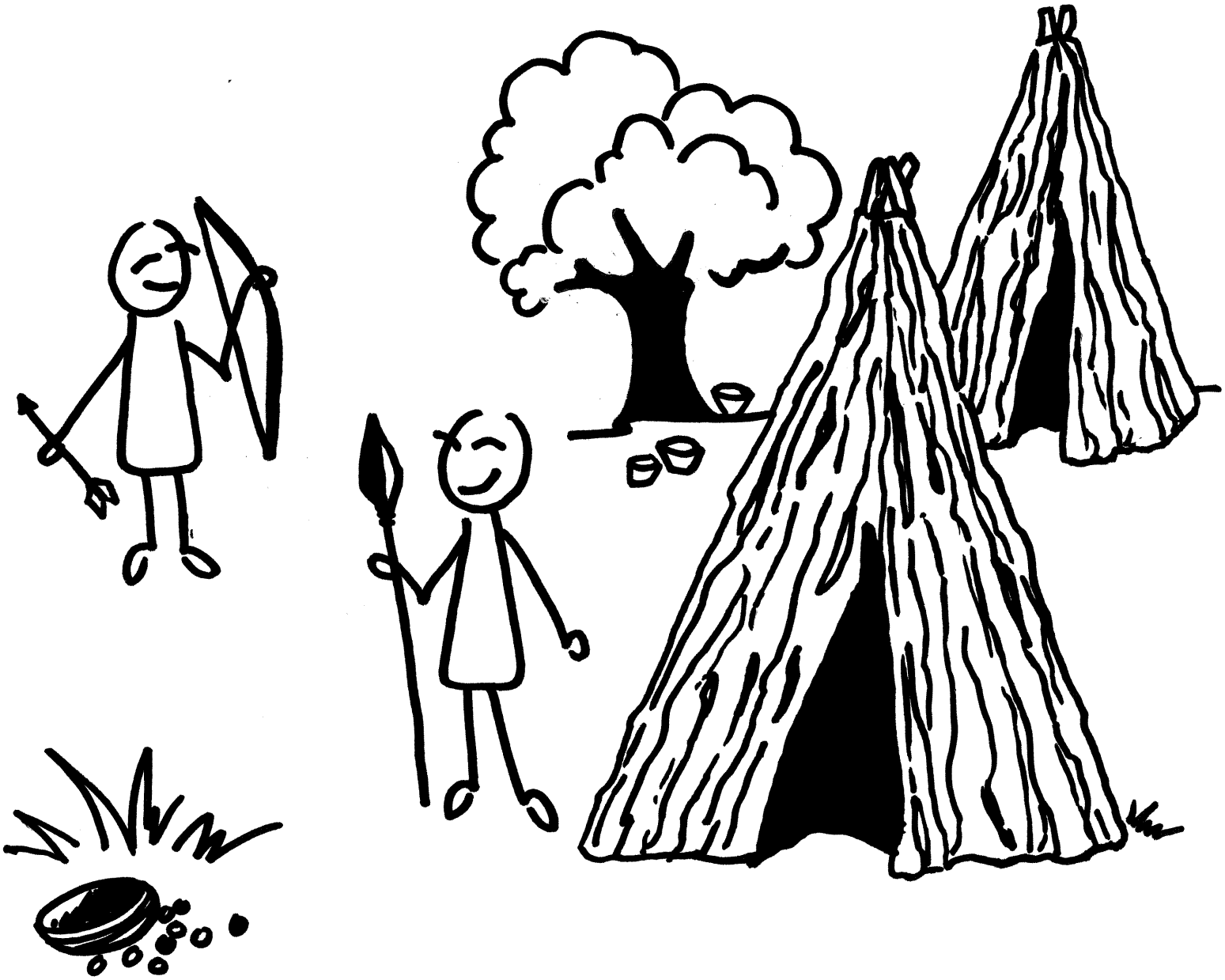
Calvin Crest Outdoor School

Lessons from the Range of Light

Miwok



MIWOK UNIT

CONTENTS:

OBJECTIVES:

The student shall learn:

Different cultures have different social systems in place that are characteristic of them and reflect their values and belief systems.

All people have the same basic needs and the same dependence on the earth and its resources.

To appreciate the natural environment through the study of the Miwok respect for and awareness of their surroundings

MAJOR CONCEPTS:

~ Miwok language, clothing, housing, food, tools, and weapons.

~Miwok beliefs and customs, especially the understanding of the natural surroundings as a life support system and way of life that did not abuse or waste resources.

~ Miwok utilization of plant materials for tools, utensils, shelter, fire building, and entertainment, in addition to food.

MATERIALS NEEDED:

~ Blindfold
~ Plant photographs and descriptions
~ Acorns
~Track identification cards
~ Pencils, pencil sharpener, writing boards, track identification worksheets
~ Nylon brush for cleaning cement track impressions

Items kept at Miwok Village
~ Pestles
~ Buckets
~ Cooking poles and stones
~ Looped stirrer
~ Elderberry clapper
~ Bull roarer
~ Markers for games
~ Sticks for games

Items kept at Hillhouse
~ Deer skull and antlers
~ Deer antler tines
~ Deer skin
~ Soaproot brush
~ Soaproot bulb sample
~ Obsidian artifacts
~ Obsidian pieces

SUPPLEMENTAL RESOURCES:

Barrett, S.A. and E. W. Gifford, Miwok Material Culture, 1933.
Clarke, Charlotte Bringle, Edible and Useful Plants of California, 1977.
Godfrey, Elizabeth, Yosemite Indians, (rev. James Snyder and Craig Bates), 1973.
Keator, Glenn, Linda Yamane and Ann Lewis, In Full View; Three Ways of Seeing California Plants, 1995.
Ortiz, Bev, It Will Live Forever: Traditional Yosemite Indian Acorn Preparation, 1991.

MIWOK - INTRODUCTION

In this unit, students will make observations and participate in activities which provide opportunities to better understand people of a different culture. They will use observation and classification skills to help them recognize plants which were useful to the Miwok. They will participate in activities that enable them to understand challenges faced by hunters in a hunter-gatherer society.

Students will examine replicas of structures to better understand how the Miwok people lived in this environment. They will participate in Miwok games in the roundhouse and be allowed to participate in specific activities based on gender to learn something of the culture. They will work with acorns to better appreciate the complexities of food gathering, storing, preparation and preservation.

BASIC INFORMATION:

What happened to the Miwok?

"That a war of extermination will continue to be waged between the two races until the Indian race becomes extinct, must be expected; while we cannot anticipate this result with but painful regret, the inevitable destiny of the race is beyond the power and wisdom of man to avert."

With these words, in his annual message in January 1851, California governor Peter H. Burnett summed up the almost certain fate of the Indigenous people of the Yosemite region as well as those of the rest of the state.

Who were these people destined to be exterminated? What had they done to deserve such a fate? What do we know of their ways, their values, their customs, their fate? Although Governor Burnett was speaking of Indigenous people as a whole, his remarks were particularly pertinent to the Southern Sierra Miwok because of the conflict they were engaged in at the time with the miners of the Mariposa region. On the one side of the conflict were the "forty-niners" - gold seekers who had flocked to California by the thousands after the 1848 discovery of gold by James Marshall near Coloma. During the interim period between Marshall's discovery and Burnett's pronouncement, miners had spread throughout the Sierra Nevada foothills in their quest for gold. Inevitably, this led to confrontations and disputes with the Natives already living in these areas - the other side of the conflict.

Although it is a broad generalization, it is evident that, for many of the miners, their goal was to get whatever they could of value from the land, regardless of their impact, and then

move on to another place where they could get more. The mountains themselves had no special meaning or value to them other than being a source for gold, some of their food supplies, and lumber products: it wasn't their home. They came with a heritage of displacing, removing, converting, or eliminating the Indigenous people who had stood in the way of westward expansion and the "civilizing" of America during the previous 175 years. With such a perspective, the conflict and impending destruction of the California Natives' way of life were, as Governor Burnett stated, inevitable.

The Indigenous people of the Yosemite region had an entirely different perspective. Their goals, values, way of life, and everything else about them was different from the newcomers. They were much more intimately aware of the subtle as well as obvious changes and processes continually going on around them, and they responded with changes in their seasonal homes, clothing, diets, and daily routines. The processes had been going on for ages and they had become a part of them. They tended to adapt their lifestyles to fit the environmental conditions they lived under. In contrast, the EuroAmerican culture made, and continues to make, efforts to adapt the environment to suit their perceived needs and desires.

Americans first entered Yosemite Valley on March 25, 1851. In the words of the group's leader, Major James Savage, "It is not our purpose to look at scenery, it is our purpose to kill Indians." Estimates of the Sierra Nevada Miwok population before the rush for gold numbered about 9,000 individuals. Within sixty years that number had been reduced by over 90%. The 1910 census revealed only 699 Miwok, and only half were full-blooded Miwok. The changes that decimated the California Natives happened with the speed and force of a wildfire.

People of different cultures often tend to be judgmental rather than appreciative, or at least tolerant, of one another. It is our desire, with this unit, to enable students to develop a sense of understanding of a way of life that is totally different from their own. As we become a more technological society and become more and more isolated from our environment, it is helpful for us to study, and to learn from others - such as the earliest inhabitants of this area.

General History

The first Indigenous people entered the Yosemite region of the Sierra Nevada sometime over 4,000 years ago, moving across the crest of the Sierra from the east during very dry years in the Great Basin. Centuries later, Miwok-speaking people moved into the Yosemite region as their territory in the Central Valley was being taken over by others coming down

from the north. The Miwok mixed with the small groups of people already in the Sierra, reaching into Yosemite Valley itself. They called this valley "Ah-wah-nee" meaning "place of a gaping mouth." "Ahwahnee" has been translated as "deep grassy valley" for approximately 100 years, but recent linguistic studies indicate that translation is probably incorrect. It was the Miwok practice to name places after their imagined resemblance to a part of the human body and the Miwok root word "Awa" means "mouth."

The California Miwok are divided into six major language groups. Two of these groups, the Coast Miwok of Marin County and the Lake Miwok of Lake County, resemble the Pomo Native culture more closely than they do the Plains and Sierra Miwok culture.

The Plains Miwok of the Sacramento-San Joaquin delta region, and the Northern, Central, and Southern Miwok (collectively called the Sierra Miwok), were similar to one another in customs and language. Cultural differences were more dependent on the resources of the areas in which they lived than on any linguistic differences. What they ate, what they wore, and how they built their homes were all dependent upon the natural resources at hand, and these varied more with changes in elevation than north-south locations. For example, houses in the foothills would be grass-thatched while those in the wooded mountains would be constructed of bark-slabs. This was true of the Northern as well as the Southern Miwok. This unit deals primarily with the Southern Miwok who dwelt in the Yosemite region of which Calvin Crest is a part.

The Miwok, like most California Natives, were peaceful - seldom waging war, and only when provoked. They lived in harmony with nature, taking from it only what they needed to survive. Their nearest neighbors were the Mono Natives to the east and the Chuckchansi to the south, with whom they actively traded. The demise of the Miwok is a story similar to that of all California Natives. The Sierra Miwok were fairly isolated from the Spanish missions established along the coast. However, during the gold rush of '49 and the years following, their numbers were heavily depleted and their culture suffered greatly at the hands of those who believed, "the only good Indian is a dead Indian." Today there are very few people of Miwok blood living in the Yosemite region.

CULTURAL CHARACTERISTICS OF THE SOUTHERN MIWOK

LANGUAGE

One of the main characteristics which separates one culture from another is language. Although each of the six Miwok groups spoke a different language, they were still able to understand one another. Even among the Southern Miwok there were three distinct dialects. This would seem to us today to cause a great deal of confusion and drastically limit communication. We respond this way because we tend to be "language loyal," that is, we prefer speaking only one language. However, among the California Natives it was not at all uncommon for individuals to be fluent in three or four languages, and most were normally at least bilingual. Thus it was that the Southern Miwok could not only interact and trade with their northern counterparts, but were also able to do so with other nearby tribes such as the Yokuts, Monos (Paiutes), Chuckchansis, and Washos.

