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## County Lands

King County has direct ownership of approximately 4,000 parcels including parks, trails, open space and storm water retention ponds. The county also maintains approximately 3,500 linear rights-of-way miles along county roads. As owners, King County is responsible for controlling listed noxious weeds found on their property.

In an effort to improve the management of noxious weeds on County lands, and to ensure speedy resolution of complaints, the King County Council approved a budget proviso during 2002 to create a new County Land 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.

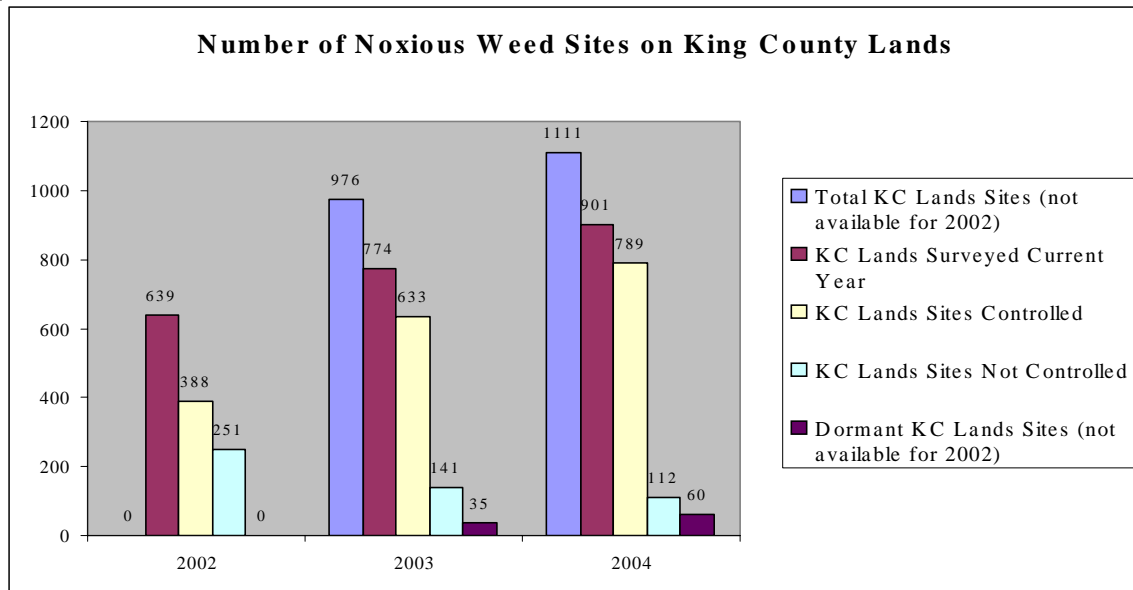
To reduce the number of complaints, the County Lands Specialist, working with seasonal weed specialists, surveyed as many county-owned parcels as possible. The primary focus during 2005 was along road rights-of-way areas. In addition to surveying, training was provided to Roads staff as well as county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

### 2004 County Lands Highlights

- There were 11 noxious weed complaints on County managed lands. This was down from 12 complaints logged in 2003, and 58 logged in 2002. The majority of complaints were for noxious weeds on road rights-of-way and two in storm water retention ponds. All complaints were responded to 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, 901 county managed parcel and road noxious weed sites were surveyed during 2004. Of these surveyed sites, 789 sites (88%) were controlled, up from 633 sites (82%) in 2003 and 388 (61%) in 2002 (Figure 4).
- A total of 503 unincorporated county roads were surveyed. This represents an increase of 68% from 342 county roads surveyed in 2003. An additional 62 roads were surveyed in incorporated areas that contract with King County Roads Maintenance. Surveys for noxious weeds on county roads documented 719 sites. Control was achieved on 88% (636) of these infestations.
- There are 75 known noxious weed infestations in storm water retention ponds documented in the program's database. All sites were surveyed and control was achieved on 93% (70) 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.

- An interdepartmental project involving Flood Hazard Reduction Services, King County Parks and Road Maintenance Section was successfully undertaken to control a major yellow hawkweed, purple loosestrife and tansy ragwort infestation found along a Snoqualmie river levee during 2003.
- In 2004, 48 county park sites were surveyed including seven new parks and three regional trails. Again as in past years, the Noxious Weed Control Program and Parks worked together controlling the noxious weeds along the Cedar River trail.

