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Purple Loosestrife Control, Survey, and Public Education Project to Protect the Kakagon/Bad River Watershed, 1996

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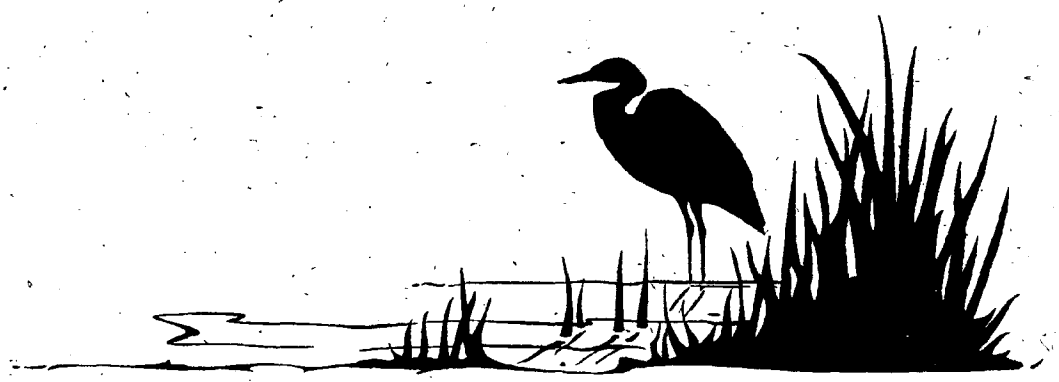

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PURPLE LOOSESTRIFE CONTROL, SURVEY, AND PUBLIC EDUCATION PROJECT TO PROTECT THE KAKAGON/BAD RIVER WATERSHED, 1996

INTRODUCTION TO THE PROBLEM

Purple loosestrife (*Lythrum salicaria*) is an exotic perennial plant that was introduced to the United States from Europe in the 1800's and has spread throughout the eastern seaboard and the upper Midwest. Purple loosestrife adapted well to the climate and environment in the United States and reached Wisconsin by the 1940's (Stuckey 1980). It spreads rapidly along waterways, canals, and road and utility right-of-ways. An aggressive plant that out-competes native vegetation, it and can eventually dominate a wetland. As purple loosestrife invades a wetland it may reduce valuable wildlife food plants, degrade the quality of waterfowl nesting habitat (McKeon 1959), and create a loss of mud flats for foraging shore birds (Smith 1959). *Lythrum salicaria* and *Lythrum virgatum* were designated as nuisance weeds in 1987 when Wisconsin recognized the effects of purple loosestrife as detrimental to native wetland communities.

Purple loosestrife poses a serious threat to Wisconsin's wetlands including the 6,400 hectare (16,000 acre) Kakagon/Bad River Sloughs complex within the Bad River Reservation on the south shore of Lake Superior.(Fig. 1) The Kakagon/Bad River Sloughs are the largest, healthiest, fully functioning estuarine system remaining in the upper Great Lakes Basin (Meeker 1992) and is recognized as a National Natural Areas Landmark. The Sloughs contain ten natural communities in a complex mosaic that supports crucial spawning grounds for Lake Superior fisheries, an abundance of wild rice beds, and provides critical nesting habitat for migratory waterfowl (Meeker 1992). In the Sloughs, purple loosestrife could transform diverse and healthy wetland communities into a monoculture devoid of many species.

In order to determine the current status and health of the Kakagon/Bad River Sloughs and to develop a long-term watershed protection plan, the Wisconsin Chapter of The Nature Conservancy and the Bad River Band of Lake Superior Chippewa have initiated a watershed conservation project. The main purposes of this project include: supporting additional research and inventory activities to better understand the Sloughs and the influence of the 3,692 square kilometer (1,420 square mile) watershed; assisting the Band in their efforts to protect the Sloughs; building relationships with other partners in the watershed; and designing and implementing strategies with partners to reduce threats for the long-term protection of this unique system.

The Great Lakes Indian Fish and Wildlife Commission (GLIFWC) has recently completed and published a survey of purple loosestrife in the Sloughs and watershed. The survey found an estimated 3.7 million plants in nine locations or corridors within the watershed, covering 146.5 hectares (366.25 acres) (Gilbert et al 1994). The survey found areas of heavy infestation inside the watershed that were upstream of the Sloughs. Purple loosestrife seeds float and travel rapidly along waterways. Areas that are infested upstream jeopardize the Sloughs and other downstream wetlands. It was determined that purple loosestrife represented a serious threat and additional attention was needed.

