



**Native American Monitor Training
for the Tuolumne Me-Wuk Tribal Council
Tuolumne, California
facilitated by
Alan Garfinkel Gold
AGG Associates
Cultural Resource Management Consultants
January 27th through January 31st 2014**

For the Tuolumne Me-Wuk Tribal Council



Monday, January 27th

Afternoon (PowerPoint Presentation 3)

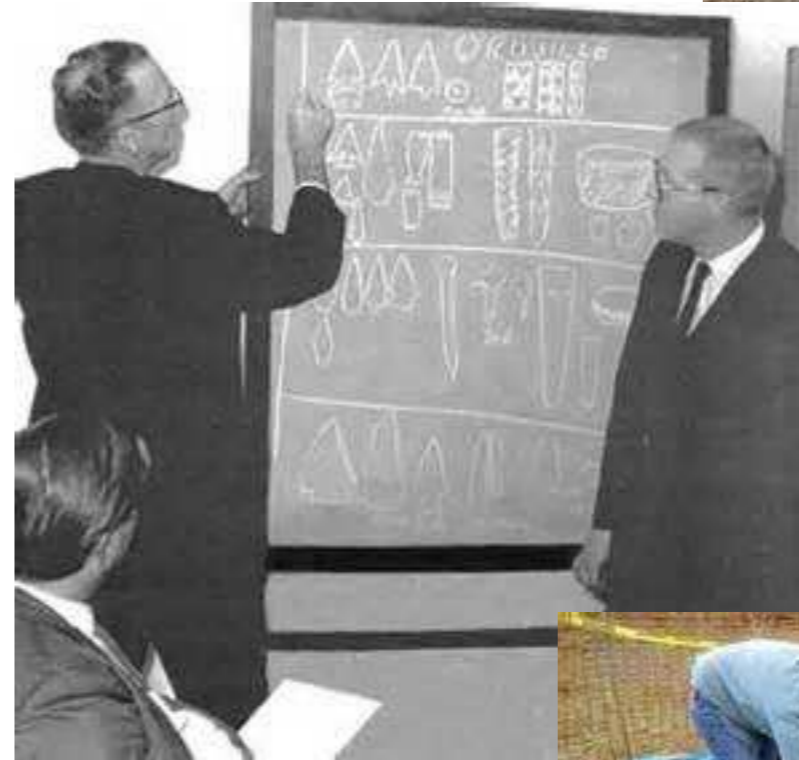
For the Tuolumne Me-Wuk Tribal Council

Submitted to

**Robert Cox
Cultural Resources Director**

California Indians Prehistory: The Archaeological Record

- During the next few hours we will go over what has been discovered and identified by archaeologists and others about the prehistory of Native people in California.
- We will trace the development of Native occupation in California.
- This summary covers the last 13,000 years from the late Pleistocene to the protohistoric era.



Prehistoric Cultural Sequences

- We have a real mess in California trying to understand what we are talking about in archaeology!
- Every archaeologists that comes through adds a new name to the cultural and chronological framework.
- Mike Moratto, one of the deans of California Prehistory, wrote a book on it and it runs over 700 pages.

dates	period	sub-period	regional phases		
			NORTH COASTAL	SOUTH COASTAL	
1715	HISTORIC		sub-regional phases		
1650			TIDE WATER Carolina Algonkians	INNER COASTAL PL. Meherrin Tuscarora	
	WOODLAND	Late	Colington	Cashie	Oak Island
800		Middle	Mount Pleasant		Cape Fear
A.D. B.C. 300		Early	Deep Creek		New River
1000	ARCHAIC	Late	Savannah River		Stallings
2000		Middle	Halifax	Stanly	Guilford Morrow Mountain
3000		Early	Kirk		
5000	PALEO-INDIAN	Late	Palmer Hardaway		
8000		Early	Hardaway-Dalton		
10,000			Clovis		
12,000					

Prehistoric Cultural Sequences

- They told him given the complexity of the State the book would be impossible. That book was published in 1984.
- He told me (and other prehistorians agree) given how much things have changed and developed over the last thirty years such a book is now basically impossible to produce.
- Why, too much archaeology has been done! Too many sites have been discovered. Things are way too complicated.

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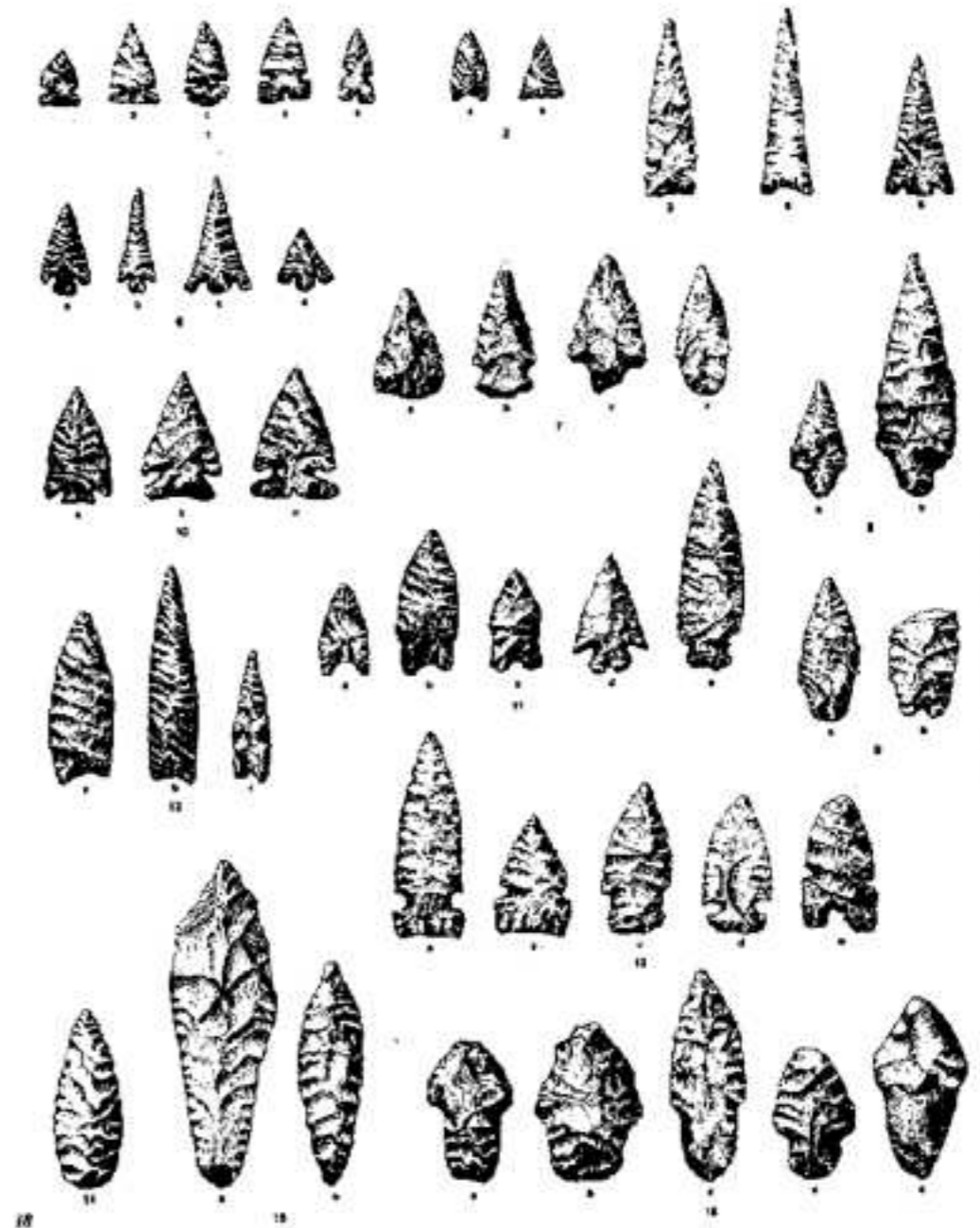
Prehistoric Cultural Sequences

- The number of prehistoric sites recorded in just one of the California counties is staggering.
- Just in Kern County alone they have over 10,000 sites that have been formally recorded!
- It takes two full pages (in Moratto's book) just to try and make some sense in tabular form of all the various cultural and temporal sequences and names of archaeological periods and complexes.
- The result of all these complications is we are now trying to separate time and culture history.
- The period designations referring to the ages of archaeological sites are now mostly in geological time scales or in less loaded cultural historical lingo.

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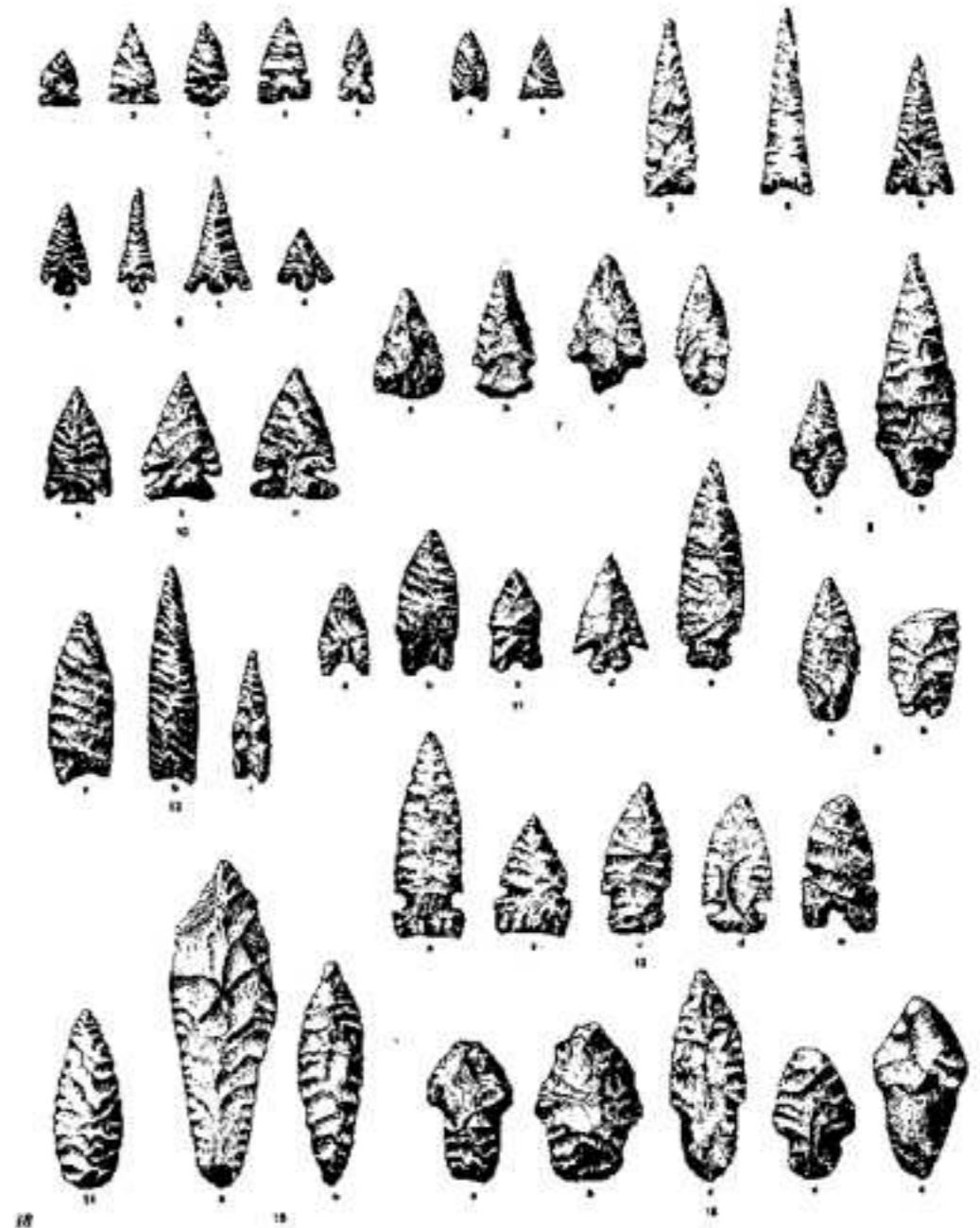
Prehistoric Cultural Sequences

- However, the older terms don't seem to want to go away and still no-one agrees on what we should consistently call things.
- You put three archaeologists in a room and you get six opinions!
- So we often still use some of the older terminology and throw it into the mix.
- The Paleo-Indian Period (the first generally agreed time period in prehistory) is basically the late Pleistocene and earliest Holocene eras running from about 13,000 to 7,000 years ago.
- The Pleistocene is basically a period that ends at 10,000 years ago.



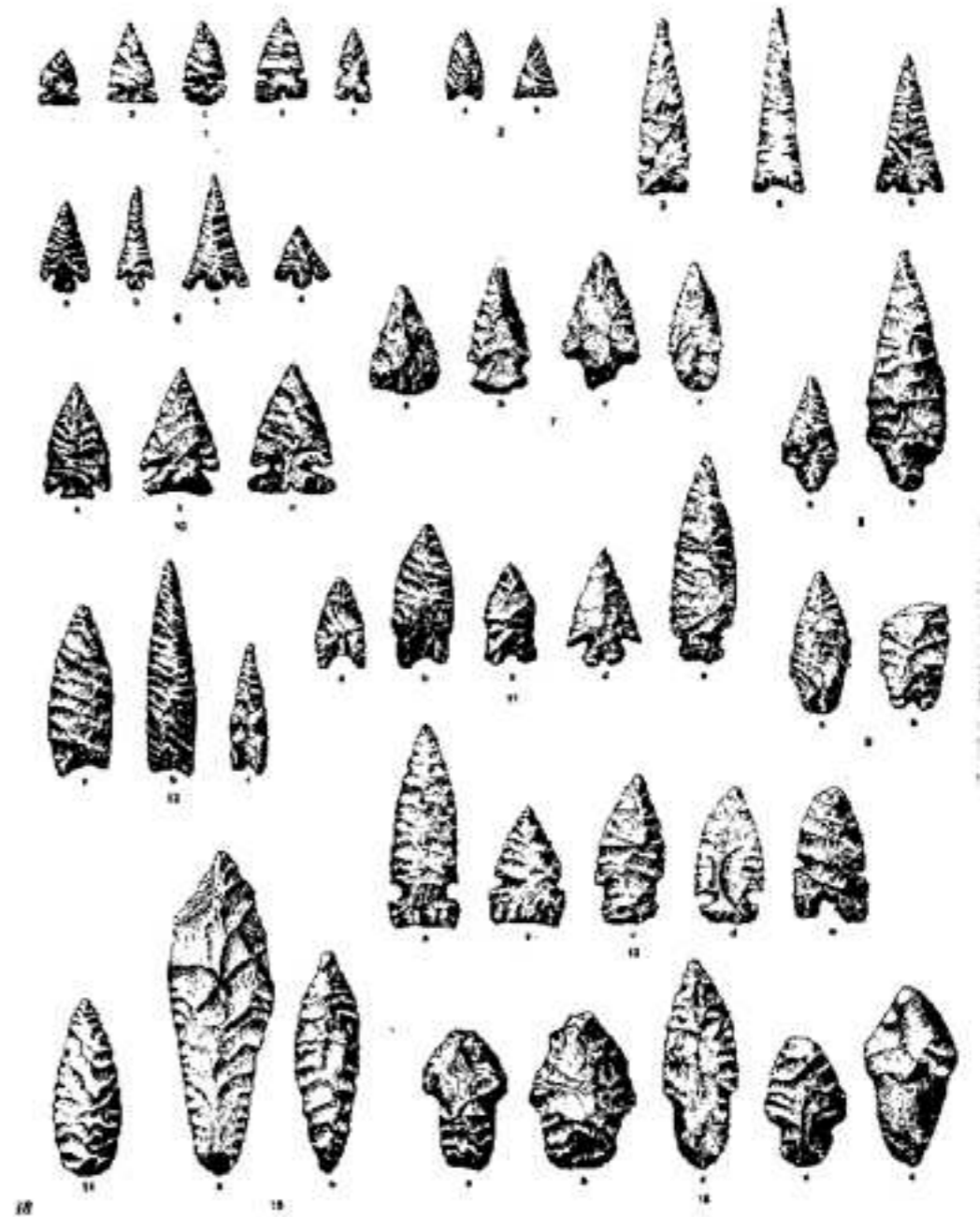
Prehistoric Cultural Sequences

- Some use the term Archaic and use the modifiers Upper, Lower and Middle to further confuse us all.
- Another layer of confusion comes about because the most common items archaeologists find in most prehistoric sites are spear, dart and arrow points...
- So we often like to use those as cultural and chronological designations (or diagnostics of time and cultural tradition) - such as Fluted, Lake Mojave (Stemmed Series), Pinto, Elko, Humboldt/Gypsum, Rose Spring, and Cottonwood and Desert Side-notched.



