Archaeologists usually work on dry land and sometimes work under water, but it is rare for them to explore a wet site that is on land. This was the case at the Bayou Jasmine site in southeast Louisiana. Indians lived there for thousands of years, when the ground was high. Later, the land gradually sank, so the lower levels of the site were below water. The wet conditions led to preservation of artifacts that normally would have been lost to decay. However, the water made the site very hard to excavate. Archaeologists used special techniques to learn about life at Bayou Jasmine.

(Left) Archaeologists had to find a way to dig at the site even though it was mostly under water. Water pumps and a cofferdam were needed. Credit: LSU Museum of Natural Science.

(Below) Archaeologists found lots of artifacts at the Bayou Jasmine site that do not normally preserve well, like the bone fishhooks seen here. Credit: R. Christopher Goodwin and Associates.
Time and Place

The Bayou Jasmine site is in St. John the Baptist Parish on the west side of Lake Pontchartrain. Archaeologists named the site after the bayou that flows along the site’s southern edge. The site is on the natural levee, which was high, dry ground at the time people lived there. The location also provided easy access to the bayou for food and travel.

American Indians used the site from 800 B.C. to A.D. 1400. That is a span of 2,200 years! The main use of the site, though, was during the Early Woodland period, from 800 B.C. to A.D. 1. The people who lived during that time in Louisiana are called the Tchefuncte culture. These Indians were the first in the area to make lots of pottery. They used some types of stone artifacts like those from the earlier Late Archaic period. However, groups were less active in long-distance trade and earthwork construction than before.

During the Early Woodland period, people left behind a lot of food waste, broken tools and other trash. The name for this kind of built-up deposit of household trash is a midden. The midden at Bayou Jasmine extends over an area nearly as big as a football field. Its contents show that people at the site relied on food like fish and clams from the nearby water. South Louisiana has other midden sites from this period. However, not one is as rich in perishable artifacts as Bayou Jasmine.

What else was going on in the world while the Tchefuncte people lived at Bayou Jasmine? About 800 B.C., the ancestors of modern Polynesians first settled on islands in the Pacific. Around 500 B.C., people built the Parthenon in Greece. By A.D. 1, the Roman Empire was in power.
Bayou Jasmine lies near Lake Pontchartrain, Lake Maurepas and the Mississippi River. These bodies of water provided routes for trade and travel, as well as sources of food. Trade may have been important to the people at Bayou Jasmine. There is no stone available near the site, and all of the stone used for tools was from other places. Many of these places were nearby in Louisiana and Mississippi, but some stone came from farther away. People also brought at least a few ceramic pots from other places to the site.

The people who lived at Bayou Jasmine may have relied heavily on waterways for trade, travel and food. They probably used dugout canoes to get around on the water. Making a dugout canoe is not easy. After felling a big tree, it was left to dry and then the inside was burned to make it easy to scrape out. This process may have looked much like the depiction in the engraving below. Engraving by Theodor de Bry after watercolor by John White. Courtesy of the Library of Congress, LC-USZ62-52443.
The bayou next to the site was a rich source of fish and clams for the people. Most of the animal food remains archaeologists found at the site came from the bayou. In the earlier part of the Early Woodland period, people ate plants, deer, alligator and turtle, but nothing was more popular than fish. The only bones found in the human coprolites from the site were from fish.

By studying food remains from the site, archaeologists found out that people lived there at different times of the year. They worked this out by looking at three things: otoliths, clamshells and animal bones. Otoliths, small bones found inside the heads of fish, are like clam shells in one way. Both otoliths and shells grow a little each season, gaining a new ring. Knowing this, archaeologists could tell when people harvested the fish and clams by counting these rings. The animal bones researchers found at the site were another good clue about when people lived there. Once archaeologists identified the bones, they figured out which kinds of species were caught the most. Based on the behavior of these animals, archaeologists have a good idea when they were easiest to catch.