The following are some common Miwok words not found in the lesson plan:

People - Miwok	Sun - Watu	Wind - Kanume	Friend - Otcinti
Water - Kiku	Rock - Hawa	Boy - Nana-tou	Yes - Hun
Fire - Wuke	Dance - Kalune	Girl - Oha-tou	No - Ken
Snow - Kela	Eat - Uwu	Man - Nana	Good - Tcutu
Rain - Nika	Tree - Lama	Woman - Oha	Bad - Uswi

A Miwok word with an interesting history is the word for grizzly bear. In most Miwok dialects "Uzumati" means grizzly bear. To the white man, the band of Natives in this area became known as the "Yosemites," a corruption of the term "Uzumati." Interestingly, the Ahwahneechee band of Miwoks inhabiting Yosemite Valley used the term "husso" for grizzly bear. In the Ahwahneechee dialect "Yosemite" is probably a corruption of "Yo-che-me-te," which translates as "some among them are killers," a reference to the Chowchilla Natives from the Central Valley, north of present-day Madera. It is from this corruption of the Miwok language that one of our most beautiful national parks got its name - Yosemite.

CLOTHING, HAIR, AND APPEARANCE

Skins from wild animals furnished clothing for the Miwok. In the summer, men wore a loin cloth of buckskin which consisted of a piece of buckskin passed between the legs and hung from a buckskin girdle as a short apron at the front and back. This way of dressing provided optimum leg freedom. Women wore buckskin skirts reaching from the waist to below the knees. Children under ten years old went unclothed in warm weather. During the winter the Miwok wrapped themselves in blankets made from the skins of deer, bear, mountain lion, coyote, or rabbit. The same blankets worn for warmth also served for bedding. The most

popular blankets were made from rabbit skins which were often obtained in trade from the Mono Lake Paiutes. Moccasins were worn only in cold weather or when traveling on long, rough trips. They were fashioned from buckskin and lined with shredded cedar bark.

Both men and women wore their hair long. The only time it was ever cut was as a sign of mourning for a close relative. It was cut with an obsidian knife and the cut-off locks were then buried with the body of the deceased so that sorcery could not be practiced on the hair's owner. The hair was often tied back in a bunch at the nape of the neck with flowers and feathers used as decorations in the hair. Shampoo came from soaproot and was supposed to promote luxuriant growth. The fibers of the soaproot were used for a hair brush. Men either permitted their beards to grow or plucked them. The hair was not only tied, but doubled back on the head in hot weather or when hunting.

FOODS

The Miwok were neither agriculturalists nor herdsmen. The only plant cultivated was tobacco and the only animal domesticated was the dog. Therefore, they had to depend entirely on their environment to provide their sustenance. California has an abundance of edible plants and animals and, though the Miwok had to work hard to gather food, they were seldom in danger of starving. Apparently, almost everything edible in the vegetable world and all mammals, birds, reptiles, and fish which could be caught, were eaten. However, the Miwok, like us, preferred some foods over others. The black oak acorn was the favorite plant eaten, deer the favorite meat, and trout the favorite fish.

Deer were hunted in several ways. Nets were sometimes stretched over known deer trails during winter and spring migrations to trap the animals as they passed. Deer were also driven over cliffs where they fell to their deaths and were then collected by the hunters. Some hunters occasionally wore a false deer's head and in this manner were able to sneak up on an unsuspecting herd and, using bow and arrow, shoot an animal.

Other animals used for food were hunted in a variety of ways. Rabbits were caught with snares while beaver and squirrel were hunted with bow and arrow. Fish were either trapped with a net, speared, poisoned with soaproot juice, or caught by hand.

The following list gives some idea of foods which were eaten by the Miwok:
Meat: deer, grey squirrel, quail, trout, rabbit.
Nuts: pine nuts, acorns, chinquapin nuts, hazelnuts.
Seeds: large variety of grasses and wildflowers.
Bulbs: swamp onions, brodiaea, Mariposa lily, squawroot.

Greens: lupine, clover, miner's lettuce, dandelions.
Other: berries, fungi, insects (especially grasshoppers), insect larvae, worms.

Though the Miwok did not cultivate plants, they did store large quantities of food. Acorns and seeds were stored without special preparations; greens and grasshoppers were steamed and dried; meat and fish were dried before storing. The Miwok diet depended largely on the season. Mushrooms and bulbs were harvested in winter, clover in spring, seeds in summer, and acorns in fall. In winter their diet consisted more largely of meat than at any other time of the year. For people without supermarkets, domestic animals or agriculture, the variety in their diet was amazing.

TOOLS AND WEAPONS

The Miwok fashioned and used a wide variety of tools. Tools made from bones and antlers included awls (used for making baskets), whistles, scrapers and devices for chipping obsidian. From obsidian itself, knives, scrapers, spearpoints and arrowheads were made. The Miwok were also excellent basket makers and the mortar and pestle were used for pounding and processing acorns. Cordage made from a variety of plant fibers was used to fashion nets, traps and snares.

MIWOK - LESSON PLAN

The Trail

The Miwok Trail is an easy 1 ½ mile loop that will lead you through a diverse natural area of mixed coniferous forest (with some black oaks), past an open meadow to replicas of Miwok village structures. A more precise description of the trail and a trail map can be found starting on page 38. This unit will help you become familiar with plants along the trail and the ways they have been used by the Miwok. Look for the numbered markers along the trail that correspond to the numbered activities in this unit. Please note that some of the annual plants described in the unit can only be easily identified when they are blossoming or fruiting (spring and summer). Regardless, a number of the plants can be identified at any time of the year. As you walk along the trail, help your students envision themselves stepping back in time. Imagine that you have no modern conveniences, and at the same time, realize that you have everything that you need. Time needed to complete the activities and observe the plants will depend on your discretion and timing. Emphasize those aspects of the course that you deem most significant. As you hike the Miwok Trail, look for the redwood posts which have been numbered for your convenience. The first marker is located along the trail leading toward the staff area from the Dining Hall. The markers are indicated on the route description and map as well.

Introduction

A. Say the words “Eskimo” and “Indian”. Have the students name the things that come to mind when we say these words.

B. Eskimos, Indians, the ancient Greeks, Americans, etc., are all examples of cultures. Discuss as a group what specific attributes make cultures differ from each other. (i.e., language, dress, housing, food, tools, religion, etc.)

C. Explain that you will be studying the Miwok culture. The Miwok lived in this area for at least several thousand years before the arrival of “white men”. The word "Miwok" means "people" in the Miwok language.

D. The Miwok were a relatively peaceful people who lived in harmony with their environment. They tended to take only what was needed without disrupting the natural order. Nature was very important to them and they respected the environment.

E. Briefly recount some of the historical information contained in the Basic Information section of this unit to give students a sense of what has happened to the Miwok.

Language

At the beginning of the hike introduce the language of the Miwok by teaching the students "yes" and "no" in Miwok (yes = hun; no = ken). Take a mock roll call by calling each student's name and allowing him/her to answer "hun", as well as calling several fictitious names (Donald Duck, Darth Vader, etc.) which allows the whole class to answer, "ken." During the remainder of the hike you might want to introduce various Miwok words as they become appropriate for the activity/location/item being discussed. For more Miwok terms, refer to pages 5 and 6.

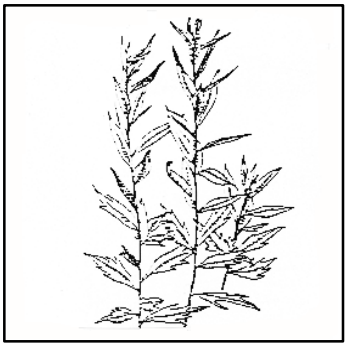
Marker 1: **Useful Plants**(Located along the trail leading toward the staff area from the Dining Hall.)

Growing alongside the trail that leads toward the staff area from the Dining Hall are a variety of plants of importance to the Miwok. Have students take a moment to think of all the ways we use plants in our daily lives. We may not be aware of it, but we use plants in many aspects of our lives: for food, medicine, clothing, fuel, shelter and tools. The Miwok used native plants to meet the same basic needs.

Their knowledge of the properties of plants was the result of experimentation and passing on information from generation to generation. They understood the properties of a large number of plants very well. The Miwok learned which plants to use for particular purposes, when and where to gather plants, how to prepare them, how to store and how to preserve them. They were not considered farmers, but they did manage plants by pruning, burning, and by sowing seeds. In so doing, they encouraged the growth and reproduction of desired plants, and minimized the impact of plants deemed less desirable. All this was done with care and respect for the plants and the land which provided them.

****Please note that although we are naming plants and describing how the Miwok used them for food, shelter, clothing, medicine, fuel and tools, we do not recommend that you try these methods yourself. We also do not guarantee the safety or effectiveness of any plants described here.**

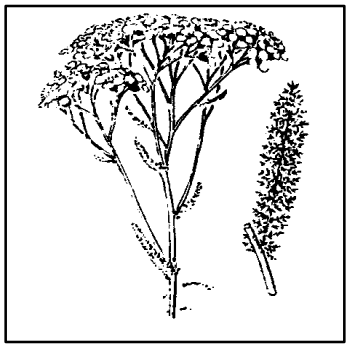
Wormwood, (Miwok - kitciño) also known as mugwort, is an aromatic plant belonging to the sage family. This is a plant which was used to line the acorn granaries to repel insects and animals. It served somewhat like an insecticide. This property was important in structures such as the roundhouse and sweat house, as it helped slow down the process of decay and decomposition brought about by insects. The leaves were used to make a medicinal tea to

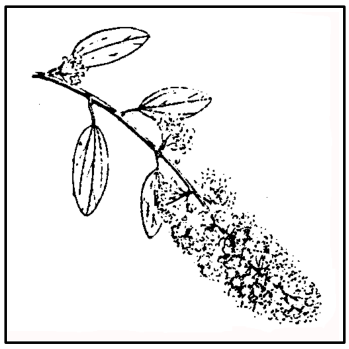


reduce swelling in any part of the body. It was also used for ceremonial and purification purposes. The leaves were put in the nostrils by mourners when crying and the pungent odor cleared the head.

Tarweed (yō´wa) is a quite sticky sunflower that blooms at this elevation during the summer months. The flower heads close during the midday heat, and are fully opened during the cooler hours of early morning and evening. The seeds were gathered in midsummer, struck off with a seed-beater into a burden basket lined with soaproot. They were easily kept in storage and sometimes the supply lasted a year. After winnowing to remove the husks or chaff, the seeds were pulverized in a bedrock mortar and ground into a very fine flour. The meal was eaten dry.

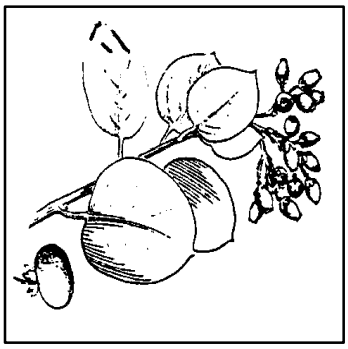
Yarrow (kama´iya) was used medicinally by the Miwok. The leaves and flowers were steeped, and the resulting liquid was either drunk or applied externally for aspirin-like pain relief. The mashed leaves, either green or dry, were bound over open cuts to stop bleeding. Interestingly, the scientific name for yarrow, *Achillaea millefolium*, has reference to Achilles of Greek mythology. Achilles was immortal, except for one weak point: his heel, or the tendon. When he was shot in the heel by an arrow, he bled to death. *Achillaea* refers to the chemical involved in clotting, or reducing bleeding.

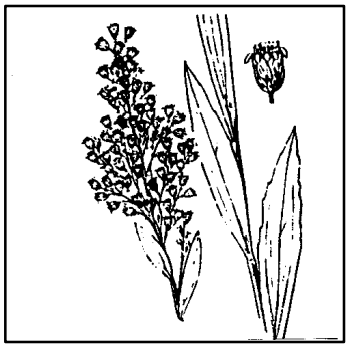




Deer brush (ceanothus) is a large shrub that is growing on both sides of the road. It was heavily pruned one growing season before it was harvested. This pruning enabled it to produce long, straight, supple shoots. The thick, straight branches were used to make digging sticks for harvesting bulbs, while the small fine shoots were used for twined basketry. Branches were used in the construction of sweathouses. When the outer bark was stripped off, the fresh, inner stem smelled like evergreen mints and could be rubbed on the body much like Bengay ointment.

