Outdoor Teaching Laboratories

by Linda Suzanne Gucciardo for the Committee on Outdoor Teaching Laboratories
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To the University Community:

On behalf of the Outdoor Teaching Laboratories Committee, I am pleased to present this comprehensive edition of the Outdoor Teaching Lab Manual. Written as part of a Master's creative component by Linda Suzanne Gucciardo, this manual will provide information to assist in the use and protection of these valuable natural areas. Once a campus in the midst of thousands of acres of pastures, woodlands, prairies, and riverine wetlands, Iowa State University now sits amidst a growing metropolitan area. Fortunately, earlier faculty and administrators saw the value in protecting some of these areas for use as outdoor laboratories. Their value has not diminished today; rather, the need for first-hand, outdoor laboratory experiences has dramatically increased. Despite the advent of virtual reality and other technological innovations in teaching, there is no substitute for the "real world." These outdoor areas provide students, faculty, and staff with excellent opportunities to study and learn from the natural resources which are, in fact, the true sources of our wealth and our health.

While many of the areas detailed in this manual are owned by ISU and are under the protection of the OTL Committee, many others are not. Where they are owned by other agencies, organizations, or individuals, be certain to check with the appropriate person for permission and current use requirements. We want all ISU classes to be welcome in these areas for many years to come.

The OTL Committee is charged not only with the management of the ISU-owned outdoor labs but also with planning for future areas as the University grows and changes. We encourage other ISU faculty, staff, administrators, and students to bring concerns or ideas to use for consideration.

We thank the Provost's Office for funding the publication of this manual, the Iowa Academy of Science (grant #85-30) for providing funding for its development, and L. Suzanne Gucciardo for writing, designing and producing it. See you on the trails!

James L. Pease, Ph.D.
Chair, Outdoor Teaching Laboratories Committee
June, 1997
The Central Campus of Iowa State University is the school's most heavily used Outdoor Teaching Laboratory.
Natural areas which constitute the Iowa State University Outdoor Teaching Laboratories are the result of processes that began more than 14,000 years ago. The Cary lobe of the Wisconsinan glacier leveled the landscape of central Iowa and covered the region with deep deposits of glacial drift. As the ice retreated, conditions favored the growth of a conifer forest. As the climate warmed, there was a gradual transition to hardwood forests, which were eventually replaced by vast grasslands within the last 8,000 years. The soils that formed on the glacial debris developed under the successive plant communities; however, most show evidence only of the prairie vegetation since it was the latest and strongest influence. Extensive root networks of the prairie plants reached deep into the earth and provided the organic matter that developed the rich, fertile soil that is well-suited to agriculture.

Charged with the responsibility of locating the State College Farm in 1858, Benjamin F. Gue was attracted to a site in western Story County by the rich natural resources. On the basis of his recommendation, and a pledge of over $21,000 from the citizens of Story County, the legislature selected this site over several others and designated it the State Agriculture College and Farm on June 21, 1859. Gue later reported to the joint legislative committee:

...that it would have been difficult for the trustees to have made a selection more fully complying with the requirements of the law, than the one purchased. It has upon it at least six different varieties of soil, representing the prevailing kinds in the State; it has more than 50 varieties of timber, bushes, and shrubs, and running water, spring water and well water in abundance; a plenty of gravel, sand, stone, and material for brick; high dry land, level dry land, rolling clay, second bottom, sloughs, flat wet bottoms, and timber bottom, besides the genuine prairie land.

Realization of the "model farm" began in 1864 when 70 acres of prairie were broken and 640 rods of fence were constructed. The next year saw more land turned by the plow and greater refinements to the buildings; this was followed by even more improvements in the succeeding years. Today the original 648 acres secured for the establishment of the State Agriculture College holds the heart of Iowa State University of Science and Technology. Amidst the buildings, research laboratories, greenhouses, roadways and pedestrian walks, it is difficult to realize that less than 150 years have passed since this area was virgin prairie.

Quality educational opportunities have been made possible by the growth of Iowa State University and its facilities on and near campus. However, undeveloped natural areas and native species remain central to the quality of education possible in some disciplines. At least thirteen University departments rely on ready access to outdoor teaching areas, both developed and natural, as an integral part of formal course instruction. Outdoor laboratory sites provide students with important first-hand experience essential to learning in those fields.

This guide illustrates the significance of various outdoor teaching laboratory areas on or near the Iowa State campus. In the following pages, the commitment of the University to the concept of outdoor teaching sites is outlined in a brief history, along with the evolution of the Outdoor Teaching Laboratory Committee, which currently has responsibility for coordinating the use of sites. Patterns of use over the years are presented as a means of suggesting appropriate activities on the various areas.
To make this guide a useful reference for faculty and students, concise descriptions of the salient natural features of the areas are provided. Many of the sites are University or affiliate-owned properties, but a few are under the jurisdiction of public agencies or private owners. The criterion for inclusion was the amount of use an area receives or its essential contribution to specific courses at Iowa State.

The idea for developing this guide dates back to 1978, shortly after the formation of the Outdoor Teaching Laboratory (OTL) Committee. Funding for development was secured in 1985 through a grant from the Iowa Science Foundation. This support, along with the encouragement of the OTL Committee members and cooperation of countless others at Iowa State University, made this book a reality. Continued support of the Iowa State administration and academic community made publication of this guide possible.
Iowa legislation creating a state agricultural college intended the school to serve as a model farm for training future generations who would be faced with the challenge of appropriately using Iowa's abundant natural resources. The realization of this charge was placed in the able hands of the school's first president, A.S. Welch. In his inaugural address he indicated the high priority of this goal in developing the new college. The focus of studies would not be the Ancient classics but "those areas of natural science that underlie the industries of this beautiful State." Welch felt that pursuit of this knowledge was valuable in two ways for the students; first as a source of intellectual discipline and secondly as training for future employment. To facilitate this training, the term of instruction extended from March through November, thus permitting ample experience for students in developing the buildings, plantings and experimental fields.

During his presidency, Welch directed the transformation of the open prairie into a place of contemplation both of inner philosophical ideas and of the beauty imbued in the surrounding landscapes. Through careful planning a setting was provided that served both of these pursuits. In describing his campus design to the State Horticultural Society in 1879, Welch said:

*Whatever is beautiful is thought to be antagonistic to that which is useful. But the real truth is, beauty is the crowning perfection of that which is useful.*

For more than 30 years, planning of the campus grounds and building sites was primarily in the hands of the president and faculty. In the early days of the College, Professor Charles E. Bessey advised Welch, encouraging the use of "all woody growths which will live and thrive upon the college grounds, to serve as practical illustrations in horticulture and arboriculture for Iowa." That this goal was, to some degree, realized is evident in the many large trees that still grace the campus.

Growth of the College placed increasing demands on the land. By 1886, it was necessary to appoint a special committee to replat the nearly 900 acres then owned. The new plat allocated specific areas for "the farm on the one hand and the horticultural and ornamentals on 'Public Grounds' and steward's garden on the others." Designating areas specifically for educational functions was not an explicit goal of campus planning but was at the heart of many designs. In the biennial report of 1890-91, J.L. Budd, professor of Horticulture, reported:

*In laying out and planting the public grounds the thought has been kept in mind of combining landscape effect and practical instruction to students and visitors. In the form of groups and isolated specimens we have about every tree and shrub that will succeed well in our climate. On the campus, and over the horticultural grounds, varieties and species are labeled and constitute a constant object lesson on a large scale for the study of students and visitors.*

In practice, this aspect of grounds design appeared of limited benefit to students and instructors in some disciplines. The loss of natural, undisturbed areas for study purposes elicited these comments from F. A. Sirrene, president of the Science Club, in a June 1893 *Aurora*, the College newspaper:

*That students may be able to study botany in a practical sense, they should have the advantage of studying all plants in their native conditions. The study of an herbarium specimen is as dry a subject for the beginner as the specimen itself is. The cultivation of all tillable land and pasturage of all that cannot be tilled destroys or drives out a large number of our native plants.... True we have many trees represented on our campus and in the nursery, but if the ground where they stand is wanted for other purposes, the mattock and grubhoe is applied without reference to the value of the plant, or an attempt to save it. The sophomore [in botany] must go beyond the old 'two mile' limit to find prairie, or woodland plants that are good representatives of what the plant is, as described in the manual.*
These sentiments were expressed because much of the land surrounding campus was occupied by the college farm, but they are no less true today. The college farm areas have themselves been supplanted by the developing campus and Ames community, making easy access to study areas difficult for classes in many disciplines. Although maintaining plant materials with instructional value in landscaped areas has received consistent consideration, less attention has been given to undeveloped areas which also serve educational purposes.

Often in the history of the University, little restraint was shown in converting "unused" sites to buildings or other facilities unless a faculty member demonstrated a particular interest in maintaining the undeveloped area. Most notable of the early champions was L.H. Pammel who promoted the protection of the wooded tract that now bears his name.

Early in the 1960s, professors from seven University departments supported the formation of a committee to address the need for undeveloped areas to serve as Outdoor Teaching Laboratories. On the basis of their recommendations, a Natural Area Study Committee was created in 1963. This committee gathered information and proposed action regarding areas which would be of value for teaching and research.

The College of Agriculture Building and Land Utilization Committee appointed a Subcommittee for Undisturbed Areas to act on the recommendations from the Natural Areas Study Committee. As a result of the activities of these two groups during the 1960s and 1970s, several areas were designated by the University as biological research and teaching areas. Some of these sites remain essential components of the Outdoor Teaching Laboratories currently in use.

