



**Webinar:
American Indian/Alaska Native
Plant Uses and Stewardship Methods
and their Potential Conservation
Benefits**

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East National Technology Support Center
Housed at the California State Office of NRCS
Davis, California
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**Many thanks to Native Americans for sharing their
knowledge and practices with me over the years.**

USDA Secretary Thomas J. Vilsack in an email to all USDA employees said that:

“As our first citizens and *first farmers*, AI/ANs hold a special place in the history of USDA which reinforces the need for their full inclusion in the USDA mission to provide leadership on food, agriculture, and natural resource issues here and around the world.”

Indigenous people of the United States practice two types of farming:

Growing domesticated crops



Seneca woman harvesting Tuscarora corn.

Stewarding wild plants for foods (called Indigenous Stewardship Methods—ISM)

- **Burning**
- **Sowing**
- **Tilling**
- **Weeding**



Lois Conner, North Fork Mono/Chukchansi with a large bundle of edible soaproot (*Chlorogalum pomeridianum*) in California.

Changes in the Natural Resources Conservation Service (NRCS) Policies and Programs to Include Indigenous Stewardship Methods



NRCS employees and indigenous advisors discuss the content of the guidebook

For more information please visit the website:

<http://directives.sc.egov.usda.gov/viewerFS.aspx?hid=27580>



A Common Indigenous Philosophy is:

Harvesting, Stewardship, & Use are Good for Native Plants



"If you keep using and caring about plants—they will make more and more berries, leaves, roots—whatever part is gathered. If the plants are not being used they just fade away."

Lawrence Bill

Mono/Choinumni/Dumna/Kechayi/Gashowu ,
Southern Sierra Nevada, California, 2006

Since many plants are cared for in a habitat—these cumulative actions maintain biological diversity in the landscape.

Outline of the Webinar

- Overview of the NRCS guidebook entitled “The Indigenous Stewardship Methods (ISM) and NRCS Conservation Practice Standards”
- Review types of work and methods of Kat’s Ethnobotany Office
- Outline the importance of Indigenous Stewardship Methods and relevance to the Plant Materials Centers
- *(Q and A Session)*
- Discuss the ISM used in different regions, outline their potential conservation benefits, and possible conservation field trials to test their conservation effects focusing on the plant use categories of :
 - Native Plant Foods
- *(Q and A Session)*
- Plants for Basketry
- Discuss what potential help Kat can provide to PMCs with ways to integrate ethnobotany into PMC activities *(Group Discussion)*

NRCS Ethnobotany Office

Documents the Following Information through Oral Interviews with Native People and Knowledgeable Non-Indians and Extensive Reviews of the Historical and Anthropological Literature

(1) Document Plant Species & their Uses

- Key out Plants and Provide Taxonomic Identifications

(2) Document Harvesting Regime

- Frequency
- Scale
- Intensity
- Season
- Pattern
- Tool

(3a) Document Indigenous Stewardship Methods

- Burning
- Coppicing
- Pruning
- Sowing
- Tilling
- Weeding

(3b) Document Indigenous Cultural Purposes for Stewardship

(e.g., for burning)

- Reduce Insects
- Eliminate Dead Plant Material
- Stimulate Plant Part Production

(3c) Document Stewardship Regime

(e.g., for burning)

- Aerial Extent
- Fire Behavior
- Frequency
- Ignition Pattern
- Intensity
- Season

Products

- Culturally significant plant guides
- National and state technical guides
- Designing and setting up Conservation Field Trials
- Reports and articles
- Returning reports, transcripts, photo albums, and rikker mounts to Native participants

(1) Document Plant Species
& their Uses

- Key out Plants and Provide Taxonomic Identifications

Tillie Lewis, Mono
Pointing out edible clovers (*Trifolium
willdenovii* & *T. variegatum*)
Big Sandy Rancheria in the Sierra Nevada
Foothills, CA 2006



(2) Document Harvesting Regime

- Frequency
- Scale
- Intensity
- Season
- Pattern
- Tool

Gathering Sites are Repeatedly Visited for Long Periods of Time Creating Ecological Effects

“I still gather them every year. We pick off the leaves that have molded or spoiled. To gather the leaves, take one or two pulls and the leaves come off from each plant and I make sure I leave some leaves so as not to kill the plant.”

Pat Boachup, Makah, 2009.



Pat Boachup, Makah, picking the leaves of Indian tea (*Ledum groenlandicum*) an important beverage and medicinal plant to tribes of the Olympic Peninsula, Washington.

(3a) Document Indigenous Stewardship Methods

- Burning
- Sowing
- Coppicing
- Tilling
- Pruning
- Weeding

(3b) Document Indigenous Cultural Purposes for Stewardship (e.g., for burning)

- Reduce Insects
- Eliminate Dead Plant Material
- Stimulate Plant Part Production

(3c) Document Stewardship Regime (e.g., for burning)

- Aerial Extent
- Ignition Pattern
- Fire Behavior
- Intensity
- Frequency
- Season

Burning or pruning of sandbar willow in the fall or winter decreases insect infestations, and creates nice long straight branches that are prized in California Indian baskets.

LaVerne Glaze, Karuk/Yurok basketweaver, pruning sandbar willow (*Salix exigua*) in northwestern California.



Sawflies
(insect pests of willow)



Willows with insect larval damage

Why are Indigenous Stewardship Methods (ISM) Important?

Many plants used for indigenous foods, basketry, and other cultural needs are getting harder and harder to find in part, because Indigenous Stewardship Methods are no longer being practiced. (It is not just habitat fragmentation and loss.)

It may be that the kinds of disturbance brought about by former indigenous harvesting and stewardship should be a key part of restoration strategies for these plants and their habitats.

Indigenous methodologies can be adapted to more mainstream conservation practices for maintaining healthy plant populations and diversity in the landscape.



Edible pods and seeds of Screwbean mesquite
(*Prosopis pubescens*)

Why is this Relevant to the Plant Materials Centers?

