

**2019 Agricultural Drainage Assistance Program  
Ongoing Maintenance Plan**

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November 30, 2019



**King County**

**I. Contents**

II. Executive Summary..... 3

III. Proviso Text..... 3

IV. Background ..... 4

V. Report Requirements..... 6

    A. Information on the agricultural waterways in King County..... 6

    B. A plan for a one-time inspection, maintenance, repair and clearing of all agricultural waterways ..... 9

    C. An ongoing maintenance schedule for the inspection and maintenance of all agricultural waterways on a seven-year cycle..... 16

VI. Findings and Recommendations..... 19

VII. Conclusions and Next Steps ..... 19

VIII. Appendices

    Appendix A: Agricultural Waterways

    Appendix B: Title 21A Zoning, Updated: April 10, 2019

    Appendix C: Aggradation Maps

## II. Executive Summary

There are over 500 miles of agricultural waterways in unincorporated King County within the Agriculture Production Districts (APDs) and on agricultural lands outside the APDs. An estimated 389 miles of agricultural waterway are classified as artificial or modified and are eligible for drainage improvement through the Agricultural Drainage Assistance Program (ADAP). The primary source of drainage impairment on those 389 miles is sediment accumulation (76 percent), followed by backwater condition (16 percent), vegetation (7 percent) and condition of water control structures (1 percent).

In 2010, the Department of Natural Resources and Parks (DNRP) coordinated an ADAP streamlining process with the King County Department of Permitting and Environmental Review (DPER) and state resource agencies. That process identified a set of standard permit conditions and Best Management Practices (BMPs) that, if implemented, would exempt drainage maintenance activities within modified streams (agricultural waterways) and agricultural drainages (artificial ditches) from County permitting.

Since 2010, ADAP has improved drainage on over 16 miles of agricultural waterway. Since 2016, 12 miles of drainage improvement has been completed through ADAP (approximately 3 miles per year). King County currently allocates \$752,375 per year for ADAP support.

Completing maintenance of all King County agricultural waterways within seven years would require drainage improvements on approximately 56 miles of waterway every year. Program modifications, County code changes, additional financial resources, and enhanced partner engagement would be required to meet that goal. It is estimated that an initial investment of the equivalent of about 109 full-time staff (95 FTE and 40 TLT June-September) and roughly \$20 million would be required to complete inspection and maintenance of all 389 miles of artificial and modified agricultural waterways within seven years.

A program that ensures that all waterways are inspected at least every seven years and ensures that all waterways are serviced on a schedule that maintains a high level of drainage function, would be similar to – but less resource-intensive than – the initial period of drainage restoration. The more sediment that is entering a waterway and the flatter the slope of the waterway, the more frequently the waterway will need to be dredged. Thus, to maintain their designed drainage function, some waterways need to be dredged relatively often and others much less frequently. It is estimated that nearly 132 miles of agricultural waterway would need to be dredged every seven years to maintain designed drainage function (approximately 19 miles per year). That level of ADAP programming would require the equivalent of approximately 47 full-time staff (40 FTE and 19 TLT June-September) and nearly \$9 million per year.

## III. Proviso Text

Ordinance 18835, Section 76, Proviso P2 requires:

Of this appropriation, \$75,000 shall not be expended or encumbered until the executive transmits an Agricultural Drainage Assistance Program Ongoing Maintenance Plan and a motion that should accept the plan and reference the subject matter, the proviso's ordinance, ordinance section and proviso number in both the title and body of the motion and a motion accepting the plan is passed by the council.

The maintenance plan shall include, but not be limited to:

- A. Information on the agricultural waterways in King County by characteristic, location, known vegetation or drainage issues, ownership and last-known maintenance;
- B. A plan for a one-time inspection, maintenance, repair, and clearing of all agricultural waterways within seven years of acceptance of the maintenance plan; and
- C. An ongoing maintenance schedule for the inspection and maintenance of all agricultural waterways on a seven-year maintenance cycle.

The executive should file the maintenance plan and a motion required by this proviso by September 30, 2019, in the form of a paper original and an electronic copy with the clerk of the council, who shall retain the original and provide an electronic copy to all councilmembers, the council chief of staff and the lead staff for the planning, rural service and environment committee, or its successor.

#### **IV. Background**

The Water and Land Resources Division (WLRD) of DNRP has a biennial budget of roughly \$300M that supports the work of nearly 400 staff. WLRD manages stormwater for unincorporated areas, houses three salmon recovery forums, acquires open space, restores habitat, monitors water quality, controls noxious weeds, and provides economic and technical support for forestry and agriculture. As service provider to the Flood Control District, the division reduces flood hazards and restores rivers and floodplains. Additionally, WLRD operates the county's Environmental Lab and Science sections, which provide environmental monitoring, data analysis, and management and modeling services to partners, jurisdictions, and residents throughout the region. The King County Hazardous Waste Management Program – a collaborative effort with the county and King County municipalities – is also part of WLRD.

The 1990 [King County Critical Areas Ordinance](#) (CAO), also known as the Sensitive Areas Ordinance, required property owners to obtain King County permits for many maintenance activities previously allowed without local permits. The intent of the permitting process is to better protect wetlands, streams, and other areas critical for salmon, water quality, and other sensitive natural resources. Later revisions to the CAO increased regulations and restrictions for working in critical areas. The 1999 listing of several salmonid species as threatened or endangered in the Puget Sound increased the scrutiny of work performed in critical areas.

The evolving federal, state, and local regulations governing property owners' responsibilities in critical areas, particularly for agricultural waterways, can be challenging to understand and follow. ADAP was created in 1998 to assist agricultural property owners to implement BMPs that minimize negative impacts to waterways, water quality and aquatic life living in the waterways during maintenance activities. The program helps property owners with an understanding of what work is allowable and the permitting requirements necessary to perform the work.

In the first 12 years of ADAP, each project obtained individual permits from local, state, and federal permit agencies as needed. Obtaining individual permits is a costly and time-consuming process. After many years, it was apparent that the permit conditions from project to project were very similar.

In 2010, ADAP went through a streamlining process with DPER, which is now part of the Department of Local Services (DLS), Washington State Department of Fish and Wildlife (WDFW), and Washington State

Department of Ecology (DOE). The streamlining process led to a set of standard permit conditions and BMPs that applied to maintenance activities within modified streams (agricultural waterways) and agricultural drainages (artificial ditches). As part of the streamlining, King County Code (KCC) [16.82](#) was changed to exempt ADAP projects from county permits if the project proponent followed the specified BMPs, obtained a Hydraulic Project Approval (HPA) from WDFW, and the property was covered by a Farm Plan prepared by the King Conservation District.

Another component of the streamlining process was the development of a [classification system](#) for agricultural waterways based on type and whether salmonids were likely to be present during construction (summer). Waterway types are defined as:

Natural – Natural waterways are naturally occurring water-bearing features, typically with headwaters, that have not been significantly altered from their historical meandering flow path or floodplain in any manner or, if historically altered, have reestablished a meandering course passively or through active restoration.

Modified – Modified waterways are natural waterways that have been straightened, usually as a consequence of diversion, dredging or diking, and have not reestablished a natural meander pattern.

Artificial – Artificial waterways are any channels that were not naturally occurring. They do not have headwaters or other natural water sources, and the Washington State Hydraulic Code does not apply to them. Their primary, typical purpose is to convey water from an individual farm property.

Unclassified – Those waterways that lack sufficient data to make a determination or where there is conflicting data that would need additional on-site investigation to make a determination.

Given the prioritization of work within the APDs, waterways outside the APDs were not classified as part of the streamlining process and are classified as needed on a case-by-case basis and not shown on the classification maps contained in Appendix A. It is estimated that there are 113 miles of agricultural waterways in unincorporated King County outside the APDs.

Participants in the streamlining process agreed that the ADAP protocols would apply only to waterways and drainages that have an average flow of less than about 1 cubic foot per second during construction. Additionally, natural waterways were not included in the streamlined ADAP permitting process at the request of participating agencies.

Salmonid use is based on several factors including known salmonid presence, the existence or not of downstream fish passage barriers, the known or expected summer flow in the waterway, the known or expected temperature regime in the waterway, the size of the upstream tributary basin, and the known or expected presence of an upstream water source. The decision-making process for determining potential salmonid use is shown in the [classification flowchart](#). The classifications for salmonid use during the summer are:

High – Greater than or equal to 0.2 salmonids (regardless of size) per linear foot of waterway (i.e., one salmonid every five feet).

Moderate – Greater than 0.1 and less than 0.2 salmonids per linear foot of waterway.

Low – Less than or equal to 0.1 salmonids per linear foot of waterway or lower.

The [King Conservation District](#) (KCD) has been a partner with ADAP for most of the program’s existence. The KCD works with agricultural property owners to develop a farm plan for their property. Farm plans are a requirement for a property owner to participate in ADAP and to receive exemptions from county permitting requirements. The KCD provides many other services to agricultural property owners and has developed good working relationships within the agricultural community.

The ADAP partnership between KCD and the County has grown over the years as the program has brought more resources to address drainage problems on agricultural properties and KCD has used its relationships in the agricultural community to recruit new participants. In addition to preparing farm plans, the KCD led an outreach effort in 2015 to identify potential ADAP projects and helped prioritize potential projects based on the number of acres of farmland brought back into agricultural production or number of acres where the drainage on the property was improved. The KCD also developed a cost share program in 2016 to help agricultural property owners pay for the construction of ADAP projects.

Based on the outreach in 2015, King County and KCD staff estimated that at the time that there were about 90 miles of agricultural waterway in the APDs in need of dredging that limited farming operations. Since 2016, ADAP projects have dredged about 12 miles of agricultural waterways (approximately 3 miles per year), resulting in improved drainage on 906 acres of agricultural land.

King County’s annual budget of \$752,375 for ADAP supports approximately 1.5 FTE worth of work split among four employees to carry out program requirements. An additional 0.9 FTE of support is provided by the Stormwater Services Section Engineering Review Program to provide surveying, design, and technical support.

## **V. Report Requirements**

### **A. Information on the agricultural waterways in King County by characteristic, location, known vegetation or drainage issues, ownership and last-known maintenance**

Information on agricultural waterways in King County by characteristic, location, known vegetation or drainage issues, ownership and last-known maintenance is shown below. Because the vast majority of agricultural waterways lie on private property, King County possesses little of the requested information in detail. Most of the information that King County does possess is within the APDs.

#### Waterway Characteristic

There are over 500 miles of agricultural waterways in unincorporated King County within the APDs and on agricultural lands outside the APDs (Table 1). Agricultural waterways have been classified by the type of waterway and the likelihood of salmonid use during the construction season (summer).

Table 1 – Miles of Agricultural Waterway by Classification and APD

Classification Type	Salmonid Use	Snoqualmie APD	Sammamish APD	Lower Green APD	Middle Green APD	Enumclaw APD	Outside of APD's	Total
Natural	High	19.47	0.00	2.53	14.53	23.11	0.00	59.64
Modified	High	29.33	4.17	5.25	1.57	55.52	0.28	96.12
Artificial	High	0.38	0.43	0.00	0.00	0.00	0.00	0.81
Natural	Moderate	9.90	0.01	0.74	4.91	2.18	0.00	17.74
Modified	Moderate	25.68	3.59	3.67	0.93	37.17	0.12	71.16
Artificial	Moderate	0.24	0.28	0.00	0.00	1.57	0.00	2.09
Natural	Low	2.34	0.01	0.00	0.86	2.25	0.00	5.46
Modified	Low	10.19	2.68	0.00	0.51	14.15	1.67	29.20
Artificial	Low	17.29	2.92	4.82	0.25	60.26	0.67	86.21
Unclassified		9.32	0.14	0.27	0.49	12.88	110.52	133.62
Total		124.14	14.23	17.28	24.05	209.09	113.29	502.08

The definition of a natural waterway includes the condition that the waterway has not been dredged in the past. Consistent with that definition, these waterways would not need to be dredged going forward. Please note that waterway classifications are updated when new information is obtained, so it is possible that some waterways classified as Natural could be reclassified in the future, but it is not anticipated that there would be so many reclassifications as to materially change the information in the report. For the purposes of this report, the unclassified waterways were proportioned among the other classifications. After the proportioning, there are approximately 389 miles of waterways in King County classified as artificial or modified. For the remainder of this report, natural waterways are not included.

Maps showing the classification of agricultural waterways in the APDs are shown on pages 1-4 of Appendix A.

Location

The locations of the classified waterways within the APDs are shown on pages 1-4 in Appendix A.

Properties outside the APDs, where zoning allows agricultural activities and that also have a waterway on them, are eligible to participate in ADAP. Properties outside the APDs are also shown on pages 1-4 in Appendix A.

Ownership

Agricultural waterways in need of drainage maintenance are found on both public and private land and it is the owner of record that typically applies for ADAP assistance. King County can advocate for ADAP projects on lands owned by the County as well as lands encumbered by a management right-of-way held by the County. Ownership of agricultural properties in unincorporated King County is shown in pages 5-8 in Appendix A.

Known Vegetation

Vegetation in and along agricultural waterways typically consists of reed canary grass, shrubs, or trees. Vegetation along agricultural waterways proposed for ADAP maintenance is determined through site inspections and/or interpreted from aerial photos. General distribution of vegetation along agricultural waterways is shown in pages 9-12 in Appendix A.

Drainage Issue/Identified Problem

Sources of poor drainage function include excessive sediment and/or vegetation, backwater flooding or malfunctioning water control structures. The source of impaired drainage was determined for each ADAP project completed since 2010 and shown on pages 13-16 in Appendix A. The sources have been summarized by year in Table 2, below.

Table 2. Summary of the sources of drainage impairment for all ADAP projects completed since 2010.

Project Year	Channel Length (mi)	Sediment accumulation	Vegetation Overgrowth	Backwater Condition	Structure Condition
2010	1.44	100%	0%	0%	0%
2012	0.29	78%	22%	0%	0%
2013	0.43	100%	0%	0%	0%
2014	0.46	68%	20%	12%	0%
2015	2.12	99%	0%	0%	1%
2016	2.47	77%	0%	19%	4%
2017	2.75	63%	21%	16%	1%
2018	3.26	99%	0%	0%	1%
2019	2.90	87%	0%	13%	0%
Future Projects <sup>1</sup>	40.47	73%	6%	19%	2%
<b>All Combined</b>	<b>56.59</b>	<b>76%</b>	<b>7%</b>	<b>16%</b>	<b>1%</b>

Table 2 indicates sediment is the primary problem along 76 percent of total length of waterways that would be maintained if a seven-year inspection and maintenance cycle were implemented. Every waterway has a baseline sediment aggradation potential<sup>2</sup> that is primarily influenced by its location on the landscape. The portion of a waterway that transitions from a steep slope, usually in a ravine or hillside, to gentle slope at the bottom of the hill, is generally associated with an active alluvial fan, and has the highest potential to deposit coarser sediments as the flowing water slows down and loses its ability to transport larger sediment. The portion of waterway downstream of an active alluvial fan will also see a high, albeit somewhat less, potential to deposit sediment. In this section of waterway, the finer sediments that remained suspended as water passed through the alluvial fan begin to settle out. Outside the influence of alluvial fans, many waterways are in major floodplains. These waterways are often small compared to the river or stream flooding and become inundated with floodwaters that are often sediment laden. As the floodwaters rise and recede, there is a moderate potential for sediment

<sup>1</sup> Future Projects are potential projects where county staff have already inspected and/or surveyed the site for an ADAP project.

<sup>2</sup> The energy of flowing water determines the amount and size of sediment that it can move. When the slope of a waterway gets flatter, the velocity of the water flowing in the waterway decreases which lowers the energy level of the water. When the energy level drops, larger sediments are no longer moved downstream so they accumulate near the energy transition. As more material is deposited, the bottom of the waterway rises (aggrades) and affects the flow capacity of the waterway.



aggradation along these small flooded waterways due to floodwater losing energy and sediment settling out.

Lastly, outside of the influence of alluvial fans and floodplains, waterways still have a potential to deposit sediment, although the processes are generally slower, and the source of sediment is mostly generated by erosion in the upstream channel. Erosion can be from bank collapse (i.e. sloughing), point discharge of overland run-off, animal damage and other causes.

Table 3 shows the projected number of miles within APDs affected by each drainage issue if the percentage of drainage issues is projected over the network of agricultural waterways.

Table 3

Total Miles of Agricultural Waterway (excluding Naturals)	Sediment accumulation	Vegetation overgrowth	Backwater condition	Structure condition
389	296	27	62	4

Last Known Maintenance

Data about the last known maintenance for individual waterways are only available for waterways maintained through ADAP projects since streamlining occurred in 2010. Past ADAP projects are shown by year on pages 17-20 in Appendix A.

**B. A plan for a one-time inspection, maintenance, repair and clearing of all agricultural waterways within seven years of acceptance of the maintenance plan**

A one-time inspection, maintenance, repair, and clearing of agricultural waterways on a seven-year cycle for the roughly 389 miles of agricultural waterways, excluding natural waterways, in the county would require a combination of additional resources, program changes, KCC changes, and/or new agreements with program partners. Completing maintenance of all King County agricultural waterways within seven years would require approximately 56 miles of waterway to be maintained every year. This equates to a nearly twenty-fold increase over the current level of ADAP waterway maintenance.

Requirements for a one-time, seven-year inspection and maintenance cycle are listed below:

Program Management

Based on the current ADAP model, it is anticipated that an additional 1.5 FTE would be required to manage an ADAP capable of implementing a seven-year inspection and maintenance cycle on all agricultural waterways in unincorporated King County.

Permitting Staff/Code Change

Given that less than half of all agricultural waterways qualify for streamlined ADAP, much of the work needed to implement a seven-year maintenance cycle would require individual county, state, and federal permits for each project. It is estimated that permitting staff capacity of 2 FTE would be required to obtain necessary permits.

KCC Section 21A.24 currently allows ADAP projects that follow the streamlined BMPs and Section 16.82 exempts ADAP projects that follow the streamlined BMPs from Clearing and Grading permit requirements. Although ADAP projects that follow approved BMPs are not

required to obtain county permits, waterways qualifying for streamlined ADAP cover less than half of all agricultural waterways in King County.

For ADAP projects that do not follow the streamlined BMPs, there is no allowed alteration in KCC 21A.24 that would allow the removal of accumulated sediment from the agricultural waterway without converting some of the agricultural area into habitat. Appendix B is a color-coded version of KCC 21A.24.045 and illustrates the four allowable alterations and conditions required for said allowable alteration that apply to removing sediment from an Aquatic Area.

KCC would have to be changed to add an allowable alteration to Aquatic Areas that would be applicable to waterways that are not covered by the streamlined ADAP BMPs. KCC 16.82 would need to be amended to expand the scope of waterways that can be maintained without the need for a County-issued Clearing and Grading Permit. An HPA from WDFW would still be required.

#### Cultural Resource Review

Every King County-supported construction project requires cultural resource review to the standard established by executive policy LUD 16-1 (AEP) (“Cultural Resources Procedures”). All ADAP projects are reviewed by the King County Historic Preservation Program (HPP) and, if warranted, additional investigation is conducted by an archeological contractor. WLRD expects that meeting the one-time, seven-year objective would require an additional HPP staff person to ensure that an archeologist is available in a timely manner to review ADAP project proposals.

#### Science Staff

Additional staff will be required to classify those agricultural waterways that have not yet been classified. One FTE would be needed in the initial year to address this need. After all agricultural waterways have been classified; there will be reduced demand to resolve classification questions when new data related to individual waterways is collected, likely necessitating an ongoing 0.25 FTE.

#### Fish Relocation Staff

The Road Services Division (RSD) of DLS currently provides fish relocation staff for ADAP projects. ADAP uses RSD staff because their level of training has been recognized by permit agencies as complying with the Regional Road Maintenance Guidelines related to protection of endangered species for work within rights-of-way. While the endangered species coverage does not explicitly apply to projects outside of rights-of-way, fish relocation techniques used for ADAP projects are largely the same as those used for rights-of-way projects and the use of RSD staff for fish relocation is one of the required BMPs for the streamlined ADAP.

RSD does not currently have the capacity to provide more staff to support an expansion of ADAP, which would be required to achieve a seven-year maintenance cycle for agricultural waterways. ADAP would need to hire additional RSD staff to meet the increased ADAP demand. Alternatively, ADAP could seek its own endangered species coverage for the program or find other qualified staff to support fish relocation. The streamlined ADAP BMPs would need to be updated to allow non-RSD staff to perform the fish relocation.

RSD currently dedicates between two to six staff to ADAP projects for fish relocation depending on the size of the project. WLRD estimates that 40 seasonal staff, in addition to ADAP staff who

would also participate in fish relocation, would be required to perform the fish relocation work generated by a one-time, seven-year ADAP drainage maintenance schedule.

#### Inspection Staff and Property Access

Because WLRD does not have adequate data on the current condition of all waterways in unincorporated King County, a comprehensive inspection program would be needed to support an enhanced maintenance program. Three staff dedicated to site inspections would be required to support a one-time, seven-year maintenance cycle on all agricultural waterways.

#### Inspection Equipment

In order to increase the productivity and reduce the physical demands of the job, an all-terrain vehicle (ATV) would be provided for each inspector like the vehicle currently used by ADAP for project support, fish relocation, and plant transportation. It is anticipated that providing an all-terrain vehicle to each inspector would more than double their productivity.

Data collected by inspection staff need to be uniformly collected and stored in a usable manner. Each inspector would be equipped with a tablet to enter data while still in the field. It may be possible to customize existing field data collection systems. If not, a new application would need to be developed to simplify data collection and processing. Collected geo-spatial and location data would be stored in a central location and managed as part of King County's Geographic Information System.

#### Project Staff

DNRP project staff are responsible for site surveys, engineering, drafting, costing, permitting, contracting, planting and plant maintenance oversight, and general project management. To meet the one-time, seven-year objective, it is projected that 16 FTE would be needed to accomplish these responsibilities.

#### Project Staff Equipment

This item includes additional equipment required to complete the inspection and maintenance of all agricultural waterways in unincorporated King County within seven years. This includes items such as tablets, survey equipment, water quality sampling equipment, and vehicles.

#### Outreach Staff

There would be logistical challenges to scheduling the increased level of effort needed to implement a seven-year inspection and maintenance program with the farming community. The vast majority of agricultural waterways are on private land. Two outreach staff would be needed to contact property owners, provide information about the ADAP, and obtain the necessary permissions to perform inspections.

#### Planting and Plant Maintenance Staff

ADAP projects require native plantings along the waterway. Only those projects in artificial waterways with low fish use are exempt (planting is still recommended to control reed canary grass and other invasive plants). Permit conditions also require three years of plant maintenance post-planting. Currently, ADAP uses Washington Conservation Corps (WCC) crews through DOE to install and maintain project plantings. Availability of WCC crews is already extremely limited, and the opportunities to increase crew availability are unlikely. ADAP would need to either contract this work to local contractors or hire additional King County staff to meet the additional

needs. To meet the seven-year objective, it is estimated that planting and plant maintenance would require 3 crew managers and 66 full time planting/maintenance staff organized into 11 six-person work crews.

