2003 Weed Management

Annual Report

December 2003

Ministry of Water, Land and Air Protection
Okanagan Region
Provincial Parks, Protected Areas and Ecological Reserves

Summary

Weed management projects were completed on Ministry of Water, Land and Air Protection (MWLAP), Okanagan Region, provincial parks, protected areas and ecological reserves as well as Nature Trust of British Columbia (BC) lease-back lands. These projects included weed inventory and control (cultural, biological and chemical). All weed management projects were completed under Weed Management Plan #671-0003-2002/2007 and met criteria outlined in PENWEED Weed Inventory Systems documents. All weed inventory and control forms were entered into the PENWEED database and digitised into ArcView GIS.

Inventory was completed on approximately 32 hectares. Mechanical treatment was completed on approximately 16 hectares. *Mecinus janthinus* biological control agents were released on provincial parks, protected areas and ecological reserves. Chemical treatments were completed on 2.5 hectares. In total, 3.4 litres of chemical was applied (3.0 litres of Tordon 22K and 0.4 litres of Roundup); therefore, 0.86 kilograms of active ingredient (0.718 kilograms of picloram and 0.142 kilograms of glyphosate) was applied.

Recommendations for 2004 weed management projects are provided based on observations and events, which occurred during the 2003 season as well as historical treatment data. Historical treatment data (prior to 2003) entered into PENWEED© was analysed to assess control effectiveness and assist in 2004 weed management recommendations.

In total, the cost estimate for the Okanagan Region's 2004 weed program is $57,185.00.

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1.0 2003 Weed Management Overview

Weed management projects were completed on Ministry of Water, Land and Air Protection (MWLAP), Okanagan Region, provincial parks, protected areas and ecological reserves as well as Nature Trust of British Columbia (BC) lease-back lands[1]. These projects included weed inventory and control (cultural, biological and chemical). All weed management projects were completed under Weed Management Plan #671-0003-2002/2007 and met criteria outlined in PENWEED Weed Inventory Systems documents. All weed inventory and control forms were entered into the PENWEED database and digitised into ArcView GIS.

2.0 2003 Weed Management Team

The Nature Trust of BC's summer crew, in co-ordination with MWLAP, completed mechanical control and inventory projects on MWLAP provincial parks, protected areas and ecological reserves as well as Nature Trust of BC lands.

Inventory, chemical control, biological control and mechanical control projects were identified and co-ordinated by Carl MacNaughton, Aaron Grant and Crystal Klym representing the Nature Trust of BC, Judy Millar representing MWLAP and Lisa Scott representing ECO-Matters Consulting. Additional MWLAP Park Rangers and Area Supervisors were involved in site visits, chemical control monitoring and biological control agent collection and releases on provincial parks, protected areas and ecological reserves. DJ Silviculture completed chemical control treatments for both the Nature Trust of BC and MWLAP.

3.0 2003 Inventory

Inventory on Nature Trust of BC lands and provincial parks, protected areas and ecological reserves met PENWEED Weed Inventory Systems criteria and was in compliance with Weed Management Plan #671-0003-2002/2007. Weed Inventory Forms were provided to, and completed by, all participants.

[1] Will be referred to solely as "lands" for the duration of the Annual Report.

