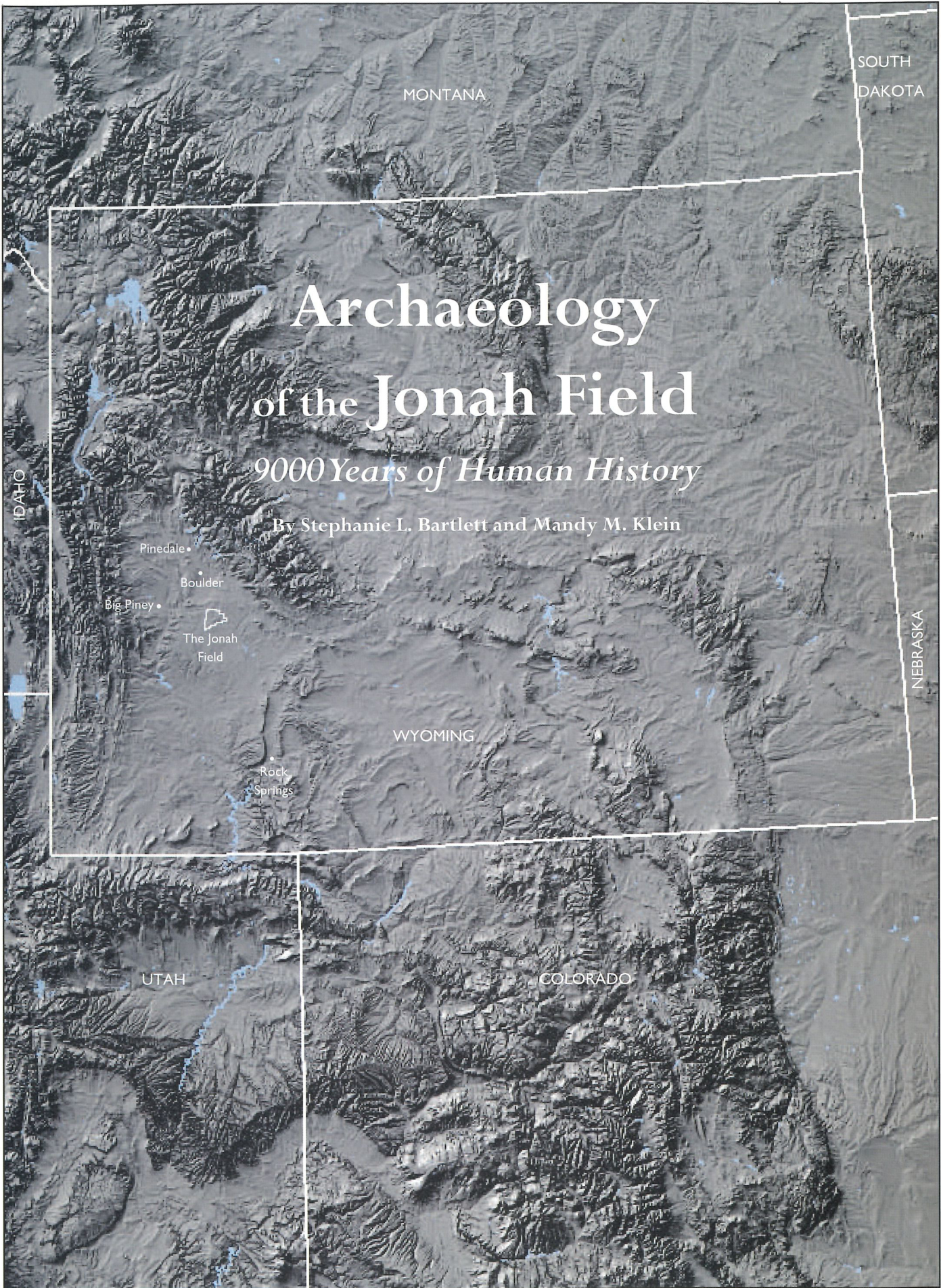


ARCHAEOLOGY
OF THE JONAH FIELD
9000 YEARS OF HUMAN HISTORY

By Stephanie L. Bartlett and Mandy M. Klein





MONTANA

SOUTH
DAKOTA

Archaeology of the Jonah Field

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Pinedale

Boulder

Big Piney

The Jonah
Field

Rock
Springs

WYOMING

NEBRASKA

UTAH

COLORADO

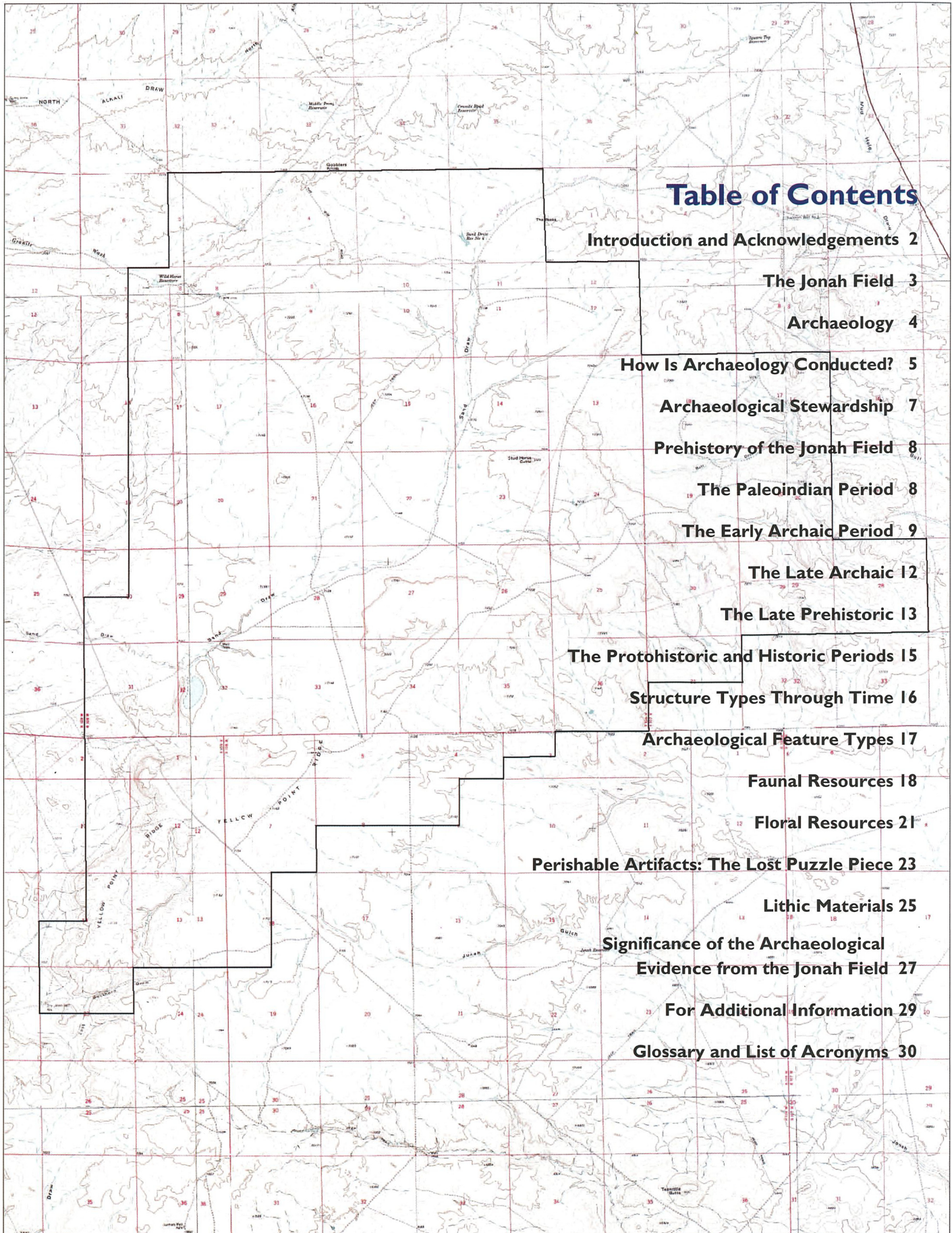


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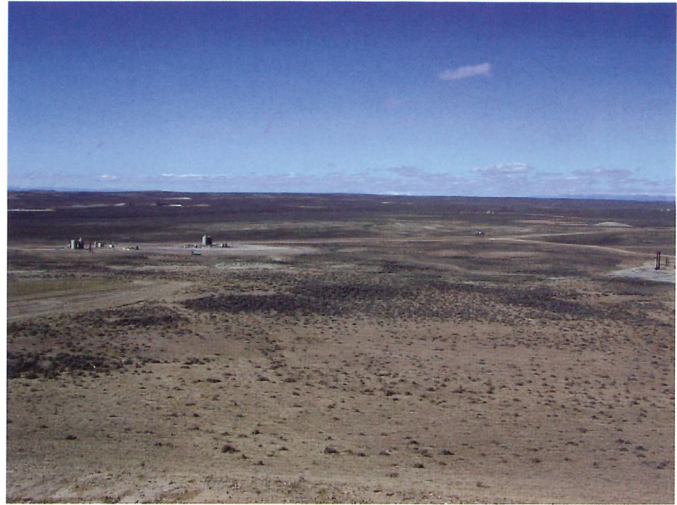
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Introduction

When one stands at the edge of Yellow Point Ridge and looks across the Sand Draw valley, a beautiful neighborhood to raise the family does not come to mind. For prehistoric people, however, the Jonah Field area was considered home for nearly 9000 years. Archaeologists seek to learn about the everyday lives of people who lived in the Green River Basin before writing systems were introduced. Through archaeology we try to figure out who these people were and how they survived the harsh climate of this semi-desert region. What kind of structures did they live in? How was their clothing made and what materials did they use? Where did they find food and water? There are so many questions that have been asked about the prehistoric people of the Green River Basin, yet so few have been answered. The more answers we find, the more we add to our list of questions.

This booklet is a compilation of the information archaeologists have learned thus far about the prehistoric residents of the Jonah Field. The knowledge we currently have was only made possible through the opportunities afforded by gas field development.



Photograph of the Jonah Field from Stud Horse Butte.

Acknowledgements

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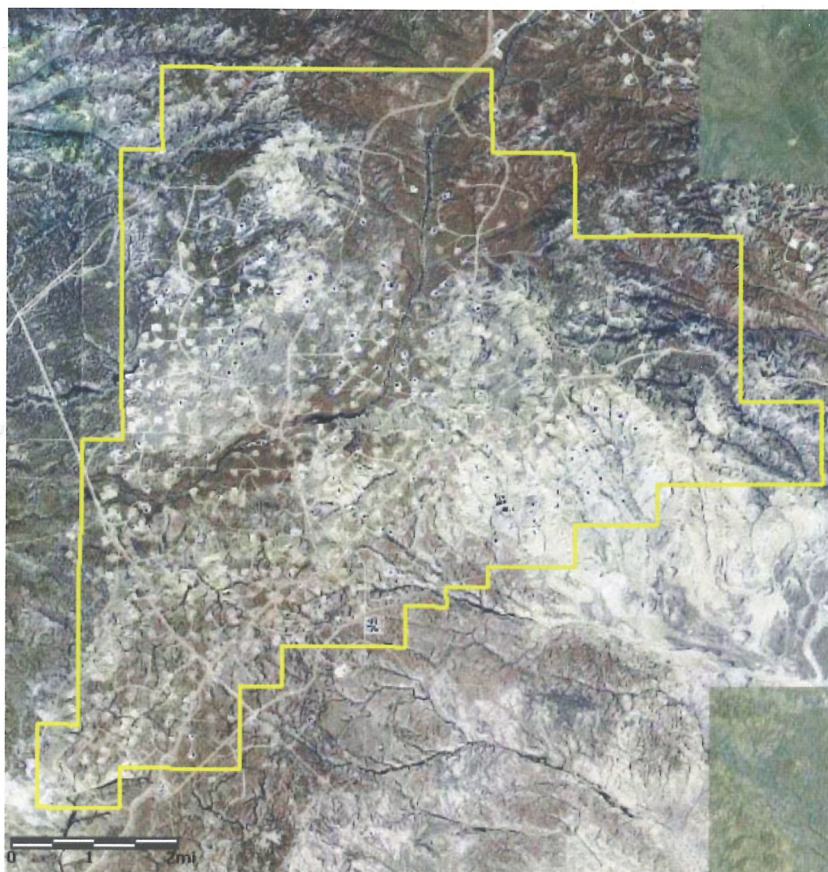
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The Jonah Field

Industrial development in the Jonah Field began in 1993. Since then, it has grown into one of the largest natural gas fields in the lower 48 states. The Jonah Field is a nearly 30,000 acre natural gas field located in Sublette County, Wyoming. The gas field is located predominantly on public lands administered by the U.S. Department of Interior Bureau of Land Management (BLM). Energy companies, such as Encana Oil and Gas (USA), Inc. and BP America Production Company, in conjunction with the Jonah Interagency Mitigation and Reclamation Office (JIO) have created a valuable opportunity to increase information about the prehistory of the region that would not have been possible otherwise. Since the beginning of the development in the Jonah Field, knowledge of the past inhabitants of the area has increased exponentially through the archaeological investigations that are legally required by such growth. To date, approximately 3500 prehistoric sites are documented in the Jonah Field.



Aerial photo of the Jonah Field. The white lines are roads and the dots are well pads. Aerial photo is courtesy of the Bureau of Land Management.

The gas field is situated in the heart of the Green River Basin between the Wind River Range to the east and the Wyoming Range to the west. The Jonah Field has a semi-desert environment with vegetation dominated by a sagebrush steppe community of plants. The Sand Draw basin is the major landform in the area. Sand Draw is a large seasonal drainage that empties the area to the southwest and eventually into the Green River. It is believed that Sand Draw once flowed more regularly and sometimes even flooded the area. The drainage basin is characterized by a fairly flat terrace along either side of the draw that gives way to rolling ridges. These ridges incorporate Stud Horse Butte and Gobblers Knob, which are two prominent knolls on the landscape. The gas field is dominated in the south by the high bench of Yellow Point Ridge, which is an Eocene-aged (40 million year old) northeast-southwest running ridgeline.

