



Color these youths green

An innovative program in Washington state uses golf courses as outdoor classrooms for local students.

Washington's First Green Foundation has made it possible for school children in the state to learn about soil science, water quality, the life cycle of the salmon and numerous other topics by attending educational programs on golf courses.
Photos by Dave Phipps

David Phipps

Community outreach and education can be a stumbling block for some golf course superintendents seeking certification through a program such as the Audubon Cooperative Sanctuary Program. This is far from the truth when it comes to the superintendents from the state of Washington. At Glendale Country Club in Bellevue, Wash., near Seattle, Steve Kealy, CGCS, has hosted countless field trips involving students from all walks of life.

Kealy, a 25-year member of GCSAA, is a founding member of a growing program in Washington state called The First Green Foundation. First Green helps superintendents connect with local educators and develops child-friendly educational programs that use golf courses as learning laboratories. Superintendents can host students on field trips where they test water quality, take soil samples, plant flower beds or simply learn about maintaining a golf course. Educational topics can range from the ecological and environmental aspects of the golf course to the business of operating a restaurant or a clothing shop.



Five learning stations were set up at various locations at Glendale CC in Bellevue, Wash., and students participated in 25-minute lessons at each station.

Kealy and First Green have done such a wonderful job promoting the program that outside environmental groups are now asking to be a part of it.

As reported in 2007, more than 8,000 students in Washington state have participated in the program. A total of \$110,000 in student scholarships and teacher grants has been provided since 2002. Karen Armstead, the executive director, is currently seeking a grant that will enable First Green to bring the program to Oregon and increase its participation in eastern Washington.

Teaching children and adults

Kealy and First Green have done such a wonderful job promoting the program that outside environmental groups are now asking to be a part of it. This has been a windfall for the program because now First Green is not only reaching out to the children, but is also having an impact on local environmental groups.

I actually overheard one of the outside volunteers say that he had always viewed the golf course as the source of the problem, but after being part of this program, he realized that the golf courses are critical to the success of our local streams. That comment speaks loudly in terms of our mission to educate the non-golfing public on the environmental benefits golf courses provide to local ecosystems. In 2012 two outside groups took part in the program.

Road trip!

Kealy was aware that I had hosted several field trips with local schools as part of my community outreach program at Stone Creek Golf Course (Oregon City, Ore.), so he contacted me in May 2011 and asked if I would like to be part of one of his events. I jumped at the opportunity and headed north to Bellevue to get a firsthand look at First Green in action. Now that I am working for GCSAA, I took the opportunity to attend again this year, and I have combined the experiences of both years in this story.

Last year Kealy hosted 50 seventh graders from Sacred Heart, a local private school. This year another school joined Sacred Heart on the field trip, and a total of 90 students participated. Five learning stations were set up, and the students spent about 25 minutes at each one. This year Kealy also asked three other local superintendents to help with the field trip, and they took time out of their schedules to participate in the program.

Soils and sand

Class A GCSAA members Jim Myers, superintendent at the Plateau Club in Sammamish,

gcm **extra**

Kyle Young, assistant superintendent at Glendale CC, taught visiting students about soil structure and water-infiltration rates.

and Greg Hall, superintendent at Fairwood Golf and Country Club in Renton, taught a lesson about soils and sand on the golf course.

Myers, who is a 20-year member of GCSAA, demonstrated how to test the pH of soil. The superintendents had helped the students prepare a vial of soil treated with a solution that would turn the soil a certain color after the soil and the solution had been thoroughly mixed for 10 minutes.

While a volunteer student was gently turning over the vial to mix its contents, Myers pulled out a sand sieve and explained why superintendents need sand with a fairly uniform particle size. Myers had a student place a scoop of sand in the top of the sieve and then demonstrated how the different layers of the sieve capture different particle sizes of the sand. He explained how he could interpret the results and determine whether the sand was appropriate for his needs. Myers then explained how he spread the sand on the grass, but he was careful to avoid using technical terms like “topdress,” which would probably be unfamiliar to the kids. Myers explained how the sand benefits the turfgrass roots by creating air space and enabling oxygen to become available in the soil.

Meanwhile, Myers’ volunteer continued to keep the soil sample vial in motion, and it was time to determine the pH. With a simple color chart the students were able to determine that the soil pH was about 6.5. At this point, they discussed pH and what was meant by the numbers 1 through 14. Myers asked the students to give some examples of an acid and a base. The great thing was the students knew and were able to give examples such as citric acid as a low pH and dishwasher soap as a high pH. When asked where plants like to live, students agreed that the correct pH is between 6 and 7.

From there, Hall took over and walked the students down to the 18th green, plunged a soil sampler in the middle of the green and gathered the students around to look at the roots. Hall related the soil sample to what Myers had just taught them about applying sand to the surface of the grass to provide greater porosity and increased root development. Hall, a 28-year GCSAA member, identified the thatch layer and led a discussion about how superintendents manage that layer to keep the grass healthy.

