

## Groundwater Studies by the Washington State Department of Ecology

Available at

<https://fortress.wa.gov/ecy/publications/UIPages/PublicationList.aspx?IndexTypeName=Topic&NameValue=Groundwater&DocumentTypeName=Publication>

1985:

- **Roza Irrigation District Ground Water Supply Study: Report for Yakima River Basin Water Enhancement Project**
- **Water in the Lower Yakima River Basin, Washington Hydrology of the Upper Yakima River Basin, Washington**

1988 - 1990:

- **Agricultural Chemicals Pilot Study Yakima County Study Area--Sampling and Analysis Plan**

1990 - 1991:

- Edaleen Dairy Lagoon Ground Water Quality Assessment February 1990 to February 1991
- Sequim-Dungeness Groundwater Quality Study
- Snohomish County Groundwater Characterization Study
- Portage Creek: Nonpoint Source Pollution Effects on Quality of the Water Resource

1992:

- **Gleed Agricultural Chemicals Ground Water Quality Assessment**
- Wellhead Protection Plan for City of Everson
- Blaine GWM Plan Final Hydrogeologic Report Volume I
- Blaine GWM Plan Final Hydrogeologic Report Volume II appendices
- Ground Water Quality Assessment: Whatcom County Dairy Lagoon #2 - Lynden, Washington
- Ground Water Quality Assessment: Sheridan Dairy Lagoon - Adna, Washington
- Report on the Geophysical Logging and TV Inspection of Blaine Wells No. 1 & No. 2
- Responsiveness Summary Amendment to Chapter 173-563 WAC Instream Resources Protection Program for the Main Stem Columbia River in Washington State and New Chapter 173-564 Water Resources Management Program for the Main Stem of the Snake River in WA state
- Redmond-Bear Creek GWM Plan Draft Hydrogeologic Characterization Report, Volume I, for Seattle-King County Health Department
- Summary of Ecology Lagoon Ground Water Assessments. Memorandum to Phil KauzLoric.

- Methods to Determine Wellhead Protection Areas for public supply wells in Clark County

1993:

- Lens Groundwater Study, Whatcom County
- **City of Grandview Class II Inspection, October 21-23, 1991**
- **Ground Water Quality Assessment: Hornby Dairy Lagoon, Sunnyside, Washington**
- **Black Rock - Moxee Valley Groundwater Study**
- Lower Issaquah Valley Wellhead Protection Plan, City of Issaquah Volume I
- Kitsap County Groundwater Management Plan Groundwater Issues Papers
- Chehalis River TMDL, Ground Water Reconnaissance and Estimated Inflows.
- Vashon GWMP, Updated Area Characterization and Data Analysis for Environmental Health Division, King County
- Vashon-Maury Island GWMA Tables, Appendices
- Quincy Agricultural Chemicals Ground Water Assessment

1994:

- Washington State Pesticide Monitoring Program: 1993 Surface Water Sampling Report
- Vadose Zone Monitoring at Tree Top Land Application Site - Selah
- Redmond-Bear Creek GWM Plan for Seattle-King County Health Department
- Effects of Leakage from Four Dairy Waste Storage Ponds on Ground Water Quality, Final Report
- Lummi Island Groundwater Study
- Ground Water Quality Survey near Edaleen Dairy, Whatcom County, Washington, January 1990 to April 1993
- Lummi Island Groundwater Study
- East Jefferson County Groundwater Characterization Study
- City of Westport and South Beach Area Groundwater Characterization Study

1995:

- Estimates of Ground-Water Contaminant Loading to the Colville River in the Vicinity of L-Bar Products
- Watershed Briefing Paper for the Upper and Lower Snake River Water Quality Management Area
- Pesticide Residues in the Walla Walla Surficial Aquifer - Pesticides in Ground Water Report #7
- Surface Water and Groundwater on Coastal Bluffs: A Guide for Puget Sound Property Owners
- Watershed Briefing Paper for the Nooksack Water Resource Inventory Area

- Guidance on Sampling and Data Analysis Methods

1996:

