

Caltrans Native American Cultural Studies Traditional Knowledge & Archaeology



This booklet serves as a primer on archaeological topics and introduction to how traditional knowledge and archaeology may compliment one another and enrich our understanding of California tribal heritage for future generations.

The input and participation of traditional tribal people are essential elements of Caltrans' cultural resources studies and archaeological investigations.



Traditional Tribal Knowledge & Expertise

The unique knowledge and expertise that California Native Americans possess about their ancestral lands helps Caltrans identify, evaluate, and make informed, culturally sensitive decisions about transportation development.

Archaeology

When effects to significant archaeological resources cannot be avoided by a transportation project, Caltrans may conduct scientific archaeological investigations to carefully recover, analyze, and interpret the physical remains of past human activities. These investigations and interpretations of past native culture are best achieved in close consultation with knowledgeable California Native American tribes.

Collaboration

Traditional expertise, oral histories, ethnographies, and archaeology, together contribute to a better understanding and appreciation of California's rich indigenous heritage and thriving modern communities, including cultural traditions, past lifeways, changing environments, land management, health and medicine, trade and political relationships, art, music, and recreation. Caltrans encourages and supports the contributions and participation of Native American tribes in the Department's cultural studies to promote successful collaborations and meaningful historic preservation outcomes in transportation development.

Visit the Native American Cultural Studies Branch online.



STONE TOOLS

What Survives in the Dirt?

Unlike many other cultural materials, stone does not readily decompose, making it one of the earliest known traces of human activities, and one of the most common.



Flintknapping an Obsidian Projectile Point

Traditional Knowledge

Traditional knowledge and archaeological research indicate that early Native Californians relied primarily on hunting, fishing, and gathering of wild plant foods for their livelihood. The stone points fashioned for spears, darts, and arrows, as well as the cutting and scraping tools used to process meat and plant foods, were critically important. The art of creating these stone tools is called flintknapping. The tools and resulting waste-flakes from flintknapping found in archaeological sites can help us understand past patterns of subsistence and mobility in various regions of the state over time.



Core



Finished
Projectile
Point



Waste-
Flakes

The art of flintknapping, still practiced by Native Californians today, adds to our understanding and interpretation of tools and flakes recovered in archaeological contexts.

What Can We Learn?

Stone tools have a lot of information to share about the past, including:

- Types of materials used
- How far people traveled to collect raw material
- How tools were made
- When tools were made
- What tools were used for
- How and why styles, technology, and manufacturing techniques vary from place to place and over time



More
Recent



Older



Some of the oldest stone tools in California are crescent-shaped.

VOLCANIC GLASS

What is Volcanic Glass?

Volcanic glass—called obsidian—forms when lava flows cool quickly and evenly.

Obsidian can be fractured predictably to create very sharp edges and was and is widely used by Native Americans for tools and other cultural items. It was valuable for trade and is frequently found in archaeological sites far from its source of origin.

A archaeological site will often contain obsidian from sources located hundreds of miles away, in many directions, providing evidence of long-range trade through time.

Traditional Knowledge

For thousands of years, Native Americans have valued obsidian for its workability in making sharp, beautiful stone tools.

Obsidian artifacts are still being made and used today and can add context to those recovered from archaeological settings that served a variety of purposes, from the ordinary to the ceremonial.



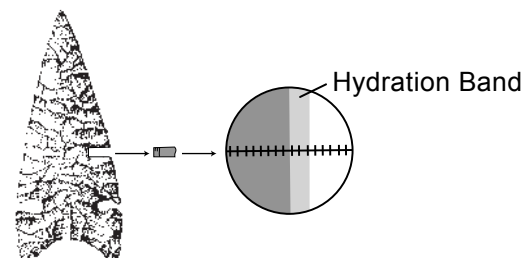
Geochemical Analysis

Archaeologists rely on non-destructive x-ray fluorescence analysis to determine the geochemical make-up of an obsidian artifact and match it with known obsidian sources to understand how far people transported or traded it.

Obsidian Hydration

When obsidian is broken or worked into an artifact, it creates a fresh surface that begins to absorb moisture from the air at a known rate, creating a hydration rim or band. The longer this surface is exposed to air, the thicker the hydration band becomes.

By cutting a thin slice from the edge of an artifact and grinding it down to be extremely thin and transparent, the width of this “hydration band” can be seen and measured under a microscope. If two artifacts made of obsidian from the same source have significantly different hydration band thicknesses, we know that one is older than the other and we can determine their approximate ages.



