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TRIBAL GEOGRAPHIC INFORMATION SYSTEM (GIS) PROTOCOL, SOUTHERN SIERRA MIWUK NATION, YOSEMITE-MARIPOSA, CAILFORNIA, US

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ABSTRACT

Indigenous names relating to Significant people and places along major tributaries emptying into the great San Joaquin River define culture boundaries. Compilation of data necessary for completing a Tribal GIS database used seven criteria listed by the BIA and implemented into theme layers. When GIS resource layers from other agencies are queried, patterns emerge to relate lineages of 11 culture resource routes through ceremonial villages, camps, and Treaty E and Treaty M boundaries to ethnographic village records. Tribal GIS protocols can be applied to datasets from other tribal cultures using a simple set of table guidelines for watershed nomenclature.

INTRODUCTION

Just before the culture changes had taken their toll upon the indigenous communities located at a major ford across the Merced River, *Se-saw-che* had been a central area for local cultures to come together. Resources that existed within a 20 mile radius consisted of salt manufacturing, salmon harvesting, seed fields in the meadows just above the cliffs, bulb and onion fields along the bottoms

called "*yowoko*" meaning "muddy or slow sluggish waters", and other necessities. [1] This bustling place was used as a crossing by the *Chimteya* and the *Awalache* people, by Moraga, by the Gold Rush multinationals, and by the U.S. Cavalry expeditions. As this place reportedly completely covered "both sides of the river" it was listed on village registries from ethnographic reconnaissance experts spelled both "Se-saw-che" or "Si-so-chi" and was reported in the language of the *Chimteya* indigenous group occupying the region for centuries. [2] This was just one of the major fords across rivers and tributaries within the culture areas of the Southern Sierra Miwuk Nation Territory.

Today this ford lays hundreds of feet below the surface of the water where recreational use occurs when the water levels of the lake are high. The Horseshoe Bend area of the Merced River has layers of history much like the theme layers, or land use layers occurring over time in many other regions of the territory. Over the past decade, a team of Geographic Information System (GIS) analysts have been compiling the data for completing the Tribal GIS database for the Southern Sierra Miwuk Nation which is comprised of the indigenous people from approximately eleven culture zones who traveled the tributaries descending from the Yosemite National Park headwaters. Similar stories of the major fords and family use areas have been recorded and mapped in the indigenous languages for the major tributaries emptying into the great San Joaquin River of the California Central Valley. These major fords were home to headmen and headwomen for centuries, and the population records, tribal rolls, historic records, oral tradition, and government census data have been used to repopulate the villages at various densities in some cases back to the Spanish occupation era. Although we understand that the indigenous population was present, the factual oral history as told by the Tribal holders-of-knowledge for some areas are still intact (through memorization) and from other areas it has been reduced due to the turbulent past.

Regions where there had been a successful recounting of these place names, fords, trails, food sources, herd routes, and other essentials for life in the early 19th century, have been captured into the searchable database in the Tribal Council offices. Since the adoption of the State of California Senate Bill 18 in 2005, there has been an effort to make available for pre-consultation helpful information saving

time and funding for projects throughout the territory.[3] It is hoped that through sharing the developments over the past decade through a "how-to" presentation of the development of the database, other Tribal groups may benefit. This task was necessary for amending the documentation for the Federal Recognition Application that was prepared in 1982 for them by Dr. Lowell Bean.[4] Given the previous research, it was only necessary to chart the documentation already available in order to find the holes in the information over each decade. These were the deficiencies that may have been detrimental had they not been defined and addressed before the Tribe became "Active" on the Bureau of Indian Affairs (BIA) schedule for review. While compiling the Tribal GIS database, the seven criterion listed by the BIA were used as part of the basis for acquiring and implementing new layers to the GIS database existing theme layers.[5]

BASIS FOR GIS PROTOCOL

This paper will present the process for organizing the information acquired into a searchable format through the use of tables and charts which are placed into a specific order. Using ordinal sequence of time and generations, and attaching them to literal positions on the topography of the landscape, all of the relationships can be seen. Theme layers explain why a population would chose a specific location to become dense, or small at various locations. When GIS resource layers combine withoutside agency data layers (biological inventory, hydrologic data, herd movement charts, androgynous population movements, aviary disposition, etc.) patterns emerge to relate all the layers of the ecosystem including the large vertebrates—humans in the macroclimates.

These theme layers developed over time as the amendment to the Federal Recognition documentation revealed relationships that had not been noticed by researchers in the past. The largest element of this process was the theme layer for the Native Naming of the people at the early phases of culture change in California. This is also the most controversial. In order to extinguish this controversy, arguments from all sides are being entered into the database. Information is entered where specific individuals were born or buried, whether areas were of shared usufractory rulings, and other variables.

This is an area that ethnographers usually avoided due to complex compliance issues with Section 106, with the mandates of the Native Graves and Repatriation Act (NAGPRA), and the environmental lawsuits issued when environmental groups partner with indigenous family members claiming special status outside of regularly recognized communities.

