

May

Taking Action

Throughout the past year, this *Guide* and *The Salmon Times* have focused on describing how aquatic ecosystems on our planet work and what kinds of physical, chemical, biological and human influences affect them. This last chapter focuses on humans and their direct connections to water and fish.

When someone takes care of something that has been entrusted to them, they are practicing **stewardship**. Environmental stewardship means taking responsibility and being careful with natural resources and the natural systems we are part of. Some people do so through their careers. They are professional stewards. Other people take care of natural resources in the ways that they live. They are also environmental stewards. We'll call them practical stewards. Environmental stewardship is very important because no matter how distant we might feel from natural systems, we are all part of ecosystems and depend on functioning, healthy ones for our survival and that of future generations.

We know matter cannot be created nor destroyed. It can, however be altered and dispersed. At any one time, we have a finite supply of natural resources (such as fisheries, forests, water, minerals, and fossil fuels) on our planet. If we contaminate them or use them up faster than they are replaced, we will automatically defeat our ability to achieve **sustainability**.

Sustainability is a complex term to define and understand. The World Conservation Union, Caring for the Earth describes it as a way of doing things that "improves the quality of human life while living within the carrying capacity of supporting ecosystems".

It means making decisions and conducting our lives based on how natural systems and cycles work.

For many, sustainability refers not only to the quantity of natural resources but to their quality as well. Quality, in this case, refers to purity of abiotic resources and genetic diversity of living things. Because natural systems are constantly changing, it is difficult to determine when an ecosystem is changing in a way that harms it beyond repair. At that point it is obviously too late. Most naturally occurring changes in ecosystems happen very slowly. Sometimes human activities cause those same changes to happen too rapidly. (See April for a discussion of cultural versus natural eutrophication).

Sustainability also includes improving the quality of life for all humans and their descendants. Therefore, it has social, economic, and political implications. Conserving natural resources and sharing the benefits of natural resources more equitably throughout the planet are part of the sustainability discussion. Decisions about using natural resources are often difficult because the ecological, economic, and social factors must all be weighed.

Stewardship can refer to using human practices that promote sustainability. Let's look at the example of green plants. Green plants on land and in the oceans supply us with oxygen, help moderate temperatures on the planet, form the base of food chains, and serve as storage reservoirs in the hydrologic and nutrient cycles. Green plants also provide us with medicines, foods and products. Using up green plants faster than they can be re-

placed eventually leads to an imbalance in the system and creates problems for humans and other living organisms on the planet. When we recognize the roles natural resources play within our ecosystems and all human's dependence on them, we cannot help but recognize a call to stewardship.

PROFESSIONAL STEWARDS

Professional stewards work in many career fields. They work with federal, state and local agencies, academic institutions, private organizations, and in business and industry. Examples of careers that provide people an

opportunity to practice stewardship every day are fisheries biologist, teacher, conservation organization representative, outdoor guide, outdoor writer, conservation officer, coastal planner, water quality technician, and marine extension specialists. Listed below are *some* of the many places you can contact for information, speakers, educational programs, publications, audio visual aids and stewardship opportunities. This list contains mostly New Hampshire addresses, however, most agencies and organizations will have comparable offices in other states in the Northeast.

<p>Federal Agencies</p> <p>US Environmental Protection Agency (EPA) US EPA, New England Region JFK Federal Building, WQP Boston, MA 02203-2211 (617) 565-3531 or 565-3420</p>	<p>UNH Cooperative Extension University of New Hampshire Durham, NH 03824-3599 for water, forests, wildlife (603) 862-1029 for County Offices (603) 862-1520</p>	<p>Connecticut River Watershed Council 1 Ferry Street Easthampton, MA 01027 (413) 529-9500</p>
<p>US Fish and Wildlife Service Central New England Anadromous Fish Restoration Program 1 Broad Street Nashua, NH (603) 598-4392</p>	<p>State Agencies</p> <p>NH Department of Environmental Services 6 Hazen Drive Concord, NH 03301 (603) 271-3503</p>	<p>Merrimack River Watershed Council 694 Main Street West Newbury, MA 01985 (508) 363-5777</p>
<p>USDI Fish and Wildlife Service New England Field Office 22 Bridge Street, Unit 1 Concord, NH 03301-4901 (603) 225-1411</p>	<p>NH Fish and Game Dept. 2 Hazen Drive Concord, NH 03301 (603) 271-3212</p>	<p>Seacoast Science Center P.O. Box 674 570 Ocean Boulevard Rye, NH 03870 (603) 436-8043</p>
<p>USDA Forest Service Northeastern Forest Experiment Station P.O. Box 640 Durham, NH 03824 (603) 868-7600</p>	<p>NH Office of State Planning 2 1/2 Beacon Street Concord, NH 03301 (603) 271-2155</p>	<p>Society for the Protection of New Hampshire Forests NH Conservation Institute 54 Portsmouth St. Concord, NH 03301 (603) 224-9945</p>
<p>University Based</p> <p>UNH Sea Grant Extension Kingman Farm University of New Hampshire Durham, NH 03824-3512 (603) 749-1565</p>	<p>Private Organizations</p> <p>Appalachian Mountain Club Box 298 Gorham, NH 03581 (603) 466-2721</p> <p>Audubon Society of New Hampshire 3 Silk Farm Road Concord, NH 03301-8200 (603) 224-9909</p>	<p>Student Conservation Association P.O. Box 550 Charlestown, NH 03603 (603) 543-1700</p> <p>The Nature Conservancy New Hampshire Field Office 2 1/2 Beacon Street, Suite #6 Concord, NH 03301 (603) 224-5853</p>