1. The PMCs can continue to educate the tribes on how to propagate, establish, and manage their culturally significant plants.
2. The PMCs can establish Field Plantings and Conservation Field Trials to test the conservation effects of indigenous gathering and stewardship methods on specific plants.
3. The PMCs can adapt existing Conservation Practice Standards or develop Job Sheets to assist tribes in maintaining, restoring, and managing habitats for culturally significant plants such as food and basketry plants.

Similarities in Indigenous Stewardship Methods (ISM) used in Different Regions of the United States Focusing on Native Plant Foods and Basketry

- 1) Native Plant Foods (Harvest and Stewardship of bulbs, corms, tubers and rhizomes)
- 2) Basketry Plants (Harvest and Stewardship of young branches from shrubs)

Native Plant Foods

Edible Bulbs, Corms, Tubers and Rhizomes



Photo courtesy of the Santa Barbara Museum of Natural History

Native Plant Foods

Bulbs, Corms, Tubers, and Rhizomes



Lomatium sp.

Large quantities gathered for food

Many indigenous cultures gathered (and still gather) bulbs, corms, tubers, and rhizomes for food. These reside under the ground and they contain high fiber and complex carbohydrates which help prevent diabetes.

Eaten raw, boiled, or baked in an earth oven



Earth Oven

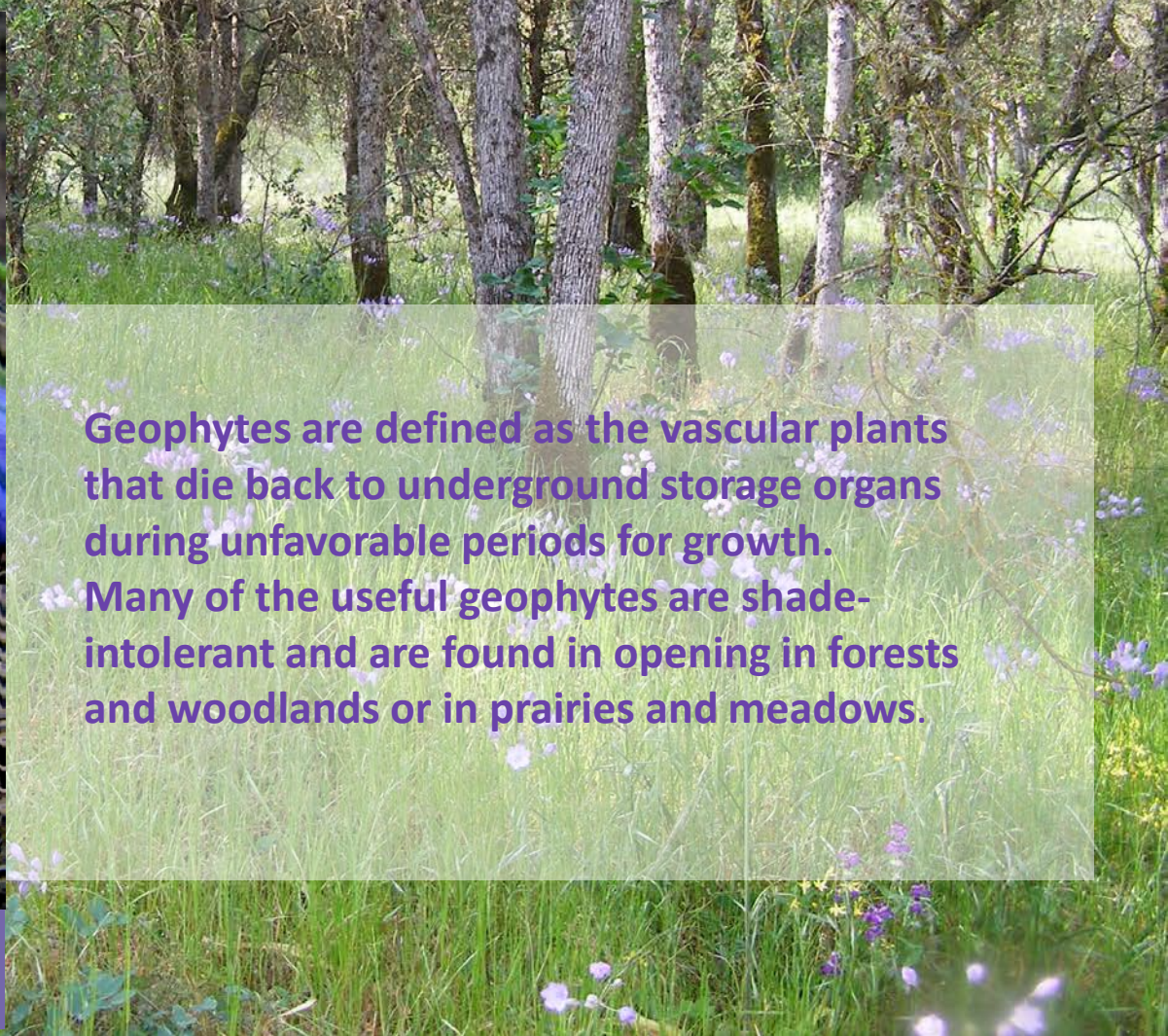
Native Plant Foods

Bulbs, Corms, Tubers, and Rhizomes

Wildflowers that have edible bulbs, corms, tubers, and rhizomes are called geophytes by ecologists and botanists



Ithuriel's Spear (*Triteleia laxa*) and its underground storage organs which are corms (Sierra Nevada Foothills in California)



Geophytes are defined as the vascular plants that die back to underground storage organs during unfavorable periods for growth. Many of the useful geophytes are shade-intolerant and are found in opening in forests and woodlands or in prairies and meadows.

