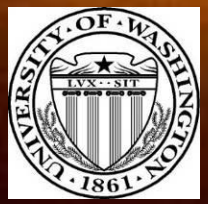
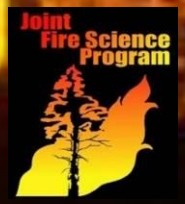
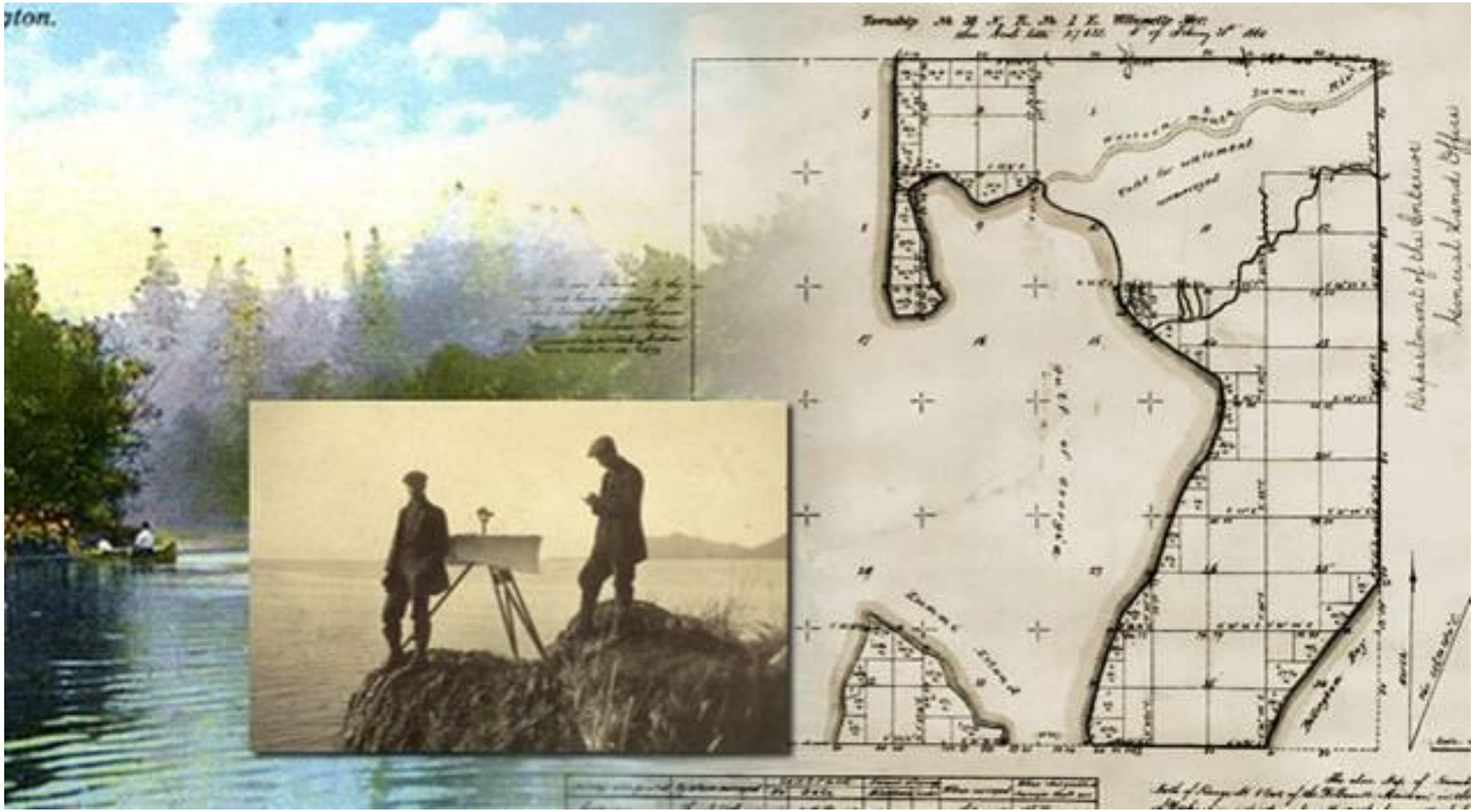
Integration of Traditional Ecological Knowledge and Western Science

Time to Listen and Learn





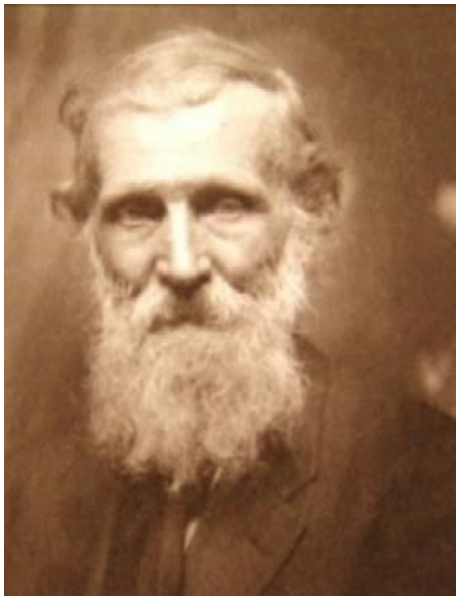
Western Science has informed remarkable achievements:



Landscapes have been transformed…

Useful skills and technologies have been developed

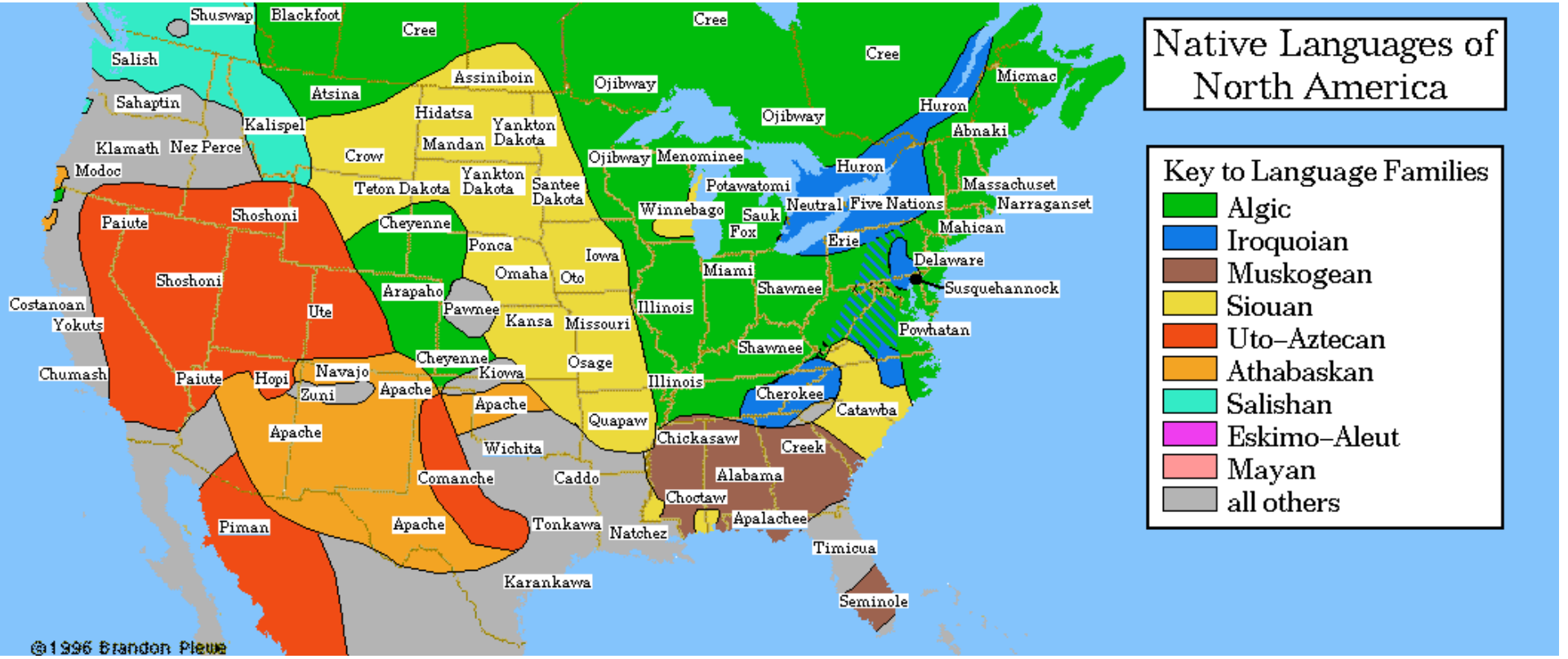
Gifford Pinchot



John Muir

However, Euro-American concepts of property and ecosystems had origin in forests that were culturally and environmentally very different from the forests of North America …

Early suppositions that Indians were few in number and had little impact on the environment set the stage for a series of inaccurate myths about people, fire, and natural resources



http://www.cogsci.indiana.edu/farg/rehling/nativeAm/ling.html

A culture of fire suppression resulted

California fire prevention notice aimed at light burning advocates, 1913.

Of all the methods of using fire as a servant, the" light-burning“ theory is the oldest, the most important, and at the same time the most undesirable and the most mischievous, from the stand point of Forestry.
Boerker, R.H. 1912. Light Burn vs Forest Management. JOF 10(2):184-194.

It is of course absurd to assume that the Indians fired the forests with any idea of forest conservation in mind.
Leopold, A. 1920. Piute Forestry vs forest fire prevention. Southwestern Magazine 2:12-13.