These landforms shape the landscape that provided the wildlife, plants and other resources necessary for survival by ancient Americans in an otherwise hostile environment. The Jonah Field is home today to antelope, jackrabbit, cottontail rabbit, ground squirrel, sage grouse, prairie dog, coyote and various birds of prey. The local

edible plant life consists of biscuitroot, bitterroot, wild onion, prickly pear cactus, Indian ricegrass, wheat grass, evening primrose and goosefoot. Sagebrush is useful as a fuel source and also as a building material. The area also provides a variety of sources for raw materials used in the manufacture of stone tools.

Overall, the Jonah Field, today and in the past, offers a broad and sometimes challenging environment for human utilization. **Hunter-gatherers** (see Glossary for definitions of bolded words) of the past adapted to this environment and persisted throughout the nearly 9000 years of prehistory in the area. These hunter-gatherer groups used every resource the land provided and adapted to changes in the local environment, climate, plant life and animal life throughout time. Later Native Americans saw mountain men, traders and pioneers move into and through the area as the surrounding territory was settled by small communities of emigrants. Finally, the natural gas resources were discovered in southwest Wyoming and turned the Jonah Field into the productive resource it is today.

Archaeology

Archaeology is a subfield of the larger discipline known as anthropology, the study of human beings. Archaeology focuses on past human cultures by studying the **material culture** or remains, such as **artifacts** and **features**, left behind. In Wyoming, the material remains most often consist of stone (a.k.a. lithic) materials, bone and fire hearth features. Perishable remains, such as plants and animals, often do not preserve well in the ever changing climate of the region.

Cultural Resource Management

One of the largest branches of archaeology today is made up of cultural resource management firms and specialists. **Cultural resource management (CRM)** is a form of applied archaeology in which the main goal is to identify, evaluate and manage historic and prehistoric cultural resources. **Cultural resources** are any object or **site** that represents human activities in the past and are an important nonrenewable resource. On federal lands, cultural resources are protected by federal laws. These federal laws include the American Antiquities Act of 1906, the National Historic Preservation Act of 1966, the Archaeological Resources Protection Act of 1979 and the Native American Graves and Repatriation Act of 1990. The BLM and the Wyoming State Historic Preservation Office (SHPO) collaborate to properly manage the cultural resources on public lands. These agencies ensure that sites eligible for the **National Register of Historic Places (NRHP)** are identified, evaluated and protected. CRM archaeologists serve as the intermediary between the developing company and the federal agency tasked with making sure all the cultural resource regulations are followed.



Archaeologists excavating at a site in the Jonah Field.

An important task of CRM is finding sites and evaluating those sites for National Register eligibility. Before any ground disturbance is permitted, CRM archaeologists conduct surveys to identify any new sites and any potential impacts to known sites. The BLM may require an archaeologist to be present during all earth moving operations at certain locations due to the presence of sensitive sites or in areas where there is a possibility of discovering buried sites. These methods are discussed in detail on the following page. Otherwise, the developers are responsible for reporting any sites uncovered during construction, which has occurred on many occasions in the Jonah Field. Construction activities are halted until an archaeologist can document, evaluate and **mitigate** the effects to the archaeological discovery.

Jonah Research Plan

An agreement was reached in 2007 between the gas field developers (Encana, BP America and Jonah Gas Gathering), the BLM, the SHPO and the Eastern Shoshone Tribe. This agreement established a Research Plan to facilitate the management of cultural resources in the Jonah Field. The plan includes funding for 500 square meters of excavation, research and investigation each year for five years. The 500 square meters are to be used at locations determined to have strong potential to provide additional knowledge about the human history of the Jonah Field area. This Research Plan attempts to fill in the gaps in the **archaeological record** and provide further understanding of past human lifeways.

The Jonah Interagency Office

The Jonah Interagency Mitigation and Reclamation Office (JIO) was created to provide overall management of field monitoring and mitigation activities both on and off site using a fund set aside by Encana Oil and Gas (USA), Inc. and BP America Production Company. This organization focuses mainly upon maximizing recovery of natural gas and the expedience of the reclamation process while leaving the least environmental impact possible. The JIO includes staff from the Bureau of Land Management, the Wyoming Department of Agriculture, the Wyoming Game and Fish Department and the Wyoming Department of Environmental Quality. The JIO has provided the funding for the Jonah Field Early Archaic Camp Exhibit at the Museum of the Mountain Man in Pinedale, Wyoming and this booklet, along with conducting other off-site research projects in this area.

How is Archaeology Conducted?

When an energy company decides to construct a well, access road and pipeline on public land in the Jonah Field, they must adhere to stipulations set forth by the Bureau of Land Management. In order to receive a permit to develop, the energy companies must take into account a number of factors, including wildlife, hydrology, plants, cultural resources and other considerations. For the archaeology portion of the permit, the energy company is required by federal laws to evaluate the area for any potential impact to cultural resources. Often, to comply with the archaeological requirements, the energy company hires a federally permitted CRM firm to conduct the work on public lands.

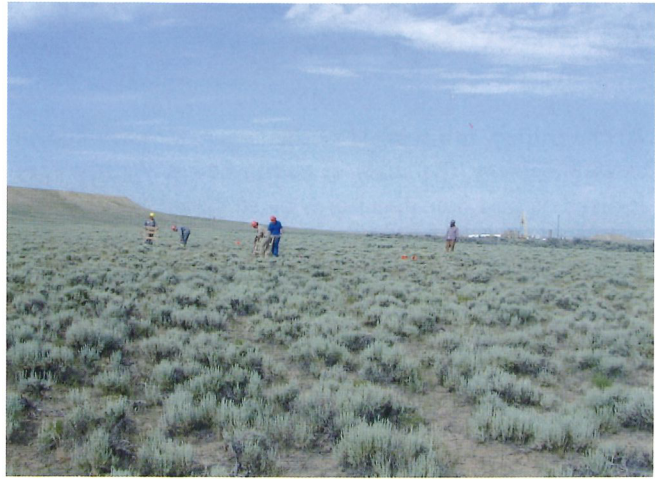
First, the energy company notifies the CRM firm of the area to be impacted. The CRM firm creates a project file for their records. The file includes a records search from the SHPO, which lists all the previous projects and previously recorded sites in the area. The CRM company looks at the area for known cultural resources and a map is generated showing the area of proposed effect along with the known sites. A field crew supervised by a federally permitted archaeologist is then sent out to conduct a pedestrian surface inspection. The surface inspection may cover an area between 10 acres and a square mile. It may also include a linear portion if roads and/or pipelines are proposed. In order to maximize the results, archaeologists walk the area back and forth in a controlled pattern with regular spacing. As the area is walked, any artifacts or features are marked so the archaeologists can return to document what was found.

When artifacts or features are encountered, the archaeologists return to the area and examine it carefully for other materials.

Centimeters or inches?

Did you know that archaeologists use metric measurements for much of their fieldwork? This is a common practice in archaeology in the United States. Metric is used because it standardizes the field around the world. In other words, any archaeologist from any part of the world can pick up another archaeologist's work and understand the measurements reported. However, historic archaeology uses Imperial Units (i.e., inches and feet) for structures and artifacts.

If there are less than 15 artifacts with no features, the find is documented as an **isolated resource**. If there are at least 15 artifacts, the area is documented as a site. Either way, recording the site or isolate includes describing the find as well as the topography and landforms, how the area drains, the vegetation and the soils. Features are photographed and drawn to scale. The site is mapped to scale on graph paper. A global position system point is also recorded for the site so it can be located accurately on a topographic map. The site is then evaluated for the NRHP. Archaeologists often determine this based on the presence of intact or undisturbed



Archaeologists mapping the site while field crew excavates shovel tests.

cultural components.

In order to evaluate the significance of the site, archaeologists dig regularly spaced shovel tests, which are round holes no less than 40 centimeters (cm) (15.5 inch (in.)) in diameter. The shovel tests are excavated in controlled 10 cm (4 in.) levels and the final depth varies depending on the soils present. The dirt from the shovel tests is screened through 1/4 inch mesh screens in order to recover any artifacts that may be present. If artifacts are found, they are collected in bags that are labeled with the project number, site number, shovel test number, level, date and the person's initials. Each shovel test and level are bagged and labeled separately. If features are found, the shovel test is photographed and/or profiled. If the site is deemed as eligible for the NRHP, the BLM, energy company and CRM firm work together to avoid impacting the site. If the project cannot be moved, then additional testing or excavations may be required.

Certain soil types are known to be more likely to preserve buried sites. When these soils are encountered, they do not always have artifacts or features on the surface, or any indicators to show a buried site is present. If this occurs, the BLM may require a permitted archaeologist to observe all earth moving activities. These monitors of construction, as they are called, have resulted in the discovery of a number of important sites in the Jonah Field. If a monitor is not required, the energy company and their contractors are responsible for reporting any sites that are unearthed. A number of significant sites have been identified from these reports in the Jonah Field. When a buried site is identified, archaeologists may temporarily halt construction until they can safely, carefully, professionally and thoroughly document the find. These temporary halts can last from an hour to several months depending on the amount or type of features found and the magnitude of work required to mitigate the impact to the site.

When a feature is identified, there are several steps to document it. Since archaeology removes the feature or artifact, documentation must be as thorough and detailed as possible. A site map is drawn showing the feature in relation to landforms and the construction. For every feature that is excavated, archaeologists draw illustrations to scale, take photographs and write detailed notes. After initial photographs and sketches are completed, half of the feature is excavated using a trowel and collected in one gallon sealable plastic bags. The bags are labeled with the project number, site number, feature number, location, depth, date and excavator's initials. Once half of the feature is removed, another photograph is taken and a map is drawn of the profile of the feature. Notes are taken about anything identified in the profile and the removed feature fill. Then the other half is removed and collected in the same manner. The excavated feature is photographed and detailed notes are taken about the color, appearance and particle size of the fill, any artifacts found, the presence of charcoal, the type of soil into which the feature is excavated and by which it was covered, the depth at which it was found and any other information the excavator deems noteworthy.

If **archaeological discoveries** consist of numerous features, especially if they are identified in the first few passes of the earth moving equipment, the project may be halted until shovel tests or test units are excavated in the undisturbed portion of the project area. Additionally, if the unearthed site consists of a housepit or surface structure, the site must be protected from other disturbance. Sometimes, when significant buried cultural materials are found, construction may not be allowed to continue and the project will either be cancelled or moved out of the archaeological discoveries. Otherwise, these sites will be pursued further using what archaeologists call a data recovery excavation.

A **data recovery excavation** is a controlled scientific dig that mitigates damage to the site while recovering the maximum amount of information possible. Data recovery excavations require special permits granted by the SHPO and BLM. These permits are obtained by submitting a detailed plan of the methods that will be used and the research questions the excavation will attempt to answer. All data recovery must be supervised by a federally permitted archaeologist.

Data recovery excavations begin by photographing the area. Then a 1 x 1 meter (m) grid system is laid out over the part of the site that will be excavated. Each 1 x 1 m square is designated by a grid coordinate. The squares are excavated in 5 or 10 cm increments and the dirt is screened using 1/8 inch mesh screen. Artifacts recovered in the screen are bagged and labeled separately by artifact type, unit and level. The depths of each level are carefully controlled using a transit and rod, which is a type of equipment that measures vertical depth (or height) below

(or above) a fixed point. The purpose of such meticulous excavation methods is to recover artifacts and features in the original place in which they were deposited and then to map that location both horizontally and vertically in the grid system. The maps are used to establish association and context between the artifacts and features recovered.

Features recovered during data recovery are excavated in the same manner as on a monitor of construction. **Housepits** and **surface structures** are also excavated in a similar way. Interior features exposed after removal of the structure fill are excavated the same as other features. After all fieldwork is completed, the bags of artifacts, feature fill, structure fill samples and any other samples collected are brought to the laboratory to be organized, processed, cataloged and analyzed. Artifact analysis varies depending on the type of material (e.g., bone, stone, pottery) from which it is made. One purpose of the artifact analysis is to determine if any distinguishable **activity areas** are present within the site and individual components. Feature fill is processed using a water percolation system that allows organic materials to be collected separately from the heavier materials and artifacts in the fill. The lighter organic material is sent for **macrofloral analysis**. Samples from the feature and structure fill are also sent to a special laboratory for **radiocarbon dating**.

When the analysis of all the artifacts, features and samples are completed, a report of the archaeological findings are submitted to the BLM and SHPO. These two agencies will then update their records to reflect the new findings. Sometimes, archaeologists will also publish their findings in journals and periodicals to share their findings with other professionals as well as the public. Once the artifacts are analyzed and cataloged and the reports are submitted, the artifacts are shipped to a curation facility for environmentally controlled storage. By storing all of the artifacts in one facility, it allows other archaeologists and museums to access the site notes and artifacts as needed for additional research and to share the finds with the public.



Archaeologists excavating a feature on a construction monitor.

Archaeological Stewardship

Archaeological sites are nonrenewable resources that are protected by federal laws on public lands. These federal laws identify significant archaeological and historical sites as irreplaceable and invaluable parts of America's heritage that should be protected from destruction or damage. Federal law also states that cultural resources on federal land are to be documented, evaluated and excavated by qualified professionals working under federally granted permits. The antiquities laws make it illegal to excavate or remove (collect) any artifacts from the surface or subsurface of public land without an authorized federal permit. Criminal penalties for non-permitted collection and/or unauthorized excavation of archaeological sites on federal land can include fines up to \$20,000 and up to two years incarceration for first time offenders and fines up to \$100,000 and up to 5 years imprisonment for repeat offenders. Penalties are based on the value of the damage done to a site as well as the costs to repair or mitigate any damage.