The first Tchefuncte people visited the site numerous times during all seasons of the year. They caught most of the freshwater drum fish during the summer and fall, while they hunted turtle and other animals in the spring. The shells left by later Indians show they were harvesting clams in the spring.
Digging at Wet Sites

The Bayou Jasmine site is now 18 feet deep, but only the upper portion of the site is above water. The ground in this part of Louisiana slowly has sunk, submerging most of the site below water. The Louisiana Department of Highways funded a study of Bayou Jasmine in 1975, after construction disturbed the site. In order to work there, archaeologists needed a way to keep water from filling the area where they dug. The Department of Highways built a box, called a cofferdam, to enclose the excavation space. The cofferdam had sheet metal walls that went 26 feet into the ground! The enclosure was 50 feet long by 7 feet wide.

The cofferdam was only partly successful, and water continually seeped into the excavation units. The site also received heavy rains during the field season. Archaeologists used a 1,500-gallon-an-hour pump to keep the area dry enough to work. They also caulked the joints of the cofferdam panels to slow water leaks. Even so, water was a big problem for the archaeologists. Wet spots made it hard for them to see patterns in the soil. The dampness also caused the thin walls of earth between the cofferdam and the excavation to fall down.

The photograph shows how close the excavation was to the highway bridge and the bayou. Credit: LSU Museum of Natural Science.
The field team used a special technique to recover small artifacts, bones and plant remains from the wet dirt they dug out of the site. Using a hose, they sprayed water on the soil, trapping the artifacts, bones and shells in a series of mesh screens. The screens were 1/4 inch, 1/8 inch and 1/16 inch, with the biggest grid screen at the top and the finest at the bottom. This system caught artifacts of all sizes. For example, the biggest screen held larger shells and pieces of pottery, while small bits passed through. The finest screen trapped tiny plant remains and fish bones. The careful water screening of the soil was slow, but it led to recovery of far more bones and artifacts than expected.

Because of the wet conditions, the archaeologists were not able to excavate as much as they planned. They were only able to dig down about 9 feet below the surface by the end of the season. They did not reach the bottom of the site. Today, the site is preserved below the water next to the highway.

Water screening using multiple screens of varying sizes has become a common technique for recovering artifacts at some archaeological sites. Credit: LSU Museum of Natural Science.
Artifact Preservation

In spite of the challenges of working at a wet site, the water was very beneficial, because it helped preserve bone and plant artifacts. First, it blocked oxygen from reaching the artifacts. Without oxygen, bacteria and other microbes that usually cause decay could not live. Second, the Bayou Jasmine artifacts probably stayed continually wet. Organic remains are preserved well only at sites that stay very dry or that stay very wet. Most sites get wet and then dry out many times each year. When moisture changes, the artifacts swell and shrink, and they become weaker and more fragile. The subsidence at Bayou Jasmine kept the artifacts always wet, so they did not break down.

Prehistoric people made lots of things out of animals and plants. At most sites, these types of artifacts rot away quickly. At Bayou Jasmine, however, some of them lasted for thousands of years. Bayou Jasmine gives a glimpse of certain artifacts that once were common, but that archaeologists rarely see.

Some of the most remarkable artifacts from the site were thin cords that people braided from plant fibers. The Indians may have used these to make fishing lines or to tie things together. Cords are not often found at archaeological sites in Louisiana.

Other uncommon artifacts were bone fishhooks, bone projectile points and bone flutes. Bone artifacts do not often survive the passage of time. These “everyday” things may not seem important, but they are very important to archaeologists. Bone artifacts show that the people who lived at the site did not waste their resources. They turned leftover bone into valuable hunting and fishing tools.

Many of the artifacts found at Bayou Jasmine would not have survived at other sites. Artifacts like the bone fishhook, bone projectile point and alligator tooth seen above are prone to decay when exposed to oxygen and the elements.
Explore the Site

When archaeologists excavate a site, they may find different layers of dirt and shell as they dig down. Archaeologists call these layers strata (stratum, singular). They try to link each stratum to a time period or activity at the site. Because people continued to dump dirt and shell on the Bayou Jasmine site as they lived there, the oldest strata are at the bottom. The most recent activity should be at the top of the site, but Bayou Jasmine is different. Explore the top spoil stratum to learn why.

