TREE CARE INDUSTRY MAGAZINE

The GREEN issue

The Official Publication of the Tree Care Industry Association

Volume XXI, Number 2 - February 2010

New Age Integrated Vegetation Management: A GREEN APPROACH TO ROW MANAGEMENT

A botanist examines the Pig Island ROW in 2009, where the two-year IVM project successfully converted the plant community from trees and shrubs to grasses and herbs.

By Richard A. Johnstone

A look at one project in Tennessee demonstrates how integrated vegetation management can reduce long-term environmental impacts on both the ROWs and surrounding environments.

The project

Columbia Gulf Transmission must maintain vegetation on its 180-foot wide natural gas transmission corridor through J. Percy Priest Recreation Area near Nashville, Tennessee, to provide safe and reliable natural gas energy services, and to meet FERC and DOT regulations for testing and leak inspections. This has been routinely accomplished with annual mowing of rights-of-way vegetation in mainland areas accessible to tractors, with exception being the 4.5 acre crossing of Pig Island.

The island vegetation, accessible only by air or boat, had been maintained with periodic hand cutting approximately every four years. The hand cutting method was chosen as a means to minimize adverse impact to riparian buffers along the lake and to public aesthetics, but the hand cutting encouraged coppice plants with increasing stem density, especially from trees that regenerate from cut stumps, surface and subsurface roots (root suckering). It also increased population density of invasive plants; such as ailanthus, autumn olive and multi-flora rose. These plants degrade the ecosystem and inhibit access necessary for the performance of cathodic and leak testing, which threatens the integrity of the pipelines and poses a hazard to the public and environment. Wood debris from repeated cutting operations also inhibits access and testing procedures.

Columbia Gulf personnel asked the Army Corp of Engineers for permission to

The objective of the IVM plan was replacement of the trees and shrubs that inhibit access and integrity of the natural gas pipelines, and provide access for maintenance.

use aerially applied herbicides from helicopters to control vegetation on Pig Island, but this posed additional problems. Since the lake is heavily used for recreation, an aerial herbicide application of tall trees and shrubs would produce dead stems that would adversely impact aesthetics for the many recreational uses of the lake. The requested herbicide for this application was one routinely used on natural gas ROW, but is a restricted use product that is not registered for use in close proximity to water or on limestone soils, thus the herbicide application request was denied.

IVM proposal

Columbia Gulf contracted with VMES, LLC consulting to meet with Army Corp personnel in the spring of 2006 to develop an effective and economical vegetation management plan that provides for access, testing and reliability needs of the natural gas transmission corridor, while meeting the aesthetic and ecosystem requirements of the Army Corp of Engineers. After a tour of the ROW crossing J.Percy Priest Reservoir, the consultant met with the Army Corp of Engineers, along with a Columbia representative, and recommended an IVM approach prescribed according to the existing conditions and desired outcome.

Various vegetation management techniques were proposed for the Columbia Gulf ROW on Pig Island to convert the vegetation from incompatible trees and brush, some of which were invasive, to low growing species compatible with safe and reliable natural gas transmission and a benefit to wildlife. The plan called for the use of manual and mechanical cutting of all vegetation within the ROW corridor, followed one year later with a ground broadcast herbicide treatment to the resprouted brush, and with a subsequent selective herbicide treatment of any missed or reseeded incompatible plants the next year. This combination of techniques would effectively eliminate the problem plant species and allow germination of desirable, low growing plants. These plants, and the wildlife that feed and nest in them, will develop the cultural and biological controls that minimize the need for future maintenance while preserving or improving aesthetics, wildlife habitat and recreational opportunities.

My company, IVM Partners, Inc., was hired to provide a case study of the plant community changes mapped on Geographic Information Systems (GIS) and documented by a trained botanist, who would establish permanent transects before and after the vegetation management interventions and document changes for two consecutive years. The procedures and results will then be shared with the Army Corp of Engineers and Tennessee Department of Natural Resources, as well as the Tennessee Valley Authority. In addition to converting vegetation to species compatible with safe and reliable natural gas transmission and improved wildlife habitat, the best management practices are also expected to reduce long-term vegetation management costs.

The Army Corp of Engineers was very receptive to this IVM approach, especially in controlling non-native invasive plant species and improving wildlife habitat, since they met their primary objectives of habitat management around the reservoir. They were also pleased that the best management practices (BMPs) developed would be documented and shown to the Tennessee Valley Authority, which has similar vegetation management issues for operating high voltage electric transmission lines from the dam's hydroelectric facilities.

Mowing

Pig Island's dense population of incompatible trees and invasive brush required reclamation of the entire corridor to restore access for safety and reliability of the pipelines, and allow germination of low growing compatible plants. This was accomplished in winter 2007 when a Columbia Gulf crew was transported to the island by pontoon boat with a tractor-mounted brush-hog mower and chain saws to cut all vegetation within the 180-foot-wide ROW.

Broadcast herbicide treatment

An ATV mounted with a Widecast spray nozzle was transported by pontoon boat to the island to broadcast herbicide treat the resprouted plants on the entire corridor. Thinvert was used as the herbicide carrier to eliminate spray drift and applied at a calibrated volume of 5 gallons per acre. Treatment was performed in the fall of 2007 to minimize aesthetic concerns, since an autumn treatment allows plant coloration due to loss of chlorophyll from herbicide action to coincide with normal fall coloration. The treatment was divided into three parts:

The ROW centerline area over the three

pipelines, about 150-feet wide received an ATV Widecast treatment with three herbicides – Garlon 3A (triclopyr), Escort (metsulfuron) and Milestone (aminopyralid) – that select for broadleaf plants and invasive spotted knapweed and Canadian thistle while releasing for growth warm season grasses.