**Figure 4: Number of Noxious Weed Sites on King County Lands 2002–2004**



### 2004 Aquatic Critical Areas Highlights

The invasion of aquatic critical areas by noxious weeds is a major source of degradation and habitat loss for a number of important wildlife species, including the endangered Puget Sound salmonids. The Aquatic Noxious Weed Specialist coordinated a wide range of noxious weed control activities in aquatic critical areas in 2004. The known major infestations of Class A and B noxious weeds in aquatic critical areas are shown in Table 5.

The treatment 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 one of these widespread infestations 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.

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Overall, 83% of the recorded noxious weed infestation sites and 69% of the recorded area of noxious weeds in aquatic critical areas were controlled in 2004 (Table 5). Both of these results show an increase in control of noxious weeds in aquatic critical areas from previous years (70% of the sites and 53% of the area was controlled in 2003).

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 since an aquatic infestation's size, impacts, and cost to control can increase exponentially in a short period of time. Two examples of the early detection/rapid response approach for new aquatic infestations pursued during 2004 are:

- Rapid response to our discovery of Brazilian elodea (*Egeria densa*) in Dolloff Lake in autumn 2003. The program was awarded a \$15,000 Department of Ecology grant for comprehensive underwater survey and control work. The project began with a public meeting with the Dolloff Lake residents in early June 2004. Just one large, dense patch was identified near the boat launch (the probable site of its introduction); divers conducted one day of hand pulling in July, and program staff added an additional day in September using snorkels. Work for 2004 was completed on November 17 by installing and securing a bottom barrier over this dense patch covering about 2,000 feet.
- A well-established infestation of water primrose (*Ludwigia hexapetala*) was discovered in wetlands adjacent to Taylor Creek, about 1 mile upstream of the confluence with the Cedar River. This is the only significant infestation of this serious aquatic weed in King County. The site was treated with an EPA-approved aquatic herbicide formulation and surfactant. Initial post-application monitoring showed an almost 100% control of the mature plants.

**Other 2004 highlights in aquatic critical areas include:**

- KCNWCP continued to work with King County Lake Stewardship on (*Hydrilla verticillata*) control in Pipe Lake/Lake Lucerne. This is the only infestation in Washington of this infamous Class A noxious weed, considered one of the most problematic aquatic plants in the U.S. Regular monitoring and adaptive management allowed for reduction in the number of herbicide (fluridone) treatments from five in 2003 to three in 2004.
- Worked with an East King County landowner to develop a new eradication strategy for the only significant county infestation of parrotfeather (*Myriophyllum aquaticum*). Eradication of parrotfeather at this site is of great public benefit, as it is connected to Vasa Creek and Lake Sammamish. Due to the small size of the total infestation, and the threat to public resources involved, the program assisted by performing an in-house application of an aquatic herbicide formulation. Initial monitoring showed a 90%+ control, and our Program will continue to follow-up through eradication.

- Conducted our first full shoreline GPS survey of Lake Sammamish by boat in 2004. This survey was done in preparation for the development of a comprehensive long-term plan to address the large garden loosestrife (*Lysimachia vulgaris*) infestation in this watershed. Lake Sammamish is the “headwaters” for this regionally significant infestation that also impacts the length of the Sammamish River and northern Lake Washington. There are no known garden loosestrife infestations of this size anywhere else in the U.S.
- KCNWCP facilitated meetings between the Washington Park Arboretum, Seattle Parks, and the UW Center for Urban Horticulture to plan a coordinated strategy to respond to the invasion by garden loosestrife (*Lysimachia vulgaris*) of Foster Island/ Marsh Park, Duck Bay, and the Union Bay Natural Area. An IPM strategy was agreed upon by the partners, and the first steps of the plan were implemented in August 2004.
- The Aquatic Weed Specialist continued to coordinate the Washington State Knotweed Working Group that was established in autumn 2003. In February, a small group from the team testified in Olympia in front of the Senate Agriculture Committee which resulted in \$500,000 per year being added to the WSDA budget for both 2004 and 2005 specifically for invasive knotweed control.
- Surveys on 15 lake systems: (Spring, Pipe/Lucerne, Cottage, Desire, North, Dolloff, Moss, Burien, Killarney, Borst, Sammamish, Margaret, Marcel, Leota, and Mud)
- Surveys on 14 creeks or river segments: (Longfellow, Newaukum, Miller [2 reaches], Thornton, Richards, Kelsey, Swamp, Judd, Issaquah, Green [3 reaches], Mill)
- Surveys on 14 wetland systems: (Juanita Bay, Rutherford Slough, Bassett Pond, Heyer Point Park (KVI beach), Fern Cove, Raab’s Lagoon, Robinson Point Park, Dumas Bay, Peasley Canyon, Poverty Bay/Lakota, Walker Creek headwaters, Foster Island/Marsh Park, Tracy Owen Park, Swamp Creek Park)

