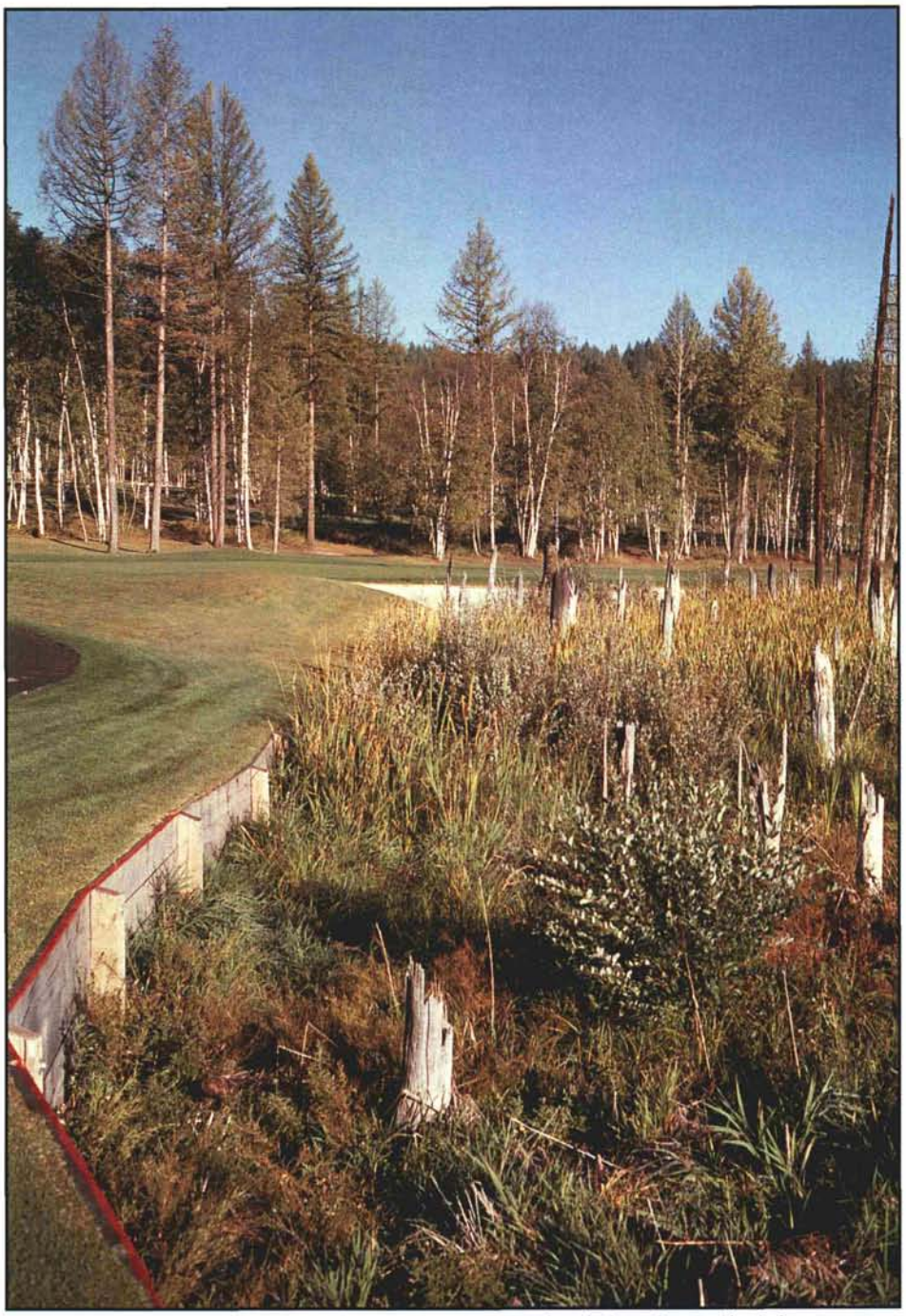
Natural Areas

Establishing natural areas on the golf course.

