



**OREGON**  
**ENVIROTHON**

**2012**

**Student and Advisor Guide**

**Oregon Envirothon  
Environmental Education Competition  
May 4, 2012**



# Oregon Envirothon 2012

## Student and Advisor Guide

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# Introduction

## What is the Envirothon?

**Envirothon** is a hands-on environmental problem-solving competition for high school-age students in the United States and Canada. Participating teams complete training and testing in **four** natural resource categories - **aquatic ecology, soils/land use, forestry and wildlife** - and **one** current environmental issue. The teams consist of five high school-aged students.

**The Envirothon** works in partnership with local conservation districts, forestry associations, educators and cooperating natural resource agencies to organize and conduct competitions on the local, regional, state and/or provincial level. Winning teams from each state and province advance to the **Canon Envirothon** for the opportunity to receive recognition, scholarships and prizes.

## Benefits

Combining in-class curriculum and hands-on field experiences, the **Envirothon** program is an excellent way to supplement environmental education inside and outside the traditional classroom. Team trainings may include field trips to natural resource sites, museums or other areas of interest; listening to presentations given by natural resource professionals; and careful study of natural resource materials.

**Envirothon** participants gain valuable knowledge and training in ecology and natural resource management principles and practices. Many students step away from the **Envirothon** experience excited about learning and motivated to pursue careers in environmental studies, environmental law, natural sciences and natural resource management.

## Valuable and Fun!

**Envirothon** stimulates, reinforces and enhances students' interest in the environment and allows them the opportunity to get "up-close and personal" with each state's natural resources. Led by a volunteer advisor, teams usually meet from late autumn until spring. Teams work cooperatively to develop their knowledge of ecology and natural resource management and to practice their environmental problem-solving skills in preparation for the competition.

# Mission, Goals and Objectives

## Mission

The mission of the Oregon Envirothon is to develop knowledgeable, skilled and dedicated citizens who are willing and prepared to work towards achieving and maintaining a natural balance between the quality of life and the quality of the environment.

The Envirothon mission is accomplished by developing in young people an understanding of the principles and practices of natural resource management and ecology through dealing with complex resource management decisions. The following goals and objectives should be used as a guide to develop effective curricula, educational resources and testing scenarios.



## Goal 1

To promote a desire to learn more about the natural environment and equip students with the knowledge and skills needed to apply the basic principles and practices of resource management and ecology to complex environmental issues.

- Students should be able to demonstrate a basic knowledge of concepts in natural resource management and ecology, especially in the areas of soils/land use, aquatic ecology, forestry, wildlife and current environmental issues.
- Students should be able to analyze soil, aquatic, forestry, wildlife and current environmental issues in problem-solving activities involving resource issues.

## Goal 2

To promote stewardship of natural resources and to encourage the development of critical thinking, cooperative problem-solving and decision-making skills required to achieve and maintain a natural balance between the quality of life and the quality of the environment.

- Students should be able to identify environmental issues in a given situation and the various interests involved, while taking into consideration ecological, social and economic factors.
- Students should be able to investigate issues using both primary and secondary sources of information and synthesize the data gathered. Additionally, students should demonstrate the ability to:
  - ✓ Listen with comprehension
  - ✓ Collect, organize and analyze information
  - ✓ Frame appropriate questions to guide their investigation
  - ✓ Use a range of resources and technologies in addressing questions
  - ✓ Critically examine information from a variety of sources

- Students should be able to assess the nature of information and materials from a variety of different viewpoints and evaluate their implications.

- Students should be able to identify alternative solutions for various issues and their associated value perspectives. They should be able to evaluate alternative solutions with respect to their ecological and cultural implications. Additionally, the alternative solutions generated should attempt to take into consideration the variety of interest involved, while maintaining a healthy environment.

- Students should be able to identify and evaluate their own position on environmental issues and their associated solutions. These positions should be based on balanced information, critical analysis and careful synthesis. Moreover, students should be able to test their position against new information, personal experiences and beliefs.

- Students should be able to evaluate the interaction of the proposed solution with other ecological and social factors and anticipate having to plan ahead when evaluating the long and short-term implications of possible solutions to environmental problems.

## Goal 3

To provide students with experience in environmentally-oriented activities, enabling them to become environmentally-aware, action-oriented citizens.



- Students should have knowledge of a wide range of action strategies involved in seeking solutions to environmental problems.

- Students should have a knowledge of agencies and organizations that can be used as resources to seek solutions to environmental problems.

- Students should be able to evaluate the impact of their own actions affecting a particular environmental problem and devise alternative actions to work toward improving environmental conditions.

- Students should be able to work independently and/or collaboratively to solve environmental problems.

## Objectives

**Awareness:** Oregon Envirothon will help students cultivate an awareness of the total environment and acquire sensitivity to its limited natural resources.

**Knowledge:** Oregon Envirothon will help students develop a basic understanding of the earth's ecological systems and the interdependence of the human species with these systems.

**Attitude:** Oregon Envirothon will help students develop attitudes which embrace environmental sensitivity and instill the dedication and motivation to participate in activities geared towards protecting the environment.

**Application:** Oregon Envirothon will help students develop skills needed to identify, investigate and contribute to the resolution of environmental issues and problems.

# History of Oregon Envirothon

The Oregon Envirothon was initiated in the spring of 1996 after a meeting between Dick Behm, a retired forest industry manager and an organizer of Washington's Envirothon, and Susie Kelly, the director of the Northwest Center for Sustainable Resources (NCSR). As a result of this meeting, Jon Yoder, Secondary Education Coordinator for NCSR, began planning Oregon's first Envirothon. A committee consisting of natural resource educators and agency personnel met in August. The competition was discussed, and a design was developed.

It was decided that unique student experiences would be developed in an approach where competitors would work through a series of four "ecostations" integrating questions on forests, wildlife, soils, and aquatics. In addition, students would prepare a presentation on an issue determined by Canon Envirothon with the specific question determined by the state committee. The purpose of this approach was to match the field experiences often taught in natural resource or environmental programs in schools with a fun and enjoyable competitive experience. In particular the aim was to draw in urban schools that traditionally did not participate in these types of experiences.

By the spring of 1997, the committee developed materials and questions for the ecostations and presentation along with scoring guides and team preparation materials. Flyers were sent out to each high school in the state and advertisements were posted in several educator publications to solicit participating teams. Volunteers and judges were enlisted,

and a site at Western Mennonite School was prepared.

On Saturday, May 17, 1997 Oregon's first Envirothon was held. The five participating teams were North Salem, Sisters, Western Mennonite, South Wasco, and Hidden Valley. North Salem claimed first place.



NCSR leadership and funding for Envirothon ended in 2001 when discussion with Monte Graham, Marion Soil and Water Conservation District (SWCD), began to continue support of the competition. SWCDs conduct competitions in other states. Graham and Janet Kaestner, also with Marion SWCD, took a leadership role in coordinating the 2001 and 2002 Oregon Envirothons. In 2003 Diane Cheyne began coordinating the competition. To closer match the Canon Envirothon, Oregon Envirothon was changed from an ecostation approach to a site specific approach and the current environmental issue site was added. During the ensuing year Cheyne developed a partnership with Julie Woodward, Oregon Forest Resources Institute and the competition was moved to The Oregon Garden.

Marion SWCD Education Coordinator, Ron Crouse, assumed coordination in 2006. The competition continued to grow and saw a record 32 teams in 2008. In 2009 it was determined that to improve and expand the program, additional support should be sought. Oregon Envirothon became established as a 501(c)(3) domestic nonprofit corporation and began to actively recruit a board of directors, technical advisors and public and private sponsorship. It is hoped that Oregon Envirothon will continue to promote natural resource education well into the future.



# Structure of the Contest

## *Important Dates to Remember:*

*Team Registration Deadline*

*April 1, 2012*

*Oral Presentation Video/DVD Deadline*

*April 15, 2012*

*Competition Date*

*May 4, 2012*

## Overall

Teachers and students use the concepts and study areas presented through Oregon Envirothon as training tools throughout the year.

The one-day **Oregon Envirothon Competition** will test each team's knowledge and problem-solving skills at five testing stations; Soils/Land Use, Forestry, Aquatic Ecology, Wildlife and the 2012 Current Environmental Issue. The tests contain multiple choice, fill-in-the-blank, diagrams and short answer questions. Each test consists of approximately 20 questions, which are written and designed each year by conservation district and resource agency experts.