**Table 5: Aquatic Critical Area Weed Control in 2004**

| Aquatic Weed       | Number of Sites | Number Controlled | Area Found (Square Feet) | Areas Controlled (Square Feet) |
|--------------------|-----------------|-------------------|--------------------------|--------------------------------|
| Common Reed        | 2               | 0                 | 6300                     | 0                              |
| Garden Loosestrife | 72              | 55                | 289,915                  | 194,360                        |
| Parrotfeather      | 2               | 1                 | 2010                     | 2000                           |
| Policeman’s Helmet | 98              | 88                | 159,244                  | 71,844                         |
| Purple Loosestrife | 644             | 538               | 665,768                  | 508,092                        |
| Water Primrose     | 1               | 1                 | 4500                     | 4500                           |

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## State and Federal Lands

The State of Washington is one of the largest landholders in King County and the Mount Baker Snoqualmie National Forest occupies more than one quarter of King County. The State and Federal Lands Noxious Weed Specialist and other program staff worked extensively with state and federal land managers to survey weed status on these lands and ensure that weed management in these areas was consistent with the community standard achieved on neighboring private lands.

### Washington State Department of Transportation (WSDOT)

Highways and road rights-of-way are one of the most common pathways by which weeds move across a landscape. Weed seeds can be transported unintentionally via tires, attached to the wheels or undercarriage, or from uncovered loads. A wide variety of weed species can be found along roadsides including 33 different noxious weed species which have been identified on WSDOT rights-of-way. Roadside species can range from threats to public health like giant hogweed, agricultural weeds such as spotted knapweed and tansy ragwort, to wetland and riparian weeds like purple loosestrife. Achievements on WSDOT managed lands include:

- 320 linear miles of highway (670 total miles in the right of way) were surveyed for noxious weeds.
- 938 noxious weed infestations have been recorded on state highways since the weed control program's inception in 1995. In 2004, only 542 of those sites are currently infested, indicating that eradication is progressively being achieved on infestations on state highways.
- 453 of the 542 active infestations in 2004 have been historically infested which is an 18% decrease in observed infested historic sites compared to 552 in 2003.
- 398 of the 542 active infestations (73%) were controlled in 2004 which is an improvement from the 72% control achieved in 2003.
- 89 new noxious weed infestations were observed in 2004 which is an increase from the 35 new infestations found in 2003, but fewer than the 100 new infestations found in 2002.

### Washington State Parks and Natural Areas

In 2004 Washington State Parks and Washington State Department of Natural Resources actively partnered with the state lands liaison and achieved weed control at several significant sites including:

- Survey and control of 3-acre (133,000 sq ft) infestation of yellow hawkweed on WSDNR land along Maple Valley-Black Diamond Road (SR-169).
- Survey and control of noxious weed infestations at Lake Sammamish, Nolte, Saltwater, West Hylebos State Parks and State Parks headquarters in Auburn, WA.



- Continued trail survey of Tiger Mountain State Forest with significant tansy ragwort infestation off SR-18 access.
- Invasive knotweed was controlled at Flaming Geyser State Park and portions of Auburn Narrows Park owned by WDNR as part of a regional Cooperative Weed Management Area targeting knotweed along the Upper and Middle Green River. Over 23,600 sq ft of knotweed was controlled using new stem injection technology and 66,700 sq ft of knotweed at the entrance of Flaming Geyser State Park was mowed and late season foliar treatment was applied to knotweed regrowth.

### **Washington State Department of Fish and Wildlife (WDFW)**

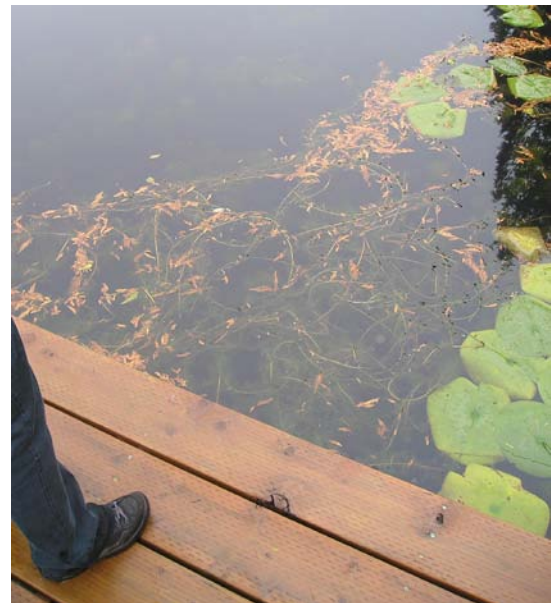
In 2004, all 34 public boat launches in King County were surveyed resulting in the discovery of 17 noxious weed infestations; 100% of these sites were controlled in 2004. Additionally, purple loosestrife sites along Lake Desire, Fish Lake, Lake Killarney, North Lake, Panther Lake, Spring Lake and Sammamish River were manually controlled or impacted by *Galerucella* beetles, a biological control agent.

