For more information, please visit the NY State Envirothon website at:
http://nysenvirothon.net/currentissue/CurrentIssue.html

2010 CURRENT ISSUE
INTRODUCTION

"PROTECTION OF GROUNDWATER THROUGH URBAN, AGRICULTURAL AND ENVIRONMENTAL PLANNING"

Access to clean and safe drinking water is essential to a healthy and thriving community. If a safe drinking water source is compromised or lost, there would be harmful consequences to human health, the environment, and the economy. These losses can be prevented or mitigated to protect current and future sources. Once groundwater is polluted, it will remain that way for decades. The potential for contamination and the high cost of treatment and expense of locating or developing alternate sources make it imperative for government entities to adopt and implement effective strategies for long-term protection. This is especially true for any area dependent on groundwater as its sole source for drinking water.

Many factors, including increasing populations and extensive development, put stresses on groundwater supplies. These include the use of pesticides, fertilizers, animal manure, and storm water runoff which contains metals, nutrients, salts and other chemicals that can leach into groundwater basins. Local governmental planning agencies generally focus on priorities such as land use development (e.g., residential and commercial), infrastructure needs (e.g., roads, wastewater treatment, etc.), the local economy, and a good jobs-per-housing ratio. Planning for groundwater protection often receives insufficient attention for addressing periods of drought, water conservation and efficiency, pollution prevention, recharge zones, surface water management and conjunctive use, storm water management, and future water needs. Due to its nature, most communities have no clear understanding of how much groundwater is available.

Efforts to monitor and assess groundwater quality and quantity have typically been sporadic and, while successful in some local jurisdictions and watersheds, largely inadequate, due primarily to high cost. More reliable, consistent, and comprehensive data are needed to sufficiently characterize groundwater quality/quantity to support critical decisions and policies for use, protection, and management.

Policy makers at all levels of government will be faced with the need to make difficult decisions regarding alternatives and trade-offs to planning future development and managing growth:

How do public officials determine priority use when allocating a limited water supply?

Should urban uses have priority over agriculture?

Should agriculture have a higher priority which may preclude or limit urban growth?

What about environmental uses such as maintaining in stream flows, aquatic life and habitat?

What is the role of storm water management?

What is the link between threats to both surface and groundwater quality/quantity?

How can they best be addressed?

Who should have jurisdiction to oversee the protection and management of large groundwater basins for both quality and quantity (e.g., recharge)?

What are the consequences of poor planning, unreasonable decisions, and lack of effective actions?

How can public officials address future threats to surface and groundwater resources?

Information is subject to change, due to following learning objectives are under review. Last updated October 2, 2009 10:14 a.m.

2010 CURRENT ISSUE
LEARNING OBJECTIVES

WATER QUALITY AND QUANTITY

1. Know the two greatest users of fresh water in North America and explain why conjunctive use of groundwater and surface water is important to ground water management and optimizing supply.

2. Appraise the value of groundwater as a component to an integrated regional water management plan, and propose strategies to increase and replenish groundwater supplies.

3. Describe the sources of pollution to groundwater and evaluate strategies for cleanup or improving groundwater quality.

The WATER/ENERGY NEXUS

1. Assess the negative energy impact that is associated with desalination and explain why this is a major concern for the construction of desalination facilities for San Diego, CA.

2. Evaluate the impact of energy production on fresh water supplies. Compare and contrast the effect on groundwater resulting from increased production of energy from nuclear and fossil fueled power plants and from biofuels necessitated by a large

increase in the use of electric cars including the direct effect on groundwater resulting from the production of biofuels from both algae and cultivated plants such as soy beans and switch grass.

3. Outline a management policy that will protect and manage groundwater resources for humans, the environment, the economy, and energy production. Differentiate the different roles that government agencies will have in protecting and managing groundwater resources as well as how water use is regulated at the state/province and federal level.

LAND USE PLANNING AND IT'S EFFECTS ON GROUNDWATER

1. Describe where groundwater depletion is occurring, the areas at risk in the future and explain how is groundwater depletion is directly related to energy use and water demand. Evaluate the impact of ground water depletion in the San Joaquin Valley watershed.

2. Analyze the impact of over pumping of groundwater and justify reasons why land use planning is necessary for groundwater management. Students should design, propose and justify management practices to achieve water conservation and water use efficiency as part of a groundwater management plan in both an urban and rural/agricultural watershed.

3. Identify the concept of conjunctive use management for groundwater basins and the integration of basin recharge programs to accommodate urban and agricultural overdraft challenges. Identify the advantages and disadvantages of instituting basin management programs.

HYDROLOGY AND CLIMATOLOGY

1. Explain the hydrologic relationship and the environmental benefits of groundwater and surface water.

2. How does global warming affect water supplies? Explain how this effect on water supplies impacts both groundwater and energy supplies.