# DEVELOPING A
# SOCIO-ECOLOGICAL RESILIENCE INDICATOR

*A Collaboration between Indigenous and Western Scientists*

How we developed our Indigenous Socio-Ecological Indicator : An example.
**Evergreen huckleberries**

## Step 1: Outline the Socio-Ecological System (SES):

- **Human/Social System:**
  - Tribal governments/Indigenous practitioners
  - Tribal territories
  - Tribal intellectual property rights protocols
  - Barter/Trade
  - Ceremonies
- **Ecosystem:**
  - Plants, animals, fungi, etc.
  - Climate & Weather
  - Biophysical setting
  - Habitat dynamics
  - Soil, Water, Air, Fire
- **Socio-Ecological Interactions:**
  - Shared food and shelter resources among humans and animals
  - Cultural management practices
  - How human practices interact with ecosystem process and function

## Step 2: Select a Socio-Ecological Indicator Species

**First:** Within a given biophysical setting (in this case, the California Mediterranean Mesic Mixed Evergreen forest) we identified a declining or extirpated species as a critical starting point.
**Second:** We looked at the food/interaction web in common among humans and the declining species.
**Third:** We selected evergreen huckleberry



Image courtesy of Kirsten Vinyeta

(*Vaccinium ovatum*) as the species that feeds the prey of the declining owl, provides food for people, forms beneficial symbiotic relationships with mushrooms and tanoak trees, and provides cover for elk protecting their young from wolves. Thus, this species has important human/social and ecological functions. Evergreen huckleberries themselves (a food and "provisioning ecosystem service" for humans and wildlife) have declined in their berry production, though the bushes are common across the landscape.

**FIRE ADAPTED COMMUNITIES**
LEARNING NETWORK
FireAdaptedNetwork.org
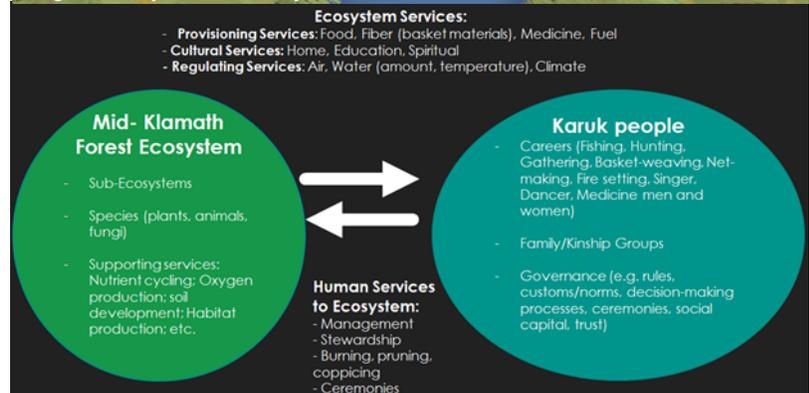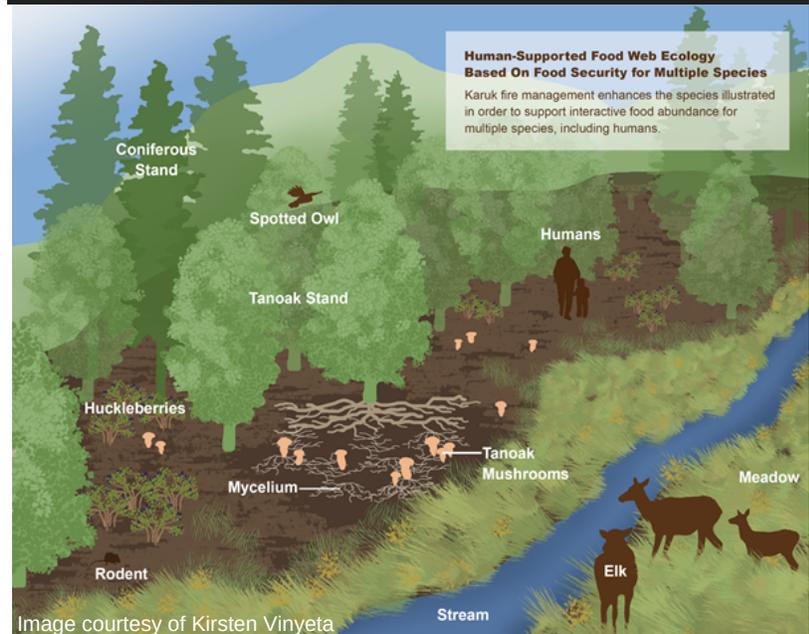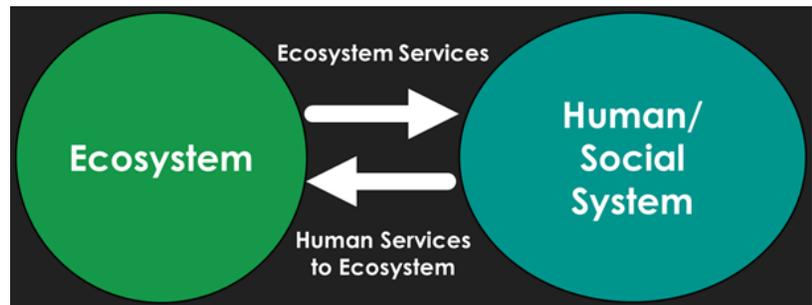
## Step 3: Define Important Qualities:

- **Ask experts (ideally Indigenous people) the following about the Socio-Ecological Indicator Species:**
  - What qualities are important? (e.g. ripeness, size, taste of berries, pliability of shoots, lack of pest/disease infestation, etc.)
  - What enhances these qualities?
  - What decreases these qualities?
  - How does this species interact with others?

## Step 4: Define a Metric to Track the Important Qualities

- For example, we created a metric called huckleberry patch quality (HPQ) which incorporated size, ripeness, tastiness, and abundance of berries into one value.
- We used a scale of 0-5 (from 0= no berries at all to 5 = dense clusters of berries everywhere they could be) to track HPQ in different places.

## Step 5: Define the Scale for Tracking

- For example, we chose the "patch" scale of roughly 17m radius circles

## Step 6: Establish Plots

- Across a range of habitats
- Across a range of good, moderate, and poor qualities (in our case, good, moderate, and poor quality huckleberry patches)

## Step 7: Collect & Analyze Data

## Step 8: Adaptive Management

- Use the data to choose management actions.
- Implement and watch/track what happens.
- Modify as needed.

## Step 9: Share what you Learn!

Photo Credit: Frank K. Lake & Colleen Rossier