

# Kumeyaay Heritage and Conservation (HC) Project

## Learning Landscapes Educational Curriculum



August 1, 2016



**Kumeyaay Diegueño Land Conservancy**

**For the Sycuan Band of the Kumeyaay Nation**

**Under a grant from the U.S. Fish and Wildlife Service**

**San Diego County, California**

**Prepared by**

This curriculum was developed with the contributions from many persons and organizations.

The primary staff of Laguna Resource Services, Inc., were:

Michael Connolly Miskwish

Stan Rodriguez

Martha Rodriguez

Organizations included:

Kumeyaay Diegueno Land Conservancy

Kumeyaay Community College

Sycuan Cultural Department

# CONTENTS

	Page
<b>Introduction</b>	1
<b>Module 1 - Kumeyaay History &amp; Lifeways</b>	2
<b>Module 2 - Kumeyaay Culture (Story Telling)</b>	4
<b>Module 3 - Kumeyaay Culture (Music)</b>	5
<b>Module 4 - Kumeyaay Culture (Games)</b>	6
<b>Module 5 - Kumeyaay Culture (Hunting, Fishing)</b>	7
<b>Module 6 - Ecosystems of Sycuan &amp; other Kumeyaay Lands</b>	8
<b>Module 7 - Kumeyaay Environmental Management</b>	9
<b>Module 8 - Kumeyaay Cosmology</b>	10
<b>Module 9 - Conservation Site Environment &amp; Planning (Sycuan)</b>	11
<b>Module 10– Course Conclusion &amp; Student Evaluation</b>	12
<b>Appendices</b>	
A Kumeyaay History and Lifeways	13
B Story Telling	26
C Music	27
D Games	28
E Tracking, Hunting, Fishing	30
F S. Cal Ecosystems & Habitat Conservation	31
G Kumeyaay Environmental Management	48
H Kumeyaay Cosmology	51
I Conservation Site Environment & Planning	54
<b>References</b>	55
<b>Constellation Coloring Book</b>	56

# **Learning Landscapes Educational Curriculum**

## **Kumeyaay Heritage & Conservation Project**

### **Introduction**

#### **Presentation of Course Overview**

This curriculum is designed to give an introduction to the Kumeyaay and the plants and animals of the Sycuan Reservation Habitat Conservation and surrounding ecosystems, as well as contemporary environmental concepts and traditional land management practices.

As a component of some course modules, Kumeyaay instructors will cover various cultural practices and beliefs to introduce the student to various aspects of Kumeyaay culture.

This curriculum is organized into nine learning modules and an evaluation module. The curriculum is intended to be a flexible guide in which modules and their components can be combined to meet various course-specific objectives and timeframes. These Modules can be used entirely as presented or by combining various parts of Modules. Module 9 is reserved for the Sycuan Band of the Kumeyaay Nation as an internal tool for the implementation of the adaptive management plan.

#### **Curriculum Use**

To ensure the proper presentation of course contents, orientation training is recommended for instructors prior to use of this curriculum. This curriculum has a wide range of intended age groups. It is up to the instructor to judge the appropriateness of a particular module, content or activity to the age, maturity and experience of the students.

#### **Curriculum Expansion**

This curriculum is designed for the non-tribal participant. Detailed instruction in the specific beliefs, customs, ceremonies and practices are conducted through the Kumeyaay communities and is not within the scope of this curriculum. This curriculum will continue to be updated. To ensure you are using the most recent version, check the website [www.KDLC.org](http://www.KDLC.org) for the Learning Landscapes Curriculum.

## **Module 1 – Kumeyaay History & Lifeways**

**Learning Objective** – Students will learn about how early Kumeyaay people lived, as well as some major historical aspects.

### **Teaching Approach & Methods**

- Lecture: Students will learn major aspects of the history of Kumeyaay people in S. California, and they will also learn about traditional Kumeyaay food, clothing, jewelry, shelter.
- Activity: Students will color a map of the Kumeyaay lands showing the area of Spanish control and the treaty lands negotiated in the Treaty of Santa Ysabel.
- Activity: Students will create an E'waa (Kumeyaay house) using poster board, pipe cleaners, construction paper and glue. Students will be taught the science behind the construction such as passive climate control, adaptive thatching, resource efficiency. Students will learn the mathematic equations supporting the geometry of design.
- Activity: Younger students will create a Kumeyaay clay doll (or action figure) by shaping a figure with clay, firing the figure and decorating with clothing using scrap cloth, yarn and plant material.
- Activity: A Kumeyaay teacher will instruct students regarding preparation of traditional foods; students will sample various foods and examine different materials used in the making of clothing and utensils.
- Discussion/ Q&A:
  - How were plants and animals important in day to day life for the Kumeyaay?
  - What affect did disease have on Kumeyaay and why was it worse than modern times? Where did it come from?
  - What are three important features of the Kumeyaay e'waa? What materials were used?
  - What kind of skirts were worn by Kumeyaay women? How were they made?
  - What kind of jewelry did Kumeyaay use?
- Vocabulary:
  - e'waa- A Kumeyaay house
  - tule- A wetland reed
  - Cosoy- The Kumeyaay village at Old Town San Diego
  - Kusiiay – An expert in medicine, spiritual and/or environmental knowledge
  - Ranchos- Large tracts of land granted to Mexican citizens by the Mexican government.
  - Vaqueros- Mexican cowboys.

- Treaty of Santa Ysabel-Treaty negotiated in 1852 between leaders of the Kumeyaay and the U.S. government.
- Gold Rush- Period from approximately 1848-1858 when massive amounts of gold were mined in California and a huge migrant population came into the State.
- Apiarist- Beekeeper
- Ejido- Mexican land owned by a specific community.
- boarding schools- Schools where Indian children were forced to attend, cut their hair, wear western clothes and speak only English. They were part of the assimilation policies of the late 19<sup>th</sup> century. By the mid-twentieth century they had lost much of the brutality of their origins.

**Skills Summary** – Targets historical understanding and critical thinking skills; understanding of basic historical points and how Kumeyaay people lived in the different time periods.

**Preparation / Materials needed (see Appendix A)**

- Materials: paper, pencils, markers/crayons
  - Traditional foods
  - Materials used for making clothing, utensils, and other daily items
- Reference Material: Video: First People Kumeyaay

## **Module 2 - Kumeyaay Culture (Story Telling)**

**Learning Objectives** – Students will listen to various traditional Kumeyaay stories and gain a basic understanding of Kumeyaay culture with regard to allegory and metaphor.

### **Teaching Approach & Methods**

- Storytelling: Sharing of traditional stories and their lessons : (see App B)
- Discussion/ Q&A: After watching a story, discuss what life lessons are being passed on. How can the story apply to present day? How are plants and animals incorporated into the stories?
- Activity: Students will draw their vision of a scene from one of the stories.
- Activity: Younger students: act out a scene from one of the stories.

**Skills Summary**– Knowledge of Kumeyaay storytelling and its usefulness in explaining life lessons and human relationship with plants and animals.

### **Preparation / Materials needed**

- Acquire Kumeyaay stories (see App B)
- Schedule Guest Instructors
- Videos of stories (Stan Rodriguez):
  - "Kumeyaay Songs & Stories" (video link: <https://youtu.be/BkqoUIUN438> )
  - "Coyote and Rabbit" (video link: <https://youtu.be/K9L--Hm6Ons> )

## **Module 3 - Kumeyaay Culture (Music)**

**Learning Objectives** – Students will gain a basic understanding and appreciation of some of the types of songs sung by the Kumeyaay.

### **Teaching Approach & Methods**

- This module should be taught with the contribution of a Kumeyaay singer. If that is not possible, recorded music can be played from [KDLC.org/songs](http://KDLC.org/songs). This introductory course will give a basic understanding of some of the instruments and songs.
- If a Kumeyaay instructor is brought in ask if he will bring/play a traditional instrument(s) and explain the song(s) and importance of music/dance to the Kumeyaay people.
- Students will learn to distinguish the following instruments – gourd rattle, turtle shell rattle (also tin can), basket rasp, pottery rattle, flute, deer toe rattle, bull roarer. How they are made and what material is used.
- Activity [This should be done only with a Kumeyaay singer guest instructor] Students will accompany a singer in dancing to an appropriate song.

**Skills Summary**– Targets knowledge of Kumeyaay music.

Learn the purpose of songs, ie social, ceremonial, historical. The types of instruments used. How dance is a part of the singing experience.

### **Preparation / Materials needed**

- Schedule Guest Instructors
- [www.KDLC.org/songs](http://www.KDLC.org/songs)



## **Module 4 - Kumeyaay Culture (Games)**

**Learning Objectives** – Students will play games and gain some understanding of the importance of Kumeyaay games, while allowing students to participate in some of these activities.

### **Teaching Approach & Methods**

- Omarr Peon is a stick game that involves a lot of knowledge and preparation. There are tournaments on many of the southern California Reservations each year. This is something better taught directly with one of the Indian nations.
- Students will be introduced to a general description of Omarr Peon, Pee Ak (aka Shinny), Palomar hoop game, Acorn caps ring - sentai katum.
- Students will be taught, and allowed to play the Pushook & Shahook Games

**Skills Summary**– Targets knowledge of Kumeyaay games and understanding of their usage. How were everyday materials in the environment used to craft games?

### **Preparation / Materials needed**

- Game and Instrument materials
- Physical space (indoor or outdoor)

## **Module 5 - Kumeyaay Culture (Tracking, Hunting, Fishing)**

**Learning Objectives** – Students will be given a basic understanding of the tools used by the Kumeyaay for hunting and fishing.

### **Teaching Approach & Methods**

- **Hunting/Fishing:** Students will be shown the Kumeyaay bow and arrow, spears, arrowheads & spear points, rabbit sticks.
- Students will be shown fishing equipment and methodology.
- Discussion/ Q&A: How did hunting and fishing vary from the coastal ecosystem to the mountains and the desert? What kind of materials were used for arrowheads? Arrows? Bows?
- Activity: Kumeyaay names for animals will be shared. Students will use padded rabbit sticks for practice competition to hit targets.

**Skills Summary**– Targets knowledge of Kumeyaay hunting, fishing and how it changes in different habitats and over different time periods.

### **Preparation / Materials needed**

- Game materials, nerf boomerang?
- Physical space (indoor or outdoor)

**Reference:** First Nation – Kumeyaay video

## **Module 6 – Ecosystems of Sycuan & other Kumeyaay Lands**

**Learning Objectives** – Students will learn about various plants and animals native to S. California and Sycuan, as well as primary invasive species; they will gain a basic understanding of local ecology and the food web.

### **Teaching Approach & Methods**

- Students will be introduced to indigenous plants, animals and invasive species of S. California, and to basic ecological concepts
  - Plants – Chaparral, Sage Scrub, Riparian, Live Oak, Willow Scrub
  - Animals – Native to S. California & HC area
  - Food Chain/Web
- Discussion: Native plants, non-native (invasive species); limiting factors; the importance of plants; the importance of animals
- Activity – Students are asked to draw a food chain/web poster (with a “who eats what” drawing) using at least 6 of the plants and animals listed in Appendix F. They will present and explain their food webs (See Appendix F).
- Activity: Field trip to the HC site; discussion of habitats; observation and identification of plants and habitats; Use the guide provided in Appendix F to identify & collect leaves from at least 5 different plants; Students should make notes of their observations (Worksheet – Appendix F).
- Activity: Students are to list (or draw) the types of plant/animal materials used by early Kumeyaay for various purposes (Worksheet - App. F).

**Skills Summary** – Ability to recognize certain native and invasive plants and animals; basic understanding of the food web concept. How were native plant species used by Kumeyaay? Were introduced species used? In what ways?

**Preparation / Materials needed** – Clippers, baggies, water bottles, sun screen, poster paper, pencils, markers/crayons

## Module 7 – Kumeyaay Environmental Management

**Learning Objectives** – Students will learn the basic aspects of Kumeyaay environmental management (*Emuht Mohay*), the Kumeyaay cultural view of water and contemporary land management

### **Teaching Approach & Methods**

- Lecture:
- Importance of Water to the Kumeyaay (Martha & Richard video)
- Water Management (Rock Structures & Spring Maintenance - (App. G )
- Traditional Plant Harvesting and Cultivation (Martha, Richard, Stan)
- Fire Management (Fire Cycle; Burning; Effect on Seeds; Fire Mosaic – (App. G)

### Discussion

- Activity (Individual): Write a short story about Kumeyaay working with nature to share with the group
- Activity (Group): Construct a model of a Kumeyaay rock drop structure. What animal can have a similar impact to the environment? How can trees naturally create similar affects?
- Activity (Group): Prepare seeds for Conservation Site native plant revegetation.
- Activity (Group): Dig soil samples and expose to heat then water and see what germinates.

**Skills Summary** – Targets understanding of contemporary & traditional Kumeyaay environmental management concepts. How was the world view of the Kumeyaay different than the common view in modern U.S. society? How does the traditional view of the Kumeyaay correspond to new approaches in environmental management?

### **Preparation / Materials needed**

- paper, pens
- modelling clay, seeds, containers, paper towels, spades

## Module 8 – Kumeyaay Cosmology (day or night time)

**Learning Objectives** – Students will learn the basic aspects of Kumeyaay cosmology. Purposes and practical usage of astronomical knowledge.

### **Teaching Approach & Methods**

- Lecture: Refer to the book *My Uuyow* and material in Appendix H.
- Discussion: Students will learn of the use of astronomy for a clock, calendar, mnemonic tool for education, philosophy & life lessons.
- Activity: Students may draw/color their favorite heavenly body or constellation and label with the correct Kumeyaay word or draw their version of the rabbit in the moon.
- Activity: Younger students can draw their interpretation of the constellations pictures using the coloring book in Appendix H.
- Activity: Observe stars at night. Instructor will instruct students regarding identifying astronomical bodies.
  - Rabbit in the Moon
  - Mountain Sheep (*Emuu*), for winter solstice
  - Lightning (Shuluk), for summer solstice
- Activity: Campfire smores feast / sharing of stories
  - Frog Story (older students)
  - Sun and Moon creation story

**Skills Summary** – Targets understanding of contemporary astronomy & Kumeyaay cosmology. Learn to identify the European constellations and their Kumeyaay counterparts.

### **Preparation / Materials needed:**

- Telescope
- Pictures of contemporary & Kumeyaay constellations
- Paper and drawing/coloring materials
- Smares materials, (marshmallows, chocolate bars, roasting sticks)

## **Module 9 – Heritage Conservation (HC) Site Planning Sycuan Only**

This module incorporates the:

**AREA SPECIFIC ADAPTIVE MANAGEMENT PLAN  
KUMEYAAY-DIEGUEÑO LAND CONSERVANCY (KDLC)  
SYCUAN BAND OF THE KUMEYAAY NATION**

**Prepared by  
Analytical Environmental Services**

## **Module 10 – Conclusion/Summary & Students' Class Evaluation**

**Instructor:** Review of Lessons Learned; Questions & Answers

**Student Evaluation:** Please take time to reflect on the events during the trip. Try to answer each question fully and to the best of your ability:

**What did you enjoy about this class?**

**Do you believe this course gave you important knowledge? Why or Why not?**

**What do you feel could have been left out or added to this course?**

**What do you think would have improved your experience?**

## Appendix A

### Module 1 – Lecture: Kumeyaay History & Lifeways

#### Kumeyaay History

Kumeyaay history can generally be explained in five historic time periods; precontact, early contacts, Spanish, Mexican and U.S.