**For 2012**, the teams will each submit a video/DVD of their 10-minute oral presentation by April 15<sup>th</sup> to the Oregon Envirothon office. The videos will be judged and scored prior to the competition. **The oral presentations may include PowerPoint slides, flip charts or other necessary props. Teams will not be penalized for not using computer technology. Creativity is encouraged.**

At the end of the testing periods, the video scores will be combined with the test scores, and the **top three teams** will make live presentations before the judges and the student audience. Each 10-minute presentation will be followed by a five-minute question/answer time with the judges. The video scores will be thrown out, the live presentation scores will be combined with the test scores, and a winning team will be announced. **Only the top three teams will give live oral presentations.**

**Oregon Envirothon** will take place at outdoor testing stations. Students need to dress appropriately for negative or positive weather conditions. Dress in layers, bring jackets and wear footwear suitable for wet, muddy terrain. All necessary testing equipment and supplies will be provided. **Students are not allowed to bring notebooks, backpacks, or electronic equipment of any kind to the test sites.**

The yearly current environmental issue drives the educational focus of the contest. Oregon's event follows the Canon Envirothon Current Environmental Issue. During the Oregon State contest, the results will be available that day.

# Day of the Contest

Each team is assigned a **number** and a **test station rotation** during registration. After the welcome and introductions, the coordinators go over the contest format, rules, and scoring with the students.

Once the contest begins, teams will have exactly 25-minutes to complete their tests with a 10-minute travel time, for a total of 35-minutes between rotations. They will answer 20+ questions in the time allotted and complete one collective answer sheet. **Cooperative decision making, free exchange of ideas and information pooling are desirable.**



The **35-Minute** period per test station will look like this:

- Volunteers will hand out the tests and pencils
- Volunteers will provide any necessary orientation information about the test (2-4 minutes)
- Actual testing time for 20+ questions (25 minutes)
- Volunteers will notify the teams at the 20-minute mark that 5-minutes are remaining
- Volunteers will collect the tests at the 25-minute mark
- Students will be guided to the next test site (10 minutes)
- Volunteers will begin the next round of testing

Completed test sheets remain at the stations to be scored by volunteers. Runners will take the tests to the main scorer who will calculate the scores.

**Every team in attendance must be prepared to give their 10-minute Oral Presentation** and must be prepared for the five-minute question/answer time with the judges. During the top three team presentations, all team members must wear an Oregon Envirothon t-shirt. No school/team identification, either written or stated, is permitted. All team members must participate in the presentation. Visual aids are welcome and must be prepared in advance. A laptop computer and projector will be available for each team to use during their presentation if needed. There will be five minutes between presentations for scoring, set-up and preparation for the next team.

After the competition and scoring is completed, teams reassemble for overall results and presentation of awards. The champion of the Oregon Envirothon will have the option of representing Oregon at the **Canon North American Envirothon** on July 22 - July 27 at Susquehanna University, Selinsgrove, Pennsylvania.

# Study Concepts

## Forest Ecology:

### Key Point 1—Tree Physiology and Tree and Shrub Identification

#### Learning Objectives:

1. Know the parts and tissues of a tree, and be able to explain the growth cycle and life cycle of a tree.
2. Understand the processes of photosynthesis and respiration and how they are important to the growth and reproduction of trees.
3. Identify common tree species without a key, and identify specific or unusual trees and shrubs through the use of a key.

#### Suggested Activities:

1. Identify trees and shrubs using leaf and seed samples through the use of a key. Identify common and Latin names for the following common trees and know their approximate ranges in Oregon:
  - Douglas-fir
  - Sitka Spruce
  - Western hemlock
  - Port-Orford-cedar
  - Junipers
  - Western larch
  - Western white pine
  - Oregon ash
  - Redwood
  - Englemann spruce
  - Western Redcedar
  - Incense cedar
  - Pacific yew
  - Red alder
  - Birches
  - Poplars
  - Lodgepole pine
  - Sugar pine
  - Bigleaf maple
  - Oregon white oak
  - Ponderosa pine
  - Cottonwoods
  - Vine maple
  - True Firs (6)

### Key Point 2—Forest Ecology

#### Learning Objectives:

1. Know the typical forest structure: canopy, understory and ground layers and crown classes.
2. Understand forest ecology concepts and factors affecting them, including the relationship between soil and forest types, tree communities, regeneration, competition, and primary and secondary succession.
3. Identify the abiotic and biotic factors in a forest ecosystem, and understand how these factors affect tree growth and forest development. Consider factors such as climate, insects, microorganisms, and wildlife.

#### Suggested Activities:

1. Identify and describe the life cycle of forest pests and invasive plants and describe their impact to a forest ecosystem. Research integrated pest management strategies for selected pests.
2. Draw food webs of a mature deciduous forest and a mature coniferous forest. Explain how wildlife habitat relates to the forest community and describe the niches of various organisms that live in both of these forest ecosystems.
3. Examine a “tree cookie” or core sample taken with an increment borer to determine the age, growing conditions, insect and disease damage, and past weather conditions.
4. Understand the ecology of fire: Explore patterns of change brought about by fires in a forest ecosystem.
9. Identify, understand the life cycles, and know common control techniques for the following insect pests and diseases of trees in Oregon:
  - Western Pine Beetle
  - Flat Headed Borers
  - Dwarf Mistletoe
  - Spruce Budworm
  - Armillaria
  - Heartrot
  - White Pine Blister Rust
  - Swiss needle cast

## Key Point 3—Sustainable Forest Management

### Learning Objectives:

1. Understand the term silviculture, and be able to explain the uses of the following silviculture techniques: thinning, prescribed burning, single tree and group tree selection, shelterwood method, clear-cutting with and without seed trees, and coppice management.
2. Explain the following silviculture systems: clear-cutting, seed tree method, even-aged management, uneven-aged management, shelterwood and selection.
3. Understand the methodology and uses of the following silviculture treatments: Planting, weeding, pre-commercial thinning (PCT), commercial thinning and harvesting.
4. Know how to use forestry tools and equipment in order to measure tree diameter, height and basal area.
5. Understand how the following issues are affected by forest health and management: biodiversity, forest fragmentation, forest health, air quality, aesthetics, fire, global warming and recreation.
6. Understand how forestry management practices and policy affect sustainability.
7. Understand how economic, social and ecological factors influence forest management decisions.
8. Learn how science and technology are being utilized in all aspects of forest management.

### Suggested Activities:

1. Use the following forestry tools and know how they are used in forest management: clinometer, increment borer, diameter tape, Biltmore stick, abney level, compass, prism and relescope.
2. Use a variety of volume tables to calculate the volume of lumber for several different tree species.
3. Understand Fire Management: Learn the many interdependencies of forests and fire in healthy ecosystems.
4. Compare two different forest types. For example: a juniper woodland in eastern Oregon to a conifer forest in western Oregon. Identify economic, social and ecological factors that affect how both of these forests are managed.
5. Explain the Information Technology used to monitor and productively manage forests, and give specific examples of how this technology is being utilized in all aspects of forest management.

## Key Point 4—Trees as an Important Renewable Resource

### Learning Objectives:

1. Understand the importance and value of trees in urban and community settings, and know the factors affecting their health and survival.
2. Understand the economic value of forests and know many of the products they provide to people and society.
3. Explain the “Ecosystem Services” provided by trees, and understand why trees and forests are important to human health, recreation, wildlife, and watershed quality.

### Suggested Activities:

1. Create a display showing the value of trees in both urban and suburban settings. Identify the factors that affect their health and survival, and explain how to properly care for trees in an urban environment.
2. Make a list of products and by-products that come from your home and are made from trees. Describe the chemical and physical properties of trees used in making these products.



# Soils/Land Use:

## Key Point 1—Physical Properties of Soil and Soil Formation

### Learning Objectives:

1. Understand the importance of soils and appreciate the relatively small amount of usable soil that exists on Earth.
2. Know the five soil forming factors, and understand how they influence soil properties.
3. Understand the origin and types of soil parent materials.
4. Understand basic soil forming processes: additions, losses, translocations, and transformations.
5. Recognize and understand features of soil profiles, and be able to use this information to determine basic soil properties and limitations.
6. Identify and describe soil characteristics (texture, structure, and color- using Munsell color charts).