Invasive knotweed on WDFW managed lands along the Green River were also included in the Cooperative Weed Management Area. This included the fish hatcheries along Soo's Creek and near Kanaskat Palmer State Park, and a public fishing site near Soo's Creek confluence with the Middle Green River. In 2004, over 27,800 sq ft of knotweed was treated by stem injection.

### **Mt. Baker-Snoqualmie National Forest**

In July 2004, King County Noxious Weed Control Program received funding for the Green-Duwamish Cooperative Weed Management area through a USDA Forest Service Cooperative Forestry Assistance Grant. This funding supported survey and control activities for invasive knotweed species in the Green-Duwamish watershed.

A similar knotweed focused control project has been identified for the South Fork of the Skykomish River based on surveys conducted in cooperation with Mt. Baker-Snoqualmie National Forest staff in 2003. Additional external funding sources are being sought in order to support a landscape-scale project for knotweed control along the Skykomish River.



**In 2004, all 34 public boat launches were surveyed for noxious weeds. Pictured above is a milfoil infestation found in Lake Leota.**

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## Geographical Information System (GIS) Technology

ArcView GIS software has become an important tool used by program staff to map noxious weed distribution, determine property ownership, identify problem areas, plan and develop projects, and visually communicate the impacts of noxious weeds to a variety of audiences.

In 2004, King County Noxious Weed Control Program staff collaborated with the King County GIS Center to post our noxious weed distribution information on King County's Imap website, allowing users to

view spatial information in a web-based format for free. This system has been widely used by the general public. Since Imap is a web-based GIS format, users do not need to purchase or be familiar with applications like ArcView or ArcGIS which require moderate skill to use the software. The noxious weed Imap page can be found at:

**[http://www.metrokc.gov/gis/mapportal/iMAP\\_main.htm](http://www.metrokc.gov/gis/mapportal/iMAP_main.htm)**

Increasingly, Global Positioning System (GPS) technology is being used by program staff to record noxious weed data and imported into ArcView GIS for mapping and analysis. In 2004, 113 sites were recorded using GPS typically in areas such as parks and forested lands, roadsides, wetlands, riparian areas, pastureland, and recreational trails.

An ongoing goal for the program is to annually develop complete countywide noxious weed distribution maps. In 2004, noxious weed spatial data has been shared with students at the University of Washington, the Seattle Urban Nature Project, and King County Department of Natural Resource staff.

Noxious weed spatial data has been used in 2004 for programmatic project planning and to develop presentation materials supporting the Green-Duwamish Cooperative Weed Management Area. Maps created using noxious weed spatial data have been used to communicate with property owners with noxious weed infestations, enhance reports, and apply for external funding.



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

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## Planning and Coordination

Program staff work with communities to develop community standards for weed control and to coordinate weed control efforts to maximize effectiveness and efficiency. One mechanism to achieve local and statewide coordination of weed management is through implementation and monitoring of weed management plans. 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 commenced in 2004 on the development of a County-wide management plan for Tansy Ragwort (*Senecio jacobaea*).

Processes for setting priorities and facilitating planning and coordination of weed management by landowners at the landscape scale are being developed. Cooperative Weed Management Areas (CWMA's) are one mechanism that is being used to achieve this goal. A CWMA refers to a local organization that integrates all noxious weed management resources 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.

Program staff also work to ensure that our weed management objectives and activities are integrated with the other natural resource management programs of King County. Increased levels of coordination and integration with other county programs was achieved in 2004 including:

1. Working with other programs in the Department of Natural Resources and Parks as well as the Department of Development and Environmental Services regarding the noxious weeds and invasive plants provisions of the Critical Areas Ordinance which went into effect on January 1, 2005.
2. Working with programs promoting opportunities for restoration and stewardship (e.g. Small Habitat Restoration Program, Land and Water Stewardship Program). In particular there was extensive collaboration with the development and implementation of the farm management, forest management and rural stewardship planning processes.
3. Coordination of aquatic weed activities with the Lake Stewardship and River Management Programs.
4. Coordination with resource use programs such as the Agriculture and Forestry Programs.