PRACTICAL STEWARDS

Practical stewards are people who have careers that do not directly involve them in environmental stewardship, but they show responsibility for taking care of the environment through their daily lives at work, school and at home. There are many ways to do this. Each person must decide what and how much he or she can do. Sometimes stewardship practices that require quite a bit of effort at first become easier when they develop into a habit. Keeping cloth bags handy for grocery shopping can become a stewardship habit at home. At work, loading the computer printer with scrap paper that has one clean side is a stewardship habit. Both of these practices, reduce the rate of paper and plastic consumption which save trees, land, energy and money!

Here are some more ideas you can use at home, school or work.

- Recycle aluminum, glass, newspaper, cardboard, and paper.
- Buy products made of recycled goods or in recyclable containers.
- Think before you buy. Do you need this? Mend and repair rather than discard and replace. Buy used.
- Use rags instead of paper towels.
- Carry your water bottle or mug with you to avoid using disposable cups.
- Compost food wastes and yard debris at home and at school.
- Use public transportation, carpool, bike, in-line skate, or walk.
- Drive a fuel efficient car and keep it well tuned.
- Plant trees in your community.
- Wear a sweater rather than turn up the thermostat.
- Use fluorescent in place of incandescent light bulbs.
- Turn off lights and appliances when not in use.
- Plant trees to shade your house in the summer.
- Hang your clothes in the sun to dry.
- Install a space saver in your toilet.
- Turn off the water between rinses when brushing teeth.
- Water plants and lawn in the morning to minimize evaporation.
- Plant drought-tolerant plants.
- Buy foods grown or produced locally.
- Have your septic tank checked regularly and pumped when it needs it.
- Use alternatives to toxic household products. (See March.)
- Never pour anything (except clean water) down a storm drain.
- Remember the earth's surface and surface waters are connected to ground water!
- Visit a landfill, wastewater treatment plant, resource recovery station, or municipal compost and find out about the life cycle of different materials and products.
- Ask municipal officials for a map and tour of the storm drain system in your town.
- Call municipal offices for household hazardous waste collection events.
- Call your county Cooperative Extension Office to see demonstration sites of forestry and agricultural best management practices and to learn about bmps for lawn care.
- Contact a River Council or Office of State Planning for information about river and coastal clean up events.
- Get involved in local politics to influence local environmental policy decisions.
- Write letters to your representatives supporting environmental action.
- Take every opportunity possible to enjoy the natural environment!

SPORTFISHING and RECREATION

There is evidence that effective environmental education includes experiences in the outdoors. These experiences might be based in exploration, research, or recreation. One potential avenue to environmental stewardship is through sportfishing, particularly when it incorporates "catch and release" practices. Sportfishing is an activity that is accessible to almost everyone. It does not require a high degree of skill to get started, however, using knowledge about aquatic ecosystems helps anglers catch fish. Some anglers get involved with technical aspects of the activity, while others keep it simple. It is possible to spend much money on equipment, spend a small amount or to make your own gear.

Sportfishing can be a springboard or culmination to discussions about:

- animal feeding and reproductive behavior
- physical and chemical requirements of fish and their prey
- point and nonpoint source pollution
- common fresh and salt water fish
- geography
- habitats and microhabitats
- food webs
- carrying capacity
- non-indigenous species
- fish biology
- fisheries management
- angling ethics
- fish as sustenance
- fish and human nutrition
- law enforcement
- respecting other's property
- public access
- regional economies
- fishing gear
- fishing tackle
- angling skills
- fishing through history
- fish art
- outdoor writing
- commercial fishing

Word Power

stewardship
sustainability

To get more information about sportfishing education and conservation contact:

Atlantic Salmon Federation
(authors of *Fish Friends* program)
Fort Andross, Suite 400
15 Maine Street
Brunswick, ME 04011
(207) 725-2833