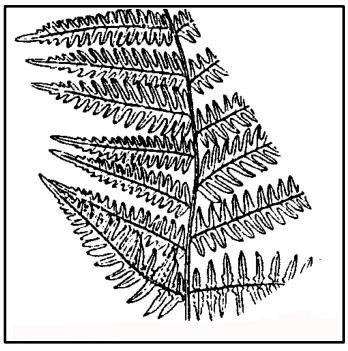
Manzanita, a shrub with smooth, reddish-brown bark, is on both sides of the road. It was named manzanita by the Spanish because the berries resembled "little apples." In the spring it is covered with fragrant smelling, pink, urn-shaped flowers. The mature, sticky, reddish brown berries were collected in baskets in late summer or early fall and stored until used to make cider. The cider was made by pounding the berries into a coarse flour. This flour was put in a winnowing basket over the top of a watertight basket. Water was poured over the winnowing basket until all the flavor was gone from the meal. This was determined by tasting. The liquid collected in the basket below was the cider, and could keep for two to four days without souring. The ripe berries were also chewed for the sake of the flavor, but not swallowed. The leaves were chewed to relieve stomachache and cramps.





Goldenrod (lo´yama) is another 1'-3' high member of the sunflower family that is found in meadow locations at this elevation. It grows alongside the road between the wormwood and the yarrow. Its yellow flower heads form dense panicles that are 3"-7" long. A small quantity of the boiled plant was used to cure toothache, however, it was never swallowed because it was poisonous. A pale green powder was also made from the leaves and applied to open sores.

Bracken Fern (ta´tama) covers much of the meadowy hillside between the dining hall and the lake. The underground stems (rhizomes) were carefully dug up, cleaned, and split to remove two black bands in the middle of the rhizomes. The fibers were dried and stored until they were used to create black designs in their coiled baskets. To make the fibers even darker, they could be soaked in water with black oak acorns. The acorn's tannic acid darkened the fibers. The bracken fern's young curled shoots, known as fiddleheads, were eaten raw.



After discussing the plants at this marker, hike up the trail to the Hillhouse, the building uphill with a stairway leading up each end of the front porch.

Hillhouse: Deer Hide and Skull, Soaproot, Obsidian Artifacts

A plastic tub with objects and artifacts to show students is kept in the Hillhouse. Display objects as you discuss them and pass them around the room for students to observe. Please return them to the tub when you are finished.

1. **Mule Deer - Hide, Skull, Antler Tines**
   Deer served as one of the most important food sources for the Miwok. The Miwok would utilize each part of the deer. Nothing was wasted. The deer brain was used in the process of tanning hides. Bones were used for tools and gambling pieces. Deer hooves were used for ceremonial rattles. Internal organs could be used for different purposes as well. Each point on an antler is called a tine. An individual tine could be cut from a set of antlers and this tine would be used to "pressure flake" small chips of obsidian from the main core to shape the implement being made. The hide was used to cover the hand of the individual working on the obsidian so that he wouldn't be cut by the razor sharp obsidian. Deer skins were also used for clothing, footwear, and bedding. The hide could be used for disguise when hunting for mule deer.

2. **Soaproot - Soaproot Bulb and Brush**
   Soaproot is a plant with a tall single stalk with long, wavy basal leaves. Its small white flowers blossom on the top of the stalk in midsummer. Its blossoms only open up in late afternoon or early evening, so few people see the flowers. This is one of the most versatile plants used by the Miwok. The underground bulbs, which were harvested using digging sticks, are covered with coarse brown fibers. The fibers were made into a stiff brush that could be used to sweep acorn meal back into a mortar hole during the pounding process. The brush handle was bound with string (made from milkweed or dogbane plants) and coated with a glue that was made from the inner bulb of the soaproot. The fibers were also used to make hair brushes. The bulb was boiled and mashed to a gooey, sticky paste that formed the water-soluble glue. The handle was usually coated with 4-5 coatings of glue; each coat drying before the next one was applied. The inner bulb was also used as soap (hence the name) and shampoo, as well as being used as a poultice for skin eruptions. Although not a favorite food, soaproot was also baked in underground ovens and eaten. In late summer or fall the bulbs were used as a poison to kill fish. The mashed bulbs were mixed with water where it flowed into a quiet pool. The chemical saponin in the soaproot was absorbed through the gills of the fish into their bloodstream, which caused their death. The dead fish would float to the surface where they were picked up by hand. The poison did not affect the meat of the fish, which was still edible.

3. **Obsidian - Spear Points, Arrowheads, Blades (Display Case), Other Pieces**
   It is interesting to note that the obsidian used by the Miwok does not naturally occur in this area. The nearest place obsidian does occur naturally is near Mono Lake to the east...over 40 miles away! The Miwok probably traded with the Mono Natives to obtain their obsidian. It is amazing to consider the large quantities of obsidian used by the Miwok, and great distances over which they carried it. Even today we occasionally find obsidian chips on the ground, as well as an increasingly rare arrowhead. Explain that the implements made from obsidian were first broken from larger hunks by striking them with a hammerstone (percussion flaking). Next, they used the tines from deer antlers to pressure flake off small pieces to form the actual shape of the implement being made. Obsidian is a volcanic rock, that when broken, or flaked, can be extremely sharp. As students observe the obsidian display have them think about how the sizes and shapes might help them know what they were used for. The largest blade could have been used for chopping or scraping, the spear point would have been attached to a large shaft; the arrowheads were smaller and more refined in the details of their manufacture.

   Ask students which they think came first, arrowheads or spear points, and what caused them to reach that conclusion. Spear points were developed before arrowheads. People were able to throw spears long before bows and bowstrings were developed.

Any obsidian found by students out on the trail must be shown to you, the teacher, for chance tickets (3), and placed back where it was originally found.

It is actually better to not even pick it up - simply observe it where it is found and leave it alone. This is because the obsidian has significance as an archeological artifact and should be left undisturbed. When it is removed, and we do not know where it came from its value diminishes appreciably.

If an arrowhead, spear point, or blade is found on Calvin Crest property, please collect it, give the finder 100 chance tickets, and turn it in to us to be used for educational purposes.

***** <u>Any</u> obsidian found off Calvin Crest's property must be left undisturbed. *****

As you leave the Hillhouse, look for the arrowhead trail markers in the trees along the trail to guide you, as well as watch for the numbered posts for locations of teaching activities.

Marker 2: Blackberries (This marker is within a couple hundred feet after leaving the Hillhouse.)

Here, where moisture is available during much of the year, plants such as **blackberries** (lututuya) seen on either side of the trail grow well. Berries were eaten fresh or dried, and the roots were used to make a medicinal tea. At this elevation, the blackberries bloom in late spring or early summer with berries ripening in late August or September. The Miwok ate a variety of other Sierran berries including currants, gooseberries, thimbleberries, raspberries, and strawberries. By the way, **thimbleberries** were good berries, but not too sweet, and the leaves are very large and soft, and would be used by the Miwok like toilet paper.

Marker 3: The Tracks Trail (Begins just beyond Eastview Cabins.)

Marker 3A - Beginning of the Tracks Trail

A. At the beginning of the Tracks Trail, just past the Eastview cabins, stop the class and demonstrate the Miwok way of walking, as opposed to the white man's way of walking. White men tend to walk noisily and usually look only at the ground. The Miwok way of walking was very quiet, putting each foot directly in front of the other and constantly observing what was all around them. Be sure to emphasize this last point. They used their eyesight, hearing, and sense of smell to gain clues about what was going on around them.

B. Conduct a short discussion on the advantages of walking quietly and observantly. Stress the fact the Miwok depended on their hunting ability for food. They needed to be aware of what was around them. If they were quiet and observant, they would more likely be able to find wildlife and approach them for a successful kill. Ask the students to be very quiet and listen for the sounds they can hear. What do these sounds tell them?

C. Have students determine what wildlife species made each set of tracks along the trail. They will do so as follows:

1. Divide students into teams of 4-5. Give each team 2 track identification cards (appendix A), a track identification worksheet (Appendix B), a pencil, and a writing board. Briefly explain how to use the track identification cards.
2. Explain that as they travel along this section of the trail they will come upon 9 sets of mammal tracks, reproduced in concrete slabs. They need to use the cards to help them classify and identify the tracks. Be sure they note number of toes, size, claw marks, and other clues to aid them in their identifications.

*Tracks 8 and 9 are not on the track identification cards.

They should record their choices on the track identification worksheet.

3. Explain that you will go to the end of this section of the trail (**Marker 3B**) and check each team's answers for accuracy (use the answer key found with the tracks trail map (page 40), as well as the repeated track samples found just before the marker). Have a cabin leader who will send one group at a time. (S)he will do so by sending the first team right after you leave. The second team will leave when team #1 leaves the first set of tracks. (S)he'll continue sending teams until they've all traveled the trail towards you. Please ensure the cabin leader has closed the gate between tracks 6 and 7 when the last group has finished with track 6.

D. Follow the activity with a discussion as to why it was important for the Miwok to recognize various animals' tracks. For the Miwok, identification was just the beginning: an excellent tracker could tell an animal's age, sex, where it had been, where it was going, its physical condition, how long ago it had passed by, and even what it was thinking. It was an artful skill learned over years of observation and practice.

Marker 4: Deer Snare (Located about 100 yards past Marker 3B and near the top of a low ridge you will pass over.)

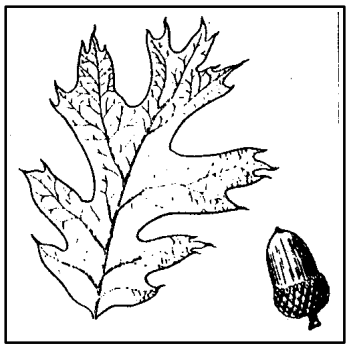
The **mule deer** (üwū´ya) was the most important mammal for food. Deer were taken in several ways. One way was to use nets up to 40 feet in length which were hung across well-used trails, one end attached to a tree, the other end held by a concealed hunter. As a deer got entangled in the net it was dispatched by the hunter with a club. Deer were also hunted using bow and arrows, driving them over a cliff, using an atlatl (a spear/lance tossing device), or by another form of deer trap. Important in deer hunting was the use of the sweat house, which is covered later in the unit. Before the hunt, men used the sweat house to try to rid themselves of human odor.

In this location, students will view a replica of a deer trap. A real deer trap consisted of a V-shaped brush fence with a small corral at the point of the V. There were 3-4 small openings in the corral (our model only has one opening), in which strong snares were set, each attached to a heavy log or a tree. Near the entrance of the corral were small pits in which hunters could hide. These men could cut off the retreat of deer trying to escape. As the frightened deer tried to flee through the openings in the corral, they would become ensnared, and were easily dispatched with clubs or arrows.

Pose the following questions to the students:

A. What was probably difficult about trying to drive deer towards the trap?
B. What might it feel like to be a deer and be pursued by hunters?
C. What made it difficult to escape as a deer?
D. How successful do you think this method of deer hunting may have been for the Miwok? What were some pros and cons of this hunting method?
E. What might be some other ways to hunt deer using the technology that the Miwok had available to them?

Marker 5: Black Oak (Left side of trail about 200 yards beyond the deer trap.)



Black oak (te´lelī) provided the most important food source for the Southern Sierra Miwok. Traditionally, each family had its own black oak tree(s) that it used as a source of acorns. The same tree(s) might be used by a family for generation after generation. Women respected others' trees, and only gathered from their own trees. **Acorns** (muyu), like most nuts, are rich in fat and protein. They were gathered and stored each fall, providing a staple food during the long winter months. The fall of acorns from the trees occurs twice each season. They didn't gather acorns from the first acorn drop, which usually occurred in late August or early September. The acorns which fall then tend to have insect larva in them, and are not used. Once the first drop occurred, fires were sometimes set in stands of oak to clear the ground for easier acorn gathering, to eliminate competing tree seedlings, and to decrease the effects of pests such as acorn weevils. Winds tend to bring down the second batch of acorns later in September or in early October. The good, healthy acorns are usually heavier than the others. Each acorn was inspected by sight and checked for holes (found in bad acorns) to ensure that only good acorns were gathered. Before the acorns could be eaten they had to be dried, shelled, cleaned, pounded into a flour, leached, and cooked (discussed in detail at the Miwok village).

Acorns served as a trade item; the Miwok traded them for the obsidian, salt, and shells other tribes had. They traded with tribes to the west to get olivella shells (Central Miwok - lū´kkū), which were obtained, at least in part, from Monterey Bay. They obtained obsidian, salt, pine nuts and alkali fly pupae (ka cha vee) from the Mono Lake Paiutes who lived east of the Sierra.

Acorns were made into toys such as acorn buzzers and acorn tops. Oak wood was used for cooking, making stirring paddles, poles for the roundhouse, and the foot drum for

roundhouse ceremonies. Oak shoots were used for making hoops for a game, and for making a type of cradle basket.