During the mid-1970s, a study of both developed and natural areas used by University classes indicated the heavy use Outdoor Teaching Laboratories (OTLs) were receiving. At the same time, budget considerations were making it difficult to transport large classes to areas distant from campus, further increasing the pressure on existing sites. To better coordinate the use of OTLs while preserving their quality as teaching tools, the Natural Areas Study Committee was replaced in April 1978 by the Committee on Outdoor Teaching Laboratories.
On April 17, 1978, the Vice President (now the Associate Provost) for Academic Affairs established the Iowa State University Committee on Outdoor Teaching Laboratories as an interdepartmental standing committee representing those academic areas with the greatest concern for the future of OTLs on and near the Iowa State campus. Faculty members are appointed for three-year terms from the departments of:

- Agronomy
- Forestry
- Animal Ecology
- Horticulture
- Animal Science
- Landscape Architecture
- Botany

The following administrative areas are also represented by members on the committee:

- Government of the Student Body
- Facilities Planning and Management

Specific functions of the committee include:

A. serving in an advisory capacity to the Office of Associate Provost on matters relating to Outdoor Teaching Laboratories.

B. facilitating the expression of concern by students, faculty and staff for the maintenance and preservation of Outdoor Teaching Laboratories.

C. serving as a review board for the acquisition of new areas.

D. serving as a forum for discussion of conflicts and problems relating to Outdoor Teaching Laboratories.

The Outdoor Teaching Laboratory Committee operates without funding for its activities and all members serve in addition to other University duties. It currently functions through individual communications that are focused through the Chair to and from concerned individuals or departments.

Presently, there are 12 University-owned areas recognized as Outdoor Teaching Laboratories. The management concern for each of these areas is assigned to the department, represented on the OTL Committee, which benefits most from its use.

Outdoor Teaching Laboratories are a substantial and integral component of teaching at Iowa State University. Firsthand experience is essential in providing quality education in the natural sciences, as well as many other fields. The OTL Committee is responsible for the continued availability of areas that can provide the necessary experiences for students in introductory courses or in advanced research. This requires the maintenance of an array of sites that suit different needs, just as indoor classrooms and laboratories are provided for different uses.

The nature of outdoor teaching areas makes the tasks of the OTL Committee difficult. Many of the sites on or near campus sustain heavy use through nonacademic activities. Inappropriate use can diminish the value of a site for instructional purposes and reduce the quality of educational experiences for the students. Like classrooms that must be maintained at all times for use during a few hours, OTLs must be consistently maintained for the academic pursuits for which they were set aside. The OTL Committee believes the development of the appropriate recognition and respect for the Outdoor Teaching Laboratory areas is necessary to maintain these valuable teaching resources. This can best be achieved by publicizing the uses of and need for OTLs to the entire University community for its support.
USE OF OUTDOOR TEACHING LABORATORIES

Table 1: Reported use of Outdoor Teaching Laboratories in formal class instruction at Iowa State University

<table>
<thead>
<tr>
<th>Year of study</th>
<th>1964a</th>
<th>1975b</th>
<th>1987c</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of departments reporting</td>
<td>5</td>
<td>9</td>
<td>13</td>
</tr>
<tr>
<td>Number of courses utilizing OTLs</td>
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<td>73</td>
<td>68</td>
</tr>
<tr>
<td>Number of students enrolled</td>
<td>1,500</td>
<td>-</td>
<td>2,500</td>
</tr>
<tr>
<td>Total number of student hours in OTLs</td>
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</tr>
<tr>
<td>Student hours of use in areas accessible by foot</td>
<td>-</td>
<td>35,042</td>
<td>39,614</td>
</tr>
<tr>
<td>Student hours of use in areas requiring transporation</td>
<td>-</td>
<td>19,739</td>
<td>19,995</td>
</tr>
<tr>
<td>Student hours spent in Pammel Woods</td>
<td>4,800</td>
<td>8,700</td>
<td>7,080</td>
</tr>
<tr>
<td>Student hours spent on Central Campus</td>
<td>-</td>
<td>14,861</td>
<td>29,312</td>
</tr>
</tbody>
</table>

a Figures provided in a press release by the Natural Area Study Committee.
c Informal survey conducted by Linda Gucciardo in 1987. Not all querants responded; figures are under-estimates of actual use.

Studies documenting the amount of use outdoor teaching areas receive have been conducted on several occasions in the past three decades. Although the methods used to gather the data varied among the surveys, the results still provide a means to compare the intensity of use over the years. A summary of the information is presented in Table 1.

Comparison of the reported use of Outdoor Teaching Laboratories by instructors in various departments of Iowa State University over a 20-year period. Student hours were computed by multiplying the average annual student enrollment in a course by the number of class hours spent in an outdoor area.

Shortly after the Natural Area Study Committee was formed, data were gathered from the five departments represented on that committee. This review of use found that more than 1,500 students benefited from the 1,000 acre campus when used as an outdoor classroom. The most heavily used area was Pammel Woods, sustaining 4,800 student hours per year in connection with 15 formal courses. The information was used for publicizing the use of outdoor laboratory areas at Iowa State. Several articles appeared in central Iowa newspapers during May 1964.

A thorough survey of use was conducted by Richard Joens in 1976 and presented in his master's thesis. Although his study included all areas used in the state, only those sites within 30 miles of campus are included here for comparison. These areas are easily reached for study during a two- or three-hour laboratory session. Nine departments reported utilizing 58 separate areas in conjunction with 73 regularly scheduled courses. The most heavily used site was still Pammel Woods, receiving 8,700 student hours of use, or 16 percent of all use within 30 miles. Of areas that could be reached easily on foot from the Iowa State campus, Pammel Woods received nearly one-fourth of the class use.
Changes in University policies brought corresponding changes in OTL use in the years following Joens’ study. These changes were evident in an informal survey conducted in the mid-1980s while this guide was prepared. Some faculty members could not be reached for comment, but the figures obtained still reflect the increased use outdoor areas received, although the results should be considered under-estimates of actual use. Thirteen departments or programs made use of Outdoor Teaching Laboratories as part of their regularly scheduled course offerings. An average of 2,500 students registered every year for the 68 courses that contributed to the nearly 60,000 student hours spent in OTLs as part of formal instruction. Hundreds of additional hours were spent in some areas as students worked on projects or independent research in conjunction with their classes. The 13 departments responding to the 1987 survey were:

- Agronomy
- Entomology
- Animal Ecology
- Environmental Studies
- Animal Science
- Geology
- Anthropology
- Horticulture
- Biology
- Landscape Architecture
- Botany
- Plant Pathology
- Engineering

Increased student enrollment and reduced financial support for transportation had combined to drastically alter the patterns of use from those seen just 10 years earlier. Some programs had dropped all outdoor class activities in response to budgetary restrictions. Other courses relied more heavily on areas within walking distance from campus. The net result was greater demand on the available resources. This trend has continued into the 1990s.

In addition to the previously recorded formal use of outdoor areas, other departments make use of outdoor areas on and near campus for occasional class activities. Students from the College of Design take advantage of the natural subjects that the campus setting has to offer. Recreational Services utilize a number of the outdoor teaching areas for the informal classes and intramural activities offered for student enjoyment. Military Science has routinely used outdoor areas for training activities.

Like classrooms, Outdoor Teaching Laboratories need coordinated planning for proper use and maintenance. It is apparent that outdoor teaching areas are limited in the amount and type of activity they can sustain. The use of Pammel Woods was estimated at just over 7,000 student hours per year in 1987. Since this area is the most accessible natural woodland near campus, it is useful to many classes. Excessive activity has had an impact on this area. Unplanned paths and inappropriate uses have damaged the landscape and modified the natural vegetation, reducing the quality of the learning experience.

Increased enrollment partially explains the doubling of student hours spent on Central Campus in formal class instruction over the years. Cooperation among the academic departments, Facilities Planning and Management, University Architect and Landscape Architect has made this area beneficial for all users. Continued concern for both aesthetic and educational aspects of planning is essential to assure the future availability of Central Campus and other University-owned areas as useful learning tools.

Outdoor Teaching Laboratories are major educational tools which reach a large portion of the Iowa State student body. OTLs provide learning opportunities unavailable in any other form. Richard Pohl, a professor of Botany, summed up the importance of outdoor labs in this way:

*You can study some of these materials indoors, but the real contacts are achieved out-of-doors. In the outdoor laboratory, the subject matter touches the emotions as well as the mind.*
LOCATING OUTDOOR TEACHING LABORATORIES

This guide presents the 33 outdoor teaching areas most frequently used in Iowa State University courses. Included are University or affiliate owned areas, as well as other public and privately held lands. Many additional sites are used by a number of the University departments. The omission of these areas does not imply lesser importance than the Outdoor Teaching Laboratories described.

Ames Area
1. Iden Farm
2. Reactor Woods/Lynn Fuhrer Lodge
3. Emma McCarthy Lee Park/
   Munn Woods
4. Pammel Woods
5. Ames High School Prairie
6. Thirteenth St. Pine Plantation
7. Brookside Park
8. Old field pasture
9. Stuart Smith Park
10. ISU Arboretum
11. Reiman Gardens
12. Littlefield Biological Area
13. Black's Prairie
14. State Forest Nursery
15. Jim Ketelsen Green Wing Marsh
Central Iowa Sites
1. Holst State Forest
2. Boone R.R. Prairie
3. Ledges State Park
4. Iowa Arboretum
5. Iowa 4-H Center
6. Little Wall Lake
7. Doolittle Prairie
8. Horticulture Station
9. Soper’s Mill Access
10. McFarland Park
11. Peterson Park
12. Sleepy Hollow
13. Iden Farm
14. Littlefield Biological Area
15. Blacks Prairie
16. State Forest Nursery
17. Jim Ketelsen Green Wing Marsh
18. Cooper’s Prairie Marsh
19. Larson Marsh
20. Hendrickson Marsh

ISU Campus
1. Pammel Woods
2. Science II Prairie
3. College of Design Prairie
4. Central Campus
5. Lake LaVerne
6. College Creek/Knoll
The native prairie is a complex community of many forms and colors. Purple coneflower is one of the myriad plants that bloom during mid-summer.
I remember well my first visit to this spot, years ago. Striking out north from Des Moines, on the great sea of prairie that then stretched, in almost unbroken wildness, to the Minnesota line, the great monotonous plain of waving grass only broken here and there by scattered groves.... Standing on the eminence where the College now looms up, we could only see one of the most beautiful landscapes in the west....