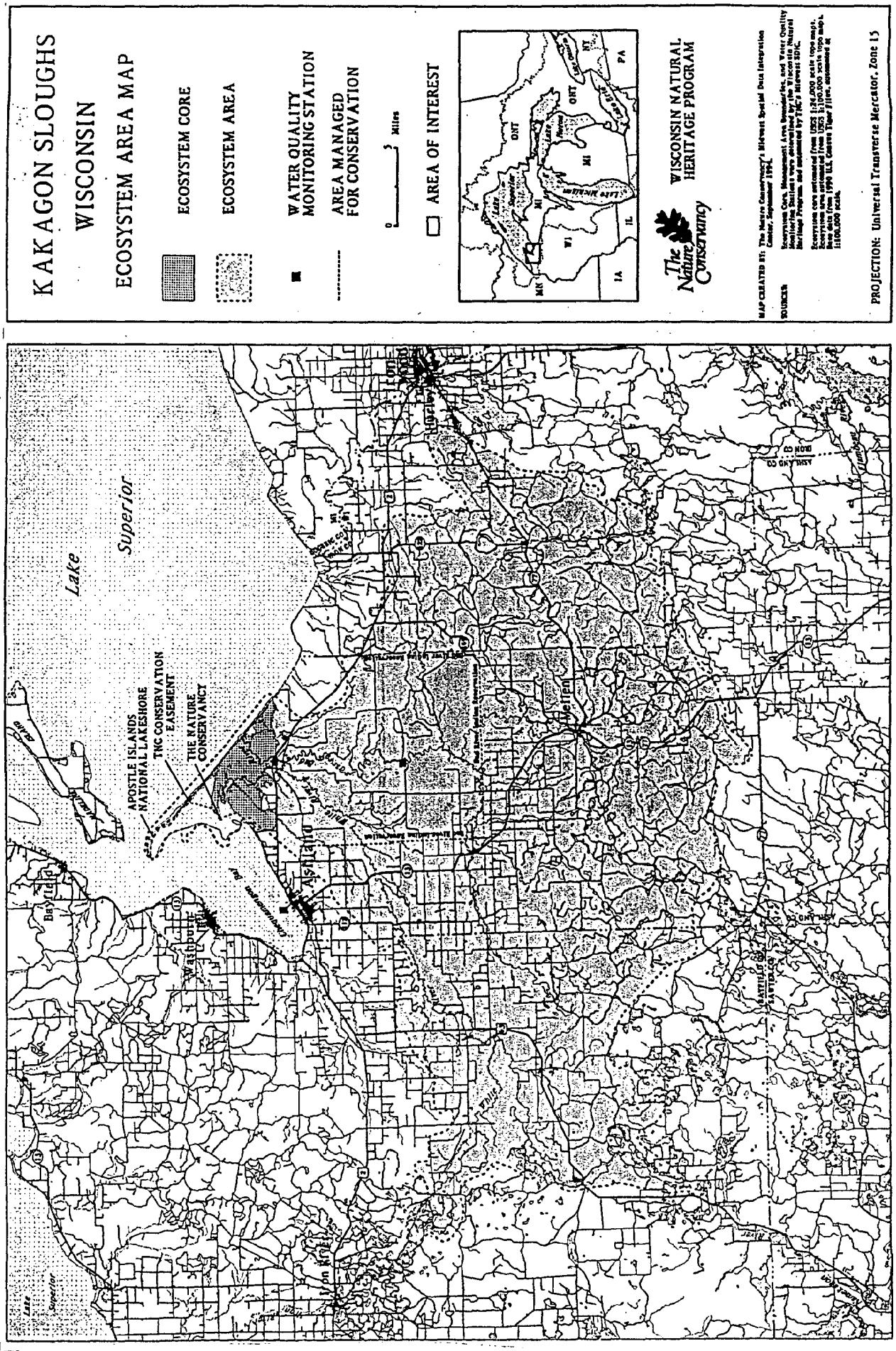

Figure 1. Location of Kakagon/Bad River Sloughs Complex

PROJECT PREVIEW

This project consisted of three components: control, survey, and public/landowner education. The Nature Conservancy hired a project coordinator who surveyed areas of purple loosestrife that were to be treated, contacted landowners and public groups, purchased supplies, coordinated activities with other organizations, supervised the purple loosestrife control crew, and writing quarterly and final reports. A four person control crew was hired during the anticipated peak flowering period to chemically treat purple loosestrife. The Conservancy also coordinated volunteers and the work that they accomplished. The Band and GLIFWC continued to supervise and support their existing crews in surveying and control work.