1895

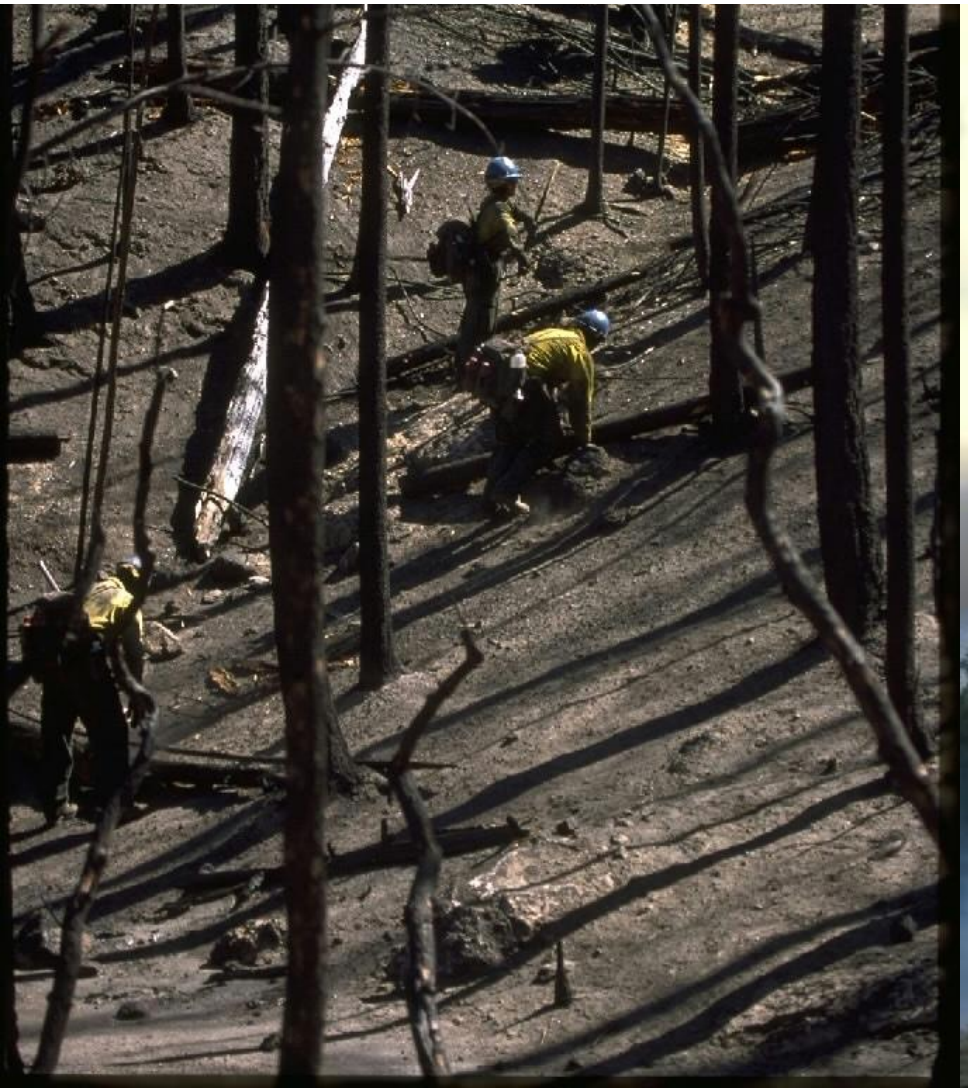
Forests become uncharacteristically dense

1980

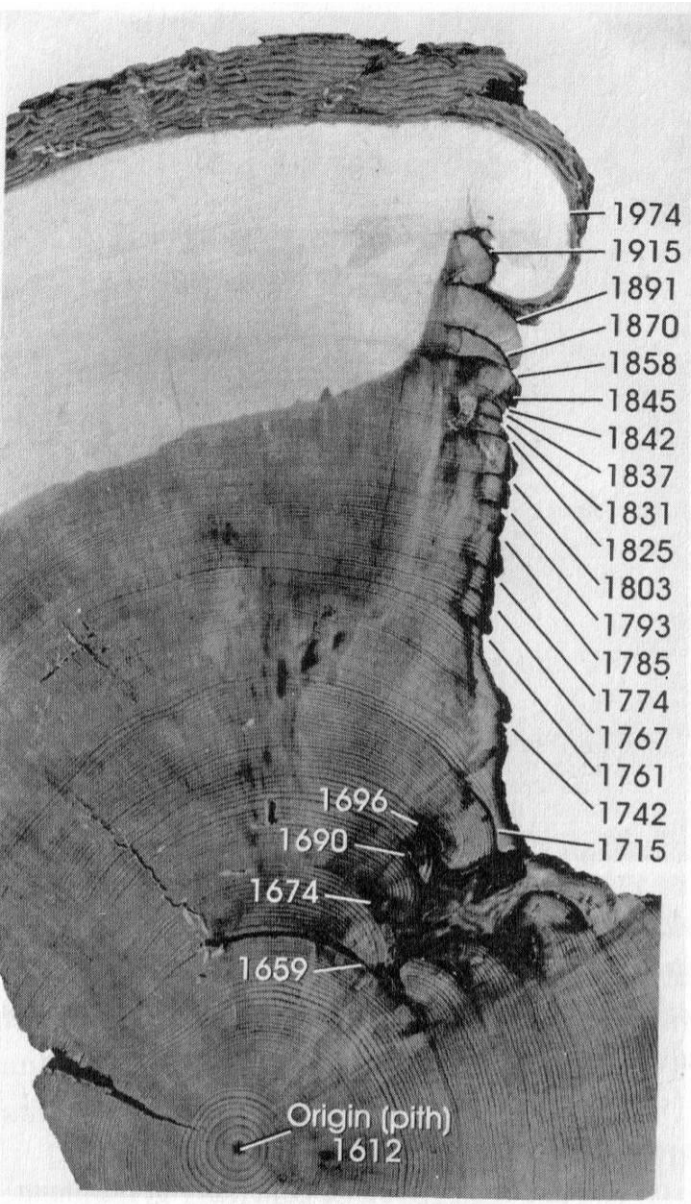
And burned uncharacteristically hot

2001

Since 2000, wildfires have consumed an average of 7 million acres/yr and federal fire suppression costs have been more than $1billion/yr.



A better understanding of the past is overdue



Cross-section of a ponderosa pine from the Bitterroot Valley, Montana, with scars from recurrent low-intensity fires. The tree recorded twenty-one fires between 1659 and 1915. Fire suppression interrupted the pattern of frequent fires after 1915. USDA Forest Service photo.

For thousands of years Native Americans used fire to transform North American landscapes.

