Lesson Plan: Rethinking Wild: Native American Plant Management Strategies
Disciplines: Science and Technology, Wabanaki Studies, Geography (Regional and Local History)
Grade Level: 9-12
Maine Learning Results Addressed:
Science and Technology A4: Scale In the range of grade 9-Diploma, students are expected to apply understanding of scale to explain phenomena in physical, biological, and technological systems.

Science and Technology D2: Students describe and analyze the biological, physical, energy, and human influences that shape and alter Earth Systems.
LD 291 Concentrated Area of Study
Cultural Systems (2)
Maine Native American Territories (2)
Major Concepts: Geography and Human Interaction with Environments
Essential Understanding: The extent of Wabanaki territories has changed over time.

Maine Learning Results Assessed:
Science and Technology A4.a. Describe how large changes of scale may change how physical and biological systems work and provide examples.
Science and Technology D2.d. Describe and analyze the effects of human influences on Earth Systems.
*LD 291.*2.b. Human Interaction with Environments: Students will understand and analyze the relationships among people and their physical environment.
LD 291 Maine Native American Territories 2.
Essential Questions 3: How did contact and colonization impact Wabanaki territories?

Goal: To introduce students to Native American plant management techniques

Learning Objectives
Students will be able to:
- Describe the variety of ways that Native Americans have modified 'wild' plants and their ecosystems.
- Compare and contrast Native American plant management approaches with those of European settlers.
- Explain how management of 'wild' plants takes place at a variety of scales, and be able to give examples of these activities.
- Explain how European settler ideas of 'wild' impacted Wabanaki homelands.

Materials Needed
- Native American plant management hand out sheet (provided at the bottom)
- Large sheets of paper
- Markers/colored pencils/crayons

Before Class

- The day before class, assign the Sweetgrass in Maine example sheet for students to read. This will begin to introduce them to Native Plant management and stewardship.

Activities

- *Freelisting:* Ask students to say what they think of when they hear the word *wild* (Write responses on board)
    - This definition from the Oxford English Dictionary can be included along with student responses:
        - Of a plant (or flower): 'Growing in a state of nature; not cultivated.'
    - if most responses do not include humans, probe the relationship between humans and wild, humans and nature- Are humans part of nature or separate from it?
    - then ask students to list where human activity is obvious on the landscape (maybe have different photographs of cities, farms, etc) as prompts
    - use the above list as a segue into talking about where human impacts on the landscape are not immediately obvious
- *Introduce the Concept of Scale*
    - Students should understand that there are many definitions of the term scale**. For this lesson plan, scale is defined as: the size of the unit at which some problem is analyzed,** such as at the county or state level. For our purposes, we will think about plants at different levels, from individual plants, to populations of plants, up to ecosystems and landscapes in which plants are found.
- *Introduce Native American Plant Management/Stewardship Techniques*:
    - start the discussion off by talking asking students what they found interesting in the Sweetgrass example they read about the night before
        - This can tie back into the earlier discussion of what it means to be *wild*
        - Ask if students found information in the article(s) surprising. In what ways?
    - use the handout sheet included- scales include ***individual, population, community and landscape*** (definitions provided on back of handout sheet)
        - have students draw a landscape on the board (in which different parts can have management activities assigned to them)
        - Prompt to begin thinking about individual scale management:
            - How many of you garden?
            - What do you do to encourage a plant to grow in your garden?
                - weed around it, water it, give it fertilizer
            - This is just what Native Americans did to encourage plants they wanted more of.
    - Cooperative Learning Activity: Break students into groups of four. Each student will be given a specific scale (individual/population/community/landscape), and contribute different management activities to the map on the board. Alternatively, have each group create their own map on large sheets of paper, and report back to the class.

Additional Discussion/Reflection

Why did Native American, including some Wabanaki people manage plants from the woods, fields, wetlands?

- to maintain access to plant resources that they need- for food, medicine, utilitarian and spiritual purposes

How do we manage plants/forests/fields now?

- Give examples of forestry practices, farming etc.

Revisit the idea of *wild*.

- Ask students if they have different opinions about the term *wild* at the end of class then they did at the beginning.

