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# Action for Wetlands Activity Packet

Team members \_\_\_\_\_

Period \_\_\_\_\_ Date \_\_\_\_\_

## Activity 1: Wetland Restoration Examples—Plans, Projects and People

### Instructions

1. Review sample documents provided by your teacher related to wetlands restoration activities sponsored or supported by the Cow Creek Band of Umpqua Tribe of Indians.
2. Review the list of "Example Restoration Tools" provided on pages 2 through 4 of this document.
3. For each sample document, answer the questions in the note-taking forms, which start on page 5.
4. Be ready to present your group's work to the whole class.

## Examples of Restoration Tools

Tool	Purpose	Sample Activities
<b>Plan</b>		
Site study	Identify a site that can benefit from restoration activities	<ul style="list-style-type: none"> <li>• Review maps</li> <li>• Review land ownership records</li> <li>• Review government records and requirements</li> </ul>
Baseline inventory	Document and describe current site conditions for planning and monitoring purposes	<ul style="list-style-type: none"> <li>• Document site hydrology, topography, and geology</li> <li>• List existing plant and animal species</li> <li>• Take pictures and videos •Take soil samples</li> </ul>
Reference ecosystem	Identify a comparable habitat to provide a model for restoration activities	<ul style="list-style-type: none"> <li>• Record animal and plant species</li> <li>• Take pictures and video</li> </ul>
Historical data	Understand site conditions and species prior to development	<ul style="list-style-type: none"> <li>• Review surveyor records</li> <li>• Read explorer journals</li> <li>• Consult Indigenous oral histories</li> <li>• Interview community elders</li> </ul>
Master plan	Provide a written plan to guide restoration activities	<ul style="list-style-type: none"> <li>• Meet with stakeholders and partners</li> <li>• Set goals and objectives</li> <li>• Write plan</li> <li>• Write budget</li> <li>• Identify project team (paid and volunteer)</li> <li>• Identify funding sources</li> <li>• Create a project schedule</li> </ul>

Tool	Purpose	Sample Activities
Outreach/publicity plan	Share news and plans about the project with the wider community	<ul style="list-style-type: none"> <li>• Create an outreach/publicity plan</li> <li>• Create or set up marketing and communications materials and tools</li> <li>• Write press releases, blog posts, and social media posts</li> </ul>
<b>Implement</b>		
Site preparation	Alter project site to restore natural processes or prepare for additional human activity	<ul style="list-style-type: none"> <li>• Remove non-native species</li> <li>• Remove soil, debris, and trash</li> <li>• Amend soil</li> <li>• Remove polluted soil</li> <li>• Add appropriate soil</li> <li>• Plug or remove drains</li> <li>• Fence out livestock and other herbivores</li> <li>• Breach dams, dikes, and levees</li> <li>• Mow or burn site</li> </ul>
Plant preparation	Support regrowth of native plant species	<ul style="list-style-type: none"> <li>• Collect seeds</li> <li>• Propagate plants</li> <li>• Collect cuttings</li> <li>• Collect plugs (new-grown whole plants with soil)</li> </ul>

Tool	Purpose	Sample Activities
<b>Installation/construction</b>	Add or modify natural and human-built land and water features to restore natural topography and hydrology	<ul style="list-style-type: none"> <li>• Construct water-control structures</li> <li>• Install bank/edge stabilization structures</li> <li>• Build habitat islands</li> <li>• Grade existing soils</li> <li>• Place and grade new soil</li> <li>• Plant plugs, seeds, cuttings, and plants</li> <li>• Install plant protections</li> <li>• Place irrigation systems</li> <li>• Construct and place habitat structures</li> <li>• Prepare “as-built” documentation</li> </ul>
<b>Monitor</b>		
<b>Monitoring/evaluation plan</b>	Track outcomes of the restoration project to measure success and inform long-term maintenance	<ul style="list-style-type: none"> <li>• Identify restoration goals and targets</li> <li>• Develop data collection procedures</li> <li>• Identify a dissemination plan (how information will be shared with the public)</li> </ul>

