

USGA®



Wildlife Links

Improving Golf's Environmental Game

Look deep into nature,
and then you will understand
everything better.

– Albert Einstein

Cover photo: John and Jeannine Henebry

Inset photo: Joel Grief

At The Old Collier Club in Naples, Fla., Collier Enterprises set out to create a world-class golf course that harmonized with nature. The club became the world's first Gold Signature Sanctuary, a certification conferred by Audubon International on a select few courses demonstrating extraordinary environmental stewardship. For more on Old Collier, see page 17.

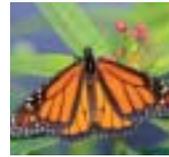
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The Back Nine

WILDLIFE LINKS

Wildlife Links is a joint venture of the USGA and the National Fish and Wildlife Foundation. Established in 1995, it represents golf's first comprehensive investigation of the game's relationship to and impact on wildlife and wildlife habitat. The program was created to fund the research, best management practices and education needed to provide golfing managers with the latest and most credible information on wildlife and habitat conservation issues. Since its inception, the USGA has funded more than 20 *Wildlife Links* projects committing more than \$750,000.

Research and publications funded through *Wildlife Links* include:

Data Management System for Information on Wildlife Habitat on Golf Courses

Golf Courses & Bird Conservation: A Management Manual

Wetlands Management Manual for Golf Courses

Pesticides & Nutrients in Surface Waters Associated with Golf Courses

Amphibian Conservation on Golf Courses

Effects of Golf Course Construction on Amphibians

Conservation of Native Pollinators on Golf Courses

Avian Community Response to Golf Courses

Corridor Establishment for an Endangered South Florida Butterfly

Golf Courses as Hotspots for Biodiversity in the Desert Southwest

Native Biodiversity and Golf Courses in Midwestern Landscapes

Burrowing Owl Conservation on Golf Courses





Introduction

I grew up on a golf course. Our front yard was just a short chip shot from the first green of the Rockport Country Club. Leaving the car parked in the side driveway was risking a nasty dent from an errant slice, and I had to scour the yard for golf balls each week before mowing commenced. After school on most days I would come home, grab a quick snack, and head over to the course – to go birding.

The Rockport Country Club was great birding. Woodcock flew from nearby woods to the roughs along the second hole each spring, drawn by the shorter grass that allowed potential mates to better witness their elaborate courtship display. The open fairways attracted eastern bluebirds, which at the time were still quite uncommon. During migration, a sora or a common snipe would sometimes lurk in the cattails bordering the small stream that bisected the course. Barn swallows nested in the utility barn, rocketing in and out through a small hole carved in the door by a caring groundskeeper. Golfers would often yell to me, sharing their recent sightings, and asking me in return for news of good birds.

The club had no special management programs to benefit birds and other wildlife, but both were abundant. Many of the members, and certainly the groundskeepers, were aware of wildlife, and did their best to conserve natural habitats. The features typical of any course – water hazards such as streams and ponds, brushy edges where rough meets wood, and even the wide open fairways – were important to both migratory and resident animals.

As a teenager, I would walk my favorite routes, fantasizing about what I would do, given the chance, to make the course even better for wildlife. By planting along streams, I was sure that red-winged black-birds could be enticed to nest. Sparrow



Peter Stangel

populations could be doubled by adding native brush under taller canopy trees. Downy woodpeckers would excavate cavities in dead limbs and snags retained in the abundant forest surrounding the course. I was sure my improvements would not only attract more birds, but also make the course more beautiful and challenging for golfers.

Fast forward to today. I am inspired by the growing environmental conservation ethic within the golfing industry, which has embraced what has been intuitively understood all along – that a healthy environment is good for golf, and that golf can play a vital role in enhancing the natural environment. And I am lucky to be part of a remarkable partnership between USGA and the National Fish and Wildlife Foundation that is funding research and developing tools golf course managers can use to make their courses more hospitable to wildlife.

This publication, the first to overview the *Wildlife Links* program, is a quick and compelling read, filled with practical information and advice any golf manager or advocate can apply, along with success stories highlighting leaders with exciting projects in the ground.

Read on and be inspired, as you discover how rewarding and easy it can be to improve your environmental game. Then explore further using the handy resources we've supplied in the *Back Nine* (page 19).

To the future of golf,

Peter Stangel, Ph.D.
National Fish and Wildlife Foundation

The FRONT 9

Tackling a conservation project can be overwhelming when you're not sure where to begin or how to proceed. We're here to help. Whether you are designing a new course or considering ways to make an existing course more hospitable to wildlife, follow these steps to success:



TAKE STOCK.

Conduct an inventory of the site's resident wildlife and habitats, both native and invasive, as a basis for formulating next steps.

Be sure to record species throughout the year to note seasonal variation. Need help? Consult with environmental experts familiar with local plants and animals. Local Audubon and Native Plant Society chapters and environmental agencies are good starting points.



SAVE WHAT'S LEFT.

Wherever possible, protect existing native habitat. Some of the world's most beautiful and challenging courses emphasize their site's natural characteristics. Left undisturbed or enhanced, native prairie grasses alongside a fairway, long leaf pine stands, even obscure wetlands in out-of-play areas can be invaluable to wildlife without compromising the game.



DEVELOP A GAMEPLAN.

Study your course with an eye to providing the basics for wildlife survival: space, food, cover and water. Then devise a plan to focus and organize your efforts. Outline goals, strategies, implementation, and monitoring, and discuss ideas with neighboring property owners. Finally, make sure your plan is comprehensive, covering a range of topics such as wildlife and habitat management, course maintenance, water conservation, water quality, and outreach and education.



USE WHAT YOU HAVE.

Take cues from your property and use what's already there, whether it's a grassy meadow, sandy uplands or a bare space in a remote area that might become a nesting site for pollinators. One of the best and easiest ways to upgrade the environmental quality of your golf course is simply to expand or enhance the existing natural amenities.



5

PROTECT ENDANGERED SPECIES.

With easy access to food, water and cover, golf courses can be excellent refuges for many wildlife species. However, providing optimum habitat requires forethought and commitment. Include a wildlife biologist or environmental agency on your planning team, and ask about programs that offer incentives to partners making special considerations to protect endangered species.



6

ESTABLISH CORRIDORS.

Corridors connect patches of wildlife habitat, enabling animals to safely travel and forage for food. Ideally corridors should be at least 30 yards wide, and located away from roads, trails and paths. Streamside corridors are extremely important because the rich, moist soils produce an abundance of lush vegetation and insects for hungry birds.

8

START AN IPM PROGRAM.

Integrated pest management uses a variety of controls to banish turfgrass pests without posing a hazard to golfers or the environment. While conventional methods rely on routine, blanket applications of pesticides, IPM promotes regular monitoring, selected thresholds for insects, proper timing and spot treatment.

7

NATURALIZE OUT-OF-PLAY AREAS.

