



# Thirteen Years of Bad Luck: Garlic Mustard in Washington State from 2000 to 2013

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*And special thanks to Greg Haubrich for the statewide maps.*

# Garlic Mustard (*Alliaria petiolata*)

- White-flowered, garlic-smelling biennial herb in the mustard family that spreads by seed
- European native that has spread to North Africa, India, New Zealand, Canada and the United States
- Fast-spreader, early spring growth, prolific seeder, both shade and sun tolerant
- Allelopathic, not used by wildlife, crowds out native plants





# Garlic Mustard: How big is it?





# Garlic Mustard: Where Can it Grow?



Forests



Back yards



Pastures



Wetlands



Hillsides



Trails and Roads



Dryland



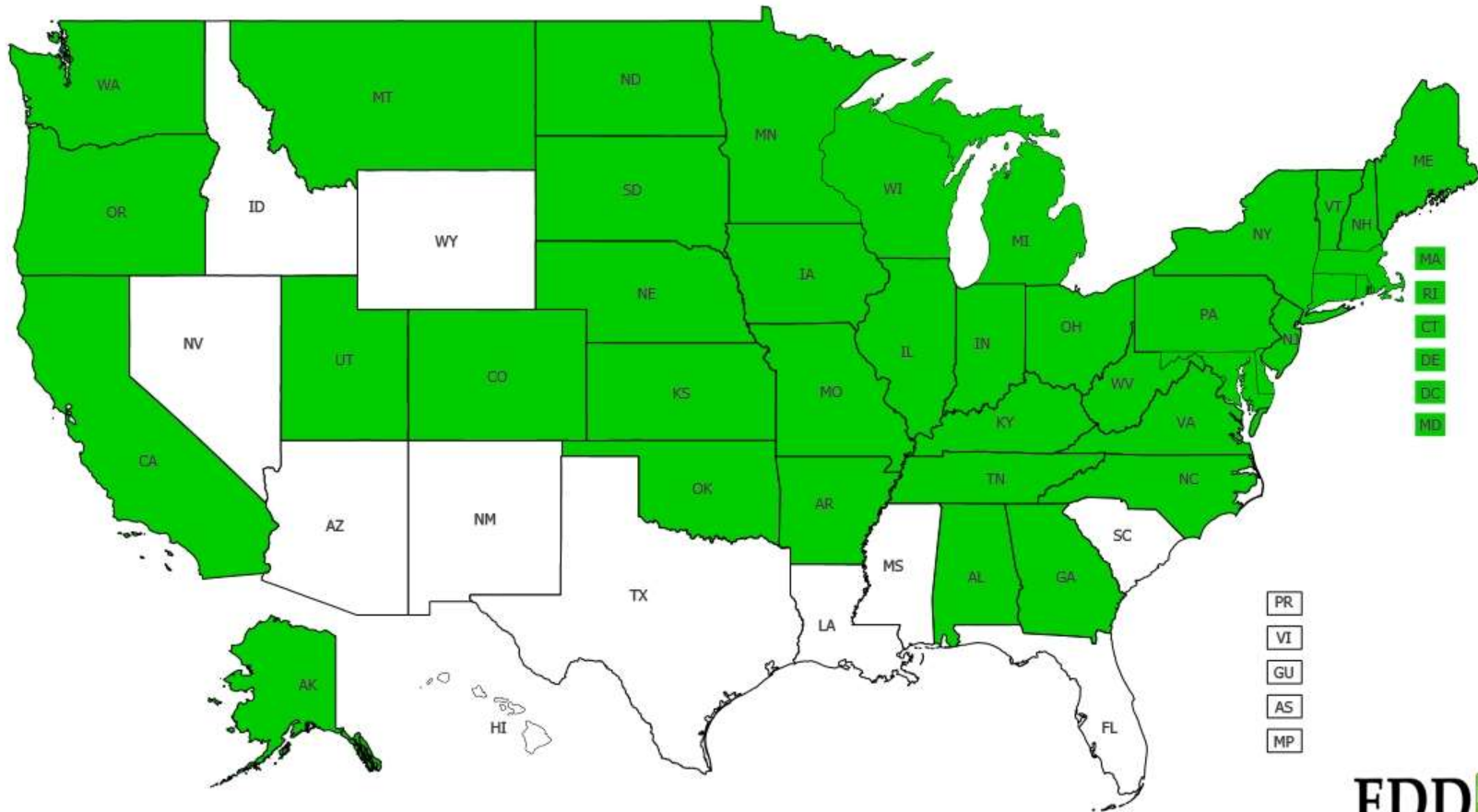
# Garlic Mustard: How Bad Can it Get?



The green covering on the forest floor on the Bartell stream bank in Peoria is almost entirely covered by garlic mustard. Photo credit: Adam Davis, University of Illinois. <http://wssa.net/wp-content/uploads/Garlic-Mustard-Streambank.jpg>

# U.S. Distribution: EDDMapS

*Alliaria petiolata*



Last observation: August 28, 2014 - Map generated: August 29, 2014

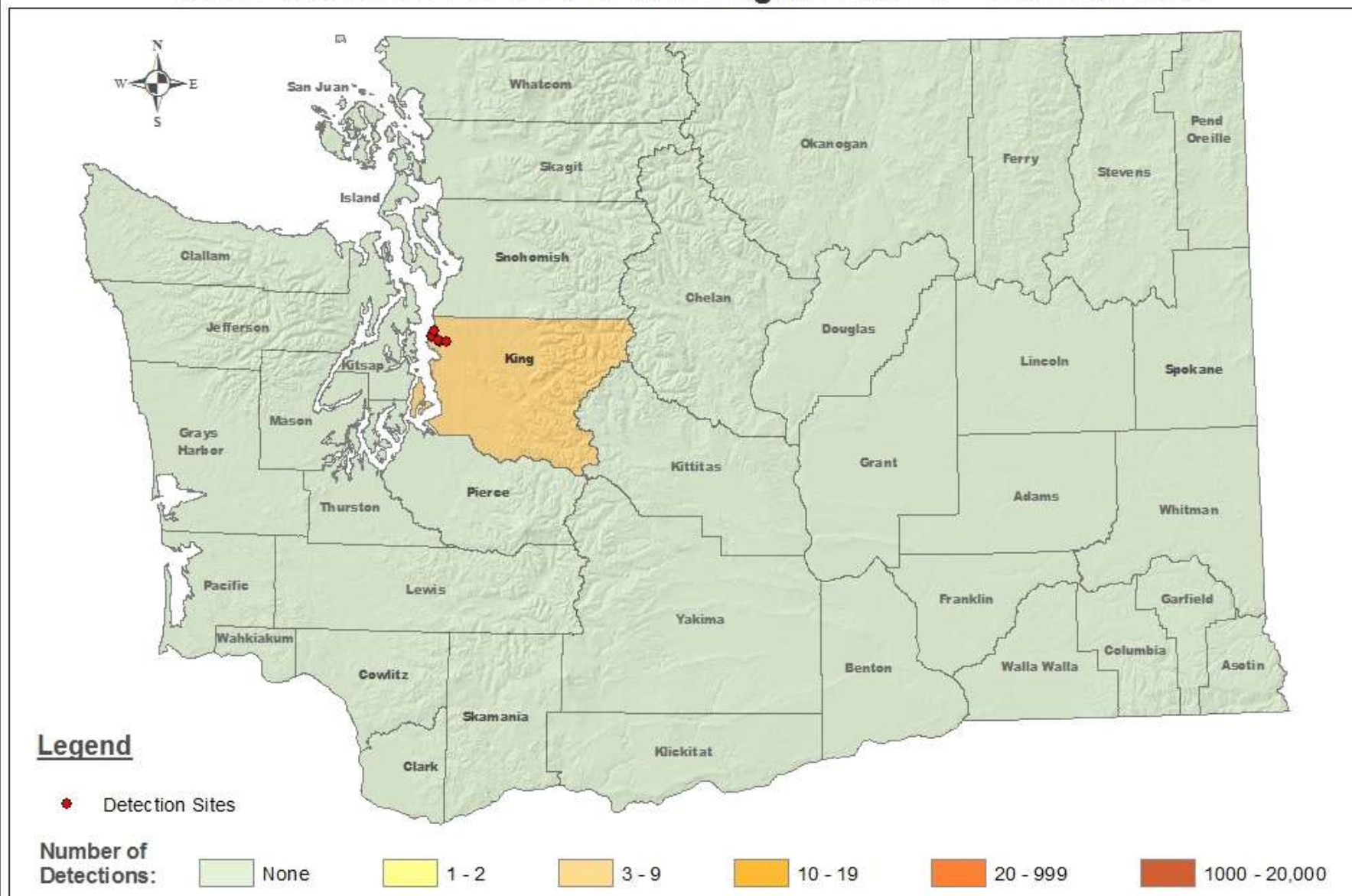
**EDDMapS**  
Early Detection & Distribution Mapping System



# A Washington-Centric Timeline of Garlic Mustard

- 
- 1868 – First collected in the United States at Long Island, NY
  - 1892 – Reported from Idaho
  - 1959 – Reported from Oregon
  - 1998 – A few plants pulled from a park in Seattle, Washington
  - 1999 – Officially identified as occurring in Washington in three Seattle parks, and proposed for state noxious weed list
  - 2000 – Given Class A noxious weed status, eradication required statewide; control begins in earnest in Seattle Parks and the hunt is on to find more plants
  - 2004 – First discovery in WA outside of Seattle (Clark County)
  - 2005 – First discovery outside of Seattle in King County
  - 2008 to 2014 – Discovered in 10 more counties in Washington and many more places in King County

# Garlic Mustard Presence in Washington State for the Year 2000



0 25 50 100 Miles

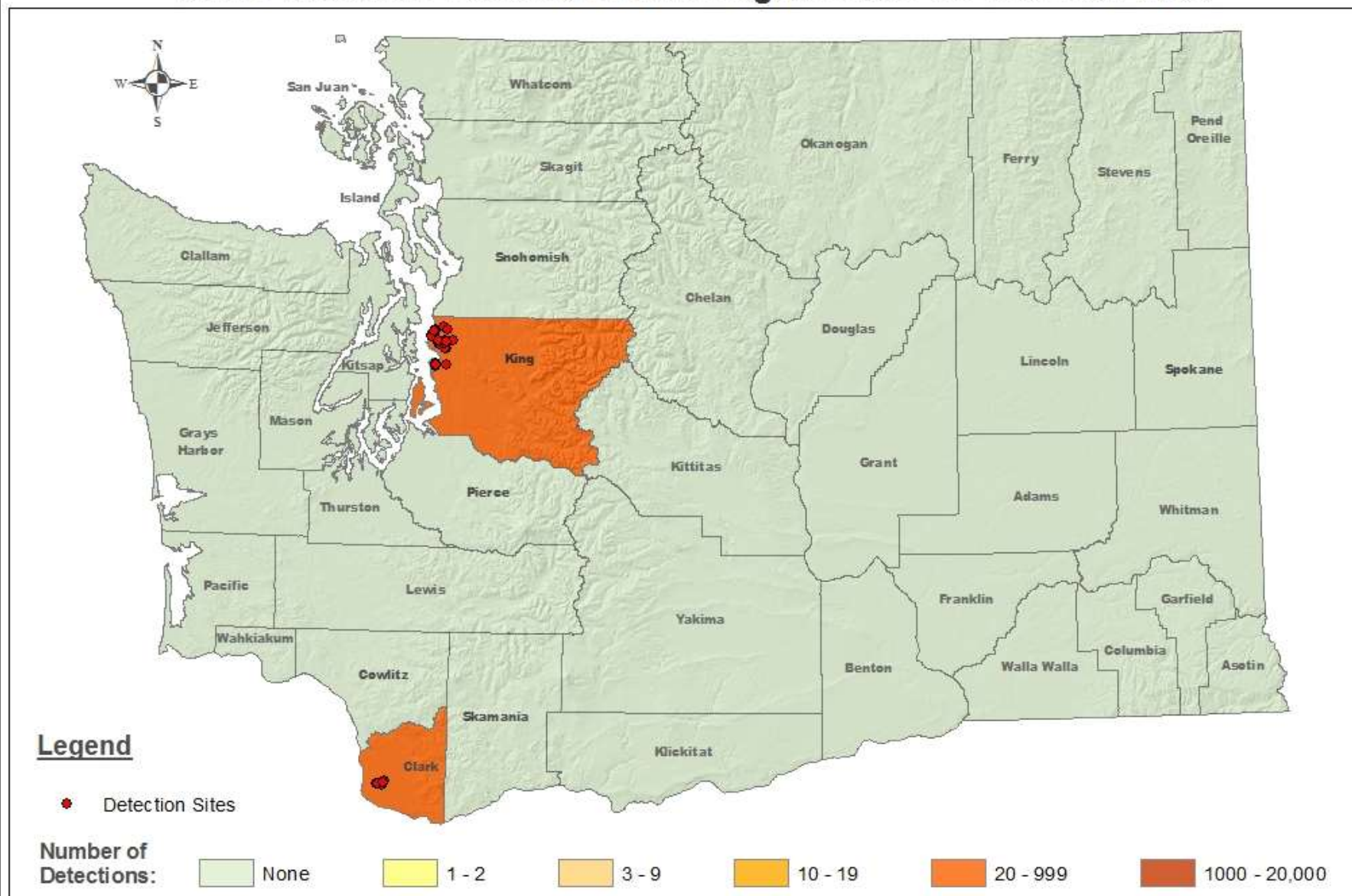
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 Coordinate System: StatePlane WA S. FIPS 4602 Ft.  
 Projection: Lambert Conformal Conic  
 Data Sources: WSDA, County Weed Cooperators  
 Cartography by: Brant Carman, 9/4/14



This Data is provided on an "AS IS," "AS AVAILABLE," and "WITH ALL FAULTS" Basis. The Content of this map and data are from many sources and are NOT warranted to be complete, accurate, or current. All critical information should be independently verified. WSDA and its officials and employees assume no responsibility or legal liability for the accuracy, completeness, reliability, timeliness, or usefulness of any of the information presented here.