### Suggested Activities:

1. Generate a list of reasons why soils and the study of soil science is important to sustaining life on Earth, and explore how much soil available on Earth is for human use.
2. Describe the five factors of soil formation and be able to explain how each factor affects the soil profile.
3. Conduct a field analysis by digging or using an auger to examine a soil pit. Determine soil characteristics and properties, by describing soil horizons and recording data.
4. Use soil profile information to compare soil samples from agriculture cropland, wetland, forest and an urban area, and explain why there are differences in water table, permeability, runoff, infiltration and water holding capacity.
5. Estimate percent sand, silt, and clay for soil samples collected and determine texture class using the texture triangle. Explain how texture is important in soil fertility and soil management.



## Key Point 2—Soil Ecosystems

### Learning Objectives:

1. Recognize that biological diversity is important for soil health and hence plant, human and environmental health.
2. Understand how the hydrologic, carbon and nutrient cycles relate to soil management.
3. Recognize that understanding soil ecosystems is important to soil management.

### Suggested Activities:

1. Construct a Burlese funnel to learn about the diversity of life living in the soil. Draw a soil food web showing the 5 trophic levels and discuss why biodiversity is important to healthy soil. (note: some important soil organisms will not show up in the Burlese funnel, but they should be included in the trophic level diagram.)
2. Draw the nitrogen, carbon and phosphorus cycles and identify the types of organisms (flora and fauna) involved in these cycles. Identify their roles in decomposition and nutrient cycling.
3. Discuss the decomposition and transformations of organic matter, toxins and pesticides. Discuss the importance of microorganisms, and what would occur if they were not present in the food chain.
4. Discuss how Integrated Pest Management can affect biological diversity.

### **Key Point 3—Chemical Properties of Soil and Soil Fertility**

#### **Learning Objectives:**

1. Understand the procedure for taking a soil sample and conducting nutrient analysis.
2. Know that plants must receive essential micro-nutrients and macro-nutrients from the soil in order to be healthy, and understand that soil fertility relates to the physical and chemical properties of the soil in addition to the quantity of nutrients.
3. Understand why soil fertility reflects the physical, chemical and biological state of the soil.

#### **Suggested Activities:**

1. Collect a representative soil sample from a piece of land (preferably your own) as an introduction to soil testing. Conduct soil test experiments to measure pH and determine the amounts of plant available nitrogen (N), Phosphorus (P), and Potassium (K) in soil samples collected from different locations such as: cropland, forested area, and in a flood plain. Record your data, and analyze and compare results.
2. Explain the ABC's of nutrient management, and how nutrients and plant health, pests, profits and the environment relate to healthy soil.
3. Explain why soil fertility reflects the physical, chemical and biological state of the soil.
4. Compare and contrast the benefits and risks of using nutrients from a synthetic fertilizer with those from a natural source.

### **Key Point 4—Soil Conservation and Land Use Management**

#### **Learning Objectives:**

1. Compare different land uses and conservation practices and their impact on soils and erosion.
2. Understand how soil is impacted by point & non-point source pollution & the importance of soil management to agriculture and clean water.
3. Understand that soil management and environmental protection requires agricultural and resource managers to use spatial tools such as Geographic Information Systems (GIS), and Global Positioning Systems (GPS) in order to make the best possible resource decisions.
4. Learn about career opportunities and the role of government in the management of natural resources.

#### **Suggested Activities:**

1. Identify or recommend Best Management Practices to maximize agriculture production and control water movement to prevent erosion and pollution on construction sites, residential development and cropland.
2. In a land use planning discussion, identify types of soil erosion and explain how soil is a factor in non-point source pollution, and describe how soils can be used to clean up pollutants.
3. Become familiar with the Universal Soil Loss Equation (USLE), and learn how it used to estimate the soil erosion rates of a selected construction site and cropland field.
4. Practice using topographic and thematic maps to uncover mysteries about the cultural and physical geography of the Earth.

### **Key Point 5—Web soil surveys & Soil Surveys**

#### **Learning Objectives:**

1. Access and use published and on-line soil data and other resources to learn how land use affects soil, and the limitations of local soils.
2. Understand the eight Land Capability Classes and how they are important in determining appropriate land use.
3. Understand soil drainage classes and be able to recognize the characteristics of hydric soils and know how soils fit into the definition of wetlands.

#### **Suggested Activities:**

1. Download your local area's soil survey map to learn the limitations that local soils have for septic systems, foundations, agriculture, and future development.
2. Describe the eight Land Capability Classes and use a soil profile and site description to determine land capability class.

# Aquatic Ecology:

## Key Point 1—Abiotic factors

### Learning Objectives:

1. Know the processes and phases for each part of the water cycle and understand the water cycle's role in soil nutrient erosion, salinization of agricultural lands, and climatic influences.
2. Understand the concept and components of a watershed and be able to identify stream orders and watershed boundaries. Know the features of a healthy watershed and an unhealthy watershed.
3. Know how to perform and interpret chemical water quality tests and understand why aquatic organisms and water quality are affected by the physical, chemical and biological conditions of the water.

### Suggested Activities:

1. Use topographic maps to investigate the concept of a watershed, identify a river's watershed system, and delineate the watershed of a given area. Be able to describe how different land uses and watershed characteristics can affect water runoff, water flow, types of stream habitats and management approaches.
2. Investigate and find out who is using the water in your watershed and become familiar with historic stream and river levels to learn if levels are increasing or decreasing. Use stream assessment data to determine the health of your watershed.
3. Conduct chemical water quality tests to determine the temperature, dissolved oxygen, pH, phosphorus, alkalinity, nitrogen, and dissolved oxygen percent saturation of a water sample and explain why these test results are indicators of water quality and can be used to assess and manage aquatic environments.

## Key Point 2—Biotic factors

### Learning Objectives:

1. Understand the dependence of all organisms on one another and how energy and matter flow within an aquatic ecosystem.
2. Understand the concept of carrying capacity for a given aquatic ecosystem, and be able to discuss how competing water usage may affect the ability of the system to sustain wildlife, forestry and anthropogenic needs.
3. Identify common, rare, threatened and endangered aquatic species as well as Aquatic Nuisance Species (ANS) through the use of a key.
4. Know how to perform biological water quality monitoring tests and understand why these tests are used to assess and manage aquatic environments.

### Suggested Activities:

1. Describe the habitat needs of three specific aquatic animals, and compare and contrast the flow of energy in three different aquatic food chains.
2. Create a visual display of rare and endangered aquatic species. Explain how human activities are causing species imperilment and specify actions being taken to protect these species.
3. Conduct a biological stream assessment by collecting macro-invertebrates. Stream Data sheets should be used to record and analyze information. Explain why these organisms are biological indicators that help us determine the health of a stream or waterway.

## Key Point 3—Aquatic Environments

### Learning Objectives:

1. Identify aquatic and wetland environments based on their physical, chemical and biological characteristics.
2. Know characteristics of different types of aquifers, and understand historical trends and threats to groundwater quantity and quality.
3. Understand societal benefits and ecological functions of wetlands.
4. Understand the functions and values of riparian zones and be able to identify riparian zone areas.

## Suggested Activities:

1. Describe the physical, chemical and biological characteristics of a stream, river, pond, lake and wetland.
2. Explain how different types of aquifers are indicators of water quantity and water quality. Describe how subsidence and salt water intrusion are related to the falling water table in many aquifers.
3. Describe three functions of wetlands, and explain how these functions are met in the absence of wetlands.
4. Describe three functions of riparian zones and explain how the removal of or damage to the riparian zone would affect water quality and specific aquatic food chains.

## Key Point 4—Water Protection and Conservation

### Learning Objectives:

1. Understand how education programs and enforcement agencies are working together to protect aquatic habitats and preventing those who use our waterways from inadvertently transporting Aquatic Nuisance Species ANS from one river to another.
2. Interpret major provincial and /or federal laws and methods used to protect water quality (i.e. surface and groundwater). Utilize this information to propose management decisions that would improve the quality of water in a given situation.
3. Be familiar with the Federal and state agencies that provide oversight of water resources, and understand that Geographic Information Systems (GIS) is a useful and important tool in the management of water resources.
4. Identify global and local sources of point and non-point source pollution and be able to discuss methods to reduce point and non-point source pollution.
5. Understand the interaction of competing uses of water for water supply, hydropower, navigation, wildlife, recreation, waste assimilation, irrigation, and industry.
6. Know the meaning of water conservation, and understand why it is important every time you turn on a faucet.