#### Planting Supplies

ADAP projects are required to install native plants along the waterway as part of the project. The number of plants required is based on the classification of the waterway. This is the cost of plants that is anticipated to be needed to perform the required planting. It is estimated that the cost of the plants, weed barrier, herbicide, and other planting supplies required to implement a one time, seven-year maintenance cycle on all agricultural waterway in unincorporated King County would be just over \$1 million.

#### Planting and Plant Maintenance Equipment

Planting and Plant Maintenance staff will require proper equipment to plant and maintain the required plantings. This item includes items such as ATVs, trailers, hand tools, and other equipment needs.

#### KCD Project Management

One of the required streamlined ADAP BMPs is for participating farms to have a current, approved farm plan created by KCD. Implementing a seven-year maintenance cycle on agricultural waterways would require a significant increase in the number of farm plans created and/or updated. WLRD estimates that KCD would need to prepare 575 farm plans each year to support a seven-year ADAP maintenance cycle, which compares with 71 on average currently produced per year. Consequently, KCD would need to increase its capacity to create/update farm plans, or landowners and consultants could be coached to develop their own plans, with KCD providing final approval. Alternatively, KCC could be changed to not require a farm plan or require a scaled down version of a farm plan.

#### KCD Owner Cost Share

The KCD has been providing a cost share to property owners participating in ADAP since 2016. The cost share program covers about 75 percent of the construction costs for an ADAP project. The KCD cost-share program has mainly been funded with grants from the King County Flood Control Zone District (District).

The KCD's cost-share program has been key to increasing property owner participation in ADAP. Regardless of where the ADAP landowner cost-share program resides, more than \$4 million would be needed to meet the one-time, seven-year maintenance cycle on all agricultural waterways in unincorporated King County. To achieve total participation from all property owners, it is anticipated that the cost-share rate may need to be raised to as high as 100 percent to allow all property owners to participate regardless of their financial position.

#### Contractor availability

There are currently few contractors in King County trained to construct ADAP projects. One of the streamlined ADAP BMPs is that the contractor will be trained in applying the ADAP BMPs. A seven-year maintenance program would necessitate a large increase in the availability of trained contractors. With a significant increase in work load, it is likely that additional contractors will show interest in ADAP projects or existing contractors would increasingly focus their work on ADAP projects. King County staff would be required to train all new contractors to ensure they

can comply with ADAP BMPs. If King County could not find sufficient contractors to meet ADAP program needs, it would have to find alternative resources such as an in-house construction crew.

Contingency and Miscellaneous

This item covers mostly overhead costs like software purchases, additional parking requirement, vehicle maintenance and a five percent contingency for unanticipated program requirements.

It is estimated that the equivalent of approximately 109 full-time staff (95 FTE and 40 TLT June-September) and roughly \$20 million would be required to complete inspection and maintenance of all 389 miles of artificial and modified agricultural waterways within seven years (Table 4). It is assumed that all 389 miles will be fully functional after the initial seven-year inspection/maintenance period.

Table 4. Planning level cost estimates necessary to implement a seven-year inspection and maintenance cycle on all artificial and modified agricultural waterways in unincorporated King County.

Description	2019 ADAP	Seven-Year Drainage Maintenance Program			Comment		
		FTE	Estimated Cost			FTE	STT / TLT
			Ongoing Annual	One-Time			
Program Management	1.5	\$405,000		1.5	Includes a managing engineer and supervising engineer.		
Permitting Staff/Code Change		\$449,000		2	These staff would be responsible for addressing code and policy changes, facilitating programmatic permit revisions and supporting complex permit submittals.		
Cultural Resource Review		\$259,000		1	An archeologist to review all project proposals and conduct onsite investigations as needed.		

Description	2019 ADAP	Seven-Year Drainage Maintenance Program				Comment
Science Staff		\$64,750	\$259,000	0.25	1	An ecologist or biologist would be needed to provide waterway classification support. The first year would require a full position, to help map the agricultural waterways that exist outside the APD's. After the first year, ongoing support would be needed to verify requests for waterway classification updates.
Fish Relocation Staff		\$965,800			13.3	13.3 seasonal fish relocation FTE equivalents (40 TLT – June -September) needed to supplement program staff.
Inspection Staff and Property Access		\$612,600		3		Engineer staff to visit each site, verify drainage location, site conditions, contributing problems and other factors.
Inspection Equipment		\$42,500	\$66,000			Equipment includes vehicles, ATV's and trailers, special computer software, survey equipment and general tools.
Project Staff		\$3,276,000		16		16 additional FTEs to scale up the ADAP to perform that anticipated workload.
Project Staff Equipment		\$192,000	\$650,000			Project equipment includes vehicles, parking, survey equipment, special computer software, water quality sensors, fish removal equipment and general tools.
Outreach Staff		\$380,000		2		Includes two administrators to arrange, coordinate and facilitate landowner interactions, access and paperwork.

Description	2019 ADAP	Seven-Year Drainage Maintenance Program				Comment
Planting and Plant Maintenance Staff		\$4,898,000		69		Includes three permanent project managers and 11 six-person crews, staffed full time.
Planting Supplies		\$1,024,000				Supplies include the weed barrier and herbicide to prepare a site, and the plants to install.
Planting and Plant Maintenance Equipment		\$115,000	\$6000			Includes vehicles, ATVs and trailers, parking, tools and maintenance items.
KCD Project Management		\$2,237,400				Includes staff at the KCD to contract and manage heavy equipment operators.
KCD Cost-Share (Full Price)		\$4,040,000				This is the project cost of paying for contractors in full to perform the work.
Contractor Availability						It is anticipated that if more ADAP work was available, more contractors would be interested in performing the work. If private contractors did not fill the demand, county forces could be used for construction.
Miscellaneous and Contingency		\$1,118,000				Includes miscellaneous administrative costs like parking, software, etc. and a five percent contingency to account for unanticipated costs.
Total		\$20.08 Million	\$0.98 Million	94.75	14.3	This includes 28.75 program staff, 66 year-round planting crew staff, 1 TLT science staff, and 13.3 FTE equivalents for TLT fish relocation staff (June-September). This does not include the staff KCD may need to increase its program capacity.

### C. An ongoing maintenance schedule for the inspection and maintenance of all agricultural waterways on a seven-year maintenance cycle

Implementing an ongoing, seven-year maintenance cycle on all agricultural waterways would be very similar to the one-time inspection and maintenance cycle described in Part B. Assuming all waterways are returned to the same level of function during the initial seven-year inspection/maintenance period, subsequent program costs would be reduced. The inspection protocol and cost would be identical; however, fewer miles per year would need to be dredged because not all waterways accrue sediment at the same rate. Thus, what DNRP has investigated is a program that ensures that all waterways are inspected at least every seven years and all waterways are serviced on a schedule that maintains a high level of drainage function.

Sediment load and waterway slope are two of the most important factors that influence the need for waterway maintenance. The more sediment that is entering a waterway and the flatter the slope of the waterway, the more frequent the waterway will need to be dredged. Thus, to maintain their designed drainage function, some waterways need to be dredged relatively often and other much less frequently. For this proviso, the concept of “aggradation potential” was developed to estimate the miles of agricultural waterway that would need to be dredged each year to implement an ongoing, seven-year maintenance cycle that keeps all waterways functioning as intended. Four aggradation potentials were identified for agricultural waterways, regardless of stream classification:

Very High – Waterways that have a dramatic change of slope from steeper to flatter. The change in slope reduces the sediment carrying capacity of the waterway and coarse sediment deposits in these areas. These waterways typically originate in uplands adjacent to floodplains and form an alluvial fan where they hit the floodplain if material were not regularly removed. It is estimated that all very high potential waterways will require dredging once every seven years.

High – Waterways downstream of waterways with Very High aggradation potential. Coarse sediment will typically deposit in Very High aggradation potential areas, but fine sediment will pass through those areas and deposit in flatter sections downstream. It is estimated that approximately one-half of all high potential waterways will require dredging every seven years` (equates to a 14-year average return interval).

Moderate – Waterways within the 100-year floodplain of major rivers. Major rivers carry a lot of sediment during flood events. When floodwater fills the floodplain and slows down, some of the sediment is deposited in the submerged waterways. It is estimated that approximately one-third of all moderate potential waterways will require dredging every seven years (equates to a 21-year average return interval).

Low – Waterways that are not in the floodplain of a major river and are not in an alluvial deposition area. It is estimated that approximately one-quarter of all low potential waterways will require dredging every seven years (equates to a 28-year average return interval).

Appendix C shows the aggradation potential for artificial and modified agricultural waterways in unincorporated King County based on a GIS analysis



Table 5. Aggradation potential of artificial and modified agricultural waterways and estimated dredging frequency.

Aggradation Potential	Miles	Comments
Very High	17	Expected to be dredged every seven-year cycle
High	25	Expected to dredge half every seven-year cycle
Moderate	187	Expected to dredge one third every seven-year cycle
Low	160	Expected to dredge one fourth every seven-year cycle
Total	389	

It is estimated that nearly 132 miles of agricultural waterway would need to be dredged every seven years to maintain designed drainage function (approximately 19 miles per year), which is approximately an eight-fold increase over current ADAP level. That level of ADAP programming would require the equivalent of approximately 47 full-time staff (40 FTE and 19 TLT June-September) and nearly \$9 million per year (Table 6).

Table 6 contains planning level cost estimates necessary to implement an ongoing, seven-year inspection and maintenance cycle on agricultural waterways in unincorporated King County, with consideration for variable maintenance recurrence interval based on the idea of aggradation potential.

Table 6. Cost estimates for an ongoing, seven-year inspection and maintenance cycle on 389 miles of agricultural waterways, with consideration for variable maintenance recurrence interval based on aggradation potential.

Description	Estimated Annual Cost	FTE	STT/TLT	Comment
Program Management	\$405,000	1.5		Includes a managing engineer and supervising engineer.
Permit Staff/Code Change	\$224,500	1		Regulatory and permit constraints will have been resolved in the first seven years. One position will remain to facilitate complex or difficult permitting.
Cultural Resource Review	\$129,500	.5		The time requirement for an archeologist will be reduced as repeat projects will benefit from prior review.
Science Staff	\$129,500	.5		An ecologist or biologist would be needed to provide waterway classification support. The first year would require a full position, to help map the agricultural waterways that exist outside the APD's. After the first year, support need from this position would be reduced to validating the waterway classification updates delivered by inspection staff.
Fish Relocation Staff	\$455,000		7	7 seasonal fish relocation FTE equivalents (19 TLT – June -September) needed to supplement program staff.

Description	Estimated Annual Cost	FTE	STT/TLT	Comment
Inspection Staff	\$612,600	3		Engineer staff to visit each site, verify site conditions, contributing problems and other factors that will prioritize repeat maintenance.
Inspection Equipment	\$54,500			Equipment includes vehicles, ATV's and trailers, special computer software, survey equipment, general tools and an equipment replacement fund to replace aging assets.
Project Staff	\$1,481,000	7		This includes 7 full time positions.
Project Staff Equipment	\$150,000			Project equipment includes vehicles, parking, survey equipment, special computer software, water quality sensors, fish removal equipment, general tools and an equipment replacement fund to replace aging assets.
Outreach Staff	\$190,200	1		Includes one administrator to arrange, coordinate and facilitate landowner interactions, access and paperwork.
Planting and Plant Maintenance Staff	\$1,761,000	25		Includes 1 permanent project manager and 4 six-person crews, staffed full time.
Planting Supplies	\$368,000			Supplies include the weed barrier and herbicide to prepare a site, and the plants to install.
Planting and Plant Maintenance Equipment	\$50,000			Includes vehicles, ATVs and trailers, parking, tools and maintenance items.
KCD Project Management	\$792,000			Includes staff at the KCD to contract and manage heavy equipment operators.
KCD Cost-Share (Full Price)	\$1,430,000			This is the project cost of paying for contractors in full to perform the work.
Contractor Availability				It is anticipated that if more ADAP work was available, more contractors would be interested in performing the work. If private contractors did not fill the demand, county forces could be used for construction.
Miscellaneous and Contingency	\$495,000			Includes miscellaneous administrative costs like parking, software, etc. and a 5 percent contingency to account for unanticipated costs.
Total	\$8.73 Million	40	7	This includes 15 program staff, 25 year-round planting crew staff, and 7 FTE equivalents for TLT fish relocation staff (June-September). This does not include the staff KCD may need to hire to increase its program capacity.

## VI. Findings and Recommendations

A one-time inspection, maintenance, repair, and clearing of agricultural waterways on a seven-year cycle for the roughly 389 miles of agricultural waterways, excluding natural waterways, in the county would require a combination of additional resources, program changes, KCC changes, and/or new agreements with program partners. Completing maintenance of all King County agricultural waterways within seven years would require approximately 56 miles of waterway to be maintained every year. This equates to a nearly twenty-fold increase over the current level of ADAP waterway maintenance. It is estimated that approximately 95 full-time and 14 FTE equivalents (40 TLT June - September) staff and roughly \$20 million would be required to meet the one-time, seven-year objective to inspect and maintain all 389 miles of artificial and modified agricultural waterways in King County.

An ongoing program that ensures that all 389 miles of waterways are inspected at least every seven years and all waterways are serviced on a schedule that maintains a high level of drainage function would require dredging approximately 19 miles per year. That level of work would require an estimated 40 year-round staff, 7 FTE equivalents (19 TLT June-September) staff and nearly \$9 million per year.

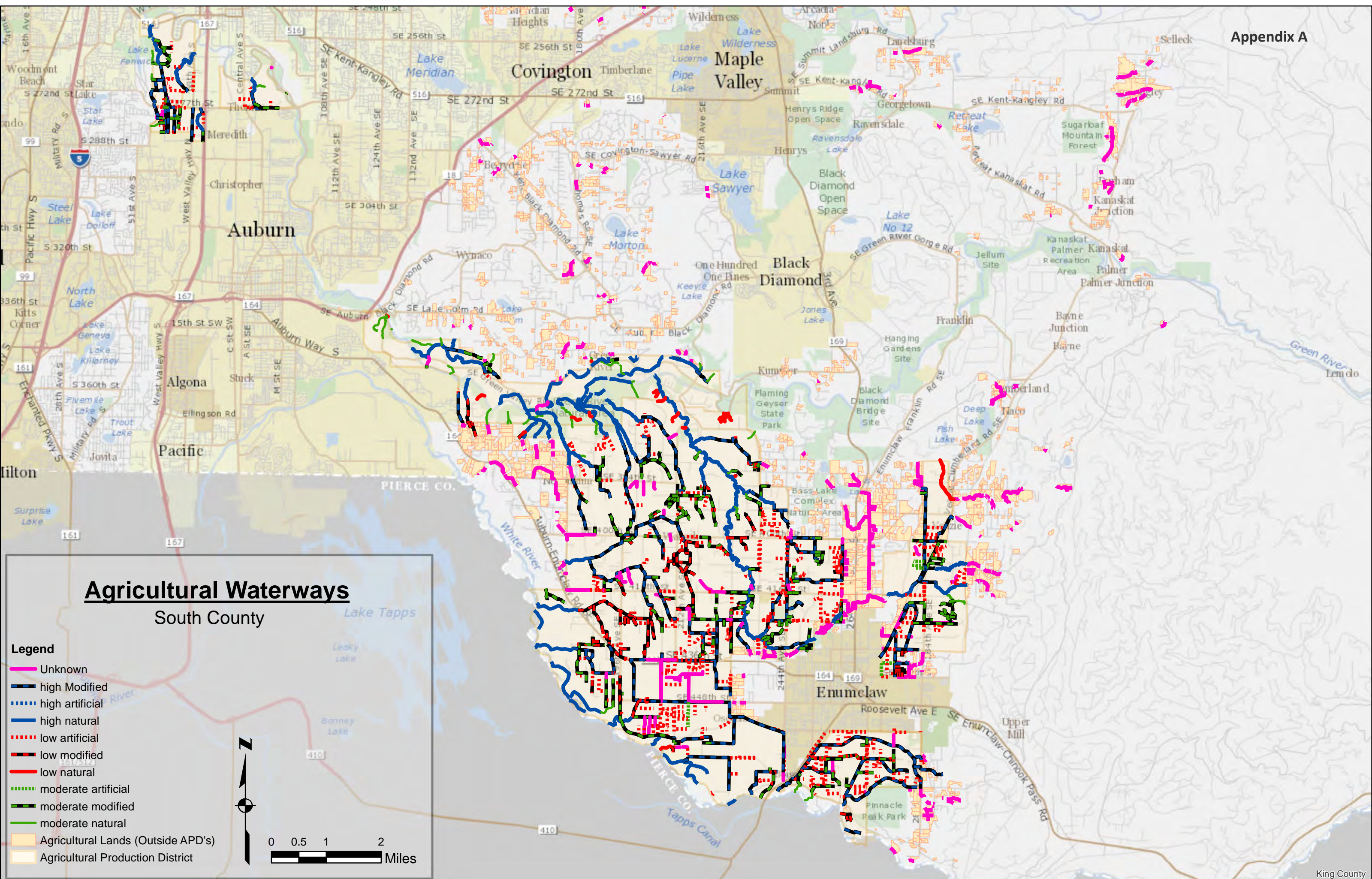
In addition to increasing staff and financial capacity and accelerated agricultural drainage program will need KCC changes, program policy revisions and resource agency support to further streamline ADAP, including the following:

- Amend KCC 16.82 to expand the scope of waterways that can be maintained without the need for a County-issued clearing and grading permit to include all artificial and modified waterways.
- Amend KCC 16.82.051.C15 and 21A.24.045C to eliminate the need for KCD-developed farm plans for ADAP projects, but maintain current ADAP BMPs to ensure a high level of environmental protection
- Expand pool of authorized fish relocation specialists beyond the Road Services Division.
- Increase cost share for project costs to incentivize greater landowner participation.
- Ensure state and federal regulatory agencies support the expanded ADAP scope.

## VII. Conclusion

King County's ADAP program addresses the primary limiting factor to agricultural production in the region: lack of adequate drainage. The program is focused on a relatively narrow part of a much larger issue that must be balanced with water quality and salmon protection objectives. Scaling up and accelerating the program requires action on multiple fronts, including: increased staff and financial capacity, code changes, program policy revisions, resource agency support, active partners and willing landowners. Expanding the scope of work in waterways beyond those covered under ADAP will require additional effort and resources. Given the complexity and sensitivity of the work, ongoing collaboration with tribes, stakeholders, resource agencies and landowners are priorities.

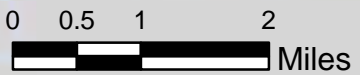
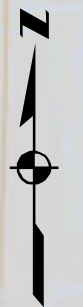
Since 2016, ADAP has improved drainage on agricultural waterways at a rate of approximately three miles per year, improving drainage on more than 900 acres of agricultural land in that time period. While the objectives specified in Ordinance 18835, Section 76, Proviso P2 are ambitious, the County can improve the rate at which local farmers are supported to increase their productivity in a manner consistent with King County's clean water and healthy habitat objectives.

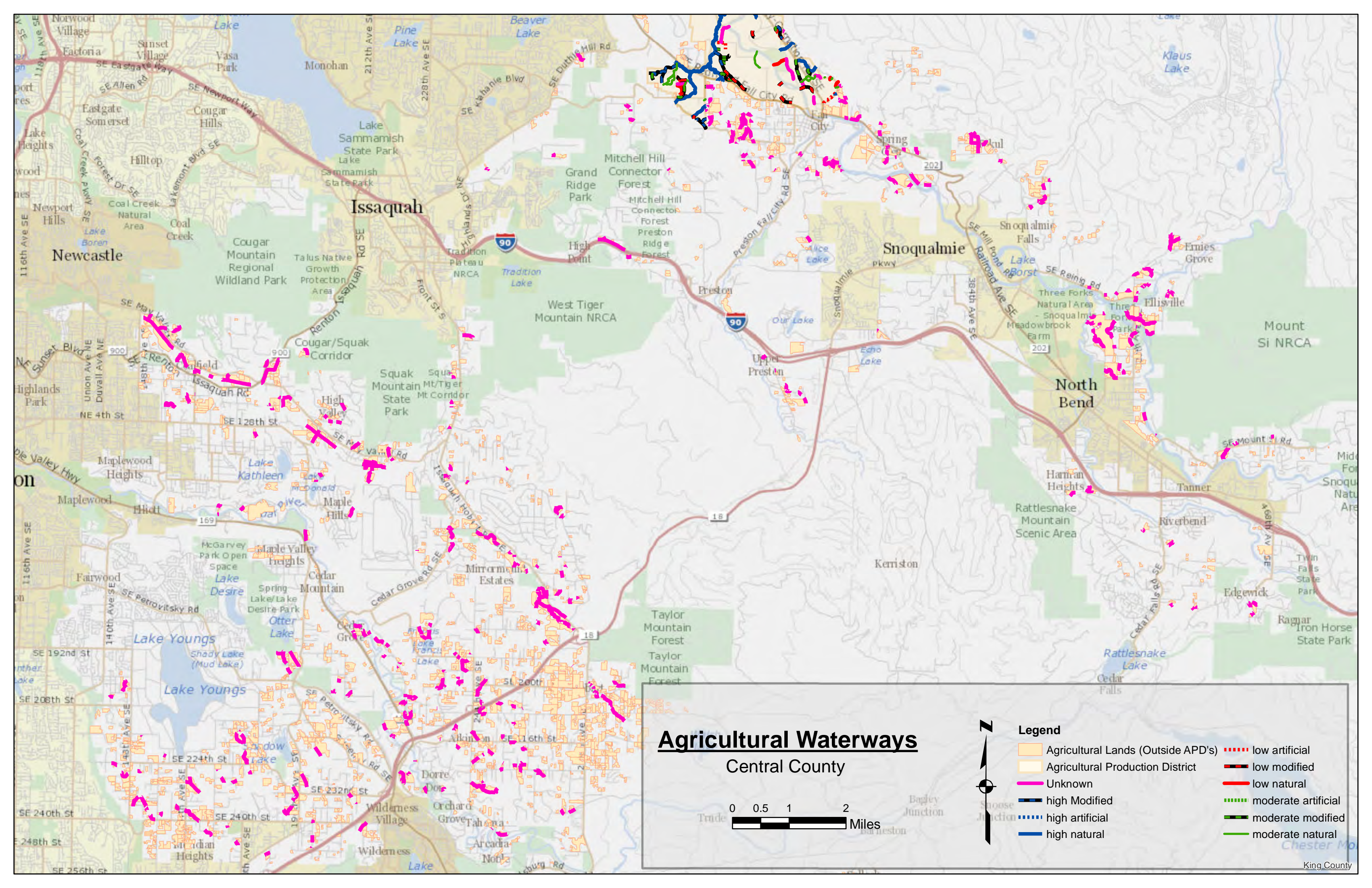


# Agricultural Waterways

South County

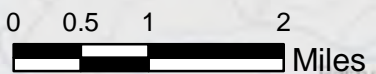
- Legend**
- Unknown
  - high Modified
  - - - high artificial
  - high natural
  - - - low artificial
  - low modified
  - low natural
  - - - moderate artificial
  - moderate modified
  - moderate natural
  - Agricultural Lands (Outside APD's)
  - Agricultural Production District





