

**Integrated Pest Management Plan  
for  
Sand Lake NWR Complex  
Columbia, South Dakota  
January, 2000**

Sand Lake is located in north central South Dakota in the Prairie Pothole Region of the Northern Great Plains. This area is a prairie/wetland ecosystem. The Sand Lake NWR Complex has management responsibility for the 21,500 acre Sand Lake NWR, the Sand Lake Wetland Management District with 162 Waterfowl Production Areas totaling 44,032 acres, and the 2,585 acre Pocasse NWR. These units of the National Wildlife Refuge System are managed to provide habitat for the production, maintenance, and basic life requirements for migratory birds, other wildlife species, and native flora. The objective of our weed control effort at Sand Lake is to provide the level of control necessary to maintain good relations with State and local government entities, as well as private landowner neighbors, and to maintain stable support for FWS programs.

**Current Noxious Weed Control Program**

The primary noxious weed species invading the grasslands of the Complex are Canada thistle, leafy spurge, and wormwood sage. Most emphasis is placed on the control of leafy spurge and Canada thistle. Wormwood sage is rapidly spreading across our grasslands and there is a growing need for more control of this species.

We try to maintain contact with the various weed supervisors and county commissioners by sending them letters each spring listing the units where we know that we have weed problems and where we plan control measures. We also ask them to contact us if they have other units that they are concerned about.

**Canada Thistle**

Since the early 1990s, the emphasis has been on restricting the use of chemicals on units of the National Wildlife Refuge System. To accommodate this policy we had to adopt integrated techniques such as mowing, spraying, and bio-control. To minimize our chemical use we adopted a policy of cosmetic weed control. We have controlled weeds primarily along public roads, private cropland, and other conspicuous areas. Little effort was placed on controlling infestations in other areas. We did not have the staff, budget, equipment, or the desire to spray all of the acres that had infestations. We also did not want to conduct a large program of boom spraying from an environmental point of view. The 1990's from 1993 until the rest of the decade were some of the wettest in recorded history. These wet conditions were ideal for Canada thistles to expand their range in the prairie pothole region and made it difficult to spray infestations. During these years we went to a program of almost exclusively using ATV's with hand held equipment to spot spray infestations. While this technique is much less efficient from a manpower point of view, it does result in less applied chemical. We

believed it was worth the tradeoff in an attempt to reduce the pounds of product applied. The underlying philosophy of this program was to minimize the amount of chemical we used until the bio-agents that we introduced became established.

Another benefit of this program was that our sprayers were very visible in their protective equipment to neighboring landowners trying to control our weeds. A concern when using ATV sprayers is the operators exposure to chemical. Our operators wear the recommended protective equipment. However, increased chemical handling and the susceptibility to spray drift is unavoidable.

In 1999 we greatly increased the acreage of Canada thistle that we mowed and then fall sprayed; mainly because our infestations had grown too large to be effective with ATV's, and we had additional complaints by private landowners and weed boards. We used three tractor mowers to mow infestations from late July until early September to set up for a fall chemical application. We then fall sprayed these areas with the herbicide curtail. This method is widely accepted to be the most effective control method for Canada thistle.

To try to keep up with our growing Canada thistle problem we will have to increase the acres we boom spray. In 1999 we updated our equipment with a new sprayer and we plan to purchase another boom sprayer during the winter of 2000. We currently have approval to use the chemicals Curtail and 2,4-D. I propose that we also be able to use the chemical Tordon tank mixed with 2,4-D on an estimated 200 acres. The use of this chemical will be limited to high and dry upland sites well away from water. Curtail will remain our primary chemical, but in certain areas we may be able to use Tordon which has proven very effective on Canada thistles according to studies completed by South Dakota State University. Also, in some cases we may contract with local weedboards who generally prefer to use Tordon/2,4-D.

✓ Sand Lake has made numerous introductions of Canada thistle specific insects for the bio-control of this weed (17 sites on the refuge and 34 on the WMD). Introduced species include *Urophora cardui*, *Larinus planus*, and *Ceutorhynchus litura*. In some cases they have overwintered, but we have no knowledge of these insects expanding much beyond their original release sites. However, not all of the release sites have been closely monitored. We are waiting and willing to try any new agents that may offer some promise of control. We will continue to monitor these release sites and do additional introductions if these or any new species show promise.

