

Eco-social Cultural Mapping: Tribal Lifestyles and Environmental Risks ---

Regional Tribal Exposure Scenarios Based on Ecological Zones and Traditional Lifeways.

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www.hhs.oregonstate.edu/ph/tribal-grant-main-page

OUTLINE

Purpose

Basic Concepts

Approach

Methods

Cases

Data Gaps and Future Research

Applications

Subsistence-Based Vulnerability of Tribal Populations to Toxic Substances in the Environment (2001). Risk assessment goals of the STAR RFP were:

- methods to quantify subsistence-based exposures and attendant effects that occur primarily through food, medicinal, cultural/ceremonial and occupational practices
- models that integrate the data collected on the subsistence activities described above to ascertain/predict the cumulative exposure profile and attendant risks.

ALSO: the community of concern [must have] a leading role in the planning, conduct, analysis, translation and dissemination of the research.



PURPOSE. This project presents a method for systematically describing how tribal people interact with the environment and might be exposed to environmental contaminants.

The initial driver was the lack of exposure scenarios and exposure factors for use in Superfund risk assessments where tribes and tribal resources are affected.

We knew that traditional tribal lifestyles are inseparable from the ecology in which they live, but we did not have a numerical representation of those environmental contact rates.

Tribal Scenarios - summary

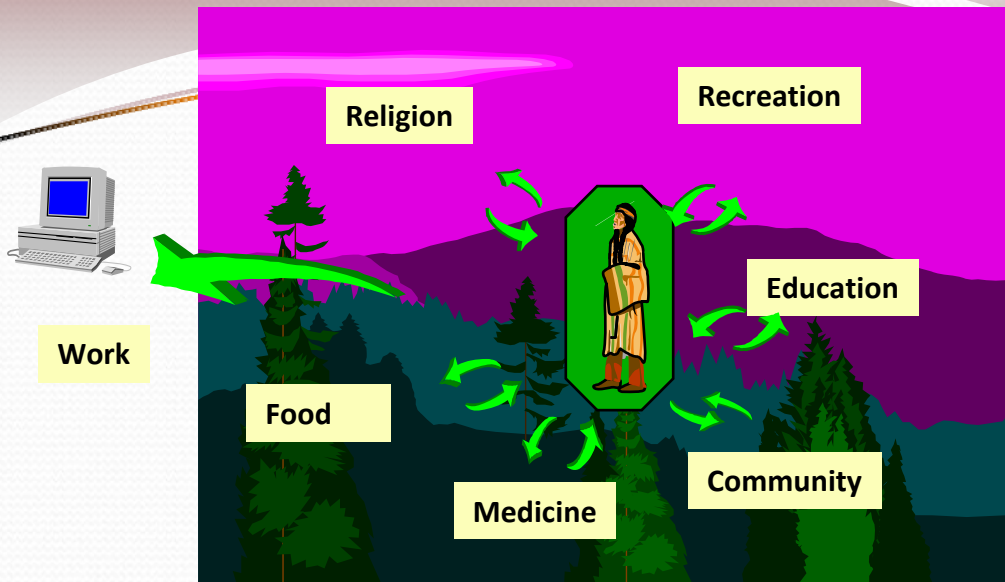
- **Active, outdoor lifestyles in all climates, with greater environmental contact rates.**
- **Direct exposure factors probably same in all climates. Most or all will be higher than EPA default rates.**
- **Every diet will be different, based on the natural resources present and the unique cultural uses.**
- **Exposure scenarios –**
 - **“whole-life” full time residential, NOT recreational**
 - **nutritionally complete diet(s)**



BASIC CONCEPT

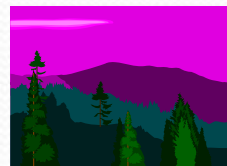
Ecological Basis.

- People live in ecosystems, and use local natural resources.
- Integration of human and ecological risk assessment has been discussed for a long time.
- People are a keystone ecological species; biota are keystone cultural species.
- New climate change tenet: people and ecosystems are resilient together, not separate.



Relation to Environment

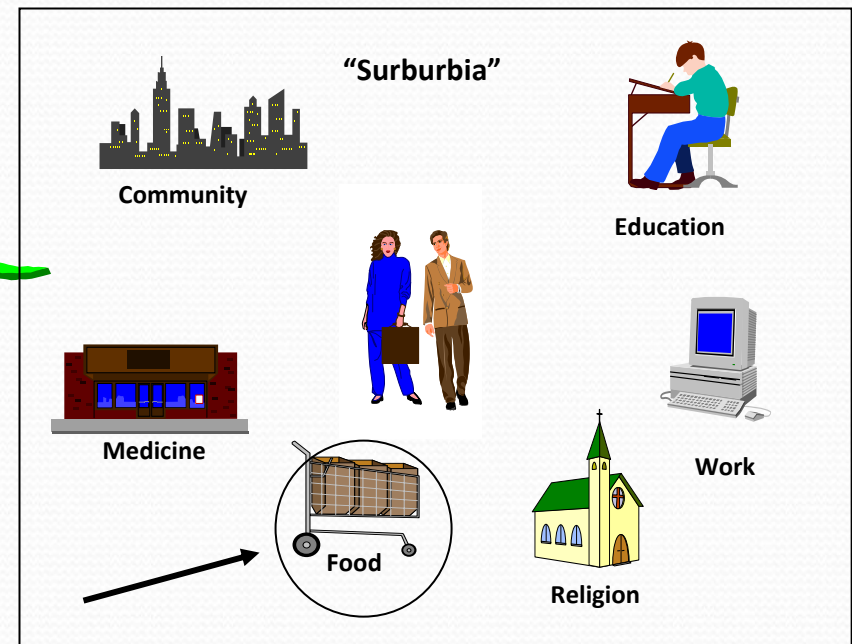
Indigenous people live embedded within the environment and derive many services from it. They may leave it only to visit “suburbia” to obtain money.



Recreation

Suburban dwellers consider the “environment” as something to be visited during recreation, and derive most of their services from other suburban locations.

Can't just add some wild food



Ethno-Habitat

Land = grocery store, school,
church, clinic, living room....
an “eco-cultural” system



Ecosystem & Services

- Biodiversity
- Landscapes
- Critical Habitat
- Human Use

Ecological RA

Foodchain concentrations
used to evaluate ecorisk
AND human subsistence
exposure and risk

Human Subsistence Uses

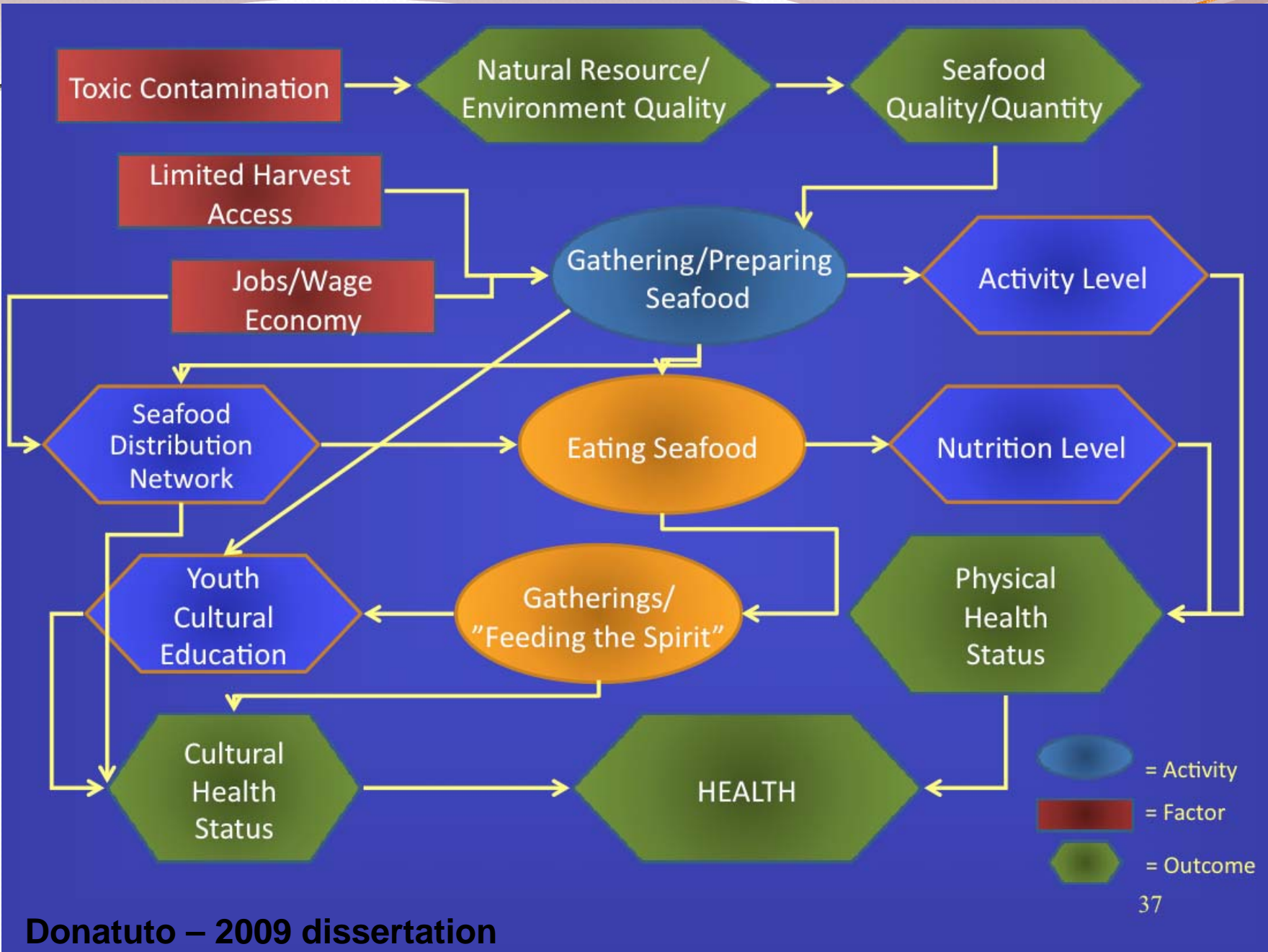
- *Exposure and health risk*
- Socio-Cultural impacts