This statement by Benjamin Gue was describing the prairie scene as it appeared in 1858, when much of the state was still blanketed by the vast grasslands that composed more than 80 percent of Iowa’s native vegetation. Climate, topography and soils had provided the perfect conditions for developing the complex tallgrass prairie community. Perhaps for 7,000 years, Iowa’s plains had shimmered and rippled as the grasses bent under the westerly winds.

Grasses are the primary visual aspect of the prairie and comprise 90 percent of the annual plant growth. More than 70 species of grasses occur in Iowa prairies, each type best suited to particular environmental conditions. Knee high mid-grasses can be found on drier sites, while the true tallgrasses are in more moist ground. These plants dominate the prairie underground as well as above ground. Their dense, branching root systems may penetrate the earth to depths of six feet or more.

As many as seven yoke of oxen were needed to break the dense prairie sod and expose the deep, rich soil. Decay of the fibrous root networks over thousands of years contributed abundant organic material, building fertile topsoil averaging more than a foot thick. Iowa’s 30 million acres of prairie were responsible for creating the greatest concentration of prime farmland in the world. Many consider this soil the State’s most precious resource.

Conversion of prairies for agricultural use was nearly complete in less than a century. Three out of every four acres in Iowa now supports cropland. Less than one tenth of one percent of the original tallgrass community remains. Gone also are many of the plants and animals adapted to life among the grasses.

Prairies were lost not only to the plow, but also to man’s control of fire. The dynamic life of a living prairie included occasional wildfires sweeping across the landscape. Fires release nutrients from the accumulated litter and exposed bare soil for the establishment of seedlings. Suppression of woody vegetation by frequent fire is considered a primary reason for the long success of tallgrass prairies in Iowa. However, the role that fire played in the maintenance of prairies is imperfectly understood. Study of this influence is just one type of research that requires availability of the original vegetation.

Access to native prairies offers other educational opportunities to students at Iowa State. The factors responsible for Iowa’s rich soil are best observed in their natural condition. The mosaic of communities found in prairies permits the study of complex ecological interactions within small areas. Comparable studies in woodlands would require vast stands of forests. Inventories of native plants and animals provide training in identification and management skills. Experiencing a true prairie also touches the cultural heritage left by the pioneers who settled these lands.

Fortunately, several high quality native prairies are within a reasonable distance from campus. These tracts are privately and publicly held lands that receive use from other groups in addition to Iowa State classes.
Doolittle Prairie
Managed by Story County Conservation Board

Design students study the native landscape at Doolittle Prairie

Doolittle Prairie is located two miles south of Story City. Sixty-one acres of virgin prairie are protected through the cooperation of several agencies and individuals. The northern 24 acres were dedicated into the state preserves system in 1980 after donation to the Iowa Department of Natural Resources by Merlin and Wesley Doolittle. A narrow central portion contains 17 acres which were purchased by the county conservation board from Kenneth Mathieson. The southern 21 acres are rented by the county from Dorrel Doolittle. The Story County Conservation Board actively manages the entire tract through controlled fires and mowing.

William Doolittle settled on this land in 1857. Much of the land, and an appreciation for the native prairie with its wildlife and flowers, remained in the family until it became available for public use. Although this area has never been plowed, prairie hay was harvested for over 50 years with little apparent effect on the vegetation.

Several potholes dot this area and represent a type of prairie that, though once very common, is now rare in Iowa. The rich Kossuth soils of Doolittle Prairie retain tallgrass prairie on the drier areas, while plants adapted to wetlands ring the potholes. The vegetation shows a wide range of diversity and includes several uncommon species. Notable among these are Ladies Tresses, *Spiranthes cernua*, and Blue Flag Iris, *Iris virginica*.

Surrounded by cultivated fields, Doolittle Prairie provides essential wildlife nesting and winter cover.

Doolittle Prairie is important for Iowa State University classes as one of the few extensive areas with the original prairie community intact. Plants and animals found here interact much as they have for thousands of years.

Black’s Prairie
Privately owned and managed

A small remnant of tallgrass prairie can be found about two miles south of Highway 30, along the State Street extension. Approximately three acres in size, this privately held area lies in a small triangle between the county road and a former railroad right-of-way.

Available information indicates that this area has never been plowed or heavily grazed, although fires may have occurred in the past due to the proximity of the railroad. Studies during the 1960s suggested that herbicide drift from adjacent fields may have had an impact on a few sensitive species.

The Webster soil on this site overlays glacial till that retards the downward movement of moisture contributing to the maintenance of a typical lowland prairie community. A plant list compiled in 1968 included 74 species of native plants from the small, early blooming Stargrass, *Hypoxis hirsuta*, to the giant of the prairie flowers, the Compass Plant, *Silphium laciniatum*.

Boone Railroad Prairie
Privately owned and managed

Extensive strips of native prairie communities occur along the Union Pacific Railroad in Boone County. Growing in the right-of-way has protected these remnants from cultivation. Removal of woody vegetation by fires in the days of the steam locomotives, and by mechanical and chemical means more recently also contributed to their persistence.

The highest quality area stretches west from Jordan, beginning west of Highway 17. The soils in this area are poorly to excessively drained permitting the growth of Bottle Gentian, *Gentiana andrewsii*, a moisture tolerant plant, adjacent to dry area plants such as Silky Aster, *Aster sericeus*. 
A 22-acre site which lies west of the Ames High School buildings contains the best example of upland, black soil prairie in central Iowa. The faculty of Iowa State University has long known about the unique nature of this prairie and woodland complex. In earlier days, the mile walk to this site took students far into the countryside. Today, it lies within the city, between university land and residential neighborhoods.

Efforts were made in the late 1940s to obtain this site for an outdoor classroom, but the owner was unwilling to sell. In 1956, it was obtained by the Ames Community School District for the location of the new high school. During this construction, 15 acres of the original 30 acres of prairie were preserved.

A desire to protect the remaining natural community received much attention both from university faculty and several private organizations. In 1970, an agreement was reached between the Ames School District and the Iowa Chapter of The Nature Conservancy. This area is now leased by the Conservancy as a preserve to function as a living classroom for Iowa State and the Ames area schools. Other activities include passive recreational use and scientific research.

Two plant communities occurred naturally on this site. The tree-covered floodplain along Squaw Creek was heavily pastured in the past and was degraded to a degree by this use. The uplands were open prairies that developed on the well-drained Clarion and Storden soils. Since settlement days the distinction between these two adjacent areas has slowly disappeared.

Studies compiled in the 1960s indicate that the prairie community now covers less than eight acres of the preserve. The encroachment of woody vegetation has slowly converted the open hillsides to woodlands. Active management is now being carried out by local members of The Nature Conservancy and Ames High School in an effort to reverse this trend. This includes periodic burns to discourage weedy and cool season plants, and physical removal of trees and poison ivy. These efforts have been rewarded by a forestalling of the woody invasion and revitalized dominance of native prairie species.

In contrast to the moist communities found at Doolittle Prairie, Ames High School Prairie contains plants well suited to dry conditions. Such grasses as Side-Oats Grama, *Bouteloua curtipendula*, and Porcupine Grass, *Stipa spartea*, can be found here. Due to the diversity of habitats on this site, the species list contains nearly 100 native prairie plants. These plants provide habitats for a wide variety of animals. Estimates suggest that 27 mammals and nearly 50 bird species may use this area during all or part of the year.
RECONSTRUCTED PRAIRIES

Big Bluestem, one of the native plants often used in reconstructed prairies

The tallgrass prairie that greeted the early settlers of Iowa was the most complex plant community in North America. Once destroyed, it would take perhaps a thousand years for the natural associations to redevelop, if left undisturbed. Although the great “seas of grass” will never be seen in Iowa again, there has been increasing interest in the use of native species for the reconstruction of prairie areas.

Prairie restoration is undertaken on lands which have never been plowed that may harbor remnants of the original flora. Reconstruction is necessary on sites where native vegetation no longer occurs. With either approach, an understanding of the environmental conditions present and the natural processes encouraging prairie is an important first step.

Prairie plants are best suited to particular soil and moisture conditions. Careful seeding into suitable microhabitats can result in an approximation of a native prairie within a few years. Small areas lend themselves most readily to this designed approach. Larger areas are more easily restored through broadcast seeding or with grain drills made for the bearded and tufted prairie seeds. It takes several years for mixtures of species applied in this way to establish the natural groupings related to subtle differences in soil conditions.

Efforts to reconstruct the appearance of a prairie usually rely on the planting of a few grass species. About a dozen grasses dominate the prairies, but many more grasses and flowering plants (forbs) are also part of this natural heritage. Many of these seeds must be collected by hand, making the broad-leaved species expensive to introduce into reconstructed sites. In addition, a few of these plants are best started under controlled conditions and set out as seedlings to enhance their chance of survival. Unfortunately, this added effort and cost may discourage the inclusion of these minor components in reconstructed areas. Absence of forb plants limits the variety in form and color of the prairie landscape. Plant-animal interactions of the native ecosystems also depend largely on the presence of forbs.

Native species sown into a firm seedbed during late spring or early summer require little care after the first two growing seasons. During the initial stages, most prairie plants direct growth to formation of the extensive root systems. Cutting weedy growth about 12 inches above the ground during the first and second summers prevents the fruiting of the undesirable annual weeds and reduces the shading of the seedlings. By the third year, native plants should be well established. The processes which led to the evolution and success of tallgrass prairie in Iowa also play a part in maintaining reconstructed areas. Occasional fires provide the same benefits for these areas as for the original grasslands.

Some people may object to the unkempt look of reconstructed prairies, but the natural appearance and benefits provided have attracted the attention of many others. Native grasses have been used in areas difficult or costly to maintain as neatly mown lawns. This includes roadsides, corporate grounds and many areas within parks. Use of carefully designed prairie openings have found favor as a part of residential landscape design. Inherent in all of these uses are the educational opportunities provided through the use of native plants.