# Garlic Mustard Presence in Washington State for the Year 2004



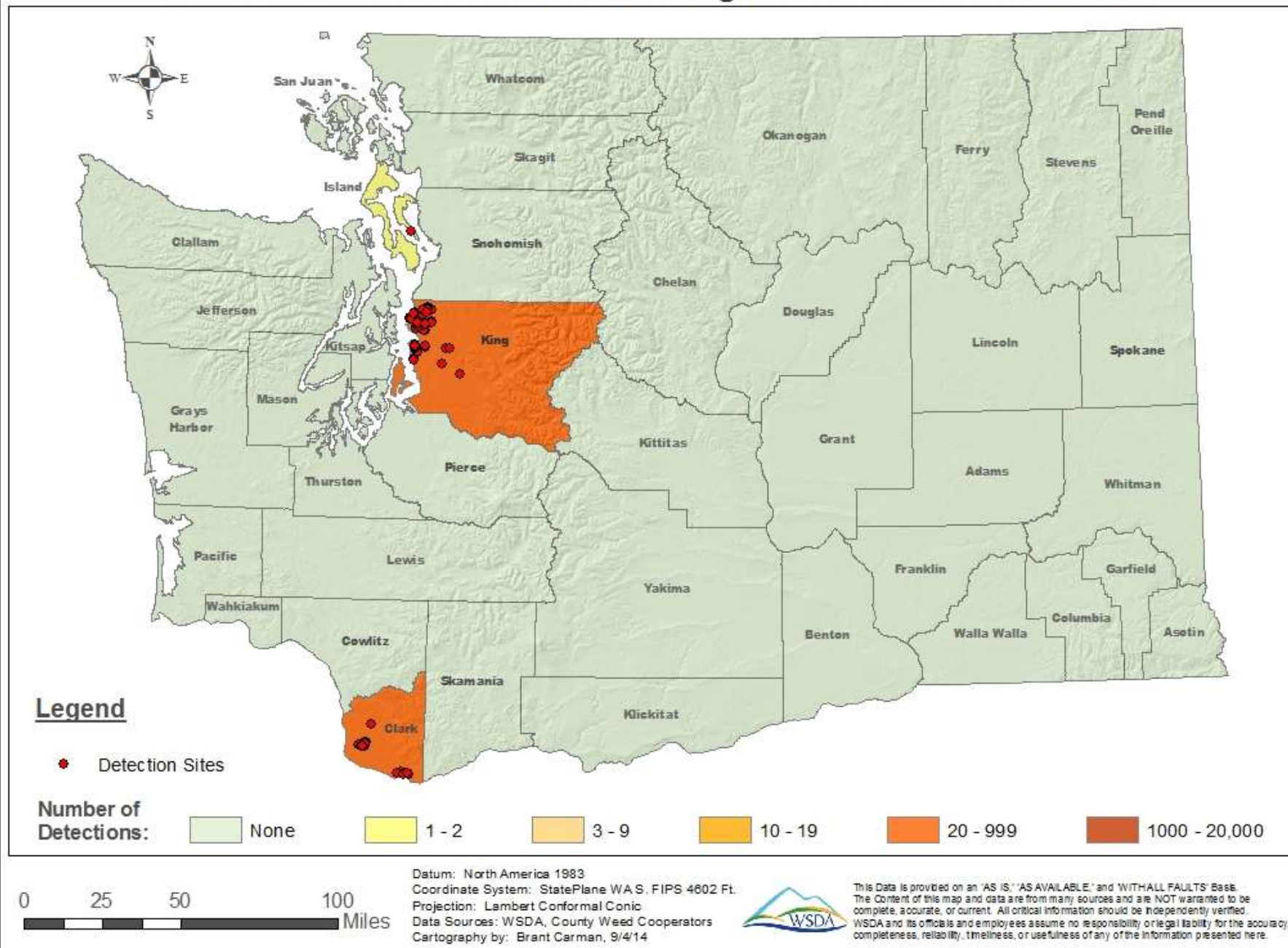
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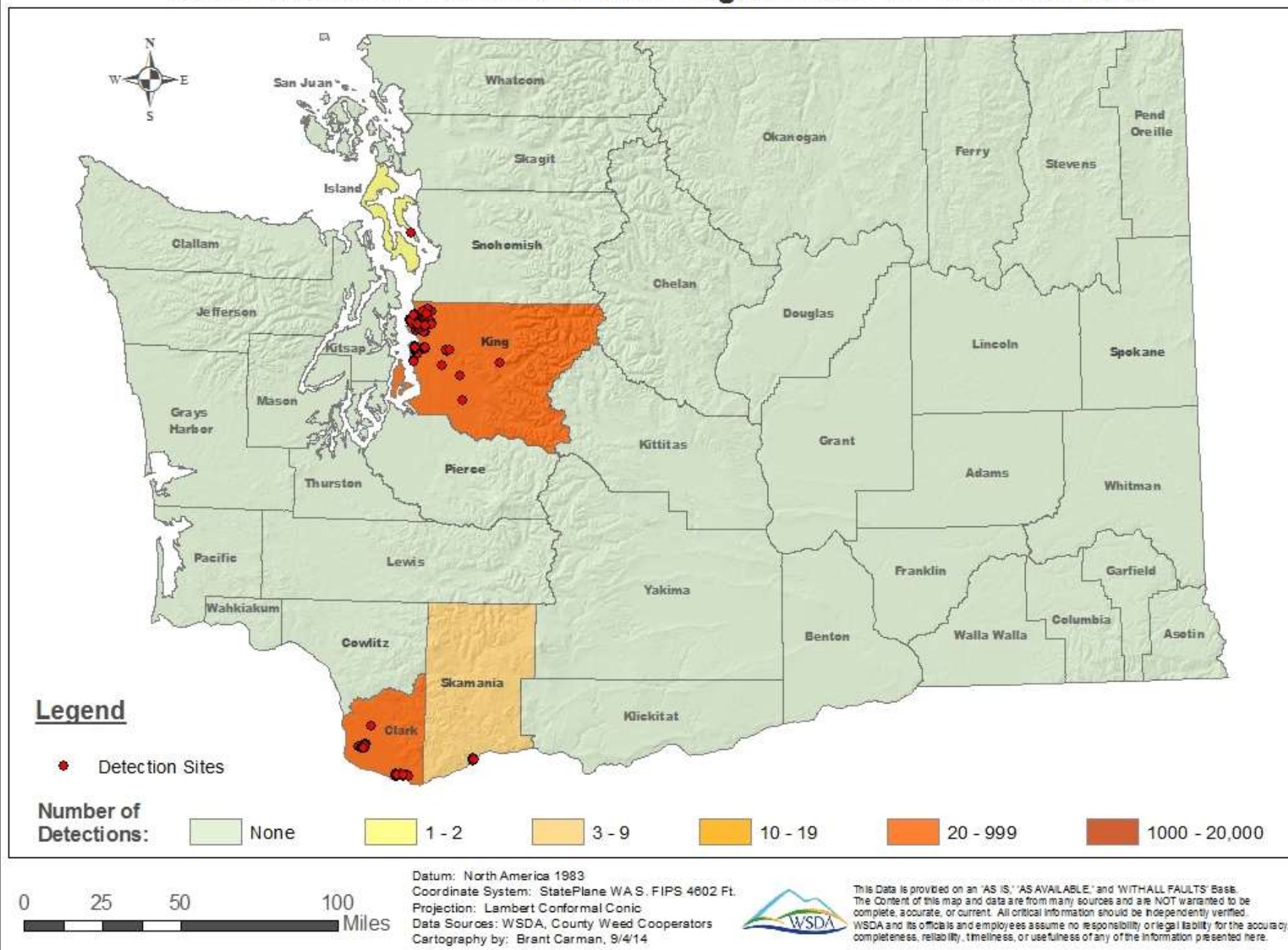
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# Garlic Mustard Presence in Washington State for the Year 2008

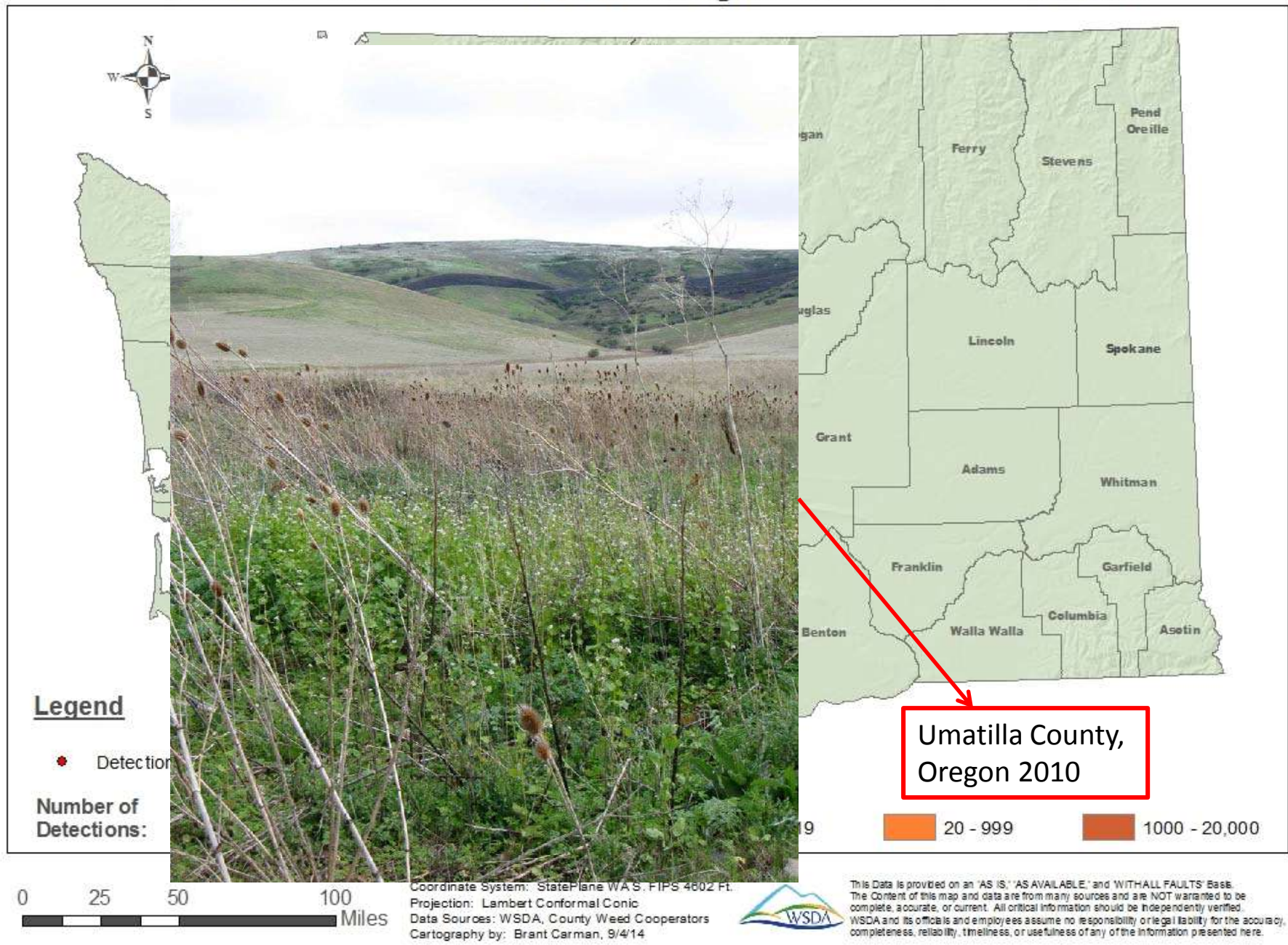




# Garlic Mustard Presence in Washington State for the Year 2009



# Garlic Mustard Presence in Washington State for the Year 2010







 Detection Sites

Number of  
Detections:

1-2

3 - 9

10 - 19

20 - 999

1000 - 20,000



Datum: North America 1983  
Coordinate System: StatePlane W A S. FIPS 4602 Ft.  
Projection: Lambert Conformal Conic  
Data Sources: WSDA, County Weed Cooperators  
Cartography by: Brant Carman, 9/4/14



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# Garlic Mustard Presence in Washington State for the Year 2012



0 25 50 100 Miles

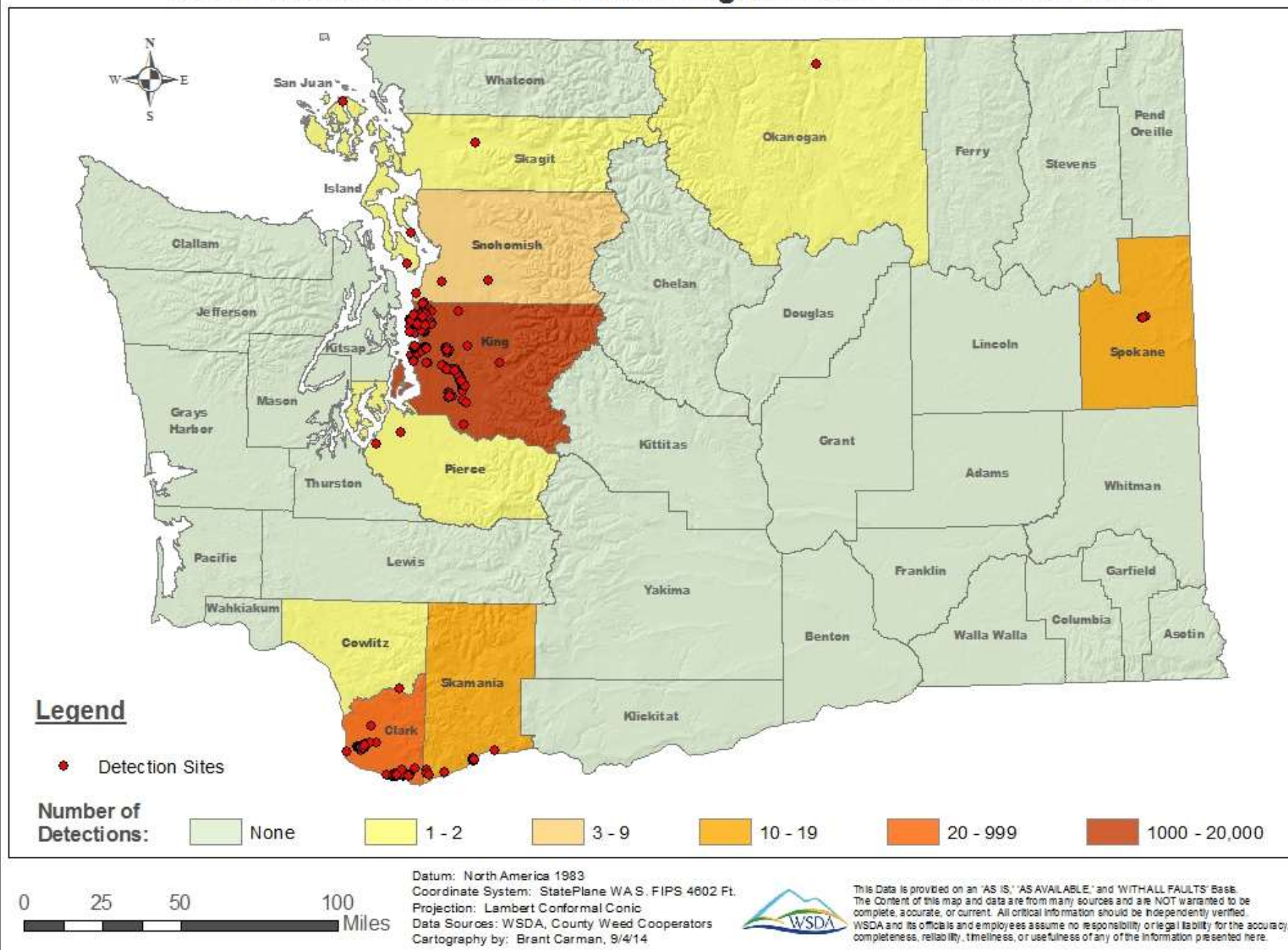
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 Cartography by: Brant Carman, 9/4/14



