POULSBO AGREEMENT DISTRIBUTION SCHEDULE

SUBJECT: **Public Utility District No. 1 – Funding of USGS Kitsap Peninsula Ground Water Model (ILA)**

CONFORM AS TO DATES & SIGNATURES

(X) Approved by the City Council: 12/01/2010
(X) Effective: 12/20/2010
(X) Completion: 12/20/2015
(X) Recorded: Posted to City's Website

DISTRIBUTE CONFORMED COPIES AS FOLLOWS:

(_) City Attorney
(1) Clerk's Department: Original
(X) Posted to Library Drive
(X) Posted to Web Site
(_) Finance:
(_) Fire District #18
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(_) Municipal Court
(_) MRSC
(_) Parks/Recreation
(_) Planning/Building
(_) Police
(_) Public Works/Engineering:
(_) Kitsap Fire Prevention District No. 18

City Clerk

January 13, 2011
Date

INTERLOCAL AGREEMENT FOR FUNDING OF USGS KITSAP PENINSULA GROUND WATER MODEL BETWEEN THE CITY OF POULSBO AND PUBLIC UTILITY DISTRICT #1 OF KITSAP COUNTY

1. **Parties. THIS INTERLOCAL AGREEMENT** ("Agreement") is made and entered into on the date referenced on the signature page by and between the City of Poulsbo (herein referred to as "Participant") and Public Utility District #1 of Kitsap County, a municipal corporation ("Lead Agency"). The term "Participants" as used herein shall include the Participant as identified in the paragraph, and all other public entities who enter into substantially similar agreements with the Lead Agency.

2. **Purpose of Agreement.** Lead Agency is entering unto an agreement with the USGS for the purpose of having the USGS prepare a comprehensive analysis of the Kitsap Peninsula Ground Water Systems and prepare a Kitsap Peninsula Ground Water Model as described in Attachment A. By entering into this agreement, no separate legal or administrative entity is created. The Participant and Lead Agency shall act as an independent contractor and not as an employee of the other party to this agreement. As such, neither party shall have the authority to bind other parties nor control employees of other parties, contractors or other entities.

3. **Role of Lead Agency.** Kitsap PUD shall be responsible for coordinating with the USGS and Participants in the preparation of the ground water model and administration of the agreement with USGS. Kitsap PUD shall receive no compensation for its administrative duties.

4. **Contribution of Participant.** Participant agrees to reimburse PUD for Participants share of payments made by Kitsap PUD to the USGS. Such payments shall be made on an annual basis. While the exact amount of Participants contribution will not be known until all Participants have been identified and have agreed to participate, in no event shall Participant's share exceed $10,000 per year for five years.

5. **Ownership and Use of Data.** All contributing Participants will be the joint owners of the model developed by the USGS. Kitsap PUD shall be the custodian of the USGS data. As Lead Agency, Kitsap PUD agrees to make available and share with all Participants all of the data and information developed by the USGS including the final ground water model.

6. **Technical Advisory Committee.** As Lead Agency, KPUD shall represent all parties in communication with the USGS. In addition, Lead Agency shall support and coordinate the technical advisory committee. All participants shall be members of this committee. Other entities may be added to the committee upon a majority vote of the participants.

7. **Term.** This Agreement shall be in effect for five years. Billings shall be provided to Participant by Lead Agency on an annual basis.

8. **Termination.** Any Participant may terminate its participation of this Interlocal Agreement at any time for any reason by providing at least 60 days advanced notice of termination in writing to the other parties. In such event, the terminating party shall no longer be obligated to pay any reimbursement costs for the remaining term of this Agreement. In the event of termination, Participant shall forfeit any rights otherwise accruing to it by this agreement.

9. **Hold Harmless.** Each party to this Agreement shall defend, indemnify and hold the other party, its appointed and elected officers and employees, harmless from claims, actions, injuries, damages, losses or suits including attorney fees, arising or alleged to have arisen directly or indirectly out of or in consequence of the performance of this Agreement to the extent caused by the fault of negligence of the indemnitor, its appointed or elected officials, employees, officers, agents, assigns, volunteers or representatives.

10. **Applicable Law and Venue.** This Agreement shall be construed and interpreted in accordance with the laws of the State of Washington. In the event of a dispute, such dispute shall be litigated in the Superior Court of Kitsap County, Washington.