##### Precontact

Evidence of human settlement in the Kumeyaay lands go back at least 9,000 years and could go much further. There is evidence of three distinct cultural periods defined by the diet and archeological remains. The oldest occurs during the period when ice age mammals were still a major food source. This Ice Age Culture gradually adapted to changing climate and food supplies by shifting to smaller prey, coastal and desert resources. Bows and throwing sticks became the primary tools for hunting the smaller game. The use of major mussel beds on the coast has often been used to characterize this culture as the Shellfish Culture. Finally, as the climate continued to dry, erosion from the land created beaches in places where much of the rocky shores previously existed. The culture change again into one dominated by small game, acorns, pine nuts and fishing. Desert areas became proficient at utilizing the plants and animals of their regions. Fire became a significant tool to manage and enhance ecosystem resources.<sup>1</sup> This Acorn Culture was what was in place when the first contact with Europeans was made.

When the Spanish landed near the village of Cosoy (present day old town San Diego) they encountered the Kumeyaay people, an indigenous culture and civilization with thousands of years of experience in adapting and enhancing natural resources of the California/Mexico border area.

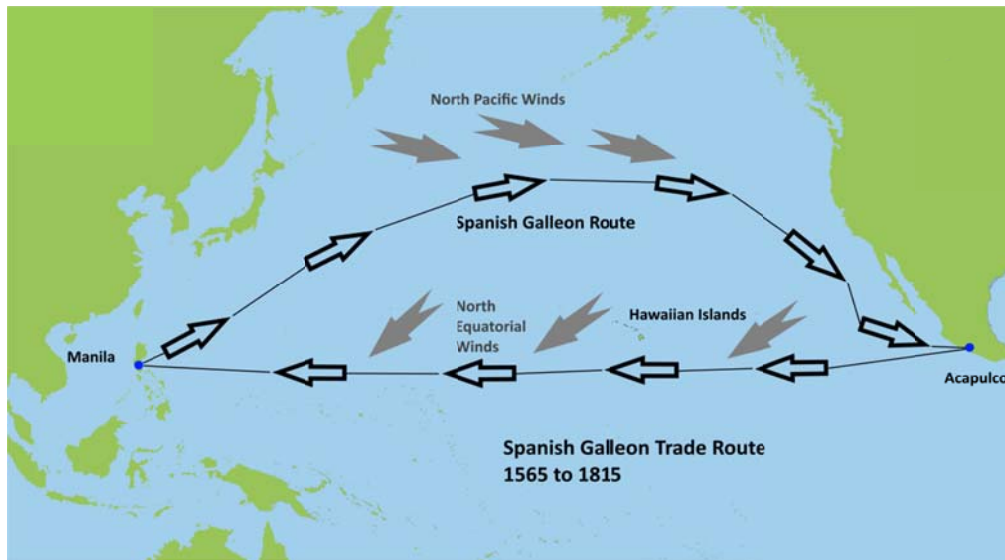
Kumeyaay spiritual leaders, known as Kusiiiaay, specialized in many different aspects of what we would now call medicine, astronomy, engineering, biology and psychology. Knowledge of the environment was essential to ensuring the proper times and places for movement of people, planting, harvesting and maintaining the land and water resources.

Early contacts: The first documented landing of Europeans in Kumeyaay lands was the arrival of Cabrillo in 1542. However, earlier contacts in the Californias go back to the landing of Hernán Cortés on California islands in 1535. The first attempts at Missions were in La Paz in 1683. However, they were repelled by local tribes and had to abandon the effort. The first permanent Mission in Baja California was in Loreto in 1695. Shipping from the Philippines started to traverse the Pacific Ocean in 1565, so, shipping would have been a regular sight from Kumeyaay lands and no doubt many undocumented contacts occurred. One of the results of these early contacts was the spread of disease into lands of the Kumeyaay and other California Indian peoples. Because of their lack of exposure to many European diseases, American Indian

---

<sup>1</sup> Archeologists generally refer to these periods as the Paleoindian, La Jolla Complex and Yuman periods.





people were especially vulnerable.



Spanish: The Mission at San Diego was founded by Father Junipero Serra, assisted by soldiers under command of Captain Fernando Rivera in 1769. The joint expedition was headed by Governor Gaspar de Portolá. The Kumeyaay were very hostile to the Mission, attacking many times until, in 1775, the Mission was destroyed. The Kumeyaay adapted to the continuing presence of the Spanish through trade for Spanish goods during intermittent periods of

coexistence interrupted by periods of armed conflict. Some Kumeyaay became converts at the Mission and began the process of neophytes under the Spanish colonial system. They became the labor force for the Missions and were the primary builders of the Missions. In all, most of the Kumeyaay people and the Kumeyaay lands remained outside the control of the Spanish.

The leather and metal armor of the Spanish, along with firearms, made it very difficult for the Kumeyaay to fight using arrows or spears. In order to be successful, warriors had to charge through the first volley of gunfire and get in close enough to use the war club. These were usually made of a hard wood such as manzanita root.



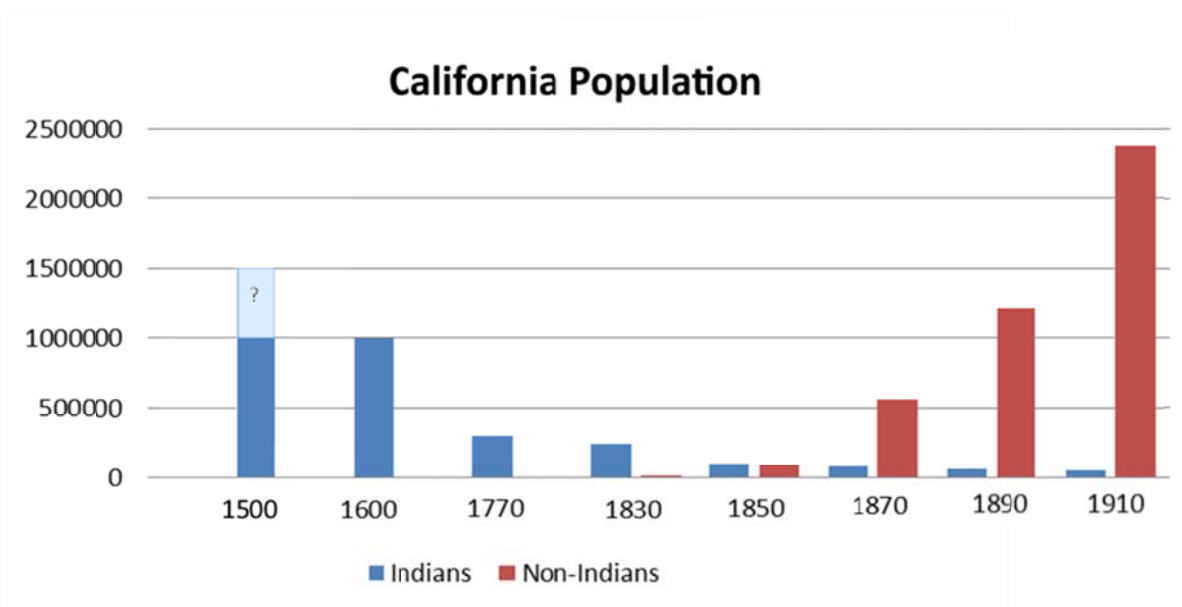
**Mexican:** After independence from Spain in 1821, Mexico sought to grant equality to all groups in Mexico. This effort was undermined in California, however, by elites from the Spanish period who hoped to carve up land into large Ranchos at the expense of the Indian and mixed Indian populations. This process was accelerated by the passage of the Secularization Act of 1833. The result was widespread rebellions in many parts of California. In the San Diego area, all the Ranchos were either abandoned or severely impacted by 1846. At times the City of San Diego was close to being taken by Kumeyaay forces. At one point, over 400 prisoners from mainland Mexico were released to serve as soldiers to help secure San Diego. Kumeyaay people had adapted to the Mexican system by becoming vaqueros, blacksmiths, seamen, soldiers and other trades. Many of these Kumeyaay joined with the independent Kumeyaay of the inland to help in the rebellion against the Mexican Ranchos. Kumeyaay also helped American forces who came into the area in the Mexican-American War.

**U.S.:**

After the Mexican-American War, 1846-1848, the United States claimed Kumeyaay lands north of the newly established Mexican border, splitting the Kumeyaay people into two groups. Gold was discovered in northern California and a gold rush started with people flooding into California from around the world. In 1852 a treaty was negotiated with Kumeyaay people. The Treaty of Santa Ysabel authorized the setting aside lands of about 20% of present day San Diego County in return for giving up claim to the remainder of lands in the U.S. Pressure from the California congressional delegation caused the Senate to vote down the treaty in committee and placing their action under seal of secrecy. California then set out to destroy any Indians or Indian communities they saw as impeding their desire for gold, land or water. Many populations of Indians were completely annihilated during this time. The legal system of the State gave little protection or recourse to Indians under the law. It wasn't until 1875 that Reservations were created for the survivors on small scattered land parcels.

When European settlers moved into San Diego County in the 1800's, the environment was greatly changed. Oak forests were cut to open up grazing land, European grasses were introduced, European honeybees, cattle, horses and sheep were brought in, and Kumeyaay were no longer able to maintain the land with regular burning, clearing and replanting. As older

native trees died there were no new trees to take their place. In some areas fast growing exotic plants were brought in to replace the native species. The Kumeyaay people survived these changing conditions by combining their traditional cultural knowledge with modern knowledge of its day. They worked in farming, ranching, construction, whaling and other industries.



Even though they no longer had access to all the traditional resources, Kumeyaay were quick to adapt where needed to survive. By 1893 there were nine Kumeyaay Reservations in San Diego County. This would grow to twelve by 1970 and four Ejidos (Mexican type of Indian communal land) in Mexico.

20<sup>th</sup> Century- By the late 19<sup>th</sup> and early 20<sup>th</sup> century, policies of the federal government had created systems of cultural destruction designed to destroy American Indian cultures and forcibly assimilate Indian people into American culture. Lands were carved out of Reservations and sold off, children were forced to attend boarding schools, native religions were suppressed and native language use was prohibited. Kumeyaay people adapted to what was required by the government, but still worked hard, and often quietly to preserve what they could of their language and culture. Efforts to get compensation for the unratified Treaty of 1852 resulted in two successful lawsuits against the federal government, however, the settlements were very small. In 1924, American Indians were granted citizenship in the United States.

In 1975 the U.S. Congress recognized the rights of American Indian people to self-determination with the passage of the Indian Self-determination Act. This greatly increased the authority of the elected governments of the Reservations and limited the authority of the federal agencies to direct resources. Tribes began to explore alternatives beyond the programs of the federal government and entered into energy resource development, timber management, fisheries development, tourism, farming and gaming. They pursued these endeavors in a much more direct manner than had been possible before.

## Food

The traditional diet of the Kumeyaay in the 1700s was quite varied depending on the time of year and the local region. Desert peoples utilized the agave plant, jojoba beans, cactus fruit and pinon in the higher elevations. The inland chaparral provided acorns, rose hips, manzanita berries, holly leaf redberries, choke cherries, and many forms of leafy foods. The coast provided sea weed, marsh plants and many types of coastal scrub vegetation. Meats were utilized throughout the territories with fish and shellfish staples along the coast.

As new foods were brought in with the different colonizers, Kumeyaay incorporated many of their foods into the diet. Grains, fruits and garden produce were incorporated into the diet. Beef, goats and sheep were also utilized for meat and dairy. Many Kumeyaay became proficient apiarists (beekeepers), sometimes using traditional materials, such as pottery, to establish hives.

Modern Kumeyaay people eat similar diets to most Americans. However, traditional foods are often brought out for special occasions or for traditional gatherings. Many supermarket products can be purchased to give a similar experience. These include:

- mustard greens (boiled)– an imported plant that became a common food.

- cactus fruit- raw

- cactus pad (nopales)-diced & cooked

- jicama – similar in taste and texture to raw yucca stalk

- spinach (cooked) – similar to cooked nettle

- chia

- elderberry jam (much sweeter than traditional, but good)

- artichokes (similar to boiled yucca blossoms)

In addition, there are places where acorn flour and native meats such as rabbit and venison can be purchased.

## Clothing & jewelry

Traditional dress for Kumeyaay before contact with Europeans was designed for practicality. In warm climates, women wore skirts of willow bark or other plant material. Men wore little except straps or chords for carrying. Shoes were worn in areas where foot protection was needed. Shoes were made of tough yucca or agave fibers. In colder areas, furs were worn for protection. Rabbit pelts cut in strips were woven into a type of pancho jacket or for bedding.

Basket hats were worn by women. Men wore headdresses of different types of feathers depending on the ceremony being performed. Necklaces were made of seed, shells or other materials. Children were often carried in cradle boards.



## Baskets

The baskets of Kumeyaay and other Native California Indians have been ranked as some of the finest works of craftsmanship in the world. Some of the larger, more elaborate baskets have sold for over \$30,000.00 in modern markets. The finest baskets were water tight and could be used to boil water for cooking. (Traditionally, Kumeyaay preferred pottery for cooking, but for some tribes in California, basket cooking was preferred.)

The commercial trade in baskets has become an important part of the economies in many Kumeyaay communities, especially in Mexico. The following are some examples of Kumeyaay baskets.





Plants such as juncus and grasses make the finest baskets, but other materials such as willow and pine needles were also used depending on the purpose.



## Pottery



Kumeyaay pottery is made from clay that is fired in pits of hot coals. The pottery is periodically turned which helps give rise to the different patterns on the surface. Skilled potters prize these patterns and will intentionally seek to create pots that are both functional and beautiful.



Pottery is also used to create dolls for children. In modern times, new materials such as yarn and cloth have been incorporated into the designs.

## The Kumeyaay E'waa

The most common type of Native American house in California before 1850 was the domed frame house. It had many different names in different parts of California. Among the Kumeyaay it is called an e'waa.



A domed house is one of the most efficient uses of materials even in present day. “Domes are the strongest, lightest and most efficient means of enclosing space yet known to man.” *American Institute of Architects*. The famous architect Buckminster Fuller was famous for popularizing the geodesic dome in his designs.



Domed structures have been used in many cultures over the ages. For thousands of years, this has also been true in California.

### *Construction efficiency*

The traditional e'waa has 25% less surface area for a given volume than any other geometric shape for a structure. This means more space for a given amount of material.

### *Efficient in high winds*

In addition to materials efficiency, the domed structure holds up to high winds by not providing a flat surface for the wind energy to push against. This is why wilderness campers use domed tents more than any others.



### *Thermal efficiency & orientation*

The e'waa was not insulated in the fashion of modern homes. Insulation was through the blankets and clothing used by the individuals. But on very cold nights hot rocks from an external fire were brought into the house to help against the chill. Because of the circular base of the structure, hot rocks radiated equally throughout the structure. The door of the house was usually toward the east to allow the morning heat to warm the structure more quickly if that was desired.

### *Adaptive roofing material*

Many types of plant material could be used for roofing. During the dry season, loose brush may be the best available. During times of rain, however, tules were the material of choice. Tule are reeds that grow throughout the Kumeyaay territories in wetlands. Dried tules are



bunched and tied as a thatching over the structure. They allow an easy flow of air through the e'waa. But when it rains, the tule expands and helps to form a waterproof covering over the occupants.