When researchers dig at a site, they can see the strata in the wall of the excavation. They carefully measure and draw a map of the layers. This map, called a profile, records the strata and helps tell the story of the site from the first activities to the last. Archaeologists label strata from the top to the bottom, which is the way they excavate. However, if you want to learn about this site from beginning to end, you would explore the profile starting at the bottom.

Take your choice, as you get to know more about the history of Bayou Jasmine. Read about the strata to learn more about the site.
Spoil Stratum

In the 1950s, and again in the 1970s, highway construction crews used a dredge to dig a canal at the edge of the site. They dumped the dredged soil on top of the site. In some areas, the dredge reached from the top of the site all the way to the bottom strata. Artifacts from all layers ended up on the surface when the digging was finished. The dredged muck, called spoil, became the top layer at the site. It was a mix of dark soil with lots of roots, bits of shell and greenish clay.

Many artifacts were in this layer. The bits of cord came from the spoil stratum, but originally they may have been at the bottom of the site. Late Archaic-style cooking balls also were in the spoil. Out of their original context, these artifacts lost some of their scientific value. On the other hand, archaeologists may never be able to dig to the bottom of the site because it is under water. These artifacts gave them a better idea of what they could expect to find if they could reach the oldest, deepest strata.

The dark clay overlying the shell floor in this photo is spoil left over from dredging. The trowel in the photo is pointing to the north. Archaeologists often use a trowel pointing north in their excavation photos so they can orient themselves when looking at the picture later. Credit: LSU Museum of Natural Science.
Shell Midden Stratum

A 3-foot-thick clam shell midden was just beneath the spoil layer, and above a layer called the peat midden. People ate a lot of clams to form the shell layer! The top part was made of black clay and whole and crushed shell. It had a range of artifacts, with some dating from A.D. 1200 to A.D. 1400, during the Mississippi period. However, the dredge disturbed some of this upper area, so older and newer materials were mixed. Archaeologists found prehistoric pottery pieces as well as a large, fired musket ball. A hunter may have fired the musket ball sometime between about 1720 and 1860. It is the only artifact at the site from the time after Europeans arrived in Louisiana.

The middle and lower parts of the stratum were not disturbed. Archaeologists found the remains of two fire pits that had pottery and charcoal in them. At the bottom of the layer, archaeologists found more pottery pieces, stone artifacts and bone tools. They also recovered many animal bones that show what meat people were eating. Fish bones were the most common, but they also found alligator bones, turtle bones, raccoon bones and waterfowl bones. The middle and lower parts of this stratum were from about 400 B.C., during the Early Woodland period.

(Top) A Rangia cuneata shell. The shell measures about 1 1/2 inches in length. Credit: R. Christopher Goodwin and Associates.

(Bottom) This image provides a detailed look at the densely packed Rangia cuneata shells in the shell midden stratum. Credit: LSU Museum of Natural Science.
Peat Midden Stratum

A peat midden stratum that was 5.5 feet thick lay below the shell midden. This lower layer had a lot of wet, organic debris, called peat, and very little shell. The shell stratum was right on top of the peat stratum, but there was a gap of time between these two layers. During the gap, people rarely used the site, and a massive tree grew on the surface. Archaeologists found its roots in the lower, peat stratum. No trace of the tree was in the shell midden stratum above. This shows that the tree was gone by the time people began creating the shell midden.

The peat stratum dated between 800 B.C. and 600 B.C., during the Early Woodland period. At that time, the site was on high ground next to the bayou, and people used it as a fishing camp. Archaeologists unearthed many artifacts and animal bones in the peat stratum. They found layers of ash, fire pits and postholes. Within the ash layers, they discovered dark circular stains, pieces of burnt split cane and pottery. These likely were the cooking areas. The cane could have been from mats that people used to wrap food for cooking, similar to the way people in Latin America wrap tamales in corn husks or banana leaves today.