11. **Non-Discrimination.** Parties shall not discriminate in any manner related to this Agreement on the basis of race, color, national origin, sex, sexual orientation, religion, age, marital status or disability in employment of the provision of services.

12. **Severability**. If any provision of the Agreement shall be held invalid, the remainder of this Agreement shall not be affected thereby if such remainder would then continue to serve the purposes and objectives of all Parties.

13. **Entire Agreement.** This Agreement constitutes the entire agreement between Parties. Any modifications or amendments to this Agreement shall be in writing and shall be signed by each party.

14. **Compliance with RCW 39.34.040.** Pursuant to RCW 39.34.040, this Agreement shall be filed with the Kitsap County Auditor or alternatively, listed by subject on the public web site of the Parties hereto or on other electronically retrievable public source.

DATED this 20TH day of DECEMBER, 2010

CITY OF POULSBO

Becky Erickson, Mayor

ATTEST:

Jill A. Boltz, City Clerk

APPROVED AS TO FORM:

James Haney, **Attorney** for City of Poulsbo

PUBLIC UTILITY DISTRICT #1
OF KITSAP COUNTY

~~John Armstrong, President~~
Board of Commissioners
Lloyd S. Berg, President

ATTEST:

Clerk for Board of Commissioners

APPROVED AS TO FORM:

William Broughton, Attorney for Kitsap PUD

SUMMARY

Characterization and Numerical Simulation of the Water Resources on the Kitsap Peninsula, Kitsap, Mason, and Pierce Counties, Washington

A proposal prepared by the U.S. Geological Survey for the Kitsap Public Utility District
July 1, 2010

Problem — Groundwater provides a major source of drinking water for the population of the Kitsap Peninsula. Consequently, as the population grows, so does the demand for groundwater. However, the quantity of usable groundwater is limited, largely because the Peninsula is bounded by seawater and the potential for water-level declines and seawater intrusion increases as groundwater usage increases.

Objectives —The major objectives of the study are to characterize the groundwater-flow system on the Kitsap Peninsula and its interaction with associated surface-water features, and to integrate this information into a numerical ground-water flow model to assist water resource managers in the development of a long-term watershed management plan. This study also will create project management tools to facilitate communication between project partners and stakeholders, and to establish consistent methods and practices among project participants for project data collection, QA/QC, and archiving.

Relevance and Benefits —This study is consistent with the national USGS mission and goals and to water-resource issues identified in the Center's Science Plan. The study addresses ground-water availability and sustainability, and surface-water and ground-water interactions as related to water-resource management, which are priority issues for both the Strategic Directions of the Water Resources Discipline 1999-2008 and the USGS Washington Water Science Center's Science Plan. This study also will provide resources managers on the Kitsap Peninsula with a numerical flow model to assist in the development of a long-term watershed management plan to meet the needs of current and future water demands within the watershed, while also working to protect and improve its natural resources. This study is appropriate for inclusion in the USGS Cooperative Program because it will provide information that advances understanding of hydrologic processes.

Approach — A project website and a quality-assurance/quality-control plan will be developed to facilitate communication and methods between project partners and stakeholders. Existing and new ground-water and surface-water data will be compiled and evaluated to characterize the flow system, and entered into the National Water Information System data base. A numerical groundwater-flow model will be constructed to simulate potential anthropogenic and climatic impacts on groundwater and surface water resources, and the model will be transferred to the Planning Unit for assisting development of a long-term watershed management plan.

Characterization and Numerical Simulation of the Water Resources on the Kitsap Peninsula, Kitsap, Mason, and Pierce Counties, Washington

A proposal prepared by the U.S. Geological Survey for the Kitsap Public Utility District
July 1, 2010

Background — At a series of public meetings in 2009 to discuss the USGS Bainbridge Island groundwater study, water managers from several water purveyors on the Kitsap Peninsula expressed a desire for an integrated peninsula groundwater model for managing their water resources. The Kitsap Peninsula shares several characteristics with Bainbridge Island, and the two areas face similar issues of limited groundwater recharge due to overlying impermeable glacial tills, increasing demands for groundwater supplies, and potential saltwater intrusion near coastal wells. The geographic proximity of the two areas also raises questions about potential connectivity between aquifers on the peninsula and the island, with groundwater pumping practices in one area potentially affecting supplies in the other. While the Bainbridge Island study was confined to the island and nearby parts of the peninsula, a larger model of the Kitsap Peninsula extended to natural hydrologic barriers would provide a more complete picture of regional groundwater supplies, and could become a valuable tool for water managers trying to coordinate regional water management plans.