### *Construction*

The frame of the e'waa was built using flexible branches, usually willow. Yucca or agave fiber chord was used to tie the joints and the external thatching. Rocks were placed around the exterior to discourage crawling animals from coming inside.

Fires were almost never made inside the structures due to the flammability of the material. For some uses mud would be packed around the outside partially sealing the structure. An A-frame or lean-to structure might sometimes be built when in a hurry.

### **Make An E'waa**

#### Materials needed

- 1' X 1' poster board
- (5) 12 inch pipe cleaners
- White glue
- 25 Small rocks (1/2 inch dia)
- Green or brown paper (alternate use is string and straw)

Frame the e'waa using the pipe cleaners, secure joints with glue.

Cut paper into strips to create the thatching (alternate, coat string with glue and lay over straw cut in 1 inch strips to create thatching)

Attach thatching to frame

Place rocks around exterior



When completed you may create a door using left over material. A fire pit can be simulated in front of the e'waa. Glue can be spread over the poster board and a light coating of tan sand can simulate the ground. Animals can be drawn on the ground. Other structures such as granaries, ramadas and curing racks can also be created.



A granary is a large basket that holds grains or nuts such as acorns. The basket was usually built with willow branches woven into a large container. Willows have natural preservative and anti-fungal properties.



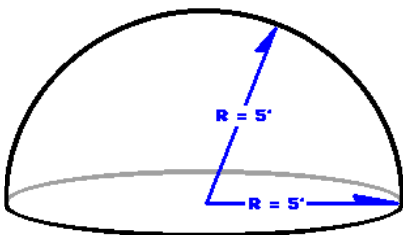
The stand could be made from rocks or branches such as that shown to the left. The stand helps protect the contents from rabbits, squirrels and wood rats.

A ramada looks similar to the granary stand above, but is much larger to allow people to walk upright underneath. Ramadas were used as shade structures for work, gatherings or ceremonies. They may be topped with shade material such as leafy branches or brush.

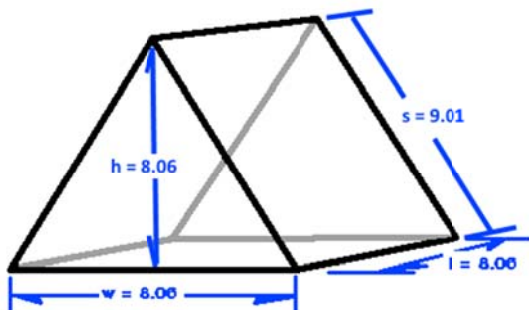
## The Math of the E'waa

The dome is the most efficient of the practical geometric shapes due to the fact that it is the shape that has the least amount of surface area for a given interior volume. (The fact that stress is distributed across the structure also adds to its comparative strength.) So, let's use geometry to confirm this is true. Let each of the following shapes confine a space of 261.80 cubic feet. How much surface area would need to be constructed? (assume the floor is left open)

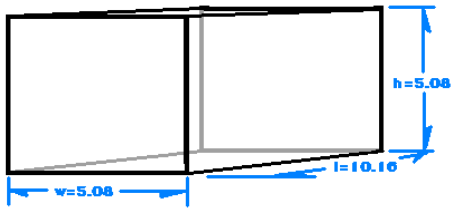
*Note: some numbers may be slightly different when calculating due to rounding.*



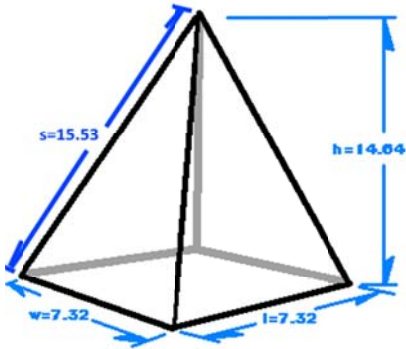
Volume of hemisphere =  $\frac{2}{3}\pi R^3$   
 Surface area of hemisphere =  $2\pi R^2$   
 Volume = 261.80 ft<sup>3</sup>  
 Surface Area = 157.08 ft<sup>2</sup>



Let  $l=w=h=8.06$  ft and  $s=9.01$   
 Volume of A-frame =  $\frac{1}{2}whl$   
 Surface area of A-frame =  $2(s*l)+(w*h)$   
 Volume = 261.80  
 Surface Area = 210.20 ft<sup>2</sup>

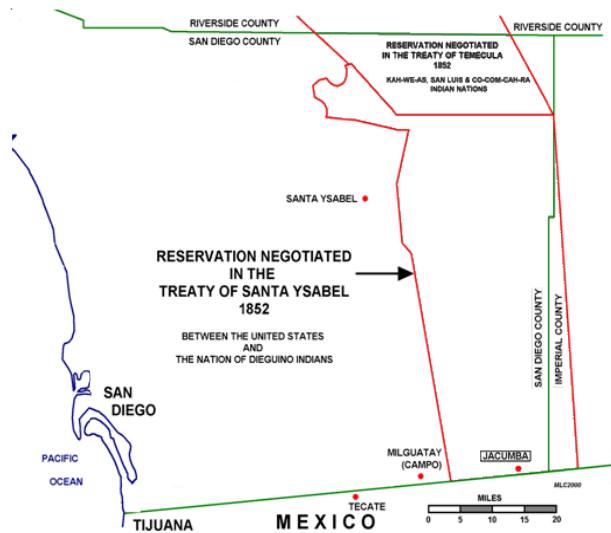
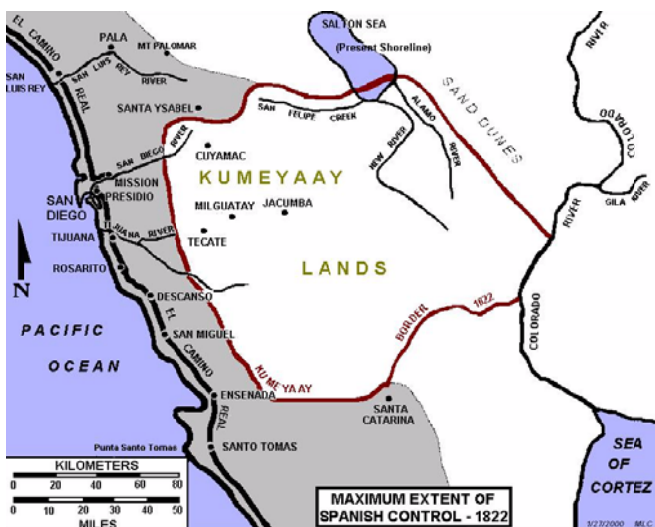
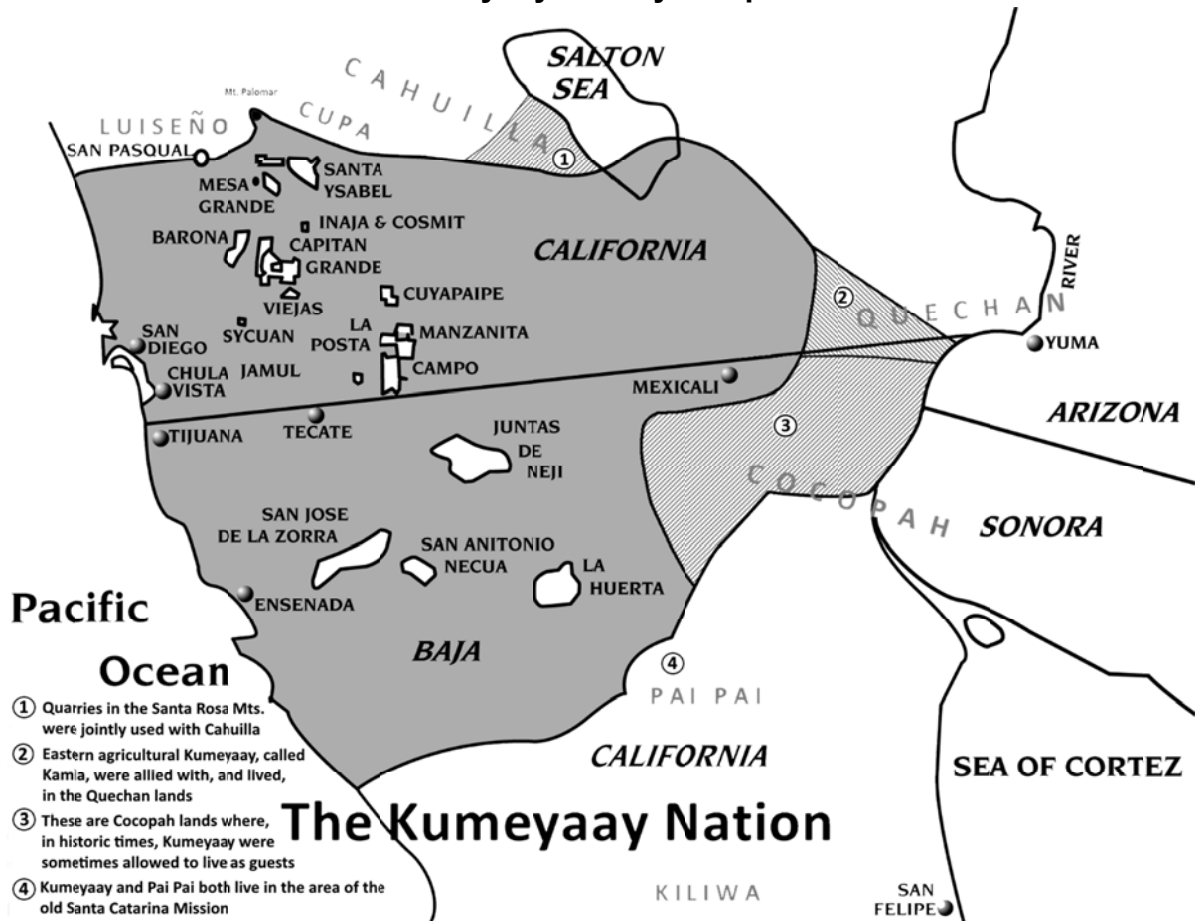


Let  $w=h=5.08$  ft and  $l=10.16$  ft  
 Volume of box =  $lwh$   
 Surface Area =  $2wh + 2lh + wl$   
 Volume = 261.80  
 Surface Area = 206.45 ft<sup>2</sup>



Let  $w=l=7.32$  ft and  $h=14.64$  ft and  $s=15.53$   
 Volume of pyramid =  $\frac{1}{3}lwh$   
 Surface Area =  $2(w*s)$   
 Volume = 261.80 ft<sup>2</sup>  
 Surface Area = 227.36 ft<sup>2</sup>

## Kumeyaay History - Maps



## **Appendix B - Story Telling**

Story telling is a significant part of the Kumeyaay cultural experience. Stories tell of the creation of the universe, people and animals. They give lessons on conduct between people and the world around them. They are often told as parables to highlight a particular teaching. For this module, a Kumeyaay storyteller should be invited to the class to share stories and discuss the meanings. This can also be done as a part of an outing to a village or teaching site. If a storyteller cannot be obtained, an alternative is to utilize the storytelling video available at [www.KDLC.org/stories](http://www.KDLC.org/stories). On this video, Mr. Stan Rodriguez shares some of the Kumeyaay stories. On completion of each video, the teacher should lead the class in discussions of the meaning and lessons being imparted.

## **Appendix C – Music**

Music is an important part of Kumeyaay culture. A Kumeyaay Singer will sing and explain songs, which teach lessons about life, history, creation. If a Kumeyaay singer cannot be obtained, there is a short lesson on some of the Kumeyaay songs and instruments at [KDLC.org/songs](http://KDLC.org/songs).

Many songs have been passed down from generation to generation. These songs remain a part of many Kumeyaay ceremonies and gatherings. They are sung by men and boys who also play the halmaa while singing. Women accompany the men by dancing to the music.

### **Deer Hoof Rattle**



### **Gourd Rattle**





## Appendix D - Games

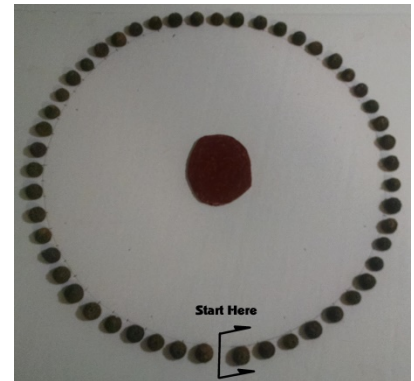
Shinny (*piak*) – A game similar to field hockey, played with a small ball and curved sticks. Teams try to get the ball to the opponents side.

Hoop game (*palomar*) – A hoop is rolled downhill and a spear is thrown through a hoop and a score is made if the hoop rings the spear. If the spear goes all the way through the hoop then there is no score.

Acorn rings (*sentai katum*) – Acorn caps are strung through a string attached to a small stick. Scores are made based on the number of caps that can be pierced at one time.

### Dice game Shahook (means 10):

Create a playing board by gluing 50 markers in a circle pattern with a striking point in the center. The above playing board was created using poster board with acorn caps as the markers and a raised poster board center for the striking surface. Traditionally, stones would be used for both purposes.



Wood dice



Drywall trim



Tongue depressors

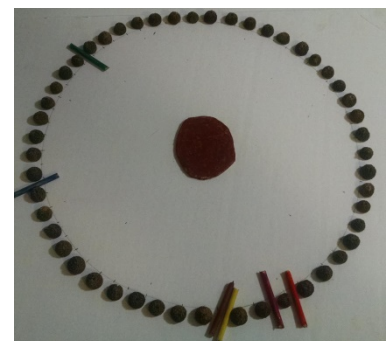
All shown with one die face down

There are three dice. Normally, they would be made in a semi-cylindrical shape but they can be made from tongue depressors, trim or other materials. The flat surface is decorated with geometric patterns (be creative, they don't affect the game). Player markers can be sticks colored differently for each player

Now, you're all set! But first, you need the Kumeyaay numbers zero to 10.

1-Shin, 2-Hewuk, 3-Hemuck, 4-Chipup, 5-Sarrup, 6-Hamhook, 7-Pekay, 8-Chiphook, 9-Nyimhamook, 10-Shahook

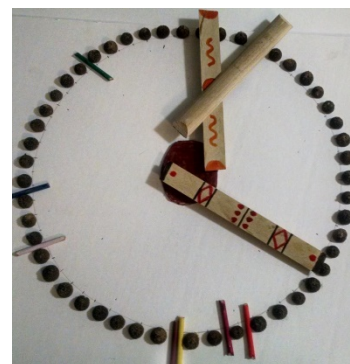
And, of course, Teh-ooee (zero)



The three dice are held about 6 inches above the striker and dropped. Movements are based on how many show marked sides up. If a die is covered by another die, even a tiny bit, it is not counted.

<u>Die count</u>	<u>Move</u>
Zero	zero
One	one
Two	five
Three	ten

Die count is one here because the second face up die is covered by another.



Call out each number as you move around the spaces (in Kumeyaay, of course). If your final position lands on a space already occupied, you send that person back to the start! When you reach the 50<sup>th</sup> space, you have won! (You don't have to land exactly on the 50<sup>th</sup> space). If you score 10, congratulations!, you get to roll again.

### **Dice Game Pushook**

4-6 people with one referee called a Coy-me.

Materials: 4 dice 7-8 inches long  
A striking surface, circular, 4-8 inches in diameter  
(15) politos (playing sticks) 6 inches long

The players sit in a circle. A stone or other flat object is placed in the center to be the striking surface. 4 dice are held above the striking surface and dropped.

