King County
Noxious Weed Control Board

2005 Annual Report

King County
Department of Natural Resources and Parks

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King County
Department of Natural Resources and Parks
Water and Land Resources Division
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Earth Day, 2005: Staff and volunteers work together to remove invasive wetland weeds.

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On the cover: gorse (Ulex europaeus), a Class B noxious weed.

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LETTER FROM THE CHAIR

Thank you for taking the time to read the annual report of the King County Noxious Weed Control Program. As Chair of the Noxious Weed Control Board, one of my responsibilities is to ensure that the noxious weed program is accountable to citizens and that they are receiving value for their investment.

I believe that the program is one of the most cost-effective in the county. It has a clearly defined mission and strategy. This strategy describes program objectives, major activities and performance standards to measure success. The 2005 Annual Report clearly describes the excellent progress made over the past year towards achieving these objectives.

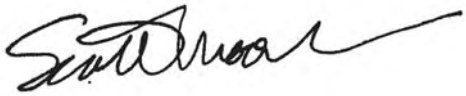
Prevention and minimization of potential impacts is one of the most important components of our noxious weed strategy. Overall, the program acts effectively as an insurance policy against the huge potential environmental economic and social costs of invasive weed species.

Large areas of the county are still heavily infested with noxious weeds and other invasive plants. Many of these have developed over a long period of time when the seriousness of this issue was less well recognized. Ignorance is no longer an acceptable excuse.

Only a well coordinated, long-term approach can have an effect on a landscape-scale problem of this nature. The King County Noxious Weed Control Program is the cornerstone of this process. To be successful, this work must engage all stakeholders, including governments, landowners, community groups and industry.

Doing nothing is making a decision to allow the problem to get worse and passing the buck to the next generation. It means leaving public and private lands in a poorer condition, less capable of producing the benefits we currently enjoy. Citizens of the county are fortunate to have this excellent program to ensure this does not occur.

Thank you for your interest and participation in this important work. Together we can make a difference.



Scott Moore

Chair
King County Noxious Weed Control Board

The Impacts of Noxious Weeds

Noxious weeds are invasive plants that can cause such significant damage, landowners are required to control or eradicate them under the Washington State Weed Law. Of the tens of thousands of introduced plant species available, only a small fraction threaten our economy, environment or public health sufficiently to achieve this status. The 2005 King County Noxious Weed List contains 111 plant species that meet these criteria (see Appendix A).

Though small in number of species, the existing or potential impacts of these weeds are huge. These impacts can be summarized as:

1) Economic impacts to agriculture: Noxious weeds reduce the productivity of agricultural lands and add additional management costs. At the national level, agricultural losses to weeds total $26.4 billion (Mack 2000, Pimental et al 2000). This figure includes significant losses in King County, one of the more agriculturally productive counties in the one of the most agriculturally productive states (USDA 2002). For example, the noxious weeds tansy ragwort (*Senecio jacobaea*) and milk thistle (*Silybum marianum*) are significantly reducing the productivity of grazing lands. In addition, King County is a point of entry for noxious weeds which have serious economic impacts in other agricultural regions of Washington state.

Rutherford Slough has been severely degraded due to noxious weeds that choke out native vegetation and damage lakeshore and wetland ecosystems.

2) Environmental impacts: Noxious and other invasive weeds also pose an extreme threat to the environmental health of natural areas in King County. They alter ecosystems through disruption of food chains, out-competing native plants and reducing habitat for native wildlife. Invasive species, including weeds, are widely recognized as having a significant negative impact on wildlife biodiversity, ranking second only to habitat destruction in threatening the extinction of endangered species (USDA Forest Service 2003). For example in King County, Japanese knotweed *(Polygonum cuspidatum)* and its hybrids and garden loosestrife *(Lysimachia vulgaris)* are degrading areas of important streamside salmon habitat.

3) Public health impacts: Many noxious weeds have toxic qualities, posing a public health threat, such as the highly toxic poison hemlock (*Conium maculatum*) and giant hogweed (*Heracleum mantegazzianum*) which has sap which causes severe burns.

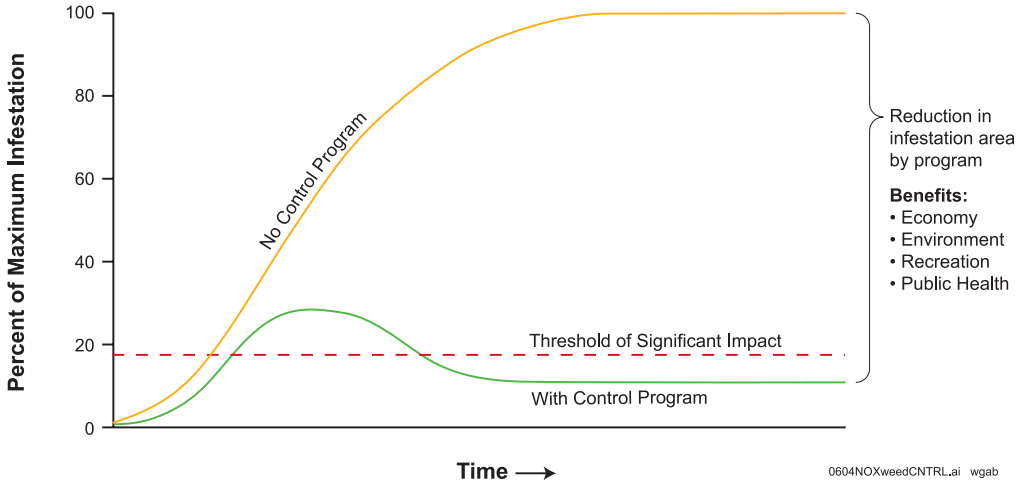
4) Recreational impacts: Other noxious weeds can significantly reduce the recreational value of public open space and aquatic areas. For example, the aquatic weeds Brazilian elodea *(Egeria densa)* and hydrilla *(Hydrilla verticillata)* can clog waterways, seriously disrupting boating and swimming.

Milk thistle (*Silybum marianum*), is a Class A weed in Washington state. Class A weeds have limited distribution; preventing new infestations and eradicating existing ones is the highest priority.

The State Weed Law (RCW 17.10) requires all landowners to eradicate Class A noxious weeds and control designated Class B and county-selected Class C noxious weeds on their properties.

The King County Noxious Weed Control Program (KCNWCP), under the direction of the King County Noxious Weed Control Board, develops and implements the county response to the serious issue of noxious weed invasion. The general effect of a successful noxious weed program over time is summarized in Figure 1. This report summarizes the program's activities in 2005, progress towards achieving its objectives and the benefits these have produced for King County citizens.

Figure 1: The Results of an Effective Noxious Weed Control Program over Time



Mission and Goals

The King County Department of Natural Resources and Parks (DNRP) has the vision of:

Sustainable and livable communities—clean and healthy natural environment.

Working towards this vision, the mission of the King County Noxious Weed Control Program is:

To reduce or prevent impacts of noxious weeds on the environment, recreation, public health and the economic resources of King County.

The program will achieve this mission by working towards the following operational goals:

1. Eradicating existing infestations and preventing new invasions of Class A noxious weeds
2. Controlling designated Class B noxious weeds to below the threshold levels of significant impacts
3. Educating the community of stakeholders about prevention and management of noxious weed infestations, and increasing participation in noxious weed control activities.

This mission and these goals were defined through the development of a strategic plan for the program under the direction of the King County Noxious Weed Control Board. This strategic plan was also used to help develop program priorities and activities in 2005 and to manage and measure its performance. This annual report describes the progress made in 2005 towards achieving these goals, mission and long-term vision.

Staff provide technical assistance and education on eradicating high priority noxious weed infestations. Seasonal weed specialist Karen Peterson (above left) oversees a garlic mustard (*Alliaria petiolata*) work party. Educational specialist Sasha Shaw (above right) gathers a sulfur cinquefoil (*Potentilla recta*) sample for a workshop.

Major Results

King County was extensively surveyed in 2005 in order to detect new weed infestations and measure changes in the extent of known infestations. Citizen and other stakeholder reports of new infestations were quickly verified. Program staff subsequently worked with the responsible landowners to achieve the required level of weed control. The effectiveness of weed control activities for each infestation were then monitored.

Eradication of Class A Noxious Weeds

There are 30 Class A noxious weeds designated for control in King County. These weeds are listed in Appendix A. Eleven of these weeds have been recorded as growing in some part of the county. The goal for these weeds is eradication of existing infestations and prevention of new invasions. The following significant progress was made in 2005 towards achieving this goal:

- *Prevented invasions of new Class A noxious weed species*

There were no invasions of new Class A noxious weed species recorded in 2005.

- *Eradicated 60% of the Class A noxious weed area found to date*

Good progress was made towards the eradication of Class A noxious weeds known to occur in the County. Sixty percent of the area of Class A weeds found since the commencement of the program has now been eradicated[1] (Figure 2). Two Class A noxious weeds (buffalobur and velvetleaf) have been eradicated from King County. Forty-one percent of Class A infestations have had no weeds present for three or more years.

- *Controlled 94% of Class A noxious weed infestations found in 2005*

There were 1091 Class A weed infestations found on parcels in King County in 2005, 94% of which were controlled[2] (Table 1). Ninety-two percent of the total area of these infestations was controlled. Of the Class A infestations found in 2005, 127 were new discoveries, including significant numbers of new garlic mustard and giant hogweed infestations in Seattle and milk thistle infestations in south King County.

[1] Based on comparing area found in 2005 with the cumulative area found since 1996.
[2] Defined as containment and prevention of seed production or propagation.

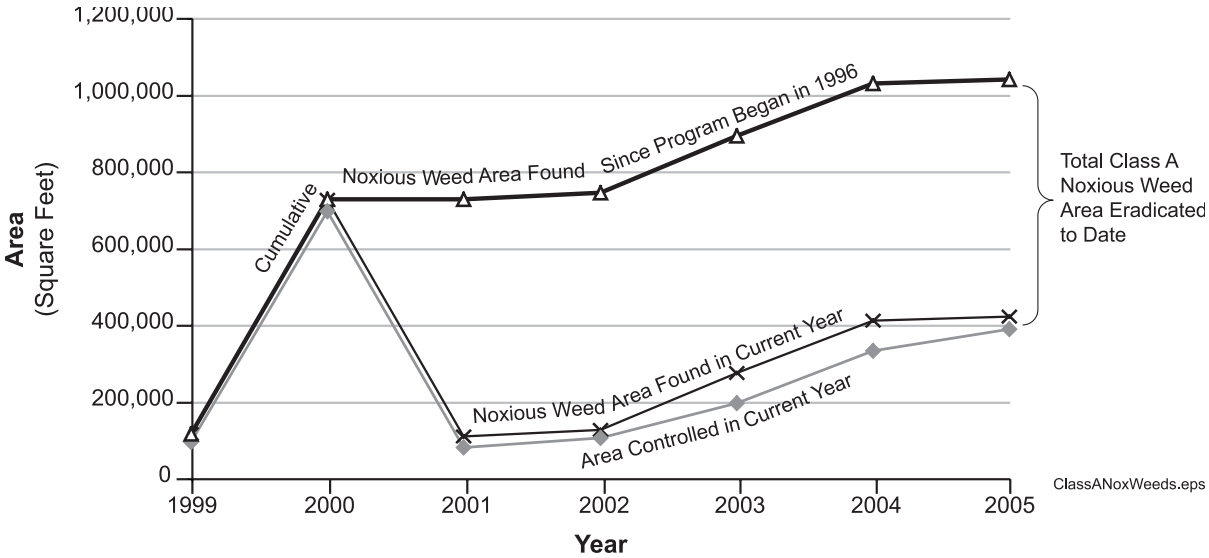
Table 1: Control of Class A Weeds on Parcels in King County 1999–2005

Class A Weeds	1999	2000	2001	2002	2003	2004	2005
Number of Infestations Surveyed	740	903	892	949	1014	897	1091
Number Controlled	661	754	796	888	904	811	1027
Percent Controlled	89%	83%	89%	94%	89%	90%	94%
Percent of Area Controlled	82%	96%	74%	83%	72%	81%	92%

The Class A weed velvetleaf (*Abutilon theophrasti*) has been eradicated from King County.

No garlic mustard (*Alliaria petiolata*) infestations were allowed to go to seed in 2005.

Figure 2: Control of Class A Weeds by Area in King County 1999–2005



Control of Designated Class B Noxious Weeds

There are 52 Class B noxious weeds designated in King County (Appendix A). The program's operational goal is to achieve control[1] of these weeds, bringing them to below the threshold levels of significant impact. The following progress was made in 2005 towards achieving this goal:

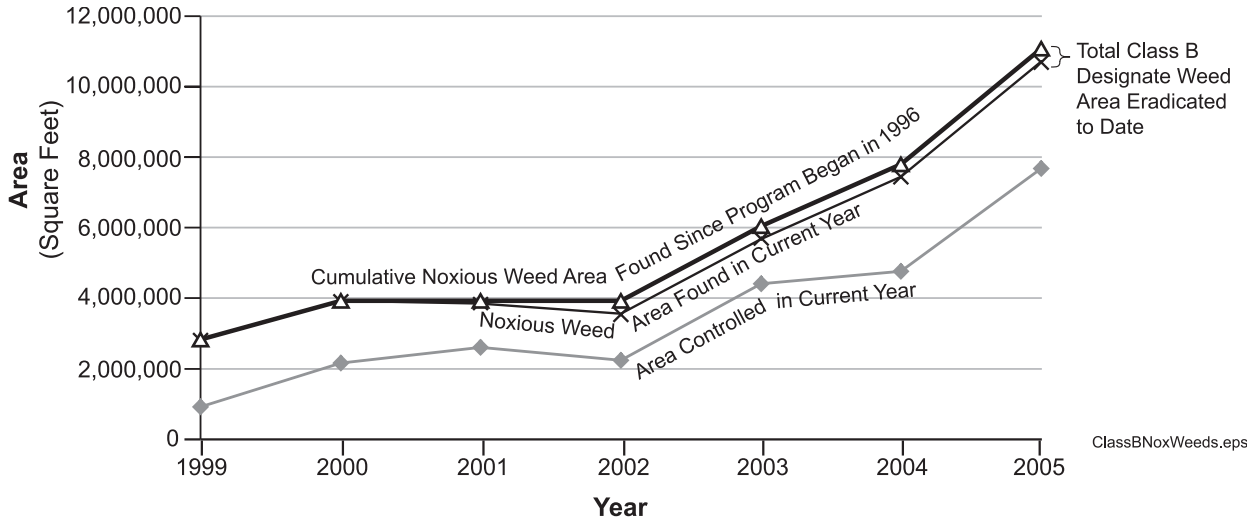
- *Eradicated 3% of the Class B noxious weed area found to date*

As the program is able to survey more properties and roads in the county each year, the area of Class B noxious weeds found continues to increase. Of the area infested by Class B noxious weeds in 2005, 17% was in new infestations. Control of seed production and containment is the overall goal for designated Class B noxious weeds, rather than eradication. To date, 3% of the area of Class B weeds found since the commencement of the program has been eradicated[2] (Figure 3).

- *Controlled 78% of designated Class B noxious weed infestations found in 2005*

Of the 3,532 designated Class B weed infestations that were found on parcels in King County in 2005, 78% were controlled. Expressed in terms of total area of infestation, 72% of the area found in 2005 was controlled (Table 2). Of the Class B weed infestations found in 2005, 548 were new discoveries. In general, for Class B noxious weed infestations found every year, the majority are controlled even though significant new areas of infestation are found each year (Table 2 and Figure 3). In 2005, a higher percentage of the large sites were controlled due to an increased focus on priority sites.

