

# A Prairie Where Pollution Ruled

by Shane Sparks

**NATIVE** prairies once covered approximately 1,500 square miles of Ohio's landscape. Ohio's abundant rainfall supports a relatively rare tallgrass prairie ecosystem. Unfortunately, due to increased population growth and cultivation, much of the native prairie land has been converted to other uses. Today, very few native prairies remain in Ohio. However, this is starting to change as remediation professionals recognize prairie restorations as part of the solution in the remediation of contaminated sites.

At the British Petroleum (BP) Refinery located just outside of Lima, Ohio in Fort Shawnee Township, an effort has been undertaken to restore a small portion of these lost prairies. The goal of the restoration was to not only produce a thriving and diverse prairie community, but to also assist in the remediation of a former landfill that has been designated as a contaminated site under the Resource Conservation and Recovery Act (RCRA). The E-Pond facility is a 23-acre site and the former location of two ponds used for refinery sludge dewatering and storage as well as a landfill for refinery and municipal refuse (operated from 1958-1973). Upon reaching capacity, the ponds and landfill were closed and BP developed a plan for the closing and remediation of the E-Pond Site.

In 2001, during RCRA cleanup reforms, the Environmental Protection Agency (EPA) determined that the surface soils at the capped E-Pond facility were contaminated with elevated levels of chromium, thallium, antimony, and polychlorinated biphenyls (PCBs). Due to the risk to human and ecological receptors that the contaminated soils presented, site corrective actions in addition to the traditional landfill soil cover were warranted. To prevent root and burrowing animal exposure to the contaminated surface soils, a synthetic root penetration barrier was laid on top of the

existing surface and anchored into the subsoil. An additional 12 inches of clean soil was imported to the site and placed on the root penetration barrier. To aid in vegetative growth and the moisture retention capacity of the soil, biosolids from the Lima Wastewater Treatment Plant were added as a soil amendment.

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Following the physical remediation activities, prairie seed was planted in an attempt to restore native vegetation to E-Pond. The first prairie planting in 2001 was unsuccessful in creating a thriving plant community as only 5% of the site had germinating prairie plants in the year following planting. The failure of

the initial planting was due to poor site preparation, inadequate supply of nutrients in the surface soil and lack of site maintenance activities. At this point, North American Wetland Engineering, LLC (NAWE) out of White Bear Lake, Minnesota was contacted to complete the prairie establishment goals of the RCRA cleanup. In 2003, NAWE began working with BP and the Cleveland, Ohio URS office to properly prepare the site and to develop a planting workplan.

Site preparation is a critical step in any prairie restoration. Prairie species require good soil aeration and an adequate nutrient supply to properly germinate. In contrast to the initial prairie planting, E-Pond was adequately prepared before prairie planting. The upper two inches of soil was disked to enhance aeration and break up the soil, creating a uniform soil surface for the seed drill. Large soil clods present on the soil from the first planting were broken down by the disking to eliminate macropores that provide excessive aeration and can dry out germinating seeds.

Grasses and forbs native to western Ohio were identified and planted on the



**E-Pond site pre-prairie establishment**

site with a Truax Seed Drill. The Truax Seed Drill was pulled behind a Kubota Tractor and works by creating small furrows in the soil before delivering a variety of seeds to the furrow. The final implement on the seed drill closes and lightly compacts the seed bed. The tall-grass prairie seed mix included such species as Big Bluestem (*Andropogon gerardii*), Black-Eyed Susan (*Rudbeckia hirta*), Sawtooth Sunflower (*Helianthus grosseserratus*) and Indian Grass (*Sorghastrum nutans*). The restoration planting also included grass and wildflower species that provide food and shelter to birds, insects, and mammals. Walking trails alongside the Ottawa River and E-Pond prairie have been established to provide educational tools on native Ohio habitats.

During the initial growing season, mowing events and herbicide applications were periodically completed to aid in the full establishment of a prairie community. The mowing effectively stunted the growth of fast-growing weed species and allowed the young prairie plants to establish their dominance. A



**Planting during prairie establishment.**

plan was also developed to control cool season grasses and manage the growth of cottonwood seedlings, teasel, and other pioneering or invasive species.

NAWE has visited the established prairie in Lima four times every year since 2003 to perform general prairie maintenance activities such as mowing and weed

control. These activities will continue into the future to ensure the long-term success of the prairie. Maintenance visits are vital at E-Pond to control the advance of invasive species that are



**Second year growth of Black Eyed Susan.**

encroaching on the prairie from adjacent properties. More specifically, the spread of Teasel (*Dipsicus fullonum*), a broadleaf weed, has been controlled with applications of Glyphosphate (trade name Roundup®) and Journey® Herbicide. Herbicide is spot-sprayed on problem areas through the use of a backpack sprayer.

The E-Pond prairie is currently in its

fourth year following reestablishment. In most prairie restorations, wildflowers such as Black-Eyed Susan dominate the vegetative landscape during the first couple of years. This was observed at E-pond during the 2004 growing season. In subsequent years, the percentage of blooming wildflowers decreases slightly as prairie grasses such as Big Bluestem take over. This was observed during the



**Third year growth of Sawtooth Sunflower.**

2005 growing season as the relative percentage of Big Bluestem has increased since 2003. Black-Eyed Susan's are still prevalent, but not to the extent of the

2004 growth.

Due to the continued maintenance, the prairie grasses have continued to extend their growth over the entire prairie. Four years following the initial planting, prairie species are established over 95% of the site and are currently thriving as a low maintenance landscape. The extensive root network of the established prairie plants has helped prevent erosion of the surface soils by holding the soil in place. In addition, the water uptake by the plants prevents rainwater from infiltrating into the contaminated subsurface. Besides aiding in pollution removal and increasing plant, insect, and mammal biodiversity, the prairie restoration also helps preserve Ohio's natural heritage by bringing back a small portion of the native prairies that have been lost. **L&W**

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