1. The Coy-me designates the playing field. Any dice that falls outside the playing field does not count. (If playing on a table, the edge of the table is usually the edge)
2. The Coy-me gives the dice to the first player chosen by the Coy-me's preference.
3. Each player drops the dice onto the striking surface. The first player to get all 4 dice face up gets one polito and passes the dice to the right. The regular game is now started.
4. Each player drops the dice and gets one polito for each face up dice. If the player gets 4 dice face up they get a second drop before passing to the next player. If the player gets no die face up they pass to the next player without receiving a polito.
5. After the Coy-me has given out all of the politos the player who earns the polito draws it from the player to the left. If the player to the left has none then the next player to the left must give up their holding until the player who won the polito gets his winning. If a player is asked for a polito and has none, they are out of the game. Once one player gets all the politos, that player is the winner and the game is over.





## Appendix E

### Hunting, fishing

Many different types of animals were hunted by the Kumeyaay including, deer, rabbit, mountain sheep, fish, rodents and reptiles. Hunting could be a group event or solitary depending on the need. For group hunts the tasks were often divided between people who herded the animals toward an ambush point where hunters lay in wait.



Traps were used for many smaller animals and included snares, nets, rock falls and the spring and box traps shown in the pictures. Rabbit sticks and arrows were commonly used for small game. Fishing was done with nets, fish hooks, arrows and fish traps.

For classroom use, the video First People, Kumeyaay is an excellent video showing fish traps, making of hunting weapons and tools.



From the top down are the spring trap, box trap, throwing stick, fish trap and, on the right, fishing tackle.

## Appendix F

### S. CA Ecosystems & Conservation Site Presentation

#### Kumeyaay Plant List

Scientific Name	Common Name	Kumeyaay Name	Noxious Species (Ns)
<i>Achillea millefolium</i>	Common yarrow		
<i>Achillea millefolium lanulosa</i>	Mountain yarrow	samaay kunisaay	
<i>Acmispon americanus</i> ( <i>Lotus purshianus</i> )	Spanish lotus		
<i>Acmispon glaber</i> ( <i>Lotus scoparius</i> )	Deerweed, Common deerweed California broom	Hawataay, hwa'ht	
<i>Acmispon glaber</i>			
<i>Acmispon maritimus</i>	Coastal lotus		
<i>Adenostoma fasciculatum</i>	Chamise	iipshi, iy pshii, iipsi, I,ipshi, ipxi	
<i>Adenostoma sparsifolium</i>	Red shank	xapull, jpu'uhl, jup 'uulh, iy jepuulh, hpull, hpu 'uull	
<i>Aesculus californica</i>	California buckeye		
<i>Agave desertii</i>	Desert agave	'emally, mull, me'ellh, ma'alh, ema'l	
<i>Ailanthus altissima</i>	Tree of heaven		NS
<i>Allium fimbriatum</i>	Wild onion, fringed onion	pull kakup	
<i>Allium</i> , ssp.	Onion	milltikup	
<i>Alnus rhombifolia</i>	White alder		
<i>Amaranthus retroflexus</i>	redroot amaranth	ekwap	
<i>Ambrosia confertiflora</i>	Ragweed, Thin-Leaf		
<i>Ambrosia monogyra</i>	Singlewhorl burrobrush	hespuuk, iy uka, wakaa, jtaasaa, oka'	
<i>Ambrosia psilostachya</i>	Ragweed	hakuhaa, hakwat, kumkaha	
<i>Amsinckia intermedia</i>	Rancher's Fiddleneck		
<i>Amsinckia tessellata</i>	Checker fiddleneck	xo oll	
<i>Anemopsis californica</i>	Yerba Mansa	'ekwis, chipan, juri, xaruuii, kurray, jumruui, furruiy, chpan, j'ruii, curruui, cujrruiy	
<i>Antirrhinum filipes</i>	Desert Snapdragon		
<i>Antirrhinum kelloggii</i>	Snapdragon, Twining		
<i>Arctostaphylos pringlei</i>	Pringle manzanita	hm'sur, husiill, hatapa nya xasill, hesill, jusilh, josilh	
<i>Artemisia californica</i>	California Sagebrush	Kuchashi, kachush, cham'pilh, chimpilh, chemajpilj	
<i>Artemisia douglasiana</i>	Douglas Mugwort		
<i>Artemisia dracuncululus</i>	Pinon Wormwood, Wild Tarragon		
<i>Artemisia palmeri</i>	Palmer Sagewort		
<i>Artemisia tridentata</i>	Sagebush	kpijau, kup'hau, pajau, hp'aaw, ph'aaw, kaph'aaw	

Scientific Name	Common Name	Kumeyaay Name	Noxious Species (Ns)
<i>Arundo donax</i>	Arundo	karris	NS
<i>Asclepias fascicularis</i>	Narrow-Leaf Milkweed		
<i>Asplenium vesperinum</i>	Western Spleenwort		
<i>Astragalus crotalariae</i>	Salton Milkvetch		
<i>Astragalus trichopoda</i>	Coast Loco Weed		
<i>Atriplex coulteri</i>	Coulter Saltbush		
<i>Atriplex sp.</i>	Atriplex	teshill	
<i>Atriplex lentiformis ssp. Breweri</i>	Brewer's saltbush		
<i>Avena fatua</i>	Wild oat	nyipaay, yippaay	
<i>Baccharis pilularis</i>	Coyote Brush		
<i>Baccharis salicifolia (Baccharis viminea)</i>	Mule fat	hamusii, xatamu, jatamual, tamoot, tamw'aal, jmushi, jamushi, jamuzi	
<i>Baccharis sarthroides</i>	Broom baccharis	kwe chip	
<i>Bahioopsis laciniata</i>	California Sunflower		
<i>Batis maritima</i>	Saltwort, turtle weed	millkamme	
<i>Beloperone californica</i>	Beloperone	askopūs	
<i>Bowlesia incana</i>	Bowlesia		
<i>Boykinia rotundifolia</i>	Round-Leaf boykinia		
<i>Brassica nigra</i>	Black mustard		NS
<i>Brickellia californica</i>	California brickelbush	kuwak nesamak, samalh jkuak, samalh kuak, sa'mall kwak, samalj coac	
<i>Bromus carinatus</i>	California brome	perhaaw, perixaw	
<i>Bromus madritensis L. ssp. Rubens</i>	Foxtail brome, Foxtail chess	mut kal	NS
<i>Calandrinia breweri</i>	Brewer calandrinia		
<i>Calochortus splendens</i>	Splendid mariposa lily		
<i>Calochortus weedii</i>	Weed mariposa lily		
<i>Calystegia longipes</i>	Morning glory	mu'ush	
<i>Calystegia macrostegia ssp. arida</i>	Southern California morning glory	moutsh	
<i>Calystegia macrostegia ssp. tenuifolia</i>	San Diego Morning-Glory	yamakwitch	
<i>Camissoniopsis bistorta</i>	California sun cup	kwakwus	
<i>Camissoniopsis pallida</i>	Pale Sun Cup		
<i>Cardamine californica</i>	Milkmaids, Toothwort		
<i>Carex ssp.</i>	Sedge		
<i>Carpobrotus chilensis</i>	Sea fig	hayaaw, xayiiow	NS
<i>Carpobrotus edulis</i>	Hottentot fig	hayiiaw	NS
<i>Castilleja affinis</i>	Indian paintbrush		
<i>Castilleja exserta</i>	Owl clover		

Scientific Name	Common Name	Kumeyaay Name	Noxious Species (Ns)
<i>Caulanthus heterophyllus</i>	Slender jewel flower (S)		
<i>Ceanothus cuneatus</i>	Wedgeleaf ceanothus	ehwiir	
<i>Ceanothus integerrimus</i>	Deer brush	ekwawiir	
<i>Ceanothus leucodermis</i>	Chaparral whitethorn	'ipewii	
<i>Ceanothus tomentosus</i>	California lilac	'ipewii	
<i>Ceanothus verrucosus</i>	White coast ceanothus		
<i>Cercocarpus betuloides</i>	Mountain mahogany	makwill	
<i>Centaurea solstitialis</i>	Yellow star thistle		NS
<i>Chamaesyce albomarginata</i>	Rattlesnake weed, Sand mat	mut eyiww, mat jnak, matt jnak, matt yiu, mat jnac, mat nñiu'	
<i>Cheilanthes newberryi</i>	Newberry's lipfern		
<i>Cheilanthes viscida</i>	Viscid lip fern		
<i>Chenactis glabriuscula</i>	YellowPincushion		
<i>Chenopodium album</i>	Lambs Quarters	hakwach, xakawch, ha your	
<i>Chenopodium californicum</i>	California goosefoot, soaproot	hakuut	
<i>Chenopodium murale</i>	Nettle leaf goosefoot	kwap, pill uull	
<i>Chenopodium rubrum</i>	Red goosefoot	pill lue	
<i>Chilopsis linearis</i>	Desert willow	hapally	
<i>Chlorogalum parviflorum</i>	Soapplant, Amole		
<i>Chorizanthe fimbriata</i>	Fringed spineflower	samaay kwi'itit	
<i>Citrullus vulgaris</i>	Watermelon	kwii yuu yiutch	
<i>Clarkia epilobioides</i>	Canyon clarkia		
<i>Clarkia purpurea</i>	Wine-Cup clarkia		
<i>Claytonia exigua</i>	Little spring beauty		
<i>Claytonia perfoliata</i> <i>ssp. mexicana, p.</i>	Miner's Lettuce	'ekwak echitt	
<i>Clematis ligusticifolia</i>	Western virgin's bower	kwuk nayull	
<i>Clematis pauciflora</i>	Small leaved clematis		
<i>Clinopodium chandleri</i>	San Miguel savory		
<i>Cneoridium dumosum</i>	Bush rue or Spice bush		
<i>Collinsia concolor</i>	Chinese houses		
<i>Corethrogyne (Lessingia)</i> <i>filaginifolia</i>	California sand aster		
<i>Cortaderia selloana</i>	Pampas grass		NS
<i>Croton setigerus</i>	Turkey mullein		
<i>Chrysanthemum sp.</i>	Chrysanthemum		NS
<i>Cucurbita foetidissima</i> <i>(C. palmata)</i>	Calabazilla, Coyote Mellon	hemechaa, xum'taay	
<i>Cucurbita palmata</i>	Coyote gourd, coyote melon	xumchanoul	
<i>Cuscuta pacifica</i>	Dodder	aukwel paxa	
<i>Cylindropuntia bigelovii</i>	Teddybear cholla	melltat, uuxpa	

Scientific Name	Common Name	Kumeyaay Name	Noxious Species (Ns)
<i>Cylindropuntia prolifera</i>	Coast cholla		
<i>Cynara cardunculus</i>	Artichoke thistle		NS
<i>Cytisus scoparius</i>	Scotch broom		NS
<i>Datura wrightii</i> ( <i>D. metaloides</i> )	Jimson weed	kusi	
<i>Daucus pusillus</i>	Wild carrot or Rattlesnake weed	hatuum	
<i>Deinandra fasciculata</i>	Tarweed		
<i>Deinandra fasciculata</i>	Clustered tarweed	xatuun	
<i>Delphinium parryi</i>	Parry larkspur		
<i>Dendromecon rigida</i>	Bush poppy, Tree poppy	xumsut	
<i>Descurainia pinnata</i>	Yellow tansy mustard	xo uull	
<i>Dichelostemma capitatum</i>	Blue dicks, Wild hyacinth	melkikup, mish'aalhy	
<i>Dodecatheon clevelandii</i>	Shooting Star		
<i>Dryopteris arguta</i>	Coastal Wood Fern		
<i>Dudleya edulis</i>	Lady Fingers	milly kumil, millkomil	
<i>Dudleya lanceolata</i>	Lanceleaf liveforever	milly kmaay, millkichiiz	
<i>Dudleya pulverulenta</i>	Chalk lettuce	Millkomaay, milhka'mey	
<i>Elaeagnus angustifolia</i>	Russian Olive		NS
<i>Eleocharis macrostachya</i>	Creeping spike rush	upsill	
<i>Elymus glaucus</i>	Wild blue rye		
<i>Elymus triticoides</i>	Beardless wild-rye		
<i>Encelia californica</i>	Encelia	nyawiiw	
<i>Ephedra californica</i>	California jointfir, desert tea	xakpip, hpiip, xuupiip, xuupiip, jpiip, jpip, mii'aaq, hpiip, hukpip, xakpip	
<i>Ericameria linearifolia</i>	Narrowleaf goldenbush	e ii samul whee	
<i>Ericameria parishii</i>	Parish's rabbitbrush	xatamuu	
<i>Eriodictyon crassifolium</i>	Felt-leaf yerba santa	samalh jlhuy, samalh jpilh, muka jepilh, pja.a, kujua', sa'mall luupnu'up	
<i>Eriodictyon trichocalyx</i>	Hairy yerba santa	pill'ha, samalh jlhuy, samalh jpilh, muka jepilh, pja.a, kujua', sa'mall luupnu'up	
<i>Eriogonum elongatum</i>	Longstem buckwheat	samull kwasill	
<i>Eriogonum fasciculatum</i>	California Buckwheat	hamill, xa mill, hamill, xamill, jm'ilh, ja'milh, iy jamilh, chimilijuur, jamilj, hm'illy	
<i>Eriophyllum confertiflorum</i>	Golden Yarrow	chanewan, chianuuan	
<i>Erodium botrys</i>	Big heron bill, long beaked filaree	mi yaaw wata	
<i>Erodium cicutarium</i>	Coastal Heron's Bill, red stemmed filaree	maayawa;amit	
<i>Erodium moschatum</i>	Musky stork's bill, white stemmed	mutull	



Scientific Name	Common Name	Kumeyaay Name	Noxious Species (Ns)
	filaree		
<i>Erysimum capitatum</i>	Wallflower, sanddune wallflower	xatuup	
<i>Eschscholzia californica</i>	California poppy	patol	
<i>Eucalyptus sp.</i>	Eucalyptus		NS
<i>Eucrypta chrysanthemifolia</i>	Common Eucrypta		
<i>Eulobus californicus</i>	California primrose	samaay	
<i>Euphorbia misera</i>	Cliff spurge	tut	
<i>Euthamia occidentalis</i>	Grass-Leaf Goldenrod		
<i>Ferocactus cylindraceus</i>	Barrel cactus, California barrel cactus	mill tut	
<i>Ferocactus viridescens</i>	Coast Barrel Cactus		
<i>Ficus carica</i>	Edible fig		NS
<i>Foeniculum vulgare</i>	Wild fennel		
<i>Fragaria vesca</i>	Wood or Wild Strawberry	chepahay	
<i>Frankenia salina</i>	Yerba Reuma, Alkali Heath	chayaaw	
<i>Fraxinus udhei</i>	Evergreen ash		NS
<i>Funastrum cynanchoides</i>	Climbing Milkweed		
<i>Galium aparine</i>	Prickly bedstraw or Goose grass		
<i>Garrya veatchii</i>	Southern silk tassel	chii, eshu	
<i>Gilia angelensis</i>	Chaparral gilia		
<i>Glebionis coronaria</i>	Crown daisy	istup	
<i>Gnaphalium beneolens</i>	Cudweed	shamanu un	
<i>Grevillea robusta</i>	Silk tree		NS
<i>Gutierrezia californica</i>	California matchweed		
<i>Gutierrezia sarothrae</i>	Common snakeweed	sarropuu	
<i>Haplopappus Palmeri</i> var. <i>pachylepis</i>	Palmer's rabbitbrush	chimpil	
<i>Hazardia squarrosa</i>	Goldenbush, Sawtooth		
<i>Helianthemum scoparium</i>	Peak Rush-Rose or Rock Rose		
<i>Helianthus annuus</i>	Western sunflower	nya'wiiw	
<i>Heliotropium curassavicum</i>	Salt heliotrope	mill kopis	
<i>Hesperocyparis forbesii</i>	Tecate cypress	isha	
<i>Hesperoyucca whipplei</i>	Our Lord's Candle	'aakull, jakulh, akul nyipi jmi, aa'aa, a'a	
<i>Heteromeles arbutifolia</i>	Toyon	kuuhik, huusiik, joshik, jushik, huusik	
<i>Heterotheca grandiflora</i>	Telegraph weed	chopill, xakuut	
<i>Hoita macrostachya</i>	Leather Root		
<i>Hymenoclea monogyra</i>	Leafy burrobush		
<i>Hymenoclea salsola</i>	Cheesebush	Ōka	
<i>Isocoma menziesii</i>	San Diego Goldenbush		