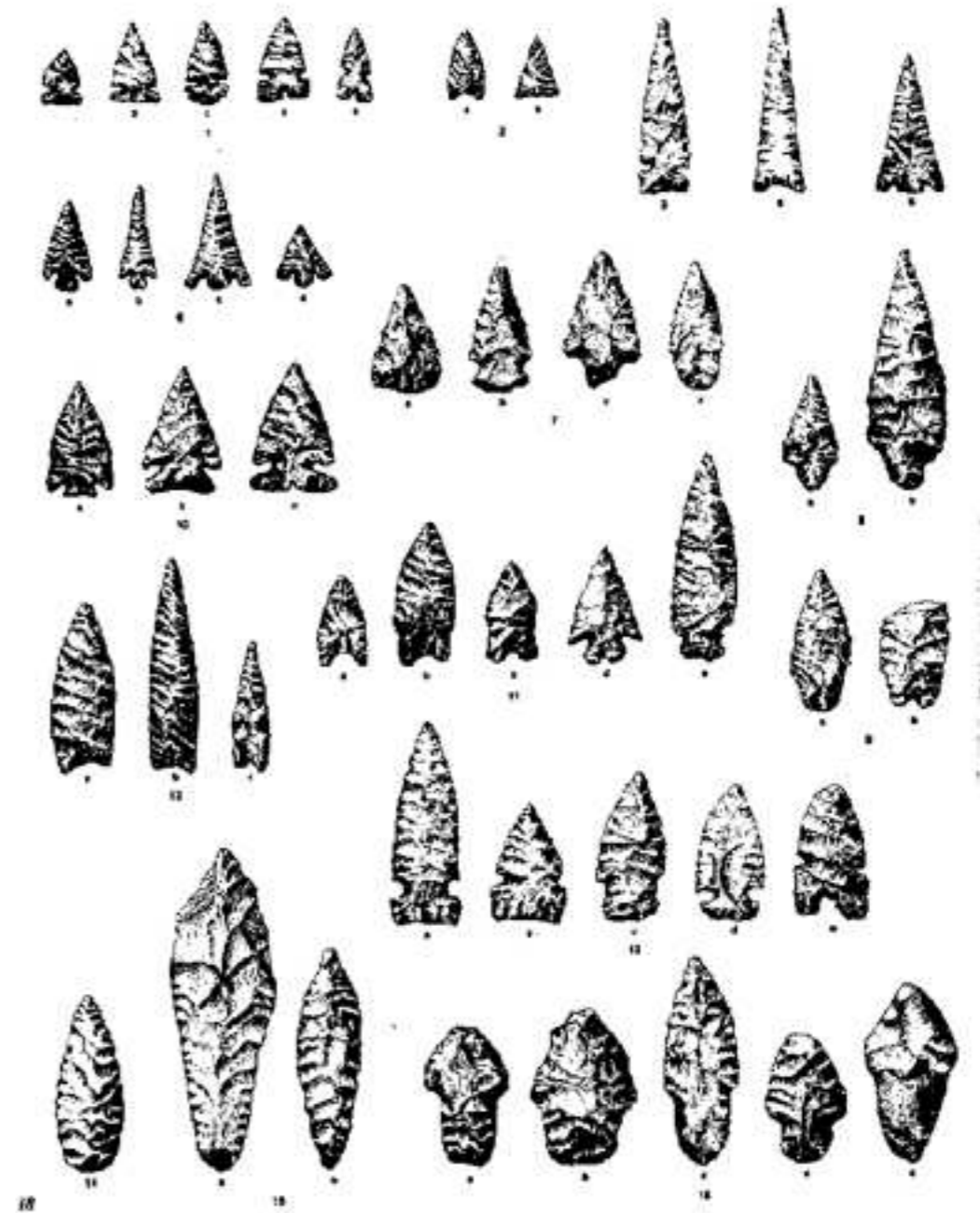
Prehistoric Cultural Sequences

- The problem with that in California is that there are more point styles in California than Carter has little liver pills...
- Just the major types number more than 60 different named types!
- These types often are designated first by a geographical appellation and another term for the morphology of the point.



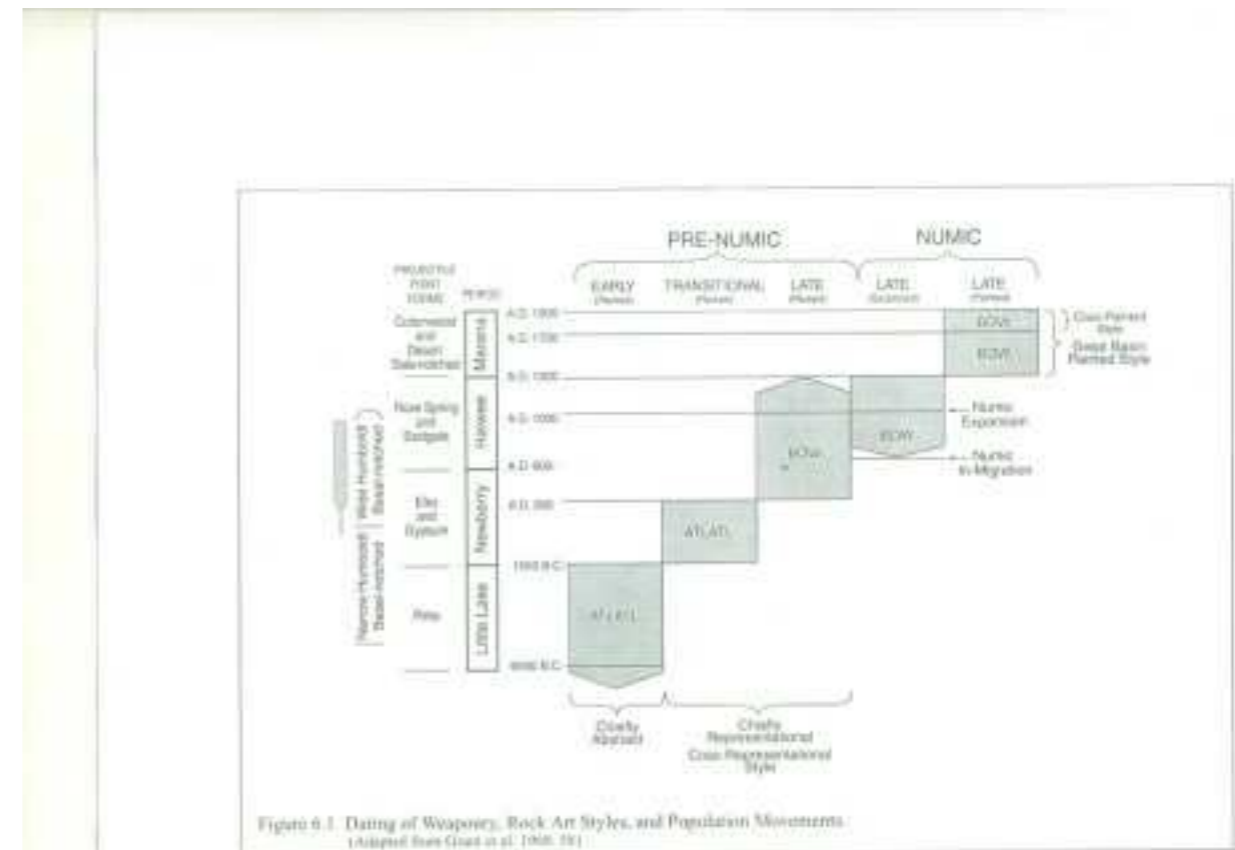
Prehistoric Cultural Sequences

- So we might have a form called Elko Eared.
- The form was first found in Elko, Nevada and so name and it has an eared basal morphology.
- Or Cottonwood Triangular found and named at the Cottonwood Creek Site in the Owens Valley on the eastern side of the Sierra Nevada.



Prehistoric Cultural Sequences

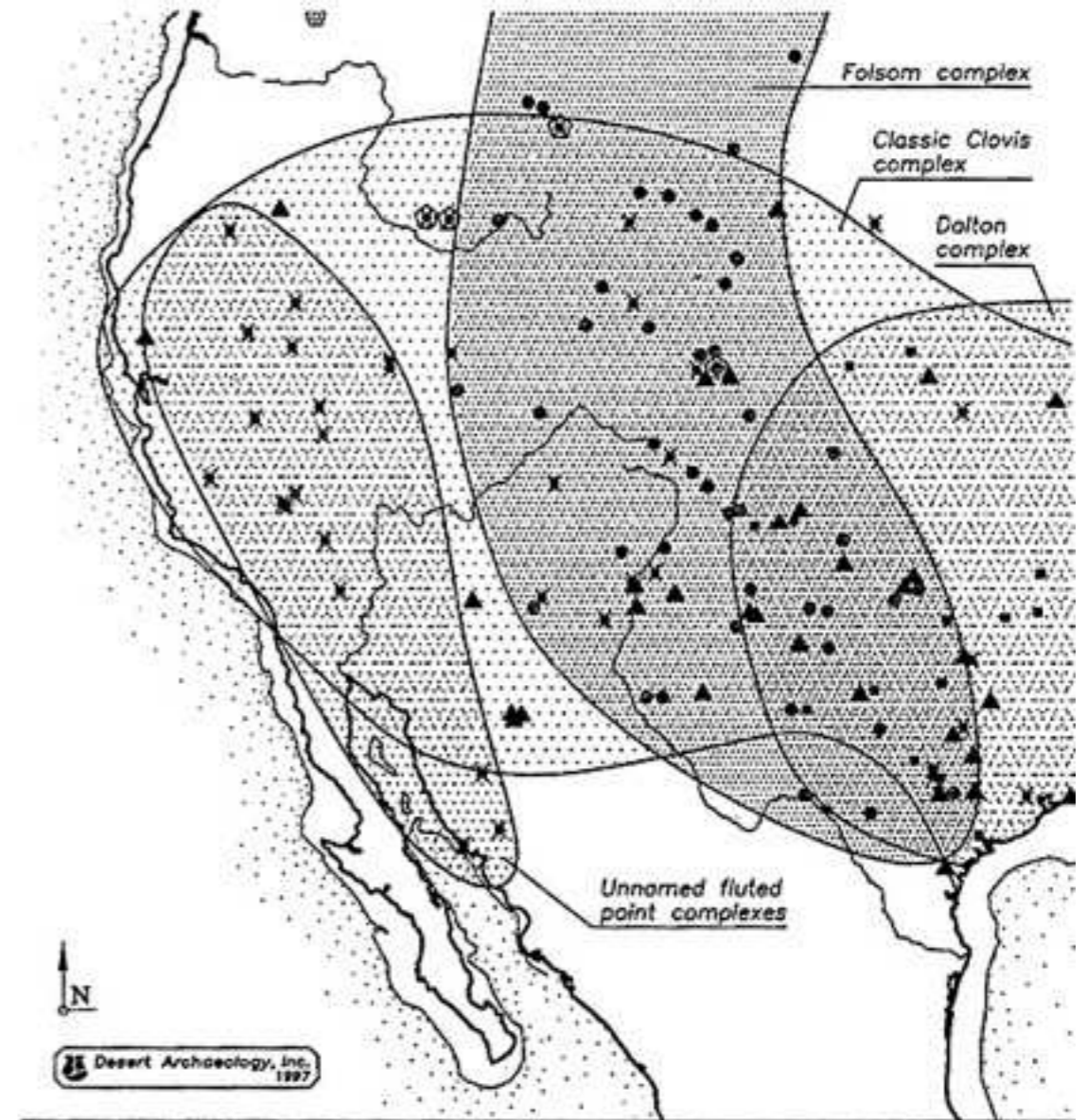
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California Indian Prehistory:

Western Fluted Points and the Paleoindians

- Currently, the most widespread and substantial expression of some the earliest human occupation in North America remains fluted flaked stone projectile points.
- Sometimes these sites have flaked stone assemblages in association with them including the bones of extinct megafauna (mammals larger than about 90 pounds).
- These sites are typically dated to between about 13,500 and 12,800 radiocarbon years ago in North America.
- However, fluted point sites are widely distributed throughout the New World, and are associated with a wide variety of paleo-environments and sometimes rather diverse artifact assemblages.

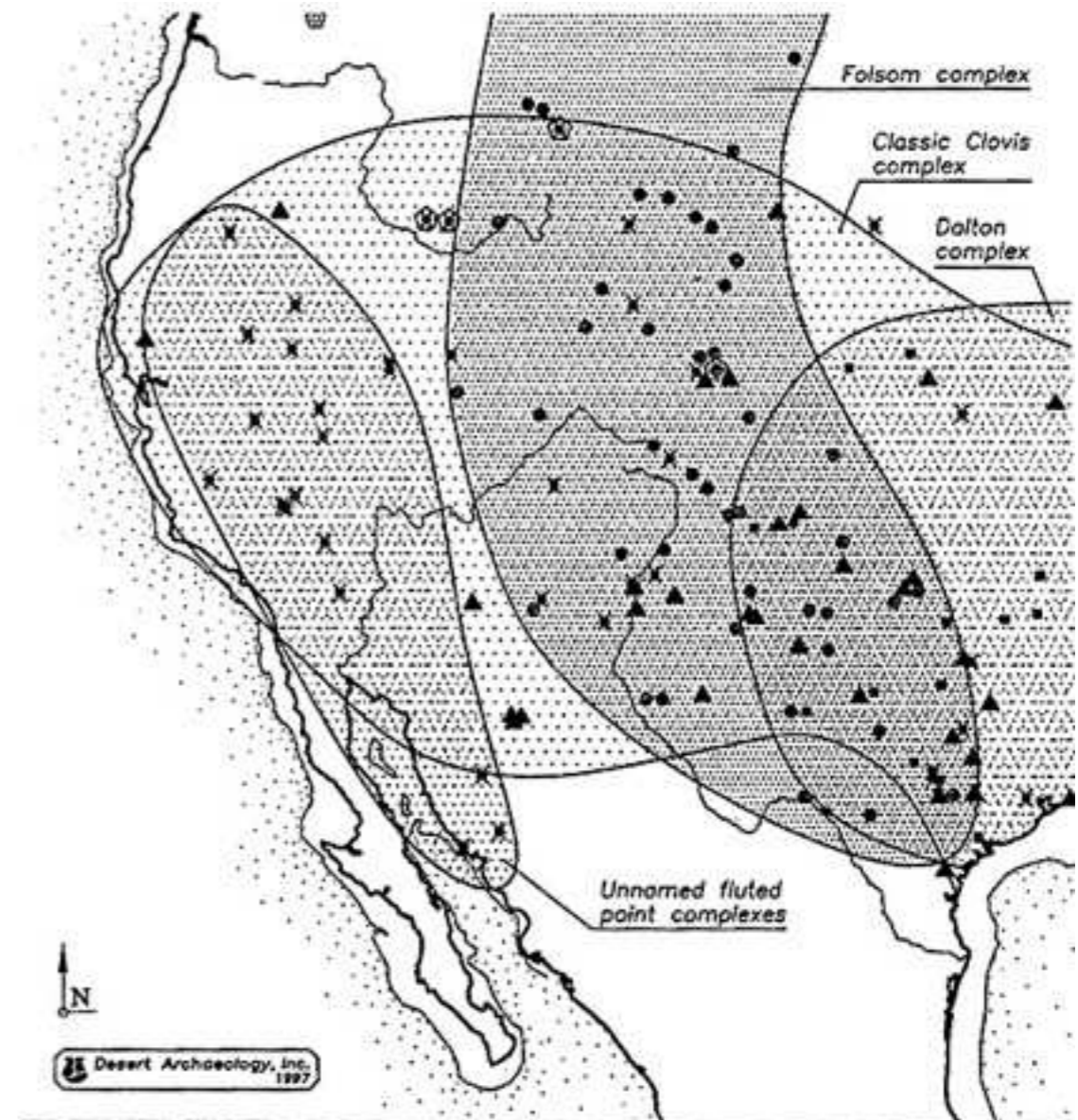


Fluted Point and Fluted Point Related Sites
in Western North America

Key ▲ Classic Clovis sites ● Folsom sites ■ Dalton sites
 × Other fluted point sites ○ Caches
 Continental shelf margins (18,000 b.p.)