In addition to forming a tie with our cultural past, reconstructed prairie areas near Iowa State and two small areas on campus provide sites for study of reconstruction methods. Records of seeding and management allow analysis of the revegetation process. Experimental techniques which would not be appropriate on preserved native prairies can be used on these sites.
Ledges Prairie
Iowa Department of Natural Resources

Perhaps the oldest reconstructed prairie in the state can be found in Ledges State Park. Late in the 1940s, Dr. J.M. Aikman of Iowa State College sowed native grasses into previously cultivated uplands. The result is clearly visible at the northeast entrance to the park. About 15 acres of tall grasses greet the visitors to Ledges State Park, which is better known for its forested hillsides. Historically, the reconstructed prairie lies in proper relation to the woodlands. Prairie covered much of the rolling topography of this region, giving way to the trees only along the steep ravines. Studies on ancient white oaks within the park suggest that a savanna occurred along this prairie-forest border, with a few scattered trees growing among the tallgrass prairie plants.

In 1989, park personnel reconstructed additional 13 acres of grasslands south of the 1940s project. A record of the 12 species of grasses and forbs sown and carefully planned management activities permit important evaluation of reconstruction methods. The entire reconstructed grassland is burned on a three-year cycle, with manual control of thistles and trees occurring yearly.

Curtiss Farm Prairie
ISU Botany Coordinating Department

Native grasses were used to reestablish permanent cover on several acres of the Curtiss Farm in the mid-1960s. This area lies adjacent to the west boundary of the Littlefield Biological Area where it offers a sharp contrast to the tree-covered hillsides that slope down to Worle Creek.

Long-term studies on small mammal populations have tracked the differences between the prairie grassland and nearby woodlands. Active management of both areas is required to maintain the diversity of habitats and animals within them. That management has most recently been conducted by the Fish and Wildlife Biology Club of the Department of Animal Ecology.

Other disciplines that make use of this area include ecology and soil science classes. The Committee for Agricultural Development, as the landowner for this site, is cooperating in the use of this area as an Outdoor Teaching Laboratory.

Science II Prairie
ISU Animal Ecology Coordinating Department

The small, one-fifth acre grassland south of Science Hall II may be the only prairie that replaced a parking lot. Fish and Wildlife Biology Club members were responsible for planting three forb and grasses mixes in May 1973. Because of repeated disturbance from construction and utility work, reseeding and weed removal remain a part of the management program for this area. A 1995 survey found 12 grass and 48 forb species on this site, of which 7 and 35, respectively, are native species of Iowa prairies.

Due to its stark contrast with the groomed lawns of campus, and its proximity to the University community, Science II Prairie is the most noticeable Outdoor Teaching Laboratory. It is also one of the most used. It serves as an outdoor teaching area and research site for both students and faculty, while providing a reminder of Iowa's original landscape.

College of Design Prairie
ISU Landscape Architecture Coordinating Department

In 1980, a border predominantly featuring broadleaf prairie plants was installed east of the College of Design. Through natural competition a few of the original 132 species of transplants and seedlings are gone, but the many species that thrived present changing waves of color throughout the year. This site provides both study subjects and plant materials for many classes in the College of Design, as well as for many other university departments. It is maintained by occasional burning.
A three hundred year old white oak. Tree ring studies identified several of these patriarchs at Ledges State Park.
The primeval woods were confined to two very dissimilar locations, to ridges of clay, sand or rock and to floodplains of streams, flats more or less wide, subject to overflow. All the richest most fertile areas of the state were prairie.

This reminiscence by T.H. MacBride, an early Iowa naturalist, describes the distribution of forests encountered by the first settlers. Throughout most of Iowa, trees were mainly associated with the river and stream valleys, while they were more generally spread over the landscape in the hilly northeast and southeast parts of the state. Records from the original land survey indicate that less than one-fifth of the land surface was described as forested.

The virgin forests of Iowa were composed of many different community types. The level floodplains held species capable of withstanding periodic flooding. Here, enormous cottonwoods and American Elms could grow, along with Silver Maple, Green Ash and Boxelder. On the other extreme, valley walls, ridges and hilltops held a White Oak-Shagbark Hickory forest that prospered in the well-drained soil and drying winds. On moister, protected hillsides, a Red Oak-Sugar Maple-Basswood association developed.

Two types of Iowa woodlands are not properly described as forest. A few hardy species are able to survive while clinging to cracks and crevices in limestone bluffs along rivers. The stunted, twisted trunks of Red Cedars found in these situations may represent some of the oldest trees in the state. Open, park-like stands of Bur or White Oak with typical prairie vegetation growing beneath characterize the savanna. These thick barked and drought resistant trees tolerated the heat during the periodic prairie fires.

Much of Iowa's woodlands disappeared during the settlement period. Clearing for crops took its toll, as did the necessary reliance on forests for fuel and building materials. Building of railroads late in the 19th century further reduced the trees; each mile of track required four to six acres of oaks for ties. The estimated 6.7 million acres of original forest had been reduced to 2.5 million acres by 1875. One hundred years later, a U.S. Forest Service survey indicated that only 1.5 million acres remained. The current estimate of 1.9 million acres of forest in Iowa is due, in part, to abandoned fields overgrown with fast growing pioneer tree species and to some intentional planting by woodland owners.

The remaining Iowa woodlands must serve many purposes. Commercial forestry for wood products is still an important industry in the state. Forests provide habitat for both game and non-game animals. Protection against soil erosion, stabilization of stream flow and moderation of temperatures are additional benefits of forest cover. Perhaps most importantly, woodlands are a retreat from the urban environment. Iowa woodlands display Nature's beauty from the solitude of winter through the early spring flowers to the blaze of autumn color.

Careful planning is necessary for wise multiple use of woodlands. Many programs at Iowa State University are designed to provide understanding of forest biology and training in forest management. A variety of woodlands, from undisturbed native forests to nurseries and plantations, are required to make these courses meaningful learning experiences. Fortunately, an array of forested areas are available within a reasonable distance from campus. Some of these Outdoor Teaching Laboratories receive especially heavy use, and require careful coordination of activities to maintain the quality of the instructional experience.
To commemorate the selection of the Story County site as the location for the new State Agriculture College, local residents held a celebration on July 4, 1859. The festivities were held at the edge of a grove that stood on the northwest corner of the future college farm.

That event was the first of many college-related activities conducted in the area now known as Pammel Woods. Fortunately, this forested spot retains many of its native characteristics in spite of the use it received over the years. One reason for the retention of natural communities on this site is the consistent protection given by the University administration. This concern was expressed as early as 1875 when the College Board set this area aside for “ornamental grounds”.

The other important factor in preservation of this woods has been the vigilance of the college community. Whenever proposals were presented that threatened the character of this site, many persuasive voices were raised in support of its continued protection. Support of alumni was particularly significant in dedication of this area as a nature preserve and outdoor classroom in 1941 as a memorial to L.H. Pammel.

Today, Pammel Woods is the most important Outdoor Teaching Laboratory for Iowa State University classes. Several native forest communities are present and are significant research sites for several disciplines. Its location between Pammel Drive and Thirteenth Street makes it easily accessible from Central Campus. This has become increasingly important with larger enrollments and limited transportation capabilities. Because of its location, it also receives much nonacademic activity which may threaten the quality of the habitats for instructional purposes. Pammel Woods is a valuable resource for the study of woodland plant and animal community dynamics. Studies over the years indicate that changes have occurred due to various academic and nonacademic activities.

A 1977 study by Richard Joens described four forest communities within Pammel Woods based on the overstory trees. A white oak-ash-shagbark hickory community covers 13 acres of the flat uplands and south facing slopes in the northwest corner of the preserve. On the steep north-facing slopes forming the southeast portion of the area, 10 acres are covered by a black maple-red oak-shagbark hickory-ash woodland. These two communities correspond with well-drained Hayden soils which developed under forest vegetation.

The third plant community is a small area of about two acres has numerous Kentucky Coffeetrees, Gymnocladus dioicus, along with Black Maple, Acer nigrum, and Black Walnut, Juglans nigra. These are on lower slopes of the east-facing hillsides. The distribution of these trees corresponds closely with Storden soils which developed under prairie vegetation.

The remaining community is found along the level floodplain of Clear Creek. A Box Elder-Willow-Ash-Cottonwood association covers 10 acres of the Hanlon-Spillville soils.

As the soil units suggest, Pammel Woods contained prairie openings in the past. By the time the school was established, much of the prairie along steeply eroded stream valleys such as this had been invaded by forests. There is some evidence that these small prairie openings remained in Pammel Woods until relatively recent times.

A plant list was included with the 1933 petition asking to set aside Pammel Woods as a preserve. Although it was described as a partial list of native plants, it contained 243 species belonging to 70 families. A similar survey in 1967 included only 176 species from 63 families. This loss of diversity resulted from the decrease in size of the preserve from 60 acres in the 1930’s to its current 35 acres, and loss of rare plants that apparently could not withstand activities of recent years.
A list compiled early in this century by J.E. Guthrie, professor of Zoology, of the animals he knew to occur in the proposed preserve included 26 mammals, 123 birds and over 20 lower vertebrates. The gradual isolation of this tract from other natural areas through urban development may have reduced the number of transitory animals that might be currently encountered.

The goal of maintaining Pammel Woods as a natural environment in equilibrium with prevailing conditions calls for non-consumptive use of its features. This applies to formal academic activities, as well as nonacademic uses.

Collection of plants and animals in connection with heavy instructional use is strongly discouraged. Although limited collection for infrequent or special research may not alter the community, indiscriminate collecting and trampling by large classes could have lasting impact.

A soil test pit was established years ago to illustrate the nature of forest soils. The continued use and maintenance of this pit limits the need for further disturbance to the preserve.