Scientific Name	Common Name	Kumeyaay Name	Noxious Species (Ns)
<i>Isomeris arborea</i>	Bladderpod	peshall, uupshash	
<i>Jaumea carnosa</i>	Fleshy jaumea		
<i>Jepsonia parryi</i>	Coast jepsonia	chapap, millkapup	
<i>Juglans californica</i>	California black walnut		
<i>Juncus acutus ssp. leopoldii</i>	Spiny rush	shiull, psilj	
<i>Juniperus californica</i>	California juniper	sha, i'sha, iy sha, chaa, ii'ur, sha'	
<i>Keckiella antirrhinoides</i>	Yellow bush penstemon, Beard-tongue		
<i>Lasthenia coronaria</i>	Southern goldenfields		
<i>Lasthenia gracilis</i>	Goldenfields		
<i>Lathyrus vestitus</i>	Wild pea		
<i>Layia platyglossa</i>	Tidy tips		
<i>Lepechinia ganderi</i>	San Diego pitchersage	po lay	
<i>Lepidium latifolium</i>	Perennial pepperweed		NS
<i>Lepidium oblongum</i>	Wayside peppergrass		
<i>Lepidium virginicum</i>	Virginia peppergrass		
<i>Leymus condensatus</i>	Giant ryegrass		
<i>Linanthus dianthiflorus</i>	Ground pink		
<i>Lithophragma affine</i>	Woodland star		
<i>Lonicera subspicata</i>	Southern honeysuckle	mellka, xamashi, xamasuur, mellka xamashi, kwak uyulh, eelphitt, kwak nuyulh, coacnuylj, melkaa	
<i>Lupinus bicolor</i>	Miniature lupine		
<i>Lupinus hirsutissimus</i>	Stinging lupine		
<i>Lupinus sparsiflorus</i>	Coulter's lupine	xamasasow	
<i>Lupinus succulentus</i>	Arroyo lupine		
<i>Lupinus truncatus</i>	Collar lupine		
<i>Lycium californicum</i>	California box thorn	hotut	
<i>Malacothamnus fasciculatus</i>	Chaparral bush mallow		
<i>Malosma laurina</i>	Laurel sumac	'ektii, kwall kumeyaay, Kwally, juaalh Kumiai, juaalh, joalj	
<i>Malva parviflora</i>	Cheeseweed	hapiex	
<i>Malvella leprosa</i>	Alkali mallow		
<i>Marah macrocarpa</i>	Wild cucumber	chilikuut	
<i>Marrubium vulgare</i>	Common horehound	milkopiis	NS
<i>Matricaria discoidea</i>	Pineapple weed	munsanii	
<i>Melica imperfecta</i>	California melic	kwisha, mutkal	
<i>Mesembryanthemum crystallinum</i>	Common iceplant	sii ee nese	
<i>Mimulus aurantiacus</i>	Sticky monkey flower		
<i>Mirabilis laevis var. crassifolia</i>	Wishbone bush		

Scientific Name	Common Name	Kumeyaay Name	Noxious Species (Ns)
<i>Muhlenbergia rigens</i>	Deer grass	kwa'yull	
<i>Myoporum laetum</i>	Lollypop tree		NS
<i>Nassella pulchra</i>	Purple needlegrass		
<i>Nasturtium officinale</i>	watercress	xamull	
<i>Nemophila menziesii</i>	Baby Blue Eyes		
<i>Nicotiana glauca</i>	Tree tobacco	'opilly, oplook	NS
<i>Nicotiana obtusifolia</i> var. <i>obtusifolia</i>	Desert tobacco	'op	
<i>Nolina interrata</i> (S)	Dehesa nolina		
<i>Notholaena californica</i>	California cloak fern		
<i>Nuttallanthus texanus</i> ( <i>Linaria canadensis</i> )	Blue toadflax		
<i>Oenothera elata</i> ssp. <i>hookeri</i>	Hookers or Marsh evening primrose		
<i>Olea europea</i>	Olive tree		NS
<i>Opuntia basilaris</i>	Beavertail Cactus	'ehpaa, jpaa jentil, jpa, xapa, chewiiw, melltat (mull tut) or pa kwin yii (O. Sp.)	
<i>Opuntia chorotica</i>	Pancake Prickly Pear	'ehpaa, jpaa jentil, jpa, xapa, chewiiw, melltat (mull tut) or pa kwin yii (O. Sp.)	
<i>Opuntia cylindropuntia</i>	Cholla	'ehpaa, jpaa jentil, jpa, xapa, chewiiw, etuts	
<i>Opuntia littoralis</i>	Coast Prickly Pear	'ehpaa, jpaa jentil, jpa, xapa, chewiiw, mull tut, pa kwin yii	
<i>Osmadenia tenella</i>	False rosinweed, Osmadenia		
<i>Paeonia californica</i>	California peony	kwukshapuk	
<i>Palafoxia linearis</i>	Spanish needle	humull, samull	
<i>Pectocarya heterocarpa</i>	Comb-bur		
<i>Pellaea andromedifolia</i>	Coffee fern		
<i>Pellaea andromedifolia</i>	Coffee fern		
<i>Pellaea mucronata</i>	Bird's foot fern	ahwe tup sha	
<i>Penstemon centranthifolius</i>	Scarlet bugler	xakopi es	
<i>Pennisetum setaceum</i>	Fountain grass		
<i>Penstemon spectabilis</i>	Showy Penstemon		
<i>Pentagramma triangularis</i> ssp. <i>Maxonii</i>	Goldenback fern		
<i>Pentagramma triangularis</i> ssp. <i>viscosa</i>	Silverback fern		
<i>Peritoma arborea</i>	Bladder pod	peshall, uupshash, pashaash, peshaalh, pchaalh, pshalh, psh'all	
<i>Persicaria lapathifolia</i>	Common knotweed		



Scientific Name	Common Name	Kumeyaay Name	Noxious Species (Ns)
<i>Petalonyx thurberi</i>	Sandpaper plant	samull humull	
<i>Phacelia campanularia</i>	Desert blue bells		
<i>Phacelia cicutaria</i> var. <i>hispida</i>	Caterpillar phacelia		
<i>Phacelia distans</i>	Common phacelia		
<i>Phacelia imbricata</i>	Imbricate phacelia	komahwii	
<i>Phacelia parryi</i>	Parry phacelia		
<i>Pholistoma membranaceum</i>	San Diego fiesta flower		
<i>Phoradendron bolleanum</i>	Mountain mistletoe		
<i>Phoradendron</i> sp.	Mistletoe	xallully	
<i>Physalis crassifolia</i>	Thick leaved ground cherry	lavoll	
<i>Pinkeringia montana</i>	Chaparral pea		
<i>Pinus torreyana</i>	Torrey pine	'ehwiiw, a hwiiu	
<i>Pityrogramma triangularis</i>	Gold back fern	a ka hwut	
<i>Plagiobothrys acanthocarpus</i>	Popcorn flower		
<i>Plantago erecta</i>	California plantain		
<i>Platanus racemosa</i>	California sycamore	'empuull, jperacha, jadvich'aa, persha, prsha, hperch'a, hameche'a', pe'che'a', ehpuull	
<i>Platystamon californicus</i>	Cream cups		
<i>Plectritis ciliosa</i>	Longspur Plectritis or Seablush		
<i>Polypodium californicum</i>	California Polypody	'awihatat	
<i>Populus fremontii</i>	Western Cottonwood	halampuulaamp (N), xa'a (S), ha'a, xa'a (S), ja'a, je'aa, h'a', jalampuulaamp	
<i>Porophyllum gracile</i>	Odora	a hwii psit	
<i>Portulaca oleracea</i>	Purslane	pill yel	
<i>Prosopis glandulosa</i> var. <i>torreyana</i>	Mesquite	a nall	
<i>Prosopis glangulosa</i>	Honey mesquite	'aanall	
<i>Prunus fremontii</i>	Desert apricot	epull	
<i>Prunus ilicifolia</i>	Holly-leaf cherry	'etat, aki eh'ka, jkay, hcai, ajcai, hkay, hakay, 'etut	
<i>Psathyrotes ramosissima</i>	Velvet rosette	humull, samull	
<i>Pseudognaphalium biolettii</i>	Bicolor everlasting	chumkwanon	
<i>Pseudognaphalium californicum</i>	California everlasting		
<i>Pseudognaphalium microcephalum</i>	White everlasting		
<i>Quercus agrifolia</i>	Coast live oak	'ensnyaaw, snyaaw, snyaw, sinyao, senyao, isnyau	
<i>Quercus berberidifolia</i>	California scrub oak	'ehwap	
<i>Quercus dumosa</i>	Nuttall's scrub oak	'ehwap, hwuup, juap, joap,	

Scientific Name	Common Name	Kumeyaay Name	Noxious Species (Ns)
		jupsao	
<i>Quercus engelmannii</i>	Engelman oak	neshaaw	
<i>Ranunculus aquatilis</i>	Whitewater crowfoot	hamill	
<i>Raphanus sativus</i>	Wild radish	hamull	
<i>Rhamnus californica</i>	Coffeeberry	jtut he'e kwesiyaay, inyekhaay nkya,	
<i>Rhamnus crocea</i>	Spiny Red berry	tat, jtut. (Names also applies to R. ilicifolia)	
<i>Rhus integrifolia</i>	Lemonade berry	huusill, xosill, xotut	
<i>Rubus ursinus</i>	California blackberry		
<i>Rhus ovata</i>	Sugar sumac	hwall, kwally, jualh, juatlh, juaalh sii'; juaalh nyak, joalj	
<i>Rhus trilobata</i>	Basket bush	pellychaa	
<i>Ribes indecorum</i>	White-flower or Winter currant		
<i>Ribes malvaceum</i>	Chaparral currant		
<i>Ribes speciosum</i>	Fuchsia-flowered gooseberry		
<i>Ricinis communis</i>	Castor bean		NS
<i>Rosa californica</i>	California rose	kwa'ak	
<i>Rubus ursinus</i>	California blackberry		
<i>Rumex crispus</i>	Curly dock	kish	
<i>Rumex occidentalis</i>	Western dock	kwish	
<i>Salix exigua</i>	Narrow leaved willow, sandbar willow	samall kamull	
<i>Salix goodingii</i>	Black willow		
<i>Salix laevigata</i>	Red willow	aayaaw, ayiaau yetch, a'yao, 'aiyau, ahiyao	
<i>Salix lasiopsis</i>	Aroyo willow	halasii	
<i>Salix lucida ssp. Lasiandra</i>	Lance-leaf willow	halasii	
<i>Salvia apiana</i>	White sage	pellytaay, pill'taay, lhtaay, shiltay, shlhtay, pilhtaiy, jtai, lta'ay	
<i>Salvia clevelandii</i>	Cleveland sage		
<i>Salvia columbariae</i>	Chia	Mulh'amulh, upsil, pshilh, pshilj, awol	
<i>Salvia leucophylla</i>	Purple sage		
<i>Salvia mellifera</i>	Black sage	iwuii, ha'a nya yul	
<i>Salvia munzii</i>	Munz's sage	uup	
<i>Salvia spathacea</i>	Pitcher sage		
<i>Sambucus nigra L. ssp. caerulea</i>	Blue elderberry	kupuull kapaatt, kupally, kupaall, jp'elh, kop'eelh, kuup'alh, kapalj, copelj, kpalj, kupall	
<i>Sanicula arguta</i>	Sharp-Tooth Sanicle		

Scientific Name	Common Name	Kumeyaay Name	Noxious Species (Ns)
<i>Schinus molle</i>	Peruvian pepper tree		NS
<i>Schinus terebinthifolius</i>	Brazilian pepper tree		
<i>Selaginella bigelovii</i>	Bigelow spike moss	semull	
<i>Selaginella cinerascens</i>	Ashy spike moss		
<i>Senecio mikanioides</i>	Cape ivy, German ivy		NS
<i>Senegalia greggii</i> (Acacia g.)	Catclaw	Xapanall	
<i>Shoenoplectus ssp.</i>	Tule	'esoq (S. cal.), komum (S. acutus)	
<i>Silene laciniata</i>	Indian Pink		
<i>Simmondsia chinensis</i>	Jojoba	ek shuu	
<i>Sisymbrium orientale</i>	Indian hedge mustard	chapamall	
<i>Sisyrinchium bellum</i>	Blue eyed grass		
<i>Solanum douglasii</i>	Douglas' nightshade	panō uu	
<i>Solanum nodiflorum</i>	Common nightshade	panoi	
<i>Sparganium eurycarpum</i>	Bur-reed		
<i>Spartina foliosa</i>	California cord grass	tapish	
<i>Sphaeralcea ambigua</i>	Desert mallow	xamoyal	
<i>Sporobolus airoides</i>	Alkali Sacaton		
<i>Stephanomeria diegensis</i>	San Diego wreath plant		
<i>Stephanomeria pauciflor</i>	Wire lettuce, Desert straw	ōka, samullhamuul	
<i>Stephanomeria virgata</i>	Tall stephanomeria	telkuu	
<i>Tamarix chinensis</i>	Tamarix, Salt cedar		NS
<i>Thalictrum fendleri</i>	Meadowrue		
<i>Thysanocarpus curvipes</i>	Fringe-pod		
<i>Toxicodendron diversilobum</i>	Poison oak	kuupaay, hupai (S)	
<i>Trichostema lanceolatum</i>	Vinegar weed		
<i>Trichostema parishii</i>	Mountain blue curls	waay nol yuul	
<i>Trifolium willdenovii</i>	Tomcat clover		
<i>Typha angustifolia</i>	Narrowleaf cattail		NS
<i>Typha domingensis</i>	Southern cattail	a hwii, ta piill	
<i>Typha latifolia</i>	Common cattail, broadleaf cattail	'epilly, 'epily	
<i>Ulex europaeus</i>	Gorse		NS
<i>Uropappus lindleyi</i>	Silver puffs		
<i>Urtica dioica</i>	Stinging nettle	hampasis	
<i>Viguiera deltoidea parishii</i>	Desert sunflower	matasa	
<i>Viguiera laciniata</i>	San Diego sunflower		
<i>Viola pedunculata</i>	Johnny jump-Up		
<i>Vitis girdiana</i>	Wild grape		
<i>Xanthium strumarium</i>	Cocklebur	xalōpis	
<i>Xylococcus bicolor</i>	Mission manzanita	haasill	
<i>Yucca schidigera</i>	Spanish bayonette, Mojave yucca	sha'aa, sha, shaa, aa'a	