Tool	Purpose	Sample Activities
<b>Data collection</b>	Collect qualitative (observational) and quantitative (numerical) data at intervals to monitor restoration progress	<ul style="list-style-type: none"> <li>• Take aerial and ground-level photos and videos</li> <li>• Record general observations of site conditions (water clarity, trash, animal and plants, erosion, condition of structures)</li> <li>• Measure water level changes</li> <li>• Collect and test water samples</li> <li>• Collect and test soil samples</li> <li>• Survey surface elevations</li> <li>• Record plant species</li> <li>• Trap and record animals</li> </ul>
<b>Dissemination</b>	Use monitoring data to inform others	<ul style="list-style-type: none"> <li>• Share monitoring data with government agencies</li> <li>• Present work to local community and ecology groups</li> <li>• Write articles for local media and ecological journals</li> <li>• Publicize work in traditional and social media</li> </ul>

Tool	Purpose	Sample Activities
<b>Maintain</b>		
Maintenance activities	Maintain restoration site in good ecological condition	<ul style="list-style-type: none"> <li>• Remedy construction deficiencies</li> <li>• Control non-native and invasive plant and animal species</li> <li>• Control cattle and other grazing animals</li> <li>• Repair structures, as needed</li> <li>• Maintain monitoring and other equipment</li> <li>• Replace plants, as necessary</li> <li>• Mow or burn site to reinstate or mimic natural disturbances</li> <li>• Reduce or prevent human intrusion</li> <li>• Control local pollutants</li> </ul>

## Wetlands Restoration Sample Document Review: Note-Taking Form

	Document 1	Document 2	Document 3
Document name/title			
How would you describe the document? What does it contain? What is its purpose? Explain your reasoning.			
Which restoration <i>phase</i> do you think the document supports, relates to, or is an example of? How do you know?	<p><i>(Select all that apply)</i></p> <p><input type="checkbox"/> Plan</p> <p><input type="checkbox"/> Implement</p> <p><input type="checkbox"/> Monitor</p> <p><input type="checkbox"/> Maintain</p> <p>Explain your reasoning:</p>	<p><i>(Select all that apply)</i></p> <p><input type="checkbox"/> Plan</p> <p><input type="checkbox"/> Implement</p> <p><input type="checkbox"/> Monitor</p> <p><input type="checkbox"/> Maintain</p> <p>Explain your reasoning:</p>	<p><i>(Select all that apply)</i></p> <p><input type="checkbox"/> Plan</p> <p><input type="checkbox"/> Implement</p> <p><input type="checkbox"/> Monitor</p> <p><input type="checkbox"/> Maintain</p> <p>Explain your reasoning:</p>

	Document 1	Document 2	Document 3
Does the document demonstrate or describe a specific restoration <i>tool</i> (e.g., baseline inventory, master plan, monitoring/evaluation plan)? If so, which one(s)? Explain your reasoning.			
Which sample restoration <i>activities</i> appear in the document? List all that apply.			



	Document 1	Document 2	Document 3
Document name/title			
How would you describe the document? What does it contain? What is its purpose? Explain your reasoning.			
Which restoration <i>phase</i> do you think the document supports, relates to, or is an example of? How do you know?	<p><i>(Select all that apply)</i></p> <p><input type="checkbox"/> Plan</p> <p><input type="checkbox"/> Implement</p> <p><input type="checkbox"/> Monitor</p> <p><input type="checkbox"/> Maintain</p> <p>Explain your reasoning:</p>	<p><i>(Select all that apply)</i></p> <p><input type="checkbox"/> Plan</p> <p><input type="checkbox"/> Implement</p> <p><input type="checkbox"/> Monitor</p> <p><input type="checkbox"/> Maintain</p> <p>Explain your reasoning:</p>	<p><i>(Select all that apply)</i></p> <p><input type="checkbox"/> Plan</p> <p><input type="checkbox"/> Implement</p> <p><input type="checkbox"/> Monitor</p> <p><input type="checkbox"/> Maintain</p> <p>Explain your reasoning:</p>

	Document 1	Document 2	Document 3
Does the document demonstrate or describe a specific restoration <i>tool</i> (e.g., baseline inventory, master plan, monitoring/evaluation plan)? If so, which one(s)? Explain your reasoning.			
Which sample restoration <i>activities</i> appear in the document? List all that apply.			

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## Activity 2. Design a Wetland Restoration Plan

### **Scenario**

The Cow Creek Band of Umpqua Tribe of Indians recently acquired a 10-acre piece of commercial property adjacent to its land holdings in Canyonville, Oregon. Originally part of a marshy area surrounding a stream that feeds into the South Umpqua River, the property has subsequently been filled in, with the stream redirected into a storm sewer and much of the property paved over with a parking lot. The developed property was first used for light manufacturing and later as an auto junkyard. Testing indicates the soil has been contaminated with industrial chemicals and petroleum products, and the periphery of the property is overgrown with Himalayan blackberry canes and other weeds and non-native plants.