Table 1: 2003 PP/PA/ER Inventory and Prescriptions

PP/PA/ER	Surveyor(s)	Date	Weed Species	Prescription
South Okanagan Grasslands PA (Chopaka West)	Nature Trust of BC's Crew	17/06/2003	No weed infestations found	None
South Okanagan Grasslands PA (Kilpoola North)	Judy Millar and Crystal Klym	25/04/2003	Sulfur cinquefoil observed	Spot-spray (backpack) sulfur cinquefoil with Tordon 22K
Okanagan Mountain PP	Nature Trust of BC's Crew	29/07/2003	Canada thistle, tansy ragwort and oxeye daisy were inventoried	None
Trout Creek ER	Nature Trust of BC's Crew	27/06/2003	Dalmatian toadflax and sulfur cinquefoil were inventoried	None
White Lake Grasslands PA (McIntyre Bluff area)	Carl MacNaughton, Crystal Klym, Judy Millar, Rose Gunoff and Rob Stewart	07/05/2003	Sulfur cinquefoil, Dalmatian toadflax, Russian knapweed, hound's tongue and diffuse knapweed were inventoried	Spot-spray sulfur cinquefoil with Tordon 22K
White Lake Grasslands PA White Lake to Kearns Creek	Nature Trust of BC's Crew	06/06/2003	Hound's tongue, Dalmatian toadflax and sulfur cinquefoil were inventoried	Mechanical control
Vaseux PP	Judy Millar, Rose Gunoff and Crystal Klym	09/04/2003	Weeds were in rosette stage and it was recommended that the site be revisited	Mechanical control
Vaseux PP	Nature Trust of BC's Crew	23/05/2003	Hound's tongue, Dalmatian toadflax, sulfur cinquefoil, diffuse knapweed and purple loosestrife were inventoried	Mechanical control
Vaseux PA (Dutton Creek area)	Judy Millar, Rose Gunoff, Marty Cancilla and Crystal Klym	04/06/2003	Sulfur cinquefoil was inventoried	Spot-spray sulfur cinquefoil with Tordon 22K
Inkaneep PP	Judy Millar, Rose Gunoff and Crystal Klym	09/04/2003	Hound's tongue and diffuse knapweed observed	Wipe-on Roundup application
Ellison PP	Judy Millar and Crystal Klym	05/06/2003	Sulfur cinquefoil, hound's tongue and diffuse knapweed were inventoried along access roads	Spot-spray SC along trail and old access road
Kettle River PP	Judy Millar and Crystal Klym	01/05/2003	Common anchusa, diffuse knapweed, spotted knapweed, St. John's-wort, hound's tongue and sulfur cinquefoil were observed	Hand-pull hound's tongue Spot-spray anchusa with Grazon Spot-spray sulfur cinquefoil on KVR
Boundary Creek PP	Judy Millar and Crystal Klym	01/05/2003	Diffuse knapweed, spotted knapweed and hound's tongue were observed throughout the campground	Spot-spray spotted knapweed and hound's tongue with Tordon (20m riparian buffer)
Johnstone Creek PP	Judy Millar and Crystal Klym	01/05/2003	Spotted knapweed (biological control agents present), diffuse knapweed, hound's tongue and bull thistle were observed	Weed whack in between campsites Burn and seed open fields at east entrance in spring 2004
Mahoney Lake ER	Judy Millar, Rose Gunoff and Crystal Klym	09/04/2003	Dalmatian toadflax, hound's tongue, sulfur cinquefoil, diffuse knapweed and Canada thistle were observed.	Hand-pull around lake
Campbell-Brown ER	Crystal Klym	26/06/2003	Small, isolated infestations of sulfur cinquefoil were inventoried in the south east corner	Spot-spray sulfur cinquefoil
Kekuli Bay PP	Judy Millar, Greg Betz and Crystal Klym	08/05/2003	Large infestations of Dalmatian toadflax and sulfur cinquefoil were observed throughout the park	Weed whack Canada thistle along riparian (host site to highway) and southwest boundary to 2m Spot-spray trail with Round-up Apply Tordon 22K to 1m on either side of trail Spot-spray sulfur cinquefoil and Dalmatian toadflax with Tordon (identified areas - biocontrol present)
Sun-Oka Beach	Judy Millar, Blake Dixon and Crystal Klym	06/05/2003	Mechanical control of baby's breath in 2002 was observed to be effective	Hand-dig baby's breath (repeat 2002 treatment)
Okanagan Lake PP	Judy Millar, Blake Dixon and Crystal Klym	06/05/2003	Minimal weeds were observed	Hand-pull hound's tongue, Dalmatian toadflax and diffuse knapweed
Kalamalka Lake PP	Judy Millar, Greg Betz and Crystal Klym	08/05/2003	Large, dense sulfur cinquefoil and St. John's-wort infestations and smaller, well-spaced infestations of Dalmatian toadflax were observed	Friends of Kal Lake to hand-pull St. John's-wort
Fintry PP	Judy Millar and Crystal Klym	06/05/2003	Abundant weed species observed along access roads and group site	Spot-spray Round-up along all roads and trails Spot-spray campion with Roundup around Group Site (seed) Mow pastures
Bear Creek PP	Judy Millar and Crystal Klym	06/05/2003	Spot-treatments of sulfur cinquefoil with Tordon 22K along the hiking trail were recommended	Spot-spray sulfur cinquefoil along trail with Tordon 22K