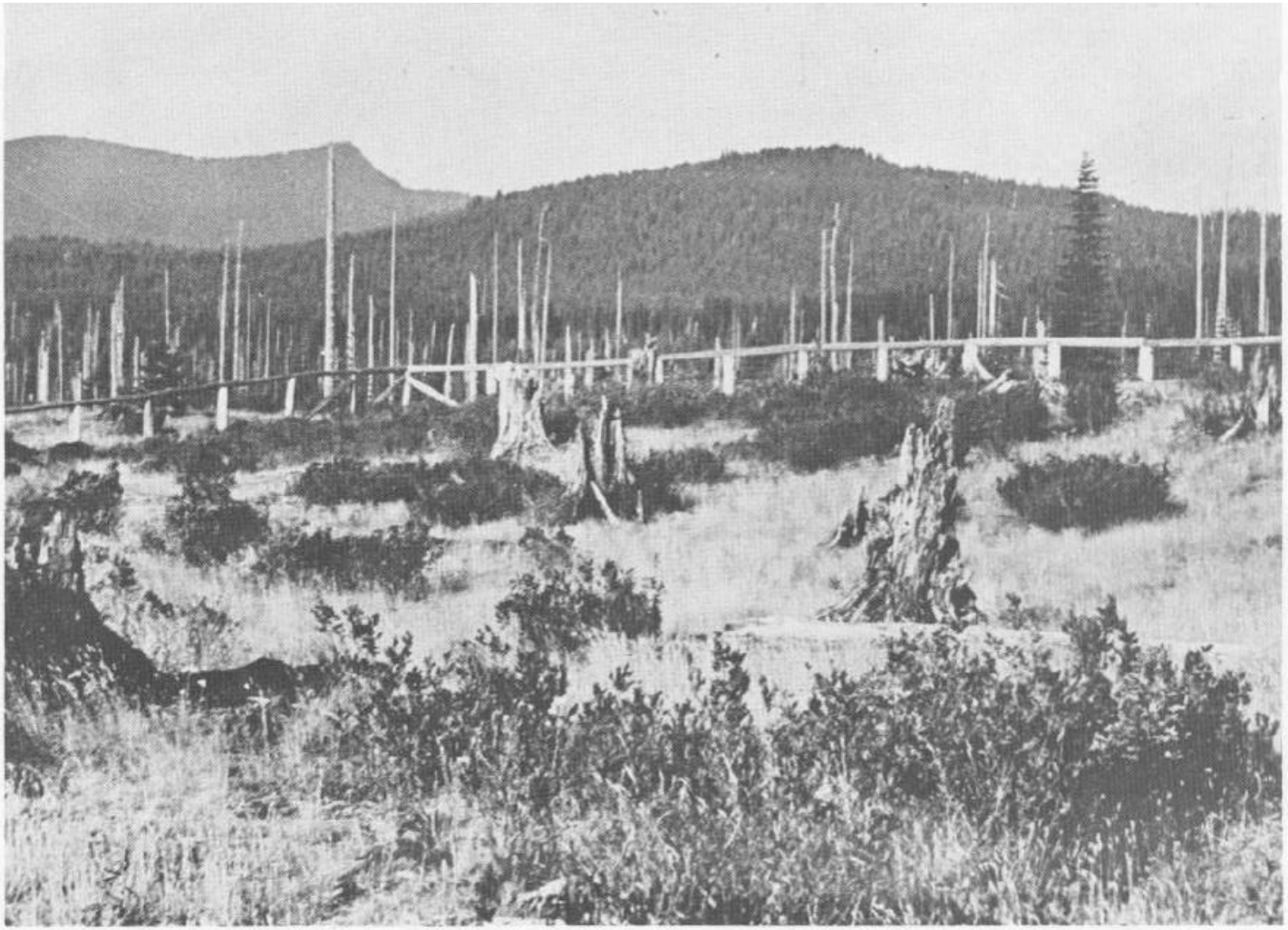


Figure 1.--A portion of the Sawtooth huckleberry field near Mount Adams, Washington in 1938. Note snags and open aspect.

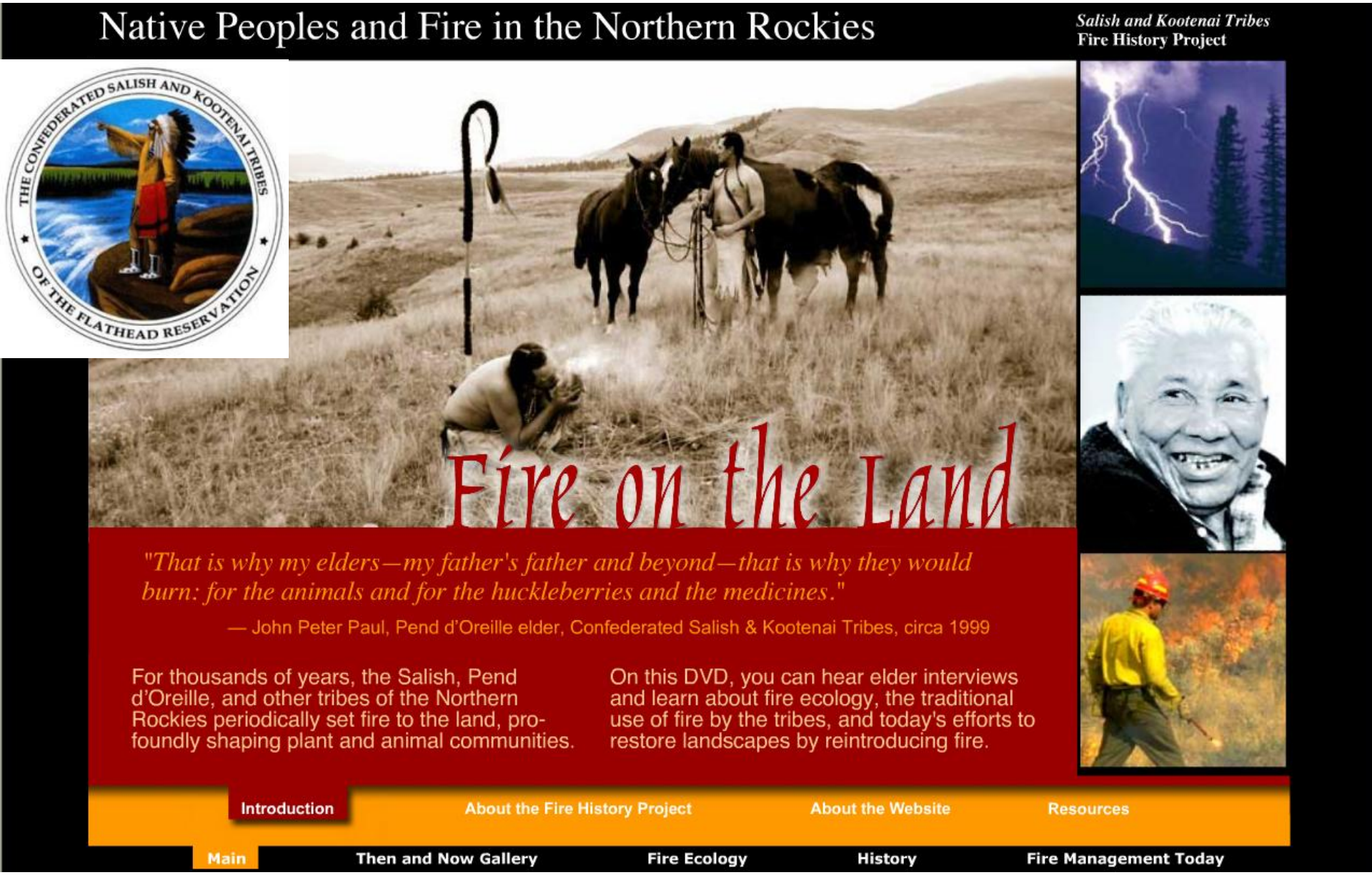
Minore, D., A.W. Smart, and M.E. Dubrasich. 1979. Huckleberry Ecology and Management Research in the Pacific Northwest. USDA Forest Service. PNW Forest and Range Experimental Station. Gen. Tech. Rep. PNW-93. 26 pp. http://www.fs.fed.us/pnw/publications/gtrs.shtml