Current policy encourages the removal of introduced species, such as Buckthorn, *Rhamnus cathartica*, which was grown in an experimental plot near Pammel Woods during the 1920s.

*Pammel Woods Preserve and Outdoor Classroom includes a driving range area which is also much used by engineering students*
A relatively undisturbed natural woodland stands one mile northwest of Central Campus. This area contains 175 acres of upland woods and floodplain forest. It has been listed under various names but is best known as Reactor Woods.

Twenty-five acres of this site is owned by the Ames-ISU YMCA and contains two buildings, Lynn Fuhrer Lodge and the Outdoor Center. These facilities were acquired through donation in 1931 and have served as the site of numerous public programs since that time.

The remaining woodland area is Iowa State University land. Construction of an atomic reactor in the early 1960s required fencing the central portion of this area and resulted in the current name.

In the early 1970s, an agreement between the YMCA and ISU led to the development of a trail system through the woodland area. Over two miles of trails provide recreation for the public and easy access to the forest communities for Iowa State University classes.

Richard Joens studied this area and discovered many similarities between Reactor Woods and Pammel Woods. Due to its larger size, however, this area has a greater diversity of species and community types. Here, Basswood, *Tilia americana*, and Bur Oak, *Quercus macrocarpa*, form important components of various forest communities.

The original vegetation cover of this area was also similar to Pammel Woods. Hayden and Storden soils occur in the same relative positions on the steeply sloped sides of the several ravines that dissect the woods. The floodplain along Onion Creek consists of a Spillville-Coland complex which is high in clay content. This area supports Honeylocusts, *Gleditsia triacanthos*, and Cottonwoods, *Populus deltoids*.

Pammel Woods imposes the same nonconsumptive restrictions. Passive use will insure that the natural environments so valuable today will be available for future generations of students.

YMCA public activities in Reactor Woods include public programming for all ages through the academic year and day camp programs for school children during the summer months. The guidelines they impose on public visitors are also applicable for instructional uses.
A bequest by Roy S. Littlefield permitted the University to acquire a 30-acre tract on the Curtiss Farm from the Alumni Achievement Fund Organization in 1966. This area had been designated a biological research area several years prior to that time, mostly at the encouragement of Roger Landers, professor of Botany.

The Littlefield Biological Area is accessed through the Curtiss Farm on State Avenue. It consists of hillsides that slope to the floodplain along Worle Creek. Hayden-Storden soils on the north slope and Lester soils on the south indicate the original vegetation was mixed hardwoods and prairie grasses. Alluvial Coland-Terril soils are found at the base of the slopes and along the stream.

Studies during the 1960s and 1970s monitored the community changes after this area was released from grazing in 1958. It was hoped that careful management and judicious introduction of native species would return the vegetation to its original composition. It is now realized that reestablishment of natural communities are effected only after long periods of careful management.

The value of this area for Iowa State University classes is related to its location nearly two miles south of the main campus. The need to transport classes to this site limits its usefulness for large introductory courses. This may make it more attractive for field studies that require the marking of permanent plots or long-term placement of equipment. Further protection from casual intruders is afforded by the surrounding University-managed lands.

Population studies on small mammals were conducted for several years on the Littlefield Biological Area and an adjacent native grass planting on the Curtiss Farm. These sites provide the opportunity for further studies in the future. Today, the Littlefield Biological Area remains an important, although infrequently used part of the Outdoor Teaching Laboratory system.

Iden Farm is located two miles northwest of Iowa State University along County Road R38. The property is owned by the Committee for Agricultural Development and is used by the Animal Science Department for pasturing horses.

Iden Farm, adjacent to Onion Creek upstream from Reactor Woods, has soils and forest associations as described above for Reactor Woods. However, here the wooded hillsides were pastured until 1970, influencing the present quality of the habitats. Both the open fields and wooded sections of the farm have been used by Iowa State classes for studying soils, landforms and environmental communities. Plans were proposed in the early 1970s to develop several wetland areas on this property for research purposes, however, funding has not become available to carry out these suggestions. Currently, the area is used most by a design course in the Landscape Architecture Department.
The connection between Iowa State University and Ledges State Park dates to the early days of this century. The concern of various professors in preserving the unique plants and animals which occur in the sandstone canyon along Pease Creek played an important role in the 1924 dedication of Ledges into the state park system. Research supported the need to protect the fragile habitats from further grazing and logging activities. Since acquiring park status, Ledges has continued to be an important site for in-depth studies of the natural features found there.

Ledges State Park is located four miles south of Boone on the east side of the Des Moines River. Facilities are available for several recreational activities within the nearly 1,200 acres of park land. Well-defined and recently renovated hiking trails offer safe and easy access to many of the numerous communities that occur on the highly variable topography.

The outstanding geologic feature is a narrow canyon of exposed sandstone bluffs that stand over 200 feet above the river floodplain. Conditions along the winding creek which carved this valley change markedly with changes in aspect and exposure. The resulting variety of microclimates has provided the setting for a number of unusual plants and animals.

Many species found at the Ledges are more typical of areas far to the north of Iowa. It is believed that the cool, moist conditions found along the north-facing sandstone walls provided a refuge for these boreal plants as the climate gradually warmed after the last glaciation. Relict populations of such species as Reindeer Lichen, *Cladonia* sp., and Juniper Moss, *Polytrichum* sp., cover large areas of a few sites. Their apparent abundance conceals the fragile nature of these communities.

The steep slopes facing the canyon and the Des Moines River valley have soil typical of the forest cover still found upon them. A recent study identified 15 distinguishable forest associations within Ledges. In general, the oak-hickory associations are found on drier, south and west slopes. The maple-basswood associations are found on north slopes, as was typical for relatively undisturbed Iowa forests.
The master plan that guides development of the Ledges State Park includes major emphasis on public interpretation of the natural features. The goal of this effort is to promote an understanding of the unique nature of the habitats found within the park and to encourage their protection by all users.

Use of this area by Iowa State University classes is in harmony with this policy. The public trails make it easier to introduce large classes to this area without damage to the environment. In addition, the Department of Natural Resources continues to cooperate with in-depth studies that monitor or improve its management of this area.

Iowa 4-H Education and Natural Resources Center
Iowa State University Extension

The 4-H Center is located on the east side of the Des Moines River about five miles south of Ledges State Park. Forested hillsides and open upland areas were originally covered with vegetation similar to Ledges, although this area lacks the sandstone bluffs and many of the fragile, rare communities. Developing the area primarily as an educational facility has left many of the natural communities relatively undisturbed.

In addition to presenting the natural environment, several sites within the camp show the results of management practices. Several hardwood plantations, reconstructed prairies and wetlands are located at various sites on the grounds. Over nine miles of trails link the sites and allow for study.

Many projects directly benefit Iowa State University classes. A long-term wildlife management program for the open grasslands and shrubby borders involves Animal Ecology and Forestry students. Studies of extant Native American burial mounds provide archeological opportunities. Internships in interpretation and environmental education provide first-hand teaching experiences for students. The Center also provides opportunities for ecological and educational research.

In 1968, 40 acres adjacent to the 4-H Center were purchased by Iowa Arboretum, Inc., a non-profit organization formed by the Horticultural Society. An outdoor museum and laboratory were created for the main purpose of helping Iowan’s appreciate and better understand plant life. The plan developed quickly and an additional 300 acres were leased from the 4-H Center to expand the facilities and services offered.

More than 900 varieties of cultivated plants can be found in the 40-acre living library of plants. These specimens display plants useful for landscape design, windbreaks and wildlife habitat. Over 200 species of native plants can be found along the one and one-half miles of trail that wind among the wooded hillsides and upland meadows.

In addition to activities offered for the public, research on plants is another mission of the Arboretum. Hardiness and adaptability of new introductions is just one area of study. Use of this area as an Outdoor Teaching Laboratory and research site for Iowa State University students benefits both institutions.

State Forest Nursery
Iowa Department of Natural Resources

The State Forest Nursery is located south of Ames on Highway 69. This location was originally used by the Civilian Conservation Corps until the early 1940s. Operation of this 100-acre nursery has been by the state since that time. Over 3.5 million tree and shrub seedlings are produced and distributed to Iowans annually. These plants are provided at low cost for the establishment of wildlife habitat. Through cooperation with the Department of Natural Resources, forestry students at Iowa State University are able to use the nursery beds as a source of stock for plant improvement studies. Because of the care required to produce seedlings, this arrangement is a valuable asset to the Forestry Department and to the general public.
McFarland Park
Story County Conservation Board

McFarland Park has proven to be a useful Outdoor Teaching Laboratory for classes in several departments of the University. It is nearly seven miles northeast of the Iowa State University campus. It can be reached from either Highway 69 or County Road R63. This 200-acre area has been developed to enhance the interpretation of natural history.

Reestablished tallgrass prairie covers a small portion of the upland area, while much of the site holds an Oak-Hickory forest. A constructed pond and several low areas provide a variety of wetland habitats. An extensive trail network runs throughout the park, including a Touch-a-Life trail for the disabled. The Ames Area Amateur Astronomers installed an observatory and are responsible for its operation. The visitor center is staffed during the week and provides meeting areas and restrooms.

Brookside/Stuart N. Smith Parks
Ames Parks and Recreation Department

Brookside Park occupies 86 acres along Squaw Creek between Sixth and Thirteenth Streets. Only half of Brookside is developed as an urban park, the rest is preserved as wildlife habitat and an environmental awareness area. Use of the latter area was enhanced when the Big Bluestem Audubon Chapter developed an interpretive trail through it in 1979. Stuart N. Smith Park provides an additional 34 acres of developed parkland along Squaw Creek from Lincoln Way to South 4th St. Between these areas, a pasture abandoned when Elwood Drive was constructed provides an old field habitat. These areas are adjacent to University property and easily reached on foot from Central Campus.