Native Plant Foods

Bulbs, Corms, Tubers, and Rhizomes

These bulbs and corms have offsets or propagules in the form of bulb scales, bulblets, or cormlets—which if severed or otherwise separated from the parent structure could grow into new plants genetically identical to the parent. So in addition to reproduction by seeds, the plants reproduce vegetatively. **Why would plants have this second mode of reproduction?**



Ithuriel's Spear
(*Triteleia laxa*)



Blue Dicks
(*Dichelostemma capitatum*)

Native Plant Foods

Bulbs, Corms, Tubers, and Rhizomes

Plants Exhibit Vegetative Reproduction as a Survival Adaptation to Herbivory by Wildlife Pictured Below

Mule Deer



Black Bear



Gopher

Native Plant Foods

Bulbs, Corms, Tubers, and Rhizomes

Benefit: Herbivory Causes Bulblet & Cormlet Dispersal



With this kind of adaptation, disturbances (especially herbivory) that might threaten the existence of the parent plant was also likely to separate and disperse the propagules, ensuring the continuation, if not the multiplication, of the genome. Feasting upon these highly nutritious bulbs, and severing the propagules to grow into new plants, gophers, ground squirrels, bears, deer, elk, and other animals would simultaneously act as predators and dispersers.

Native Plant Foods

Bulbs, Corms, Tubers, and Rhizomes

Similar to Snouts, Humans Used Digging Sticks in the harvest of bulbs, corms, tubers, and rhizomes



Yakama woman digging bulbs in Washington, 1909, (Photo by Edward S. Curtis)



Burt Billie, Seminole, digging up edible tubers of elephant's ear (*Xanthosoma* sp.). (Photo by and courtesy of William C. Sturtevant, Big Cypress Reservation, Florida, 1959.)



Cheyenne women digging large Indian breadfruit (*Pediomelum esculentum*) (Courtesy of the Southwest Museum)



Wintu couple digging yampah (*Perideridia* sp.) in Indian Valley, California (Courtesy of the Santa Barbara Museum of Natural History)

Native Plant Foods

Bulbs, Corms, Tubers, and Rhizomes

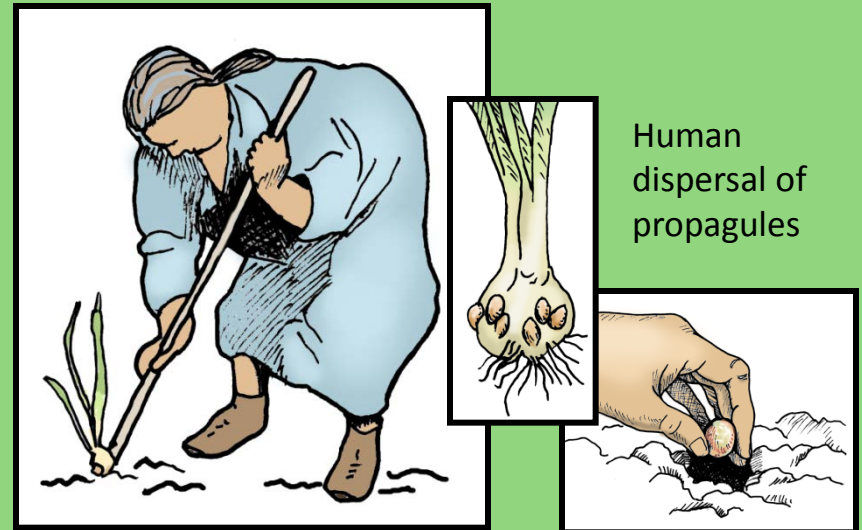
Humans are Mimicking Natural Disturbance = Dispersal



Gopher dispersal of propagules

Through digging, bulblets and cormlets get knocked off in the harvest process—simulating mammal disturbance. Thus, native people who exploited these wildflowers as food were simply stepping in to the herbivore role, taking advantage of the pre-existing adaptations that made most of these plants excellent subjects for food intensification strategies. In addition, Native people deliberately replanted the small ones.

- Aerates the soil
- Increases water holding capacity of the soil
- Prepares the seedbed
- Softens the earth so jays can plant acorns and other nuts
- Is a form of tillage



Human dispersal of propagules

Native Plant Foods

Bulbs, Corms, Tubers, and Rhizomes

Additional Indigenous Stewardship Methods (ISM)



- **Break off at the root crown and leave crown and bulb tissue behind***
- Leave tuber fragment behind
- **Harvest after seeding and dump the seeds into holes***
- Allow rest periods between harvests
- Spare individual plants and leave bulbs behind that are too small or large
- **Burn area to keep it open, recycle nutrients, reduce competition and enhance plant growth***
- Transplant bulbs, corms, or tubers to new areas
- Irrigation

Native Plant Foods

Bulbs, Corms, Tubers, and Rhizomes (Soaproot)

Indigenous Stewardship Method: Leave Root Crowns Behind and Put Seeds in Holes



“Grandma Hazel taught me to always dig in the fall after the seedpods have opened. You’re helping the plants reproduce. Rosalie Bethel taught me to leave the root crowns behind. She said “If you break them off—they’ll come back.” --Lois Conner)

Lois Conner, North Fork Mono/Chukchansi, digging soaproot (*Chlorogalum pomeridianum*) in Sierra National Forest, 2008.



Root Crowns with bulb tissue left behind



Cover hole with soil

Native Plant Foods

Bulbs, Corms, Tubers, and Rhizomes (Soaproot)

Indigenous Stewardship Method: Burn area to keep it open, recycle nutrients, reduce competition and enhance plant growth



“Fire is the ticket for everything. Soaproot is thick in the areas where the Forest Service burned brush piles. Where it’s been burned I find plants that are doubles, triples, and bigger clusters and the bulbs are huge. In places that haven’t burned I find only single plants and most of them are bald or have gray hair. Where it’s been disturbed the hairs are thick. The best thing to do is burn them; it brings them back to life.”

Lois Conner, North Fork
Mono/ Chuckchansi, 2008.

Major Wildflower Species in the Northeast Valued for their Bulbs, Corms, Tubers, & Rhizomes

(Candidates for Propagation Projects and Conservation Field Trials)

Groundnut (*Apios americana*)

INDIAN AGRICULTURE

TABLE I.—INDIAN FOOD AND INDUSTRIAL PLANTS.