California Indian Prehistory: Western Fluted Points

- There are several varieties of fluted points in western North America, and there are places where the distributions of the Clovis, Folsom, and Dalton points overlap in the Southern Plains.
- Yet, most all of the fluted points found in the Great Basin, California, and northwestern Sonora, Mexico have V-shaped, concave bases and are generally smaller, narrower, and less regular in shape than other types of fluted points found elsewhere.
- They are also more heavily worked through pressure flaking; these types of points may in fact represent another, currently unnamed fluted point variety.
- These earliest of Native cultures in California are represented by this widespread but limited inventory of stone spear points.



Fluted Point and Fluted Point Related Sites
in Western North America

- Key
- ▲ Classic Clovis sites
 - Folsom sites
 - Dalton sites
 - × Other fluted point sites
 - Caches
- Continental shelf margins (18,000 b.p.)

California Indian Prehistory: Western Fluted Points

- These most ancient materials have been labeled as the California Fluted Point Tradition or more generally - Western Fluted.
- Accompanying the true fluted points are end-thinned Concave Base points that date to the same time span.
- Ages for these materials have been rather difficult to determine.
- Most finds of fluted points are surface occurrences.
- Hence, we have really no directly associated radiocarbon dates with such artifacts.
- However, indirect dating using obsidian hydration supports ages of nearly 13,000 to perhaps 12,000 or 11,000 years ago.



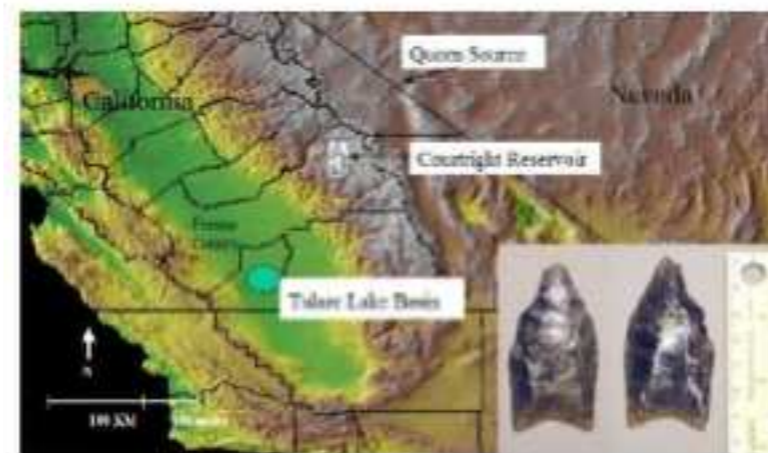
Western Fluted Points - Lithic Technology: Fluting Points

- Fluted Points are a distinctive flaked stone artifact form.
- They exhibit a sizable channel scar running up the central portion of the spear point.
- This rather deep flake scar and the associated technology for its manufacture is distinctive and only occurred in prehistoric times during the late Pleistocene and early Holocene eras.
- This type of flaked stone reduction is also only found in the Americas.
- There is nothing like it elsewhere in the world.
- So it must have been an independent invention and developed full blown in the Americas. There is no earlier indication of a basis for this development.



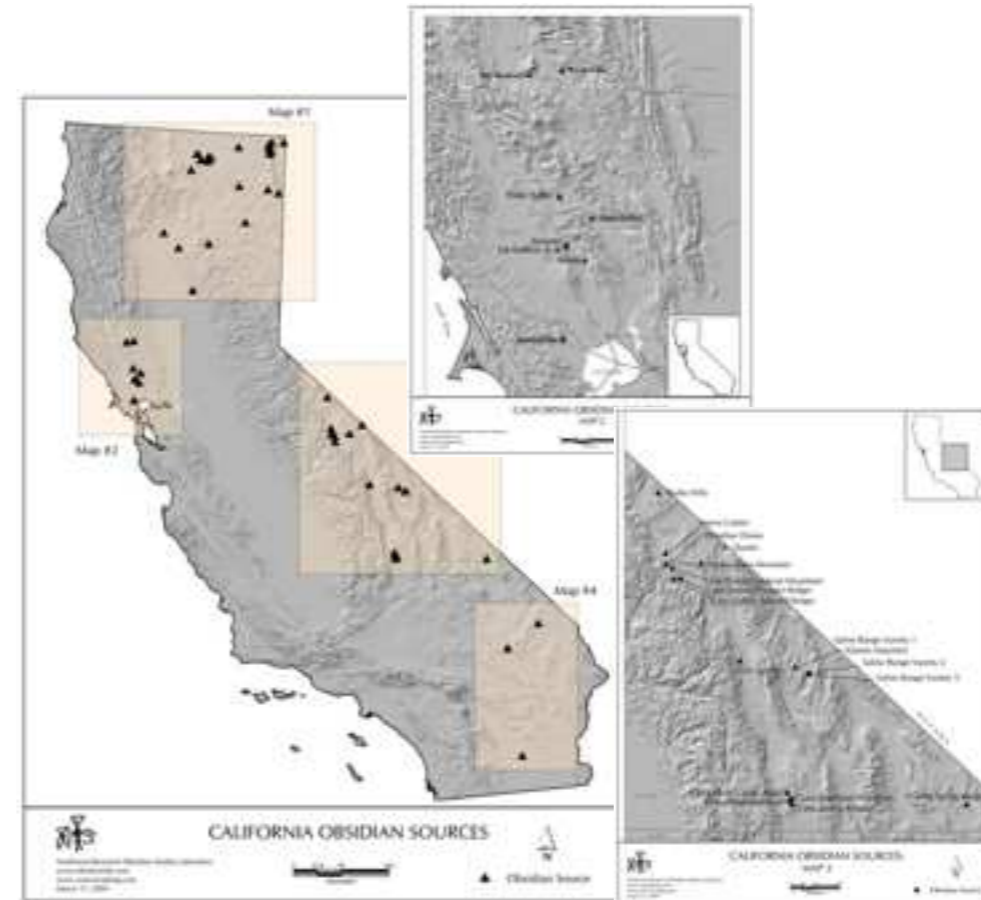
California Western Fluted Points

- About 400 fluted points have been discovered so far throughout California.
- They have often been identified most often as isolates and only in rare cases have there been discoveries that exhibit a number of these points in one single location.
- The fluted points are fashioned of both obsidian and a variety of non-obsidian toolstone including various high quality cryptocrystalline silicate stone materials (including Franciscan and Monterey chert, jasper, and Jacalitos chert) and quartz crystal.
- The points have been found along ancient shorelines of Pleistocene lakes, in piedmont zones of former grasslands, and in mountain passes between fossil lakes.



California Western Fluted Points

- What we have found is that distant obsidian sources were directly quarried or moved through long distance trade. These volcanic glass sources include:
- Fish Springs, Coso, Casa Diablo, Buck Mountain, Queen, and Saline Valley, located east of the Sierra Nevada.
- Also Napa and Borax Lake in Northern California in the Coast Ranges.
- These sources were all employed at a very early date for the manufacture of stone weapon tips of the Western Fluted tradition.



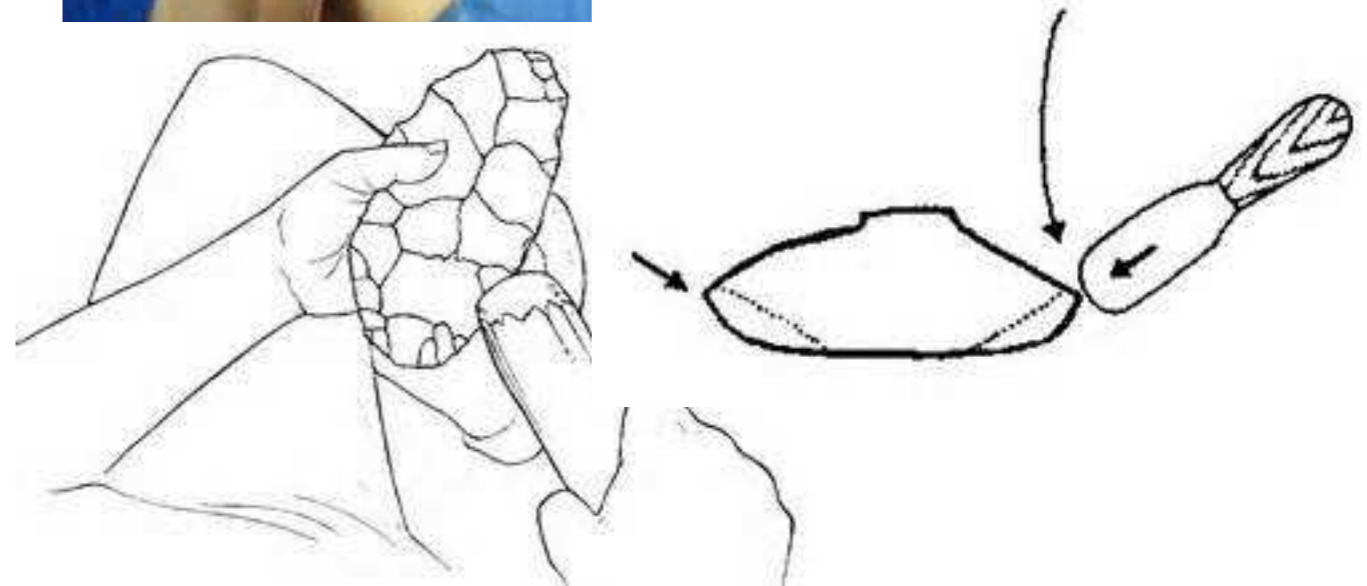
Western Fluted Points - Lithic Technology: Fluting Points

- There was much discussion in the literature and many years of replicative lithic analysis to focus on just how this fluting was done.
- A very famous flint knapper (Don Crabtree) - the father of replicative systems analysis, developed a chest punch to flute his replicas.
- Yet a more simple way has been developed.
- To create the flute one sets up a remnant platform (or nipple) at the base of the point and then removes it with indirect percussion in a single blow.



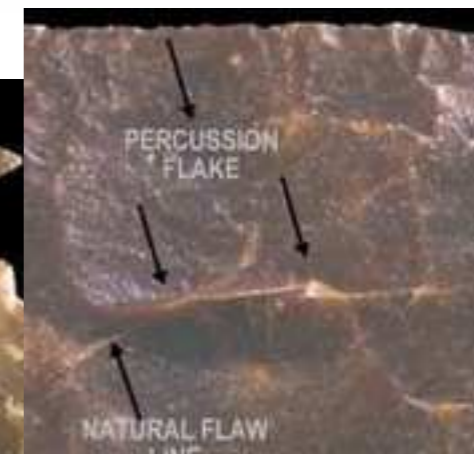
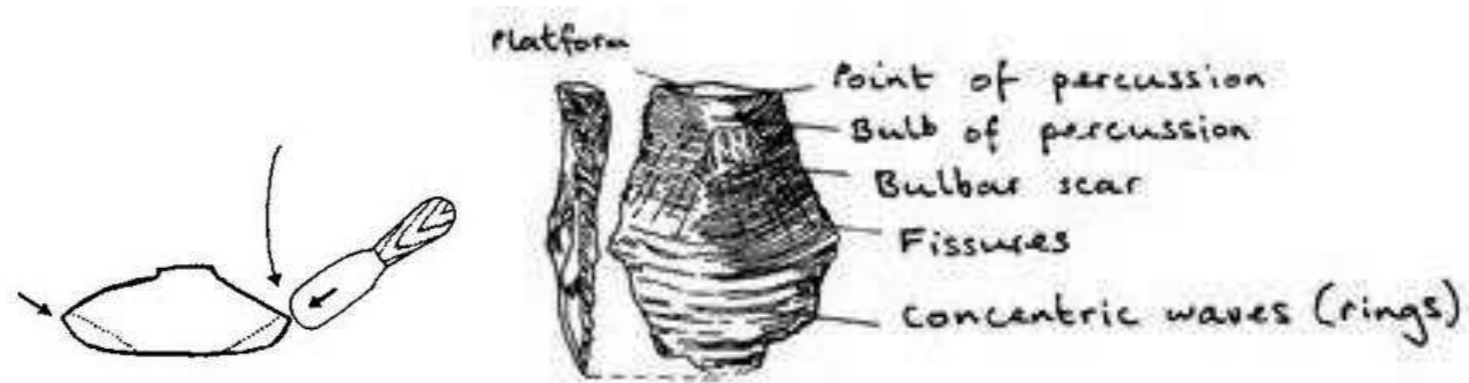
Western Fluted Points - Lithic Technology: Percussion Flaking versus Pressure Flaking

- Typically the Clovis points from the American Southwest and on the Plains are in the majority percussion flaked.
- Lithic technologists and students of flaked stone believe that most of the Western or California fluted points date to the end of Clovis times (12,800 years ago) or immediately thereafter.
- It is thought they may represent a slightly different type of point form and a distinct stone tool tradition rather than being a consistent manifestation falling under the Classic Clovis umbrella.
- Additionally, there are overall fewer true fluted points and many more end-thinned points found throughout California and the Great Basin.
- The latter have been identified as Concave Base points and given names of Black Rock or Great Basin Concave Base points.



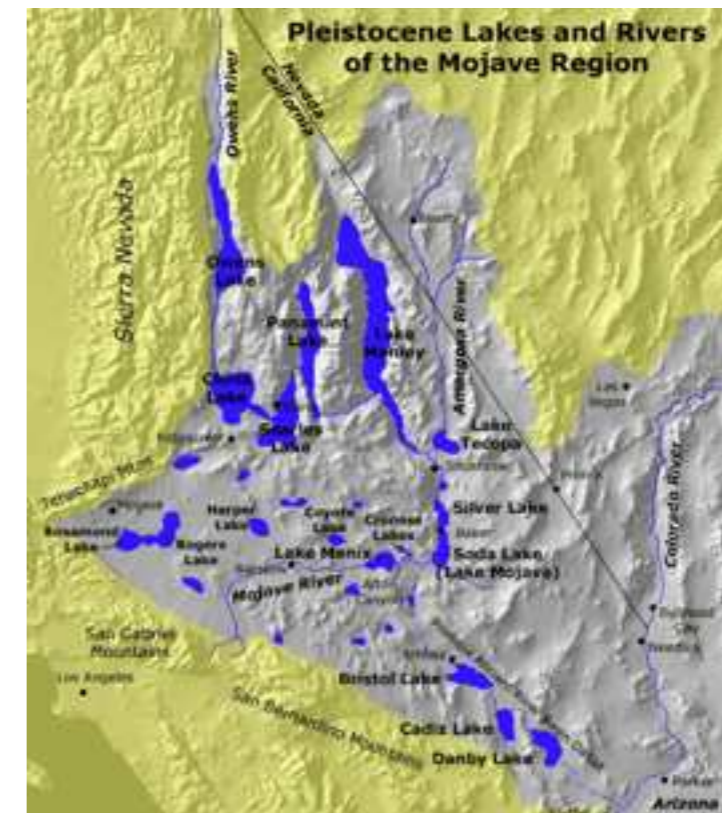
Western Fluted Points - Lithic Technology: Percussion Flaking vs Pressure Flaking

- The California fluted points are a bit different than their related fluted points first recognized as Clovis.
- The California fluted points are most often fully pressure flaked rather than having much of their production as percussion.
- Percussion produces larger flakes and these are typically fashioned with a bone baton or a stone hammer.
- Pressure retouch is done with a smaller and pointed bone or antler flaker and produces much smaller retouch flakes that are often a finishing elements completing a spear, dart, or arrow point.