### Suggested Activities:

1. List at least 3 Aquatic Nuisance Species ANS, and describe their effects on an aquatic ecosystem. Consider what can happen when predator ANS are imported, and develop a plan for the eradication of a target ANS.
2. Cite water protection laws at a mock hearing to decide whether a permit should be given to build a new shopping mall along a river.
3. Explain how Geographic Information Systems (GIS) are being used to help communities assess water quality and watershed health information.
4. Compare water usage in different regions of Oregon and propose actions to help counties strike a balance between supply and demand in order to realize maximum benefit from our water resources.
5. Design a comprehensive water conservation plan for your home and the watershed below your home. This should include groundwater replenishment, securing sediment on your property, managing non-point source pollution and following the path of good quality water as it leaves your property on its way to the sea.
6. Many dams are used to provide low cost electricity at the critical time of day when there is peak demand for electricity. Today a major issue is deciding which is more important to the economy, low cost energy or improving/restoring the ecology of a river. Evaluate the issue and develop recommendations for conservation groups and utility executives.

# Wildlife Ecology:

## Key Point 1—Knowledge of Wild Birds, Mammals and Herps

### Learning Objectives:

1. Identify wildlife species using mounted specimens, skins/pelts, pictures, skulls, silhouettes, decoys, wings (waterfowl), scats, tracks, animal sounds, or other common signs. Animal tracks may be original or molds made of the prints. Wildlife signs may be real or reproduced.
2. Use a key or field guide to identify wildlife species or signs. Wildlife species or signs may be presented in any form as described above.
3. Identify general food habits (herbivore, omnivore, carnivore), habitats (terrestrial, aquatic, fossorial), and habits (diurnal, nocturnal) using skull morphology and/or teeth.

## Key Point 2—Wildlife Ecology

### Learning Objectives:

1. Know the meaning of “habitat”, and be able to name the habitat requirements for wildlife and the factors that affect wildlife suitability.
2. Know and understand basic ecological concepts and terminology.
3. Understand the difference between an ecosystem, community and population. Be able to explain how communities interact with their non-living surroundings to form ecosystems.
4. Understand wildlife population dynamics such as birth, mortality, age-structure, sex ratio, and mating systems. Understand the impact of limiting and decimating factors of common wildlife species on wildlife management.
5. Recognize that all living things must be well-adapted to their native environment in order to survive. Be able to identify, describe and explain the advantages of specific anatomical, physiological and/or behavioral adaptations of wildlife to their environment.
6. Know the meaning of the term “Biodiversity”, and understand why biodiversity is important to people and wildlife.
7. Understand the importance of the 3 levels of biodiversity: genetics, species and ecosystem or community, and understand the implications of biodiversity loss at each level.



### Suggested Activities:

1. Draw a map of an area and identify sources of food, water and shelter available to wildlife. Select a wildlife species, and assess whether the area on your map will provide suitable habitat for this species. If any part of the habitat is lacking, explain what you could do to improve the habitat for this species?
2. Explain the relationship between the Pyramid of Numbers and the Pyramid of Biomass. Relate this exercise to an actual habitat to help you understand how much land area is needed to support life at each level of the food chain.
3. Create a detailed display to show examples of different types of food chains and illustrate the interdependence of organisms within a food web. Include terms such as trophic levels, predator, prey, scavengers, decomposers, omnivore, insectivore, herbivore, carnivore, producer, primary consumer, secondary consumer and tertiary consumer.
4. Explain the term “ecosystem” and give examples of different types of ecosystems. Describe a type of ecosystem and explain the importance of a keystone species. Draw food chains that include a specific keystone species and discuss what might happen if this species were removed from the food chain or if their populations diminished.

5. Select several wildlife species common to your area and list potential limiting and decimating factors for each. Visit a natural area, park, forest, and/or farm and assess the area to determine which of the limiting and decimating factors on your list would actually impact your selected species. For example, water may be a potential limiting factor, but the area you visit may have an abundance of water. Therefore, water would not be a limiting factor on this area and would have no impact.
6. Explain why Oregon is so diverse and explain what is being done to protect the biodiversity of wildlife. Include the following vocabulary to help you explain your answer: biodiversity, keystone species, native, endemic, habitat, biome, and food web.
7. Compare and contrast the behavioral and physiological adaptations of specific animals that live in two different environments. Explain why these animals are well-adapted to survive in their particular environment and include wildlife biology terms to describe specific adaptations.
8. Web Lesson: Measuring Biodiversity across North America  
As a result of completing an investigation into the biodiversity of North American Mammals, students should develop an understanding of the concept of biodiversity, and learn ways to measure the diversity of organisms. In addition, students should become more familiar with the mammal communities and ecoregions in their residential areas and the biomes and ecoregions in Oregon.
9. Explain the three levels of biodiversity and give several reasons why biodiversity is important to wildlife and people. Select examples of species in your area that have become locally extinct and explain what causes loss of biodiversity. What can be done to gain biodiversity?

### **Key Point 3—Conservation and Management of Wildlife**

#### **Learning Objectives:**

1. Know the preferred habitat types and specific habitat requirements of common wildlife species in Oregon. Understand how this knowledge helps us to better protect both the land and the wildlife species that depend on it.
2. Understand the difference between biological and cultural carrying capacity, and be able to identify social and ecological considerations where human use of land conflicts with wildlife habitat needs.
3. Identify common wildlife management practices and methods that are being used to manage and improve wildlife habitat in Oregon.
4. Understand the role of federal and state Fish and Wildlife Agencies in the management, conservation, protection, and enhancement of fish and wildlife and their habitats.

#### **Suggested Activities:**

1. Explain the meaning of the terms “migration route” and “flyway”. Know the four major North American flyways and understand the importance of these routes to migratory land, water and shore birds.
2. Determine which common wildlife species in your area depend on open land, woodland and wetland habitat for their survival. Identify the various types of habitat within open lands, woodlands, and wetlands, and explain the importance of these specific habitats to common wildlife species within your area.
3. Explain why human use of land is the major reason for habitat loss. Provide examples of habitat destruction, fragmentation, and degradation and explain how wildlife species survival is threatened by habitat loss in Oregon.
4. Research and analyze controversial issues in order to understand the relationship between wildlife, economics and society.
5. Make a list of wildlife management practices and strategies that will restore or improve habitat for each of the following land uses: cropland, grassland, woodland, wetland, pond/lake, and urban setting (backyards, greenways, urban parks). Include specific wildlife species that will benefit from each wildlife practice or strategy.
6. Make a list of the Federal and State Fish and Wildlife Agencies within Oregon. Determine how each protects and manages the wildlife resources of your area, and describe activities and programs that are undertaken to protect and manage wildlife and their habitats.

7. Explain regulated trapping procedures and discuss the issues that are involved in trapping fur bearing animals. Research and explain the dilemma of biological carrying capacity vs. cultural carrying capacity in your discussion.
8. Explain how Wildlife Managers are using Satellite Remote Sensing, GPS and GIS in Conservation and Wildlife Management. Give an example explaining the benefits of using this technology in remote areas.

## Key Point 4—Issues Involving Wildlife and Society

### Learning Objectives:

1. Understand how non-native (exotic), invasive species threaten our environment and the biodiversity of many wildlife species. Understand that non-native (exotic), invasive plants impact wildlife habitat and thus have a tremendous impact on native wildlife.
2. Learn about the complexities of decision-making in making land use decisions that affect wildlife, and understand that wildlife resources are under constant pressure caused by human population growth, environmental degradation, and habitat reduction.
3. Know that Wildlife species are subject to diseases resulting from exposure to microbes, parasites, toxins, and other biological and physical agents.
4. Understand the terminology and factors that affect threatened and endangered wildlife species. Know the meaning of extinct, extirpated, endangered, threatened, candidate species and reintroduction.
5. Identify the characteristics that many extinct and endangered species possess, and be able to identify many species of wildlife that are endangered and threatened.
6. Understand the role of the Endangered Species Act in helping to conserve endangered and threatened species. Know the organizations and agencies responsible for listing and protecting endangered species on global, federal and state levels.