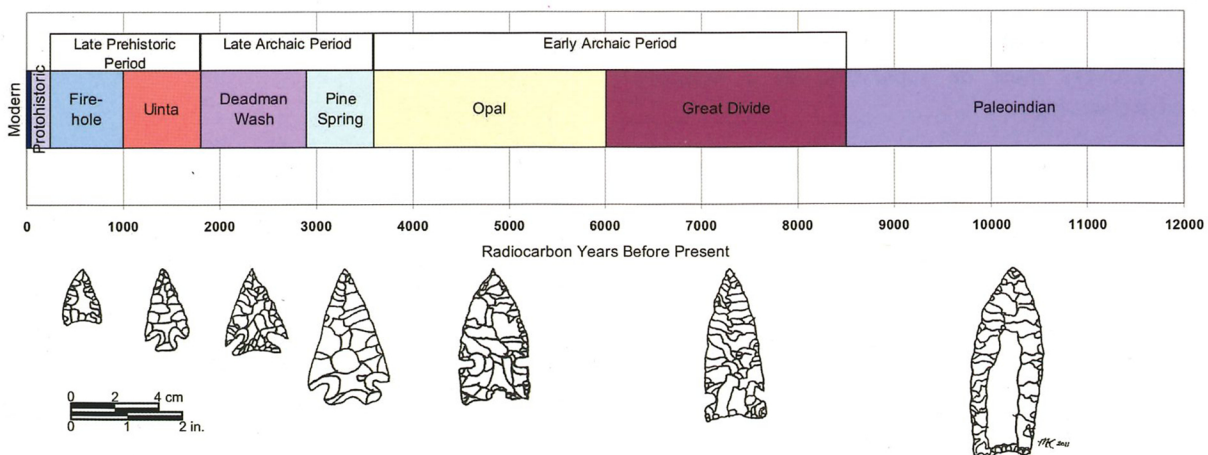


Archaeologists salvaging a feature discovered during construction in the Jonah Field. This is an excellent example of cooperation between the energy companies and the U.S. Bureau of Land Management.

Why should cultural resources be protected?

Collecting artifacts and vandalizing sites destroys the archaeological record. It removes the artifacts from their context. **Context** is an artifact's or site's position in time and space in relation to the other objects and features from a **component** in the site as well as its relation to the cultural remains from other components and sites. Without context, the artifact no longer provides information about the past—it loses all meaning. The information in this booklet was only made possible because the artifacts and sites were found in context. The site also loses valuable data by the removal of even a single artifact because the context of the whole site is compromised. Each artifact, when considered in association with all the other parts of a site, provides a story about the past. Once an object is removed or even moved around, that part of the story is lost and sometimes the meaning of the rest of the story is changed. It's like tearing out random pages from a book or taking pieces of one puzzle and putting them in the box of another. If one were to do this, the story would lose the plot and both puzzles would become jumbled.

Archaeological sites contribute not only to the history of Native Americans or historic settlers, but to the human species as a whole. By the ethical and responsible preservation of the past, we can all share in it together as well as save it for generations to come. If any vandalism or looting is observed on public land, contact the U.S. Bureau of Land Management immediately. Report any unlawful or suspicious activity to the U.S. Bureau of Land Management's hotline at (800) 722-3998. On public lands, it is everyone's responsibility to protect such fragile resources from unlawful collection, destruction and vandalism.



Timeline showing the Prehistoric Periods and Phases for the Jonah Field along with typical point styles for each phase.

Prehistory of the Jonah Field

Evidence of human use of the Jonah Field area spans the last 9000 years. In order to describe this timeline of human occupation, archaeologists divide the past into different time periods based on common characteristics found at sites. These periods are further subdivided into phases based on characteristics of different dated components. Five periods have been identified for the Jonah Field including the Paleoindian (older than 8500 years before present (ybp)), the Early Archaic (8500-3600 ybp), the Late Archaic (3600-1800 ybp), the Late Prehistoric (1800-250 ybp) and the Protohistoric (less than 250 ybp). Sites are divided into these periods based on typological dating of artifacts as well as radiocarbon dating of archaeological features, such as fire hearths and housepits.

Typological dating uses established chronologies developed for different types of artifacts, such as projectile points or **ceramics**. These chronologies are based on artifacts with distinctive styles from well-dated components and sites. The dates associated with the distinctive artifact style determine the relative time period that particular style was used. In addition to this relative dating technique, absolute dating methods are used. Radiocarbon dating is an absolute dating technique that determines the age of a feature or organic object by measuring how long a once-living thing, such as the charred wood in a fire hearth or a piece of bone, has been dead. Living objects absorb carbon naturally throughout their lifespan and once dead the carbon absorption stops. Existing carbon in the object begins to decay at a known rate. With the knowledge of this fixed rate, scientists can determine how long the object has been dead and therefore, the age of a given biological element.

The Paleoindian Period

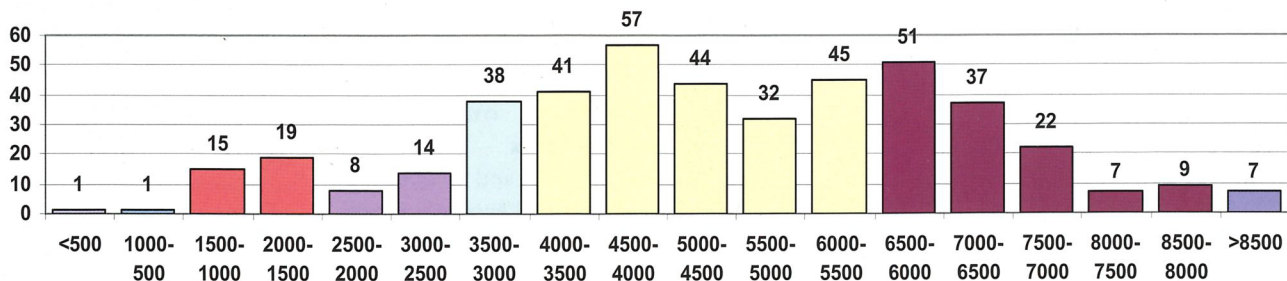
The Paleoindian Period in the Jonah Field is poorly understood. For the most part, finds from the period prior to 8500 ybp are represented by seven radiocarbon dates. Diagnostic Paleoindian **projectile points** have



From left to right, an Eden point, a Hell Gap point and a Folsom point from the Jonah Field. These Paleoindian points would have been hafted onto a spear or dart foreshaft.

been found in buried and surface contexts. In general, this early time marks the transition from a **periglacial** environment (cool moist climate along glacier margins) to a milder and warmer environment. Larger mammal species, such as mammoth, horse and camel became extinct, while other species, such as bison, decreased in size to adapt to the changing environment. Paleoindian people also adapted to the changing environment by becoming less reliant on the disappearing big game animals. They began to broaden their diet to include smaller animals, such as rabbit and ground squirrel, and plants, such as seeds, roots and tubers.

The radiocarbon dates from the Paleoindian Period in the Jonah Field are each from fire hearths. Most of these fire hearths contained animal bones from unidentifiable small animals or jackrabbit. Fuel sources from these features include both sagebrush and birch. The presence of birch suggests that more water was present in the area than is found today. Researchers in the area have suggested that Sand Draw may have flowed year round during this time rather than seasonally. In addition, it has also been suggested that a year round water source may have been



Graph showing the number of radiocarbon dates per 500 years in the Jonah Field. The colors of the bars approximate which phase each date range falls into in the timeline on the opposite page.

Archaeology in the Jonah Field

present in the Jonah Field during the Paleoindian Period.

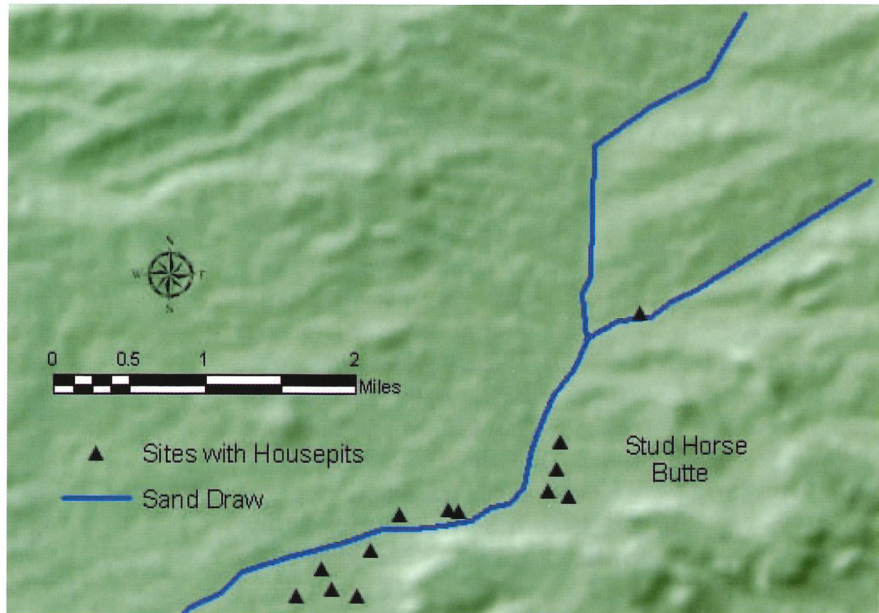
Projectile points from this time period are rare, but when found they are most often on the surface. Point styles from this time are generally long with straight sides and ground edges along the base. Sometimes these points have **stemmed** bases and others have a concave base. These points would have been **hafted** (mounted) to a shaft for use as a spear. Point types found in the Jonah Field include Folsom, Agate Basin, Hell Gap, Alberta, Cody (Scottsbluff and Eden) and Angostura. These points are most often made from local Alkali Creek, fossiliferous and oolitic chert materials. Other tools from the Paleoindian Period include **spurred end-scrapers** and **burins**. Since most of these early tools have been found on the surface, it seems that preservation of these early sites is lacking thus explaining why so few sites from this time are identified in the Jonah Field.

The Early Archaic Period

The Early Archaic Period (8500-3600 ybp) is the most represented time period in the Jonah Field. It appears that archaic hunter-gatherers often visited and revisited the Jonah Field area. Currently, there are 334 radiocarbon dates dating to the Early Archaic Period from sites in the area. This period is separated into the Great Divide Phase from 8500-6000 ybp and the Opal Phase from 6000-3600 ybp. In general, the climate during the Great Divide Phase became warmer and drier than the previous pattern. This



Surface structure from Site 48SU6582 near Sand Draw. This structure dated from the end of the Great Divide Phase into the Opal Phase of the Early Archaic. Note the postmolds around the outside of the interior features and the lack of staining in the interior.



Shaded relief map showing the distribution of housepit sites around the Sand Draw area of the Jonah Field. The sites each have one or more housepits present.

warm, dry trend is termed the **Altihermal** by scientists. During this time antelope and rabbits thrived in the Jonah Field area and native peoples most often exploited these for meat along with occasional deer, elk, bison and bighorn sheep. During the Opal Phase, the climate began to shift back to a cooler moister pattern, but was still drier and warmer than today. With this shift, very small numbers of bison begin to appear in the archaeological record of the area. Seeds increase in the record especially in macrofloral samples from fire hearths. **Ground stone** tools, such as **manos** and **metates** used for grinding and processing plants become more common during the Early Archaic Period. The increase of plants,

Wyoming's Oldest Human Burial

Did you know the Jonah Field is home to the state's oldest burial? A human burial dating to 7290 ybp (the Great Divide Phase) was discovered in the Jonah Field. The human remains consist of over 100 bone fragments, most unidentifiable due to deterioration. The individual was a woman aged 60+ years. Her remains were found inside a housepit, which may have been constructed specifically for her interment.

Archaeologists can find out information about ancient human remains using a branch of science called **osteology**. This field can establish the sex, age, growth and development of an individual and in many cases the cause of their death. Commonly, an osteologist's analysis consists of determining the bone elements present (including side of body and sex if possible), a dental inventory, bone development and deterioration (to establish age at death), stature (using length and girth of long bones) and pathology (diseases or healed/unhealed injuries). Ethnicity may also be ascertained if the skull is intact by comparing certain facial structures (e.g., eye orbits, teeth, nasal region) to known samplings from around the world.

manos and metates in the record suggest that prehistoric people were incorporating more plants into their diet during this time. Again, researchers believe prehistoric peoples were attracted to the area by the available animal, plant and stone resources as well as possible water sources in Sand Draw and a prehistoric lake. However, it is thought that by the end of the Early Archaic, the prehistoric lake most likely dried up and Sand Draw slowed and became a seasonal stream.

Great Divide Phase

Great Divide Phase sites have been identified on the surface and in buried contexts in the Jonah Field. The buried sites most often include fire hearths and two different types of structures, housepits and surface structures. Archaeologically, housepits appear as large circular to oval shaped gray to black **stains** with small circular **postmolds** or **postholes**, partially to completely surrounding it. In profile, these structures are basin shaped indicating that the interior floor was excavated. When the housepit fill is removed, fire hearths and storage pits are often present at the bottom. To date, 12 Great Divide Phase housepits have been identified in the Jonah Field at seven sites. Surface structures are similar to housepits in size and also have postmolds around the outside. They are different from housepits, however, in that surface structures were not dug out and the fire hearths and/or storage pits are found on the same surface as the postmolds. To date, four Great Divide Phase surface structures have been found in the Jonah Field. Both types of structures were believed to include a conical superstructure of wooden posts with either hides or sagebrush for the walls and roof.

Artifacts identified at sites from this time include ground stone manos and metates, bone tools (**awls**, **fleshers**), **debitage**, expedient stone tools (e.g., end-scrapers, side-scrapers, **spokeshaves**, retouched flakes) and **bifaces** (e.g., knives, drills). Animal bones are most often from jackrabbits, cottontail rabbits and occasionally antelope.



Early Archaic projectile points. These points would have been hafted to a foreshaft and inserted into the dart shaft. The darts would have been thrown using an atlatl.



Examples of bone awls from an Opal Phase component at Fremont Lake and an Opal Phase component at the New Fork Awl Site.



Different types of flaked stone tools. Clockwise from the top center: a possible spokeshave, a drill tip, a biface (knife blade), an awl, a flake tool and a biface (knife blade).