Table 2: 2003 Nature Trust of BC Inventory and Prescriptions

NT Land	Surveyor(s)	Date	Weed Species	Prescription
Vaseux Farms	Nature Trust of BC's Crew	29/05/2003	Dalmatian toadflax and sulfur cinquefoil were inventoried	Mechanical control
Schneider	Nature Trust of BC's Crew	24/06/2003	Sulfur cinquefoil was inventoried	Mechanical and chemical control
Emery	Nature Trust of BC's Crew	19/06/2003	Dalmatian toadflax and sulfur cinquefoil were inventoried	Mechanical control
White Lake Ranch area	Nature Trust of BC's Crew	04/06/2003	Hoary cress	Mechanical control
White Lake area	Nature Trust of BC's Crew	30/05/2003	Hound's tongue, sulfur cinquefoil, Canada thistle and hoary cress were inventoried	Mechanical control
Skaha Eastside	Nature Trust of BC's Crew	28/05/2003	Dalmatian toadflax, sulfur cinquefoil and burdock were inventoried	Mechanical control
Wainwright	Nature Trust of BC's Crew	18/06/2003	Dalmatian toadflax, hound's tongue and burdock were inventoried	Mechancial control
Kilpoola.	Nature Trust of BC's Crew	13/06/2003	Dalmatian toadflax, hound's tongue and sulfur cinquefoil	Mechanical control

Approximately 32 hectares was inventoried on provincial parks, protected areas, ecological reserves and Nature Trust of BC lands. All Weed Inventory Forms submitted to MWLAP were entered into the PENWEED© Weed Inventory System database and digitised into ArcView GIS for subsequent weed management planning and monitoring.

4.0 2003 Treatments

Biological control, mechanical control and chemical control treatments were conducted on inventoried provincial parks, protected areas, ecological reserves and Nature Trust of BC lands.

4.1 Biological Control

Mecinus janthinus biological control agents were released in Kekuli Provincial Park, Campbell-Brown Ecological Reserve, Hayne's Point Provincial Park, White Lake Grasslands Protected Area and Kalamalka Lake Provincial Park.

Table 3: 2003 Biological Control Releases

Biological Control Agent Name	Target Weed	PP/PA/ER	Release Quantity
Mecinus janthinus	Dalamatian toadflax	Kekuli PP	700
Mecinus janthinus	Dalamatian toadflax	Campbell-Brown ER	400
Mecinus janthinus	Dalamatian toadflax	Hayne's Point PP	100
Mecinus janthinus	Dalamatian toadflax	White Lake Grasslands PA	100
Mecinus janthinus	Dalamatian toadflax	Kalamalka Lake PP	200
Total Quantity Released			**1500**

In total, 1500 *Mecinus janthinus* biological control agents were released.

Expanding the Okanagan Region's biological control program, to include the release of other biological control agents, is recommended. Area and weed species (Canada thistle, purple loosestrife and Dalmatian toadflax) specific release requests are detailed in Section 5.0 of this Annual Report.

4.2 Mechanical Control

Mechanical control treatments were completed by the Nature Trust of BC's summer crew are outlined in the following table:

Table 4: 2003 Mechanical Control

Method	Target Weed	PP/PA/ER	NT Land
Hand pulling	Diffuse Knapweed	Hayne's Point PP	
	Dalmatian Toadflax		
Cutting	Canada Thistle		
Hand digging	Baby's Breath		
Hand digging	Baby's Breath	Sun-Oka PP	
Hand pulling	Sulphur cinquefoil	Trout Creek ER	
Hand pulling	Sulphur cinquefoil	South Okanagan Grasslands PA (Kilpoola North)	
Hand pulling	Hound's tongue	Vaseux PP	
	Sulphur cinquefoil		
	Dalmatian Toadflax		
Hand pulling	Sulphur cinquefoil	Vaseux PA (Dutton Creek area)	
Hand pulling	Sulphur cinquefoil	Kettle River PP	
Hand pulling	Dalmatian Toadflax	White Lake Grasslands PA	
	Hound's tongue		
Hand pulling	Hound's tongue	Mahoney Lake ER	
	Dalmatian Toadflax		
Hand pulling	Dalmatian Toadflax		Vaseux Farms
	Hound's tongue		
Hand pulling	Sulphur cinquefoil		Emery
	Dalmatian Toadflax		
Hand pulling	Hound's tongue		White Lake
	Sulphur cinquefoil		
	Dalmatian Toadflax		
Cutting	Hoary cress		White Lake
Hand pulling	Dalmatian Toadflax		Skaha Eastside
	Sulphur cinquefoil		
	Burdock		
Hand pulling	Dalmatian Toadflax		Wainwright
	Hound's tongue		
	Burdock		
Hand pulling	Hound's tongue		Kilpoola
	Sulphur cinquefoil		