### Suggested Activities:

1. Give specific examples of non-native (exotic), invasive species in your area and describe how they have altered habitats, threatened ecosystems, and impacted wildlife. Explain what is being done to increase awareness and facilitate effective prevention and management of non-native (exotic) invasive species.
2. Explain the three major kinds of habitat loss. Give examples of how human activity is the biggest threat to wildlife habitat and also discuss how people can have a positive impact on wildlife habitat and biodiversity.
3. HIPPO is an acronym that represents the five major threats to biodiversity, which are caused by human activity. Design a poster to illustrate the HIPPO concept and factors that bring about the loss of biodiversity.
4. Name and describe two examples of diseases that are critically impacting wildlife and explain why controlling emerging wildlife diseases have become a high-priority concern in the United States. Explain the life cycles of these diseases and how they can be transmitted to humans.
5. Identify and describe factors that threaten and endanger wildlife species in your area. Explain what actions are being taken by various agencies and interest groups to improve the chance of survival for specific threatened and endangered species. Also, determine what practical measures private citizens can take to assist in the recovery of threatened and endangered species.
6. Select several endangered species and create a display to describe the characteristics that have made these species more vulnerable. Discuss state and federal efforts being taken to protect these species.

# 2012 Envirothon Current Issue Topic

## Nonpoint Source Pollution/Low Impact Development

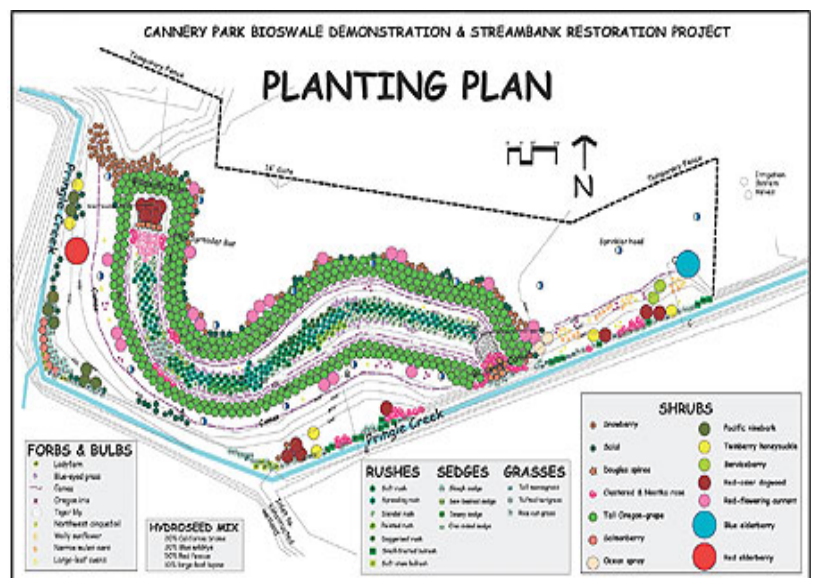
### *“Going Green with LID technology to reduce NPS”*

Nonpoint source pollution, (NPS), unlike pollution from industrial and sewage treatment plants, can come from many different sources. Stormwater runoff carries pollutants into our streams, rivers, reservoirs and other bodies of water.

An estimated 60 percent of current water pollution is attributed to stormwater runoff. Nonpoint source pollution can contaminate drinking water, destroy wildlife habitat, close beaches, kill fish and cause many other serious environmental and public health problems. Every year, millions of dollars are spent to restore and protect areas damaged by nonpoint source pollutants. Stormwater has been identified as one of the leading sources of pollution for all waterbody types in the United States. Furthermore, the impacts of stormwater pollution are not static; they usually increase with more development and urbanization.

One of the most exciting new trends in managing stormwater runoff is the increased use of Low Impact Development (LID) to help protect and restore water quality. LID comprises a set of approaches and practices that are designed to reduce runoff of water and pollutants from the site at which they are generated. By means of infiltration, evapotranspiration, and reuse of rainwater, LID techniques manage water and water pollutants at the source and thereby prevent or reduce the impact of development on rivers, streams, lakes, coastal waters, and ground water.

LID is an approach to land development (or re-development) that works with nature to manage stormwater as close to its source as possible. LID employs principles such as preserving and recreating natural landscape features, minimizing effective imperviousness to create functional and appealing site drainage that treat stormwater as a resource rather than a waste product. There are many practices that have been used to adhere to these principles such as bioretention facilities, rain gardens, bioswales, vegetated rooftops, rain barrels, and permeable pavements.



By implementing LID principles and practices, water can be managed in a way that reduces the impact of built areas and promotes the natural movement of water within an ecosystem or watershed. Applied on a broad scale, LID can maintain or restore a watershed’s hydrologic and ecological functions. LID has been characterized as a sustainable stormwater practice by the Water Environment Research Foundation and others.

## **Benefits of LID:**

- improved aesthetics
- expanded recreational opportunities
- increased property values due to the desirability of the lots and their proximity to open space
- increased total number of units developed
- increased marketing potential and faster sales
- reduced runoff volumes and pollutant loadings to downstream waters
- reduced incidences of combined sewer overflows
- enhanced property values
- improved habitat
- aesthetic amenities
- improved quality of life.

Although the increase in application of these practices is growing rapidly, data regarding both the effectiveness of these practices and their costs remain limited. In the vast majority of cases, the U.S. Environmental Protection Agency (EPA) has found that implementing well-chosen LID practices saves money for developers, property owners, and communities while protecting and restoring water quality.

As water becomes an ever-increasing issue nationwide, managing our stormwater properly is not only a green technology, it becomes a necessity. And through the use of Low Impact Development strategies, properly managing stormwater is something all of us can do.

## **2012 Learning Objectives**

After completing study of this issue, students will be able to:

1. Define Low Impact Development (LID).
2. Define nonpoint source pollution.
3. Explain the impacts of land use on watersheds.
4. Understand the limitations and benefits of conventional stormwater management design versus LID.
5. Identify and apply LID Best Management Practices (BMPs) and selection criteria.
6. Explain how soils, wildlife, forestry, and aquatics affect and are affected by nonpoint source pollution (and its reduction) and LID.
7. Identify how LID is used to manage stormwater.
8. Explain the impacts urban sprawl has on nonpoint source pollution and how LID can be used to manage and reduce nonpoint source pollution.
9. Analyze pros and cons of the application of LID Best Management Practices.
10. Understand the relationship between LID hydrologic controls (i.e. retention ponds, swales, etc.) and water quality benefits.
11. Provide examples of what individuals and communities can do to implement LID at home.

# 2012 Oregon Envirothon Current Issue Non-point Source Pollution/Low Impact Development

## *Non-point Source Pollution (NPS)*

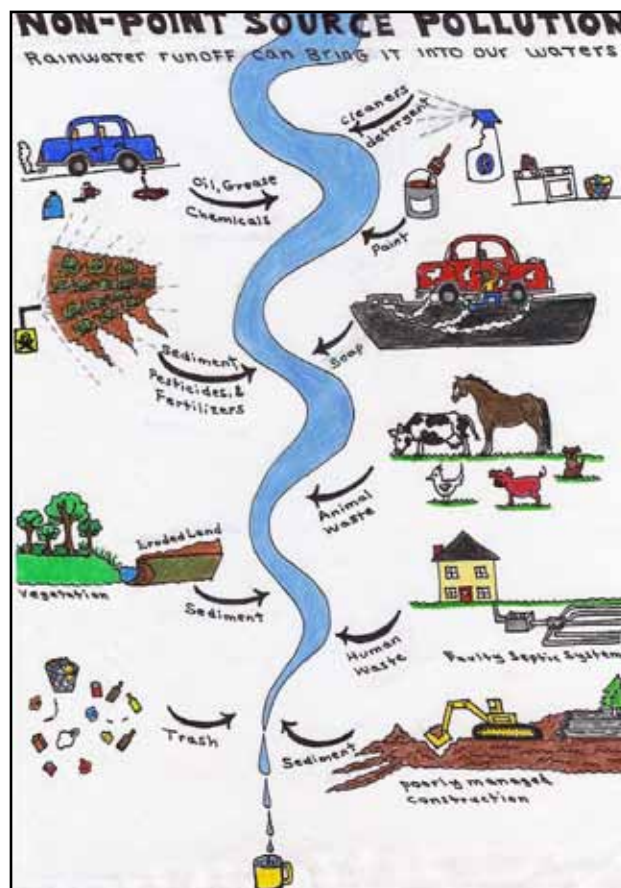
Non-point sources are often linked with agricultural, forestry, urban, and rural residential land use activities where rain or snow runs off to surface waters. As the runoff moves, it picks up and carries away natural pollutants and pollutants resulting from human activity, depositing them into lakes, rivers, wetlands, coastal waters, and groundwater. Polluted runoff causes damage to fish, wildlife, and their habitat; damages drinking water supplies; promotes excessive weed growth; and degrades Oregon's scenic beauty and recreational opportunities. Non-point sources continue to be a leading cause of significant water quality impacts across the state and the nation as a whole.