Cultural Quality of Life

BASIC CONCEPTS

Broader definition of health.

- Many tribal meetings start with invocations for good thoughts and promises to take care of the land and its resources, the children, and each other. Example: Onondaga 'words that come before all else' – the thanksgiving address.
- **Health** - A state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity. (WHO, 1946)
- Many Native American communities regard health as multi-dimensional and reflective of their values, beliefs, and practices; this includes physical, cultural, social, mental, and spiritual indicators that are inter-related on a community level and cannot be assessed separately. (Donatuto, Arquette, Harris, Harper, Wolfley, many others)

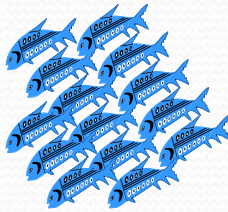


BASIC CONCEPT

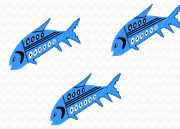
Contemporary suppression of resource use. Contemporary uses may be restricted due to contamination (e.g., fish advisories, contaminated sites), legal limbo (rights of access), etc.

-- Do you want to know current exposures for public health reasons?

-- Do you want to know what risks would be if people used the resource in an unrestricted manner (e.g., a baseline CERCLA risk assessment)?



Past



Present



Future

Do you know if your Tribe is bimodal? Status of fishing rights? Policies?
Cross-sectional data are modern statistical averages, not a cultural description of either a traditional or current subsistence lifestyle or diet.

BASIC CONCEPT

Reconstruction of traditional lifeways and natural resource use with confirmatory interviews.

- In order to know what baseline natural resource uses are/were, the anthropology literature (with contemporary interviews) is the best source of information.
- NOT food consumption surveys
- Interviews must be culturally competent
- Precision and Accuracy (contemporary data precision vs historical accuracy).

Ethnobotany

Ecology

Culture

Historical records

*Language &
Oral Tradition*

Traditional Ecological Knowledge

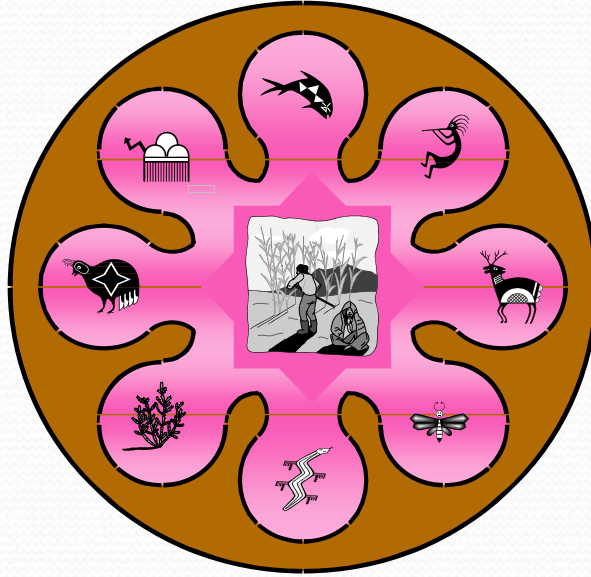
Exposure science

Physiology, for physiological coherence

Robustness - Combination of Methods with Multiple Lines of Evidence, extra peer review.

- **Even for current information, questionnaires and data-intensive (statistical or probabilistic) and intrusive methods do not work well in Tribal communities.**
- **Ethnographic methods are well-validated and widely used, but more open ended and time-intensive. They are just as “scientific” and probably more accurate.**
- **Ethnohistory to document traditional Treaty-based rates requires archival research and anthropological literature, as well as eco-historical research.**
- **Follows *Daubert* rules of evidence and the scientific method – repeatable, verifiable, testable. Minimal proprietary data used.**

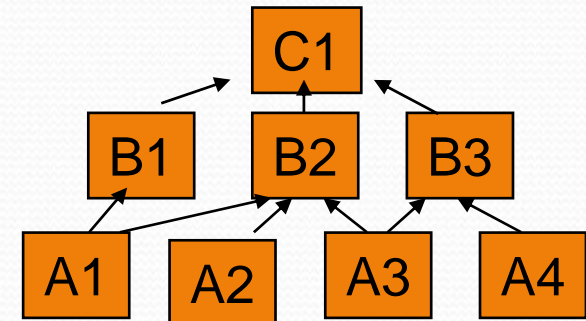
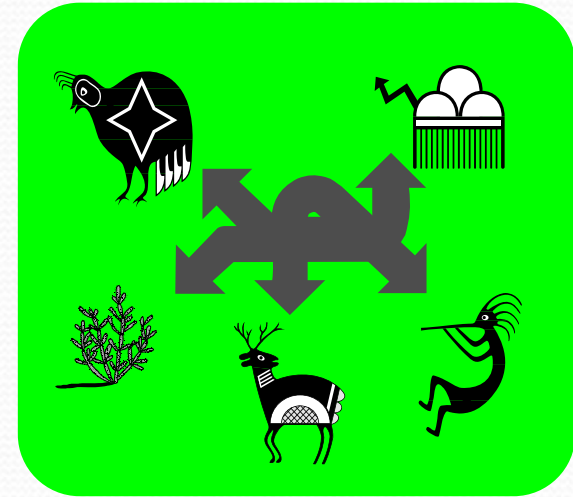
Tribal Ecosystem or Ecocultural System



Concentrations and Species			
	C1	C2	C3
Species 1	23.4	0	2.4
Species 2	12.5	2435.3	222.8
Species 3	3.5	234.4	23.65
Species 4	1	132	0

Culture in a Spreadsheet

Definition of Linkages



Simplified Trophic Levels (surrogates and indicators)



Catalog or Inventory
Approach:

**Lists of every plant eaten
with amounts of each;**

**Lists of “important”
species (typically >200);**

Lists of every place visited;

**Statistical surveys and
“real” tribal data.**

**Intrusive, data-intensive,
always incomplete.**


Holistic Overview
Approach:

**Major food groups with
total calorie estimates**

**Indicators & Surrogates,
start with ecological web.**

**General understanding of
cultural activities for
development of
exposure factors**

**Less probablistic but more
complete and accurate.**



APPROACH. An advisory board consisting of tribal and technical members ensured that the community(ies) are involved (CBPR), informed (informed consent) and in control of the data (intellectual property).

➤ **Community-based participatory research**

➤ **True informed consent means taking the time to make sure that the participating community understands the methods, benefits, potential downsides (due to attitudes toward Native Americans, regulatory applications)**

Ethics & Informed Consent

Try It. You'll like it.

**TRUST ME.
I want to help**

I know just what you need

Federal Institutional Review Board rules require extra effort to explain benefits and disadvantages of collecting different kinds of data, using various methods, participating in various studies.