Assessment

- To demonstrate an understanding of scale as well as an understanding of some of the plant stewardship techniques employed by Native Americans, give students a plant-based scenario, and ask them to identify the scales at which stewardship activities occur, and to propose their own management recommendations
- Here is a prompt:
    - Red willow is a shrub that is found in old agricultural fields. Native Americans in Maine harvest red willow stems, and some use the bark from the stems as a medicine. To harvest plants sustainably, gatherers do not take whole shrubs. Instead, they choose to cut off only some of the plant stems on many different plants. Cutting off the stems is a form of pruning, which stimulates vigorous regrowth the following year. In addition, some red willow habitat is being lost as old agricultural fields turn back into forests. Young trees shade out the red willow, and they are unable to survive.
    - **At what scale are Native American gatherers interacting with plants**? (answer- individual level- because the pruning action stimulates regrowth of new stems on the plants, and population level, because taking a little bit of material from many plants ensures that whole populations are not impacted negatively by gathering.)
    - **What type of management activities would you recommend to maintain red willow habitat?**
    - **What activities would you recommend to maximize the regeneration of red-willow stems?**
- For homework, assign students the 2-page article about Black Oaks in Yosemite National Park (Alternatively, assign excerpts from the paper "Native Americans as active and passive promoters of mast and fruit trees in the eastern USA". Some might prefer this article because it gives examples that are geographically closer to Maine). Ask them to identify the specific management techniques, and scales at which they occur.

Background

This lesson plan will have students re-examine their ideas of what 'wild' means. Using examples of Native American Plant management, students will explore how human activities have, and continue to, alter and modify their surroundings. The term 'wild' can suggest the absence of human influence. While humans are often perceived to be "unnatural", this lesson will introduce humans as active participants in their ecology. Students will be introduced to different techniques that Native Americans applied to plants. Utilizing the concept of scale, the lesson will explore how management includes a variety of nested scales from weeding around an individual plant to using fire as a landscape-level tool to promote favorable conditions for certain plant species.

In colonial times, the idea of 'wild' lands was used by European settlers as a justification for appropriating Wabanaki homelands. Settlers arriving from Europe from the 1600s on believed that agriculture was the best and most productive use of land. Agriculture is an ***intensive*** type of land use- it is immediately obvious, and requires a lot of inputs of human labor, water, fertilizer, and other resources in a relatively small space. In what is now Maine, many Native American inhabitants had not been practicing intensive agriculture. They interacted with the land in many other ways, some of which were subtle and not obvious to settlers who were used to agricultural landscapes. Their land use was ***extensive-*** Wabanaki peoples had large homelands which they travelled through seasonally. They utilized land for subsistence activities, including productive berry patches, hunting grounds, and fishing sites.

European settlers did not consider these activities efficient or productive land uses. Furthermore, they believed that using the land for these purposes was enough to constitute ownership of the land. The principle of ***vacuum domicilium*****,** or empty lands, was based on this idea (Cronon, 1983, Bruneeyl, 2007). The result was that land that was utilized for other subsistence activities, including berry patches, hunting grounds, and fishing sites, was not considered by the settlers to have been claimed as private property by Native Americans. Instead, the landscape appeared 'wild' to the settlers, and was considered blank space in the landscape and on the map that was available for the taking, either to convert into agriculture, or to extract valuable resources. Settlers may not have recognized the many ways that 'wild' Native American lands had been heavily managed, manipulated and altered for thousands of years.

Researchers have found that many plants once presumed to be wild in fact rely on specific human actions. For example, Shipeck (1989) and Anderson (2006) demonstrated that Native communities in California have enhanced plant diversity in their landscapes through sophisticated stewardship of many so-called wild species. Others have extensively documented similar activities in British Columbia, Canada (eg Turner and Peacock, 2005). These activities range from encouraging the growth of individual plants to modification of entire landscapes (see handout).

Examples of these activities include (a) **selective weeding** to reduce intraspecies composition; **(b) tilling the soil** for prepared beds of edible tubers, and (c) **setting controlled** fires to enhance habitat for desirable species. Taken together, these activities increase the productivity of desired species, increase within- habitat diversity, and increase the heterogeneity of entire landscapes

(Turner and Peacock, 2005). They are, in effect, creating landscapes where the abundance of culturally important plant species (and also animal species) is increased.