#### Leafy Spurge

Sand Lake has been able to complete chemical control on most known infestations in the Complex. Sand Lake does not have large, heavy infestations of this weed (approximately 100 acres scattered in numerous locations). For this program we have approval to use Tordon/2,4-D to spot spray known infestations. We have been able to slow the spread of this species, but new infestation sites are found each year. We hope that our spraying program will suppress this weed until introduced insects can control this species.



We have actively introduced insects for the bio-control of leafy spurge and they have successfully become established in several areas (flea beetle species). Our staff has been able to capture enough insects for our needs and they have been introduced to most leafy spurge concentrations in the Complex. It is our hope that we will be able to discontinue the use of herbicides for the control of leafy spurge in the near future.

We will continue a program using the herbicides Tordon and 2,4-D to slow the spread of leafy spurge. We will actively continue releasing flea beetle species if they are available for collection by our staff.

#### Wormwood Sage

Wormwood sage continues its expansion in our grasslands primarily in areas of DNC. It occupies high, dry upland sites and may be very scattered. We have not put much effort on its control because large areas will have to be sprayed. However, it is a growing problem and more emphasis will have to be placed on controlling this species. The chemicals curtail and 2,4-D will be applied in the spring with boom sprayers where this species is becoming a problem.

Prescribed burning may be used to control wormwood sage if the timing of a burn is right. This tool will be used when conditions permit. However, annual burns may be needed to eradicate this species which conflicts with our objectives for nesting migratory birds.

Grazing and prescribed burning will both be used to remove cover on grasslands prior to herbicide treatments. However, both management techniques encourage the growth of legumes in tame seedings which improves the quality of nesting habitat. A herbicide application will destroy these legumes. Chemicals will only be used in the worst infestations.

Numerous other species of noxious weeds exist within this complex. Control of these species is generally limited to initiating control when we receive complaints. However, known species such as musk thistle that have the potential to provide serious problems will be controlled as discovered.

During the mid term, we plan to continue with our stated objective using an integrated approach and spraying as little as possible to accomplish our force account weed control program.

#### COOPERATIVE FARMING PROGRAM

The other part of Sand Lake's weed control effort relates to the cooperative farming program on the Sand Lake Refuge. Sand Lake currently conducts a farming program on 1300 acres with 9 cooperative farmers. We have been cognizant of the need to reduce chemicals associated with the farming program and to implement farming practices which will result in the need for less chemicals. Rotations are followed and field sizes are maintained at a maximum of 20 rods to reduce wind erosion to our sandy soils on the east side of the James River. No insecticides are allowed or needed because we rotate crops.

combination  
to what is  
stated on  
last page.



The objectives of the Sand Lake farm program have been changing with less emphasis placed on providing food for migratory birds. Providing food to benefit the current high population of snow geese is no longer an objective. However, Sand Lake has a long history of complaints from neighboring landowners about whitetail deer depredations to adjacent cropland. It is our responsibility to maintain food plots as a buffer where depredations are a problem.

A rotation of corn and spring wheat or soybeans is the principle rotation used in the Sand Lake farming program. Cooperators get 100% of the wheat or soybeans and a percentage of the corn. Our share is generally corn left standing in traditional depredation problem areas or important resident wildlife wintering areas. Other crops that may be planted in this rotation include millet, sweetclover, sorghum, or alfalfa. We prefer that our cooperators use a tank mix of Accent/Banvel on corn. Accent is a post-emergent herbicide for grass control and Banvel is needed to control broadleaves, especially Canada thistle. The herbicide 2,4-D is not generally recommended for modern corn hybrids. Banvel or 2,4-D is used on wheat, but our cooperators have requested the use of the herbicide Tiller which is a post-emergent grass herbicide. There are a number of reasons for our proposal to use Tiller. Some of our cooperators are moving to planting wheat no-till which will benefit our farming program. This requires an additional herbicide to control grass species. The most commonly used method is to plow/plant in one operation. During years of above normal precipitation, a herbicide is needed to control pigeon grass for all wheat seedings. It is estimated that Tiller tank mixed with Banvel will be sprayed on up to 200 acres per year.

