FIELD TRIP GUIDE FOR UTICA MARSH

Edited by Ernest Williams. Written by Pete Colverson, Jamie Doolittle, Marsha Guzewich, Lee Kowalsky, Steve Litwhiler, Kathe Salzman, Wendy Whitney, and Ernest Williams. June, 1997.

This document is designed to help people learn to lead field trips at Utica Marsh. Each topic in it is described independently, so a reader may look through the listing below and choose to read and learn about whatever appeals to him or her. All of us involved in this project have learned stories about the Marsh that we regularly tell to groups we lead; in this booklet we have tried to compile these stories for others. Parts A, B, and C describe progressively narrower stories about the marsh, while part D helps prepare one to lead a group, and part E provides background information. With greater confidence in what one can say to a group at the marsh, additional people may become willing to lead such groups, and, consequently, more field trips will take place. And that is our goal: to enhance environmental education through the use of Utica Marsh. We hope you find some tasty tidbits in the smorgasbord that follows!

We continue to learn more ourselves, of course, and to learn from each other, so this booklet will likely be revised and expanded at some future date. We want to remind readers that the precurser volume, *A Marsh for All Seasons: Information and Teacher's Guide to Utica Marsh,* contains much additional information and youth activities. EHW

A. GENERAL VIEWS OF THE MARSH

A1. Natural History of the Utica Marsh (Kathe Salzman)

Use the map in the Utica Marsh brochure to orient people to the area and to provide some information about the marsh. One can point out, especially to the children, that just as people have personal histories and countries have national histories, so, too, the land has a natural history.

Using our Information and Teachers' Guide as a reference (p. 7), I begin by saying that scientists believe 10 to 30 thousand years ago upstate New York was covered by glaciers. As climatic changes caused those glaciers to melt and recede, the Mohawk River was born and carved its way through the Utica area. The second bridge one crosses on Barnes Avenue on the way to the marsh spans the Mohawk, and, in fact, the Utica Marsh is only a part of the wide floodplain that borders the river. In the spring, when melting snow and heavy rains cause the river to flood its banks, the floodplain acts as a sponge and absorbs the water.

In its present state, the Utica Marsh can be most simply described as a cattail marsh where some of the land has been disturbed by human activities such as trash dumping and trail construction. Depending on the time of year that one walks at the Utica Marsh, one can see examples of a mix of wetland types, including shallow pools, emergent vegetation, flooded swamps, and wet meadows. Despite all "the encroachments of civilization on the marsh, it still has the most diverse biological communities found in this geographical area" (Marsh Guide).

People are fond of numbers as a way of getting a picture of things, so the following from the Marsh guidebook illustrates nicely the diversity of Utica Marsh inhabitants:

8 species of toads and frogs 8 species of fish
10 species of salamanders 3 species of turtles
10 species of snakes (non-poisonous; important to mention)
150 species of birds, including at least 37 species that breed here
30 species of mammals

In 1987, the muskrat population was estimated, based on cattail consumption and the number of lodges, at approximately 3,000 individuals.

A2. Value of Wetlands (Ernest Williams)

Notice the junkyards all along Barnes Avenue on the way to Utica Marsh. People have given little value to wetlands historically because they can't be built upon or farmed and because they are often breeding grounds for mosquitoes. Thus, people have filled in wetlands for other purposes, such as building Sangertown Mall on what before 1980 was a rich, productive marsh and swamp (you can still see cattail remnants around it). Or they have simply used the land bordering wetlands as low-cost areas for junkyards.

But wetlands do have great value. (1) Wetlands serve as sponges for soaking up floodwaters, as the Utica Marsh does during the spring melt every year. The most economically damaging floods occur in areas where people have built homes in floodplains or channeled the rivers so that water could not spill over into fringing wetlands &endash; until rising waters creat holes in the dikes, and water floods communities and agricultural areas (e.g., the midwestern floods of 1992). (2) Wetlands purify water. Water soaked up by wetlands is released gradually back into the nearby rivers, while particulate matter is filtered out and organic matter is broken down by decomposers in the wetlands. (3) Because of the combination of water, nutrients, and sun, wetlands are very rich, productive habitats. In consequence, many diverse organisms live in wetlands (see the numbers given above in section A1). These are the most biologically rich habitats around.

So what's wrong with this picture: junkyards around wetlands?

A3. The Changing Water Table (Ernest Williams)

Utica Marsh currently encompasses about 213 acres, but it was not always so extensive. Hundreds of years ago, there was a fringe of marsh along the Mohawk River. But then when white people first moved into the area, they constructed transportation routes &endash; first the Erie Canal, then a railway, then the barge canal, and then major highways. Each of these transportation routes was constructed on an embankment that changed the drainage patterns of water around Utica Marsh. The Barge Canal also cut off all tributaries from the north side of the Mohawk River, further changing the hydrology of the area. Then in the 1950's, both the New York Throughway and the Horatio Arterial (Route 12, running north-south) were built across the wetland, consequently restricting water drainage. Thus, the water table at Utica Marsh has risen during the past century, and there is more marsh now than there was hundreds of years ago. One can see evidence of the rising water table in the occasional standing dead trees in the deeper parts of the marsh; the sites where these trees grow were drier when the trees were saplings. The interaction between civilization and nature shows the resilience of the local vegetation. When environmental conditions change, the local flora and fauna respond, creating more marsh as the land becomes wetter.

A4. An Urban Wetland (Pete Colverson)

Utica marsh is a floodplain wetland; it regularly receives water from the nearby Mohawk river when water is high. But it is also an urban wetland, not only because it is within the Utica city limit, but also because, in a very real sense, the marsh is surrounded by an urban environment. Protected urban wetlands are quite rare. While all cities have parks with varying amounts of natural vegetation, few have a fully functioning wetland ecosystem within a long stone's throw of downtown.

Despite the official protection of Utica Marsh, our city has not always been friendly to marshes; both our malls plus the huge complex of roads near Riverside Mall known as "The MUD Project" were built on wetlands. And part of a recent controversy to build a new shopping complex near Commercial Drive involves the proposed draining and filling of some wetland areas. On the positive side, the City of Utica was actively involved with the original efforts to protect the marsh and donated 58.3 acres to the preserve as part of the current total of 213 acres.

The urban aspect of the marsh is perhaps the easiest thing for the untrained eye to detect. Human development both surrounds and divides the marsh. The City of Utica lies to the south with a distinctive skyline of low, square-topped red-brick buildings, tower blocks, church spires and the magnificent golden dome of the Utica Savings bank. To the west, the marsh's neighbors are car "cemeteries." Take a hike on the western boundary trail to experience a great natural scene with the flotsam of modern society in close juxtaposition; rusting car parts, tires, drums, plus a miscellany of other mechanical knick-knacks protrude from marshy swales. Wildflowers grow out of engine blocks, and cattails sprout through wheel rims. Nature IS resilient! Many animals and plants are not only tolerant of human bric-a-brac but they positively thrive in disturbed places. Look for numerous flowering plants among Detroit's castoffs in the shrubby woodlands that are slowly taking over the dryer areas.

The clearest boundary of the marsh is the straight cut of the barge canal to the north. There are additional swampy wetlands north of the canal, however, so perhaps it is the massive complex of highways that form the real boundary. The causeway that carries Route 12 across the marsh forms an eastern boundary to the large north pool of the marsh. East of Route 12 the marsh continues but soon blends into woodlands that extend east to Harbor Point and Genesee Street.

At night, the proximity to the urban environment means that artificial light is an ever present force. We know that insects are attracted to lights, sometimes in great numbers, but otherwise, it is difficult to gauge the effects, if any, of artificial light. The Rt. 12 causeway probably has the most direct impact with huge floodlights illuminating a wide area of the northeast corner of the marsh.

It is easy to become negative when commenting upon human interaction with nature, so let's conclude on a positive note. Utica marsh, because it is so close to the city, is VERY accessible. Only 5 minutes from downtown lies a fully functioning, rich wetland ecosystem with a diverse plant community supporting a rich array of microbes, insects, fish, amphibians, reptiles, birds and mammals. Take advantage!

B. COMMUNITY PATTERNS

B1. Bioindicators of the Water Table (Ernest Williams)

Looking over the marsh from the trail, one can see areas with cattails, areas with goldenrods, and areas with trees. Cattails grow where their roots are wet, but goldenrods grow only in dry places. Some sedges and grasses grow in the standing water, whereas others grow only in dryer locations. Most trees require dry land, but willows grow on wet soil. One can easily see the broad distributional patterns of these plants because different species appear a different shade of green Simply scanning across the marsh, one can tell by the size, shape, and color of the vegetation where there is standing water and where the ground is dry. Can you distinguish the vegetation of deeper water from that of shallower water?

B2. Succession (Pete Colverson)

Any community of plants and animals is dynamic. Change is constant in nature and is caused by numerous forces. Fire is perhaps the best known; a forest burns, new growth quickly sprouts to hide the charred ground, and soon, young trees begin to sprout to replace their dead parents. Communities are so well adapted to dramatic change such as fire that several plant species specialize in growing in newly burned areas. Some tree seeds must reach high temperatures before they will germinate, e.g., pitch pine. A less dramatic example of succession is the revegetation of a small patch of forest floor after a large, old tree falls.

As succession progresses, we say that a plant community moves through several stages. Early on, after a disturbance, the ground becomes covered by annual, herbaceous plants and grasses. These plants grow rapidly and produce huge quantities of seeds, great adaptations for an early colonist. Their roots help to stabilize exposed soil, which in turn gives shrubs and young tree seedlings the chance to get started. After a few years, an area that receives no new disturbances will produce dense clusters of waist-high shrubs which thrive in bright sunshine. The next stage is slower, but as time passes trees will outgrow the shrubs. Those shrubs that do not tolerate shade will die out. New tree seedlings which thrive in the shade will now grow and eventually overgrow the earlier trees to produce a "climax" forest: the end point of succession in our geographic area and a stable community, until it is once again disturbed. Note from this example that light and a plant's adaptations to more or less of it play critical roles in driving plant succession. Human activities tend to maintain early successional stages when plant growth rates tend to be more rapid. Mowing lawns is perhaps the most familiar example, but agriculture and forestry are also similar. Plowing a field and cutting down a forest of mature trees are classic disturbances.