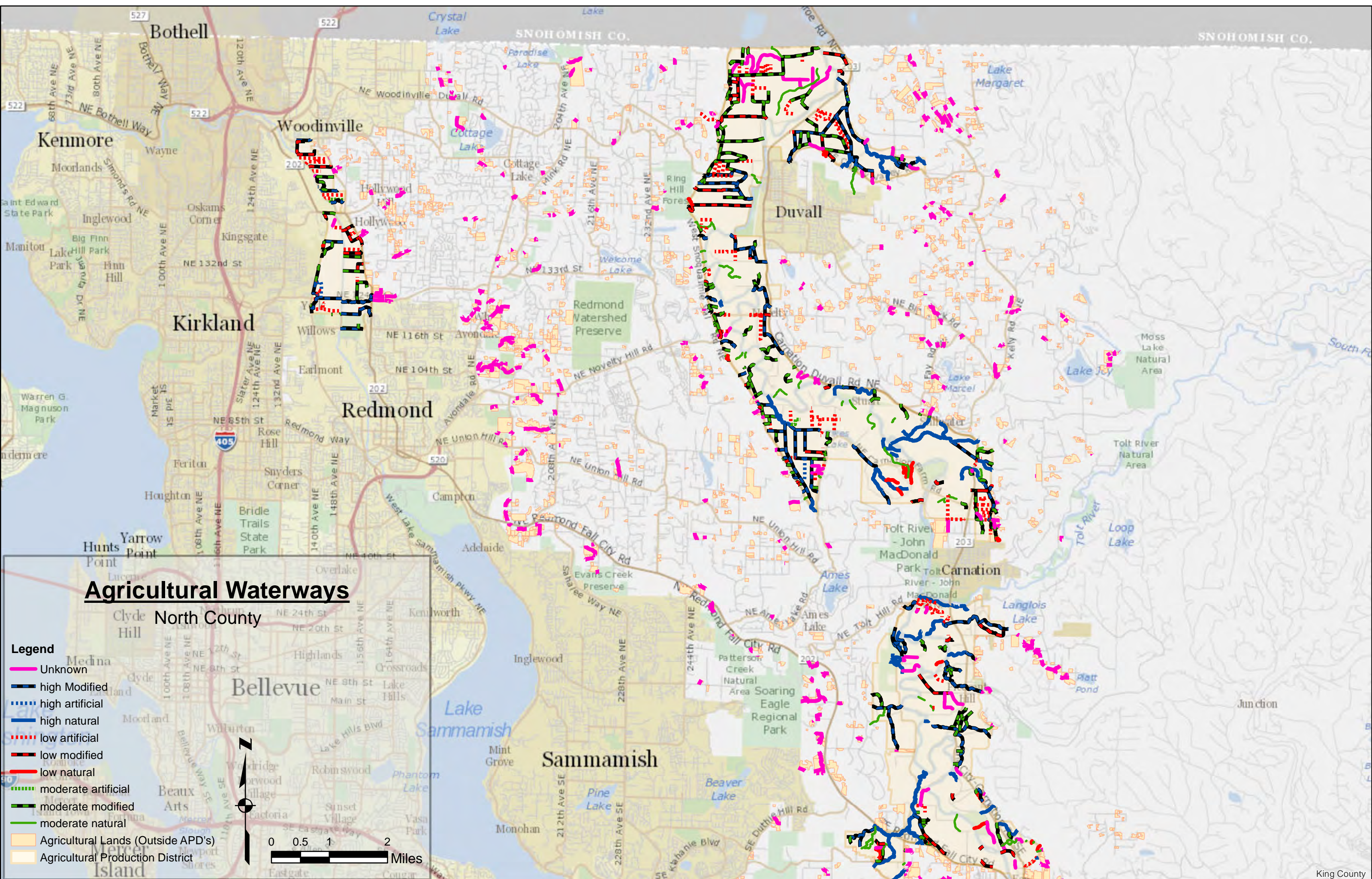
# Agricultural Waterways

Central County



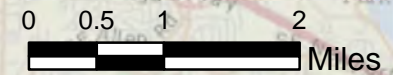
## Legend

- Agricultural Lands (Outside APD's)
- Agricultural Production District
- Unknown
- high Modified
- high artificial
- high natural
- low artificial
- low modified
- low natural
- moderate artificial
- moderate modified
- moderate natural



# Agricultural Waterways

- Legend**
- Unknown
  - high Modified
  - high artificial
  - high natural
  - low artificial
  - low modified
  - low natural
  - moderate artificial
  - moderate modified
  - moderate natural
  - Agricultural Lands (Outside APD's)
  - Agricultural Production District



# Agricultural Waterways

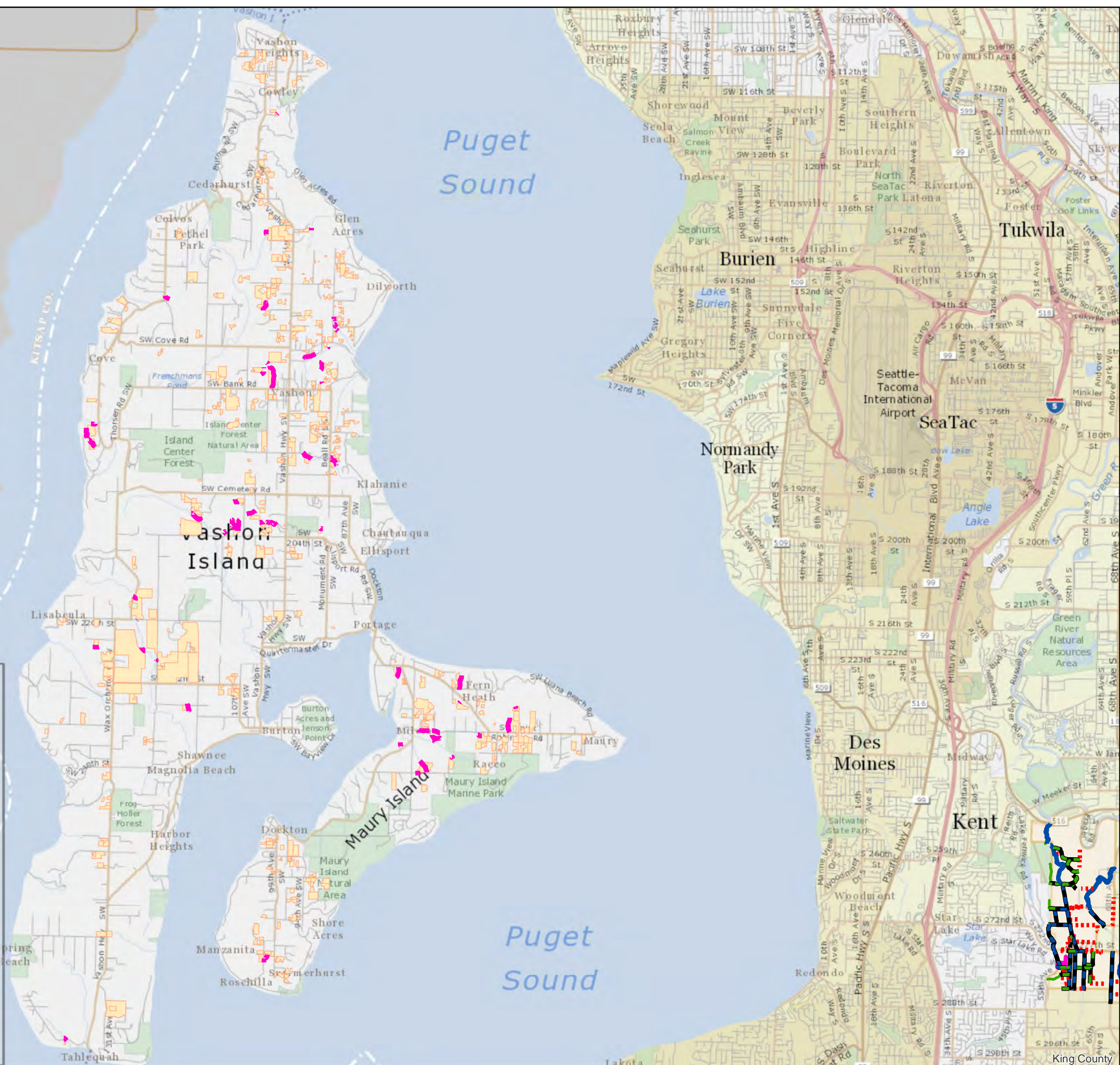
Vashon Island

## Legend

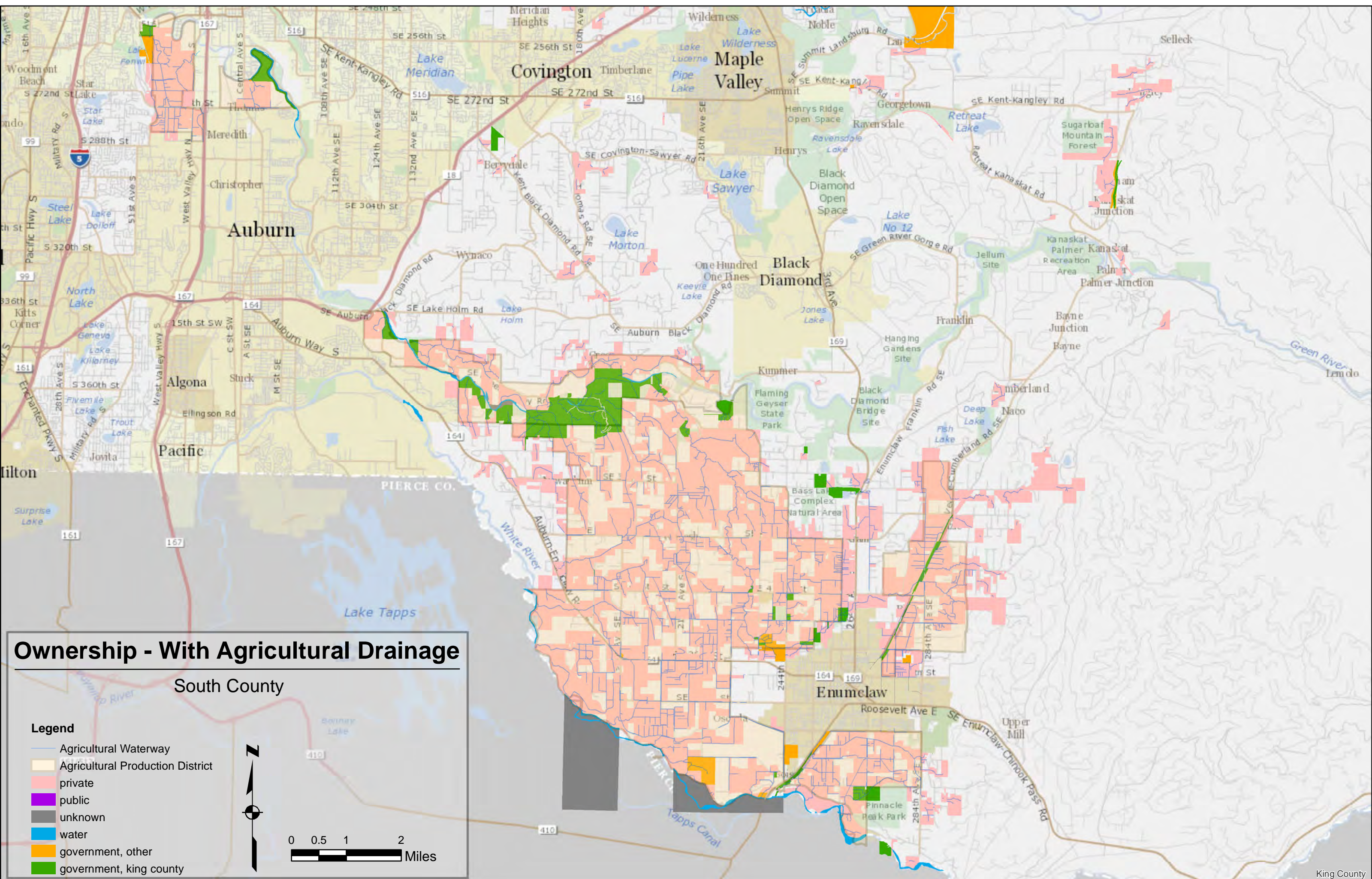
- Unknown
- high Modified
- high artificial
- high natural
- low artificial
- low modified
- low natural
- moderate artificial
- moderate modified
- moderate natural
- Agricultural Lands (Outside APD's)
- Agricultural Production District



0 0.5 1 2 Miles







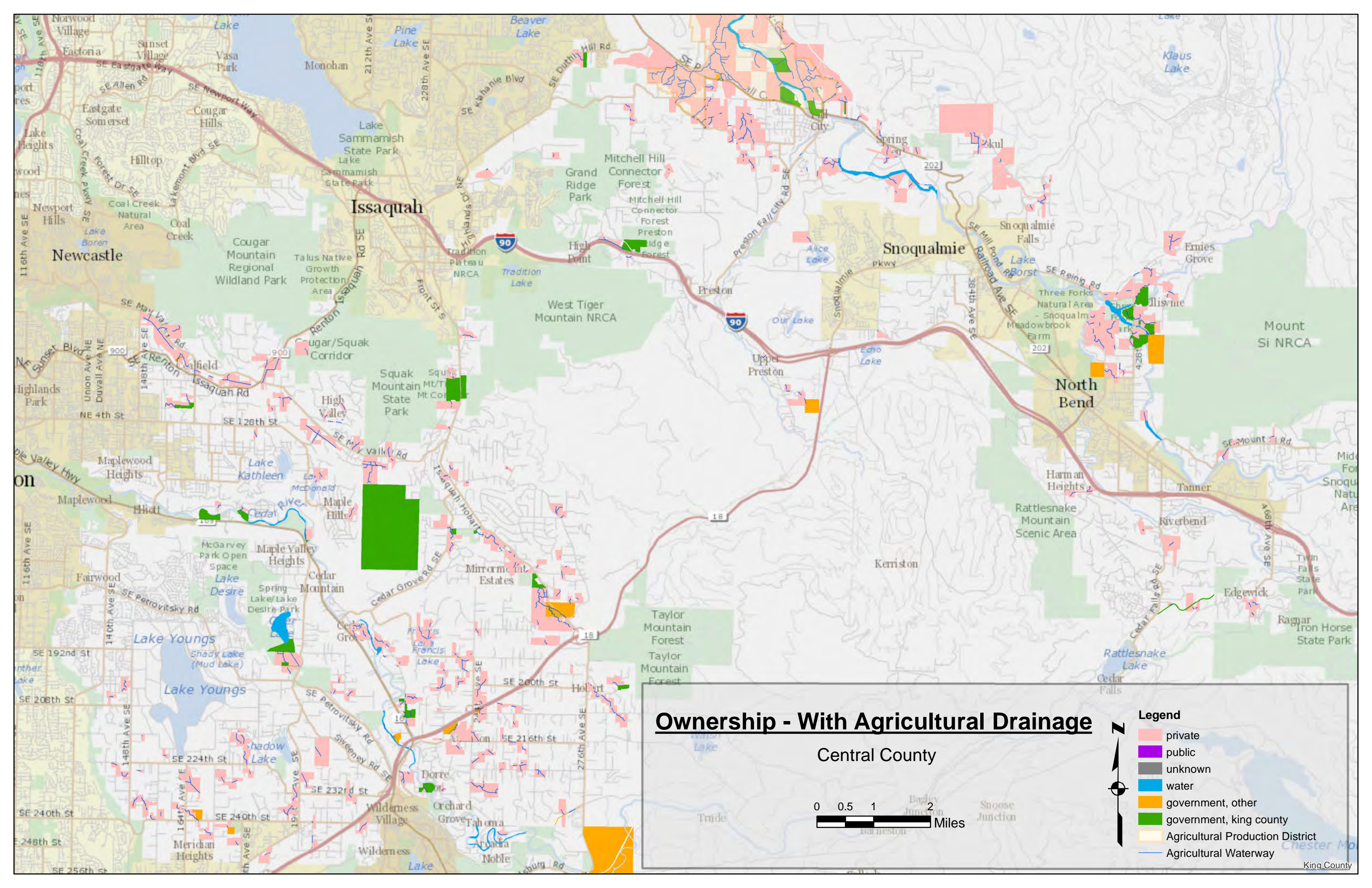
# Ownership - With Agricultural Drainage

South County

**Legend**

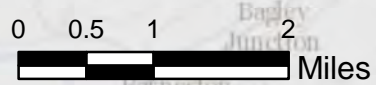
- Agricultural Waterway
- Agricultural Production District
- private
- public
- unknown
- water
- government, other
- government, king county

N  
  
 0 0.5 1 2 Miles



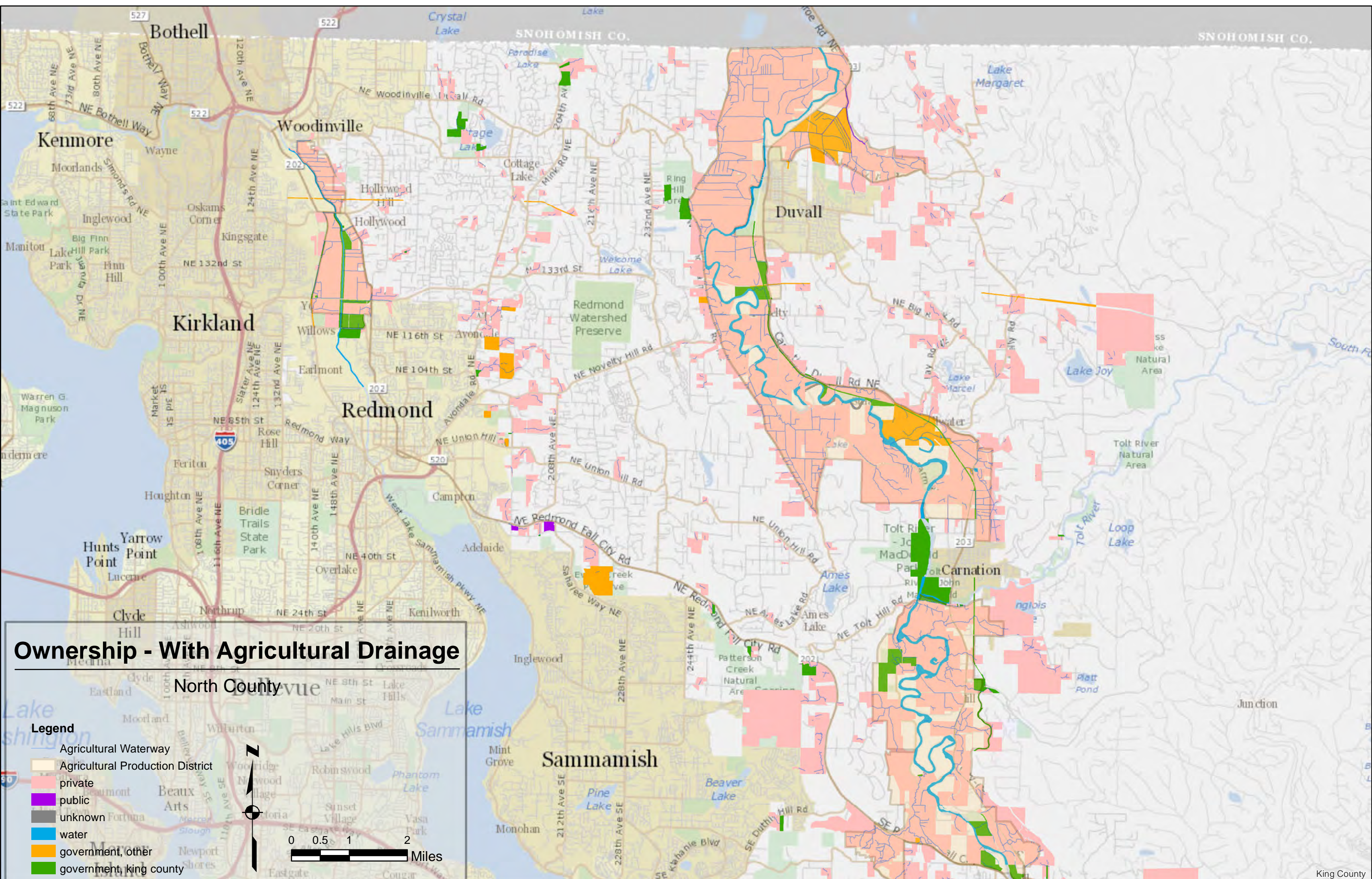
## Ownership - With Agricultural Drainage

Central County



### Legend

- private
- public
- unknown
- water
- government, other
- government, king county
- Agricultural Production District
- Agricultural Waterway