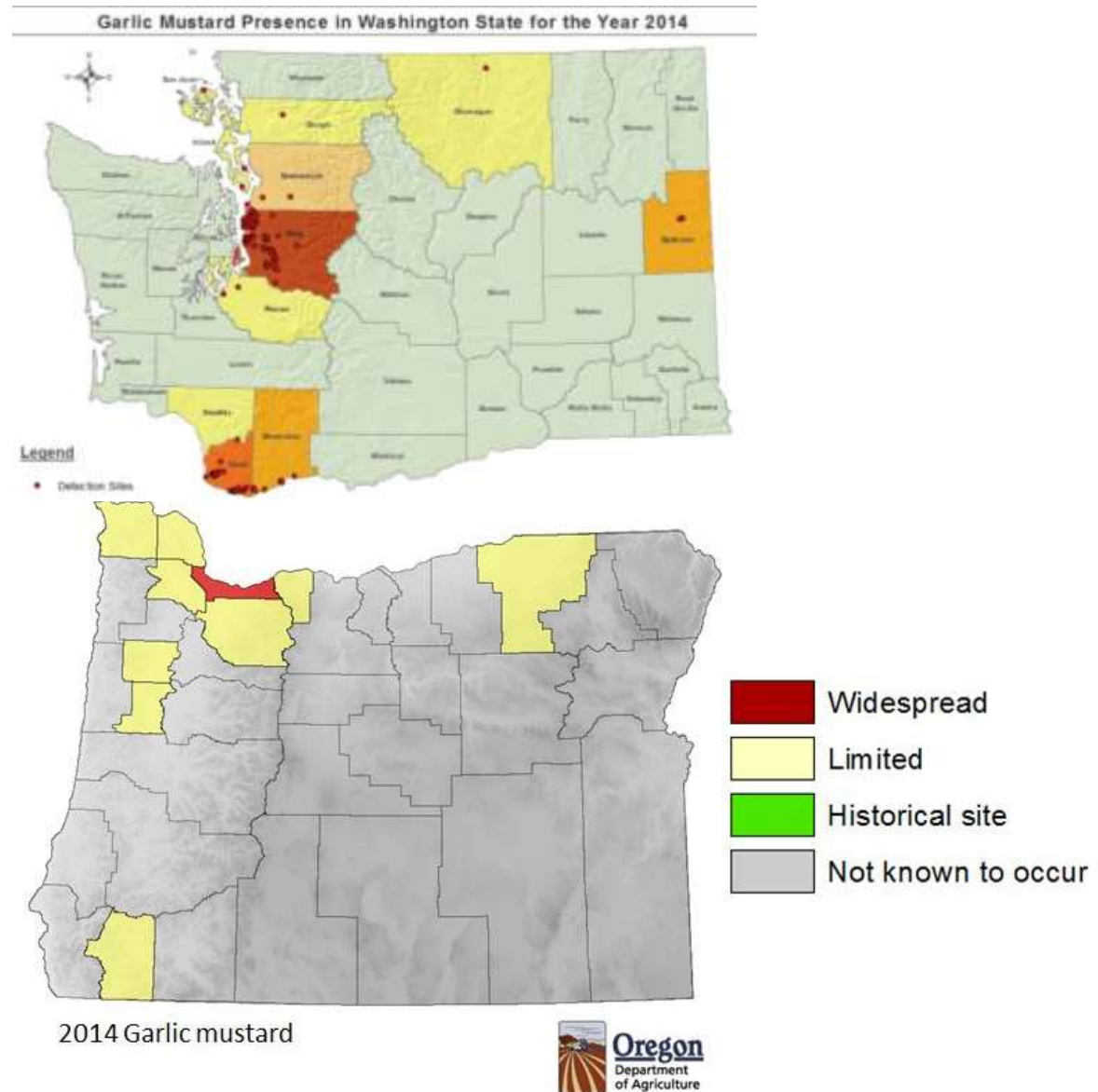
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# Garlic Mustard Presence in Washington State for the Year 2014