ROW borders (approximately 15-feet wide on each wood edge) were ATV Widecast treated with Krenite (fosamine), Escort (metsulfuron) and Habitat (imazapyr) herbicides to try and develop a native shrub border. This should encourage a three-tiered plant community of grasses transitioning to shrubs and then trees, the optimum habitats for various wildlife species.

The ROW riparian buffer – approximately 50-feet from lake shore waters edge across the entire 180-foot ROW – were selective backpack treated with water-approved herbicides Accord (glyphosate) and Habitat (imazapyr) in Thinvert to remove targeted plants and develop a riparian buffer to minimize washing of sediment into the water.

The 2007 treatment efficacy was adversely impacted by the occurrence of rain toward the end of the ATV Widecast treatment of the west side border zone, and overall skips due to spray equipment quality control and minimal employee training. The spray crew was not well versed in the use of the ATV Widecast application technique, thus the spray pattern was not always monitored to insure operation at its full potential. This was noted but not documented until botanical inventory was conducted in 2008.

Botanical documentation was performed by Haggie Consulting, prior to herbicide intervention in August 2007, to establish baseline plant community inventory along permanent transects in both the centerline and border (lateral) zones of the ROW. These transects were established in a low lying "valley area" and replicated in a high "hill area" to track relative differences of wet and dry growth conditions.

2008 backpack treatment followed the plant inventory performed in September 2008, which revealed that the 2007 herbicide application failed to meet the efficacy expectations, especially in the "hill area" due to the rain occurrence and spotty application. This necessitated a more thorough follow-up backpack application across the entire ROW in October 2008, using a standard herbicide mixture of Accord (glyphosate) and Habitat (imazapyr) to enable treatment on either riparian or dry locations. A professional herbicide application contractor, Progressive Solutions, donated their backpack crew complement to perform this work.

Results

The objective of the IVM plan ws the conversion of the plant community from trees and shrubs that inhibit access and integrity of the natural gas pipelines, to grasses and herbs that provide access for maintenance and protect the pipes with a minimum of inputs and costs. Another botanical documentation was performed on Pig Island in July 2009 and found that the follow-up backpack treatment had achieved efficacy of 90 percent or better control of the targeted plants.

Economics

Hand cutting: A three-man crew with chain saws spent about a week to cut the 4.5-acre ROW at a cost of approximately $4,000, or about $900 per acre.

Mowing: A mowing crew with chain saws spent about a day to cut the ROW at a cost of approximately $1,000, or about $200 per acre.

ATV: The ATV Widecast crew spent about two-thrids of a day to spray the ROW at a cost for labor, equipment and herbicides of $1,500, or about $325 per acre.

Backpack: The backpack crew spent about 1/2 day to spray the ROW at a donated cost for labor, equipment and herbicides of $700, or about $150 per acre.

Future: Subsequent plant community inspections will determine the threshold of need for future herbicide treatments, but due to the success of the vegetation management plan in restoring low growing compatible plants, only a selective backpack treatment should be needed in 2011. The expected future cost of touch-up backpack treatments, once every three or four years, is $500 or about $125 per acre.

Lessons learned

Natural gas corridors that are easily accessible to mowers can be routinely maintained with annual mowing at a cost of about $80 per acre. This practice effectively maintains a "grass-like" habitat that is easily accessible for inspections and equipment maintenance, but tree species and invasive plants continue to grow and can increase in number and density, especially if they have the capability to root-sucker. The timing of the mowing can also adversely impact nesting birds and

mammals and reduce populations of desirable species, if flower tops are cut off prior to seed set. Heavy mowing equipment can also damage sensitive wetlands by rutting soil or leaking of oil and fuel, and pose erosion and stream sedimentation problems. This can prevent a ROW from reaching its full habitat potential, especially for providing flowers and nectar to pollinators, such as bees and butterflies.

Relying on cutting is also aggravated in areas not easily accessible to mowers, since steep slopes and marshes must be periodically hand-cut at 10-times the cost per acre. With more stringent safety regulations for natural gas pipelines, this expensive and hazardous hand cutting will need to be performed on a more frequent basis. Chain saws also add to noise pollution and can pollute air and water with hydrocarbons. At a time when efforts are being made to decrease the carbon footprint of maintenance practices, solely relying on cutting as a maintenance strategy defeats this effort.

The Pig Island Case Study points to an alternative strategy of converting the ROW plant community to low growing species that allow unimpeded access for inspections and maintenance through judicious use of selective herbicide treatments. One broadcast treatment may be necessary to convert from dense populations of undesirable plants, but once the desirable plant community is established, it can be managed with periodic selective backpack herbicide treatments. While initial plant species conversion may be more expensive than mowing, it is more than offset by desirable plant communities decreasing future maintenance expenditures. Periodic backpack treatments, about once every three or four years, replace wholesale disturbance of the entire ROW ecosystems, and at a net annual cost of less than $50 per acre.

Conclusions

This case study project demonstrates that proper vegetation management can improve wildlife habitat, control invasive plant species, and improve ecosystem management, while providing for safety and access needs of an energy corridor and showing that a utility ROW can be beneficial to the environment. Proper use of IVM techniques can establish a plant community dominated by compatible plants. These in turn can provide food and habitat for various mammals and birds that will assist in vegetation management through consumption of tree seeds and seedlings. The result is a self-sustaining ecosystem that will only require periodic interventions to maintain it in a healthy state, compatible with the facility maintenance needs of electric, oil and natural gas transmission. This can improve relations between utilities and the regulatory agencies making future capital construction permits easier to obtain, while also demonstrating to the community that an energy corridor is consistent with recreational and environmental quality.

Richard A. Johnstone is president of IVM Partners, Inc. in Newark, Delaware.