"Tribal and indigenous peoples'…lifestyles can offer modern societies many lessons in the management of resources in complex forest, mountain, and dryland ecosystems."

Our Common Future, the report of the World Commission on Environment and Development (WCED 1987)

An opportunity exists to learn from one another

This project builds upon the work begun by the Confederated Salish Kootenai Tribes



http://www.cskt.org/fire_history.swf

and Salish Kootenai College

Dialogue begins

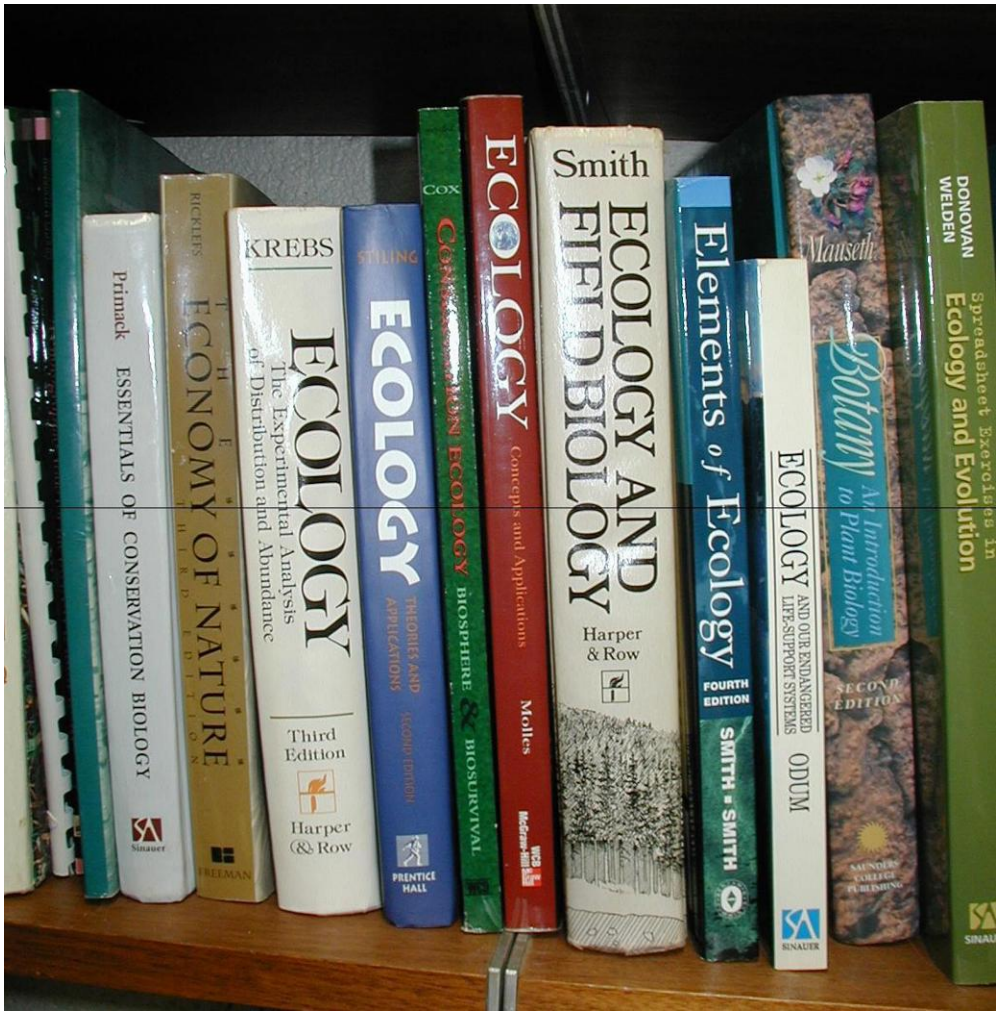
For two days in June 2010, 27 people from different realms of expertise and cultural backgrounds gathered together on the Flathead Indian Reservation, home of the Confederated Salish Kootenai Tribes, for a workshop to explore cross-cultural integration of Native American stewardship practices, traditional knowledge and philosophies with Western science. It was shared concern about forest health and wildfire hazard that brought these people together but broader issues of cultural respect, humility, and knowledge-sharing quickly emerged.