This should be a discussion at multiple levels of Tribal authority, not a sales pitch.

The Tribe must have ownership of the project & data.

Informed consent is obtained from research subjects or their legally authorized representatives.

- (a) Does the informed consent document include the eight required elements?**
- (b) Is the consent document understandable to subjects?**
- (c) Who will obtain informed consent (PI, nurse, other?) & in what setting?**

Additional safeguards required for subjects likely to be vulnerable to coercion or undue influence.

- (a) Are appropriate protections in place for vulnerable subjects, e.g., pregnant women, fetuses, socially- or economically-disadvantaged, decisionally-impaired?**

Subject privacy & confidentiality are maximized.

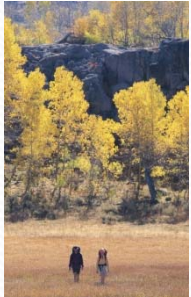
- (a) Will personally-identifiable research data be protected to the extent possible from access or use?**
- (b) Are any special privacy & confidentiality issues properly addressed, e.g., use of genetic information?**



METHODS used to develop regional subsistence exposure scenarios.

- (1) description of eco-cultural zones (the environmental setting);**
- (2) reconstruction of an original subsistence diet using multiple lines of evidence;**
- (3) determining general and unique tribal exposure pathways through activities of traditional people, such as hunting, gathering, making material items, fishing;**
- (4) identification of direct exposure factors (activities and their frequency, duration and intensity, and resource use); and,**
- (5) quantification of exposure factors into metrics that can be used in the development of CERCLA-style exposure scenarios.**

Ecologically-Based exposure scenarios for use in risk assessment that reflect traditional subsistence Tribal lifestyles in CERCLA format



Where you live



What you do



What you eat

Scenario – a set of activities and diet(s) that describe a lifestyle and its degree of environmental contact

Exposure factors – the numbers or rates that explain the frequency, duration, and intensity of exposure for each pathway

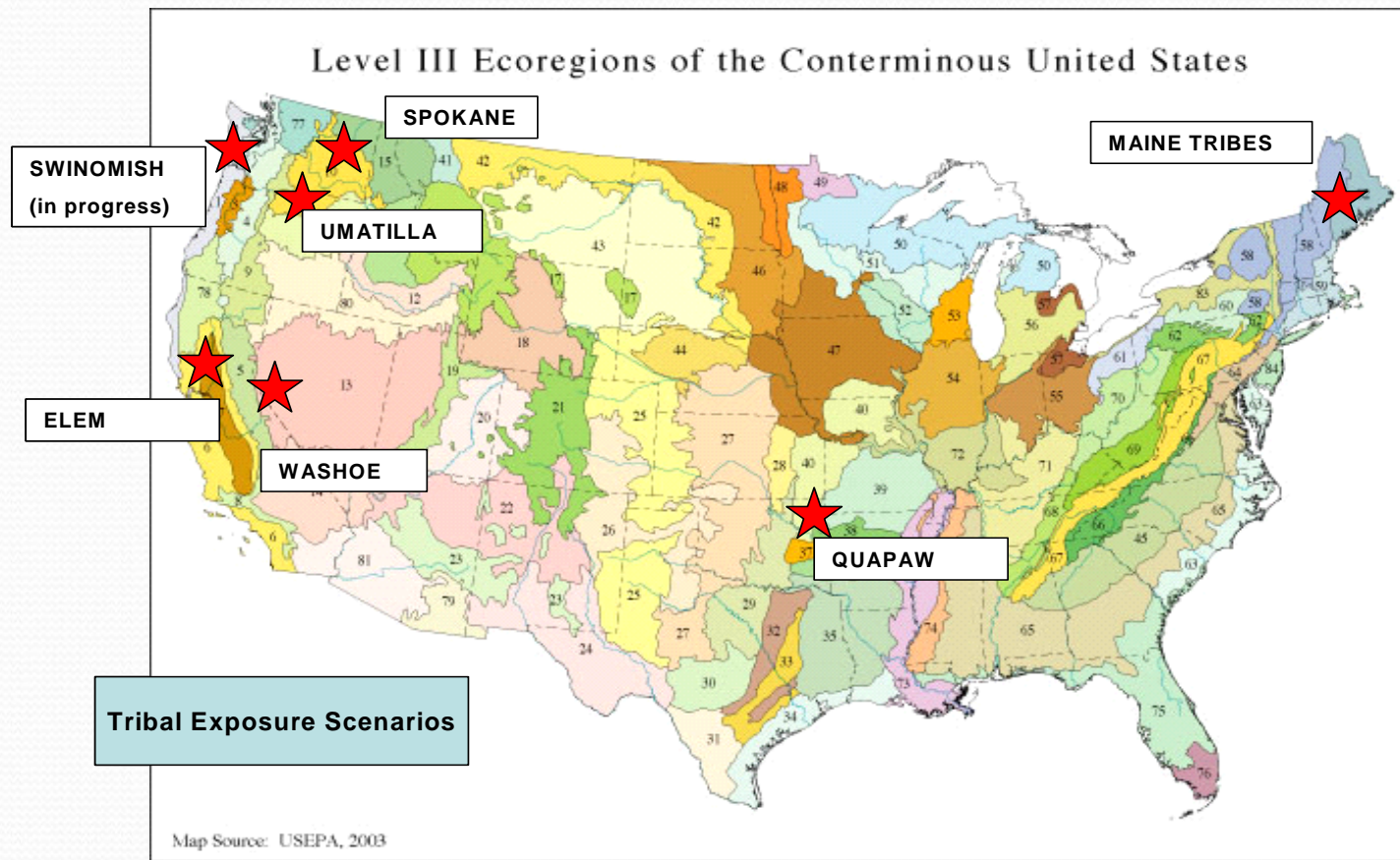
Baseline scenarios describe how the resources are used if they are available and are not contaminated.

Numerical components:

ALL components, not just one pathway at a time.

- Nutritionally-complete diets equivalent to a food pyramid. Staples, not lengthy lists, yet complete.
- Soil ingestion rate – extensive literature review; local climate, housing and living conditions
- Inhalation rate – physiologically able to support active lifestyle
- Water intake rate – climate based plus sweat lodge

CASES. Of the scenarios developed to date, most are being used at Superfund sites in baseline risk assessments. Another is being used to support the development of water quality standards




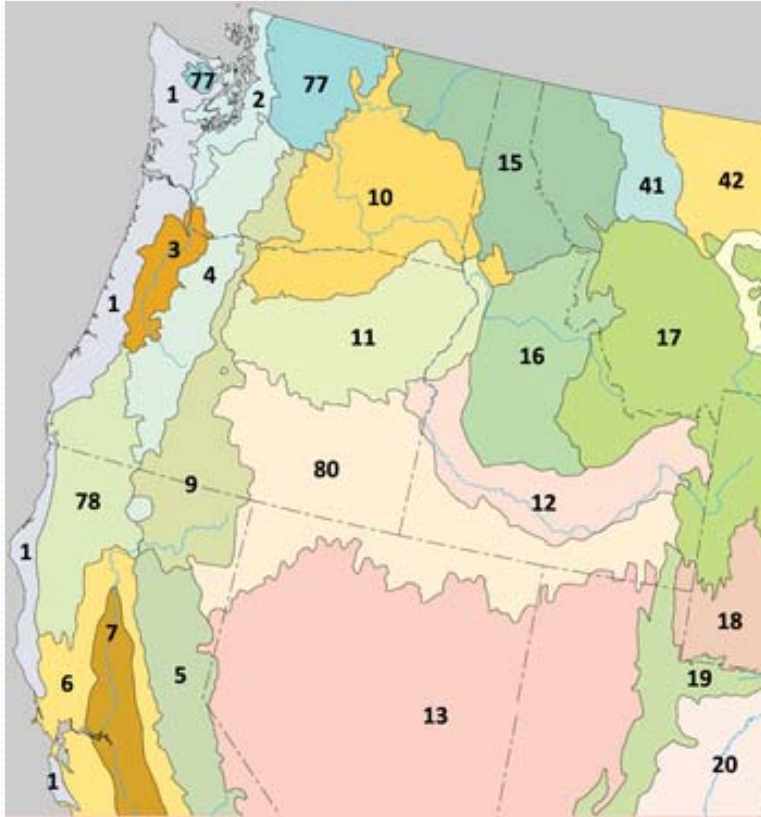
Note: Climate Change will change ecoregions, and affect tribal culture and identity