Native American Plant Management in Maine

Unfortunately, unlike the western United States and Canada, scholarship and historical accounts of Native American plant stewardship in the northeastern United States is sparse. The evidence we do have suggests that native people of Maine have been interacting with plants for thousands of years. Archaeological data from settlements in the Canadian province of Nova Scotia suggest that Mi'kmaq people were tending 'wild' plants including groundnut (*Apios americana*) and American plum (*Prunus americanus*) at least 500 years before European settlers arrived (Leonard, 1996). Historical accounts, such as the writings of Champlain and French Jesuit missionaries from the 1600s mention the fact that native people of what is now Maine were skilled in the use of medicinal plants for healing, but do not extensively document all of the species in use.

Research from the 1900s on focuses on identifying culturally important plants and their uses, but does not include data about how intensively some of these species may have been managed. This may in part be due to a longer legacy of interaction with European settlers, precipitating a much earlier loss of control over land. It may also have to do with the differing ecological contexts between eastern and western North America. For example, burning was a commonly-practiced plant stewardship tool in many places in the west. This type of landscape level activity mimicked the fact that large fires were a regular part of disturbance cycles in the west. In the northeastern United States, disturbance patterns are smaller, having to more to do with wind and insect infestations than large fires. It may also follow suit that indigenous management practices were also carried out on smaller scales, and their legacy may not be as immediately apparent on the landscape.

Despite the lack of historical data about northeastern plant stewardship techniques, recent research (Baumflek et al. 2010) highlights that a variety of practices are still implemented. Over 120 species of plants and fungus are currently gathered in northern Maine. Gatherers employ a variety of harvest and management techniques that intervene at different parts of a plant's life cycle to ensure the continued abundance of these species. Here are some examples:

- <u>scattering/sowing of seeds</u>: gatherers report scattering the seeds of species including: lupine (*Lupinus sp.*) , sweetgrass (*Hierochloe odorata*), angelica (*Angelica purpurea*) and mullein (*Verbascum thapsus*).

- <u>replanting roots and rhizomes:</u> after harvesting the below-ground parts of certain plants, gatherers will replant small rootlets and tubers to allow them to regenerate in coming years. This practice is implemented for Muskrat root (*Acorus americanus, Acorus calamus)* and goldthread (*Coptis trifolia*).

- <u>pruning/coppicing:</u> the methods of harvest for certain species encourages vigorous vegetative regrowth, and in some case the promotion of fruit production. Example species

include red willow (*Cornus sericea),* high-bush cranberry and common raspberry (*Rubus ideaus).*

- transplanting species: gatherers will actively transplant species they utilize, placing them in locations that are more convenient to their homes. Species include high-bush cranberry (*Viburnum opulus),* muskrat root (*Acorus sp.*) and fiddleheads *(Matteuccia struthiopteris).*

Additional Resources

Maliseet/Passamaquoddy language videos that talk about and demonstrate plant harvests:

***Sweetgrass*:** http://pmportal.org/node/371537

Pretty Soon It Will be Time for Sweetgrass http://pmportal.org/videos/pretty-soon-itll-be-time-sweetgrass

Tending the Wild: Native American Knowledge and the Management of California's Natural Resources, by M.Kat Anderson

Changes In the Land: *Indians Colonists and the Ecology of New England* by William Cronon

Culturally and Economically Important Nontimber Forest Products of Northern Maine by M. Baumflek, M. Emery, and C. Ginger.

(Instructor Version) Maine Plant Management Example: Sweetgrass

Sweetgrass is widely used in Maine by all four Wabanaki tribes. Sweetgrass is considered a sacred plant and has several different uses: it is used as a smudge (similar to incense) to purify people and places during ceremonies. It is also used decoratively in baskets, earrings and other craft items (see photo below). Sweetgrass can be found growing in meadows by the ocean as well as in fields inland. Some people differentiate between saltwater sweetgrass, which grows right near the ocean and freshwater sweetgrass, which can be found inland, in fields. Some plant gatherers prefer saltwater sweetgrass because it grows taller than freshwater sweetgrass. Others prefer freshwater sweetgrass, which they say burns better (as a smudge) than saltwater sweetgrass.