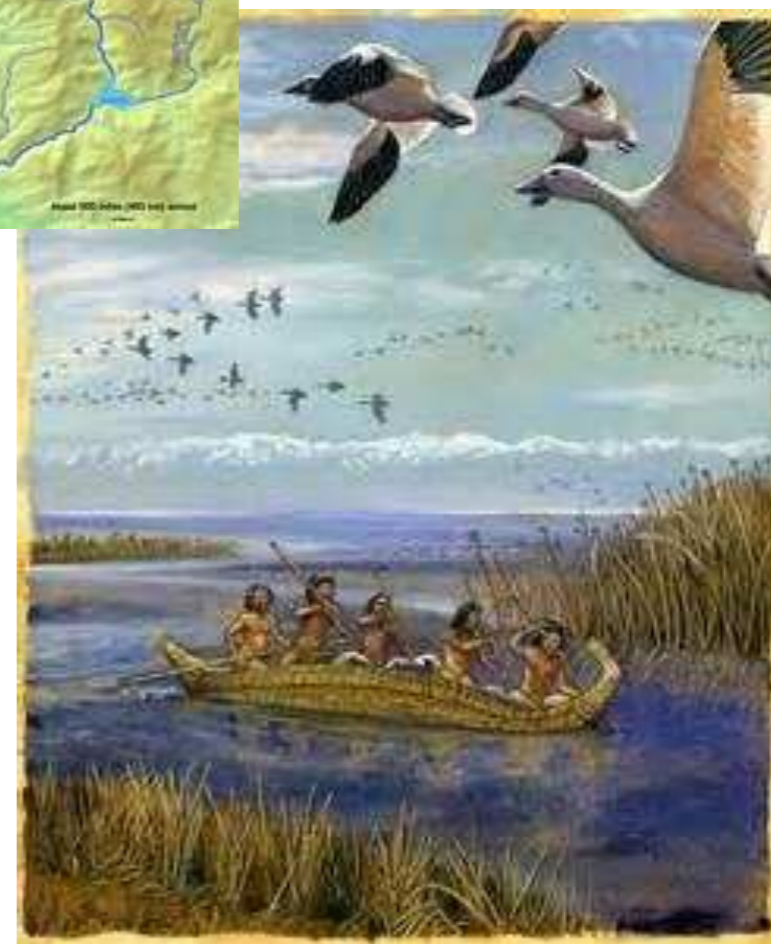
California Western Fluted Points

- California Fluted points have been recovered from over 50 different locations.
- These include finds from throughout California including: the Yuha Desert (Imperial County), Ocotillo Wells and Cuyamaca Pass (San Diego County), Pinto Basin (San Bernardino County), Tehachapi and the El Paso Mountains and far southern Sierra Nevada (eastern Kern County), Owens Valley, Indian Wells Valley, Panamint Valley and Death Valley (eastern Kern, Inyo and Mono Counties), on the coast in San Luis Obispo and in Santa Barbara, in the Central Valley in Tulare, Kings, Merced, and Calaveras Counties, and in northern California in Napa, Lake, Mendocino, and Amador Counties.
- Most of these are isolated finds but in a few locations one finds a concentration of these points.
- Areas where there have been multiple finds of California or Western Fluted points include: China Lake, Owens Lake, Tulare Lake, Rose Valley, Lake Mojave and Borax Lake.
- All of these locations are the sites of ancient Pleistocene lakes and river channels with most located in the Mojave Desert.



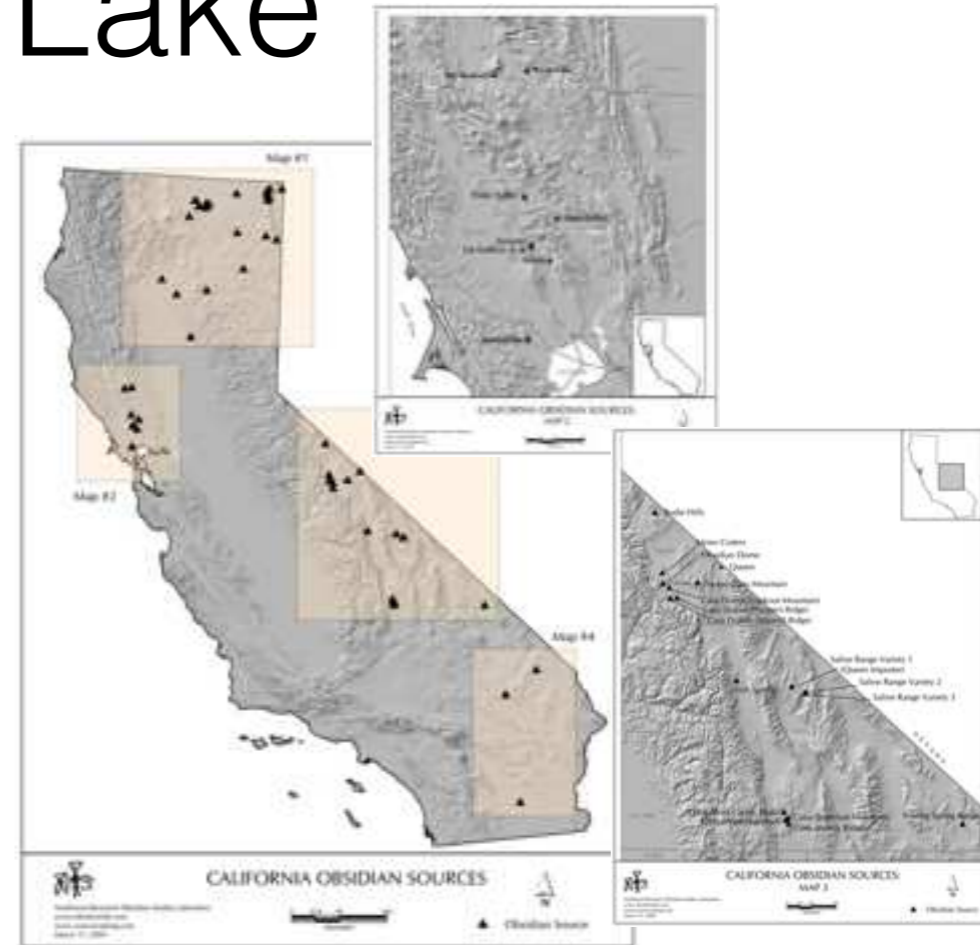
California Western Fluted Points: The Tulare Lake Locality

- The one location with the greatest concentration of California Fluted and Concave Base, end-thinned points is the Tulare Lake Locality in Kings County near Hanford in the southern San Joaquin Valley.
- Hundreds of Concave Base and Fluted points have been discovered there - along the shores of this ancient body of water.
- Tulare Lake was the largest freshwater lake west of the Mississippi. The lake was 100 miles long and 50 miles wide with a depth of about 40 feet and covered over 500 square miles in area.
- It was used by Native peoples more or less continuously for over 12,000 years.
- The ancient ancestors of the Yokuts lived by the lake and availed themselves of the rich riparian resources there.



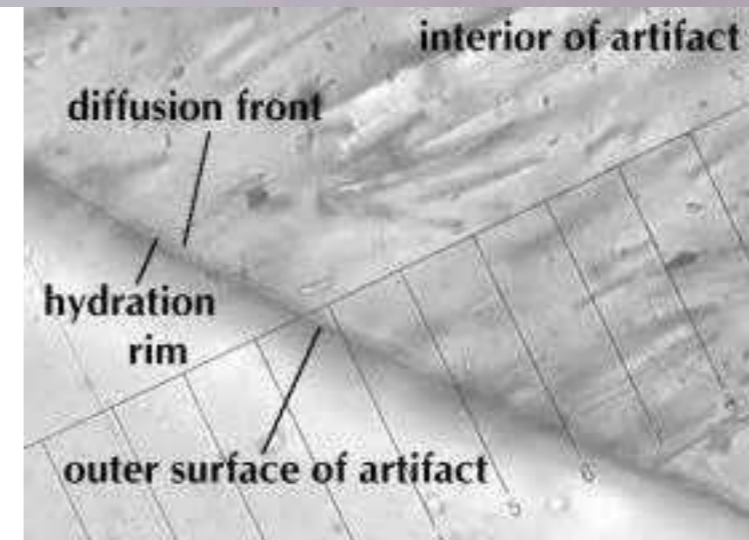
California Western Fluted Points: Tulare Lake

- Studies of the flaked stone materials identified on the shores of Tulare Lake led to some interesting discoveries.
- Even though there were no nearby sources of volcanic glass, Native people obtained obsidian from distant sources located hundreds of miles away.
- Through long distance trade they were able to procure obsidian from east of the Sierra Nevada in the western Mojave Desert and from the Owens Valley.
- Also identified was obsidian from Northern California, over 300 miles away in Napa County.
- Dates for these early forays and distant connections fit well within the late Pleistocene and very early Holocene periods from ca. 13,000 to 11,500 years ago.



Western Fluted Points: Obsidian Hydration Dating

- How did they obtain dates on those early obsidian spear points from Tulare Lake?
- Obsidian, volcanic glass, has an interesting property in that it actually is permeable by water molecules.
- As it ages it picks up water from the air or ground and forms a band or diffusion front on an artifact.
- That diffusion front also called a hydration rim, its size, has been found to be a function of age.
- We now have been studying this process for almost 50 years and through experimentation and mathematical models can date obsidian artifacts.



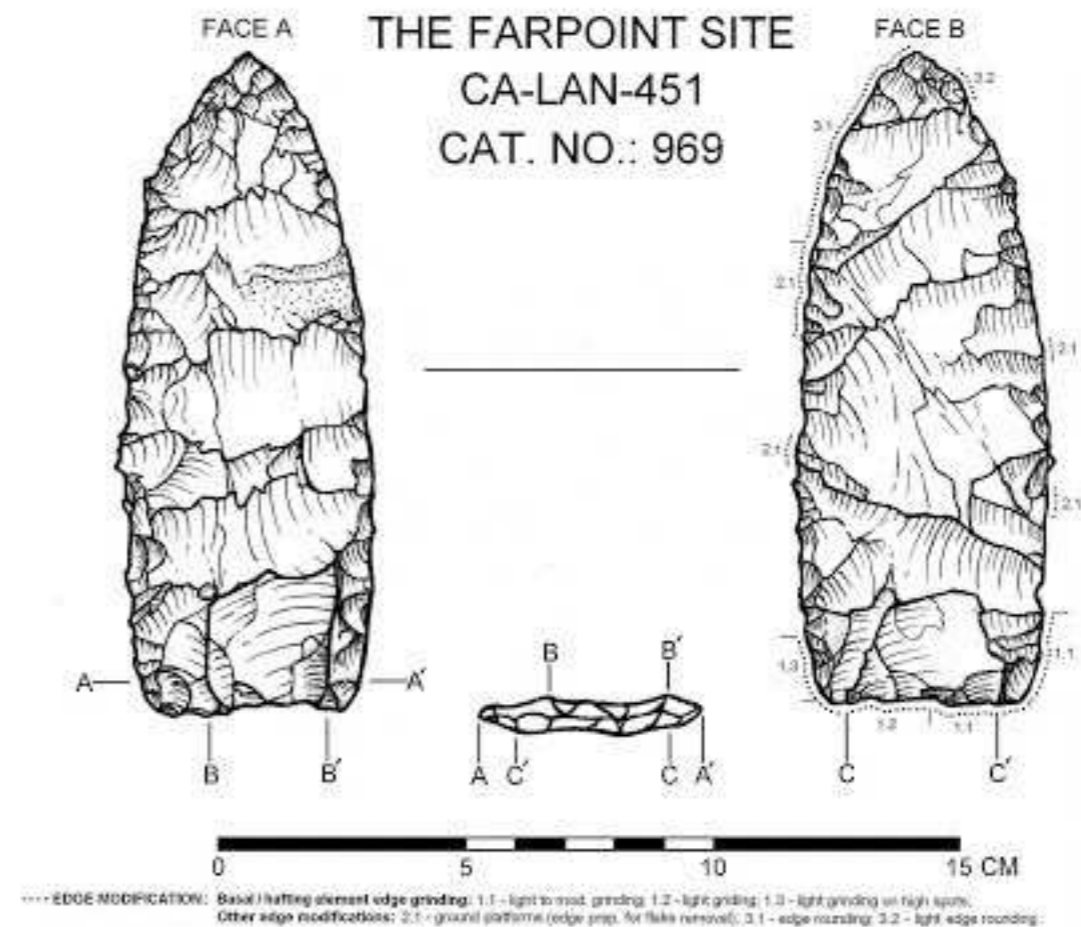
California Western Fluted Points: Summary

- The archaeological expression of California or Western Fluted and Concave Base Points Cultures testifies to a very early expression of Native occupation in California.
- Unfortunately no direct dating via radiocarbon assays or associated artifact forms or faunal remains have been identified.
- In fact we really don't know much about the total archaeological assemblage characteristic of this period.
- Yet we can say a few things about these early discoveries.



California Western Fluted Points: Summary

- The Native people who used the Western Fluted points were highly mobile.
- They appear to have migrated over a hundred miles in their annual forays.
- They were most likely diversified and generalized hunter gatherers.
- It is unlikely that they were the big game hunters that we think of when characterizing Clovis Culture folk in the American Southwest and on the Plains.
- It appears likely that when most of the California occupation took place the Pleistocene megafauna had died away.



California Western Fluted Points: Summary

- These foragers were likely generalists who subsisted mainly on small game, plant foods, and marine invertebrates (shellfish).
- They most likely did not have any sort of developed groundstone industry and may not have used formalized milling equipment to any extent during this very early time.
- They may have avoided any types of foods with extensive processing such as hard seeds.



California Western Fluted Points: Summary

- We don't know much about the other elements of their technology or archaeological assemblage besides the spear points.
- We do know they had a large biface technology and it appears that they were exceptionally sophisticated in terms of their skill at flintknapping making very thin knives.
- It is most likely that they did not develop the elaborate prismatic core and blade technology found in regions of the United States with a more abundant representation of Clovis Fluted points.



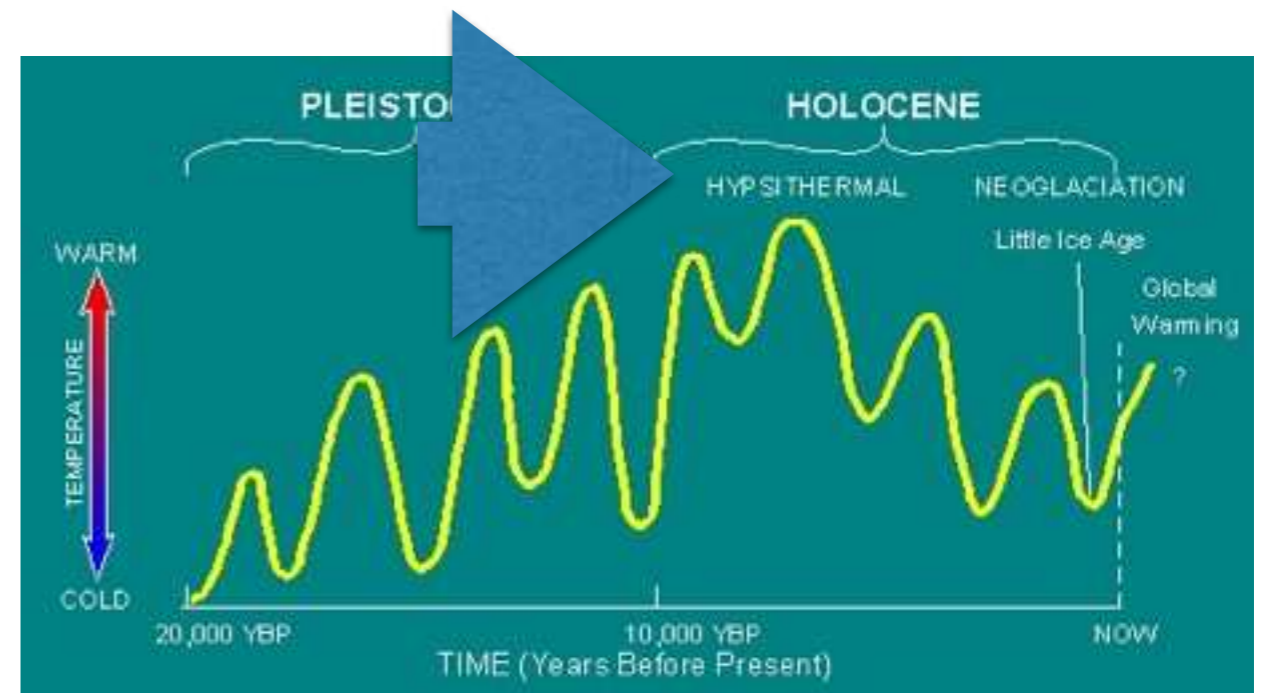
Western Pluvial Lakes Tradition

- Following close at hand and perhaps having some limited overlap in time with the Western Fluted cultures was another widely distributed prehistoric, archaeological cultural expression.
- Bedwell (1970) coined the name Western Pluvial Lakes Tradition.
- This archeological complex is meant as an umbrella term covering archaeological materials in diverse settings including materials from coastal San Diego County, inland in the Colorado Desert, in the Mojave Desert, in the southern San Joaquin Valley at Buena Vista Lake and even in northern California in Lake County.
- The dating for this complex runs from 11,000 to 8,000 years ago (9,000 to 6,000 BC).