Utica Marsh is neither forest, lawn nor corn field, but it is a natural community, and so it must be subject to natural laws. In fact, aquatic plant communities, plus the animals that survive with them, represent an early successional stage. While light plays a pivotal role in the forest's succession, water depth is critical at the marsh. Note that the deeper pools are clear of emergent vegetation &endash; cattails, arrowhead, and other plants that grow rooted in the muds and whose leaves and flowers emerge above the water's surface. But where the water is shallow enough, these plants thrive. Shallower still, we find the introduced Phragmites and purple loosestrife, plus willow and alder trees. Eventually surface water disappears, and we have a woodland around the edge of the marsh.

The vegetation of the marsh causes stabilization of the substrate (mud!) in which it grows. Rainwater runoff entering the marsh brings eroded soil. Flooding from the Mohawk river brings silt &endash; very fine, suspended soil particles. These materials settle out among the cattails and make the marsh shallower. Each generation of marsh plants (their emerged portions are generally annual and die back each fall) adds large quantities of decaying vegetation to this embryonic soil. What is happening, therefore, is that the marsh is slowly but surely filling in, its processes in essence causing its own demise. Eventually it will become a wet meadow, followed by a shrubby woodland followed by a forest. How long will this take? In human terms, a long time &endash; many generations. For nature, this may be just the blink of an eye, yet it is another example of the dynamic forces of change that constantly mold our natural world.

B3. Seed Dispersal (Ernest Williams)

Using one of several mechanisms, plants must disperse their seeds to new locations to begin a new generation. Dispersal of seeds may be by wind, animals, or expulsion. All the following examples may be seen on a walk at Utica Marsh.

Dandelions and milkweeds are good examples of plants with wind-dispersed seeds. The wings or parachutes of the seeds keep them aloft long enough in a breeze so that the seeds are carried some distance from the parent plant. Plants that use wind dispersal typically have very small seeds or seeds with wing-like structures. Try blowing dandelion or milkweed seeds to see how far you can get them to go.

Burdock seeds have hooks or thorns to attach to the fur of passing mammals. With this mode of seed dispersal, burdock spreads easily. One can simply toss a burdock seed head towards someone's sweatshirt, and the curved tips of the mature seeds will hook into the fabric threads of the clothing. The hooks of burdock seeds are especially conspicuous under a handlens. One enterprising person capitalized on knowing about this phenomenon and invented velcro using the design of burdock seeds; when you look at burdock, you're looking at Nature's velcro! Just by walking through field with exposed socks you may pick up a sample of mammal-dispersed seeds.

Other seeds attrack animals, especially birds, to feed on them. As the seeds pass through the intestines of the seed-feeder, they are then deposited some distance away along with their own fertilizer. To attrack animals, these seeds are often red in color; staghorn sumac, hollies, and cherries are well known for having bird-dispersed seeds.

Another mode of seed dispersal is shown by jewelweed. Plants usually have more surviving offspring when their seeds are dispersed away from the parent plant into new areas rather than right next to the parent. In late summer, Jewelweed, also known as touch-me-not, produces seedpods with tension in the pod walls. When a jewelweed pod is mature, all it takes is a slight touch from a nearby wind-blown leaf to trigger the opening mechanism of the pod: the walls of the pod curl back so rapidly that they toss the enclosed seeds several feet from the parent plant. This mechanism is known as "explosive dehiscence," and it is impressive to see how much coiling and tension develops within the walls of these pods. If you look for jewelweed pods, you'll find plumper ones to be riper and have more tension in the pod walls. Simply pinch one end of the pod to test its ripeness. The seeds aren't spread as far as they would be by insects or wind, however; thus, jewelweed tends to grow in clumps.

B4. Tracks and Scats (Steve Litwhiler)

Tracks and droppings are often the only way people know that animals are nearby. Many animals are active only at night, and most others will avoid being seen or approached by people. Getting to know bird and mammal tracks opens up a whole new world of investigations into the secret lives of animals. Pieces of hair and feathers are other clues the observant wildlife detective can find. Look in the mud and soft ground, even along people trails. Everyone should keep a watchful eye out for sign. Droppings are also good clues about what the animals may be eating. It's also good to look carefully so you don't step in it; for example, goose droppings can make a mess on the bottom of your shoes! Beaver cuttings indicate their presence at the marsh. You can show how they cut off the bark with their teeth. Their teeth grow continuously, so they must chew, to wear away the softer backside of the front teeth, leaving them chisel-shaped and hard. Trails are another sign to look for. Like the muskrat trails that they eat through the cattails, other animals use regular trails through the fields and woods.

C. STORIES FROM THE MARSH

C1. Cattails (Steve Litwhiler)

The predominant plants in the open shallow water of Utica Marsh are cattails. They are identified by long narrow leaves coming right out of the water. They can grow very tight together into a solid mass of plants hard or impossible to walk through. Cattails are essential to the health of this marsh; they capture sunlight, water, and carbon dioxide to produce oxygen, water, and plant material (carbohydrates). A healthy cattail marsh is one of the most productive ecosystems on earth. If cattails grow so much to fill all the open water areas, plants and animals, including fish, that need open water to live must move elsewhere or die. Conversely, if there aren't enough cattails, the other plants or animals that need them must move or die. A balance between cattail cover and open water is best for Utica Marsh. This will allow the greatest number of different plants and animals to live there. One great threat to the marsh currently is the invasion of purple loosestrife. In the north pool the cattails are largely replaced by this purple-flowered plant, decreasing the productivity of the marsh and the diversity of fish and other wildlife living there.

C2. Black Willow (Steve Litwhiler)

One can readily identify the habitat requirements of black willows by where they live in a marsh. They need a place where the soil is quite wet, and they can live with their roots being covered by water for part of the year. Yet, standing water around a tree all year will kill it. Notice that these trees are found where there are small mounds that get the trees on a little higher ground. These trees are important along the river to help hold the soil in place when the river floods. Cottonwoods are very important to the Utica Marsh in similar ways. What animals do you think need or can use these trees?

C3. Quaking Aspen (Ernest Williams)

On the main trail leading to the bird tower, there are quaking aspen trees (Populus tremuloides), and, as their name suggests, the leaves of these trees shimmer in the slightest of breezes. The

mechanistic reason for their quaking is apparent if one looks at the leaves, especially at the petiole or stem that holds the flat part of the leaf (the blade) onto the tree. The best engineering design for holding a leaf blade firmly is to use a cylindrical petiole. In contrast, aspen have petioles that are conspicuously flattened, so the leaf blades flop easily from side to side as the flattened petiole bends.

Why these trees evolved this design involves two factors. The first is that leaves of all plants photosynthesize at a maximal rate at only about 30% of full sunlight; thus, maximal photosynthesis takes place even on cloudy days. The second factor is that aspen grow in open, sunny locations and have leaves scattered throughout the volume encompassed by the tree. If their leaves were held firmly, the top leaves of the tree would directly overshade the next lower leaves and reduce their photosynthetic gain. But when the leaves shake back and forth, there is no direct overshading; instead, the overall light to the lower layers is reduced only a little, and leaves within the volume of the tree still photosynthesize at the maximal rate. In summary, the tree benefits when its leaves "quake" because that movement enhances overall photosynthesis.

C4. Duckweed (Ernest Williams)

By late summer, all open water of the marsh is covered by what looks like algae or green slime. Up close, however, one finds the distinct small leaves of duckweed. There are two species of duckweed found here. Duckweeds of the genus Lemna have small rounded leaves with tiny roots hanging beneath. Duckweeds of the genus Wolffia, on the other hand, look like tiny green grains. It is hard to imagine these green grains as flowering plants, but they are; furthermore, they are the smallest flowering plants in North America!

Most duckweeds die during the winter freeze, but then the next spring a few begin growing again. A population of duckweeds grows exponentially during the summer until most all open water is covered. As turtles and muskrats swim along the water surface, they leave trails in the duckweed that show the patterns of their movement.

C5. Jewelweed Distribution and Muskrat Lodges (Ernest Williams)

When standing on the bird tower looking over the south pool of Utica Marsh, one can see clumps of a lighter green vegetation scattered throughout the darker-green sea of cattails and sedges. The lighter green color is produced by jewelweed (touch-me-not), a plant otherwise found only along the margins of the wetland. How can these clumps grow in the middle of the marsh? They grow on slightly higher mounds where the roots of the jewelweed are not submerged in water. Usually, the mounds are piles of vegetation gathered by muskrats for their homes. Seen from far away, the light green clumps are bioindicators of the locations of muskrat lodges.

C6. Introduced Species (Pete Colverson)

True to the American tradition, a number of plants at Utica Marsh are immigrants. As people came to the "New World" from all over the "Old", they brought with them a wide variety of plants and animals, sometimes deliberately, sometimes accidentally. The zebra mussel, which has invaded the Great Lakes from northern Europe (it was brought over accidentally in the ballast water of ships and released when that water was evacuated from the ships), is perhaps the most famous recent example in our area. The dandelion, everybody's favorite lawn "weed," is another. In fact, a

large percentage of the vegetation along trails and near disturbed areas is comprised of alien species. The following sections present three examples of relatively large and aggressive invaders that inhabit the marsh preserve.

C7. Purple Loosestrife, *Lythrum salicaria* (Pete Colverson)

Purple loosestrife grows in water or at the water's edge to a height of 3 to 5 feet. The submerged rootstocks can produce several erect, woody stems, each capable of producing a tall spike of flowers that range from pink to purple in mid to late summer. The number of petals can vary from 4 to 6, but all grow from the axils of the opposite, unstalked lanceolate leaves. Last year's dead stalks persist through to next spring, appearing as bunches of tall, thin "twigs" protruding from the marsh. The scientific name of loosestrife tells an interesting story. Lythrum refers to the bright reddish purple of the flowers; it is derived from the Greek word "lythron," which means blood. Salicaria denotes the willow-like shape of the leaves (willow is Salix). Scientifically then, purple loosetrife is "blood-red flower with willow-shaped leaves!"

After the arrival of purple loosestrife in America as an ornamental from Europe in the early 1800's, it spread quickly through wetlands. Dense stands produce a beautiful purple flower show in late summer, but little else about this plant, "the purple plague," is desirable. In Utica Marsh, purple loosestrife has a firm hold in the north pool between the railway and Route 12, with the densest stands in the northwestern area near the bike trail. It is still sparse in the south pool. Purple loosestrife is an aggressive invader whose dense growth can crowd out many native plants, plants which are more desirable to local wildlife. Few animals have acquired a taste for it, so it grows unhindered, putting native plants at a competitive disadvantage. It spreads laterally as the root stocks expand and also produces millions of seeds. Eventually purple loosestrife can take over an area of marsh completely. Because little eats it, the base of various food chains is reduced, thus causing a cascading effect throughout the entire marsh community.