The Kitsap Peninsula is a 580 square-mile area located between Seattle and the Olympic Peninsula, surrounded by parts of Puget Sound on the north, east, and south and by Hood Canal on the west (fig. 1). Connection to the mainland is through a 2.2 mile strip of land between Lynch Cove on Hood Canal and North Bay on Case Inlet, with over 250 miles of shoreline delineating the rest of the perimeter. Due to several recent glaciations, the geologic units of interest to a hydrologic study are comprised of alternating layers of glacial till, sand and gravel, and silt and clay. The peninsula contains no major river systems, though it is incised by many short streams

that flow from the interior to Puget Sound (Hood Canal, Dyes Inlet, Sinclair Inlet, Carr Inlet, and Case Inlet). Most streams flow-year round and are fed by springs and surface runoff after storms. Where cliffs are present along the coastline, glacial and interglacial deposits of the peninsula interior are exposed and springs and seeps discharge water directly onto the beach and into Puget Sound.

The peninsula has a temperate maritime climate with mean annual precipitation between 30 and 60 inches per year. Precipitation amounts are in large part controlled by the Olympic Mountains to the west. In general, precipitation reaches a minimum during midsummer and a maximum during the late fall and early spring. Mean monthly temperatures range from about 39 degrees Fahrenheit (°F) in January to 64°F in July and August. At times, temperatures are sufficiently low for a few inches of snow to accumulate, but snow accumulation is not normally significant.

Land use on the peninsula includes approximately 40% coniferous and deciduous forests and 20% urban and military development. The remaining 40% is covered by non-forest vegetation, which includes agricultural and natural vegetative cover. Naval Submarine Base Bangor occupies a significant area in the northwest corner of the peninsula, and other military bases on the peninsula include Camp Wesley Harris, the Puget Sound Naval Complex, Naval Station Bremerton, and the Keyport Naval Undersea Warfare Center.

Population on the peninsula is estimated to be about 240,000 residents. Major cities include Bremerton, Silverdale, Poulsbo, Port Orchard, and Gig Harbor, though with the exception of Bremerton none of these is estimated to include more than 20,000 residents. Outside of these towns, the countryside is rural and semirural and many homes obtain potable water from individual wells instead of public supply systems. Population growth in Kitsap County has averaged about

2.8% for the thirty year period ending in 2000; if this rate of growth continues, groundwater pumping on the peninsula will need to support an additional 317,000 people over the next thirty years. Current observed water level declines at large public supply wells suggest that such an increase may not be possible without significant new pumping capacity and numerous new wells. The impacts of such potential growth are not yet well understood.

Problem — Groundwater provides a major source of drinking water for the population of the Kitsap Peninsula. Consequently, as the population grows, so does the demand for groundwater. However, the quantity of usable groundwater is limited, largely because the Peninsula is bounded by seawater and the potential for water-level declines and seawater intrusion increases as ground-water usage increases.

In 2010, the Water Purveyors Association of Kitsap County (Water PAK) contacted the USGS regarding the development of a numerical groundwater-flow model that could assist water-resource managers in developing long-term management plans. An initial presentation was given by the USGS to members of the Water PAK where the USGS outlined some preliminary study options. Meeting attendees generated questions relevant to water resources issues in the watershed (listed below) and agreed that additional data collection and analysis and the construction and use of a numerical flow model of the Kitsap Peninsula were needed to help address many of these questions and assist water resource managers in the development of a long-term watershed management plan. As a result of this meeting, Water PAK members and stakeholders asked the USGS Washington Water Science Center (WAWSC) to help design and conduct a study, including the construction of a numerical flow model, to assist in the development of a long-term watershed management plan for the Kitsap Peninsula.

Questions developed by the Water PAK are:

1) Which regions or aquifers are most likely to be adversely affected by current and future groundwater withdrawal?
2) Which regions might provide the most benefit to recharge if they are protected from impermeable surfaces?
3) What are the effects on stream flow from current and future groundwater use?
4) How will saltwater intrusion affect coastal wells?
5) How can the model enhance wellhead protection efforts?
6) Are there specific regions or aquifers where ASR is best suited?