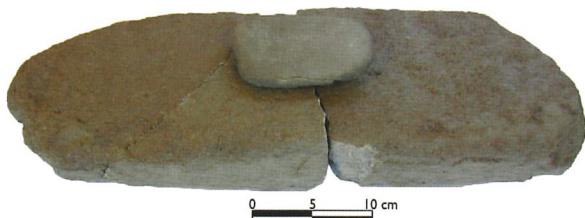
Projectile points from the Great Divide Phase often have straight sided to triangular shaped blades with side notches. These points are smaller than Paleoindian points and were hafted onto foreshafts for **darts** that were thrown using an **atlatl**. An atlatl, or spear thrower, was a long, flat bone or wooden device with a peg, spur or cup at one end that the dart shaft abutted. The purpose of the atlatl was to extend the distance and power behind a thrown dart. Archaic point types found in the Jonah Field include Pryor Stemmed, Hawken and Bitterroot (Northern) **Side-notched**.



Housepit feature at the J. David Love Site. The interior fill has been removed and the interior features have been profiled.

Opal Phase

Opal Phase sites are the most common in the Jonah Field. These sites also include **surface scatters** and buried deposits. The buried sites from this time include fire hearths and surface structures. A few of the housepit interior features also date into this phase. Five surface structures from the Opal Phase have been identified in the Jonah Field. Outside of the Jonah Field, numerous housepits have been found from this time period, but thus far none in the Jonah Field have exclusively dated to the Opal Phase. Some of the fire hearths from this time period are filled with **fire-cracked rock** or have slab linings near the bottom. Macrofloral analysis of samples from these features has identified prickly pear cactus, goosefoot seeds, Indian ricegrass seeds, mustard seeds, bitterroot and biscuitroot. These plants were likely included in the diet of people of the time. Artifacts identified at sites from this time include ground stone manos and metates, debitage, expedient stone tools and bifaces. Animal bones are most often from rabbits, antelope and occasionally bison.

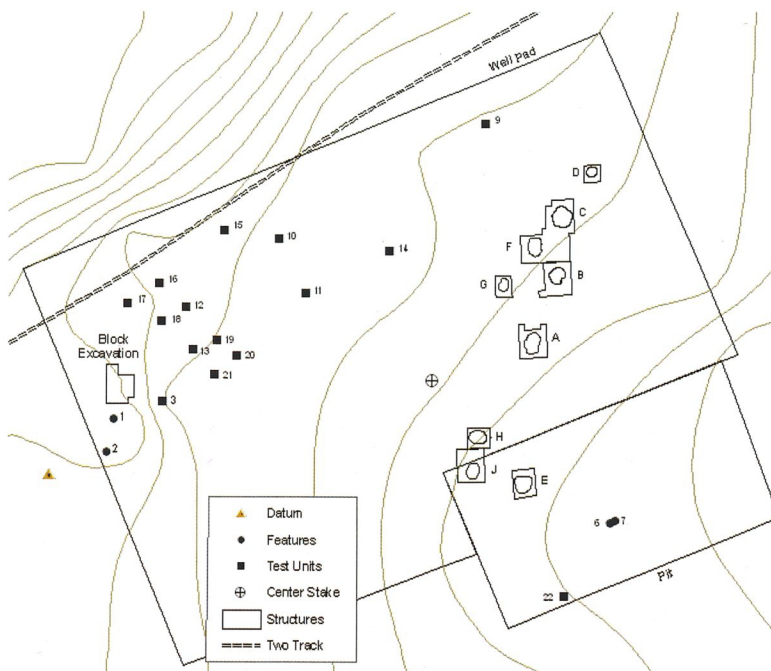


Sandstone ground stone. The mano is the smaller handstone on top and the metate is the larger slab underneath.

Opal-aged projectile points generally consist of triangular shaped blades with side or corner notches. These points were much smaller than Paleoindian points and usually smaller than Great Divide points. Again, these points were hafted onto foreshafts for darts that were thrown using an atlatl. Point types from this time found in the Jonah Field include Duncan, Hanna, McKean Lanceolate, Elko **Corner-notched**, Bitterroot Side-notched, Yankee and Pinto Basin (Square-shoulder and Sloping-shoulder).

The J. David Love Site

The J. David Love Site is an example of Early Archaic occupations in the Jonah Field. This unique site is represented by nine structures with internal fire hearths and/or storage pits, seven external fire hearth features and a human burial. Radiocarbon dates from the site extend throughout the Great Divide and Opal Phases. Habitation of these structures is thought to have been periodic over the site's history. The other nine habitation



Sketch map of the J. David Love Site. The site was found during construction of the well pad. Not to scale.

sites in the Jonah Field each consist of only one or two structures. The particular uses of these habitation sites are unknown. Several theories for the high concentration of structures in the Jonah Field have been suggested. One idea suggests that these structures represented way stations or stops along migration routes. Alternatively, these structures may have been used as seasonal camps from which groups could go out to gather food and supplies to bring back to a central camp. Another proposes that the structures were used to store supply caches for winter use or were inhabited during the harsh cold winters. Additionally, these structures may represent a large central camp where different groups in the region would occasionally gather to trade goods and information, hunt together or perform ritual ceremonies.



Crew excavating a housepit at the J. David Love Site with other housepits in the foreground and background. Note the postholes (the small black dots) around the outside of the excavated housepit in the foreground.

The Late Archaic Period

In the Jonah Field, the Late Archaic Period (3600-1800 ybp) is well-represented. Again, prehistoric peoples returned continuously throughout the period, however, it is thought that they may have returned less frequently than the previous periods. During this time, it is thought that Sand Draw may have become strictly seasonal or only flowed periodically. Seventy-three Late Archaic radiocarbon dates have been reported from sites in the Jonah Field. The Late Archaic is divided into the Pine Spring Phase from 3600-2900 ybp and the Deadman Wash



Rockshelter Area C at the Raven's Nest Site (48SU3871). This area had a Late Prehistoric component from 0-8 in. (0-20 cm) with a Late Archaic, Deadman Wash Phase component below. The Deadman Wash Phase included a fire hearth type feature.

Phase from 2900-1800 ybp. The Late Archaic Period is marked by a moist cool climate referred to as the **Neoglacial** period. The additional precipitation may have improved available plant resources and allowed small herds of bison to survive in the area. This is reflected in the archeological record by an increase in bison remains. Ancient people of this time were still hunting and eating antelope, rabbit, ground squirrel and other small animals as well as using various plants, such as bitterroot, biscuitroot, Indian ricegrass, goosefoot and prickly pear cactus.



Excavations at Site 48SU2230 in the Jonah Field. The site dated to the Late Archaic Period and had a number of features and stains.

Pine Spring Phase sites are more common in the Jonah Field than Deadman Wash Phase sites. Both time periods are represented by surface and buried sites. It is interesting to note that no structures have been found from the Late Archaic Period. Several thoughts have been proposed for the lack of structures. These ideas include **preservation biases** due to climate and depositional factors of the time, a lack of need for such formal structures because of the milder climate or that people of that time built their structures in areas outside of those currently explored. Many of the fire hearths dating to this period are filled with rock cobbles, slabs or fragments, suggesting they were used as roasting pits for bison, antelope or plants. Artifacts include numerous ground stone manos and metates, debitage, expedient stone tools and bifaces. Projectile points were still made for atlatl darts. During this time, the most common points are large corner-notched, triangular bladed points. Particular types include the Elko (Corner-notched, Eared and Contracting Stem), Pinto Basin (Square-shoulder and Sloping-shoulder) and Pelican Lake.

Late Archaic projectile points. These points also would have been attached to foreshafts for darts.



The Late Prehistoric Period

The Late Prehistoric Period (1800-250 ybp) is also represented in the Jonah Field. Thirty-four radiocarbon dates have been reported from sites of this age. However, surface scatters with projectile points from this time period are the most commonly identified Late Prehistoric sites. This period is divided into the Uinta Phase (1800-1000 ybp) and the Firehole Phase (1000-250 ybp). The Late Prehistoric is marked by a short return to drier climates, termed the "Little Altithermal," followed by the "Little Ice Age," which was a cooler, moister period. In the Jonah Field, there is a marked drop in the number of Late Prehistoric sites that have been found. Whether this



Bison skull found in the Jonah Field on Yellow Point Ridge. Bison skulls were used in a variety of sacred ceremonies. This particular skull was noncultural. Bison were thought to be present in the Jonah area in small numbers from the latter part of the Early Archaic Period until the Late Prehistoric Period.

drop is due to the fluctuating climate, lack of people in the area or poor preservation, is unknown. The Late Prehistoric Period saw the introduction of the bow and arrow, various **rock art** styles and pottery. Cultural affiliations begin to take shape in the archaeological record. For the most part, the Green River Basin was inhabited by Shoshone Tribes. However, it is also possible



A variety of Late Prehistoric projectile points. These types of points are arrowheads.

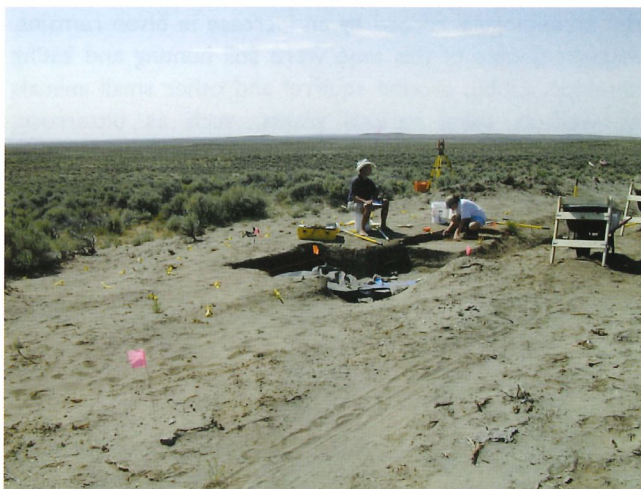


Rock-filled feature from the Wolf Tooth Site, which dates to the Late Prehistoric Period.

that small groups of Northern Ute and Crow may have migrated into the area on occasion as well. Projectile points from this time are considerably smaller in size and vary greatly in notch and base styles. Evidence from the surrounding region indicates that ancient groups were participating in group or communal hunts of bison and antelope through the use of traps and jumps.

Uinta Phase

The Uinta Phase shares some similarities with the Early Archaic Period. Housepits of this age, although smaller in size than their predecessors, are found in the region south of the Jonah Field. Sites of this age again show a diversity of plant and animal resources being used. The similarities between these two phases suggest that the Uinta Phase people were adapting to similar environmental and climatic conditions as their forerunners. Uinta-aged sites are more common than Firehole Phase sites in the Jonah Field. These sites are more often surface scatters than buried sites. Buried deposits contain fire hearth features with bison bone and/or a variety of plant species. Common point types of this time include Rose Springs (Corner-notched, Side-notched



Excavations at the Wolf Tooth Site. Eight ceramic sherds were identified in the block and refit to form the rim of a vessel (photo on page 23).



These sherds from the Raven's Nest Site are examples of the typical gray ware (also called Intermountain ware) found at Late Prehistoric Sites around Wyoming.



From left to right, a punctated rim sherd, a fingernail incised sherd and a rim sherd from Rockshelter Area B at the Raven's Nest Site. These sherds show the variation between the types found throughout the site. The punctations and fingernail marks were forms of decoration.

and Expanding Stem) and small corner-notched, triangular bladed points. Rose Springs points are considered diagnostic markers of Uinta Phase sites because they have only been associated with these sites.

Firehole Phase

The Firehole Phase sees a change in projectile point styles to side-notched and tri-notched styles, such as Desert Side-notched, Cottonwood Triangular, Plains Side-notched and Prairie Side-notched. The majority of sites from this time are surface scatters with only a few buried deposits. The surface scatters often consist of lithic debris, small projectile points and ground stone artifacts. No rock art sites are currently known in the Jonah Field. Rare finds from this time include **steatite** objects. One decorated steatite artifact, which looks like a rattlesnake rattle, has been found in the Jonah Field and it may be a gaming piece or an adorned pendant. Several tipi rings have been found on Yellow Point Ridge. The tipi rings consist of a ring of rocks that would have been used to hold down the animal skins that formed the tipi shell. In addition, a small possible "shaman circle" has been found on Yellow Point Ridge and is thought to be from a Firehole Phase occupation.

Late Prehistoric Ceramics

Ceramic sites are a rare find in the area and may represent an important part of the cultural history of the

area. Pottery has been identified at 10 sites in the Jonah Field. While most of these sites are of an unknown age, the antiquity of sites with ceramics is generally thought to be from the Late Prehistoric Period. Usually ceramics from the Jonah Field are small **sherds** of plain brown or gray utility ware. No specific ceramic type has been assigned to ceramics from the Jonah Field, but Intermountain Ware, which is considered a cultural marker for Shoshonean tribes, has been suggested as a possibility. The Wolf Tooth Site, in the far southern Jonah Field area, had a large number of fragments. Eight of these sherds fit together to form the upper part of a single vessel. Another site had 14 pottery sherds identified, but no refit study was reported. Site 48SU4000 contains several locations with ceramics. This complex represents the highest concentration of ceramic sites known in southwestern Wyoming. One of these locations, the Raven's Nest, was excavated and over 1100 pottery sherds were found. These sherds included the typical gray utility ware along with several other stylistic varieties.



This excavation block at the Raven's Nest Site contained ceramic sherds, a glass trade bead, Late Prehistoric points, debitage, bone fragments and a posthole.



Rockshelter Area B at the Raven's Nest Site had a Late Prehistoric Component from 0-24 in. (0-60 cm) with a Late Archaic Component in the lower levels. The Late Prehistoric levels included debitage, bison bone, ceramic sherds and diagnostic projectile points.