Whether these regularly recognized communities are the "real" communities is not at issue here. This database is directed toward resource management relationships. As the data-entry contains only factual reference annotations georeferenced implementing plot markings and buffers, any information donated in the category of Oral Tradition is referenced as such and any participant has the ability to include their remembrances and have them mapped. All of the information submitted is mapped with a confidentiality statement and a secure storage location accessible only to the person who submitted the data and the system administrator. This type of storage system has been in use across the world for protecting information. The protocols for this protection for our study has been adopted from the State of Arizona - AZSITE, the official archaeological cyber system for professional archaeologists to access and submit archaeological field work data and maps. [6]

The organization of this paper will review the process of how this group (from 2000-2008) followed a strategy to gather the information necessary to amend the existing information obtained in 1982. The process that was undertaken by Dr. Bean followed a research design that extended over a 3-4 year period when a team including Dr. Bean, Edra Moore, and Sylvia Brakke-Vane initiated and completed the study. [7] This study provided the format used to compare its' contents to the seven criterion provided by the BIA for approved submissions. In 2001 there were initial telephonic communications with the Tribal attorneys, with other Tribes initiating this process using GIS and their attorneys. Detailed notes of these interactions are housed in the Tribal archives in Mariposa. Also found in the Tribal archives were communications and government documents donated by Allogan Slagle. His contribution and communications with the past Chairman in the 1980s during the original petition construction were invaluable. During 2001-2002 the author had communications with Mr. Slagle. [8] This has been offered as

background. Endeavors such as this project span over generations. While discussing the Federal Recognition process with Elders in the Tribe over the age of 70 years there is a common thread of the anticipation of failure and statements of hope are rare.

OUTLINE FOR TABLE CONSTRUCTION

There are ten tables that were compiled in order to attach them to the GIS theme layers. The georeference and UTM locations for each of these tables are searchable. The tables consist of: a.) Family names- individuals listed by Indian names and Anglo names; b.) Chronological listing - Birthdates of all of these individuals; c.) Alphabetical Listing of all Indian names for all habitation locations, villages and camps; d.) Alphabetical Listing of all names from legends and mythology, ceremony, culturally related nomenclature; e.) Alphabetical Listing of Indian Names all Economic Plant species and determination of medicinal use (important for ceremonial village site locations); f.) Alphabetical Listing of Indian Names of all non-botanical resources used- obsidian source regions, minerals, clay, salt, shells etc.; g.) Numerical listing of all known archaeological sites within the region you are creating the GIS mapping with georeference; h.) Alphabetical Listing of the headmen and headwomen relating them to the larger cultural name; i.) Culture Area Names defined and attached to the various family lineages; and,   j.) Create a database of all symbols, tattoo, pictographs, petroglyphs or any type of representational signs- even hand gestures if found that may have been found to divide a group of people from another group of people. [9] Each of these tables will be described in the following discussions.

In order to answer NEPA, CCP, PAD [10] or any other Ethnographic inquiry, there needed to be a basis for defining the culture areas. These areas are not just random resource areas and villages, they were macroclimates organized to support various population densities (before 1770s) and supporting historic populations today. Combining all the references and oral histories collected since work on reconfiguring the submission for recognition began, we have come up with a guide to the division of use. The previously listed tables/charts are sorted by a color code, by alphabetical village names (328 habitation

sites), Culture Areas (11 family lineages), Culture Area Routes (11 +/- travel ways between elevation resource areas), and by the Quadrangles in the GIS mapping system. Village names have been configured within the GIS as points where the buffer for village size can be formulated within variables (elevation to include in the village, water resources, soil types, topography, etc.). Each village point has a link to the population which lists the people found in of literature and oral record to have lived there or visited there.

Each name that appears in the population list has been linked to a cultural area group of names. Hence, the quantitative groupings of all 11 culture areas that we have input have the qualitative investigative efficacy of the references derived from the bibliography. Along with the inventory of villages having UTM georeference, the cemetery records, burial site records, and roundhouse ceremonial village references can be used to delineate the findings listed with coordinates. In village regions where the population became sparse in the late 1700s, there may be patterns of cultural movements that may explain these regions. After the buffers for the village regions have been set-up using elements of the environment, the layers for flora populations (plants with economic value), faunal movement (herds, schools, and flocks), and non-organic substances that are used can be layered over these routes to understand better management practices.[11] These layers can be queried at a later date with faunal remains databases.

Alphabetical Table of Family Names

Family names and the names of individuals listed by Indigenous names and Anglo names need to be entered into a table with both listings visible for alphabetical reference. When the names are entered into the table, the name, the reference, the geographic location, important dates, or topic can be added. The table columns may be designed to include other information since it can be accessed in later queries. The names listed on roll applications in other languages, for example, Haw-haw, can also be marked in a column titled "Signer of the Petition to Congress" or "Signer of Treaty M" or any other document in the database.[12] The Anglo name for Haw-haw is Joe Rube, so he will be listed as: 1.) Rube, Joe, Haw-haw;

2.) Haw-haw, Joe Rube with the same information marked in the columns after his name that appear both places .[13] Under the Family Names columns, there is also the need to list maiden names for females in this way. The column for "Events" can be added for people of significance to have a mention of what that person is well known for and where the event happened can be attached to the UTM column. This table and the Village table are the two with the highest level of importance and are the basic theme layers.

Numerical Generations, Genealogy by Birthdates

Chronological listing of birth is useful for determining the generation relationship of family members that sequentially name themselves after one another. This misinformation might disqualify the data when inspected by the Bureau of Indian Affairs (BIA) reviewers.[14] Birthdates of all of these individuals can be entered into the original Family Names table and then the table altered at the end to sort by birthdate. The birthdate table is important to the chronology of events later on in the database use. As an example of the use of ethnographic references, when a question was raised regarding the daughter / granddaughter of Tenaya from Park Service literature, this information clarified the relationships.[15]