Future Fisherman Foundation
(educational arm of American Sportfishing Association and authors of *Get Hooked on Fishing, Not Drugs* program)
1033 North Fairfax Street, Suite 200
Alexandria, VA 22314
(703) 519-9691

NH Fish and Game
(authors of *Let's Go Fishing* program)
2 Hazen Drive
Concord, NH 03301
(603) 271-3212

Trout Unlimited
800 Follin Lane SE, Suite 250
Vienna, VA 22180-4906
(703) 281-1880

Career Quest

Concepts: There are a wide variety of environmentally oriented careers. Interviewing people in those careers can provide valuable information about characteristics of the career and of the people working in that field. Interviewing people can also provide valuable information about academic, professional and personal preparation required for that field. Interviewing gives students an opportunity to practice social skills.

Objectives:

1. Students will ask questions of and listen to answers from professionals working in environmental careers.
2. Students will record information they find out.
3. Based on the results of interviewing, students will determine their suitability for the professions they investigated and how that profession meets their values.
4. Students will investigate what preparation they can obtain to reach career goals and make appropriate plans for upcoming years.

Materials:

- worksheets to record interview information
- something to write with

Subjects: Science, Social Studies, Language Arts

Preparation and Procedure:

Have students use copies of the following pages to help them conduct informational interviews of people who work in environmental professions. This activity can be structured a number of different ways. Students, as a group, can interview a visitor to the classroom. They can also work in small groups to conduct interviews. Or, they can work individually and each interview a different person in the community.

Worksheet I focuses on describing the occupation, working conditions, opportunities and trends, benefits, training, and personal qualifications required for that job.

Worksheet II focuses the student on their own values, interests, and qualifications in comparison with the occupations they have investigated.

Worksheet III can be used to help the student develop a plan for acquiring the training necessary to prepare for the desired occupation.

Student name _____

Date _____

Interviewee's name _____

Interviewee's occupation _____

A. Nature of the work

After each activity, put a checkmark under the term that best describes the frequency of this activity in this occupation.

ALL THE TIME SOME OF THE TIME SELDOM NEVER

- 1. Serve or help people
- 2. Work with ideas
- 3. Work with plants or animals
- 4. Work with money
- 5. Do things with your hands
- 6. Operate machinery or instruments
- 7. Use a computer
- 8. Do detailed work
- 9. Work with people individually
- 10. Work with people in small groups
- 11. Work with people in large groups
- 12. Read and /or study
- 13. Write
- 14. Explore
- 15. Investigate
- 16. Discover
- 17. Work out-of-doors
- 18. Work in an office
- 19. Travel

B. Working conditions

- 1. Where are jobs in this field located? _____
- 2. Is the work seasonal or year-round? _____
- 3. Are there any health or safety hazards in this line of work? _____ If so, what are they?

- 4. Are there many professional hazards (lay-offs, financial losses, insecurity, etc.) in this line of work?

C. Family conditions

1. How do the particular characteristics of this job affect the family?

D. Employment Opportunities and Trends

1. In the future, will the need for people in this occupation

Increase?

Decrease?

Remain the same?

2. What occupations could I shift to if opportunities in this profession decline?

3. Are there many opportunities to advance from this occupation to a better one?

E. Wages, work hours, and employee benefits

1. Do people in this occupation, earn their pay

by the hour?

by piece-work
for fees?

for a salary?
as self-employed business owners?

for a commission?

2. What is the pay range?

3. How many hours per week are spent on the job?

4. Is there paid vacation and sick leave?

5. Are retirement benefits offered?

F. Training requirements

1. How many years and what kind of education are required for this occupation?

2. Does this profession have any special requirements such as a license, special examination or certification?

3. Is any special work experience required?

4. Where does one obtain training in this field?

5. What is the approximate cost of training? _____

6. How much will it cost to enter the occupation after training is completed? (for example, a farmer needs equipment and operating cash, a dentist needs dental and office equipment, a machinist needs tools, etc.)

G. Personal qualifications needed to succeed in this occupation

1. List any special physical requirements?

2. List any special personality requirements?

3. List any special abilities required?

H. Reflection

1. What I like most about this occupation

2. What I find less attractive about this occupation

Student name _____

Date _____

The following pages are designed to help students determine how their feelings, values, and qualifications match those of the occupations they have investigated.

A. Nature of work

Use this list to sort out which work activities you like the best and least. Put a checkmark under the appropriate column.