Look for non-play areas that are currently maintained with mowed grass or that are visually unappealing. Areas between fairways, below elevated tees, in roughs and bordering woodlands may be especially suitable for naturalization. Naturalized areas need not be large – you can start small and expand over time.

9

ENGAGE GOLFERS.

Communicate plans ahead of time and educate golfers about wildlife conservation opportunities and initiatives. With a strong outreach plan, you'll enlist plenty of support. After all, getting outdoors and reconnecting with nature are among the top reasons why people play golf.



INSIDE: practical ideas and suggestions for making your golf course wildlife-friendly.



Good for Golf

From a bird's-eye view, golf courses represent a quiet oasis in a sea of humanity, a place to rest and recharge along water features and in trees high above the grounds-play. Nature's avian ambassadors have delighted golfers since the beginnings of the game, becoming even more visible in recent decades as encroaching development forces them to find new greenscapes.

Although golf course construction alters the natural landscape, with proper design and management the new mosaic of altered and introduced habitats can provide safe haven to birds and other wildlife. As bird conservation on golf courses evolves, researchers are learning more about the habitat needs of birds and how golf courses actually mimic some vanishing natural habitats.

At the same time, pesticide use on golf courses is changing thanks to safer products, smarter application, and widespread adoption of Integrated Pest Management principles that promote spot treatment over broadcast application and favor least toxic chemicals.

The up-shot is this: Birds are good for golf – and golf can be good for birds. Plenty of courses attest to this, and more and more golf course operators are getting in the game, working to enhance habitat as they recognize the symbiotic link between wildlife and enjoyment of one of America's great past-times.

And not a moment too soon. Populations of some bird species are declining at alarming rates, especially long-distance migrants making the perilous journey from breeding sites in the U.S. and Canada to wintering homes in Central and South America. Migratory birds often have only one chance

to nest and are vulnerable to parasites like the brown-headed cowbird, an opportunist that lays eggs in other bird's nests. The adoptive parents are left to raise the demanding intruders, often at the expense of their own hatchlings.

Opportunities for bird conservation are great and growing, and with more than 150 acres of open space on average, golf courses are primed to play an important conservation role.

LINKS RESEARCH

With USGA funding, researchers are evaluating the special habitat needs of species commonly found on golf courses as well as those likely to take up residence with a little encouragement.

One study of 24 golf courses in South Carolina examined how breeding birds utilize a variety of golf course designs, from highly altered landscapes to those where the majority of native vegetation, including a substantial amount of forested area, remained intact. For each course, researchers noted the abundance of breeding birds, including long-distance migrants, as well as species diversity.

Not surprisingly, less-developed courses had a greater diversity of birds and migratory bird species, but other findings shed new light on which habitats provide the greatest value and in what amounts. The single most significant landscape attribute was the amount of forested area. But while the study confirmed the importance of maintaining large patches of native vegetation, it also revealed that disturbed areas can create vital habitat for some declining species that need the open, grassy areas golf courses provide.



Courtesy of Denny Bingaman

In a study of 100 golf courses in Midwestern Ohio, red-headed woodpeckers were found on 26 courses, and breeding success on the golf courses was comparable to success off-site. One of the biggest factors separating bird-friendly golf courses from others was the presence of dead trees or snags in out-of-play areas. Snags are used by at least 85 North American bird species — from owls and woodpeckers to swallows and other songbirds — as places to forage, attract mates and build nests.



Courtesy of Indian River Club

One such benefactor is the red-headed woodpecker. Once abundant in the upper Midwest in open woods maintained by natural fire, the number of red-headed woodpeckers has plummeted in the last century along with their habitat. By mimicking the open woodlands these striking birds favor, golf courses may actually supply a promising surrogate habitat.

In southwest Florida, researchers with the University of Florida conducted a two-year study of the habitat value of golf course ponds to waterbirds. While a large numbers of waterbirds use ponds, primarily for feeding, the low density of birds suggests that there are ample opportunities to improve habitat quality.

Several factors — including pond size, proximity to food and amount of shoreline vegetation — influenced the extent to which birds utilized the ponds. In general, larger ponds attracted more waterbirds, but wading birds required waterscapes with shallow vegetation, which provides cover and foraging area.

Overall findings pointed to the benefits of a wide range of pond habitats managed as a wetlands complex, preferably with several ponds designed and planted to cater to different species. They also uncovered some unexpected opportunities. For instance, low-lying shoreline areas that are difficult to maintain could be planted to expand the shallow-water areas wading birds require.

TAKING ACTION

Designing a course favorable to birds involves planning on a large spatial or landscape scale, but it need not entail drastic action. Start by protecting existing

native habitat and understanding how birds utilize altered habitats.

1 Take stock.

Consult with local experts to identify birds that are indigenous to the area, and survey your golf course to determine which species are already present. Use this as basis for developing a gameplan to make your course more bird-friendly.

2 Think big.

- Start with large-scale conservation efforts.
 - Most bird species prefer large patches of habitat with fewer opportunities for predators to intrude and more interior space. Wherever possible, protect and enhance large habitat patches, expand existing habitats by adding native plants and connect smaller habitat patches. Many birds require at least 20 acres of habitat to thrive. Clustering fairways, buildings and parking lots together will leave the greatest amount of undisturbed habitat for wildlife, and the larger the patch, the more species will use it.
 - If larger patches are unavailable, don't despair. Even small habitat patches, such as individual trees or small woodlots, can add value, particularly to migrant birds looking for an easy spot to rest and refuel.
 - Focus on quality and location. High-quality bird habitat contains a large proportion of native vegetation that provides the basics – food, water and shelter, as well as minimum disturbance from golfers. Positioning high-quality patches together is highly preferable to locating them alongside a degraded or busy area.



Courtesy of Indian River Club

Elegant sandhill cranes are popular residents at the Indian River Club in Vero Beach, Fla., a wildlife-friendly golfing community that was one of the first in the country to become a certified Audubon Sanctuary. Native habitats are featured throughout the property, which relies on reclaimed water for irrigation and least-toxic methods of pest control. The club also established an adjacent 14-acre upland preserve that is home to the threatened Florida scrub-jay, whose population has declined by as much as 90%. “We try to educate our residents about how important it is to maintain the environment,” says superintendent Mitchell Clark. “There’s only so much natural habitat left, and you can’t really replace it when you take it out.”

Pinehurst

Endangered birds and birdies are rarities on most courses, but not at Pinehurst. While golf's greatest were teeing off at the 105th U.S. Open in June 2005, red-cockaded woodpeckers were busy preparing their young to fly.

The red-cockaded woodpecker is a treasured sight at the venerable North Carolina club, where stately long-leaf pines — some centuries old and among the last remaining stands in the Southeast — line emerald green fairways. An innovative agreement hatched a decade ago is helping the endangered bird battle back from the brink.

In 1994, Pinehurst was getting ready to build No. 8, the latest in a series of championship courses. Superintendent Brad Kocher wanted to attract woodpeckers to the course, but worried that extending a “pine branch” might open up a Pandora’s box of unknown and likely unwelcome restrictions on nearby residents.