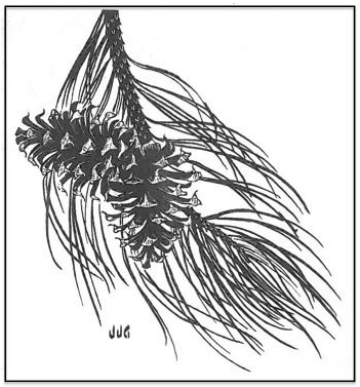
*Fall schools - You may have students gather acorns (several each) at this location, or others along the way, for taking to the acorn granary. Be sure the acorns are good quality (no insect holes or bumps). We will give 1 chance ticket/ 3 **good** acorns that students bring back to us at the Dining Hall.

Marker 6: Ponderosa Pine, Sugar Pine, White Fir, Incense Cedar

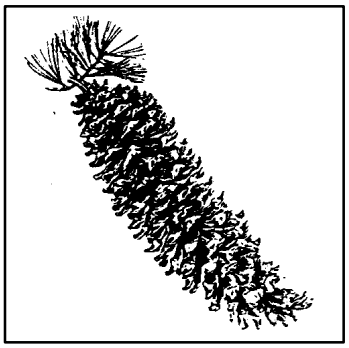
(On both sides of trail a couple hundred feet beyond the black oak.)

Several species of trees which occur commonly in this area can be viewed from this location. Black oak, which you have just seen, provided one of the main food sources.

Marker A: Ponderosa pine (wa´ssa) is characterized by needles in groups of three and cones that have a prickle or spur at the end of each scale. This is the most common pine in this area. Because the pine nuts were small in the ponderosa pine, it was seldom used as a food source. When the Miwok did gather them, the cones were dried in the sun, which caused them to open up. This allowed them to extract the seeds. A gum, usually found near the base of a tree (particularly a tree that had been burnt) was also chewed. Dried branches were used as firewood, which was true of many of the tree species found in this area.

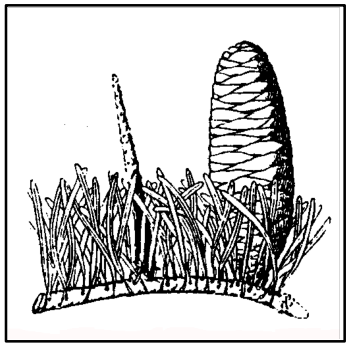


Marker B: Sugar pine (Central Miwok - hi´ñatcī), which is identified by its long cones and needles in bunches of five, provided the best pine nuts at this elevation. A Miwok would climb a tree and remove cones by using his hands or feet to cause a branch to make a swaying or rotating motion, which caused the cones to fall. This was done after the cones had turned brown, but before they had opened up enough for the seeds to fall out on their own. Cones were then ignited to burn off the pitch, then hammered on a rock to split them in two. The nuts could then be removed, shelled and eaten, or pulverized in a mortar until they had the consistency of peanut butter. This was especially prepared for feasts. Dried sugar pine sap was used as a glue, chewed as a gum, and used for medicinal purposes. Sugar

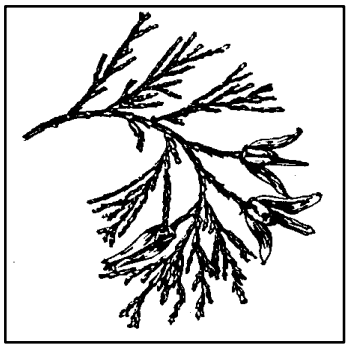


pine “sugar” is only found in the heartwood of sugar pines. It is not sap or pitch, but is probably a by-product of the ray cells. The substance in it is called pinetol. It is a milky-white water soluble substance that disappears when rained on. It is crystalline, sweet and melts in the mouth. However, it is indigestible. It was used for a laxative and a wash for sore or blind eyes.

Marker C: White fir (Central Miwok - tuttukine) is characterized by single 1"-2" needles, not in bunches. Cones are upright on uppermost branches. Boughs were sometimes used in the construction of the acorn granaries. They were hung in overlapping rows, much like shingles on a roof, around the outer perimeter of the granary with the needles pointing downward. By thatching the outside of the granary with the fir branches, the Miwok were able to waterproof the structure. White fir boughs were also used, as were incense cedar boughs, as a type of waterbreak in the process of leaching acorn meal. Water was poured over the boughs held closely above the meal. This spread the water out more evenly over the meal, ensuring even leaching and absorbing the force of the poured water.



Marker D: Incense cedar (mō´nōku) has scale-like, segmented leaves, very small cones that are 1"-1 ½” in length and look like tiny ducks’ bills. Cedar was an extremely important tree for the Miwok. One way cedars were used was for bow making. Although the best bows were made from Pacific yew, the tree is not common in the area, so the most commonly used wood for bow making was incense cedar. The bow maker looked for limbs that had a natural bow shape to them and were about 3"-4" in diameter. He would also look for a limb with few side branches. He would let the limb die on the tree, or take off all of the end branches and greenery so that the limb would die. After it had died he would leave it on the tree for another year. After removing the limb from the tree he would begin the process of making the bow. First, he would split the limb lengthwise along a line formed by the pith between the top of the branch and the bottom. The bottom wood was stronger than the top, so this section was used. After working the bow into the shape he wanted, he would reinforce it with strips of deer sinew which were glued on using soaproot glue. Sinew was also used for the bowstring. The incense cedar was also used in the same way as white fir for covering the acorn granary and for protecting the acorn meal being leached as water was poured over it. The incense cedar was the most important tree used for construction as well. This will be discussed at the next stop along the trail.



Marker 7: Incense Cedar - Construction (Located about 100 feet beyond Marker 6.)

On the right-hand side of the trail is a large incense cedar. The bark of large cedars such as this one was used in the construction of many of the structures found in a Miwok village. You will see this when you visit the replicas further on in the hike. The bark was obtained from trees that had died, and usually had been dead for several years. A standing dead tree such as this cedar is called a snag. As the dead tree dried out, the bark separated from the wood. This allowed the bark to be removed much more easily. The fibrous nature of cedar bark allowed it to be removed from a tree in long slabs. These slabs were then placed on the structures in such a way as to shed rain and snow. Not only did the slabs prevent moisture from easily entering the structures, they also protected the structures from wind. Sometimes the slabs were thick enough that they were able to support the structure alone, without the use of a pole framework. The thickness also made the incense cedar bark an excellent insulator. The cedar bark was also pounded and shredded to make tinder for starting fires. A piece of cedar could serve as the fireboard (base) when making fire by friction.

Marker 8: "Deer Smacking" Game

(Across the trail from the cedar snag - use the platform in the middle of the clearing for the "deer" to sit on.)

Although the Miwok may or may not have participated in such an activity, some Indigenous groups learned valuable hunting skills by "Deer Smacking." The goal of a stalker was to be able to move so stealthily that he would be able to approach an unsuspecting deer close enough to reach out and "smack" it before it knew he was there. The startled deer would flee, and the stalker would have improved his skills.

Choose one person in your group to be the blindfolded "deer." The rest of the group will be Miwok hunters/stalkers. The "deer" sits blindfolded on the stump listening carefully for sounds of an approaching hunter/stalker. The stalkers form a ring around the deer about 15-20 paces away. Tell the deer that you are going to send in a stalker, then silently point to one student in the outer ring. That student must try to move as quietly as possible to attempt to "smack" the deer (in this activity - a light touch on the shoulder). Everyone else must remain stationary and completely silent. If the "deer" hears an approaching stalker, (s)he points in that direction. If his/her finger points in the correct direction (or very nearly so), say "Freeze!" and the stalker must freeze. There may be some debate as to the accuracy of the pointing, so you must act as the judge to determine whether or not the stalker was heard by the deer. When a stalker is frozen (staying at that spot), point to another stalker who will then make an attempt to smack the deer. If a stalker is successful, (s)he becomes

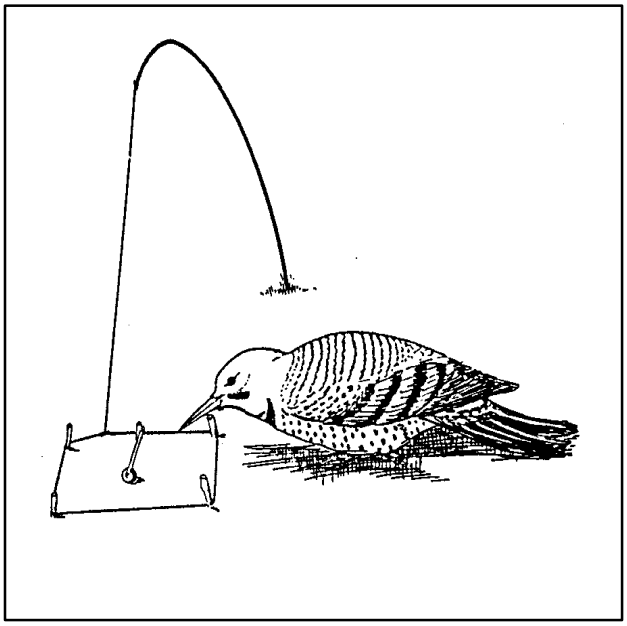
the new "deer." Try to allow everyone to be a stalker, but only once, as you'll use up too much time if you continue the activity for very long.

*****When you leave this site DO NOT continue on the same level trail. You will head uphill from the deer smacking site following the trail markers that lead up towards the Sugar Pine Road and the Miwok village.*****

Marker 9: Setting a Spring Snare Trap

(150 feet further along the trail on the left near the huge uprooted oak stump .)

Beside the trail are 9 "modern day replicas" of a spring snare (noose trap) similar to one that might have been used by the Miwok to trap small birds such as pigeons, jays and red-shafted flickers. The Miwok would have made such a snare from natural materials, using a young sapling for the spring pole, small sticks for the vertical perimeter of the trap, cordage made from milkweed or dogbane for the main line, and deer sinew (tendon) for the noose. The sinew was smooth and would slide easily and quickly over itself, which was essential for a good noose.



Get one of the fiberglass rods out of the cabinet on the cedar. Demonstrate for the students how to set the snare. (See description that follows of how to do so.) When the snare is set, have a student attempt to remove the bait without getting caught. You might explain to the students that the replicas we have set up are simply made to be durable and last for many such experiments by students. Natural objects would tend to wear out and need to be replaced more often.

How to set a snare: Put the fiberglass pole in the PVC pipe in the ground, bend it down, and slip the attached snare (with a slip knot) around the metal rods. The rod farthest from, and directly opposite the pole has a small notch in it. Put a short, slender twig (trigger) in the notch and above the nylon line so that it prevents the line from slipping over the tops of the rods. Be sure no one stands near the pole - or behind it, to avoid being struck by it as it "springs."

After you've demonstrated how to set the spring snare, split students into groups of 2-3 and have each group use one of the other replicas located nearby to practice setting the spring snare traps themselves. When students have completed setting and tripping the snares, ask questions such as the following:

A. Do you think that this would have been an effective way to capture small animals? Why, or why not?
B. What kind of bait might have been useful for the Miwok? How do you think they determined which bait might work for which animals?
C. Why would it be important, as a Miwok, to be a careful observer of plants and animals?

Leave the Spring Snare site by continuing up the trail which will shortly make a 90˚ right-hand turn onto an old logging skid road. Continue following the markers up to Sugar Pine Road. This road was originally a railroad built for logging the area in the early 1900's.

Note the water jug and cups for drinking to your right and behind the pine tree adjacent to the road. Allow students to get drinks of water from the water jug. Please be sure all empty cups are put in the trash. Cross Sugar Pine Road towards the meadow above and follow trail markers leading uphill. You will continue up this dirt road to the Miwok village.

Marker 10: Meadow Plants

(Immediately above Sugar Pine Road as you pass the meadow area to your right.)

One of the sure signs of summer is the blossoming of the wildflower aptly named **farewell-to-spring** (Central Miwok - witala). When most of the other annual plants have died and turned yellow or brown, the purple farewell-to-spring makes its colorful announcement that spring has indeed passed, and summer is beginning in earnest. The Miwok harvested farewell-to spring by breaking off the tops of the plants and tying them in large bundles, using the stem of one for binding. The bundles were laid on a granite outcrop to dry in the sun. Treading and beating with sticks loosened the seeds. These were parched and pulverized before eating.

The meadow contains a wide variety of other spring/summer flowering plants and grasses that would have been used by the Miwok, including ripgut grass, tarweed, harvest brodiaea, golden brodiaea, and yarrow.

Replica Miwok Village (Follow the dirt road from the meadow area up through the small group of trees; turn to the right along the level skid road to reach the village.)