Figure 3: Control of Class B Weeds by Area in King County 1999–2005



[1] Defined as containment and prevention of seed production or propagation.
[2] Based on comparing area found in 2005 with the cumulative area found since 1996.

Citizen Participation in Weed Control and Other Major Performance Measures

Through an extensive range of education and outreach activities, the noxious weed control program seeks to increase the awareness, knowledge and participation of landholders and other stakeholders in weed management. A summary and five-year comparison of measures of landholder participation and other major performance measures is shown in Table 3. Highlights of these include:

- *Discovered 964 new noxious weed infestations in 2005*

The total number of known noxious weed infestations in King County is steadily increasing as 966 new weed infestations were discovered in 2005 (Table 3). New infestations that were most frequently identified were tansy ragwort, giant hogweed, spotted knapweed and purple loosestrife (Appendix C). This is the result of the effective, on-going weed survey effort as well as high levels of citizen reporting, participation and involvement.

Citizen participation in weed control is key to achieving the program's goals.

There are now records of 10,416 noxious weed infestations in King County (Table 3). A breakdown of these showing the number of infestations by weed species is given in Appendix B. A complete description of the number of infestations found from 1999 to 2005 for the 20 most common noxious weeds is given in Appendix G.

- *Continued high overall level of noxious weed control*

Overall, 80% of the recorded noxious weed infestations were controlled in 2005. This is similar to the high levels of control achieved in 2004 and 2003 and significantly greater than the general level of control achieved in the years prior to this (Table 3).

Table 2: Control of Class B Weeds on Parcels in King County 1999–2005

Class B Weeds	1999	2000	2001	2002	2003	2004	2005
Number of Infestations Surveyed	1425	2302	2755	2888	3876	3696	3532
Number Controlled	926	1501	2234	2046	3107	3048	2745
Percent Controlled	65%	65%	81%	71%	80%	82%	78%
Percent of Area Controlled	33%	55%	68%	63%	80%	64%	72%

Table 3: Program Performance Indicators 1999–2005

Weed Control	1999	2000	2001	2002	2003	2004	2005
Number of infestations: cumulative	3099	4655	5769	6957	8037	9634	10416
Number of infestations surveyed each year	2876	4337	4894	5191	6506	6443	6786
Percent of infestations controlled *(Control is defined as management action to prevent seeding or spread of a noxious weed)*	73%	72%	77%	72%	82%	80%	80%
Percent of infestations surveyed that were voluntarily controlled	64%	64%	69%	62%	74%	73%	71%
Percent of infestations surveyed controlled by weed program staff	8%	10%	10%	10%	10%	8%	11%
Percent of infestations surveyed controlled by enforcements	1.0%	0.0%	0.2%	0.7%	0.2%	0.0%	0.1%
Percent of infestations with no weeds seen in current year	26%	30%	38%	40%	45%	51%	39%
Number of new sites *(defined as those recorded for the first time that year)*	1091	1558	1189	1197	1081	732	966
Percent of total infestations that are new	38%	36%	24%	23%	17%	11%	14%
Landowner Notifications							
Total number of notifications	1286	1615	2043	2005	2159	3382	3775
% notifications done by mail or email	60%	72%	80%	74%	76%	86%	75%
% notifications done by phone or fax	16%	13%	9%	11%	11%	6%	8%
% notifications done in person or by doorhanger	24%	15%	12%	15%	13%	9%	16%
Infestation Reports							
Number of infestation reports	200	292	220	332	143	134	189
Percent of infestation reports checked	88%	91%	80%	89%	90%	91%	88%
Percent of reports confirmed correct	73%	74%	74%	79%	66%	59%	64%

- *Customer service survey cards show an overwhelming "A" rating of the program*

In 2005, the Noxious Weed Control Program launched its first large-scale public survey. Almost one thousand customer service survey cards were mailed to landowers who had been contacted by staff regarding noxious weeds (Figure 4). The survey cards asked a variety of questions such as:

> Did our staff provide advice and answer questions?
> Was our staff professional and courteous?
> If you received educational materials, did you find them helpful?

We also asked landowners to grade their overall experience working with the King County Noxious Weed Control Program. Of the 156 survey cards received back, 72% give the program an "A" as an overall grade.

The survey cards also asked for additional comments. Many landowners took the opportunity to give both praise and suggestions for improving the program. (See Appendix I)

- *Increased stewardship and community participation in noxious weed management*

Program staff undertook a wide range of education and outreach activities seeking to increase the level of community participation in noxious weed management and the stewardship of publicly owned natural lands. These activities are described in detail in the relevant major activity reports that follow.

Figure 4: New Customer Survey Form

HOW IS OUR CUSTOMER SERVICE?

1. What noxious weed(s) did we contact you about?_____

2. How were you contacted regarding the infestation? (Check as many as appropriate)
   ☐ Email ☐ Phone ☐ Letter ☐ Doorhanger ☐ In person

(Please check one for each of the following questions)

	Definitely Yes ✔	Somewhat Yes ✔	Somewhat Not ✔	Definitely Not ✔
3. Once notified, did our staff clearly explain what was expected of you to address the weed problem?	____	____	____	____
4. Did our staff provide advice and answer questions?	____	____	____	____
5. Was our staff professional and courteous?	____	____	____	____
6. If you received educational materials, did you find them helpful?	____	____	____	____

7. Overall, how would you grade your experience working with the King County Noxious Weed Control Program? (Please circle one. A=Excellent/F=Failing) A B C D F

Please include any additional comments or recommendations you may have for the program.

Education and Outreach

Community and landowner education is the single most important activity of the King County Noxious Weed Control Program. The program aims to achieve an informed community of stakeholders with effective participation in the prevention and management of noxious weed infestations. Informed and committed citizens are the key to the management of noxious weeds in King County. To achieve a knowledgeable and engaged community, the program carries out a wide range of outreach and training activities targeted to reach the key stakeholder groups in the county.

The 2005 outreach and communication program carried out the following initiatives:

1. Delivered the message that the impact of invasive weeds is a high-priority problem that affects all county citizens
2. Increased visibility of our program to key audiences and to the general public
3. Improved communications with rural landowners and delivered the message that our program is an ally and a resource for the property owner, not simply a regulatory agency
4. Fostered positive relationships with key communities, stewardship groups and agencies and increased our usefulness as a resource to these groups
5. Improved the noxious weed identification and management skills of vegetation management practitioners in public agencies, community and conservation groups, and the private sector

In 2005, program staff worked individually with over 1,970 landowners, land managers, and public weed management personnel to provide them with the tools needed to locate and manage regulated noxious weeds on their properties in King County. In addition, program staff answered a broad range of inquiries on invasive and noxious weeds, provided technical handouts on weeds and performed site visits to help property owners identify and manage weeds. The use by the public of the program website continues to increase and program brochures and technical handouts are often downloaded from the web

Do the Puyallup: staff helped spread the word about noxious weeds at the 2005 Puyallup Fair.

as well as being requested by mail. Website visitor sessions increased by an impressive 38% in the past year.

Staff showed off a wide array of noxious weeds at the King County Fair in Enumclaw, one of several public outreach events conducted in 2005.

In addition to one-on-one technical assistance activities, the program provided outreach to a wide range of groups and neighborhoods through presentations, technical workshops, volunteer work parties, the program website and informational booths. In 2005, the program expanded its workshops to include pasture weeds and natural area invasives. By participating in regional outreach events such as the Puyallup Fair as well as local community events throughout the county, the program was able to reach a broad segment of the general public. In all these cases, the public response was very positive. Particularly in rural areas, the public appreciated and benefited from program staff coming to them with information and advice on managing invasive weeds in a positive, non-regulatory approach.

The program tracks its outreach activities each year. A summary of these data is provided in Table 4. Hightlights of the program's education and technical training activities include:

- Fifty-six formal presentations and training workshops on weed identification and management were provided to increase the skill levels of landowners, stewardship groups, federal, state and local agency staff, volunteers and other stakeholders. Pesticide recertification credits were provided for both private and public applicators at several program workshops.

- New for 2005 were several community workshops developed and organized by the program and targeted toward the weed issues facing property owners in particular communities. Workshops were provided for community members in Maple Valley, Snoqualmie-North Bend, Vashon, Seattle, Bellevue, Lake Desire and the Lake Sammamish / Sammamish River area.

- Agencies provided with training in 2005 included EPA-Region 10, University of Washington grounds crew, Washington State Department of Transportation, King County Parks and Transportation crews and municipal vegetation management crews for most cities in the county.

- In 2005, the program worked with many non-profit and community organizations to increase their knowledge about invasive plants. Some of these groups included: Washington Native Plant Society, Picardo P-Patch Gardeners, Enumclaw Garden Club, Kiwanis Club, Woodland Park Zoo, Leschi Community

Council, Burien Habitat Stewards, Horses for Clean Water, Trout Unlimited, People for Puget Sound, Mountains to Sound Greenway Trust, Vashon-Maury Island Garden Club and the Master Gardeners.

- In addition, program staff contributed to several regional or large-scale seminars and conferences including the Society for Ecological Restoration NW regional conference and the Design to Dirt Workshop for restoration professionals, the City of Seattle Recertification Seminar, and the Green Gardening Program. Program staff also contributed to county training on invasives at Naturescaping workshops and in the Watershed Steward and Forest Steward training programs held by WSU Extension.

- The program provided workshops on noxious weeds for several schools and youth groups including: South Seattle Community College, Kentridge High School, Bellevue's Well Kept Kids Program, Southwest King County Girl Scouts, Vista Footer High School, Bellevue Natural Resource Week and Issaquah's Apollo Elementary School.

Other 2005 highlights of the outreach program include:

- Program staff provided outreach to the public on noxious weeds at 21 community and regional events, including the Northwest Flower and Garden Show, the King County Fair, the Puyallup Fair, Issaquah Salmon Days, Vashon Strawberry Festival, Tukwila Backyard Wildlife Fair, Lake Forest Park Green Fair and Shoreline Natural Yard Care Festival.

- New for 2005 was an email newsletter titled *KC Weed News* that was distributed to interested members of the public and government agencies. Seven issues were produced in 2005, each featuring brief updates and news related to invasive weeds in the county, upcoming workshops and events sponsored by the program and a "Weed of the Month." An email list was developed throughout the year at public events and workshops and by word of mouth. As of December 2005, there were 408 people on the subscriber list.

- The program partnered with several non-profit organizations and municipal programs to carry out volunteer weed pull events including Sammamish River Stewards, People for Puget Sound, Port of Seattle, Seattle Parks and Recreation Department, and Friends of Golden Garden's Off-Leash Area. More than 70 volunteers removed invasive weeds at these events.

- The program continued its positive incentive programs including a formal cost-share program to assist landowners unable to afford noxious weed control and the distribution of solid waste vouchers to private citizens. In 2005, 80 vouchers were given for noxious sweed disposal.

- The program achieved significant positive media exposure in 2005, appearing in print, radio and TV news 10 times. Program staff were interviewed by the media seven times. The program generated six official press releases through King County Public Affairs.

• Program staff continued to gather information to update the Best Management Practices (BMP's) for the noxious weeds of most importance to King County citizens and land managers.

• The new urban weeds brochure titled "Neighborhood Bullies: Invasive Weeds in Urban Lands" was widely distributed throughout the county. In addition, many new practical, easy to read Fact Sheets on noxious weeds were distributed at events, by mail and through the website. The practical information and color photos in these fact sheets greatly improves the program's ability to provide technical information on noxious weeds to the general public.

Program staff provided outreach to the public on noxious weeeds at 21 community and regional events in 2005.

• In addition to distributing materials at program events, the program also provided over 8,900 brochures and handouts to county agencies, municipal agencies, schools, and non-profit organizations for their outreach efforts on invasives. In total, the program distributed over 23,000 brochures and handouts.

Table 4: Education and Outreach Activities 2000–2005

Education and Outreach Activities	2000	2001	2002	2003	2004	2005
Total audience for presentations (est.)	321	312	988	925	2296	1812
Number of contacts at events (est.)	N/A	N/A	N/A	2800	5596	4783
Number of presentations	31	18	63	45	36	56
Number of public outreach events	N/A	N/A	N/A	9	15	21
Requests for brochures and fact sheets	137	185	209	155	94	166
Technical assistance calls and emails	103	128	124	238	218	343
Other types of technical assistance (including site visits)	51	72	51	23	34	114
Total outreach and education activities	322	403	447	468	397	700
Brochures and bulletins distributed	9,881	23,095	14,634	13,355	20,502	23,393
Website visitor sessions	N/A	N/A	66,061	71,645	81,178	112,197

County Lands

King County has direct ownership of approximately 4,000 parcels including parks, trails, open space and stormwater retention ponds. The county also maintains approximately 3,500 linear rights-of-way (ROW) miles along county roads. As a land owner, King County is responsible for controlling listed noxious weeds found on its property.

In an effort to improve the management of noxious weeds on county lands, and to ensure quick resolution of complaints, the King County Council approved a budget proviso during 2002 to create a new County Lands Noxious Weed Specialist position. This dedicated staff member works with the relevant county land managers to ensure that at least the same standard of weed control is achieved on county lands as is required on private lands. This position is also responsible for investigating, tracking and resolving county lands noxious weed complaints.

To reduce the number of complaints, the county lands specialist, working with seasonal weed specialists, surveyed as many county-owned parcels as possible. The primary focus during 2005 was along ROW areas. In addition to surveying, training was provided to roads staff as well as county staff responsible for maintaining stormwater ponds, parks and trails. Training included weed identification, control options and regulations pertaining to weed control activities.

To increase the ability of land managers responsible for controlling noxious weeds in difficult-to-access areas, the KCNWCP paid for personnel within the Parks Division to receive pesticide training and licensing. This expenditure resulted in an increase in Parks' ability and commitment to effectively control several invasive aquatic plants (purple loosestrife, garden loosestrife and knotweed) in riparian areas.

2005 County Lands Highlights

- There were 20 noxious weed complaints on county-managed lands. This was up from 11 complaints logged in 2004 and 12 complaints logged in 2003. The majority of complaints were for noxious weeds on road ROW, one in a stormwater retention pond and one on open space land. All complaints were checked within a week and were controlled by the responsible land managers or by the county lands weed specialist. All complaint areas were controlled prior to seed production.

- In total, 908 county-managed parcel and road noxious weed sites were surveyed during 2005. Of these surveyed sites, 795 sites (88%) were controlled up from 789 sites (88%) in 2004, 633 sites (82%) in 2003 and 388 (61%) in 2002 (Figure 5).