Alphabetical Habitation Locations, Villages, and Camps

Alphabetical Listing of Indigenous names for habitation locations, villages and camps are the other important georeference tool. In the Southern Sierra Miwuk territory, there are various ethnographers over time that mapped out the locations. There were rather clear descriptions of these locations when read by a familiar geographic resident to the region. The landmarks used by them can be traced back through the land deeds and records from the county to locate historic plot maps showing similar localities for positioning populations. Some quadrangle village listings have up to 6 ethnographic references for one village location. When newspaper, magazine, court documents or other errata are matched to the locations the quality of the data-point is high. Each ethnographic village list was first plotted on the hard copy map. In some cases, the population differed or the specific location was moved a few miles. In many cases the same people were listed on village populations in many villages by different ethnographers.[16] Until a few

years ago this has been attributed to family visiting, but in recent findings, this is attributed to family use route usufractory ownership of single culture routes crossing and inhabiting other culture area regions. [17]

Alphabetical Nomenclature of Legends, Mythology Naming Patterns

Alphabetical Listing of all names from legends and mythology, ceremony, culturally related nomenclature are recorded in tables with both the Anglo name, the Indigenous Name, and the significance of the name. The importance of this part of the semantic referent is high where there may be only one or two references to a person or village where a definite correlation between a legend or myth that is not shared across cultures. This is significant in order to parse the vague relationships. When the mythological semantic is then transferred to other naming processes surrounding the 5-10 mile radius, the patterns are easier to locate. The literal contents of the mythology can also be referenced to add clarity to oral history, to cultural boundary disputes, to usufractory claims and to clarify an ethnographer's notes regarding people of that place. [18]

Alphabetical Economic Plant Species Naming and Management

Alphabetical Listing of Indigenous Names for all Economic Plant species and determination of medicinal use (important for ceremonial village site locations), material culture uses, and for nutrition has potential for georeferencing. While investigating the ceremonial villages there was a set of medicinal plants that appeared in most roundhouse villages that were related to naming procedures. These plants still appear nearby, and during archaeological investigations the soil seed bank produces samples of fiber or seed for some of these plants. The elevation levels contribute to various species populating ceremonial villages. [19] Usufractory areas for major seed gathering plots are around the lower elevations. Some high mountain meadows have short seasons for seed gathering. A resource inventory might be seen in Hetch-Hetchy where the entire valley was named after the medicinal grass roots. [20] Historic literature cites many occurrences of witnesses to seed-beating and gathering practices. Most of the oldest sightings were of burden baskets filled with acorn . [21] The Southern Sierra Miwuk Native Plants Database listing table in

this GIS system lists 1,183 species with a list of 750 waiting to be listed on the main list. [22] Listing on this table requires references to the use of the species in one or more ways either from literature or from an Elder report.

Alphabetical Economic Use of Non-Botanicals

Alphabetical Listing of Indigenous Names of all non-botanical resources used, such as obsidian source regions, minerals, clay, salt, shells, and other items. This can include areas used to trade the substances, or areas used to produce them. These types of items have been mapped by Sample, 1950 and Davis, 1961 where they produced papers based on resource findings from archaeology. [23] The routes were confirmed through historic maps. The use of archaeological findings can be linked through this table by linking to the table of numerical archaeological sites within the territory.

Numerical Archaeological Site Records Table

Numerical listing of all known archaeological sites within the region you are creating the GIS mapping can have georeference links for the resources found in the studies. [24] Each study inventory of artifacts can be a column in the table searchable from other tables with close proximity UTM locations. This has already been done in the AZSITE database for the faunal remains in archaeological site records for the entire state of Arizona (see this list at http://faunaz.asu.edu/). The historic and significant person references on site records can also be linked to add support for findings.

Alphabetical Headmen and Headwomen

An alphabetical listing of the headmen and headwomen with the reference literature relating them to significant events, documents, and the larger cultural territory charts the relationships of them to other groups. Villages where they were known to visit and live, resource areas they were cited as being usufractory components, and generational relationships answer temporal queries. The referents need to be noted. In other words, who called them a Captain or Headperson, who called them a medicine person or

dance Captain (i.e. who was the informant?). How were they participating in the reference, and where was the activity occurring. Incorrect terminology for the activity or name for a person makes it is important to define the source as well as the referent at this level.

Regional Cultural Area Color Code of Village Resources

Culture Area Names defined and attached to the various family lineages in this table can be from both sides of a family. When an individual calls himself a cultural name, or when someone from another cultural group calls them a cultural name the two may not match. It is important to just write down what they said and who said it into a concise table. There is sometimes confusion as to the "directional" use of directions from one culture to the next.[25] This table's accuracy is dependant upon the volume of listings and the quality of the informant. The culture code for a group of families may come from information from all of the other culture tables combined to give a percentage of probability for being a member of one culture more then another culture. The kinship rules apply here where they may be matrilineal or patrilineal which would affect the locations they resided and the villages that they maintained.

Numerical Listing of Symbols, Tattoo, Pictographs, Petroglyphs

Create a database of all symbols, tattoo, pictographs, petroglyphs or any type of representational signs- even hand gestures if found that may have been found to divide a group of people from another group of people. Each of these tables will be described in the following discussions. Julian Steward divided them according to symbol names.[26] This table can also be divided according to a numerical system that you design according to the visual images of your culture, or whether there was a form of orthography present. In our culture there was no orthography, only a small set of symbols.

ASSEMBLE ETHNOGRAPHIC RECORDS

Compile the primary source materials regarding your group of people. Use all government records, anthropologists, establish them in a chronological pattern according to their collection periods.

Find the "negative space" in ethnographic literature and oral interviews where people were not named. These records can be statistically related to specific people after the database is larger. The dates on various census data will relate to when an ethnographer was in a region. Ethnographer's data can be put on the table according to the geographic markers, chronology at the locale, and information regarding a person. Beginning with the Spanish records, Alexander Taylor Smith, Mission, and other historic records-table this data according to the chronology of the events, and dates of the articles.[27] The numerical or alphabetical information from the ethnographer in the table with a column for the authorship reference can be sorted creating a reference table searchable for all of an ethnographer's entries.