Western Pluvial Lakes Tradition

- Cultures adapted to wetland environments appear to have concentrated their activities and had similar expressions relating to lake, marsh, and grassland environments.
- This prehistoric cultural expression flourished for several millennia and gradually disappeared with the Altithermal climatic period.
- The Altithermal (also called the Hypsithermal) was a continent wide dry spell that lasted from about 8,000 to 5,000 years ago.
- This was a time of sustained summer droughts and higher than average temperatures.



Western Pluvial Lakes Tradition (WPLT)

- The WPLT Cultures may best be characterized by the a number of key elements.
- A tendency for sites to be located on or near the shores of former pluvial lakes, marshes, or ancient stream channels.
- An apparent dependence on the procurement of various mammals, waterfowl, and collecting and gathering



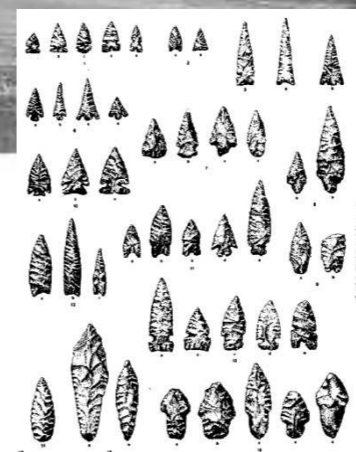
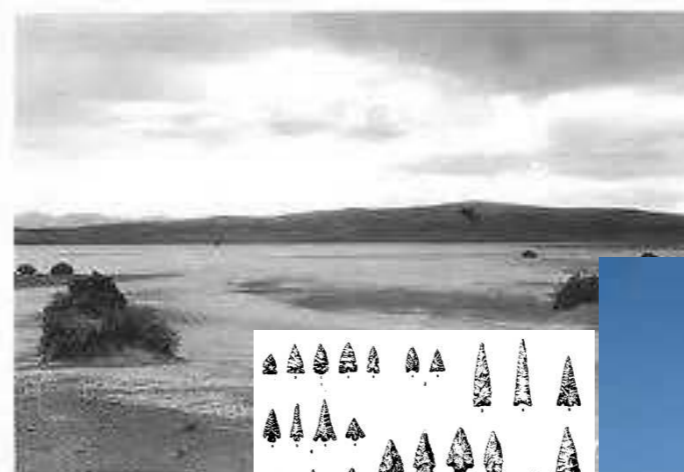
Western Pluvial Lakes Tradition (WPLT)

- An absence of ground stone artifacts (handstones, milling slabs, pestles or mortars) implying a lack of hard seed procurement.
- A highly developed flaked stone industry marked by percussion flaked knives, diagnostic leaf shaped and stemmed dart points, lance-like bifaces, and the resharpener and repurposing of points as burins.
- Finally, the presence of a diverse set of formally developed and pressure/percussion flaked stone tools including; crescents, scrapers, choppers, limaces, scraper-planes, hammerstones, drills and gravers.



Western Pluvial Lakes Tradition

- Cultures adapted to wetland environments appear to have concentrated their activities and had similar expressions relating to lake, marsh, and grassland environments.
- The type site for this expression are the archaeological sites found at Lake Mojave (over by Baker and the Bun Boy - now a Big Boy).
- This is a series of dry lakes located in the eastern Mojave Desert in San Bernardino County.
- The stemmed series of projectile points identified there have been given names of Lake Mojave and Silver Lake.



Western Pluvial Lakes Tradition

- The Lake Mojave points are the longer and more slender of the two. The smaller and broader are the Silver Lake. Both are roughly contemporaneous.
- There is a distinct preference during this time for employing types of stone that are more intractable. That is tougher and more resilient.
- Obsidian was in fact less preferred in contrast to the sturdier igneous fine grained materials including basalt, rhyolite, and various cryptocrystalline silicate materials (including chert, agate, chalcedony, and jasper).

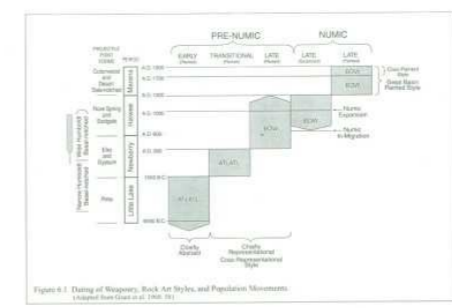


Quick Lesson in Toolstone Material Types: Obsidian

- There are several classes of frequently used toolstone lithic materials that are represented in prehistoric artifact collections.
- Possibly the most ubiquitous is an igneous rock called obsidian - volcanic glass.
- It is usually rather easy to identify due to its high luster, brittleness and ability to conchoidally fracture.
- It comes in a number of colors and can be jet black and relative opaque, semi-transparent, banded, grey-green, red, with white inclusions (phenocrysts) or in many other forms.
- All stone tool materials that are used for tool production must have the property to predictable be “flaked” or reduced into artifact forms and have the property of conchoidally fracturing.

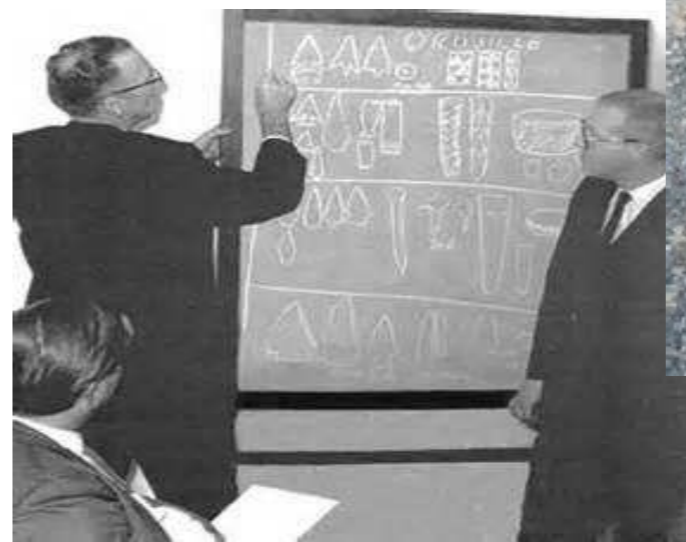


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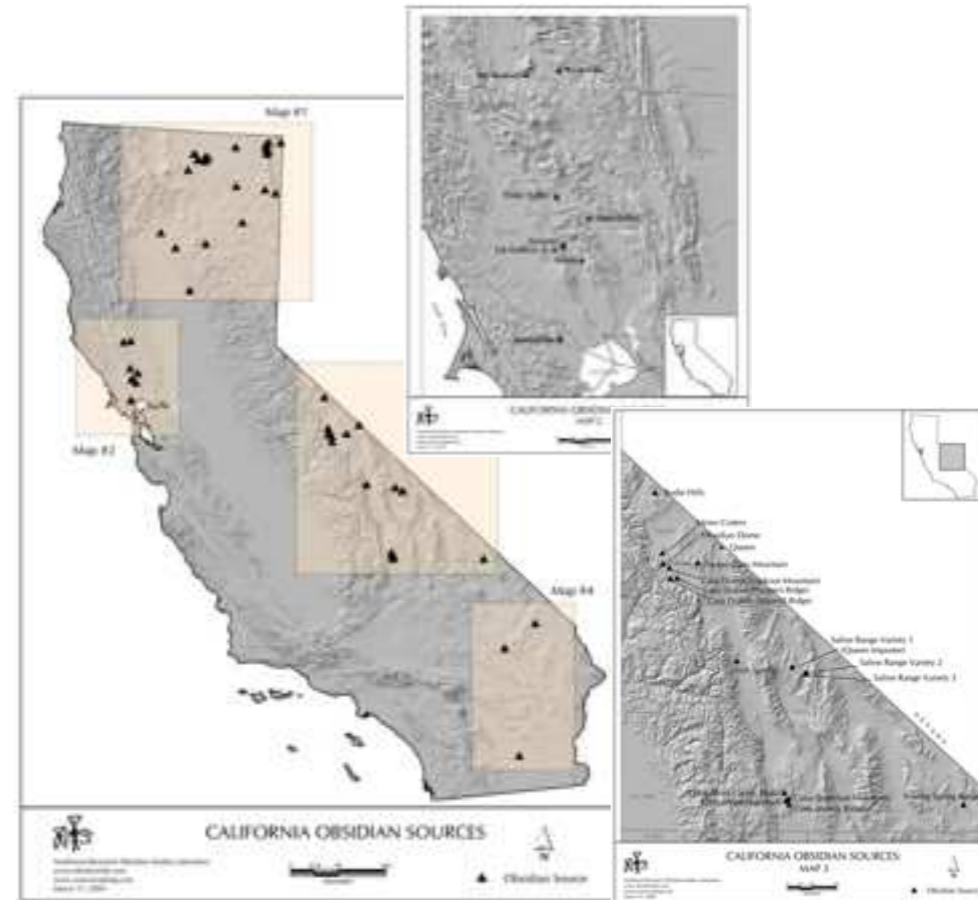
Quick Lesson in Toolstone Material Types: Obsidian

- California in many areas is rich with such materials.
- Northern California in Lake and Napa Counties has Napa, Borax Lake and Mount Konocti.
- In Southern California there is a source on the Salton Sea that was only used late in prehistory.
- We are just now finding out that this source may have been unavailable earlier. Either non-existent or under water!
- On the eastern side of the Sierra Nevada are many glass sources. The one used most commonly here (near Sonora) is Casa Diablo.



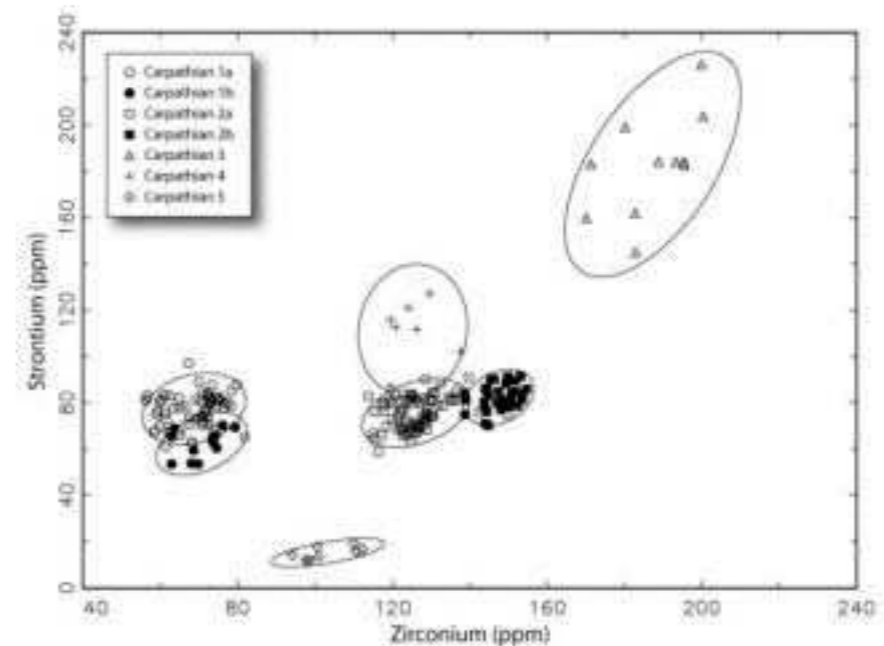
Obsidian Sources in California

- We have been able to chemically fingerprint the specific geographical sources of the obsidian (volcanic glass) using X-ray fluorescence.
- There are labs in California and Oregon that do this kind of work. One is run by Richard Hughes in northern California and another by Craig Skinner in Corvallis Oregon.



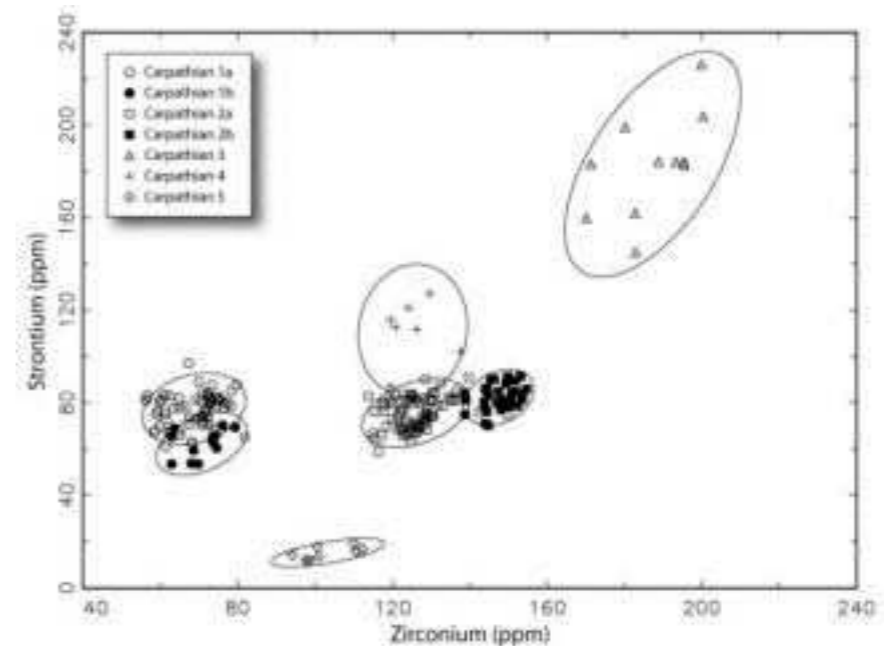
Quick Lesson in Toolstone Material Types: Obsidian Source Determination

- Volcanic glass (an igneous rock) is another name for obsidian comes in a number of colors and all of it can be dated and traced - using obsidian hydration and obsidian source determination.
- Volcanic glass from different areas has different chemical finger prints and using X-ray fluorescence see can measure relative frequency of certain key elements.
- The relative proportions of those elements tells us the source or sub source of the volcanic glass.



Quick Lesson in Toolstone Material Types: Obsidian Source Determination

- We need to know this because the rate at which the glass grows the hydration rim varies from source to source.
- There are several classes of frequently used toolstone lithic materials that are represented in prehistoric artifact collections.
- As you can see in the chart it is often Zirconium and Strontium that in some cases can differentiate the sources for obsidian. Other trace elements also are important as well.



Quick Lesson in Toolstone Material Types

- All of the thousands of different rock types fall into three categories: igneous, sedimentary and metamorphic.
- Igneous rocks are those that solidify from a molten state and they can be extrusive or intrusive.
- Extrusive igneous include basalt, andesite and rhyolite - all are used for toolstone. These are some of the less silica rich stones.