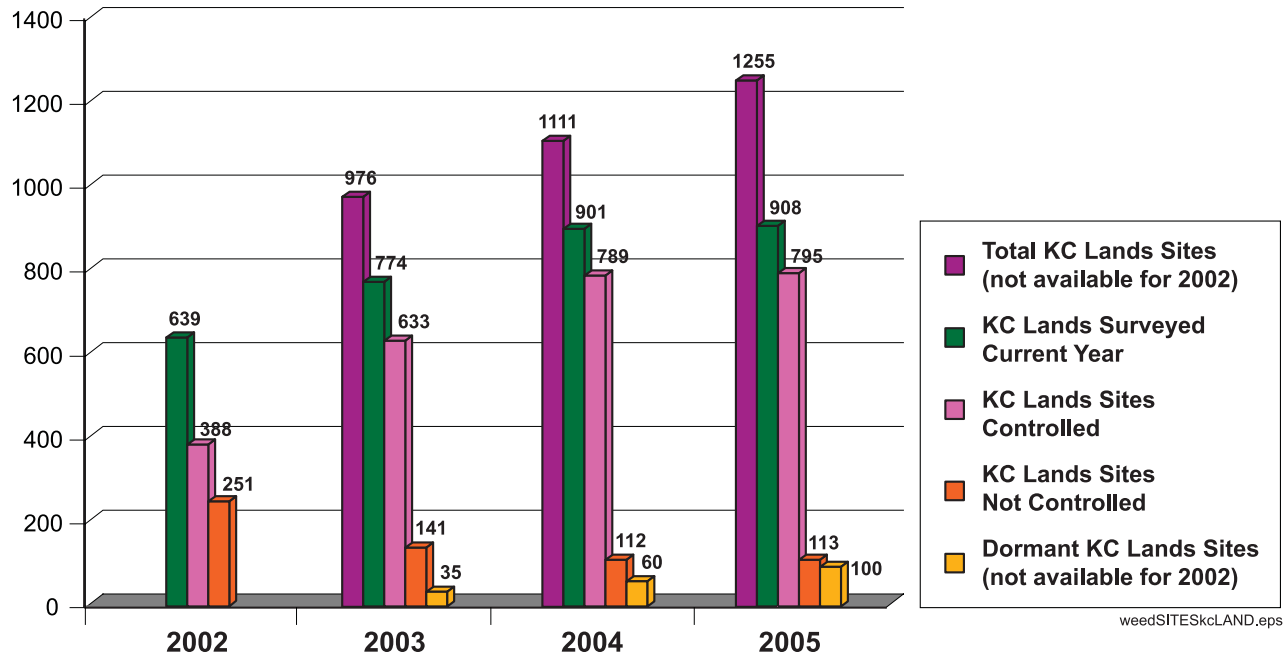
- A total of 447 unincorporated county roads were surveyed in 2005. An additional 72 roads were surveyed in incorporated areas that contract with King County Roads Maintenance. Surveys for noxious weeds on county roads documented 709 sites. Control was achieved on 88% (626) of these infestations.

- While conducting road surveys, a class B noxious weed previously not known to occur in King County was discovered. Mouseear hawkweed (*Hieracium pilosella*) was found on road ROW and adjoining private property near the Auburn area. Through a cooperative control effort by the private property owner and county roads crew excellent control was achieved. Rapid response and control of pioneering weed infestations such as this has the greatest chance for successful eradication.

- There are 79 known noxious weed infestations in storm water retention ponds documented in the program's database. Seventy sites were surveyed and control was achieved on 90% (63) of the sites. Control of the other five sites was not obtained due to being new sites found late in the year after the weeds had already gone to seed.

- During the 2005 season 199 county managed parcels were also surveyed for noxious weeds. These parcels included areas managed by King County Parks, Resource Lands, and Stormwater Services. Control was achieved on 85% of these sites. Many of these areas included difficult to control weeds growing in hard to access areas

Figure 5: Number of Noxious Weed Sites on King County Lands 2002-2005



Aquatic Areas

The invasion of noxious weeds in aquatic critical areas is a major source of degradation and habitat loss for a number of important wildlife species, including the endangered Puget Sound salmonids. The program's seasonal staff along with full-time staff surveyed and performed a range of weed control activities in aquatic critical areas during 2005. Aquatic noxious weed control activities in aquatic critical areas are shown in Table 5.

The control of aquatic and riparian infestations usually involves a high level of coordination, and often cooperation, between multiple landowners and jurisdictions. Education and outreach is particularly important in the first few seasons after the discovery of an aquatic weed infestation in order to develop a community understanding of the problem and an agreed-upon community standard of weed control. After this is achieved, the program then facilitates a coordinated community-wide control strategy to address the identified weed problem. This is the approach being applied to King County's small lakes, which are being systematically surveyed in an effort to protect both the individual resources as well as the lake ecosystems as a whole.

Overall, 79% of the recorded noxious weed infestation sites and 76% of the recorded area of noxious weeds in aquatic critical areas were controlled in 2005 (Table 5). These results show that there was a decrease in the number of sites controlled and an increase of the area controlled from 2004. The decrease in the number of sites controlled represents the loss of the dedicated staff position focusing on these areas. The increase in the area controlled is due to focusing control on a smaller number of larger infestations.

The program places a high priority on the early detection of pioneering infestations and responding rapidly to achieve control and eradication as efficiently as possible. This strategy is especially important with aquatic noxious weeds. A noxious weed infestation's size, impacts, and cost to control can increase exponentially in a short period of time andthis effect is magnified for aquatic noxious weeds. Rapid response and control of aquatic noxious weeds continued to be a focus during 2005. Two examples follow:

- A rapid response control program for Brazilian elodea (*Egeria densa*) in Dolloff lake initiated in 2004 was continued during 2005.

- A pioneering infestation of water primrose in a county property previously thought to be *Ludwigia hexapetala* during 2004, was positively identified by Washington

Department of Ecology and an aquatic plant specialist with the Missouri Botanical Gardens as *Ludwigia peploides*. This noxious weed is new to Washington and has the ability to severely impact aquatic areas. Due to its invasiveness and its presence in only one site in the state, the KCNWCP requested the State to include this species as a Class A noxious weed. The State Noxious Weed Board agreed and placed this species on the 2005 weed list. Program staff treated the infestation for the second year with an EPA-approved aquatic herbicide formulation and surfactant. Only 11% of the infestation returned after the 2004 treatment and it is hoped that this infestation will be eradicated in the near future.

Other 2005 Highlights:

- KCNWCP continued to foster cooperative working relationships with other county programs. Partnerships included work with the Lake Stewardship Program on aquatic weed control Pipe Lake/Lake Lucerne and on Spring Lake.

- Provided technical support to King County Parks for controlling purple loosestrife and garden loosestrife on several Parks' managed properties. Also funded pesticide training and licensing for 10 Parks personnel. KCNWCP staff also assisted Parks personnel in controlling purple loosestrife.

- For the first time, in cooperation between private business and property owners, 100% of the garden loosestrife (*Lysimachia vulgaris*) infestations found at Rutherford Slough was controlled. This large infestation next to the Snoqualmie River poses a significant threat to the Snoqualmie River watershed aquatic habitat.

Table 5: Aquatic Critical Area Weed Control in 2005

Aquatic Weed	Number of Sites	Area Found (sq ft)	% Sites Controlled	% Area Controlled
Brazillian Elodea	2	2330	100%	100%
Common Reed	17	203,890	24%	2%
Garden Loosestrife	78	447,047	86%	91%
Hairy Willowherb	2	20,020	100%	100%
Parrotfeather	1	0	100%	100%
Policeman's Helmet	161	792,771	77%	83%
Purple Loosestrife	470	698,795	80%	81%
Water Primrose	2	575	50%	87%
Total	**733**	**2,165,428**	**79%**	**76%**

- Surveys on 14 lake systems: (Spring, Pipe, Lucerne, Cottage, Dolloff, Moss, Burien, Borst, Joy, Spring, Killarney, Brook, Yellow, Bellevue).

- Surveys on 16 creeks or river segments: (Longfellow, Miller, Thornton, Kelsey, Issaquah, Green, Cross Landing, Daniels, Des Moines, Laughing Jacobs, Ober, Sammamish, Slaughters, Taylor, Walker, Wallace Swamp).

- Surveys on 10 wetland systems: (Rutherford Slough, Bassett Pond, Heyer Point Park (KVI beach), Robinson Point Park, Dumas Bay, Peasley Canyon, Poverty Bay / Lakota, Foster Island / Marsh Park, Tracy Owen Park, Swamp Creek Park).

Program staff conducted weed surveys on 14 lake systems including Lake Dolloff (below).

State and Federal Lands

The State of Washington and the Federal Government are among the largest landholders in King County with over 3,700 parcels comprising 38% of the total area within King County. The State and Federal Lands Noxious Weed Specialist is responsible for coordinating and improving noxious weed control on publicly managed lands including state highways, parks, conservation areas, resource lands, and ports of entry.

Washington State Department of Transportation (WSDOT)

An annual survey of 18 state routes and interstate highways was conducted covering 660 total miles (330 linear miles). In 2005, 839 priority noxious weed infested sites were observed along roadsides; and 555 (67%) of these sites were controlled. The accumulation of 118 new noxious weed sites and the late season proliferation of tansy ragwort decreased the percentage controlled by 7% from 2004. However, the number of controlled sites increased by 159 in 2005. Over the last four years, WSDOT has averaged 70% control of priority noxious weed sites along its roadsides. The results have been summarized in the Table 6.

In addition to roadside weed control, WSDOT staff participated in weed control projects in wetlands and riparian areas along Mill Creek near Auburn in a collaborative project with KCNWCP staff and the City of Auburn as well as Miller Creek near City of Burien. These projects resulted in excellent weed control, improved inter-agency relationships, and delineated property boundaries for future reference. The weed control along Miller Creek was an important component in a watershed-scale project to prevent the movement of noxious weeds downstream where restoration efforts are underway.

Table 6: Washington State Department of Transporation Sites

WSDOT Sites 2002-2005

Year	New Sites	Infested Sites	Controlled Sites	Percent Controlled
2005	118	839	555	67%
2004	87	540	396	74%
2003	88	819	589	72%
2002	100	701	472	67%

Washington Department of Fish and Wildlife (WDFW)

In 2005, 24 surveys were conducted at WDFW boat launches and 100% of the weeds found were controlled. Program staff assisted WDFW staff in the control of purple loosestrife at Panther Lake, North Lake, Lake Desire, and along the Snoqualmie River south of Carnation.

Washington State Parks

A joint effort between KCNWCP, King County Parks, and Washington State Parks resulted in comprehensive treatment of 30,000 square feet of combined purple and garden loosestrife at Lake Sammamish State Park. The second year of treatment for invasive knotweed at Flaming Geyser State Park and portions of Auburn Narrows was completed. Survey and control of noxious weed infestations at Saltwater State Park, State Parks Headquarters in Auburn and Iron Horse Trail were also completed in 2005.

Washington State Department of Natural Resources (WDNR)

WDNR staff completed the second year of treatment of a 3-acre infestation of yellow hawkweed along Maple Valley-Black Diamond Rd (SR-169).

Port of Seattle

In 2004 and 2005, KCNWCP staff surveyed and worked with Port of Seattle staff and consultants to develop a management plan for noxious weed control along Miller Creek within the mitigation area for the expansion of the Seattle-Tacoma International Airport. In 2005, Port of Seattle began streambank restoration and controlled 100% of the combined 19,370 square feet of noxious weeds on site.

Knotweed project manager Monica Walker inspects plants treated with special aquatic-safe herbicides to determine the effectiveness of the control at a site along the Green River.

Program staff worked extensively with Port of Seattle landscape staff to control 48 noxious weed infestations on park lands along the Duwamish River, industrial sites adjacent to Sea-Tac Airport, and Tyee Valley Golf Course.

Geographic Information System (GIS) Technology

The collection and analysis of spatial data has been an invaluable tool for the ongoing control of noxious weeds. Program staff use ArcView GIS software to plan surveys, determine property ownership, map noxious weed infestations, identify problem areas, and visually communicate the impacts of noxious weeds to a variety of stakeholders.

Global Positioning System (GPS) technology is used by staff to record noxious weed locations.

Since 2004, program staff has collaborated with the King County GIS Center to post noxious weed geospatial data on King County's iMAP website, allowing users to view noxious weed distribution data in a web-based format for free. This web-based application can also be used to create and print maps at any scale selected by the user. The noxious weed data set (called map set) is classified by four habitat categories: aquatic, urban, open space, and pasture/agriculture. The noxious weed iMAP map set is also linked to the noxious weed program website where the user can learn about the weeds during their mapping session. The noxious weed iMAP page can be found at:

http://www.metrokc.gov/gis/Mapportal/iMAP_main.htm

Through the use of GIS and Global Positioning Systems (GPS) the program has improved the accuracy and efficiency of locating noxious weed sites throughout King County especially on roadsides, parks, forested lands and other sproperties where access is difficult or there are few landmarks. In 2005, 175 surveys were conducted utilizing GPS technology.

Noxious weed spatial data has been useful for program planning including revising seasonal specialist routes, tracking where new infestations have been detected and where known locations have become dormant after several years of control work. In 2005, an analysis of noxious weed infestations by sub-watershed basins was conducted to describe the distribution and impact of a number of weed species. The resulting maps for tansy ragwort, giant hogweed, purple loosestrife, and spotted knapweed have been included in Appendix D.

Planning and Coordination

Achieving sustainable, long-term reductions in weed impacts requires large-scale coordination of weed control effort. Weed control at the individual project or property level usually fails in the long run if neighboring infestations are not also treated and are allowed to provide a source for re-infestation. Program staff worked to achieve coordinated weed control in a number of ways:

1) Working with communities to develop community standards for weed control in a neighborhood. This involves a process of landowner contact and community outreach, aiming to raise awareness of the impacts of noxious weeds and to seek voluntary control of infestations. Where a high community standard of weed control is established, landowners with weed infestations clearly outside those standards may then be targeted for enforcement action under the regulatory compliance provisions of RCW 17.10.

2) Development and implementation of weed management plans through active participation of stakeholders. Specific weed management plans have been developed for the high priority Class A noxious weeds garlic mustard (*Alliaria petiolata*), milk thistle (*Silybum marianum*) and goatsrue (*Galega officinalis*). Work continued in 2005 on the development of a county-wide management plan for the Class B noxious weed tansy ragwort *(Senecio jacobaea).*

3) Participation in broader county planning and programming efforts regarding noxious weed issues, such as the development and implementation of the Water Resources Inventory Area (WRIA) plans and the Critical Areas Ordinance (CAO).

One of several large knotweed rhizomes removed during a control project on the Green River.

4) Development of Cooperative Weed Management Areas (CWMA). A CWMA refers to a local organization that integrates all noxious weed management resources on a large scale across jurisdictional boundaries in

order to benefit entire communities. The purpose is to facilitate cooperation and increase the efficiency and effectiveness of the weed control efforts of participants.

Noxious weed specialist Amy Yahnke tackles invasive knotweed using a specially designed knotweed herbicide injector gun as part of the Green River Watershed CWMA knotweed control project.

In addition to the implementation of the first CWMA project in King County in the Green Duwamish watershed, the program also participated in the initiation of additional CWMA's in the South Fork of the Skykomish watershed, the Middle Fork of the Snoqualmie River and in the Hylebos Creek watersheds.

Major operational activities were undertaken in two of these CWMA project areas, focusing on the noxious weed Japanese knotweed (*Polygonum cuspidatum*) and its hybrids, which are having a substantial impact on riparian ecosystems in the county :

a) Green Duwamish CWMA. In cooperation with CWMA partners, the watershed was extensively surveyed for Japanese knotweed and its hybrids and an action plan was developed. This action plan defined high priority sites for control. Thirty-one sites were selected for treatment in 2005 in the Green/Duwamish watershed. Control was achieved on 30 of these sites.

   These sites were treated with a variety of methods including stem injection, foliar application of the herbicide glyphosate and shading with geotextile fabric. In total, 8.96 net acres of invasive knotweed was treated in 2005 within 23.3 gross infested acres. This project was implemented with a grant of $34,600 from the USDA Forest Service and $10,000 from the Washington State Department of Agriculture.

b) Skykomish CWMA. Using a similar strategy to the Green Duwamish CWMA, the watershed was surveyed for Japanese knotweed and its hybrids and an action plan developed. In total, 9.3 net acres of invasive knotweed was treated in 2005 within 21.2 gross infested acres. Treatment was either by stem injection or foliar application of the herbicide glyphosate. This project was implemented with a grant of $10,000 from the USDA Forest Service.