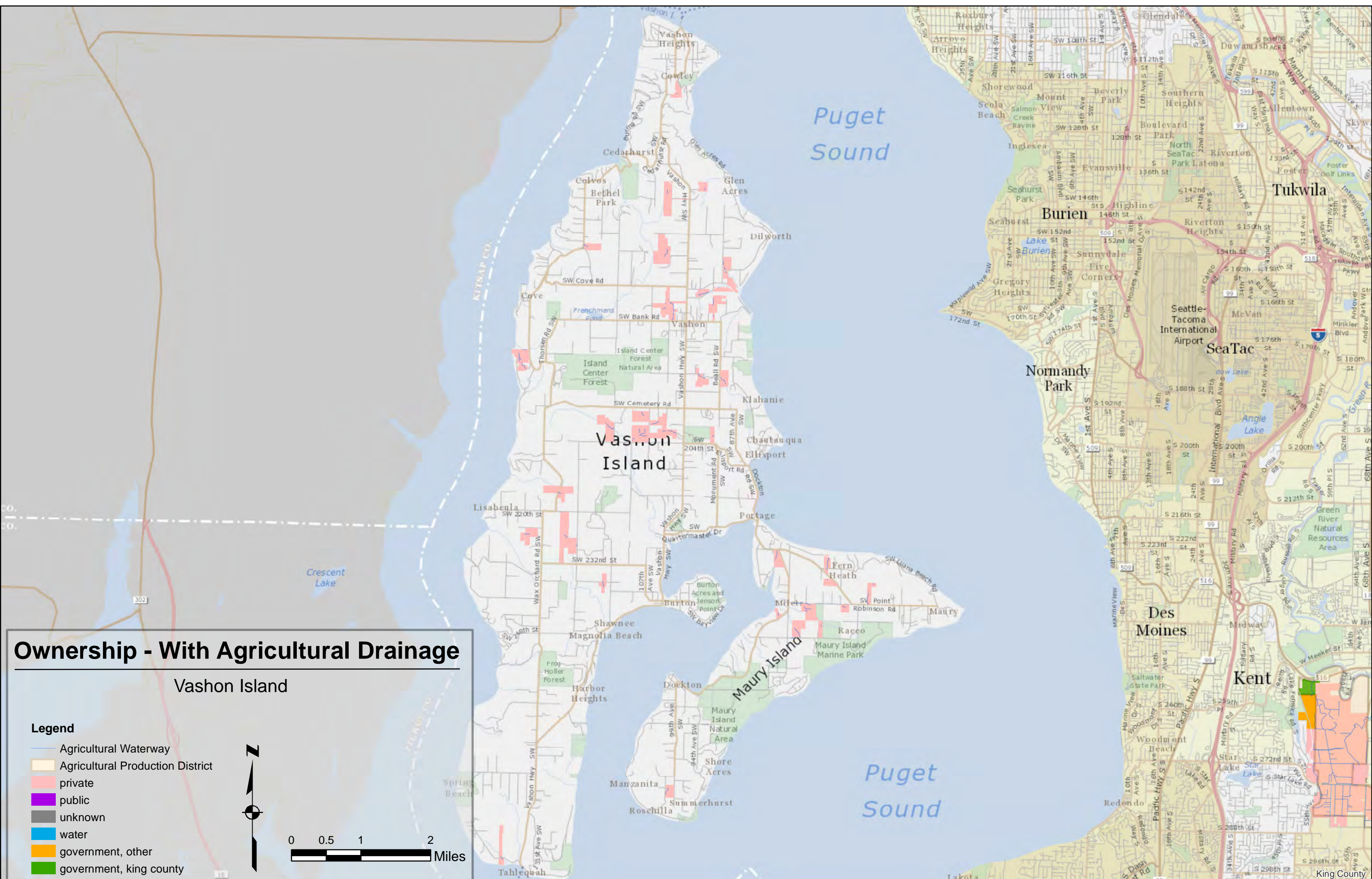
# Ownership - With Agricultural Drainage

**North County**

**Legend**

- Agricultural Waterway
- Agricultural Production District
- private
- public
- unknown
- water
- government, other
- government, king county

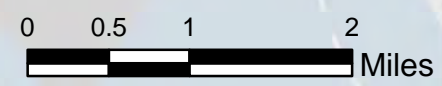
0 0.5 1 2 Miles

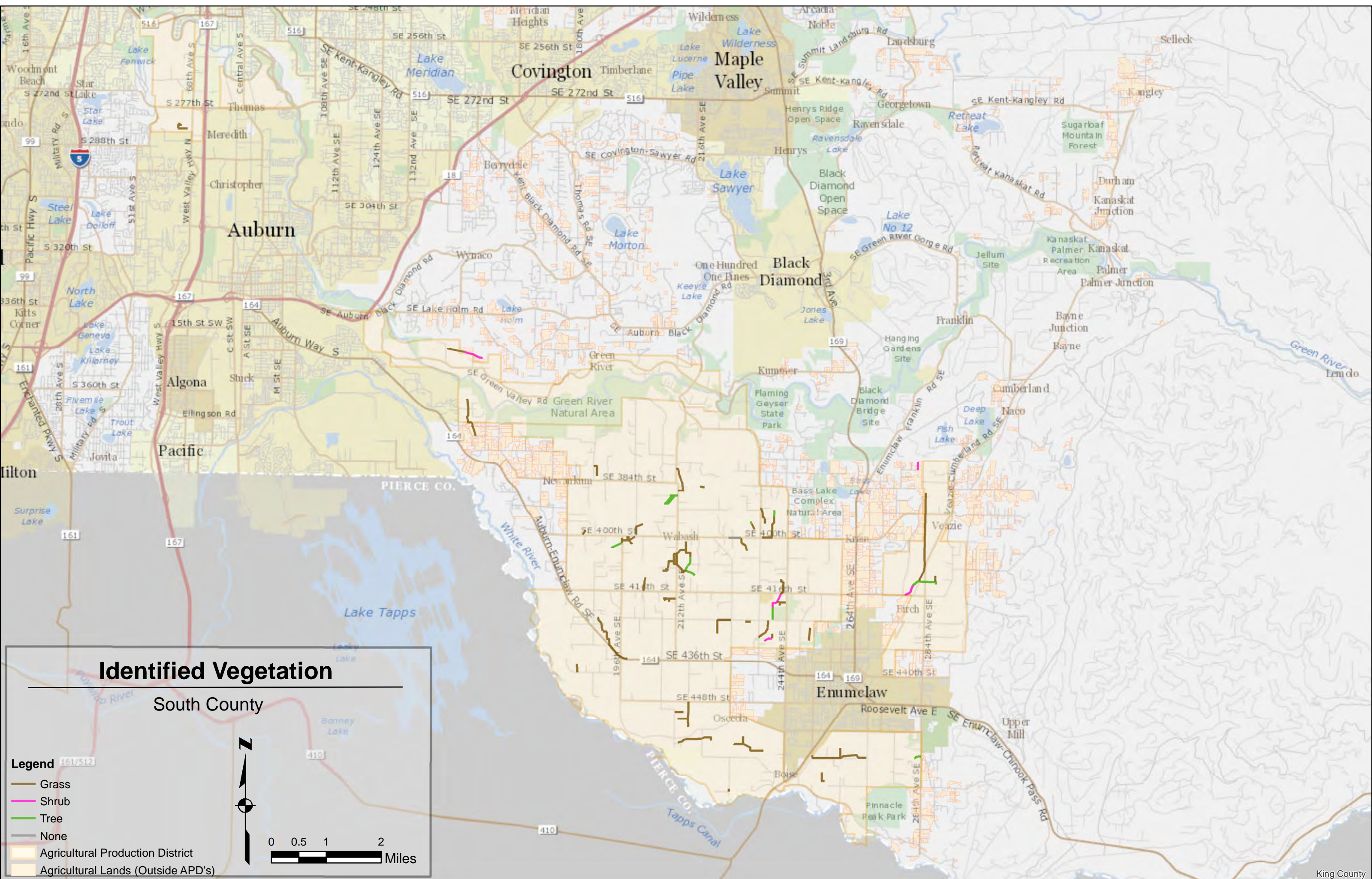


# Ownership - With Agricultural Drainage

Vashon Island

- Legend**
- Agricultural Waterway
  - Agricultural Production District
  - private
  - public
  - unknown
  - water
  - government, other
  - government, king county

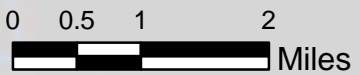
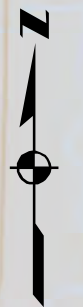


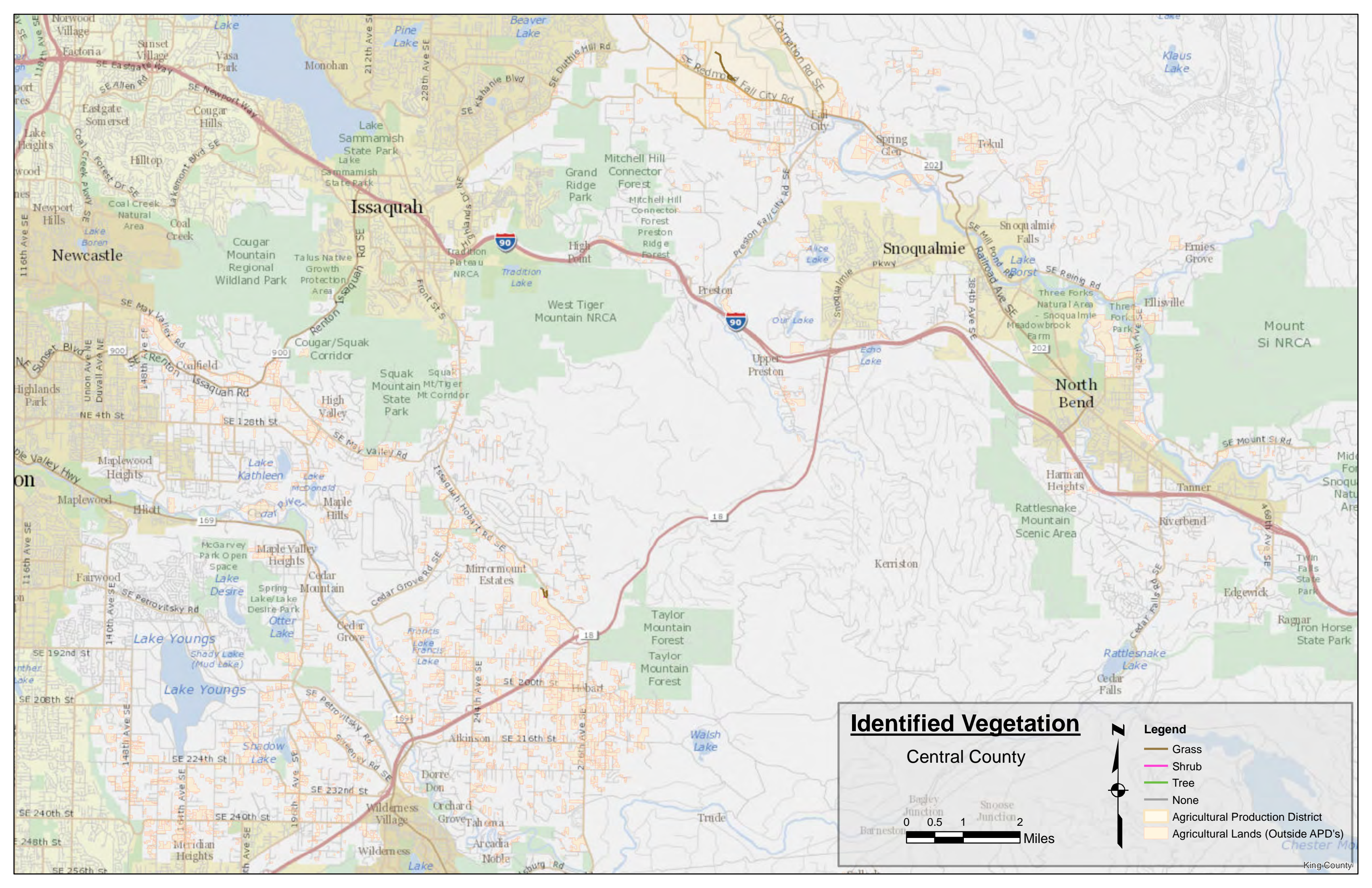


### Identified Vegetation

South County

- Legend**
- Grass
  - Shrub
  - Tree
  - None
  - Agricultural Production District
  - Agricultural Lands (Outside APD's)





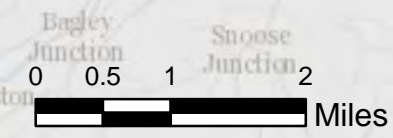
Issaquah

Snoqualmie

North Bend

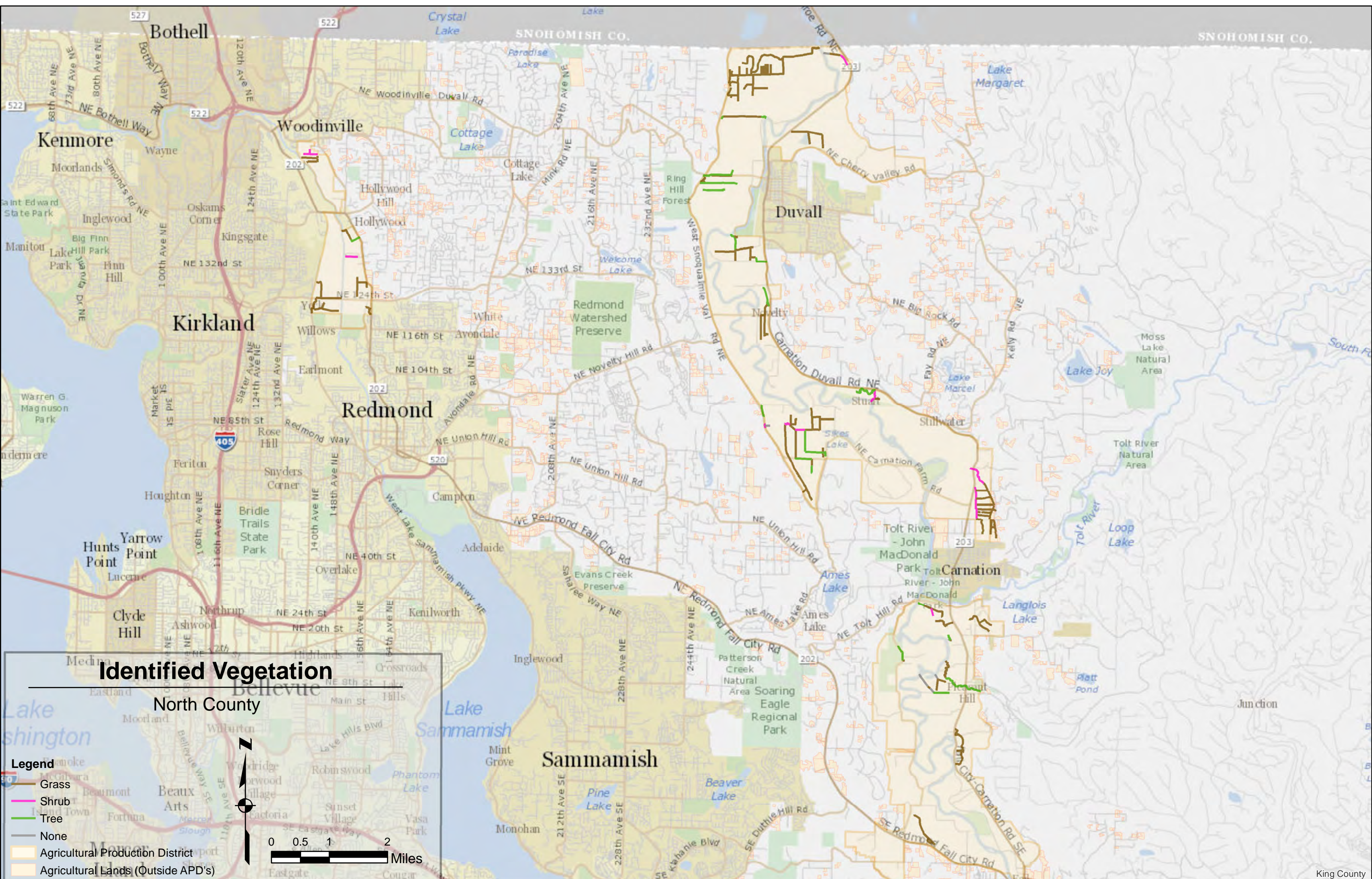
### Identified Vegetation

Central County



#### Legend

- Grass
- Shrub
- Tree
- None
- Agricultural Production District
- Agricultural Lands (Outside APD's)

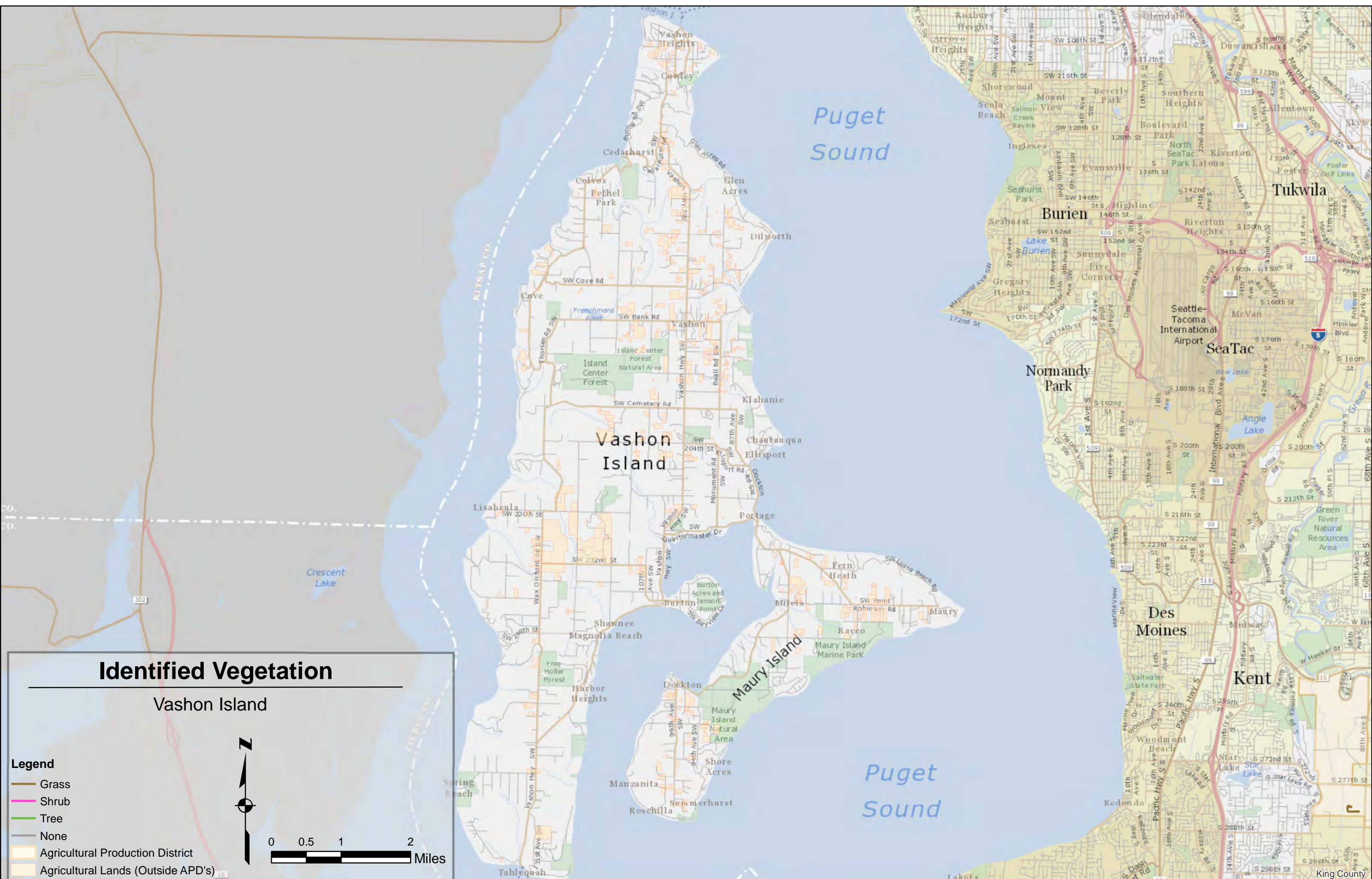


### Identified Vegetation

**Legend**

- Grass
- Shrub
- Tree
- None
- Agricultural Production District
- Agricultural Lands (Outside APD's)

0 0.5 1 2 Miles



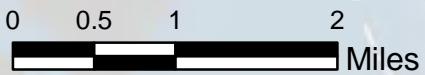
Puget Sound

Vashon Island

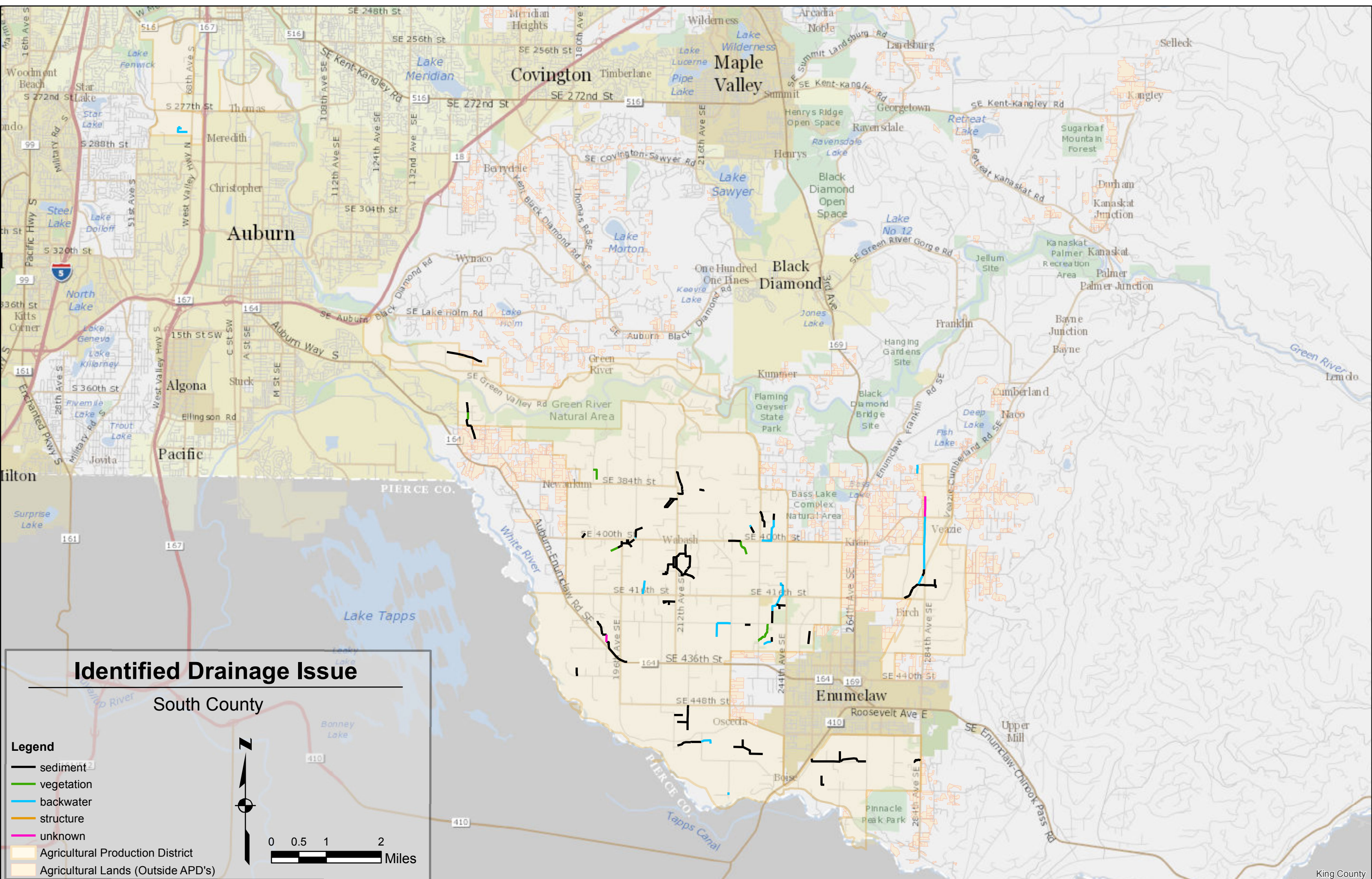
**Identified Vegetation**

Vashon Island

- Grass
- Shrub
- Tree
- None
- Agricultural Production District
- Agricultural Lands (Outside APD's)





