The Value of a Nature Area in Teaching Biology and Conservation

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The point has repeatedly been called to our attention by leading educators, biologists, and conservationists, that many of our new schools are laid out in areas where native flora and fauna abound, yet too many school campuses wind up as ecological deserts.

It seems that the greatest enemies of nature today are the bulldozer, the chain-saw, and the asphalted parking lot. Many new high schools over the state, with modern buildings and a campus of 20 or 30 acres, ignore the ever increasing need for an outdoor laboratory. Many thousands of dollars are spent for landscaping, gardening, terracing, etc., but fitting the whole into the native landscaping is ignored. Many fine trees have been destroyed needlessly. Natural swamps have been filled or drained; hills have been leveled. It has often been advocated that we set aside small plots of native landscape as part of our educational opportunities and American heritage for the boys and girls in our communities.

Basically we are all interested in our natural environment. There has been an enormous increase in recent years in the overflow public to demand to see for themselves the wonder of nature. There has also been a steady increase in the true nature lover who duly appreciates and enjoys contact with the out-of-doors. The National Park Service, The Forest Service, state parks and like agencies have found an avowed increased demand for an interpretive program of our flora, fauna, and scenic phenomena. In much of this interest, the aspects are recreational—enjoyment which comes through participation in hunting, fishing, and camping; or in the aesthetic—appreciation of the beauties of nature, and reverence for the wonders of God's great out-of-doors.

While there is a growing sense of the interrelation of all physical and biological factors in our environment, there is also a growing concern over man's relationship to his ecology. Building roads, cutting forests, grazing mountain ranges, mining mountain sides, polluting water, eliminating predators, modernizing our remaining wilderness areas, tramping over, defacing and littering our picnic ground—all have their chain reactions. These are problems which man and his modern civilization cannot ignore without bringing disaster upon himself. Problems have arisen out of such misuse of the land, and these problems involve the principles of conservation. Man must understand nature's basic laws and interrelationship involved. These principles do not involve a few people; they affect all of us and develop into a threat to our rich American heritage and democratic way of life.

There is no dearth of good teaching materials in biology, conservation, and nature study, or for that matter in any phase of science teaching. Often the problem is which method is most effective in the all too crowded course where time is our most precious element. Perhaps we have all been guilty of skimming through to cover the mass of content in the required time allotted. In our effort to cover the basic content of the course, we often lose sight of the fact that there is no substitute for first-hand teaching materials on our own doorsteps, in our backyards, or our school grounds, even though we teach in the heart of a big city. Interrelationships exist even in our own houses and classrooms. The potted plant on the window ledge receives our exhaled carbon dioxide, combines it with water from the soil, and by the sun's energy produces all the food need for our existence.

Due to the elimination of natural areas by ever-expanding superhighways, suburbia, and industry, there is developing a greater need, in every school, and especially in the big high school, for an outdoor laboratory, readily accessible for the year round, and dedicated permanently to the study of outdoor biology, where the wise use of natural resources may be studied first hand through scientific and educational investigation.

We all need outdoors occasionally in the fresh air and sunshine and study nature at first hand. We might be inspired to appreciate the words of John Muir, "The grand show is eternal." We have lost much of our ability to

observe outdoor phenomena. A leaf collection on a board does not convey the understanding of, nor the appreciation for, the beauty all around us. One bird in a bush is worth a whole flock in a museum. A land use survey scale chart of the school campus can vitally increase the students' understanding of natural resources as they apply to himself. Bird charts of the area, listing the arrival and departure of migrants, permanent residents, and winter visitors and their activities can be a challenge to a select committee from any biology class. A month by month study and recording of nature activities in the area throughout the school year can develop into a lifetime hobby which will enrich the lives of many.

The "Nature Area" at the East St. Louis Senior High School consists of a two and one-half acre plot on the northwest corner of the campus. This area is unique in that it includes a remnant stand of native climax oak–elm forest and a wide variety of native plants and animal life in its native habitat.

The plant species include an overlapping vegetation where north meets south, a wide combination of flora and fauna in the great "American Bottom." It offers a rare combination of habitat including swamp, in the old river oxbow loop (lagoon), upper grassland, and climax forest. The immediate plans are for a multiflora rose fence surrounding the area. The east unforested part will be planted to native trees of this locality. Planting projects underway or planned in the future include: a wildlife food patch, a small forest nursery, a wildflower area, a wilderness area, and a small lake.

Assistance in developing the area has been obtained from the Soil Conservation Service. The State Department of Conservation, the State Forester, the State Department of Public Instruction, local school administrators, and various other schools which have or are now developing such areas.

The general goals to be accomplished in the use of such an area include: collecting and identifying specimens in their natural habitat, bird study, adaptations, plant succession, climax vegetation, appreciation for the out-of-doors, respect for public property, fire prevention and control, recreational opportunities in the out-of-doors, developing interest in lifetime hobbies, and in the conservation of natural resources.