Quick Lesson in Toolstone Material Types

- Sedimentary rocks are just what they seem to be composed of sediments accumulating over thousands of years compacted and cemented together.
- These include shale, sandstone, and limestone.
- Metamorphic rocks have been altered by heat and pressure and the chemical actions of fluids and gases - these include schist and quartzite,



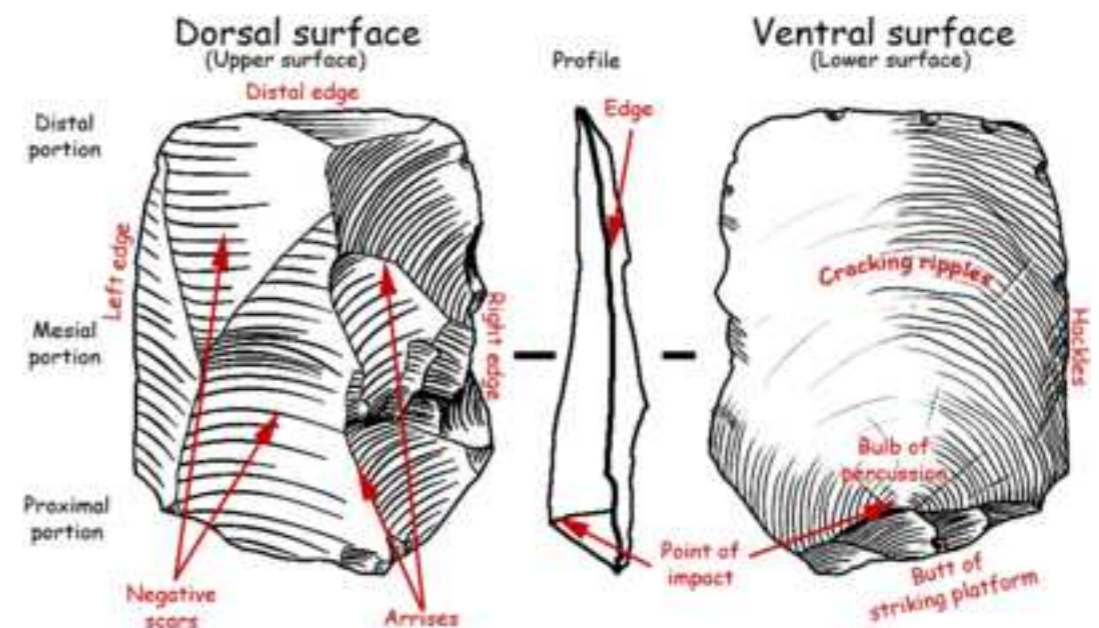
Quick Lesson in Toolstone Material Types

- Other stones include cryptocrystalline silicate materials (including chert, agate, chalcedony, jasper).
- These types of stones have verify fine aggregates crystals found in them in which the crystals are too fine to be distinguished even under a microscope.
- Often these are produced by rapid cooling of magma.
- Chert is one of the more common names for a fine grained silica rich microcrystalline or cryptocrystalline sedimentary rock. The ones we see quite often and have their own names are Franciscan (left) and Monterey chert (right).
- Chert is called flint in England.
- Other terms for silica rich stones are taken from rock hounds and they relate to their color and gemlike appearance.
- Jasper and chalcedony are often used interchangeably. They are the beautiful red, brown, yellow, or mottled opaque stones.
- When they refer to agate normally they are the beautiful banded and translucent materials.



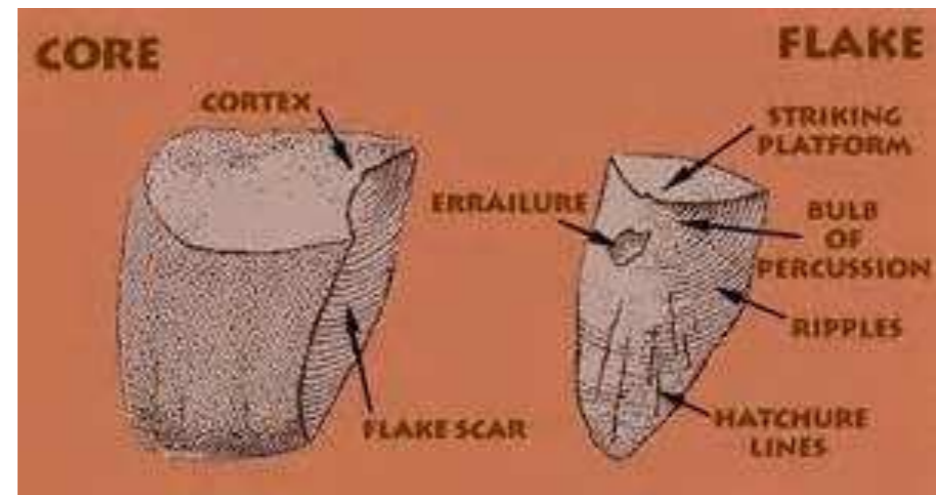
Quick Lesson in Toolstone Material Types: Lithic Technology

- All toolstone when it is reduced or flaked by a Native person produces flakes.
- A flake is a piece of rock removed by percussion or pressure flaking.
- We call many flakes that are the waste flakes from toolstone reduction from flintknapping activity collectively by the French word debitage.
- The mass of rock where the flake was removed from is called a core.



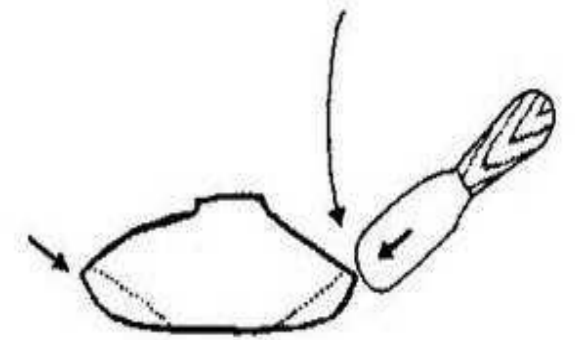
Quick Lesson in Toolstone Material Types: Lithic Technology

- When a rock is flaked the blow often produces a cone and is subject to a conchoidal fracture.
- Such spalls are almost always less than 90 degrees.
- We can in fact tell if the flake we discover is natural or cultural depending upon its edge angle.
- If we have many of 90 or greater degrees these are undoubtedly produced from natural rather than cultural processes.



Western Pluvial Lakes Tradition

- The Western Pluvial Lakes flaked stone assemblage is relatively unique in California prehistory.
- During this type a wide array of formal stone tool types were represented within the lithic industry.
- These forms were fashioned in great detail and specifically percussion and pressure flaked into the exact desired outline and form.
- Two of these forms are some of the more enigmatic and mysterious objects known in California archaeology.



Western Pluvial Lakes Tradition: Eccentric Crescents

- The first form is known as a crescent.
- There are many variants and elaborate typologies have been developed for these objects.
- They are crescentic in shape.
- Bifacially flaked and have a number of different forms



Western Pluvial Lakes Tradition: Eccentric Crescents

- Sometimes they appear to have wings and in other instances they are known as “Eccentric Crescents” as in these instances they take elaborate and complex shapes - almost like mini sculptures.
- The crescents depicted to the right are suggested to be animals.
- The great blue artifact may be an example of a bear and may have been an effigy, talisman or power object for a medicine person.
- It is also our State of California prehistoric artifact.



Western Pluvial Lakes Tradition: Crescents

- Speculation abounds as to at the function of crescents.
- Suggestions have been made that these are surgical instruments.
- Others argue that they are amulets, ornaments or talismans.
- Still others think they are cutting implements.
- We really don't know.
- One of the more intriguing possibilities are that they are hafted weapons that were using on the waterside hunting of large birds (waterfowl) as transverse "bunts".
- Although their function is mysterious whatever their use it is definitely associated with a littoral adaptation - near marshes, rivers and lakes during the terminal Pleistocene and early Holocene eras.

DATE	SITE	CULTURE	REGIONAL CROSS	
			NORTH COASTAL	SOUTH COASTAL
1710			Yreka	Wacama
1650			Stevenson	
800		Late	Collington	Oak Ridge
300		Middle	Mount Pleasant	Cape Fear
1000		Early	Deep Creek	New River
3000				Stallings
8000		Middle	Halifax	Guilford
8000		Early		Murray Mountain
10000		Late		Kirk
10000		Early		Palmer
12000				Hardaway
				Hardaway-Dutton
				Clay



Western Pluvial Lakes Tradition: Limaces

- There are many examples of an unusual tool form especially from Tulare Lake, China Lake, and Rose Valley of a formalized flake stone tool.
- This tool is unifacially worked.
- It has no flake scars on its dorsal face.
- It bears extensive technology edge damage with hinge fractures near the margins.
- Mike Sampson and other studying this artifact type suggest that these are woodworking adzes.
- They would have been hafted into a wooden handle and used in manufacturing activities.
- There are many names for these artifacts: humpies, slug scrapers, etc.
- They were discarded, sometimes in large numbers, apparently when their edge angles became too steep to continue to use for their expressed purpose.
- Although their function is still somewhat mysterious whatever their use it is definitely associated with a littoral adaptation - near marshes, rivers and lakes during the terminal Pleistocene and early Holocene eras.



Western Pluvial Lakes Tradition: Summary

- The Western Pluvial Lakes Tradition (11,000 to 8,000 years ago) expression is unique in California prehistory. It postdates and may overlap partly with the previous California Fluted or Western Fluted cultural expression (13,000 to 11,000 years ago)
- It dates to a time when lacustrine and riverine conditions were more common and could be accessed for a rich bounty.
- Attesting to this prehistoric complex is a remarkable array and abundant inventory of formalized stone tools and spear points.
- The limited subsistence data supports the reconstruction that an array of small mammals, fish, waterfowl, and invertebrates (shellfish) were the principal components of the diet.



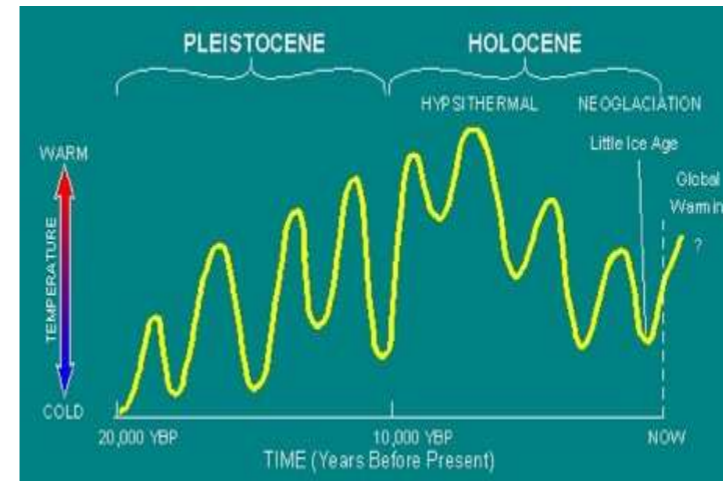
Western Pluvial Lakes Tradition: Summary

- It appears also that sizable groups of Native people seasonally, if not year round, inhabited the margins of marshes, rivers and lakes.
- They also moved very long distances over the landscape in their subsistence-settlement pattern.
- It is possible that other related expressions of their seasonal round of these people incorporated upland settlements.
- These potentially associated encampments demonstrate a complementary diet of seeds, nuts, and other plant foods and included a contrasting archaeological assemblage that includes examples of missing elements that are notably absent at the lakeside sites including a substantial groundstone industry (including milling slabs and manos, mortars and pestles).



The Millingstone Horizon

- Following the Western Pluvial Lakes Tradition is the last of the real statewide archaeological expressions. It is known as the Millingstone Horizon.
- Other names for the complex include the Millingstone Complex or Millingstone Period, Topanga, La Jolla, and Oak Grove.
- Prehistoric archaeological sites after this time, fall into more regional and distinctive expressions beginning at ca. 2000 BC and these regional expressions proliferate and get very, very complicated.
- Although not found in all areas of California - the Millingstone Horizon does have expressions in many areas throughout California and is worthy of an overarching umbrella discussion.
- It has been variously dated, but runs in its various expressions from about 8000 or 9000 years ago to around 4000 years ago or from 6000 to 2000 BC.



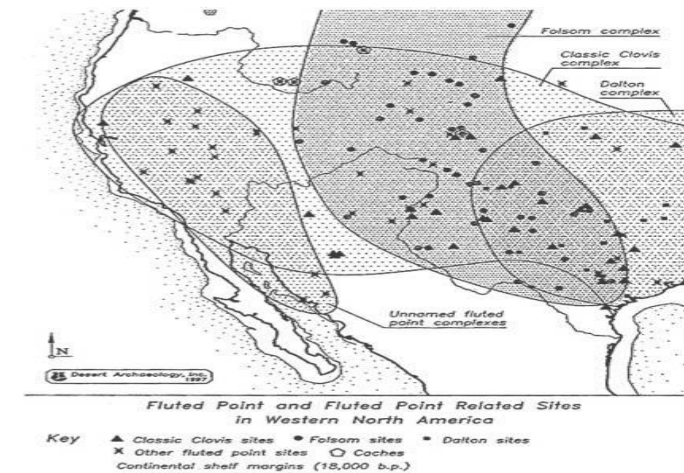
The Millingstone Horizon

- The Millingstone Horizon has expressions mostly in southern California but there are hints of this same tradition in the northern part of the state.
- Sites have been recognized as belonging to this complex include prehistoric settlements in Lake, Los Angeles, Orange, Riverside, San Bernardino, San Diego, Santa Barbara, Santa Cruz and Ventura counties.
- The classic hallmarks and key characteristics of such sites include an abundance of handstones (manos) and milling slabs (metates). Many more of the former than the latter, given that they are apt to wear out sooner.



The Millingstone Horizon

- Burials are found under rock cairns or placed below inverted and sometimes killed milling slabs.
- A lack of projectile points is quite typical.
- The points that are represented in very limited numbers include types that are related or identified as Elko, Pinto or leaf-shaped forms.
- Substantial midden deposits and evidence of intense occupations are represented including midden (blackened soil and kitchen refuse - animal and plant remains) deposits that are sometimes several feet deep.



The Millingstone Horizon

- Flaked and battered stones from sites of this period are distinctive.
- The early pattern of extensive biface reduction and elaborate formalized percussion and pressure flaked tools gives way to an entirely different assemblage.
- Biface reduction is much less emphasized, although smaller tools such as scrapers and knives are present but in limited numbers.
- Instead there is a predominant emphasis on cores, smaller flake tools and hammerstones



The Millingstone Horizon

- One of the more distinctive elements of the expression is a tool form known as a “scraper plane”.
- They are most often fashioned from the somewhat more intractable and resilient materials including rhyolite, basalt, quartzite and other more durable toolstone materials.
- These artifacts are fist-sized plano-convex core tools with extensive evidence of edge damage from use and/or production in the form of hinge fractures.
- They have steep edge angles along their working surfaces.



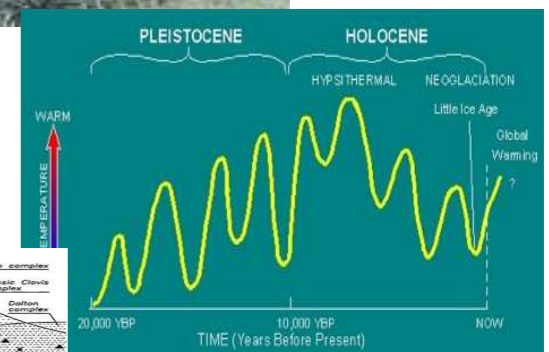
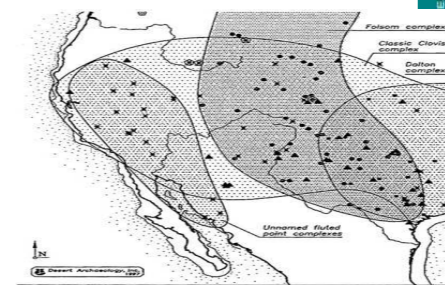
The Millingstone Horizon: Scraper Planes

- The hammerstones and scraper planes are another category of stone tool that may have had a number of uses and is subject to considerable discussion as to the nature of their function and the implications within the archaeological record.
- Makota Kowta wrote an extensive study on the Millingstone Horizon and argued that the function of scraper planes was principally for agave and yucca processing.
- To extract the fibrous materials for rope and cordage and materials for textiles.



The Millingstone Horizon: Scraper Planes

- Use wear analysis and even residue studies do support Kowta's suggestions in some cases.
- However, it is also very likely that the scraper planes and hammerstones were heavy duty implements that often served as devices to refresh or resharpen the surfaces of milling slabs.
- Milling slabs unless roughened regularly become too slick and no longer work effectively as rotary grinding palettes that turn seeds and nuts into flour.