The portion of Brookside Park west of the stream is on the floodplain of Squaw Creek. The soils found here are typical soils derived from alluvium of the Hanlon-Spillville and Spillville-Coland complexes. In general, the soils are loamy and well-drained. A native floodplain forest is supported which includes large Silver Maples, *Acer saccharinum*, Hackberries, *Celtis occidentalis*, Cottonwoods, *Populus deltoides*, and Black Walnuts, *Juglans nigra*. Numerous American Elms, *Ulmus americana*, were lost from this area in the 1960s due to Dutch elm disease.

The variety of facilities available in Brookside Park makes this the most heavily used park in the Ames park system. Scheduled sports events account for much of this use, as does the summer day camp and little league programs. Casual use by the public is estimated at several hundred thousand persons each year.

This heavy public use is not in conflict with use of the area as an Outdoor Teaching Laboratory, but it does limit the type of instructional activities possible. The combination of developed and natural landscapes within walking distance of campus makes Brookside Park, Stuart N. Smith Park and the adjacent floodplain areas valuable to many University departments. It is of particular interest for introductory courses where both natural or maintained features are observed. Long-term or in-depth studies may be limited by public use of the area.

*Many youngsters’ first experience with natural areas is along the nature trail at Brookside Park*
Emma McCarthy Lee Park/Munn Woods
Ames Parks and Recreation Department

A 38-acre tract was donated to the City of Ames in 1949 by Judge Lee in memory of his wife, Emma McCarthy Lee. This park lies west of Central Campus and can be reached by foottrail from Oakland Avenue or from Ross Road. This area consists of sloping hillsides and floodplain areas along Clear Creek. The stream margins have not been highly developed in contrast to the maintained sections of the park. Defined hiking and jogging trails help to limit the impact on the remaining natural vegetation.

Emma McCarthy Lee Park is a blend of natural and developed landscapes within an urban setting. As such, it is of value to students studying appropriate means of incorporating our natural heritage into built landscapes.

This park lies near Munn Woods, a 40-acre tract of natural woodland acquired by the City of Ames in 1992. A hiking trail winds through the site providing access for no-impact activities. It has, on occasion, served as a research area for Iowa State students.

Thirteenth Street Plantation
ISU Forestry Coordinating Department

A small plantation lies north of Thirteenth Street, between the horse pastures and Ames High School. It is most easily reached by the bicycle path that connects Ridgewood Avenue with the University Village area.

Between 1918 and 1926, two forestry professors, G.B. McDonald and J.A. Larson planted this area to White, Red and Scotch Pine, *Pinus strobus*, *P. resinosa* and *P. sylvestris*, with *Catalpa speciosa* trees along the eastern edge. Larson kept records on the growth of these trees for many years.

One of the reasons for this plantation, in addition to providing a study area for forestry students, was to demonstrate the use of land not suited to cultivation. The steeply sloping Lester soil on this area is prone to severe erosion when used for crops or pastured woodlands.

This plantation provides a site for the practice of forestry methods that range from measurement techniques to the study of understory regeneration.

Holst State Forest
Iowa Department of Natural Resources

Forestry students practice tree growth measurements

Holst Forest is located south of Fraser on the upland bluffs that overlook the Des Moines River. The Holst family of Boone donated the 304-acre tract to the state forest system in 1939 with the stipulation that management remain the responsibility of the Iowa State University Forestry Club.

Fifteen acres of this site were planted to groves of conifers and hardwoods between 1949 and 1952. The rest remains in the native oak-hickory forest which covers the sidehills and slopes of the several small drainage systems that dissect this area. Most of the site is blanketed by Hayden soils which indicates the long history of forests on this land.

Interesting features of this site include a few exceptional native species found at the limit of their ranges here. Recently disturbed slopes are covered with stands of Bigtooth and Quaking Aspen, *Populus grandidentata* and *P. tremuloides*, both of which are typical of more northerly climates. Specimens of Ohio Buckeye, *Aesculus glabra*, are also known from Holst Forest, a northerly extension for a southern species.

The usefulness of Holst Forest as an Outdoor Teaching Laboratory is not limited to the Forestry Department. The diversity of natural woodland habitats found on this site is valuable to many other disciplines, not only for the plant life, but for the wildlife it harbors. Visits to Holst Forest are usually day-long field trips for extended study and management activities.
Squaw Creek in Brookside Park, an easily reached Outdoor Teaching Laboratories on the east edge of Iowa State University
As the Cary lobe of the Wisconsinan glacier retreated from north central Iowa, it left behind a landscape scraped and gouged during the advance of the ice. Many of the depressions and basins filled with water as the ice melted. Some of these became large permanent lakes, while most were shallow marshes or seasonally flooded potholes. What the rich glacial till provided for the development of prairie soils, these wetlands provided for the growth of vast numbers of waterfowl. This prairie pothole region contained over 1.5 million acres of wetlands that supported a wildlife population which seemed inexhaustible.

Story County lies within the Cary lobe and its original cover exhibited the prairie-marsh mosaic typical of this region. Thirty-five percent of the county’s 340,000 acres was considered poorly drained and required drainage prior to cultivation. The settlement history of the county reflects the low esteem in which wetlands were at first regarded. In 1852, six years after Iowa became a state, there were only 214 residents in Story County.

Two factors contributed to the drainage of the wetlands. The Swampland Acts of 1850 and 1860 made these areas available at very low cost and, once drained, farmers discovered the rich soils these sites held. During the last part of the 19th century many of Iowa’s marshes began to disappear as the land was converted to agricultural use. Authorization of drainage districts by the Iowa Legislature hastened this process. Drainage of surface waters from agricultural lands and all other lands was assumed to be a public benefit. By 1955, only 138,000 acres of aquatic habitats remained in the state. Today, more than 95 percent of the original wetlands have been drained.

Ditching and tiling placed a burden on the streams that drained the wetlands. Water that had been held in marshes following rains was now discharged rapidly into the river systems causing flooding and erosion of streambanks. To minimize this problem, many streams and rivers were straightened and channelized during the early days of this century further increasing the rate at which wetlands were drained. The impact channelization had on fish and wildlife habitat was as severe as the loss of the wetlands themselves.

The reliance of Iowa’s wildlife on marshes, lakes and streams was an important factor in preserving the remaining wetlands. Of the 110,000 acres of water-related habitats still existing, nearly 60 percent are publicly owned. Many of these sites were acquired to enhance the production of game species. Although the countless flocks of ducks and geese are gone, ample populations of waterfowl can be found nesting in and around Iowa’s marshes, or using these areas during migration. Many other recreational benefits are provided by the continued protection of these few remaining wetlands.

The benefits provided by marshes and sloughs were realized too late to prevent the destruction of these habitats. Melting snow and rainwater held in marshes helps recharge the groundwater. Erosion and flooding are reduced by the slow release of water into streams. Stream quality is protected by the containment of sediments and chemicals in wetlands. The processes and interactions responsible for these benefits may provide answers for the growing concern related to water quality and availability.

Streams and marshes represent the teaching resource in shortest supply for Iowa State University courses. Most of the original wetlands were drained for cultivation, and long stretches of the principal streams were channelized. Of the few natural areas remaining, many are held by public agencies that have cooperated in the research and instructional use of these sites.
After the retreat of the Wisconsinan glacier, the Skunk River re-formed as water drained from countless marshes and potholes. In the area below Story City, the water was slowed by a terminal moraine left by the ice. Cutting its way through the gravel mounds, the river continued on its way, forming a picturesque valley holding the swiftly flowing stream. Trees skirted the stream where there was protection from prairie fires. Wildlife was plentiful in the rich habitats provided by the river and its surroundings.

This picture of the Skunk River valley between Story City and Ames is largely unchanged today. This stretch of the stream escaped the channelization that was carried out on the river above Story City and below Ames. Much of the forest cover remains intact along the banks where soils derived from alluvium are difficult to cultivate. Most importantly, a commitment to the preservation of this area was made in 1977 when zoning changes approved this corridor as a greenbelt and restricted future development.

The goal of the Story County Conservation Board is to bring much of the river corridor into public use. Progress has been significant in this endeavor and numerous sites are now available for a variety of recreational activities. The Skunk River Greenbelt now consists of 426 acres of river access areas and hiking trails.

Public access is provided by the Story County Conservation Board at each bridge crossing the Skunk River between Story City and the Ames city limits. Parking is provided, and in some cases, hiking trails follow the river for short distances. The only exception to this is along County Road E18 where no formal access is available.

Larger parks along the stream include Soper’s Mill Access on E23. This area consists of 18 acres of river frontage and a mile long trail which winds through a rugged woodland.

Peterson Park can be reached from Highway 69 or R63. The two sections of the park lie on either side of the river. Each portion has several gravel quarries that are converted for recreational uses in addition to river frontage. This 200-acre area was obtained in 1980 through a cooperative acquisition with the Story County Board of Supervisors and the City of Ames.

Sleepy Hollow, at the north edge of Ames, is state-owned land on which the county has a management easement to provide river access to anglers and canoeists.

Iowa State University students and faculty benefit from the development of this greenbelt. The opportunity to use these public lands offers an array of habitats not found elsewhere in the Outdoor Teaching Laboratory system. Access to a stream environment and the surrounding woodlands is essential for ecological studies. Geologic processes can be studied under natural conditions. Almost all of the University departments represented on the OTL committee utilize the Skunk River Greenbelt in some manner.

**Skunk River Greenbelt**

1. Doolittle Prairie
2. Horticulture Experimental Station
3. Soper’s Mill Access
4. McFarland Park
5. Peterson Park
6. Sleepy Hollow
7. Jim Ketelsen Green Wing Marsh
**The Skunk River Greenbelt**
follows a portion of the river that flows freely and untamed like this stretch at Soper’s Mill Access.

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**Jim Ketelsen Green Wing Marsh**
Story County Conservation Board

This marsh and upland complex is one of the richest sites in the Ames area. The 10-acre pond contains a species of algae, *Nitella bastinii*, once thought to be extinct. This is one of the few occurrences of it in the world. The 28 acres of prairie that surround the water contain a wide diversity of native plants. Ironically, this marsh is located adjacent to Interstate Highway 35, just north of the Thirteenth Street extension.

