

Innovative plan to heal the land

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Late this summer, the biology department at Cal Poly and Unocal Corp. hope to write a new chapter in oil field cleanups.

They are proposing a first-of-its-kind ecological remediation project at the heavily contaminated Guadalupe oil field that will combine pollution reduction with habitat restoration and prevent oil pollution from seeping into the ocean.

The plan calls for planting six acres of wetland and dune scrub habitat at the northern edge of the oil field near the ocean. The native plants will mimic the oil field's natural plant communities and will speed up the breakdown of oil pollution in the soil, said V. L. Holland, chair of Cal Poly's biological sciences department.

"It's a real exciting project," he said. "When you get to be on the cutting edge and doing something no one else has done, it's pretty exciting."

The project is innovative because it takes two common practices and combines them in a way never done before.

All cleanups involve some form of habitat restoration, and many petroleum spills use trees and other plants to speed up oil's natural decomposition - a technique called phytoremediation. But most phytoremediation projects use non-native or hybrid trees that are planted in artificial groves. This is the first time restoration of natural ecosystems and phytoremediation have been used together in this way. Holland said.

Such innovative approaches will be necessary if the Guadalupe oil field is ever going to be cleaned up. The 2,700-acre site in the southwestern corner of San Luis Obispo County is polluted with between 8.5 and 20 million gallons of a toxic oil-thinning product, called diluent that leaked from Unocal distribution pipes.

Some plumes of contamination - including the one targeted in the Cal Poly project - are leaking dissolved diluent into the ocean, Caruso said. Others saturate huge inland Pockets of sand. Because this massive amount of contamination sits beneath one of the few remaining coastal dune habitats in the state, cleanup of the oil field is one of the nation's most vexing environmental dilemmas, said James Caruso, the county's Guadalupe cleanup planner. How to clean the oil field up without destroying it?

Only a small percentage of the pollution at the field is scheduled to be removed by excavation. Undetermined and, perhaps, yet-uninvented cleanup methods will be required to remove the bulk contamination. The cleanup will take decades to complete.

The Cal Poly proposal, which Holland has dubbed the Guadalupe ecoremediation project, calls for willows, cottonwoods and other native trees and vegetation to be planted after two pockets of shallow contamination have been excavated.

The plants will speed up the natural decomposition of the remaining pollution. The plants do not actually consume the oil, what scientists often refer to as hydrocarbons, but their roots aerate the soil and create an underground habitat for microorganisms that do.

"The roots will create an ecosystem that will increase the diversity of the microorganisms in the soil," Holland explained. "Hopefully, they will break down all the hydrocarbons before they enter the ocean."

The ecoremediation project replaces a more traditional method of eliminating residual oil - biosparging. Biosparging calls for wells to be drilled and air injected into the ground. This injected air also accelerates natural decomposition.

Gonzalo Garcia, Unocal's Guadalupe oil field cleanup manager, said he, too, is excited about the Cal Poly project.

"When you can benefit habitat and do cleanup all at the same time, that's a winner," he said.

Unocal plans to start digging up the two sites in April and could be ready to do the ecoremediation as early as August. All of this will require approval from state and county regulators.

County planners are scrutinizing the ecoremediation plan to make sure it benefits the dunes environment. Some questions remain. Although the project will use native vegetation, it calls for treating wetlands where they did not exist before, said county cleanup planner Caruso.

"What I'm afraid of is that the plantings aren't restoration-oriented; they're cleanup-oriented, and that could be backwards," he said. "It should be based on what would help the dunes system most."

Holland is confident his project will pass muster. He has designed it so that it will duplicate two dunes habitats already there.

One habitat is coastal dune scrub, which is comprised mostly of shrubby vegetation, such as mock heather and dune lupine. The other habitat is dune slack or dune swale, which has a very shallow water table and can support such water-dependent species as willows, cottonwoods, coast live oak and waxmyrtle.

These two habitats will be planted in a mosaic. This approach differs significantly from other phytoremediation projects, which feature artificial-looking rows of non-native trees.

"It will look exactly like what is found in undisturbed areas of the dunes," Holland said, "and it will be a lot better than going somewhere and seeing just rows of trees planted."