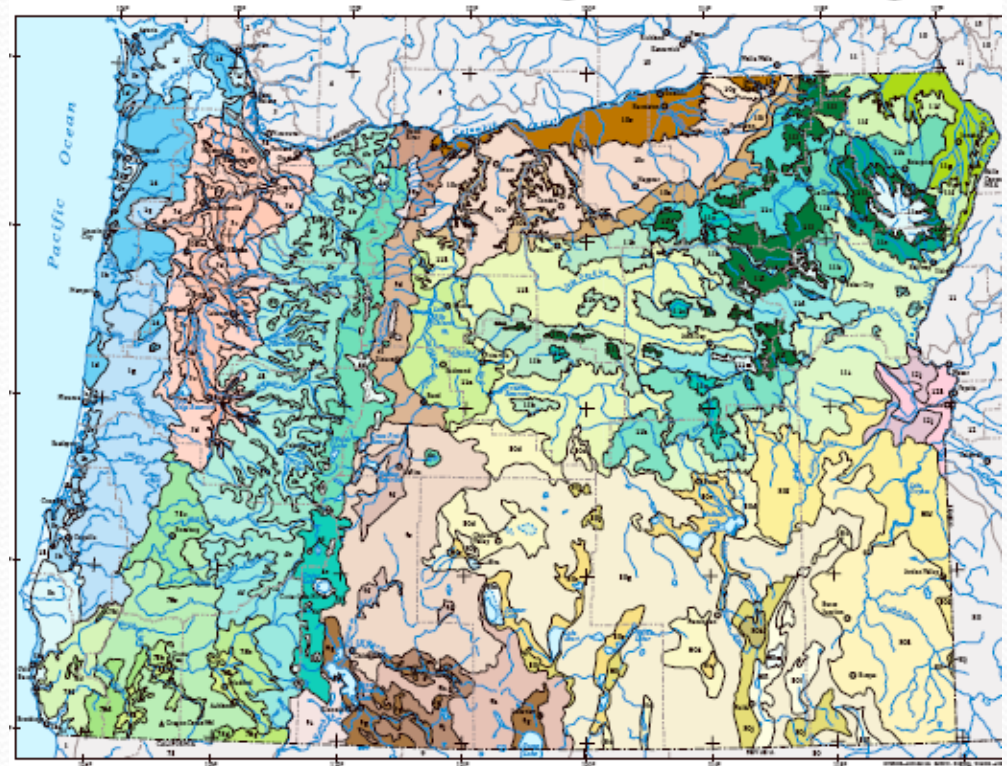
- **Scenario report – A. Tribal history**

- **The section on Tribal history describes factors such as whether Tribes have moved or have been consolidated on reservations, historical reports such as trading records, and linguistic and oral history that describes how Tribes identify with and use natural resources.**
- **This information is needed to understand lifeways as they existed prior to significant resource degradation, the abundance and cultural importance of specific resources, cultural affiliation, etc.**

- 
- **Scenario report – B. Environmental Setting.**
 - **The ecological description provides information about plants, animals, biodiversity, relative proportions of different habitat types, seasonality, and physiographic features of the environment.**
 - **This information is needed to support estimates of dietary staples (the resources that are most abundant and reliable), and environmental characteristics that affect contact rates with soil, sediment, and water (for example, proportion of wetlands versus dry upland habitats).**




Western Level III Ecoregions



Level IV Ecoregions of Oregon

States also have habitat descriptions.

- 
- **Scenario report – C. Natural Resource Use**
 - **Ethnobotanical and ethnohistorical literature describes the general diversity of plants used for food, medicine, or materials in various regional ecotypes and helps derive dietary intake values. This section is both general to a County and specific to the site.**
 - **Traditional ecological knowledge (TEK) combines anthropological and environmental knowledge with tribal knowledge, teaching, and observation.**

Local ecologies, Natural resource use, Seasonal Rounds



Umatilla multi-habitat Seasonal Round

Seasonal rounds must be compressed into exposure points to be used in CERCLA.

On-site resources are substituted so that FC = 1.

The diet is nutritionally complete (2000 – 2500 kcal).

This is an EJ issue to preserve the same margin of exposure.

Culture areas roughly track ecological zones



Figure 24. Important Subsistence Foods (after Driver and Massey 1957)



Figure 23. Dominant Subsistence Food Categories (after Driver and Massey 1957)

Sources: Waldman 2000, Driver and Massey 1957, National Geographic 2005.



- **Scenario Report – D. Diet**

- **In some cases, a complete diet may have been identified in the foraging theory literature, but more often the major dietary staples are identified but not fully quantified within a nutritionally complete diet.**
- **Information about natural resources and their abundance and uses is used to estimate relative importance of the major food categories. This is combined with nutritional information to estimate a nutritionally complete subsistence diet.**

Describing Traditional Subsistence Diets

- 1. What natural resources are present that are edible, medicinal, or materially useful. Typically ~ 200 species for multi-habitat tribes. But we do not want to list all of them.**
 - Ecological information**
 - Anthropological information**
 - TEK and interviews with cultural and academic experts**
- 2. Identify staples with rough apportions among food categories. NOT a simple substitution of food pictures, but description of what the diet actually was/is.**
- 3. Estimate quantities and percents of calories among food groups**
- 4. Check USDA nutritional database – kcal/100g portion of actual or nearest food (same plant family), same food prep method.**
- 5. Ensure totals of 2000 kcal/day and about 1500 grams/day (about 3 lbs/day)**

The items below are the same for all Maine subsistence diets (50% of calories)
 UNIT = kcal/100 gram portion in most commonly eaten form (wet weight)

Fowl and Eggs	6.5% or 130 kcal	Quail (for partridge), total edible - 234 Duck, cooked - 200 Duck eggs – 185 Pheasant (for wild turkey) - 247	130 kcal x 100g/200 kcal = 65 gpd
Roots, Tubers, Rhizomes	8% or 160 kcal	Raw Chicory root - 73 Boiled burdock root – 88 Potato, baked (tuber) – 200	160 kcal x 100g/100 kcal = 160 gpd
Bulbs	2.5% or 50 kcal	Leek, onions and bulbs (bulb & leaf) – 31	50 kcal x 100g/30 kcal = 166 gpd
Berries, fruits	6.5% or 130 kcal	Raw elderberries – 73 Raw strawberries - 70	130 kcal x 100g/100 kcal = 130 gpd
Other vegetables (above-ground, no rind)	8% or 160 kcal	Beans, cooked pinto, kidney or white – 143 Peas, boiled pigeon or split - 120 Squash, cooked winter – 37 Squash, cooked Navajo strain – 16 Mushroom, average raw or cooked - 35	160 kcal x 100g/100 kcal = 160 gpd
Greens, Tea**	5% or 100 kcal	Raw dandelion greens – 45 Raw watercress – 11 Fiddleheads, raw - 34	100 kcal x 100g/30 kcal = 300 gpd
Seeds, Nuts, Grain	8% or 160 kcal	Corn, Navajo strain, steamed - 386 Raw dried sunflower seeds – 570 Chia seeds – 490 Hazelnut, dry roast – 646 Butternuts, dried - 612	100 kcal x 100g/500 kcal = 20 gpd
Honey, Maple syrup	5.5% or 110 kcal	Honey – 304 Maple syrup - 261	125 kcal x 100g/275 kcal = 45 gpd

* All USDA data

** Greens include watercress, and the leaves, stems, shoots of other species for food, medicine, tea, flavor.

USDA Information for Fish, Game, Shellfish Kcal/100 g

Large and Small Game

- Deer, roasted – 158 kcal/100 g portions
- Moose, roasted – 134
- Moose liver, braised - 155
- Rabbit, wild, roasted – 173
- Beaver, roasted – 212
- Muskrat, roasted - 236

Fish and Aquatic Animals, Freshwater and Marine

- Mixed trout, cooked – 190
- Crayfish, wild cooked – 82
- Turtle, raw – 89
- Salmon, cooked – 180
- Shad, cooked – 252
- Herring, dry cooked – 200
- Pollock, dry cooked – 118
- Eel, dry cooked – 236
- Oyster, dry cooked – 70
- Clam, moist cooked – 148
- Lobster, moist heat cooked – 98
- Seal, raw – 142
- Beluga, raw - 111

Tribal Diet examples. Depending on political history, there may be multiple tribes and habitats on one reservation. Distinct dietary patterns may persist in blended tribes. Must know local tribal history. All are ~ 2000 kcal/day and ~ 1500 grams.