by MATT NELSON

MANY articles have expounded the merits of golf courses in the overall scheme of environmental quality. Some of the environmental benefits provided by golf courses include wildlife habitat, water purification, noise reduction, temperature modification, atmospheric processes, and preservation of green space.[1] Adversaries of golf courses cite rampant development, often in environmentally sensitive locations, potential pollution by pesticides and fertilizers, unwarranted use of potable water, and other threats posed to the environment by golf courses. Regardless of the exact ecological significance of golf courses, the fact remains that the approximately 15,000 golf courses in the United States constitute a sizeable acreage, particularly in urban and suburban areas. Opportunities to naturalize exist within many golf courses, and these will become increasingly significant in landscape conservation. This article discusses establishment and maintenance of three general types of natural areas commonly found on golf courses: (1) grasslands, including wildflower areas; (2) riparian areas, including streams, shorelines, and wetlands; and (3) forested areas.



Clearly delineated wetlands at the South Course, Whitefish Lake Golf Club, Whitefish, Montana.

Grasslands

The value of natural areas on the golf course is generally acknowledged, but little has been published concerning the implementation of natural area plantings on golf courses. The use of native grasses to establish attractive, environmentally beneficial, low-maintenance areas is one of the most commonly desired types of natural areas. Stands of native grasses can result in water savings, reduced fuel use and labor, and improved aesthetics. Images of these areas conjure visions of some of the world's greatest courses — the Old Course at St. Andrews, Prairie Dunes, Shinnecock Hills, and National Golf Links. Unfortunately, not all sites are blessed with the soils, climate, and existing vegetation to make the establishment and maintenance of these areas as easy as the great courses make it seem. Most course officials do not understand the establishment process required for native grasses, and accordingly lack the patience to see the implementation of these areas through to fruition. Even more common is the failure to employ proper establishment techniques, which often translates into the development of an unsightly stand of weeds that receives strong criticism from the golfers.

Establishment

When establishing native grasses from seed, minimum or no tillage is recommended when preparing the seedbed. This technique discourages the germination of weed seed present in the soil. Drill seeding is preferred, and seeding rates should be kept low to avoid establishing an excessively thick stand that reduces the quality of wildlife habitat and slows the pace of play.

A rate of 25 lbs. of seed per acre is a common recommendation for sowing seeds of native grasses.[7] Grasses such as fescues or annual ryegrass used as a cover crop can dominate the stand and hinder native grass establishment, so cover crops usually are not recommended and, if used, should be kept to a very low seeding rate. Fertilizer is not recommended except for extremely poor soils and, if used at all, should consist of low analysis natural organic material. Fertility generally enhances weed growth over the native grass stand. The use of a non-selective herbicide prior to planting reduces competition with existing vegetation for nutrients, water, and light. An early fall planting date takes advantage of favorable soil temperatures and decreased weed pressure in most areas. Since most of these areas will be non-irrigated, seeding dates should be timed to take advantage of climatic patterns and expected precipitation. Early spring seeding and dormant seeding also can be effective in many areas.[5]

During the first year or two of establishment, native grasses typically allocate around 70% of fixed carbohydrates to root development.[7] This explains why it may take up to three years to notice significant foliar development in native grass stands. The phrase "sleep, creep, and leap" is often used to describe the first three years of native grass development. Therefore, it is important to convey to the golfing clientele what to expect when establishing grasslands with native species.

Milkweed provides invaluable habitat for monarch butterflies.

Native grasses also can be established vegetatively. Many nurseries today stock native plants, including grasses. Some golf courses have established on-site nurseries today of native grasses where plant material can be expanded and relocated to desired areas on the golf course. Vegetative establishment is an effective way to speed stand establishment, and may be especially desirable on steep slopes that are prone to erosion.