Attempts at draining this area were unsuccessful. The pond margins have never been plowed, but the drier outer borders were tilled in dry years. Most of these previously cultivated areas have returned to grass cover. Management will attempt to favor the native species over the introduced plants.

Acquisition of this area by the county was made possible with the help of several private organizations that raised the funds necessary for purchase. Management by the Story County Conservation Board began in the 1988 growing season. Establishing this area in the county system was a memorial to Jim Ketelsen, a well-known local sportsman who drowned in an hunting accident in 1986.

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**Cooper’s Prairie Marsh**
Story County Conservation Board

A shallow six-acre marsh and four acres of the surrounding upland were acquired by the County Conservation Board in 1976. This marsh is located three miles northeast of Ames and south of County Road E29.

Records indicate that the marshy Okoboji soils on this site have never been drained and retain much of their native vegetation. However, the surrounding upland areas were frequently dry enough to sustain row crops. Early attempts by the County Conservation Board to reestablish native grasses were hindered by herbicide carryover in the Harps soil on these sites.

Year round wildlife cover on this site is improving with wildlife management. The value of the habitat is indicated by nesting waterfowl and yellow-headed blackbirds.
Little Wall Lake
Hamilton County Conservation Board

Little Wall Lake is located two miles south of Jewell on Highway 69. A 61-acre park adjacent to the lake contains access points and hiking trails along the shore. This is one of the few natural lakes in the Ames vicinity. The characteristic shape and rocky material forming this lake indicates it is a relict of the last glaciation. A large mass of ice may have melted in this area creating a depression and filling it with water.

This area is used by various classes from Iowa State University but is most frequently visited by groups observing the numerous birds attracted by the open lake and shallow shoreline.

Hendrickson Marsh
Iowa Department of Natural Resources

This state-managed wildlife area consists of 640 acres of marsh and associated uplands. A control structure permits careful management of the water level to insure the best conditions for waterfowl nesting and food resources during migration.

The location of Hendrickson Marsh is seven miles southeast of Colo. It provides a large scale waterfowl habitat useful to several Iowa State University wildlife courses.

Larson Marsh
Story County Conservation Board

Larson Marsh is located three miles east of 13th St. and I-35 interchange. The 12 acres of marsh and surrounding upland area are managed for wildlife habitat. Hunting is permitted during the regulated season. During the rest of the year, a hiking trail allows visitors a closer view of the wildlife that uses the cover available here.

Bird watching is serious business when it is part of the learning experience available through Outdoor Teaching Laboratories.
Prior to 1970, the largest body of water owned by Iowa State was Lake LaVerne. Studies of the algal and fish populations were carried out, but with a degree of uncertainty. Recreational use of the lake and the surrounding urban landscape adversely affect conditions compared to a natural setting.

In recent years, a research site has been available that provides a sizable aquatic environment with controlled access. A small lake formed by an earthen embankment covers nearly 10 acres on Horticulture Experimental Station land. It is stocked with several species of fish and also attracts waterfowl and other wildlife. Fisheries management is aided by an aquaculture research facility on the shore.
A variety of plant species are maintained on Central Campus to enhance its use for teaching purposes.
DEVELOPED AREAS

Six periods in the history of Iowa State University landscape design, between 1858 and 1966, were identified in a 1966 thesis by Robert Werle. The first period was dominated by the desire of President A.S. Welch to bring a human scale into the prairie landscape. Perceptual interest was added to the plains by composing natural landscape elements to form a series of pastoral vistas. Today, about 15 percent of the developed areas are still as Welch envisioned them. The central circle of scattered groves on an expanse of lawn has been retained by subsequent designers.

During the period from 1884 to 1906, the College experienced an eightfold increase in enrollment. With increased demand for facilities, much of the landscape changes during this time were guided by expediency rather than design. A report was submitted in 1906 by the noted landscape architect J.C. Olmstead which suggested an integrated plan for the development of the buildings and grounds as the College expanded. Although this plan was not officially adopted, some of the suggestions were incorporated into changes over the next decade. Interest in classicism was expressed in the construction of large buildings in symmetrical relationships.

A desire to develop middle and foreground forms was the central concept of the fourth period. Chicago landscape gardener O.C. Simmons personally directed much of the landscape construction. His main contributions were the original development of Lake LaVerne and the introduction of shrubs and bushes as foundation plantings.

Design consultants from the departments of Architecture and Landscape Architecture guided the development of campus planning from 1923 to 1950. During this period, the landscape was regarded as a medium that could relate indoor and outdoor experiences. Plans were developed for a system of interconnecting landscape spaces and outdoor rooms. The overall concept was intended to reflect urban sophistication and culture.

The sixth period of landscape design saw the first full-time design personnel added to the staff of the University. A landscape architect became responsible for the design of plantings adjacent to buildings and supervision of plant material maintenance. Coordination with the architects achieved a degree of unity in the overall campus design. A desire to perpetuate a pastoral landscape in an increasingly complex university scheme was reflected in the preservation of natural, flowing landscapes and freely geometric gardens.

Since 1966, Iowa State University has undergone considerable growth. During this time, consideration has been given to retaining aspects of previous landscape designs. Throughout the history of Iowa State, landscaped areas have served both as the physical setting for the buildings and as outdoor classrooms. Many of the first trees were planted by students under Dr. Welch’s guidance. The Landscape Gardening course he began was one of the first in the nation, and offered the opportunity for important “hands-on” experience. In subsequent plantings, various faculty members have encouraged the inclusion of all native Iowa varieties of plants and important introduced species from other regions. Thomas Sloss, superintendent of buildings and grounds from 1910 to 1936, was particularly willing to comply, with the result that many mature specimens are available for appreciation and study by today’s students. Currently, cooperation between the landscape architect and the academic departments continues to provide instructional plant materials and opportunities within the overall landscape plan of the University.
Transformation of the open prairie into a tree dominated landscape began in 1859 when 500 trees were transplanted from the northwest corner of the College Farm. Fast growing species were set out as windbreaks, along fencerows and in nursery areas. Tree planting was guided by the need to establish the farm in the years before the school opened.

The original 21-acre campus was laid out by President A.S. Welch in the spring of 1869. A circular road defined the central lawn that remains the focus of the University landscape. According to legend, the locations of trees were determined by throwing potatoes onto the ground and planting where they landed. In reality, groves were carefully located to permit views of the distant prairie. Rapidly growing trees such as Silver Maple, *Acer saccharinum*, Austrian and Scots Pine, *Pinus nigra* and *P. sylvestris*, and Norway Spruce, *Picea abies*, were transplanted from nurseries. American Elm, *Ulmus americana*, Black Maple, *Acer nigrum*, and other native species were obtained from Pammel Woods.

The school obtained its first lawn mower in 1875. It was powered by a single horse and did an admirable job, if the bluegrass lawn was of sufficient length. The advent of a manicured turf created a problem that exists to the current day. Short cutting led to undesirable “cattle paths” across the landscape that damaged grasses and generated many complaints in the student newspaper. Various attempts at controlling this problem over the years have met with mixed results.

J.L. Budd, professor of Horticulture, developed a “Russian” orchard in the area now west of Old Botany in 1878. It contained thousands of grafts from more than 600 varieties native to northern Europe. In a decade, all but a few species had died out. Those surviving were important introductions to the campus and midwestern horticulture. Only a large white birch, south of MacKay Hall, marks the former location of this nursery.

In time, the original fast-growing trees were replaced by longer lived species. Professors of Botany Bessey and Pammel encouraged the use of plants native to Iowa. Their philosophy led to the first oaks on campus, in 1888, which still stand in front of Old Botany. Two white pines were brought by ox cart from Hardin County and remain as a memorial to Bessey. These stand in an area of campus referred to as the Pinetum in an 1892 newspaper. With Pammel’s guidance, a memorials committee dedicated many of the new and existing groves to individuals instrumental in the growth of the College.

An entry in the 1903-1905 Biennial Report described the condition of the Central Campus in those days. An increase in funds was requested for maintenance of the expanding grounds. Anticipated growth required setting out new border plantings and other landscaped areas. By 1916, 125 acres held the main campus buildings and lawns. Continued growth has greatly increased the area encompassed by developed and maintained landscapes. Currently, Central Campus is considered to consist of the original 648 acres purchased.

The main lawn of the University includes a number of groves set out by Welch and his students to soften the prairie landscape when the land was open and undeveloped. Today’s campus setting also contains a number of courtyards that were design features planned by A.H. Kimball, professor of Architecture, and P.H. Elwood, professor of Landscape Architecture, between 1923 and 1951. These outdoor rooms form important retreats from the urban setting of the modern campus. An intimate atmosphere is achieved through the use of a wide variety of plant materials and construction methods.

The State Agriculture College and Model Farm was intended to promote the practice of agriculture and horticulture. To this end, the use of a wide array of plant materials has been part of landscape considerations from the earliest days of the school. However, there has been some question of the degree of diversity presented at any time. A news article in 1933 stated that 155 species of trees grew on Central Campus, including 32 coniferous species and 123 hardwoods.
During the following year, a great deal of transplanting was undertaken by the Civil Works Administration under the direction of Elwood. Oaks and maples were introduced to many areas of Central Campus to make the whole area as finished as the main lawn. However, a report at the end of this effort claimed only 93 woody species from 23 families then on campus.

Beginning in 1960, a major change began in the campus landscape. The occurrence of Dutch elm disease caused the death of more than a thousand mature elms that once graced campus. Although vigilance and research attempted to save these trees, all but a scattered few were lost from campus and Pammel Woods during the next decade.

Since 1960, the continuation of the earlier naturalistic landscape approach has been followed by the replacement and maintenance of existing plant material. From 1993 to 1996, many campus plantings were underplanted with similar species to maintain the original landscape. An estimate in the 1960s listed 350 species among the 10,000 trees and innumerable shrubs on campus. Current information on the number of species and varieties on campus is not available. An effort is underway by Facilities Planning and Management and the University Landscape Architect to verify identification of all plant materials and to maintain a current map of locations.