ENJOY GREATLY ENJOY SOMEWHAT DISLIKE SOMEWHAT DISLIKE GREATLY

- 1. Serve or help people
- 2. Work with ideas
- 3. Work with plants or animals
- 4. Work with money
- 5. Do things with your hands
- 6. Operate machinery or instruments
- 7. Use a computer
- 8. Do detailed work
- 9. Work with people individually
- 10. Work with people in small groups
- 11. Work with people in large groups
- 12. Read and /or study
- 13. Write
- 14. Explore
- 15. Investigate
- 16. Discover
- 17. Work out-of-doors
- 18. Work in an office
- 19. Travel

B. Evaluating work conditions - Use the following instructions to complete the chart on the next page.

*How important to you are each of the work conditions listed on the chart? In the first column, labeled IMPORTANCE TO YOU, put 4 stars(****) to indicate VERY IMPORTANT, 3 stars (***)to indicate SOMEWHAT IMPORTANT, 2 star (**) to indicate NOT VERY IMPORTANT and 1 star(*) to indicate NOT IMPORTANT AT ALL.*

In the following 4 columns, list one occupation on the blank line at the top of each column. Go through the list of work conditions again, refer to Worksheet 1 for each occupation, and fill in the appropriate number of stars to reflect the degree to which each occupation offers that condition. See which occupations offer the work conditions that are most important to you.

CONDITION	IMPORTANCE TO YOU				
live in a particular country, region, or setting					
seasonal variety					
low risk to health and safety					
low professional risk					
high job security					
family-friendly situation					
advancement potential					
opportunity to develop skills					
high financial benefits					
other benefits					
challenging work					
prestige					
independence					
structure					

c. **Finding a good match**

Using the information you have gathered about different occupations as well as the what you have determined about your own preferences, fill in the chart below to see how your preferences and abilities match up with the occupations you investigated. Place 4 stars (****) in boxes where your preferences and abilities **very closely match** those required by the occupation listed at the top of the column. Use 3 stars (***) if there is a **good match**. Use 2 stars (**) if the match is **okay**. Use 1 star (*) if there is **little to no match**.

Use this information to rate these occupations 1-4 in order of your preference and suitability. Put your rating underneath each occupation you listed.

Occupations

	_____	_____	_____	_____
Nature of the Work (Do you like doing the kinds of tasks required?)				
Work Conditions (Does this job offer what is important to you?)				
Physical Requirements (Could you meet them for this work?)				
Suitable Personality (Do you have it for this work?)				
Aptitude (Do you have one for this work?)				
Required Training (Are you willing /able to obtain it?)				

D. Planning ahead

Find out about preparing for a particular career by...

- interviewing someone in the field about their training,
- researching the information in the library,
- researching the information electronically,
- talking with a guidance counselor,
- or, by contacting the university or training school itself.

1. Where can I secure the training I need to enter this profession?

2. What high school courses will I need to have completed when I graduate in the year _____ in order to pursue the training I want?

3. What summer work experiences should I arrange over the next 3 years to help me in my career?

Next summer: _____

Second summer: _____

Third summer: _____

4. What kinds of on-the-job training opportunities would be helpful? Where could I get it? Who should I contact?

Taking Action

Concepts: Human activities can help protect water quality and wildlife habitat. With adult support, students can raise community awareness about environmental issues through presentations and projects.

Objectives: 1. Students will participate in a presentation or project as a result of their learning.

Materials: will vary

Subjects: Any!

Project ideas:

Protect water resources from pollution.

1. Riparian buffers protect water quality by slowing down erosion and trapping sediments. Riparian buffers also protect wildlife by providing terrestrial habitat and shading water habitats. Contact a state forester in the fall to arrange an order of saplings you and your class can plant in the spring. A UNH Cooperative Extension Forestry Specialist can also help arrange for the order and can provide technical help and education during the planting event. Ask either professional about appropriate sites on or off school property for such an event.
2. Organize and hold a river, lake or wetland clean up day.

Have students share what they have learned about watersheds.

1. Publicize your environmental studies through the local news media and with other teachers.
2. Conduct a public information program to inform landowners in the watershed on how they can prevent water pollution (Contact UNH Cooperative Extension or NH Department of Environmental Services for landowner information.)

Use results of water quality monitoring.

1. Collect and compile your results and conclusions and develop a report to share with interested people and organizations in the community.
2. Offer to assist your community's conservation commission or private conservation groups in projects they lead.

Conduct an education campaign.

1. Work with the town engineer to identify storm drains that lead directly into a local water body. Have students work in teams to stencil them with the message "Dump No Waste, Drains to Stream (or lake, estuary, river, etc.)" Work with the town engineer to find suitable paint, supplies and to set up traffic cones around students.
2. Organize an educational fair or festival around your local water body.

Learn more.

1. Visit a farm, logging operation, or construction site that employs Best Management Practices (BMPs) to protect water quality. Learn how these individuals do what they can to protect resources. Find out if students could actually helping with these tasks. Contact UNH Cooperative Extension for recommendations.
2. Call the Clean Water Network (202) 624-9357 to learn about current national action ideas.

References and Resources

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