“If you have a woodpecker tree you are somewhat limited in what you can do within a half-mile radius of the (nesting) cavity because it’s foraging habitat,” explains Kocher, senior vice president of golf course management, whose responsibilities for parent company ClubCorp include overseeing golf course maintenance activities at more than 90 properties.

“Although we didn’t have cavity trees at the time,” he said, “we knew if we did things to encourage the species, like making artificial cavities in trees and clearing out the understory, we might subject ourselves and our neighbors to restrictions.”

“Back then, if a landowner did a good deed, he was rewarded with restrictions that could tie up part of the land,” says Susan Miller, a biologist with the U.S. Fish & Wildlife Service, the agency that enforces federal wildlife laws.

Fearful of those restraints, some folks went as far as cutting down old-growth pines to prevent woodpeckers from nesting.

Kocher and others knew that there must be a better way. After consulting with a local

biologist, Kocher met with Michael Bean of Environmental Defense and officials from the U.S. Fish & Wildlife Service, who crafted a flexible agreement that would protect the birds without penalizing landowners.

“Next thing I knew, Safe Harbor was sitting in front of us,” says Kocher, recalling how Pinehurst became the first private landowner to sign up for the program. Under Safe Harbor, landowners who agree to encourage red-cockaded woodpeckers to nest are exempted from some future property restrictions, and eligible for management and, in some cases, monetary assistance for habitat enhancement.

In the Sandhills region of North Carolina alone, there are now 91 Safe Harbor agreements supporting 56 groups of red-cockaded woodpeckers, with neighboring golf courses leading the way. Since the program expanded nationally in 1999, more than 320 private landowners have enrolled to protect 35 endangered and threatened species on almost 3.6 million acres of land and 16 linear miles of stream.

Today, Pinehurst boasts 21 colonies of red-cockaded woodpeckers, including nesting clusters and trees harboring actively pecking adults. The chipper noise is music to Kocher’s ears. “If you had to pick something that’s been a win-win for landowners, endangered species and regulators, this is it.”

Pinehurst golfers, residents and staff take pride in their conservation role and No. 8’s status as an Audubon Signature Sanctuary, a designation earned through special efforts to protect birds and limit environmental impacts. Maintenance crews have helped install artificial nesting cavities in pine trees, finishing in hours what it takes a woodpecker up to six years to complete. They also keep the understory clear to prevent hardwood intrusion.

Kocher is quick to point out that Pinehurst’s environmental ethic is not extraordinary by their standards, but rather business as usual for a company that operates on a simple principle.

“We wear a little button here at Pinehurst. It says: ‘Do what’s right.’”





The venerable North Carolina club that secured its place in golfing history in 1999, when Payne Stewart clinched his 2nd U.S. Open Title with a 15-foot putt on the final hole, needs no introduction. Revered by golfers worldwide, it's also earned an impressive reputation among birds – and conservationists – for its success in recruiting and sustaining the red-cockaded woodpecker, an endangered species battling back from the brink.

Courtesy of Pinehurst

- Establish buffer zones to protect the nests of large nesting birds, and to protect areas with large numbers of nests and birds. A 100-foot buffer is ideal, but screening vegetation can reduce the distance required.
- Establish natural travel corridors at least 30 yards wide for birds and other wildlife. Stream-side corridors are particularly important because they offer rich soils and ample insects for birds to feed on.
- Consider adjacent land uses and coordinate with neighboring property owners to optimize wildlife habitat.

3 Where larger habitat areas are not possible or practical, focus efforts on smaller scales.

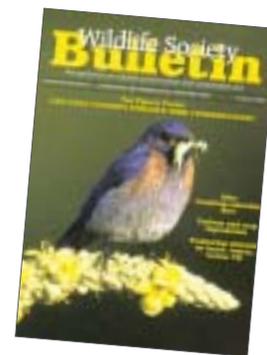
- Determine which bird species could potentially be attracted to your course, and which birds are present but in low numbers.
- Decide which missing or uncommon birds you want to attract, and plan accordingly by investigating the habitat requirements of those species and making appropriate modifications.
- Work with natural features first, then artificial features.
- Design vertical layers of habitat including ground, low, medium and tall vegetation.
- Plant clusters rather than isolated plants.
- Use native plants, especially fruit-bearing varieties, which are vastly superior to exotic plants as habitat and food sources.
- Leave dead trees or large snags standing in out-of-play areas.
- Provide bird houses for specific species where natural cavities are lacking. Build birdhouses out of wood, and position them away from human activity.
- Place bird feeders and baths 8 to 10 feet from trees and clean regularly.
- Provide a variety of water depths, perching sites and vegetation with water features.

4 Use pesticides and herbicides sparingly, avoiding application in bird nesting season and near bird nesting sites.



Courtesy of Indian River Club

Wading birds require shallow ledges around ponds and lakes where they can probe for food. Planted shorelines also help protect the water against contaminants.



Are golf courses for the birds? The Wildlife Society (www.wildlife.org) weighs in with a special summer 2005 bulletin featuring 10 research papers highlighting investigations funded by the USGA Wildlife Links Program. While golf courses are not a substitute for native ecosystems, they do provide habitat for a wide variety of birds, including species of special concern. That role takes on even greater importance in rapidly urbanized landscapes that often lack other large open spaces or natural areas.

The Forgotten Link

Next time you breeze down a grocery aisle or stroll by a flowerbed, consider the tiny unsung heroes on which we rely for most fruits and vegetables. Pollinators such as hummingbirds, butterflies and bees ensure that people have food by helping plants reproduce. In fact, about 80 percent of all plant species require the help of pollinators for reproduction. While searching for nectar, a single female bee may visit tens or even hundreds of flowers, actively gathering and depositing pollen along the way.

Despite providing a service so essential, pollinators are often ignored. But renewed interest and research by the USGA is putting these forgotten creatures back in the spotlight.

Contrary to popular belief, most bees are actually quite docile. Less than two percent of U.S. bees species are social bees (ie; honey bees, bumble bees) with a colony to defend – those likeliest to sting. And even the majority of these are non-aggressive.

Encounters are rare with the rest of the nearly 4,000 bee species. Intent on foraging, these solitary nesters avoid conflict and sting only as a last resort. Far more common are backyard brushes with wasps, which are often mistaken for bees.

Native bees are declining worldwide and face extinction in some areas as habitat gives way to development. Herbicides and pesticides are partly to blame, by killing some beneficial bees and impairing remaining habitat.

LINKS RESEARCH

A 1997 study by the Xerces Society in cooperation with the U.S. Department of Agriculture explored ways to enrich out-of-

play areas with native plants for pollinator insects. With funding from *Wildlife Links*, project staff worked with three golf courses in Oregon and Washington to survey and compare pollinating insects; enrich out-of-play and rough areas with native flowering plants; establish pollinator nesting sites; and educate golfers about the importance of pollinators.