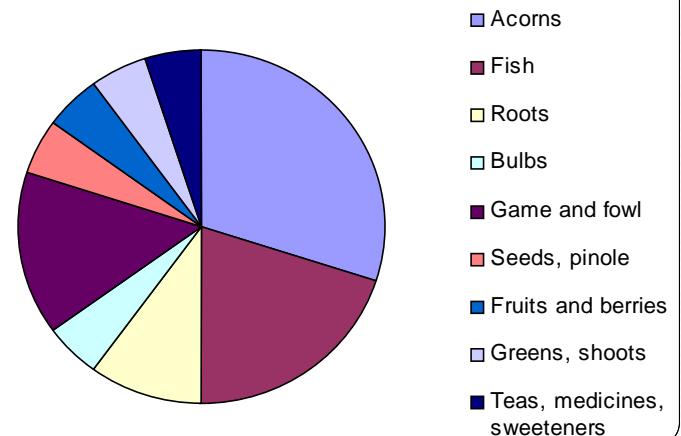


Washoe Tribe – Pinyon-juniper/Tahoe region, from eastern Sierra Nevada to Great Basin floor steppe and marshes.



Elem (Pomo), Clear Lake CA. Fish, game, tule, acorns

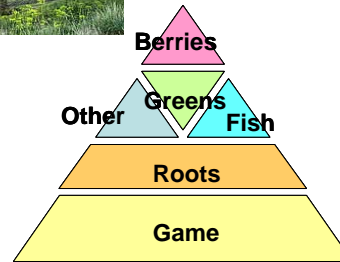
Dietary Categories, by percent of total calories



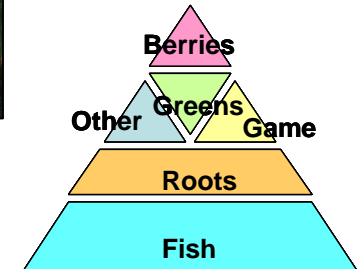
Three CTUIR Tribes – Two basic habitat types

Food Category	Grams per day	Kcal per day	% of kcal
Fish	620 (Boldt decision)	1000	40
Game, Fowl, Eggs	225	400	16
Roots	500	500	20
Berries, fruits, nuts	125	125	7
Greens, medicines, tea, grain	300	300	12
Sweeteners, mushrooms, other	125	125	5

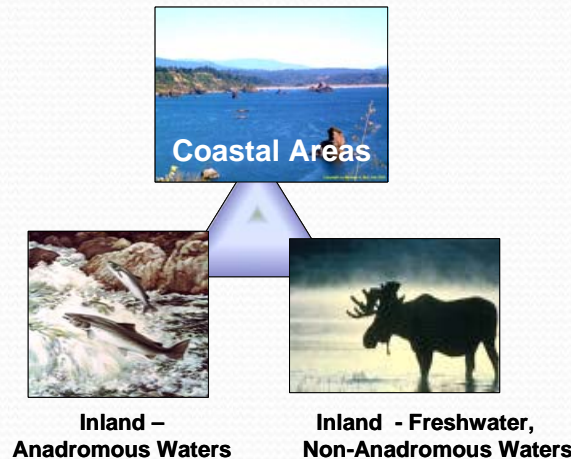
Cayuse (Upland peoples)



Walla Walla, Umatilla (River peoples)



Maine – 25% wetlands. Three bounding case diets for the 3 major habitat types. Allows hybrid diets for site-specific or tribe-specific use.



Example – Maine Inland Anadromous

Category	Percent of 2000 Kcal	Daily kcal	Daily grams
Resident fish and other aquatic	10%	200	115 gpd
Anadromous-marine fish; shellfish	10%	200	115 gpd
Game, large and small	30%	600	343 gpd
Fowl and Eggs	6.5%	130	65 gpd
Roots, Tubers, Bulbs	10.5%	211	326 gpd
Berries, Fruits, Seeds, Nuts, Grain, other above-ground veg.	22.5%	290	210 gpd
Greens, Tea	5%	100	300 gpd
Honey, Maple syrup	5.5%	110	45 gpd



- **Scenario Report – E. Diet Direct exposure factors (soil, sediment, water, and air pathways)**

- **There is little data directly relevant to environmental contact rates with abiotic media for indigenous styles other than the foraging theory literature, which tends to be non-specific, and some individual studies.**
- **The crosswalk between major activities (hunting, fishing, gathering, and so on) and the abiotic exposure pathways (soil ingestion, sediment ingestion, water intake, and inhalation) is based on estimates of activity levels and the frequency, duration, and intensity of each activity category.**
- **Physiological information adds knowledge of activity levels, and the relation between inhalation rates and calorie needs to ensure a reasonable and physiologically coherent set of exposure parameters.**

Crosswalk Process – Multiple Lines of Evidence

	Hunting and associated activities	Fishing and associated activities	Gathering and associated activities	Sweatlodge and associated activities
Food, Medicine, Tea, other biota ingestion (diet)	<i>n</i> deer /yr diet; Total large -small game, fowl. Organs eaten	<i>n</i> fish /yr diet; Total pounds or meals/day -wk-yr; Organs eaten.	Includes foods, medicines, teas, etc.	No food, but herbal particulates are inhaled.
Soil, sediment, dust, and mud ingestion -- 400 mg/d	Terrain types; Degree of dermal contact; How much dirt and mud,,,,	Sediment contact, dust and smoke if drying; weir construction in mud.	External soil on plants; cooking method such as pit cooking; ingestion when gathering.	Includes building the sweat lodge and getting materials..
Inhalation rates -- 25 m ³ /d	Days per terrain; Exertion level; hide scraping; load & grade,,,,	Exertion level – nets and gaffing methods; cleaning effort.	Exertion level for load and grade; or gardening. Include making items.	Includes building the lodge, chopping firewood, singing.
Groundwater and Surface water pathways -- 3 L/d	Drinking water; wash water; water - to-game pathways.	Drinking water; incidental ingestion	Drinking water, cooking water, etc.	Steam in lodge; drinking water during sweat.

Not micro time-activity data, but enough to support daily or annual averages

Comparison between typical tribal and suburban residential scenarios

Exposure Factor	Typical Suburban	Typical Tribal
Soil ingestion	50-200 mg/day	400 mg/d (all ages)
Fish ingestion	17.5 g/day	500-1000 g/day (west coast salmon rivers)
Other diet	Incomplete	Complete 2000 kcal
Inhalation rate	20 m ³ /day	25 m ³ /day
Exposure duration	Varies, often 30 yrs	70 yrs
Sweat lodge	No	Yes

Sweat Lodge: stepwise steam vapor confined space model, pouring 4 L on heated rocks in several aliquots over 1 hour, with condensation. Not a sauna.

$$I_{inh} = \frac{C_{dw} \cdot \left(\frac{V_{w,total}}{\frac{2}{3} \cdot \pi \cdot r^3} \right) \cdot \left(ET + k \cdot \ln \left(\frac{k}{ET + k} \right) \right) \cdot IR \cdot EF \cdot ED}{BW \cdot AT \cdot CF} \quad (9)$$

Ongoing research:

Activity levels with VO_2 and heart rate data during specific traditional activities, to complement CHAD and check calorie intake and inhalation rates.



Contaminant uptake into native food plants such as cattails; nutritional values; native diets and diabetes control.

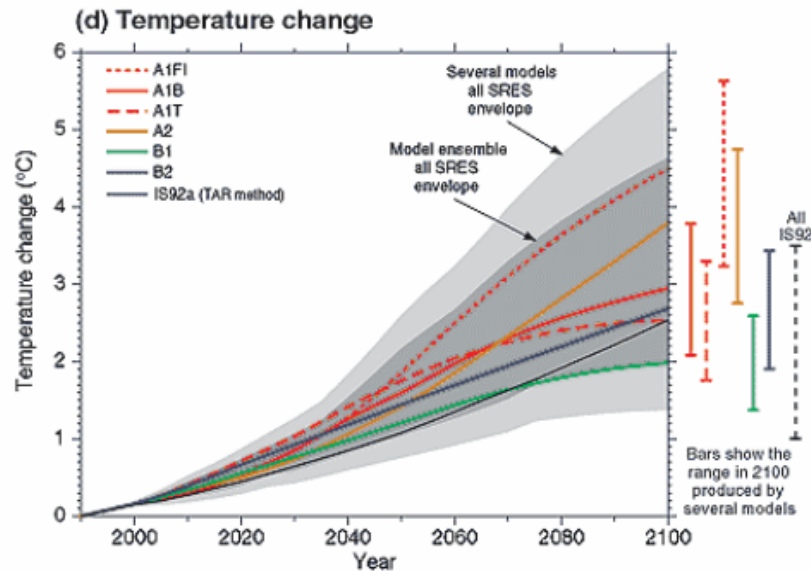
FUTURE APPLICATIONS and TRIBAL NEEDS.