Fluted Point and Fluted Point Related Sites in Western North America

The Millingstone Horizon: Functional Lithic Analysis

- Use wear analysis and residue analysis are sometimes used to infer the function of stone tools.
- Use wear analysis includes replicative studies of the manufacture of comparable, contemporary stone tools crafted by modern flintknappers and then with high powered magnification one may potentially identify the types and intensity of use wear patterns.
- It has been found that the use of stone tools provides clues to the type of activities the flaked stone implements were employed.



The Millingstone Horizon: Functional Lithic Analysis

- Bifacial damage on the edge of a flaked stone tool would normally suggest cutting. Unifacial damage scraping.
- The type of damage is sometimes called nibbling or polish depending on the kind of materials being cut or scraped.
- Heavy edge damage or use wear relate to intense activities such as pounding or chopping or resharpening (like the milling slabs).
- The latter produce pitting and hinge fractures.
- It is sometimes rather difficult to differentiate technological damage from use wear - to say this in another way, Did the edge damage come from the way the tool was made or how it was used?



The Millingstone Horizon: Residue Analysis

- Protein residue analysis is also used to identify the presence of prehistoric, historic, or even modern proteins, of both animal and plant.
- Proteins are present in plant tissues and in all body fluids and tissues, including blood, urine, saliva, fecal material, etc.
- This analysis has been applied most commonly to lithic artifacts, such as scrapers and projectile points, but it also has been successful used on groundstone, soil samples, and paleofeces (coprolites).



dates	period	sub-period	regional phases		
			NORTH COASTAL	SOUTH COASTAL	
			sub-regional phases		
1715-1650	HISTORIC		TIDE WATER Carolina Algonkians	INNER COASTAL PL. Maherrin Tuscarora	Waccamaw
800-300 A.D.		WOODLAND	Late	Collington	Cashie
	Middle		Mount Pleasant		Cope Fear
	Early		Deep Creek		New River
1000-2000	ARCHAIC	Late	Savannah River		Stallings
		Middle	Halifax	Stanly	Guilford Morrow Mountain
		Early			Kirk
8000-10,000	PALEO-INDIAN	Late	Palmer Hardaway		
		Early	Hardaway-Dalton		Clovis

The Millingstone Horizon: Residue Analysis

- Samples are tested using an immunologically-based technique referred to as counter (or sometimes cross-over) immunoelectrophoresis (CIEP or COE).
- CIEP and other immunologically based assays have been modified from techniques developed by forensic experts for use in criminal cases, such as to determine the origin of bloodstains or the type of blood present on a murder weapon.
- These techniques have also been used by the U.S. Fish and Game.



The Millingstone Horizon: Residue Analysis

- Residue analysis on artifacts recovered from a dry cave in Mexico provided scraper planes with adhering materials along their edges.
- Studies of these materials testified to the fact that this residual plant material was from the agave plant.
- Hence, in that instance it appears that the scraper planes were being used to process agave.



The Millingstone Horizon: Cogstones

- Cogstones were made between 6,000 BC and 2,000 BC and are found almost exclusively in Southern California, mostly in Costa Mesa, Bolsa Chica and Newport Beach.
- They were made of stone (frequently softer volcanics - such as pumice and scoria) and often look like a gear.
- Cogstones typically are found on bluffs overlooking the ocean, along creeks or rivers and on knolls above the plains, although some have been discovered in the desert.
- Cogstones are rarely found among other artifacts, so scientists do not know the context in which they were used or crafted.
- We have no written or pictorial references to them.
- Scientists say cogstones, or objects of similar shapes, do not appear in other Native cultures.



The Millingstone Horizon: Cogstones

- The objects lack wear patterns.
- They are in overall morphology grossly similar.
- However in detail they vary greatly in the number of teeth and their form and overall shape.
- Some have teeth, others do not. Some have central depressions, others lack this feature.
- Some are polished, a few are broken and others repaired.
- They are too soft to be used as weapons or milling tools.



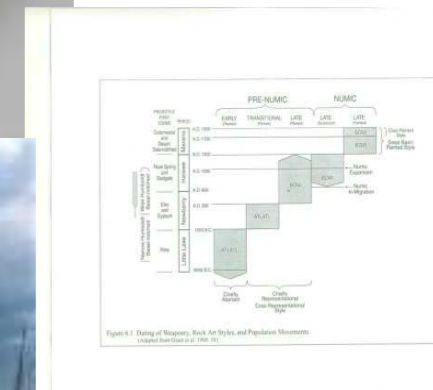
The Millingstone Horizon: Cogstones

- Alternative functions have been suggested.
- Medicinal or spiritual objects, recreational artifacts used in games, numerological/ symbolic and ceremonial use, representations of marine life (sea urchins, starfish, shark vertebra, sand dollars and intended to replenish and re-fertilize sea life).
- Recently another archaeologist forwarded the hypothesis that they were related to a hallucinogenic cactus in shape and hence were associated with Indian doctors and their vision quest rituals.
- However no-one really knows so this remains a mystery.



The Millingstone Horizon: Summary

- So after diving superficially into the intricacies of the Millingstone Horizon what might we say in summary?
- To provide some overall generalizations by way of synthesis we can agree on the following.
- The Millingstone Horizon represents an intensive subsistence adaptation (seeds, nuts, and other plants [roots, bulbs, corms, tubers, flowers, etc.] and a dramatic reduction in mobility [greater permanence in residential settlements].
- Residential sites were occupied recurrently in villages of perhaps 50 people - year after year.
- These were most likely a few extender families that were for the most part economically independent.
- During this period of California prehistory there must have been little gender differentiation in that men and women collaborated on a variety of subsistence activities and were not so much specialized in their efforts (as they were later in time in California prehistory).
- This particular mode of life continued for thousands of years and formed the foundation for the florescence of regionally specialized adaptations and distinctive cultural expressions that ultimately exploded onto the California landscape during the time from 2000 BC to the historic era.



Class Exercise

- Count off by threes. One, two, three, one, two, three, etc.
- We should have five people in each group.
- Pick one to be the Principal Investigator, one to be the field director, one who is the Secretary and one who is the Public Speaker who will present your study.
- You have three topics to:
 - California Western Fluted Points - Group One
 - Western Pluvial Lakes Tradition - Group Two
 - Millingstone Horizon - Group Three
- I will provide you with a scenario for each.
- It is your job to:
 - Describe the Project (Construction and Development Project that led you to investigate the site).
 - Answer the following questions? How big is the site? Is it surface or also subsurface?
 - What was found at the site? Describe all the order of data. What was present - flaked stone, debitage, groundstone, shell beads, plant remains, etc?
 - What forms of analysis did this material undergo? Residue analysis - why? Source determination? Obsidian hydration? Radiocarbon analysis? Functional lithic analysis? Technological lithic analysis? Replicative experiments? Macrobotanical identification?
 - Please reconstruct the prehistoric life ways as best you can from the data provided from the site and see if you might address some questions?
 - How old is the site? How long was it used? What did they do there? How many people lived there? Was it a long term or short term occupation? Were the people highly mobile or were the mostly long term in their residential use. Can we tell what they ate? Can you tell me anything about their social structure or their religion?

California Western Fluted Exercise and Case Study: Group 1

- You have discovered a prehistoric archaeological site along the edge of Tulare Lake, near the town of Hanford in the Central Valley of California and it is scheduled to be destroyed by the construction of a supermarket (K Mart).
- The site is 100 meters long by 50 meters wide.
- The site is mostly a surface expression, but the site is also adjacent to a drainage and you found some of the flaked stone artifacts buried in what appears to be a hearth with charcoal, fire cracked rock and bone.
- The land is privately held and it is a CEQA driven study.
- There are a total of 100 artifacts that you discovered.
- You found 20 California Western Fluted Points. Ten of those are made of obsidian. The rest are chert.
- You identified 20 End-thinned, unfluted Concave Base points as well. Five of those are obsidian and the rest are various cryptocrystalline materials. All are relatively complete.
- You also found 20 bifaces and biface fragments, five are obsidian and the rest are chert.
- You also found two crescents - one is a beautiful eccentric and the other is a simple crescent. Both are obsidian.
- Around the formal artifacts are 40 pieces of debitage. These are unworked flakes and they include 10 of obsidian and 30 of chert.
- In the hearth you identified another fluted and a concave base point and two flakes. The animal bone looks like it is from a Pleistocene animal. It is the end of a femur (leg bone). There are bits of charcoal scattered around the hearth.

Pluvial Lakes Tradition Exercise and Case Study: Group 2

- You have discovered a prehistoric archaeological site along the edge of ancient Pleistocene Lake Mojave in the eastern Mojave Desert
- The site is 100 meters long and 500 meters wide.
- The site is mostly a surface expression, but the site is also adjacent to an ancient overflow channel of the lake and you found some of the artifacts buried in what appears to be a lens of midden (culturally altered soils) that may contain plant and animal remains.
- Upon examination you find several seeds and some animal bones.
- The land is privately held and it is a CEQA driven study.
- There are a total of 200 artifacts that you discovered.
- You found 20 Silver Lake and 20 Lake Mojave Points. Also 40 crescents. Additionally there are the following 10 ovate scrapers, 10 drills, 10 knives, 15 limaces, 10 gravers, and 85 pieces of debitage.
- About 20% of the flaked stone assemblage is made of volcanic glass.
- There appears to be some type of residue on one of crescents near their centers. And one of the limaces has an odd black material adhering to it as well.

Millingstone Horizon Exercise and Case Study: Group 3

- You have discovered a prehistoric archaeological site in the Cajon Pass area of the Transverse Ranges where the San Bernardino meet the San Gabriel Mountains
- The site covers the entire top of a ridge surrounded by drainages and is covered with artifacts and midden. The site is 1000 meters long and 1000 meters wide.
- The site is not far from a permanent spring and is in an area rich with yucca (also called Our Lord's Candle or Spanish Bayonet).
- The site goes down almost two meters in depth.
- The surface of the site is littered with milling slabs. About 50 metates were discovered.
- Additionally 150 manos were collected from the surface and subsurface test excavations.
- The land is owned by the Forest Service. There are a total of 350 artifacts that you discovered.
- You found 3 Pinto Style Points. Also 50 metates, 150 manos, 65 scraper planes, 12 cogstones, and the remaining materials are pieces of debitage (flake waste). One of the points is made of obsidian and 5 of the flakes are volcanic glass.
- Excavations provide a small amount of charcoal and a limited array of economic animal bones (50 pieces, 20 jack rabbit, 10 deer, 10 cottontail, 10 unidentifiable).

Summary and Overview of California Prehistory

- In discussing the prehistory of California it becomes increasingly difficult to make state wide generalizations as we progress through the ancient past to more recent times.
- Overarching generalizations about California prehistory are no longer valid after about 2000 BC.
- After that time regional prehistoric expressions abound throughout the state.

DATE	PERIOD	PERIOD CHARACTERISTICS
1800	EMERGENT PERIOD Upper	Clam disk bead money economy appears. Increasing quantities of goods moving farther and farther. Growth of local specializations re: production and exchange. Interpenetration of south and central exchange systems.
1500		Lower
500	UPPER ARCHAIC PERIOD	Growth of sociopolitical complexity; development of status distinctions based upon wealth. Emergence of group-oriented religions. Greater complexity of exchange systems; evidence of regular, sustained exchanges between groups. Shell beads gain in significance, possibly indicators of both exchange and status. Possible origins or Kuksu religious system at end of period.
AD BC		
1000	MIDDLE ARCHAIC PERIOD	Allthermal may have ended by ca. 3000 B.C.; climate becomes more similar to present-day. Mortars and pestles and inferred acorn technology introduced. Hunting important. Possibility of entry of new population. Diversification of economy; sedentism more fully developed, population growth and expansion. Technological and environmental factors provide dominant themes. Little evidence for significant changes in exchange relations.
3000	LOWER ARCHAIC PERIOD	Allthermal may have begun about 6000 B.C.; ancient lakes drying up. Milling stones develop or are introduced; plant food emphasis, little hunting. Although semi-sedentary life style, exchange seems similar to previous period. Most artifacts manufactured of local materials. Little emphasis on wealth.
6000	PALEO-INDIAN PERIOD	First demonstrated entry and spread of humans into California. Lakeside sites with a probable but not clearly demonstrated hunting emphasis. No evidence for a developed milling technology although cultures with such a technology exist in state at this time depth. Exchange probably ad hoc, individual, one-to-one. Social unit not heavily dependent upon exchanges; resources acquired by changing habitat.
		(No satisfactory information from the preceding Early Lithic Period.)



11,000

Summary and Overview of California Prehistory

- In the grand syntheses developed by two of the “founding fathers” of California archaeology for the Smithsonian volume, they divide up the past with William Wallace taking the period before 2000 BC and Albert Elsasser presenting a picture of California’s past after that time.
- It is interesting to note that Wallace takes 12 pages to cover 9000 years including 13 photographs and illustrations, one map and one table.
- Elsasser covering less than half that time takes 21 pages and requires six tables, four of them covering a full page, and uses just two photographs and one map!
- The latter is just a thin inkling of the complexity of California prehistory when we just look at the last four millennia.

DATE	PERIOD	PERIOD CHARACTERISTICS
1800	EMERGENT PERIOD Upper	Clam disk bead money economy appears. Increasing quantities of goods moving farther and farther. Growth of local specializations re: production and exchange. Interpenetration of south and central exchange systems.
1500		Lower
500	UPPER ARCHAIC PERIOD	Bow and arrow introduced, replace dart and atlatl; south coast maritime adaptation flowers. Territorial boundaries fairly well established. Evidence of distinctions in social status linked to wealth increasingly common. Regularized exchanges between groups continue with more material entering into the network of exchanges.
AD BC		
1000	MIDDLE ARCHAIC PERIOD	Growth of sociopolitical complexity; development of status distinctions based upon wealth. Emergence of group-oriented religions. Greater complexity of exchange systems; evidence of regular, sustained exchanges between groups. Shell beads gain in significance, possibly indicators of both exchange and status. Possible origins or Kuksu religious system at end of period.
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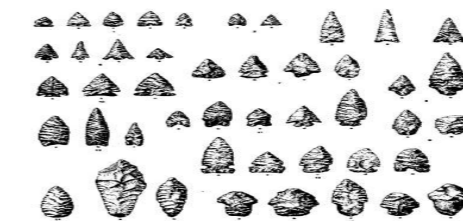
Regional Prehistory

- Suffice it to say things get very, very complex.
- The archaeological record begins to grow in profusion and especially in Central California, the Bay area, and Coastal Southern California there exists elaborate mortuary complexes with an incredible array of material culture.
- The latter is indicative of the highest degrees of social elaboration.
- Impressive sociopolitical organization, great ethnic diversity, and the highest concentration of population north of Mexico characterizes these prehistoric cultures.
- In some instances within California we are dealing with societies that achieved an incipient chiefdom level of society, had permanent villages, shell bead money (a true currency) and elaborate exchange (trade) systems.



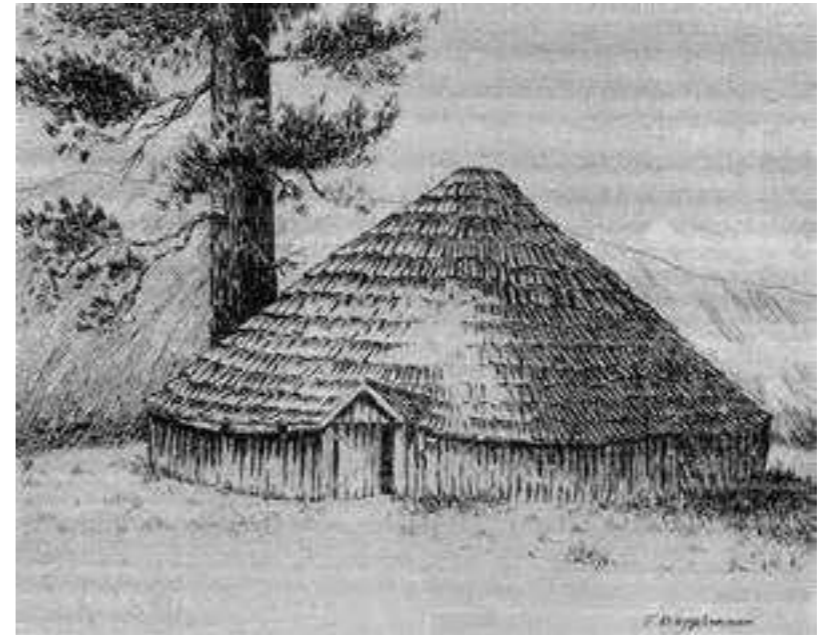
Regional Prehistory

- Since we can't really deal with a statewide synthesis and the archaeological record statewide is so complex - perhaps the next best thing is to focus on the regional prehistory of your immediate area.
- I thought it appropriate to provide an overview of what we think we know about the prehistory of the Sonora Region.
- My discussion is based on the works of my colleagues at Far Western.
- Particularly the recent studies of Jeff Rosenthal, Kelly McGuire, Bill Hildebrandt, Eric Wohlgemuth and Kim Carpenter.
- We are especially fortunate for their in-depth studies of prehistory and the partnership that your tribe, Caltrans and Far Western forged with respect to their work for the Sonora Bypass.