FIELD SEASON PREPARATION

The Nature Conservancy's control work focused on four areas: Highbridge, Sioux River, Long Island and Oak Point. Highbridge was designated as a priority area by GLIFWC because it contained the highest concentration of purple loosestrife in the areas they surveyed in 1994. Highbridge has a rich seed bank and is a seed source for the Highway 13, Silver Creek, and Marengo River purple loosestrife populations. The purple loosestrife in Highbridge can reach the Bad River Sloughs by traveling down Silver Creek (which flows through Highbridge) into the Marengo River and into the Bad River. With a highly populated area that has a direct seed dispersal path to the Bad River Sloughs, the Highbridge population was a key area for the Conservancy's control work. Areas that were covered in Highbridge are shown in Figure 2.

The Sioux River also has a high population of purple loosestrife. It flows directly into Chequamegon Bay and poses a threat to the Kakagon Sloughs due to the seeds floating on the water and the boat traffic that may increase dispersal. The Department of Natural Resources (DNR) had been treating this area for the past few years, but due to budget cuts and constraints they were not able to treat this summer. The DNR donated the use of their backpack sprayers and chemicals to the Conservancy's crew.

Oak Point and Long Island both harbor high concentrations of purple loosestrife. Due to their close proximity to the Kakagon and Bad River Sloughs and the high amount of boat traffic in this area, there exists the potential to spread and establish vast seed banks if it is not suppressed. Steve Richter, Land Steward for The Nature Conservancy, has held volunteer work parties to control purple loosestrife on Oak Point and Long Island for the past four summers. He returned again this summer to educate and train volunteers about the detrimental effects purple loosestrife and assisted the National Park Service on their control efforts in these areas.

The Bad River Band and GLIFWC treated areas within the reservation and watershed. The Band focused much of their efforts within the Kakagon and Bad River Sloughs, in areas that have known populations of purple loosestrife. Areas within and outside of the watershed which had known infestations of purple loosestrife were treated by GLIFWC.

