



Golf Balls as Pollution

Some time ago, I was doing volunteer litter collection in a natural area across the street from a golf course. Two holes were across the way, a 4-par and a 5-par, and it would have taken a pretty good hook to get to the road, let alone across it.

But I found several hundred golf balls in various states, and it made me wonder: how long do golf balls last and do they break down and pollute as they age in the elements.

Materials of the Modern Golf Ball

Modern golf balls (which are marked by DuPont's development of the Surlyn cover in 1967) are generally composed of a core and a cover (two-piece balls). Some balls have additional layers or mantles, which result in three-, four-, and five-piece balls. The cores are almost all rubber, natural or synthetic (there may be some old balls with liquid center cores). Metals, such as zinc, are added to the core to help it cure and enhance performance (speed the ball's return to its original shape after the compression caused by impact). Dye is also added to provide a color to the core.

Covers are generally surlyn, a plastic resin (also used for single-use containers), but can also be urethane, a synthetic elastomer or synthetic rubber. Surlyn is said to provide for more distance, while urethane provides greater spin and therefore control. Cover paints are also added.

When a ball has additional layers between the core and cover (for example, TaylorMade's five-layer ball), additional resins and thermal plastics with proprietary additives are used.

So, essentially, a golf ball is made of rubber, plastics, other synthetics, and some metals. If a ball were to instantly decompose upon impact with the ground, it would probably not be great for the fairway grass.

How Long Do Lost Golf Balls Last?

Golf Digest has stated that the shelf life (storage in a cool and dry place) of a ball, where there is no change in performance, is at least five to seven years (Titleist says five years). It is possible that three-plus-piece balls may have a shorter life because of additional stresses (heating, cooling, reforming) placed on the ball during manufacturing. Exposure to excessive heat or cold can shorten the shelf life of a ball.

This is a pretty long shelf life, but what about used balls? Golf Digest has stated that a ball should last at least seven 18-hole rounds without any compromise in performance. But for us average golfers, a ball should last a lot longer. The folks at Practical Golf were provided with recovered (but unscuffed), lost balls from Two Guys With Balls and found no difference in performance compared to new balls. [See article](#). There was no description of how long the balls were in the elements or what kind of elements the balls were exposed to (they may not have known).

To determine if a found ball is any good, assuming you don't have a private driving range handy, the easiest test is the bounce test. Drop a new ball and the used ball on an even, hard, not easily breakable surface and see if they sound and behave the same. If they do, add the used ball to your bag. If the found ball does not bounce as well, sounds funny, or if the used ball is cracked or scuffed in any way, toss it in the shag bag or trash. A ball that is even slightly chipped or scratched can lose its compression and/or spin rate very quickly.

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But that's performance. What about a golf ball as a pollutant? When does a ball start to decompose and release its ingredients of plastics, synthetics, and metals?

A study in the 2000s by the Danish Golf Union estimated that it would take between 100 and 1000 years for a golf ball to decompose. (Surprisingly, this study was the only study on the speed of decomposition of golf balls that I was able to find – Students! There is a PhD dissertation waiting here!) Certain conditions may cause a ball to decompose faster. For example, sunlight exposure may increase the speed of erosion of the cover of the ball; a ball that is cracked or chipped has greater surface areas to speed decay; and a ball that continues to strike a surface, such as a ball rolling around on the ocean floor, may fall apart much faster.

But if modern balls generally take at least 100 years to decompose, what's the big deal? Well, there are a lot of lost balls. The Danish Golf Union estimated that approximately 300 million golf balls are lost each year in the United States. (It has also been estimated that the average golfer loses two balls per 18-hole round. National Golf Foundation stated that in 2013, there were over 465 million rounds played. Assuming these are 9-hole rounds, that would still be over 400 million balls lost each year in the United States!)

Of course, not all balls that are lost stay lost. Shaun Shienfield, president of Foundgolfballs.com, estimated that over 100 million balls are found, processed, and resold every year. (The recycled golf ball industry has become a massive business, with estimated sales of over \$200 million. The largest player, PG Golf, is owned by Acushnet, the parent company of Titleist.) Millions of additional golf balls are recovered by other players (like me), found by industrious youngsters for personal resale, or are chipped apart or buried by mowers. But if 300 – 400 million balls are lost each year, 100 million balls are recovered and reused through the used golf ball market, and maybe an equal amount recovered by other players, industrious youngsters, and the maintenance crew, there are still probably a large number of balls that are permanently lost. Maybe 100 million. That number of golf balls would cover about 20 football fields. That's 20 football fields of plastics and metals waiting to be released, with 20 more football fields being added each year.

