

Specially Designed Wetlands Treat Golf Course Runoff

Phytozones can help with water quality management.

BY KRAIG MARQUIS

Many golf course superintendents find water quality management one of the most challenging aspects of their jobs. Success in managing water sources for golf, wildlife, aesthetics, irrigation, and overall water quality depends on having a basic understanding of factors influencing water quality and on adopting Best Management Practices (BMPs).

Members of the Audubon Signature Program have a special advantage of working with Audubon International to build in systems that protect water quality right from the start. One approach to protect water quality in lakes uses a unique wetland treatment system known as a *phytozone*. In general terms, a phytozone is similar to a shallow forebay at the edge of a lake. The design is unique, however, because it integrates the treatment benefits of a detention basin and a created wetland.

CASE STUDY: RAPTOR BAY, ESTERO, FLORIDA

Raptor Bay is a WCI Communities, Inc., resort-class championship golf course development with residential timeshare units and associated amenities located in Estero, on Florida's Gulf Coast. Raptor Bay Golf Club was designed by Raymond Floyd. In March of 2002 it won certification as the third Audubon International Gold Signature Sanctuary golf course in the world, meeting Audubon International's highest standards for development in concert with the environment.

The entire project encompasses approximately 510 acres, of which more than 150 acres will remain undeveloped and preserved in perpetuity under conservation easements. This large preserve area is home to an active nesting pair of bald eagles and several gopher tortoises, and is planned to feature a nature trail and interpretive signs detailing the unique ecosystem.

The Raptor Bay property consists primarily of pine flatwoods with pockets of cypress strand and xeric oak scrub vegetation communities. Halfway Creek, classified as a Florida Outstanding Water, runs through the property and drains into the Estero River and then into Estero Bay.

PHYTOZONES AT RAPTOR BAY

In order to protect water quality in the created lakes on site and water bodies downstream of the project, including Halfway Creek and Estero Bay, approximately 22 acres of phytozones, or small wetland pockets, were constructed to treat runoff from the golf course. The phytozones at Raptor Bay are characterized by a wide earthen berm that separates a shallow pool from the main body of the lake. Each is constructed to receive runoff directly from the storm-water drainage system or from swales around the lakes.

Once the runoff is discharged into the phytozone by pipe or swale, it is detained before flowing into the main body of the lake. The phytozone tem-

porarily stores and slows the movement of the runoff and therefore promotes settling of solids and attached pollutants. Vegetation planted in the phytozone absorbs and filters dissolved nutrients.

The phytozones at Raptor Bay are sized to treat runoff from smaller, more frequent storm events that have the greatest potential to degrade water quality. Preliminary water monitoring results have indicated that water quality is good and that the phytozones are functioning effectively.

Phytozones can have the added benefit of providing habitat and feeding areas for wading birds and other wildlife. Results from the wildlife monitoring program at Raptor Bay indicate a substantial increase in the variety of bird species on the property. Surveys conducted in December 2001 and December 2002 added 22 new bird species, including nine new water-dependent birds, to Raptor Bay's bird list. Rare birds, including listed species, have been observed feeding along the lake banks and vegetated berms. These berms are especially popular because they provide additional forage area and protect the birds from predators and the occasional unknowing golfer searching for a stray golf ball.

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