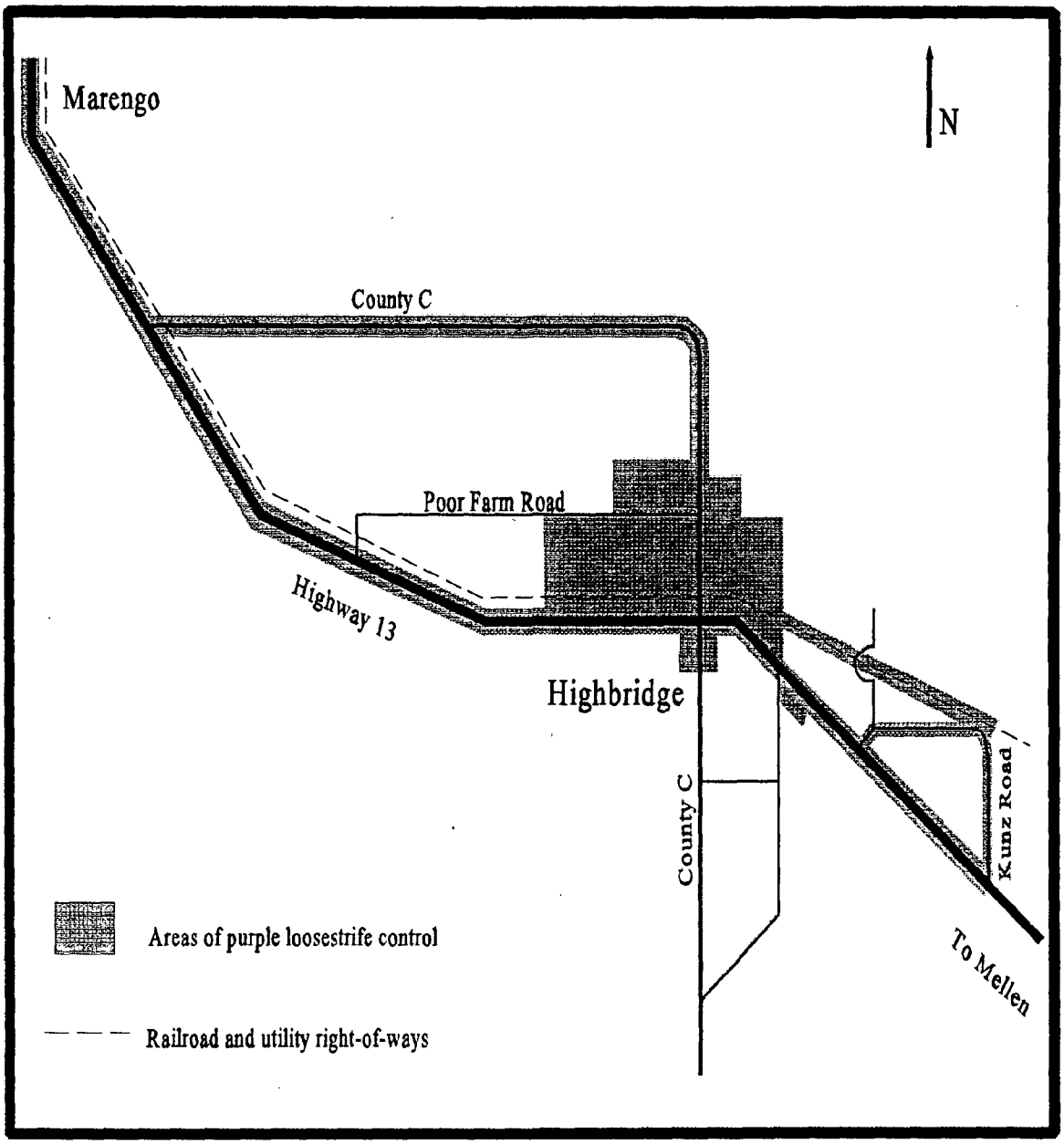

Figure 2. Purple loosestrife control in and near Highbridge, Wisconsin

GLIFWC assisted The Nature Conservancy in the initial planning and strategies regarding treatment and education. In preparation for the field season of treating purple loosestrife, the Conservancy gathered needed equipment including: backpack sprayers, herbicides, surfactant, clippers, water containers, chest waders, hipboots, coveralls, safety glasses, respirators, and safety equipment.

The Conservancy also spent the start of the summer making contacts with officials and landowners in order to get permission to treat on private land and to educate the public about the concerns surrounding purple loosestrife. Landowners who had known patches of purple loosestrife on their property were approached and educated. Most landowners were receptive to purple loosestrife control efforts on their land. Permission to treat on the railroad and utility right-of-ways were granted and permits were obtained from the Department of Transportation to treat along the state highways. County and town road crews allowed the treatment of purple loosestrife along the roadside before they mowed. In order to increase public awareness and to discuss proposed treatment in Highbridge, representatives from The Nature Conservancy spoke at a meeting for the Town of Ashland. Educational brochures were distributed in the Highbridge Post Office. The Nature Conservancy talked with classes from Penokee Hills Home School and the Washburn School District.

FIELD SEASON EFFORTS AND RESULTS

The Nature Conservancy

The project coordinator and the control crew spent four weeks, or approximately 800 hours, treating purple loosestrife. Ten volunteers and three staff from The Nature Conservancy in Madison contributed three days, or 254 hours, to purple loosestrife control at Long Island and Oak Point. Two days were spent by the crew near the Sioux River Sloughs treating on state land and state highway right of ways.

The crew spent 18 days in Highbridge treating on 5.28 kilometers (3.3 miles) of railroad right of ways, 4.8 kilometers (3 miles) of utility right of ways, and 17.6 kilometers (11 miles) of state, county and town road right-of-ways. The crew treated purple loosestrife on eight private land parcels that covered 140 hectares (350 acres). Four additional landowners in adjacent areas allowed the crew on their property, but there was very little purple loosestrife found on their 52.8 hectares (132 acres) when surveyed. Highbridge had a serious infestation of purple loosestrife. Dense areas of growth provided a substantial seed bank that allowed for the plants to continually spread. Most areas were so thick that it was impossible to spray each plant individually and the crew was forced to broadcast spray an entire area. Only a limited amount of other species of plants were found in these areas and they were already out shaded by the purple loosestrife. Plants ranged in height from less than 30 centimeters (12 inches) to over 2.7 meters (9 feet) tall in Highbridge. The ground was generally moist to dry, but it was apparent that at various times of the year water flowed through the areas that were treated and allowed for seed travel in ditches and ravines.