Non-point source pollution is briefly defined in Oregon Administrative Rule 340-41-006 (17) as: ***“diffuse or unconfined sources of pollution where wastes can either enter into or be conveyed by the movement of water to public waters.”*** In Oregon, the most prevalent non-point source pollutants are temperature, sediment, bacteria, nutrients, heavy metals, pesticides, and other toxics.

Non-point source pollution can include:

- Excess fertilizers, herbicides and insecticides from agricultural lands and residential areas
- Oil, grease and toxic chemicals from urban runoff and energy production
- Sediment from improperly managed construction sites, crop and forest lands, and eroding streambanks
- Salt from irrigation practices and acid drainage from abandoned mines
- Bacteria and nutrients from livestock, pet wastes and faulty septic systems
- Atmospheric deposition and hydromodification

States report that non-point source pollution is a leading cause of water quality problems. The effects of non-point source pollutants on specific waters vary and may not always be fully assessed. However, we know that these pollutants have harmful effects on drinking water supplies, recreation, fisheries and wildlife.



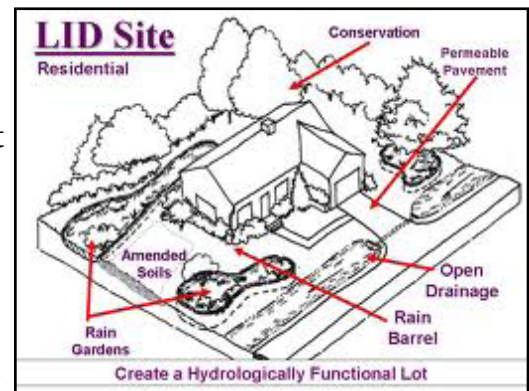
# ***Low impact development (LID)***

***“A stormwater management strategy that emphasizes conservation and use of existing natural site features integrated with distributed, small-scale stormwater controls to more closely mimic natural hydrologic patterns in residential, commercial, and industrial settings” (Puget Sound Action Team 2005).***

Newer, more sustainable stormwater management techniques use plants and soil to capture and filter runoff and allow the cleaned water to recharge groundwater supplies, mimicking a natural system. Low impact development (LID) is a term used to describe a suite of development practices that reduce stormwater runoff by preserving existing natural site features and installing distributed, small-scale stormwater technologies that mimic the way nature manages rainfall. One example of an LID practice is a rain garden, which helps slow, capture, filter, and infiltrate stormwater that runs off of impervious surfaces.

Common Low Impact Development practices include rain gardens, bioswales, pervious surfaces, eco-roofs, green streets, rainwater harvesting and conservation planning. LID can be designed to create an attractive amenity in a variety of situations, including residential or commercial applications, schools and public facilities, new development, and already developed areas.

In undeveloped areas, very little rainwater or snowmelt runs off the land like it does in cities. Trees, plants and soil capture much of the precipitation, and some of it evaporates back into the air. Most of the precipitation that doesn't evaporate or get captured by vegetation soaks into the ground where soil and microbes remove pollutants naturally. The water slowly recharges streams, wetlands and groundwater. Very little runs off, except in very large storms. This natural hydrologic cycle is radically changed when land is developed in the way it has been for decades. Typical development clears the land of vegetation and covers it with hard surfaces such as roads, parking lots and rooftops. Construction compacts soils, so that even landscaped areas can generate unnaturally high runoff volumes. Storm drains are installed to get water out of the way by sending it into local streams or injecting it underground without treatment.



Development dramatically increases runoff volumes which, even when controlled by detention basins, causes flooding, damages fish and wildlife habitat, and delivers urban pollutants such as oils and pesticides to local waterways. The decreased infiltration results in less cool, clean groundwater to recharge streams in the dry summer months. LID mimics the natural hydrology of the site by using improved site design and careful construction practices, preserving trees and natural areas, careful construction practices, and managing water close to where it falls. LID can be used for public projects, residential and commercial development and redevelopment, and has proven to be a cost-effective way to manage runoff and protect the environment. It also increases livability by making communities greener and more attractive. 21

# 2012 Oregon Oral Presentation

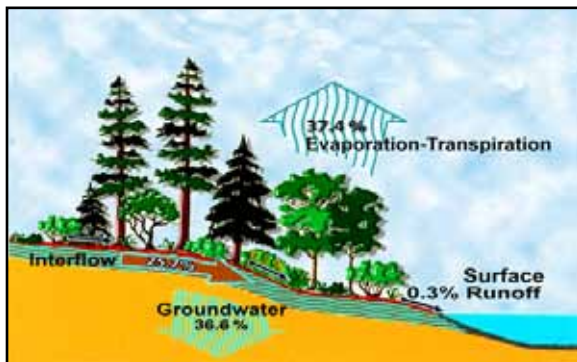
There are numerous examples of low impact development techniques that have been implemented across the State of Oregon. For the 2012 Oregon Envirothon oral presentation your team will represent a consulting group that must address the issue of non-point source pollution and formulate the best low impact development practices to manage or reduce the problem. Your goals are to search out and identify non-point sources of pollution that are having a major effect on the water quality in your local area and develop low impact development recommendations that can be efficiently implemented, be effective in controlling or reversing the identified problem and show that your proposed actions are economically feasible.

You may be as original as you wish as long as you can document that your actions will be successful. You may research present development designs and implementation strategies. Be sure to properly cite all references referred to in your presentation.

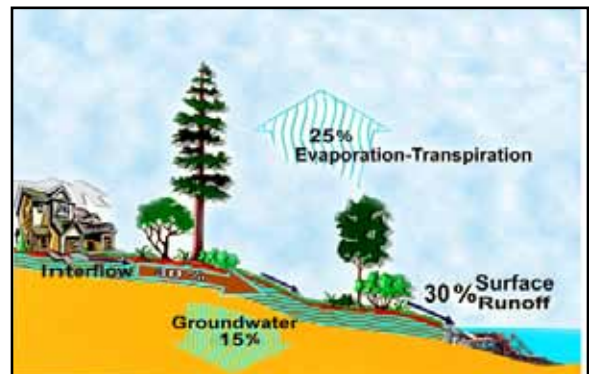
Your presentation must address these points.

- Identify the geographic area you are addressing.
- Describe the demographics of the area.
- Identify and describe the source of the pollution.
- Identify how the pollution is affecting water quality and the extent of the impacts to the surrounding environment.
- Present your low impact development recommendations.
- Document how these recommendations will successfully correct or prevent the problem.
- Justify that your recommendations are economically feasible and cost effective.

Your presentation must be 10 minutes in length and all team members must participate. You are not required to use computer technology (i.e. PowerPoint) for your presentation. You may use flip charts, props, public forum discussion, etc. Judges scoring is based on content, not the method of delivery. Record a video of your presentation and submit it to Oregon Envirothon by the **due date of April 15, 2012.**



*Prior to Development*



*After Development*

# Tips to Help You with Your Presentation

- 1. MOST IMPORTANT!** Every team will divide its presentation into a very recognizable **INTRODUCTION**, **BODY**, and **CONCLUSION**. For example:
  - 1). In the introduction, have the team leader briefly recap the problem, state each objective, and name the person presenting each objective.
  - 2). In the body, clearly outline and explain said objectives.
  - 3). In the conclusion, using new language, restate said objectives and demonstrate a definite finish.
  - 4.) Use the Oral Presentation Judging Criteria to structure your presentation to achieve best possible scores.
2. Plan what each team member will say, and **MAKE SURE EVERYONE SPEAKS AT LEAST ONCE!**
3. Practice and know when it is your turn to speak.
4. Make your drawings and text large and easy to read.
5. Face your audience.
6. Stand clear of visual aids, so that all may see. It is best to have non-speaking team members take turns holding the visual aids. **DO NOT DEPEND UPON A COMPUTER OR A POWERPOINT PROGRAM, TECHNOLOGY CAN BREAK!**
7. Speak in complete sentences.
8. Expand upon an idea. Give examples. **USE REFERENCES AND RESOURCES AND CITE THEM CORRECTLY!**
9. Make your voice loud, clear, and expressive.
10. Nervousness is okay!!

