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Golf Facility: The Bear Trace At Harrison Bay

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Executive Summary

The Bear Trace at Harrison Bay, a public access golf facility, is one of nine courses on the Tennessee Golf Trail (part of a state park system, government owned and funded), for which Paul L. Carter, CGCS, is superintendent. Paul says that success for sustainability at Bear Trace is achieved through innovation and teamwork, to “do a lot with a little”.

The course’s resident pair of American bald eagles are social media stars. The facility’s nearly all-electric turf maintenance fleet has reduced financial and environmental impacts. The team collaborates with the local community for ongoing projects, and more. The Jack Nicklaus designed course is situated along the shoreline of the Chickamauga Lake which supplies its irrigation. The friendly course layout attracts golfers of all skill levels, in addition to hosting events to support charity and foster development of the sport for women, juniors, and the disabled.

While the energy efficiency focus has measurably decreased petroleum and energy consumption, the all-electric mowers lend further to the serenity of the sanctuary for deer, turkey, bluebirds, duck, squirrels and more, that golfers can see and hear upon stepping up to the first tee. Over the past decade, reduction of maintained turf area by 50 acres, and conversion of grass selection on the greens, has resulted in tremendous savings of dollars, energy use, labor, and product inputs, water, CO2 emissions, fuel, and created more wildlife habitat. These efforts have also set up solid pollution prevention that is augmented with buffers along the lake shore.

Contributing to the onsite verification at Bear Trace, were Paul Carter, CGCS; Robin Boyer, PGA; Don Campbell, Park Manager; Matt Vawter, Park Ranger; and Jim Morgan and Diane Johnston, from the leadership of Friends of Harrison Bay. The facility regularly seeks to improve environmental performance, and future attention is towards increased efficiency of operations and fostering collaboration for sustainability with partner organizations.

Nature

Nature projects at The Bear Trace are a community effort, as they include government, private and local volunteer groups; however, their attraction is global. As situated within Harrison Bay State Park, a state-owned property, the facility regularly consults with local and state level environmental and utility divisions to ensure that preventative and proactive efforts benefit the natural environment.

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With postcard views of the lake, rolling hills, woodlands and more, The Bear Trace is a beautiful place for all to call home. Understory vegetation, dead trees, woody and leaf debris are left in woodland areas when possible providing habitat and food sources for wildlife. And with feeders located along tree lines throughout the course, turkey and deer wander leisurely as golfers go about their game.

The local Friends of Harrison Bay group has spearheaded and manages many projects including a bluebird trail of 43 boxes placed throughout the 18hole track. The volunteer effort has been monitoring the trail every April to August season since 2011. Its detailed records of nesting, eggs, outcomes, placement, predation, and more, show steady increase in population since 2012. All data is submitted to Nestwatch at the Cornell Department of Ornithology, as part of a study to understand how the population is responding to climate change, habitat degradation and loss, non-native plants and animals, and more.

Delineated wetland habitats as well as designated lake buffers are highly regulated and maintained in cooperation with the Tennessee Valley Authority - a US government owned independent corporation that manages Harrison Bay. By decreasing maintained turf grass over the last decade, more natural habitat is available to wildlife. The facility team works closely with the park rangers on biodiversity management planning and practices, and allows for as much naturalization as possible that does not affect course playability.

While an initial attempt to implement the Operation Pollinator program in 2014 was unsuccessful, the Bear Trace team will try again in fall 2017. The effort to construct plots with specific wildflower species will engage student volunteers from a local high school to manage and monitor the project. The effort can demonstrate how beneficial golf courses can be as safe, sustainable habitats for birds, animals, and pollinating insects.

The Harrison Bay Eagle Cam project began in 2011 and provides live streaming of the nesting and brooding habits of superstar American bald eagles, Elliott and Eliza. The pair built its nest in a 75' pine tree located between the 10green and 11tee, perfectly poised for visitors to observe, and for volunteers to monitor. Visitors from around the globe log in daily for updates, and in 2016 alone there were 112,001 unique viewers. The Friends of Harrison Bay monitor and record details of the pair and their annual eaglet offspring, and the project is fully funded by donations. Each Thursday morning, the course is open to all visitors for live viewing, welcoming avid bird watching outings, school groups, and more. The eagles seem to enjoy the attention, and have not altered any natural behaviors. Having the eagles choose Bear Trace as its home year after year is a clear indicator that the course is a safe, suitable, and sustainable home for wildlife to prosper.