Tribal Archives & Confidential Data

History books, gazetteers, multi-era maps, journals, and diaries, newspapers and magazine articles, ethnographer's field notes, and compilations all of the literature for a region can be cataloged. These should be placed in a bibliography and chronologically by date of publication. Organize records for repatriations and family involvement in NAGPRA genealogical reviews and documentation from the local and federal government. Organize the Tribal history, Federal Recognition documentation, legal court cases, correspondence with your attorneys, planning department interaction reports and correspondence, all government records and correspondences between all government agencies chronologically. Notes from Tribal Consultations, Tribal Council Meetings, Oral Histories and testimonies should be archived in order of date. It is not necessary to scan these documents right away, but eventually all of this will be in PDF attachments for the GIS links to the places they depict.

Place all of the important village lists into a single location—binder/binders chronologically—as Merriam has all those lists of Yokut names alphabetically.[28] Keep the maps from each village list with that ethnographer's data. It is important to be able to match the rivers to the maps. It is important to have all of the maps from each ethnographer in one place for quick reference. Within the village data retrieval for the territory we have surveyed there are village map references from literature.[29] There are

independent indigenous contributions for locations for villages and usufractory territories. These should all be scanned and placed into the links for the UTM coordinates.

COMPILATION OF HARD COPY MAPS

Beginning to plot the layers can be done by using hard copy topographic quadrangle maps for your territory. Examples of this process were presented at the ESRI UC in 2005 in a presentation for a project in Canada where culture mapping was videotaped.[30] The Environmental Protection Agency (EPA) provides funding for programs similar to the Coeur d'Alene tribal group who applied for geographic name changes for their territory mapping. Coeur d'Alene Tribe who was awarded the grant for the three day geographic naming conference via the EPA. In the report of the September 2007 US Geographic Name conference there were various applications for indigenous names around the country to be approved as alternative listings in the GNIS after being submitted to the BNC.[31] The first step toward indigenous naming on the U.S. Geographical Survey (USGS) maps is to begin the recreation of the cultural environment of the 18th century.

Creating a mapping grid requires placing the quadrangles in order on the master map on a small scale in order to correlate quadrangles. Once you obtain the hard copy maps, store the maps alphabetically. Mount the quadrangle maps on cardboard or foamcore so that they are stable and don't tear under heavy use. The territory of our family routes uses approximately 75-80 topographic quadrangles. These are housed in metal drafting drawers and transported using portfolios. Clear mylar or polyester layers can be placed as overlays in order to organize the materials for input into the GIS database.

Pencil in Ethnographic References

Pencil the locations in where the important, obvious villages, and burial areas appear in the literature on the maps. In the beginning it is not necessary to create the distributions or get the locations

exact, but place approximate penciled in areas that can be redefined later with more information. Attach

an envelope to the back of the cardboard maps for related information and papers that go with that

quadrangle. This can be done by using a reference list that directs you over to a file cabinet with the

literature listed previously with the bibliography and pages referenced. The population layers have the

references listed next to each name on the chart with clear adhesive on top of the Mylar. There can be a

bibliography page like a running record that is stored in the envelope and added over time.

Use Clear Overlays for Other Data

Clear layers can be an over lament for population, archaeological sites, biological resources,

gathering areas, burial grounds—sometimes we use the Mylar in a manner that allows us to use the

village layer underneath and a family member may come in and create his/her own information layer that

is keyed to the quadrangle with corner markers and that can be put away filed under name so that another

family member cannot see the information. There is less mixed information making confirmation of a

location more accurate.

Colored sharpies were used to color code specific layers, villages were green, archaeology sites

were black. The populations of the villages were recorded into each village by using a clear adhesive page

copied with a table for people to write the name of the person, and the reference name and date. This label

adheres to the surface of the clear Mylar overlay. These charts are Mylar flaps over the village layer that

can be lifted off. As the villages are placed in approximate locations according to each ethnographer or

oral interview, they seem to reposition each other along the way as the ethnographic descriptors increase.

Once the Ethnographer's villages areas were mapped, the Gazetteer's references and other

historic references positioned other historic place names around them and tightened it up. As

archaeological site records confirmed locations, as current family land ownership and other data identified

a place—usually from 3 references, location is more stable. We try to have at least 2 sightings or citations

per village. Some villages can have up to 30 references—Wassama State Park is one of them.[32]

VILLAGE BUFFER QUERY STRATEGY

Determined by Population

Village desnity and area were determined by a number of variables. The first villages to be defined were the ceremonial villages. These were determined by royal family named population. Known captains were identified through the genealogies. These people were placed in their birth places or living places. Research into ceremonial records of ethnographers placed them in other people's villages. Be sure they are not leading a ceremony in another village and you label it as their village. This is figured out usually by plotting them all out first and seeing how it looks to the families. By the time the populations were attached to a roundhouse village there were enough references for an important person to understand the culture group he/she represents. Once the ceremonial villages have been identified, then the sub-captains need to be identified and through a process figure out where they lived. These were usually the brother-in-laws or brothers of Headmen in our culture. There could be 5-6 large villages with 40-80 miles between them (a days journey apart) that housed the same families having either a village as a satellite village next to another cultural area roundhouse, or a roundhouse village with other cultural areas as the satellite villages.

