

# Preserving Stream Corridors Mitigates Erosion, Pollution

By Alan D. Wood

**G**olf courses, like most outdoor recreation facilities, can be highly compatible with restoring and maintaining natural stream corridors. Riparian corridors, normally including most of the floodplain, are complex ecosystems that require a balance among several factors: hydrology, geomorphology and biology. In layman's terms, that's water, ground and plant and animal life.

If we remove all these components from a stream, by building a concrete channel, for example, we are left with a lifeless waterway, which is not aesthetically appealing, nor environmentally friendly. Unfortunately, a typical natural stream corridor, which in most climate zones includes trees and shrubs, is not always compatible with outdoor recreation, such as golf, which requires some open spaces.

In Photo 1, we see a course with a beautiful vista of snow-capped mountains. However, to have that vista and allow for low drives across the stream in the foreground, all the trees and shrubs were

removed from the stream corridor. Not only does this destroy the riparian ecosystem and detract from the visual appeal, but it also opens the door for severe erosion of the streambank soils. Other courses want an English garden look with grass mowed down to the water's edge (Photo 2), again removing the protection that deep-rooted vegetation provides from erosion.

However, streambanks can be maintained with vegetation and/or "hard" materials which simultaneously promote a natural ecosystem and allow for the activities on a golf course. In Photo 3, wildflowers and shrubs have been planted among some large rocks to be both aesthetically pleasing and erosion-resistant. Where needed for visibility or ball flight, the shrub varieties can be selected from among those with a naturally low-growing height (e.g., chokeberry, silky dogwood, dwarf willow and spirea) or can be pruned to maintain a specific height. (For a complete list with applications, see NRCS's Streambank and Shoreline Protection at [www.info.usda.gov/CED/ftp/CED/EFH-Ch16.pdf](http://www.info.usda.gov/CED/ftp/CED/EFH-Ch16.pdf))

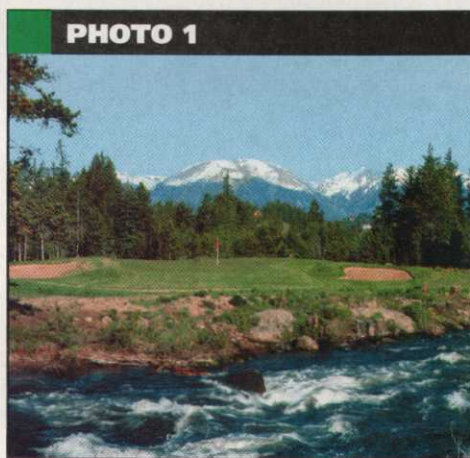
In areas where rock is difficult to obtain, large woody material, such as rootwads, can be installed in streambanks to resist erosion along with grasses or until live woody vegetation can be established. Photo 4 shows rootwads, constructed of two logs (one with the rootball still attached) and buried into the streambank (to prevent floating away). Low shrubs have been planted between the rootwads to re-establish woody vegetation.

Although shrubs can be planted from rooted cuttings or nursery stock, soil-bioengineering uses "unrooted" cuttings of species, such as willows and red-osier dogwood, to establish woody shrubs along the streambank. During dormancy, live-stakes or whips of the plant stems can be



## QUICK TIP

Now that the holiday season is over, a new year is upon us, bringing with it new challenges. What to do with the old tube television and where to hang the flat-panel LCD or plasma TV might be high on your to-do list. However, learning new ways to better manage your course should also be near the top. Many companies are currently finalizing new products they plan to introduce at the Golf Industry Show in Orlando. These innovations can help turf managers do their job more efficiently and more economically, with less environmental impact. So, use the rest of the month to educate yourself on these new products. Get to it — and don't forget to come see us at the show!



*Streambanks are part of a complex riparian ecosystem.*



**PHOTO 2**



*Grass mowed to the streambank often begins unsightly erosion.*

**PHOTO 3**



*Streambank rocks and plantings can prevent erosion, stop unnecessary mowing and provide aesthetic appeal.*

**PHOTO 4**



*Rootwads stabilize the streambank while letting riparian shrubs to establish.*

inserted into the streambank at very low per-unit costs. Within a couple of years, as seen in Photo 5 (page 62), lush vegetation will provide good riparian cover, and even hide rocks, among which cuttings can be planted.

Although “hard materials” such as rocks and rootwads are needed on high-velocity streams, vegetation alone can be utilized on slow-moving waterways. However, it is best to use nongrass species, if for no other reason than to remind the mowing staff NOT to mow right up to the stream edge. In areas with year-round growing seasons, wildflower mixtures can serve this purpose as well as being aesthetically pleasing. In colder climates, obligate (wetland) plants, such as cattails, can be visually pleasing and provide erosion resistance, even during dormant periods, as seen in Photo 6 (page 62).

Obviously, the best vegetation to maintain along the stream corridor is that which naturally occurred prior to human activities, such as large trees and shrubs. Even where a course layout requires a fairway to cross a stream, a window can be created through the tree line where only low shrubs are still maintained, as seen in Photo 7 (page 62).

By keeping the plants and wildlife necessary for a healthy riparian ecosystem, other important factors such as shade and nutrient uptake are provided. The former is important to prevent heating of the stream water (which is not good for most fish species); not to mention the appreciation of golfers on a hot afternoon. The latter can be important on a golf course where high amounts of fertilizer are needed to maintain durable, attractive grass. The stream-edge buffer plants can intercept any excess nutrients and utilize them for growth, instead of allowing them to enter the stream as pollution.

Many landscape architects are knowledgeable with riparian corridor plantings that can compliment a golf course. Additional information can be obtained from state and federal agencies, such as USDA’s Natural Resources Conservation Service, which has several helpful references (page 62), as well as conservationists and engineers that can assist with plantings and streambank structures. As we all try to improve the quality of our natural envi-

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**Stream-edge buffer plants can intercept any excess nutrients and use them for growth, instead of allowing them to enter the stream as pollution.**



**PHOTO 5**



Soil-bioengineering after three years provides riparian cover and hides a rock toe.

**PHOTO 6**



Even dormant cattails can stabilize the banks of a slow-moving stream.

**PHOTO 7**



A fairway window through a tree-lined riparian corridor provides a challenge for drives across a stream.

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ronment, outdoor recreational facilities such as parks and golf courses, can easily be a partner by restoring and maintaining good stream corridors.

Alan Wood's current emphasis is on stream restoration activities. He completed a Ph.D. in agriculture and biological engineering at Penn State University in 2004. Wood started his career with the Soil Conservation Service in 1970 in Maryland, and from 1978 to 1985 was a design engineer for SCS in Albuquerque, N.M. Since 1985, he has been the state project engineer for NRCS in Pennsylvania, where he has worked on numerous flood control, mine reclamation and pollution-control projects.

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