Scientific Name	Common Name	Kumeyaay Name	Noxious Species (Ns)
<i>Zeltnera venusta</i>	Canchalagua		
<i>Zigadenus chlorogalum</i>	Soap lily	millkakup	
<i>Ziziphus parryi</i>	Parry's jujube	uxtut	

## Common Animals

Scientific Name	Common Name	Kumeyaay Name
<i>Sylvilagus audubonii</i>	Desert Cottontail	Hellyaw
<i>Lepus californicus</i>	Black-tailed Jackrabbit	Kunyaaw
<i>Spermophilus lateralis</i>	CA Ground Squirrel	
<i>Odocoileus hemionus</i>	Mule Deer	Kwak
<i>Bassariscus astutus</i>	Ringtail	
<i>Mustela frenata</i>	Long-Tailed Weasel	Hatekarr
<i>Mephitis mephitis</i>	Striped Skunk	Ketun
<i>Procyon lotor</i>	Raccoon	Nemas
<i>Urocyon cinereoargenteus</i>	Gray Fox	Perhow
<i>Canis latrans</i>	Coyote	Hetepaa
<i>Felis concolor</i>	Mountain Lion	Nyemtaay
<i>Felis rufus</i>	Bobcat	Nyemii
<i>Ardea herodias</i>	Great Blue Heron	
<i>Egretta thula</i>	Snowy Egret	
<i>Cathartes aura</i>	Turkey Vulture	Shaii
<i>Buteo jamaicensis</i>	Red-Tailed Hawk	Ku'uun
<i>Lophortyx californicus</i>	California Quail	'Aahmaa
<i>Bubo virginianus</i>	Great Horned Owl	Yu-uu
<i>Geococcyx californianus</i>	Roadrunner	Tellypuu
<i>Selasphorus rufus</i>	Rufous Hummingbird	Hampaashuuk
<i>Aphelocoma californica</i>	Scrub Jay	'Uusuull
<i>Melospiza melodia</i>	Song Sparrow	
<i>Elgaria multicarinata</i>	Alligator Lizard	Haakwal
<i>Crotalus viridis</i>	Rattlesnake	'Ewii
<i>Pituiphis catenifer</i>	Pacific Gopher Snake	Ewii yuk
<i>Anaxyrus boreas</i>	California Toad	Hantak
<i>Batrachoseps attenuatus</i>	California Slender Salamander	
<i>Didelphis virginiana</i>	Opossum	
<i>Psaltiriparus minimus</i>	Bushtit	
<i>Agelaius phoeniceus</i>	Red-winged Blackbird	'Aakwisay
<i>Zenaida macroura</i>	Mourning Dove	Kilyaahwii

<i>Aquila chrysaetos</i>	Eagle, Golden	'Eshpaa
<i>Mimus polyglottos</i>	Mockingbird, Northern	'Aashaa kwilaaw
<i>Icterus cucullatus</i>	Oriole, Hooded	Hachehwach
<i>Corvus corax</i>	Raven, Common	'Ahaak

### **Native Vegetative Communities (Habitats) of Sycuan & Heritage Conservation Site<sup>1</sup>**

- Coastal Sage Scrub – North & East of Sloan Canyon Rd. (lower elevations) Sparse scrubby plants, many lose their leaves over summer; mainly: California Sagebrush, Buckwheat, Laurel Sumac, Mule Fat, & White Sage. (Survey: Coast sagebrush, Sunflower, Wishbone bush, Tocalote, White sage, morning glory, spurge, filaree, foxtail mustard).
- Mixed Chaparral – Both sides of Sloan Canyon Rd. (gravel slopes; 500 – 4500') Dense thickets, mainly: Chamise, Manzanita, Scrub Oak, Sumac, Mtn. Mahogany. (Survey: CA Buckwheat, Coastal sagebrush, Yellow bush penstemon, Golden yarrow, Bedstraw, Mustard, Tocalote)
- Riparian Woodland – North of Sloan Canyon Rd. (stream banks; year-round water supply), Cottonwood, Sycamore, Red Willow, Elderberry. (Survey: Cottonwood, Wild grape, Mulefat, Arroyo willow, Douglas mugwort, W. Sycamore, Coast live oak, Ripgut brome, Ragweed)
- Oak Woodland – North & East of Sloan Canyon Rd., (below 5000') trees over 15' tall. (Survey: Coast Live Oak, ripgut brome, CA buckwheat, Milk thistle, Dwarf nettle, Italian thistle)
- Willow Scrub – Eastern side of Willow Lake; Thickets and understory plants, mainly: Sandbar Willow & other willow species, Salt Marsh Fleabane & White Sweetclover

(Survey: Arroyo Willow, Mulefat, Western Cottonwood, Broom baccharis, Short pod mustard, Foxtail brome)

### **Invasive (Non-native) plants on Sycuan & Heritage Conservation Site:**

- Giant Reed (*Arrundo*)
- Salt Cedar (*Tamarisk*)
- Saltbush (*Atriplex*)
- Tumbleweed
- Russian Thistle (*Salsola*)
- Telegraph Weed

### **Limiting Factors**

Discuss the concept of limiting factors in the ecosystem: e.g., water, soil, food supply, climate, elevation, disease, etc.

**Sun** - Energy source needed by all living things

**Producers** - Plants obtain energy directly from the sun (also called Autotrophs); they convert the energy into sugars, fats and proteins.

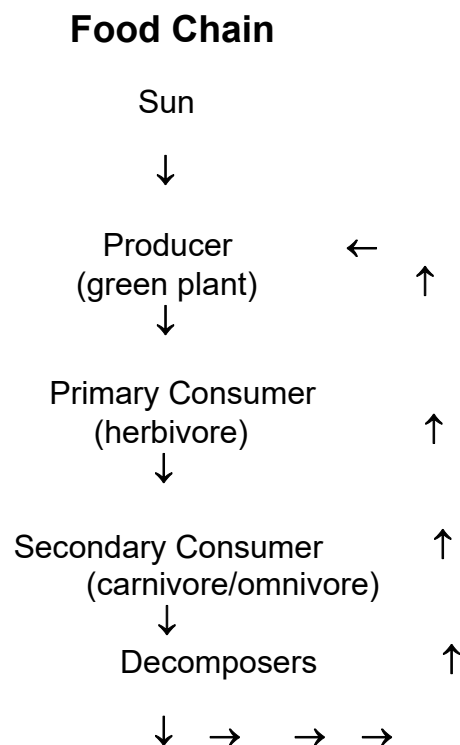
**Consumers** - Feed on others (also called Heterotrophs)

Primary consumers – Herbivores feed on autotrophs (e.g., cows, rabbits, songbirds)

Secondary consumers - Feed on consumers & autotrophs (e.g., coyotes, hawks)

**Decomposers** – Break down dead organisms and convert into basic elements  
(e.g., bacteria & fungi, also vultures)

**Food Chain** - The flow of energy from the sun through plants and animals. It is a series of feeding relationships that shows who eats whom or what.



## **Appendix F**

### **S. CA Ecosystems & HC Site Food Chain/Web**

**Activity – Draw a food web below using at least 6 of the plants and animals listed in App. A & B. Be prepared to explain your food web**

## **Appendix F**

### **Food Chain/Web Worksheet**

#### Student Food Chain/Web Drawings:

Have students color their drawings, and draw arrows (in red) indicating the direction of energy flow. Arrows point to the organism that is doing the eating. Use colors as directed in the questions.

1. What is the energy source of the food web? (color Yellow on drawing)
2. Which organisms can change the sun's energy into food? (color Green on drawing)
3. Which organisms break down plant materials? (color Brown on drawing)
4. What are decomposers?
5. Where are the decomposers? (color Blue on drawing)
6. Which organisms eat decomposers?
7. What fertilizes the plants?
8. Which part of the food web do you think is most important and why?



## Appendix F

### S. CA Ecosystems & HC Site Field Trip

**Activity: Collect leaves from at least 5 different plants (Using guide provided in App. B)**  
**Identify & write down anything below that you want to remember or report on.**

**NOTES & OBSERVATIONS:**

**Activity: Present the leaves you collected and explain which plants they are from and what these plants are used for by the Kumeyaay**

## Appendix F

### S. CA Ecosystems & HC Activity

**Activity: List the types of plants used by Kumeyaay for the following purposes:**

Food:

Houses:

Medicine:

Clothing:

Tools:

Other Practical Uses:

Value for Environment & Animals:

## Appendix G

### Kumeyaay Environmental Management

#### Harvesting and Cultivation

The Kumeyaay people interacted with the environment in a way that allowed them to conserve and enhance the native plants and animals in a manner that helped to ensure a high level of production for resources important to their daily lives. This type of management also created conditions that supported many other species in the environment. The traditional view of the world, including plants and animals, was as an interconnected whole.

Plant harvesting was done according to time honored traditions. Harvests were timed according to season, rains and moon cycle. Traditional harvesting involved customs of expressing gratitude to the plant and the creator for its sacrifice.

Example: Chia grows on grass-like stalks. Traditional harvesting involved hitting the stalks. Since the tallest stalks got hit the most, their seeds were dispersed more. The shorter stalks ended up dropping their seeds closer together when they overcrowded themselves. In many areas Chia has been reported to have become smaller than in the past.

The Kumeyaay came to know plants very well, identifying and transforming plant seeds, shoots, leaves, bark, roots, and fruit.

Kumeyaay people very purposefully tended, harvested and protected their favorite plants and animals, learning the best times and methods of harvesting, passing on this knowledge and way of life from generation to generation. Before harvesting a plant or killing an animal, a person would ask permission, offer a prayer of thanksgiving, and tell their intention for use of the plant or animal. By patiently observing and experimenting over thousands of years, the Kumeyaay shared the land with the native creatures in a sustainable way, taking only as much of a resource as was needed, leaving some for other animals. Such practice resulted in enhancing the productivity and diversity of the environment around them. Early Kumeyaay people believed that humans must interact respectfully with nature and co-exist with all living things, believing all life forms to be related.

Many different techniques of plant horticulture were developed, by learning the best times and ways of harvesting. Techniques used by the Kumeyaay included pruning, coppicing, sowing, weeding, burning, digging, thinning, and harvesting. Tools used to harvest plants included digging sticks for getting roots and tubers, rock knives, for harvesting young branches, stalks and leaves, poles for knocking down acorns, cones, and flower pods, sharpened ones, antlers and sticks for prying out seeds or fruit from prickly plants. Seed beaters, shallow baskets used to collect grains and seeds, allowed collection without harming the plant, as well as reseeding from seeds falling to the ground. Kumeyaay would also relocate (transplant) important plants, and plant the seeds of favorite plants in useful locations. They used resource management techniques to promote desired plants and plant communities, animal populations and habitat relationships.

In recent years there has been increasing appreciation for environmental practices of the indigenous Kumeyaay, and many of the ancient practices are being re-introduced on lands today. The Kumeyaay Diegueno Land Conservancy was formed for the protection of cultural resources and to enhance understanding of the traditional relationship of our people to the environment. This is being done by incorporating traditional principals into environmental resource management to enhance wetland and riparian environments, groundwater storage capacity, to provide foods and crafts, and an overall healthier and more sustainable ecosystem.

## **Kumeyaay Fire Management**

Wildfire is a naturally occurring phenomenon usually occurring during the late summer and early fall. Many plant species are able to survive fire, and some even need it to thrive. The Kumeyaay knew this, creating and using fire to increase the abundance of edible plants for humans and wildlife, for controlling insects and diseases that could harm edible and useful plants, and to increase plant materials used in making baskets, cordage, clothing, and tools. Fire was also used purposefully to remove dead materials and to promote plant growth and recycling of nutrients.

### **Effect on Seeds;**

Fire can help to break down the protective covering around many types of chaparral seeds. This break down process is referred to as scarification. Scarification can also occur from passing through the digestive tract of an animal or from being gnawed on.

### **Creating a Fire Mosaic**

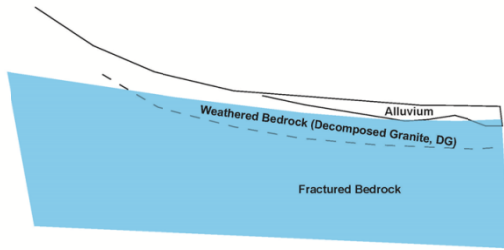
The repeated burning of small areas over time creates a pattern of burned areas in various states of regrowth. This pattern is sometimes referred to as the fire mosaic.

## **Water Management**

Springtime floods are another natural disturbance occurring in southern California. Some ecosystems and their plants depend upon such disturbance, which increases the diversity of many plants and animals.

### **Rock Structures**

Kumeyaay people created and enhanced inland water areas known as wetlands and riparian areas, through the use of rock and brush weirs. By laying rocks and brush across stream channels in mountainous areas, water was slowed down so it dropped its silt. The slower water speed allowed the soils to absorb more moisture, thereby increasing groundwater recharge. This enabled the creation of wetlands and healthy riparian areas. Stream flow was also enhanced for the drier parts of the year.



Groundwater characteristics in the mountainous areas of the Kumeyaay lands are well suited to the placement of retention structures.



The modern use of the traditional rock drop structure has allowed the recreation and enhancement of wetland and riparian areas.

#### Glossary of Land Management Terms:

- Sowing
- Tilling
- Pruning
- Coppicing
- Irrigating
- Transplanting
- Burning
- Ecosystem
- Productivity
- Diversity
- Sustainability
- Natural disturbance
- Fire Mosaic Rock Structure
- Wetland
- Riparian Area

## APPENDIX H

### Kumeyaay Cosmology



The stars were used extensively in Kumeyaay society, aiding in the timing of village movement, setting fires, harvesting, hunting, navigation and ceremonies. The constellations represented stories of creation, lessons of life, balance and harmony in the celestial cycles.

Kumeyaay used natural and man-made observatories to mark the rising of the sun, moon and stars at different parts of the year. Rock art and hole patterns have also been found to represent different constellations. Kumeyaay observed eclipses, comets, meteors and planets and had extensive belief systems for the importance of these observances.

Details of the cosmology can be found in the book, “Maay Uuyow”.

This module was envisioned as a nighttime module where students are able to see the major constellations of the season. The corollaries to the European constellations are as follows:

Kumeyaay Name	Meaning in English	European Constellation
Kwechnyay	hunter	part of Orion
Hachaa	6 laughing girls	Pleiades
Hawitai	garter snake	Lyra
Akewii	chaser	part of Orion
Hechkullk	wolf	Auriga, Taurus
Shallymaat	arm	Big Dipper
Shally	hand	Leo
Pehkay	cross	Cygnus

Llykuushirra	racer snake	Cassiopeia
Menniih	tarantula	Canis Major/Minor
Namuuly	bear	Gemini
'Ehwii	rattlesnake	Draco
Shuluk	lightning	Scorpio
Hetepaa	coyote	Bootes
Shaaai	buzzard	Virgo
'Ahaak	raven	Aquila
Emuu	mountain sheep	Orion's belt
Awi yuk	gopher snake	Corvus/Hydra
Nyemii	bobcat	Piscis Austrinus
Kwellyap Kwetull	north star	Polaris

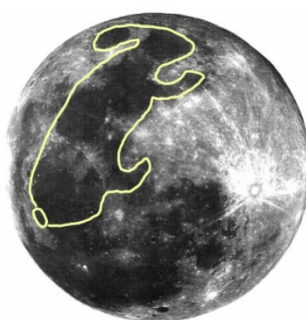
The figure of the “rabbit in the moon” can also be a subject for discussion. Both the hare, or jackrabbit, and cottontail are familiar figures in cultures from southern Africa, across Asia and into North and South America.