Integrated Pest Management

Since its inception, the program has applied an Integrated Pest Management (IPM) approach to fulfill the requirements of the Washington State Noxious Weed Law, RCW 17.10, and the King County Executive order on Integrated Pest Management. Integrated Pest Management, as defined by RCW 17.15, is a coordinated decision-making process that uses the most appropriate pest control methods and strategy in an environmentally and economically sound manner to meet pest management objectives. Table 7 summarizes the range of control techniques used by landholders on noxious weed infestations in 2005.

Table 7: Comparison of 2005 Landholder Noxious Weed Control Methods (Percent of Infestation Sites where Control Method is Known)

Control Method	Parcel Sites	Road Sites	All Sites
Biological	1%	0%	0%
Chemical	30%	58%	38%
Manual	51%	19%	42%
Mechanical (Mowing)	14%	12%	14%
Cultural	0%	1%	0%
Combination of Techniques	4%	10%	6%

Biological control is an important element in our IPM control strategy. This control method is used for controlling large weed populations often in difficult-to-access areas. One noxious weed in particular that fits into this category is purple loosestrife. Biological agents are also a good match for controlling noxious weeds that are pervasive in the county and are not selected for control due to their pervasiveness. If biological control agents successfully establish over time, the weed populations can be decreased to manageable levels. Some additional widespread noxious weeds for which biological controls have been released include tansy ragwort, Canada thistle, poison hemlock, Scotch broom and St. Johnswort.

2005 Biological Control Highlights:

- Biocontrol projects begun in conjunction with Washington State University King County Extension in 2004 were continued in 2005. Projects included collecting and releasing suitable biological control agents. Additionally, a mapping project marking release locations with GPS coordinates was initiated.

- In 2005, there were two releases of *Galerucella* beetles at established purple loosestrife sites. Releases were conducted in May and August to better guarantee that a population of Galerucella would be present throughout the growing season.

- In May, 950 *Galerucella* beetles were released at Auburn Supermall and Marymoor park. During the August release, 3,200 *Galerucella* were released at Mercer Slough, Lake Forest Park, Sammamish Wilmot Gateway Park, Magnuson Park, Lake Desire and Auburn Supermall.

- During the 2005 season, a St. Johnswort site was selected for the release of *Chrysolina* beetles. A suitable location at Spring Lake Park was selected and 388 beetles were released. Additionally, surveys were conducted for suitable sites to release Canada thistle and bull thistle biological agents in 2006.

Galerucella ***beetles are released to help with the control of purple loosestrife, a Class B noxious weed.***

Biological agents include the cinnabar caterpillar that helps control tansy ragwort plants.

Conclusions

The public investment in noxious weed control by the King County Noxious Weed Control Program is creating significant public value for the citizens of King County. This is achieved by reducing impacts of noxious weeds on the environment, recreation, public health and economic resources of the county. Continued progress was made towards the operational goals of eradication of Class A noxious weeds and the control of designated Class B noxious weeds.

Engaging citizens as active participants in weed control activities through education and outreach lies at the foundation of the program's success. The program continues to achieve extremely high levels of voluntary compliance by landowners with noxious weed control responsibilities as required under the State Weed Law RCW 17.10. Citizen satisfaction regarding the program performance is high, with 72% of surveyed respondents giving the program an "A" grade.

Noxious weed specialist Sean MacDougall removes a large phragmites plant during an Earth Day weed pull at Herrings House Park on the Duwamish River.

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APPENDIX A

2005 King County Noxious Weed List

Garlic Mustard
Class A Noxious Weed

2005 King County Noxious Weed List

Class A: Eradication Required

Scientific Name	Common Name
Abutilon theophrasti	velvetleaf
Alliaria petiolata	garlic mustard
Carduus pycnocephalus	Italian thistle
Carduus tenuiflorus	slenderflower thistle
Centaurea calcitrapa	purple starthistle[1]
Centaurea macrocephala	bighead knapweed
Centaurea nigrescens	Vochin knapweed
Crupina vulgaris	common crupina
Euphorbia oblongata	eggleaf spurge[1]
Galega officinalis	goatsrue[1]
Helianthus ciliaris	Texas blueweed
Heracleum mantegazzianum	giant hogweed[1]
Hieracium floribundum	yellow devil hawkweed
Hydrilla verticillata	hydrilla
Isatis tinctoria	dyers woad
Mirabilis nyctaginea	wild four o'clock
Pueraria montana var. *lobata*	kudzu
Salvia aethiopis	Mediterranean sage
Salvia pratensis	meadow clary
Salvia sclarea	clary sage
Silybum marianum	milk thistle[1]
Solanum elaeagnifolium	silverleaf nightshade[1]
Solanum rostratum	buffalobur
Soliva sessilis	lawnweed
Sorghum halepense	johnsongrass[1]
Spartina densiflora	dense flower cordgrass
Spartina patens	salt meadow cordgrass
Spartium junceum[1]	Spanish broom[1]
Thymelaea passerina	spurge flax
Zygophyllum fabago	Syrian bean-caper

Class B: Control Required

Scientific Name	Common Name
Acroptilon repens	Russian knapweed[1]
Alhagi maurorum	camelthorn
Alopecurus myosuroides	blackgrass
Anchusa arvensis	annual bugloss
Anchusa officinalis	common bugloss
Anthriscus sylvestris	wild chervil[1]
Berteroa incana	hoary alyssum
Bryonia alba	white bryony[1]
Cabomba caroliniana	fanwort
Carduus acanthoides	plumeless thistle
Carduus nutans	musk thistle
Cenchrus longispinus	longspine sandbur
Centaurea biebersteinii	spotted knapweed
Centaurea diffusa	diffuse knapweed
Centaurea jacea	brown knapweed
Centaurea jacea x nigra	meadow knapweed
Centaurea nigra	black knapweed
Centaurea solstitialis	yellow starthistle[1]
Chondrilla juncea	rush skeletonweed
Cyperus esculentus	yellow nutsedge
Cytisus scoparius	Scotch broom[1,2]
Echium vulgare	blueweed, viper's bugloss[1]
Egeria densa	Brazilian elodea[3]
Euphorbia esula	leafy spurge[1]
Hieracium atratum	polar hawkweed
Hieracium aurantiacum	orange hawkweed
Hieracium caespitosum	yellow hawkweed
Hieracium glomeratum	queen-devil hawkweed
Hieracium laevigatum	smooth hawkweed
Hieracium pilosella	mouseear hawkweed
Impatiens glandulifera	policeman's helmet
Kochia scoparia	kochia
Lepidium latifolium	perennial pepperweed
Lepyrodiclis holosteoides	lepyrodiclis
Linaria dalmatica ssp. *dalmatica*	Dalmatian toadflax
Ludwigia hexapetala	water primrose
Lysimachia vulgaris	garden loosestrife[4]
Lythrum salicaria	purple loosestrife[4]
Myriophyllum aquaticum	parrotfeather
Nymphoides peltata	yellow floating heart
Onopordum acanthium	Scotch thistle
Picris hieracioides	oxtongue hawkweed
Potentilla recta	sulfur cinquefoil
Rorippa austriaca	Austrian fieldcress
Sagittaria graminea	grass-leaved arrowhead
Senecio jacobaea	tansy ragwort[1]
Sonchus arvensis	perennial sowthistle
Spartina alterniflora	smooth cordgrass
Spartina anglica	common cordgrass
Sphaerophysa salsula	swainsonpea
Tamarix ramosissima	saltcedar
Torilis arvensis	hedgeparsley
Ulex europaeus	gorse

Class C: County Selected for Control

Scientific Name	Common Name
Artemisia absinthium	absinth wormwood[1]
Epilobium hirsutum	hairy willowherb
Hieracium spp.	non-native and invasive hawkweeds
Linaria vulgaris	yellow toadflax
Phragmites australis	common reed (non-native genotypes)

Obnoxious Weeds

The King County Weed Board recognizes these plants as invasive and is collecting information on their distribution. The Board recommends control and containment of existing populations and discourages new plantings. Below is a list of plants considered to be obnoxious:

Scientific Name	Common Name
Ilex aquifolium	English holly[1]
Prunus laurocerasus	English laurel
Rubus discolor	Himalayan blackberry
Rubus laciniatus	evergreen blackberry
Solanum dulcamara	bittersweet nightshade[1]

Noxious Weeds of Concern: Control Recommended

Scientific Name	Common Name
Buddleia davdii	butterfly bush
Cirsium arvense	Canada thistle
Cirsium vulgare	bull thistle
Clematis vitalba	old man's beard[1]
Conium maculatum	poison-hemlock[1]
Convolvulus arvensis	field bindweed
Daucus carota	wild carrot[1]
Euphorbia myrsinites	myrtle spurge
Geranium robertianum	herb Robert
Hedera helix 'Baltica' 'Pittsburgh' and 'Star' *Hedera hibernica* 'Hibernica'	English ivy[1] (four cultivars listed)
Hypericum perforatum	common St. Johnswort[5]
Iris pseudacorus	yellow flag iris[1]
Leucanthemum vulgare	oxeye daisy
Myriophyllum spicatum	Eurasian watermilfoil
Nymphaea odorata	fragrant water lily
Phalaris arundinacea	reed canarygrass
Potamogeton crispus	curly-leaf pondweed
Polygonum bohemicum	Bohemian knotweed
Polygonum cuspidatum	Japanese knotweed
Polygonum polystachyum	Himalayan knotweed

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[1] Reported to be toxic to livestock and/or humans. Sources: USDA Poisonous Plant Research Laboratory, USDA Natural Resources Conservation Service, WA State Weed Board. This list is for general information only and may not be all-inclusive. Contact a veterinarian, doctor or local Poison Control Center for a complete list and information about treatment.

[2] Control of Scotch broom is required on I-90 between mile marker 34 and the King/Kittitas County line.

[3] Brazilian elodea is designated for control throughout King County except in Lake Washington, Lake Sammamish, Lake Union and Lake Fenwick.

[4] Purple and garden loosestrife are county-selected for control in all areas of King County including those excluded by WAC 16-750.

[5] Permit from KC Weed Board required to grow St. Johnswort as a crop in King County.

APPENDIX B

Table: Number of Known Sites by Noxious Weed in King County Cumulative 1996-2005

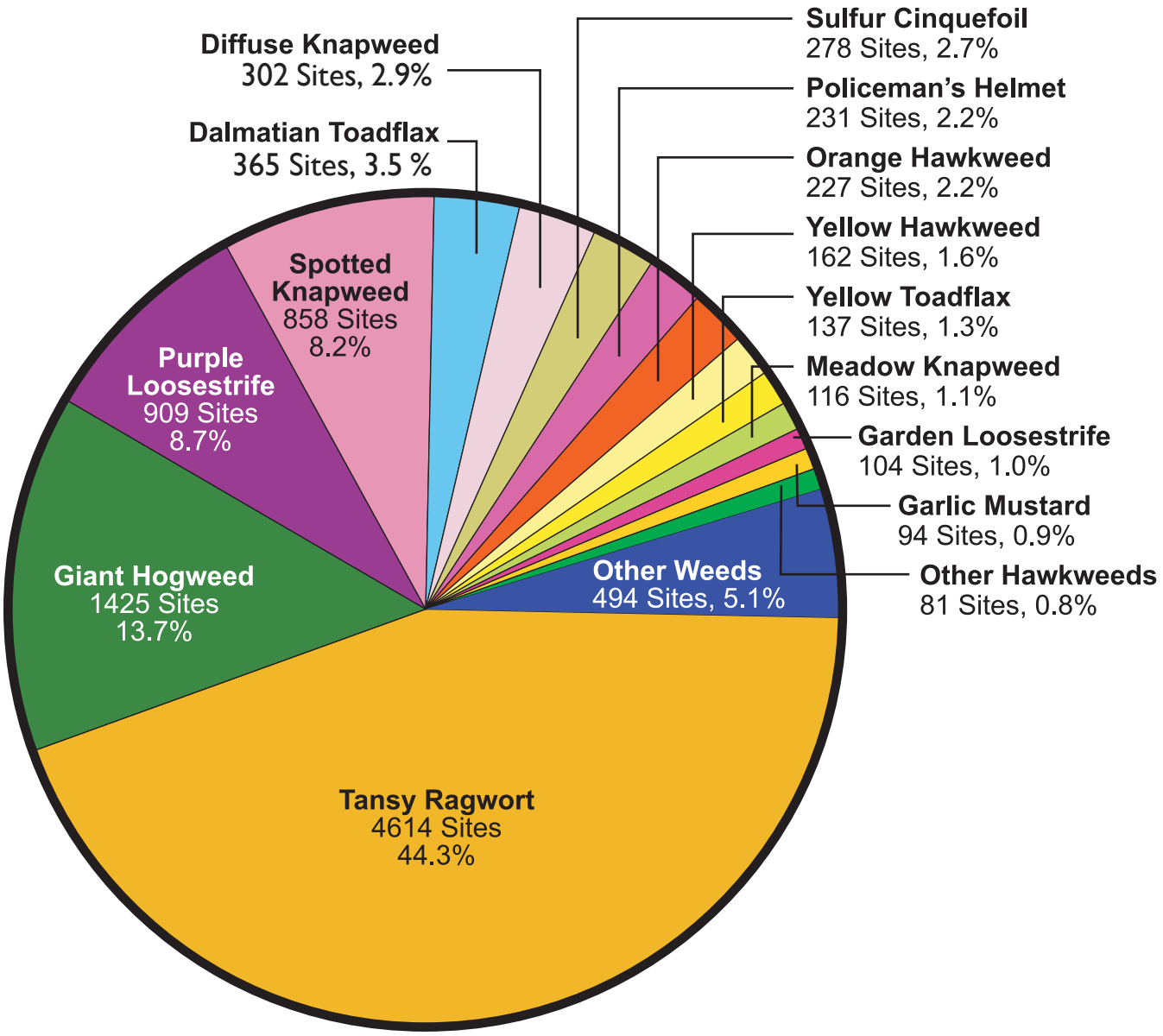
Figure: Known Noxious Weed Sites Cumulative 1996-2005

Sulfur Cinquefoil
Class B Noxious Weed

Number of Noxious Weed Sites in King County: Cumulative 1996-2005

	Number of Sites	% Dormant
CLASS A WEEDS		
Bighead Knapweed	27	48%
Buffalobur	2	100%
Clary Sage	3	0%
Garlic Mustard	94	0%
Giant Hogweed	1425	45%
Goatsrue	30	3%
Milk Thistle	55	7%
Spanish Broom	51	51%
Velvetleaf	1	100%
A Subtotal	**1,688**	**41%**
CLASS B WEEDS		
Annual Bugloss	1	100%
Brazilian Elodea	1	0%
Brown Knapweed	1	100%
Common Bugloss	1	100%
Common Cordgrass	2	0%
Dalmatian Toadflax	365	12%
Diffuse Knapweed	302	10%
Garden Loosestrife	104	3%
Gorse	49	22%
Hedge Parsley	38	39%
Kochia	18	11%
Leafy Spurge	6	83%
Meadow Knapweed	116	22%
Mouseear Hawkweed	1	0%
Musk Thistle	1	100%
Orange Hawkweed	227	12%
Parrotfeather	5	40%
Perennial Pepperweed	54	6%
Perennial Sowthistle	21	10%
Policeman's Helmet	231	23%
Purple Loosestrife	909	7%
Rush Skeletonweed	9	0%
Scotch Thistle	7	43%
Smooth Hawkweed	24	8%
Spotted Knapweed	858	19%
Sulfur Cinquefoil	278	15%
Tansy Ragwort	4614	17%
Viper's Bugloss	14	36%
Water Primrose	3	33%
Yellow Hawkweed	162	3%
Yellow Nutsedge	7	0%
Yellow Starthistle	4	0%
B Subtotal	**8,434**	**15%**
CLASS C WEEDS		
Absinth Wormwood	57	18%
Common Reed	17	0%
Hairy Willowherb	2	0%
Hawkweeds, invasive and non-native	81	0%
Yellow Toadflax	137	17%
C Subtotal	**294**	**11%**
TOTAL	**10,416**	**19%**

