

# DESCRIPTION OF DIGITAL FILES FOR GEOLOGIC MAP OF NORTHWESTERN SEATTLE (PART OF THE SEATTLE NORTH 7.5 X 15-MINUTE QUADRANGLE), KING COUNTY, WASHINGTON

Database by Scott Shimel, Philip Dinterman, Karen Wheeler and Matt Anders

## INTRODUCTION

This readme document serves to introduce and describe the digital files that are included in this publication. They are available for downloading at <http://pubs.usgs.gov> and include both Geographic Information System (GIS) software files (both raster and vector data) that are viewable with an Environmental Systems Research Institute (ESRI) compatible commercial GIS (or with ESRI's ArcReader utility; a free map viewer with no editing capabilities) as well as Portable Document Format (PDF) files that are viewable with a reader or web browser plug-in available for free on the internet. Two download packages are available (see the section entitled "Scientific Investigations Map 2903 Digital Contents" below for details) depending on the resources available to the user. For those interested only in a paper plot of the Scientific Investigations Map, please see the section entitled "Obtaining Paper Plots" below.

This digital map publication, generated from new mapping by the authors, shows the general distribution of bedrock and surficial deposits in the Northwestern Seattle (Part of the Seattle North 7.5 x 15-minute quadrangle) map area. Together with the accompanying geologic description, it presents current knowledge of the geologic structure and stratigraphy of the area covered. The database identifies map units that are classified by general age and lithology following the stratigraphic nomenclature used by the U.S. Geological Survey. The scale of the source map limits the spatial resolution (scale) of the database to 1:12,000 or smaller. The content and character of the digital publication, as well as methods of obtaining the digital files, are described below.

## SCIENTIFIC INVESTIGATIONS MAP 2903 DIGITAL CONTENTS

The digital data for this Scientific Investigations Map consists of:

- 1) A **Geodatabase** package that contains geologic vector and table data stored as data objects within an ESRI format personal geodatabase, raster data stored as ESRI format DRG-TIFF, an ESRI map document for use with ArcGIS 9.0 which allows full control of editing and rendering of the data sources, an ESRI published map document for use with ArcReader which allows viewing and querying of the source data along with metadata and an ArcGIS style for symbolizing the map.
- 2) A **Shapefile** package that contains shapefiles exported from the personal geodatabase, and the same ESRI DRG-TIFF as in the Geodatabase package along with supporting files. This package does not contain annotation layers included in the Geodatabase package due to software limitations.
- 3) An **html** file with metadata for the entire database.
- 4) **PDF** files of the map sheet and geology pamphlet.

Each package has been compressed into a single file (.zip extension) using WinZip, a downloadable compression software utility (download from <http://www.winzip.com>). Each compressed file will uncompress into a folder containing the associated files.

If you:

- Have access to ArcGIS 9.0, download the Geodatabase package and open the map document (.mxd extension) from ArcGIS.
- Have access to ArcView 3.x (or a GIS that can read shapefiles), download the Shapefile package.
- Do not have access to a GIS but wish to view and query the data, download the Geodatabase package and open the published map document (.pmf extension) with ArcReader (free download from <http://www.esri.com>).
- Do not have access to a GIS and only wish to print the map sheet or parts of it, download the PDF package and open them from Adobe Reader 5.0 or later (free download from <http://www.adobe.com>). Note that the map sheet is approximately 36 x 50 inches and will require a large-format plotter.

- Only wish to have a paper copy of the Scientific Investigations Map, see the section entitled "Obtaining Paper Plots" below.

## 1) GEODATABASE PACKAGE

(SIM2903\_DB.zip, 135 MB COMPRESSED, 298 MB UNCOMPRESSED)

### Geodatabase data objects

### Description

SeattleNW.mdb	An ESRI personal geodatabase with simple feature classes:
“Geology Feature Dataset”	
<u>Feature Classes</u>	
<i>SeattleNWContacts</i>	A line feature class representing the contacts and faults of the geology
<i>SeattleNWScarps</i>	A line feature class representing the fault scarps
<i>SeattleNWContour40</i>	A line feature class representing the 40 foot contour interval basemap
<i>SeattleNWGeologyPoly</i>	A polygon feature class representing geologic units
<i>SeattleNWFill</i>	A polygon feature class representing fill units
<i>SeattleNWMassWastage</i>	A polygon feature class representing mass-wastage deposits
<i>SeattleNWOcean</i>	A polygon feature class representing the ocean boundary in map area
<i>SeattleNWC14Dates</i>	A point feature class representing Carbon-14 data
<i>SeattleNWExploration</i>	A point feature class representing exploration points
<i>SeattleNWExposure</i>	A point feature class representing exposure localities
<i>SeattleNWRISLDates</i>	A point feature class representing Infrared-stimulated luminescence age localities
<i>SeattleNWC14DatesAnno</i>	An annotation feature class (feature-linked) representing dates Carbon-14 sample localities
<i>SeattleNWGeologyPolyAnno</i>	An annotation feature class (feature-linked) representing the map unit symbols of the geologic units
<i>SeattleNWRISLDatesAnno</i>	An annotation feature class (feature-linked) representing dates of IRSL localities
“CrossSection Feature Dataset”	
<u>Feature Classes</u>	
<i>SeattleNWCrossSection</i>	A line feature class representing the cross section lines
<i>SeattleNWCrossSectionAnno</i>	An annotation feature class (feature-linked) representing the cross section labels
“Landslides Feature Dataset”	
<u>Feature Classes</u>	
<i>SeattleNWLandslideLocations</i>	A point feature class representing localities from the winter of 1996-1997 landslides (see Baum et al, 2000 for complete dataset) and all slides through 1999 on file with the City of Seattle (see Shannon & Wilson, Inc., 2000 for complete dataset) in map area