- **Climate change** (how to maintain a culturally acceptable native diet and healthy lifestyle as the resource base changes),
environmental justice (disproportionate impacts to tribal resources),
- **Integrated (cumulative)** assessment, planning, and management
- **Natural resource damage assessment** (making us 'whole' by cleaning and restoring the resources).
- **Regulations** such as pesticide registration, CWA, CERCLA,
- **Homeland security**, quality of life,
- Tribal measures for EPA's Strategic Plan, and others.

Climate Change Science

Climate Science is clear. The Pacific Northwest can expect:

- At least 4° of warming;
- Altered and unpredictable weather patterns;
- More winter precipitation as rain. Less snowpack;
- Earlier spring freshet, lower summer flows, less aquifer recharge;
- Higher water temperatures in tributaries.

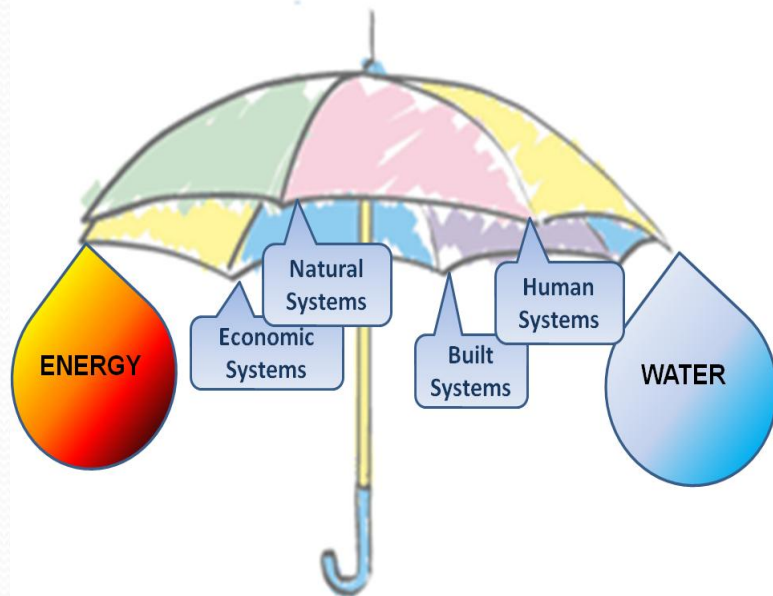


- Vegetation will be stressed, move, or disappear.
- Agriculture will be stressed.
- Water conflicts will occur.
- Population will increase in the Umatilla Basin.
- Tribal resources will be coveted.

The CTUIR Department of Science & Engineering hosted a workshop on Adaptive Governance & Climate Change

Tribal needs:

1. Stable support for climate science staff
2. Support for regional workshops with consistent federal toolkit
3. Real-time changes in plant hardiness zones (currently classified).



If salmon are contaminated...

What kind of risks and impacts are considered in a risk assessment?



Interconnected components



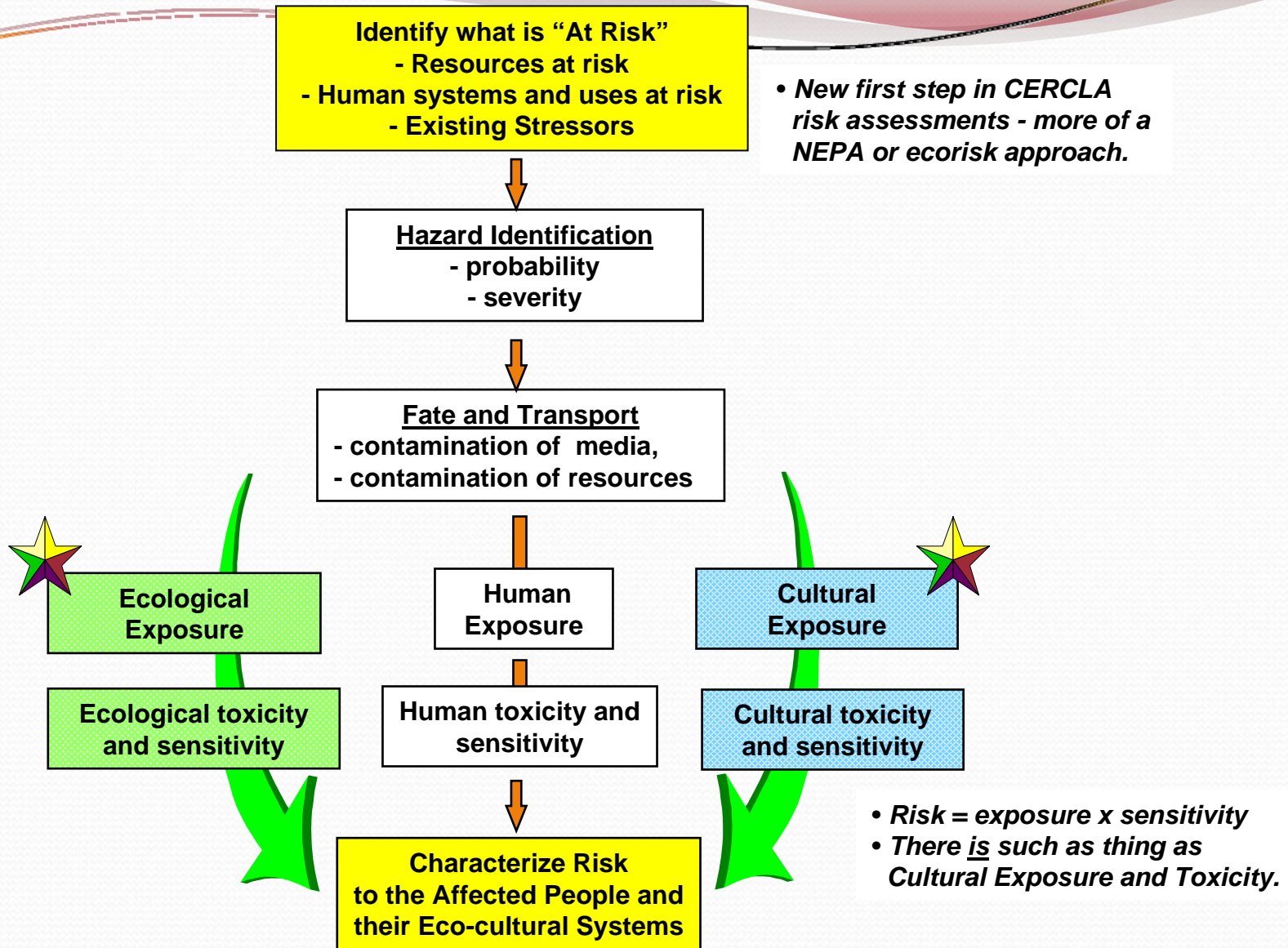
Media and biotic resources are degraded



People are exposed through food



Social and religious activities are impaired.



Characterization of Cumulative Risks requires that all risks and impacts be included within the risk assessment framework.

Defining and assessing health in relation to contaminated shellfish

Important health indicators:

Community cohesion

- Participation & cooperation
- Roles
- Familiarity

Ceremonial use

- Gatherings and ceremonies
- Give thanks
- Feed the spirit

Food security

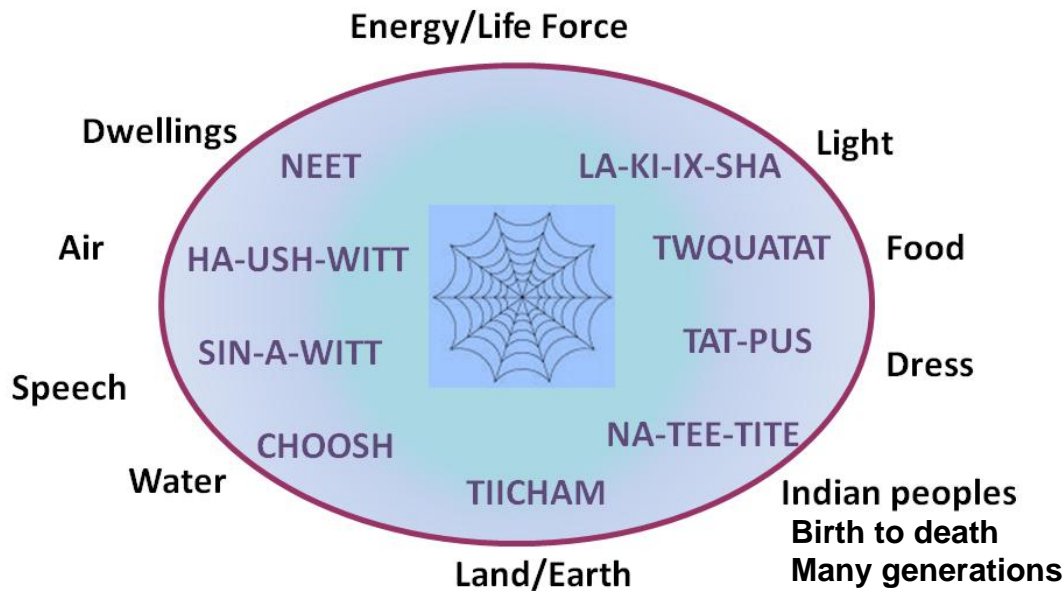
- Availability
- Access
- Sharing

Education

- The Teachings
- Elders
- Youth

CTUIR Tamánwit and First Foods

Tamánwit the Natural Law



*Everything is interconnected locally, and over space and time.
Live lightly on the land. Waste nothing. Share. Tribal peoples
are not only inseparable from the environment, they are
emergent from it..*

First Foods, served in order:

WATER

AQUATICS

- Salmon – chinook, coho, sockeye, steelhead
- Lamprey, Sturgeon
- Mussels
- Trout, Whitefish, Suckers

LAND MAMMALS

- Mule deer, Elk, Whitetail deer, bighorn, mountain goat, bison, moose

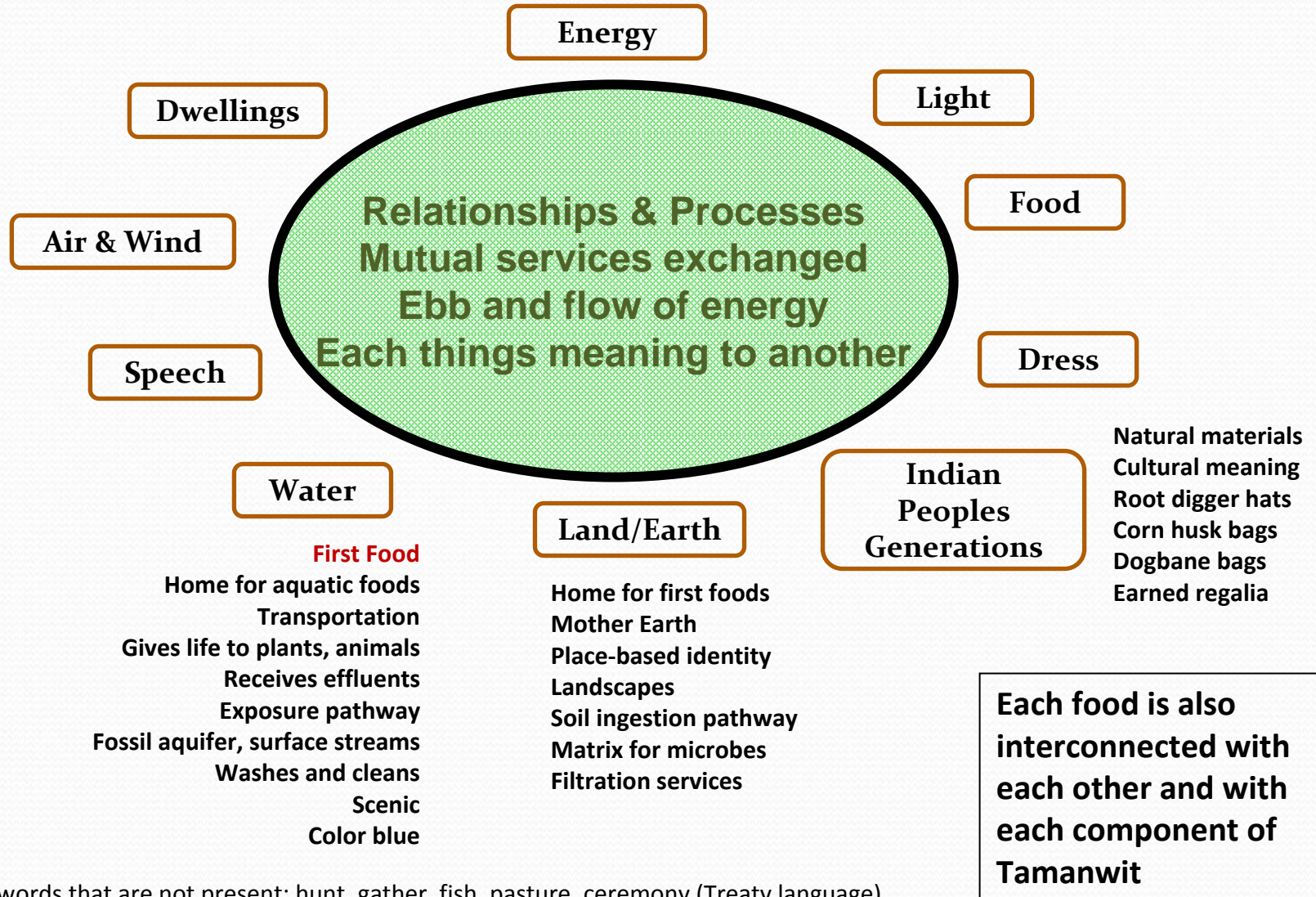
ROOTS

- Cous, Camas, Celery, Carrot, Bitterroot (also moss, greens)

BERRIES

- Chokecherry, Huckleberry

Examples of Reasons why each component is important



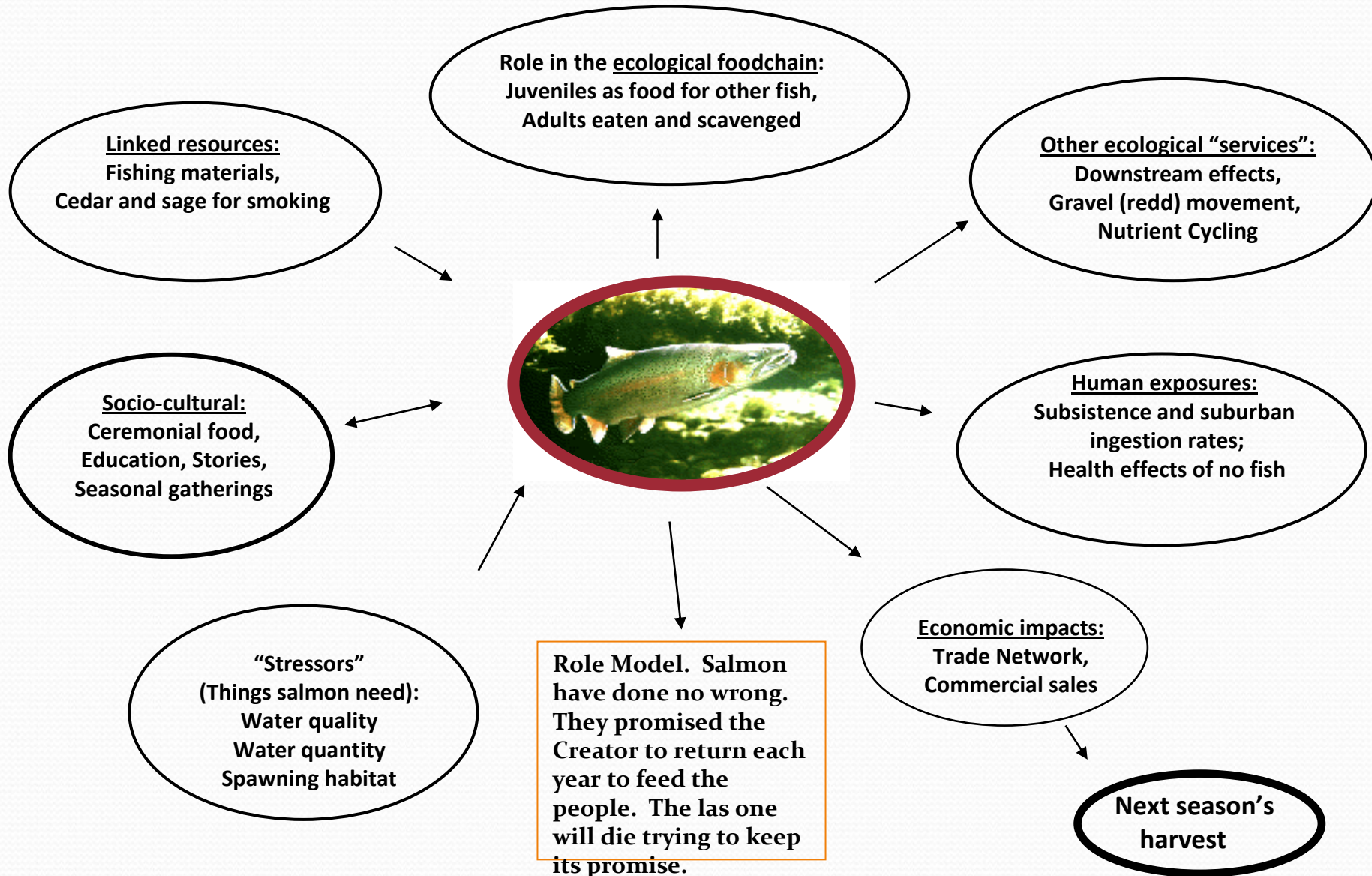
Note the words that are not present: hunt, gather, fish, pasture, ceremony (Treaty language)
 Currency is trust, obligation, knowledge, material skill, oratory skill, character.