Purple loosestrife does have some desirable effects. Honeybees and other insects do collect pollen and nectar; the caterpillar of the pearly woodnymph moth does eat it; and research has shown that it can absorb and thus detoxify PCB's (polychlorinated biphenols), dangerous and fairly widespread pollutants, if they are present in the marsh sediments

Control of loosestrife is very difficult. The rootstocks are tenacious and cannot easily be pulled. If the plant is simply cut it will resprout, and uncollected clippings can drift across the marsh and then take root elsewhere. A poorly devised cutting program can therefore hasten the spread of this weed, so please desist from your own weeding efforts. It is possible to control loosestrife by raising the water level and inundating the rootstock at a critical growth phase in spring, though this cannot be done at Utica Marsh as it is at Montezuma National Wildlife Refuge west of Syracuse. Another approach to controlling exotics is to find animals that like to eat them back in their native lands and then introduce them here. Great care is needed, however, not to add yet another pest species. There are a couple of promising weevil species being worked on by researchers at Cornell University that have been experimentally released in some marshes, including Utica Marsh, and are being monitored.

C8. Common Reed, *Phragmites australis* (Pete Colverson)

Giant reed is a tall plant in the grass family. It grows in dense stands with long, sword-shaped leaves. Wind-pollinated flowers form purplish plumes atop the stems in June and July that then dry to a yellowish color in the fall as the seeds are shed. The flowering stems are very attractive. Phragmites may well have the distinction of being the plant species with the largest geographical distribution in the world. The scientific name hides no particularly special meanings - the Greek word "phragma" means fence or screen, indicating the dense growth form, while communis derives from the communal growth habit.

Many people call this tall, elegant looking plant by its scientific name Phragmites (pronounced frag-my-tease). It has a firm foothold at Utica Marsh, but in only three locations. The largest patch grows on the trail that connects the railway line to the south trail across the south pool. Here several hundred square feet are covered by Phragmites and nothing else. Two smaller stands grow in the eastern end of the south pool, both right next to the trail. One can exercise all of one's senses while walking though these stands of giant grass, as their leaves and stems brush across face and arms. Close your eyes, and it's easy to imagine that you've been transported to a tropical jungle!

Far from being tropical, reed was introduced from Europe, possibly as far back as last century, though it may have been native to the Atlantic coast of North America. It certainly did not grow inland, however. Like loosestrife and knotweed, reed forms dense monocultural stands that crowd out all other plants. Its growth is so dense that literally nothing else can get started.

Growing up to 15 feet in height, Phragmites is the tallest herbaceous plant at the marsh. Several birds, particularly red-winged blackbirds, use the tall stems as song perches in spring. The sheer density of foliage makes stands of this plant good potential nesting habitat for several birds, including mallards, redwings, and bitterns. Muskrats eat the leaves and stems, but they prefer other plants such as cattail. Each year new stems and leaves are produced from the rootstocks. If these new shoots are flooded for a concerted period, they will likely die. It is probably this fact that has prevented the more extensive spread of Phragmites, because during most springs the marsh's water level rises significantly. Note that established stands are on or close to islands of dry land.

C9. Japanese Knotweed, *Polygonum cuspidatum* (Pete Colverson)

Japanese knotweed is a large, spreading plant with jointed, hollow, greenish stems much like large bamboo. The large, broad leaves grow from the stem joints, with flower clusters developing in the leaf axils. Flowers are very small and greenish white in color and appear in August and September. Male and female flowers are on separate plants.

This tall bamboo-like plant grows all around the marsh in dryer areas a little away from water. It is another aggressive, introduced plant, this time from Asia. The tall shoots develop in dense clusters from spreading root stocks that can quickly take over an area of many square feet to the total exclusion of all other plant life. Knotweed, a member of the buckwheat family, can grow up to 10 feet tall with stems at least 2 inches in diameter. It appears to have some similarities to bamboo (it is also called Mexican bamboo), hollow jointed stems for example, though bamboo is actually a grass while knotweed is closely related to rhubarb (note the similarity of the flower clusters to those of rhubarb). While knotweed is a perennial, its above ground shoots die back in winter, leaving a mass of dried, dead stems as an ugly epitaph of its presence. The underground rhizomes

(horizontal stems) produce a new crop of shoots the next spring, and of course they spread out a little farther each year.

As with many introduced species, much of our wildlife has had a hard time figuring ways to use knotweed. The dense clusters of vegetation provide good cover, even in winter when the stems are dead. The shed seeds are eaten by sparrows and other ground feeding song birds.

There are two culinary uses of this plant that provide it some saving grace. If you pick the young shoots in spring, you can steam or boil them and serve them as you would asparagus. You may need a little sugar, for they can be a bit tart. Remember, knotweed is related to rhubarb. This relationship provides for a second use: pick some older stems, peel off the rind, and then use them as you would rhubarb to make jam or pie.

C10. Staghorn Sumac (Steve Litwhiler)

Staghorn sumac is an abundant small tree species found along the trails at Utica Marsh. It is easily identified by the red fruit spikes that are present through the winter and spring, the fuzzy nature of the new branches, and the long compound leaves (up to 2 feet long) with many leaflets. An interesting fact is that the seeds need to pass through the digestive tract of birds or mammals (or be heated by fire) to germinate. The trees spread mostly by root sprouting, which is why they grow in clusters. Staghorn sumac is an extremely important small tree for wildlife; 300 species of songbirds, pheasants, grouse, and wild turkeys include sumac fruit in their diet. Squirrels and rabbits eat the bark in the winter, and deer use the fruit and twigs as an important winter food.

C11. Woolly Mullein (Ernest Williams)

Woolly mullein is a plant introduced from Europe. As a weedy species, it finds room to grow in disturbed areas such as along trails and railway tracks. What is remarkable about this plant, though, is the hairiness of its leaves. If possible, look at a mullein leaf with a hand lens. The leaves are covered with branching (stellate) hairs that are so thick on the surface that the leaf has a very soft texture.

Equally impressive is the deterrence of insect herbivores. One finds negligible insect feeding damage to these leaves (other forms of damage do occur) because the dense thicket of branching hairs prevents insects from getting through to the tissue of the leaf. The thick hairs also trap a layer of moist air next to the leaf surface so that less water is lost from the leaf when the stomates open for gas exchange (CO_2 uptake).

C12. Goldenrod Galls (Ernest Williams)

Swellings are often visible on goldenrod stems. These are called galls, and each contains an insect larva inside. Early in the season, when the goldenrod was as tall only as the height of the gall, a fly laid an egg on the growing tip of the plant. Because of chemical secretions from the egg and its larva, the plant grew additional tissue around this spot, and that is what creates the swelling. The larva then lives inside the gall, protected from predators while consuming the sugary fluids of the plant as food. The larva grows and pupates in the gall, finally emerging from the dead goldenrod stem early the next spring. Then it mates and lays eggs on next year's growing goldenrod stems.

By cutting a gall in half, one can usually find the insect larva inside. Occasionally, there are other insects in the middle of the gall, too, simply making use of the available cavity. During the winter, downy woodpeckers peck open these galls to eat the larvae. The commonest gall on goldenrods is rounded and is known as the goldenrod ball gall. There is another kind of gall, due to a different species of insect, that ressembles a tight cluster of leaves at the top of a goldenrod stem, and yet another that produces an elliptical gall. Other plants have galls, too, including cottonwood and grape leaves, and these galls may also be found at Utica Marsh.

C13. Monarchs and Milkweeds (Ernest Williams)

Milkweeds, which grow on dry ground in Utica Marsh, are so named because of the milky sap or latex they exude. This sap contains poisonous chemicals produced by the plant that prevent most animals from eating their leaves. The chemicals are called cardenolides or cardiac glycosides because they affect the heart rate of vertebrate animals. Even if the toxins weren't there, the latex is so gummy and dries so quickly that small insects couldn't feed easily on milkweeds anyway.

Very few herbivores are able to eat milkweed leaves. The caterpillars of Monarch butterflies can do so, however, and they store the plant poisons in their own tissues to make themselves unpalatable to their own predators. Interestingly, different milkweed species, which grow in different parts of the country, have different arrays of these cardenolide chemicals in their leaves. An overwintering Monarch butterfly found in Mexico can be analyzed for these chemicals, and by matching the chemical profile of the butterfly to the profile of a specific milkweed species, one can tell what part of the U.S. the monarch came from.

C14. Dragonflies (Ernest Williams)

With large wings that are often colorful, dragonflies and damselflies are voracious insect predators that fly back and forth over wetlands, consuming huge numbers of mosquitoes. Their large eyes and strong wings enable them to dart quickly after prey, which they capture while flying in a basket made by their long legs. Then they cut up the prey with their sharp mouthparts. They can also hover or fly backwards, and small flying insects have trouble escaping these skilled hunters. Even bees and butterflies may fall prey to them. Males and females are often seen flying in tandem as mated pairs. The juveniles (naiads) of dragonflies and damselflies live in the water, where they, too, are voracious predators, killing even tadpoles and small fish.

Damselflies are the more slender of these insects, with wings that fold dorsally over the body; the wings are held straight out to the side in dragonflies. Remarkably, a male damselfly is able to remove a competing male's sperm sac from a female's reproductive tract by hooking it with a projection from the tip of his penis and withdrawing it. He then leaves his own sperm sac to assure that he becomes the father of the female's offspring.

C15. Hidden Insects: Spittle Bugs (Ernest Williams)

Many insects are hidden from the view of human observers. Often at the Marsh one sees a wet frothy mass like bubbly saliva on an herbaceous stem. Each of these masses surrounds one or more insects called spittle bugs. Each spittle bug sits head down on a plant stem while feeding on plant juices; it produces the "spittle" by injecting air into fluid from its anus and mucus from glands, and the bubbly mass flows down over the insect, thus providing a moist, hidden place to

feed that is protected from predators and parasites. If you rub your fingers along the plant stem to remove the spittle, you'll find the spittle bug underneath. Spittle bugs are actually nymphs (juveniles) of insects called froghoppers; after their last molt, the adults do not remain in a spittle mass but move about actively, feeding on plants. They look like tiny frogs hopping from plant to plant.