Archaeologists also found human coprolites and a flat, clay floor with at least 12 postholes in it. This probably was a living area, where people cleaned and smoked the fish they caught. They may have cut off the heads and some other parts to make a fish soup to eat while they dried the fillets over fires. The large number of fire pits and artifacts show that people used this location many times over a long period.

Detail of the peat stratum at the site. The signboard at the top identifies the site, excavation unit number, depth, and other details. Credit: LSU Museum of Natural Science.
Below Peat Stratum

Archaeologists knew there were more layers beneath the peat, based on a series of soil cores from the site. However, they could not reach these deeper strata before the field season ended. In spite of the difficulties of working at the site, the crew reached a depth of more than 9 feet, most of it below the water table!

(Right) A mobile coring machine was able to reach the bottom of the site 18 feet below the ground surface. Soil cores allow archaeologists to see what the layers of soil look like in a single, undisturbed column. Credit: LSU Museum of Natural Science.

(Below) Researchers working at the site had more things to worry about than water seeping through the walls of the cofferdams. They also had to look out for snakes that would sometimes fall into their excavation units! Credit: LSU Museum of Natural Science.
Artifacts

Many people, including archaeologists, tell stories about the past. What makes archaeologists' stories special? They are pieced together with evidence and guided by science. Artifacts, the things people made and left behind, are the best known kinds of evidence that archaeologists find. Archaeologists found a wealth of artifacts at the Bayou Jasmine site. Read on to learn more about the things they found and what they reveal about the people who lived at the site.

Atlatl Hook

Archaeologists found a conch or whelk shell atlatl hook at Bayou Jasmine. Atlatls, or spear throwers, were hunting tools that increased the range of a thrown spear considerably.

Atlatl thrower illustration by Jon Gibson.
Cooking Balls

Some prehistoric peoples used ceramic cooking balls to heat their food. Archaeologists found 11 cooking balls in the midden strata, and more in the spoil stratum. However, they were not found in cooking pits, so archaeologists cannot be sure about their function.

Awls

Archaeologists found many different kinds of bone tools at the site. These included narrow, pointed tools made of bone and antler. People may have used these pointed tools as awls or pins. Awls are used for poking holes in hides or wood.

Coprolites

Coprolites are preserved feces (poop). Archaeologists get very excited when they find coprolites at sites. Coprolites can offer a close look into the life of a single person. Preserved waste can reveal details about the person’s diet and diseases, like if they ate certain foods or had parasites. Sometimes, archaeologists can even get DNA from coprolites. The ones at Bayou Jasmine were from the peat stratum, when the site was a fishing camp. The coprolites had a large number of tiny fish head bones. The coprolites, like all the artifacts from Bayou Jasmine, are preserved and available for future analysis when new techniques may provide more information.
Cords

Researchers analyzed 31 pieces of cord from the site. Thin cords, woven with plant materials, usually do not survive so long. Cord weaving at Bayou Jasmine stands out in a few ways. First, the cords were braided, not twisted, which is a more common style found at sites in the Southeast. Examination showed that the cords have 4 to 10 strands. Second, cords from Bayou Jasmine are thinner than those archaeologists have found at other sites in the Southeast. They are an average of .06 inch, which is about the diameter of a toothpick. Third, the part of the plant that people at the site used for the cords is unusual. The Bayou Jasmine cords were made from very fine roots of a grass or sedge. At other sites in the Southeast, people used twisted grass, bark, stems or leaves, not roots. No other prehistoric sites in the U.S. have cords made from roots, and no other fiber descriptions resemble those from Bayou Jasmine. Although a biologist researched the plant for three years, she could not determine precisely which plant people used.