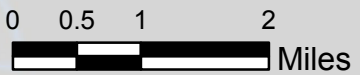


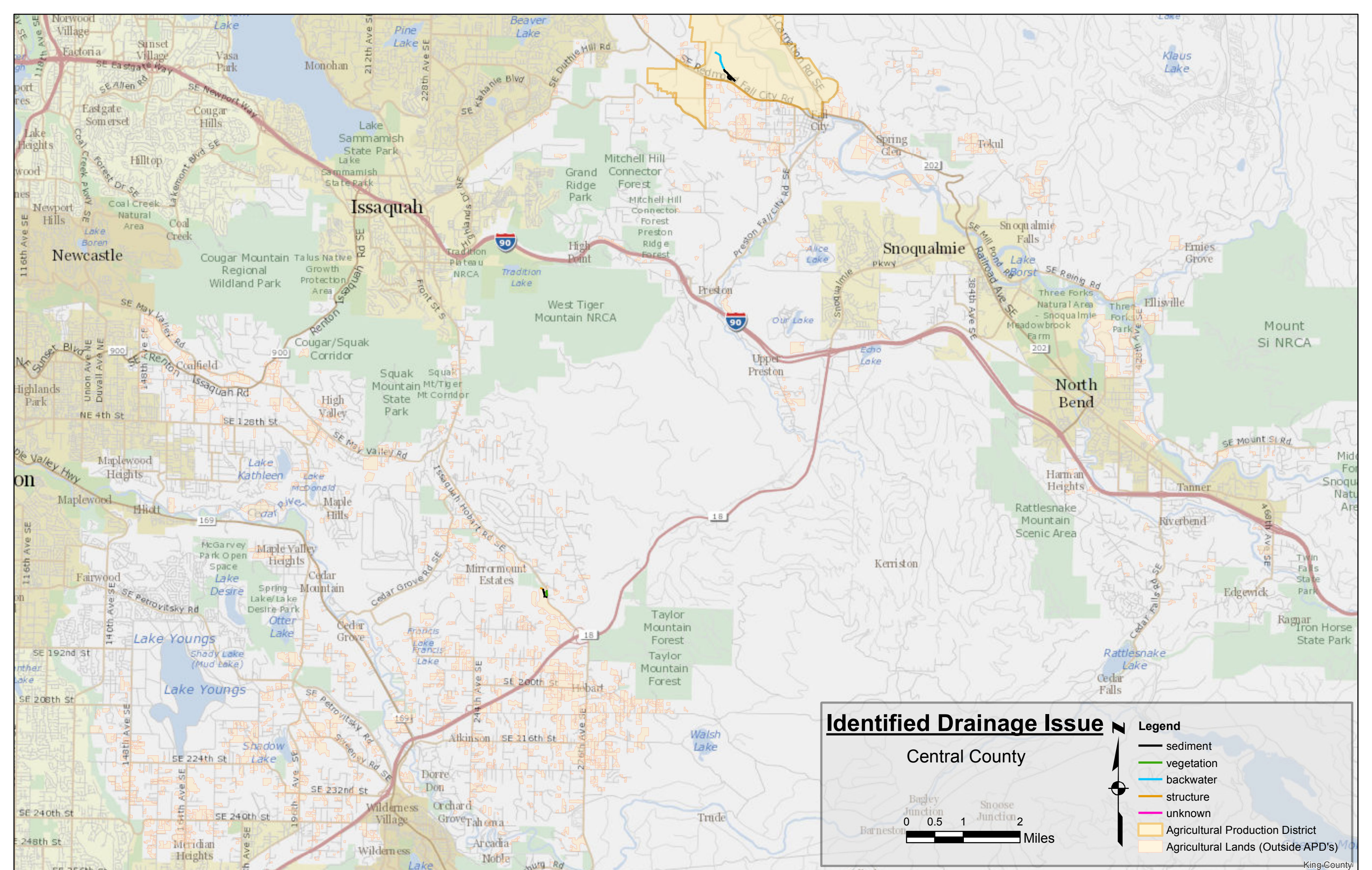
### Identified Drainage Issue

South County

- Legend**
- sediment
  - vegetation
  - backwater
  - structure
  - unknown

- Agricultural Production District
- Agricultural Lands (Outside APD's)





Issaquah

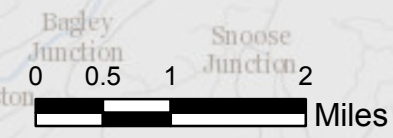
Newcastle

Snoqualmie

North Bend

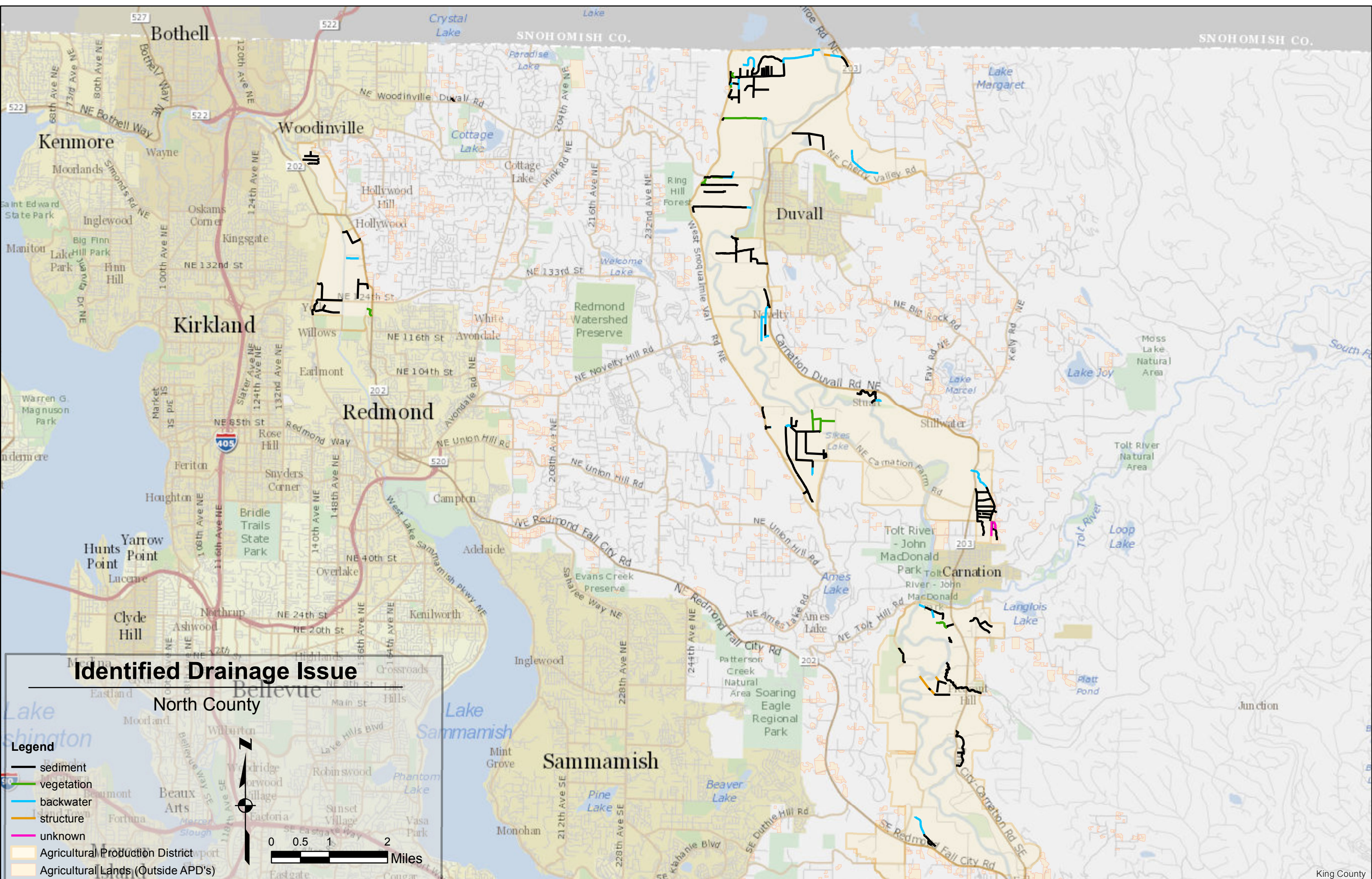
**Identified Drainage Issue**

Central County



**Legend**

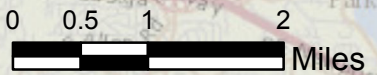
- sediment
- vegetation
- backwater
- structure
- unknown
- Agricultural Production District
- Agricultural Lands (Outside APD's)

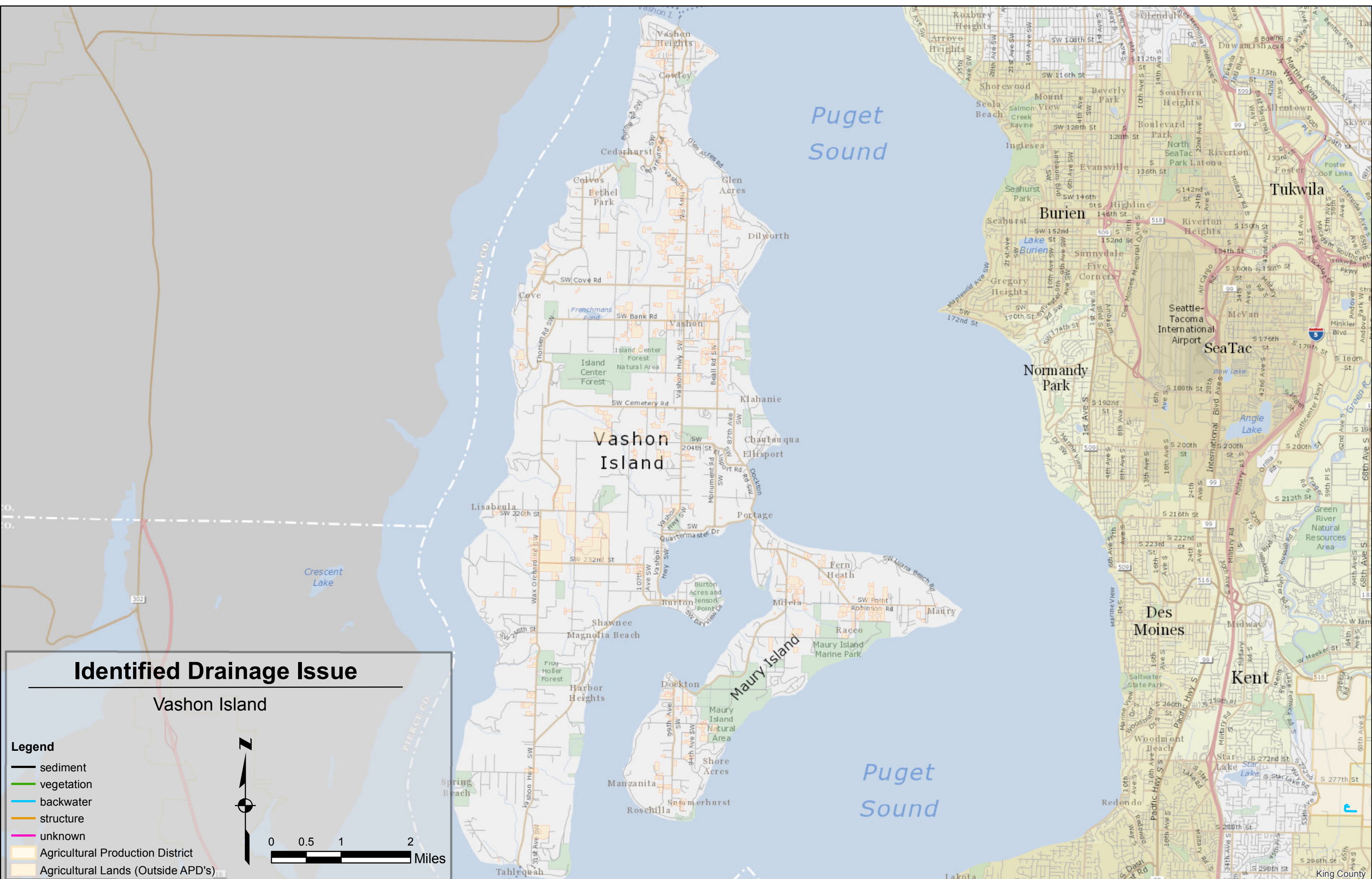


# Identified Drainage Issue

- Legend**
- sediment
  - vegetation
  - backwater
  - structure
  - unknown

Agricultural Production District  
 Agricultural Lands (Outside APD's)





### Identified Drainage Issue

- sediment
- vegetation
- backwater
- structure
- unknown
- Agricultural Production District
- Agricultural Lands (Outside APD's)