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Over the last decade, the Bear Trace team has naturalized 50 acres of maintained turf grass area and changed grass species on its greens, achieving savings in energy use, labor, fuel, and product inputs. Grass species choice considers tolerance to drought, disease, seasonal, shade and wear. Product application and maintenance activities consider temperature, rainfall, height of cut, soil testing and more, to optimize health, operational efficiency, and playability. The team regularly conducts moisture meter and soil testing, which is analyzed and reported in detail by POGO, to understand pH, saturation, salinity, composition and more. This data supports best decision making for inputs and maintenance.

The positive effect of these practices on the course's budget is well documented and provides an exemplary model for how turf grass selection and strategic coverage area can benefit the 'triple-bottom-line' for sustainability, with environmental, economic, and community impacts. As Director of Agronomy over the nine Tennessee Golf Trail facilities, including Bear Trace, Paul L. Carter, CGCS, references this business case for sustainability to promote engagement by other facilities.

Additionally, Paul created a Standard Operating Procedures (SOP) guide for Bear Trace. The document promotes clarity and consistency through efficient operations, and also serves as a reference for all departments regarding any interference of maintenance with playability as well as course conditions. The SOP has proven successful and now serves as a template for all nine of the Tennessee Golf Trail facilities.

Mowing practices at Bear Trace follow a terrain cut approach to optimize cutting and minimize time and fuel use. The SOP includes schedules for mowing, green speeds, grass heights, chemical/fertilizer applications, and regular and seasonal practices to promote cooperation between maintenance and pro shop staff.

The Bear Trace at Harrison Bay has been recognized as an *Audubon Cooperative Sanctuary* course, a *Groundwater Guardian Green Site*, and received a *Golf Digest Green Star Award*. For his leadership of sustainability in golf, Paul L. Carter, CGCS, received the *GCSAA President's Award for Environmental Stewardship*, as well as *Golf Digest's Environmental Leaders in Golf* award.

The Bear Trace at Harrison Bay is a designated *Groundwater Guardian Green Site* as a result of the groundwater-friendly practices implemented at the golf course. Pollution prevention is successful due to efficient and resource-sensitive turf nutritional and IPM programs.

Application "as needed" is paramount for all inputs; the team often utilizes spot and hand application for accuracy and decreased waste. Weather and other course happenings help determine application schedules to avoid runoff or other negative side effects. Buffers and

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natural filters are well maintained, and a 'treatment-train' approach is used to prevent pollution from leaving the maintenance area via the wash pad and entering Chickamauga Lake, the course's source for irrigation.

As a Tennessee state-owned property within Harrison Bay State Park, the team works closely with the Tennessee Valley Authority that manages the adjacent Chickamauga Lake. Water quality is monitored regularly with testing as needed to address any concerns.

All waste water is filtered and processed on site using physical and biological methods. The water is then pumped or gravity-fed into state-approved and monitored septic fields. No waste water leaves the site and septic disposal is up to date.

The maintenance building has impermeable flooring of concrete. Cross ventilation in the building increases airflow and reduces air pollution. All hazardous materials are stored under lock and key, and liquid materials are arranged below dry materials. Used cooking oils and grease, as well as used lubricating oils and filters are all collected for recycling or converted to biodiesel. Spill kits and materials are readily assessable, as well as first aid kits. Fuel is stored a sufficient distance from any buildings on a non-combustible, concrete surface with bump barriers to prevent machinery accidents.

Shelving in the storage room was recently converted from wood to metal, and the team hopes to have two PondHawk Solar Aeration Systems installed in the irrigation pond in 2017. These solar powered systems deliver proper aeration to the pond for improved quality of water used in irrigation; the effort will reduce pollution risk to the ground too.

Resources

The team has taken numerous water conservation measures to reduce water use, the results of which are well documented to validate and monitor their effectiveness.

No irrigation is needed for the 50 acres of maintained turf grass area that have been naturalized over the last decade. Placement of half irrigation heads and improved spray patterns have increased precision and reduced quantity of water needed. Phasing in of more tolerant grass species has also contributed to saving millions of gallons of water per year at the facility.