Approximately 16 hectares were mechanically treated on provincial parks, protected areas, ecological reserves and Nature Trust of BC lands.

4.3 Chemical Control

Chemical control treatments were completed on Inkaneep PP, White Lake Grasslands PA, South Okanagan Grasslands PA, Bear Creek PP and Ellison PP as well as the Nature Trust of BC's Schneider property.

Table 5: 2003 Chemical Treatments

Product Name	Pesticide (AI)	Target Weed Species	Total Chemical Used (L)	Application Rate (L chemical/ha)	Quantity of AI Used (Kg)	Area Treated (ha.)	Date	Location of Treatment
Tordon	picloram	Sulphur cinquefoil	0.459 L	1.125	0.110	0.4 ha.	16/06/2003	Mahoney Lake Area - Dam (WLGL-PA)
Tordon	picloram	Sulphur cinquefoil	0.169 L	1.125	0.041	0.2 ha.	16/06/2003	White Lake Area (Observatory) Mahoney Lake Area (WLGL-PA)
Tordon	picloram	Sulphur cinquefoil	0.230 L	1.125	0.055	0.2 ha.	17/06/2003	Kilpoola (SOG-PA)
Tordon	picloram	Sulphur cinquefoil	0.080 L	1.125	0.019	0.1 ha.	17/06/2003	Mahoney Lake Area - Dam (WLGL-PA)
Tordon	picloram	Sulphur cinquefoil	0.056 L	1.125	0.013	0.0 ha.	17/06/2003	Mahoney Lake Area (WLGL-PA)
Tordon	picloram	Sulphur cinquefoil	0.070 L	1.125	0.017	0.1 ha.	17/06/2003	Mahoney Lake Area (WLGL-PA)
Tordon	picloram	Sulphur cinquefoil	0.126 L	1.125	0.030	0.1 ha.	18/06/2003	Lot 106 (Adjacent to Mike Seral's private property) (WLGL-PA)
Tordon	picloram	Hound's tongue		4.500				
Tordon	picloram	Dalmatian toadflax		4.500				
Tordon	picloram	Diffuse knapweed		2.250				
Tordon	picloram	Dalmatian toadflax	0.291 L	4.500	0.070	0.1 ha.	19/06/2003	White Lake Ponds and Area (WLGL-PA)
Tordon	picloram	Sulphur cinquefoil	0.106 L	1.125	0.025	0.1 ha.	19/06/2003	White Lake Ponds and Area (WLGL-PA)
Roundup	glyphosate	Hound's tongue Diffuse knapweed	0.400 L	6.000	0.142	0.1 ha.	30/06/2003	Inkaneep PP
Tordon	picloram	Sulphur cinquefoil	0.084 L	1.120	0.020	0.1 ha.	07/07/2003	Bear Creek PP
Tordon	picloram	Sulphur cinquefoil	0.098 L	1.120	0.024	0.1 ha.	08/07/2003	Ellison PP
Tordon	picloram	Sulphur cinquefoil	0.534 L	1.125	0.128	0.5 ha.	18/06/2003	Schneider (Nature Trust Land)
Tordon	picloram	Sulphur cinquefoil	0.138 L	1.125	0.033	0.1 ha.	18/06/2003	Schneider (Nature Trust Land)
Tordon	picloram	Sulphur cinquefoil	0.506 L	1.125	0.121	0.4 ha.	19/06/2003	Schneider (Nature Trust Land)
Tordon	picloram	Sulphur cinquefoil	0.028 L	1.125	0.007	0.0 ha.	19/06/2003	Schneider (Nature Trust Land)
Total			**3.4 L**		**0.86**	**2.5 ha.**		

*WLGL-PA = White Lake Grasslands PA
SOG-PA = South Okanagan Grasslands PA

Chemical treatments were completed on 2.5 hectares. In total, 3.4 litres of chemical was applied (3.0 litres of Tordon 22K and 0.4 litres of Roundup); therefore, 0.86 kilograms of active ingredient (0.718 kilograms of picloram and 0.142 kilograms of glyphosate) was applied.