SHELL BEADS THROUGH TIME

Bead Styles

The most common beads found in archaeological sites were made of purple olive shell (*Olivella biplicata*). Over 50 different *Olivella* bead styles have been identified. Each style has geographic and temporal association.



Archaeological evidence suggests that bead production occurred primarily in villages on the Channel Islands and along coastal southern California. Some evidence is found near Monterey and Bodega bays and occasionally in the interior.

Cultural Significance

Beads were used as decoration—on clothing and baskets and as jewelry. They were widely traded and were often included as funerary offerings.

Some shell beads were used as money. Their value was often determined by the number of beads or length of the strand.



Hupa shaman wearing highly prized *Dentalium* shell bead necklaces, circa 1923. Photo courtesy the Library of Congress.

Traditional Knowledge

Shell beads continue to be handcrafted by Native California artisans. These modern beads continue to be used for traditional jewelry and to decorate dance regalia and baskets. Many artists use time-honored methods to cut, shape, finish, and string their beads.

Dating Shell Beads

Archaeological evidence suggests that shell beads have been made and used in California for over 11,000 years and increase in frequency in the archaeological record about 4,000 years ago.

Bead form and material changed over time.

- Material - *Olivella*, abalone, clam, *Dentalium*
- Shape - rectangular, round, oval
- Part of the shell used
- Bead and hole size



Bead styles indicate relative age (one is older than another). Radiocarbon dating can determine a bead's actual calendar age.

Trade Networks

Native American trade routes were California's first highways. Isotopic analysis can identify a shell's chemical makeup. From this, shell beads can be traced to their region of origin. This informs us about the extent of trade and social relationships in the past.



Map courtesy of the Smithsonian Institution.

PLANT REMAINS

Ethnobotany & Archaeology

Ethnobotany is the study of human uses and cultural meaning of plants.

Evidence of cooking activities is often preserved in archaeological deposits in the form of stone tools, cooking vessels, and food residue including plant remains.

Unburnt leaves, fibers, flowers, and fruit decompose quickly. However, charred plant parts are often preserved in archaeological sites. These include burned tubers, seeds, and nutshell which can be recovered from finely screened soil samples and identified under a microscope.

Microscopic plant starch grains are preserved on artifacts such as mortars and pestles and can be recovered and identified to reveal what plants were being processed and eaten.

Pollen can be extracted from the soil and analyzed to give us clues about past environmental conditions.



Bowl Mortar



Maggie Howard, Paiute, Shelling Acorns, circa 1930.
Photo courtesy of the National Park Service.

Traditional Knowledge

Plant materials were, and continue to be, an integral part of life and a rich cultural legacy. Plants provide food, medicines, and raw materials for baskets, dyes, tools, structural material, and fuel. Traditional knowledge of the plant world can contribute to interpretations of archaeological plant remains.



Tule



Boat Made from
Bundles of Tule



California bay nuts are roasted and eaten, and the leaves are used for seasoning. The leaves are steeped, and the steam inhaled to treat congestion and respiratory illness. Crushed leaves can be rubbed on the skin to repel mosquitoes. Leaf sprigs are hung indoors to purify the home and to protect it from insects.

ARCHAEOLOGICAL FEATURES

What is a Feature?

Features are more stationary parts of the cultural landscape that represent particular activities or events, such as:

- Houses & house pits
- Bedrock mortars
- Hearths & ovens
- Rock art
- Rock rings
- Trails, trail markers (blazes & rock cairns)



Traditional Knowledge

Many Native California communities continue to build and use traditional hearths, houses, dance houses, and sweat lodges. Indigenous knowledge of traditional materials and building techniques is invaluable to the interpretations of such features identified in archaeological contexts.

Exposing & Recording Features

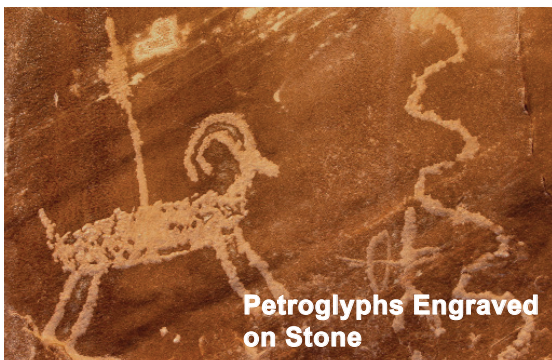
Features can be buried, like a house floor, or partially or completely visible on the surface, like the bedrock mortars below.