## Some common presentation errors:

1. Slang expressions, such as frequent use of “you know” and “uh.”
2. Frequent interrupting and cutting off of each other.
3. Speaking too rapidly.
4. Speaking in sentence fragments.
5. Speaking in a monotone.
6. Constant body movement.



# Example Oral Presentation Judging Criteria

**Be able to demonstrate the following:**

**Part I – Preparation & Presentation of Plan (30 points maximum)**

- A. Were references and resources cited in the team presentation? 0 1 2 3 4 5
- B. How well did the presentation address or identify:
  - The interrelationship between the environment, natural resources and the different natural resource management strategies? 0 1 2 3 4 5
  - All the different players/interest groups affected by the problem? 0 1 2 3 4 5
  - The major natural resources areas (soils/land use, aquatic ecology, forestry, wildlife)? 0 1 2 3 4 5
  - The current issue? 0 1 2 3 4 5
  - The specific environmental problem and related issues regarding the problem? 0 1 2 3 4 5

**Part II – Application of Data (40 points maximum)**

- A. The team demonstrated a solid understanding of political issues(s) related to the problem (regulations, mandates, impact on political system/community)? 0 1 2 3 4 5
- B. The team demonstrated a solid understanding of ecological/environmental issue(s) related to the problem? 0 1 2 3 4 5
- C. The team demonstrated a solid understanding of economic issue(s) related to the problem including the cost and benefits of the proposed plan, cost of implementing the plan, economic impact on local resources, cost of doing nothing, future costs, funding source(s), etc.) 0 1 2 3 4 5
- D. The team demonstrated a solid understanding of social and/or cultural issue(s) related to the problem (private property rights, traditions, clean and healthy environment, right to farm, urban issues, cultural issues, environmental justice)? 0 1 2 3 4 5
- E. The team presented one viable solution to the problem addressing the resource issue? 0 1 2 3 4 5
- F. The main parts were clearly stated and supported? 0 1 2 3 4 5
- G. The solution in the presentation has potential to be applied or implemented with long term sustainability to natural resources? 0 1 2 3 4 5
- H. Did the solution reflect or address the concerns of all affected groups and issues? 0 1 2 3 4 5

**Part III - Quality of Presentation (20 points maximum)**

- A. The presentation was well organized with a clear introduction and strong conclusion. 0 1 2 3 4 5
- B. The participants enhanced the presentation (eye contact, gestures, voice inflection, originality, exhibited professionalism, etc.) 0 1 2 3 4 5
- C. The visual aids were used to make major points and show conclusions. (Visual aids should be correct, eye appealing, readable, neat, etc.) 0 1 2 3 4 5
- D. The questions were answered logically and concisely by all team members participating. 0 1 2 3 4 5

**Part IV – Required Elements (10 points)**

- A. Add up to ten points for team member participants in the presentation. (Each team member can receive up to 2 points for equal oral participation in the presentation). 0 1 2 3 4 5
- B. Add up to five points if the presentation was accomplished in the allotted time scale and the team made effective use of their time. (Time scale is 10 minutes.) **Actual Time:** \_\_\_\_\_

Point System

5 pts 9-10 minutes/4 pts 7-8 minutes/ 3 pts 5-6 minutes/ 2 pts 3-4 minutes/ 1 pt 1-2 minutes

0 1 2 3 4 5

**Scale for Scoring**

- 0 Not at all
- 1 Poor or poorly (major misconceptions and gaps; ineffective; inadequate; inappropriate)
- 2 Fair or slightly well (some misconceptions and flaws; minimally effective; somewhat appropriate)
- 3 Good or fairly well (complete; accurate; effective; adequate; appropriate)
- 4 Excellent or very well (complete; very detailed; logical; ideas well supported and well organized; highly effective; all details appropriate)
- 5 Outstanding (profound, in-depth; done in an insightful manner; extremely effective; points to a most effective strategy)

# Oregon Envirothon 2012

## Rules & Regulations

1. Team members must be enrolled in grades 9-12 (home school, private school or public school.)
2. Each team must have a maximum of five members and a minimum of three. Team members may not be drawn from different schools. One alternate is permitted for each team. **Teams with less than five members will not be allowed to advance to the Canon Envirothon.**
3. Alternate team members may substitute for regular team members if properly registered.
4. Teams will be issued a number that must be used during the competition. Switching team members will not be allowed after the registration of the team.
5. Teachers, team advisors or chaperones must accompany their teams to the competition but may not assist their teams in any way once the competition is under way.
6. The Oregon Envirothon shall consist of five competitive sites based on soils/land use, aquatic ecology, forestry, wildlife and the current environmental issue, and one video Oral Presentation on the current environmental problem. Judge's and scorer's decisions are final on all events.
7. Scoring for the Oregon Envirothon will be:
  - a. Each of the five outside testing sites will be worth 50 points for a total of 250 points.
  - b. The video Oral Presentation will be worth 100 points. The live Oral Presentation will be worth 100 points. Upon earning the top three honors, the video oral presentation score will be thrown out and the live oral presentation score will be used to reach the total competition points.
  - c. The total competition will be worth 350 points.
8. Teams will not be allowed to bring notes, field guides or other resource materials to the stations. Any necessary materials will be provided by Oregon Envirothon. **No backpacks or electronic devices of any kind are allowed at the testing sites.**
9. Team members will work together to complete their field experiences and questions and submit one answer sheet before moving on to the next site. Twenty-five minutes will be allowed at each field site and ten minutes will be given to rotate to the next site.
10. The winning team will be the team with the highest cumulative score from the six events. The tie breaker will be the highest score from the oral presentation.
11. **Registration forms and fees must be received by April 1, 2012, NO EXCEPTIONS.** All illegible registration forms will be rejected. Advisors must submit the Parental Consent Form and Medical Release Form for each team member to the Oregon Envirothon competition.
12. In the event that the winning team cannot represent Oregon at the Canon Envirothon, the team with the next highest score will be eligible to compete.
13. Rules and regulations of the Oregon Envirothon are subject to change. Any and all relevant changes will be explained to all teams and advisors.
14. No tobacco, intoxicants or drugs will be allowed on site.

# Example Schedule- Day of Event

## Student Activity Schedule

8:30am	-	9:00am	Registration and Breakfast at The Oregon Garden
9:00am	-	9:15am	Welcome/Event Orientation
9:30am	-	9:55am	Rotation #1
10:05am	-	10:30am	Rotation #2
10:40am	-	11:05am	Rotation #3
11:15am	-	11:40am	Rotation #4
11:50am	-	12:15am	Rotation #5
12:15pm	-	1:00pm	Lunch/Tabulations
1:00pm	-	1:10pm	Announcement of Top 3 Teams
1:10pm	-	1:30pm	Oral Presentation preparation for Top 3 Teams
1:30pm	-	1:50pm	1 <sup>st</sup> Oral Presentation
1:50pm	-	2:10pm	2 <sup>nd</sup> Oral Presentation
2:10pm	-	2:30pm	3 <sup>rd</sup> Oral Presentation
2:30pm	-	2:45pm	Tabulations
3:00pm	-	3:30pm	Award Ceremony and Photo Session

## Logistics

Reminders and activities for advisors/chaperones:

1. Teams of students **MUST** be accompanied to the event by an advisor/ chaperone.
2. No backpacks, tote bags, reference materials or electronics (calculators, cell phones, cameras, etc.) are allowed on the testing circuit. Video cameras and digital cameras may be used by advisors/ chaperones for promotional purposes only.
3. The outside testing stations will be 25-minutes in length. The top 3 oral presentations will be ten-minutes in length followed by a five-minute question and answer time.
4. Advisors/chaperones are not allowed to travel with their teams through the rotations during the day, but advisors/chaperones may join together and take the tests as teams. Advisors/chaperones may also wander the garden or use the time as they wish; but advisors/chaperones may not leave the Oregon Garden until the Oregon Envirothon is completed.