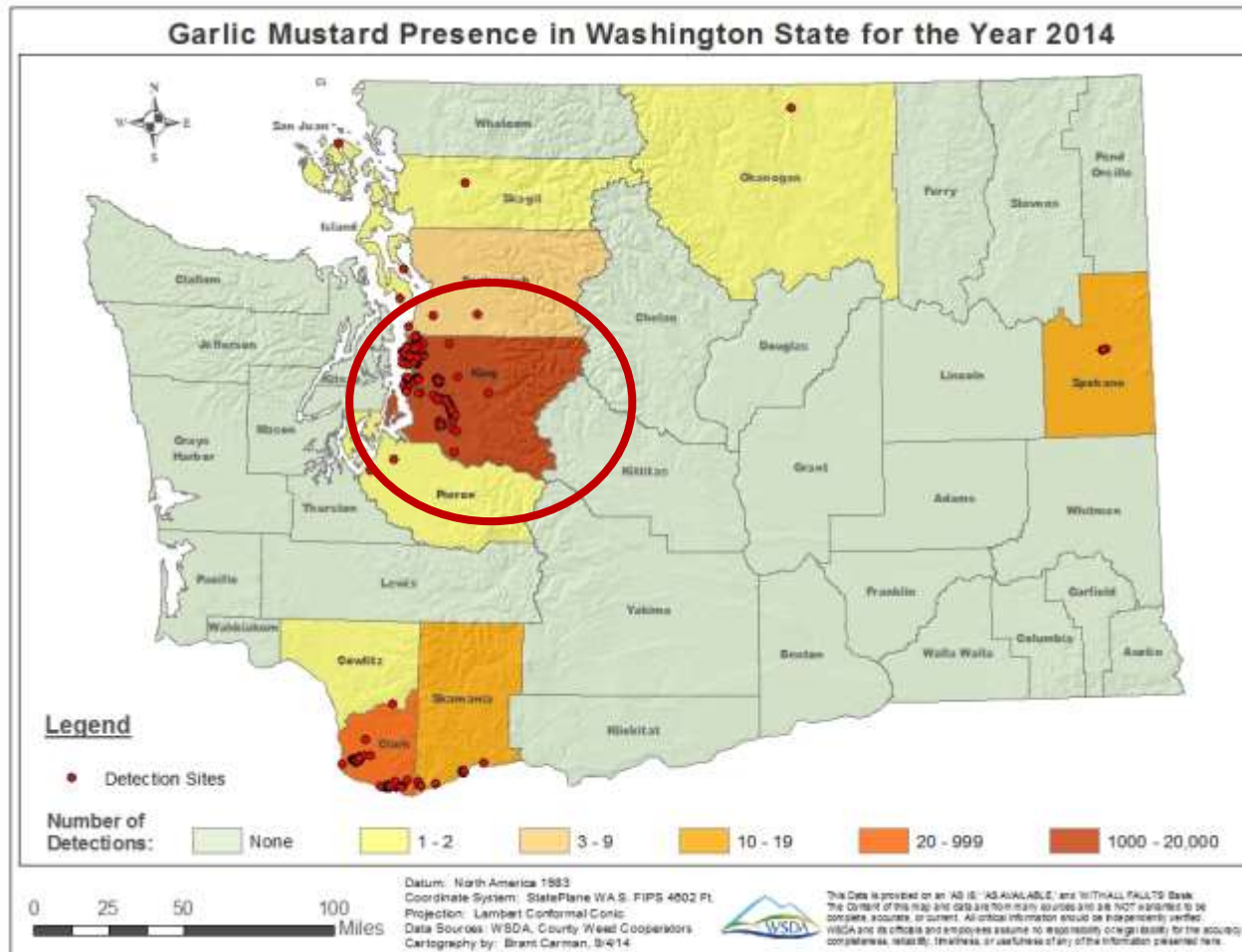


# Distribution in Washington and Oregon

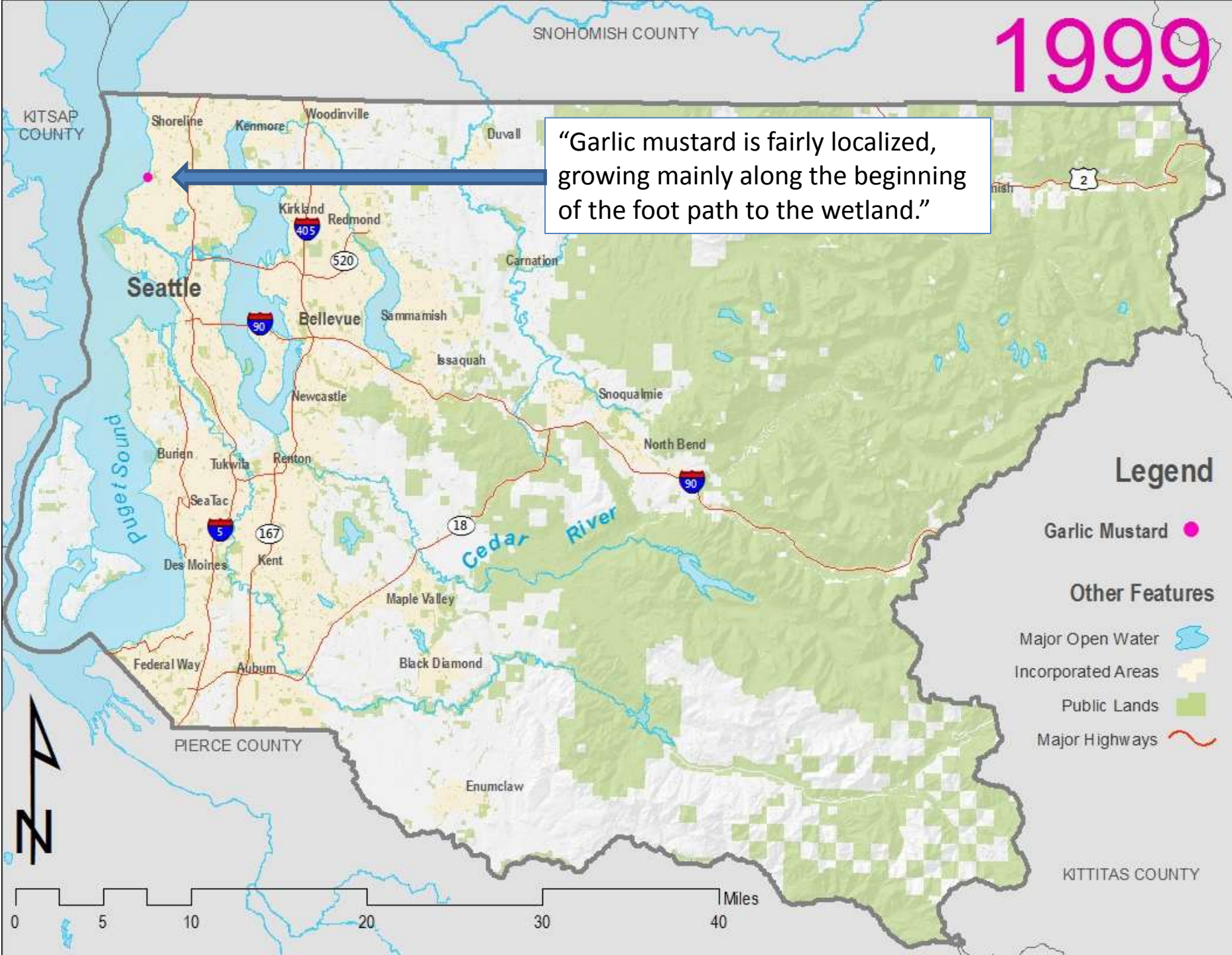




# A Closer Look at King County, Washington

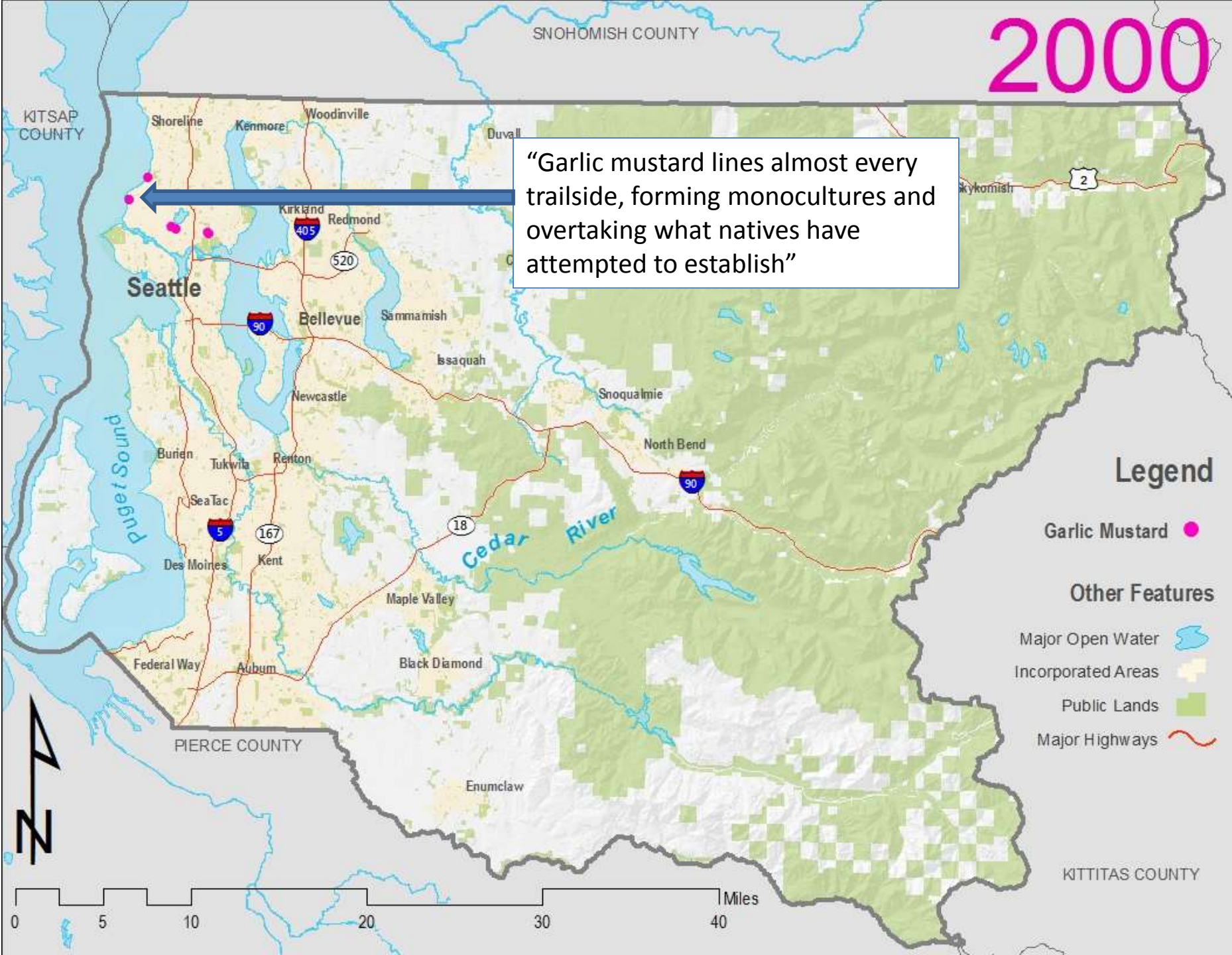


# 1999



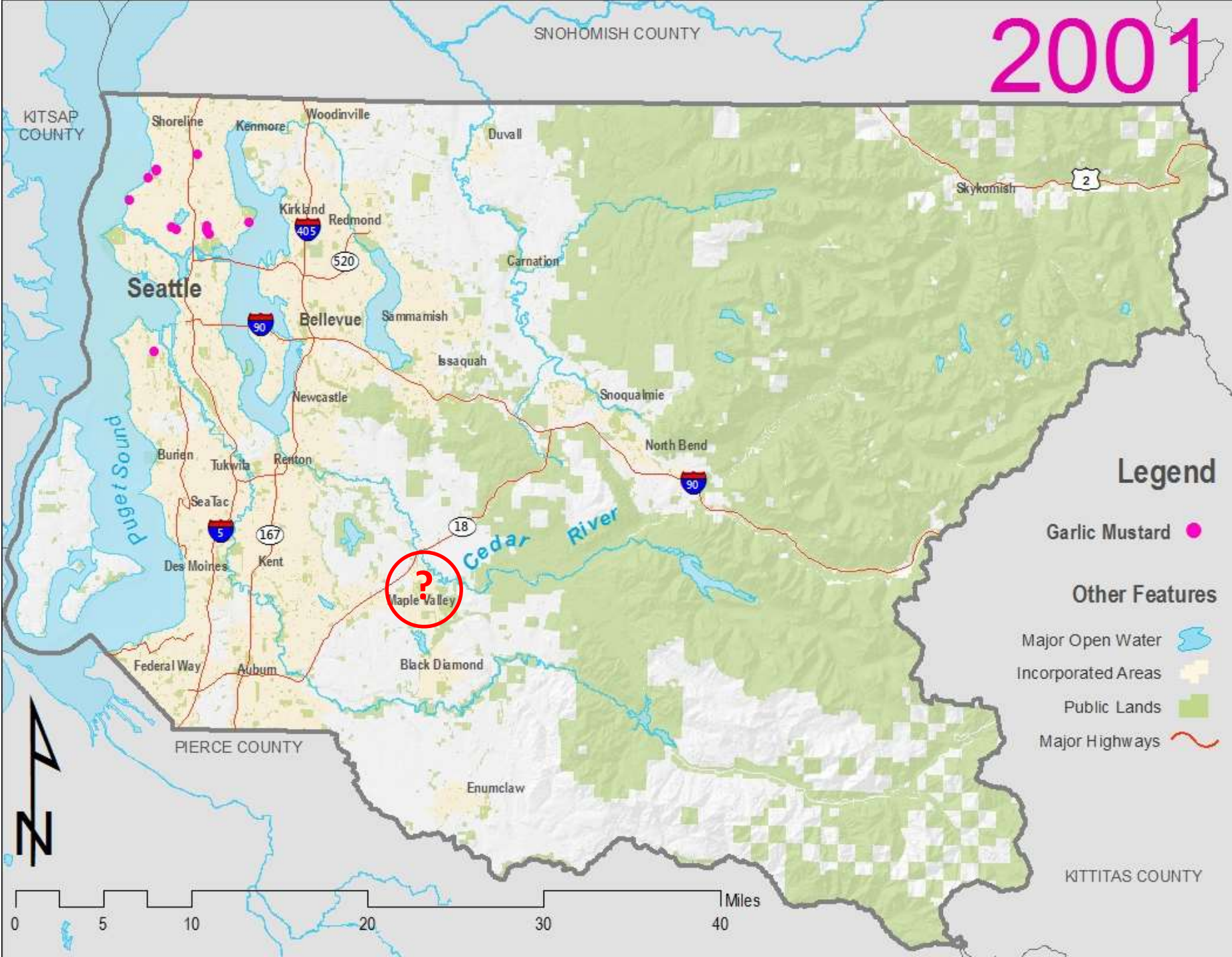


# 2000



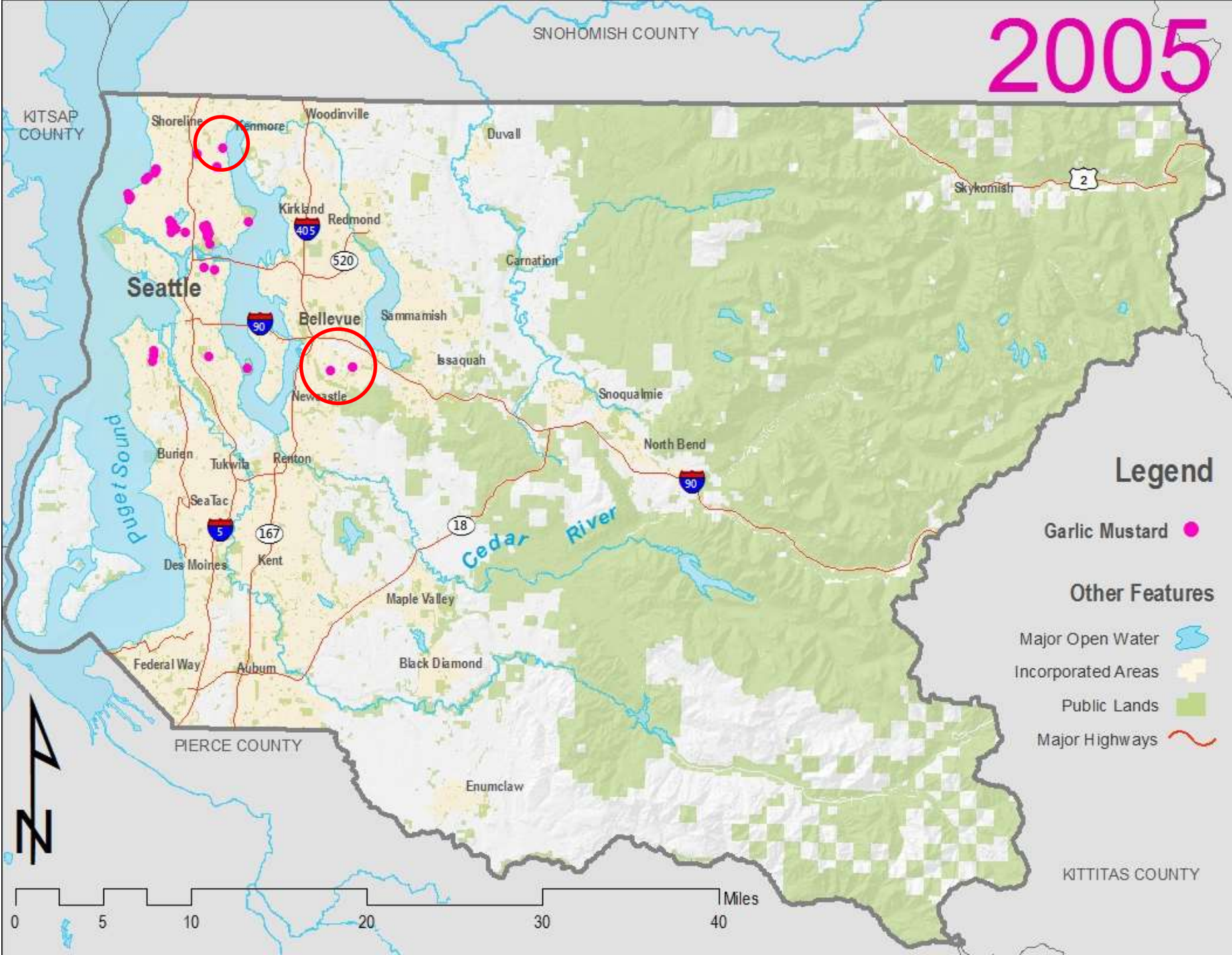


# 2001



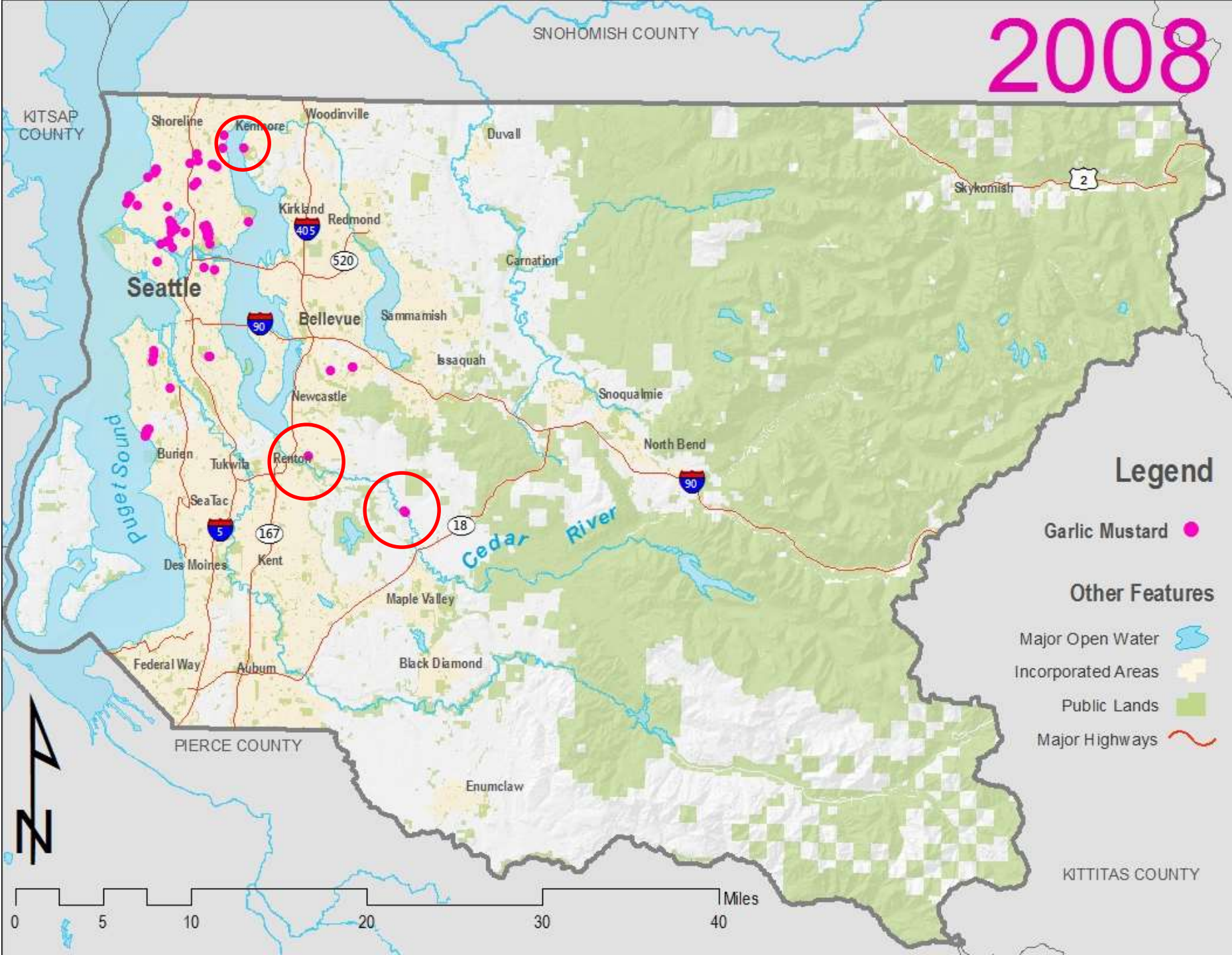


# 2005



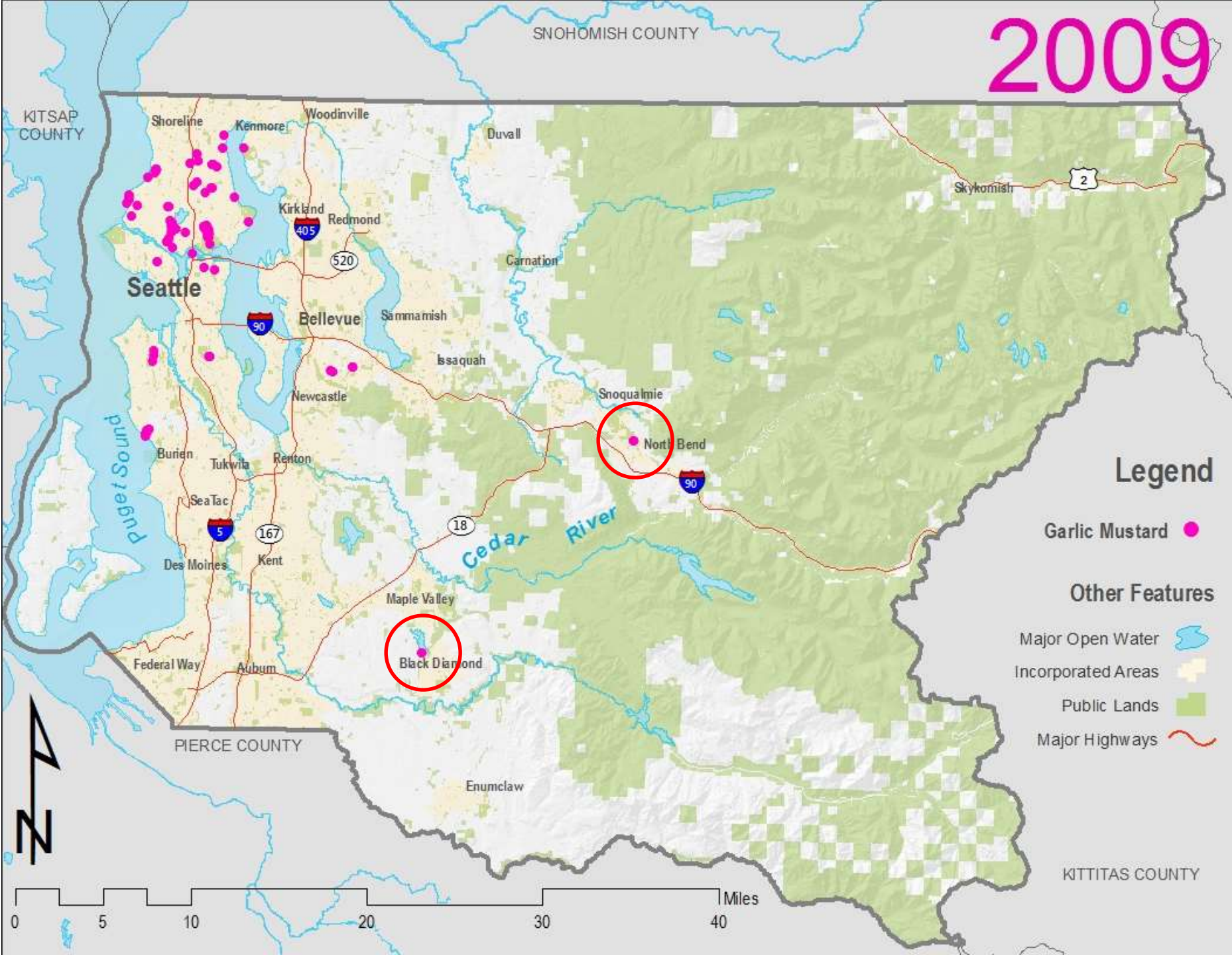


# 2008



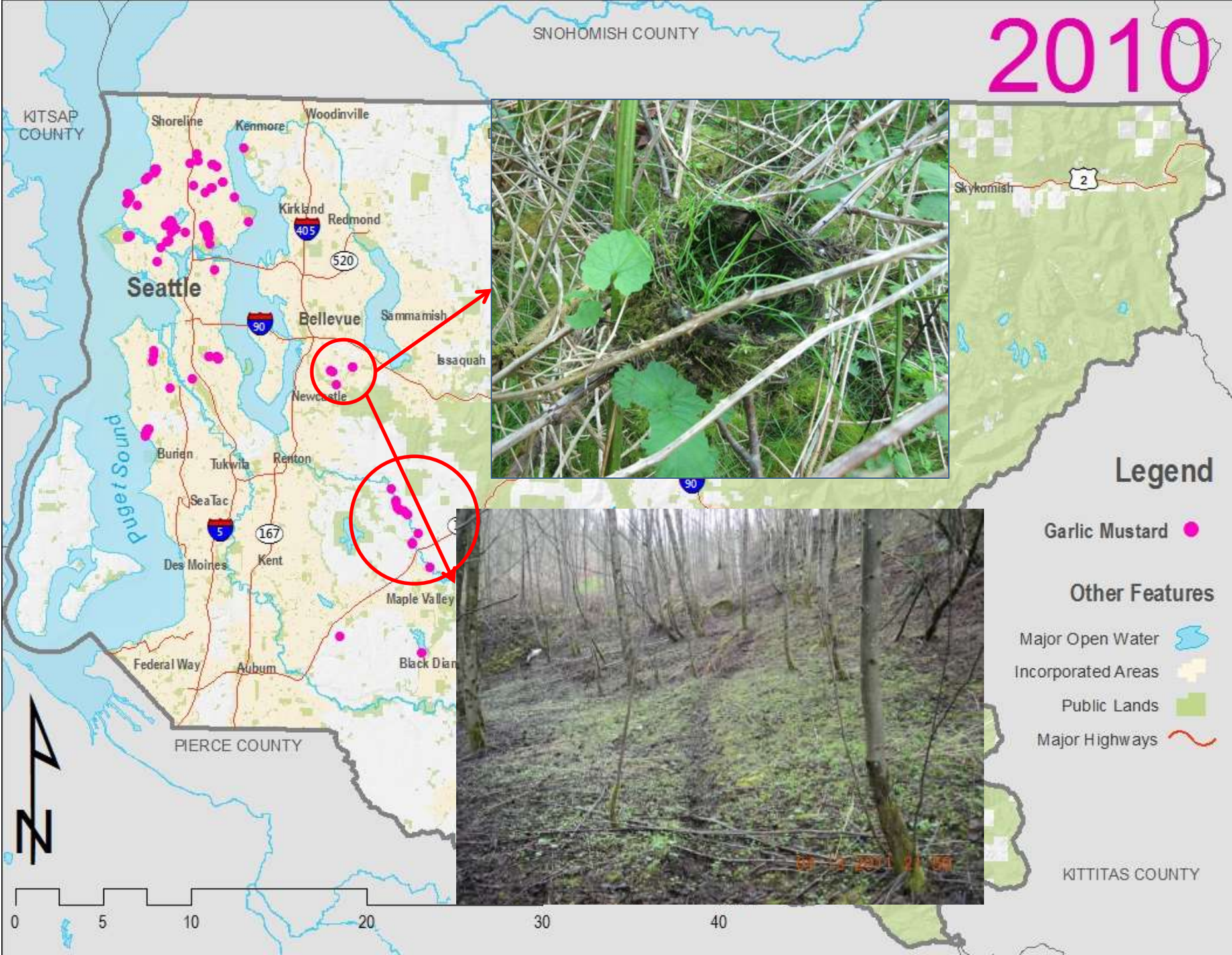


# 2009



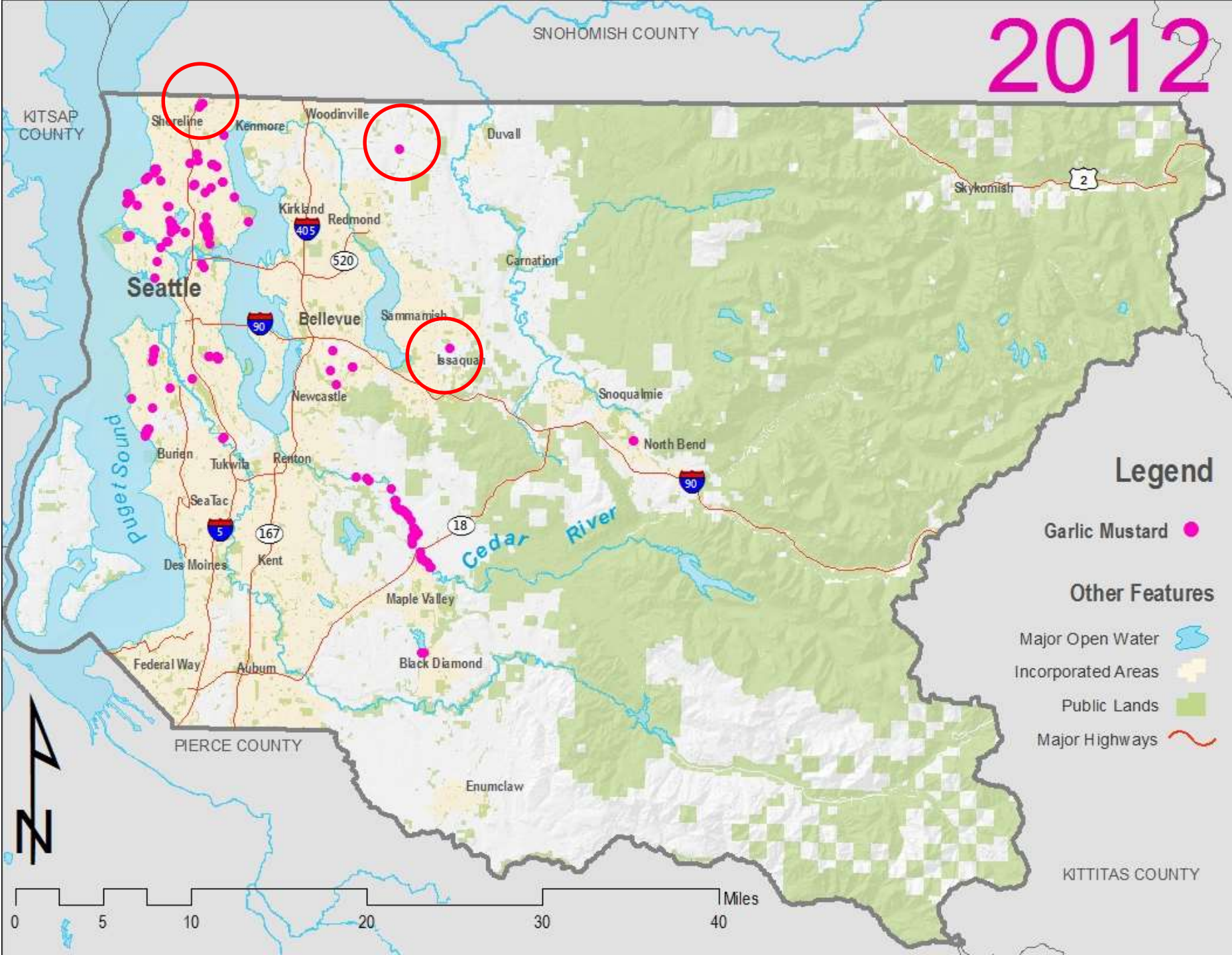


# 2010



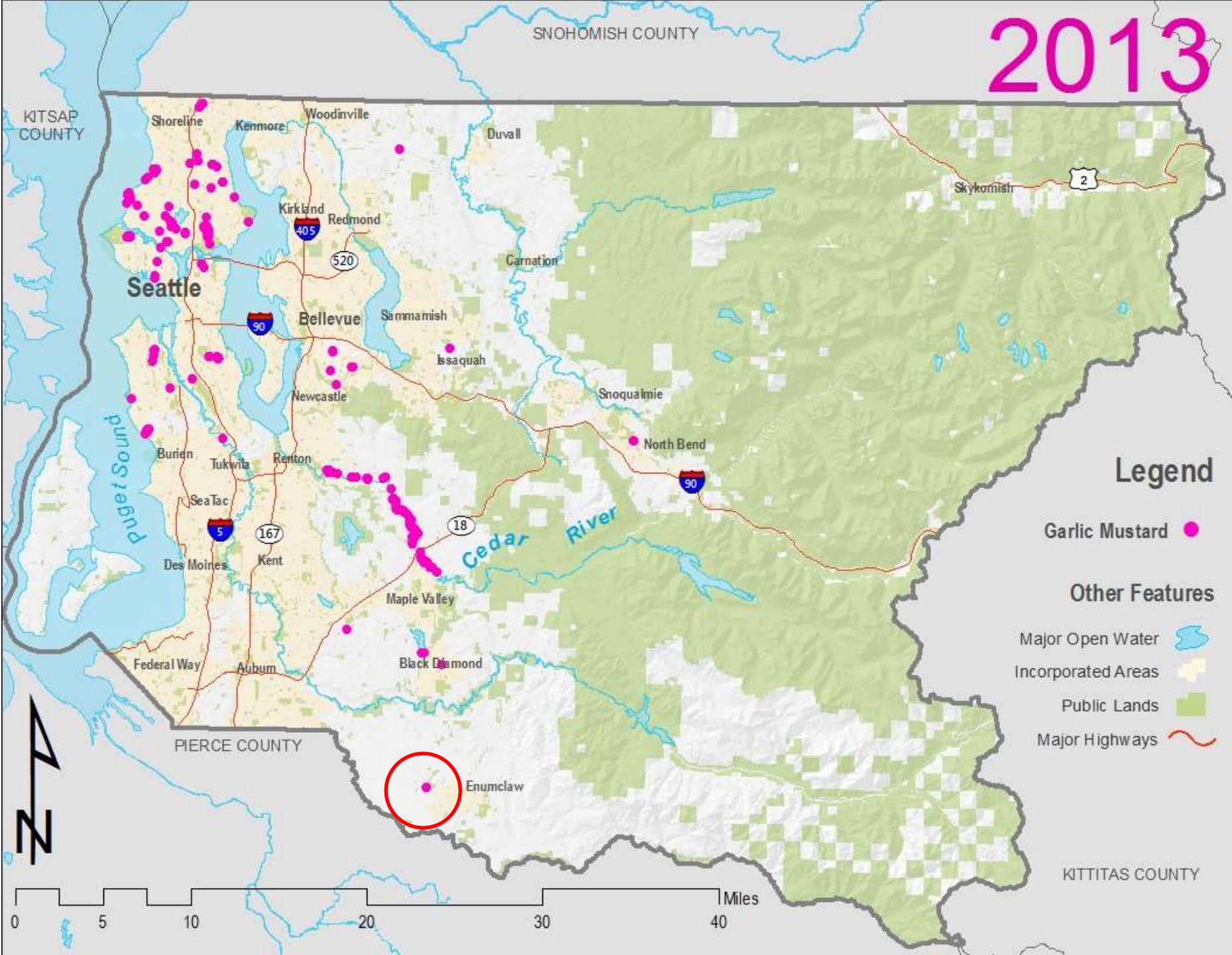