Weed Control

Controlling weeds during establishment is an important facet of a planting program and can involve mowing, hand rouging, spot or wick application of selective herbicides, and open field burning. Mowing establishing grassland areas reduces weed pressure by inhibiting photosynthesis of broadleaf species. Mow twice per year during the first few years of establishment.[7] Pulling weeds manually is one of the most effective methods of weed control, but obviously is labor intensive. Spot applications of a selective herbicide also are possible, as is wick application early in the year when broadleaf weeds have grown above the canopy of the grasses.

However, weed control should be carefully considered. Many plants deemed weeds are in fact valuable herbs and forbes within the community. For instance, milkweed might be considered undesirable by some for aesthetic reasons, but this plant is critical for the reproduction cycle of monarch butterflies. The best approach is to have all plants in the stand identified and their relative significance and abundance evaluated by someone familiar with local ecology. Species identification can determine where and when weed control efforts are warranted.

Open field burning is a very effective means of reducing weed pressure since it destroys weed seed. Burning also reduces disease and insect pests and improves vigor of desirable grasses.[3] Burning grasslands is one of the oldest agricultural practices, and its benefits were well known by native peoples of this continent who employed burning of grasslands for millennia. If allowed, burning should commence on an annual basis after the third year of establishment. Burning before this time could cause injury to juvenile grass plants. Burn in early spring, and it may be helpful to swath the area ahead of time to lay senesced tissue down for fuel.[16] Be sure to obtain all necessary permits before proceeding to burn natural areas.

Among the most popular native grasses used on the golf course are big and little bluestem, switchgrass, indiangrass, blue grama, side-oats grama, buffalograss, reed canary grass, wheatgrasses, and sheep fescue. These grasses vary in their climatic adaptation, so

check references to determine appropriate native grasses for your particular site.[7]

Wildflowers often are a popular component of grass stands and are sometimes established alone. Much of the same advice applies for establishment: minimize tillage and fertility, prepare the site in advance, and seed when germination is favored. Wildflowers usually do not perform well in shaded or trafficked areas, or under very poor soil conditions. Look for sunny, well-drained, out-of-the-way sites for wildflowers. As with grasses, choose a mix of wildflowers that is adapted to your region, and choose a desired blend of annual and perennial flowers. Wildflower areas may require annual or biennial seeding to prevent one perennial species from dominating the stand. Weed control requires preplant herbicide applications and hand pulling of weeds. Spot applications of herbicides can be made, but no selective herbicides are available for broadleaf weed control in wildflower stands.[8]

Wildlife

Wildlife habitat can be significantly enhanced with the establishment of grasslands. Birds and mammals utilize prairie plant communities for nesting, foraging, and cover. Stands that are too thick actually reduce habitat quality by impeding overland travel; therefore, maintain open, bunch-type stands of grasses and flowers.[4] Creating cells, or zoned patches, of habitat with shrubs or trees enhances the wildlife value of the area by mimicking natural plant succession. Isolated patches of shrubs provide thermal and protective cover for wildlife, thereby reducing isolation and vulnerability to predators.

A stand of native plants also helps preserve populations of native insect pollinators. Many ecologists have considered the loss of native pollinators a significant threat to many native plant species. The relationship between plant and insect can be very specific, and golf courses offer an opportunity to preserve native plant species within the ecosystem.[13]

Another important consideration with regard to wildlife habitat is the presence of ecotones, which are the transition areas between habitat types. For instance, edges of forests and riparian areas could be considered ecotones. The most desirable approach when considering ecotones is to avoid stark transitions like straight lines. Transition areas should approximate the natural landscape and include irregular borders and a diverse vegetative composition. Ecotones are important components of the ecosystem as they represent areas of community interaction and varied wildlife habitat components.[14, 15]

When naturalizing the golf course with native grasses and wildflowers, be sure to start with a small area to evaluate establishment methods and the adaptability of the chosen plants. Also, be sure that the selected areas are appropriately located so as not to adversely affect the speed of play. Excessively thick stands of secondary rough often are located too close to in-play features and can be overly penal. The caliber of play at the golf course should be evaluated to determine where forced carries and other natural areas come into play. The number of available teeing areas per hole also could impact where natural areas are appropriate. From an aesthetic standpoint, determine what type of natural areas are suitable to your site. Not all sites are suited to prairie or meadow-type natural areas, and they may look out of place when forced into the wrong location.