C16. Hidden Insects: Woolly Aphids (Ernest Williams)

Woolly aphids feed on plant juices as do garden aphids, but they are another kind of hidden insect. Woolly aphids are so named because they have numerous wax glands that produce abundant waxy threadlike secretions; in consequence, they appear woolly and are less likely to be found by predators because of their secretions. During the summer, these insects reproduce asexually and, with females producing many female offspring, are able to build up high numbers quickly. They produce males only in the fall so that a sexually reproduced generation overwinters to begin the population the next spring with new genetic combinations. They can appear in dense masses on alders and maples, especially near the pavilion at the Marsh, giving an odd, whitish, woolly appearance to a stem. Close observation shows the woolly masses to be made up of these small insects. Look, also, for predators that have discovered the aphids and have started to feed on them.

C17. Turtles (Lee Kowalsky)

Painted turtles can be observed especially in the spring and during morning hours while they bask in the sun on logs and old tires. As reptiles, turtles are cold-blooded, which means that they need to warm themselves in the sun after a cold night. When observing painted turtles, you may notice that they have a smooth carapace with red and yellow stripes on their necks, legs, and tails. If you see one wandering on the trails or railroad tracks, the best thing to do is to leave it alone.

Snapping turtles are rarely seen because they venture on land only to lay eggs during the summer. They have a very powerful jaw for capturing crayfish, fish, frogs, and ducks, and can grow to be as large as 18 inches and 62 pounds. They should not be handled because they can inflict a serious bite. You can sometimes spot their eyes and nose sticking just above the water surface (aquatic basking), but more likely you will see their trail in the mud as they find a place to lay their eggs.

Turtles lay their eggs on land near the water &endash; late May to June for painted turtles and June into July for snapping turtles. While walking along the trails and railroad tracks at the Marsh, you may find the remains of eggs in the dirt near a nest. The eggs may have hatched, or, if you see that a nest has been dug up, more likely fed on by a skunk or raccoon. The eggs have a shell that is much thinner than a chicken's egg. Painted turtle eggs are oblong in appearance with a leathery shell, while snapping turtle eggs resemble ping pong balls.

C18. Herons (Jamie Doolittle & Ernest Williams)

Standing in the water or flying slowly over the marsh, a Great Blue Heron may appear before you. These birds, often called modern Pterodactyls, are the largest herons in North America and are our local fishermen. They patrol shallow waters in search of fish, crayfish, frogs, and other small animals; after standing motionless for a while, one may make a lightning-quick jab of its sharp, dagger-like beak to skewer its prey. Green Herons are also common at the marsh; they have shorter legs, a crest, are smaller than Great Blues, and usually eat smaller prey. On one bird walk,

we watched a Green Heron eat a frog almost as big as he was! What a sight it was as he attempted to flip the frog into his throat. Occasionally, a Black-crowned Night Heron may appear, a heron of short legs and thick neck that fishes more at night.

C19. Ducks (Jamie Doolittle & Ernest Williams)

The most conspicuous birds at the marsh are ducks, mostly Mallards, Black Ducks, and Wood Ducks. Mallards, with green-headed males, are the best known of all ducks. If you're lucky, you may see courtship displays among these ducks from fall to early spring, with head-shakes, tail-shakes, and other noticeable behaviors. Ducklings are visible through the summer. Mallards often flock with black ducks, with whom they are closely related; black ducks look like melanistic (dark) female mallards. Wood ducks can sometimes can be seen flying across the marsh late in the day to roost in the trees of the north pool. They eat various kinds of plant material and nest in natural tree cavities and nest boxes. Males of this species are known for their colorful plumage.

C20. Rails (Jamie Doolittle & Ernest Williams)

Farther down the path is the observation tower. Bring your spotting scope with you if you have one because from here you can see virtually the whole marsh. Look closely on the ground below you. With luck, you may see a Virginia Rail running from one clump of vegetation to another. Rails are infrequently seen and are more often just heard. Virginia Rails have a distinctive metallic call that sounds like "kid-ick, kid-ick, kid-ick," while the other common rail at Utica Marsh, the Sora, gives a descending whinny. Rails have beautiful long beaks that they use to probe the mud for food &endash; seeds, buds, insects, crustaceans, and molluscs.

C21. Warblers (Jamie Doolittle & Ernest Williams)

As you walk down the bike path towards the barge canal, keep a close eye on the shrubs and bushes to either side of you. Likely in the late spring and summer you will see and hear many warblers, birds which are very active insect-feeders and which migrate back from the tropics after our winter is over. Warblers are difficult to identify as they move quickly from branch to branch, but they are heard more often than seen, and some of their songs are readily recognizable. Yellow Warblers sing a distinctive "sweet-sweet-sweeter-than-sweet", while Common Yellowthroats sing a three-noted "wititee wititee wititee." During spring migration there are numerous other warblers at the Marsh, too, including Redstarts and Cerulean Warblers.

C22. Red-winged Blackbirds (Lee Kowalsky)

Red-winged blackbirds are among the most easily seen birds in a wetland or field, and they are often the first birds to arrive in the spring migration. Males are black with brilliant red to orange-red epaulets (shoulder patches) on their wings, and they can be seen perching on the top of cattails as they sing and display to protect their territories. One of their songs is a distinctive "kong-ka-ree." Females, on the other hand, are seen less often because they have a nondescript brown-streaked color (almost sparrow-like) and blend in with the grasses. Females build nests of woven grasses that hang just above water level in the cattails, reeds, or grasses. They lay 3 to 5 eggs per nest, and both parents will scold if you are close to the nest. Because the birds are territorial, with some patience you can observe their territorial and courtship displays, labelled (Stokes Nature Guides, A Guide to Bird Behavior, Vol. 1, 1979, p. 275) song-spread, bill-tilt, song-flight, tail-

flick, crouch, sexual-chase, and wing-tipping. At Utica Marsh, you can easily see variations in their posture and songs.

C23. Muskrat Houses and Trails (Steve Litwhiler)

The mounds of cattails and other materials that muskrats construct are for summer and winter protection. The inside contains a cavity above the water line where they can have young, escape predators, and get air in the winter. A marsh's population of muskrats can be estimated by counting the houses and multiplying by 5. On the average, 2 to 3 houses per acre indicate a muskrat population in balance with the needs of the marsh. After the very dry conditions during the summer of 1995, the muskrat population has been low, and few lodges can be seen. Muskrat are very prolific, however, and with a normal water level, the population can rebound in just one summer. The roots of cattails are the muskrat's primary winter food supply, and too many muskrats can open up the marsh too much. On the opposite extreme, with too few muskrats all the shallow areas of the marsh may fill in with cattails. The trails that muskrats make by eating their way through the solid mat of cattails are essential for all the water-dwelling creatures to travel around the marsh. Again, balance is important in the marsh, and often people must help to maintain that balance. Muskrat cuttings are pieces of cattails and often whole floating plants (their roots have been dug up and eaten) that can be seen washed up along shores and their travel routes.

D. LEADING FIELD TRIPS

D1. Preparing Groups for the Marsh (Wendy Whitney)

When taking groups out for trail walks, it is always better to be over-prepared than under-prepared. These general guidelines may be helpful in planning a successful outing at the Utica Marsh or elsewhere.

Audience
- group size: ten participants to one leader is the maximum recommended
- age level : mixed, or around the same age such as a class
- objectives: strictly recreational? or are there specific educational goals? define the goals.

Time
- time of year : There are many different things to see during each season. If it is winter, check the wind chill factor.
- time of day : In summer, it is cooler in the morning or early evening. Mosquitoes are terrible toward later evening and early in the morning, especially in shady areas.
- length of outing: For youngsters, it is better to limit the time to one hour and make certain that everyone is dressed appropriately. Remember that there are no facilities, so 2-3 hours is usually enough, depending on the age group.

Dress
- Advise participants to dress appropriately. Shorts may be cooler, but tender legs are inviting to mosquitoes. Also, old shoes or boots are better than new ones.
- In winter, wear a hat and mittens and dress in layers for warmth.

Equipment

What do you want participants to bring?

Who is responsible for equipment? Have participants help carry some items.

What you provide: bring extra equipment such as binoculars, bug repellent without DEET, gloves in winter, etc.

suggested equipment, depending on objectives and availability; map, compass, binoculars, field guides, water, insect repellent, bags to dispose of garbage, first aid kit, field guides, a watch, bandanas (good for first aid and keeping mosquitoes away from your face), water sampling equipment, and collecting equipment. But don't carry so much on one trip that it becomes a burden.

Collecting

Unless you are planning to do further study in a classroom or laboratory environment, you should return any living thing back to its habitat. If you do take something from the marsh or any other natural environment, please return it to the same place and not another habitat. Use good judgment as to what is appropriate to remove. It is illegal to possess wildlife such as turtles without a specific permit from New York State's Department of Environmental Conservation (DEC).

D2. Leading A Walk (Wendy Whitney)

The beauty of a nature walk is that you never know what you will come across. Discovery is exciting, especially with young children. It doesn't matter if you don't know everything (very few have knowledge of all that you may encounter), so just enjoy the walk, and others will also.

D2. Leading A Walk Wendy Whitney

The beauty of a nature walk is that you never know what you will come across. Discovery is exciting, especially with young children. It doesn't matter if you don't know everything (very few have knowledge of all that you may encounter), so just enjoy the walk, and others will also.

Set the tone for the walk ahead of time. If your goal is to observe waterfowl, then you must be as quiet as possible so that the birds do not disappear from view. Set up a spotting scope on the observation platform near the pavilion or anywhere along the trail. Be patient, and the wildlife will become visible to you. Young children will not be so easy to keep quiet, but don't worry because they will enjoy the many frogs, turtles, and insects that they will encounter. Listening to the sounds of birds and other wildlife is a key to observing wildlife. Many animals blend in with their surroundings so well that you may pass by without even noticing them.

A group of 10 people for each leader is about the maximum recommended for walking the trails at the marsh; if you have children under the age of 7, then 5-6 to one leader is better. You'll want to note the time you start out so that you'll know when you should return. At some time prior to leading a group, it would be a good idea to walk the entire trail system at the marsh to get a feel for the environment and a sense of timing. Depending on the time of year, most groups use only a small portion of the trails because there is so much to see and experience. Don't worry about covering a lot of territory. Just enjoy what you see, hear, and touch, and come back for more on another day!

D3. Safety Issues (Wendy Whitney)

Emergency First Aid certification is recommended, or have someone along who is certified. If not certified, it is a good idea to have a cellular phone to call for emergency help. Bring a first aid kit small enough to carry with you that is equipped for allergic reactions. Are any participants asthmatic or allergic to insect bites? They should bring what they need for such a situation.