# 2012



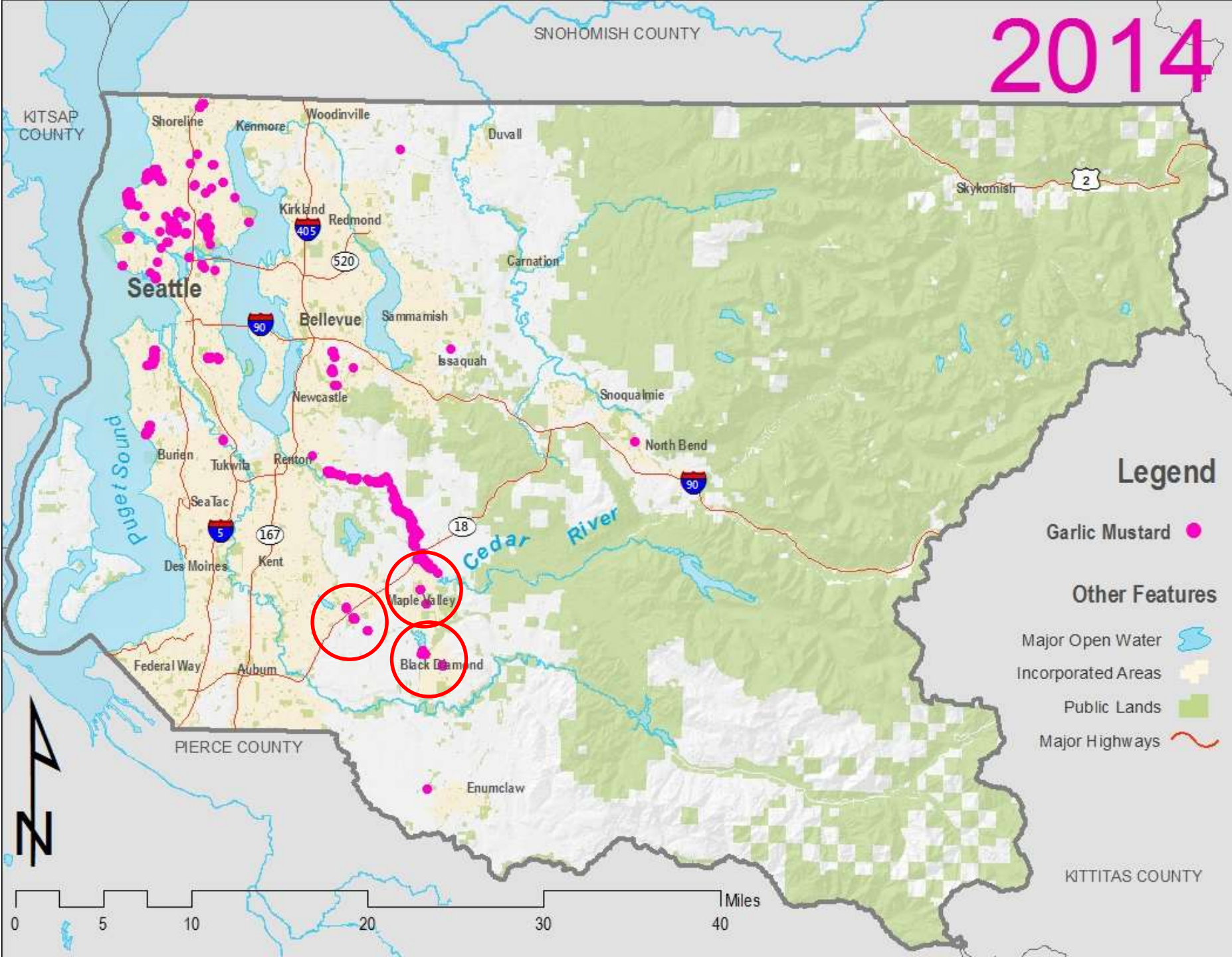


# 2013

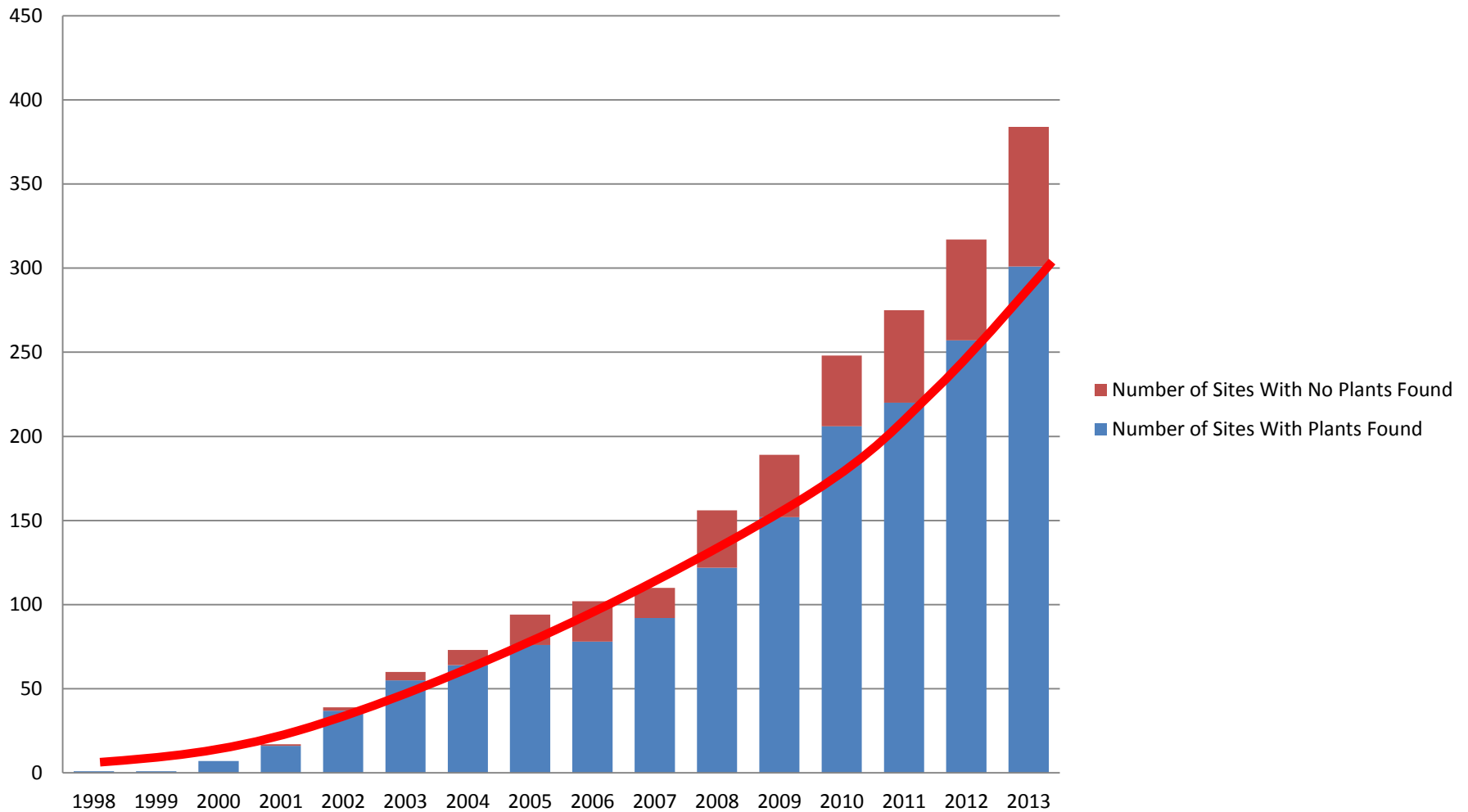




# 2014

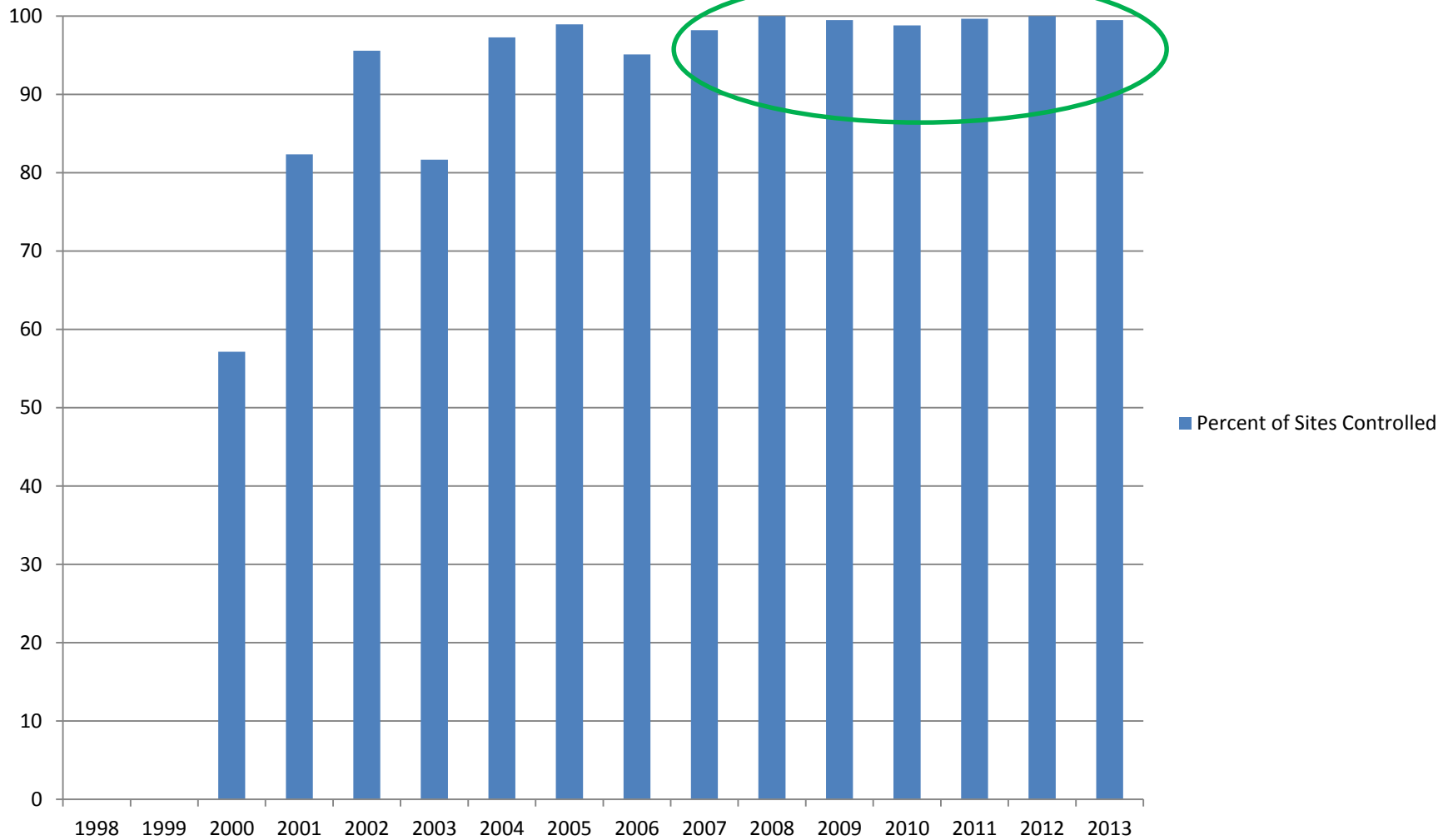


## Garlic Mustard Infestations Surveyed in King County, Washington

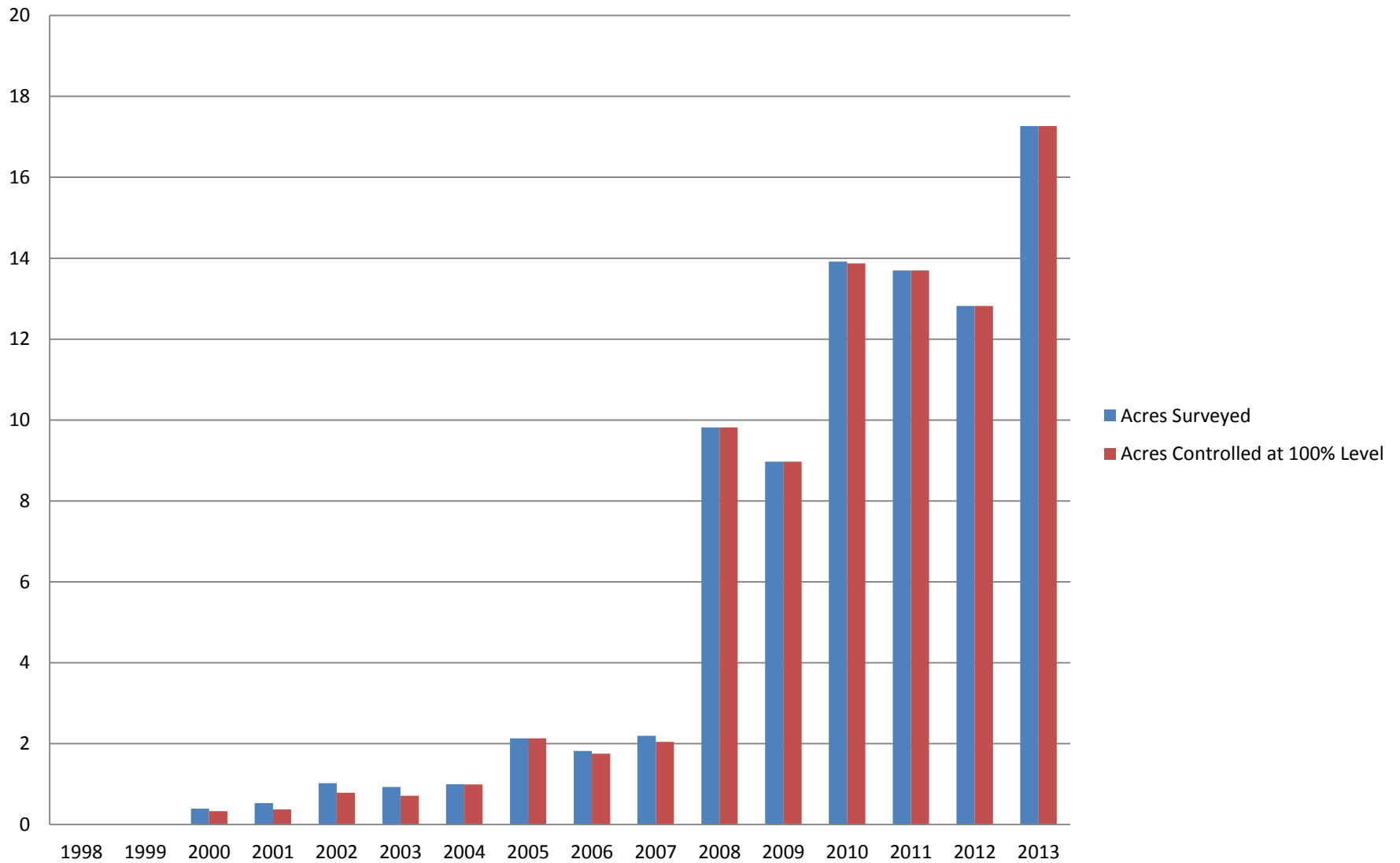




# Percent of Sites Controlled Annually



## Area of Garlic Mustard Surveyed and Controlled in King County, Washington





# Reaching Out



Having live samples at information tables and workshops helps teach people what to look for.

## Public Reports of Garlic Mustard

Year	Number of Confirmed Reports
2000	1
2001	3
2002	7
2003	1
