

learn from the deer photos. Divide the report into sections. Assign groups to read sections of the information sheet and report to the large group. After learning about deer, each group is to complete the worksheet entitled Problem Solving Worksheet.

Discuss the Problem Solving Worksheet in a large group. Discuss the pros and cons of different deer management strategies. Discuss the concerns of different people from state forests, state parks, agricultural lands, hunters, animal rights activists and homeowners as deer populations encroach on resources. Discuss current strategies on management.

- Deer exclosures
- Hunting regulations
- Fertility control
- Trapping and transporting
- Repellants
- Fencing

Optional: Visit a deer exclosure area and demonstration plots that prevent deer from browsing in the understory.

Optional: Conduct the following activity:

Project Wild, “Oh, Deer”

www.projectwild.org

The activity involves participants assuming the role of deer while others become elements of the environment. The activity illustrates that limiting factors maintain populations at a predictable level.

- Good habitat is key to wildlife survival;
- A population will continue to increase in size until some limiting factors are imposed; limiting factors contribute to fluctuations in wildlife populations;
- Nature is never in balance but constantly changing.

Activity 2: *Ecosystem Services*

Summary: The ecosystem provides valuable services that have great economic and environmental value. In this activity, participants will gain a perspective of the value of land and the services provided by environmental systems.

Questions: How valuable is productive land? What are the services provided by the environment? What would happen if the services were eliminated?

Preparation

- Earth is an Apple Activity: Apples, plastic knives and plates for each group.
- Copy and distribute Ecosystem Services Worksheets (p 149). Answer sheet on pp 150.
- Have flip chart and markers available.
- Prepare Thank You Trees Worksheet (pp 151-152).
- Review Economic Benefits of Ecosystems Information Sheet (p 153).

Procedure

1. We realize how important planning is for protecting habitats and considering the consequences to wildlife as habitats are altered. How valuable are Earth’s services to us? What services does the ecosystems provide that we take for granted? What services do ecosystems provide for us that should be valued as we look at land use choices?

Brainstorm some ideas from students and write them on the board. We will discuss services in depth following the first demonstration.

2. *Conduct Earth is an Apple activity to demonstrate the value of land for growing food and crops.* Use one large apple or apples for each group and plastic knives.

Think of the earth as an apple. Slice an apple into quarters and set aside three of the quarters. What do these represent? Three quarters represent the oceans of the world. The remaining quarter represents the total land area of the world.

Slice the quarter that is land in half. Set aside one of the pieces. The portion set aside represents the land area that is inhospitable to people such as the polar areas, deserts, swamps and mountains. What fraction do we have left? ($1/8$.) The piece that is left is land where people live but do not necessarily grow foods we need.

Slice the $1/8$ piece into four sections and set three aside. What fraction do we have left? ($1/32$). The $3/32$ set aside represents the areas unsuitable for food or crops. Those contain the developed and built areas of our environment...the parking lots, highways, shopping centers and areas that are too steep or soil is too poor.

Carefully peel the $1/32$ slice of earth. This represents the surface, the thin skin of earth's crust which we depend on for food. It is less than five feet deep.

Explain that protecting land resources is very important. There is a fixed land resource base. As we continue to develop and pave, we must plan for the services that land provides and protect land for those services such as growing food.

3. *What are other services provided by ecosystems?* Work in groups. Distribute the Ecosystem Services Worksheets to each group. This can be conducted on a trail walk or in a park. Look at each service and provide examples for each of the Ecosystem Services. Review in a large group. Write the responses on the

Activity 2

flip chart. You can refer to the Economic Benefits of Ecosystems Information Sheet.

It is important to discuss the economic value of environmental services. What if price tags were placed on each of the services? Would we value the services more and be more inclined to protect the resources?

4. *Trees provide many services and have great value to the community.* Review photos of trees (not included) and make a list of the different services provided by trees. Refer to the worksheet "Thank you, Trees." Check off ways trees help in your community.

The North American Forestry Association estimates that a 50 year old urban tree annually yields \$75 in soil erosion and storm water control, \$75 in wildlife shelter benefits, \$73.00 in air cooling services and \$50 in air pollution control. Compounded at 5 percent interest over a tree's 50 year life, this adds up to \$57,151."

Urban forestry is a major initiative throughout the country. Urban foresters in DCNR are available to provide information on trees and forests within communities. Tree Vitalize is a public/private partnership sponsored in conjunction with DCNR to encourage an increase in urban tree cover through community action volunteers. It started in Philadelphia and has expanded to other cities in Pennsylvania. Learn more at www.treevitalize.net.

Participants can encourage their community to conduct a tree inventory to determine the health of community trees and how to manage them. Some communities develop special tree ordinances that help communities protect trees. Some communities establish Shade Tree Commissions. Learn more about the city of Pittsburgh's Shade Tree Commission at www.city.pittsburgh.pa.us/cp/html/shade_tree_commission.html.

Study the benefits of tree cover. To evaluate the impacts of land cover change, develop a land cover

classification system with four classes: tree canopy, turf, bare soil and impervious surface.

When it rains, rank the four classes of land cover classification with respect to the amount of rainfall that would infiltrate into groundwater from “1” being the most infiltration to the least infiltration “4.” (Answer, canopy cover, turf, bare soil, and impervious.)

Discuss the implications of recent land cover changes in a community. Has there been an increase in runoff? What are the consequences of increased runoff? (flooding, poor surface water quality from sediment, changes in stream temperatures, decrease in groundwater resources/levels, etc.)

Geographic Information System (GIS) and Global Positioning System (GPS) enables participants to use Forest Service software for evaluation purposes. Digital aerial photos from PA MAP (www.dcnr.state.pa.us/topo-geo/pamap/index.aspx) or Google Earth (earth.google.com) image is used to identify trees. A software package quantifies the benefits of trees for carbon sequestration, air pollutant uptake, stormwater management, and local climate benefits.

Activity 3:

Tools to Protect Land Resources

Summary: Land is developed for housing, commercial and industrial needs. Roads, parking lots and other forms of transportation need space for the movement of people and goods. As land is developed, communities need to consider protection of natural space as a prime concern. Communities recognize the value of farmland, greenways and natural wild areas. There is an economic price tag that can be placed on protection of open space and must be part of the consideration as communities grow and develop. There is a way to

develop sustainable communities, maintaining farmland, wilderness and unfragmented tracks of land for wildlife migration and human enjoyment. Protecting green space is critical to the health of future generations and for the health of the environment.

Questions: What is the value of protecting open space for a community? What are the tools that will protect land? How can they be implemented?

Preparation

- Divide participants in work groups, following procedures for working in groups.
- Prepare the Declaration of Rights (p 154) for each participant.
- Prepare “Development versus Preservation Worksheet” (p 155) for each group.
- Prepare copies or transparency of both The Last Straw artwork (p 156) and Lancaster County Farmland Photos (p 157).
- Prepare and distribute copies of the Last Straw Worksheet (p 158).
- Prepare information sheets on each area of land preservation:
 - Natural Areas (pp 159-160)
 - Farmlands (pp 161-162)
 - Land Trusts and Environmental Advisory Councils (pp 163-166)
 - Greenways (pp 167-169)
 - Land Recycling (pp 170-171)
- Prepare copies of Community Planning Worksheet (p 172).
- Prepare Land Bingo Sheets (p 173) for each participant.