0 0.5 1 2 Miles

Puget Sound

Vashon Island

Maury Island

Burien

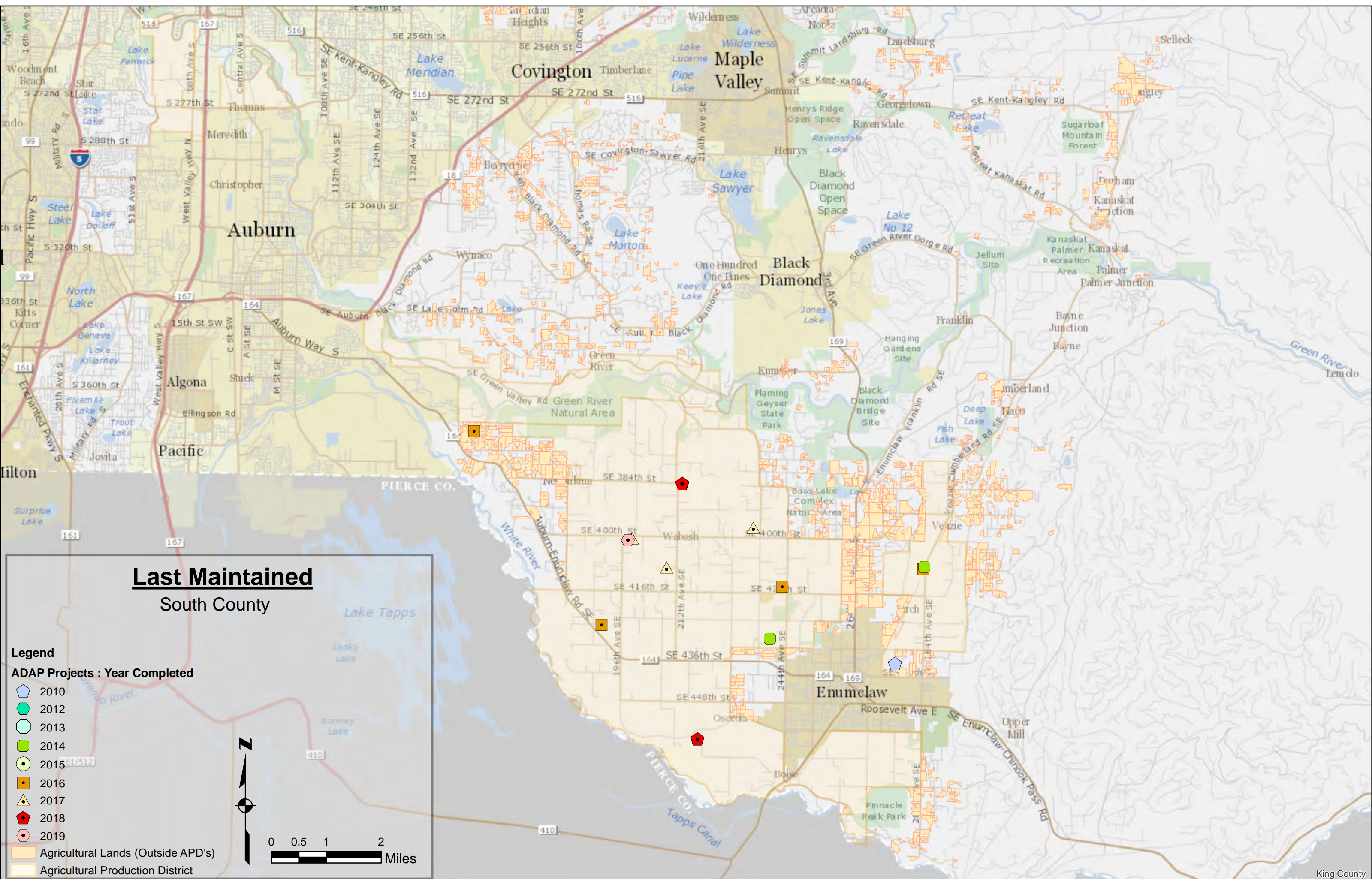
Tukwila

SeaTac

Des Moines

Kent

Puget Sound



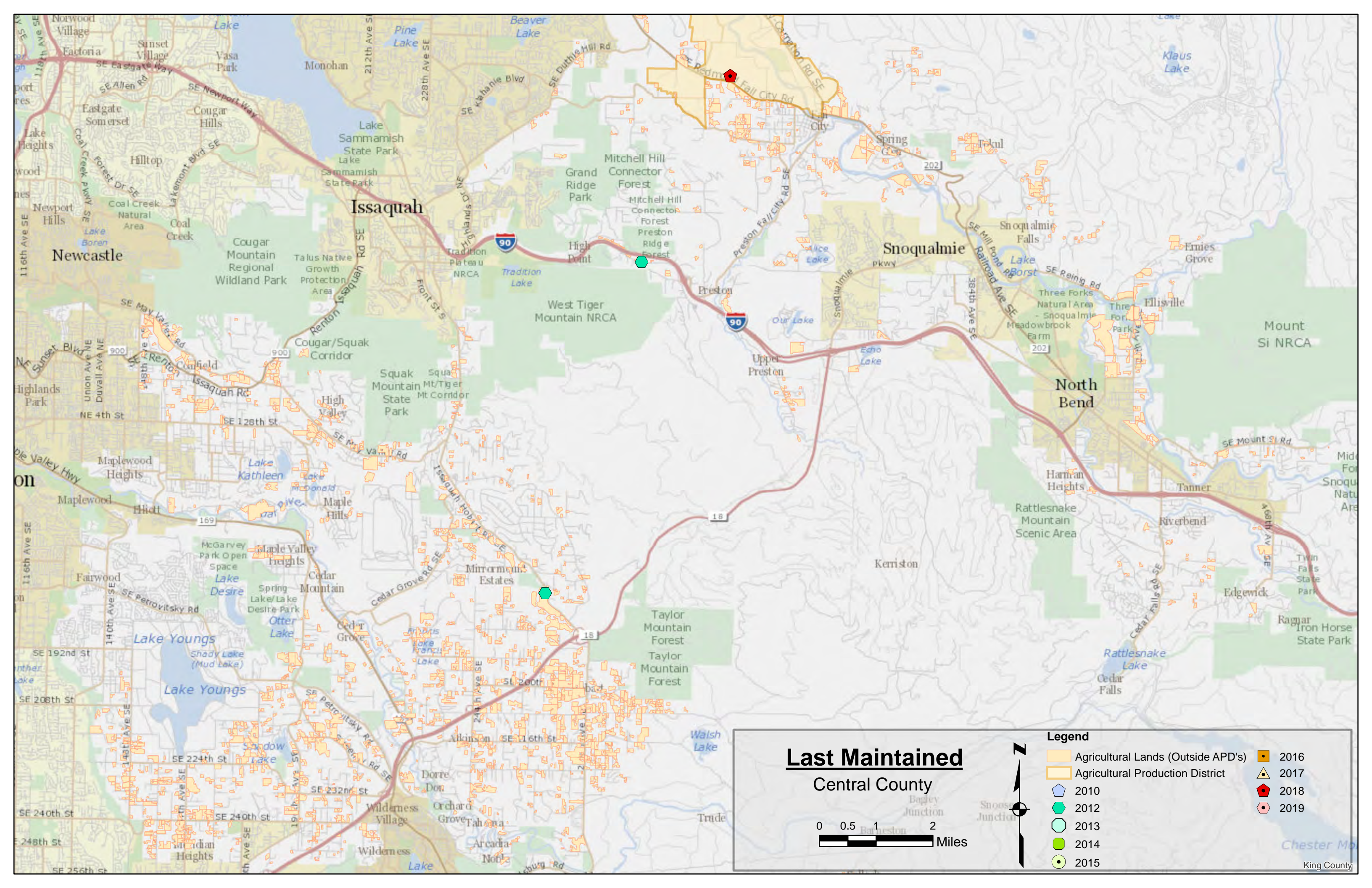
## Last Maintained South County

### Legend ADAP Projects : Year Completed

- ◊ 2010
- ◊ 2012
- ◊ 2013
- ◊ 2014
- ◊ 2015
- ◊ 2016
- ◊ 2017
- ◊ 2018
- ◊ 2019

- Agricultural Lands (Outside APD's)
- Agricultural Production District



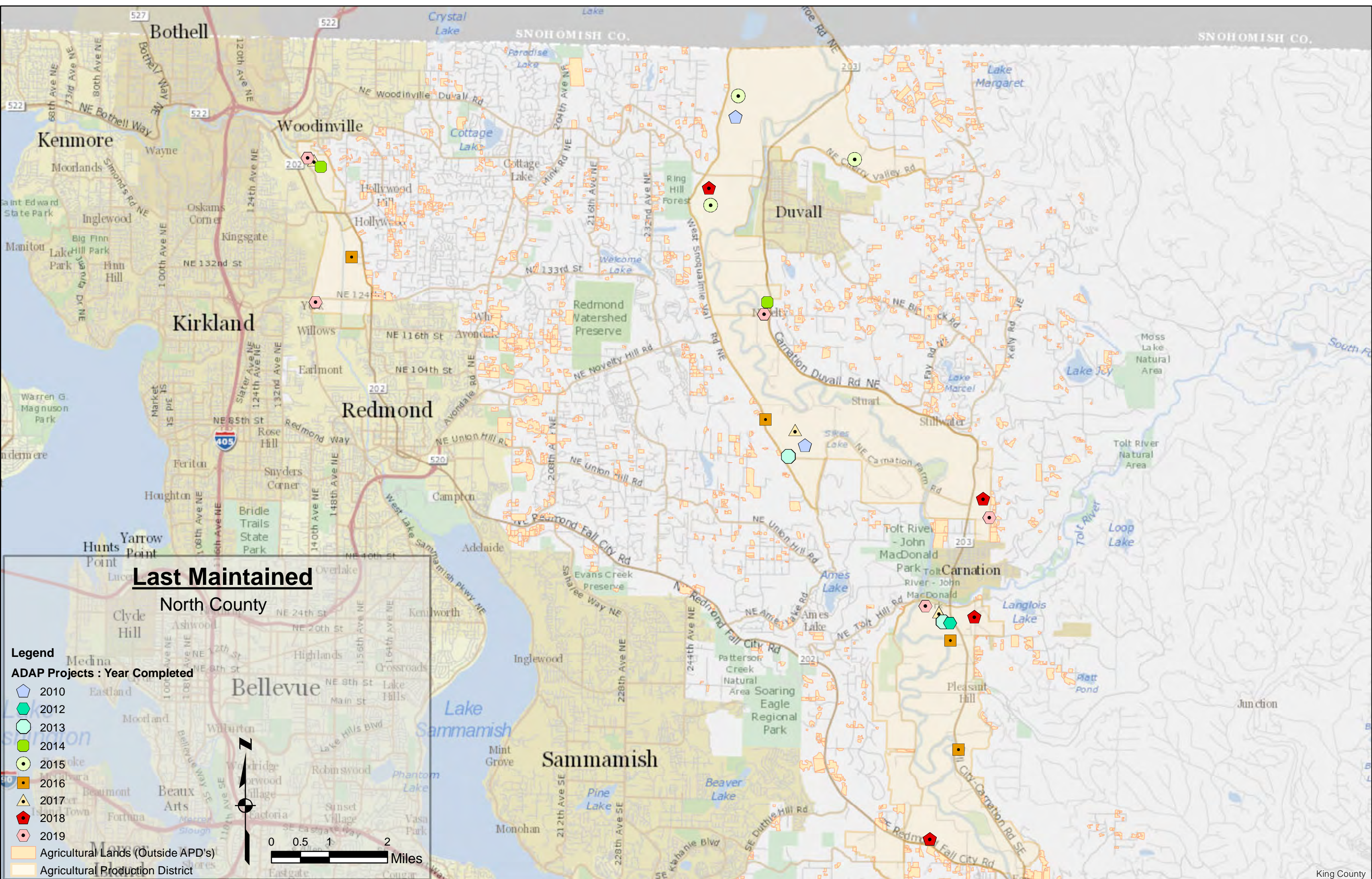


### Last Maintained Central County

0 0.5 1 2 Miles

**Legend**

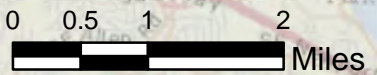
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<span style="display: inline-block; width: 15px; height: 10px; background-color: #FFD700; border: 1px solid black;"></span> Agricultural Production District	<span style="display: inline-block; width: 10px; height: 10px; border: 1px solid black; border-style: dashed;"></span> 2017
<span style="display: inline-block; width: 10px; height: 10px; border: 1px solid blue;"></span> 2010	<span style="display: inline-block; width: 10px; height: 10px; border: 1px solid red;"></span> 2018
<span style="display: inline-block; width: 10px; height: 10px; border: 1px solid green;"></span> 2012	<span style="display: inline-block; width: 10px; height: 10px; border: 1px solid pink;"></span> 2019
<span style="display: inline-block; width: 10px; height: 10px; border: 1px solid cyan;"></span> 2013	
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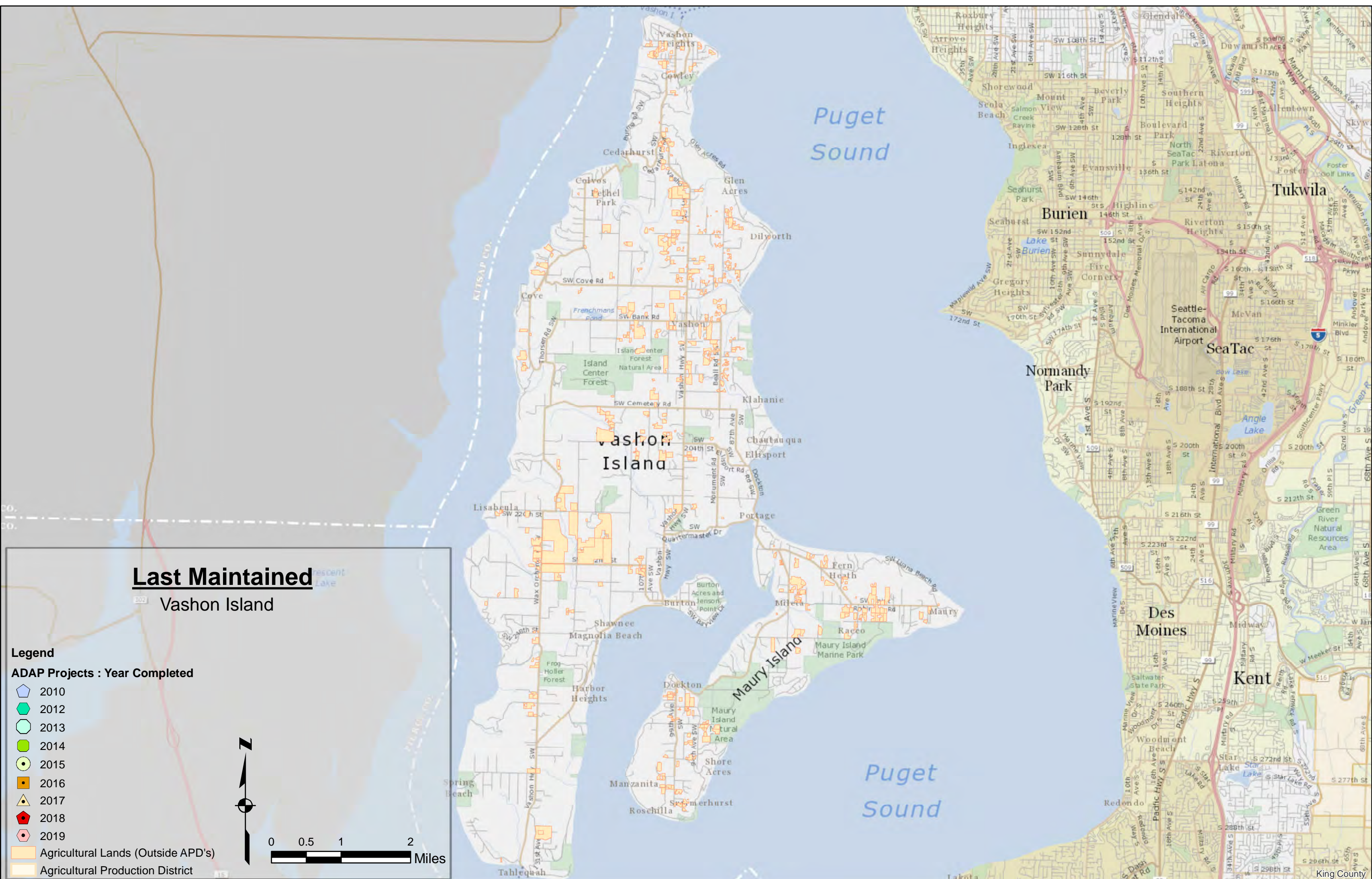


**Last Maintained**

**Legend**  
**ADAP Projects : Year Completed**

- 2010
- 2012
- 2013
- 2014
- 2015
- 2016
- 2017
- 2018
- 2019
- Agricultural Lands (Outside APD's)
- Agricultural Production District





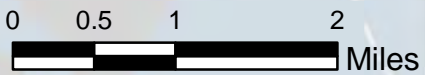
**Last Maintained**

Vashon Island

**Legend**

**ADAP Projects : Year Completed**

- 2010
- 2012
- 2013
- 2014
- 2015
- 2016
- 2017
- 2018
- 2019
- Agricultural Lands (Outside APD's)
- Agricultural Production District





This color-coded version of King County Code 21A.24.045 highlights each allowed alteration that can be used to remove accumulated sediment from an Aquatic Area and the corresponding conditions that are required to use the allowed alteration. An allowed alteration and the conditions that apply to that alteration are highlighted in the same color to clearly show the relationship between the two.

**Title 21A  
ZONING**

**UPDATED: April 10, 2019**

**21A.24.045 Allowed alterations (in effect everywhere except for the shoreline jurisdiction, for which this takes effect fourteen days after Department of Ecology approval in accordance with Ordinance 18767, Section 21, and Ordinance 18791, Section 215).**

A. Within the following seven critical areas and their buffers all alterations are allowed if the alteration complies with the development standards, impact avoidance and mitigation requirements and other applicable requirements established in this chapter:

1. Critical aquifer recharge area;
2. Coal mine hazard area;
3. Erosion hazard area;
4. Flood hazard area except in the severe channel migration hazard area;
5. Landslide hazard area under forty percent slope;
6. Seismic hazard area; and
7. Volcanic hazard areas.

B. Within the following seven critical areas and their buffers, unless allowed as an alteration exception under K.C.C. 21A.24.070, only the alterations on the table in subsection C. of this section are allowed if the alteration complies with conditions in subsection D. of this section and the development standards, impact avoidance and mitigation requirements and other applicable requirements established in this chapter:

1. Severe channel migration hazard area;
2. Landslide hazard area over forty percent slope;
3. Steep slope hazard area;
4. Wetland;
5. Aquatic area;
6. Wildlife habitat conservation area; and
7. Wildlife habitat network.

C. In the following table where an activity is included in more than one activity category, the numbered conditions applicable to the most specific description of the activity governs. Where more than one numbered condition appears for a listed activity, each of the relevant conditions specified for that activity within the given critical area applies. For alterations involving more than one critical area, compliance with the conditions applicable to each critical area is required.

A= alteration is allowed Numbers indicate applicable development condition in subsection D. of this section	Landslide Hazard Over 40 percent and Buffer	Steep Slope Hazard and Buffer	Wetland and Buffer	Aquatic Area and Buffer and Severe Channel Migration	Wildlife Habitat Conservation Area and Wildlife Habitat Network
<b>Structures</b>					

Appendix B: Title 21A Zoning, Updated: April 10, 2019

Construction of new single detached dwelling unit			A 1	A 2	
Construction of a new tree-supported structure			A 64	A 64	A 64
Construction of nonresidential structure			A 3	A 3	A 3, 4
Maintenance or repair of existing structure	A 5	A	A	A	A 4
Expansion or replacement of existing structure	A 5, 7	A 5, 7	A 7, 8	A 6, 7, 8	A 4, 7
Interior remodeling	A	A	A	A	A
Construction of new dock or pier			A 9	A 9, 10, 11	
Maintenance, repair or replacement of dock or pier			A 12	A 10, 11	A 4
<b>Grading</b>					
Grading		A 13		A 14	A 4, 14
Construction of new slope stabilization	A 15	A 15	A 15	A 15	A 4, 15
Maintenance of existing slope stabilization	A 16	A 13	A 17	A 16, 17	A 4
Mineral extraction	A	A			
<b>Clearing</b>					
Clearing	A 18	A 18	A 18, 20	A 14, 18, 20	A 4, 14, 18, 20
Cutting firewood		A 21	A 21	A 21	A 4, 21
Vegetation management	A 19	A 19	A 19	A 19	A 4, 19
Removal of vegetation for fire safety	A 22	A 22	A 22	A 22	A 4, 22
Removal of noxious weeds or invasive vegetation	A 23	A 23	A 23	A 23	A 4, 23
<b>Forest Practices</b>					
Forest management activity	A	A	A	A	A 25
<b>Roads</b>					
Construction of new public road right-of-way structure on unimproved right-of-way			A 26	A 26	
Construction of new road in a plat			A 26	A 26	
Maintenance of public road right-of-way structure	A 16	A 16	A 16	A 16	A 16, 27
Expansion beyond public road right-of way structure	A	A	A 26	A 26	
Repair, replacement or modification within the roadway	A 16	A 16	A 16	A 16	A 16, 27
Construction of driveway or private access road	A 28	A 28	A 28	A 28	A 28
Construction of farm field access drive	A 29	A 29	A 29	A 29	A 29
Maintenance of driveway, private access road, farm field access drive or parking lot	A	A	A 17	A 17	A 17, 27
Construction of a bridge or culvert as part of a driveway or private access road	A 39	A 39	A 39	A 39	A 39
<b>Bridges or culverts</b>					
Maintenance or repair of bridge or culvert	A 16, 17	A 16, 17	A 16, 17	A 16, 17	A 16, 17, 27
Construction of a new bridge	A 16, 39	A 16, 39	A 16, 39	A 16, 39	A 4, 16, 39
Replacement of bridge or culvert	A 16	A 16	A 16	A 16, 30	A 16, 27
Expansion of bridge or culvert	A 16, 17	A 16, 17	A 16, 17, 31	A 17, 31	A 4
<b>Utilities and other infrastructure</b>					
Construction of new utility corridor or utility facility	A 32, 33	A 32, 33	A 32, 34	A 32, 34	A 27, 32, 35
Construction or maintenance of a hydroelectric generating facility	A 67	A 67	A 66	A 66	A 4, 66
Construction of a new residential utility service distribution line	A 32, 33	A 32, 33	A 32, 60	A 32, 60	A 27, 32, 60
Maintenance, repair or replacement of utility corridor or utility facility	A 32, 33	A 32, 33	A 32, 34, 36	A 32, 34, 36	A 4, 32, 37
Construction of a new on-site sewage disposal system or well	A 24	A 24	A 63	A 63	
Maintenance or repair of existing well	A 37	A 37	A 37	A 37	A 4, 37
Maintenance or repair of on-site sewage disposal system	A	A	A	A 37	A 4
Construction of new surface water conveyance system	A 32, 33	A 32, 33	A 32, 38	A 32, 38	A 4
Construction, maintenance or repair of in-water heat exchanger			A 68	A 68	
Maintenance, repair or replacement of existing surface water conveyance system	A 33	A 33	A 16, 32, 38	A 16, 40, 41	A 4, 37

Appendix B: Title 21A Zoning, Updated: April 10, 2019

Construction of new surface water flow control or surface water quality treatment facility			A 32	A 32	A 4, 32
Maintenance or repair of existing surface water flow control or surface water quality treatment facility	A 16	A 16	A 16	A 16	A 4
Construction of new flood protection facility			A 42	A 42	A 27, 42
Maintenance, repair or replacement of flood protection facility	A 33, 43	A 33, 43	A 43	A 43	A 27, 43
Flood risk reduction gravel removal	A 61	A 61	A 61	A 61	A 61
Construction of new instream structure or instream work	A 16	A 16	A 16	A 16, 44, 45	A 4, 16, 44, 45
Maintenance or repair of existing instream structure	A 16	A	A	A	A 4
<b>Recreation</b>					
Construction of new trail	A 46	A 46	A 47	A 47	A 4, 47
Maintenance of outdoor public park facility, trail or publicly improved recreation area	A 48	A 48	A 48	A 48	A 4, 48
<b>Habitat, education and science projects</b>					
Habitat restoration or enhancement project	A 49	A 49	A 49	A 49	A 4, 49
Scientific sampling for salmonids			A 50	A 50	A 50
Drilling and testing for critical areas report	A 51	A 51	A 51, 52	A 51, 52	A 4
Environmental education project	A 62	A 62	A 62	A 62	A 62
<b>Agriculture</b>					
Horticulture activity including tilling, discing, planting, seeding, harvesting, preparing soil, rotating crops and related activity	A 53	A 53	A 53, 54	A 53, 54	A 53, 54
Grazing livestock	A 53	A 53	A 53, 54	A 53, 54	A 53, 54
Construction or maintenance of a commercial fish farm			A 53, 54	A 53, 54	A 53, 54
Construction or maintenance of livestock manure storage facility			A 53, 54, 55	A 53, 54, 55, 56	A 53, 54
Construction of a livestock heavy use area			A 53, 54, 55	A 53, 54, 55, 56	A 53, 54
Construction or maintenance of a farm pad			A 56	A 56	
Construction of agricultural drainage			A 57	A 57	A 4, 57
Maintenance or replacement of agricultural drainage	A 23, 58	A 23, 58	A 23, 53, 54, 58	A 23, 53, 54, 58	A 4, 23, 53, 54, 58
Maintenance of agricultural waterway			A 69	A 69	
Construction or maintenance of farm pond, fish pond or livestock watering pond	A 53	A 53	A 53, 54	A 53, 54	A 53, 54
<b>Other</b>					
Shoreline water dependent or shoreline water oriented use				A 65	
Excavation of cemetery graves in established and approved cemetery	A	A	A	A	A
Maintenance of cemetery graves	A	A	A	A	A
Maintenance of lawn, landscaping or garden for personal consumption	A 59	A 59	A 59	A 59	A 59
Maintenance of golf course	A 17	A 17	A 17	A 17	A 4, 17

D. The following alteration conditions apply:

1. Limited to farm residences in grazed or tilled wet meadows and subject to the limitations of subsection D.3. of this section.
2. Only allowed in a buffer of a lake that is twenty acres or larger on a lot that was created before January 1, 2005, if:
  - a. at least seventy-five percent of the lots abutting the shoreline of the lake or seventy-five percent of the lake frontage, whichever constitutes the most developable lake frontage, has existing density of four dwelling units per acre or more;
  - b. the development proposal, including mitigation required by this chapter, will have the least adverse impact on the critical area;

c. existing native vegetation within the critical area buffer will remain undisturbed except as necessary to accommodate the development proposal and required building setbacks;

d. access is located to have the least adverse impact on the critical area and critical area buffer;

e. the site alteration is the minimum necessary to accommodate the development proposal and in no case in excess of five thousand square feet;

f. the alteration is no closer than:

(1) on site with a shoreline environment designation of high intensity or residential, the greater of twenty-five feet or the average of the setbacks on adjacent lots on either side of the subject property, as measured from the ordinary high water mark of the lake shoreline;

(2) on a site with a shoreline environment designation of rural, conservancy, resource or forestry, the greater of fifty feet or the average of the setbacks on adjacent lots on either side of the subject property, as measured from the ordinary high water mark the lake shoreline; and

(3) on a site with a shoreline environment designation of natural, the greater of one hundred feet or the average of the setbacks on adjacent lots on either side of the subject property, as measured from the ordinary high water mark; and

g. to the maximum extent practical, alterations are mitigated on the development proposal site by enhancing or restoring remaining critical area buffers.

3. Limited to nonresidential farm-structures in grazed or tilled wet meadows or buffers of wetlands or aquatic areas where:

a. the site is predominantly used for the practice of agriculture;

b. the structure is in compliance with an approved farm management plan in accordance with K.C.C. 21A.24.051;

c. the structure is either:

(1) on or adjacent to existing nonresidential impervious surface areas, additional impervious surface area is not created waterward of any existing impervious surface areas and the area was not used for crop production;

(2) higher in elevation and no closer to the critical area than its existing position; or

(3) at a location away from existing impervious surface areas that is determined to be the optimum site in the farm management plan;

d. all best management practices associated with the structure specified in the farm management plan are installed and maintained;

e. installation of fencing in accordance with K.C.C. chapter 21A.30 does not require the development of a farm management plan if required best management practices are followed and the installation does not require clearing of critical areas or their buffers; and

f. in a severe channel migration hazard area portion of an aquatic buffer only if:

(1) there is no feasible alternative location on-site;

(2) the structure is located where it is least subject to risk from channel migration;

(3) the structure is not used to house animals or store hazardous substances; and

(4) the total footprint of all accessory structures within the severe channel migration hazard area will not exceed the greater of one thousand square feet or two percent of the severe channel migration hazard area on the site.

4. No clearing, external construction or other disturbance in a wildlife habitat conservation area is allowed during breeding seasons established under K.C.C. 21A.24.382.

5. Allowed for structures when:

a. the landslide hazard poses little or no risk of injury;

b. the risk of landsliding is low; and

c. there is not an expansion of the structure.

6. Within a severe channel migration hazard area allowed for:

- a. existing legally established primary structures if:
    - (1) there is not an increase of the footprint of any existing structure; and
    - (2) there is not a substantial improvement as defined in K.C.C. 21A.06.1270; and
  - b. existing legally established accessory structures if:
    - (1) additions to the footprint will not make the total footprint of all existing structures more than one-thousand square feet; and
    - (2) there is not an expansion of the footprint towards any source of channel migration hazard, unless the applicant demonstrates that the location is less subject to risk and has less impact on the critical area.
7. Allowed only in grazed wet meadows or the buffer or building setback outside a severe channel migration hazard area if:
- a. the expansion or replacement does not increase the footprint of a nonresidential structure;
  - b.(1) for a legally established dwelling unit, the expansion or replacement, including any expansion of a legally established accessory structure allowed under this subsection B.7.b., does not increase the footprint of the dwelling unit and all other structures by more than one thousand square feet, not including any expansion of a drainfield made necessary by the expansion of the dwelling unit. To the maximum extent practical, the replacement or expansion of a drainfield in the buffer should be located within areas of existing lawn or landscaping, unless another location will have a lesser impact on the critical area and its buffer;
  - (2) for a structure accessory to a dwelling unit, the expansion or replacement is located on or adjacent to existing impervious surface areas and does not result in a cumulative increase in the footprint of the accessory structure and the dwelling unit by more than one thousand square feet;
  - (3) the location of the expansion has the least adverse impact on the critical area; and
  - (4) a comparable area of degraded buffer area shall be enhanced through removal of nonnative plants and replacement with native vegetation in accordance with an approved landscaping plan;
  - c. the structure was not established as the result of an alteration exception, variance, buffer averaging or reasonable use exception;
  - d. to the maximum extent practical, the expansion or replacement is not located closer to the critical area or within the relic of a channel that can be connected to an aquatic area; and
  - e. The expansion of a residential structure in the buffer of a Type S aquatic area that extends towards the ordinary high water mark requires a shoreline variance if:
    - (1) the expansion is within thirty-five feet of the ordinary high water mark; or
    - (2) the expansion is between thirty-five and fifty feet of the ordinary high water mark and the area of the expansion extending towards the ordinary high water mark is greater than three hundred square feet.
8. Allowed upon another portion of an existing impervious surface outside a severe channel migration hazard area if:
- a. except as otherwise allowed under subsection D.7. of this section, the structure is not located closer to the critical area;
  - b. except as otherwise allowed under subsection D.7. of this section, the existing impervious surface within the critical area or buffer is not expanded; and
  - c. the degraded buffer area is enhanced through removal of nonnative plants and replacement with native vegetation in accordance with an approved landscaping plan.
9. Limited to piers or seasonal floating docks in a category II, III or IV wetland or its buffer or along a lake shoreline or its buffer where:

a. the vegetation where the alteration is proposed does not consist of dominant native wetland herbaceous or woody vegetation six feet in width or greater and the lack of this vegetation is not the result of any violation of law;

b. the wetland or lake shoreline is not a salmonid spawning area;

c. hazardous substances or toxic materials are not used; and

d. if located in a freshwater lake, the pier or dock conforms to the standards for docks under K.C.C. 21A.25.180.

10. Allowed on type N or O aquatic areas if hazardous substances or toxic materials are not used.

11. Allowed on type S or F aquatic areas outside of the severe channel migration hazard area if in compliance with K.C.C. 21A.25.180.