5.0 2004 Weed Management Recommendations

Recommendations for 2004 weed management projects are provided based on observations and events, which occurred during the 2003 season as well as historical treatment data. Historical treatment data (prior to 2003) entered into PENWEED© was analysed to assess treatment effectiveness and assist in 2004 weed management recommendations. These assessments assisted in recommendations; however, due to the lack of permanent monitoring plots and annual site monitoring, these assessments may have to be updated in 2004 pending onsite monitoring and subsequent treatments.

Provincial parks, protected areas and ecological reserves are grouped as either Priority 1 (high) or Priority 2 (moderate). These classifications were previously used by the Okanagan Region in 2003; however, are subject to change as necessary.

5.1 Priority 1 PP/PA/ER

Bear Creek PP[*]

Spot-treatment of sulphur cinquefoil with Tordon 22K along the hiking trail was completed in 2003. It is recommended that additional chemical control and inventory be completed on these sites in 2004. Currently, sulphur cinquefoil infestations are restricted to the trail right-of-way and disturbed areas.

Boundary Creek PP

Hound's tongue was mechanically controlled in 2000. Diffuse knapweed, spotted knapweed and hound's tongue were observed throughout the campground in 2003. Mechanical control (dig and bag) of hound's tongue and biological control of diffuse and spotted knapweed is recommended in 2004. Chemical control (spot-treatment with Tordon 22K) is an option if co-ordinated with the Ministry of Transportation.

Campbell-Brown ER

Four releases (200 agents per release) of *Mecinus janthinus* were released on Dalmatian toadflax in 2002. One release (400 agents) of *Mecinus janthinus* was released on Dalmatian toadflax in 2003. Small, isolated infestations of sulphur cinquefoil were inventoried in 2003. A thorough inventory and subsequent chemical control is recommended for sulphur cinquefoil throughout the protected area.

Cathedral PP

Inventory and mechanical control of all weed species is recommended for Buckhorn Campground, Ewert Campground and Lakeview Campground, as well as main access trails, in 2004.

Ellison PP*

Sulphur cinquefoil, hound's tongue and diffuse knapweed was inventoried in 2003 along two abandoned access roads. Chemical control was completed in 2003. It is recommended that a thorough inventory and additional chemical treatments be completed in 2004.

Field's Lease ER

Mechanical and chemical control of Dalmatian toadflax was completed in 2000. Russian thistle, Canada thistle, hound's tongue, diffuse knapweed and Dalmatian toadflax were inventoried in 2000. It is recommended that this site be visited to assess its suitability for biological control in 2004 for Dalmatian toadflax.

[*] Historical treatment data is absent; therefore, either no treatments have been performed prior to 2003 or the treatment information is not available.

Fintry PP
Mechanical control of diffuse knapweed, sulphur cinquefoil and Dalmation toadflax was completed in 2002 along the main trail and trailhead parking area. Chemical control of diffuse knapweed, spotted knapweed, sulphur cinquefoil and Dalmatian toadflax was completed in 2002 throughout the campsites and main access roads. Two releases of *Mecinus janthinus* (200 agents per release) were released on Dalmatian toadflax in 2002. It is recommended that all roads and trails are spot-treated with Roundup in 2004. Spot-treatment of Roundup at the Group Site is also recommended in 2004.

Hayne's Lease ER
Mechanical control of diffuse knapweed, Russian thistle and Dalmatian toadflax was completed in 2000. Mechanical control was repeated for Dalmatian toadflax in 2002; however, was not a suitable control method due to infestation size and density. Nine releases of *Mecinus janthinus* (200 agents per release) were released on Dalmatian toadflax in 2002. It is recommended that this site be visited to assess its suitability for additional biological control in 2004 for Dalmatian toadflax.