Objectives — The major objectives of the study are to characterize the groundwater-flow system in Kitsap County and its interaction with associated surface water features, and to integrate this information into a numerical groundwater-flow model to assist water resource managers in the development of a long-term watershed management plan. This study also will create project management tools to facilitate communication between project partners and stakeholders, and to establish consistent methods and practices among project participants for project data collection, QA/QC, and archiving.

Relevance and Benefits —This study is consistent with the national USGS mission and goals and to water-resource issues identified in the Center's Science Plan. The study addresses groundwater availability and sustainability, and surface-water and groundwater interactions as related to water-resource management, which are priority issues for both the Strategic Directions of the Water Resources Discipline 1999-2008 and the Washington Water Science Center's Science

Plan. This study also will provide resources managers on the Kitsap Peninsula with a numerical flow model to assist in the development of a long-term watershed management plan to meet the needs of current and future water demands within the watershed, while also working to protect and improve its natural resources. This study is appropriate for inclusion in the USGS Cooperative Program because it will provide information that advances understanding of hydrologic processes.

Approach — A project website and a quality-assurance/quality-control plan will be developed to facilitate communication and methods between project partners and stakeholders. Existing and new ground-water and surface-water data will be compiled and evaluated to characterize the flow system, and entered into the National Water Information System data base. A numerical ground-water flow model will be constructed to simulate potential anthropogenic and climatic impacts on ground-water and surface-water resources, and the model will be transferred to the Planning Unit for assisting development of a long-term watershed management plan. Two USGS Water-Resources Investigations Reports will be published to describe: 1) the conceptual model of the watershed; and 2) numerical model construction, limitations, and results from approximately six simulations representing a range of potential anthropogenic activities and hydrologic conditions. An overview of the specific tasks needed to complete the study is presented below. A project timeline and budget are given at the end of this document. The project duration is expected to be approximately 4 and a half years, with 2 years of groundwater level and streamflow data collection at established monitoring network sites.

I. Create project management tools to facilitate communication between project partners and stakeholders, and to establish consistent methods and practices among project participants for project data collection, QA/QC, and archiving

Task 1.1 Establish Project Website (FY11) - Create a project website, accessible by Project Team members and the public, to provide descriptions of project objectives and study methods, periodic project progress updates, project reports, and other products. The website also may contain links to project data and results. Links to preliminary project data and results will be password protected to prevent the premature dissemination of information outside the Project Team. The website will hosted by the USGS, and maintained for the duration of the project.

Task 1.2 Establish Project QA/QC Plan (FY11) - Develop a project quality-assurance/quality-control plan to establish accurate and consistent methods and procedures for data collection, analysis, and storage. This plan will be based on the WWSC QA/QC Plan for ground-water activities (Drost, 2005).

II. Characterize the groundwater-flow system on the Kitsap Peninsula and its interaction with associated surface-water features

Task 2.1 Compile and Evaluate Currently Available Data and Populate Database (FY11) - Compile currently available data, evaluate its accuracy, and populate the project database (GWSI) and website. The area is within the Puget Sound Regional Aquifer System, which was described at a regional scale by Vaccaro and others (1998). Once all available data have been compiled and reviewed, the extent of the area to be represented in the numerical flow model will be determined. Once established, the area to be modeled will guide decisions about additional data needs. Data to be compiled will include: a) information describing the areal extent, thickness, and lithologic composition of aquifers and aquitards, ground-water levels, aquifer boundary conditions, and the spatial distribution

of aquifer hydraulic properties; b) soils and land use coverages; c) aquifer recharge data (precipitation, leakage from surface-water features, anthropogenic return flows, and inflows from tributary basins and adjacent uplands); d) aquifer discharge data (withdrawals from wells and permitted water rights, baseflow to surface-water features, evapotranspiration estimates, and underflow to adjacent units); and e) streamflow and lake-level records for the study area to identify possible trends and delineate gaining/losing reaches.

A spatially oriented project database(s) for storage, evaluation, and analysis of currently available information for the study area will be established using a combination of GIS and data management and analysis software (ArcGISVersion 9.1, GWSI, Rockworks, etc.). The database will integrate information from multiple sources, and will be continually populated with new data as they become available. All data will be checked for accuracy in accordance with the project QA/QC plan. The database will contain information about geology, hydrology, water use, and land use in the study area, and will be accessible to all project members.