Tamánwit and Well-being, Subsistence Economy

The terms “fish, hunt or gather” are shorthand labels that identify some of the most visible activities, but they also include a wide range of associated activities such as preparation, processing, using or consuming, and various traditional and cultural activities.

A subsistence economy includes people with a wide range of ‘jobs’ such as food procurement, processing, and distribution; transportation (pasturing and veterinary); botany/apothecary services; administration and coordination (chiefs); education (elders, linguists); governance (citizenship activities, conclaves); finance (trade, accumulation and discharge of obligations); spiritual health care; social gathering; and so on. The categories of ‘fish, hunt, and gather’ each include a full cross section of these activities. This is why ‘hunting’ is not just the act of shooting and eating an animal, but includes a full cross-section of all the activities that a hunter-specialist does.

The Role of Salmon in Society



Affected Environment,
Existing or original quality

Selection of Metrics,
Assessment of risks and impacts

Quality of Life System

Stories, Values, Lifestyles, Treaties, Sources of Identity

Health

Culturally-relevant exposure scenario, Health effects selected by the tribe, Multigeneration and population effects, Functionality

Environment

Treaty Resources, Media, Biota Relevant species, Ecosystems and cycles, Habitats, Watersheds TCP, Landscapes, Functions and services

Social, Cultural

Cultural resources, Cultural activities, Ceremonial uses, Social indicators, Language, Rights and Access, "Values"

Economic

Economic services (food, shelter, jobs, education, etc.), Valuation of natural resources, Costs to avoid, mitigate or repair

Ethno-Habitats or Eco-Cultural Systems; Overall Health, Well-being, Quality of Life

Characterize risks to each traditional or cultural way of life and community health using measured or predicted impacts and co-risk factors.

Co-Risk Factors for Individuals from a Public Health Perspective

Poverty	HIV-HepA-STD rates
Mental health	BRFSS & NHANES data
Job hazards	-lack of access to data
Existing disease	Rural dumps
Young populations & accidents	Small water systems with
Family life factors such as domestic violence	lower standards
Number of single mothers	Other psychological factors
Education level and job skills, dropout rates	EJ issues/GIS
Religion loss, ceremony loss	Other health disparities
Diet quality – replacement commodity	Lack of political voice
Prenatal care	mistrust
Pesticide exposure	legal challenge
Fish and biota contamination	Trusteeship lacking
Thrifty genotypes and other genetics	Nursing homes not cultural
Alcohol & road conditions & weather	Lack of access to sacred sites
Major disease rates and sequelae	Racism & profiling & more jail time
Late diagnosis, lack of advanced care such as dialysis, life expectancy, etc.	
Housing conditions, crowded, age, lead, asbestos, lack of ramps, lack of loans, high interest	
Lack of protective environmental standards & its psychological effect – you don't matter, you don't deserve the same level of protection.	
Lack of money to get technical and legal expertise needed for equal participation.	



Securing the Homeland

Governance for the people, by the people:

- Support the infrastructure for commerce
 - Provide services for the population
- Provide for the well-being of the people
- Set bounds, protect rights and resources

Utilities

Language

Land Base

Clothing

Shelter

Workforce

Education

Truancy

Voting

Domestic violence

Offices

Investments

Cultural Resources

Connectivity, Communications

Insurance

Social Services

Fairness

Water & sewer

Justice

Potholes and stop signs

Roads

Food

Emergency Preparedness

Friends

Clinic

Clean Water

Energy

Safety

Securing the Future



All healthy people (tribal nations, cities, states) need sovereignty, jurisdiction, and self-determination for health and well-being (but preserving culture and language):

aLand Base – a secure land base with jurisdiction and ownership. Freedom from legal attacks.

GGovernance – stable, balanced government with self-determination of the tribal nation

RResources – natural, cultural, legal, technical, organizational, and human resources adequate to define and meet threats to stability, self-determination, resources, culture, mental and physical health, religion, economy and security. Technical, legal, health care adequately funded.

CCapital Resources – infrastructure, cyber, and domestic resources designed to respond to threats and protect tribal values and resources with strength and understanding in a traditional manner. adequate housing, etc.

SSecurity – confidence in natural resource adequacy and quality, confidence in a leadership that looks out for the members and the resources, confidence in adequate economic well-being; confidence that the culture, language, values, and people will survive; freedom from constant legal battles brought by the federal and other governments.

CCulture – appreciation of individuals, creativity, support of the needy, devotion to the people, justice, and the shared history and blood ties to the land and to each other, according teachings of elders.

RReligion – freedom to choose and practice any religion.

EEconomy – adequate food, clothing, shelter for individual and tribal needs, both in dollars and barter, but also including riches of the landscape, heritage, and knowledge.

NRDA: “Making whole”

Means ... Making the site clean enough to safely use in our traditional manner (as translated into the Scenario).

Restored enough that the resources are sufficient to support those uses through ecological functions, human services, and landscape-level metrics.

Protected from pollution and development



EPA's "Policy for the Administration of Environmental Programs on Indian Reservations"

[EPA] will view Tribal Governments as the appropriate non-Federal parties for making decisions and carrying out program responsibilities affecting Indian reservations, their environments, and the health and welfare ...

There are four foundational principles ... derived from Treaty and Constitutional law, Supreme Court and lower court decisions, Public Laws as passed by the Congress, and Executive Orders and Memoranda:

(1) Trust Responsibility. EPA will protect resources (the environment and human health) as a fiduciary for the benefit of the Tribes. [This implies a higher degree of protection than is due the average citizen of the U.S.]

Helping EPA meet its Trust responsibility to Indian Tribes:

NEJAC, an advisory committee to EPA, describes the Trust obligation as “the strictest fiduciary standards.” As the Supreme Court explained, federal officials are “bound by every moral and equitable consideration to discharge the federal government’s trust with good faith and fairness” when dealing with Indian tribes. “The trust doctrine includes duties to manage natural resources for the benefit of tribes and individual Indian landowners.”

Trust Responsibility includes but is not limited to: promotion and protection of tribal treaty rights, ... regulations to protect AI/AN traditional and cultural lifeways, natural resources, treaty, and other federally recognized and reserved rights.

Executive Order 12898, “Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations,” requires the consideration of subsistence. (Clinton, 1994)

“Each Federal agency, whenever practicable and appropriate, shall collect, maintain, and analyze information assessing and comparing environmental and human health risks borne by populations identified by race, national origin, or income.” This applies to “facilities or sites expected to have a substantial environmental, human health, or economic effect on the surrounding populations...”

Sec. 4-4. Subsistence Consumption of Fish and Wildlife.

4-401. Consumption Patterns. In order to assist in identifying the need for ensuring protection of populations with differential patterns of subsistence consumption of fish and wildlife, *4-402. Guidance.* Federal agencies, whenever practicable and appropriate, shall work in a coordinated manner to publish guidance reflecting the latest scientific information available concerning methods for evaluating the human health risks associated with the consumption of pollutant-bearing fish or wildlife. Agencies shall consider such guidance in developing their policies and rules.

A scenic landscape featuring a wide river in the foreground, with rolling hills and a cloudy sky in the background. The sky is filled with soft, golden light, suggesting a sunset or sunrise. The text is overlaid on the image in a stylized, white font with a black outline.

For as long as...

... the grass grows

the wind blows

the river flows