COMMON NAME	SCIENTIFIC NAME	PART USED	PURPOSE
PLANTS CULTIVATED BY THE IROQUOIS OF NEW YORK STATE			
Artichoke, Jerusalem	<i>Helianthus tuberosus</i> . . .	Tubers	Food
Beans, common	<i>Phaseolus vulgaris</i>	Seeds	Food
Corn, Indian	<i>Zea Mays</i>	Seeds	Food
Gourds	<i>Cucurbita Pepo</i> var. <i>ovifera</i>	Fruits	Dishes, cups, etc.
Groundnut	<i>Apios tuberosa</i>	Tubers	Food
Leeks (wild onion)	<i>Allium tricoccum</i>	Bulbs	Food
Pumpkins, various	<i>Cucurbita Pepo</i>	Fruits	Food
Squash, cushaw	<i>Cucurbita moschata</i>	Fruits	Food
Squash, winter	<i>Cucurbita maxima</i>	Fruits	Food
Tobacco, wild	<i>Nicotiana rustica</i>	Leaves and stems	Smoking
NATIVE PLANTS USED BUT APPARENTLY NOT CULTIVATED			
Arrow-aram	<i>Peltandra virginica</i>	Rootstocks	Food
Bayberry	<i>Myrica carolinensis</i>	Wax from fruits.	Candles
Bearberry	<i>Arctostaphylos Uva-ursi</i>	Leaves	Smoking
Beech	<i>Fagus grandifolia</i>	Nuts	Food
Birch, canoe	<i>Betula papyrifera</i>	Bark	Canoes, buckets, etc.
Blackberries	<i>Rubus allegheniensis</i> and other spp.	Fruits	Food
Bloodroot	<i>Sanguinaria canadensis</i>	Roots	Dye
Blueberries	<i>Vaccinium corymbosum</i> and other spp.	Fruits	Food
Bulrushes	<i>Scirpus validus</i> and other spp.	Stems	Mats, baskets, etc.
Butternut	<i>Juglans cinerea</i>	Nuts	Food
Cat-tails	<i>Typha latifolia</i> and <i>T. angustifolia</i>	Stems and leaves.	Baskets, mats, etc.
Checkerberry	<i>Gaultheria procumbens</i>	Fruits	Food
Cherry, choke	<i>Prunus virginiana</i>	Fruits	Food
Cherry, wild red	<i>Prunus pennsylvanica</i>	Fruits	Food
Chestnut	<i>Castanea dentata</i>	Nuts	Food
Cranberries	<i>Vaccinium macrocarpon</i> and <i>V. Oxycoccus</i>	Fruits	Food
Currants	<i>Ribes americanum</i> and other spp.	Fruits	Food
Dewberries	<i>Rubus flagellaris</i> and other spp.	Fruits	Food

From: *A History of Agriculture in the State of New York* by U.P. Hedrick 1933



Photo by Robert H. Mohlenbrock



Jerusalem artichokes (*Helianthus tuberosus*)

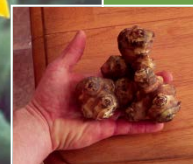


Photo by Jennifer Anderson



Photo by Thomas G. Barnes

Leeks or Ramp (*Allium tricoccum*)



All tuber photos by Samuel Thayer

Potential Ecological Effects and Conservation Benefits of Tillage

Corm with over 2 dozen cormlets



POTENTIAL ECOLOGICAL EFFECTS:

- Cormlets or bulblets may remain suppressed (through the formation of auxin) until they are detached from the mother corm. Digging and replanting would sever the tiny ones, activating their growth.
- Thinning may keep the population from overpopulating and running out of nutrients if not broken up.
- Replanting propagules may select for specific genotypes that hold up well to, and perhaps even thrive under human harvesting regimes
- Replanting propagules may select for those corms and bulbs that produce the greatest number of offspring

POTENTIAL CONSERVATION BENEFITS:

- Digging with a digging stick potentially mixes surface nutrients into the ground, improving drainage during winter months and allowing better absorption of moisture during the growing season.
- Replanting propagules may accelerate their growth and maturity, leading to resource intensification which benefits pollinators and herbivores that feed on the plants.



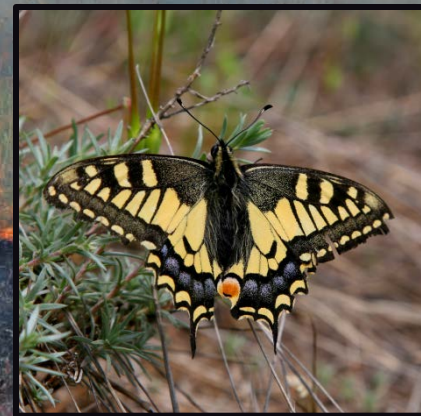
Potential Ecological Effects and Conservation Benefits of Burning

POTENTIAL ECOLOGICAL EFFECTS:

- Removal of litter and keeping an area open with periodic burning increases bud set which leads to augmented flowering and fruiting
- Burning recycles nutrients, reduces plant competition, and increases numbers of plants and size of bulbs, corms, and tubers
- Burning may also expand the gathering tract and number of gathering tracts (many patches)

POTENTIAL CONSERVATION BENEFITS:

- Heightened number and diversity of pollinators
- Enhanced diet of herbivores



Example of a Possible Conservation Field Trial

I assisted the Big Pine Paiute, the Bishop Field Office, and the Lockeford Plant Materials Center in writing a Conservation Field Trial proposal, which has been funded. We will set up it up on the Big Pine Paiute Reservation in early October (with irrigation) to measure the growth response of blue dicks or *nahavita* (*Dichelostemma capitatum*), a traditional food, to different indigenous harvesting and stewardship regimes.