Hayne's Point PP
Chemical control of diffuse knapweed and Canada thistle was completed in 2000; however, Canada thistle populations have increased in size and density. Mechanical control was completed around the campsites and boardwalk in 2003 for all weed species where appropriate. One release of *Mecinus janthinus* was released on Dalmatian toadflax in 2003. Additional mechanical control is recommended in 2004 on all weed species particularly baby's breath. Biological control is recommended for Canada thistle and purple loosestrife that is located near the boardwalk and wetland area.

Inkaneep PP
Chemical control was completed along the dyke and throughout the campground on diffuse knapweed, Dalmatian toadflax, hound's tongue and burdock in 2000. Chemical and mechanical control was completed east of Tuc-el-Nuit Road on Dalmatian toadflax in 2000; however, this treatment appeared to have been ineffective as eight releases (200 agents per release) of *Mecinus janthinus* were released on Dalmatian toadflax in 2002. Chemical control (wipe-on Roundup) on hound's tongue and diffuse knapweed rosettes was completed in 2003 on the dyke area (Appendix 4). The treatment appeared to be successful; however, additional hound's tongue rosettes were observed following the 2003 treatment. Mature diffuse knapweed plants appear to be successfully under biological control as abundant *Larinus minutus* weevils were observed on the seed heads. It is recommended hound's tongue be chemically treated again in 2004. Also, additional treatments may be required in the campsite area. Biological control is recommended for Canada thistle infestations along the dyke.

Johnstone Creek PP*
Spotted knapweed (biological control agents present), diffuse knapweed, hound's tongue and bull thistle were observed in 2003. Mechanical control (weed whack) is recommended, in conjunction with cultural control (controlled burn and seed), in between campsites.

Kalamalka Lake PP
Chemical control of sulphur cinquefoil was completed in 2002; however, large, dense sulphur cinquefoil infestations were observed in 2003. Smaller, well-spaced infestations of Dalmation toadflax were observed. Two releases of *Mecinus janthinus* were released on Dalmatian toadflax in 2003; however, it is recommended that additional agents be released in 2004. The Friends of Kal Lake group may volunteer to mechanically control St. John's-wort infestations.

Kekuli Bay PP
Chemical control of burdock, Canada thistle, hound's tongue and Dalmatian toadflax was completed in 2002. Eight releases (200 agents per release) of *Mecinus janthinus* were released on Dalmatian toadflax in 2002. Three releases of *Mecinus janthinus* (totalling 700 agents) were released on Dalmatian toadflax in 2003. Large infestations of Dalmatian toadflax and sulphur cinquefoil were observed throughout the park in 2003. It is recommended that hiking trails be spot-treated with Roundup (to 1 meter on either side of the trail) for all weed species in 2004. Additional biological control releases are recommended for Dalmatian toadflax infestations in 2004. A combination of mechanical control and biological control is recommended for Canada thistle infestations in 2004 where chemical control is not appropriate.

Kettle River PP
Mechanical control was completed on common anchusa in 2000. Three releases (200 agents per release) of *Mecinus janthinus* were released on Dalmatian toadflax in 2002. Common anchusa, diffuse knapweed, spotted knapweed, St. John's-wort, hound's tongue and sulphur cinquefoil were observed in 2003. Chemical treatment of sulphur cinquefoil and biological control of Dalmation toadflax, which is located along the Kettle Valley Railway, is recommended in 2004.

Mahoney Lake ER
Mechanical control of Dalmatian toadflax and chemical control of diffuse knapweed was completed in 2000. Mechanical control of diffuse knapweed and hound's tongue was completed in 2002. Dalmatian toadflax, hound's tongue, sulphur cinquefoil, diffuse knapweed and Canada thistle were observed in 2003. Mechanical control was completed on hound's tongue in 2003 and it is recommended that follow-up treatments occur in 2004. Repeated mechanical control of hound's tongue has appeared to be successful when assessed in 2003. Two releases (200 agents per release) of *Mecinus janthinus* were released on Dalmatian toadflax in 2002.

Myra Bellevue PA
Currently, no inventory exits for this area; therefore, it is recommended that this area be assessed in 2004. Do to the recent Okanagan Mountain forest fire, new inventories will have to be completed for areas of potential weed infestation for the majority of the park. Areas of focus include, but are not limited to, utility corridors, firebreaks and access roads.