- City of Blaine Wellhead Protection Program
- Watershed Briefing Paper for the Lower Columbia Basin Watershed
- **Watershed Briefing Paper for the Upper and Lower Yakima Watersheds**
- Nooksack Watershed Surficial Aquifer Characterization
- City of Sumas Wellhead Protection Plan
- Ground Water Quality Characterization and Nitrate Investigation of the Glade Creek Watershed
- Relationship Between Ground Water and Surface Water in the Quilceda Creek Watershed
- Washington State Pesticide Monitoring Program: Pesticides in Washington State's Ground Water, A Summary Report, 1988-1995: Pesticides in Ground Water Report No. 9
- Pesticide Residues in the Skagit Delta Surficial Aquifer - Washington State Pesticide Monitoring Program
- City of Kent Wellhead Protection Program, Clark, Kent, and Armstrong Springs
- Issaquah Creek Valley Groundwater Management Plan Supplement, Draft
- A Report on Nitrate Contamination of Ground Water in the mid-Columbia Basin

1997:

- Ground Water in Washington State (Interagency Report)
- Island County Groundwater Nitrate Study
- City of Redmond Wellhead Protection Report
- City of Tumwater Wellhead Protection Program
- Pesticide Residues in the Kittitas Valley Surficial Aquifer
- Winter Soil Pore-Water Nitrate at the Deer Park Land Application Site 1995-96
- Mid-Columbia GWMA -- Quarterly Progress Summary

1998:

- Sumas-Blaine Surficial Aquifer Nitrate Characterization Washington State Pesticide Monitoring Program: 1995 Surface Water Sampling Report
- Chehalis River Watershed Surficial Aquifer Characterization
- Yelm Groundwater Baseline Sampling

1999:

- **Yakima Groundwater Study (OBSOLETE)**
- The Aquifer Vulnerability Project -- Nooksack Pilot Study Report
- Estimates of Nitrate-N Loading to South Puget Sound by Groundwater Discharge

- Groundwater Data Compilation for the Okanogan Watershed
- The Aquifer Vulnerability Project -- Nooksack Pilot Study Report
- Snohomish County Groundwater Management Plan
- Report on Groundwater Contamination that Affects Drinking Water in Washington State

2000:

- North Central Sumas-Blaine Surficial Aquifer Nitrate Characterization Project - June 1999
- Quality Assurance Project Plan: Characterizing Surface Water/Groundwater Interactions in the Muck Creek Watershed Pierce County, Washington
- Quality Assurance Project Plan: Lower Yakima River Water Quality Model and Evaluation of the USBR Columbia River Pump Exchange Project
- Quality Assurance Project Plan: Ambient Groundwater Monitoring in the Dungeness Watershed, Clallam County, Washington
- WDOT-Skokomish Site near Potlatch: Volume 2. Groundwater Mounding Analysis
- WDOT-Skokomish Site near Potlatch: Volume 1. Rapid Infiltration Hydrogeologic Study
- Smith Prairie Groundwater Quality Assessment
- Guidance Document for the Establishment of Critical Aquifer Recharge Area Ordinances

2001:

- Artificial Storage and Recovery of Ground Water: 2001 Report to the Legislature
- Assessment of Surface Water and Groundwater Interchange within the Muck Creek Watershed, Pierce County
- Relationship Between the Upper Dungeness River and the Bedrock Aquifer, Clallam County
- Groundwater Quantity Report for WRIA 01, Phase II
- Groundwater Resources Chapter Level 1 Technical Assessment
- Water Quality Chapter 8 Technical Assessment
- Quality Assurance Project Plan: Groundwater/Surface Water Interactions In the Sammamish River: a Preliminary Analysis.
- Spokane River/Aquifer Interaction Project Results, May - November 1999
- Technical Memorandum-Level 1 Technical Assessment Hydraulic Continuity Evaluation
- Quality Assurance Project Plan: Characterization of the Groundwater Discharge to Moses Lake, Washington