Proposed Conservation Field Trial Study – FY2011 Big Pine Paiute Tribe of the Owens Valley



**THE EDIBLE CORM PLANT NAHAVITA (*DICHELOSTEMMA CAPITATUM*):
VEGETATIVE REPRODUCTION RESPONSE TO
BIG PINE PAIUTE HARVESTING REGIMES**

Project Sponsors

- Inyo-Mono Resource Conservation District (IMRCD)
- Big Pine Paiute Tribe of the Owens Valley, Big Pine Paiute Indian Reservation, Big Pine, CA (BPPT)
- Natural Resources Conservation Service, Bishop Field Office (NRCS)
- National Ethnecology Office, Natural Resources Conservation Service and University of California, Davis, CA (NEO)
- California Plant Materials Center, NRCS, Lockeford, CA (CAPMC)

Project Cooperators

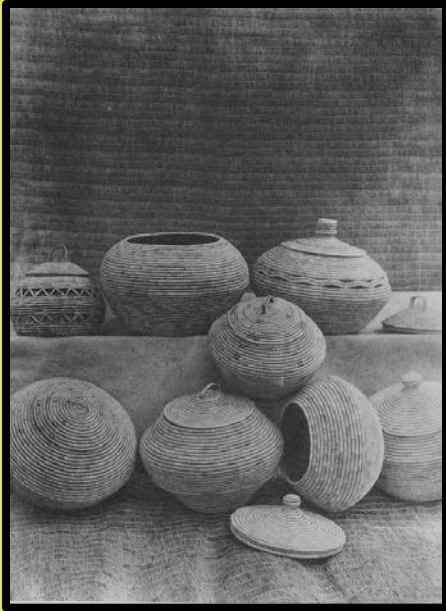
- Inyo and Mono County / University of California Cooperative Research, Extension and Education Service, Bishop, CA (UCCE)
- Inyo-Mono Advocates for Community Action, Bishop, CA (IMACA)
- Desert-Mountain Resource Conservation and Development Program, Ridgecrest, CA (DMRC&D)
- Bureau of Land Management, Bishop Resource District, Bishop, CA (BLM)
- US Forest Service, Inyo National Forest, Bishop, CA (USFS)
- Los Angeles Department of Water and Power, Los Angeles, CA (DWP)

Basketry Plants



Basketry

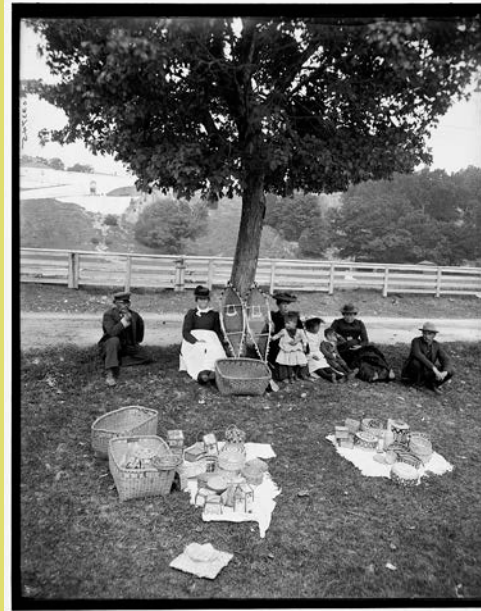
Some of the Many Indigenous Cultures that Made & Still Make Baskets



Nunivak Baskets from Alaska
(Photo by Edward S. Curtis)



Makah basketmaker at
Neah Bay, Washington
using cedar bark and
beargrass, 1936. Courtesy
of the National Archives,
Seattle, WA.



Indians of Michigan (perhaps
Ojibwa) on Mackinac Island
with their baskets for sale (c
1900, Courtesy of Library of
Congress



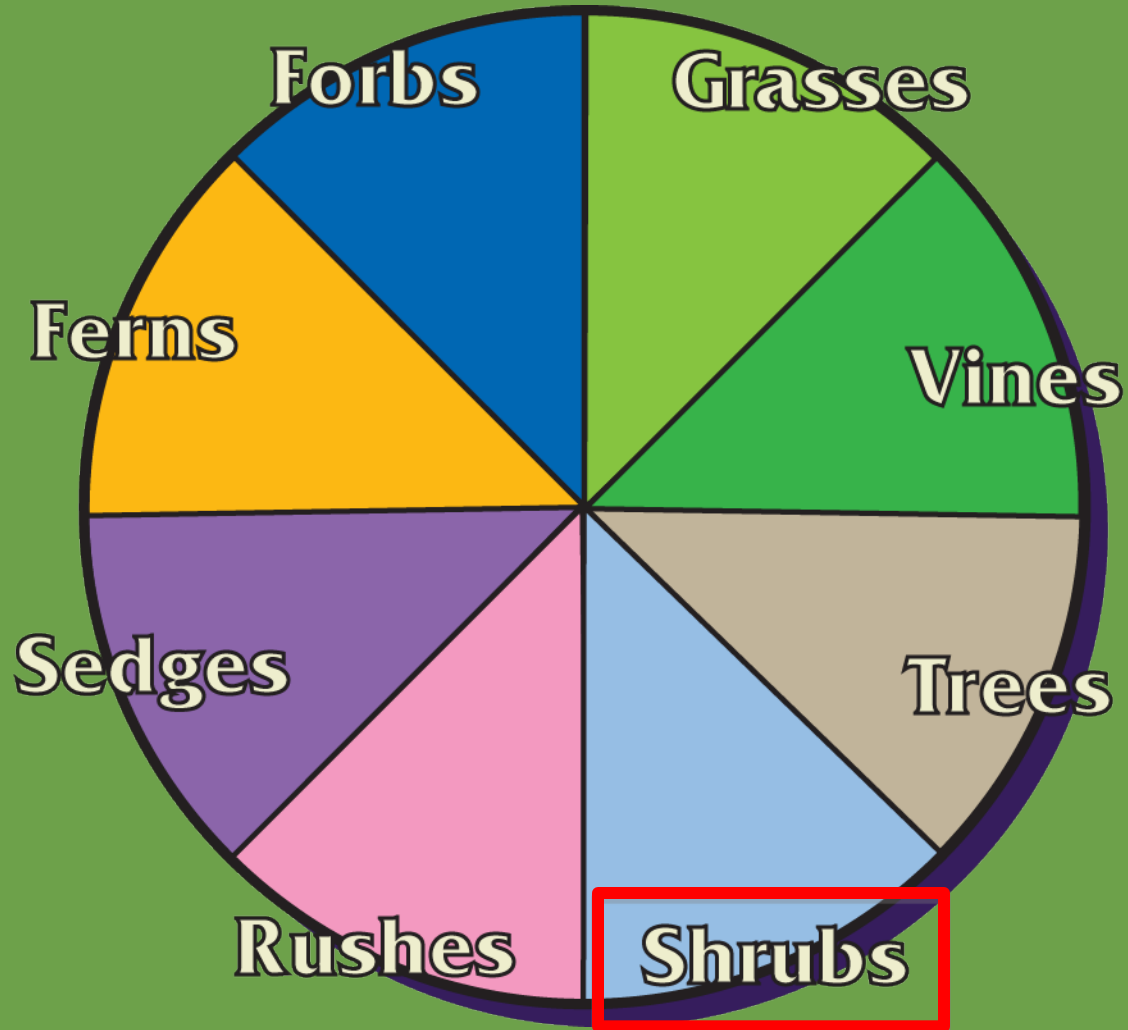
Wisham Basketmaker
(Photo by Edward S.
Curtis)