2005	4
2006	1
2007	1
2008	7
2009	5
2010	7
2011	11
2012	7
2013	5
2014	1

# EDRR at work on the Duwamish River

## Duwamish River Survey 2014



- Found by a volunteer in 2012
- **Cool fact:** in central King County (Bellevue, Renton, Tukwila, Sammamish, Issaquah), all sites not on the Cedar River have been found by volunteers, park employees, contractors, or landowners (20 properties)
- Outreach and education has been effective!



# Focus on a Few Key Areas in King County

- Seattle
- Bellevue
- Cedar River

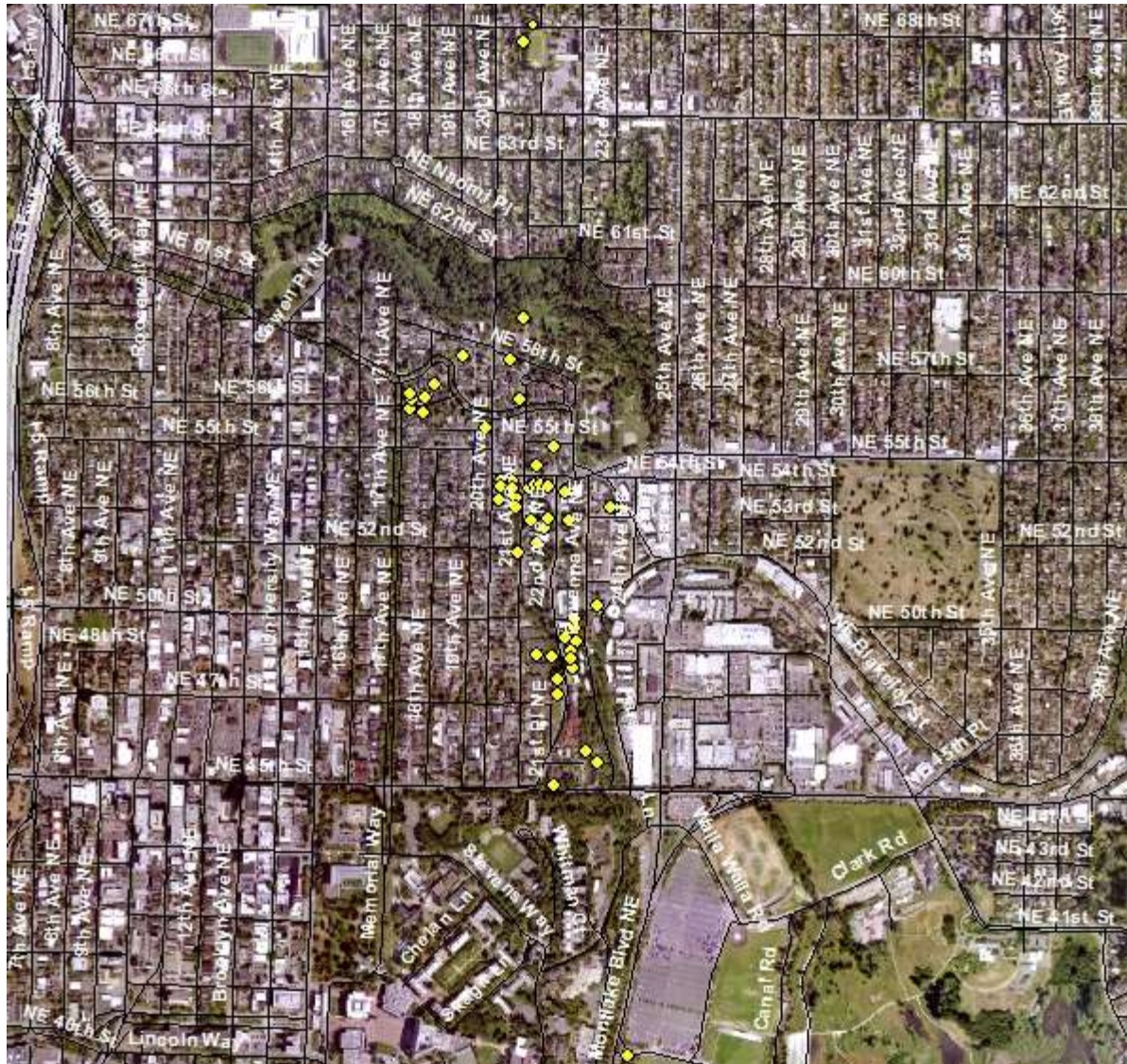
# Main Seattle Areas with Garlic Mustard