As you approach the village area, have the students be observant of their surroundings. Give students a few minutes to discover the structures themselves. **(Do not allow girls in the sweat house!)** After they have had a chance to look at them on their own, gather them together and tell them that each structure serves a specific function. As a whole group now go to each structure and give the students an opportunity to try to determine what each structure is, and what was its function. Have them note the size, and any distinguishing characteristics of each structure.

Marker 11: Sweathouse (The structure farthest to the right as you enter the village.)

The sweathouse (tcapu´ya) was a semi-subterranean, conical, earth-covered structure, six to fifteen feet in diameter and of a height permitting only a half-erect posture (our replica is a bit too tall). The largest would accommodate ten men. It was heated by fire, not steam, and used for cleanliness and curative purposes. It was regularly used for deer-hunting preparations, because sweating, followed by a dip in the cold creek would, hopefully, purify the hunter and rid him of his human odor. He might repeat the procedure once or twice to further purify himself. It was also supposed to make the hunter's legs strong so that he could walk far distances without aching.

Each man who sweated had a little pile of wood to feed the fire. Whoever added the most fuel, thus creating the most heat, was considered to be the strongest. Each man knelt and put his face on the ground so as not to be smothered by the smoke.

Although the most common use of the tcapu´ya was for preparation before deer hunting, it was also used by men with rheumatism and headaches. It was not slept in, nor was it used as a lounging place for men and boys.

Activity in Tcapu´ya

All the **boys** in your class can fit in the tcapu´ya. Have them gather inside, and have some of the boys kneel around the fire pit in the fashion mentioned. This will help the students better visualize how the tcapu´ya was used. Should some of the girls want to enter, **do not** allow them to do so. As the Miwok did not allow the women to use the tcapu´ya, we want the students to gain an understanding of that culture by following the same practices. This may generate some discussion (usually of the "That's not fair!" type), which is fine. Again, the goal here is to try to understand a different culture. In Miwok culture, each gender had

its specific roles to play, and the customs were carefully observed. (Don't worry, the boys' time to be the ones who are excluded will come.)

Marker 12: **Dwelling** (The conical structure to the left of the sweat house.)

The main dwelling (u´macha) of the Southern Miwok was a conical cedar bark, tepee-like structure. A family of six or more could comfortably fit into this home along with all their possessions. It was extremely practical in that it was easily built, retained heat from a centrally located fire and was relatively rain and snow tight. Poles 10-12 feet long were set in the ground around an area about 12 feet in diameter, with the tops of the poles inclined towards one another. Several layers of incense cedar bark from dead cedar trees were laid over this framework. A portable door could be used to close the entrance. Sometimes the earthen floor, except near the fire pit, was covered with pine needles. A layer of earth was heaped against the outer perimeter of the structure.

Activity in U´macha

Have two volunteer students lie down inside the u´macha with their heads towards the center and their feet pointing in opposite directions, so that each student forms a radius to the circular structure. Explain that this was how the diameter of the u´macha was determined. Two men would lay down to determine the basic size of the dwelling to be built and the logs forming the beginning of the support structure were placed slightly beyond where their feet reached.

This is also a good location to discuss with the students how much of their own household belongings would fit in a dwelling of this size. You may even want to pose this question: If you had to live with your family in a home of this size, what possessions would you bring with you, and which ones would you leave behind?

Marker 13: Acorn Preparation Area (To the left of the entrance to the roundhouse.)

Acorn Granary (To the far left beyond the mortar holes on left side of entrance to the round house.)
The acorn granary (chuckah) was a structure built to store acorns. Nearly every family had at least one of these caches which could hold almost a whole winter's supply of acorns. Estimates are that a chuckah could hold 500 pounds or more of acorns (stored without the caps). It was built in such a manner as to be weather-proof and to discourage the invasion of insects and rodents. It consisted of a frame support of slender poles from eight-twelve feet high around a center log or rock two feet high which served as the bottom of the chuckah. The poles were wrapped with rings of grapevine or willow branches to form a

roughly twined, open container. The basket-like interior was made from interwoven branches of deer brush, willow, or white fir, and lined with dry pine needles and wormwood, the latter to discourage insects and rodents. After it had been filled with acorns in the fall, it was topped with pine needles, wormwood, and incense cedar bark bound down firmly to withstand storms. The exterior was thatched with short boughs of white fir or incense cedar, with needles pointing downward to shed rain and snow. Acorns were removed as needed by carefully pulling aside some of the exterior thatching, removing the desired quantity, and then carefully closing the opening.

Activity at Chuckah

***Fall Schools:** If students have gathered acorns along the trail, have them check each one for insect holes or bumps, or other damage. If the acorns are not of good quality, please discard them away from the chuckah. Like the Miwok, they are returning the acorns to the earth. If they are of good quality, (no insect holes or bumps), remind students that you will give 1 chance ticket/ 3 good acorns that students bring back to the Dining Hall. (Collect these in a large baggie and give them to one of the Calvin Crest staff.) *Please remember that just as one bad apple spoils the whole barrel, the same problems can arise with acorns if poor quality ones are mixed in with the good ones.* Keep enough acorns to allow the girls in your group to each process an acorn. Although still "green," these acorns will be taken over to the mortar holes between the u´macha and the tcapu´ya for pounding later.

***Spring Schools:** Students will not have been able to gather any good quality acorns as the winter weather will have rendered them useless. Remove acorns from the baggie in your backpack, and give one acorn/girl to process at the mortar holes later.

Once again, the cry will be heard (this time from one or more of the boys), "That's not fair." While this may be true, in the Miwok culture, it was the women only who processed the acorns, and we would like you to respect their cultural practices. Remind them of the discussion you had in the tcapu´ya about culture. Have your boys changed their minds about the Miwok cultural practices? How about the girls?

Mortar Holes (Located between the u´macha and the tcapu´ya, near roundhouse entrance.)

Use the replicas of the mortar holes (tco´se) to give students some insight into how acorns were processed. Following is a general description of the steps involved in acorn preparation.

The acorns were gathered in fall and then stored in chuckahs until used. Ideally, acorns were not used until at least the year following their gathering. This allowed them to dry out.

When first gathered, the fresh acorns were too soft to shell and pound properly. The acorns were laid out in the sun, weather permitting, and dried before storing them, without their caps, in the chuckah. Acorns could be successfully stored for up to 10-12 years and still then pounded into a very fine flour in the following manner:

1. The acorn was shelled by standing it on its pointed end on a stone and striking the flat end with a small hammerstone (pasa´kkila). The acorn was tapped several times until a crack was heard. Once the shell was removed the acorn was set out to dry so that the reddish skin could be removed.
2. Next it was skinned. If the skin was not completely removed the resulting acorn meal would be much more bitter as the skin contains a high concentration of tannic acid. It is necessary to split the acorn along its natural grooves to completely remove the skin.
3. The acorns were winnowed by tossing them up in the air with a winnowing basket, so that the light skins could be blown away by the wind, or the winnower's blowing.
4. The acorn was pounded in a bedrock mortar hole using a pestle (kawa´tcī) which gradually reduced the acorns to a fine flour. The person pounding the acorns would usually sit with the mortar hole between her outspread legs. The pestle was held in both hands and lifted above the acorns. Ideally the pile of acorns should be at least 1 ½ inches deep to start. This prevents the pestle from coming into contact with the mortar. The pestle was pounded, lightly at first, and then with heavier blows on the acorns. It was extremely important to avoid having the pestle come into contact with the mortar which would get rock grit into the acorn meal. As the acorn was being pounded, the meal that scattered outside of the mortar hole was swept back into the hole using a soaproot brush (caka´nī).
5. The flour was then sifted in a sifting basket and any course meal was returned to the mortar hole for further pounding. The very fine flour which clung to the sifting basket was shaken out into another basket to prepare for the next step.
6. The acorn meal then had to be leached to remove the naturally occurring tannic acid. This was done by scooping out a shallow, level basin in a mound of sandy soil (note our replica near the chuckah), which was covered with leafy plants or pine needles. When the leaching basin (mo´lappa) was ready, the ground meal would be mixed with cold water and then poured into

it. As the water soaked into the sand below, the tannic acid began to be leached away. A second basket of water was then poured over the meal. At this point, the water was poured over white fir or incense cedar boughs held just above the meal to evenly distribute the water, and to prevent splashing the meal. It was necessary to leach the meal about ten times. The water was allowed to soak into the sand each time before more water was added. Cold, damp weather, or soil that was not sandy enough slowed the process down considerably. The meal was then tested - when the bitter taste was gone and the flour very white, the leached meal was scooped out.

7. The acorn meal was now ready to be cooked. This was done by heating rocks, (usually steatite [soapstone], or pumice, if available) in a fire. When they were hot enough, they were removed from the fire with cooking poles, one at a time, rinsed in waterproofed baskets to wash off the soot or ashes from the fire, and added to the acorn meal in a cooking basket. The rocks were continually stirred in the basket to avoid scorching or burning the basket. As a rock cooled, it was removed from the meal and put in another basket of clean, cold water so any adhering acorn meal could be saved. Each time a rock cooled, it was replaced by another stone to keep the cooking process going.
8. The resulting acorn mush was cooked into a soup (akiva), the consistency of tomato soup, a mush (nuppa), or a water biscuit (uhlley).

Activity at the Tco´se

It was customary for women to bury their pestles near the bedrock mortars so they didn't have to transport them every time they were used. Have the **girls** (remember that boys cannot be allowed to pound acorns), retrieve pestles and hammerstones from the roundhouse cabinet. (*Please be sure to return these items to their storage containers when you are finished.) Allow each girl to shell her acorn (careful of fingers getting mashed). Once the acorn is shelled, have her try to remove the skin. Add all of the acorns to one of the mortar holes and allow each girl to sit on the granite and take turns pounding the acorns to make some acorn meal. Unfortunately, time will not allow students to leach the acorn meal here. If you would like, you can put the meal in a plastic baggie and finish processing it back at school. Please return the pestles and hammerstones to the roundhouse.

From your position by the mortar holes you might want to talk about the hierarchy of Miwok life. Because the Miwok believed that "life is dangerous," the men might sit and fashion arrowheads from obsidian, or work on other projects in an area uphill above a bedrock mortar site. From their vantage point, the men could keep an eye on the women as they worked at the bedrock site. Near the mortar site might be a location where the children could play while being watched by the women. This arrangement would bring about a certain level of protection.

A nearby source of water was useful as the acorn meal had to be leached before it could be used, and leaching was a process that required large amounts of water. The leaching rid the acorn meal of bitter tannic acid.

At an actual bedrock mortar site you would be able to observe mortar holes of varying depths, from ½" in depth to over 9" deep. Many would be at an intermediate depth.

Ask students the following questions:

1. What might be the reason that the mortar holes are different depths?
2. Which holes might have been used for pounding acorns? Why?
3. Which holes would have been best for pounding small seeds? Why?

Answers:

1. The holes are different depths for pounding/processing different types of food materials.
2. The shallowest holes were used for pounding acorns, but as they were used over the years they became deeper. The medium depth ones were the result of long term use for pounding acorns. Actually, the pounding was not the cause for the increase in depth, as the women were careful to avoid hitting the bottom of the holes with their pestles (kawa´tcī), because they did not want to get grit in their acorn meal. Each winter, as the mortar holes filled with rain water or snow, and then froze, the ice that formed caused flaking and cracking of the granite. When the holes were used the following year, the rough spots caused by freezing were smoothed out with another stone. This caused the holes to get deeper over time. Eventually, a hole became so deep that the acorn meal being pounded would get trapped down low in the hole and become sticky and greasy. When this began to happen the hole was no longer used for acorns.
3. Once the holes became too deep for pounding acorns, they would be used for other seeds. Small seeds were pounded in the deepest holes. The deep holes were beneficial for small seeds because the depth of the holes prevented the tiny seeds from flying out easily. The deep holes were also used for pounding manzanita berries and oats. When holes got too deep, they were abandoned.