Mohawk men and
women carrying
their baskets to
trade. (Photo by
W.S. Tanner, c 1894,
Library of Congress).

Basketry


Plant Lifeforms Utilized in Making Baskets



Basketry

Shrubs

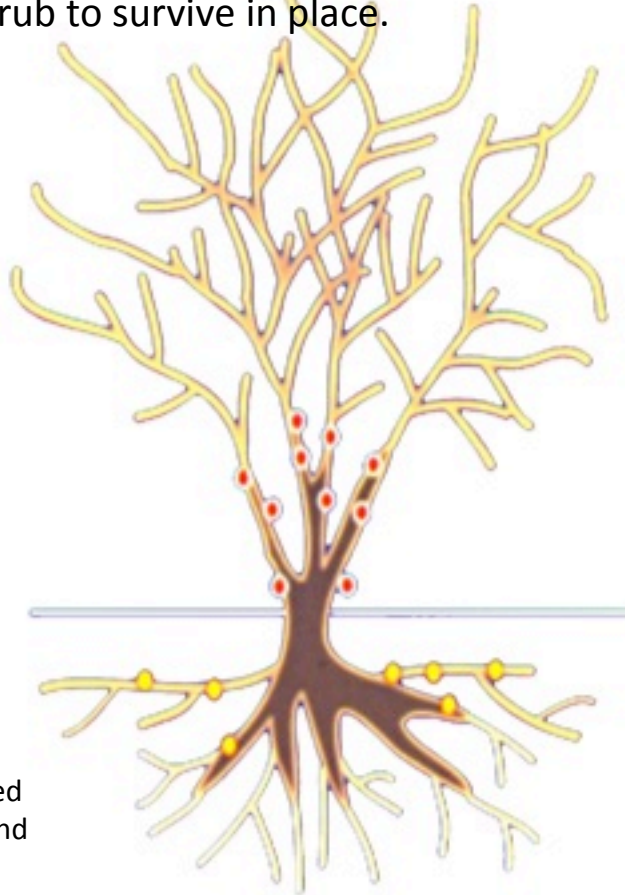
Many of the shrubs used in indigenous basketry have suppressed buds along their trunks or roots, which are called epicormic and adventitious buds. If damaged by natural disturbance, such as herbivory, flooding, or a lightning fire, these suppressed buds rapidly elongate into tall, straight branches and this is an adaptive strategy, enabling the shrub to survive in place.

 **Epicormic buds:**
Suppressed buds
buried in the periderm
of branches or trunks

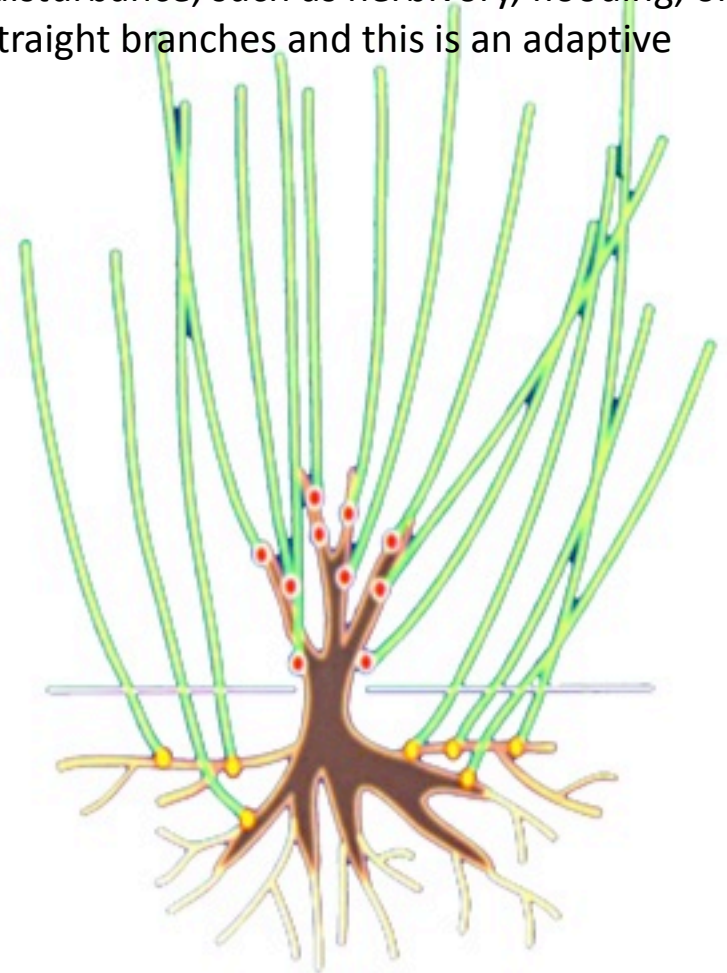
 **Adventitious buds:**
Found on lateral roots

Examples:

- 1) Willows or maples knocked down by a rise in the river and flooding
- 2) Hazelnuts and dogwoods burned in a wildfire