As I sat back and took some photos, I could tell that Myers and Hall were really enjoying what they were doing. They were simply explaining what they do day in and day out, and they were giving these students a glimpse of why science is important in their daily lives. At that

gcm **extra**

Superintendent Jim Myers gave youngsters a lesson on soil pH, sand particle size and topdressing.

I was impressed to see Kealy using a proper technique to regain their attention and equally impressed to see the students were quick to respond and get back on track.

point, I realized that I didn't have to lead the field trips on my course by myself. Seeking volunteers from local courses was a great idea. Myers and Hall did a fantastic job of engaging the kids and were having a great time doing it.

This year Kealy's assistant superintendents, Kyle Young and Josh Cheney, led the class. Young and Cheney talked about the three elements of soil structure: sand, silt and clay. They provided some excellent examples of water infiltration rates and discussed how important the use of sand is on a golf course. I loved the fact that Kealy engaged his assistants. Young and Cheney were learning the process and will, in turn, carry it to their courses if they become superintendents.

Stormwater

In 2011 Kealy and Craig Benson of Meridian Valley Country Club were giving a lesson on stormwater. Kealy began the lesson by walking to the top of the golf course to the main entrance. We all stood around a catch basin that was located in the middle of the road. Next to the grate was a plaque that read "Don't Pollute, Drains to Kelsey Creek." Kealy and Benson, a 22-year GCSAA member, held up a large aerial photo-

graph of the golf course and described the path the water takes as it drains to the creek. Kealy pointed out how the surface of the ground can affect the rate at which the water travels.

Kelsey Creek runs right through the center of Glendale and is the main source of drainage for a large portion of the city of Bellevue. Kelsey Creek also happens to be an active salmon-bearing stream that connects to Puget Sound. This information led to the discussion of the fate of our water as it leaves our homes.

Kealy separated the water into two categories: water inside the house and water outside the house. The inside water, or sewer, comes from our showers, sinks and toilets and goes to the treatment plant where the water can be reclaimed or cleaned and discharged back to a stream or even used to irrigate a golf course. The outside water, or stormwater, comes from our roof and gutters and from the water that we use to wash our cars as well as the water we use to irrigate our lawns. This water generally flows into gutters and storm pipes and is discharged directly to our streams. This last category of water is the water that we can prevent from carrying pollution to our streams.

The students were quick to point out that oil leaking from cars is a problem. Kealy added that washing your car in your driveway can lead to excessive phosphates in the streams. As he directed the students' attention to the neighboring houses, he illustrated how a misplaced fertilizer application can also lead to pollution, and he stressed how important it is to sweep fertilizer off the sidewalk and back on the grass where it belongs.

Kealy continued to discuss the different ways our streams can become polluted and noticed the kids' attention was waning. He quickly made eye contact with the students and politely engaged them by asking them questions that led back to the key point of the discussion. I was impressed to see Kealy using a proper technique to regain their attention and equally impressed to see the students were quick to respond and get back on track.

On the way back down the hill, Kealy stopped by a recent renovation project at the club. Glendale CC chose to use a green roof on its new pro shop. The new roof provided a teaching tool as Kealy pointed out the cooling benefits and how the green roof slows the rate at which the water travels from the roof to the gutter and finally to the stream.

Stream water

Kealy led a different class on water in 2012. He had the students determine the cubic feet per second (CFS) of Kelsey Creek. The first step was for a student to toss tennis balls one at a time into the creek. The students measured how long it took each ball to travel a set distance, and then they figured the average speed at which the balls traveled. The students then calculated the depth of the stream with the help of one of Kealy's assistants. They measured

gcm **extra**

15 points across the stream and took an average depth, and then using the average speed of the tennis balls and the average depth of the creek, they calculated the rate at which the stream was flowing. They figured cubic feet per second, cubic feet per minute and cubic feet per hour. The number got so large that they had to convert it to total acre-feet. The exercise demonstrated the importance of math outside of the classroom.

Kealy also used the message to describe how much water is reaching our bays and lakes just from stormwater runoff. He used the example of a football field. Just 75 yards of the field covered with water 1 foot deep would equal an acre-foot of water. When the students realized how many acre-feet of water ran down Kelsey Creek in an hour, they were amazed.

Water quality

In 2011, one of the teaching stations was at Kelsey Creek, where they examined the water and talked about salmon. When we arrived, Melanie Baker from Nature Vision was there to lead the group. First Green has partnered with Nature Vision to help provide hands-on programs for the students. It is a natural relationship because the two organizations share the goal of fostering appreciation and stewardship of the environment through the integration of school and community for a sustainable future.