**The Kumeyaay rabbit, Hellyaw**



**East Asia**



**South Asia**



**Aztec**

**The Constellation Coloring book is attached after the References**



## **Appendix I**

### **HC Site Planning**

This section utilizes the:

AREA SPECIFIC ADAPTIVE MANAGEMENT PLAN  
KUMEYAAY-DIEGUEÑO LAND CONSERVANCY (KDLC)  
SYCUAN BAND OF THE KUMEYAAY NATION

The material of the plan are incorporated by reference



## References

Analytical Environmental Services. 2014. Draft Area-Specific Adaptive Management Plan (ASAMP). Prepared for the Kumeyaay-Diegueño Land Conservancy (KDLC)

Anderson, M. Kat. 2005. Tending The Wild – Native American Knowledge and the Management of California's Natural Resources.

Barona Inter-Tribal Dictionary, 'lipaay Aa Tiipay Aa Uumall', Edited by Cheryl Hinton and Paul Jeffrey, Barona Museum Press in cooperation with Sunbelt Publications, 2008.

Connolly Miskwish, M. 2007. Kumeyaay – A History Textbook Vol. I Kumeyaay: Precontact to 1893.

Connolly Miskwish, M. 2016, Maay Uuyow, Kumeyaay Cosmology

Hoffman, G. M. & Gamble, L. H. 2006. A Teacher's Guide to Historical and Contemporary Kumeyaay Culture. A Supplemental Resource for Third and Fourth Grade Teachers. Institute For Regional Studies of the Californias. SDSU.

Kavanagh, J. 1994. The Nature of California – An Introduction to Common Plants and Animals and Natural Attractions.

Kumeyaay Ethnobotany – Course material from Kumeyaay Community College, Richard Bugbee & Michelle Garcia

Kumeyaay Ethnoecology – Course material from Kumeyaay Community College, Richard Bugbee & Michelle Garcia

Rodriguez, Martha, personal interviews, 2015-2016

Rodriguez, Stan, personal interviews, 2015-2016

**Use of this book for other than educational purposes, copying or resale without the express permission of the Kumeyaay Diegueno Land Conservancy is expressly prohibited.**