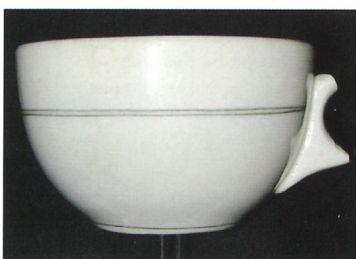
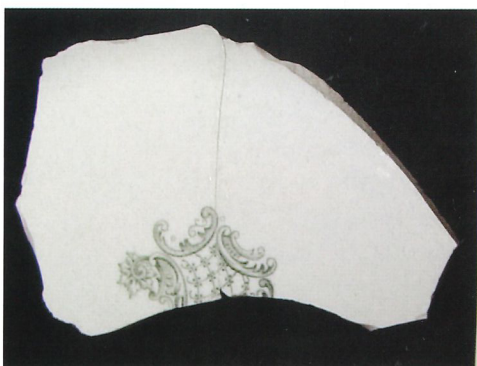
Photograph of Granite Camp with the cabin, animal pen, windmill and a stock pond.

The Protohistoric Period

The Protohistoric Period begins about 250 years ago and ends in the early 1800s when Euro-American mountain men entered the area. While historic documentation of Euro-Americans is limited in the Jonah Field itself, the surrounding areas were host to fur trappers, traders and explorers. The Raven's Nest Site is the only site to produce a radiocarbon date from the Protohistoric Period.



Foundation remains of a historic cow camp located near Sand Draw (in background). The structure is the grassy depression in the middle with sandstone foundation slabs around the outside. The wooden beams were part of the structure.



Historic artifacts from the Jonah Field. A ceramic plate shard with a maker's mark (top), a bottle neck (middle left), a coffee cup (middle right), a bottle base with maker's mark (bottom left) and a ceramic plate shard (bottom right).

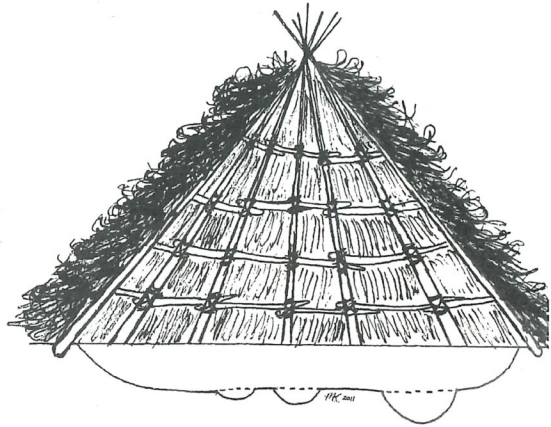
The Historic Period

The Historic Period begins in the early 1800s and ends around the 1960s. Multiple historic wagon and auto roads cross through the upper Green River Basin near the Jonah Field. These roads brought people and supplies to the small blossoming ranching and farming communities of the region. Within the Jonah Field, historically called the Desert, there are three documented **cow camps** used by local ranchers during the first half of the 20th century while driving cattle through the area. Johnny Wardell's Castle is a cabin site that was used from the early 1940s through today. Granite Camp is another stock-herder site established in the 1930s or 40s. The third cow camp was also in use from the 1930s to the 1950s. Shepherding camps, represented by trash scatters (e.g., cans, bottle glass and wire), are reported in the Jonah Field as well. Shepherder camps were generally occupied for short periods of time and then abandoned as sheep were herded through the region to surrounding pastures. A Historic Period glass trade bead and a pipe stem fragment were found at the Raven's Nest Site. The plate **shards**, bottle neck, coffee mug and bottle base with a **maker's mark** pictured below came from a historic debris site in the Jonah Field.

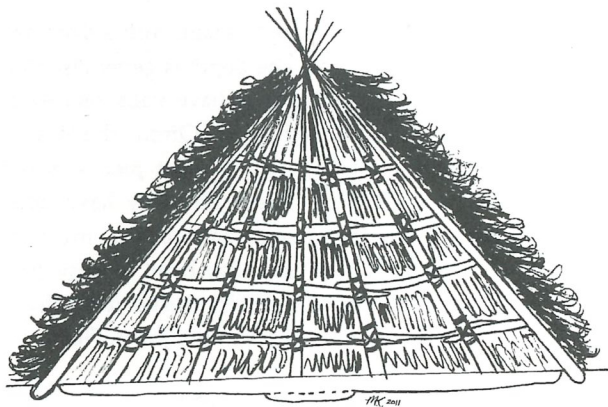
Structure Types Through Time

As in architecture today, structures have changed over the course of time depending on advances in technology and materials available.

Housepits are the most common structure type found in the Jonah Field. A housepit is a semi-subterranean structure. The floor is excavated up to two feet below the ground surface. Housepits are usually 6-10 ft (2-3 m) in diameter and oval to circular in shape. Willow, cottonwood, birch or juniper posts were gathered in the area and placed in the ground around the outside of the pit and tied together with sagebrush bark or rawhide at the top. Smaller supporting willow branches were woven or tied around the posts horizontally to add support. Hides and/or sagebrush were secured to the posts and supports to cover the structure. Archaeologically, these appear as large circles or ovals of gray to black dirt with postholes around the outside. Pit features for either storage or hearths are found across the floor of the structure. Artifacts in these structures include debitage, flake tools, rabbit and antelope bones and ground stone. Radiocarbon dates from this type of structure range from 8000-5000 years ago in the Jonah Field.



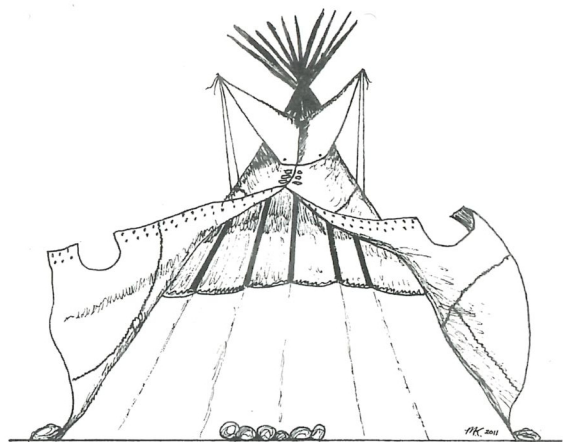
Line drawing of the cross section of a housepit, which may have looked like the replica (previous page) at the Museum of the Mountain Man in Pinedale, Wyoming.



Line drawing of the cross section of a surface structure.

Surface structures are very similar to housepits in size and shape. However, the floor is not excavated. Instead, a thin “trample zone” may form from people moving around inside the structure and from the structure being cleaned out. The rest of the structure construction is the same as for housepits. Archaeologically, these appear as large irregular to oval shaped gray to black staining with a circle of postholes around the outside. Sometimes no staining is present in the trample zone. If stained, it is usually only an inch or two deep with varying thicknesses across the floor. The tops of the interior features appear at the same depth as the postholes. The types of cultural materials found in housepits are also identified in surface structures. Most surface structures from the Jonah Field date to 6000-4000 years ago. Outside of the Jonah Field, few surface structures have been identified.

Tipis were the main structure used during the Late Prehistoric Period (1800-200 years ago). Tipis are different from housepits and surface structures. The poles are made from tall straight trees, such as lodgepole pines, which would be harvested in one area and then carried with the people wherever they moved. A tipi structure is usually 13-17 ft (4-5 m) in diameter. Besides the poles and hide covering, rawhide tie downs and wooden pegs were used to secure the structure. The hide cover would be tied around the poles and the bottom would often be secured with rocks. Only one fire pit would be located inside the structure near the center. Archaeologically, these appear as a ring of rocks sometimes with a fire hearth near the center. Artifacts associated with tipi rings are usually outside the structure if present and can include animal bones and debitage. Only a handful of tipi rings are found in the



Line drawing of a tipi and its interior.

Archaeological Feature Types

Archaeologists generally describe feature types based on the physical characteristics such as the shape and the presence or absence of rocks or slabs. In the Jonah Field, recognized feature types include unlined basins/pits, belled pits, rock-filled pits, rock-lined pits and slab-lined pits. While the types are defined by physical characteristics, the actual use or purpose of a feature is based on the cultural materials found in the fill and often this designation is vague and open to interpretation.

Unlined basins or pits are usually identified as circular or elliptical stains with a diameter of 7-43 in. (20-110 cm). They range in depth from 4-28 in. (10-70 cm). Unlined pits were most likely fire hearths used for cooking, heat, light or ceremonial purposes. These are the most common types of feature found in the Jonah Field.

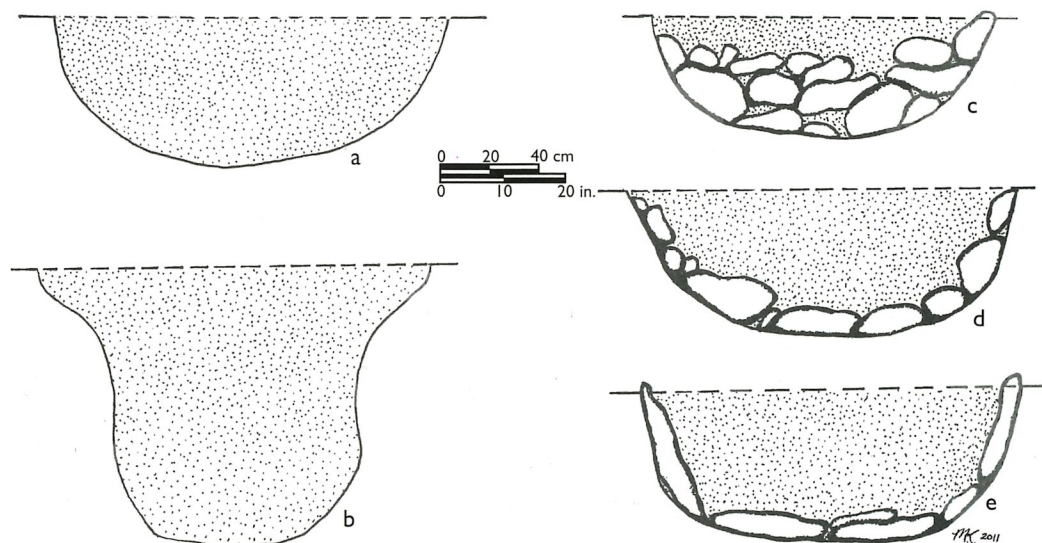
Belled pits are features that appear as circular stains on the surface with a diameter of 7-27 in. (20-65 cm). In profile, they are shaped like an upside down bell, or in other words the top flares outward and then the walls angle in before angling back outward again. These types of features were most likely used for cooking, heat, light, storage or ceremonial purposes. Belled pits occur at a number of sites in the Jonah Field.

Rock-filled pits are usually circular, elliptical or ovoid pits ranging in diameter from 19-39 in. (50-100 cm) with depths up to 24 in. (60 cm). This type of feature has fire-cracked rock or cobbles throughout the fill. Sometimes

the rock is mostly towards the bottom of the feature or one side wall. These features are believed to have a variety of food processing or cooking uses including as roaster pits for roots, tubers and meats. These pits may have also been used to heat up the stones for use in boiling bags or for burial under a sleeping mat for warmth. Some also believe that, since the rocks retain heat, they may have been used during the smoking or food drying process. These are the second most common type of feature found in the Jonah Field.

Rock-lined pits are circular features that have a lining of rocks either at the base or near the base. Sometimes the lining may extend up the sides of the pit. This type of feature usually ranges in size from 19-32 in. (50-80 cm) with depths ranging from 12-28 in. (30-70 cm). Rock-lined features may be fire hearths used for cooking and food processing or storage pits. In the Jonah Field, these features are present at a few sites.

Slab-lined pits are usually circular in shape with a diameter between 15-24 in. (40-60 cm). The depth is generally from 14-32 in. (35-80 cm). These features have slabs, usually of sandstone, lining the walls and floor. Often, the spaces between the slabs are filled in with smaller pieces of the rock to create a solid liner. These pits may have been used as ovens for roasting roots and tubers, meat or other foods. These pits may have also been storage pits, since the slabs would have protected stored items from rodents. This type of feature is rare in the Jonah Field.



Line drawings of the different feature types: basin-shaped feature (a), bell-shaped feature (b), rock-filled feature (c), rock-lined feature (d) and a slab-lined feature (e).

Faunal Resources

The ecosystem of southwestern Wyoming supports a wide variety of fauna or animals. Many of these animals are migratory, meaning they move from one area to another with the changing seasons. There are some animals, however, that can be found in the Jonah area year round. Despite the growing activity of the gas field, many animals have remained and adapted to the daily presence of people, vehicle traffic and other modern additions to the area.

Native American cultures had uses for every animal from small rodents to large grazers. Unfortunately, most remains of the fauna used by prehistoric people, no matter how well processed, do not withstand the tests of time or the weather conditions of Wyoming. They decay over time and become lost to the archaeological record. Remains that are found can be studied by **zooarchaeologists** to determine the species, age and sex of the animal. These characteristics can help determine the season that the site was used. Using what archaeologists call the direct historical approach, the purposes past people had for different animals can sometimes be gleaned from the record by comparing it to and using the knowledge of recent and extant Native American peoples. The most obvious uses for animals would be for food in the form of meat from the muscles and marrow from the bones. Other uses are discussed below along with each animal species.

Bison (*Bison bison*) are among the largest animals identified in Wyoming. While they are not present in the Jonah today, evidence of bison exists from the Opal Phase through the Late Prehistoric Period. Bison were a



Bison bison bulls, cows and calves.

migratory animal that roamed as they grazed on available grasses and sedges. Kills in the Jonah field are believed to have been opportunistic rather than planned. Bison

populations were likely very low in this area and bone found in prehistoric fire hearths suggests only a single bison was killed at a time. Only one communal bison kill site, the Wardell Site, has been found in the region to the northwest of the Jonah Field. When a large animal, such as a bison was killed, native peoples most likely used every part of the animal. Some parts had a variety of uses

while others were used for specific purposes. The muscles make up the meat that was taken from the animal, while the larger bones were often crushed to extract the marrow and grease.

