. Facing	Photo-grapher	Date

L6 Figure 1. Example of a photo log

Site Significance Determination

What makes a site significant and why is a significance determination important. The site is considered significant if:

1) a historic figure was born, lived, rested, or died at that location
2) an important event occurred there.
3) it exhibits unusual characteristics for its era(s).
4) it has the potential to contribute to the existing body of knowledge concerning the history and/or prehistory of a specified area.

A significance determination is important because it can help protect and preserve the site or, at the very least, preserve the data from that site.