Cultural Significance

Native Americans painted and engraved images on stone to act as:

- Boundary markers
- A record of past events
- Ceremonies
- Artistic expressions
- Communications with the spirit world



Evidence of some features, such as house floors, is subtle and careful excavation is required to expose posts, hearths, tools, and other artifacts.

Archaeologists carefully measure, describe, photograph, and map each feature.



Mortar cup size, shape, wear, and microscopic contents, can indicate what was processed. This information is often complemented by traditional knowledge of plant resources in the area.

GEOARCHAEOLOGY

California's landscape has been shaped and reshaped by nature and by humans. Geoarchaeology is the study of how these landscape changes have affected archaeological sites.

Traditional Knowledge

Some tribal members possess knowledge passed from generation to generation about possible village and camp site locations now buried by nature or by the construction of dams, levees, towns, and cities.

Geoarchaeological Research

Includes:

- Ground surface age determination
- How archaeological sites are buried, preserved, and altered by geological processes
- What the landscape and environment looked like when people lived on it in the past
- What resources were available to Native Californians given the changing environment
- Determining the best places to look for buried archaeological sites
- Traditional tribal knowledge and oral history

Buried Soils

Former land-surfaces become covered by younger sediments through a variety of environmental processes, such as mudslides and flooding. These events are often followed by long periods of stability.

These processes have left a series of buried landscapes, including those once lived on by Native people. Many archaeological sites are now buried beneath land and water.



Why is Geoarchaeology Important?

Geoarchaeology considers how past landscape changes have hidden evidence of village and camp sites and uses appropriate methods to discover where these settlements may be preserved beneath the modern ground surface. Caltrans conducts geoarchaeological analyses to identify these locations early in the environmental review process to better protect cultural resources that may otherwise be adversely affected by construction.

Where are all the Sites?

Geoarchaeologists search for archaeological sites before construction activities using:



- Predictive modeling using distance to water & slope of the terrain
- Surveying & augering
- Exploring creek banks & other exposures
- Backhoe trenching
- Coring for projects with deep impacts

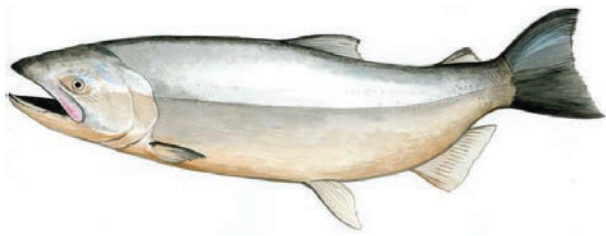
Beneath San Francisco Bay

Sea level rise has drastically changed the Bay Area over thousands of years. Geoarchaeological research has identified and dated those changes. Evidence of Native Californian presence has been found more than 20 meters (65 feet) below the bay surface and bay mud. Likewise, other areas of California have experienced other environmental changes that must be accounted for during archaeological efforts.



USING THE PAST TO SHAPE THE FUTURE

Helping Restore Endangered & Threatened Species



Salmon

Most of California's major salmon rivers have been altered by gold mining, water storage structures, and hydroelectric dams. These have severely impacted salmon spawning grounds and other critical habitats. Understanding the natural life cycle of salmon, an endangered and threatened species, is critical for conservation and the restoration goals shared by tribal governments and the State of California.

Science & Culture

To help preserve and restore salmon populations, scientists are turning to the archaeological record and Native oral histories to better understand past distributions, migration patterns, spawning seasons, and responses to climate change.



Man spearing fish at a trap. Exact location unknown.
Photo courtesy Humboldt State University Library.

Traditional Knowledge

Native Californians have harvested salmon for thousands of years and it remains integral to some tribal communities where the fish are still a part of traditional ceremonies and are a highly valued food.

Tribal governments from across the state are working with federal, state, and local agencies to remove fish passage barriers, restore rivers and streams, and increase salmon populations.



A Traditional Method of Smoking Salmon

The Archaeological Record

Archaeologists often find salmon bones or tools used for fishing in village sites along northern California rivers.

Otoliths or fish "ear stones" are common in sites. They form in layers like tree rings. Each layer records information about the environment of the fish during its life cycle.



Otoliths recovered from an archaeological site.

With the otoliths, the age of the fish when it entered the ocean and returned to freshwater to spawn, the season of the spawning run, and even which streams supported spawning can be discovered. Otolith length also indicates the size of the fish when it died. This allows us to track changes in fish populations over thousands of years.