Some biology projects which are underway by individuals or committees include: wildlife and land-use, a water survey, a soil survey, a plant survey, wildflower study, photography committee, and file or records committee.

Problem study involves the ecological relationship and types of habitats which include: climax forest, old log, stump, and dead tree, aquatic, thicket, grassland, and food plot. Projects include: nesting census, classification of all plants and animals of area, mapping the area, water resources, fire control and damage, a month by month activities survey, food chains, and plant succession.

Committees: Study of Nature Area

The field trip challenges the power of our observation and man's relationship to his environment as they can be observed on the school campus or Nature Area. All natural resources are interrelated.

I. School Campus
  A. Survey of local campus
    1. Charts and maps committee
      a. Draw to scale
      b. School campus
    2. Whole school ground
    3. Aerial view
    4. Nature area
    5. Locate all present plantings, trees, and shrubs
  B. Sidewalks and lawn committee
    a. Evergreen plantings
    b. Deciduous
    c. Lawn
    d. Shade trees
    e. Collect and burn bag worm cocoons

II. Nature Area
  A. Wildlife and land use committee
    1. Present wildlife examples
      Card index on same
    2. Additional wildlife available if food and cover were provided
      a. Food plants–millet, sorgo, corn, wheat, rye, oats
      b. Cover plants–*Lespedeza*
      c. Species expected
      d. Value to biology study
      e. Value to man in general
  B. Water survey committee
    1. Sources of water

2. Water table
3. Uses to man
4. Better storage facilities. Value
5. Water plants
6. Aquatic animals
7. Multiple use of ponds

C. Plant survey committee
A card (3 by 5) index on all plants present. List each on map of area.
1. Evergreen trees
2. Deciduous
3. Shrubs
4. Weeds
5. Grasses
6. Vines
7. Thallophytes
8. Byrophytes
9. Pteridophytes

D. A wildflower survey committee
A card index (3 by 5) on all.

E. Outdoor laboratory development committee
1. Survey
2. Planting
3. Care and cultivation
4. Harvest

F. Soil survey committee
1. 1 sq. ft. life, type, textures
2. Analyze, tests, mineral present
3. A soil profile

G. Photography committee
1. B & W
2. Color transparencies
3. Use of resources
4. Misuse of resources

H. File committee
1. Card index file of all
2. Plants—Animals (3 by 5)
3. Common Name-Phyla-Class-Order-Family-Genus-Species
4. Characteristics
5. Economic importance
6. Occurrence, few, winter resident
7. Location, hollow dead tree, N. boundary, etc.

I. Nursery committee
1. Plant seed
2. Tend young plants
3. Transplants

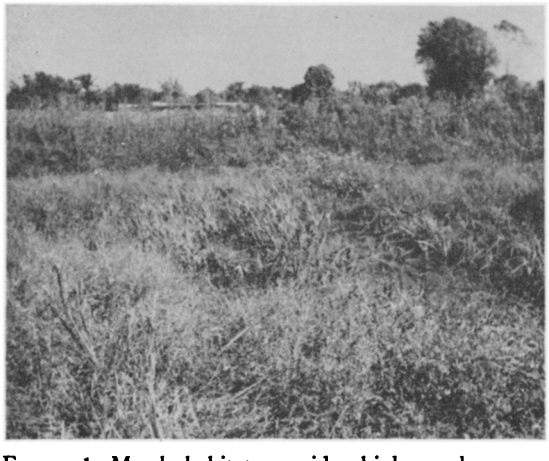

FIGURE 1. Marsh habitat provides biology classes an excellent source for study of aquatic life.

Projects for Nature Area
Spring or Fall

1. Ecological relationships
   a. Predator-prey
   b. Symbiosis
   c. Parasitism or saprophysitism
   d. Plant succession
   e. Camouflage—protective coloration, etc.
2. Habitat study
   a. Climax Forest—Oak
   b. Old log and stump
   c. Dead tree (standing)
   d. Aquatic-swamp
   e. High ground areas
   f. Shade and sun
   g. Thicket area
   h. Pond
   i. Food plot area
3. Miscellaneous
   a. Food patch development
   b. Plant communication
   c. Plant succession
   d. Nesting census
   e. Classification of plants
   f. Classification of animals
   g. Classification of birds
   h. Classification of insects
   i. Classification of mammals

Fall or Winter

1. Bird nest collection
2. Identification of trees. Collection of twigs or wood.

Year-round Projects

1. Forest seedling nursery
2. Map plants of area on chart of area
3. Bird census and classification

4. History and geology of area
5. Soil resources of area
6. Water resources on area
7. Fire damage on area
8. Mammal census and classification

Month by Month Survey

March: First bud on tree
First wild flower
First bird migrant
First bird nesting
First frog egg, toad egg, etc.
Pollination
Seed disposal
Continue with April, May, June, etc.