## Map document files

<i>SeattleNW.mxd</i>	Map document created in ArcGIS 9.0 containing the data rendering and symbolization information that was used in the production of the Scientific Investigations Map sheet. For this release, the layers were grouped logically and given aliases in order to be more usable
<i>SeattleNW.pmf</i>	Published map document created from SeattleNW.mxd for use with ArcReader. It contains all of the same rendering and symbolization information that is in the original .mxd. Features may be queried with the identify tool in the same way they could in the .mxd, but there are no editing capabilities with this utility
<i>SeattleNW.style</i>	Custom style file used to symbolize lines, polygons, and points.
<i>SeaNWLidar</i>	DEM created with the Light Detection and Ranging (LiDAR) data at 4x vertical exaggeration, sun azimuth at 45 degrees, and sun vertical angle at 45 degrees

## **2) SHAPEFILE PACKAGE**

(SIM2903 \_SHP.zip, 58.6 MB COMPRESSED, 79.4 MB UNCOMPRESSED)

<u>Shapefiles</u>	<u>Description</u>
<i>SeattleNWcontacts.shp</i>	A line shapefile of the SeattleNWContacts feature class exported from the geodatabase (see Geodatabase Package above)
<i>SeattleNWScarps.shp</i>	A line shapefile of the SeattleNWScarps feature class exported from the geodatabase (see Geodatabase Package above)
<i>SeattleNWContour40.shp</i>	A line shapefile of the SeattleNWContour40 feature class exported from the geodatabase (see Geodatabase Package above)
<i>SeattleNWCrossSection.shp</i>	A line shapefile of the SeattleNWCrossSection feature class exported from the geodatabase (see Geodatabase Package above)
<i>SeattleNWGeologyPoly.shp</i>	A polygon shapefile of the SeattleNWGeologyPoly feature class exported from the geodatabase (see Geodatabase Package above)
<i>SeattleNWFill.shp</i>	A polygon shapefile of the SeattleNWFill feature class exported from the geodatabase (see Geodatabase Package above)
<i>SeattleNWMassWastage.shp</i>	A polygon shapefile of the SeattleNWMassWastage feature class exported from the geodatabase (see Geodatabase Package above)
<i>SeattleNWOcean.shp</i>	A polygon shapefile of the SeattleNWOcean feature class exported from the geodatabase (see Geodatabase Package above)
<i>SeattleNWC14Dates.shp</i>	A point shapefile of the SeattleNWC14Dates feature class exported from geodatabase (see Geodatabase Package above)
<i>SeattleNWExploration.shp</i>	A point shapefile of the SeattleNWExploration feature class exported from the geodatabase (see Geodatabase Package above)
<i>SeattleNWExposure.shp</i>	A point shapefile of the SeattleNWExposure feature class exported from the geodatabase (see Geodatabase Package above)
<i>SeattleNWRISLDates.shp</i>	A point shapefile of the SeattleNWRISLDates feature class exported from the geodatabase (see Geodatabase Package above)
<i>SeattleNWLandslide</i>	A point shapefile of the SeattleNWLandslideLocations feature class exported

*Locations.shp* from the geodatabase (see Geodatabase Package above)

Map document files

*SeattleNW.style* Custom style file used to symbolize lines, polygons, and points.

*SeaNWLidar* DEM created with the LiDAR data at 4x vertical exaggeration, sun azimuth at 45 degrees, and sun vertical angle at 45 degrees

**3) METADATA (.html) (53.9 KB)**

Files

*SeattleNWmetadata.html*

Description

Metadata created in ArcCatalog for this map

**4) PORTABLE DOCUMENT FORMAT (ADOBE ACROBAT 5.0) FILES (33.2 MB)**

Files

*SeattleNW\_map.pdf*

Description

A PDF file containing an image of the entire map sheet, exported from Adobe Illustrator

**OBTAINING THE DIGITAL DATA**

The digital data for this map can be obtained in two ways:

- 1) Download from the U.S. Geological Survey Web Site
- 2) Request a compact disc (CD) of the files.