12. When located on a lake, must be in compliance with K.C.C. 21A.25.180.

13. Limited to regrading and stabilizing of a slope formed as a result of a legal grading activity.

14. The following are allowed in the severe channel migration hazard area if conducted more than one hundred sixty-five feet from the ordinary high water mark in the rural area and natural resource lands and one-hundred fifteen feet from the ordinary high water mark in the urban area:

a. grading of up to fifty cubic yards on lot less than five acres; and

b. clearing of up to one-thousand square feet or up to a cumulative thirty-five percent of the severe channel migration hazard area.

15. Only where erosion or landsliding threatens a structure, utility facility, roadway, driveway, public trails, aquatic area or wetland if, to the maximum extent practical, stabilization work does not disturb the slope and its vegetative cover and any associated critical areas.

16. Allowed when performed by, at the direction of or authorized by a government agency in accordance with regional road maintenance guidelines.

17. Allowed when not performed under the direction of a government agency only if:

a. the maintenance or expansion does not involve the use of herbicides, hazardous substances, sealants or other liquid oily substances in aquatic areas, wetlands or their buffers; and

b. when maintenance, expansion or replacement of bridges or culverts involves water used by salmonids:

(1) the work is in compliance with ditch standards in public rule; and

(2) the maintenance of culverts is limited to removal of sediment and debris from the culvert and its inlet, invert and outlet and the stabilization of the disturbed or damaged bank or channel immediately adjacent to the culvert and shall not involve the excavation of a new sediment trap adjacent to the inlet.

18. Allowed for the removal of hazard trees and vegetation as necessary for surveying or testing purposes.

19. The limited trimming, pruning or removal of vegetation under a vegetation management plan approved by the department:

a. in steep slope and landslide hazard areas, for the making and maintenance of view corridors; and

b. in all critical areas for habitat enhancement, invasive species control or forest management activities.

20. Harvesting of plants and plant materials, such as plugs, stakes, seeds or fruits, for restoration and enhancement projects is allowed.

21. Cutting of firewood is subject to the following:

a. within a wildlife habitat conservation area, cutting firewood is not allowed;

b. within a wildlife network, cutting shall be in accordance with a management plan approved under K.C.C. 21A.24.386; and

c. within a critical area buffer, cutting shall be for personal use and in accordance with an approved forest management plan or rural stewardship plan.

22. Allowed only in buffers if in accordance with best management practices approved by the King County fire marshal.

23. Allowed as follows:

a. if conducted in accordance with an approved forest management plan, farm management plan or rural stewardship plan; or

b. without an approved forest management plan, farm management plan or rural stewardship plan, only if:

(1) removal is undertaken with hand labor, including hand-held mechanical tools, unless the King County noxious weed control board otherwise prescribes the use of riding mowers, light mechanical cultivating equipment or herbicides or biological control methods;

(2) the area is stabilized to avoid regrowth or regeneration of noxious weeds;

(3) the cleared area is revegetated with native vegetation and stabilized against erosion; and

(4) herbicide use is in accordance with federal and state law;

24. Allowed to repair or replace existing on site wastewater disposal systems in accordance with the applicable public health standards within Marine Recovery Areas adopted by the Seattle King County board of health and:

a. there is no alternative location available with less impact on the critical area;

b. impacts to the critical area are minimized to the maximum extent practicable;

c. the alterations will not subject the critical area to increased risk of landslide or erosion;

d. vegetation removal is the minimum necessary to accommodate the septic system; and

e. significant risk of personal injury is eliminated or minimized in the landslide hazard area.

25. Only if in compliance with published Washington state Department of Fish and Wildlife and Washington state Department of Natural Resources Management standards for the species. If there are no published Washington state standards, only if in compliance with management standards determined by the county to be consistent with best available science.

26. Allowed only if:

a. there is not another feasible location with less adverse impact on the critical area and its buffer;

b. the corridor is not located over habitat used for salmonid rearing or spawning or by a species listed as endangered or threatened by the state or federal government unless the department determines that there is no other feasible crossing site.

c. the corridor width is minimized to the maximum extent practical;

d. the construction occurs during approved periods for instream work;

e. the corridor will not change or diminish the overall aquatic area flow peaks, duration or volume or the flood storage capacity; and

f. no new public right-of-way is established within a severe channel migration hazard area.

27. To the maximum extent practical, during breeding season established under K.C.C. 21A.24.382, land clearing machinery such as bulldozers, graders or other heavy equipment are not operated within a wildlife habitat conservation area.

28. Allowed only if:

a. an alternative access is not available;

b. impact to the critical area is minimized to the maximum extent practical including the use of walls to limit the amount of cut and fill necessary;

c. the risk associated with landslide and erosion is minimized;

d. access is located where it is least subject to risk from channel migration; and

e. construction occurs during approved periods for instream work.

29. Only if in compliance with a farm management plan in accordance with K.C.C. 21A.24.051.
30. Allowed only if:
  - a. the new construction or replacement is made fish passable in accordance with the most recent Washington state Department of Fish and Wildlife manuals or with the National Marine and Fisheries Services guidelines for federally listed salmonid species; and
  - b. the site is restored with appropriate native vegetation.
31. Allowed if necessary to bring the bridge or culvert up to current standards and if:
  - a. there is not another feasible alternative available with less impact on the aquatic area and its buffer; and
  - b. to the maximum extent practical, the bridge or culvert is located to minimize impacts to the aquatic area and its buffers.
32. Allowed in an existing roadway if conducted consistent with the regional road maintenance guidelines.
33. Allowed outside the roadway if:
  - a. the alterations will not subject the critical area to an increased risk of landslide or erosion;
  - b. vegetation removal is the minimum necessary to locate the utility or construct the corridor;and
  - c. significant risk of personal injury is eliminated or minimized in the landslide hazard area.
34. Limited to the pipelines, cables, wires and support structures of utility facilities within utility corridors if:
  - a. there is no alternative location with less adverse impact on the critical area and critical area buffer;
  - b. new utility corridors meet the all of the following to the maximum extent practical:
    - (1) are not located over habitat used for salmonid rearing or spawning or by a species listed as endangered or threatened by the state or federal government unless the department determines that there is no other feasible crossing site;
    - (2) the mean annual flow rate is less than twenty cubic feet per second; and
    - (3) paralleling the channel or following a down-valley route near the channel is avoided;
  - c. to the maximum extent practical utility corridors are located so that:
    - (1) the width is the minimized;
    - (2) the removal of trees greater than twelve inches diameter at breast height is minimized;
    - (3) an additional, contiguous and undisturbed critical area buffer, equal in area to the disturbed critical area buffer area including any allowed maintenance roads, is provided to protect the critical area;
  - d. to the maximum extent practical, access for maintenance is at limited access points into the critical area buffer rather than by a parallel maintenance road. If a parallel maintenance road is necessary the following standards are met:
    - (1) to the maximum extent practical the width of the maintenance road is minimized and in no event greater than fifteen feet; and
    - (2) the location of the maintenance road is contiguous to the utility corridor on the side of the utility corridor farthest from the critical area;
  - e. the utility corridor or facility will not adversely impact the overall critical area hydrology or diminish flood storage capacity;
  - f. the construction occurs during approved periods for instream work;
  - g. the utility corridor serves multiple purposes and properties to the maximum extent practical;
  - h. bridges or other construction techniques that do not disturb the critical areas are used to the maximum extent practical;



i. bored, drilled or other trenchless crossing is laterally constructed at least four feet below the maximum depth of scour for the base flood;

j. bridge piers or abutments for bridge crossing are not placed within the FEMA floodway or the ordinary high water mark;

k. open trenching is only used during low flow periods or only within aquatic areas when they are dry. The department may approve open trenching of type S or F aquatic areas only if there is not a feasible alternative and equivalent or greater environmental protection can be achieved; and

l. minor communication facilities may collocate on existing utility facilities if:

(1) no new transmission support structure is required; and

(2) equipment cabinets are located on the transmission support structure.

35. Allowed only for new utility facilities in existing utility corridors.

36. Allowed for onsite private individual utility service connections or private or public utilities if the disturbed area is not expanded and no hazardous substances, pesticides or fertilizers are applied.

37. Allowed if the disturbed area is not expanded, clearing is limited to the maximum extent practical and no hazardous substances, pesticides or fertilizers are applied.

38. Allowed if:

a. conveying the surface water into the wetland or aquatic area buffer and discharging into the wetland or aquatic area buffer or at the wetland or aquatic area edge has less adverse impact upon the wetland or aquatic area or wetland or aquatic area buffer than if the surface water were discharged at the buffer's edge and allowed to naturally drain through the buffer;

b. the volume of discharge is minimized through application of low impact development and water quality measures identified in the King County Surface Water Design Manual;

c. the conveyance and outfall are installed with hand equipment where feasible;

d. the outfall shall include bioengineering techniques where feasible; and

e. the outfall is designed to minimize adverse impacts to critical areas.

39. Allowed only if:

a. there is no feasible alternative with less impact on the critical area and its buffer;

b. to the maximum extent practical, the bridge or culvert is located to minimize impacts to the critical area and its buffer;

c. the bridge or culvert is not located over habitat used for salmonid rearing or spawning unless there is no other feasible crossing site;

d. construction occurs during approved periods for in-stream work; and

e. bridge piers or abutments for bridge crossings are not placed within the FEMA floodway, severe channel migration hazard area or waterward of the ordinary high water mark.

40. Allowed for an open, vegetated stormwater management conveyance system and outfall structure that simulates natural conditions if:

a. fish habitat features necessary for feeding, cover and reproduction are included when appropriate;

b. vegetation is maintained and added adjacent to all open channels and ponds, if necessary to prevent erosion, filter out sediments or shade the water; and

c. bioengineering techniques are used to the maximum extent practical.

41. Allowed for a closed, tightlined conveyance system and outfall structure if:

a. necessary to avoid erosion of slopes; and

b. bioengineering techniques are used to the maximum extent practical.

42. Allowed in a severe channel migration hazard area or an aquatic area buffer to prevent bank erosion only:

a. if consistent with the Integrated Streambank Protection Guidelines (Washington State Aquatic Habitat Guidelines Program, 2002) and if bioengineering techniques are used to the maximum

extent practical, unless the applicant demonstrates that other methods provide equivalent structural stabilization and environmental function;

b. based on a critical areas report, the department determines that the new flood protection facility will not cause significant impacts to upstream or downstream properties; and

c. to prevent bank erosion for the protection of:

(1) public roadways;

(2) sole access routes in existence before February 16, 1995;

(3) new primary dwelling units, accessory dwelling units or accessory living quarters and residential accessory structures located outside the severe channel migration hazard area if:

(a) the site is adjacent to or abutted by properties on both sides containing buildings or sole access routes protected by legal bank stabilization in existence before February 16, 1995. The buildings, sole access routes or bank stabilization must be located no more than six hundred feet apart as measured parallel to the migrating channel; and

(b) the new primary dwelling units, accessory dwelling units, accessory living quarters or residential accessory structures are located no closer to the aquatic area than existing primary dwelling units, accessory dwelling units, accessory living quarters or residential accessory structures on abutting or adjacent properties; or

(4) existing primary dwelling units, accessory dwelling units, accessory living quarters or residential accessory structures if:

(a) the structure was in existence before the adoption date of a King County Channel Migration Zone hazard map that applies to that channel, if such a map exists;

(b) the structure is in imminent danger, as determined by a geologist, engineering geologist or geotechnical engineer;

(c) the applicant has demonstrated that the existing structure is at risk, and the structure and supporting infrastructure cannot be relocated on the lot further from the source of channel migration; and

(d) nonstructural measures are not feasible.

43. Applies to lawfully established existing structures if:

a. the height of the facility is not increased, unless the facility is being replaced in a new alignment that is landward of the previous alignment and enhances aquatic area habitat and process;

b. the linear length of the facility is not increased, unless the facility is being replaced in a new alignment that is landward of the previous alignment and enhances aquatic area habitat and process;

c. the footprint of the facility is not expanded waterward;

d. consistent with the Integrated Streambank Protection Guidelines (Washington State Aquatic Habitat Guidelines Program, 2002) and bioengineering techniques are used to the maximum extent practical;

e. the site is restored with appropriate native vegetation and erosion protection materials; and

f. based on a critical areas report, the department determines that the maintenance, repair, replacement or construction will not cause significant impacts to upstream or downstream properties.

44. Allowed in type N and O aquatic areas if done in least impacting way at least impacting time of year, in conformance with applicable best management practices, and all affected instream and buffer features are restored.

45. Allowed in a type S or F water when such work is:

a. included as part of a project to evaluate, restore or improve habitat, and

b. sponsored or cosponsored by a public agency that has natural resource management as a function or by a federally recognized tribe.

46. Allowed as long as the trail is not constructed of impervious surfaces that will contribute to surface water run-off, unless the construction is necessary for soil stabilization or soil erosion prevention or unless the trail system is specifically designed and intended to be accessible to handicapped persons.

47. Not allowed in a wildlife habitat conservation area. Otherwise, allowed in the buffer or for crossing a category II, III or IV wetland or a type F, N or O aquatic area, if:

a. the trail surface is made of pervious materials, except that public multipurpose trails may be made of impervious materials if they meet all the requirements in K.C.C. chapter 9.12. A trail that crosses a wetland or aquatic area shall be constructed as a raised boardwalk or bridge;

b. to the maximum extent practical, buffers are expanded equal to the width of the trail corridor including disturbed areas;

c. there is not another feasible location with less adverse impact on the critical area and its buffer;

d. the trail is not located over habitat used for salmonid rearing or spawning or by a species listed as endangered or threatened by the state or federal government unless the department determines that there is no other feasible crossing site;

e. the trail width is minimized to the maximum extent practical;

f. the construction occurs during approved periods for instream work; and

g. the trail corridor will not change or diminish the overall aquatic area flow peaks, duration or volume or the flood storage capacity.

h. the trail may be located across a critical area buffer for access to a viewing platform or to a permitted dock or pier;

i. A private viewing platform may be allowed if it is:

(1) located upland from the wetland edge or the ordinary high water mark of an aquatic area;

(2) located where it will not be detrimental to the functions of the wetland or aquatic area and will have the least adverse environmental impact on the critical area or its buffer;

(3) limited to fifty square feet in size;

(4) constructed of materials that are nontoxic; and

(5) on footings located outside of the wetland or aquatic area.

48. Only if the maintenance:

a. does not involve the use of herbicides or other hazardous substances except for the removal of noxious weeds or invasive vegetation;

b. when salmonids are present, the maintenance is in compliance with ditch standards in public rule; and

c. does not involve any expansion of the roadway, lawn, landscaping, ditch, culvert, engineered slope or other improved area being maintained.

49. Limited to alterations to restore habitat forming processes or directly restore habitat function and value, including access for construction, as follows:

a. projects sponsored or cosponsored by a public agency that has natural resource management as a primary function or by a federally recognized tribe;

b. restoration and enhancement plans prepared by a qualified biologist; or

c. conducted in accordance with an approved forest management plan, farm management plan or rural stewardship plan.

50. Allowed in accordance with a scientific sampling permit issued by Washington state Department of Fish and Wildlife or an incidental take permit issued under Section 10 of the Endangered Species Act.

51. Allowed for the minimal clearing and grading, including site access, necessary to prepare critical area reports.

52. The following are allowed if associated spoils are contained:

- a. data collection and research if carried out to the maximum extent practical by nonmechanical or hand-held equipment;
- b. survey monument placement;
- c. site exploration and gage installation if performed in accordance with state-approved sampling protocols and accomplished to the maximum extent practical by hand-held equipment and; or similar work associated with an incidental take permit issued under Section 10 of the Endangered Species Act or consultation under Section 7 of the Endangered Species Act.

53. Limited to activities in continuous existence since January 1, 2005, with no expansion within the critical area or critical area buffer. "Continuous existence" includes cyclical operations and managed periods of soil restoration, enhancement or other fallow states associated with these horticultural and agricultural activities.

54. Allowed for expansion of existing or new agricultural activities where:

- a. the site is predominantly involved in the practice of agriculture;
- b. there is no expansion into an area that:
  - (1) has been cleared under a class I, II, III, IV-S or nonconversion IV-G forest practice permit; or
  - (2) is more than ten thousand square feet with tree cover at a uniform density more than ninety trees per acre and with the predominant mainstream diameter of the trees at least four inches diameter at breast height, not including areas that are actively managed as agricultural crops for pulpwood, Christmas trees or ornamental nursery stock;
- c. the activities are in compliance with an approved farm management plan in accordance with K.C.C. 21A.24.051; and
- d. all best management practices associated with the activities specified in the farm management plan are installed and maintained.

55. Only allowed in grazed or tilled wet meadows or their buffers if:

- a. the facilities are designed to the standards of an approved farm management plan in accordance K.C.C. 21A.24.051 or an approved livestock management plan in accordance with K.C.C. chapter 21A.30;
- b. there is not a feasible alternative location available on the site; and
- c. the facilities are located close to the outside edge of the buffer to the maximum extent practical.

56. Only allowed in: 1) a severe channel migration hazard area located outside of the shorelines jurisdiction area, 2) grazed or tilled wet meadow or wet meadow buffer or 3) aquatic area buffer and only if:

- a. the applicant demonstrates that adverse impacts to the critical area and critical area buffers have been minimized;
- b. there is not another feasible location available on the site that is located outside of the critical area or critical area buffer;
- c. the farm pad is designed to the standards in an approved farm management plan in accordance with K.C.C. 21A.24.051; and
- d. for proposals located in the severe channel migration hazard area, the farm pad or livestock manure storage facility is located where it is least subject to risk from channel migration.

57. Allowed for new agricultural drainage in compliance with an approved farm management plan in accordance with K.C.C. 21A.24.051 and all best management practices associated with the activities specified in the farm management plan are installed and maintained.

58. If the agricultural drainage is used by salmonids, maintenance shall be in compliance with an approved farm management plan in accordance with K.C.C. 21A.24.051.

59. Allowed within existing landscaped areas or other previously disturbed areas.

60. Allowed for residential utility service distribution lines to residential dwellings, including, but not limited to, well water conveyance, septic system conveyance, water service, sewer service, natural gas, electrical, cable and telephone, if:

a. there is no alternative location with less adverse impact on the critical area or the critical area buffer;

b. the residential utility service distribution lines meet the all of the following, to the maximum extent practical:

(1) are not located over habitat used for salmonid rearing or spawning or by a species listed as endangered or threatened by the state or federal government unless the department determines that there is no other feasible crossing site;

(2) not located over a type S aquatic area;

(3) paralleling the channel or following a down-valley route near the channel is avoided;

(4) the width of clearing is minimized;

(5) the removal of trees greater than twelve inches diameter at breast height is minimized;

(6) an additional, contiguous and undisturbed critical area buffer, equal in area to the disturbed critical area buffer area is provided to protect the critical area;

(7) access for maintenance is at limited access points into the critical area buffer.

(8) the construction occurs during approved periods for instream work;

(9) bored, drilled or other trenchless crossing is encouraged, and shall be laterally constructed at least four feet below the maximum depth of scour for the base flood; and

(10) open trenching across Type O or Type N aquatic areas is only used during low flow periods or only within aquatic areas when they are dry.

61. Allowed if sponsored or cosponsored by the countywide flood control zone district and the department determines that the project and its location:

a. is the best flood risk reduction alternative practicable;

b. is part of a comprehensive, long-term flood management strategy;

c. is consistent with the King County Flood Hazard Management Plan policies;

d. will have the least adverse impact on the ecological functions of the critical area or its buffer, including habitat for fish and wildlife that are identified for protection in the King County Comprehensive Plan; and

e. has been subject to public notice in accordance with K.C.C. 20.44.060.

62.a. Not allowed in wildlife habitat conservation areas;

b. Only allowed if:

(1) the project is sponsored or cosponsored by a public agency whose primary function deals with natural resources management;

(2) the project is located on public land or on land that is owned by a nonprofit agency whose primary function deals with natural resources management;

(3) there is not a feasible alternative location available on the site with less impact to the critical area or its associated buffer;

(4) the aquatic area or wetland is not for salmonid rearing or spawning;

(5) the project minimizes the footprint of structures and the number of access points to any critical areas; and

(6) the project meets the following design criteria:

(a) to the maximum extent practical size of platform shall not exceed one hundred square feet;

(b) all construction materials for any structures, including the platform, pilings, exterior and interior walls and roof, are constructed of nontoxic material, such as nontreated wood, vinyl-coated

wood, nongalvanized steel, plastic, plastic wood, fiberglass or cured concrete that the department determines will not have an adverse impact on water quality;

(c) the exterior of any structures are sufficiently camouflaged using netting or equivalent to avoid any visual deterrent for wildlife species to the maximum extent practical. The camouflage shall be maintained to retain concealment effectiveness;

(d) structures shall be located outside of the wetland or aquatic area landward of the Ordinary High Water Mark or open water component (if applicable) to the maximum extent practical on the site;

(e) construction occurs during approved periods for work inside the Ordinary High Water Mark;

(f) construction associated with bird blinds shall not occur from March 1 through August 31, in order to avoid disturbance to birds during the breeding, nesting and rearing seasons;

(g) to the maximum extent practical, provide accessibility for persons with physical disabilities in accordance with the International Building Code;

(h) trail access is designed in accordance with public rules adopted by the department;

(i) existing native vegetation within the critical area will remain undisturbed except as necessary to accommodate the proposal. Only minimal hand clearing of vegetation is allowed; and

(j) disturbed bare ground areas around the structure must be replanted with native vegetation approved by the department.

63. Not allowed in the severe channel migration zone, there is no alternative location with less adverse impact on the critical area and buffer and clearing is minimized to the maximum extent practical.

64. Only structures wholly or partially supported by a tree and used as accessory living quarters or for play and similar uses described in K.C.C. 16.02.240.1, subject to the following:

a. not allowed in wildlife habitat conservation areas or severe channel migration hazard areas;

b. the structure's floor area shall not exceed two hundred square feet, excluding a narrow access stairway or landing leading to the structure;

c. the structure shall be located as far from the critical area as practical, but in no case closer than seventy-five feet from the critical area;

d. only one tree-supported structure within a critical area buffer is allowed on a lot;

e. all construction materials for the structure, including the platform, pilings, exterior and interior walls and roof, shall be constructed of nontoxic material, such as nontreated wood, vinyl-coated wood, nongalvanized steel, plastic, plastic wood, fiberglass or cured concrete that the department determines will not have an adverse impact on water quality;

f. to the maximum extent practical, the exterior of the structure shall be camouflaged with natural wood and earth tone colors to limit visual impacts to wildlife and visibility from the critical area. The camouflage shall be maintained to retain concealment effectiveness;

g. the structure must not adversely impact the long-term health and viability of the tree. The evaluation shall include, but not be limited to, the following:

(1) the quantity of supporting anchors and connection points to attach the tree house to the tree shall be the minimum necessary to adequately support the structure;

(2) the attachments shall be constructed using the best available tree anchor bolt technology; and

(3) an ISA Certified Arborist shall evaluate the tree proposed for placement of the tree house and shall submit a report discussing how the tree's long-term health and viability will not be negatively impacted by the tree house or associated infrastructure;

h. exterior lighting shall meet the following criteria:

(1) limited to the minimum quantity of lights necessary to meet the building code requirements to allow for safe exiting of the structure and stairway; and

(2) exterior lights shall be fully shielded and shall direct light downward, in an attempt to minimize impacts to the nighttime environment;

i. unless otherwise approved by the department, all external construction shall be limited to September 1 through March 1 in order to avoid disturbance to wildlife species during typical breeding, nesting and rearing seasons;

j. trail access to the structure shall be designed in accordance with trail standards under subsection D.47. of this section;

k. to the maximum extent practical, existing native vegetation shall be left undisturbed. Only minimal hand clearing of vegetation is allowed; and

l. vegetated areas within the critical area buffer that are temporarily impacted by construction of the structure shall be restored by planting native vegetation according to a vegetation management plan approved by the department.