Okanagan Lake PP
Chemical control of diffuse knapweed, hound's tongue, Dalmatian toadflax and Canada thistle was completed in 2002 on the eastside of Highway 97. Mechanical control of hound's tongue, Dalmatian toadflax and diffuse knapweed is recommended in 2004 along trails and high use areas. Areas affected by Highway 97 construction should monitored for weed infestation establishment.

Okanagan Mountain PP
Mechanical control was completed on tansy ragwort in 2002. Canada thistle, tansy ragwort and oxeye daisy were inventoried (not treated) in 2003. Do to the recent Okanagan Mountain forest fire, new inventories will have to be completed for the majority of the park including the areas inventoried in 2003. Areas of focus include, but are not limited to, utility corridors, firebreaks and access roads.

South Okanagan Grasslands PA (Chopaka West)*
No weed infestations were observed in 2003. Follow-up monitoring is required to ensure weed species do not encroach from the Ministry of Transportation's road right-of-way are recommended in 2004.

South Okanagan Grasslands PA (Kilpoola North)*
Hound's tongue was mechanically controlled in 2003 and sulphur cinquefoil was chemically treated in 2003. Previously to 2003, mechanical and chemical treatments were not completed; however, spotted knapweed and diffuse knapweed were inventoried in 2001. Continued mechanical and chemical control is recommended in 2004, as the weed infestations are small, isolated and restricted to disturbed areas. Biological control is recommended for Canada thistle infestations located at the Western border of the protected area.

Sun-Oka Beach
Chemical control of diffuse knapweed was completed in 2000 only. Mechanical control of baby's breath along the Trout Creek River dyke, which was completed in 2002, was observed to be effective; therefore, additional treatments occurred in 2003. It is recommended that further mechanical treatments occur in 2004.

Texas Creek PP*
Biological control for spotted knapweed is recommended in 2004.

Trout Creek ER
Dalmatian toadflax and sulphur cinquefoil was inventoried in 2003. Mechanical control was completed on smaller sulphur cinquefoil infestations; however, biological control is recommended for Dalmatian toadflax. It is recommended that mechanical control continues on sulphur cinquefoil infestations in 2004 and that the success of these treatments be recorded and monitored. Three *Mecinus janthinus* releases (200 agents per release) were released in 2002; however, it is too early to assess the effectiveness of these releases.

White Lake Grasslands PA (MacDonald Dam Area)
Crystal Klym and Marty Cancilla put in chemical control monitoring photo points in the MacDonald Dam area of the White Lake Grasslands Protected Area (Appendix 3) on June 03, 2003. These photo points will be used to monitor the effectiveness of Tordon 22K applications on sulphur cinquefoil infestations, which were completed on May 14, 2002 and repeated on June 17, 2003. It is recommended that these photo points be revisited in 2004 prior to additional chemical treatments.

White Lake Grasslands PA (McIntyre Bluff Area)*
Sulphur cinquefoil, Dalmatian toadflax, Russian knapweed, hound's tongue and diffuse knapweed were inventoried in 2003. This is the first year that inventory was completed for this area by MWLAP. Chemical control is recommended in 2004 for all weeds in this area due to the small infestation sizes and risk of spread into pristine higher elevation areas. Chemical control is to be completed in co-ordination with the Nature Trust of BC and BC Hydro.

White Lake Grasslands PA (White Lake to Kearns Creek)*
Hound's tongue, Dalmatian toadflax and sulphur cinquefoil were inventoried in 2003. Biological control is recommended for larger (> 0.5 hectares) Dalmatian toadflax infestations while mechanical control is recommended for smaller (< 0.5 hectares) Dalmatian toadflax, hound's tongue and sulphur cinquefoil infestations. Areas were mechanically controlled in 2003 and it is recommended that these areas be revisited in 2004.

Vaseux PP
Chemical and mechanical control was completed on hound's tongue, diffuse knapweed and Dalmatian toadflax in 2000. Chemical control and cultural control was completed on diffuse knapweed, Dalmatian toadflax, hound's tongue and sulphur cinquefoil in 2002. Five releases (200 agents per release) of *Mecinus janthinus* were released on Dalmatian toadflax in 2002. Mechanical control was completed in 2003 on hound's tongue, Dalmatian toadflax, sulphur cinquefoil and diffuse knapweed. Biological control is recommended for purple loosestrife located in along the boardwalk. Do to the recent Vaseux forest fire, new inventories will have to be completed for the majority of the park including the areas inventoried and mechanically controlled in 2003. Biological control releases may have been lost as well.