The bison hides would be tanned and made into clothing, structure covers, blankets, bags, slings and cooking skins. Strips of the hide could be dried to make rawhide and then sliced for tethers, binding materials, bracelets, necklaces or for other ornamentation. The hair could be left on the hides for blankets and clothing as well. The horns were made into eating utensils, drinking cups and ornaments on ceremonial objects and headdresses. The hooves and some bones may have been boiled down to form an adhesive for attaching points to foreshafts and shafts. The sinew, or tendons and ligaments, were dried to form strong cords or strings. The gut, bladder and intestines were cleaned and dried then utilized as storage containers for food and water or as boiling bags. The gut was also cut into fine strings for bows. Fat was boiled down to tallow and added to foods like **pemmican** or used as a grease or medicinal salve. The tallow could also have been stored for later. Various bones were shaped into a number of tools. The scapulae, or shoulder blades could be attached to a shaft to form a hoe or shovel. Splinters of the leg bones and ribs were sometimes sharpened or shaped into digging tools, burins, awls, knives, hide scrapers or any of a number of other useful tools. Some of the bones may have been ground up and used to thicken soups and stews or made into a paste for eating. The teeth may have been worn as adornment while the heavy jaw bone may become a ceremonial club. The brain was used in the tanning process and, finally, the skull, was important in many ceremonies and rituals.

Pronghorn antelope (*Antilocapra americana*), mule deer (*Odocoileus hemionus*) and bighorn sheep (*Ovis canadensis*) were more readily available than bison. While some could argue the smaller size made them less desirable than the larger bison, the greater population of these animals in the area made them a more reliable target throughout the area's prehistory. This can be seen to the north near Pinedale, Wyoming at the Trappers Point, a large game kill



Buck antelope (left) and a *doe antelope and fawns* (right).

Archaeology in the Jonah Field

site that dates from the Early Archaic to Late Archaic and the Eden-Farson antelope kill site to the southeast, which dates to the Late Prehistoric Period. Pronghorn can still be found throughout the Jonah Field today, while mule deer are found in the surrounding region.



Mule deer doe.

The range of bighorn sheep, on the other hand, has shrunk back out of the basin into the mountains. Deer and sheep bones, some with butcher marks, have been identified in several fire pits in the Jonah. Pronghorn bones have been identified in features at a large number of sites throughout the Jonah and surrounding area. Sites with pronghorn remains date from the earliest part of the Early Archaic through the Late Prehistoric Periods. The



Bighorn sheep ram.

uses of the organs and parts of these animals are very similar to those of bison. The meat from the muscles are highly desirable protein sources. The hide, gut, sinew, intestines, brains, bones and teeth would all be used for similar purposes as these parts from the bison. The skulls could be used for decoration. The antlers of deer were often used as handles for hafted tools, large and small hammers for stone tool making, punches and awls. Smaller splinters of antler could also be ground and smoothed into a fine sharp needle. Bighorn sheep horns could be made into bow staves or ornaments.



Grey wolf photo compliments of the National Park Service.

these animals. However, sites to the north have had some possible canine bones identified, but whether the animal was eaten as food, accidentally deposited in the cultural levels, a family pet that died or killed as a pest, is unknown. These animals are not

Wolves (*Canis lupus*), coyotes (*Canis latrans*) and foxes (*Vulpes vulpes*) were likely present in the area in the past and they are still found today. No definitive evidence exists in the Jonah Field for the harvesting or use of



Coyote.



Red fox.

often used as a food source, but the meat may have been eaten when one was killed for the pelts or during times of starvation. Wolf, coyote and fox pelts are highly desirable for clothing in colder climates such as Wyoming where winters can be extreme. The pelts are soft, water resistant and provide great insulation. Pelts could also be made into blankets and clothing. The claws, teeth and skulls were sometimes manufactured into various types of ornamentation or used for ceremonial purposes.

Jackrabbit (*Lepus californicus*) and cottontail rabbit (*Sylvilagus audubonii*) populations are widespread and substantial throughout the region. A large body of evidence exists for their presence and use from the Paleoindian Period through today. Rabbit bones are often found in the fill of fire hearth features from all



Rabbit.

time periods throughout the Jonah. While most do not consider rabbit a prime source of food, the evidence suggests rabbit may have supplemented food stores in winter or during the spring and fall gathering periods. Rabbit would likely have been an ingredient in stews along with other foods. Besides being a source of meat, their soft, warm pelts were desirable for lining the insides of footwear and clothing. The pelts could also be made into blankets, robes, capes and other clothing. The longer, thicker leg bones could be made into various tools, including needles, burins, awls and punches. Many of the long bones could be made into beads. Rabbit bones were often crushed and boiled for the grease and marrow. Evidence of these last two activities is frequently identified in the Jonah.

Prairie dogs (*Cynomys ludovicianus*) and ground squirrels (*Uroditellus elegans*) are also common animals to the Jonah Field and colonies of these animals can be found along pipelines and reclaimed well pads. Charred ground squirrel



Ground squirrel.



Prairie dog.

bones have been identified in several sites in the Jonah. Both of these animals were used for meat, especially in stews and soups. The bones from these animals may have been ground up to make a sort of paste used to thicken the stews and soups. The bones could also have been made into beads.



Blue grouse.

Game birds, like sage grouse (*Centrocercus urophasianus*), blue grouse (*Dendragapus obscurus*) and turkeys (*Meleagris gallopavo*), were present in the Jonah and surrounding mountainous areas in the past. Some of these species are still present today. Eggshell and game bird bones have been identified at sites in the Jonah and the surrounding area. Burned avian bones and eggshell have been found in a number of fire hearth features. These animals were taken for their meat while the feathers were often used for decorative purposes. The eggs, laid in spring, were collected for use. The bones could be made into beads and small musical instruments.

Fish were most likely never present in the streams in the Jonah Field. However, the New Fork River and Green River, in the past and today, have a variety of native fish, including cutthroat trout and mountain whitefish. No fish bones or scales have been found in the Jonah Field sites themselves. Fish bones have been found at a handful of sites near the Green and New Fork rivers. Cooked fish residues were identified during organic residue testing on a piece of ground stone in a fire feature north of the Jonah Field. Fish would have been a desirable protein. The bones could be made into needles and ornaments.



Trout.

Smaller rodents, such as chipmunks, mice, moles and voles, also present some evidence in the Jonah Field. Small burned bones matching animals of this size have been found in fire hearths in sites around the Jonah Field. Prehistoric people may have been burning rodents killed around the camp site or they may have eaten them in stews and soups. Sometimes the finer bones from these animals would be crushed up into a paste that could be used to thicken stews and soups.



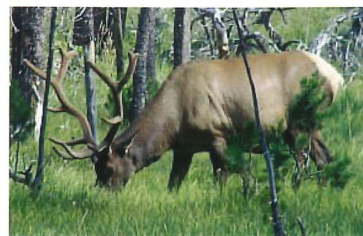
Chipmunk.

Moose moved into the basin during the latter half of the Late Prehistoric Period and are present today. No archaeological remains have been identified in the Jonah Field sites. Elk were present



Bull moose.

throughout the basin prehistorically as they are today, but no identifiable evidence has been found in the Jonah sites. Exploitation of elk has been noted at a handful of sites in the upper Green River Basin, at least one site along the New Fork River and at the Trappers Point Site to the north near Pinedale, Wyoming. Grizzly bear and black bear show up in Native American mythology, however, it is unknown if they were used prehistorically. Mountain lions, bobcats and lynx are known to live in the mountains of Wyoming. These animals, especially the bobcat, may have been taken for their furs while the claws and teeth could have been used for ornamentation or ceremonial purposes.



Bull elk.



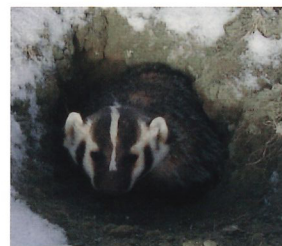
Grizzly bear sow and cub.

Nongame birds, such as eagles, hawks, falcons, osprey, owls, magpies and ravens, were rarely used as a food source. Many of these birds, especially the eagles, were considered sacred by native groups. Their feathers were used for decorating ceremonial capes, clubs and head pieces throughout the Late Prehistoric Period and perhaps before that time.



Bald eagles.

Porcupine, badgers, skunks, ferrets and weasels are also present around the region. Porcupine quills were flattened, dyed and woven into clothing for decoration. The pelts of the others could be used for clothing and blankets. River otters and beavers inhabited the creeks and rivers of the upper Green River Basin. These animals would be taken for their warm waterproof pelts. Both animals were very important in the historic fur trade industry.



Badger.



Weasel.

Floral Resources

An often forgotten artifact, plant materials were one of the most important resources used by early peoples. Plants made up the fuel for their fires, the backbone of their weapons, their nets for fishing, the framework and covering for their shelters, the baskets and slings for gathering, the sticks for digging and the staples of their diet. Plant materials are very versatile and used for so many things, but often, we forget the importance of such prehistoric resources and only focus on the stone artifacts that withstand time.

Macrofloral studies of feature fill from the Jonah Field have revealed that a variety of plant materials were utilized throughout the 9000 year history of the area. Sagebrush is the primary fuel source found in hearths from the Early Archaic through the Protohistoric Periods while Paleoindian-aged hearths usually have birch as the primary fuel source. Many features are found to contain charred prickly pear cactus pads, edible tissues or seeds. Some hearths contain charred goosefoot seeds, Indian ricegrass seeds and mustard seeds. Biscuitroot is also found, but not as frequently as the other plants. Evidence of use of cottonwoods and willows has also been found.

Today, many people view sagebrush (*Artemisia tridentata*) as just a boring, useless plant covering the hills and valleys of western Wyoming. To peoples of the past, however, sagebrush was a very important resource that provided an endless list of uses. By far, one of its most important uses was as fuel for a fire. Without fire, survival would have been impossible especially since very few alternative fuel

sources are available in the area. Sagebrush was also useful for making structures that protected people from the weather. Hunting blinds may have also been constructed from sagebrush. The bark of sagebrush and the fibers of its roots can be peeled to make strong materials for nets, snares and ropes. This part of the plant can also be woven into mats, baskets, sandals and bags. Historically, sagebrush has been utilized as an aromatic in sweat lodges and ceremonies.

Prickly pear cactus (*Opuntia polyacantha*) is another very useful plant as a food and as part of the cooking process. The spines of the fruit and pads would have been cut away or burned away by fire. The fruit of the plant can be eaten raw or cooked. The pads could have been used as a cooked food as well as a moisture buffer when cooking other items in an oven-like pit. The moisture in the plant keeps the food from burning while helping it retain moisture. The flower buds, pads and fruits could be dried and stored for later use as food. The sap from the pads can also be used for medicinal purposes in a manner similar to aloe vera. Additionally, the cactus spines can be used as fish hooks.

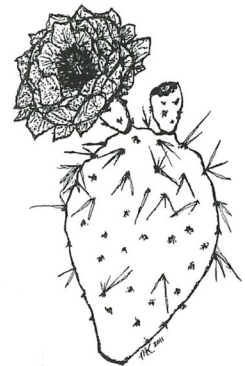


Illustration of the prickly pear cactus.

Goosefoot (*Chenopodium* sp.) is a type of annual flowering plant that produces large seeds. The seeds may be cooked and eaten as a cereal or type of gruel. The seeds could be dried and ground into a meal or flour that could be used to thicken soups or stews, or for cakes and flat breads. The parched seeds, meal or flour could also be stored for use during the winter. The leaves and shoots may have been eaten raw or boiled.

Indian ricegrass (*Oryzopsis hymenoides*) is a type of perennial bunchgrass that can grow around sagebrush. This type of grass tends to turn green earlier than other plants and may have been an important source of food in late winter when food stores were diminished. Indian ricegrass seeds would have been gathered, parched and ground into meal or flour. The meal or flour could be used to thicken soups and stews, to make a type of gruel or to be made into cakes and flat breads. Also, the grasses may have been used to line storage or cooking pits and could be woven together to make baskets and mats.



Illustrations of the goosefoot plant (left) and Indian ricegrass (right).



Illustrations of the mustard plant (left) and biscuitroot (right).

Mustard (*Brassica* sp.) is a flowering plant that is part of the family of plants collectively called the mustard family or the cabbage family. Depending on the type of mustard plant, different parts could be used for different things. The roots, stems, leaves, flowers and seeds have each been developed for and used as foods in different regions. Each of these parts can be used raw or cooked. Mustard seeds are the part of that plant most often found in features in the Jonah Field. Mustard seed is commonly used as a spice to season foods. It can also be used for medicinal purposes as well as to produce oil.

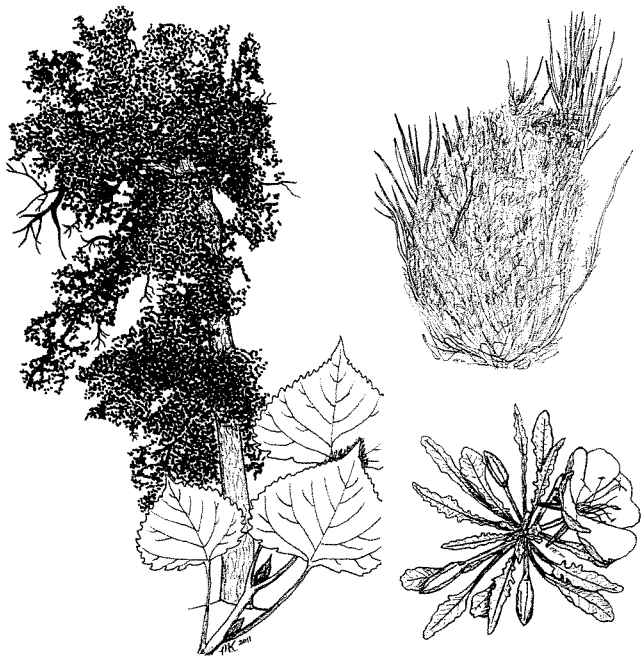
Biscuitroot (*Cymopterus bulbosus*) is a perennial herb that produces a starchy edible root. The leaves could also be eaten as a leafy green. The starchy roots were dug up using a digging stick and then boiled or baked. Dried tubers could be ground into a flour for use in cakes and flat breads. The cooked roots could be eaten along with meats and other plants or included as part of a stew.