Sand Lake is in the process of converting crop land used to meet migratory bird objectives to seeded native or tame grasses for upland nesting cover. This is a gradual project as we work with cooperators to prepare seedbeds and slowly reduce their dependence on the refuge as part of their operation. To establish suitable seedbeds we generally seed into soybean or wheat stubble. This commonly used method requires an application of roundup herbicide prior to seeding to kill volunteer grasses and broadleaves. We have used this method to newly establish several hundred acres of native grassland. Roundup is also used on roundup-ready soybeans and corn. The chemical roundup is used in place of other chemicals, which should result in less residual chemical in the soil. Roundup may be used on up to approximately 700 acres of rowcrops.

All of the refuge's share of the crops (either corn or millet) is left standing in the field prohibiting any fall tillage. The entire east side of the refuge (approximately 75% of our crop fields) is on highly erodible land and must be farmed under a conservation plan. These plans authorize only light fall tillage which also reduces our non-chemical weed control ability. If chemicals are reduced, tillage must increase to control annual and perennial weeds. Canada thistles have pioneered and prospered along most of the wetland areas on the refuge. With this available seed source, Canada thistles continuously spread to adjacent crop fields. Mechanical tillage does more to spread the problem than to control it. As a result, chemical control is required to control Canada thistle.

Mechanical tillage has been emphasized as a method to reduce chemical usage in our farming program. In most cases our farmers have kept up with advances in modern agricultural. They have abandoned their dependance on mechanical weed

control in favor of larger row cropping implements to remain competitive in the modern market place. An increased dependency on chemicals is a result and mechanical tillage is not as feasible.

We will continue to reduce our chemical use in the farming program in the short term by reducing the number of acres farmed. We will also continue to evaluate other chemicals that come on the market to make a change to more environmental friendly chemicals if possible.

#### PROPOSAL FOR THE TERM OF THIS PLAN

Force Account Weed Control - We propose to continue an integrated program of pest management using mowing, livestock grazing, prescribed burning, the release of biological control agents, and spraying of approved chemicals when necessary.

We propose to continue to use the following chemicals for our force account weed spraying program:

Curtail - for the spot and boom spraying of Canada thistle and Canada thistle

Tordon/2,4-D - for the spraying of leafy spurge and Canada thistle

Roundup - for weed control in seedbeds prior to seeding native grasses.

2,4-D - may occasionally be used for the suppression of Canada thistle, leafy spurge, and wormwood sage

#### Cooperative Farming Program

Accent - Will be used for the post emergent control of grass in corn. Cooperators are happy with the results they have received with this chemical and most get good control with only 1/3 ounce/acre.

Banvel - Will be used for the control of Canada thistle in all small grain and row crops. This chemical is relatively cheap and is the only practical chemical to tank mix with accent to control Canada thistle.

2,4-D - This chemical can be used on small grains for the control of broadleaf weeds. It is not labeled for corn.

Roundup - This chemical is used by cooperative farmers to spot spray quack grass in farm fields and for the control of broadleaf and grass species in corn and soybeans.



Tiller - This chemical will be used to control grass species in spring wheat. It will be tank mixed with low rates of Banvel for both grass/broadleaf control.

We plan to continue the concepts of sustainable agriculture with long term crop rotations, tillage, and occasional alfalfa seedings in the rotations to reduce herbicide use.

Long term plans include a reduction in the number of acres farmed on the refuge primarily due to changing migratory bird patterns. This, combined with controlling the white-tailed deer population at objective levels, will reduce our long term need for row crops and thus chemical use on the refuge.

As stated earlier, we will continue a strong effort to reduce herbicide use. During the term of this plan, we propose the use of modest amounts of herbicide to maintain the quality of our crops and cooperator interest in farming on Sand Lake.

Submitted by: \_\_\_\_\_  
Date

Approved by: \_\_\_\_\_  
Date

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Date