The point of Baker's discussion was to teach the students the benefit of clean water and how it affects salmon. Baker first explained the life cycle of the Puget Sound salmon, from where they are hatched to the range in which they feed, which can be as far away as Alaska and Japan.

The important part of the salmon's life cycle is its journey to the spawning ground. Certain conditions — correct pH, temperature and dissolved oxygen content of the stream — will enable the salmon to be successful in reaching the spawning ground and producing eggs. Baker explained how to test the stream water and described the optimal range for pH, temperature and dissolved oxygen content.

The first test was the temperature. Streams often become too warm from a lack of vegetation and cover. The students discussed how they could benefit the stream and what could be done to keep it cool. They agreed that getting involved in stream enhancement groups and planting native materials around the stream and removing invasive species would have positive effects.

The next test was pH. In order to spawn successfully, salmon need a neutral pH of around 7.0. Baker asked the students for examples of high pH solutions and low pH solutions. I thought it was great that the first thing they rattled off was dish soap for a high pH. This tells me that the community is doing a good job of educating the young on the protection of their natural resources. The students proceeded to take the test. Using a color chart, they were able to compare colors of the water solution and determine that the pH was between 6.5 and 7.0.

Dissolved oxygen is also important in the life cycle of the salmon. Baker compared the salmon's journey up the stream to that of an athlete. Just as athletes need oxygen to supply their



Top: Kelsey Creek, a salmon-bearing stream that runs through the center of Glendale CC, is a valuable teaching tool for lessons about water pollution and stormwater.

Above: An exercise in measuring the rate at which Kelsey Creek flows taught the students that they could use math for purposes they never imagined.

The more visual aids you have and the more hands-on experiences you can provide, the better the learning experience will be.

lungs, which supply oxygenated blood to their muscles, the salmon need oxygen in the water to supply their muscles, too. As they swim upstream, they incur many obstacles. If the oxygen in the water is not sufficient, the salmon may never make it to their final destination. To ensure a successful migration, the oxygen level should be around 20 percent.

The students determined what created oxygen in the stream, and it was easy to see that Glendale CC had done its part by installing log structures that cause the water in the creek to churn and create bubbles. The structures also created natural gravel beds in which the salmon could lay their eggs.

The life cycle of salmon

This year Moira Campbell, another volunteer from Nature Vision, taught the students about the salmon life cycle. The beauty of having outside groups teaching these classes is that they come complete with visual aids. Campbell was no exception.

Campbell demonstrated the importance of oxygenated water to developing salmon eggs by using two clear containers with water in them — one with large pea gravel and the other with sandy silt. She placed bright red marbles in each container and had two volunteers swirl them around for a period of time. After the swirling was completed, the students observed open spaces between the red marble “eggs” in the pea gravel. However, the eggs in the sandy silt were buried, and it was clear they would not survive. This demonstration led to a discussion about protecting stream banks with proper vegetation to prevent erosion.

Campbell next explained the stages of the salmon’s life cycle using fabric representations of an egg, an alevin, a fry, a smolt and a spawning adult. The more visual aids you have and the more hands-on experiences you can provide, the better the learning experience will be.

Invertebrates

One of the more popular stations this year was about invertebrates. Laurie Deveraux from the city of Bellevue’s Stream Team led the discussion. Deveraux had dip water samples (dip samples are taken by dipping a container into the body of water to be tested) that included living organisms and some of the natural vegetation from along the pond. The students dipped plastic spoons into the water samples to remove invertebrates, which they placed in small plastic containers. The students drew the insects they had removed from the water and subsequently identified the insects using a poster that Deveraux had provided.

Deveraux’s take-home message was, “Only rain goes down the drain.” She talked about how what we place on the ground has the potential to reach our lakes and streams. The class identified washing cars in the driveways, misapplication of fertilizers and not picking up after your dogs as ways of polluting streams.

In the middle of the session, KOMO News arrived and began filming the event. I was impressed by how well the kids behaved when the camera was only a few feet from their faces. The story aired that evening on the local news (www.komonews.com/news/local/School-program-uses-golf-to-teach-students-about-science-149593035.html?tab=video#idc-container0).

Club member involvement

Some may wonder what the club members think about this program and about having children running around the course. Kealy said that the majority of the visits occur on Mondays when the course is normally closed, but recently members have asked if they can participate. The Glendale membership now contributes \$10 per member to the First Green Foundation annually, and that trend is beginning to grow as other clubs in the area find out about the program.

Thousands of children have been touched by this program in Washington state. It is the goal of First Green to grow and offer the program to other states as well. For further information on First Green, visit their website (www.TheFirstGreen.org).

GCM

David Phipps is GCSAA’s field-staff representative for the Northwest Region. Previously, he was the golf course superintendent at Stone Creek Golf Club in Oregon City, Ore.