Shrub with suppressed buds



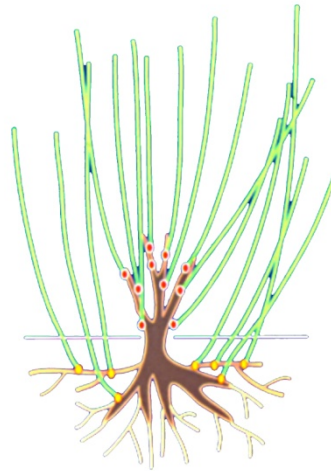
Shrub with activated buds that rapidly elongate after disturbance

Basketry

Shrubs

Special Characteristics of Young Shrub Branches that Grow after Natural Disturbance

- Flexible (will not break under tension)
- Straight (split more easily and evenly)
- Bark blemishes are absent (caused by lichens, insects, and diseases)
- Long length and even diameter
- Have special pigments
- Lateral branching is absent



Justin Farmer, Ipai weaver from southern California splitting sumac (*Rhus trilobata*) into three sewing strands

It turns out that these are the same characteristics that many basketweavers seek in gathering shrub branches throughout much of the western United States.

Basketry

Shrubs

Observations of Wild Plant Architecture in Nature Show:

- Young branch growth activated by natural disturbance is uncommon
- Old, crooked branch growth is prevalent



Wild Western Redbud (*Cercis orbiculata*)—a very important basketry shrub to California Indian tribes. Note the crooked growth. None of the branches are suitable for basketry material.

Basketry

Shrubs

Yet Staggering Amounts of Young Branch Growth are Needed to Complete Baskets



This Sierra Miwok Feasting Basket would take about 10,000 young western redbud (*Cercis orbiculata*) branches to complete



Contrasting the wild plant architecture (above) with plant architecture of young western redbud branches created through disturbance (below)

Thus the Need for Indigenous Stewardship

Producing Basketry Material with Desirable Qualities: Burning, Pruning, or Coppicing of Shrubs for young Branch Growth



Pruned willow (*Salix exigua*)



Burning California Hazelnut
(*Corylus cornuta* var. *californica*)

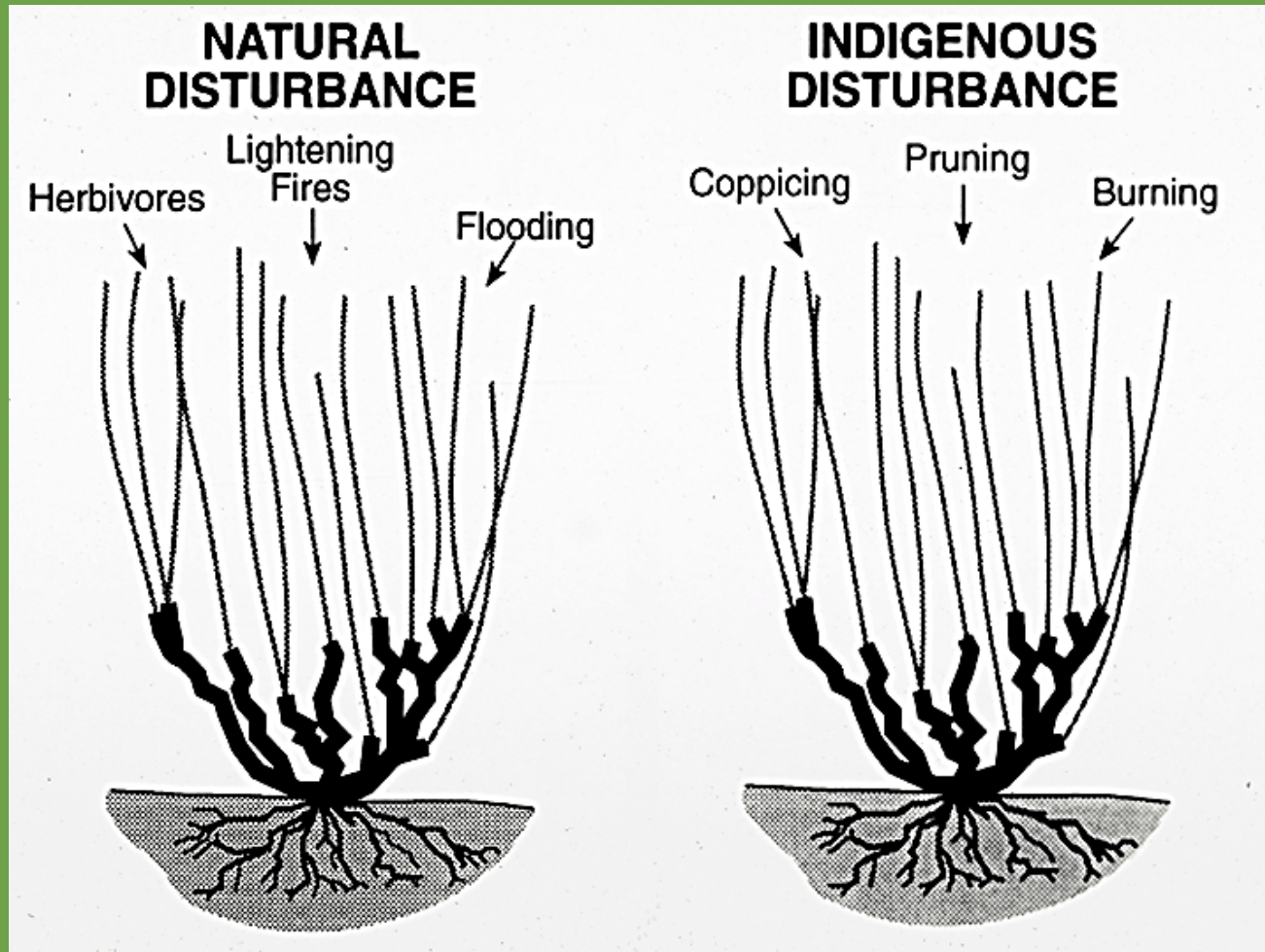


Coppiced redbud
(*Cercis orbiculata*)

Basketry

Shrubs

Similar to Natural Disturbance, Humans Burned, Pruned, or Coppiced Shrubs to Activate Young Branches so Prized in Basketry



Basketry

Shrubs (Example: Sumac or Souberry—*Rhus trilobata*—used by many tribes in California, Great Basin, and the Southwest)



Large quantities of young branches were and still are gathered for baskets.