Riparian Areas

Riparian areas on the golf course include the shorelines of lakes and ponds, stream corridors, and wetlands. Natural vegetation in these areas serves the dual purpose of improving aesthetics and providing a functional component of ecosystem enhancement. Buffer strips along lakes, ponds, and streams reduce soil erosion, filter runoff, provide a barrier between nutrient-rich grass clippings and the water feature, create wildlife habitat, utilize nutrients that have entered the water feature, and help prevent thermal pollution of our waterways.[2, 11] Establishing buffers also saves valuable labor hours by reducing or eliminating time-consuming string trimming and walk mowing. Vegetative buffers also may deter geese from occupying critical play areas such as greens, tees, and fairways. Geese often are reluctant to venture through thick vegetation when exiting a water source for fear of predators on the terrestrial side.

A wonderful example of a stream in natural condition. Thermal protection from trees, vegetated stream banks for erosion control and habitat, and spillways oxygenating the water all contribute to a healthy stream. Springdale Golf Club, Princeton, New Jersey.

Lakes, Ponds, and Streams

Vegetated shorelines and streambanks can be established simply by allowing existing vegetation to grow unmaintained, or native riparian plant species can be established by seed or transplanting. Emergent vegetation such as juncus and iris can be transplanted and provide a wonderful aesthetic enhancement, especially where water levels fluctuate. Cattail

seed can be collected by hand and spread along shorelines to establish this extremely productive plant. Cattails utilize many nutrients which otherwise might be available for algal growth. These are a few examples of various techniques used to reclaim shoreline vegetation.

Maintaining vegetation along streams, especially trees in out-of-play areas, provides thermal protection and helps maintain adequate supplies of dissolved oxygen for floral and faunal aquatic species by reducing biological oxygen demand. Vegetated streambanks and shorelines also anchor soils and reduce erosion. Another important consideration for streams is to leave a certain amount of downed wood and rocks in the stream channel to create spillways and eddies for oxygenation and wildlife habitat. This is a lesson the U.S. Forest Service learned after decades of logging and stream clearing when salmon habitat declined severely. Dredging and clearing stream channels eliminates wildlife habitat, reduces natural water purification, and promotes accelerated erosion.

Water quality in streams, ponds, and lakes should be monitored regularly to document change and establish baseline values for evaluation of maintenance practices. A testing laboratory can perform water quality testing, and stream health can be gauged by sampling macroinvertebrate aquatic species.[9]

Vegetated shorelines and streambanks should be at least 10 to 15 feet deep from the edge, and should be clearly marked for hazard delineation on the maintained edge. Protection of our waterways should be given a high priority by golf courses, as protection of water resources is at the forefront of environmental concern in this country. Also, maintenance hours spent string trimming and hand mowing shorelines and streambanks can be put to better use on other areas of the golf course more critical to play.

Wetlands

Wetland areas should be clearly delineated, and players and employees should be kept out. Use caution with fertilizer, pesticides, clippings, and irrigation near wetlands. In some cases, it may be appropriate to designate wetlands as environmentally sensitive areas by an appropriate authority. Wetland areas are among the most productive and dynamic ecosystems on the face of the earth, and they are host to numerous foraging and nesting wildlife species. Wetlands should be monitored yearly for water level fluctuations, water quality, and species changes. Water should be tested and numerous photographs should be taken at regular intervals throughout the year.[10, 12] Documentation of wetland parameters enables the establishment of a database, which can be used to evaluate management practices and correlate to climate variations.