Scout the area out beforehand and determine if there are any potential hazardous situations. Check areas around the pavilion and parking lots for broken glass and other things that might be unsanitary. Use precaution and wear gloves when disposing of such items.

Learn to identify poison ivy, and note its location. Fortunately, it is not widespread at the marsh.

Warn participants to not eat any wild foods without learning from an expert in the field. Most wild foods such as apples and grapes may upset stomachs not used to them. Also, some wild plants are poisonous but ressemble edible plants.

Advise participants to wash their hands before eating, especially if they have touched various animals such as frogs, toads, and salamanders. These animals are known to exude a substance that causes diarrhea.

D4. The Marsh as a Classroom (Kathe Salzman)

When leading a trail walk for young people, presenting age-appropriate material in an age-appropriate way is probably the most important factor. If possible, I have the group view the Utica Marsh slide presentation before taking the field trip. I stress that a field trip to a wildlife sanctuary is not like a trip to a zoo. The animals are not caged, waiting to be seen, so it is best for them to learn something about the seasonal habits of the animals in the habitat they are visiting. Scats and footprints make an exciting topic for them, as you might imagine. For pre-teen groups, the idea of being a "nature detective" is very appealing.

A quiet demeanor on the trail is regarded as foreign behavior to most kids who have just escaped on large yellow vehicles from a day in the school. Still, with a streak of incurable optimism, I begin each walk with that suggestion. (If you don't want to scare every bird within a mile and attract the attention of the student "buzzard," stop screeching your friends' names at the top of your lungs! A sense of humor is extremely important for the survival of a trail guide sent out with school children from any district.)

Eight is about the ideal number for a trail walk because in that size group, everybody can hear, and everybody gets a turn to talk. Group discipline problems arise more frequently when students can't hear or don't get a turn to talk. It's important to use the kids' names and ask for their experience with some topic you've introduced. They may have things they can and want to teach the group, and when that happens, you're probably on the track of a good learning experience.

When I meet with a class beforehand to prepare them for what they may see at the marsh, it usually makes for a better experience for all concerned. I make sure to inform the teacher requesting a guided walk that a Marsh Guide should be found in the school's library. (I always

bring one with me in case the classroom teacher decides to join the Council.) If I am unable to give a slide presentation before a field trip, I ask for information about classroom studies in science and social studies/history so that I can try to relate the walk to their curriculum.

For elementary school children, asking them to think of themselves as Native American children living before the arrival of the colonists generally intrigues them. The ecology of the marsh can be passed on in a personalized way with that approach. I can't really recommend one source for content on that kind of walk, but much of the information, especially, in the area of wild foods and medicinal plants, would be helpful. Don't forget the resources available at the Oneida Nation Museum (near the reservation Smoke Shop on Rt. 46) if this walk approach interests you. This may, also, be a good approach for junior high groups depending on their scientific sophistication. The ecology games in the back of the Marsh Guide have been used successfully by teachers as pre-walk and post-walk activities.

Certainly, field studies in ecology can enliven a student's interest in related school subjects. Generally, I've found that being a trail guide is a satisfying activity. Getting kids outside in the wild world is harder and harder in the age of VCR's and Sega, but it can have so many positive effects for both intellectual and social development that it's sure worth a try.

D5. Trails (Wendy Whitney)

The Utica Marsh Council, in cooperation with the NYSDEC, developed the walking trails through the marsh. The bike trail was developed by NYS Department of Transportation (?) and now is owned by NYS Thruway Authority (not sure on this). Volunteer organizations as well as NYSDEC have contributed over the years to the building of the observation decks and maintenance of the trails. Among these are Adirondack Mountain Club, Utica Rotary, GE ELFUNS (Retired GE Engineers), Oneida County Sheriff's Department Work Offender Program, Boy Scouts of America, Oneida County Summer Youth Employment Program, Midstate Correctional Facility Inmate Work Program, and Utica Marsh Council members.

Although the road along the railroad tracks is a popular and convenient way to view the marsh, it is not part of the Utica Marsh trail system itself and caution should be taken should one choose to use it. In any case, the railroad tracks should NOT be used on a trail walk, and you should advise participants not to walk on the tracks! A floating boardwalk is currently being pursued as a feasible alternative to using the railroad track area; however, construction of the boardwalk is very difficult, and it is not ready for use.

The Utica Marsh Council is always looking for volunteers to help with trail maintenance. Please contact us if you would like to volunteer as an individual or as an organized group. Your help is most appreciated. Please also let us know of any conditions considered hazardous or in need of repair.

D6. Bike Trail Wendy Whitney

The paved bike trail is great for bike riding, walking, and jogging as well as cross-country skiing and snowshoeing in the winter time. It begins at the end of Barnes Avenue past the railroad tracks and runs along the north end of the marsh, paralleling the Barge Canal. When you reach the Route 12 overpass, you may take a right up a slight uphill grade and loop around parallel to Route 12

heading north. Then there is a nice little downhill run which then goes up a slight incline crossing the New York State Thruway. The trail then slopes toward and ends at Route 49.

Although it is not a very long bike ride, there is much to see. As you travel along you'll come across one of the observation towers, which is worth using to observe wildlife and to get an overview of the marsh itself. On a hot summer day, the bike trail is a wonderful way to spend a day at the marsh in the shade because of the many trees lining both sides of the trail. This trail is also a good way to access fishing spots along the barge canal. There is also a swampy area with a lot of dead trees as you head toward Route 49. Hawks and owls have been seen here as well as woodpeckers getting a meal from the dead trees.

You may also choose to go straight instead of taking the right hand turn at the Route 12 overpass. As you travel east underneath Route 12, you can observe three pools to the right which were created for waterfowl when the arterial project was completed.

E. PEOPLE AND THE MARSH

E1. Marsh Council and Community Involvement (Kathe Salzman)

Before the Marsh Council, there was the Mohawk Floodplain Association, a group organized and inspired by the local naturalist Virginia Billings. That group was concerned about preventing further loss of freshwater wetlands along the Mohawk and began efforts in 1970 to create a marsh preserve on the 213 acres now owned by the state of New York. Prior to 1979, the area known as the Utica Marsh Wildlife Management Area was owned by the City of Utica and private individuals. Through the activity of the members of the Floodplain Association, enough community interest was generated to press the city and the state to work together in a plan to preserve the marsh. Chet Wilczek, Nancy Cooper, and Paul Baker are three recent council members whom we can thank for their work back in the seventies!

The Utica Marsh Council, incorporated in 1988, is a non-profit organization dedicated to environmental education and conservation of wetlands, and it acts as an advisory group to the state Department of Environmental Conservation (D.E.C.) on issues, concerns, and projects affecting the Utica Marsh and the floodplain of the Mohawk River. The Council has approximately 100 members and currently meets at 7:30 p.m. on the third Thursday of the month, September through June (no December meeting), usually at the Munson Williams Procter Meetinghouse on State Street.

A slide show presentation (with a 17 min. tape) to acquaint the public with the Utica Marsh as an urban wildlife sanctuary and the multiple benefits of wetlands, in general, is available to local groups and schools on request (contact Kathe Salzman 853-6696). The major objectives of this presentation are to change the public's view of marshlands as trashlands and to encourage more appropriate use of the marsh for hiking, biking, bird watching, and picnicking. The slides have also been designed to be used in the classroom, in conjunction with the Utica Marsh Information and Teacher's Guide and field trips to the Marsh, as an effective ecology teaching module. The Guide has received statewide recognition as an outstanding way of integrating our local natural resources into the science curriculum of our schools.

It is important to take note of the wide range of grassroots support that the Utica Marsh Council has received so that credit can be given to the groups that have worked and are continuing to work to improve the facilities and educational activities at the marsh.

local Naval Reserve Unit : helped construct the bikeway along the Barge Canal (1972)
Rotary Club of Utica: helped construct the bikeway (1972) and gave a grant for construction of the second bird observation tower (1992)
N.Y.S.D.E.C.: built a parking lot and the central bird observation tower, which was dedicated to Statira and Carl Gruppe "for their tireless efforts on behalf of Mother Earth" (1977)
Utica Neighborhood Center, trail construction (1980)
City of Utica Youth Conservation Corps, trail construction (1981)
General Electric and the New York Telephone employees &endash; built picnic pavilion (1985)
Utica Children's Museum: education at the marsh through a Return a Gift to Wildlife grant (1985)
New York State Power Authority :funds for trail improvement (1987)
Cub Scout Pack 88: trail development (1988)
State Senator James Donovan: helped secure a state grant to publish the marsh book, the Utica Marsh Information and Teacher's Guide (1988)
ELFUN Society (General Electric employees): financed and built hundreds of feet of boardwalk (1994)
Izaak Walton League: funds for slide show improvement (1996)
The Adirondack Mountain Club and the Oneida County Environmental Management Council have also been supporters over the years.

This brief list illustrates the point that community support for the objectives of the Marsh Council remains strong. Also, in recent years,the marsh has been a work site for the City of Utica summer Youth Employment Program, and the annual clean-up in 1996 was aided greatly by the work of prisoners from the Oneida County Correctional Facilty.

The annual clean-up at the marsh generally takes place near Earth Week in April and attracts around 100 students and adults. It is a great example of community involvement in marsh conservation. The Paris Rod and Gun Club offers the use of their clubhouse on Barnes Avenue as the headquarters for the activity. Workers come from the Federated Sportsmen's Club, Adirondack Mountain Club, scout troops, and local colleges. Science students from the Utica schools, also, work with their teachers and individual council members in cooperation with state wildlife officers to remove the mountains of trash deposited each year by unconcerned citizens.

"Community Day" is another activity that the council has sponsored over the years to promote public awareness of wetland conservation and the facilities at Utica Marsh. Those days, usually one in early summer and one in fall, are advertised in the Observer Dispatch and take place on Saturday mornings from 9:00 a.m. to noon. Trail leaders are especially needed at that time.

When leading walks, stress that for the activities of the Marsh Council to continue, people must become actively involved. Encourage the visitors to peruse the Information and Teacher's Guide, and, perhaps, attend a meeting to see if they would consider joining and becoming active in Marsh Council activities. Don't forget to provide each walker with a brochure which contains a membership form.