Determined by Elements of the Environment

Large villages identify with major river confluences and fords. If the river canyon was small or narrow, there would be a large village not far away. There are environmental resources necessary for a village. Compile a list of things in your culture that are found at every village (springs, grasses, seeds, oaks, ponds, rivers, BRMs, burials). Begin charting these variables at each location that you have identified and mapped as a possible village site.[33] Determine the century of climate based upon the geology and geomorphology that you are dealing with and figure what resources would have been there at the time the people were there. This can include soil seed bank, lineage memory of gathering resources, or other information.[34] Buffering formulas for buffering a village at different elevation levels depends upon

the variables. In the November 2007 Northern Data-sharing Meeting at Columbia, California, we compiled a grouping of topographic representations of roundhouse villages and mapped them out at their elevation level of the elements of a village. At any given elevation level, the range of distribution of these elements was between 100 to 300 ft. of elevation difference with "slope" on the site-for drainage or for viewshed. Depending on the environment, and the elevation, the elements were somewhat different. When it was a major village and there were more then 3-4 family groups identified there, literature review and oral interview was accessed to figure out which would have been the places that would have divided those families, and which family was the dominant inhabitant. There were examples at river fords, in oak or grassland areas, in canyons where from 3 to 6 culture regions were located in the same village region but in different areas of the landscape –which could have been named as smaller satellite villages or named as the name of the area.

List of Ceremonial Villages

Ceremonies-Dances-Roundhouses all based in the oral interviews by territorial inhabitants and literature review can reveal information in order to classify a village as a large important center for ceremony. It is rare for any archaeological site record to contain the house pit depressions or the larger roundhouse depression. The roundhouse was an element of society repeated in Class 1 villages.[35] They existed in almost every region surrounding Yosemite and beyond. Roundhouses and dances were recorded in the oral interviews of many of the residents of Yosemite. A list of the dance houses and roundhouse locations named in these oral interviews, and a list of dances that were held outside as well as indoors should be charted. These could have been brush structures, subterranean, wood-shingled, or open air ceremonial places. Dances in Yosemite Valley varied between two kinds after the turn of the century, the activity for public viewing and the ritual dances for ceremonies held in private. Even though the private dances may not have been held in Yosemite Valley, they were attended by the Yosemite Southern Sierra Miwok. Dances for the public were held in locations that have also been mapped and charted.

TRAINING AND SOFTWARE REQUIREMENTS

ESRI GIS Software

ESRI ARCView was our first software. In 2002 we attended Conservation GIS meetings, and then presented at the 2005 ESRI user conference. [36] Mr. Dangermond and the conservation people allowed us to use the 3.2 software and we began plotting the villages. [37] We kept upgrading the GIS software until now we are on the 9.0. The Tribe invested in a laptop and a desktop computer. The software license could be allowed on both. A Federally Recognized tribe probably already has access to the software through the environmental department of the tribe. [38] Equipment needed for large high quality mapping can be researched anywhere that engineering firms purchase supplies.

Archival Training

Western Archives Institute (WAI) Training was attended in 2003 by the Archaeologist with the State of California Archivist and a group of Tribal Archivists. [39] This was a two week training exclusively focused on Tribal Archives. This was important since a Tribe is a sovereign nation and there are different legal requirements for records management. This was held in Redlands and at the UC Riverside Rupert Costo Library where collections management and rehabilitation were studied. There were safety and disaster trainings for security and restoration concurrently. The archaeologist already had university courses in archiving and manuscript preservation during the anthropology program. The Tribal archivist attended WAI archives training in San Diego in 2005. Both worked on research in Yosemite Research Library and the Yosemite collections and other repositories.

ESRI GIS Training

The Archaeologist had 35 years working for engineering design firms, and two anthropology masters degrees that incorporated GIS, and a masters in a linguistics related field. The Tribal Archivist attended university GIS courses and a summer (3 months) of ESRI courses in Redlands CA at the

software manufacturer's headquarters. The cost was approximately $10,000 for the ESRI education. [40] It was important to establish a relationship with County Planning Department for the county GIS layers. An agreement was made in 2001 between the Tribe and the county for the APN layers. [41] Other departments also partner with the Tribe on resource layers. The Archaeologist was awarded a fellowship at the American Geographical Society Library in Milwaukee Wisconsin. [42] Both the Archaeologist and the Archivist spent two weeks retrieving and scanning historic maps of the region. There were also other resources collected. All of the archives used for the database have been scanned and are linked through import with ACCESS software through the GIS Software.

LINGUISTIC AND LANGUAGE REFERENCES

Systematically begin to collect all of the language information available. Find the mapping information from within the ethnographic maps that were collected when the village recording was catalogued. This village information can be divided according to the linguistic word use and semantics of the regional languages. In order to determine the culture present within a village, the naming of the resources and region can shed light on the occupancy. Follow these steps in order to compile language information:

- Compile all of the dictionaries for the languages spoken in your region.

- Compile all the ethnographic language sample sheets with vocabularies for your region.

- Compile a list of speakers that are still using the language and their contact information. (We have the Hudson, Merriam, Hudson, Barrett, Gifford, Broadbent etc. language data)

- Compile a list of all of the voice recordings from various archives and museums and identify the speakers and what family they belong to.

- Make a summary list of languages, dialects, and ethnographic language maps

- Divide out the oral interviews by the ethnographers in your area relating to vocabularies

SUCCESSFUL CULTURE MAPPING PROJECT REFERENCES

The current use of digital media used to record and preserve indigenous language in the subject area began in the late 1970s and continued to improve as technology advanced. There are other computer programs used for this purpose, such as Google Maps and the Google Community Outreach projects. [43] This is a user friendly technology with 3D imaging capabilities. The ESRI GIS is useful for our purposes due to the need to develop the base maps for the Tribal government of the future. Infrastructure development has already begun for the regional theme layers. Recorded in the Conservation GIS web pages there are various indigenous groups throughout the world using digital media to structure their tribes. Since reclamation, energy development, solid waste controls, and other environmental concerns seem to concentrate on agency and reservation lands, the assistance available for developing the databases in Indian Country have advanced. [44]

This paper has attempted to present the process used to organize the information acquired into a searchable format through the use of tables and charts which are placed into a specific order. The relationships work to conform this information for use when placed in ordinal sequence of time and generations and attaching them to literal positions on the topography of the landscape. As we interpret the information gleaned from the theme layer queries, it is possible to begin to explain the relationships between a population and agency data layers already establishing (biological inventory, hydrologic data, herd movement charts, androgynous population movements, aviary disposition, etc.) revealing patterns emerging to relate all the layers of the ecosystem including the large vertebrates—humans—impacting the macroclimates.