Two ways of thinking and knowing

Traditional Knowledge (TK)	***Scientific Ecological Knowledge (SEK)***
Abstract	Concrete
Qualitative	Quantitative
Inclusive	Exclusive
Intuitive	Intellectual
Holistic	Reductionist
Spiritual (social values)	Clinical (“value free”)
Co-existence	Control
Diachronic (long time series, place oriented)	Synchronic (short time series, broad generalities)
People are part of nature (reciprocity)	People apart from nature (competition)
Communal Knowledge Based on insights collected by practitioners (transferred generation to generation)	Individual Knowledge Data collected by specialists/researchers (shared by publication)

Adapted from Berkes, F. 1993. Traditional Ecological Knowledge in Perspective.

Traditional Knowledge is not found in Ecology Text Books



We must learn from the Elders

The Kootenai Elders: *Louise Andrew, John Eneas, Margaret Friedlander, Kathy Hamel*
The Pend d'Oreille Elders: *Mike Durglo Sr, Pat Pierre, Steven Smallsalmon*

- **Fire is central to Indian life and religion.**
- **The people look to fire to keep the land clean, encourage growth of culturally important plants, and control insects.**
- **There were once tribal fire specialists called "Burners" who understood fire conditions and knew exactly when and how to start a fire to produce desired results.**
- **Encroachment of trees into prairies once maintained with fire is a loss for the tribe and brings sadness to the people.**
- **The grandfathers complained that it was ridiculous for white people to stop Indian burning.**
- **Now white people come to ask what can be done?**

The Elders:

- **Elders are eager to help and share knowledge but need be convinced that inquiries from academia and agencies are sincere and that recommendations carry real influence.**
- **Elders are proud of Native students as they become the bridge between the two worlds.**
- **It is important to bring Indian and non-Indian together as we all share responsibility for future generations.**

The earth does not belong to us; we belong to the earth.

The Students: *Everett Isaac (Yakama; PhD UW), Laurel James (Yakama; MS UW), Matt Weingart (CSKT; BS SKC), Spus Wilder (Colville; MS UW)*

- **For generations Indian people have regarded fire use as an essential part of life.**
- **Proper use fulfills a responsibility to take care of the land.**
- **Native Americans burned camp sites and berry patches and to keep the land clear for seasonal passage from high to low elevation.**
- **It is important to hear the stories but much Indian learning is unspoken; often gained by doing.**
- **It is difficult to convey lessons learned from elders to non-native students and faculty.**

The Students:

- **Tribal colleges fill an important niche by providing culturally sensitive education.**
- **Recognition of TK by science and education communities brings welcome inclusion for Native students attending large universities.**
- **In addition to cultural challenges, many Indians must also fulfill family obligations and work responsibilities while attending school.**
- **Students expressed uncertainty about how they may be received by tribal communities after extended exposure to Western education and non-Indian values.**

The Tribal Foresters: *Jim Durglo (CSKT; For Mgr), Tony Harwood (CSKT; For Tech Spec), Vernon Stearns (Spokane Tribe; Fire Mgr), Howard Teasley (Nez Perce Tribe; Allotment Forester), Germaine White (CSKT; Res Info and Ed Spec and Proj Dir Fire on the Land)*

- **Forestry on tribal lands must successfully accommodate protection of cultural values while proceeding with harvest activities that generate revenues and employment.**
- **Cultural values include places of spiritual significance; traditional foods such as huckleberries, camas, and wild potatoes; access to fuel wood; protected wildlife habitats; and others.**
- **Regulations such NEPA must be followed adding to costs and complexities.**
- **Funding constraints present real world challenges to reservation stewardship.**

The Tribal Foresters:

- **A dynamic balancing of competing objectives and multiple funding sources is imperative for success.**
- **Tribal foresters expressed gratitude for the guidance of the elders.**
- **In spite of many challenges, Indian fire and forestry programs are acknowledged as successful models of adaptive management; in part due to inclusion of TK in planning and implementation.**
- **Co-authored management plans and stewardship contracts are a good way to build working relationships and share knowledge with Forest Service neighbors.**
- **One obstacle that constrains relationship building, however, has been frequent turn-over of Forest Service personnel.**

The Intertribal Timber Council: *Jim Erickson (Colville; ITC Fire Spec), Gary Morishima (Quinault; Nat'l Res Tech Spec and ITC founder). Jim Durglo, Vernon Stearns, and Howard Teasley also serve as ITC board members.*

- **Established in 1976, ITC is a non-profit national consortium of Indian Tribes, Alaska Corporations, and individuals dedicated to improving management of natural resources important to tribal communities.**
- **Timber was consciously selected for inclusion in the ITC name. Utilization of natural resources has always been vital to the survival of Indian peoples.**
- **Increased awareness of cultural values and Native burning by federal agencies and researchers can be helpful for fire planning on federal lands near reservations.**
- **Past policies of *"appropriate management response"* and *"let it burn"* have resulted in cultural and economic losses for tribes.**

The Intertribal Timber Council:

- **ITC is hopeful that greater appreciation of TK will help guide fire risk-analyses.**
- **Questions remain, however, about how to avoid the biases inherent in *"best science"* approaches to wildland policies that reflect a legacy of subordination of Indian values.**
- **Improved communication and alliances between agencies, scientists, and tribes can overcome prejudices and bridge knowledge gaps.**

Federal Agencies: *Fred Clark (Potawatomi; Dir of Tribal Affairs USDA FS), Colin Hardy (Program Mgr Fire, Fuels, and Smoke USDA FS RMRS), Faline Haven (Metlakatla; Mgmt Analyst Tribal Affairs USDA FS), Bodie Shaw (Warm Springs; Dep Dir USDI BIA and NIFC), Carol Raish (Anthropologist USDA FS RMRS)*

- **Cultural disconnects create regulatory quandaries. For example, in the Bob Marshall Wilderness there prairies created by hundreds of years of repeated Native burning that are now being lost to tree encroachment.**

- **Wilderness status, which prohibits human management, has resulted in ecosystem conditions that differ significantly from those historically sustained by tribes raising the question of *"What is natural and what is not natural?"***

- **Many within the Forest Service are eager to learn from Indian practices but lack opportunity to gain familiarity with TK. Others retain *"organizational arrogance"* that manifests as *"we know best and are going to show you how to do things."***

Federal Agencies:

- **Knowledge and ability should not be measured by education alone. Traditional burners may have little formal education yet have sophisticated fire skills.**
- **Lack of agency knowledge compromises protection of cultural resources.**
- **Multi-ownership planning, student internships, and professional exchange programs have potential to facilitate information exchange.**
- **Most managers learn more from practical experiences than published literature.**
- **Terms and methods employed by federal agencies perpetuate misunderstanding. Terms like *"natural"* and *"wilderness"* are culturally burdened. *"Science-based"* risk analyses are biased by ethnocentric concepts of comparative value.**

The Academics: *Ernesto Alvarado (Prof Fire Ecology; UW), Robert Kenning (For Inst; SKC), Adrian Leighton (For Inst; SKC), Larry Mason (Res Sci & Outreach Coordinator; UW)*

- **There is growing recognition of the importance of TK within academia but much work remains if TK is to be integrated into resource science curricula.**
- **Non-native faculty and research scientists lack opportunities to get to know Indian Country and to learn from elders.**
- **Institutions are slow to change.**
- **TK, while intensively studied by anthropologists, has been comparatively ignored by fire and other natural resource scientists.**
- **Guest lectures by Native scholars and elders offer ready start towards cross-cultural education. Field trips to reservations are additional opportunities.**

The Academics:

- **Educators are in agreement with elders that Native students build a bridge between worlds of knowing. Students that accept such responsibility need support from reservations and universities.**
- **An approach to get beyond barriers may be to develop research projects where questions, hypotheses, methodologies and analyses are conducted in consultation with elders and tribal practitioners.**
- **Discovery of agreement between SEK and TK can highlight the deductive power of each while assuring congruence between abstraction and place.**

Scientists and faculty need to learn as well as teach; listen as well as talk.

81 year old Pend d'Oreille Elder, Pat Pierre, offered a simple prescription for cross-cultural progress:

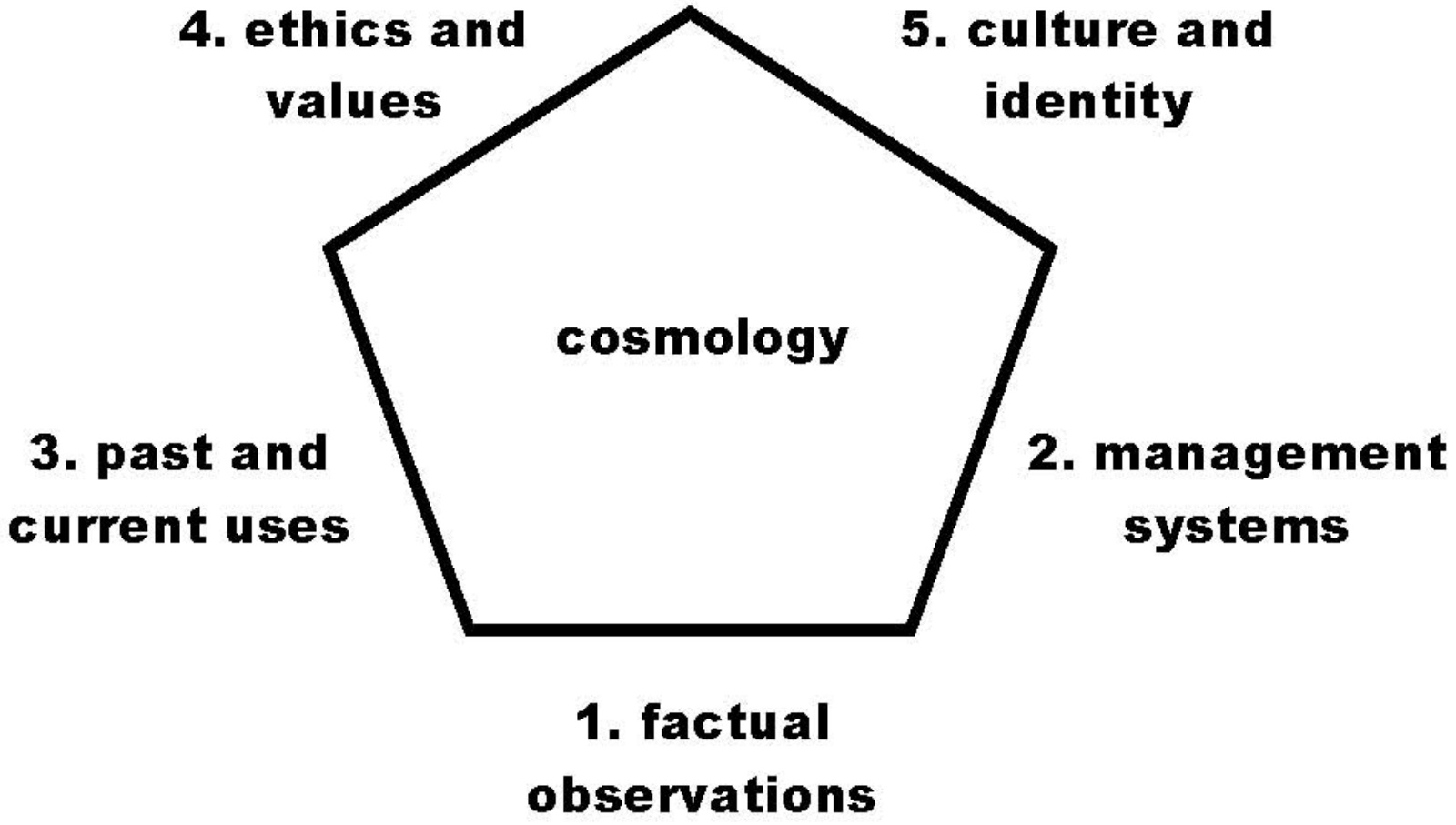
"Open communication, education, respect, and friendliness"