While large numbers of bees used some courses, golf course trappings revealed a disproportionate number of sweat bees associated with disturbed or degraded plant communities. These opportunistic feeders are able to exploit a wide variety of plants. But their diverse tastes and almost random foraging habitats make them inferior pollinators. Specialist bees, by contrast, zero in on just a few flowers with greater efficiency and success.

TAKING ACTION

With simple changes, out-of-play areas on golf courses can attract master pollinators such as native bees, without interfering with golfers. All that's required is establishing foraging and nesting habitat in relatively undisturbed areas free from pesticides and herbicides.

1 Select a location. Look for opportunities to expand existing habitat or link to new foraging areas in out-of-play areas and roughs. Joining together a number of smaller patches will increase their effectiveness and provide corridors for wildlife. These larger plots are vastly superior.

2 Establish foraging habitat. Select a range of native flowering plants to ensure the availability of nectar



Photo courtesy of Robert Parks



Photo courtesy USDA-ARS/Scott Bauer



Photo courtesy of Robert Parks

A hole-in-one is all in a day's work for these master pollinators. Above (top), bee with heavy pollen load; (middle) a mason bee and (bottom) eucrine bee probing for nectar.



Courtesy of USGA

Field investigators check a bee nesting box at Veterans Memorial Golf Course in Walla Walla, WA.

and pollen throughout the growing season. Including both perennials and annuals will cater to a greater diversity of bees active in different seasons – and make the habitat more attractive to golfers.

Color and shape are also important. Bees favor blues, violets, yellows and whites. Their mouths differ, with some bees able to extract nectar from deep flower tubes and others dependent on shallower varieties. Because the depth of the flower tube determines the type of bee it will attract, a variety of flower shapes will entice a variety of bees.

Native plants are better suited to local conditions and, once established, require minimal maintenance. Starting with pot-grown plants rather than seeds will improve chances for survival. Clustering plants together will make it easier for the bees to gather food for their young. For helpful advice on which plants to use where and what pollinators they attract, contact your local native plant nurseries, the local chapter of the native plant society or regional wildlife agencies.

3 Create nesting sites.

Nests should mimic natural features, and be located within or near feeding areas. Because many bees cannot fly long distances, they will avoid isolated nests. But if the right conditions are created, bees often will begin using a nest within days of its completion. The more nest types supplied, the more bee species they are likely to attract.

4 Avoid using chemicals that may be toxic to pollinators, and monitor foraging areas until the plants are established to keep weeds at bay.

ATTRACTING GROUND-NESTING BEES:

Most native bees are ground-nesters that require sunny, well-drained soils in open spaces. These sun-worshippers favor east or southeast facing nest sites that warm in the early morning. The following nest designs are suitable for attracting a variety of these species.

Bare ground

Clear vegetation from a small level or sloping area (roughly six by six feet), and gently compact the soil. Choose a well-drained area in a sunny, open place and on a southeastern slope, where possible. Adding a few rocks around the perimeter will create basking places.

Sand pit

Select a sunny, well-drained spot, then fill a pit (roughly 12 feet square and 3 feet deep) with fine-grain sand or sand/loam mix. Where drainage is a problem, a sand pile or raised bed contained by lumber or bricks will suffice. Fill with sand or sand/loam mixture to a height of two feet.

Adobe blocks

Warm, dry nesting areas also can be constructed with adobe blocks, but this method is not recommended for rainy climates. Make a wall about 4 feet high by 6 feet long, supported with wood or metal backing to prevent blocks from toppling. The front of the wall should face east or southeast. In this face, drill holes into the blocks as deep as you can in a range of diameters between 3/32 inch and 3/8 inch (at least four inches deep for larger holes).

ATTRACTING WOOD-NESTING BEES:

Wood-nesters, such as leafcutters and masons, make their home in beetle tunnels in snags and similar holes. When making wood nesting blocks, provide a range of drilled hole sizes to attract and support a wider range of species.

Logs and snags

Place logs or old stumps in sunny habitat patches. Plant a few upright like dead trees to ensure that some stay dry. On the southeast side of each log, drill a range of holes as with adobe blocks, between 3/32 inch and 3/8 inch in diameter as deep as possible, and make sure that interiors of holes are smooth.

Twig bundles

Twig bundles can be made with any hollow stemmed plant such as bamboo. Cut stems in lengths of 8 to 12 inches. Tie with string, wire or duct tape with open ends facing the same way.

Elderberry stakes

Cut elderberry stems into stakes between 24 and 30 inches long, and sharpen one end to make it easier to push into the ground. Drill out pith from opposite end to a depth of about 6 inches, and then about 12 inches down, drill another side hole of similar diameter just into the pith. Drive the stakes 6 inches into the ground in a line across your habitat area.

Nesting blocks

Using any water-resistant lumber at least 4 inches by 4 inches by 6 (or 8) inches, drill holes between 3/32 and 3/8 inches in diameter into one side of the block at approximately 3/4-inch centers. Because the holes need to be closed at one end, either drill almost all the way through or drill through and then block the back with wood. Affix a sloping roof extending beyond the front of the block to shield the nests from rain. The block can be attached to a stake, fence or tree in a sunny, east or southeasterly exposure. Avoid treated lumber and cedar because they may affect the insects.



Courtesy of Wildhorse Resort

Nestled in wheat fields that stretch as far as the eye can see, Wildhorse Resort in Pendleton, OR is an oasis of green for golfers and wildlife.

Wildhorse Resort

Sean Hoolehan will never forget the morning in 1997 when he arrived at work to find a mysterious offering of brightly colored bowls strewn along the edge of his golf course. “It looked like a wind had randomly blown them all around,” recalls Hoolehan, superintendent at Wildhorse Resort in Northeastern Oregon, run by the Confederated Tribes of the Umatilla Indian Reservation.

Turns out the collection bowls, filled with a soapy solution, were traps for unsuspecting bees – the initial steps in a pollinator conservation project Hoolehan had agreed to participate in. The technicolor receptacles did the trick, luring pollinators to traps from which researchers were able to identify the diversity of bees – more than 30 species in all.

Nestled in the foothills of Oregon’s Blue Mountains, Wildhorse is an oasis of green in an amber quilt of wheat fields that stretch as far as the eye can see. Back then, construction crews were busy putting the final touches on a course designed by John Steidel, while researchers from the Xerces Society worked with Hoolehan to roll out the welcome mat for an entirely different set of players – native bees, the master pollinators responsible for sustaining much of the planet’s flower and plant life.

That the Tribes would embrace opportunities to make their new course hospitable to native wildlife of any kind came as no surprise to Hoolehan, who says they understand the connection between native plants and pollinators. The project also found an ardent supporter in Hoolehan, a strapping Irishman with a fierce love of golf whose first encounters with wildlife occurred on

the golf courses where he caddied as a kid growing up near Chicago.

But bees? Hoolehan concedes a lot of people bemoan bugs and insects in general, but adds: “If we’re ever going to restore habitat, for me connecting the dots between native pollinator bees and native plants is easy,” he adds. Besides, he notes, “I always tell people that native pollinators are gentle,” countering a popular misconception.