E2. Nest Boxes and Conservation History (Steve Litwhiler)

Nest boxes or natural tree cavities can be seen around the marsh. The most obvious may be the wood duck boxes. Wood ducks and other tree-nesting ducks such as mergansers may have been saved from extinction by boxes like these. In the early 1900's people cut trees right up to the water's edge, including trees which tree-nesting ducks and other cavity nesting birds needed to have young. These changes, combined with a lack of laws restricting the shooting of ducks, caused a drastic decline in their populations. In the 1930's conservation-minded people noticed this problem and came up with nest boxes and laws protecting all wildlife. More recently, laws were passed protecting trees along waterways. When a natural tree cavity is available, a bird will usually select it. The boxes we can provide are a great benefit to birds when natural cavities aren't available and the boxes are placed in the right locations. Many birds can benefit from boxes depending on the size of the boxes and entry hole. Bluebird nest boxes are seen all around the countryside these days. Not all birds use boxes, but some can often be helped in nesting with structures like floating platforms for loons, nesting towers for ospreys or eagles, and man-made islands for geese.

E3. Stories of the Past (Kathe Salzman)

I believe that learning to love and respect the natural world is an exercise in loving that relates to developing the ability to love on a personal and on a community level. Each time that I lead a group of children on a walk, I'm hoping that by teaching them to observe the awesome activity of nature, as seen in the Utica Marsh, they will learn to love a cattail, a heron, a muskrat lodge and grow on to more complicated emotions. Bumper stickers that in ecological fervor proclaim "Love Your Mother" depend for meaning on people getting to know Mother Earth, and ideally, I think, that acquaintance best begins with getting to know one spot well.

This belief in the importance of an emotional attachment to a natural place led me to interview Chet Wilczek, John Gasek and Henry Dousharm, all of whom grew up in the West Utica neighborhood surrounding the marsh. The tidbits of social history they provided about the marsh are interesting to integrate into guided walks. The stories tell us about their relationships to the area and how it has changed. They are interesting comments on commitment to community and on the human connections in web of the ecology of the Utica Marsh. If you chose to integrate any part of this information into your walks, it may be a way of capturing the imagination of the walkers and spurring their further interest in the Marsh or in places they learned to love as children.

Mr. Wilczek was employed for forty-six years by Westinghouse in their factory that was located at Harbor Point in Utica not far from the marsh. Since 1949, he has been the coordinator of the county Sportsmen Education Program. He is also active with the Utica Marsh Council, the Federated Sportsmen's Club, the Isaac Walton League, to name a few.

Mr. Dousharm is retiring this year from a sucessful demolition business that was based on the land adjacent to the present state land (land on which the pavilion is located was taken from him by the state through eminent domain in 1979). The main trail we use from the pavilion to the railroad tracks is actually the remnant of a road he put through there in the sixties for a developer who hoped to sell housing lots there.)

Mr. Gasek is retired from Chicago Pneumatic. He remains active in Polish community organizations such as the Kopernik Association and the Federated Sportsmen's Club. He is a dedicated hunter, naturalist, and avid photographer of nature who has a large collection of photos of the Mohawk River floodplain.

In May we met under the pavilion at the end of Dousharm Rd., and these men spoke about what the floodplain meant to the immigrant communities in the neighborhood, about the businesses that were active in the area in the first half of the twentieth century, and about some of the changes that they've witnessed over the years.

"To get a picture of what West Utica was like in 1911" (the year he was born), Wilczek begins, "you have to know that most of the people here were Italian, Polish, Irish, or German (the majority were Christians but some were Jewish). And I mean by that that most of them were immigrants from those countries."

"My parents and John's (John Gasek)," he continues, "came from Galicia, a place that went back and forth between Prussia, Austria, Russia and Poland over the years. They were hard-working people who saw the beautiful big pieces of land and figured it wouldn't be hard to be successful at farming. For a year or so, my parents rented a farm outside of Rome and worked their fingers to the bone dairying. But the land didn't have the good topsoil that they had in Europe so they called it quits and moved back to the city."

"My father," Gasek says, "was a naturalist and a taxidermist in the old country so naturally he taught me everything he knew about hunting and fishing and nature."

In that West Utica community of European immigrants, most with strong connection to the earth, the floodplain area became "a mecca for your neighborhood," Wilczek says. "You have to understand that the land wasn't always as wet as it is now," Wilczek explains. "Before the M.U.D. Project with the dikes and everything, the Mohawk would flood badly in the spring but then the land would soak it up. The area off to the left of the trail near the pavilion area used to dry up so well that Edick's Dairy used to bring their cows down from Marcy and graze them over there."

Even though the land was privately owned (the Edick family holding one of the original land grants) no one, that Wilczek knows of, was ever stopped from using the area as long as they did no damage. Over the years, a few people who lived in marginal ways actually built shacks in the area that went undisturbed, except by the yearly floods. Dousharm recalls rescuing one couple from the roof of their home as the Mohawk was busy doing its spring demolition.

"It was a way of life years back," says Wilczek. "There were no posted signs about trespassing. It was open land and people from the neighborhood picnicked here, played here and freely harvested the plants and animals that lived here."

"Do you remember," Dousharm asks Wilczek, "in the forties we had a baseball diamond on the land behind where the Rod and Gun Club is now. The married guys would play the singles. Whoever lost would pay for the half-a-keg of beer that sat in the shade until we finished. "And I'll tell you what I'll never forget," Dousharm continues, "the way the Truant Officer, Mrs. Westfall from St. Pat's, would always seem to catch us skinny dipping down to the Barge Canal. She'd yell

out in that big voice of hers that we couldn't hide from her, and if we wanted to see our clothes again we'd better come out fast." Wikczek laughs, remembering quite clearly those moments.

The younger kids, he says, swam in the rainwater-filled clay pits of the brickyards that used to be situated on both sides of Dousharm Rd. Of course, in the wintertime, those pools became ice rinks. On the other side of Cleaver Rd. (Barnes Ave.), there were ponds on which the great Olympian speed skater, Val Bialas, is known to have practiced for the 1924, 1928 and 1932 Olympic Games.

During World War II, families in West Utica planted their Victory Gardens down on the floodplain, but for years before that they had harvested wild foods from the land.

Wilczek remembers an Eastertime ritual in which families would walk down Cleaver Rd. (Barnes Ave.) with a shovel and pail to harvest horseradish for Easter dinner (or for Passover seder). Some of the gatherers, aware that overharvesting could cause an end to this custom, were careful to leave enough root for future growth.

"There's still a nice patch of horseradish down by the boat launch," Dousharm reveals. "And of course," ways Wilczek, "most of them were used to collecting mushrooms in the old country, so it was a place to do that, too."

Dousharm remembers that if they weren't sure about whether the mushrooms were poisonous or not, they'd boil them down and throw a dime in the pot. If the dime turned black, they wouldn't eat them; otherwise, they were supper.

"Not a foolproof system, though," Wilczek observes. "People got stomach aches and diarrhea more than once after eating them." Tree mushrooms and podpinkes were among the best choices for a mushroom meal from the marsh.

They recall that chokecherries and elderberries used to grow in abundance, especially along the Barge Canal. Dousharm remembers harvesting a pick-up truck load of elderberries one year to make wine. He observes sadly that you can hardly find an elderberry bush any longer. It was common for the people to make wine and jelly from the wild grapes and berries that grew in the area. "What you made and which berry you chose to make it from depended on which ethnic group you belonged to," says Wilczek.

Boys were the most avid trappers of muskrat, woodchuck and rabbits in the marsh. Sometimes they'd actually sleep by their traps to make sure they didn't lose their bounty to an earlier riser.

Nowadays, they acknowledge, you can't harvest plants or hunt and trap in the marsh because it belongs to the state (they do issue ten licenses a year to trap muskrats though), but the Utica Marsh is still the best place around to study nature, especially birds. To know that 150 different bird species have been sighted at the marsh and that 35 of those species nest at the marsh is always amazing to visitors.

In the twenties and thirties, when the depression had trimmed slim family resources even further, the kids could sell a muskrat or a rabbit to Utica Hide and Tallow Company on Whitesboro Street for fifty cents. Big money for sure. Utica Hide would take the whole animal, but if you were good at skinning you had another marketing possibility at the fur stores in downtown Utica.

Gasek has particular memory of the hobos who'd camp near the railroad tracks over by the Barge Canal. In those days there were a hundred trains a day (maybe more Gasek adds) going through Utica. "Us kids would trap woodchucks and bring them down to the men in the hobo camps," says Gasek.

"Then they'd go down to the green grocer Jacob Gennis," Wilczek adds. "He'd give them the leftovers of the day and they'd go make themselves a 'mulligan' stew."

"You gotta understand," Gasek says with conviction, "Those people weren't bums. They were mostly people who couldn't find work and had lost everything so the kids helped them out." Self-reliance and self-esteem among the boys appear to have been closely related to knowledge of nature and the floodplain in their neighborhood.

Dousharm chides a young member of the council who has stopped to listen to the conversation. "Come on, Steve, if you were on the ball you could be making big money like I did selling bait that I caught out there (he points to the marsh). In the fifties, I used to come down here after work and catch hundreds of frogs, crawfish and bass bugs (dragonfly nymphs) to sell. Made a pretty penny per week, too... But I guess state regulations have changed a lot of things these days."

It's a shame," agrees Wilczek. "It just seems like people don't respect the land or property anymore so more and more laws and regulations are made but I'm not sure it helps very much."

In the thirties, Wilczek believes, because the city of Utica used the floodplain as a garbage dump, a large population of pheasants flourished there. He recalls a story related to pheasant hunting and the negative impact that the three slaughterhouses on each side of Cleaver Rd. (Barnes Ave.) had on the river and on the air quality of West Utica.

"I remember one day, I got myself a pheasant but it dropped in the river, which was red with blood and entrails because it was a slaughtering day at Durr's. Just to show you how important it was for me to bring that bird home, I'll tell you that I went right into that stuff to get it out."

"Nobody thought much about how the river would run with blood or the air would stink to high heaven," he says. "Sometimes the river would even turn purple or blue from the inks used at the paper mill on Erie St. The neighbors complained but you just learned to live with it. It was a way of doing things that you figured you had to accept because complaining got you nowhere."

This acceptance of untreated industrial waste was seen in the thirties when tar was being manufactured at Harbor Point by the Tarmack Company or when coal was being burned to make illuminated gas by Utica Gas and Electric in the same place. Everyone knew the air and the soil were being affected but that was just the cost of progress they were told.

In the seventies, Wilczek remembers a woman from the Scotia area coming up to give a talk about how things being done by the factories on Harbor Point in Utica were poisoning the wells of people downstream. That was about the time of the first Earth Day when awareness of environmental pollution was beginning to grow.