Task 2.2 Identify Additional Data Needs (FY11) - Identify additional data necessary to meet study objectives, based on an evaluation of currently available data. Additional data collection will be guided by information needed to construct a numerical flow model of the Kitsap Peninsula and will help address data gaps and technical questions from the stakeholders and project staff of the current study. Additional data collection may be necessary in parts of the study area to adequately define the hydrogeologic framework of the groundwater system for the numerical flow model.

Task 2.3 Additional Data Collection - Additional data will include the collection of groundwater levels, streamflows, and lake levels. These data will be used to supplement existing monitoring networks in areas of interest that are not currently being monitored. Baseflow measurements also may be made to delineate gaining/losing stream reaches, and drillers' logs and other geologic information may be used to refine aquifer/aquitard extent and thickness maps. Specific data collection tasks include:

Task 2.3.1 Augment Water Purveyors Ground-Water Monitoring Networks (FY11-13) and Data Collection and Processing (FY11-13) - The Kitsap PUD (KPUD) and other water purveyors maintain ground-water monitoring networks (monthly water levels) for their public-supply wells in Kitsap County. The number of ground-water monitoring wells will be increased by about 70 wells) to: 1) provide more complete areal and vertical coverage of the major aquifers in the study area, 2) to better evaluate ground- and surface-water interactions, and 3) to document ground-water levels away from major withdrawal areas. Selected monitoring wells (6 wells) will be instrumented with continuous recorders. Activities in FY11 will include a well-records inventory and a field inventory (well location and access permission). In FY11-13, transducers will be installed, and data collected and processed (monthly water-level measurements, transducers down-loaded, and data entered into GWSI).

Task 2.3.2 Conduct Stream Baseflow Measurements (FY11-12) - Stream baseflow measurements will be made to delineate gaining/losing stream reaches. Baseflow measurement sites (20 sites) will augment the 2 USGS surface-water gaging stations and other surface-water gaging stations operated by the KPUD currently operating in

the study area. Measurements will be made three times during the summer months of 2011 and 2012 to document seasonal changes in GW/SW exchange.

Task 2.3.3 Construct Water-Level Maps (FY12) - Construction of water-level maps for major aquifers in the Kitsap Peninsula based on data collected during this study. The maps will provide information about groundwater-flow directions, horizontal and vertical gradients, and the delineation of gaining/losing stream reaches.

Task 2.4 Conceptual Model and Report (FY12-13) - The conceptual model will be based on the interpretations of previously available and newly collected information, and will provide the conceptual understanding necessary to accurately represent the hydrogeologic framework and hydrologic processes of the Kitsap Peninsula in the numerical groundwater-flow model. Using previous investigations, additional data, geologic maps, and the lithologic information from drillers' logs, hydrogeologic cross sections for the study area will be constructed using ARC GIS software. After the sections are constructed and the major hydrogeologic units have been identified, maps of the extents and thicknesses of the major units will be constructed. Hydraulic parameters will be estimated for hydrogeologic units using available data from aquifer tests, drillers' reports (specific capacity tests), and published values. Ground-water recharge estimates will be based on previously published regression equations (Bidlake and Payne, 2001). Water-right and current/historic water-use information will be provided by municipalities and water purveyors located within the study area.

A report summarizing the conceptual model of the Kitsap Peninsula will be prepared and published by September 30, 2013. The Publication Service Center (PSC) will provide

illustration, editorial, and publishing services. The conceptual model report will include descriptions of: a) information describing the extents and thicknesses, and lithologic composition of major aquifers and aquitards, aquifer boundary conditions, and the spatial distribution of aquifer hydraulic properties; b) ground-water movement as it relates to aquifers, aquitards and surface-water features; c) soils and land use coverages; d) aquifer recharge data (precipitation, leakage from surface-water features, and anthropogenic return flows); e) aquifer discharge data (withdrawals from wells and baseflow to surface-water features); and f) streamflow and lake-level records for the Kitsap Peninsula to identify possible trends and delineate gaining/losing reaches.

III. Integrate project information into a numerical flow model to assist water resource managers in the development of a long-range watershed management plan.