After identifying native bees on site, the team set up nesting boxes in out-of-play areas to woo the pollinators. Native flowers, both annual and perennial varieties, were added to provide a food source for the diminutive creatures. Not only were bees drawn to the flowering landscape, but the course also began attracting birds like ruddy ducks, curlews, hawks and owls – and recently welcomed its first quail.

“I’m always impressed at the positive reception from golfers,” says Matthew Shepherd, Xerces’ director of pollinator conservation. Once they know what we’re up to, “it’s easy to sell because there’s a concrete connection to their lives.”

Hoolehan’s and Shepherd’s advice: look at what you already have. “Most golf courses already probably have pollinator habitat – they just may need to tweak the plants and habitat a little,” says Hoolehan.

“This is one of the lowest-cost, highest-pay-back conservation projects you can get into,” he adds.

“For me it’s important that we recognize and promote the good that golf can do.”



Courtesy of Stephen Buchmann

Simple changes bring big rewards: Converting an out-of-play area to a pollinator refuge can transform a neglected fringe into an attractive backdrop for golfers, while also attracting wildlife.

Little Big Shot

It's a fact of life – wildlife, that is – that attracting birds, ducks, deer and other magnificent creatures to golf courses requires currying favor with the smaller animals on which they depend for food.

These mostly nocturnal cast members, including squirrels, mice, chipmunks and voles, are the little big shots of the animal kingdom, meriting consideration in golf course design and management plans.

Researcher Erika Barthelmess recalls an idyllic scene captured in a photograph: as golfers prepare to tee off on a sun-drenched day, several deer stand off in the distance, heads up, alert and graceful. The magical image evokes what many have come to expect from the game – the chance to spend time outdoors, close to nature, while immersed in a challenging sport.

But how real is the image?

“It's easy to overlook the smaller animals that support the more visible wildlife we've come to expect,” says Barthelmess, a biology professor at St. Lawrence University in upstate New York. “But we can't have one without the other.”

USGA tapped Barthelmess to investigate ways to strengthen the link between golf and these “forgotten fauna.” Over a two-year period, Barthelmess compared populations of small mammals on the campus golf course to an adjacent woodland tract.

Although the total numbers of small mammals was similar at both sites, there were dramatic differences in species diversity. Not surprisingly, researchers identified a greater variety of small mammals at the comparably sized woodland tract.

The tiny slivers of habitat dotting the golf course landscape are like islands in a sea of unsuitable habitat (open greens and fairways), notes Barthelmess – too small and too far removed from other natural areas to have a positive impact.

SIZING UP THE OPPORTUNITIES

The good news is that golf course superintendents can correct the deficiency by connecting patches of habitat to create corridors and larger naturalized spaces for wildlife to roam and forage. Even greater opportunities to accommodate wildlife exist in the planning stages, when golf courses are designed. Remember:

- **Where habitat is concerned, size matters.** One large naturalized area is superior to several small fragments, but enlarging smaller habitats also creates value.
- **Distance counts too.** Animals tend to avoid isolated habitat patches that require them to travel long distances or across open areas where the risk of predation is high. Locating patches in close proximity to one another, or creating natural corridors with longer grass to connect smaller habitat patches, can resolve this problem.
- **Complex beats simple.** The more natural vegetation and ground cover within a habitat, the likelier it is to attract a diversity of animals.
- **Use pesticides sparingly.** The proximity of small mammals to the ground makes them particularly susceptible to harmful chemicals. An integrated pest management program is advised.



Courtesy of Joel Grief

Planning for wildlife requires attention to all creatures great and small. Although small mammals rarely capture the spotlight, their importance in the food chain is vital to sustaining a wide variety of other species.



At Water's Edge

As wildlife conservation on golf courses has advanced, so has recognition of the importance of maintaining a broad diversity of species. Golf courses designed to attract a wide array of birds, butterflies and other animals can make a day on the links all the more enticing.

Among the more fascinating and often overlooked creatures taking up residence on golf courses are amphibians, animals adapted to live on land and in the water. Amphibians such as frogs and toads begin life in the water as tadpoles with gills, but also have lungs that allow them to breathe on land. They typically lay their eggs in the water but spend most of their lives in nearby forested uplands before returning to water's edge to mate.

Worldwide declines of amphibians due to habitat loss and pollutants are impacting scores of animals that rely on them as a food source. Not only are these creatures valued as food for birds, they also serve another indispensable role. Frogs are voracious mosquito predators, consuming thousands of insects each season.

Golf course wetlands can provide a haven to these water-loving amphibians when properly designed and maintained. Seasonal wetlands are especially important because of the diversity of species they support. Evaluating your course for ways to protect and improve seasonal and permanent wetlands can be a boon both to nature-loving golfers enjoying the course and the animals seeking refuge there.

LINKS RESEARCH

Amphibians are creatures of the night, most active after dark, out of sight of golfers. Because they often escape notice, little has been known until recently about their populations and movements on golf courses. Research sponsored by *Wildlife Links* has helped to identify how golf courses can support these lowly but highly important denizens.

Studies by the University of Rhode Island on pond-breeding amphibians in New England golf courses reveal complex life cycles that make amphibians vulnerable to habitat loss and patchy remnants too small to sustain them. Amphibians migrate twice a year, once to their breeding habitat and again to return to their non-breeding territory. While ponds are often used by adults for mating and laying eggs – and by larvae until they become terrestrial organisms – adults and juveniles spend most of the year in forested areas near breeding ponds.

In two separate studies, wetland investigations uncovered only a few amphibian species, mostly bullfrogs (*Rana catesbeiana*), southern toads (*Bufo terrestris*) and green frogs (*Rana clamitans*). That's because most wetlands on golf courses are permanent water features that harbor fish, which prey on tadpoles and all but a few of the hardiest amphibians.

Seasonal wetlands, by contrast, support a greater diversity of amphibians – two to three additional salamander species and two to five more frog and toad species than do permanent wetlands, based on research by the University of Georgia's Savannah River Ecology Lab.



Frogs and toads, including this Carolina gopher frog, are voracious insect predators, making them welcome additions on golf courses.

Courtesy of David Scott



Both studies found that the length of time a wetland holds water, known as the hydroperiod, is a key determinant of amphibian diversity. Ponds that stay wet longer (filling in Spring and drying in October or November) tended to have the most species, while those with short or medium hydroperiods revealed species not found anywhere else.

Despite their ecological value, seasonal wetlands are under siege. While wetland losses overall have been severe – more than half of these vital habitats have been destroyed over the past century – seasonal wetlands, which remain unprotected by most wetland regulations, are vanishing at an even faster rate, making conservation efforts vital.