Where do these lost balls go? There are probably a bunch on or near courses

in inaccessible areas (under blackberry bushes or cacti, or across the street from a course). But the majority are probably ending up in water hazards (think large collection areas) that are not subject to recovery programs. There are lots of examples of this. In 2009, scientists exploring Loch Ness for evidence of the resident monster found over 100,000 golf balls in the Ness. Hundreds of golf balls were found in or on the shore of Lake Michigan next to Arcadia Bluffs Golf Club. Over 50,000 balls were found in a two-year period in and on the shores of Monterey Bay, the home of multiple famed courses including Pebble Beach. In Oregon, Meadow Lakes in Prineville reports that it recovers over 25,000 balls each year from its lakes (which are added to the used ball market).

In a January 18, 2019, article in The Conversation, researchers from Stanford who have been studying the golf balls recovered from Monterey Bay have found that many balls were “severely degraded” possibly owing to the constant mechanics of wave motion tossing balls against sand and rock. [See Article](#) . As balls degrade, they release microplastics that are harmful to wildlife (and may eventually end up in the food chain). In response to these findings, the Pebble Beach Company teamed up with the Monterey Bay National Marine Sanctuary to help clean up the bay and reduce further golf ball contributions to the bay. Pebble Beach Company now has a golf ball recovery program, where it sends divers into the bay at least 200 times each year. It also sends its employees to pick up balls on the beach, and has a prohibition on players intentionally hitting balls into the ocean.

An informal poll of several golf courses in Oregon found that many courses have a recovery program for golf balls in water hazards (and many of those courses get compensation for the golf balls that are removed). But many courses in Oregon do not have any recovery program. There are only two golf destinations in Oregon that have golf holes along the ocean or bays that feed directly into the ocean: Bandon and Salishan, both Certified Audubon Cooperative Sanctuaries. Salishan presently does not have any program to prevent balls from going into or collect balls from Siletz Bay. Bandon did not respond to requests for information on any program it may have to prevent balls from going into the ocean or collecting balls from the ocean or beach. Other courses that have creeks that feed into the ocean are mixed in their approach: some have third parties pick up balls in water hazards (like Seaside Golf Club), some organize volunteers to pick up balls in water hazards (like Neskowin Beach Golf Course), and some have barriers like grates that prevent balls from going down the on-course creek to the ocean (like Sunset Bay Golf Course). Many coastal courses, however, have no program to recover balls from water hazards.

In response to this problem of golf balls as pollution particularly in water, several companies produce environmentally friendly golf balls. Albus Golf produces the Ecobioball, made of biodegradable material (and a core that contains fish food).[See AlbusGolf.com](#) Biodegradable Golf Balls, a Canadian company, produces (you guessed it) a biodegradable ball made of corn starch and polyvinyl alcohol. See Biodegradable GolfBalls.com Both balls are single-use and quickly dissolve in water. Testing on the Ecobioball shows that its distance for short shots is similar to a standard golf ball, but there is about a 30 percent distance loss with a driver.

Note that Wilson and Dixon both produce what they call “environmentally friendly” balls that are made with recycled materials. Performance of these balls is reported to be very good, and the companies should be celebrated for using recycled materials to manufacture the balls. But the balls are not biodegradable and still contain plastics and metals.

What Should You Do?

It is interesting to note that Audubon International (which operates the Audubon Cooperative Sanctuary Program) has no position on removal of lost balls, particularly from water hazards. But there is no question that the modern golf ball, full of plastics and metals, is a pollutant when lost. Indeed, the hitting of standard golf balls off a ship into the ocean was essentially banned by international treaty (Annex V of the MARPOL Treaty). The bigger concern is the harmful effects caused as the ball begins to decompose. This problem seems most immediate for balls that end up in bodies of water that are subject to constant motion (think ocean and tidal areas).

So what should the environmentally conscientious golfer do?

If you find a ball, pick it up. Then dispose of it properly (in the bag, to a friend, in the shag bag, or in the trash).

Keep the ball out of the water hazard (you knew this). If your ball goes into the water (that is not OB), drop – don't chance another ball going into the water (unless your second ball is a biodegradable ball). And spend a moment trying to recover the original ball.

Do not ever intentionally hit a ball into the beach, bay, ocean, or any water unless the ball is biodegradable.

Ask your course if it has a program to remove balls from water hazards and, if not, suggest that the course could make a profit if it contacted a golf ball retrieval company.

Right now, golf balls as pollution is a small problem. But like many things, if unabated it could end up being a significant problem to both habitats and humans. And, like many things, a little effort now will prevent a big problem later.

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