END NOTES

1.   Barrett, S.A., "Samuel Alfred Barrett, 1893-1977." Collection no. BANC MSS   86/172, negative no. 2778, University of California, Berkeley. Microfilm housed in AICMC,Inc Archives; Barrett, S.A. (1908a). "Totemism among the Miwok Indians." *Journal of American Folklore.* Vol. 21, No. 81-82. New York: American Folklore Society, Houghton Mifflin; Barrett, S.A. (1908b). *The Geography and Dialects of the Miwok Indians.* Berkeley: University of California Press.

2.   Lists of habitation areas were compiled by ethnographers over time in the region: Barrett, S.A., "Samuel Alfred Barrett, 1893-1977." See note 1; Merriam, C. Hart (1900, 1901, 1902, 1903, 1910, 1920) *Field Journals.* Washington, D.C.: Library of Congress; Merriam, C. Hart (1911). "Map of the Indian Villages" copy on file with the American Indian Council of Mariposa County, Inc.; Recognition Committee Files.; Merriam, C. Hart (1917). "Indian Village and Camp Sites in Yosemite Valley." *Sierra Club Bulletin,* X(2): 202-209. Kroeber, A. L.(1907) *Handbook of the Indians of California.* University of California Publications in American Archeology and Ethnology, Vol. 4, No. 6. Berkeley: University of California Press.; and Levy, Richard (1978) "Eastern Miwok in California." *Handbook of North American Indians, vol.8*, pp. 398-413. W.C. Sturtevant (general editor), R.F. Heizer (ed.), Washington, DC: Smithsonian Institution.

3.   Walsh, Sean, Scott Morgan, and Terry Roberts, (2005). *The State of California Tribal Consultation Guidelines*. Sacramento, CA: Governor's Office of Planning and Research, Publication, accessed by the author from http://www.opr.ca.gov/SB182004.html .

4.   Bean, L. J., & S. Vane (1984). *Petition to the Government of the United States from the American Indian Council of Mariposa County for Acknowledgment as the Yosemite Indian Tribe*. Prepared by Cultural Systems Research, Inc. for the American Indian Council of Mariposa County.; and Moore, Edra, 1982a *Eternal Acorn*. Unpublished manuscript in Yosemite Archaeology.1982b *Ethnohistorical Basis of the Petition to the Government of the United States from the American Indian Council of Mariposa County*. Unpublished manuscript. 2001–2002Personal communication with the author.

5.   The Bureau of Indian Affairs web site offers information regarding access to tribal federal recognition status, http://www.doi.gov/bia/ ; The website of the National Congress of American Indians provides current articles regarding government actions and information, http://www.ncai.org/BIA-Modernization-Initiative.90.0.html.

6.   Karl, Rick, (2005). *The Trials of Centralizing Arizona's Archaeological Records*. Tucson, AZ, Unpbulished paper, University of Arizona; copy of manuscript in the AICMC, Inc. Archives. Karl, Rick, (2006, 2007). Notes from personal communications with the authors housed in the ARC archives, Mariposa, CA.

7.   Ibid., 4

8.   Slagle, Allogan, 1989 Unfinished justice: Completing the restoration and acknowledgement of California Indian tribes. *American Indian Quarterly*. Fall, No 13, pp. 324-345; 2002 Personal telephonic communications with the author.; and McKee, Colonel Redick, 1851, Senate Executive Document 4: Correspondence of federal Indian Commissioners who ere negotiating with Mariposa County Indians. Letters of Colonel Redick McKee. As retrieved from the National Archives in Washington D. C. by Allogan Slagle for the Southern Sierra Miwuk Tribal Archives.

9.   Sandra Gaskell, 2002, *Interpretive Artistry of Anthropological Myth; the Religious Geography of the Southern Sierra Miwuk Nation*. Turlock, CA: Unpublished thesis in partial requirement for the masters degree at CSU, Stanislaus.

10. There are many acronyms used for Federal and State agency compliance procedures. One of the best references is by Thomas F. King 1998; *Cultural Resource Law & Practice an Introductory Guide*. Walnut Creek, CA: AltaMira Press, p. 115-183, Appendix III & IV.

11. Woolfenden, Wallace B.; *Human Ecological Implications of Migratory Deer Behavior in Sierran Prehistory.* Unpublished manuscript. Presented at the annual meeting of the Society for California Archaeology at the USDA Forest Service Office, MonoLake Ranger District, Lee Vining, CA.

12. Tribal representatives signed documents in 1851 and around 1880; Harrison, Michael (1891). "*Report of the acting superintendent of the Yosemite national park to the secretary of the interior.*" Includes "Petition to the Senators and Representatives of the Congress of the United States in the Behalf of the Remnants of the Former Tribes of the Yosemite Indians Praying for Aid and Assistance, Important, Please Read." Dated 1891 but date of authorship is thought to be 1888 Original copy gifted to Yosemite Research Library. Washington: U.S. Government Printing Office.; and Heizer, Robert 1972 *The Eighteen Unratified Treaties of 1851–1852 Between the California Indians and the United States government.* Berkeley: Archaeology Research Facility, Department of Anthropology, University of California, Berkeley.