Known Noxious Weed Sites
Cumulative 1996-2005



KnownNW_SitesPIE.eps

APPENDIX C

Table: New Infestations on Parcels Six-Year Comparison for Selected Weeds 2000-2005

Figure: New Infestations on Parcels Selected Weeds 2001-2005

English Ivy
Noxious Weed of Concern

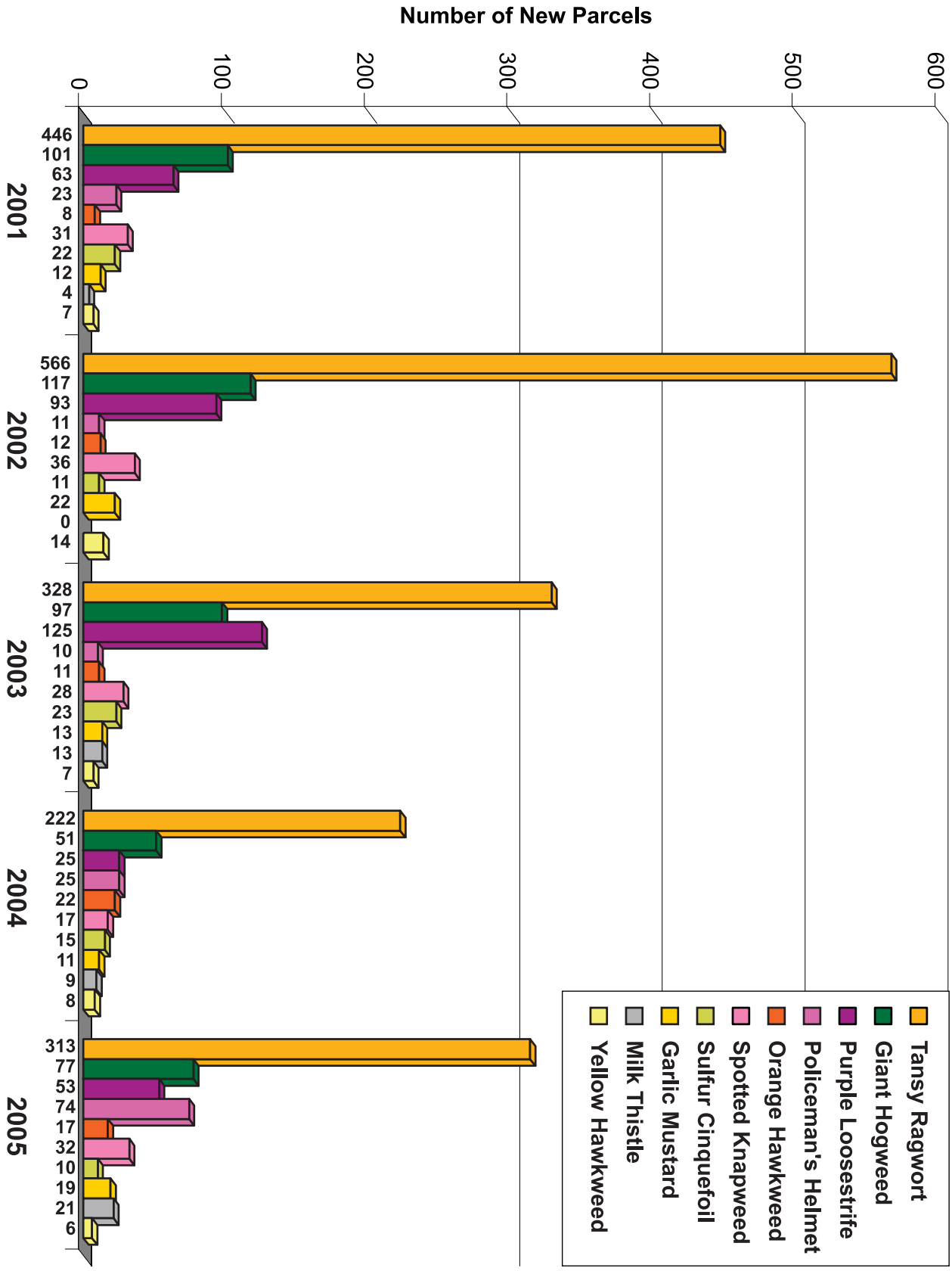
New Infestations on Parcels: Selected Weeds
A Six-Year Comparison 2000-2005

Weed Name	2000	2001	2002	2003	2004	2005
Tansy Ragwort	710	446	566	328	222	313
Giant Hogweed	165	101	117	97	51	77
Policeman's Helmet	40	23	11	10	25	74
Purple Loosestrife	81	63	93	125	25	53
Spotted Knapweed	33	31	36	28	17	32
Milk Thistle	1	4	0	13	9	21
Garlic Mustard	5	12	22	13	11	19
Orange Hawkweed	19	8	12	11	22	17
Sulfur Cinquefoil	17	22	11	23	15	10
Garden Loosestrife	2	10	29	32	7	9
Diffuse Knapweed	16	1	2	2	4	9
Yellow Toadflax	7	25	8	9	18	7
Dalmatian Toadflax	24	19	4	25	7	7
Common Reed	0	0	0	0	2	7
Yellow Hawkweed	6	7	14	7	8	6
Perennial Pepperweed	4	1	5	7	8	5
Meadow Knapweed	5	6	2	1	5	5
Goatsrue	7	0	2	0	6	2
Perennial Sowthistle	1	0	1	0	4	2
Hawkweeds, unspecified*	0	0	4	8	1	2
Gorse	6	1	5	5	4	1
Absinth Wormwood	1	3	0	0	2	1
Clary Sage	0	0	0	0	2	1
Viper's Bugloss	2	0	0	0	1	1
Water Primrose	1	0	0	0	1	1
Scotch Thistle	0	0	0	0	1	0

NOTE: Table includes only weed infestations found on legal parcels and does not include roadside infestations due to a difference in data collection and record keeping methods.

*Hawkweed taxonomy is under revision; some sites may be reclassified in the future.

New Infestations on Parcels: Selected Weeds 2001-2005



APPENDIX D

Profiles of King County's Top Four Noxious Weeds

Tansy Ragwort

Giant Hogweed

Spotted Knapweed

Purple Loosestrife

Floating Primrose
Class A Noxious Weed

PURPLE LOOSESTRIFE (Lythrum salicaria)

Class B Noxious Weed

- A hearty perennial up to 9 feet in height, topped by showy, magenta flower spikes. Flowers appear from June to early October. Highly invasive and spreads by seed, runners, and stem cuttings.

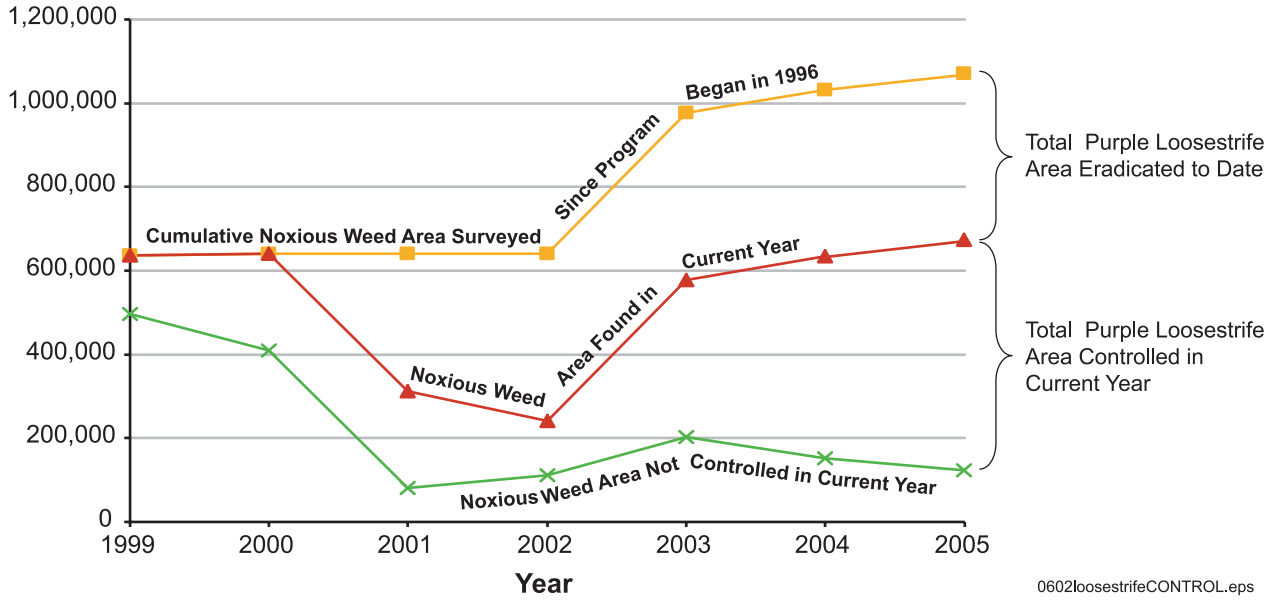
- Purple loosestrife aggressively spreads in wetland and shoreline areas, crowding out native plants and reducing habitat for wildlife.

- Found on lakes and waterways throughout King County. Most prevalent in Council District 1 (49 sites), District 3 (174 sites), District 7 (96 sites), District 8 (81 sites).

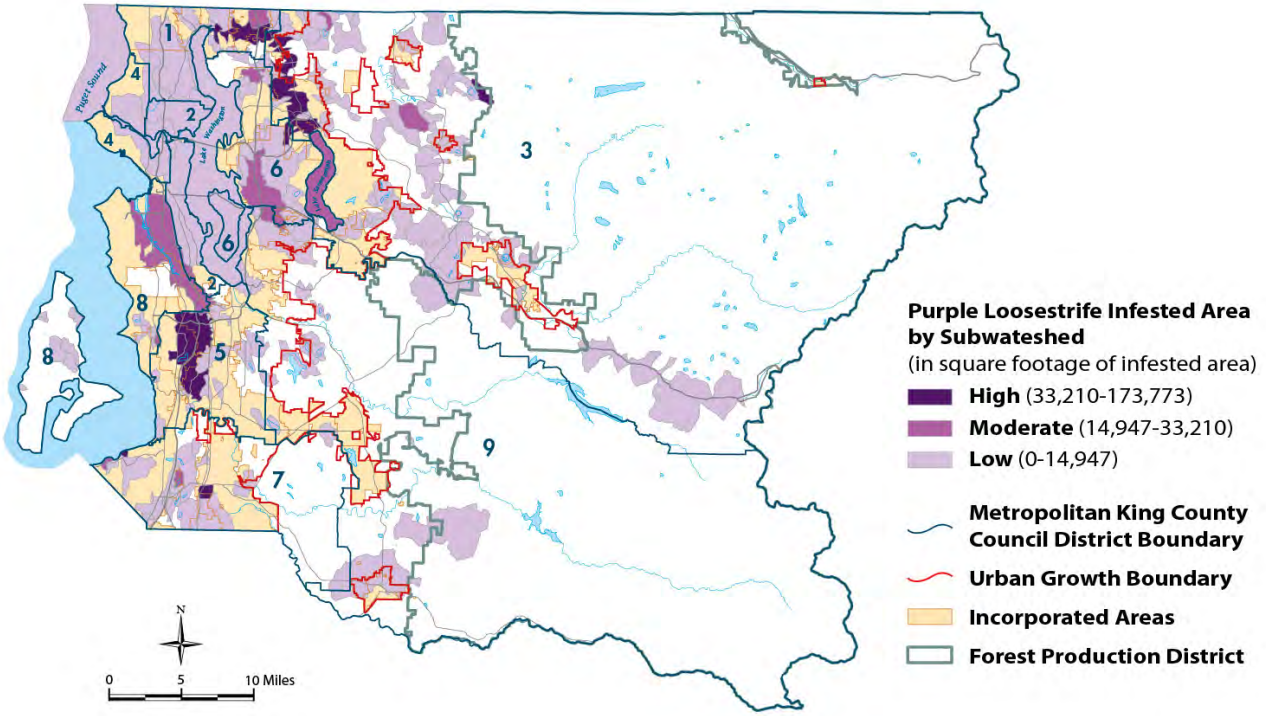
The goals for this damaging wetland weed in King County are to contain further spread, to focus our control effort where it can be most beneficial and cost-effective, and to work cooperatively with land managers to develop long-term integrated weed management plans for the large, established infestations.

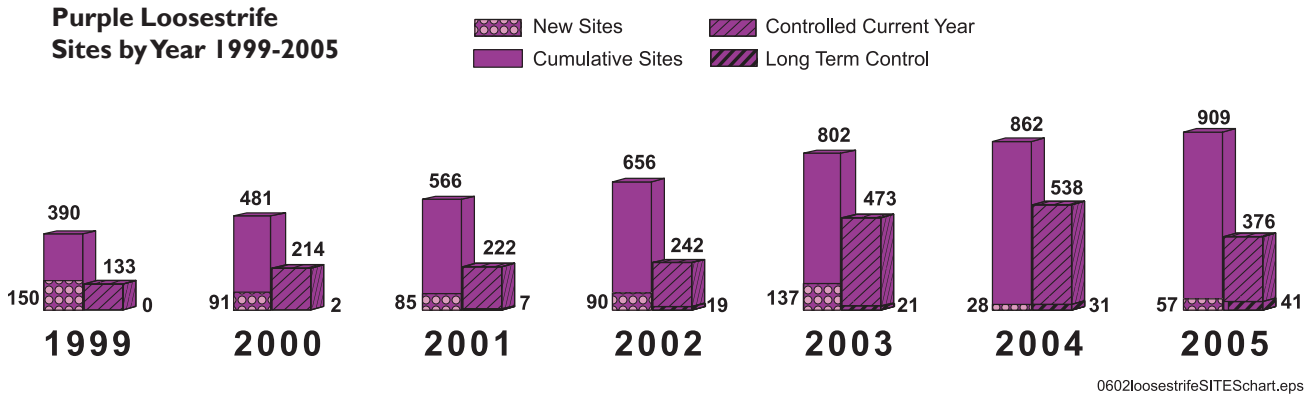
Since 1996, of the 909 sites found, 7% have shown no re-occurrence of purple loosestrife for three or more years. In 2005, 81% of the area infested with purple loosestrife was controlled and 80% of all purple loosestrife sites found were controlled.

Control of Purple Loosestrife in King County 1999 to 2005



Known Purple Loosestrife Distribution in 2005





SPOTTED KNAPWEED (*Centaurea biebersteinii*)

Class B Noxious Weed

- A perennial, native to Eurasia, highly competitive, that readily invades and dominates range lands, pastures, disturbed sites and transportation corridors. Flowers May to September.