Volunteers used the technique of cutting flower heads and dabbing or spraying herbicide directly on the cut stem. The herbicide used with this method was Rodeo. Rodeo is a systemic, generalist herbicide that only takes a small amount to be effective, but will kill any plant it contacts. Nine and one half liters (2.5 gallons) of Rodeo was applied using a 20% ratio of Rodeo to water. The crew went through 47.5 liters (12.5 gallons) of Garlon 3A and sprayed 380 backpack sprayers, using a 1% ratio of Garlon 3A to water. All ratios are based on a total solution of herbicide including active and non-active ingredients. Garlon 3A is a dicot-specific herbicide, and will only kill broad leaf plants. Garlon 3A allowed grasses, forbs, and other monocots to continue to colonize the treated area.

The crew used backpack sprayers almost exclusively and used Garlon 3A on both young plants, under 30 centimeters (12 inches) tall, and very mature stands of plants, over 2.7 meters (9 feet) tall. When returning to the areas after treatment, both young plants and mature plants were found dead. Treatment of purple loosestrife began at the early stages flowering. Concern was expressed that spraying at this time may not be compatible with the energy flow in the plant and may not transport the chemical to the roots, causing the plant to die. However, upon returning to the areas, plants that were sprayed before and after flowering were found dead.

Education was an integral part of our effort, and many people were reached due to Wisconsin Coastal Management Program's funding. The Nature Conservancy mailed over 914 educational brochures concerning purple loosestrife to residents of northern Wisconsin. Personal contacts were made with ten landowners in Highbridge. In addition, nine individuals stopped and talked to the crew while they were treating in Highbridge. Twelve individuals attended the meeting for the Town of Ashland and discussed the concerns surrounding purple loosestrife. Over 115 school children from the Washburn School District and Penokee Hills Home School were presented with information concerning purple loosestrife and how it interferes with the natural processes where it occurs. All received a brochure and were informed of the threats purple loosestrife poses to the area in which they live. Road crews for the county and state were made aware of the Conservancy's efforts and supported them by agreeing not to mow the shoulders of the highways until the purple loosestrife in that area had been treated.

An observation was made in the response of purple loosestrife in cow pastures. Two cow pastures in the Highbridge area contained populations of purple loosestrife. The purple loosestrife mainly grew in small ravines that provided the only source of water for the cattle. In the first field the purple loosestrife was basically trampled by the cattle, with a small amount being grazed. This field had very few shade trees and the cattle may have found these wet areas with purple loosestrife cooler. Very little of this purple loosestrife was left standing and allowed to bloom. In another field, the cattle grazed heavily on the purple loosestrife, but did not trample it down. This field had many shade trees and areas with drinking water that did not contain any purple loosestrife. The areas that did contain purple loosestrife were grazed as far in as the cattle could reach, due to fencing and muddy conditions. The cattle grazed the plants to 60 centimeters (2 feet) off the ground, this allowed the plants to not only recover, but to branch out and create additional stems. If the additional stems produce seed heads, the cattle could potentially create a

hardier plant that could produce more seeds than if it was not grazed. If the additional stems do not produce seed heads then the grazing could help control the spreading of seeds for that year by not allowing seed production to occur. More data needs to be collected to assess the potential positive and negative effects of grazing on purple loosestrife.

Bad River Band

The Bad River Band of Lake Superior Chippewa have been intensively treating purple loosestrife. The Band had a three person crew start when the purple loosestrife began blooming. An additional three person crew started a month later to reach areas that had not been treated. The Band spent 600 hours in purple loosestrife control work. At the time of this report, three weeks of control work was still scheduled and their accumulative data could not be totaled.