# Kumeyaay Constellations

**‘Ahaak**

*raven*



**Hetepaa**

*coyote*



**‘Ewii**

*rattlesnake*



**Shally**

*hand*



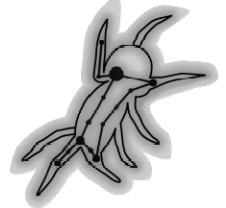
**Shaii**

*buzzard*



**Menniih**

*tarantula*



**Emuu**

*mountain  
sheep*



**Namuuly**

*bear*



**Hechkullk**

*wolf*



**Shuluk**

*lightning*



**Hachaa**

*6 laughing  
girls*



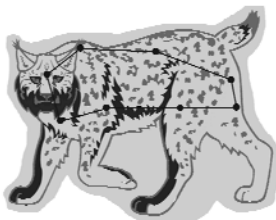
**Hawitai**

*garter snake*



**Nyemii**

*Wildcat*



**Pehkay**

*the cross*



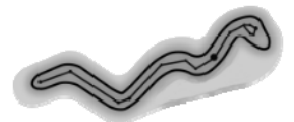
**Llykuushirra**

*racer snake*



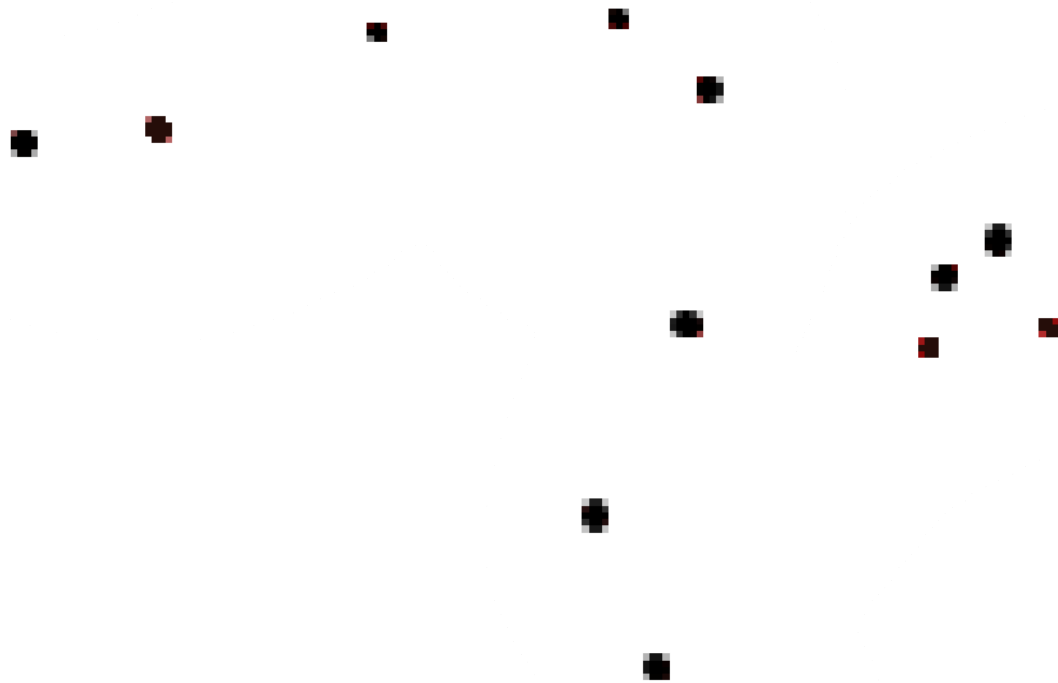
**Awi yuk**

*gopher snake*

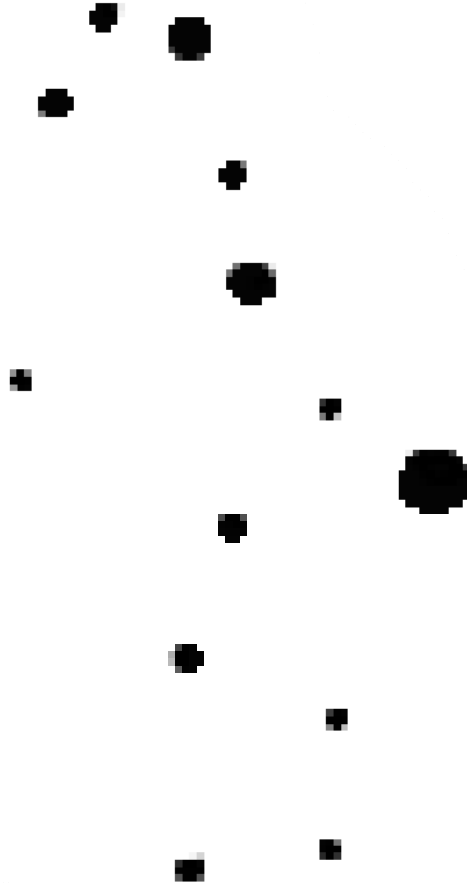




**‘Ahaak - the raven**

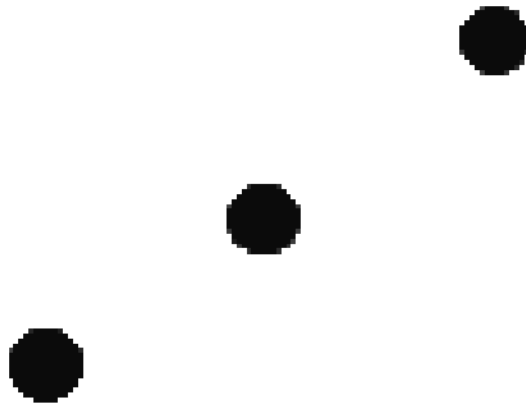


**‘Ewii - the rattlesnake**

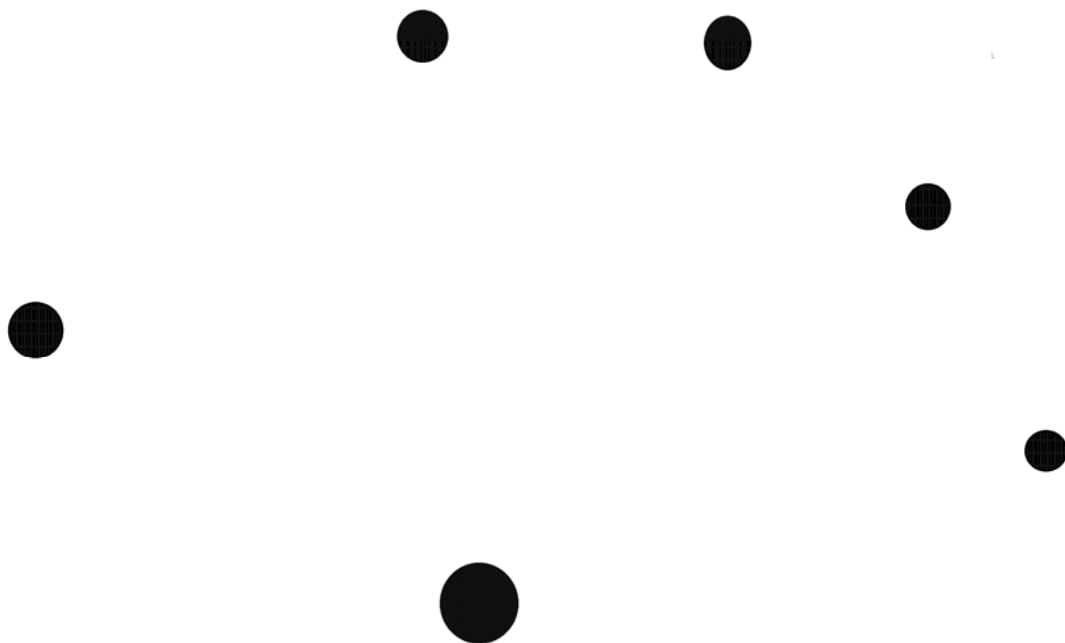


**Shaii - the buzzard**

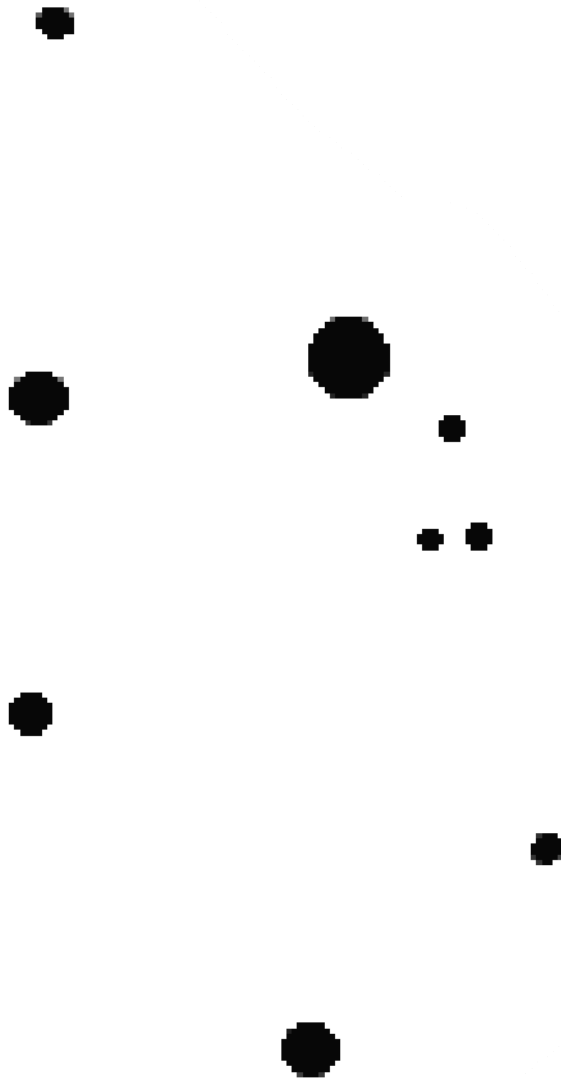




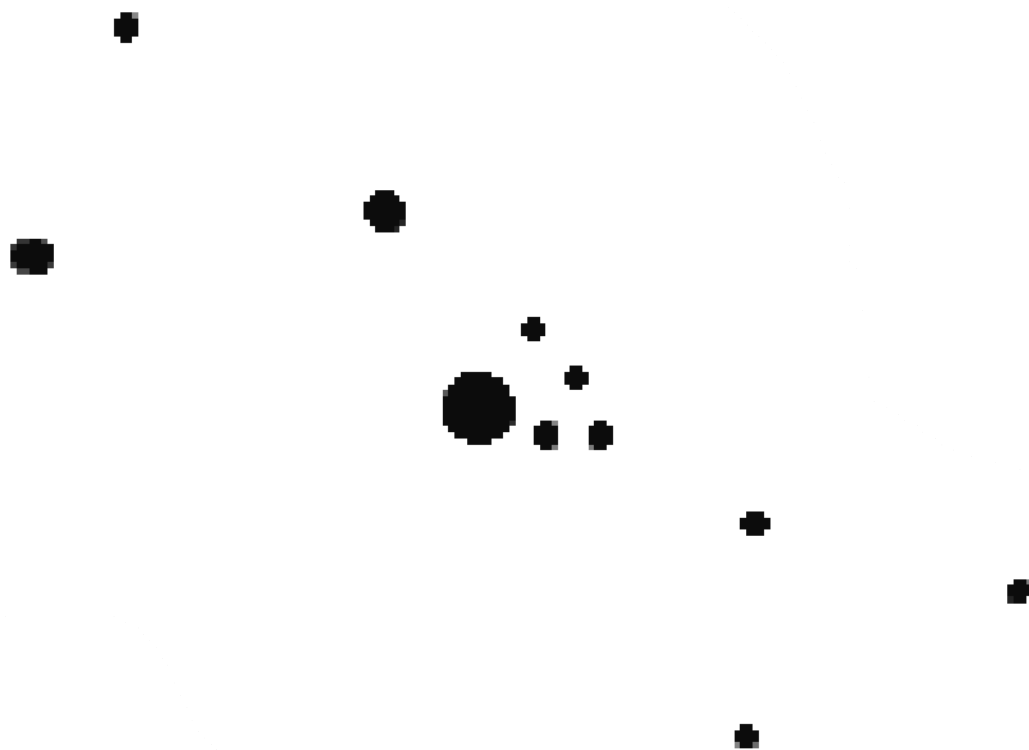
**Emuu - the mountain sheep**



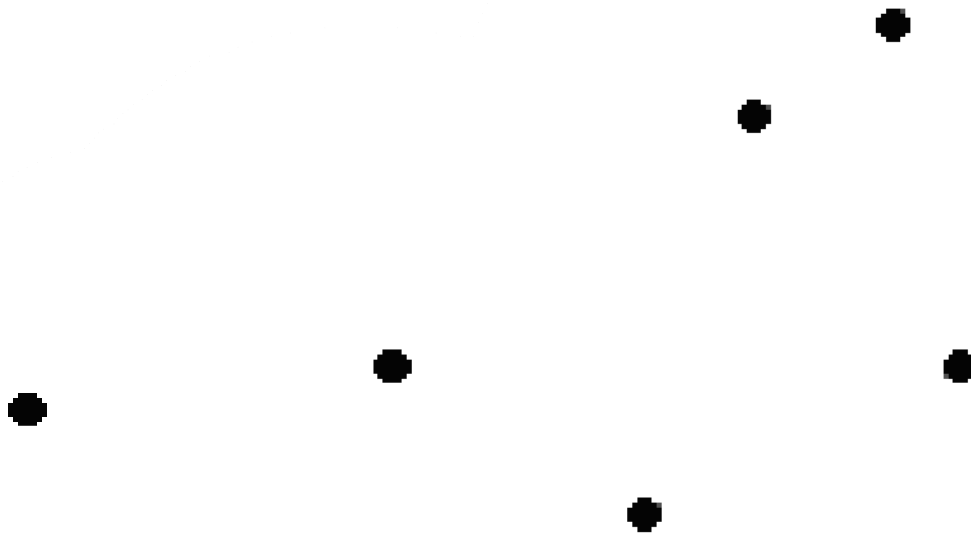
**Shally - the hand**



**Hechkullk - the wolf**



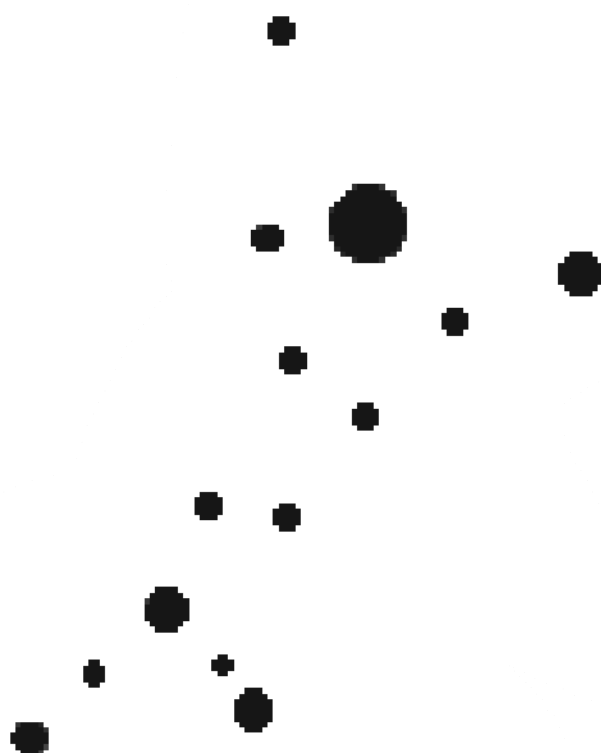
**Hetepaa - the coyote**



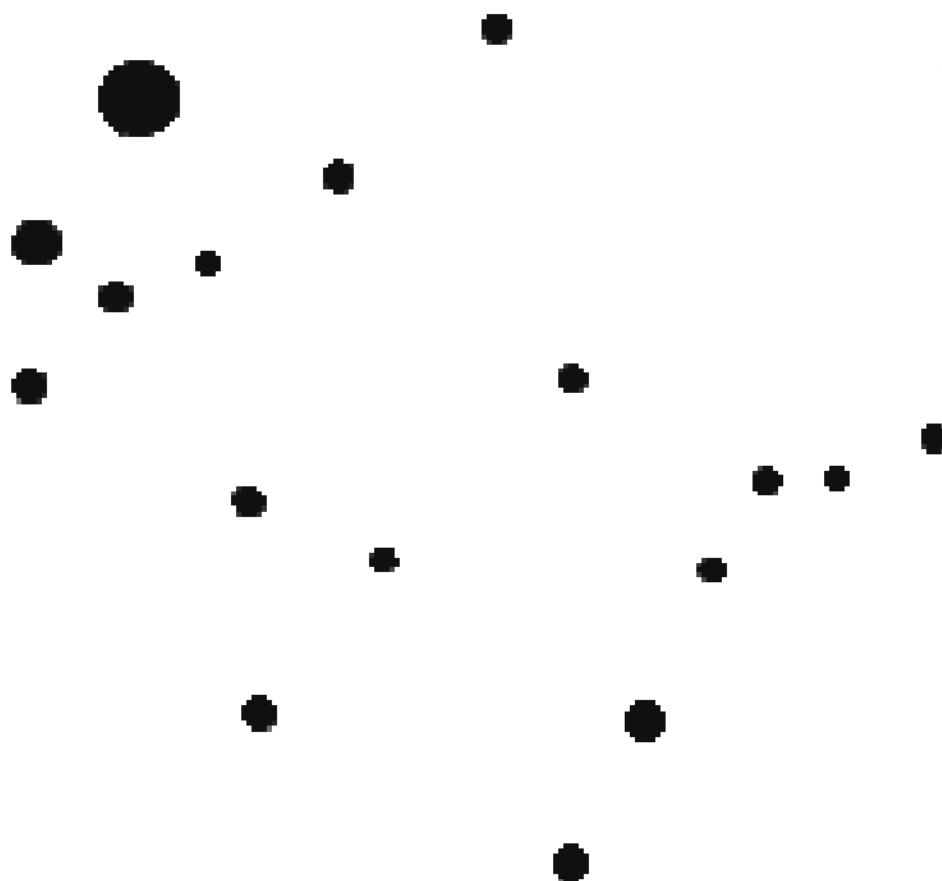
**Hachaa - the six laughing girls**



**Llykuushirra - the racer snake**

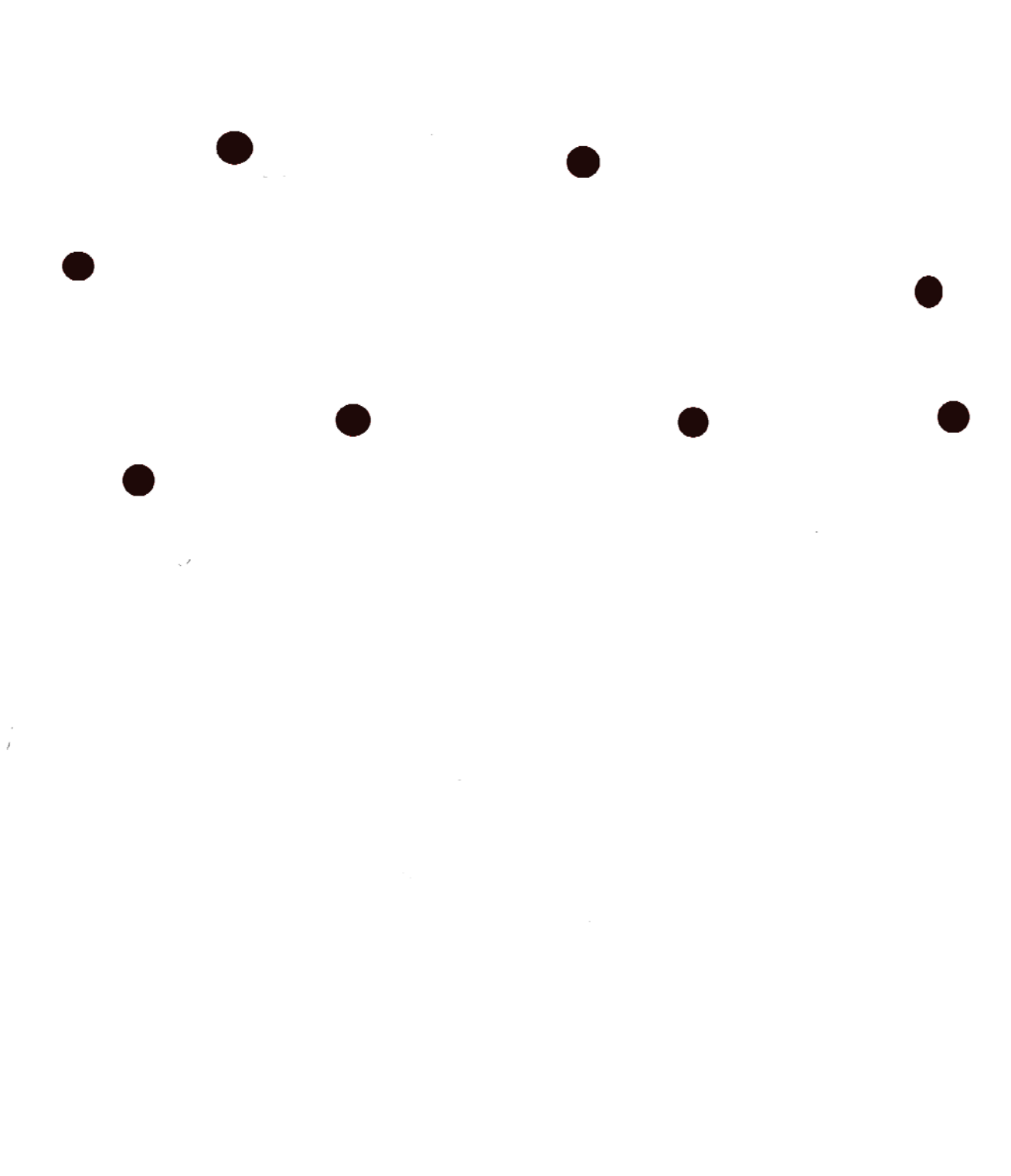


**Menniih - the tarantula**

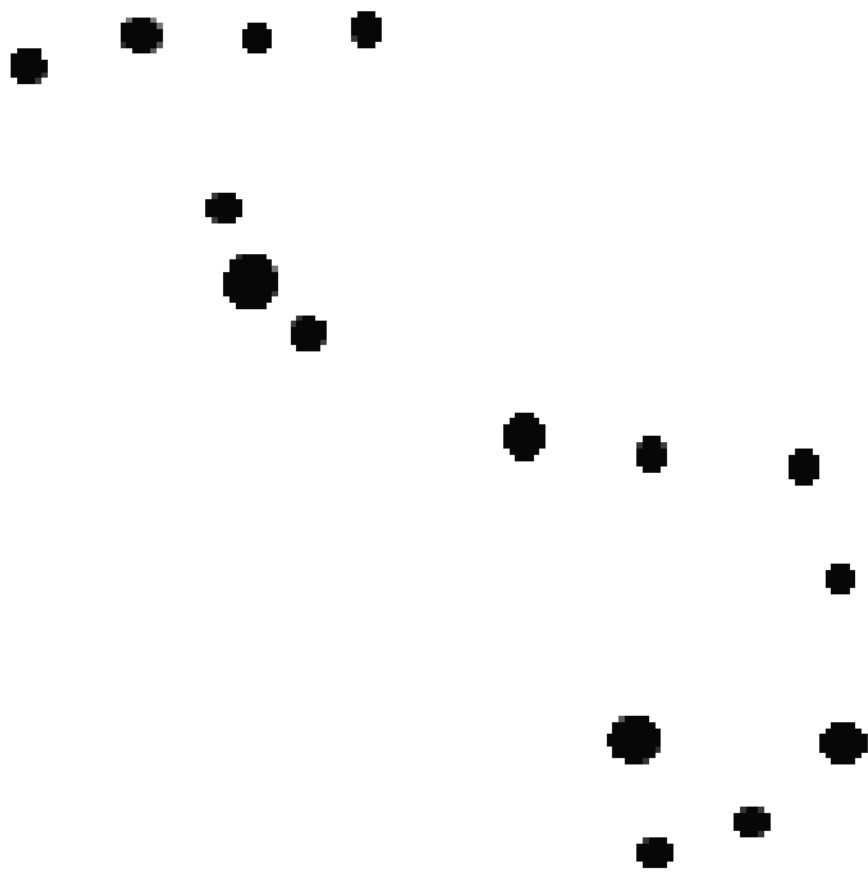


**Namuuly - the bear**

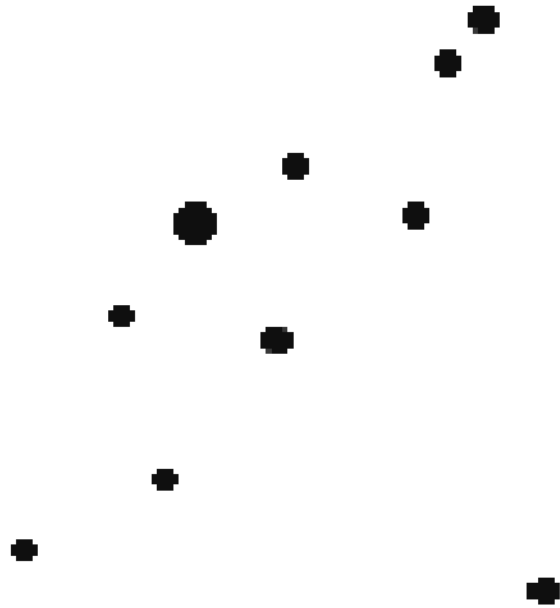




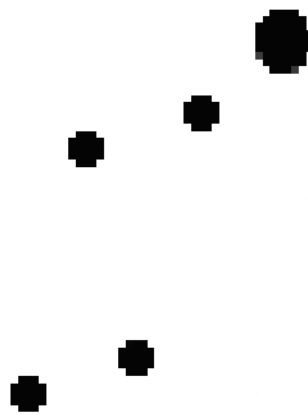
**Nyemii - the wildcat**



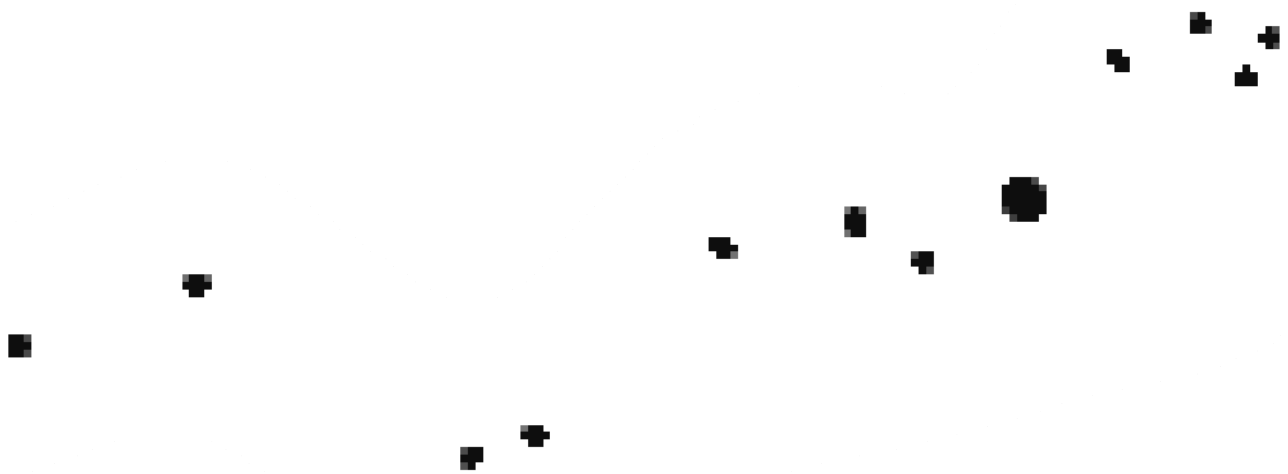
**Shuluuk - the lightning**



**Pehkay - the cross**



**Hawitai - the garter snake**



**Awi yuk - the gopher snake**