- Thornton Creek
- Carkeek Park and Neighborhood
- Golden Gardens Park and Neighborhood
- Lower Woodland Park and Woodland Park Zoo
- Good Shepherd Center
- Ravenna Park and Neighborhood
- Kiwanis Ravine (Magnolia)
- Longfellow Creek/West Seattle Golf Course/Camp Long
- Cheasty Greenspace (SE Seattle) and nearby residential areas
- Seola Beach Greenspace (SW Seattle)

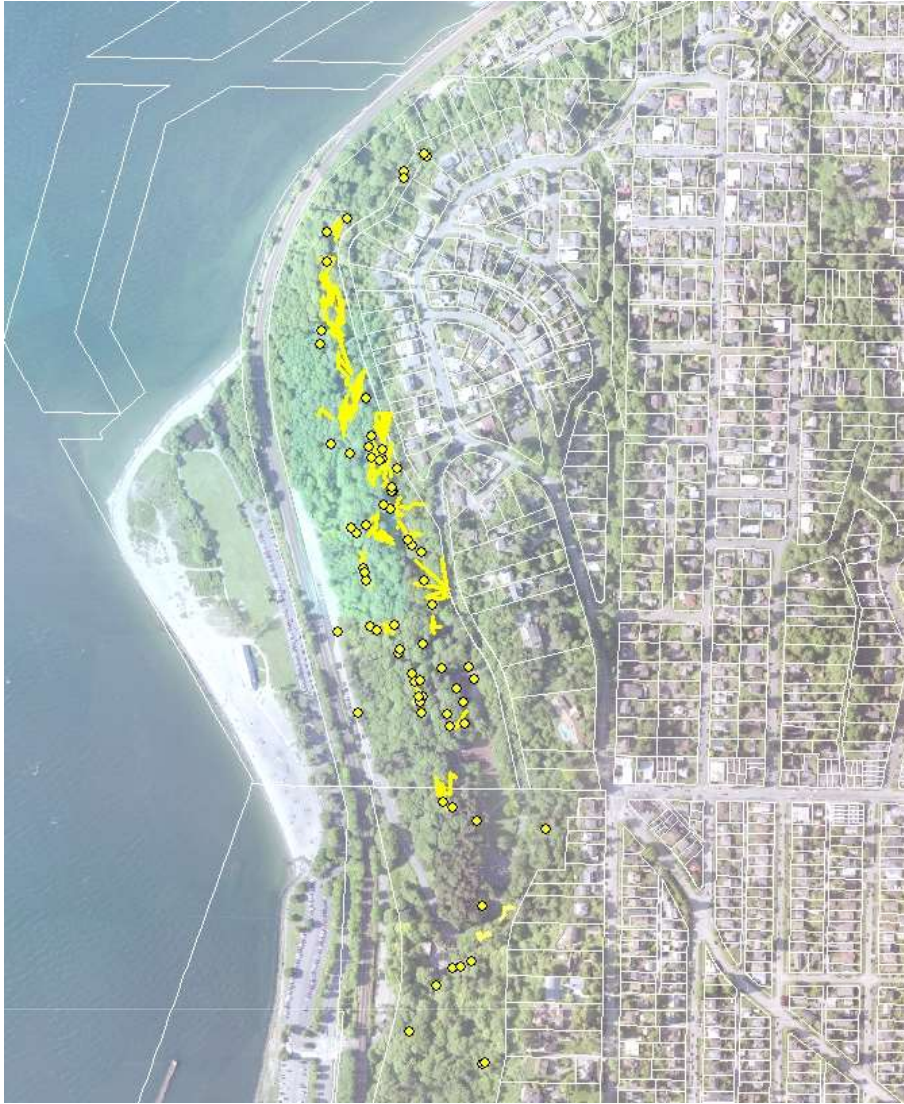


# Ravenna/University of Washington



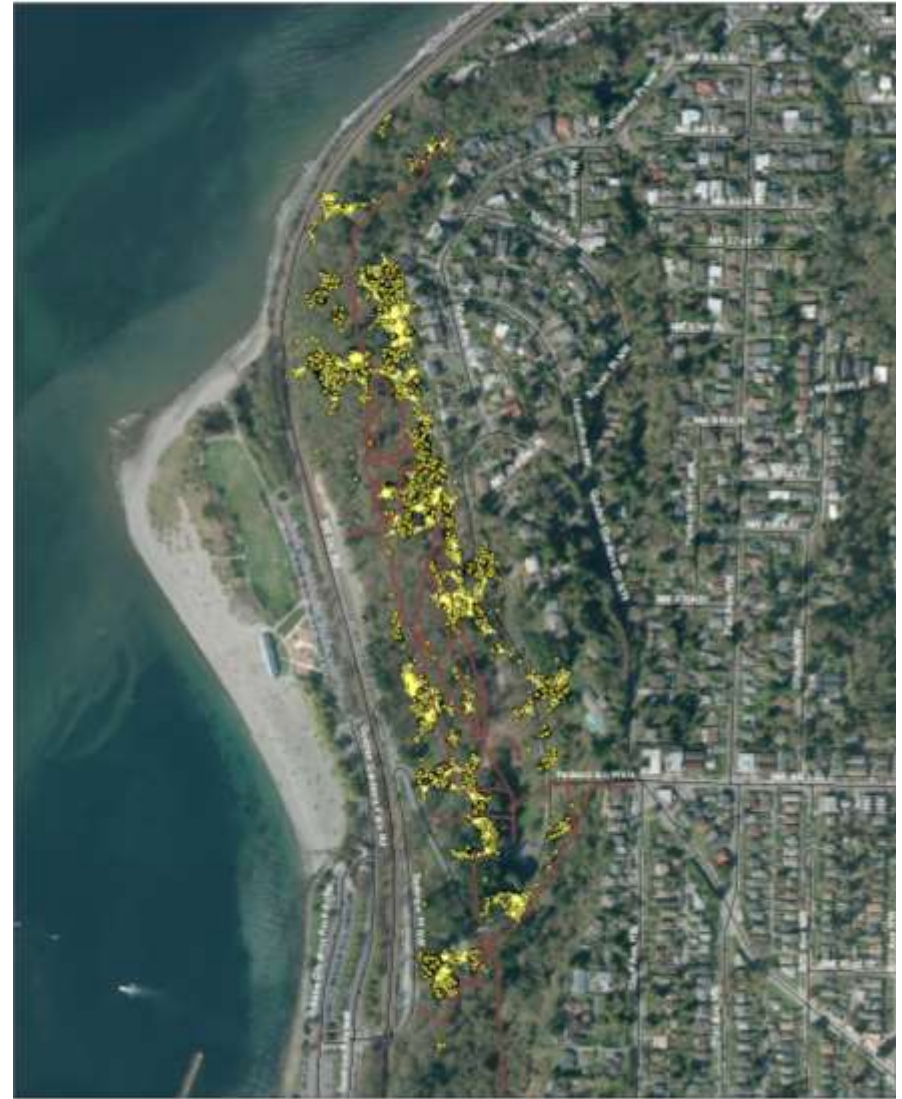


# Golden Gardens Park (a.k.a. “Golden Garlic”)



2004

Approx. 6.9 acres, 11-25% cover



2013

Approx. 3.4 acres, <10% cover

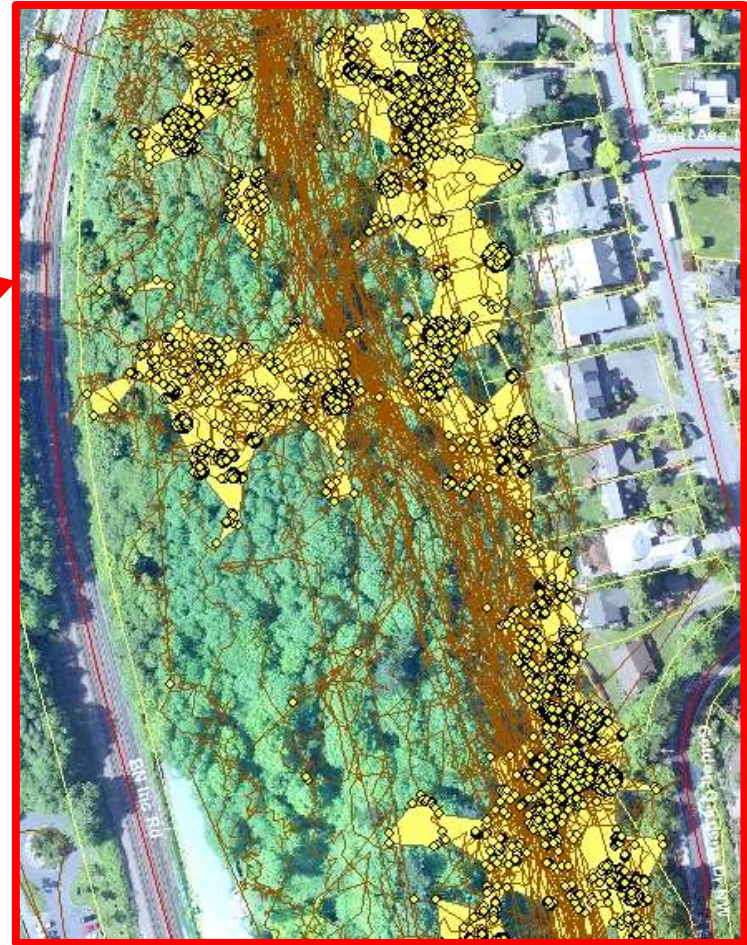


# Golden Gardens: Hills, Nettles & Bags



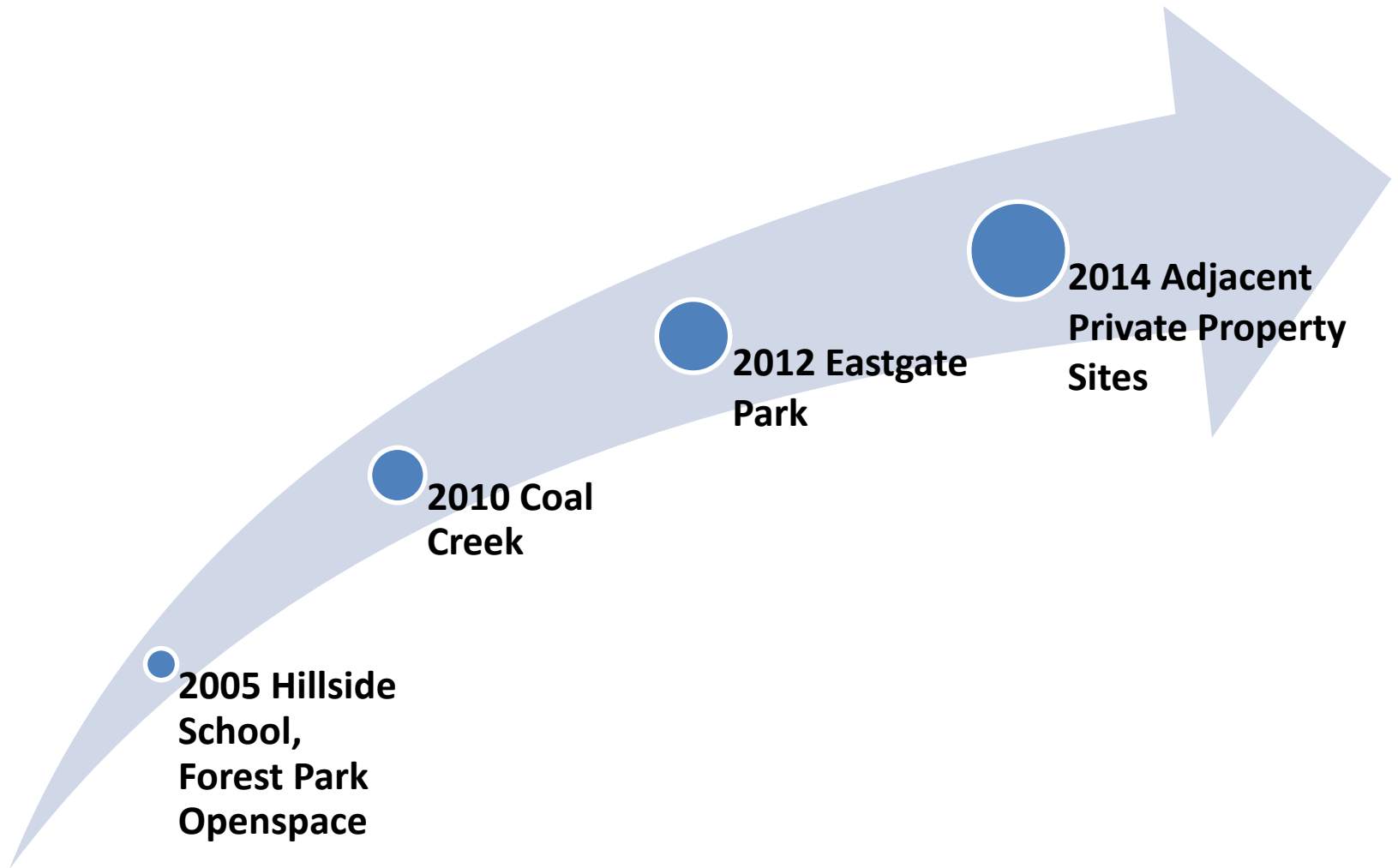


# Golden Gardens Park 2013 Survey





# Garlic Mustard in Bellevue



# Control Efforts

- Collaboration with Parks staff and private landowners has been effective in Bellevue
- Density has decreased at sites we've been working on for several years, but the total area seems to have hit a plateau
- Mulch works for a few seasons before decomposing
  - Arborist chips may be more effective than fine mulch but anything needs to be replaced after a few seasons