Conclusion

The indigenous peoples of North America have studied ecosystems and fire for thousands of years.

Traditional Knowledge represents place-based, multigenerational community observations that contemporary scholars would be well-served to recognize and respect.

A Science Model of TK?

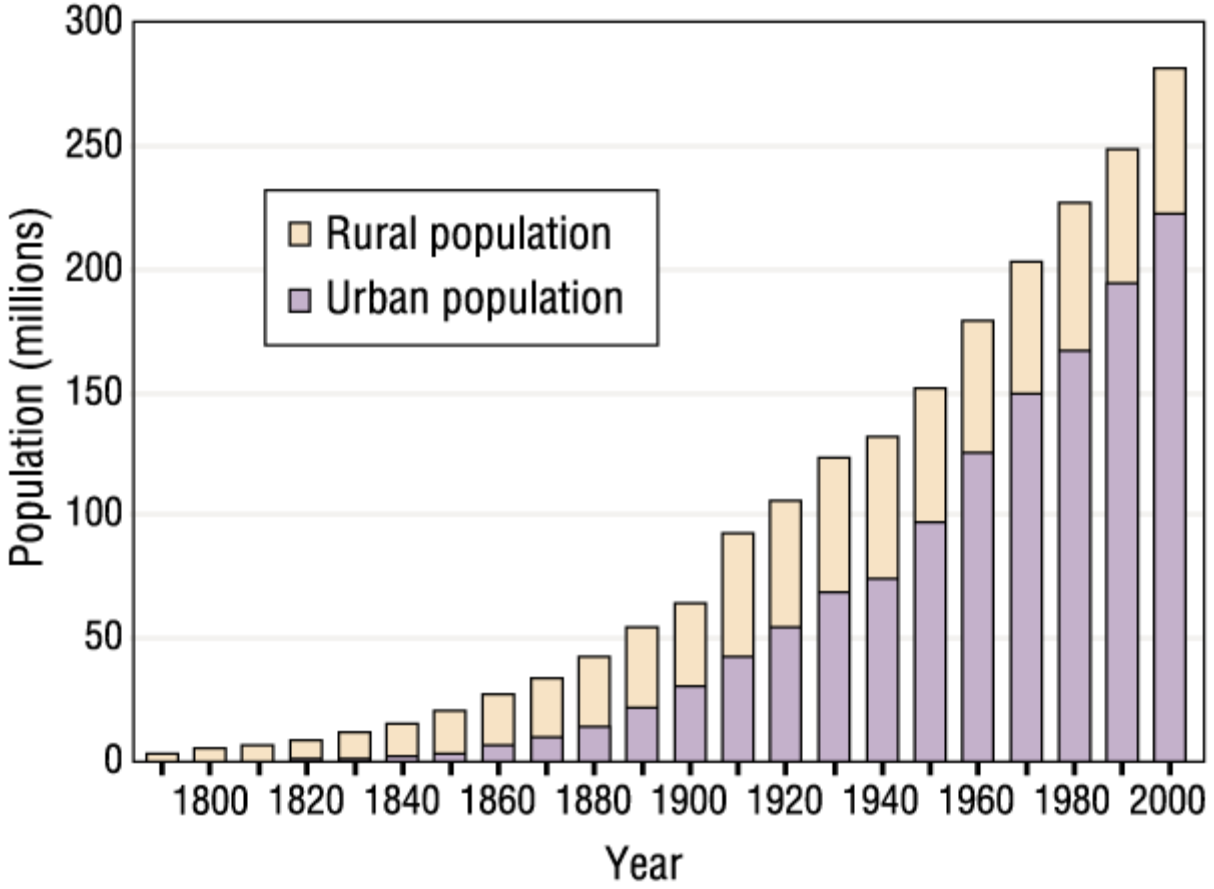


From: Houde (2007). The Six Faces of Traditional Ecological Knowledge

Recommendations:

- ***National Knowledge-Sharing Program***
- ***Workshops on Reservations***
- ***Protocols for Conduct***
- ***Personal Relationships for Sharing Trust***
- ***Partnerships for Higher Education***
- ***Collaborative Research Projects***

Urbanization of America 1790-2000



Who will be the stewards?

US Census Bureau

Who will teach the children?

Time to Listen and Learn

Thank You