Activity at the Fire Circle (Downhill from the acorn granary)

Males were allowed to assist the women in the cooking process by removing the stones from the fire, rinsing them, and adding them to the cooking basket. In the roundhouse cabinet are several pumice heating stones. Put these in the fire circle. Also get two fire hardened (on one end) cooking poles hanging on the upper right pole of the shade

structure over the mortar holes, and four plastic buckets from the cabinet in the roundhouse. Place the first bucket about 5 feet from the fire. Arrange the next three in line, also about five feet apart. Have the students take turns attempting to move a stone from the fire circle (using the poles like giant chopsticks), dipping the stone in the first two buckets without letting the stone drop, and dropping it in the third bucket. You might offer a reward of 5 chance tickets to anyone who can do so successfully on his or her first try. The third bucket represents the cooking basket; the fourth - a basket for rinsing acorn meal from the stones. The rock would be stirred in bucket #3 with a looped stirrer (get from the roundhouse cabinet), which was also used to remove the stone and drop it into the final rinse bucket (basket). Please return everything to the roundhouse cabinet.

Marker 14: Roundhouse (The largest structure in the village.)

The roundhouse (ha´ñī) was never used as a dwelling or even as sleeping quarters, except when a ceremony was being held in the village. The ha´ñī was under the care of an official fire tender. It was the place where social and ceremonial gatherings were held. It was also the place where gambling and dancing were conducted. (See “Miwok Beliefs and Customs” below.) Frequently, when people cooked meat or acorns they took some to this house to distribute to other people.

One of the distinctive features of the ha´ñī was the large foot drum (tū´mma), made from a 5-10 foot long section of a log. The Miwok looked for a log that had been hollowed by fire, insects, or rot. This they split in half lengthwise, and after further hollowing by fire, placed it over a pit 2-3 feet deep. The pit served as a resonance chamber. The drum was stamped upon, or pounded with a pole. The space around the drum was occupied by singers during ceremonies. The floor where spectators sat was often covered with sedge or pine needles. A fire pit was dug in the center of the new ha´ñī during a celebration following its completion. The fire pit was dug with a digging stick to a depth of about 1 foot, with a diameter of 2-3 feet.

When a ha´ñī became old and rotten, it was torn down, and a merry occasion. The death of a chief would also be an occasion for tearing down a ha´ñī as a mourning observance. Following the construction of a new ha´ñī, Miwok from various villages would come to the opening ceremonies.

Activities in the Ha´ñī

Using the Foot Drum and Elderberry Clapper

Have several student volunteers take turns using the foot drum. Only allow one student on the drum at a time. Remind them that it is very important that they carefully maintain their balance while on the drum, and only use one foot at a time to make a beat - no jumping. There is a short pole at the back of the ha´ñī, near the foot drum, which can be used to thump out a rhythm. Urge students to be careful and take turns.

You can get the elderberry clapper out of the cabinet to use as an instrument for keeping time with the foot drum. Take the binding off the split end of the clapper. This allows the split sections to "clap" as the clapper is shaken, or hit against the hand. Please be sure to bind the ends when you are done, or the clapper will warp.

Display Artifacts From the Cupboard

Show the looped stirrer. The looped stirring stick was used in the acorn cooking process. The stirrer could hold a heating stone and control its location as it was stirred through the acorn mush. The loop in the end made it easier to remove a stone from the mush. The stirrer was often made from a young black oak branch.

Digging sticks were made from deer brush or mountain mahogany. The digging end was sharpened and hardened by fire. It was used for digging bulbs for food, roots and rhizomes for basket materials, and for excavating sites for sweathouses and roundhouses.

Cordage (string) was made from dogbane (a plant that is relatively common in Yosemite Valley, but not near Calvin Crest), or milkweed. It was used for bow strings, snares, nets, baskets, and tying many other objects together.

Show the bull roarer. These were noise makers - toys that Miwok children used. The bull roarer looks like a small paddle suspended on two long strings. In a manner similar to the acorn buzzer, spin the string until it is tight. Hang the bull roarer from your hand so that the wooden section is hanging down. Next, start to spin the bull roarer like an airplane propeller blade (vertically). The twisted string will cause the wooden paddle to roar (well, it'll at least make a noise). Have students be sure that they can not hit any person or object as they attempt to make it roar. Miwok children also used acorn buzzers.

Stick Gambling Games

1. Six sticks and fifteen markers are needed for the first game. The sticks are flat on one side and rounded on the other side with designs on the rounded sides. One person

throws, or drops, the sticks on the ground. If the sticks land with all six sides the same way (up or down) the person throwing gets two markers and two more turns. If the sticks land three rounded sides up and three flat sides up the person throwing gets one marker and one more turn. If the sticks do not land in either of these positions, the turn is passed to the next person. The object of the game is to earn the most markers. The one who can win all fifteen markers or the one with the most markers at the end of the time permitted to play the game is the winner. The Miwok gambled on this game and others like it. You, the teacher, are the pit boss. You are to judge whether or not the sticks land face up or face down. You also hand out the markers as they are won by students. Eventually you will have no more markers to hand out. From that point on the thrower who wins a marker(s) takes the marker from the first person on his/her left who has a marker(s).

2. Start with forty-four small sticks and ten markers. One person holds the 44 in his left hand and suddenly grabs a bunch with his right hand. These he places behind his back. Another person guesses how many the grabber will have left over in his right hand after separating the sticks in groups of four. If the guesser is correct, he receives a marker, and the sticks. If the guesser is wrong, the person holding the sticks earns a marker and another turn. The markers are handled by the teacher the same as in the previous game. The children can take turns doing the grabbing and guessing. This game helps illustrate the importance of the number four (4) in the Miwok culture. This game can be played in teams, with a representative from each team holding the sticks while the whole other team tries to determine how many sticks will be left over. They must reach a consensus on what number to pick between 1-4.

Miwok Beliefs and Customs

The Miwok view of life consisted of four basic ideas, all of which are similar to the views held by many Indigenous people. They are:

1. Life is dangerous. (White men know this, too, but are not concerned with this fact.)
2. Nature is more powerful than man. Any attempt to master nature is futile. One must act properly and perform the correct rituals in order to get along with nature.
3. Human nature is neither good nor evil and both qualities are blended in a whole person. Also, a person's mind cannot be separated from his body.
4. This life is all that counts. (It is not a preparation for another life, although the possibility of an after-life is not dismissed by the Miwok.)

Four is the Miwok sacred number. Rituals were usually performed four times; the dance stage contained four parts; the dance itself was performed in four stages; the ceremonies lasted four days, etc.

The Miwok depended totally on the environment to supply all their needs for food, shelter, and clothing. Because of this they had a deep spiritual relationship with nature which created many of the traditions by which they lived. For example, before every hunt the hunter prayed to the spirits for success, because without food his family could go hungry. After a successful hunt the hunter not only said a prayer of thanksgiving, but also offered up an apology to the spirits for having killed the animal. This is because the Miwok believed that they did not own the land or its animals; they were simply a part of the environment. For both spiritual and practical reasons, nothing was wasted. If a deer was killed, not only was the meat eaten, but the hide was used for clothing, the tendons for string, the hooves for dance rattles, the bones for needles or game pieces, and the antlers for chipping tools to make arrowheads. In this way the individual Miwok kept alive his appreciation for the environment by disturbing it as little as possible.

The village roundhouse was the center of Miwok religious activities. Only one roundhouse was built per village and the men prepared their dance costumes and stored them there safely away from the women and children. Each village chief was responsible for building the roundhouse with the help of all the rest of the villagers. It was believed that the spirit of this chief was incorporated into the building and upon his death the roundhouse was torn down to release his spirit.

Dancing was the means through which the Miwok expressed themselves. There were dances of celebration, mourning, and thanksgiving. Dancing was for them the visual expression of prayer to the spirits. Through dance the spirits were thanked for what had been received and asked for things still needed.

The acorn ceremony provides an example of Miwok ceremonial dancing. It was an annual event occurring in the fall after the acorn harvest. For three days and nights the participants fasted and danced. Many dressed in costumes which represented the animals and spirits which had helped them during the past year. The culmination of the festival was on the fourth day when a few of the women prepared acorn mush and other food for a great feast. When the food was ready everyone who was to participate in the feast began to dance, moving slowing around the fire in a large circle. One of the women ended this dance just before the feast by spreading acorn gruel four times around the edge of the fire so that it might burn and be carried into the air to be eaten by the spirits. No one was allowed to eat of the new acorn crop until the spirits had satisfied themselves. After the feast the dancing continued far into the night. There was a fire dance as a tribute to the fire that heated the cooking stones, a stone dance to thank the hot stones which cooked the acorn mush and a basket dance to the basket which held the mush.

The Miwok way of life was very different from ours. They didn't have the modern conveniences we do such as large houses, ready-made clothes, and supermarkets. Almost all of their time had to be spent gathering and preparing food, building shelters, and making clothes. However, there was usually some time left over for playing games or for celebrations like the acorn ceremony. They worked hard and were very aware of their dependence on the environment.

Because of their different lifestyle many people today think that Indigenous ways of living were not as good as ours. Other people think it was better. Although it is obvious how much the Miwok depended on the environment for their livelihood, it is equally true today that we are dependent on the earth and its resources. We are just insulated from this dependence by our "modern conveniences." What do you think about this difference in lifestyle?

Miwok Legends

If time permits, and you want to do so, you could tell students one of the Miwok legends while you are in the ha´ñī. (Legends can be found starting on page 34.) This would be an appropriate way to end your time at the village. Emphasize the importance of story-telling to the Miwok as a way to teach and pass along cultural traditions and beliefs.

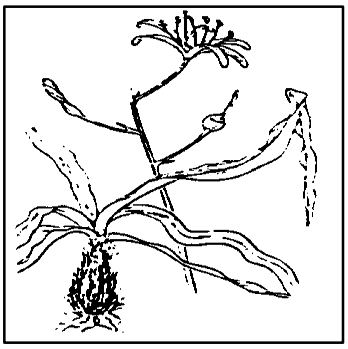
Conclusion

Is our appreciation of the Miwok culture a little late? Not if we can learn from our mistakes. We can learn to be tolerant and understanding of people different from ourselves. All people are equal; we are no better than someone who dresses, speaks, acts, or believes differently than we do. The Miwok have much to teach us about living in harmony with our environment. Their environment was well cared for; ours is largely ignored. We have fouled the land, the air, and the water and are rapidly depleting our natural resources. Every plant and creature has a place, but many are being thoughtlessly wiped out by man today.
The sky overhead and the pine-scented breeze coming down from the high Sierra have changed very little, but the hidden workings of these mountains are being overlooked by a race of people who have the energy of an ant, the appetite of a bear, and the sensitivity of a locust plague. Let us learn from the Miwok.

Travel Back to the Dining Hall

When you have completed all the activities at the village, please put all of the items you have used back in their proper storage locations. Follow the markers from the village back to the Sugar Pine Road. Turn right and travel along the road to the west until you reach the trail that goes downhill through the Eastview cabin area and back to the Dining Hall. As you go by the Eastview cabins, note the soaproot plants out in the open meadow area to your right.

Marker 15: Soaproot (Located beside the meadow above the Eastview cabins.)



Visible uphill to the right in the open meadow are a number of soaproot plants - plants that have a tall single stalk with long, wavy basal leaves. Remember, this is one of the most versatile plants used by the Miwok. Its small white flowers blossom on the top of the single tall stalk in midsummer. Its blossoms only open up in late afternoon or early evening, so few people see the flowers. The underground bulbs, which were harvested with digging sticks, are covered with coarse brown fibers. The fibers were made into a stiff brush that could be used to sweep acorn meal back into a mortar cup during the pounding process.

YOSEMITE LEGENDS

The stories about "Ahwahnee" told by the Yosemites were their means of explaining and ordering their world. Stories were told for enjoyment during the cold winter months, but they also embodied the history of the band and lent a continuity to its past as they passed from generation to generation by word of mouth. Value systems, behavioral guides, explanations of creation and customs, life philosophies -- all of these were elements of legends which not only outlined a view of the universe but defined the relationship of the band and its members to that universe. The three legends which follow tell of the origin of several of the most prominent features of Yosemite -- El Capitan, the massive cliff toward the lower end of the valley; the Lost Arrow Spire, a spectacular shaft of rock jutting out from the cliff just east of Yosemite Falls; and Half Dome, Royal Arches, Washington Column, and Basket Dome at the upper end of the valley.

Legend of El Capitan (To-tokan-oo-lah)

Long, long ago there lived in the valley of Ahwahnee two cub bears. One hot day they slipped away from their mother and went down to the river for a swim. When they came out of the water, they were so tired that they lay down to rest on an immense, flat boulder and fell fast asleep. While they slumbered, the huge rock began to rise slowly until, at length, it towered into the blue sky far above the tree tops, and woolly, white clouds fell over the sleeping cubs like fleecy coverlets.