Great Lakes Indian Fish and Wildlife Commission

The Great Lakes Indian Fish and Wildlife Commission's three person control crew worked for 30 days. They used backpack sprayers to apply 34.2 liters (nine gallons) of Garlon 3A concentrate and 3.8 liters (one gallon) of Rodeo. They covered many areas in the watershed and around Chequamegon Bay including Fish Creek Sloughs, Whittlesey Creek, the mouth of Whittlesey Creek, Highbridge, Highway 13 South, and Kakagon Sloughs. In addition, GLIFWC hired a crew to study the effectiveness of their control methods by establishing 100 square meter (120 square yard) test plots. Their results are in the process of being compiled. Jon Gilbert, GLIFWC Wildlife Section Leader, is currently assembling a report containing numerous recommendations for the improvement of purple loosestrife control.

DISCUSSION

Benefits

This project has helped to reduce a significant threat to the Kakagon/Bad River Sloughs. Strong efforts were made to reduce the population of purple loosestrife. The Nature Conservancy's efforts were focused in the Highbridge area, a potential seed bank to the Sloughs. The Band spent the majority of their time in the reservations making direct progress on purple loosestrife plants that are already in the Sloughs. GLIFWC controlled purple loosestrife in the both the reservation and the watershed eliminating plants in known problem areas. Considering the prolific seed production and dispersal capabilities of purple loosestrife, it may dominate a large wetland a few years after it reaches 20% of the plant biomass. By trying to eliminate or reduce the population now will keep it from expanding to the point where it may cause substantially more ecological harm and be difficult or impossible to remove. This is the ecological equivalent of the saying that "an ounce of prevention is worth a pound of cure." The control work that was accomplished because of this project will significantly contribute to that ounce of prevention.

In addition, this project has benefitted the public/landowner awareness of purple loosestrife. This awareness is essential in the battle against an exotic species, especially against

one that has a visually appealing flower. Many people became aware of the negative impacts of purple loosestrife and now know ways that they can help prevent the plant from spreading to other areas. Fortunately, most land owners that we contacted were already informed about purple loosestrife, but they were not aware of what they could do on their own land to control it. This project helped to motivate and empower the public to provide actions of their own that will help to contain purple loosestrife populations.

The favorable impacts that this project has provided includes: protection of the diverse and healthy natural communities, and rare species, in the Sloughs; protection of many important economic, social, and cultural uses including wild rice harvest, duck hunting, furbearer trapping, and wildlife viewing. This project also demonstrated how the cooperation among many partners and people at a watershed level can reduce a common environmental threat.

Recommendations

The implementation of this project was very successful and free of major problems. Some recommendations for improvement include; a more flexible working time frame for the control crew, thoroughly treating all plants in an area and revisiting treated sites, and using different applicators for different situations.

Since there are native plants of similar appearance, the best time to identify and treat purple loosestrife is while it is flowering, but before seed production occurs. The previous long winter and cool, dry spring, along with other factors caused the purple loosestrife to bloom late this past summer. The blooming period normally begins mid to late July and lasts until early September. This year the plant did not start heavy blooming until early August. The Band did not begin treating until the second week of August and continued treating until the end of September. The Nature Conservancy's crew started late July and ended late August. It may have been easier to schedule around unanticipated events such as the late flowering and weather if at least a six week time frame was used instead of four week time frame for the crew to accomplish the same amount of work.

When doing control work it seemed to work best to return to an area to make sure all plants had been sprayed and were dying. Visual effects from the herbicide were apparent within three days after being sprayed. To insure thorough treatment, The Nature Conservancy crew returned to the most intensively populated areas to cover any plants that were still living. This technique seemed to work well.

Adding blue dye to the mixed herbicide solution was also very helpful in accurately treating purple loosestrife. The dye was not permanent and does not stain the equipment or clothing. It remains visually apparent on the plants for 15-20 minutes. This is long enough to treat an immediate area and to make sure all plants are sprayed.

The Nature Conservancy also found a need for different applicators for different

situations. Backpack sprayers worked the best for the majority of the time, but other methods of application could be used for different situations. When treating along the shoulder of a road that was not heavily infested, hand held spray bottles worked better than backpack sprayers. Hand held sprayers were quicker and created less hassle when getting in and out of the vehicle to treat individual plants. This method also works well when canoeing into remote areas to treat small populations of plants. It is also easier to work with hand held spray bottles when cutting flower heads and spraying the Rodeo on cut stems.

It would be impossible to successfully eliminate every individual purple loosestrife plant from a given area with only one treatment effort. Areas treated this year will need to be treated for the next few years to remove plants established from the seed bed or plants missed from previous treatments.

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