Water withdrawal reporting, weather stations, moisture meter testing, equipment inspections and more, lend to efficient irrigation practices that save water and optimize turf

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health. Additionally, Paul L. Carter, CGCS, aims to complete training to become an irrigation auditor in the future to further enhance management of water use on the course.

The Bear Trace at Harrison Bay is a focused and progressive energy efficient consumer. However, this does not deter the team from engaging in further energy conservation projects. The facility is part of the Tennessee Department of Environment and Conservation agency, and it strives to limit its use of natural resources whenever possible. While the facility may not have a hefty operating budget, it makes smart investments for significant outcomes; progress to conserve energy is no exception.

In 2013, the course purchased 18 all-electric pieces of Jacobsen turf equipment, a decision that was carefully considered and monitored for success. The purchase was funded through the Tennessee Clean Energy Grant in collaboration with the Tennessee Department of Environment and Conservation, through its Office of Sustainable Practices. The all-electric fleet lends to serenity and silence on the course during their operation, has no carbon emissions, and reduces operational costs by \$30,000 annually. The reduced noise pollution is praised by golfers, as the equipment generates only 53 decibels, which allows operation outside hours set by the Noise Control Act of 1972. The minimal outputs of the machines reduce health risks for the operators and potential course damage via pollution. While electricity use has risen, fuel consumption has decreased by an average of 9,000 gallons per year. The energy savings are well documented, continue to be tracked, and the success story is featured in national publications. This initiative's success has prompted engagement by all nine Tennessee Golf Trail golf courses that are now adding electric equipment to their fleets as feasible.

The course purchases green power through the local utility. As a state-owned facility, many energy consumption records are not kept on site and need to be located from central administration offices. The course uses a variable-frequency-drive (VFD) irrigation pump system that saves energy use and extends pump and piping life.

A solar array on the maintenance building to capture and supply power for electric equipment is on the wish list as a future project. And it is anticipated that a PondHawk Solar Aeration System will be installed on the irrigation pond in 2017.

The Bear Trace is part of the nine course Tennessee Golf Trail. Being in this large group has purchasing advantages, but also presents some challenges. Purchasing in bulk allows for better pricing and less waste in packaging materials and delivery impacts, but there are limits to how a single course may influence decisions made at the state level. As director of agronomy over all facilities in the group, Paul L. Carter, CGCS at Bear Trace, is always looking

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for opportunities to improve even in the smallest ways, as it all adds up; and he has proven that a facility can do a lot with a little.

The Bear Trace team insists on local suppliers when possible, such as when purchasing produce for food and beverage. However, this preferred option is outweighed by bulk purchases from statewide volume suppliers to meet other needs.

Turf input product needs have greatly reduced with the naturalization of 50 maintained acres of turf grass, including fertilizer, pesticides, herbicides and more. When possible, products from recycled materials or that are sustainably sourced are used. These include crushed aggregate, timber, wood chips and more. Soil, sand, turf materials, and cores are reused on the course, and qualified haulers remove used items, such as cooking oils and machinery oil, for biodiesel conversion, reuse, or recycling as is available.

The grill serves condiments in bulk to reduce waste, and offers patrons half portion sizes on many items to decrease food waste. Separate bins for recycling are available at the clubhouse and cart barn; golf and grill staff are educated about the initiatives to increase participation. Well placed signage communicates recycling efforts and promotes how everyone can do their part to help. These visible actions lend further to the Bear Trace brand image of prioritizing environmental stewardship.

The golf facility is a single component of the larger Harrison Bay State Park. All records for its waste generation and removal quantities are housed in a separate department and location. The facility is exploring next steps to better understand that data, and minimize waste going forward.

Community

Success of the Bear Trace's efforts to do a lot with a little, is in part due to exceptional community engagement and support. The facility may have a small, dedicated staff, but its reach has no limitations. Course offerings attract regular, local and global attention, whether through the Harrison Bay Eagle Cam, hosting of events to benefit charity and junior golf, or utilizing local volunteers to manage nature projects.

Consistent cross departmental communication helps to ensure optimal guest experiences and operational efficiencies. Close knit relationships and mutual respect among team members also pays off with increased loyalty to the Bear Trace brand and little employee turnover.