Forests

Trees can be both an environmental asset and liability on golf courses. The key is to know where forest habitat is appropriate and where it is not. From an environmental standpoint, it generally is believed that a diverse mix of both tree species and ages is the best for wildlife and plants. A stand consisting of a well-developed structure provides the greatest amount of habitat niches for the most diverse amount of wildlife. Thus, canopy, secondary growth, and understory all are important functional components of the forest community. It has been well documented that snags and dead or decaying trees provide excellent roosting habitat for many raptors and nesting habitat for cavity-nesting bird species such as the spotted owl. Equally important, but often overlooked, is downed wood on the forest floor. Downed wood provides habitat for many terrestrial species, serves as nurse logs for new trees, is important for nutrient cycling, and helps hold moisture in humus and soil layers. Leaving downed wood in forest areas is just as important as leaving snags.

In many climates across the United States, however, there are areas of the golf course where natural forest areas are not appropriate. Where summer humidity and disease pressure are problems, a well-structured forest in close proximity to turfgrass can create severe problems, especially for greens and tees. This is the case where trees can actually create an environmental liability. Shading and restricted air circulation limit growth and recovery of turfgrasses, and enhance disease pressure. To keep grass alive, increased pesticide use often is necessary, which increases employee and golfer exposure, volatile losses to the atmosphere, and the threat of groundwater or surface water pollution. Although proper management and application can minimize these risks, modification of the growing environment can reduce the amount of needed chemical inputs. Shade and poor air circulation are among the biggest problems for turf management in the United States, reflecting people's poor understanding of the effects of trees on turfgrass. Forested areas can provide tremendous environmental enhancement, but they need to be properly located and also properly balanced with the rest of the management program.

Rarely do tree plantings approximate the natural condition. Trees planted on golf courses should be selected for a number of management and playability factors, and species that are part of native, local forest communities should be selected. Never plant trees to the immediate southeast of greens and tees, as they eventually restrict morning sunlight penetration. Morning sun is thought to be the most important of the day. Also, avoid introduced species. The Norway maple is an example of an introduced tree species commonly used on golf courses. It severely restricts grass growth and has become a problem in natural forest communities. Norway maples develop leaves much earlier in the season than most native trees, and they hold their leaves much later into the fall. The result is that many forest species and turfgrass are effectively shaded out of establishment. This weed can be considered one of the greatest threats to native plant communities in many parts of the country.

Using forested natural areas as corridors between larger natural areas is a progressive means of enhancing wildlife habitat and managing within the larger ecosystem. Linking fragments of habitat preserves genetic diversity among populations and provides thermal and protective cover for diurnal and seasonal movement of wildlife.[10] Golf courses often serve as *links* between surrounding habitats and natural features. This point should always be given consideration during new development.

Forested natural areas can be an excellent benefit to wildlife and the environment, but be sure they are properly located far enough away from critical play areas. Allowing forest plants to develop through natural succession is perhaps the best way to manage these areas. Leave snags and downed wood, and allow the forest to manage itself. Walking paths with signs identifying different species and components are a wonderful way to share the benefits of natural areas with golfers.

The implementation of plans for natural areas on the golf course can be a rewarding experience for humans and nature. Every golf course has something different to offer, and collectively golf courses can play a tremendous role in landscape conservation across this country. The game of golf is here to stay, as is continued population growth and development. The focus now should be retrofitting the nearly 15,000 golf courses nationwide to maximize their environmental contribution, and laying the groundwork for sustainable golf course development and management in the future. Golf has long shared a close connection with our environment, and the game now has an increasingly important role in conservation. It is time to step up and contribute at your course. After all, it isn't called the greatest game for nothing.

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Wildflowers can provide an attractive and functional feature on golf courses. Niagara Falls Country Club, Lewiston, New York.