The **cottonwood** (*Populus* sp.) is a relative of the poplar and aspen. Cottonwoods are a hardwood species that generally grow to be very tall and in some instances, the trunk may become as broad as six feet in diameter. These trees generally grow near the mud banks of rivers and streams. Though cottonwoods do not grow in the Jonah Field today, they may have in prehistoric times when the Sand Draw area was wetter. A handful of sites in the Jonah Field have produced evidence for the use of cottonwood materials by prehistoric inhabitants. Each of these sites had one or more fire hearth type features with cottonwood charcoal present. At two of the sites, it is believed that the cottonwood charcoal could have been a discarded tool rather than a fuel source, since the cottonwood charcoal was present in only small quantities.

Possible uses for cottonwood are as the frame materials of house structures, drying rack frames, digging sticks, handles for hafted tools, spear or dart shafts, atlatls and arrow shafts. Certain parts were edible to humans and animals and could be used medicinally. The light green young shoots may have also been used in basket making.

The **willow** (*Salix* sp.) is a shrub or small tree that grows in riparian areas along rivers and streams, sometimes forming very dense thickets. These willows may grow to be close to fifteen feet tall. They do not grow in the Jonah Field today. However, they may have grown along the draws during prehistoric times when the climate was moister. The more robust willows could have been used as materials for house structure frames, drying rack frames, pack frames, ceremonial sticks, walking sticks, and digging sticks. The smaller, more pliable branches could be used to make attractive baskets.

Other edible plant species found in and around the Jonah Field include evening primrose (*Oenothera strigosa*), scarlet globemallow (*Sphaeralcea coccinea*), saltbush (*Atriplex canescens*), wild onion (*Allium textile*), camass (*Camassia quamash*), plantains (*Plantago major*) and sego lily (*Calochortus nuttallii*). Other useful plants include greasewood (*Sarcobatus vermiculatus*) and a variety of wild flowers, phloxes, sedges and bunchgrasses. Along the Green and New Fork rivers, service berry and other berry plants can also be found along with wild rose, cattails, reeds and dandelions. All of these plants have historically been known to be used by Native Americans. However, no evidence of their utilization is presently known for the Jonah Field.



Illustrations of a cottonwood tree (left), a willow bush (top right) and an evening primrose (bottom right).

Perishable Artifacts: The Lost Puzzle Piece

In a climate like that of Wyoming, the majority of cultural material found consists of stone and bone artifacts. Artifacts made of wood, such as digging sticks, weapon shafts, atlatls, drying racks, bark mats and baskets, pack frames and structure frames, and those of other plant materials, such as reed or grass mats and baskets, cordage, sandals, snares and nets do not withstand the ravages of time and weather conditions. Softer animal materials, like tanned hides or furs used for clothing, moccasins, boots, bags, blankets or bedding and structure covers, sinew used for fasteners or cordage, hair used for cordage and clothing embellishments, gut used as boiling bags, food storage skins and water skins and smaller animal bones used for musical instruments, beads, needles and decoration, decay much faster than the larger harder bones of the animal. Seasonal changes in temperature and moisture break down and decay these materials into smaller and smaller particles until they become lost to the record. Considering most tools and products used by archaic peoples were completely or partially made of these perishable materials, the remaining stone and bone artifacts that archaeologists find are only a small percentage of items used by past people.



Harder materials, such as this refit ceramic vessel rim from the Wolf Tooth Site, can withstand the ravages of time and weather better than many other softer perishable materials, such as willow baskets which may have been used for many of the same purposes.

Today, when looking at the stone tools, it is easy to forget the time, knowledge and energy it took to produce a complete tool as well as the other parts that may have been associated with the stone tool. Archaic peoples had to have the skills to make the tools for everything they did. Each person had to know how to make every tool necessary to perform their day-to-day and seasonal tasks. One must also consider that multiples of each tool as well as a variety of tools were necessary for a complete tool kit. After all, just as a person has multiple utensils and



Bone artifacts, such as these two tool tips from the Wolf Tooth Site, preserve better in the archaeological record than other artifacts made from the softer hides and organs of the animal.

gadgets, each with a different purpose, archaic peoples had different tools for different uses back then, too.

For example, to make a stone knife, the person had to first choose the material for the blade either from what they had stored up or by walking to a stone source to gather more. Then, the proper hammerstone was required to reduce the cobble to a smaller workable piece. A different type or size of hammer, say of softer material, may have been needed to further reduce the stone. During this reduction process other tools, such as a sandstone abrador to prepare the edges and a piece of leather to hold the worked piece, may have been required. Finally, a much smaller antler or bone punch was necessary to finish the tool to the final form and create a sharp useable edge. While the hammerstones may have only taken a few moments of time and a short walk around the campsite to find, the leather to hold the tool and the antler punch would have been collected during the hunting season. The leather would have been tanned using a process that could take from several days to over a week while the antler was a matter of breaking off a tine using a hammerstone or stone cutting tool.



Replica bison bladder sack from the Museum of the Mountain Man. This type of bag was used to carry and store water.

For the handle, the person would choose the material, such as a piece of antler collected from an animal killed while

hunting. They would then have to cut or break the antler to the necessary size using a stone cutting tool or a hammer. Abraders and polishing stones would be used to finish the broken end(s) and shape the piece to the desired polish and grip. To acquire the abrading and polishing stones, one may have picked up the sandstone material during the seasonal round or from local sources. The shaping process itself could take several hours or even days to complete. A stone chisel and a hammerstone would be used to create a notch for the blade. To attach the blade and the handle, an adhesive, such as pine sap, would be collected from a tree, heated to make it pliable and applied to the notch. The pine sap may have been collected during the seasonal round and stored as a solid piece in leather until needed. Sinew had to be cut from an animal and processed to preserve it, same as the hides. The sinew was soaked in water to make it pliable and wrapped around and tied off to secure the hafted tool. As the sinew dried, it would shrink around the hafted tool. Adding more support to the attachment area. To make one single stone knife, a variety of tools and materials were required and each material could take from only a few moments to a week or more to find or make. However, an archaeologist today may only find a hammerstone, lithic debris or a knife blade at the remnants of a campsite or where it was lost in the desert.

Over the course of their lifetime, each person would have



Conceptual model of an Early Archaic sagebrush structure at the Museum of the Mountain Man in Pinedale, Wyoming. The sagebrush covering and willow posts of the structure would not preserve well through time leaving just the interior stain and the postholes for archaeologists to find today.

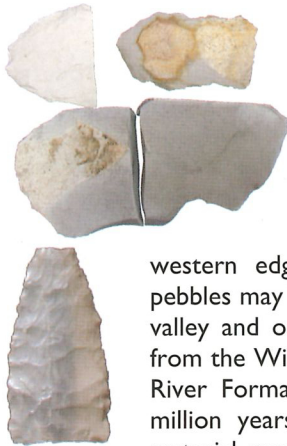
made hundreds, or even thousands of tools and products from a variety of materials. Only a very small percentage of these objects may be preserved and found today. Most often the artifacts found are stone providing only a small piece of the puzzle. The other puzzle pieces are lost to the record. The numerous everyday objects that made up early peoples' lifeways—their clothing, footwear, bedding, bags, baskets, mats, adornments, weapon shafts, tool handles, digging sticks, nets, snares—are gone forever making piecing together the puzzles of how archaic peoples lived and why they were in the Jonah Field area a challenging endeavor.



The interior of the 1870s Cheyenne Buffalo Hide Tipi Exhibit (right) at the Museum of the Mountain Man in Pinedale, Wyoming. Note how many of the objects, including the replica hand drum (top left) and rawhide bag (bottom left), are made from plant and animal materials that would disintegrate over time.

Lithic Materials

One resource found in the Jonah Field that has evidence of use from Paleindian times to today is stone or lithic materials. The raw stone materials drew people into the area. Three particular stone materials have sources in the Jonah Field area. These are Alkali Creek Chert (a.k.a. Wilkins Peak), oolitic chert and quartzite. Other materials that may be found within 20-50 miles of the Jonah Field are a wide variety of fossiliferous cherts, sandstone, chalcedonies, moss agates, petrified wood and steatite. Regional materials that may have been physically brought in by the people living in the area or obtained through trading with surrounding groups include obsidian, orange and red dendritic chert, tiger chert, Whiskey Buttes chert and Granger Green chert. The sources of these materials may all be found within a roughly 200 mile radius of the Jonah Field.



Alkali Creek chert, which is also sometimes called Wilkins Peak or Bridger chert, is the most common lithic material identified in the Jonah. The source of this material is in the Granite Wash area along the

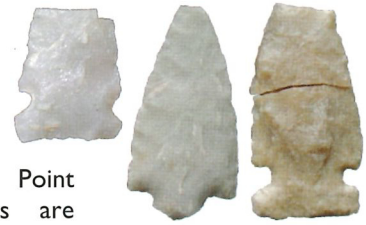
western edge of the Jonah. Cobbles and pebbles may be found around the Sand Draw valley and on Yellow Point Ridge. It comes from the Wilkins Peak Member of the Green River Formation, which formed roughly 49 million years ago during the Eocene. This material ranges in color from dark gray to white or tan. The quality of this material ranges from low quality grainy stone to very high quality smooth stone.

Oolitic chert is another very common material found in the Jonah Field. The source for this material is northeast of Stud Horse Butte along the ridges. This stone material comes from the Laney Member of the Green River Formation, which formed approximately 45 million years ago during the Eocene. This material is often brown with tan to white oolites, which are small calcium carbonate encrusted particles that form on the bottom of lakes and seas. Another color variation

is light tan to gray with brown to white oolites. This material is high quality and flakes well.



Quartzite is abundant throughout the Jonah Field and surrounding areas. Quartzite cobbles are especially common along Yellow Point Ridge. These cobbles are usually part of the Laney Member of the Green River Formation. Quartzite can be found in a range of colors including black, gray, brown, tan, white, pink, red and green. The quality of quartzite varies from cobble to cobble depending on the size of the quartzite grains. Most of the tools made of quartzite in the Jonah are tan or white in color.



Fossiliferous chert in all its varieties is also common in the Jonah Field. This material comes from

cobbles scattered across the surface of the area as well as from sources a few miles to the north of the Jonah along the Blue Rim and Ross Ridge. These materials mostly come from the Fontenelle Tongue of the Green River Formation, which is Eocene in age. There are a number of varieties of this material. Color variations include, but are not limited to, tan and brown mottled, gray and white mottled, tan and white mottled, gray and white banded and gray and tan mottled. These materials encompass a variety of types of fossils including algae, **ostracods**, **stromatolites** and fossil palm wood. Often, this type of chert flakes well and is a medium to high quality material.



Chalcedony can be found as cobbles scattered across the Jonah Field and surrounding areas especially to the south. Chalcedony varies in color, but it is often semi-translucent to translucent white to gray, grayish-blue or pale brown to very dark brown. Chalcedony is a very high quality material for making flaked artifacts.



Moss agate, which can be considered a type of chalcedony, may be found as cobbles on



9000 Years of Human History

the surface throughout the Jonah Field. These cobbles are generally sparsely distributed. To the south of the Jonah in the lower Green River Basin, these materials are commonly found on the surface. Moss agate is often white to nearly translucent with dark moss-like inclusions. These materials are usually high quality flaking stone.

Petrified wood is wood that has, over time, had the particles replaced with **silica** to form a hard stone that maintains the structure of the wood. Pieces of petrified wood can be found on the surface in the Jonah and surrounding areas. Petrified wood in the Jonah usually has a dull tan to grayish tan outside with a clear to blue chalcedony-like material inside. Quality of the material varies from piece to piece. Some can be used for stone tool making.



Orange and red dendritic chert or pumpkin chert is sometimes found at sites in the Jonah Field. This type of material comes from the lag and cobble deposits around the Washakie Basin to the southeast. These deposits are part of the Washakie Formation, which formed during the Eocene. This type of material consists of orange to red chert with black or dark colored dendritic inclusions. Pumpkin chert is usually medium to high quality and flakes well.



Tiger chert comes from the Cedar Mountain area near Lonetree, Wyoming in the southern Green River Basin. This material is rare, but known to be found at some sites in the Jonah usually as final tools. Tiger chert is banded dark brown and tan in appearance. Tiger chert is also a high quality material for flaked artifacts.



Whiskey Buttes chert comes from the Shute Creek area in the southwestern Green River Basin. This type of chert is black with light blue inclusions. Flakes are found at scattered sites throughout the Jonah. Whiskey Buttes chert is a high quality material.



Granger Green chert is found in the Granger area in the southwestern Green River Basin. It is believed to



have been deposited by glacial movement. It most likely came from glaciers around the Uinta Mountains. Granger Green chert usually has a mottled light green and black, light green to dark green or light green and brownish-tan cortex with light to medium green interior material. The interior material may have some small tan or dark inclusions. Like the other cherts, not all cobbles or pieces of material are created equally and the quality of the material varies between each cobble.

Obsidian is a glossy black volcanic glass. Unlike other materials, obsidian can be sourced to a specific location of origin using a special technique called x-ray fluorescence.



Obsidian artifacts from the Jonah Field have been linked to sources that include Teton Pass, Jackson, Wyoming area, Obsidian Cliff, Green River Gravels, Malad, Idaho and Bear Gulch, Idaho. Teton Pass and Malad are the two most common results for Jonah artifacts. Both of these sources are within 150 miles of the Jonah Field. Obsidian is considered to be the highest quality flaking material.

Sandstone can be found in outcrops throughout the Jonah. However, these outcrops usually have very large grains that are not conducive to use as ground stone tools. Smaller grained compact sandstones, such as those found to the south of the Jonah and in drainage channels to the north, were favored for use as ground stone manos, metates, abraders and polishers. Sandstones are often brown to tan in color and sometimes white.



Steatite, also called soapstone or talc is a soft gray to green stone that could be carved into bowls, beads, pipes, gaming pieces, decorative figurines and pendants. Steatite is found sporadically in cobble to boulder sized pieces in the upper Green River Basin especially near the Wind River Range. Steatite artifacts are often associated with the Late Prehistoric Period and later and are rare in the Jonah.