For academic purposes, Central Campus is used for introductions to plant identification and plant characteristics, as a backdrop for design and survey studies, and for limited instruction in plant and landscape maintenance skills. The mown lawns have also served as arenas for various sports and other recreational activities.

**Uses of Central Campus**

*One of the many court yards on Central Campus which provide both restful surroundings and an important variety of plants*

**College Creek/Knoll**

Facilities Planning and Management Coordinating Department

Early plans for campus development reserved the area south of the circle drive for a college park. No buildings were to be placed here, but as the school grew it became necessary to use this site. Even with the Memorial Union in this location, the conditions here offer an aspect different from the main lawn.

Welch planted tamaracks on the north-facing hillside along College Creek. These did not succeed here, but many pine and hemlock grew well and now shelter the home of the University President. In 1996, a portion of College Creek was regraded for improved natural storm drainage.

Other plants can be found on this protected site that make this area an important Outdoor Teaching Laboratory. A mature American Beech, *Fagus grandifolia*, grows here, as well as an American Chestnut tree, *Castanea dentate*. Native wildflowers bloom along the stream in the spring.
Lake LaVerne
Facilities Planning and Management Coordinating Department

LaVerne Noyes, a member of the first Iowa State College graduating class in 1872, donated $10,000 for the development of a lake on the south side of the main campus. The services of O.C. Simonds were engaged for the design and construction of what was to become Lake LaVerne.

A dam was constructed in the fall of 1914 providing a skating area for students the first winter. Final transformation of a marshy stretch of College Creek into a lake 500 feet long and 150 feet wide was not completed until 1916.

The improvement of this area into a useful pond did not last long. Uncontrolled erosion from farms upstream filled the lake with sediments. Efforts to remove the sediments were largely unsuccessful and the lake was facetiously labeled Lake LaMud and Simond’s Folly.

Civilian Conservation Corps efforts during the 1930s redeveloped the lake and left it much as it is today. A bypass tunnel was constructed to redirect the flow of the stream. Settling ponds upstream also helped reduce the siltation in the lake. All of the problems were not eliminated, however, and dredging was necessary in 1959 and again in 1995.

Simonds had carefully selected plants suitable for the moist soils around the lake margin. Mature specimens of unusual plants are still located near Lake LaVerne as the result of his original design. These include the shrubby Buttonbush, *Cephalanthus occidentalis*, European Alder, *Alnus glutinosa*, and a Black Gum, *Nyssa sylvatica*. Additional plantings were installed when the lake was deepened in 1995.

Lake LaVerne provides the setting for numerous activities, both collegiate and individual. The resident waterfowl attract many visitors from the Ames community. Students use the area for recreation during all seasons of the year.

University classes use the site for the study of fish, algae, and ecology of aquatic habitats. Lake LaVerne provides a picturesque classroom setting for art and design students.
Arboretum
Facilities Planning and Management Coordinating Department

Iowa State obtained 74 acres of land along College Creek one mile southwest of the main campus in 1924. Plans for an arboretum were drawn up, but development did not begin until the 1930s when Civilian Conservation Corps aid was enlisted. This was to be one of the few arboretums in the country at that time.

At the completion of the CCC work, 10 footbridges spanned the creek where a cinder path wandered through the grounds. Several hundred trees were transplanted to the eastern section of this area. The western portion was to remain in natural conditions.

Although hopes to continue development of this area have surfaced from time to time, this site remains much in the same condition it was left in 1938. Part of the original acquisition was west of State Street where plantations of Douglas Fir, *Pseudotsuga taxifolia*, Black Walnut, *Juglans nigra*, and Austrian and Red Pines, *Pinus nigra* and *P. resinosa*, remain from this early work.

Currently, the arboretum stretches from Sheldon Avenue to State Street. The eastern portion has two remaining footbridges crossing the creek in neat, park-like surroundings. A section of the northwest corner was set aside as a memorial to Thomas Maney, professor of Horticulture and an important breeder of landscape plants. Many of the junipers that grow in this area are cultivars he introduced.

Although most of the 2,450 species in the first plans for the arboretum were not planted, this site remains a useful Outdoor Teaching Laboratory for several departments. The mature landscape plants allowed to grow unrestrained in this area present a contrast to the same species as maintained on the main campus.

In 1995, the University developed a cross-country course through the arboretum and agricultural fields to the south.

Intramural Fields
ISU Recreation Services Coordinating Department

The intramural fields located near several student residential areas provide the setting for an essential part of the college experience. The opportunity to relax and recreate promotes students' physical and mental well-being.

The intramural fields are at the edge of the campus community which places them in a conspicuous location to visitors to Iowa State. With this in mind the scheduled use of these areas is rotated to promote the healthy appearance of the fields. Scheduled activities account for more than 32,000 actual hours of use on these areas. Football, soccer and softball involve over 13,000 students from the University.

The intramural fields also constitute an Outdoor Teaching Laboratory. Recreation classes use these areas during the scheduled class day for sports training. Other departments utilize these fields for the plants and animals found under these conditions. The open landscape invites designers and artists to use these settings.

Horse Pastures
ISU Animal Science Coordinating Department

The pastures used to board the horses provide opportunities for other departments. Horse pastures along Thirteenth Street near Squaw Creek are used for the study of ecology and entomology.
Reiman Gardens
ISU Horticulture Coordinating Department

Iowa State University maintains a display garden in fulfillment of the original charter of the school as a model farm. A horticulture garden for instructional use for both students and the public has existed on campus since 1914. In the early 1990s, it was evident that the garden site near Haber Road and Pammel Drive was not adequate for needed expansion. It was the desire of the faculty, administration and others to move the display gardens to a more visible location to enhance the image of the campus and provide improved educational facilities. In response to this interest, ISU alumnus Roy Reiman and his wife provided the initial funds for developing the gardens on a 14-acre site at Beach Avenue and Elwood Drive. Additional contributions of monies and materials made it possible to dedicate the Reiman Gardens in September 1995.

The initial four-acre phase of development relocated the heart of the Iowa State University horticulture garden into the midst of a beautifully designed garden accentuated with limestone and rustic wood in the new location. Iowa State has participated in the All-American Rose Selection program since its inception and trial plantings can be found, along with antique roses and modern hybrids. Hardy roses developed at Iowa State are displayed in the Griffith Buck rose collection. Plants with medicinal, culinary and other economic uses are displayed in an herb and fragrance garden. The location of the Reiman Gardens permits the development of displays not found elsewhere on campus. A flowing stream provides the backdrop for a wetland garden. Both hardwood and dwarf conifer plantings are underway. Along with the additional garden space for annual and perennial displays, the John P. Mahlstede Horticulture Learning Center provides increased educational facilities for both ISU courses and public outreach programs.

Public educational outreach is a primary goal of the Reiman Gardens. They also offer important hands-on experience and research opportunities for horticulture students. For students of Botany, the gardens represent a primary resource for learning plant characteristics. Other departments that utilize this resource include Landscape Architecture, Entomology, Plant Pathology and Design.

The public response to the Reiman Gardens has been good, even during its early stages of development. Public hours are dawn to dusk, from April through October. Group tours led by volunteer guides are available to the public or classes between May 15 and October 1. Even if a guide is not required, ISU instructors planning class activities in the Reiman Gardens should call several weeks in advance for a reservation. This will avoid conflicts with other groups that may be scheduled in the gardens, or allow the staff to turn the irrigation system off during the class visit. Information about scheduling activities or other education opportunities at the gardens is available at (515) 294-2710.

Uses of the Reiman Gardens

1. Dwarf conifer collection
2. Maintenance facility
3. Mahlstede Horticulture Learning Center
4. Dunlap entry courtyard
5. Annual flower trial garden
6. Herb garden
7. Peony collection
8. Griffith Buck rose collection
9. Rose garden
10. Old fashioned garden roses
11. Garden campanile
12. Hardwood forest
13. Wetland garden
14. Fragrance garden
Horticulture Experimental Station
ISU Horticulture Coordinating Department

After existing on scattered plots near the periphery of Central Campus, the Horticulture Experimental Station found a permanent home when state land became available in the late 1960s. The station is located five miles northeast of Ames on County Road E23.

The gently rolling hills of this quarter section of land provides ample room and excellent conditions for the growth of many research and demonstration plants. The soil is predominantly well-drained Clarion with lesser amounts of Webster and Nicollet loams. A few large Bur Oaks, *Quercus macrocarpa*, occur near drainage ways, but the original vegetation was prairie grass.

**Uses of the Horticulture Experimental Station**

1. Nut trees
2. Turf grass varieties
3. Ornamental breeding
4. Small fruit breeding
5. Apple orchard
6. Cucurbit breeding
7. Stone fruits
8. Aquaculture laboratory
9. Crabapple varieties
10. Grape varieties
11. Apple rootstock studies
12. Vegetable breeding
13. Raspberry varieties
14. Ornamentals

This area is intensively used by Horticulture students. The nature of the research conducted and skills taught require access to growing plants. A wide assortment of plants are available for a variety of these uses. Plant introduction plots evaluate the response of varieties to the growing conditions of this region. Much of the plant material tested in this manner is donated from the horticultural industry. Iowa State also cooperates with the North Central Region Research Group which studies tree introductions. Plant breeding is carried out with numerous small fruits and vegetables. Instruction in cultural practices and the results of those practices are studied at this facility. A sizable orchard produces apples for training purposes and for commercial distribution.

In addition to college student related activities, a great number of training courses and workshops are conducted through the Horticulture Experimental Station. In a typical year, over 3,000 visitors may attend some form of educational function held on this site.

Visitors and dignitaries from other states and countries are often escorted through the grounds on tour. Such tours not only exhibit the latest in plant materials and technology at the station, but it gives the visitors a view of one of the more picturesque areas associated with Iowa State University.
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