1) TO OBTAIN THE FILES FROM THE U.S. GEOLOGICAL SURVEY WEB PAGES:

The U.S. Geological Survey supports a set of graphical pages on the World Wide Web. Digital publications (including this one) can be accessed via these pages. The location of the main Web page for the entire U.S. Geological Survey is <http://www.usgs.gov>. The Web server for digital publications is <http://pubs.usgs.gov>. To access files for this Scientific Investigations Map report, go to <http://pubs.usgs.gov/sim/2005/2903/>.

2) TO OBTAIN A CD OF THE FILES:

A CD of any or all of the digital files described here can be obtained by sending a request and return address to:

Karen Wheeler (or Ray Wells)  
U.S. Geological Survey  
345 Middlefield Road, M/S 973  
Menlo Park, CA 94025

or by email: [kwheeler@usgs.gov](mailto:kwheeler@usgs.gov) or [rwells@usgs.gov](mailto:rwells@usgs.gov)

**OBTAINING PAPER PLOTS**

TO OBTAIN PLOTS FROM A COMMERCIAL VENDOR:

First obtain the PDF package via a download or by requesting a CD of the PDF package as described above. Take that package to a commercial vendor with a large-format plotter. Make sure the vendor is capable of reading CDs and PDF files and provide the vendor with a copy of this document.

TO OBTAIN PAPER PLOTS FROM THE U.S. GEOLOGICAL SURVEY:

The U.S. Geological Survey provides a print on demand service for digital maps such as this report. To obtain plots, contact the U.S. Geological Survey:

**USGS Information Services**  
**Box 25286**  
**Denver Federal Center**  
**Denver, CO 80225-0046**

**(303) 202-4200**

**1-888-ASK-USGS**

**FAX: (303) 202-USGS**

**e-mail: [infoservices@usgs.gov](mailto:infoservices@usgs.gov)**

Be sure to include with your request the Scientific Investigations Map number 2903.

### **DIGITAL COMPILATION**

Several different feature classes were generated within a geodatabase during the construction of the Northwestern Seattle (Part of the Seattle North 7.5 x 15-minute quadrangle) map area. The LiDAR base map remains as a digital grid and is overlain on the geology feature class in ArcMap at a 70% transparency level, +30 contrast, and +20 brightness. Some custom menus were used to project, transform, edit, tag, and build points in the map. A digital layout or map collar was made with Adobe Illustrator. The map was exported from the layout view in ArcMap as an Adobe Illustrator file, rotated counterclockwise 1.1 degrees and added to a single Adobe Illustrator file that also contained the description of map units, correlation of map units, cross sections, stratigraphic section, two data tables and a geologic summary. Differences between the maps as they appear in the final map sheet and as they appear in either the .mxd or .pmf files represent changes made in the Adobe Illustrator file to the symbology only and do not reflect any changes in the actual source data. The map is in State Plane, Washington projection, NAD 83, North, FIPS 4601, feet, and 1:12,000 scale.

### **BASE MAP**

The base map for the digital compilation is a shaded relief map from Digital Elevation Model (DEM) created with the Light Detection and Ranging (LiDAR) data at 4x vertical exaggeration, a sun azimuth at 45 degrees, and sun vertical angle at 45 degrees. The LiDAR data was acquired from the Puget Sound LiDAR Consortium and King County Endangered Species Act/Sensitive Areas Ordinance, LiDAR Digital Ground Model (DGM), 2001-2003. Horizontal accuracy is ~1.8 meters; vertical accuracy is ~0.3 meters. Street data was extracted from City of Seattle, WA, 1:1200-scale proprietary street data, 2001. Horizontal accuracy is ~1.5 meters. Since the street data is proprietary it is not released in the geodatabase or shapefile package and appears only on the PDF map file.

### **SPATIAL RESOLUTION**

Uses of this digital geologic map should not violate the spatial resolution of the data. Although the digital form of the data removes the constraint imposed by the scale of a paper map, the detail and accuracy inherent in map scale are also present in the digital data. The fact that this database was edited at a scale of 1:12,000 means that higher resolution information is not present in the dataset. Plotting at scales larger than 1:12,000 will not yield greater real detail, although it may reveal fine-scale irregularities below the intended resolution of the database. Similarly, where this database is used in combination with other data of higher resolution, the resolution of the combined output will be limited by the lower resolution of these data.

### **ACKNOWLEDGMENTS**

We thank Scott Graham for a digital review of this database.

### **REFERENCES**

Baum, R.L., Harp, E.L., and Hultman, W.A., 2000, Map showing recent and historic landslide activity on coastal bluffs of Puget Sound between Shilshole Bay and Everett, Washington: U.S. Geological Survey Miscellaneous Field Studies Map MF-2346, 1 sheet, scale 1:24,000 [available on World Wide Web at <http://pubs.usgs.gov/mf/2000/mf-2346/>].

Shannon & Wilson, Inc., 2000, Seattle Landslide Study: report for Seattle Public Utilities, 164 p., with map folio and Seattle landslide database [available on World Wide Web at <http://www.seattle.gov/DPD/Landslide/Study/default.asp>].