TAKING ACTION

Making golf courses friendly to amphibians can be accomplished in several ways:

- 1 Survey your site.** Some seasonal wetlands are so small they escape notice or can be mistaken for large mud puddles. Experts advise conducting a site survey in late spring following a significant rainfall. Look in forested or out-of-play areas for flooded depressions that may be no more than three feet deep and 15 feet across.
- 2 Preserve any seasonal wetlands** you find, and maintain a forested rim around the perimeter wherever possible.
- 3 Follow these practices** to support amphibians at all permanent or seasonal water features on site:

- ▶ Don't stock fish, which prey on amphibians and tadpoles.
- ▶ Establish a buffer of taller grasses and native plants around the edge of ponds to provide cover and egg-laying substrate for frogs and toads. Plants also help maintain water quality by filtering runoff.
- ▶ Create shallow shelves around deeper ponds or lakes, and enhance shallow water areas with emergent plants.
- ▶ Implement a no-mow, no-spray zone of at least 10 to 25 feet around the water's edge to provide habitat and keep pollutants out of the water.
- ▶ Add shelters such as rock or brush piles or small logs in damp places amphibians are likely to frequent.
- ▶ Retain or create natural corridors connecting uplands and wetlands for wildlife to travel safely, and link together as many natural and restored areas as possible.
- ▶ Preserve large, intact forested areas, and their woodland understory, including a shrub layer, leaf litter and downed limbs. Adult amphibians spend most of their lives on land in nearby forested areas that may be as valuable in preserving the species as the wetlands themselves.
- ▶ Design courses with seasonal wetlands in mind. A variety of wetland water features buffered by plants and adjoining forests can beautify a course and make it more challenging.

Preserving seasonal wetlands in out-of-play areas will increase the diversity of wildlife on a golf course. Many pond-breeding amphibians, such as the Chamberlain dwarf salamander (pictured above), rely on seasonal wetlands for mating and egg-laying.



Courtesy of David Scott

Golf course ponds tend to be dominated by bullfrogs, which are among the few amphibians that can compete with the fish often present in permanent wetlands. However, a healthy ecosystem requires a greater diversity of amphibian species.

Source: Xerces Society



Courtesy of David Scott

Toad-ally awesome: A healthy diversity of frogs and toads signals a healthy environment. Golf courses can enrich the biological diversity of their landscape by protecting both permanent and seasonal wetlands, and maintaining a natural buffer around them.

the frog prince



Courtesy of David Scott

A younger David Scott, before the scratch golfer grew up to become a wildlife biologist.

For research biologist David Scott, nothing thrills like the throaty chorus of frogs and toads. These stealthy creatures are part of a fascinating amphibian kingdom that moves largely under cloak of darkness on rainy nights that drive most mortals indoors.

Scott's work for the Savannah River Ecology Lab in Aiken, South Carolina takes him deep into the heart of forests to monitor wetlands for amphibian populations. Like a restless kid eager to splash around in mud puddles, Scott welcomes the rain. "On a good night, we might see thousands of frogs and salamanders."

The frog prince was once a scratch golfer, a lanky kid who played competitively in high school, well enough to earn one of three state spots in a national tournament called the Insurance Youth Classic. The top 60 earned a chance to play with PGA masters. Scott was paired one day with golfing legend Byron Nelson, the next with Jim Colbert.

It was a humbling experience, says Scott, even though as a teenager he didn't fully appreciate the significance of sharing the golf stage with these two masters. "There was this one hole that required a fairly long drive," Scott recalls. "I made a big cut, my ball barely cleared the ravine. It was literally as far as I could hit a golf ball. Jim Colbert got up and, with no perceptible difference, hit the ball an extra 30 yards or more."

Lesson learned, says Scott: "The situation required it and he did it."

As for the youth classic, Scott was driving to victory until someone happened to mention he had just taken the lead. "I had a really easy shot, and then proceeded to use an 8-iron to hit my ball into the lake."

From an early age, Scott coupled a love of golf with a passion for all things wet and wild. He once spotted a northern water snake in a pond on a golf course and dove through a briar patch to capture the slithery (and, undoubtedly, stunned) creature. Emerging scathed but happy, he toted the specimen in his golf bag till he could show it to his biology teacher and weigh and measure his prize. Of his rowdy antics that day – of which Huck Finn would heartily applaud – an older Scott now admits: "If I was hard pressed to say why I did it, there was really no good reason."

The exuberant young golfer ultimately grew up to become a biologist, keeping tabs on the wild creatures that fascinated him in his youth. The chance to team up with USGA to evaluate ways to protect amphibians on golf courses was serendipity.

"People often slam golf courses," says Scott, "but if they are designed and managed properly they can be really great habitats."

The beauty and grandeur of many of golf's most celebrated courses is enhanced by waterscapes that glisten like gems on a green horizon. But how these wetlands are designed and maintained can spell the difference between a sterile environment demanding constant tending and one that works in harmony with nature to attract wildlife and the admiration of golfers.

It's hard to overstate the environmental significance of wetlands. Not only do wetlands support a remarkable array of plants and animals, including rare and endangered species existing nowhere else, they also filter runoff from the land and help prevent flooding by soaking up excess rainwater.

We know them as ponds, lakes, marshes and swamps, but wetlands also include smaller seasonally wet areas that support a unique cast of pond-breeding frogs and toads unable to compete with fish found in many permanent wetlands. In all their varying forms, these wetlands provide specific and invaluable functions in the larger landscape.

As wetlands are drained and filled for development, the land's natural hydrology is altered. Stormwater runoff is dramatically increased — and with it the chances for flooding, while water-dependent wildlife is eliminated.

That's changing with a growing appreciation of the role wetlands play and as a result of laws safeguarding these vital habitats. For enlightened golf course managers, the opportunities and rewards wetlands bring are enormous, starting with golf course design through construction and maintenance.