Tribal oral histories tell of Cow Creek ancestors harvesting useful plants, crayfish, waterfowl, and the occasional fish from the area. The Tribe would like to restore the property to its former marshy state for cultural and aesthetic reasons, as well as to reduce stormwater-management costs.

You and your team are environmental consultants invited by the Tribe's natural resources department to submit a bid to perform the first year of restoration work. Work will include: de-paving the parking lot, removing contaminated soil, restoring the area's original topography, "daylighting" the buried stream and restoring its flow, restoring natural vegetation, and preparing a monitoring and evaluation plan.

### **Instructions**

1. Using the information in the "Examples of Restoration Tools" table starting on page 2, select restoration activities you would like to use for the project and record them in the "Proposal" section of the "Wetland Restoration Packet" on the next page. There is no single right answer, so use your creativity and teamwork to design a project your team feels good about.
2. If your project will include planting of native plants, look online or ask your teacher for a list of native plants for Western Oregon so that you can suggest a few specific plants in your plan. One such list provided by Oregon State University Extension can be accessed via a link provided in the "Sources" section at the end of this document (be sure to cite this and other sources you might use).
3. Use the provided "Site Map" page to design your team's project site map to accompany your plan. Include a compass rose to indicate directions (i.e., which direction is north, south, and so on) and a key that identifies land and water features and labels or symbols for where you will implement your planned activities. Include symbols for any native plant species you plan to plant at the site.
4. If time permits—and as directed by your teacher—prepare a budget for the restoration activities you selected using the "Project Budget" table. Note that some costs are indicated in acres, and you are working with a 10-acre site. Look online or ask your teacher for a list of sample costs that you can

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## Activity 2. Design a Wetland Restoration Plan *(Continued)*

include in your budget. One such list provided by the Confederated Tribes of Siletz Indians in their grade 6 curriculum can be accessed via a link provided in the “Sources” section at the end of this document (be sure to cite this and other sources you might use).

5. If directed by your teacher, present your restoration plan and map to the rest of the class. Ensure that each team member has a speaking part in the presentation.

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# Design a Wetland Restoration Plan

## Wetland Restoration Worksheet

Site Name \_\_\_\_\_

Site Size: 10 acres

### **Proposal**

#### ***Plan***

Proposed activities:

#### ***Implement***

Proposed activities:

#### ***Monitor***

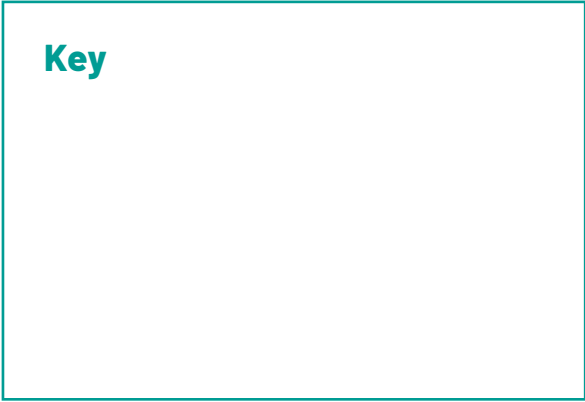
Proposed activities:

#### ***Maintain***

Proposed activities:

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# Site Map





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## Sources

- Interagency Workgroup on Wetland Restoration. (2003). *An introduction and user's guide to wetland restoration, creation, and enhancement*. National Oceanic and Atmospheric Administration, Environmental Protection Agency, Army Corps of Engineers, Fish and Wildlife Service, and Natural Resources Conservation Service. <https://www.csu.edu/cerc/documents/AnIntroductionandUsersGuidetoWetlandsRestoration.pdf>
- Kesselheim, A. S., Slattery, B. E., Higgins, S., & Schilling, M. R. (1995). *WOW!: The wonders of wetlands*. Environmental Concern.
- Knapp, T. (2019). *6th grade wetlands curriculum*. Confederated Tribes of Siletz Indians. <https://appliedeco.org/wp-content/uploads/Siletz-Wetlands-Book.pdf>
- Oregon State University Extension Service. (n.d.). *Recommended native plants for home gardens in Western Oregon*. <https://extension.oregonstate.edu/sites/default/files/documents/1/nativeplantreclist.pdf>