The Indians put a lot of effort into making these cords. Roots can be hard to work with because of their tough outer layer. Weavers soaked roots in water to remove the outer layer. This made the roots easier to braid. Some of the roots were whole, while others were split lengthwise into two or four strands. The strands were an average of only .02 inch wide. People began making the cord by tying two strands together, and sometimes by forming a loop. Then, they attached this loop to something stable, so they could use both hands to braid the strands together. Next, they added other strands to make the cords the desired width, strength and length. The final cord could be several feet long.

People likely used cords in many ways at Bayou Jasmine. Their main purpose may have been fishing lines, but they also could have been used as twine to hang things, to make fishing nets and to impress designs on pottery.

Fishhooks

The Indians at Bayou Jasmine caught and ate a lot of fish, based on the large numbers of fish bones in the midden. Archaeologists found evidence for how the Tchefuncte people caught the fish. Archaeologists found 56 examples of bone and antler fishhooks.
**Net-Making Tools**

People also may have caught fish using nets. Archaeologists found several small rectangles made of turtle shell like the one below. They believe that these rectangular tools were used in weaving fish nets. The size of the rectangles helped determine the size of the openings in the net. Some of the cords found at the site may have been remnants of nets, or possibly of fishing line used with fishhooks.

**Flutes**

Archaeologists unearthed two very rare bone artifacts at Bayou Jasmine. They discovered two jawbones from either dogs or wolves. People had removed the teeth from these bones and cut open both ends of the jawbones. Archaeologists think the Indians may have used these bones as flutes, placing their fingers over the tooth sockets and blowing on one end to make music.
Pendants

Archaeologists found pendants at the site, including ones made from bone (top three) and alligator teeth (bottom two). Pendants were probably decorative items that people wore. They were suspended in two ways. One kind of pendant had a hole drilled through it, and the other had a groove carved around it.

Pottery

There were a lot of pieces of broken pots at the Bayou Jasmine site. The Tchefuncte pottery was not as thin, sturdy or well made as later Middle Woodland period pottery. In cross section, the clay in the pots was layered, showing that the makers did not knead it thoroughly before shaping the pots. Archaeologists found over 37,000 pieces of ceramic pots, bowls and jars at the site.
(Top) People decorated the Tchefuncte vessels with a variety of designs. Most of the designs have rectangular geometric patterns but a few had curving lines. Some vessels have lines drawn on the wet clay with a pointed or blunt tool.

(Middle two) For some pots, as the tool was dragged across the surface, it was regularly jabbed into the surface. This technique created a row of dents, or punctates, connected by a line (drag and jab designs).

(Bottom) Other vessels have big areas of punctates. Pushing a pointed tool into the damp clay created a group of shallow holes or punctates.
Sometimes the pottery maker pressed a piece of cord into the clay to create a line.

At times, the pottery maker pinched the clay between two fingers to make designs.

Rocking a short straight or curved tool across the surface created a distinctive decoration.

On some pots, the top of the vessel lip was also decorated.

Some of the pots had feet on them to hold them up.
Projectile Points

(Right) Archaeologists found many stone projectile points at the site. These were tips for darts thrown with atlatls. The most common kind of stone projectile point was the Pontchartrain type (A, B, C, and F). Archaeologists also found Delhi (D) and Kent types (E) at the site. Most of these points were made of rock that was not from the site. This means people either traveled long distances to get stone or traded or exchanged with outsiders for stone or projectile points. The closest source of rock to the site was Citronelle chert from north of Lake Pontchartrain.

(Below) People also made and used bone projectile points at Bayou Jasmine. These included bone points, made from long bones of deer (A), birds (B), small animals (C) and even alligators (D). These points were hollow at the bottom, so they could slip onto the wooden shaft of a spear or dart.
Learn More

You can learn more about the Bayou Jasmine site by checking out the resources below. Have more questions about the site? Be sure to read the Top Site FAQs section!


Glossary

**Coprolites:** Coprolites are preserved human feces. Archaeologists are usually interested in analyzing human coprolites. This is because coprolites can offer a lot of detailed information about people’s diet and health.