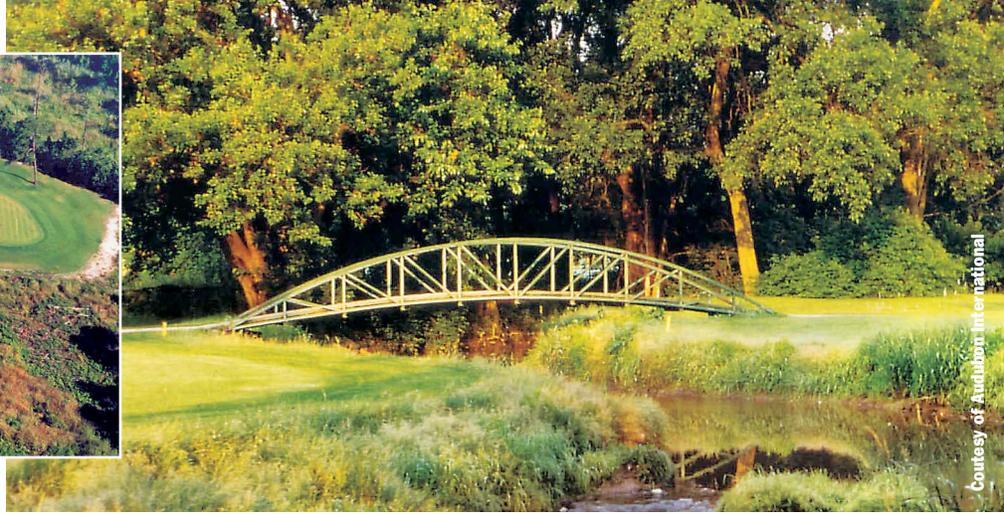
INCORPORATING WETLANDS IN GOLF COURSES

- Because of the complexity of creating wetlands, the best strategy is to avoid disturbing existing wetlands in the first place by taking advantage of a site's natural features and incorporating them into the master design.
- Site planners also should look for opportunities to enhance degraded wetlands by removing and replacing exotic invasive plants with native species, and repairing hydrologic functions.
- Where impacts can't be avoided, wetlands may be created, but extraordinary care must be taken to ensure that created wetlands provide both the functional and aesthetic qualities of their natural counterparts.
- Wherever possible, maintain a direct connection between wetlands and wooded upland areas, or establish habitat corridors that link the two. While government regulations rarely stipulate that these connections be preserved, the linkage is essential for a number of species that live in uplands but feed or reproduce at water's edge.



At The Old Collier Golf Club in Naples, Fla., Audubon International's first Gold Signature Sanctuary, natural buffers along streams connect wildlife habitat patches on the course to hundreds of acres of protected mangrove swamp. Environmental pressures in the fast-growing South Florida region, including demands for dwindling freshwater resources and declines in sensitive native habitats, led developers at Collier Enterprises down an unconventional path when they set out to create a world-class golf course that would complement nature. With water conservation as a primary aim, Collier identified a salt-tolerant grass, *seashore paspalum*, to use on its entire course including greens, tees, fairways and roughs. It then became the first golf course in the world to irrigate with brackish water, using a state-of-the-art computerized system and native plants that further reduce the need for watering.

But conservation didn't stop there. The club's Integrated Pest Management program has reduced reliance on pesticides and fertilizers, resulting in substantial cost savings. Its commitment even extends to bridge surfaces, benches and trash cans, which are constructed of 100% post-consumer recycled materials. But the stunning results of Old Collier's vision are best represented by the wildlife at home there. Today, more than 100 species of birds including the bald eagle, great horned owl and screech owl, along with bobcats, foxes and gopher tortoises, share the magnificent property with the club's golf members.



Courtesy of Avianport International

Healthy wetlands are not sterile environments, but thriving places surrounded by native vegetation where animals can feed and hide. Above left, at Lost Key Golf Course in Perdido Key, Fla., golf holes are nestled among wetlands, lakes and woods to reduce fragmentation of natural habitats and maintain important wetland-upland connections. Above right, plants stabilize the shoreline and enhance the beauty of Butterfield Creek as it flows through Olympia Fields Country Club in Olympia Fields, IL.

DESIGNING A HEALTHY WETLAND

Healthy wetlands not only serve important hydrologic functions, they also provide the ingredients essential for sustaining a diversity of wildlife. Those ingredients are food, water, shelter and mating spaces. The ability of wetlands to provide them is related to several factors:

SIZE: Generally, the bigger the wetland, the better it is at sustaining a wide variety of species – with one exception. Small seasonal wetlands, used exclusively by some pond-breeding amphibians and many reptiles, are critically important for what they don't support – fish, which prey on the eggs of frogs and toads.

DIVERSITY: Structural diversity increases wildlife diversity. Ideally, wetlands should include a progression of submerged, emergent and shoreline plants, as well as other structural elements such as rocks and tree snags where animals can rest or hide. Plant

diversity also is important. The greater variety of native wetland plants available, the more sources of food and cover are available throughout the year.

BUFFERS: For wetlands to thrive, they need protection. Shoreline plantings serve double duty in this regard by filtering pollutants and providing wildlife spaces, while further enhancing the beauty of golf's waterscapes. They're also vital places for wildlife to mate and raise their young. Mowing and spraying should be avoided in buffer zones, which also should be off-limits to golfers to avoid disturbance.

CORRIDORS: Corridors connecting habitat patches can mean the difference between survival and extinction for some species. Without the ability to safely slither, crawl or walk from one critical habitat to the next, many animals will avoid an isolated habitat altogether – and being cut off from feeding or mating grounds can spell the end of once thriving populations. Natural habitat corridors need not be large, but they should be protected from cart paths and roads.



CHECK, Please!

Use this simple self-assessment checklist to evaluate your wetland maintenance practices and identify new strategies to employ.

1. Are no-mow areas or shoreline plantings incorporated around wetlands to slow and filter runoff and provide habitat? Y N N/A
2. Where more extensive shoreline plantings cannot be incorporated, is the mowing height raised around wetland borders to create a grassy buffer? Y N N/A
3. Are no-spray or limited spray practices and mechanical controls employed around wetlands? Y N N/A
4. Is a comprehensive integrated pest management (IPM) program in place to keep turfgrass vigorous and healthy and minimize the need for chemical control measures? Y N N/A
5. When aquatic weed maintenance is required, are physical solutions employed first (e.g., hand and mechanical weed removal)? Y N N/A
6. Are maintenance companies selected that comply with the course's request for environmentally sensitive best management practices? Y N N/A
7. Are maintenance staff trained and familiar with management strategies protecting wetland areas? Y N N/A
9. Are signs used to call attention to wetland boundaries and educate golfers about the importance of these areas? Y N N/A
10. Are carts kept out of wetland areas? Y N N/A



Photo: Joel Grief

CREATING AN ENVIRONMENTAL PLAN

Environmental stewardship covers a wide variety of topics, from water conservation and water quality management to numerous other practices designed to keep weeds in check, playing surfaces thriving and wildlife habitats healthy. One of the best ways to get started is to develop an environmental plan.

AN ENVIRONMENTAL PLAN SHOULD:

- Define goals
- Identify implementation strategies, responsible parties and timelines
- Assess what works, and what needs fine-tuning.

The plan itself may be relatively simple or complex but should be comprehensive, recommends Audubon International, which has helped hundreds of golf course managers improve their environmental game. Include such topics as wildlife and habitat management, integrated pest management, water conservation, water quality management and outreach and education.

DEFINING GOALS: Begin with the end in mind, defining goals and overall objectives that define what you hope to accomplish and provide a guidepost for action. Start by jotting down the strengths and weaknesses of your property and its unique characteristics, including natural features and non-play areas that may present special opportunities for conservation and enhancement.

IDENTIFYING STRATEGIES: For each topic area, identify projects and project steps, who will be responsible for implementing them, and timelines for initiation and completion.

WILDLIFE AND HABITAT

MANAGEMENT: While property size and existing habitat will impact what you are able to accomplish, the objective is to maximize available space to provide the best possible habitat given the features of your site. To assess success over time, establish a wildlife inventory and consider projects that will provide food, water and cover for birds, mammals and amphibians.