65. Shoreline water dependent and shoreline water oriented uses are allowed in the aquatic area and aquatic area buffer of a Type S aquatic area if consistent with K.C.C. chapter 21A.25, chapter 90.58 RCW and the King County Comprehensive Plan.

66. Only hydroelectric generating facilities meeting the requirements of K.C.C. 21A.08.100B.14., and only as follows:

a. there is not another feasible location within the aquatic area with less adverse impact on the critical area and its buffer;

b. the facility and corridor is not located over habitat used for salmonid rearing or spawning or by a species listed as endangered or threatened by the state or federal government unless the department determines that there is no other feasible location;

c. the facility is not located in Category I wetlands or Category II wetlands with a habitat score 30 points or greater

d. the corridor width is minimized to the maximum extent practical;

e. paralleling the channel or following a down-valley route within an aquatic area buffer is avoided to the maximum extent practical;

f. the construction occurs during approved periods for instream work;

g. the facility and corridor will not change or adversely impact the overall aquatic area flow peaks, duration or volume or the flood storage capacity;

h. the facility and corridor is not located within a severe channel migration hazard area;

i. to the maximum extent practical, buildings will be located outside the buffer and away from the aquatic area or wetland;

j. to the maximum extent practical, access for maintenance is at limited access points into the critical area buffer rather than by a parallel maintenance road. If a parallel maintenance road is necessary the following standards are met:

(1) to the maximum extent practical the width of the maintenance road is minimized and in no event greater than fifteen feet; and

(2) the location of the maintenance road is contiguous to the utility corridor on the side of the utility corridor farthest from the critical area;

k. the facility does not pose an unreasonable threat to the public health, safety or welfare on or off the development proposal site and is consistent with the general purposes of this chapter and the public interest; and

l. the facility connects to or is an alteration to a public roadway, public trail, a utility corridor or utility facility or other infrastructure owned or operated by a public utility.

67. Only hydroelectric generating facilities meeting the requirements of K.C.C. 21A.08.100.B.14, and only as follows:
- a. there is not another feasible location with less adverse impact on the critical area and its buffer;
  - b. the alterations will not subject the critical area to an increased risk of landslide or erosion;
  - c. the corridor width is minimized to the maximum extent practical;
  - d. vegetation removal is the minimum necessary to locate the utility or construct the corridor;
  - e. the facility and corridor do not pose an unreasonable threat to the public health, safety or welfare on or off the development proposal site and is consistent with the general purposes of this chapter, and the public interest and significant risk of personal injury is eliminated or minimized in the landslide hazard area; and
  - f. the facility connects to or is an alteration to a public roadway, public trail, a utility corridor or utility facility or other infrastructure owned or operated by a public utility.

68. Only for a single detached dwelling unit on a lake twenty acres or larger and only as follows:

- a. the heat exchanger must be a closed loop system that does not draw water from or discharge to the lake;
- b. the lake bed shall not be disturbed, except as required by the county or a state or federal agency to mitigate for impacts of the heat exchanger;
- c. the in-water portion of system is only allowed where water depth exceeds six feet; and
- d. system structural support for the heat exchanger piping shall be attached to an existing dock or pier or be attached to a new structure that meets the requirements of K.C.C. 21A.25.180.

69. Only for maintenance of agricultural waterways if:

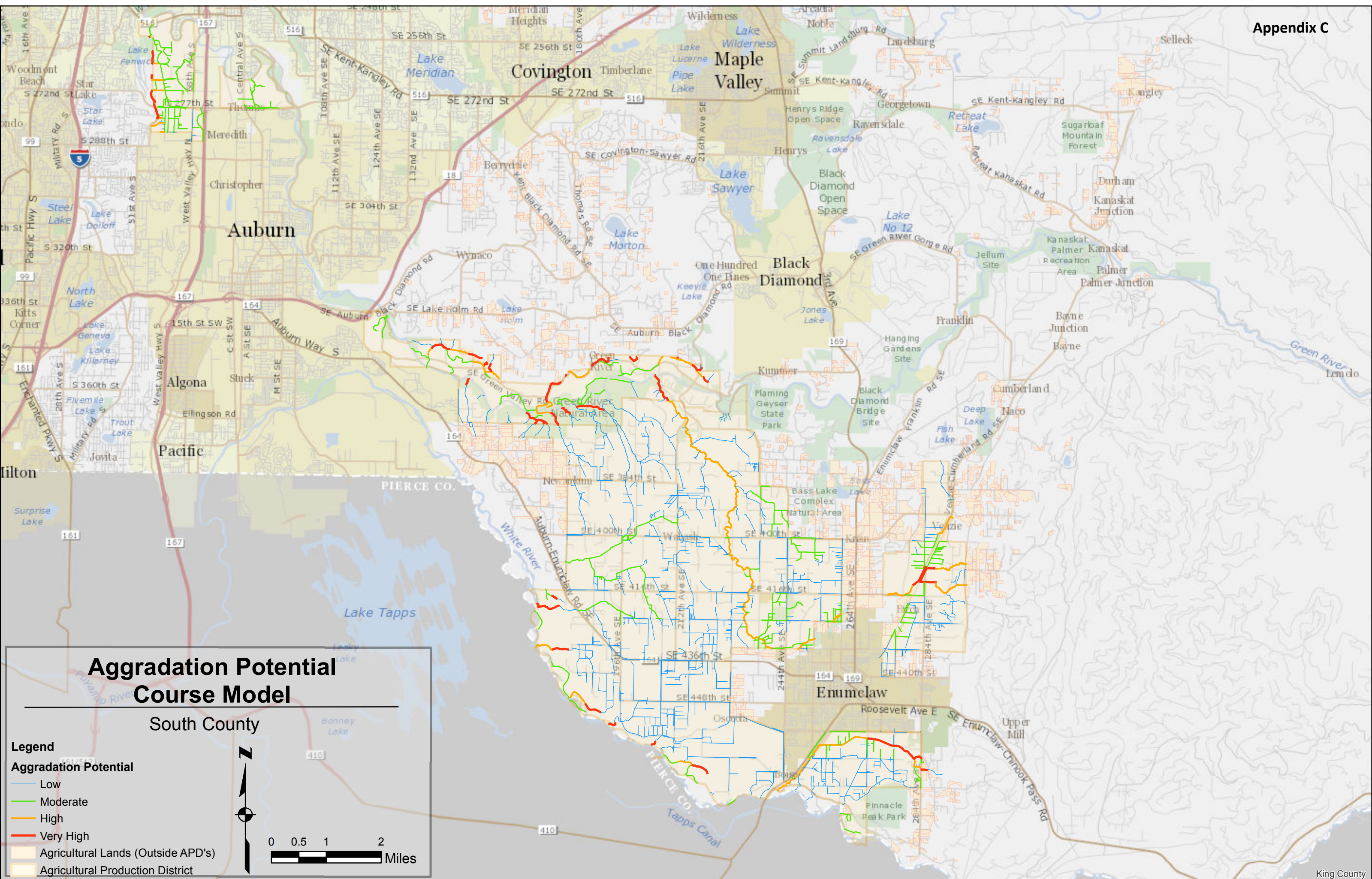
- a. the purpose of the maintenance project is to improve agricultural production on a site predominately engaged in the practice of agriculture;
- b. the maintenance project is conducted in compliance with a hydraulic project approval issued by the Washington state Department of Fish and Wildlife pursuant to chapter 77.55 RCW;
- c. the maintenance project complies with the King County agricultural drainage assistance program as agreed to by the Washington state Department of Fish and Wildlife, the department of local services, permitting division, and the department of natural resources and parks, and as reviewed by the Washington state Department of Ecology;
- d. the person performing the maintenance and the land owner have attended training provided by King County on the King County agricultural drainage assistance program and the best management practices required under that program; and
- e. the maintenance project complies with K.C.C. chapter 16.82. (Ord. 18791 § 172, 2018: Ord. 18767 § 7, 2018: Ord. 17841 § 38, 2014: Ord. 17539 § 44, 2013: Ord. 17485 § 18, 2012: Ord. 17191 § 40, 2011: Ord. 16985 § 120, 2010: Ord. 16950 § 24, 2010: Ord. 16267 § 40, 2008: Ord. 15051 § 137, 2004).

**Reviser's notes:**

**In accordance with K.C.C. 20.12.200, the executive shall submit this ordinance to the state Department of Ecology for its approval of the standards in sections 147, 172, 173, 174 and 176 of this ordinance, as provided in RCW 90.58.090. (Ordinance 18791, § 215).**

**Sections 147, 172, 173, 174 and 176 of this ordinance take effect within the shoreline jurisdiction fourteen days after the state Department of Ecology provides written notice of final action stating that the proposal is approved, in accordance with RCW 90.58.909. The executive shall provide the written notice of final action to the clerk of the council. (Ordinance 18791, § 216).**






### Aggradation Potential Course Model

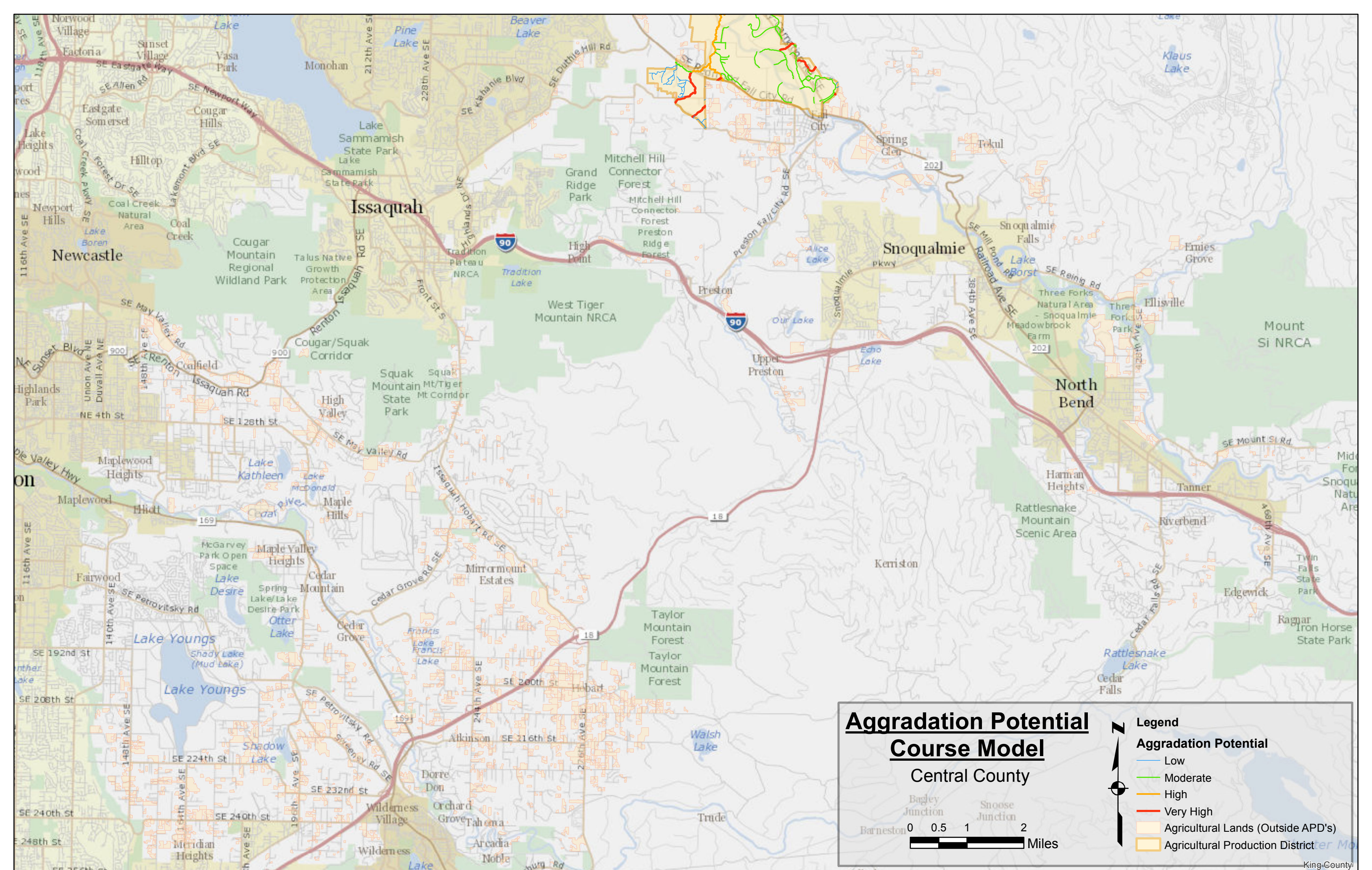
South County

**Legend**

- Low
- Moderate
- High
- Very High
- Agricultural Lands (Outside APD's)
- Agricultural Production District

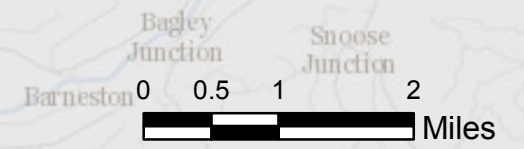


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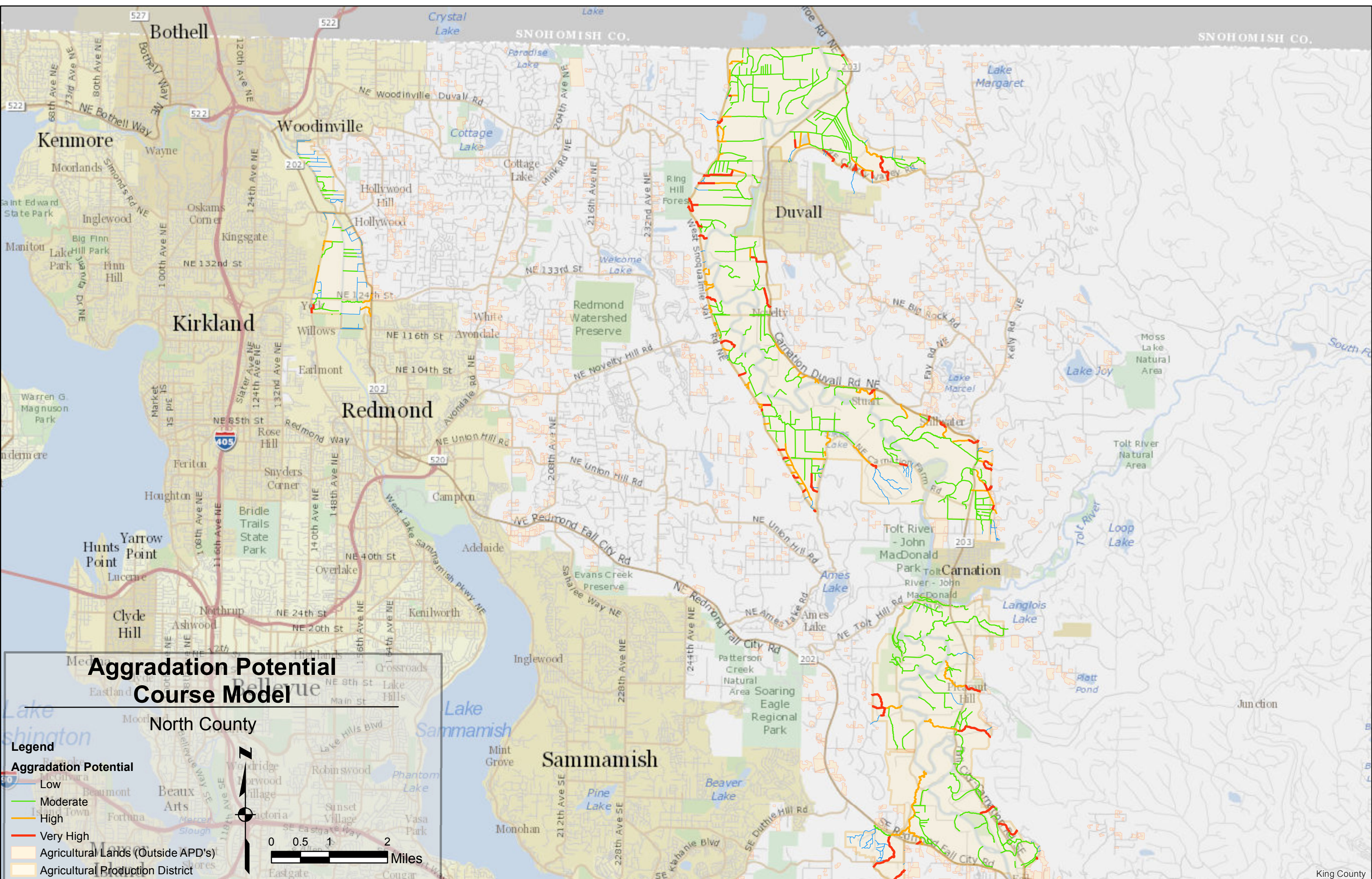


# Aggradation Potential Course Model

Central County

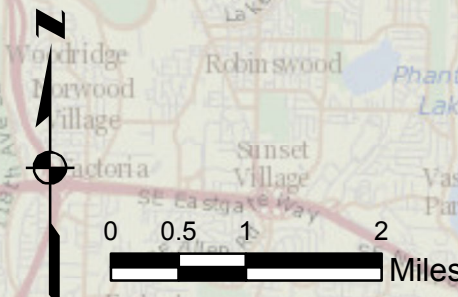


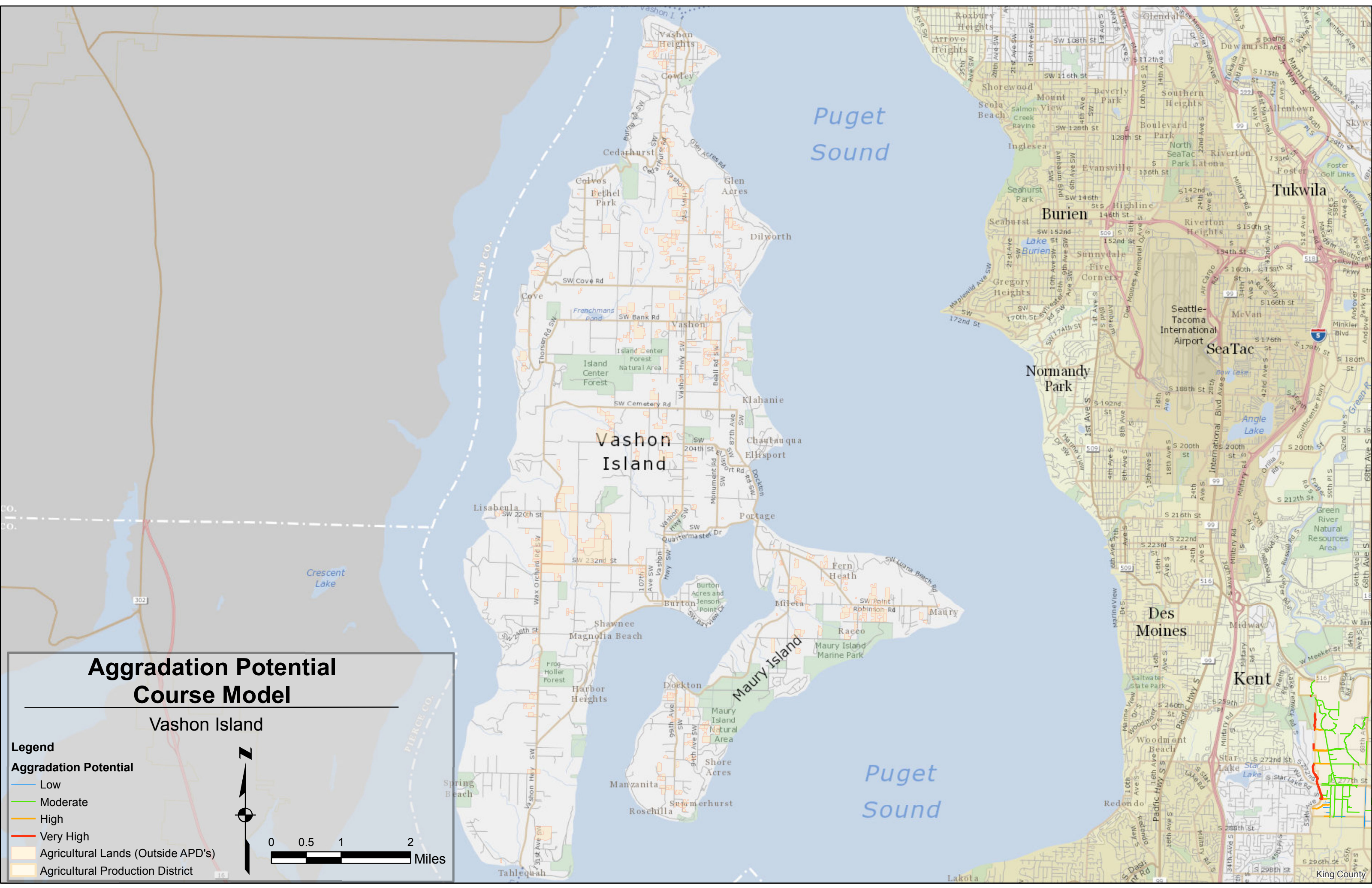
- Legend**
- Aggradation Potential
    - Low (light blue line)
    - Moderate (green line)
    - High (orange line)
    - Very High (red line)
  - Agricultural Lands (Outside APD's) (light yellow)
  - Agricultural Production Districts (yellow)



# Aggradation Potential Course Model

- Legend**
- Low
  - Moderate
  - High
  - Very High
  - Agricultural Lands (Outside APD's)
  - Agricultural Production District

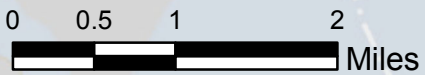




# Aggradation Potential Course Model

Vashon Island

- Legend**
- Aggradation Potential**
- Low
  - Moderate
  - High
  - Very High
  - Agricultural Lands (Outside APD's)
  - Agricultural Production District



Puget Sound

Puget Sound