# Example Envirothon Score Totals

Team Number \_\_\_\_\_

(Test Score/Possible Points)

Soils/Land Use Site \_\_\_\_\_/50

Forestry Site \_\_\_\_\_/50

Aquatic Ecology Site \_\_\_\_\_/50

Wildlife Site \_\_\_\_\_/50

Current Environmental Issue Site \_\_\_\_\_/50

TEST TOTALS \_\_\_\_\_/250

Video Oral Presentation \_\_\_\_\_/100

WITH VIDEO FINAL SCORE \_\_\_\_\_/350

## TOP 3 SCORES

TEST TOTALS \_\_\_\_\_/250

TOP 3 ORAL PRESENTATION \_\_\_\_\_/100

TOP 3 FINAL SCORE \_\_\_\_\_/350

# General Reference Guide

## Sources for Information

Bureau of Land Management  
Conservation Districts  
Dept. of Fish and Wildlife  
Division of State Lands  
Natural Resource Conservation Service  
Oregon Dept. of Agriculture  
O.S.U Extension Services  
U.S. Forest Service

## Web Curriculum, Resources, Links

[http://ww2010.atmos.uiuc.edu/\(Gh\)/guides/mtr/hyd/home.xml](http://ww2010.atmos.uiuc.edu/(Gh)/guides/mtr/hyd/home.xml)  
[ceres.ca.gov/education](http://ceres.ca.gov/education)  
[plants.usda.gov/](http://plants.usda.gov/)  
[soils.usda.gov](http://soils.usda.gov)  
[www.4sos.org/](http://www.4sos.org/)  
[www.eeao.org](http://www.eeao.org)  
[www.envirolink.org](http://www.envirolink.org)  
[www.envirothon.org](http://www.envirothon.org)  
[www.envmedia.com](http://www.envmedia.com)  
[www.epa.gov/OWOW/](http://www.epa.gov/OWOW/)  
[www.epa.gov/safewater/kids/wsb/index.html#9-12](http://www.epa.gov/safewater/kids/wsb/index.html#9-12)  
<http://cfpub.epa.gov/surf/locate/index.cfm>  
[www.fws.gov](http://www.fws.gov)  
[www.nal.usda.gov/wqic/](http://www.nal.usda.gov/wqic/)  
[www.nationalgeographic.com](http://www.nationalgeographic.com)  
[www.ncsr.org](http://www.ncsr.org)  
[www.nmfs.noaa.gov/](http://www.nmfs.noaa.gov/)  
[www.nrcs.usda.gov/feature/backyard/](http://www.nrcs.usda.gov/feature/backyard/)  
[www.nrcs.usda.gov/programs/](http://www.nrcs.usda.gov/programs/)  
[www.nsta.org](http://www.nsta.org)  
[www.oregon-plan.org/](http://www.oregon-plan.org/)  
<http://www.thefreshwatertrust.org/>  
[www.plt.org](http://www.plt.org)  
[www.usgs.gov/education](http://www.usgs.gov/education)  
[www.uwex.edu/erc/ey paw/](http://www.uwex.edu/erc/ey paw/)  
[www.wrd.state.or.us/](http://www.wrd.state.or.us/)

The Hydrologic Cycle  
California Environmental Education Curriculum  
Plants National Database Home Page  
USDA-NRCS Soils Data  
Salmon Nation  
Environmental Education Association of Oregon  
Environmental Education Information  
Environmental Issue Information  
Environmental Media  
Wetlands, Oceans and Watersheds  
Water Source Book  
Surf Your Watershed  
Fish and Wildlife Service  
National Agriculture Library: Water Quality Information Center  
National Geographic  
N.W. Center for Sustainable Resources  
National Marine Fisheries (NOAA Fisheries)  
Backyard Conservation  
USDA-NRCS Conservation Programs  
National Science Teacher's Association  
Oregon Plan for Salmon and Watersheds  
The Freshwater Trust  
Project Learning Tree  
US Geological Survey  
Educating Young People about Water  
Oregon Water Resource Department

## Videos

Here Today - Here Tomorrow  
How Chemicals Move Through Soil  
How Water Moves Through Soil  
Inquiry at Hinkle Creek  
Naturally Fertile Fields  
Partners in the Oregon Plan  
The Wealth of Wetlands  
You and Your Watershed



# Books/CD's/Reference Materials

Abiotic Indicators of Aquatic Life Handout  
American Wildlife and Plants: A Guide to Wildlife and Food Habits  
Aqua Venturer CD with Teacher Guide  
Benthic Macroinvertebrate Training Materials Handout  
Better Trout Habitat  
Conservation Tillage on CD  
Core 4 Technical Reference Conservation Practices: The Common Sense Approach to Natural Resource Conservation  
Development at the Urban Fringe and Beyond: Impacts on Agriculture and Rural Land  
Dam Removal Success Stories  
Estimating Soil Moisture by Feel and Appearance  
Farmland Protection: The Role of Public Preferences for Rural Amenities  
Food, Land, & People Curriculum  
Guide to Aquatic Pollution Tolerance of Stream Invertebrates Handout  
Guide to Pacific Northwest Aquatic Invertebrates  
Handbook of Northwestern Plants  
Helping People Understand Soils  
Living on the Land (Vol. I and II)  
Manual for Judging Oregon Soils  
Nonpoint Pollution of Surface Waters with Phosphorus and Nitrogen  
Nonpoint Source Pollution Handout  
Nonpoint Source Water Pollution Handout  
The Oregon Plan for Salmon and Watersheds  
Principles of Landscaping for Wildlife  
Project Aquatic Wild  
Project Learning Tree  
Project Wet  
Project Wild  
Soil Quality Information Sheet  
Soil Science: Principles & Practices  
Soil Survey (Marion, Polk, Yamhill)  
Source Water Protection: Surface Water Sources  
Stream Invertebrates Handout  
The Stream Scene... Watersheds, Wildlife and People  
Stream Visual Assessment Protocol- Technical Note 99-1 NRCS  
Succession and Wildlife Management Handout  
Sustaining Healthy Freshwater Ecosystems  
Teaching Soil and Water Conservation: A Classroom and Field Guide  
Trees to Know in Oregon  
Understanding Invasive Aquatic Weeds Homework & Classroom Activities  
Water in a Changing World  
Water Quality Monitoring- Technical Guide Book  
Watershed, Wetlands, Forests, Streams  
Water Source Book Lessons:  
    Wastewater Treatment  
    Water Careers  
    Biography of a River  
    Groundwater Basics  
    From Ground to Water  
    What's the Level?  
    What Goes on Down Under?  
    Do You Drink It?  
    Hydraulic Head  
    Flow Nets  
    Groundwater: Cleaning Up  
    What is Groundwater Pollution Doing to the Neighborhood?  
    Landfills and the Potential for Groundwater Contamination  
    Leaking Underground Storage Tanks  
Wetland Plants of Oregon & Washington  
Wetlands fact Sheet: Wetland Functions and Values  
Wildlife Ecology and Management Handout  
Woodland in the Soil Conservation Service



# Suggested Contacts

Bureau of Land Management  
County Planning Department  
County Public Works Department  
Department of Environmental Quality  
Department of Geology and Mineral Industries  
Department of Water Resources  
Division of State Lands  
Environmental Protection Agency  
Farm Service Agency  
Local Conservation and Development, Inc.  
Local Ranger Station  
Local Soil and Water Conservation District  
Local Water Control District  
Local Watershed Council  
National Forest Service  
National Marine Fisheries Service  
Natural Resource Conservation Service  
Oregon Department of Agriculture  
Oregon Department of Fish and Wildlife  
Oregon Department of Forestry  
Oregon Forest Resources Institute  
Oregon State University Extension Office  
Oregon State University Research Center  
Oregon Watershed Enhancement Board  
Plant Material Center  
Rural Development  
U.S. Army Corp of Engineers  
U.S. Department of Fish and Wildlife  
Water Resources Department



# Contact Information

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