13. Ibid., 4, 12

14. Ibid., 5

15. Using this single example of familial oral history found in the literature of Chief Tenaya's Grandaughter found in: Taylor, Mrs. J.H. (1936). *Yosemite Indians and Other Sketches*. San Francisco. Johnck & Seeger.; Russell, Carl P. (1928). "A last link with the past." *Yosemite Nature Notes*, Vol. 7, No. 6. , pp. 41-46. ; and Rust, James (1996). Interview by Brian Bibby. Transcript. "A Native American Oral History of the Yosemite National Park Region," Yosemite Research Library and Records Center, Yosemite National Park, CA.

16. Ibid. 2

17. Merriam, C. Hart (1966). *Ethnographic notes on California Indian tribes*. Reports of the University of California Archeological Survey, No. 68, Part I, Berkeley, CA: University of California Berkeley, Department of Anthropology Research Facility.; and Heizer, Robert Fleming, (1941). *Alexander S. Taylor's Map of California Indian Tribes, 1864* in *California Historical Society Quarterly*, San Francisco, , Vol. XX No. 2, June 1941, pg. 171-180.; and Kelsey, C.E. (1906). *Census of Non-reservation California Indians, 1905–1906*. Archaeological Research Facility, Department of Anthropology, University of California, Berkeley.

18. Barrett, S.A. (1919). "Myths of the Southern Sierra Miwok." *University of California Publications in Archaeology and Ethnology. Vol. 16*, No. 1. March 27. Berkeley: University of California.; and C. Hart Merriam, Dawn of the World: Myths and Weird Tales Told by the Mewan Indians Of California (Cleveland: Arthur H. Clarke, 1910)., and Frank Latta in 1999 wrote *California Indian Folklore*. Exeter, CA: Brewer's Historical Press.; and Gifford, Edward Winslow, 1930, *California Indian Nights Entertainments*. Glendale, CA: Aurther H. Clark Co.

19. Sandra Gaskell, 2005, wrote of a comparative analysis between five Roundhouse villages and their botanical elements in the Chapter 6 Case Studies in the thesis titled *Law, Health, and Sacred Sites Resources of the Southern Sierra Miwuk Sacred Sites Inventory*. Fresno, Turlock, CA: Unpublished thesis in partial requirement for the masters degree at CSU, Stanislaus and Archaeology at CSU Fresno.

20. Stephen Powers Powers, Stephen (1877). "The Tribes of California." *Contributions to American Ethnology, Vol. III*. United States Geographical and Geological Survey of the Rocky Mountain Region, Washington, D.C. ; and revisited in Powers, Stephen (1975). *Centennial Mission to the*

Indians of Western Nevada and California. Robert F. Heizer, ed. Rev. San Francisco: Friends of the Bancroft Library, University of California.

21.   Kat Anderson has worked during her career with the ethnobotany of this region. Her writings are influential and used to define management practices in : Anderson, M. Kat, (2006). *Tending the Wild; Native American Knowledge and the Management of California's Natural Resources.* Berkeley, CA: University of California Press.; and Anderson, Kat (1988). *Southern Sierra Miwok plant resource use and management of the Yosemite Region: A study of the biological, and cultural bases for plant gathering, field horticulture, and anthropogenic impacts on Sierra vegetation.* Unpublished master's thesis. Berkeley: University of California.

22.   Sandra Gaskell compiled an inventory of literature review and site visit ethnobotany in a report: Gaskell, Sandra, (2004). *The Southern Sierra Miwuk Biological Inventory Plant Phyto-Comparison Chart.* Mariposa, CA: Unpublished Inventory in the AICMC, Inc. Archives., and presented at the ESRI conference during 2005 as Gaskell, Sandra, and Anthony Brochini, (2005). *Plants Along the Village Route of Yosemite Genealogical Family Use Districts.* Mariposa, CA: paper presented to the ESRI UC, San Diego, CA.

23.   The earliest papers regarding the California trade routes are: Sample, L. L. (1950) "Trade and trails in aboriginal California." *University of California Archaeological Survey, No.8.* Sept. 15. Berkeley: University of California., and Davis, James T. (1974) "Trade routes and economic exchange among the Indians of California." *Reports of the University of California Archaeological Survey 54.* Publications in Archaeology, Ethnology and History, No. 3. Rev. Ramona, CA: Ballena Press.

24.   The California Historic Resource Information System network retains the archaeological records for the entire state in regional centers, see http://ohp.parks.ca.gov/?page_id=1068 and the Historical Resources Consultants List is online at www.chrisinfo.org.

25.   Stephen Powers uses the Miwok language use for directions to name the cultural regions he came into contact with during the 1860 Wheeler Survey as seen in Powers, Stephen (1877). "The Tribes of California." *Contributions to American Ethnology, Vol. III.* United States Geographical and Geological Survey of the Rocky Mountain Region, Washington, D.C., pages 347-351.

26.   Symbolism was recorded in the works of; Kroeber, A. L.(1907) *Handbook of the Indians of California.* University of California Publications in American Archeology and Ethnology, Vol. 4, No. 6. Berkeley: University of California Press.; in Steward, Julian, (1929). "Petroglyphs of California and adjoining states." *University of California Publications in American Archaeology and Ethnology*, Vol. 24. Berkeley: University of California; and in Whitley, David, (2000). *Handbook of Rock Art Research.* Walnut Creek, C: Alta Mira Press. Recent Roak art work was performed in the region and reported by Sandra Gaskell in *Report for Yosemite Archaeology, Forensic Rock Art Reconstruction: Valley Images.* Mariposa, CA. Unpublished report, CSU, Stanislaus, June through October, 2001. and in the *Report for Yosemite Archaeology, Forensic Rock Art Reconstruction; Pate Valley Images.* Mariposa, CA; Unpublished report. CSU Stanislaus, June through October, 2001 where the work from James A.Bennyhoff, 1956, was used from "An Appraisal of the Archaeological Resources of Yosemite National Park." *Reports of the University of California Archeological Survey, 34*: pp. 1-71. Berkeley, CA: University of California.