WATER CONSERVATION: Water use on golf courses is a key concern across the country. Establishing a water conservation plan demonstrates commitment to judicious water use and environmental stewardship. Consider irrigation practices and equipment, choice of turfgrass and ornamental plantings, as well as opportunities to naturalize non-play areas with water-thrifty native plants.

INTEGRATED PEST

MANAGEMENT: A comprehensive integrated pest management program can ensure a healthy environment for wildlife and golfers, while maintaining top-notch playing surfaces. IPM relies on monitoring, proper timing and spot treatment of problem areas and least toxic forms of chemical control. An integral part of IPM is educating staff about responsible plant management and establishing a clean and efficient maintenance area.

WATER QUALITY MANAGEMENT:

Concerns about the impacts of golf courses on local lakes and streams have led many golf course managers to formalize strategies to monitor water quality and improve conditions if warranted. Consider buffers and swales to filter pollutants from runoff and the adoption of no-spray or limited-spray zones around wetlands, as well as slow-release fertilizers that limit nutrient leaching. Collecting baseline data on water quality will help you evaluate how well your management efforts are working.

OUTREACH AND EDUCATION:

Communications can make or break an environmental plan. Gaining recognition and support for efforts requires educating golfers about the importance of environmental stewardship, especially early on when new projects or practices may raise questions. Newsletters, volunteer plantings or bird walks, and golfer representation on environmental planning teams, are excellent ways to keep golfers informed, enthused and invested. It's also important to let the public know that golf courses can be community assets and environmentally responsive through news releases and special events that showcase your conservation efforts.

Turn the page for additional resources.

Source: Audubon International

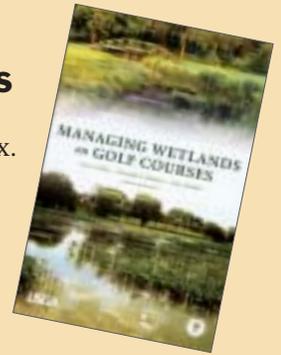
A good environmental plan articulates vision and provides direction. Gaining support and recognition for efforts requires educating golfers about the importance of environmental stewardship, especially early on when new projects or practices may raise questions.

The BACK 9

Putting ideas into action is easy with these handy resources. For The *Back Nine*, we've compiled a list of the best people, publications and organizations available to help golf course operators improve their environmental stewardship. Practical advice. Step-by-step instruction. Ready to play on?

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Golf course **WETLANDS ARE WONDERFUL** – and wonderfully complex. It takes knowledge and experience to design, restore and manage them properly. While you can't expect to become an expert overnight, you can arm yourself with expert information. *Managing Wetlands on Golf Courses* is chock full of helpful advice arranged by wetland type, with self-assessment checklists for water-loving greenkeepers. The 173-page hardbound book is a cooperative venture of USGA, Audubon International and the National Fish and Wildlife Foundation.



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START HERE.

Your USGA Green Team, online at www.usga.org/turf, is home base for helpful information on wildlife conservation on golf courses. All of the following publications are available at www.usgapubs.com. Also visit <http://usgatero.msu.edu> for turf-grass and environmental research online.



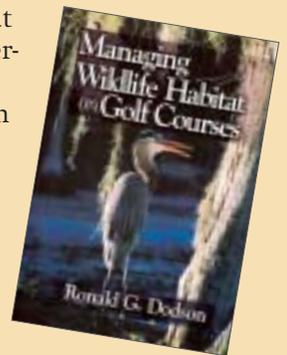
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Find out why Sean Hoolehan is bullish on bees (see page 10), then learn more about how to attract pollinators and the beautiful flowers and plants they support to your course in *Making Room for Native Pollinators*. We think it's **THE BEES-KNEES!** Inside the soft-bound publication, written by the Xerces Society (www.xerces.org) with USGA support, are inexpensive projects that are simple and richly rewarding. What could be better?



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There's nothing dull about wildlife and habitat conservation, especially in the capable hands of Audubon International President Ron Dodson. Dodson's *Managing Wildlife Habitat on Golf Courses* is an excellent primer on an important topic. **FOR A WILD TIME**, go to www.usgapubs.com.

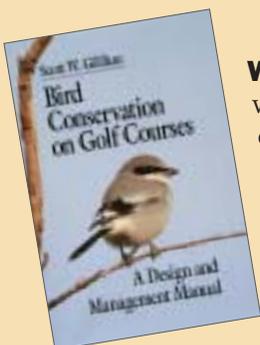


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Prove that **YOU'VE GOT GAME** by making your golf course a certified Wildlife Sanctuary. Audubon International is waiting in the wings to assist with a comprehensive suite of helpful materials and resources, plus compelling case studies of golf courses that are basking in praise from happy golfers. For starters, check out *A Guide to Environmental Stewardship on Golf Courses*. To learn more, visit www.auduboninternational.com.

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WHY WING IT when everything you ever wanted to know about bird conservation on golf courses is summed up in one fabulous book? *Bird Conservation on Golf Courses*, Scott Gillihan's tell-all book about the winged wonders that grace our golf courses is must-read material for every well-schooled golf superintendent.



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CHECK OUT THE LEADER BOARD at GCSAA, the Golf Course Superintendents Association of America, which honors environmentally progressive golf course managers. Annual awards spotlight leaders, while the GCSAA's Environmental Institute for Golf helps course managers sharpen their environmental game through best practices and information, including the EDGE, an online resource portal stocked with the latest and greatest intelligence on water management, integrated pest management, wildlife conservation, golf course design and construction, and energy/waste management. If only a hole in one was this easy. Go to www.eifg.org.

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Those in the know know that **EVERY DAY IS A GOOD DAY TO TGIF**. The Turfgrass Information File (TGIF) at Michigan State University contains the most comprehensive collection of turfgrass educational materials available anywhere in the world, with more than 100,000 records in its primary database. Visit www.tic.msu.edu

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Who says **ALL GOOD THINGS** must come to an end? Resources abound for golf course managers interested in learning more about native habitat and wildlife conservation. If you can't find it here or need additional assistance, seek out the talent in your community. Consult with biologists and water quality experts at state and local wildlife and environmental agencies, or contact the local chapters of the Audubon Society or Native Plant Society for starters. They may be eager and willing to offer expert assistance – or recommend local professionals who can.

ABOUT THE USGA GREEN TEAM

Established in 1920, the USGA Green Section is the nation's leading source for impartial, authoritative information on turfgrass management. The Green Section is engaged in every phase of golf course maintenance and management, from investigating new and improved strains of turfgrass to promoting environmentally sensitive construction and care. Its Turf Advisory Service lets course operators schedule one-on-one visits with agronomists specially trained in golf course maintenance. The Green Section also proudly supports ongoing environmental research through Wildlife Links, a joint venture of USGA and the National Fish and Wildlife Foundation.

The Green Section Record magazine, which many consider to be the authoritative voice on golf course management, debuted in its current form in May 1963. The bi-monthly publication offers the latest information on research, turfgrass culture, golf course management and environmental issues. Access past issues or subscribe online at www.usga.org

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