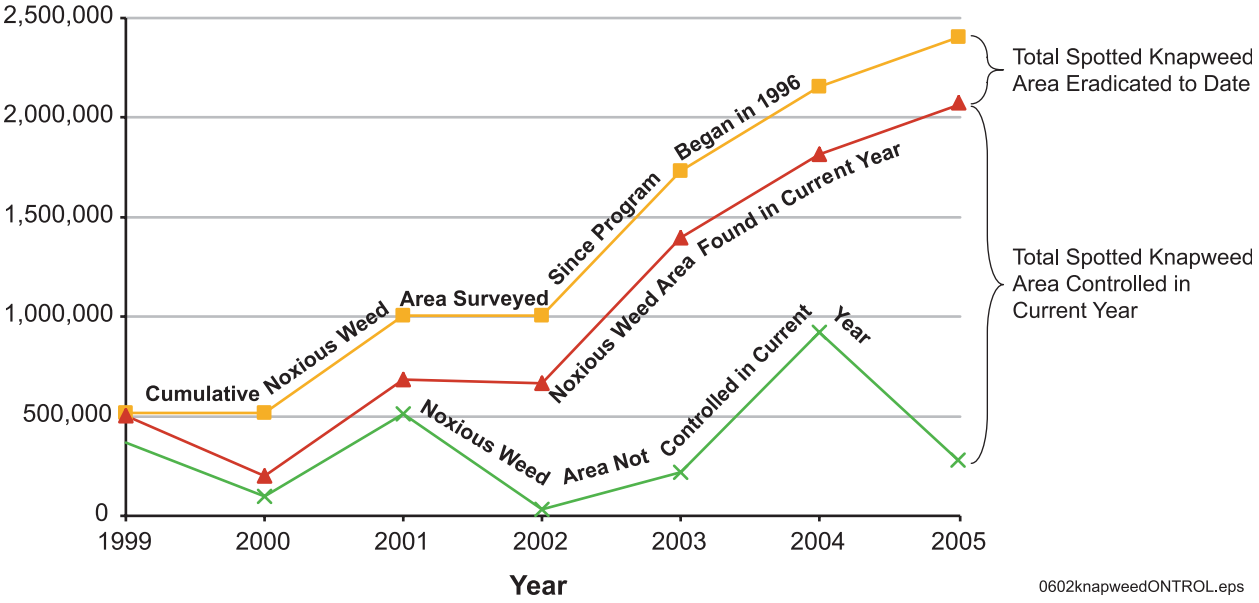
- Crowds out native plants and degrades habitat resulting in reduced wildlife and livestock forage and increased erosion, which can degrade surface water quality.

- The goal in King County is to reduce the impact of this weed by preventing further spread, monitoring for new sites and eradicating isolated infestations where feasible.

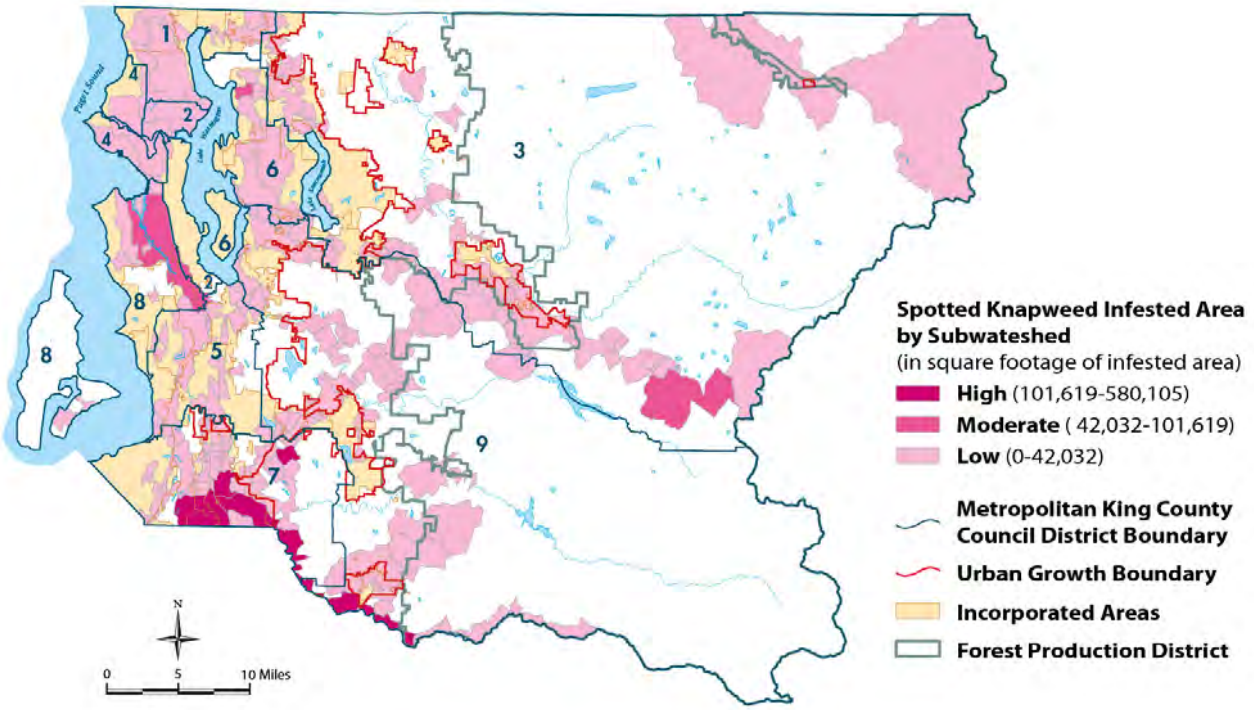
Spotted knapweed is most common along state highways and railroads. It is also found in abandoned fields and pastures. Most prevalent in Council District 3 (93 sites), District 7 (234 sites), District 8 (100 sites) and District 9 (86 sites).

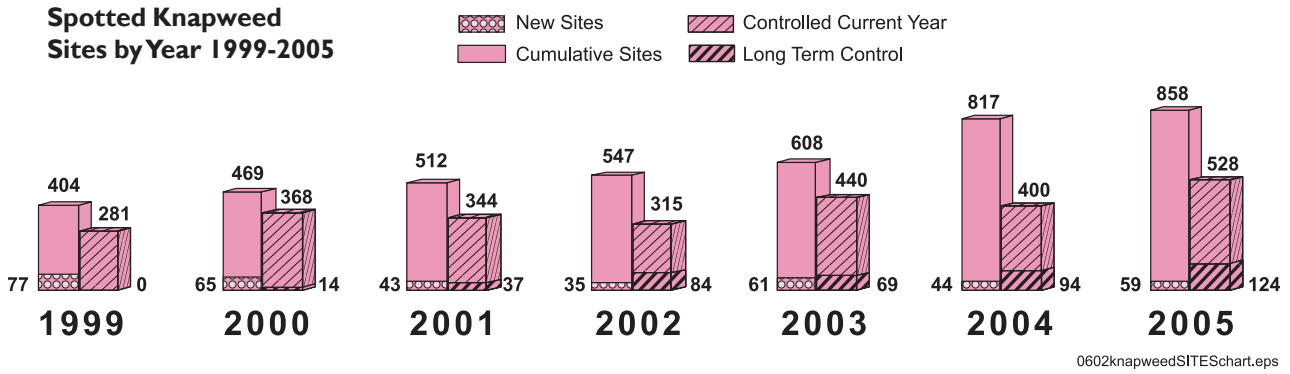
Since 1996, of the 858 sites found, 19%, have shown no re-occurrence of knapweed for three or more years. In 2005, 82% of the area infested with spotted knapweed was controlled and 86 of all spotted knapweed sites found were controlled.

Control of Spotted Knapweed in King County 1999 to 2005



Known Spotted Knapweed Distribution in 2005





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GIANT HOGWEED (*Heracleum mantegazzianum*)

Class A Noxious Weed

- Robust perennial from Eurasia with large, flat-topped, umbrella-shaped white flower clusters on stout, ridged, hollow stems, grows to 15 feet when in flower. Flowers May to July.

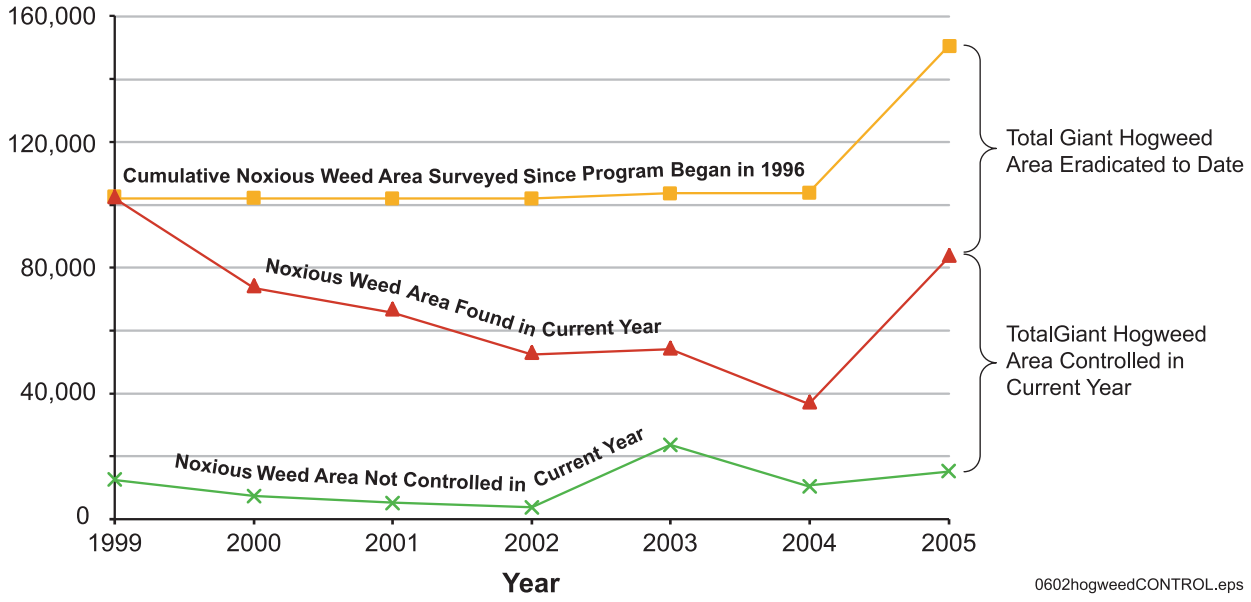
- A public health hazard, the sap can cause severe blistering and scarring of the skin. Scarring can be permanent. Also invades native forests and degrades habitat.

- Typically found in vacant urban properties, ornamental gardens, along streambanks and in ravines. Most prevalent in Council District 2 (322 sites), District 8 (251 sites), District 4 (186 sites), and District 1 (93 sites).

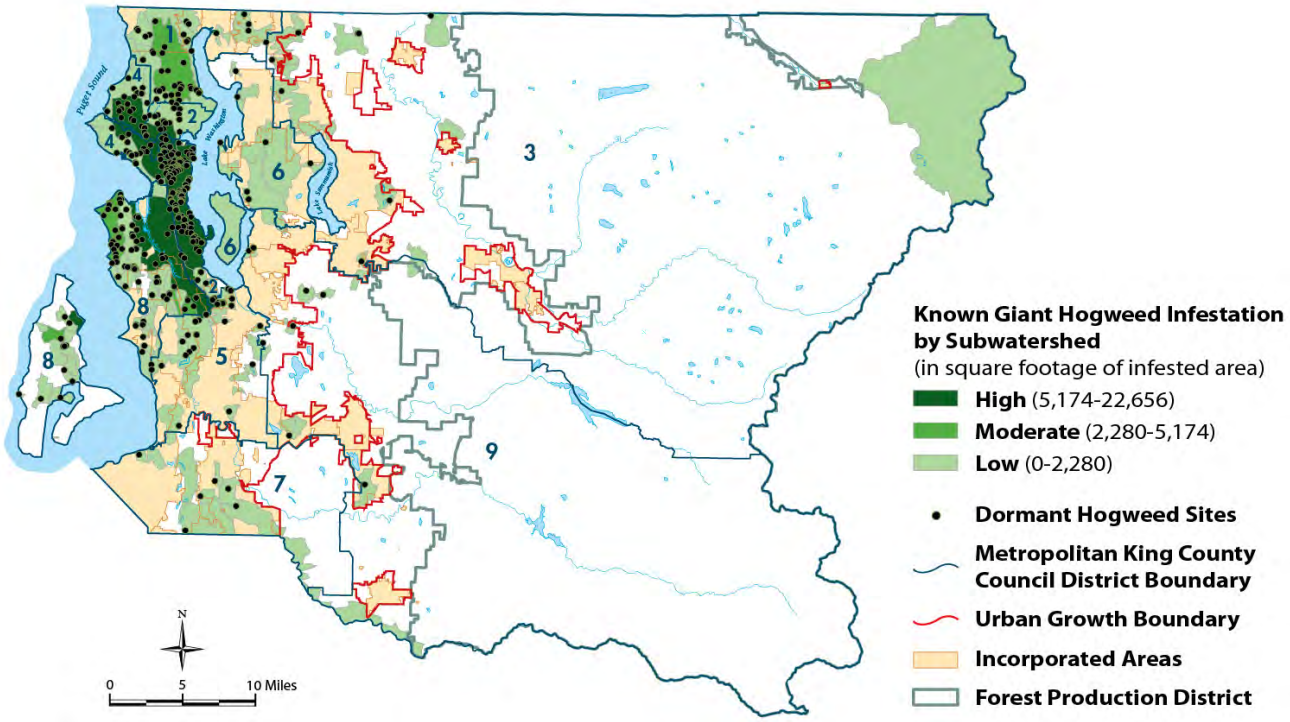
The goal for this weed in King County is to alert the public to its health hazards and to eradicate the weed wherever infestations are found.

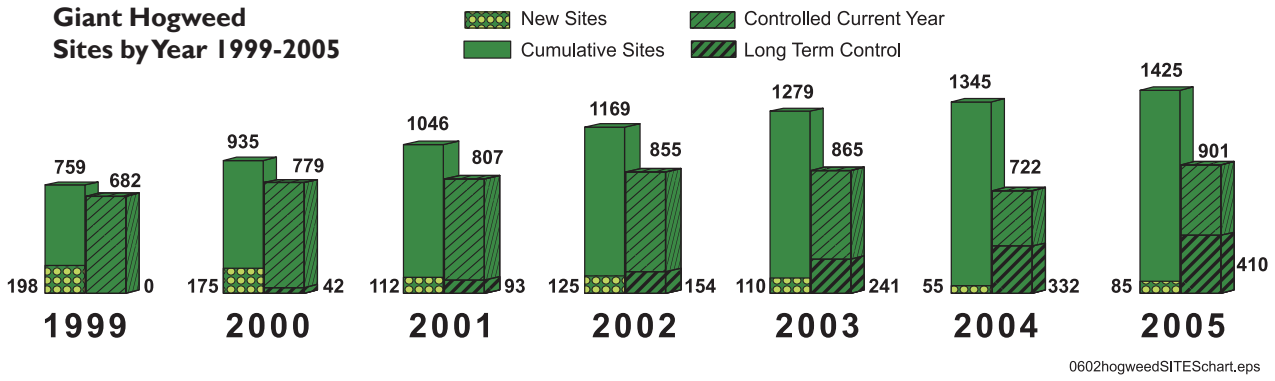
Since 1996, the program has found over 1425 infestations of hogweed. Of these, 45% have shown no re-occurrence of hogweed for three or more years. In 2005, 83% of the area infested with hogweed was controlled and 93% of all hogweed sites found were controlled.