The distracted mother bear searched in vain for her two cubs and, although she questioned every animal in the valley, not one could give her a clue about what had happened to them. At last To-tah-kan, the sharp-eyed crane, discovered them still asleep on top of the great

rock. Then the mother bear became more anxious than ever, lest her cubs should awaken and feel so frightened upon finding themselves up near the blue sky that they would jump off and be killed!

All the other animals in the valley felt very sorry for the mother bear and promised to help rescue the cubs. Gathering together, each attempted to climb the great rock, but it was as slippery as obsidian, and their feet would not hold. The little field mouse climbed two feet and became frightened; the rat fell backward and lost hold after three feet; the fox went a bit higher, but it was no use. The larger animals could not do much better, although they tried so hard that to this day one can see the dark scratches of their feet at the base of the rock.

When all had given up, along came the tiny measuring worm. "I believe I can climb up to the top and bring the cubs down," it courageously announced.

The other animals all sneered and made sport of this boast from one of the most insignificant of their number, but the measuring worm paid no attention to their insults and immediately began the perilous ascent. "Too-tack, too-tack, To-tokan-oo-lah," it chanted, and its feet clung even to that polished surface. Higher and higher it went until the animals below began to realize that the measuring worm was not so stupid after all. Midway, the great rock flared, and the measuring worm clung at a dizzy height only by its front feet.

Continuing to chant its song, the frightened measuring worm managed to twist its body and to take a zig-zag course, which made the climb a great deal longer but much safer. Weak and exhausted, it reached the top of the great rock at last, awakened the cubs, and miraculously guided them safely down to their anxious mother. All the animals were overjoyed with the return of the cubs and loudly sang the praises of the measuring worm. As a token of honor the animals decided to name the great rock "To-to-kan-oo-lah" for the measuring worm.

Legend of the Lost Arrow (Hum-mo)

Tee-hee-neh, a beautiful maiden, was betrothed to Kos-soo-kah, who was fearless and bold with his spear and bow. At dawn on the day before their marriage, Kos-soo-kah made ready with other men to go into the mountains to hunt deer, bear, rabbit, and grouse for the wedding feast. Before leaving, he slipped away from the other hunters to meet Tee-hee-neh, his bride, who was waiting nearby.

As they parted, Kos-soo-kah said, "We go to hunt now, but at the end of the day, I will shoot

an arrow from the cliff between Cho-look, the high fall, and Le-hamite, the canyon of the arrow-wood, and by the number of feathers you will know what kill has been made." Tee-hee-neh happily assisted the women preparing acorn bread and other food for the marriage celebration until the appointed time when she was to wait at the foot of the high fall for the arrow message from Kos-soo-kah. Hour after hour she waited until gradually the joy she had known was replaced with fear and concern for her lover's safety. At last, unable to bear her anguish any longer, she decided to climb the rugged and difficult trail that led to the top of the cliff.

"Kos-soo-kah," she called again and again, but the only answer was the faint echoing of her own voice. Breathless, frightened, and her heart heavy with dreaded fear that Kos-soo-kah had met with harm, she reached the summit. Seeing footprints in the direction of the cliff, she moved toward the edge, alarmed not for her own safety but for what she might behold. As she leaned over and looked down, she gave a piercing cry of despair, for in the starlight she beheld the still form of her loved one lying on a ledge below with the spent bow in his hand. She remembered that at the hour of sunset, while she had stood waiting for Kos-soo-kah's arrow to fall, she had heard the distant, thunder-like rumble of a rockslide. Her despair was almost overwhelming as she realized that, while her faithful Kos-soo-kah had stood on the edge of the cliff to draw his bow, he had been caught in the unexpected slide of earth that had hurled him to his doom.

A faint hope stirred in Tee-hee-neh's heart. Perhaps Kos-soo-kah was still alive. To summon assistance as quickly as possible, she frantically collected cones and dead limbs to light a signal fire for urgent help. Although numbed with grief, she kept the fire bright and high for several hours before men from the valley and others returning from the hunt in the high country were able to reach her. Quickly, they made a pole from lengths of tamarack fastened securely with thongs of hide from the deer that had been killed for the marriage feast. Although exhausted, Tee-hee-neh was the first to descend to the ledge where Kos-soo-kah lay. As she knelt beside him and listened for breath, her own heartbeat almost stopped, for the brave Kos-soo-kah was cold and still. Without a murmur, she motioned for the men above to lift her.

Tee-hee-neh's wedding day had dawned by the time the men had raised the body of Kos-soo-kah to the top of the cliff where the others waited. As his lifeless form was placed gently on the ground, Tee-hee-nah knelt beside him, and, with tears streaming down her cheeks, she repeated his name over and over, as though by doing so she could call him back to her. Suddenly, she fell forward on Kos-soo-kah's breast as her spirit, too, departed to join his. With great wailing and mourning, the two lovers and all their belongings were placed for

cremation on the funeral pyre in accordance with the burial custom. In Kos-soo-kah's hand was the fatal bow, but the arrow had been lost forever. In its stead the spirits lodged a pointed column of rock in the cliff between Cho-look, the high fall, and Le-hamite, the canyon of arrow-wood, in memory of the faithful Kos-soo-kah, who met his death in keeping a promise to Tee-hee-neh. Ever since, this rock has been known as Hum-mo, the Lost Arrow.

Legend of Half Dome (Tis-sa-ack)

Many, many generations ago, long before the gods had completed the fashioning of the magnificent cliffs of the valley of Ahwahnee, there dwelt far off in the arid plains a woman named Tis-sa-ack and her husband Nangas. Learning from other Natives of the beautiful and fertile valley of Ahwahnee, they decided to get there and make it their dwelling place. Their journey led them over rugged terrain, steep canyons, and through dense forests. Tis-sa-ack carried on her back a heavy burden basket filled with acorns and other articles, as well as a baby carrier. Nangas followed at a short distance carrying his bow, arrows, and a rude staff.

After days and days of weary travelling, they entered the valley of Ahwahnee. Nangas, being tired, hungry, and very thirsty, lost his temper and struck Tis-sa-ack a sharp blow across her shoulders with his staff. Such mistreatment was contrary to custom, and Tis-as-ack became terrified and ran eastward from her husband.

As she went, the gods caused the path she took to become the course of a stream, and the acorns that dropped from her burden basket sprang up into stalwart oaks. When Tis-sa-ack reached Mirror Lake, her thirst was so great that she drank every drop of the cool, quiet water. Nangas caught up with Tis-sa-ack and saw that there was no water left to quench his thirst. His anger then knew no bounds, and again he struck her with his staff. Tis-sa-ack ran from him, but he pursued her and continued to beat her.

Looking down on them, the gods were sorely displeased. "Tis-sa-ack and Nangas have broken the spell of peace," they said. "Let us transform them into cliffs of granite that face each other so that they will be forever parted."
As she fled, Tis-as-ack tossed aside the heavy burden basket, which, landing upside down, immediately became Basket Dome. Next she threw the baby carrier to the north wall of the canyon, and it became Royal Arches. Nangas was then changed into Washington Column and Tis-sa-ack into Half Dome. The dark streaks that mar the face of this great cliff were the tears that Tis-sa-ack shed as she ran from her angry husband.

Miwok Trail Description and Breakdown

The Miwok Trail is a moderately easy loop trail about 1 ½ miles in length. It travels through the mixed coniferous forest to Marker 8 "Deer Smacking" site. From there, travel up to the Sugar Pine Road, cross that road and continue uphill to the replica of the Miwok village. Travel downhill from the village to the Sugar Pine Road, continue west along the road until the trail leads downhill to the left through the Eastview cabins and back to the Dining Hall.

The Miwok Trail is reached by taking the Eastview Trail at the eastern end of the parking lot above the Lodge (Dining Hall). At the beginning of the Eastview Trail, look diagonally across the main road for **Marker 1** (a redwood post), along the trail leading toward the staff area from the Dining Hall. Here you will begin plant identification. After completing this activity, go uphill to the Hillhouse for information about deer, soaproot, and obsidian. Next, travel about 200 feet along the Eastview Trail and to **Marker 2** (blackberries). Then cross the Hillside Road. Here the Miwok Trail starts by the power pole. The trail is well-defined and marked by small blue triangular signs with an arrowhead symbol. The long axis of the sign points in the direction you need to travel. Watch for remaining **numbered markers** (redwood posts) along the trail that correspond to the following activities:

3A will be found shortly after passing the Eastview cabins. **3B** is about 300 feet further down the trail , where the trail passes through a gate in the fence. Within 100 yards **4** is reached. **Markers 5 - 7** will be passed in the next 1/4 mile of trail before reaching the Deer Smacking Activity **(Marker 8)**.

At the Deer Smacking site turn uphill to your left and travel to a fork in the trail. Take the trail less traveled, bearing to your right, following the arrowhead symbols. About 300 feet up this trail you will reach the water jug, and the Sugar Pine Road. Please dispose of cups in the provided trash bag.

Immediately on the other side of the Sugar Pine Road is another, smaller dirt road which travels uphill. Travel uphill beside the meadow to the village site. The village is about 250 yards above Sugar Pine Road.

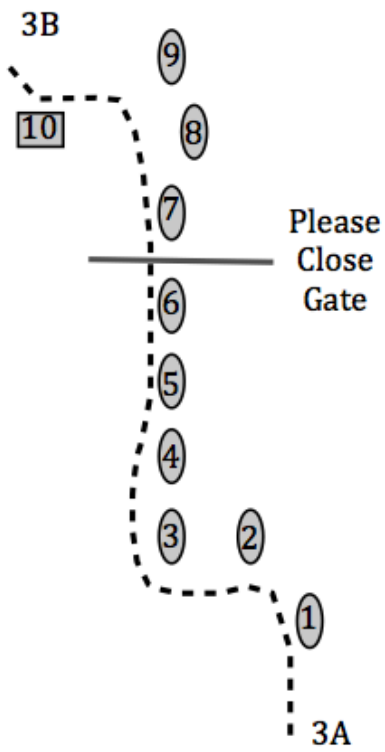
When you have completed the activities at the village site, travel downhill to the Sugar Pine Road. Turn right and continue west along the road until you see the trail signs directing you downhill to the left through the Eastview cabins and back to the Dining Hall.

NOTE: THERE ARE NO RESTROOMS AVAILABLE ON THIS TRAIL.