Task 3.1 Construct and Calibrate a Steady-State Numerical Ground-Water Flow Model (FY12-13) -

A numerical ground-water flow model (MODFLOW) will be constructed to represent hydrologic processes on the Kitsap Peninsula, and simulate potential anthropogenic and climatic impacts on ground-water and surface-water resources. MODFLOW is a widely used three-dimensional, finite-difference ground-water flow model written by the USGS (Harbaugh, 2005; and McDonald and Harbaugh, 1988). Steady-state and transient (task 3.2) condition models will be constructed and calibrated. Model calibration and sensitivity analysis will be conducted using parameter estimation methods (Doherty, 2005). Time-averaged and synoptic ground-water-level and streamflow data will be evaluated (see task 2.4) for use in steady-state model calibration. A commercial graphical user interface will be

used to construct the model, manage the data, and conduct post-processing of modeling results.

Model boundary locations and conditions that match natural boundary features as closely as possible will be selected. The model will be bounded by Puget Sound and Hood Canal on all sides except for small portions between Hood Canal and Case Inlet and between Case Inlet and Carr Inlet on the south side of the model domain.

Task 3.2 Convert Steady-State Numerical Flow Model to Transient and Calibrate (FY13-14) - The steady-state model will be converted to transient once the collection of temporal water- level and streamflow data is completed and available for model calibration. Data collection is scheduled to begin January 2011 and end December 2012 (task 2.3). The transient model will have a monthly or shorter time step, depending on how quickly the actual flow system responds to stresses.

Task 3.3 Model Performance Simulations (FY14) - Model performance will be demonstrated by approximately six simulations representing a range of conditions. Simulations will demonstrate modeled responses (changes in streamflow and ground-water level) to variations in ground-water withdrawal rates, depths, and locations, and recharge rates (precipitation and anthropogenic infrastructure such as pavement and storm water drains). Simulation conditions will be determined by the USGS and project partners by September 30, 2012, in consultation with stakeholders and others. SEAWAT (Langevin and others, 2007), a model software capable of simulating density-dependent flow, will be used to simulate the fresh/seawater interface, and evaluate the potential for seawater intrusion.

Task 3.4 Prepare Report Summarizing Model Construction and Results (FY14-15) - A report summarizing numerical model construction, performance, limitations, and results from approximately six simulations will be prepared.

Task 3.5 Report Publication and Transfer of Model to Cooperator (FY15) - The model report will be published and the model, including input files, will be transferred to the cooperator or a designee(s) of the cooperator by March 31, 2015. The Publication Service Center (PSC) will provide illustration, editorial, and publishing services. The cooperator or their designee(s) will be required to have a working knowledge of appropriate modeling software. The USGS will not provide instruction on ground-water flow modeling or the use of modeling software. It is noted that the model and input files are within the public domain and will be provided to any entity requesting them.

Budget — The project will cost $1,400,000 over four and a half fiscal years (FY 2011-2015). Project costs will be shared equally by the USGS and Kitsap Public Utility District.

Funding Sources —

Agency	**FY2011**	**FY2012**	**FY2013**	**FY2014**	**FY2015**	**Total**
USGS	$112,500	$125,000	$225,000	$187,500	$50,000	$700,000
Kitsap Public Utility District	$112,500	$125,000	$225,000	$187,500	$50,000	$700,000
Total	$225,000	$250,000	$450,000	$375,000	$100,000	$1,400,000

Timelines and Report Products — The USGS will prepare and publish two USGS Science Investigations Reports. The Conceptual Model Report will be published by September 30, 2013.

The Numerical Model Report will be published and the model, including input files, will be transferred to a designee of the cooperator by March 31, 2015. A project website will be established and maintained for the duration of the study. A detailed timeline for the project is provided in the table below.

FY	2011				2012				2013				2014				2015	
Quarter starting	Oct	Jan	Apr	July	Oct	Jan	Apr	July	Oct	Jan	Apr	July	Oct	Jan	Apr	July	Oct	Jan
Tasks																		
1.1 Establish project website	X																	
1.2 Establish project QA/QC plan	X																	
2.1 Compile and evaluate currently available data and populate database	X	X																
2.2 Identify additional data needs	X	X																
2.3.1 Augment existing gw network; data collection and processing		X	X	X	X	X	X	X	X									
2.3.2 Conduct stream baseflow measurements			X	X			X	X										
2.3.4 Construct water-level maps				X	X													
2.4 Conceptual model and report						X	X	X	X	X	X	X						
3.1 Construct and calibrate steady-state numerical flow model							X	X	X	X	X							
3.2 Convert steady-state numerical flow model to transient and calibrate											X	X	X	X	X			
3.3 Model Performance Simulations														X	X	X		
3.4 Prepare numerical model report														X	X	X	X	X
3.5 Publish numerical model report and transfer model																	X	X