Control of Giant Hogweed in King County 1999 to 2005



Known Giant Hogweed Distribution in 2005





TANSY RAGWORT (*Senecio jacobaea*)

Class B Noxious Weed

- Tap-rooted biennial or short-lived perennial to 4 feet tall with erect stems, branched near the top, with clusters of bright yellow, daisy-like flower heads. Flowers June through September.

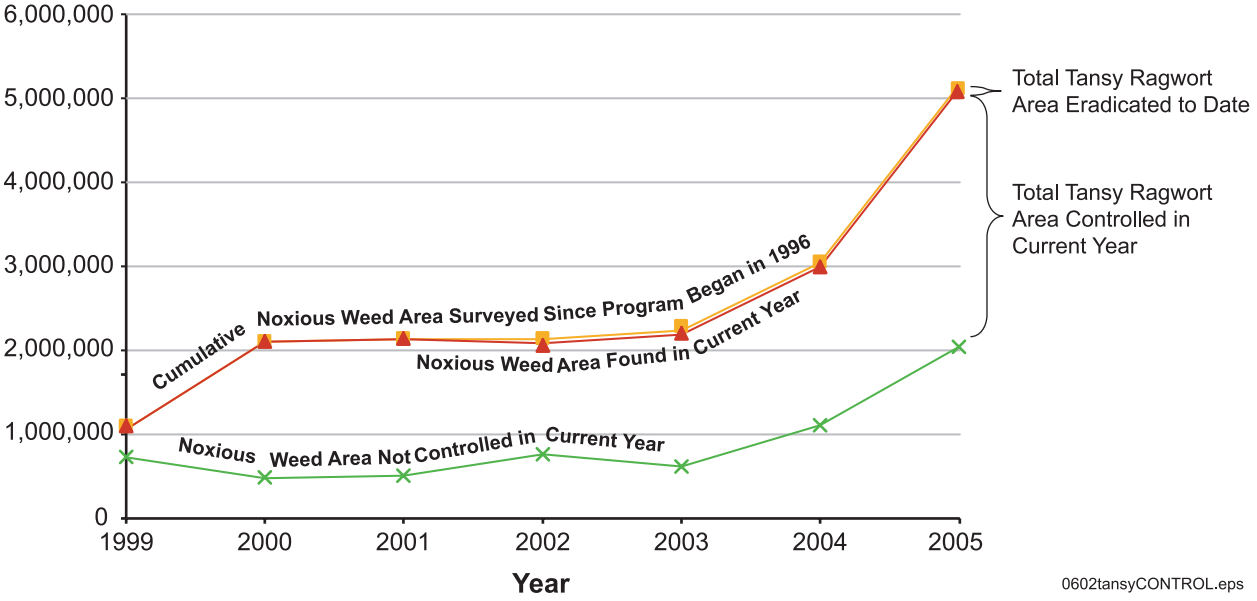
- Toxic to horses, cattle, sheep, livestock and people. The toxin is cumulative over the life of an animal, causes decreased liver function, and can cause death. Reduces productivity of agricultural land.

- The goal for this weed in King County is to reduce its impacts on livestock and pasture quality by containing its spread, educating land managers about control methods and eliminating new infestations where feasible.

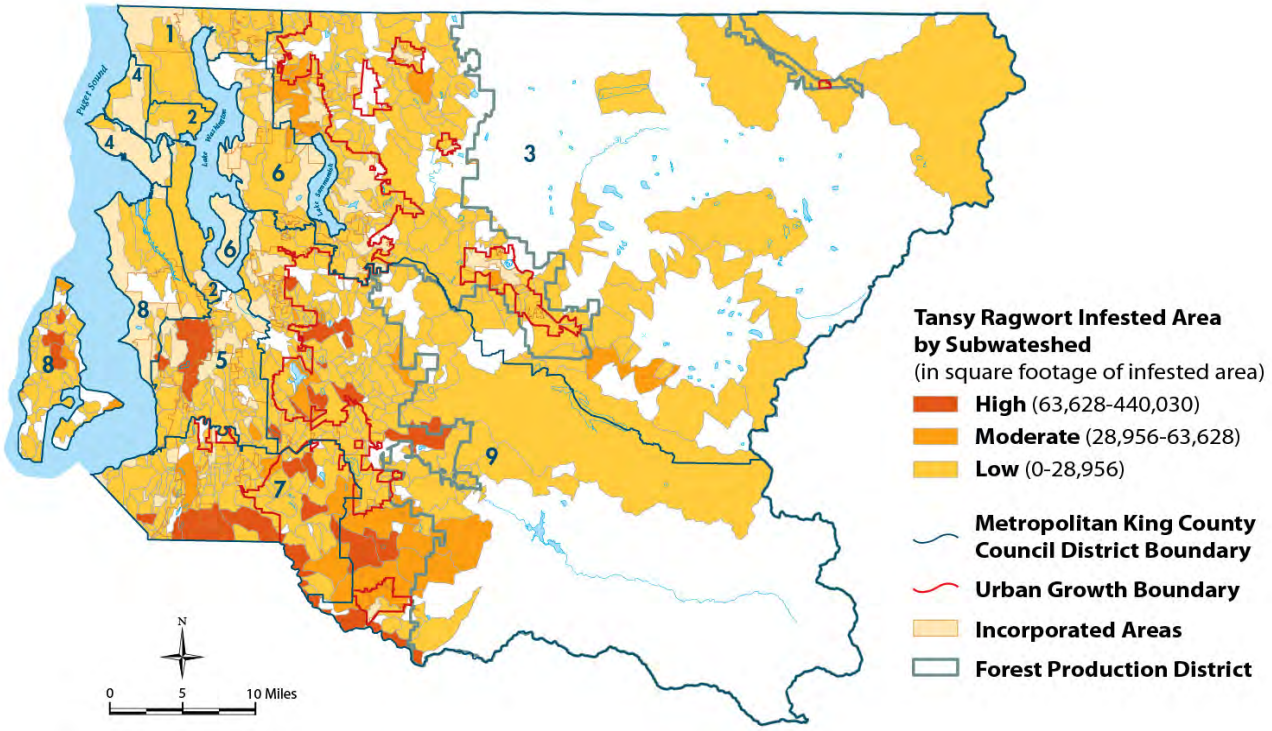
Tansy ragwort is a widespread problem in King County. It is found in pasturelands, roadsides and other open areas especially in the south end of the county. Most prevalent in Council District 9 (888 sites), District 7 (782 sites), District 8 (465 sites), District 3 (372) and District 5 (302 sites).

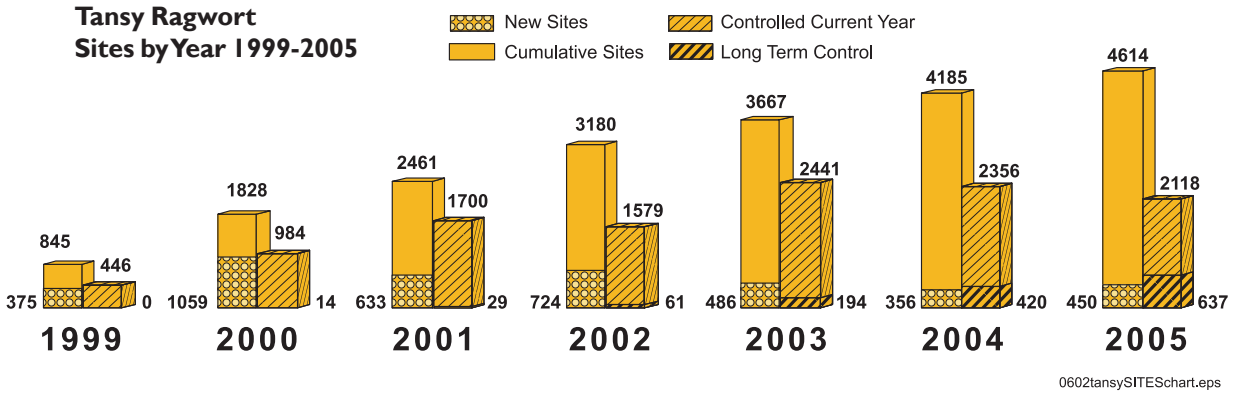
Since 1996, of the 4614 sites found, 17% have shown no re-occurrence of tansy ragwort for three or more years. In 2005, 56% of the area infested with tansy ragwort was controlled and 72% of all tansy ragwort sites found were controlled.

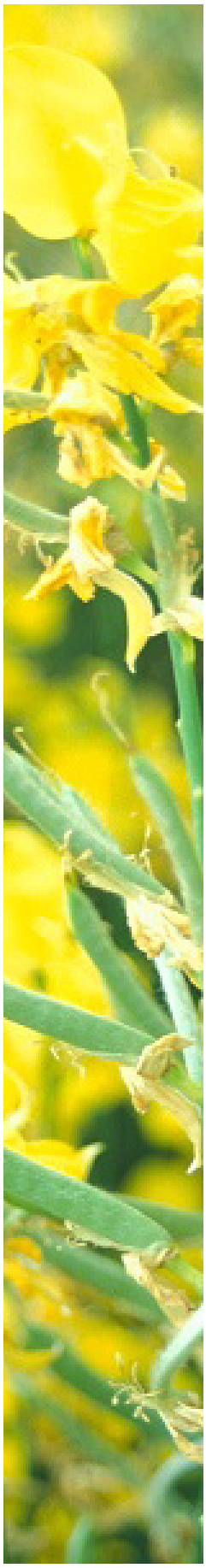
Control of Tansy Ragwort in King County 1999 to 2005



Known Tansy Ragwort Distribution in 2005







APPENDIX E

Known Noxious Weed Locations Map: Cumulative Data 1996-2005

Spanish broom
Class A Noxious Weed

APPENDIX F

Number of Active Noxious Weed Sites by Council District

Goatsrue
Class A Noxious Weed

Number of Noxious Weed Infestations by Council District

Council District 1
Bob Ferguson

Noxious Weed	Parcel Sites	Road Sites	Total Sites
Absinth Wormwood	0	1	1
Common Reed	1	0	1
Dalmatian Toadflax	0	5	5
Diffuse Knapweed	0	14	14
Garden Loosestrife	13	0	13
Garlic Mustard	4	0	4
Giant Hogweed	86	7	93
Gorse	1	0	1
Hairy Willowherb	1	0	1
Hawkweeds, other	0	1	1
Meadow Knapweed	1	0	1
Orange Hawkweed	1	5	6
Perennial Pepperweed	1	0	1
Policeman's Helmet	10	0	10
Purple Loosestrife	46	3	49
Smooth Hawkweed	1	0	1
Spanish Broom	4	0	4
Spotted Knapweed	1	12	13
Sulfur Cinquefoil	2	6	8
Tansy Ragwort	45	31	76
Yellow Hawkweed	0	2	2
Yellow Nutsedge	1	0	1
Subtotal for District 1	**219**	**87**	**306**

Council District 2
Larry Gossett

Noxious Weed	Parcel Sites	Road Sites	Total Sites
Bighead Knapweed	2	0	2
Clary Sage	3	0	3
Common Bugloss	1	0	1
Dalmatian Toadflax	2	0	2
Diffuse Knapweed	0	2	2
Garden Loosestrife	2	0	2
Garlic Mustard	55	8	63
Giant Hogweed	311	11	322
Goatsrue	1	0	1
Gorse	6	2	8
Hawkweeds, other	1	0	1
Milk Thistle	10	0	10
Orange Hawkweed	2	0	2
Policeman's Helmet	3	0	3
Purple Loosestrife	2	0	2
Spanish Broom	8	1	9
Spotted Knapweed	1	1	2
Sulfur Cinquefoil	1	0	1
Tansy Ragwort	3	0	3
Viper's Bugloss	1	0	1
Subtotal for District 2	**415**	**25**	**440**

Council District 3
Kathy Lambert

Noxious Weed	Parcel Sites	Road Sites	Total Sites
Absinth Wormwood	0	19	19
Bighead Knapweed	1	0	1
Dalmatian Toadflax	2	50	52
Diffuse Knapweed	2	62	64
Garden Loosestrife	11	1	12
Giant Hogweed	13	1	14
Gorse	3	1	4
Hawkweeds, other	2	27	29
Meadow Knapweed	6	6	12
Orange Hawkweed	93	38	131
Parrotfeather	1	0	1
Policeman's Helmet	9	2	11
Purple Loosestrife	150	24	174
Spotted Knapweed	9	84	93
Sulfur Cinquefoil	14	33	47
Tansy Ragwort	173	199	372
Viper's Bugloss	1	1	2
Yellow Hawkweed	14	38	52
Yellow Starthistle	0	1	1
Yellow Toadflax	4	4	8
Subtotal for District 3	**508**	**591**	**1099**

Council District 4
Larry Phillips

Noxious Weed	Parcel Sites	Road Sites	Total Sites
Bighead Knapweed	1	0	1
Dalmatian Toadflax	9	4	13
Diffuse Knapweed	7	7	14
Garlic Mustard	18	3	21
Giant Hogweed	177	9	186
Gorse	1	0	1
Milk Thistle	1	0	1
Musk Thistle	1	0	1
Orange Hawkweed	2	0	2
Policeman's Helmet	3	0	3
Purple Loosestrife	2	0	2
Scotch Thistle	1	0	1
Spanish Broom	2	0	2
Spotted Knapweed	2	6	8
Tansy Ragwort	2	1	3
Yellow Nutsedge	2	0	2
Yellow Toadflax	4	1	5
Subtotal for District 4	**235**	**31**	**266**

Council District 5
Julia Patterson

Noxious Weed	Parcel Sites	Road Sites	Total Sites
Absinth Wormwood	1	1	2
Dalmatian Toadflax	10	15	25
Diffuse Knapweed	1	17	18
Giant Hogweed	49	8	57
Gorse	1	1	2
Milk Thistle	1	0	1
Orange Hawkweed	2	1	3
Perennial Pepperweed	1	1	2
Perennial Sowthistle	1	0	1
Policeman's Helmet	3	0	3
Purple Loosestrife	15	9	24
Spotted Knapweed	32	28	60
Sulfur Cinquefoil	1	2	3
Tansy Ragwort	217	85	302
Yellow Toadflax	2	1	3
Subtotal for District 5	**337**	**169**	**506**

Council District 6
Jane Hague

Noxious Weed	Parcel Sites	Road Sites	Total Sites
Absinth Wormwood	0	1	1
Bighead Knapweed	1	0	1
Common Reed	0	1	1
Dalmatian Toadflax	0	10	10
Garden Loosestrife	2	18	20
Giant Hogweed	11	0	11
Meadow Knapweed	40	0	40
Orange Hawkweed	1	9	10
Policeman's Helmet	12	4	16
Purple Loosestrife	20	4	24
Rush Skeletonweed	0	3	3
Spotted Knapweed	1	14	15
Sulfur Cinquefoil	2	8	10
Tansy Ragwort	4	27	31
Subtotal for District 6	**94**	**99**	**193**

Council District 7
Pete von Reichbauer

Noxious Weed	Parcel Sites	Road Sites	Total Sites
Absinth Wormwood	3	0	3
Bighead Knapweed	2	0	2
Common Reed	2	1	3
Dalmatian Toadflax	15	19	34
Diffuse Knapweed	3	14	17
Giant Hogweed	10	2	12
Goatsrue	15	9	24
Gorse	1	1	2
Hawkweeds, other	8	2	10