2002

- Groundwater Quantity Report for WRIA 01, Phase II

- Quality Assurance Project Plan: Monitoring for Nitrate Trends in the Central Sumas-Blaine Surficial Aquifer
- Quality Assurance Project Plan: Characterization of Groundwater Discharge to Lake Whatcom
- Surface Water-Ground Water Interactions Along the Dungeness River and Vertical Hydraulic Conductivity of Streambed Sediments, Clallam County, Washington, September 1999-July 2001
- A Comparison of Horizontal Hydraulic Conductivity Values Derived from Aquifer Test and Well Specific-Capacity Data for the Sequim-Dungeness Area
- Effects of Land Application of Manure on Groundwater at Two Dairies over the Sumas-Blaine Surficial Aquifer: Implications for Agronomic Rate Estimates
- Aquifer Vulnerability Analysis Using the Pesticide Root-Zone Model (PRZM2) -- Columbia Basin Irrigation Project Area
- Deschutes River Groundwater Inflow Study 2001 Final Report
- Nitrogen and Pesticide Contamination of GW in WRIA01, V1.3
- Chehalis Reservation 2001 GW Monitoring Report
- Chehalis Reservation Wellhead Protection Report
- Effects of Land Application of Dairy Manure and Wastewater on Groundwater Quality: Pre- and Post-Animal Waste Holding Pond Monitoring

2003:

- **Groundwater Quality in the Central Ahtanum Valley, Yakima County, March 2001 - December 2002**
- Quality Assurance Project Plan: Monitoring for Nitrate Trends in the Central Sumas-Blaine Surficial Aquifer
- Quality Assurance Project Plan: Characterization of Groundwater Discharge to Lake Whatcom
- Effects of Land Application of Manure on Groundwater at Two Dairies over the Sumas-Blaine Surficial Aquifer: Implications for Agronomic Rate Estimates
- Nitrogen and Pesticide Contamination of GW in WRIA01, V1.3
- Technical Memorandum (Task 8A) EF Lewis Ground Water and Surface Water Relationships
- Aquifer Storage and Recovery Evaluation Report
- Groundwater Quality in the Agnew and Carlsborg area, Clallam County, December 2000 - September 2002
- Groundwater/Surface Water Interactions in the Upper Sammamish River: A Preliminary Analysis
- Moses Lake Total Maximum Daily Load Groundwater Study

2004:

- Quality Assurance Project Plan: Groundwater, Soil, and Crop Nitrogen at a Field Where Dairy Waste is Used as Fertilizer in Whatcom County.

- City of Yelm Groundwater Monitoring Project
- Hudson Bay Aquifer Recharge Testing Annual Report 2004
- Groundwater Recharge Topic Paper, Derivation of the CARA Susceptibility Map
- Study of Phosphorus Sources in Groundwater Entering Lake Steilacoom
- Stillaguamish River Watershed Fecal Coliform, Dissolved Oxygen, pH, Mercury, and Arsenic Total Maximum Daily Load Study
- Dungeness Groundwater Modeling Evaluation of Full Buildout in Dungeness River Area
- Level 2 Technical Assessment Watershed Simulation Model, Little and Middle Spokane Watersheds
- Appendix D Phase II Watershed Assessment, Nitrate Concentration and Distribution Study
- Quality Assurance Project Plan: Groundwater Assessment Program Pilot Study, Phase 2

2005:

- **Quality Assurance Project Plan: Assessment of Ambient Groundwater Quality Conditions in the Surficial Unconsolidated Sedimentary Aquifer of the Moxee Valley, Yakima County, Washington**
- Washington State Groundwater Assessment Program: Hydrology and Quality of Groundwater in the Centralia-Chehalis Area Surficial Aquifer
- Hudson Bay Aquifer Recharge Testing Annual Report 2005
- Implementation Guidance for the Ground Water Quality Standards
- Aquifer Storage and Recovery Assessment, City of Kennewick
- Focus on: Montesano soil & groundwater investigation
- Surficial Aquifers and Approximate Depth to Water
- Assessment of Surface Water and Groundwater Interchange in the Walla Walla River Watershed
- Groundwater Data Summary for the Wenatchee River Watershed Total Maximum Daily Load Study
- Hydrogeologic Assessment of Tucannon River, Pataha and Asotin Creek Drainages
- Focus Sheet: Developing Ground Water Cleanup Standards under the Model Toxics Control Act
- Hydrogeologic Study of the Lower Dosewallips\_Brinnon Area\_WRIA 16 Final Report
- Critical Aquifer Recharge Areas: Guidance Document
- Lake Whatcom Total Maximum Daily Load Groundwater Study

2006:

- **Groundwater-Surface Water Interactions along the Naches and Tieton Rivers, Summer and Fall 2004**
- Lake Whatcom Total Maximum Daily Load Groundwater Study

- An Evaluation of a Piezometer-Based Constant Head Injection Test (CHIT) for use in Groundwater/Surface Water Interaction Studies

2007:

- **Ambient Groundwater Quality in the Moxee Valley Surficial Aquifer, Yakima County, January-June 2006**
- Quality Assurance Project Plan: Bertrand Creek and Meadowdale Areas (Whatcom County) Follow-Up Study of EDB and 1,2-DCP in Residential Wells. Addendum to Quality Assurance Project Plan: Groundwater, Soil, and Crop Nitrogen at a Field Where Dairy Waste is Used as Fertilizer in Whatcom County
- Technical Memorandum #8: Impacts of Climate Change on Groundwater Resources - A Literature Review
- City of Walla Walla Shallow Aquifer Recharge Feasibility Study
- Project Completion Report for Shallow Aquifer Recharge Testing, Hall-Wentland Site
- Webb Hill Biosolids Facility Hydrogeologic Investigation\_Phase 1
- Ground-Water Flow Model for the Spokane Valley-Rathdrum Prairie Aquifer, Spokane County, Washington and Bonner and Kootenai Counties, Idaho
- Hydrogeologic Framework and Water Budget of the Spokane Valley-Rathdrum Prairie Aquifer, Spokane County, Washington and Bonner and Kootenai Counties, Idaho
- Report to Management: Groundwater Assessment Program Pilot Study
- Assessment of Surface Water / Groundwater Interactions and Associated Nutrient Fluxes in the Deschutes River and Percival Creek Watersheds, Thurston County
- Addendum to Quality Assurance Project Plan: Groundwater, Soil, and Crop Nitrogen at a Field Where Dairy Waste is Used as Fertilizer in Whatcom County

2008:

- Nitrate Trends in the Central Sumas-Blaine Surficial Aquifer
- Fecal Coliform and Nitrate Transport in Shallow GW Discharging to Streams, Nooksack Indian Tribe
- San Juan County Annual Groundwater Monitoring Report
- Interim Aquifer Protection Report, Eastsound, San Juan County
- Ground Water Level Field Monitoring Report-Phase II, Alpowa and Asotin Creek Basins
- Installation of Monitoring Wells and Staff Gages in Lower Dungeness Watershed- Technical Memo
- Quality Assurance Project Plan: High-resolution, Pore-water Sampling Near the Groundwater/Surface Water Interface
- Quality Assurance Project Plan: Groundwater-Surface Water Interactions Along Chumstick Creek and Mission Creek in WRIA 45, Chelan County, Washington
- Ambient Groundwater Monitoring Program and Data Quality Management Plan

- Addendum to Quality Assurance Project Plan: Type N Experimental Buffer Treatment Study: Addressing Buffer Effectiveness on Riparian Inputs, Water Quality, and Exports to Fish-Bearing Waters in Basaltic Lithologies

2009:

- Quality Assurance Project Plan: Effects of Conventional versus Minimum Tillage on Groundwater Nitrate at a Manured Grass Field
- Bertrand Fish trap Flow Depletion Model (Whatcom County)
- Columbia Basin GWMA Subsurface Mapping and Aquifer Assessment Project, Final Project Performance Report
- Focus on Upper Crab-Wilson Watershed
- QAPP Groundwater Level Gauging Program, Northern Lincoln County, ver\_1 Draft
- Monitoring Riparian Buffer Functions to Reduce Non-Point Pollution in Pierce County, Clarks Creek, Puyallup
- Groundwater Level Declines in the Columbia River Basalt Group and their Relationship to Mechanisms for Groundwater Recharge: A Conceptual Groundwater System Model
- Memo: Groundwater Monitoring in Chumstick Creek Subwatershed
- Little Spokane River Groundwater Inventory & Mapping Report
- Cumulative Impact Analysis\_Report\_of Outdoor Water Use by Permit-Exempt Wells in the Chumstick and Mission Creek Subwatersheds
- Surface Water/Groundwater Exchange Along the East Fork Lewis River (Clark County), 2005
- Quality Assurance Project Plan: Sumas-Blaine Surficial Aquifer Long-Term Ambient Groundwater Monitoring

2010:

- **Lower Yakima Valley Groundwater Quality Preliminary Assessment and Recommendations Document**
- Concise Explanatory Statement: Chapter 173-539A WAC, Upper Kittitas Groundwater Rule
- Quality Assurance Project Plan: Puget Sound Groundwater Toxics Loading Analysis, Direct Discharge Pathway
- Little Spokane Groundwater Elevation and Stream Flow Monitoring Project
- Little Spokane Groundwater Elevation and Stream Flow Monitoring Project
- Groundwater Inventory and Mapping Project Lower Lake Roosevelt Watershed
- Preliminary Critical Aquifer Recharge Analysis Report Lower Lake Roosevelt Watershed
- Small Business Economic Impact Statement Chapter 173-539A WAC Water Resources Program for the Upper Kittitas Groundwater Area
- Preliminary Cost Benefit and Least Burdensome Analyses for Chapter 173-539A WAC: Upper Kittitas Groundwater Rule



- Rule Proposal Notice: Upper Kittitas Ground Water Rule, Chapter 173-539A WAC
- Technical Memo\_Lake Spokane GW Loading Analysis\_DRAFT
- Bertrand Fishtrap Flow Depletion Model
- Technical Memorandum Groundwater Time of Travel Contours\_McCarteney Creek and Rattlesnake Springs
- Groundwater Elevation Monitoring Report\_Exempt Well Water Use Phase II\_2009

2011:

- North Whatcom Groundwater Update
- Quality Assurance Project Plan: Sumas-Blaine Aquifer Nitrate Contamination Summary
- North Whatcom Groundwater Update Quality Assurance Project Plan: Sumas-Blaine Aquifer Nitrate Contamination Summary
- EDB and 1,2-DCP in Domestic Groundwater Supplies, Follow-Up Investigation: Bertrand Creek Area (Whatcom County)
- Sumas-Blaine Aquifer Long-Term Groundwater Quality Monitoring Network, 2009 Annual Report
- Groundwater Level Gauging Project: Lower Lake Roosevelt Watershed (WRIA 53),
- Mission Creek Subwatershed Hydro-Geologic Monitoring Report
- Chumstick Creek Subwatershed Hydro-Geologic Monitoring Report
- Little Spokane Groundwater Elevation and Stream Flow Monitoring Project, Tech. Memo - 2011 Project Update
- 2011 Swale Creek Subbasin Water Level Monitoring Summary, WRIA 30
- Control of Toxic Chemicals in Puget Sound: Evaluation of Loading of Toxic Chemicals to Puget Sound by Direct Groundwater Discharge

2012:

- Quality Assurance Project Plan Little Squalicum Creek Estuary Soil and Groundwater Characterization
- Addendum to Quality Assurance Project Plan Sumas-Blaine Surficial Aquifer Long - Term Ambient Groundwater Monitoring
- **Yakima River Basin Integrated Water Resource Management Plan**
- Surface Water/Groundwater Interactions and Near-Stream Groundwater Quality along Burnt Bridge Creek, Clark County
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2013:

- Focus on: The Ground Water Permit Exemption
- WRIA 1 Groundwater Data Assessment (Whatcom County)
- Little Squalicum Creek Estuary Soil and Groundwater Characterization (Whatcom County)
- Surface-Water/Groundwater Interactions and Near-Stream Groundwater Quality, Lacamas Creek, Clark County

2014:

- Nitrogen Dynamics at a Manured Grass Field Overlying the Sumas-Blaine Aquifer in Whatcom County
- **Focus on Water Availability: Lower Yakima Watershed, WRIA 37**
- Spreadsheet Models for Determining the Influence of Land Applications of Fertilizer on Underlying Groundwater Nitrate Concentrations

2015

- Relationship between Land Use and Nitrate Concentrations in Washington State Department of Ecology Monitored Watersheds

2016

- Quality Assurance Project Plan Evaluation of Groundwater Quality and Discharge Conditions at the Terminus of Deep and Coulee Creeks (Spokane County)
- Manure and Groundwater Quality Literature Review
- Washington Nitrate Prioritization Project
- Predicted Impacts of Climate Change on Groundwater Resources of Washington State

2017

- Sumas-Blaine Aquifer Long-Term Groundwater Quality Monitoring, 2009-2016
- **Addendum to Quality Assurance Project Plan Yakima Railroad Area Groundwater Performance Monitoring**
- Economic Impact Analysis Final Concentrated Animal Feeding Operation General Permit

2018

- Preliminary Re-Evaluation of Discharges from Washington's Water Treatment Plants
- Quality Assurance Project Plan Sumas-Blaine Aquifer Nitrate Characterization, 2018

Yakima County – 17 studies

Whatcom County – 46 studies