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Friends of Harrison Bay is an integrated team of volunteers who are community stakeholders. They are regularly involved in the park happenings, especially nature projects at the golf course. This group initiated and helps manage the Harrison Bay Eagle Cam, mallard tubes, and bluebird trail. In 2016, Bear Trace received an estimated 50 hours per week of volunteer assistance. There is an open invitation to individuals, families, and groups to join the effort to protect, preserve and promote cultural and natural resources of the state park.

While formal cultural heritage sites are not part of the actual course, the facility is part of Harrison Bay State Park, the first state park in Tennessee, with a fascinating history. The park was originally developed as a Tennessee Valley Authority recreation demonstration area in 1937 to coincide with the first ever offering of electricity to the area; it was built by the Civilian Conservation Corp. The park's name is derived from a large bay of the Tennessee River that covers the old town of Harrison, and the original town site was also the last Cherokee Campground in the area.

The Bear Trace team works closely with the park rangers for guidance with wildlife and vegetation projects. The 1,200 acre park is approximately 20 miles from Chattanooga, offering camping, boating, biking, fishing, as well as a 12-box bluebird trail, and the Harrison Bay Raptor Aviary to visitors. The Harrison Bay Eagle Cam cross promotes the aviary, an educational center that houses three raptors that have been injured by automobiles; the birds have been rehabilitated, but cannot be released back into the wild.

In the spirit of giving back to the community and promoting the next generation of golfers, Bear Trace hosted more than 24,000 charity event rounds in 2016. These groups include Chattanooga Women's Golf, TN Junior Tour, Special Olympics, Hurricane Junior Tour, Golf Channel Junior Tour and more.

Signage, clubhouse flyers and postings, and sharing of information with state park visitors is common practice. The course leadership communicates daily updates, happenings, and course conditions through social media, regular blog postings, and onsite signage. Informed and educated patrons have historically been supportive of environmental stewardship efforts as well as changes to playing conditions when in the best interest of facility sustainability.

The Bear Trace at Harrison Bay is a beacon of light dispelling the stigma that golf courses are only consumers of resources, when in fact, a facility can contribute to the natural and human communities. Communications efforts by this team are integrated in every media platform. Successes are reported by local, regional, and national media. The Bear Trace team is telling their story, and it's one to be very proud of.

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Conclusion

I, Teresa Wade, independent accredited verifier, recommend The Bear Trace at Harrison Bay to be awarded its recertification as GEO Certified® ecolabel. Its ongoing efforts to advance comprehensive facility sustainability through innovation and collaboration is positively impacting the environment, community and bottom line.

While Bear Trace does not have a hefty operating budget, it is doing a lot with a little, specifically through projects made possible through partnerships and community engagement. The team makes smart investments for significant outcomes, and prioritizes communication to stakeholders and the golf industry, to educate and promote sustainable practices.

The facility is part of the Tennessee Department of Environment and Conservation agency, and it strives to limit its use of natural resources whenever possible. The all-electric fleet lends to serenity and silence on the course during their operation, has no carbon emissions, reduces fuel consumption by 9,000 gallons and operational costs by \$30,000 annually. By decreasing maintained turf grass over the last decade, more natural habitat is available to wildlife, while mowing practices optimize cutting and minimize time and fuel use.

Placement of half irrigation heads and improved spray patterns have increased precision and reduced quantity of water needed. Phasing in of more tolerant grass species has also contributed to saving millions of gallons of water per year at the facility.

The local Friends of Harrison Bay group has spearheaded and manages many projects including the Harrison Bay Eagle Cam, and a bluebird trail of 43 boxes. Bear Trace received an estimated 50 hours per week of volunteer assistance. In the spirit of giving back to the community and promoting the next generation of golfers, Bear Trace hosted more than 24,000 charity event rounds in 2016.

As visitors from around the globe log in daily to the Harrison Bay Eagle Cam, there is opportunity promote how a golf course can contribute to our natural and human communities. The facility is a living example of continual improvement through its many initiatives to decrease energy consumption and carbon emissions, improve nature, reduce pollution risks, support the local supply chain, minimize waste, enhance the visitor experience, promote the game of golf, and improve financial performance. The Bear Trace at Harrison Bay is demonstrating leadership for sustainability through golf, and is a superb example of how a facility can do a lot with a little, and make a big difference.