Council District 7, continued

Pete von Reichbauer	Noxious Weed	Parcel Sites	Road Sites	Total Sites
	Kochia	1	0	1
	Meadow Knapweed	1	3	4
	Milk Thistle	23	2	25
	Mouseear Hawkweed	0	1	1
	Orange Hawkweed	9	2	11
	Perennial Pepperweed	5	0	5
	Perennial Sowthistle	2	3	5
	Policeman's Helmet	14	5	19
	Purple Loosestrife	92	4	96
	Smooth Hawkweed	1	4	5
	Spanish Broom	1	0	1
	Spotted Knapweed	174	60	234
	Sulfur Cinquefoil	25	15	40
	Tansy Ragwort	597	185	782
	Yellow Hawkweed	13	15	28
	Yellow Toadflax	15	6	21
	Subtotal for District 7	**1032**	**353**	**1385**

Council District 8

Dow Constantine	Noxious Weed	Parcel Sites	Road Sites	Total Sites
	Absinth Wormwood	0	1	1
	Bighead Knapweed	2	0	2
	Brazilian Elodea	1	0	1
	Common Cordgrass	1	0	1
	Common Reed	6	6	12
	Dalmatian Toadflax	55	21	76
	Diffuse Knapweed	11	18	29
	Garden Loosestrife	48	0	48
	Garlic Mustard	3	0	3
	Giant Hogweed	224	27	251
	Goatsrue	0	1	1
	Gorse	14	4	18
	Hairy Willowherb	1	0	1
	Kochia	3	0	3
	Meadow Knapweed	1	0	1
	Orange Hawkweed	4	2	6
	Perennial Pepperweed	18	11	29
	Perennial Sowthistle	7	3	10
	Policeman's Helmet	77	4	81
	Purple Loosestrife	75	6	81
	Spanish Broom	6	0	6
	Spotted Knapweed	65	35	100
	Tansy Ragwort	331	134	465
	Yellow Toadflax	9	5	14
	Subtotal for District 8	**962**	**278**	**1240**

Council District 9
Reagan Dunn

Noxious Weed	Parcel Sites	Road Sites	Total Sites
Absinth Wormwood	1	4	5
Bighead Knapweed	4	0	4
Dalmatian Toadflax	8	12	20
Diffuse Knapweed	8	21	29
Garden Loosestrife	0	1	1
Garlic Mustard	3	0	3
Giant Hogweed	1	1	2
Goatsrue	0	2	2
Hawkweeds, other	4	34	38
Meadow Knapweed	8	6	14
Milk Thistle	10	1	11
Orange Hawkweed	5	7	12
Perennial Sowthistle	0	2	2
Policeman's Helmet	12	2	14
Purple Loosestrife	13	5	18
Scotch Thistle	1	0	1
Smooth Hawkweed	3	2	5
Spanish Broom	1	0	1
Spotted Knapweed	37	49	86
Sulfur Cinquefoil	50	23	73
Tansy Ragwort	644	244	888
Water Primrose	2	0	2
Yellow Hawkweed	21	26	47
Yellow Toadflax	11	11	22
Subtotal for District 9	**847**	**453**	**1300**
TOTAL FOR ALL DISTRICTS	**4649**	**2086**	**6735**

APPENDIX G

Table: Top 20 Noxious Weeds Found in King County 1999-2005

Figure: Top 10 Noxious Weeds Found in King County 1999-2005

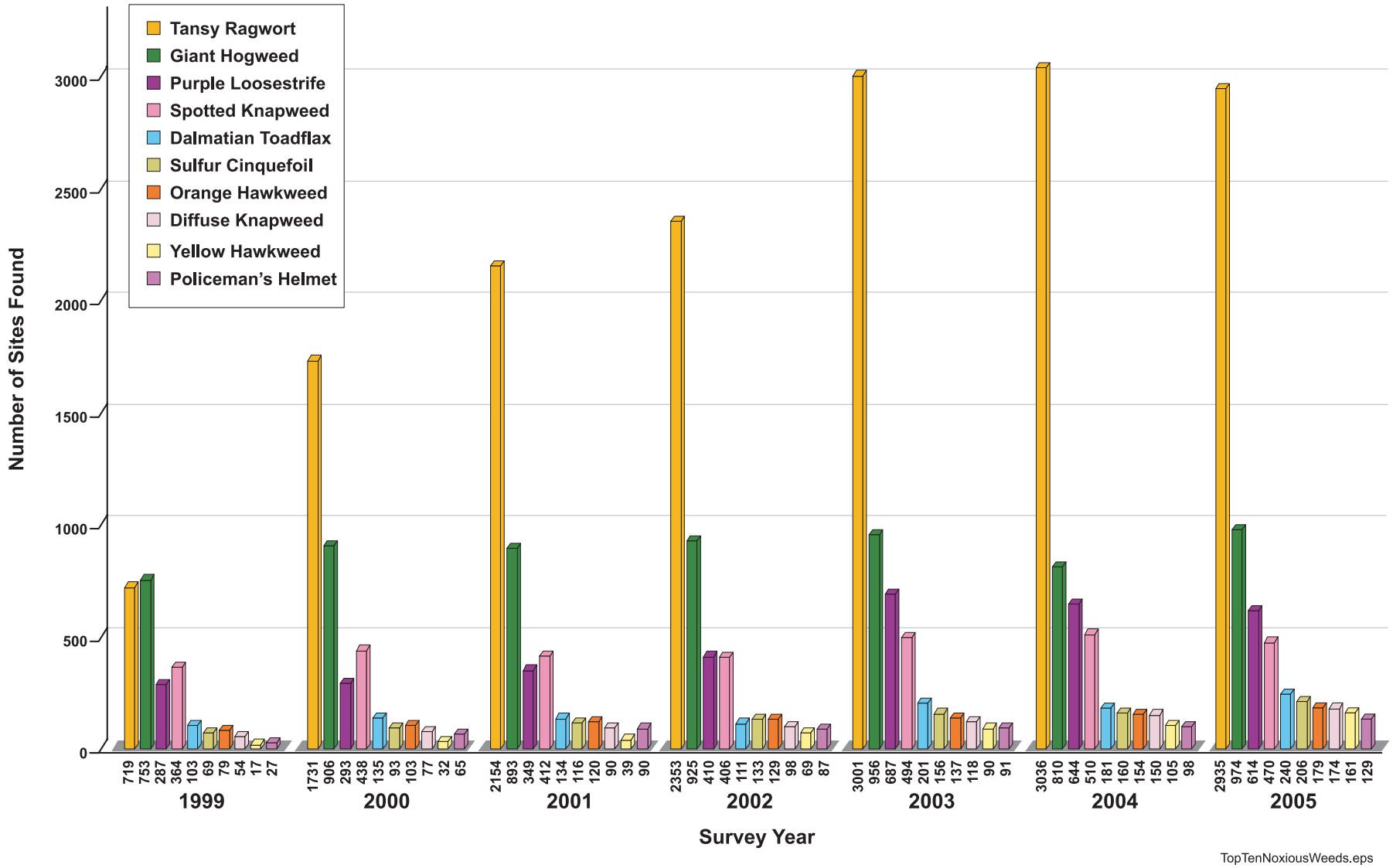
Japanese Knotweed
Noxious Weed of Concern

Top 20 Noxious Weeds Found in King County 1999 to 2005

	Number of Sites Each Year						
Noxious Weed	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**
Tansy Ragwort	719	1731	2154	2353	3001	3036	2935
Giant Hogweed	753	906	893	925	956	810	974
Purple Loosestrife	364	438	412	406	494	510	614
Spotted Knapweed	287	293	349	410	687	644	470
Dalmatian Toadflax	103	135	134	111	201	181	240
Sulfur Cinquefoil	54	77	90	98	118	150	206
Orange Hawkweed	69	93	116	133	156	160	179
Diffuse Knapweed	79	103	120	129	137	154	174
Yellow Hawkweed	27	65	90	87	91	98	161
Policeman's Helmet	17	32	39	69	90	105	129
Yellow Toadflax	1	8	19	45	60	73	94
Garlic Mustard	67	71	68	81	84	61	81
Garden Loosestrife	0	0	0	12	26	67	79
Hawkweeds, other*	11	5	12	51	82	72	78
Meadow Knapweed	30	46	75	53	80	81	73
Gorse	4	5	10	8	20	32	48
Milk Thistle	19	25	22	31	30	34	38
Perennial Pepperweed	18	21	21	9	27	32	37
Goatsrue	20	20	23	20	19	24	33
Absinth Wormwood	0	11	10	16	15	26	28

*Hawkweed taxonomy is under revision; some sites may be reclassified in the future.

Top Ten Noxious Weeds Found in King County
1999 to 2005



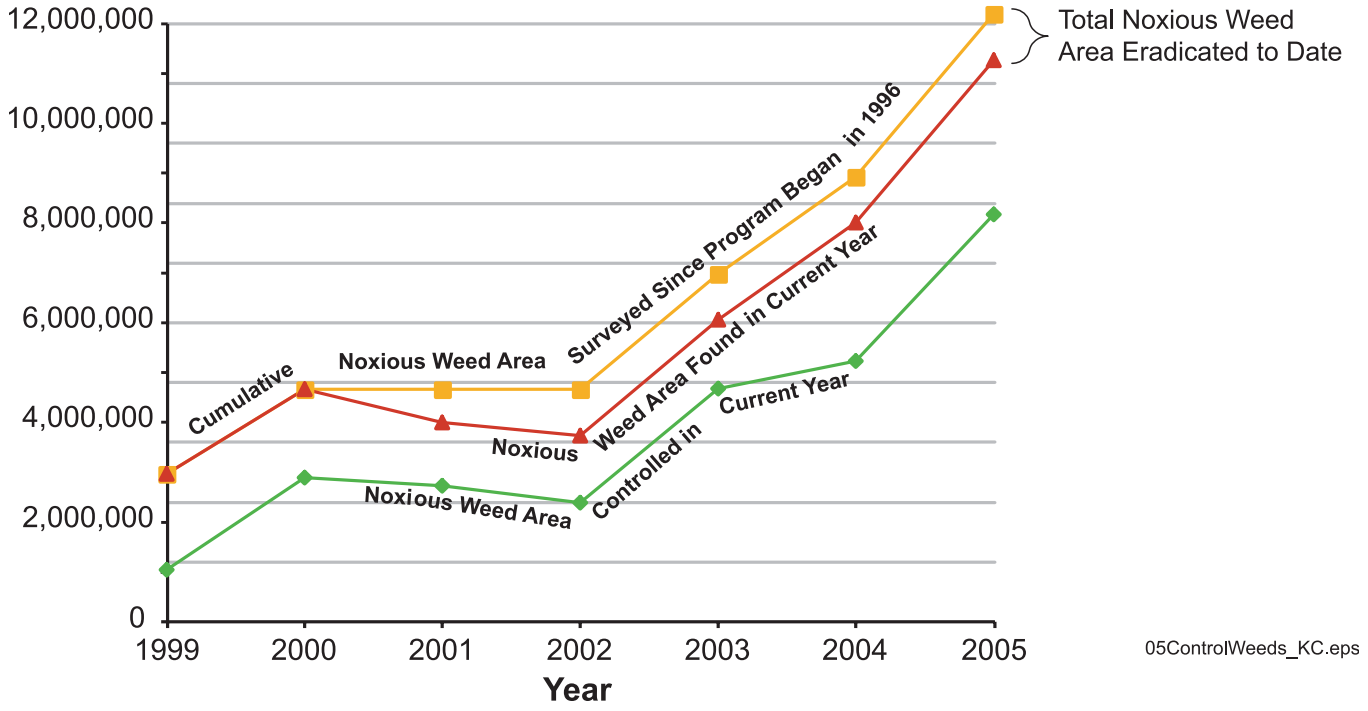
APPENDIX H

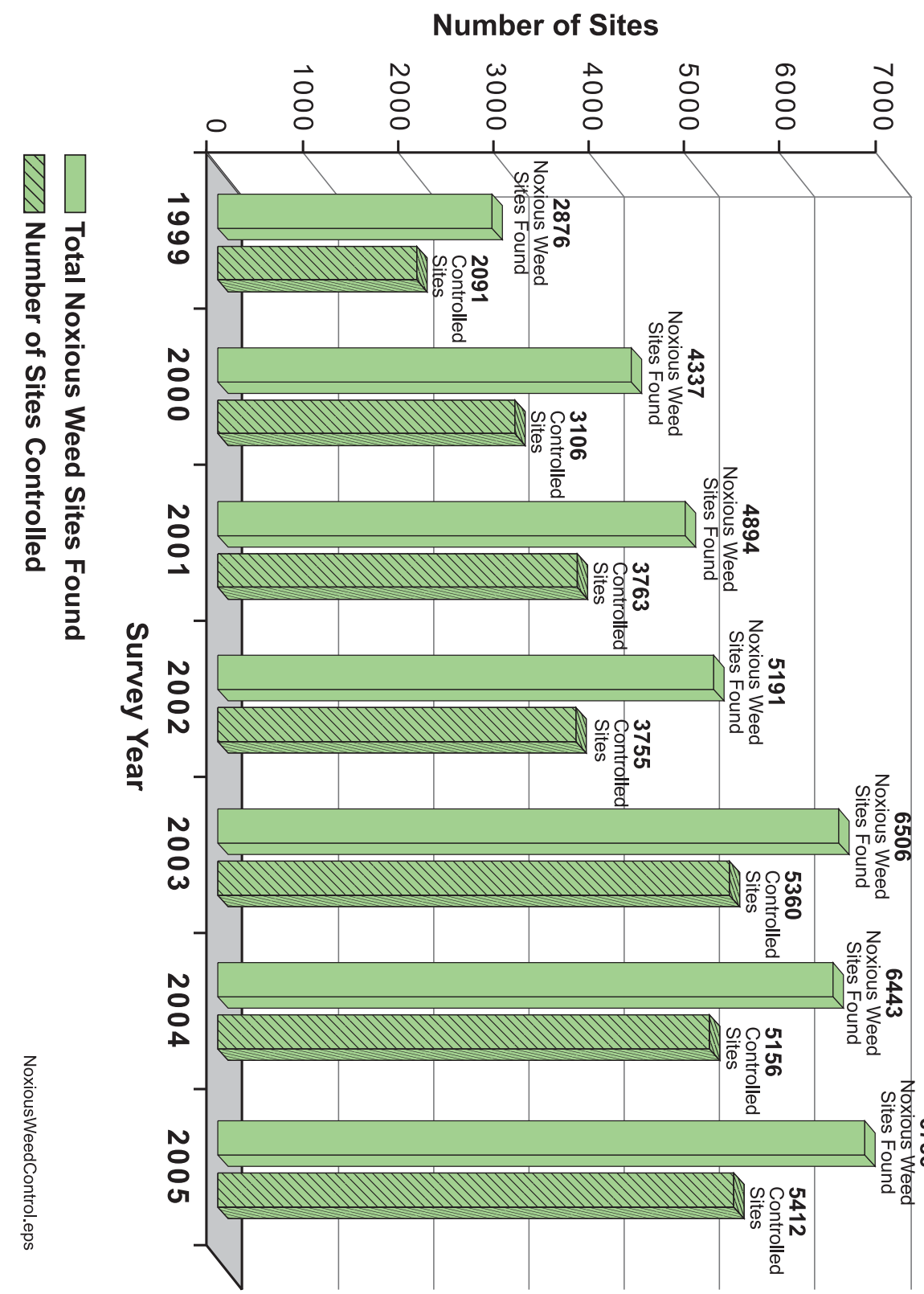
Control of Noxious Weeds in King County: 1999-2005

Noxious Weeds in King County: Number of Infestations Found and Controlled 1999-2005

Tansy Ragwort
Class B Noxious Weed

Control of Noxious Weeds in King County: 1999-2005





NoxiousWeedControl.eps