Still committed to improving his community, in his eighty-fifth year, Wilczek finds himself serving on a citizens advisory committee to the N.Y.S. clean-up project at Harbor Point (a seriously polluted area near the marsh located between the Mohawk and the Barge Canal). Wilczek takes the philosophical position that years ago industries were like 'the pioneers.' They didn't understand the full effect of their practices. "It was just the way things were done then," he says. "Now we should know better."

The three men spoke of how the close and lasting ties they have to the neighborhood and the floodplain have influenced their lives. The fact that they're still down there almost every day and still working to teach the things they've learned speaks about the power a river, a marsh, a well-loved place can have on a person.

Now it is clear, they agree, that our survival on this planet depends on developing greater respect for the land and knowledge of the use of our natural resources. Political and industrial policies must be based on up-to-date scientific knowledge. And, of course, an enthusiasm for the natural sciences and the beauty of nature can begin your guided trail walk down at the marsh!

E4. Outdoor & Environmental Education Resources (Marsha Guzewich)

* - These resources are not available in bookstores. Please contact Rogers Center to order.
# - These out-of-print resources may be difficult to find.

NATURAL HISTORY REFERENCES

Fieldbook of Natural History. E. Laurence Palmer and H. Seymour Fowler, McGraw Hill Book Co. An identification and reference guide covering a wide array of topics, including astronomy, weather, geology, plants, and animals. This large book has interesting, though brief, information about each species covered. Covers most common species, especially useful is the coverage of domestic plants and animals. All species descriptions contain life cycle, reproduction, and economic value comments, often not found in other books, though some comments are outdated.

A Field Guide to the Familiar. Gale Lawrence, Prentice Hall Press. Designed to encourage the beginning naturalist, and to challenge the more experienced observer, to look at the familiar in new ways.

Handbook of Nature Study. Anna Botsford Comstock, Cornell University Press, 937pp. A comprehensive volume of nature study of organisms in their environment, their relation to the world around them, and the features which enable them to function in their surroundings.

Reader's Digest - North American Wildlife: An Illustrated Guide to 2,000 Plants and Animals. Susan J. Wernert, editor, Reader's Digest Association. Beginning with an introduction to habitats, this book covers wildlife and plants found in North America. Each species accompanied by a color drawing, habitat key, characteristics, and a brief text.

Nature Smart: A Family Guide to Nature. Stan Tekiela & Karen Shanberg, Adventure Publications, 1995. Comprehensive and user-friendly nature guide covering birds, bugs, mammals, reptiles, amphibians, plants, rocks, weather, stars, and more. Illustrated. Easy-to-use question and answer format.

ACTIVITY GUIDES

Where does one go to obtain ideas for outdoor or ecology-oriented activities? As with field guides, there is an amazing array of information available, but some of it has to be actively sought out. Recently, there has been a proliferation of activity guides. The following books should be reviewed for grade level, subject matter, setting, types of materials, and equipment to determine if they are appropriate for your needs.

Cooperative Activity Guides

Cowstails and Cobras 2. Karl Rohnke, Kendall/Hunt Publishing Co. A guide to games, initiatives, ropes courses, and adventure curriculum.

Everybody Wins. Jeffrey Sobel, Walker and Company. 393 non-competitive games for young children.

Silver Bullets. Karl Rohnke, Kendall/Hunt Publishing Co. A guide to initiative problems, adventure games, and trust activities.

Playfair. Matt Weinstein and Joel Goodman, Impact Publishers. Everybody's guide to non-competitive play.

The New Games Book. Andrew Fluegelman, Doubleday. Play hard, play fair, nobody hurt.

More New Games and Playful Ideas From the New Games Foundation. Andrew Fluegelman, Doubleday.

Nature Activity Guides

* Project WILD and * Aquatic Project WILD each require attendance at a three-hour workshop toobtain a free copy of the manual. Both contain interdisciplinary environmental education activities that focus on wildlife. Aquatic Project WILD deals specifically with water and its wildlife influences. Each WILD activity description provides the background necessary to run the activity and is set up in lesson plan format. Children experience a variety of teaching methods through these books. * Project WET is a water education program for educators and young people grades K-12 that promotes awareness, appreciation, knowledge, and stewardship of water resources. An activity guide is available at nominal fee after a 4-hour workshop. To find out more about WILD, and WET workshops, call Rogers Environmental Education Center (607) 674-4017.

* Project Learning Tree is a very similar activity guide, focusing on plant life. This guide is obtained by attending a six-hour training session that includes a fee. To find out more about PLT, contact the Division of Lands and Forests at your local NYS Department of Environmental Conservation (DEC) office.

Sharing Nature With Children. Joseph Cornell, Dawn Publications. Becoming one of the standard nature activity books used by parents, teachers, and youth leaders. Available in many bookstores, the book contains activities appropriate for ages 3 and up. The activities help children explore, discover, and stimulate nature. Sharing the Joy of Nature is the sequel to this book. In it, the author expands upon the methods he discovered through his work teaching children about nature and its inspirations. He calls these methods "flow learning" to describe ways to learn nature activities in a flowing, purposeful, directional way. The book contains explanations of this learning process as well as twenty activities using these concepts. Journey to the Heart of Nature by Cornell is for young adults, adults, teachers, and youth leaders. Nature stories and absorbing activities guide you on an ever-deepening exploration into the heart of your selected outdoor spot.

NatureScope is a periodical published by the National Wildlife Federation. Each issue focuses on a specific topic such as mammals, birds, trees, endangered species, wetlands, and weather. There are at least 16 different topics. Coverage of each topic is very thorough, including background information, pages for copying, and a wide variety of activities covering a range of age levels and situations. Many of the activities are indoor-oriented, but they make excellent lead-ins or follow-ups for field trips. The whole series or individual issues may be purchased through the National Wildlife Federation. This one is well worth the cost.
Naturescope Titles: Discovering Deserts; Pollution: Problems and Solutions; Geology: The Active Earth; Wild and Crafty; Wild about Weather; Wading into Wetlands; Diving into Oceans; Rain Forests: Tropical Treasures; Astronomy Adventures; Incredible Insects; Endangered Species: Wild and Rare; Let's Hear It for the Herps (reptiles & amphibians)

The Curious Naturalist is an attractive book containing illustrations and ideas for outdoor explorations, organized by season. Written by John Mitchell and the Massachusetts Audubon Society, the book is a compilation of material from the magazine The Curious Naturalist. This guide offers lots of useful and interesting tidbits relating to the natural world, in answer to the questions that might result from a field trip.

Sunship Earth is one of three activity books by Steve Van Matre, American Camping Association. This reasonably priced book is an entire program focusing on ecological concepts. Through magic, props, and hands-on experiences, these activities are designed to help children understand and appreciate the workings of the natural world in a simplified manner. Acclimatization and Acclimatizing were the forerunners of Sunship Earth.

Hug A Tree. Robert E. Rockwell, E.A. Sherwood, and R.A. Williams, Gryphon House, Inc., and # Nature With Children of All Ages, Edith A. Sisson, Prentice-Hall, Inc., are both excellent activity books for the young child. Parents, teachers, and youth leaders can discover easy-to-follow ideas. Hug A Tree is organized by the processes of exploring the outdoors, i.e., by sensory exploration, data collecting, and weather watching. # Nature With Children of All Ages is organized by topics such as trees, seeds, mammals, birds, etc. Materials for these activities are items you can find around the house or classroom.

The Brown Paper School Series, published by Little, Brown and Co., is a series of small books about big ideas, written and designed for kids and adults together. Titles for environmental education include The Book of Where (Natural Geography), The Reasons For Seasons, Beastly Neighbors (Wild Things in the City), and The Night Sky Book (Astronomy), and are recommended for the variety of information and activity ideas included. Many activities may be done by a child alone with little guidance from a parent or adult. The level of activities is upper elementary.

Hands On Nature. Jenepher Linglebach, The Vermont Institute of Natural Science, includes concept units of activities developed by VINS. Each unit stands alone, though single activities can be taken out of the concept units. Activities are aimed for the elementary level and include pertinent background information and clear instructions for leading the activities with young people. Manyactivities are group oriented. Materials are inexpensive and easy to obtain.

* OBIS (Outdoor Biological Instructional Strategies) consists of 97 different activities which are distributed singly or in modules. The activities are designed for 12-15 year olds but are adapted

easily for younger children. The activity leader needs little or no science background to lead these ativities. They are hands-on and discovery- oriented, focusing on nature and including habitats such as lawn, pond, and stream, as well as concepts such as camouflage and predator-prey relationships. Each activity provides background information, procedures, and clear instructions for making one's own equipment. OBIS is distributed through DELTA Education, Inc. (Box M, Nashua, NJ 03061). One can attend training sessions for these activities through the Girl Scouts. There is a fee for the workshop and for the individual activity descriptions.

Education Goes Outdoors. Frank Johns, Kurt Liske, Amy Evans, Addison-Wesley Publishing Company. A collection of activities designed for students in grades K-9. The learning experiences teach students basic skills through direct contact with the natural world. Designed for science, math, language arts, social studies, and the arts.

Tips and Tricks in Outdoor Education. Malcolm D. Swan, The Interstate Printers and Publishers, Inc., 1983. Approaches to providing children with educational experiences in the outdoors. An assortment of guides, plans, ideas, and suggestions helpful to persons wanting to provide children with educational experiences outdoors.

Beyond The Classroom: Exploration of Schoolground and Backyard. Charles Roth, Cleti Cerroni, Thomas Wellnitz, Elizabeth Arms, Massachusetts Audubon Society. A collection of activities designed for grades K-9 to develop observation skills, and the use of all their senses to gather information.

One of the older but still useful outdoor education books is Ten Minute Field Trips, Helen Ross Russell, J.G. Ferguson Publishing Company and recently re-released. The focus of these activities is taking a class of children outdoors from school. Explorations use the school grounds and whatever can be found there. City, suburban, or rural schoolyards are all appropriate for these field trips. Topics ranging from plants to earth science include background information, indoor and outdoor activities, and details of how the teacher needs to prepare.

Another older book is Learning About Nature Through Games, Virginia Musselman, Stackpole Books. The basic premise of the book is that children build stepping stones by learning through games without the pressure of school. The short and simple games are designed to build awareness, lead to questions, and encourage children to explore something new.

* Utica Marsh Guide: A Marsh For All Seasons, Utica Marsh Council, Inc. Utica, NY. An in-depth exploration of marsh life and ecology, accompanied by activities designed for teachers. Applicable to any freshwater marsh.