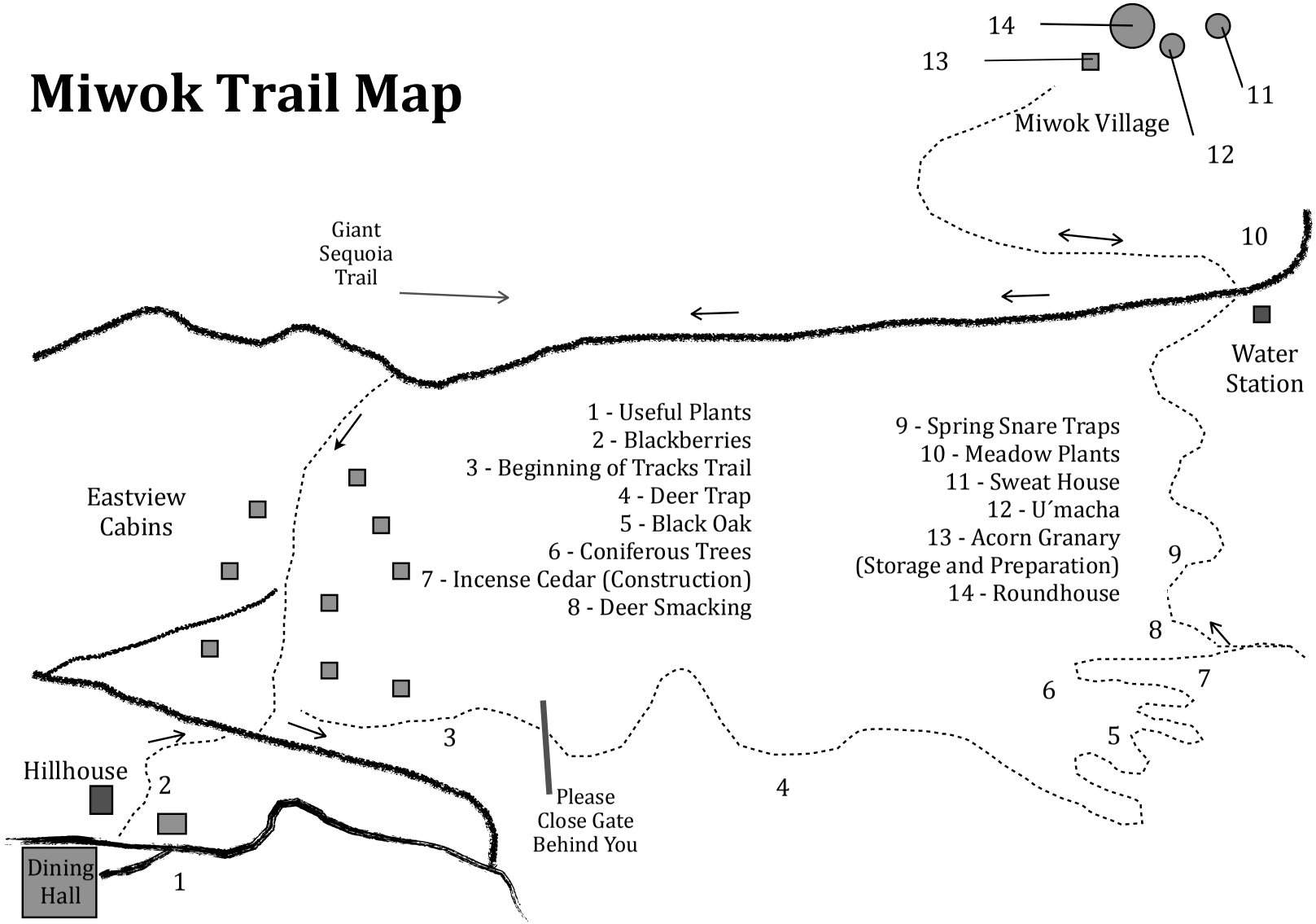
- At **Marker 1**, students will use observation/classification skills to identify plants used by the Miwok .
- At the **Hillhouse**, students will examine plant, animal, and stone objects to learn how natural resources were utilized by the Miwok.
- At **Marker 3**, students will use observation skills to recognize wildlife species' tracks. Based on those observations they will attempt to identify tracks they might encounter along the remainder of the trail.
- At **Marker 4**, students will observe how a deer snare trap might have looked.
- At **Marker 5**, students will use observation/classification skills to learn to recognize black oak trees and the acorns, which provided the main staple food for the Miwok.
- At **Marker 6**, students will use observation/classification skills to recognize several species of conifers found in a mixed coniferous forest and utilized by the Miwok; students will observe the shape of branches on incense cedars to gain insight in how branches were used for making bows..
- At **Marker 7**, students will learn how incense cedar was utilized by the Miwok for construction purposes.
- At **Marker 8**, students will participate in "Deer Smacking," an activity enabling them to understand some of the challenges faced by hunters.
- At **Marker 9**, students will observe how to set a spring snare trap, and attempt to set one themselves.
- At **Marker 10**, students will observe various species of meadow wildflowers used by the Miwok for food and medicinal purposes.
- At the **Miwok Village**, students will examine structures utilized by the Miwok, learn the functions of each structure, and see how natural resources were utilized.
- At **Marker 11**, students will learn how a sweat house was utilized, and be exposed to the impact of some of the Miwok cultural practices.
- At **Marker 12**, students will use observation skills to learn about the structure and function of an u'macha, a Miwok home.
- At **Marker 13**, students will examine mortar holes, pestles, a leaching mound, an acorn granary, and participate in a simulated cooking situation to better understand food preparation practices.
- At **Marker 14**, students will examine the roundhouse, various tools, toys, and other implements to learn how the Miwok people utilized natural resources. Students will participate in Miwok games and learn about their culture.
- At **Marker 15**, students will observe soaproot plants to learn to recognize the plant that had so many uses for the Miwok (uses addressed at the Hillhouse).
- The **Conclusion** is designed to provide a summary of the concepts developed in the course.

Answer Key/Map of Tracks Trail

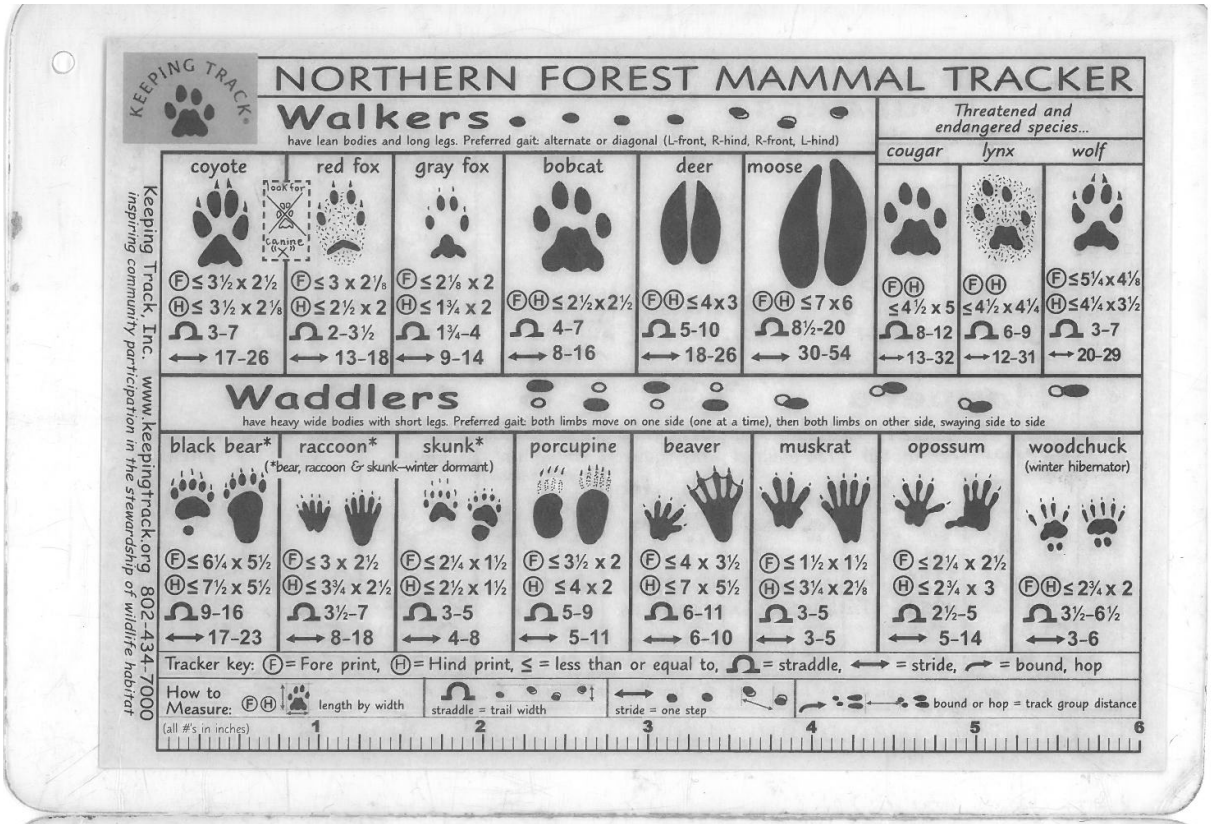
3A - Beginning of Tracks Trail
1 - Raccoon
2 - Mule Deer
3 - Gray Fox
4 - Gray Squirrel
5 - Coyote
6 - Black Bear
7 - Mountain Lion (Cougar)
8 - Grizzly Bear
9 - Human/Miwok
10 - Tracks Review
3B - End of Tracks Trail

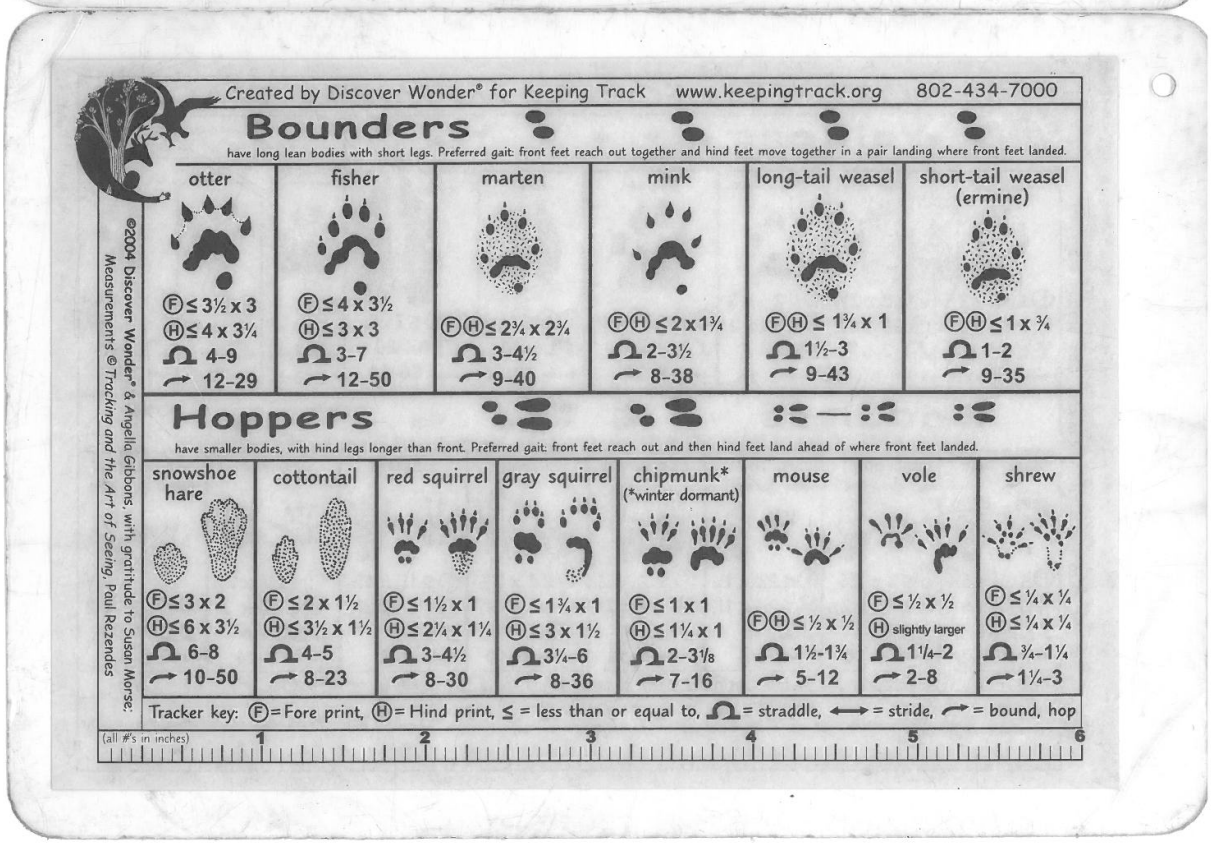


Miwok Trail Map



APPENDIX A: TRACK IDENTIFICATION CARDS





APPENDIX B: TRACK IDENTIFICATION WORKSHEETS

Miwok Track Trail

Trackers: ______________________________

____

Write the name of the wildlife species that made each set of tracks.

1. ______________________________
2. ______________________________
3. ______________________________
4. ______________________________
5. ______________________________
6. ______________________________
7. ______________________________
8. ______________________________
9. ______________________________

Miwok Track Trail

Trackers: ______________________________

____

Write the name of the wildlife species that made each set of tracks.

1. ______________________________
2. ______________________________
3. ______________________________
4. ______________________________
5. ______________________________
6. ______________________________
7. ______________________________
8. ______________________________
9. ______________________________

Miwok Track Trail

Trackers: ______________________________

____

Write the name of the wildlife species that made each set of tracks.

1. ______________________________
2. ______________________________
3. ______________________________
4. ______________________________
5. ______________________________
6. ______________________________
7. ______________________________
8. ______________________________
9. ______________________________

Miwok Track Trail

Trackers: ______________________________

____

Write the name of the wildlife species that made each set of tracks.

1. ______________________________
2. ______________________________
3. ______________________________
4. ______________________________
5. ______________________________
6. ______________________________
7. ______________________________
8. ______________________________
9. ______________________________

Miwok Track Trail

Trackers: ______________________________

____

Write the name of the wildlife species that made each set of tracks.

1. ______________________________
2. ______________________________
3. ______________________________
4. ______________________________
5. ______________________________
6. ______________________________
7. ______________________________
8. ______________________________
9. ______________________________

Miwok Track Trail

Trackers: ______________________________

____

Write the name of the wildlife species that made each set of tracks.

1. ______________________________
2. ______________________________
3. ______________________________
4. ______________________________
5. ______________________________
6. ______________________________
7. ______________________________
8. ______________________________
9. ______________________________