Lois Conner holding a cradleboard that required about 675 young branches to complete.

Contrasting the wild plant architecture (top right) with plant architecture of young sumac branches created through indigenous stewardship (lower right)



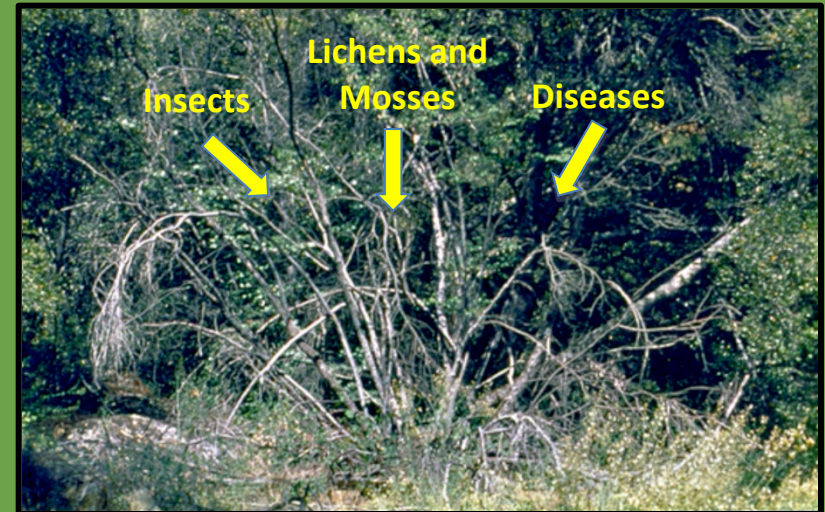
Potential Ecological Effects and Conservation Benefits of Burning, Pruning and Coppicing

POTENTIAL ECOLOGICAL EFFECTS AT THE INDIVIDUAL PLANT LEVEL:

- Selection for shrubs that are vigorous sprouters
- Increased lifespan of individual shrubs through enlargement of the root surface area and greater leaf area

POTENTIAL CONSERVATION BENEFITS:

- Heightened number of young shoots for herbivore diets which may be more palatable and nutritious



Unmanaged Western Redbud (*Cercis orbiculata*)



Managed Western Redbud (*Cercis orbiculata*)

Potential Ecological Effects and Conservation Benefits of Burning, Pruning or Coppicing

POTENTIAL ECOLOGICAL EFFECTS AT THE LANDSCAPE LEVEL:

- Patchiness-from full sunlight to canopy closure
- Increase of lifeforms: grasses, shrubs, trees
- Increase in age and size classes of shrubs
- Increase in numbers of plant and animal species

POTENTIAL CONSERVATION BENEFITS AT THE LANDSCAPE LEVEL:

- Increased biological diversity
- Patchiness creates many more openings, enhancing accessibility to animals
- Wildlife are able to forage on a greater variety of plants
- Patchiness may foster pollinators



Various size classes of Western Redbud (*Cercis orbiculata*)
Shrubs in the foreground were coppiced one year prior to this photo

Possible Studies or Conservation Field Trials

Objective—to assess the effect of single and repeated coppicing on the productivity of redbud in terms of numbers of usable branches



Basket with dark red designs of redbud



Mature redbud branch has gray bark (above). The dark red pigment appears only in the bark of the young redbud branches (below).



Treatment 1: First year coppice of redbuds



Treatment 2: Second year coppice of redbuds (also coppiced in year 1)



Treatment 3: Controls—no coppice



Counting number of useable branches from coppiced redbuds

Findings: Winter coppicing in year 1 and years 1 and 2 caused significant increases in numbers of usable shoots on redbud shrubs compared to the controls in the final year

Basketry

Additional Indigenous Stewardship Methods

1) Judicious harvest in ways that sustain the resource

- Rest periods
- Sparing plants and plant parts
- Harvest at time of year that is least detrimental to target species
- Harvest bark so as not to girdle the tree (example: western redcedar)

2) Producing material with desirable qualities

- Burning or pruning plants for root and rhizome production
- Burning or pruning herbaceous plants for leaf or flower stalk production
- Burning, pruning, or coppicing of shrubs and trees for young branch growth (example: sumac—*Rhus trilobata*)**

3) Maintaining the habitat and access



Makah woman sustainably harvesting the bark of western redcedar (*Thuja plicata*) for baskets

Examples of Conservation Practice Standards that Provide the Best Guide to Restoration, Enhancement, and Maintenance Activities of Suitable Basketry Plants and Habitat

- **Hedgerow Planting (422)** can include grasses, shrubs, and trees important for basketry that also provide pollen and nectar for native bees.
- **Riparian Forest Buffer (390)** can include shrubs, trees, grasses and forbs for riparian enhancement that also provide basketry material and provide wildlife habitat improvement, erosion control, and enhance water quality.
- **Tree and Shrub Pruning (660)** includes removal of all or part of selected branches, leaders or roots from trees and shrubs to improve the quality and quantity of basketry material taken from these plants. Some plants are left to flower for pollinator needs of pollen and nectar.
- **Wetland Enhancement (659)** can include shrubs, trees, grasses and forbs for wetland enhancement that also provide basketry material and provide wildlife habitat improvement, erosion control, and enhance water quality.

How Kat can Integrate Ethnobotany into PMC Activities

1. Assist in developing culturally significant plant guides
2. Assist in developing technical notes at the state, region, or country level
3. Assist in writing proposals and setting up field plantings and conservation field trials to test the conservation effects of ISM
4. Assist in the collection of seeds and vegetative cuttings of culturally significant plants for field plantings
5. Other ideas?