Significance of the Archaeological Evidence from the Jonah Field

The development of the natural gas resources in the Jonah Field has allowed archaeologists to examine many sites and gain unprecedented insight into the prehistory of Western Wyoming. To date, more housepits have been excavated within a 3 x 5 mile area in the heart of the Jonah Field than in any other part of the state. These excavations have provided intensive insight into the Early Archaic Period. The oldest human burial in Wyoming was found here due to the cooperative efforts of Encana Oil and Gas (USA), Inc., the Bureau of Land Management, Pinedale Field Office and the archaeologists. The Jonah Field is also home to the densest concentration of ceramic sites in southwestern Wyoming. These discoveries are causing considerable enthusiastic debate amongst archaeologists working in the region.

The Jonah Field presents an intriguing picture about the way people lived and the activities they performed in the



Crew working while an archaeologist explains to school children about the excavation and the site.

past. The magnitude of sites in the Jonah Field makes it a unique archaeological area in the American west. The sheer number of sites creates a prehistoric laboratory where archaeologists can study the material culture left behind by people from almost any time period, but especially by inhabitants from the Early Archaic. This leads to some interesting questions about the area. What drew early people to the Jonah Field? Why were people present specifically during the Early Archaic? Were the water, plant, lithic and animal resources available a sufficient reason for people to be here? Were the people of the past here year-round or only during specific seasons? While the evidence from the Jonah Field may answer some of these questions, it also raises many, many more and archaeologists will continue investigating and searching for answers.

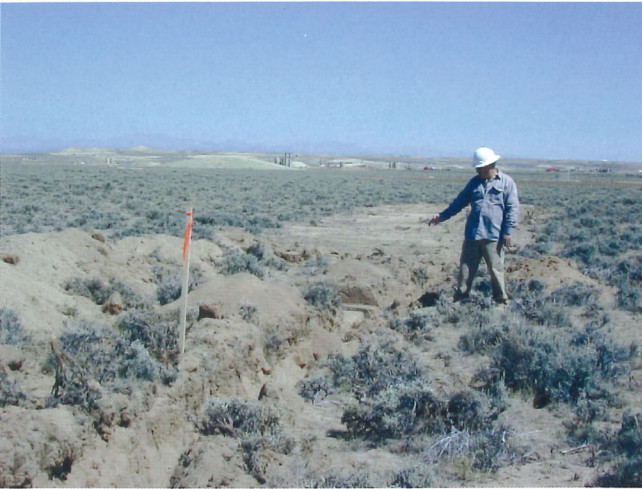


Archaeologist completing cleanup before the final excavation photos are taken.

Based on the radiocarbon dates, the prehistoric population in the Jonah Field seems to fluctuate throughout time. This may be a reflection of a number of things. First, the data may reflect a sampling bias due to the fact that archaeologists working here are limited to the areas that oil and gas industry would like to develop. If this is the case, were people of certain time periods camping outside of the areas archaeologists are allowed to examine? Second, the dates may reflect a preservation bias in the record. A preservation bias is the selective retention of certain aspects of human occupation in the archaeological record while other parts are partially to completely destroyed or removed. Site preservation is affected by environmental factors, such as precipitation and high winds. Therefore, if there is a bias, is it because of the changes in the climate through time? Third, the number of dates may actually reflect the population fluctuations through time. In this case, what were the



Heated tent used for excavations during the winter. The heater keeps the ground unfrozen so archaeologists can dig.



Example of backhoe testing used to determine if substantial archaeological deposits are present before construction begins.

reasons for the population changes?

Archaeology performed in the Jonah Field has taught researchers some interesting things about the people of prehistory. For instance, it was previously believed that the dry interior basin areas were infrequently inhabited throughout prehistory. However, the evidence from the Jonah Field suggests these areas were much more heavily utilized over the last 9000 years than was originally thought. For another example, archaeologists believed that early native peoples relied predominantly on large game animals, such as deer, antelope and bison while later peoples exploited a more diverse diet breadth. However, based on the abundance of rabbit bone, rodent bone and ground stone artifacts, the sites in the Jonah Field show that rabbit along with various plant resources were also frequently included in the diet throughout prehistory. Also, based on the housepit data, people of the Early Archaic built substantial dwellings complete with support posts and excavated floors. Radiocarbon dates from the interior features suggest the structure footprints were reused for up to a thousand years. Prior to the discovery



Crew excavating inside the heated tent during late winter.

and investigation of these structures, it was thought that people of this time period would not have expended that much effort on building and maintaining such structures.

Recently, paleoclimatic research has been initiated using JIO funding. This on-going project will greatly enhance our understanding of the past climate of the region. A better understanding of the environmental factors of the past will aid in the interpretation of the sites discovered thus far. This additional information will help answer some of the stated questions. It may allow archaeologists to gain more insight into prehistoric site patterns and how the sites relate to each other across the landscape and throughout time. For example, if this paleoclimate research suggests that Sand Draw had flowing water in the Early Archaic Period, then light would be shed on the use and distribution of housepits along Sand Draw.



Excavation block in Rockshelter Area K at the Raven's Nest Site with archaeologist in background.

The ideas mentioned above are only made possible through the cooperation of Encana Oil and Gas (USA), Inc., BP America Production Company and the JIO. As archaeologists, we are very grateful for the opportunities arising from this cooperation. As mentioned, these opportunities have answered some questions about past lifeways while generating numerous others, most of which cannot be answered at this time. With the continued mutual efforts of gas companies, government agencies and archaeologists, we may yet identify more pieces to this unfinished puzzle. Considering all the knowledge gained about prehistoric peoples over the last 15 years in the Jonah Field, the next 15 years should prove to be an exciting and insightful journey.

For Additional Information

Bureau of Land Management, Pinedale Field Office

www.blm.gov/wy/st/en/field_offices/pinedale/arch.html

Fagan, B. M.

2008 *Archaeology: A Brief Introduction*. 10th ed. Prentice Hall, Upper Saddle River, New Jersey.

Frison, G. C.

1991 *Prehistoric Hunters of the High Plains*. 2nd ed. Academic Press, San Diego.

Jonah Interagency Field Office, Pinedale, Wyoming

<http://www.wy.blm.gov/jio-papo/jio/index.htm>

Museum of the Mountain Man, Pinedale, Wyoming

www.MMMuseum.com

Wyoming Association of Professional Archaeologists/Wyoming Archaeological Society

www.wyomingarchaeology.org

Wyoming State Historical Society

www.wyshs.org

Wyoming State Historic Preservation Office

www.wyoshpo.state.wy.us

Glossary and List of Acronyms

Activity areas: a task specific location in a site.

Alithermal: a period of time from ca. 7000-5000 ybp when the climate was hot and dry.

Archaeological discoveries: cultural remains identified during earth moving activities.

Archaeological record: the material culture, artifacts, sites and other humanly manufactured features, that result from human behavior and their context.

Archaeology: the study of past cultures through the objects (e.g., artifacts and features) left behind.

Artifact: any manually portable object (or remains of an object) that has been created, modified or used by a human.

Atlatl: a long, flat bone or wooden device with a peg, spur or cup at one end that is used to propel a dart (spear). The atlatl is used as an extension of a person's arm in order to get greater distance and power behind the dart.

Awl: a small pointed hand tool used for poking holes in leather, wood or other soft materials.

Biface: a stone artifact that has been worked on both sides.

BLM: Bureau of Land Management.

Burin: a pointed chisel-like stone tool used for engraving bone, antler, wood or soft materials.

Ceramics: pottery; clays mixed with other agents, such as crushed rock, shell or organic materials that is shaped into bowls and other vessels then dried to a hardened state by sun drying or firing.

Component: a collection of artifacts and/or features from a given archaeological period or phase at a site.

Context: an artifact's or site's position in time and space in relation to the other objects and features from a component in the site as well as its relation to the cultural remains from other components and sites.

Corner-notched: projectile points that have a groove or indentation flaked inward from the corner of the tool towards the center. The purpose of the notches was to aid in the attachment or hafting process.

Cow camps: sites that local ranchers and cowboys lived in while watching and checking on grazing cattle.

Cultural resource: any object or site from the past that represents human activities.

Cultural resource management (CRM): a branch of applied archaeology that focuses on the identification, evaluation and management of prehistoric and historic cultural resources.

Curation: careful management of artifacts and other data recovered in archaeological research.

Dart: a sharpened shaft or shaft with a hafted projectile point that is thrown by hand or with an atlatl.

Data recovery excavation: a controlled scientific dig that attempts to mitigate any damage to a site while recovering the maximum amount of information possible based on research questions.

Debitage: the byproduct or debris left over from stone tool production.

Expedient stone tools: tools manufactured as needed from materials available on hand. Examples include retouched flakes, retouched cobbles and utilized flakes.

Feature: a non-transportable product of human creation, modification or use (e.g., structural remains, fire hearths).

Fire-cracked rock: rock that fractured from exposure to heat.

Flesher: a tool that is used to remove the flesh or hide from an animal.

Grooved abrader: a grooved or notched ground stone tool used for sharpening, smoothing or shaping other tools.

Ground stone: any item that is manufactured by using grinding, abrasion or polish, or is itself used to grind, abrade or polish.

Hafted: attached with an adhesive and/or binding to a shaft or handle.

Housepit: a structure that was excavated or dug into the ground surface to create a semi-subterranean dwelling. Interior features of these appear along the bottom and/or walls of the dug out floor.

Hunter-gatherers: mobile or semi-sedentary groups that survive by hunting game and gathering wild plants and other resources.

Isolated resource: a type of cultural resource that consists of less than 15 spatially associated prehistoric artifacts and no features.

JIO: Jonah Interagency Mitigation and Reclamation Office.

Lithic: of or pertaining to stone.

Macrofloral analysis: the study, identification and interpretation of organic remains, usually from samples of feature fill.

Maker's mark: printed, stamped or impressed marks usually applied to the base of an object that provides the manufacturer's name, date of manufacture and sometimes the location of the fabrication facility.

Archaeology in the Jonah Field

Mano: a handheld stone used for grinding materials on a slab or metate.

Material culture: the artifacts and features or remains left behind by people.

Metate: a stone slab or basin that materials are ground against.

Mitigate: in archaeology, to lessen or minimize the destruction or disturbance to an archaeological site through scientific methods.

National Register of Historic Places: the United States Government's list of cultural resources that are deemed worthy of preservation based on the recommendations of archaeologists and historians following the standards put forth by the National Register.

Neoglacial: a period of time from ca. 5000-2000 ybp when the climate was cool and moist.

Noncultural: anything that was not manipulated by humans.

Oolites: small calcium carbonate encrusted particles that form on the bottom of lakes and seas.

Osteology: the study of bones in order to establish sex, age, growth and development and the cause of death.

Ostracods: in fossiliferous chert, fossilized molted bivalve crustacean (i.e., seed shrimp) shells, which appear as oval shaped to tear shaped inclusions in the chert.

Pemmican: small cakes or loaves made of dried meat pounded into a powder and mixed with hot animal fat and dried fruits and/or berries.

Periglacial: cool moist climate along glacier margins.

Posthole or **Postmold:** the impression, stain or cavity left from where a support post once stood.

Preservation bias: the selective retention of certain aspects of human occupation in the archaeological record while other parts are partially to completely destroyed or removed.

Projectile point: general term for any implement that was attached to a shaft for use as a weapon, usually for hunting (i.e., arrowheads, dart points and spear points).

Radiocarbon dating: an absolute dating technique that used the known half life of Carbon-14 to measure the amount of undecayed Carbon-14 that remains in organic remains to determine how long ago the object lived.

Rock art: the general term for pecked, incised or painted figures or symbols on rock (e.g., petroglyphs and pictographs).

Scraper: a tool with a beveled (steeply angled) edge that is used in scraping, scouring or planing tasks.

Shard: a fragment of historic ceramic or glass.

Sherd: a fragment of prehistoric ceramic.

Shoulder: the part of a stone tool that separates the blade from the stem or base. The shoulders can be shaped a number of ways including sloped, squared, tapered, barbed, etc.

SHPO: State Historic Preservation Office.

Site: any discreet location where human activity occurred and material remains (e.g., artifacts and features) were deposited or left behind.

Side-notched: projectile points that have a groove or indentation flaked inward from the side edge of the tool towards the center. The purpose of the notches was to aid in the attachment or hafting process.

Silica: very hard particles of silicon dioxide, which make up the basic building blocks of quartz, quartzite, sand and many cherts.

Spear: a long shafted weapon with sharpened point or hafted projectile point that is used to stab or thrust.

Spokeshave: a tool with a grooved or concave edge used to shape wooden or bone shafts.

Spurred end-scraper: a scraper tool that was worked on one end and has one or more small spurs or points worked into the end.

Staining or **cultural staining:** discoloration of the soil caused by human activities.

Steatite: soapstone or talc; a soft gray to green stone that was often carved into bowls, beads, pipes, gaming pieces and sometimes decorative figurines or pendants.

Stemmed: the extension of the base of a stone tool that is designed for gripping or hafting. The shape of the stem can be expanding, constricting, straight-sided or concave-sided.

Stromatolite: in fossiliferous chert, fossilized remains of colonies of blue-green bacteria or algae. These appear as semi-concentric circular inclusions in the chert.

Surface scatters: sites found with artifacts only on the ground surface.

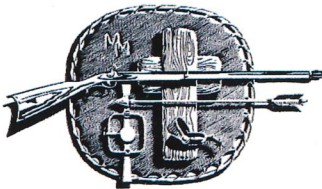
Surface structure: a structure that was not dug out or excavated into the ground and remain on the surface.

Tipi ring: a ring of rocks that was used to hold down the edges of a tipi.

Typological dating: a relative dating technique that arranges artifacts chronologically.

Ybp: years before present.

Zooarchaeology: a branch of archaeology that studies animal remains identified in the archaeological record. These scientists try to establish the age, sex, cause of death and species of the remains as well as the context of the remains at the site through identification of any human modifications or butchering marks.



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