5.2 Priority 2 PP/PA/ER

Anarchist PA*
Currently, no inventory exits for this area; therefore, it is recommended that this area be assessed in 2004. Priority should be given to this area due to the recent fire disturbance in this area and the possible opportunity for weed infestation establishment.

Bromley Rock*
Dalmatian toadflax, diffuse knapweed and spotted knapweed were inventoried in 2001. In 2002, mechanical weed whacking was performed two times to control the height and

seed production of all weed species near campsites. It is recommended that biological control agents be released for knapweed species and Dalmatian toadflax in 2004.

EC Manning PP*
Currently, no inventory exits for this area; therefore, it is recommended that this area be assessed in 2004. Observations made in 2003 by Judy Millar indicate that inventory is required on major access roads and trails within the park due to the presence of weed species.

Enderby Cliffs*
Currently, no inventory exits for this area; therefore, it is recommended that this area be assessed in 2004. Desi Cheverie observed a sulphur cinquefoil infestation in a private lot adjacent to the protected area in 2003. This infestation is of concern because a trail cuts through this lot and leads into the protected area.

Gladstone*
Currently, no inventory exits for this area; therefore, it is recommended that this area be assessed in 2004. Inventory areas of focus include trails and main access roads.

Jewel Lake*
Currently, no inventory exits for this area; therefore, it is recommended that this area be assessed in 2004.

Kentucky-Alleyne*
Currently, no inventory exits for this area; therefore, it is recommended that this area be inventoried in 2004. Observations made in 2003 by Judy Millar indicate that mechanical control may be effective on hound's tongue infestations. In 2001, 200 spotted knapweed biological control agents (*Larinus minutus*) were released; however, additional releases are recommended.

Snowy PA*
Currently, no inventory exits for this area; therefore, it is recommended that this area be assessed in 2004.

Stemwinder*
Diffuse knapweed and spotted knapweed were inventoried in 2001. In 2002, mechanical weed whacking was performed two times to control the height and seed production of all weed species near campsites. It is recommended that biological control agents be released for knapweed species.

Vaseux PA (Dutton Creek Area)*
A few isolated infestations of sulphur cinquefoil were inventoried in 2003. It is recommended that this area, as well as adjacent areas, be thoroughly inventoried in 2004. Following inventory, chemical control is recommended in 2004. Do to the recent Vaseux forest fire, new inventories will be necessary for the majority of the protected area.

Vance Creek ER*
Currently, no inventory exits for this area; therefore, it is recommended that this area be assessed in 2004.

Whipsaw Creek ER*
Currently, no inventory exits for this area; therefore, it is recommended that this area be assessed in 2004.

6.0 2004 Weed Program Cost Estimate

By completing thorough inventories on provincial parks, protected areas and ecological reserves, existing weed infestations can be monitored and controlled while potential weed infestations can be identified and prevented. Accurate inventories allow for effective and proactive weed management planning. It is critical that weed control, particularly chemical and mechanical control, be followed-up annually (if possible) to ensure control success.

Recommended weed inventory, mechanical control and chemical control projects are detailed in Appendix 6. The cost estimate to complete all identified inventory and mechanical control projects totals $29,925. This figure is based on the estimate that a field crew will cost $450.00/day, which includes four crewmembers and an appropriate transport vehicle. Priority will be given to those areas effected by the recent fire disturbances, which occurred throughout the summer of 2003, or otherwise selected by the Okanagan Region. The cost estimate to complete all identified chemical control projects is $14,260.00. This figure is based on the estimate that a field crew will cost $620.00/day, which includes crewmembers, equipment and an appropriate transport vehicle.

The cost estimate for an Okanagan Region, Weed Program Co-ordinator is $12, 000 (75 days at $160.00/day). Services provided by the Weed Program Co-ordinator will include weed inventory and control (mechanical and chemical) scheduling and monitoring, biological control agent monitoring, collection and release, weed program reporting and PENWEED© data entry.

The cost estimate for PENWEED© troubleshooting totals $1000.00. This will include any Access 97 database updates or corrections that may be required to complete data entry.

In total, the cost estimate for the Okanagan Region's 2004 weed program is $57,185.00.