Habitat Factors in a Woods

1. Light meter
   Various layers
   Leaf arrangement comparison-mosaic
2. Humidity-woods are moist-hygrometer
3. Temperature-woods are cool
4. Winds-windbreak
5. Soil of woods, water holding capacity, humus content

Plant Survey of 3 Square Feet

Clear all vegetation of 3 sq. feet. Count weed seeds, etc., sprouts, moisture. Not destroyed and why?

Bird Nesting Survey

Make a nest census. Number of young, breeding loss, why, etc.?

Food Chain in a Wood

1. Green plants
2. Vegetarian-mice aphids in oak leaves, deer-browse, rabbit, and muskrat.
3. Carnivorous
   a. Predacous insects-spider
   b. Insectivorous birds-wood thrush
   c. Larger carnivore-wolf-mink
4. Scavengers
   a. Insects-tumble bug
   b. Crow-dead rabbit
   c. Buzzard-dead horse
5. Parasitic-lice-intestinal worm
6. Saprophyte fungi decay breakdown CO_2 plus H_2O plus simple minerals.
7. Mineral content. pH content of soil

FIGURE 2. Bird watching.

Biotic Factors

1. Man-cut dead trees-woodpeckers
2. Rabbit
3. Wood mice
4. Blue jay
5. Woodpecker
6. Earthworms
7. Fungi
8. Algae
9. Lichen-symbiosis

Animal Habitats

All animals found in preference habitat.

1. Tree layer-sweeping net-canopy-scarlet Tanager nest
   Beating tray-sheet insect-moths-woodpecker-wood boxer
   Flying squirrel-owl-caterpillar

FIGURE 3. Dead trees are attractive homes for our wildlife friends.

2. Shrub layer-wood lice-fungi (Nets)
3. Field layer-centipedes-millipedes (trappings)
4. Moss or leaf litter layer (surface ground layer)
   towhee-brown thrush-blackbird
5. Soil layer-worms, ants

Seed Germination Experiments See Turtox Leaflets

No. 30—Growing plant in nutrient culture—media
No. 37—Growing flowering plants
No. 47—Plant experiments (gibberellic acid)
No. 51—Hydroponics experiment
No. 54—Hormones experiment
No. 60—Artificial light experiment

Biology In The News

Brother H. Charles, F.S.C.

What Is Life Made Of? Sir Lawrence Bragg, *Saturday Evening Post*, October 7, 1961, pp. 34-35; 54-64.

A considerable discussion of biology at the molecular level. Your better students will like it. It will be a challenge for them.

Tobacco, "Noxious Weed" or "Sweet Charm of Solitude," *Ladies Home Journal*, November 1961, pp. 114, 116.

Short but packed with facts, opinions and results of studies relative to tobacco and tobacco users. Something for both sides of a class discussion.

Ulcer Report, Gretta Baker, *Cosmopolitan*, November 1961, pp. 88-91.

Today's stresses may mean tomorrow's ulcers. Everyone needs to consider stresses and their effects on us. The author evaluates the various treatments in present use.

The Facts Behind America's "Mystery Epidemic," Ruth and Edward Brecker, *Good Housekeeping*, November 1961, pp. 59, 178-184.

Hepatitis is a common disease. Its serious effects were realized long ago but only lately have we realized that effective control depends on extensive environmental sanitation.

Atomic War on Insects, Charles E. Ball, *Saturday Evening Post*, September 9, 1961, pp. 36-37-51.

Control pests by sterilizing the males of the population. This new weapon is effective in battling insects. The article also gives hints on methods for securing funds for your research.

Doctors vs. Witchcraft, Joe Alex Morris, *Saturday Evening Post*, September 16, 1961, pp. 48-64.

The work of Dr. Larry Mellon should be known to all. The use of his extensive fortune to establish a hospital for the poor of Haiti and the tireless work of himself and his wife is an inspiration for thoughtful people.

A Startling Story That May Save Your Life, Jhan and June Robbins, *Good Housekeeping*, October 1961, pp. 69, 178, 182-186.

A story of a compulsive speeder. This could stimulate a lively, profitable discussion of the psychology of accident proneness.

Beware of the Miracle Merchants, Arthur S. Flemming, *Good Housekeeping*, October 1961, pp. 56, 58-61.

False claims for cosmetics and medications lead Americans to spend millions of dollars on worthless merchandise. The U. S. Food and Drug Administration can prevent this waste of money only if people will cooperate with it. This article tells you how to help.

Science Education

Science education beginning in kindergarten has been proposed as part of a major program to effect improvements in science and mathematics instruction in all grades through junior high school. A report of a study undertaken by the AAAS also calls for a coordinated 10-year sequence of science as an important thread of a general education "to equip all persons for life in a scientific and technological society." The study, sponsored by the NSF, sees the need for "a substantial team effort" of scientists and educators to produce high quality materials for a major improvement in elementary and junior high science teaching.