Sweetgrass is a good example of the plant management we have discussed above. It is actually a plant whose populations do better when used by humans! Sweetgrass is harvested in the summer, from late July through early September, before the blades of grass start to turn brown (*See one of the two video links below for footage of Passamaquoddy people harvesting sweetgrass*). Some gatherers say that they wait until the grass has produced seeds, which they scatter over the fields as they harvest. **(Prompt- when telling the class about sweetgrass, at this point the instructor can ask at what scale is this type of plant management an example of) effects .** In addition, there are two ways that gatherers collect sweetgrass. Some pull the plants up blade by blade, leaving the roots undisturbed. Others pull up whole plants, often in clumps, roots and all. It turns out that both of these forms of harvesting actually stimulate the sweetgrass to grow more vigorously. In effect, it is the harvesting activities of people that result in bigger populations of sweetgrass. **This is another example of management that is implemented at the *population* level.**

People picking Sweetgrass, Pictou Nova Scotia, 1930. *From Smithsonian Archives*

Maine Plant Management Example: Sweetgrass

Sweetgrass is widely used in Maine by all four Wabanaki tribes. Sweetgrass is considered a sacred plant and has several different uses: it is used as a smudge (similar to incense) to purify people and places during ceremonies. It is also used decoratively in baskets, earrings and other craft items (see photos on the right). Sweetgrass can be found growing in meadows by the ocean as well as in fields inland. Some people differentiate between saltwater sweetgrass, which grows right near the ocean and freshwater sweetgrass, which can be found inland, in fields. Some plant gatherers prefer saltwater sweetgrass because it grows taller than freshwater sweetgrass. Others prefer freshwater sweetgrass, which they say burns better (as a smudge) than saltwater sweetgrass.

Sweetgrass is actually a plant whose populations do better when used by humans! Sweetgrass is harvested in the summer, from late July through early September, before the blades of grass start to turn brown. Some gatherers say that they wait until the grass has produced seeds, which they scatter over the fields as they harvest. In addition, there are two ways that gatherers collect sweetgrass. Some pull the plants up blade by blade, leaving the roots undisturbed. Others pull up whole plants, often in clumps, roots and all. It turns out that both of these forms of harvesting actually stimulate the sweetgrass to grow more vigorously. In effect, it is the harvesting activities of people that result in bigger populations of sweetgrass.

People picking Sweetgrass, Pictou Nova Scotia, 1930. *From Smithsonian Archives*

Scale	Representative Activities	Ecological Effects
Individual plants	Selective harvesting	Reduced intraspecies competition
 http://www.nrs.fs.fed.us/sustaining_forests/conserve_enhance/special_products/maine_ntfp/plants/sweetgrass/	Weeding around individual plants	Reduced interspecies competition
	Pruning and coppicing	Stimulates vegetative production, leads to increased flowering and fruiting
	Fertilizing	Increases vigor, supplementing soil nutrients
Population	Scattering/Sowing seeds	Replenishes population, potentially increases genetic diversity
 http://www.prairiemoon.com/seeds/grasses-sedges-rushes/hierochloe-odorata-sweet-grass/	Tilling	Creates local soil disturbance, aerates soil, recycles soil nutrients, increases moisture-retention capacity
	Transplanting	Promotes dispersion of propagules to new habitats
Community	Burning	Reduces competition, promotes vigorous plant growth, accelerates mineral nutrient recycling, promotes selection of annual habitat, maintains successional stages, creates canopy openings
 http://www.maine.gov/doc/nrimc/mnap/features/communities/brackishmarsh.htm		
Landscape	Controlled flooding	Increases amount of wetland habitat, alter plant diversity and abundance
		

http://www.maine.gov/doc/nrimc/mnap/focusarea/crystal_bog_focus_area.pdf

Individual plant management

Activities that promote, encourage or increase the health of an individual plant.

Population management

Activities designed to enhance the reliability and productivity of any culturally significant species at the population level.

Community management

Strategies that create and maintain diversity in selected habitats or locales, often successional, where populations of culturally significant plant resources occur.

Landscape management

The totality of peoples' management effects, including systems of decision making and social sanctions that control the management and harvesting of plant resources in various habitats throughout a large geographic area, such as a traditional territory.

Definitions adapted from Turner and Peacock, 2005