**Early Woodland Period:** (800 B.C. to A.D. 1) This period is known in Louisiana for the first widespread use of pottery. However, although people made a lot of pottery, it was mostly of very poor quality. The Tchefuncte culture is associated with this period. At this time, Tchefuncte-style pottery was made at sites throughout the Lower Mississippi River Valley.

**Earthworks:** At many sites, American Indians built mounds and embankments of soil. Since these are made of earth, they are called earthworks.

**Late Archaic Period:** (2000 B.C. to 800 B.C.) In Louisiana, the Late Archaic period is often described as a time when the climate shifted from hotter and drier to cooler and wetter. Mobile bands of people started settling down and forming small villages. It is also a period marked by the earliest use of containers made of stone and ceramic. People made other ceramic objects, too, like cooking balls, figurines and pipes.

**Middle Woodland Period:** (A.D. 1 to A.D. 400) This period saw a rise in population and influences from Hopewell culture sites in the Midwest. At this time, some people could be born into, or gain, more social or political power than others. Some people, who may have been leaders, had special burials.

**Midden:** A midden is an area of trash and debris that accumulated where people lived. A shell midden contains a very large amount of shell from bivalves like clams or mussels. This usually suggests a place that was used repeatedly for meals.

**Mississippi Period:** (A.D. 1200 to A.D. 1700) During the Mississippi period in Louisiana, some sites show the influence of the Cahokia site near St. Louis. People sometimes built flat-topped mounds, they made fine quality pottery and, generally, they hunted with bows and arrows. In some parts of the state, people grew maize in gardens, but they also continued to hunt, fish and gather wild plants.

**Posthole:** A posthole shows where a wooden pole or post once stood. When archaeologists find them, postholes usually look like dark circular or semi-circular stains in the soil because the hole was filled with different dirt. Sometimes, there are stains remaining from the wooden posts, and they are called postmolds.

**Subsidence:** Gradual sinking of land because of natural or human activities.
Top Site FAQs (Frequently Asked Questions)

Q1. What tribe(s) built the Bayou Jasmine site?

It is impossible to tell which tribe(s) built the site. When Europeans came to Louisiana in the 1600s, Muskogean-speaking peoples occupied the land around Lake Pontchartrain. Most of these groups no longer exist. Because we do not know what Early Woodland period inhabitants of the Bayou Jasmine site called themselves, we call them the Tchefuncte culture, named after the Tchefuncte site in St. Tammany Parish, where members of the same group also lived.

Q2. How did archaeologists find the site?

Archaeologists first recorded the Bayou Jasmine site in 1957, but they did not excavate there until 1975. Archaeologists first noted the site when it was exposed during the construction of what is now Old Highway 51.

Q3. Why do archaeologists want to study coprolites?

Archaeologists study coprolites because coprolites can tell them a lot about what people ate. Sometimes, coprolites can also tell archaeologists if people had certain health problems, like parasites.

Q4. What did archaeologists do to try to keep water out of their excavations?

They had a metal cofferdam built around their excavation area and used pumps to remove water that seeped into the cofferdam.

Q5. With all those shells at Bayou Jasmine, were clams a major source of nutrition?

Studies have shown that the clams eaten there, *Rangia cuneata*, did not have much nutritional value. They were low in carbohydrates and low in protein. They probably were eaten because they were plentiful and readily available.
Q6. What caused subsidence at Bayou Jasmine?

Scientists have identified many processes that contribute to subsidence in this part of Louisiana. They include natural causes, like fault movement, and human ones, like surface water drainage.

Q7. What are the numbers on some of the artifacts?

Archaeologists label artifacts with a site number and a catalog number. The site number for Bayou Jasmine is 16SJB2. The 16 refers to Louisiana, the SJB stands for St. John the Baptist Parish, and the 2 means it was the second archaeological site recorded in that parish. The catalog number is also on a list that tells where the archaeologists found each artifact. All the artifacts have numbers, but most of the numbers do not show in the photographs.
The crew who worked at the site was made up of both professional archaeological technicians and volunteers. Credit: LSU Museum of Natural Science.

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