### **2004 Planning and Coordination Highlights**

The Noxious Weed Control Board had extensive input into the development of the Noxious Weed and Invasive Plant provisions of the Critical Areas Ordinance. This resulted



in a greater range of control options to landowner for the control noxious weeds in critical areas and their buffers without a permit. In addition:

- The Program participated in the extensive Water Resources Inventory Area (WRIA) planning efforts that occurred in autumn 2004. The Aquatic Weed Specialist attended the public meetings for WRIA's 7 & 8, and individual meetings for the four subwatersheds of WRIA 9. Consequently, the Program submitted project/site recommendations as well as a comprehensive list of programmatic recommendations. A focus on invasives is essential to the success of these large restoration efforts, and it is important to have language to that effect prominently represented in the formal plans.
- Development of the first Cooperative Weed Management Area (CWMA) in King County covering the Green-Duwamish watershed. This is a voluntary group focussed on developing a coordinated, strategic approach to the control of priority noxious weeds in the Green-Duwamish watershed. To build the foundation for a cohesive group, the program began networking with stakeholders in 2003, and held the first CWMA meeting in September to allow the group's members to chart the direction of the efforts.
- As part of the CWMA planning process, the program was successful in achieving \$34,600 in funding from the USDA Forest Service Forest Health Program for knotweed control in the Green-Duwamish watershed. This successfully implemented the first stage of a control strategy that will provide substantial long-term environmental benefits to the Green-Duwamish riparian ecosystem. The watershed was extensively surveyed and an action plan defined 28 high priority infestations totaling 16.8 acres for control. These priority infestations were successfully controlled with at least 80% initial knotweed cane mortality observed at each site. To be effective over time, this project needs to be the start of long-term strategic knotweed control program. A significant outcome of the project has been the development of the capacity of the CWMA to implement this long-term strategy.



**Applying a bottom weed barrier at Lake Dolloff.**



**Monitoring the results of a knotweed stem injection project in the Green-Duwamish watershed.**

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## 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 and action process that uses the most appropriate pest control methods and strategy in an environmentally and economically sound manner to meet pest management objectives. Table 6 summarizes the range of control techniques used by landholders on noxious weed infestations in 2004.

**Table 6: Comparison of 2004 Landholder Noxious Weed Control Methods (Percent of Infestation Sites where Control Method is Known)**

| Control Method            | Parcel Sites | Road Sites | All Sites |
|---------------------------|--------------|------------|-----------|
| Biological                | 6%           | 0%         | 4%        |
| Chemical                  | 22%          | 62%        | 33%       |
| Manual                    | 38%          | 18%        | 32%       |
| Mechanical (Mowing)       | 22%          | 6%         | 18%       |
| Cultural                  | 1%           | 0%         | 1%        |
| Combination of techniques | 11%          | 13%        | 12%       |

As a component of our IPM approach the program has increased its emphasis on the use of biological control for a number of common noxious weeds. Biological control provides significant potential to assist in the control of widespread noxious weeds such as tansy ragwort, purple loosestrife, Canada thistle, poison-hemlock and St. Johnswort.

### 2004 Biological Control Highlights

Coordination was begun with WSU Cooperative Extension-King County and their newly established biological control coordinator for western Washington, whose work fits into a statewide biological control program. The program initiated a plan to better coordinate the collection and distribution of biological control agents in an effort to increase the effectiveness and efficiency of biological control in King County.

For the control of purple loosestrife, this year's program released 1,800 *Galerucella* beetles at the Auburn supermall. Over 400 *Galerucella* sp. were released at Sammamish Wilmot Gateway Park and another 400 were released at Portage Bay. At the Marymoor Park boardwalk, 775 *Galerucella* beetles were released.

The biological control program for the control of Canada thistle continued this year with the release of 300 *Larinus planus* and 40 galls containing *Urophora cardui* at O'Grady Park. Each gall contains from 5 to 15 insects.

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## Conclusions

The impacts of noxious weeds on the environment, recreation, public health and the economic resources of King County are being significantly reduced by the activities of the King County Noxious Weed Control Program. Continued progress was made towards the operational goals of eradication of Class A noxious weeds and the control of designated Class B noxious weeds. Major accomplishments of the program in 2004 include: 1) incorporation of more flexible noxious weed control options into the King County Critical Areas Ordinance, 2) successful implementation of the first Cooperative Weed Management Area project in King County and 3) delivery of an unprecedented range of education and outreach activities. The program continues to achieve extremely high levels of voluntary compliance with the landowner noxious weed control responsibilities required under RCW 17.10. The public investment in noxious weed control is providing significant environmental, economic and social benefits to the citizens of King County.

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