# Learning Where to Look Next

Wildlife corridors and other pathways

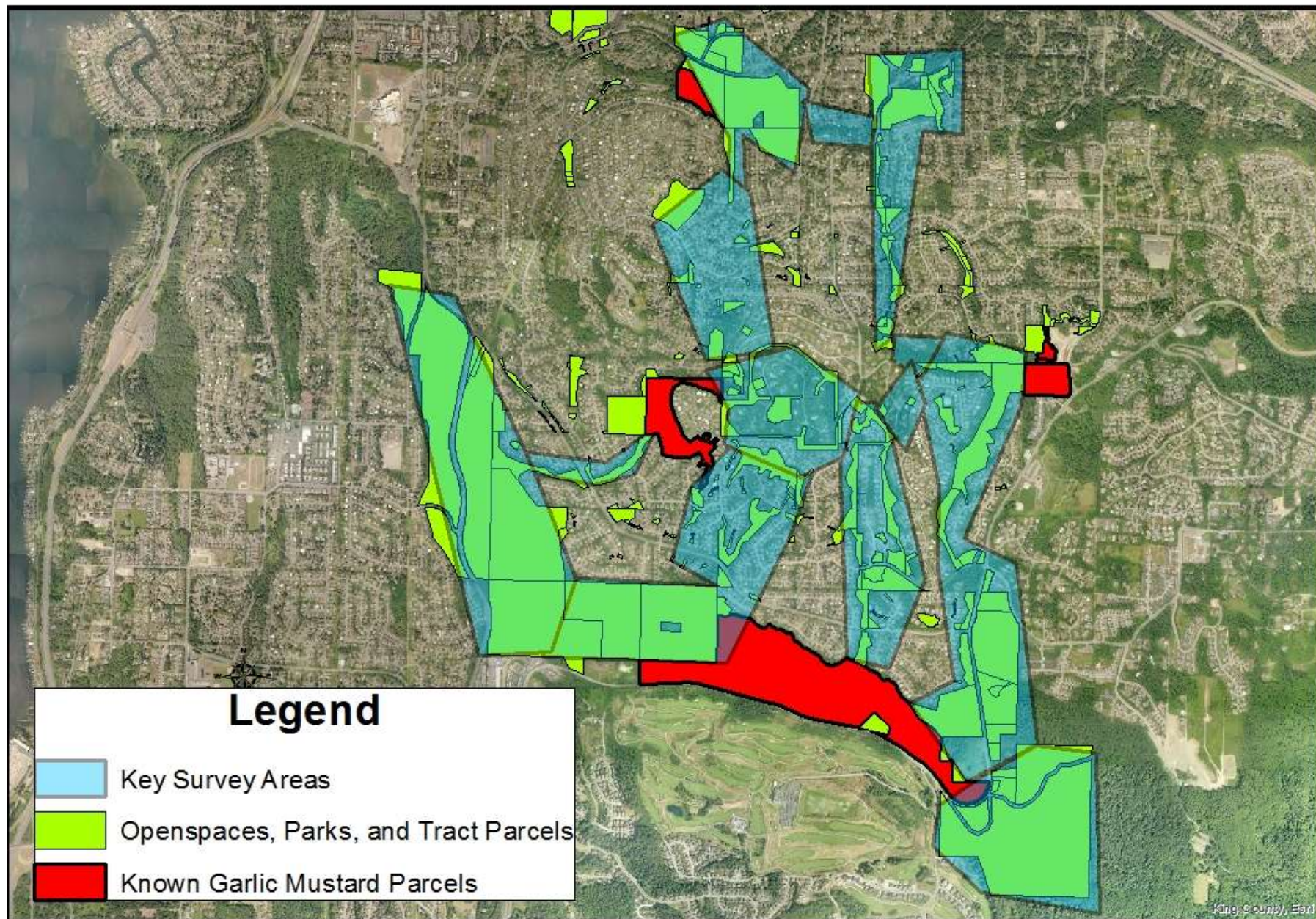


The borderlands of Park/Private Property

***Follow the  
deer trails!***

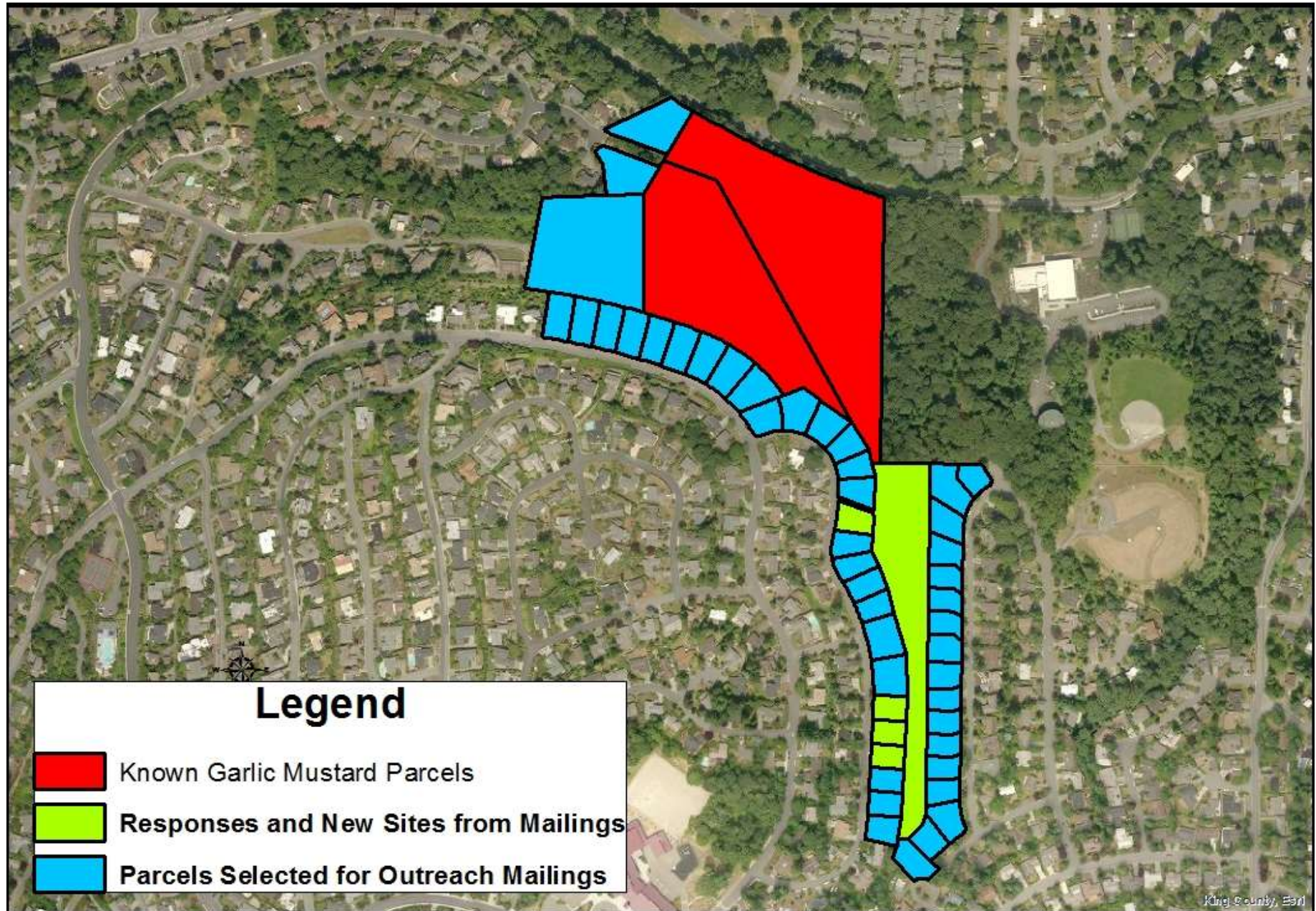


# Potential Migration Pathways





# Outreach to Adjacent Properties



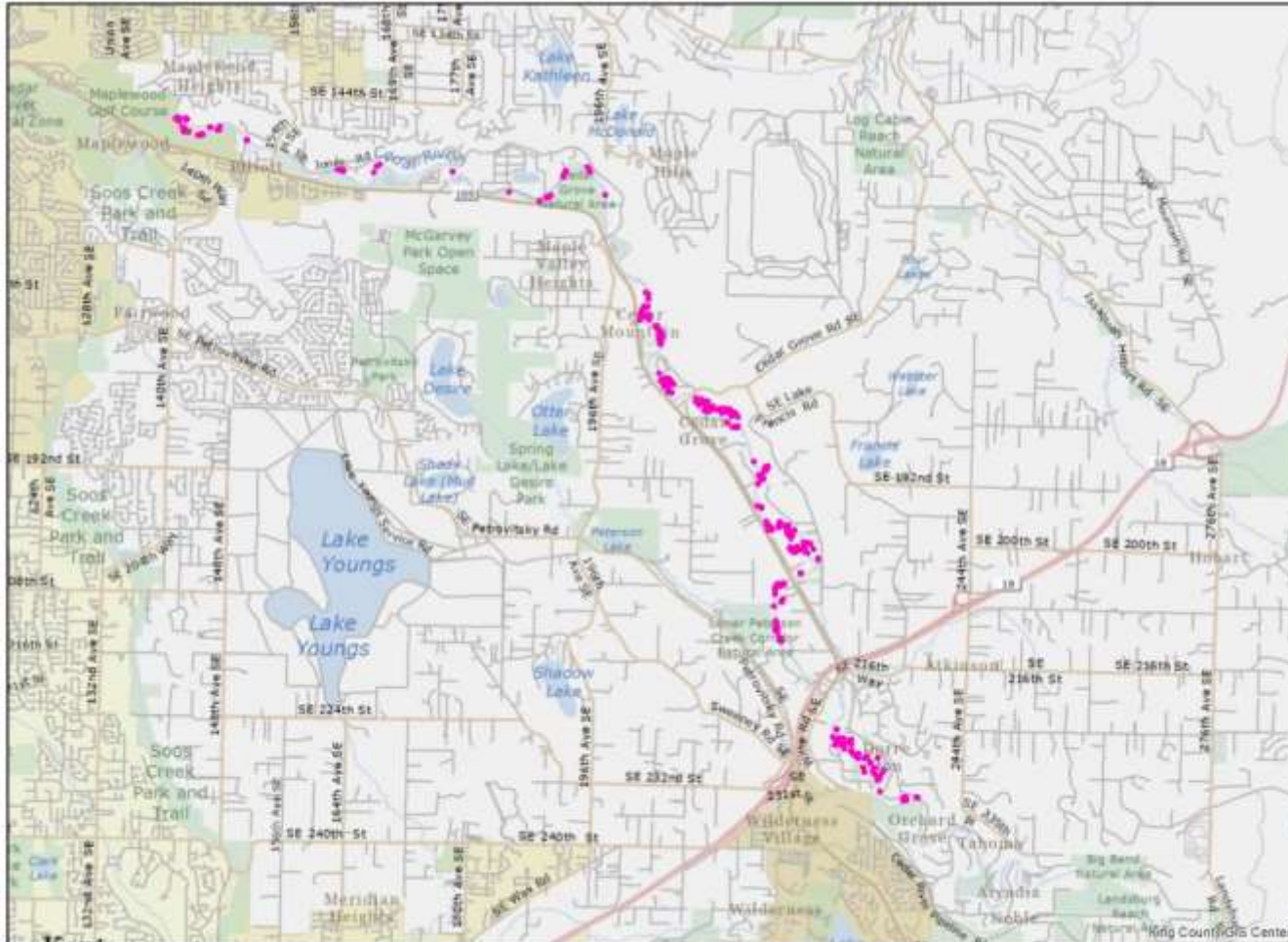


# New Site from Postcard Response





# Cedar River Garlic Mustard 2013 Distribution



Cedar River Garlic Mustard

- 12.5 river miles (river mile 4.5 to 17)
- 66 sites
- 2.87 acres of garlic mustard



# Cedar River Garlic Mustard

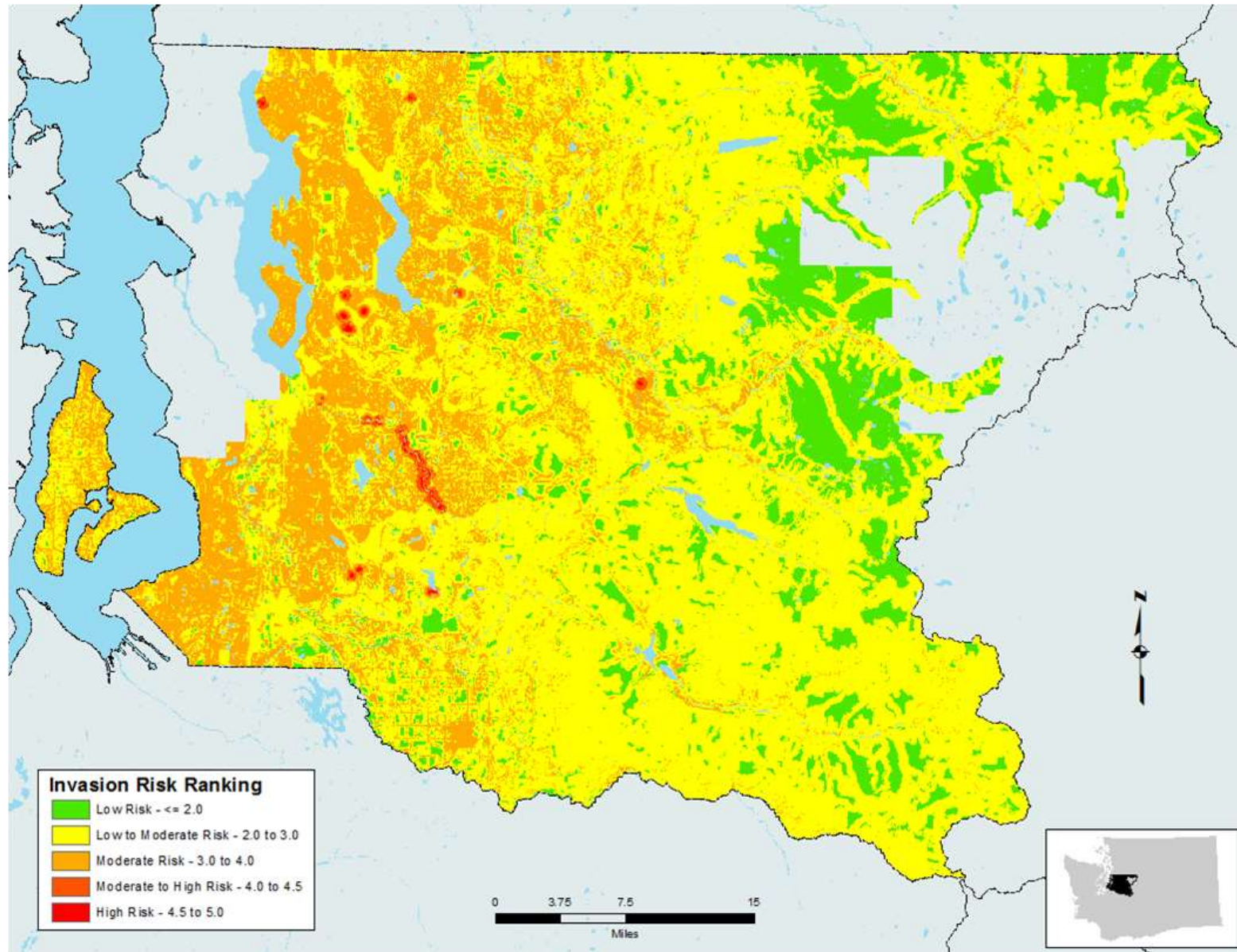


Photos: Matt Below

Photo by Matt Below



# Looking Forward: Garlic Mustard Risk Assessment for King County, Washington



# Lessons Learned

- **Garlic mustard is sneaky**
  - It's hard to find this plant before it gets established and there is almost always more than first thought; systematic and smart-surveying is the key!
- **People carry seeds**
  - Clean boots and equipment obsessively after working in infested areas
  - Consider signs warning people away from infested sites
- **Repeat as needed**
  - Multiple, careful searches and complete control over several visits each season is essential for containment and eventual control
- **We're in for a long fight**
  - Even small sites are very persistent
  - Large sites in naturally disturbed areas may not be possible to eradicate
- **More eyes, more detections**
  - As many trained watchers as possible and tons of public outreach are the key to detecting this hard to ID plant
- **We need to team up against garlic mustard**
  - A coordinated effort with shared resources across the state, or even the region, might be our only hope at this point