27.   Bancroft Library, UC Berkeley, (1887). List of Printed Maps of California, Library Bulletin 9.; Heizer, Robert Fleming, (1941). *Alexander S. Taylor's Map of California Indian Tribes, 1864* in *California Historical Society Quarterly*, San Francisco, , Vol. XX No. 2, June 1941, pg. 171-180.

; Milliken, Randall, (1995). *A Time of Little Choice: The Disintegration of Tribal Culture in the San Francisco Bay Area 1769-1810.* Berkeley, CA; Ballena Press.

28. Merriam, C. Hart (1900, 1901, 1902, 1903, 1910, 1920) *Field Journals.* Washington, D.C.: Library of Congress; and C. Hart MerriamPapers, Bancroft MSS 80/18c, Box 1556:7, w/22a-22hh/N1-22 page version. Microfilm reels housed in the Tribal Archives.

29. Ibid., 1, 2, 4, 17, and Broadbent, Sylvia M.,1960, *A Grammar of Southern Sierra Miwuk.* Berkeley. Unpublished master's thesis. University of California, Berkeley.; Clark, Galen 1904 *Indians of the Yosemite Valley: Their history, customs and traditions.* Yosemite, CA; Yosemite.; Dixon, R.B.,1903, Sierra Miwok Field Notes, 1903. Handwritten transcription by Craig Bates (n.d.) in Yosemite Research Library, Yosemite, CA.; Gayton, Anna Hadwich, 1930, *The Ghost Dance of 1870 in South-Central California.* Berkeley: University of California Press and the Yokuts-Mono Chiefs and Shamans. *University of California Publications in American Archaeology and Ethnology, Vol. 24, No. 8.* Berkeley: University of California Press.; Gifford, Edward Winslow, 1916, Miwok moieties. *University of California Publications in American Archaeology and Ethnology.* Vol. 12, no. 4. Berkeley: University of California Press.; and in 1955, *Central Miwok Ceremonies.* University of California Anthropological Research,Vol.14 (4). pp.261-318. Berkeley, CA: University of California Press.; Hudson, J. W., 1899–1902, Field notes from 1899-1902. Field notes from the collection of Craig Bates obtained by him. The Ukiah Sun House Collection and the Field Museum of Natural History, Chicago. Copied from microfilm.; maps and notes from Latta, Frank F., 1930-1938, Unpublished field notes and correspondence with Duncan, W. Tilden, of Lindsay on Indian history, geography, and legends (including credibility of Yosemite legends and the word "Yosemite"). On file in the Frank Latta Collection, YosemiteResearch Library, Yosemite National Park., and the maps from Schenck, Egbert W., 1926, Historic Aboriginal Groups of the California Delta Region. *University of California Publications in American Archaeology and Ethnology,*Vol 23, No. 2, Nov. 13. Berkeley: University of California.

30. Mackett, David, (2005). *Language of the Land: Protecting and Promoting Traditional Ecosystem Knowledge.* Thunder Bay, Ontario: Lake Superior First Nation Development Trust Sustainable Communities Initiative Proposal, manuscript on file in the AICMC, Inc. Archives.

31. U.S. Board on Geographic Names, (2007). The U.S. Board on Geographic Names Domestic Names Committee Meeting Minutes. Washington D. C.: Department of Interior 691st Meeting, September 13, 2007.

32. Ibid., 19, and Kroeber, A.L. (1916). "California Place Names of Indian Origin." *University of California Publications in Archeology and Ethnology.* Vol. 12, No. 2. Berkeley: University of California Press. Merriam, C. Hart, (1907). "Distribution and classification of the Mewan Stock of California." *American Anthropologist*; Vol. 9, pp 338-357.

33. Gaskell, Sandra, (2008). *Village Delineation and GIS Buffers Using Elements of the Environment.* Mariposa, CA; Unpublished manuscript prepared for the proceedings of the 2009 ESRI UC.

34. Ibid., 21

35. Ibid., 2, 32

36. The Society for Conservation GIS is an organization dedicated to the research and development of technology to preserve and improve environmental management. http://www.scgis.org/.

37. The originator of the ESRI software concept invited the participants to tour the ESRI Redlands Campus. While on this tour he was encouraging the resource protection aspects of the Tribal program offering technical support to the Southern Sierra Miwuk Nation.

38. Enviromental Protection Agency (EPA) Tribal Programs provides information about tribal topics regional and National http://www.epa.gov/tribalportal/trprograms/.

39. Western Archives Institute http://www.sos.ca.gov/archives/level3_wai.html. and the First Archivist's Circle that was established in 2002, a private archives group comprised of American Indian archives.

40. ESRI Training Course website http://training.esri.com/gateway/index.cfm.

41. Cal Trans Grant for the Mariposa County base layers was completed in February of 2002 with the first three layers being roads, topography, water, and utilities.

42. John S. Best American Geographical Society Library Fellowship program scholarships provide access to collections, http://www.uwm.edu/Libraries/AGSL/bestpast.html.

43. Bioneers and Rebecca Moore of Google Earth Community Outreach projects presents a 3-dimensional approach http://www.bioneers.org/node/2609. and provides a basis for using visualization for projects http://www.sierraclub.org/sierra/200709/google.asp.

44. Ibid., 36