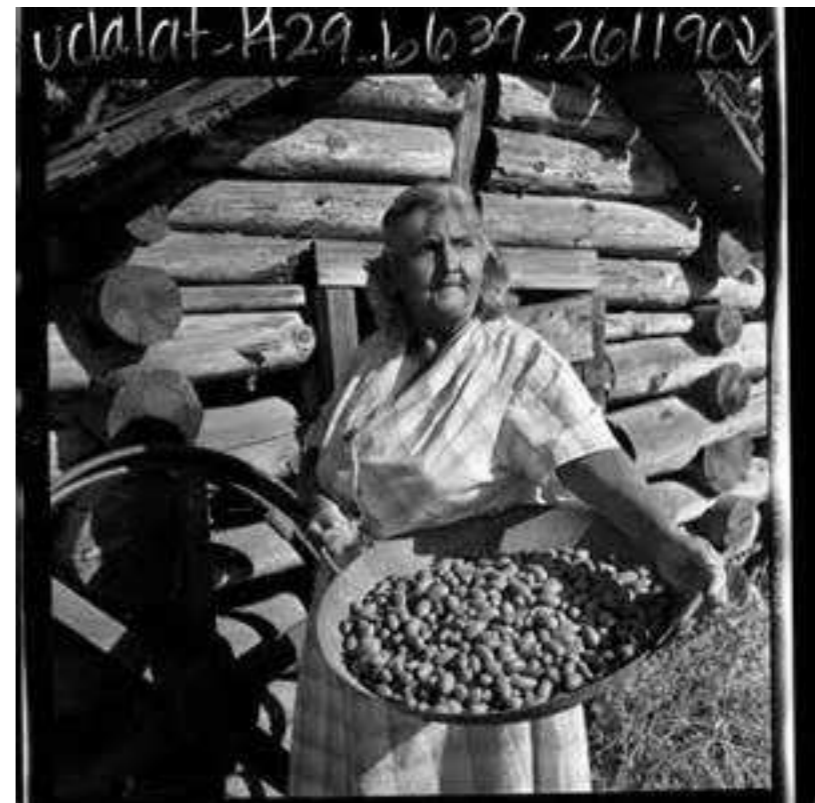
Sonora Region Prehistory: Late Archaic

- The period from about 2000 BC to the time of Euroamerican Contact has been divided into three distinct periods.
- The first period is known as the Late Archaic.
- That time begins at 3000 cal (calibrated) years before present (BP), ca 1000 BC and endures into a time dating to 1100 cal BP or ca AD 900.



Sonora Region Prehistory: Late Archaic

- During the Late Archaic the Sonora Region evidenced extensive Native occupations including substantial residential use.
- The latter can be recognized by the presence of dense and diverse archeological assemblages.
- The materials at these sites include substantial accumulations of fire affected rocks.



Sonora Region Prehistory: Late Archaic

- Archaeobotanical remains attest to a dominance of fall ripening nuts with only a minor complement of spring and summer ripening seeds.
- Such sites appear to have been occupied seasonally over a long period of time.
- During the Late Archaic, sites are broad scatters of cultural material suggesting repeated and generalized use of certain habitats and landforms.



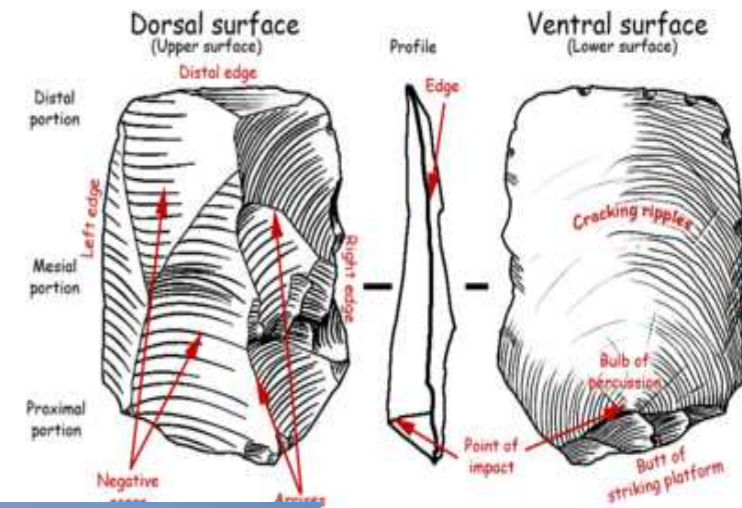
Sonora Region Prehistory: Late Archaic

- The milling slab handstone combination is the predominant expression of ground stone technology.
- Late Archaic sites of the Sonora Region exhibit a specialized and selective set of tools indicative of extensive processing of plant foods.
- These include core tools, battered cobbles, and millingstones.
- It has been argued that this surely represents an archaeological analog for the ethnographically described fall pine nut processing industry.



Sonora Region Prehistory: Late Archaic

- Exotic volcanic glass is a significant contributor to the flaked stone industry in the Sonora Region throughout prehistory tallying between 24 and 54 percent of the entire assemblage.
- However, it is the Late Archaic Period that sees peak obsidian use with obsidian contributing its highest frequencies.
- Significantly, we see the greatest amounts of Casa Diablo obsidian - higher than in any other period of time in prehistory.
- In other time periods Bodie Hills obsidian is the most dominant of the volcanic glasses.



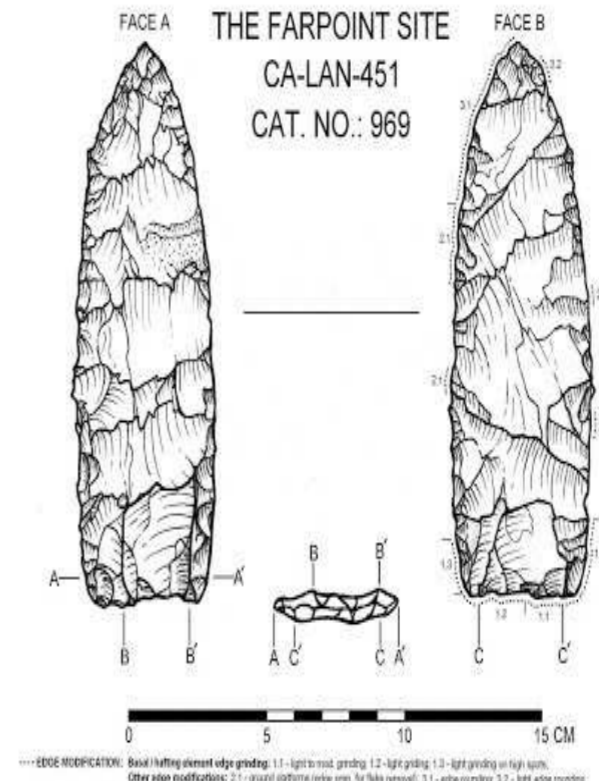
Sonora Region Prehistory: Late Archaic

- The Late Archaic peak in obsidian in the Sonora Region was fueled by the production of Casa Diablo and Bodie obsidian black glass traders.
- This was the apex of the large scale, regionally extensive, trans-Sierran, exchange system in California.
- This inter-regional exchange saw its rise and fall coupled with a decrease in mobility (rise in sedentism) and an increase in logistical organization land use patterns (rise of gender differentiated work organization).



Sonora Region Prehistory: Late Archaic

- Men specialized in the hunt, women in gathering plant foods.
- For the east-siders, men were in the uplands hunting big game (bighorn) and trading obsidian bifaces with the Sonora Region folk.
- The east-side Natives were supplying the west with surplus obsidian for exchange.
- Upland areas were used almost exclusively by eastern Sierran peoples from the Great Basin.
- Far reaching mobility patterns respond to the Late Archaic pulse of Casa Diablo obsidian.



Sonora Region Prehistory: Recent Prehistoric I

- A striking element of the prehistoric occupation pattern in the Sonora Region is an almost complete absence of use of the area during the period known as Recent Prehistoric .
- That episode falls within a temporal span running from 1100 to 610 cal bp or ca. AD 900 to 1400.
- Such a Period is notable since this is now known as a time of pervasive drought and epic dry spells.



Sonora Region Prehistory: Recent Prehistoric I

- The latter is especially prevalent during two especially dry intervals from 1100 to 900 cal bp and from 800 to 650 cal bp.
- There is a close correlation of these two time periods.
- No other apparent socioeconomic motivation provides a basis for serious consideration when attempting to explain this pattern of settlement disruption.
- However, the set of catastrophic environmental circumstances remains a plausible explanation for the lack of prehistoric cultural activity and virtual abandonment of the area.



Sonora Region Prehistory: Recent Prehistoric II

- A rather sudden and dramatic shift in settlement and subsistence patterns marks the Recent Prehistoric II time in the Sonora Region.
- We see more intensive use and a pattern of more restricted and fixed land use representing more regular occupations of longer durations.
- Accompanying this shift is the regularly occurrence of permanent, bedrock milling features



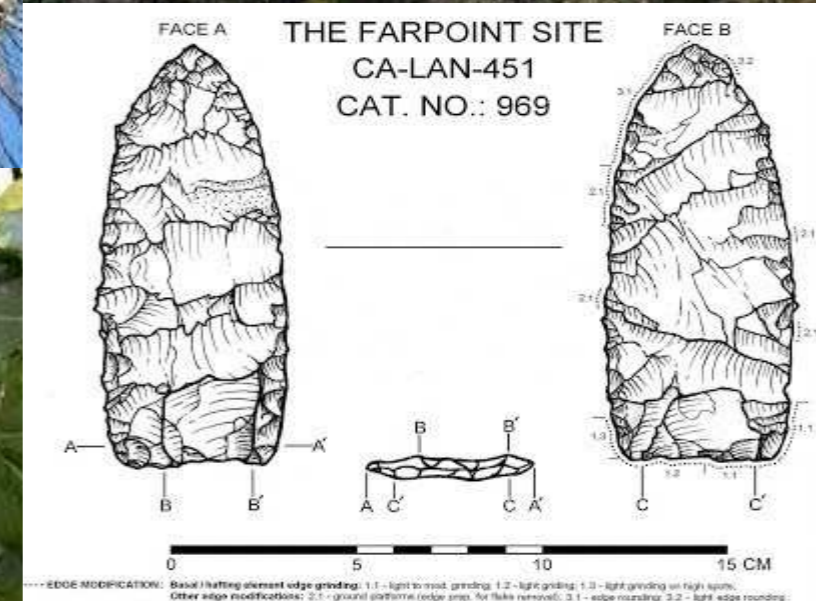
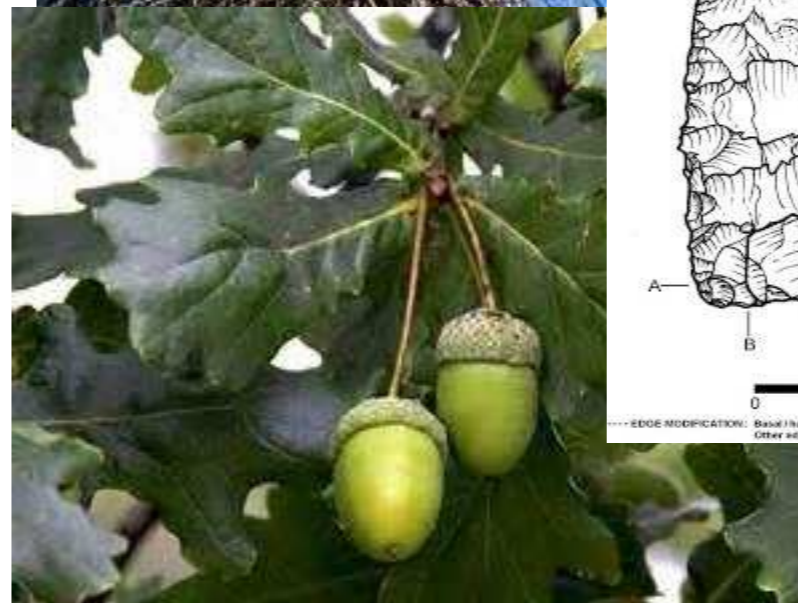
Sonora Region Prehistory: Recent Prehistoric II

- The bow and arrow are clearly the primary hunting weapons supplanting the dart and atlatl.
- This transition is considerably later than in other areas of California and the Great Basin.
- In general with the establishment of permanent milling facilities, we recognize a distinctively greater emphasis on territoriality and residential stability.



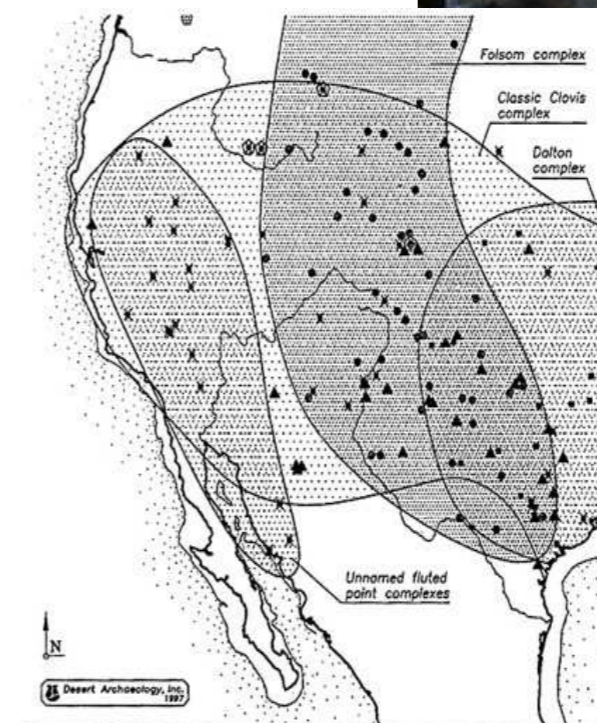
Sonora Region Prehistory: Recent Prehistoric II

- Acorns clearly became the nut crop of choice and the dominant and central subsistence focus.
- Grey pine nuts were still important but were mostly supplanted by a full scale acorn economy.
- This emphasis on acorns came thousands of years later than equivalent expressions identified in the Central Valley and the San Francisco Bay area.



Sonora Region Prehistory: Recent Prehistoric II

- The far reaching effects of the east side black glass traders is drastically reduced.
- Moving from a dramatic flow to no more than a trickle.
- That restructuring of such a ubiquitous and long enduring pattern is thought to owe to shifts in mobility (to a much higher degree of sedentism for the Sonora Region Natives) and the shift from dart to arrow production.



Fluted Point and Fluted Point Related Sites
in Western North America

Key ▲ Classic Clovis sites ● Folsom sites ■ Dalton sites
X Other fluted point sites ○ Caches
Continental shelf margins (18,000 b.p.)

Sonora Region Prehistory: Recent Prehistoric II

- Prehistorians have suggested that the Recent Prehistoric II archaeological remains and the attendant changes that came with that expression may not relate to *in situ*, cultural developments.
- This rather may represent the immigration of an exotic people - the arrival of the Me-Wuk from the north.
- The Me-Wuk may have been able to supplant the former resident populations abiding in the region due to their ability to take better advantage of the local resource base.