Outdoor Education Equipment. Russell E. Bachert, and Emerson L. Snooks, The Interstate Printers and Publishers, Inc., Danville, IL 61832. Plans for easy-to-make items... a valuable collection of instructional aids assembled easily and inexpensively.

Keepers of the Earth (Native American Stories and Environmental Activities for Children), Keepers of the Animals (Native American Stories and Wildlife Activities for Children), Keepers ofLife (Discovering Plants through Native American Stories and Earth Activities for Children), Keepers of the Night (Native American Stories and Nocturnal Activities for Children). Michael Caduto and Joseph Bruchac, Fulcrum Inc.

Earth Child. Kathryn Sheehan and Mary Waidner, Ph.D., Council Oak Books. Games, stories, activities, experiments, and ideas about living lightly on Planet Earth. Activities designed for children ranging in age from 3 to 12 years. Sample topics include the circle of day and night, earth celebrations throughout the year, wet and wonderful, and hurt no living thing.

Nature for the Very Young. Marcia Bowden, John Wiley and Sons, Inc. A handbook of indoor and outdoor activities. Designed for preschool children. Sample topics include autumn - time of preparation, winter - color recognition, spring - sequencing, and summer - body awareness.

Talking to Fireflies, Shrinking the Moon. Edward Duensing, Penquin Books. A parents guide to nature activities. Sample activities include fish watching, water walkers, bee hunting, eyes in the dark, the feather of illusion, and a star to guide you.

Trails, Tails, and Tidepools in Pails. Docents of Nursery Nature Walks, Nursery Nature Walks. Over 100 nature activities for families with toddlers and preschoolers. Topics include senses, birds
insects and other animals, trees and plants, beach and shore activities, rocks earth mountains and weather, and discoveries.

A Naturalist's Teaching. Manual Jennifer Bauer Wilson, Prentice Hall Press. Activities and ideas for teaching natural history for the young of all ages. Sample topics include awakening the senses, getting acquainted with plants, moon walks, snow walks, and making friends with birds.

Into Winter. William P. Nestor, Houghton Mifflin Company. Discovering a season. All activities deal with the winter season, such as the wonder of birds, animal tracks, insects and galls, and exploring water communities.

Ecology For All Ages: Discovering Nature Through Activities for Children and Adults. Jorie Hunken, The Globe Pequot Press, 1994. Emphasis is on family and group activities to produce an understanding of ecology encouraging a commitment to preserve the Earth's natural systems. Also available: Botany For All Ages.

Field Guides

Where do you find more about natural history? There are a number of excellent field guides that can help. These guides vary in cost, depth of information, approach to the subject, and ease of use. Each person chooses from this array depending on their own background, interests, and type of information sought.

The most popular is the Peterson Field Guide Series Houghton Mifflin Company. Available on different groups of organisms, with nearly 45 books in print. They are excellent field guides, and contain identification information, range maps, and color drawings. The written descriptions are usually separate from the plates, making it hard to refer to both at the same time.
Peterson Field Guide Series: Advanced Birding; Animal Tracks; Atlantic Coast Fishes; Atlantic Seashore; Atmosphere; Beetles; Backyard Bird Song; Birding By Ear (eastern and western); Bird Songs (eastern and western); Birds (eastern, western, Mexican); Birds of Texas and Adjacent States; Birds of Britain and Europe; Birds of West Indies; Birds' Nests (eastern, western); Butterflies (eastern, western); Coral Reefs (Caribbean and Florida); Ecology of Forests (eastern,

western); Edible Wild Plants (e. and cen. N. America); Ferns (northeast and central N. America); Freshwater Fishes (North America north of Mexico); Hawks; Insects (America north of Mexico); Mammals; Medicinal Plants; Moths (eastern); Mushrooms; Pacific Coast Fishes; Pacific Coast Shells (including Hawaii); Reptiles & Amphibians (e. & cen. N. America, western); Rocks and Minerals; Shells of the Atlantic & Gulf Coasts, W. Indies, Southeastern and Caribbean Seashores; Stars and Planets; Trees (eastern, western); Trees and Shrubs; Venomous Animals and Poisonous Plants; Wildflowers (ne. and n.-cen. N. America, Pacific States, Rocky Mountain, Southwestern and Texas)

The Peterson First Guide Series Houghton Mifflin Company. Designed for the beginner who does not want to get confused looking through a more comprehensive volume. With simplicity, however, comes the drawback that many common species have been omitted. First Guide to Birds is frustrating in its omissions, others are more complete. Basic descriptions of included species are good. Range maps are not present.
Peterson First Guide Series: Astronomy; Birds; Caterpillars; Clouds and Weather; Dinosaurs; Fishes; Insects; Mammals; Reptiles and Amphibians; Rocks and Minerals; Seashores; Shells; Solar System;
Wildflowers

The most recent series is the Audubon Society Field Guides Chanticleer Press, c/o Alfred A. Knopf.
These books have photographs instead of paintings for plates. Most of the photographs are excellent, and the books are worth examining, and having, for the photographs alone. They are not as helpful as the Peterson and Golden guides, though, because photographs show organisms from only one perspective, while paintings can highlight the identifying characteristics, regardless of perspective. They contain identification information, color photos, range maps, and natural history descriptions, and extensive life history information. The organization of each book is based on color and shape, not biological relationships, and consequently, it is often difficult to find what one is looking for. Many people use these books to refer to after making a field identification with another book.
Audubon Society Field Guides: African Wildlife; Birds (eastern, western); Butterflies; Fishes, Whales & Dolphins; Fossils; Insects & Spiders; Mammals; Mushrooms; Night Sky; Reptiles & Amphibians; Rocks & Minerals; Seashells; Seashore Creatures; Trees (eastern, western); Weather; Wildflowers (eastern, western)

The Audubon Society Nature Guides Chanticleer Press. Focus on habitats rather than taxonomic groupings. Each volume contains good information and excellent photographs of trees, shrubs,birds, mushrooms, mammals, butterflies, insects, spiders, reptiles, and amphibians. Because they cover broad areas and many types of organisms, only common species are illustrated.
Audubon Society Nature Guides: Atlantic & Gulf Coast; Deserts; Eastern Forests; Grasslands; Pacific Coast; Western Forests; Wetlands

The Golden Field Guides Western Publishing Company, began appearing in the late 1960s in two series. The Golden Guides to Field Identification are full size field guides. The main advantage to this series is that all plates and descriptions are together. Each volume covers all of North America. They contain identification information, color drawings, and range maps. The drawings

are not quite as high quality as other guides but are generally adequate. There is also a much more diverse series of smaller guides, simply entitled Golden Guides. These are inexpensive and excellent introductions to different nature topics.
Golden Guides to Field Identification: Birds of North America; Trees of North America; Rocks and Minerals; Seashells of North America; Eastern Birds; Families of Birds; Reptiles of North America; Skyguide; Wildflowers of North America
Golden Guides: Bats of the World; Bird Life; Birds; Butterflies & Moths; Dinosaurs; Exploring Space; Fishes; Fishing; Flowers; Fossils; Geology; Indian Arts; Insects; Mammals; Planets; Pond Life; Reptiles & Amphibians; Rocks & Minerals; Seashells; Seashores; Sky Observer's Guide; Spiders & Their Kin; Stars; Trees; Tropical Fish; Venomous Animals; Weather; Weeds; Whales & Sea Mammals

The Stokes Nature Guides Little Brown and Co., take a very different approach to the natural world. Readers are encouraged to go beyond simple identification to observe the lives of plants and animals. These field guides highlight behavior, life cycles, and interrelationships, making them very valuable for anyone to learn about these organisms. For any one group, fewer species aredescribed than in the field guides listed above, but the information about each is much more extensive.
Stokes Nature Guides: Bird Behavior I, II, & III; Bird Feeder Book; Bluebird Book; Butterfly Book; Complete Birdhouse Book; Guide to Animal Tracking & Behavior; Guide to Amphibians and Reptiles; Guide to Enjoying Wildflowers; Guide to Nature in Winter; Guide to Observing Insect Lives; Hummingbird Book; Natural History of Wild Shrubs & Vines; Wildflower Book; Wildflower Book, Rockies West

Nature Study Guild - The Finder Series Easy-to-use dichotomous keys to identify various organisms. Line drawings, and easy information make these exceptional for beginners.
Finder Series: Flower; Tree; Winter Tree; Fern; Track; Berry; Life on Intertidal Rocks; Winter Weed; Bird

Resource Books Not Part of a Series
Trees of Eastern and Central United States and Canada. William Harlow, Dover Publications, Inc. A keyed field guide with some interpretive information for each species of tree. It contains photographs of twigs, fruits, bark, leaves, and buds.

The Tree Identification Book and The Shrub Identification Book. George Symonds, William Morrow and Co., Inc. These large-format books use photographs for matching up leaves, flowers, fruit, twigs, and bark. When all components are matched, the reader is referred to a master page. They provide little information besides identification.

Weeds in Winter. Lauren Brown, W.W. Norton and Co. Although the book is organized on a key system, most readers simply "shop" through the lovely pen and ink drawings to find a match. Botanical information is provided with each species.

Common Marsh, Underwater and Floating-leaved Plants of the United States and Canada. Neil Hotchkiss, Dover Publications. Line drawings of many of the common water plants are good for identification.

Newcomb's Wildflower Guide. Lawrence Newcomb, Little Brown and Co. Rather than using flower color as the method of identification, as many wildflower field guides do, this book uses a key system based on plant type, leaf characteristics, and parts of the flower. This guide appeals to those who like a scientific approach to identification but are not interested in using a technical taxonomic key.

A Field Guide to Wildlife Habitats of the Eastern United States. Janine M. Benyus, Simon & Schuster Inc. This guide differs from the rest in its habitat first approach. It defines habitat, gives tips and observations, describes habitats covering special features, and provides geological and ecological histories, essays, and illustrations. Each section includes three wildlife profiles: bird, mammal, and amphibian or reptile.

American Wildlife and Plants: A Guide to Wildlife Food Habits. Martin, Zim and Nelson, Dover Publications, Inc. An excellent cross reference of animals and their foods, and plants useful to wildlife.

Tracking and the Art of Seeing. Paul Rezendes, Camden House Publishing, Inc., 1992. This book is an excellent look at the tracks and signs made by more than 50 different mammals. Excellent photographs help identify the sign and the sign makers.