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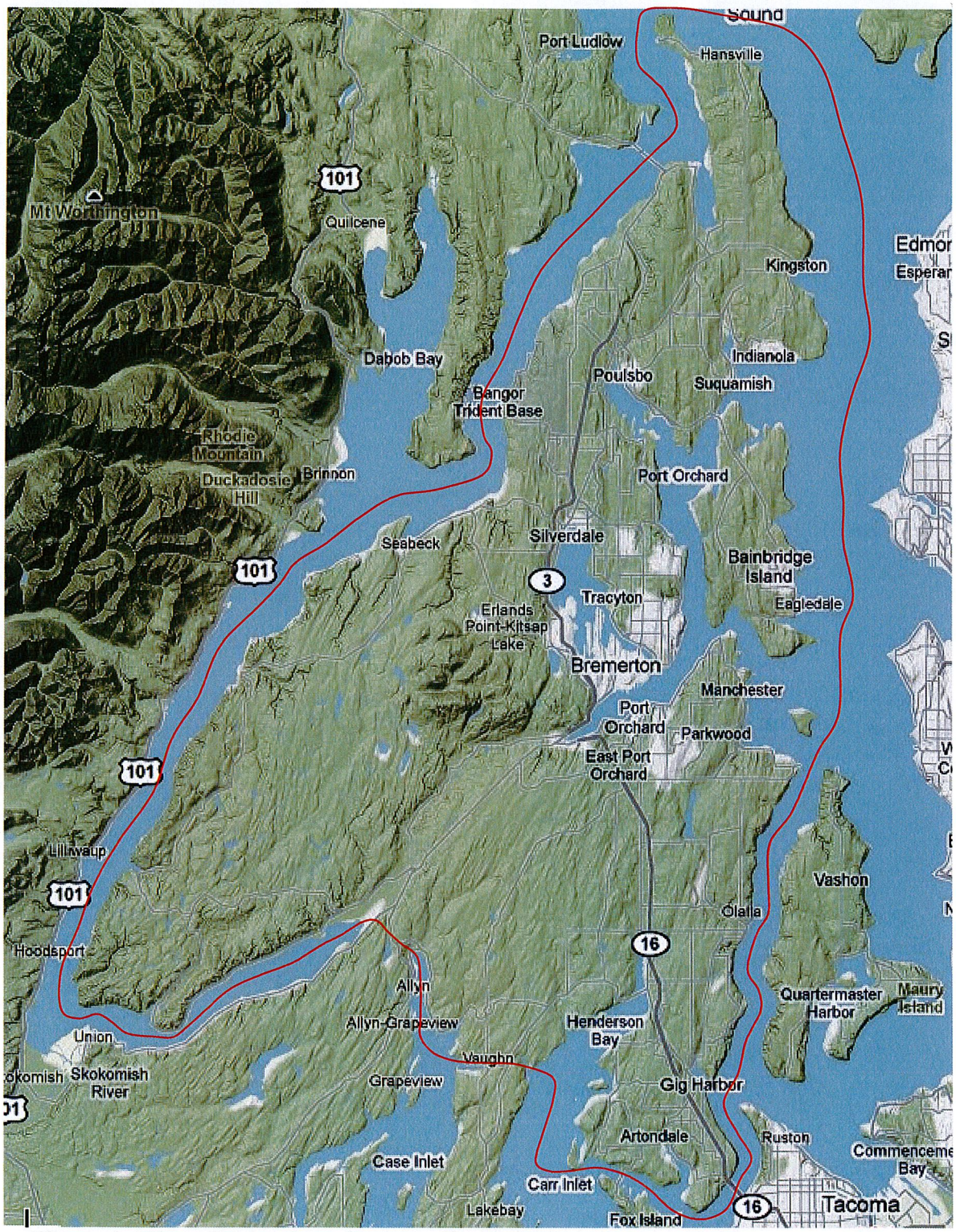

Figure 1. Kitsap Peninsula and surrounding areas.