



WASHINGTON STATE DEPARTMENT OF
Natural Resources
Doug Sutherland - Commissioner of Public Lands

DGER NEWS

DIVISION OF GEOLOGY AND EARTH RESOURCES
"Washington State's Geological Survey since 1890"

Website: <http://www.dnr.wa.gov/geology/>

Vol. 2, No. 4, Winter 2005

DECISION-MAKERS FIELD CONFERENCE

On Sept. 17, DGER held a one-day field conference for legislators and other local decision-makers. The field trip was an opportunity to learn first-hand about natural hazards and their impacts on people, economic development, and transportation.

In an informal outdoor setting, speakers presented the latest information on understanding and mitigating geologic disasters. Since the conference was field-oriented, participants visited sites that are the focus of concern. The field-trip format stimulated on-site debates about public policy, strategies for growth, funding for geologic hazard work, and methods for solving problems.

The first stop was Timberlake Park on Lake Sammamish to view earthquake-induced landslides and evidence for a major earthquake along the Seattle fault (Fig. 1). Tim Walsh of DGER gave an introduction on what risk is and how it is mitigated. Brian Sherrod of the USGS described his research on the Seattle fault, which has documented evidence of faulting and the size and extent of the fault. Tim Nogler, Director of the Building Codes Council, gave a presentation on seismic hazards and how they affect building codes.

At Carkeek Park, Walsh set the stage by talking about the unstable bluffs north of the park, where hundreds of debris flows blocked a critical rail corridor in January of 1997. Bill Laprade of Shannon & Wilson (Fig. 2) described bluff stratigraphy and causes of the debris flows. He explained that, even with the engineered works along this important rail line, prevention is uncertain.

Hugh Shipman of the Shorelands Division of the Washington State Department of Ecology gave an overview of landsliding in Puget Sound and the broader shoreline management picture. While the bluffs are a geological hazard, there are also environmental issues that must be considered. Shipman said there should be an emphasis on avoiding hazards rather than mitigating or controlling them and recommended

educational work with communities and property owners. The Department of Ecology looks to agencies such as DGER and the USGS for mapping and technical guidance. With the emergence of lidar and new geologic mapping, there is a critical need for updated slide mapping, he said.

The final stop was at the Don Armeni Boat Launch in West Seattle. It provided a spectacular view of Seattle, Elliott Bay, the lower Duwamish Waterway, Harbor Island, Magnolia, Mount Rainier, and landslides along Harbor Drive (Fig. 3). The presentations centered on our vulnerability to hazards from the Seattle fault, tsunamis, and eruptions of Mount Rainier. Tim Walsh led off

by describing what would happen if there were an earthquake along the Seattle fault. He vividly described the liquefaction that would occur and the tsunami that would roll

Continued on next page



Figure 1. Field conference participants discuss the Seattle fault at Timberlake Park on Lake Sammamish. Lively presentations and Q&A sessions helped them understand Washington's geologic hazards.

MESSAGE FROM THE STATE GEOLOGIST

The Division of Geology and Earth Resources has spent most of the last few months getting ready for the 2006 legislative session. This session may be a watershed event for the Division. All of the Division's programs are under severe budget constraints. Programs such as oil and gas regulation and geologic hazards no longer exist. The surface mine reclamation account that funds the surface mine reclamation program will be effectively bankrupt by August of 2006 at current rates of expenditure. The geologic mapping program exists only as long as the federal STATEMAP grant program continues to exist, as it provides 50 percent of our mapping funds.

To begin to address these problems, the Division has asked the Department of Natural Resources to request four pieces of legislation and submit one supplemental budget request. One proposal is to ask the legislature to provide expanded cost-reimbursement



Ron Teissere
State Geologist

authority for oil and gas regulation that would allow us to contract with consulting firms for evaluation of oil and gas proposals and then be reimbursed by the project proponents. A related request is for authorization to conduct a year-long study of how a comprehensive approach to oil and gas exploration and development should be implemented by the state. We are also asking the legislature to increase the fees paid for surface mining permits by 50 percent to fund a more effective surface mine reclamation program. Without the increase, this program may also be defunct within the next year or two. Lastly, we are asking the legislature to modernize the enabling legislation for the state geological survey to better reflect current needs. The existing language dates back to statehood and is concerned almost exclusively with minerals and mining. While we believe that natural resources remain an

Continued on next page



Figure 2. Bill Laprade presents the geologic and stratigraphic reasons for the landslides along the bluffs at Carkeek Park. Many trains rumbled past, making presentations difficult but also making the point that this critical transportation corridor is very busy and highly vulnerable.



Figure 3. Tim Walsh points to the Duwamish Waterway and Harbor Island and describes the possible effects of a Seattle fault earthquake and tsunami.

through the bay and the damage it would do. He was able to point out the 1997 Magnolia bluffs landslides in the distance. Walsh also presented evidence for past lahars from Mount Rainier that have covered

GEOLOGIC MAP OF WASHINGTON WINS DESIGN AWARD

Our new Geologic Map of Washington State won first place in the environmental category at the ESRI Northwest GIS Users Conference. The environmental category was the largest category and had many beautiful maps entered. ESRI is a company that makes GIS (geographic information systems) software.

The Geologic Map of Washington State (GM-53) is the first new 1:500,000-scale geologic map of Washington since 1961. It is a 55.5 x 36-inch full-color map and may be purchased flat or folded. The flat map is printed on heavy, coated white stock and is suitable for framing. This map and the geologic quadrant maps that preceded it may be ordered from the Washington State Department of Printing at <http://www.prt.wa.gov>, click on General Store/Shop by Agency/Department of Natural Resources (Geology Division)/Geologic Maps/. The PDF may be viewed and downloaded at http://www.dnr.wa.gov/geology/pubs/pubs_ol.htm under GM-53. ■

Harbor Island and described what would happen if there were a large lahar from Mount Rainier today.

George Crawford of the Washington State Emergency Management Division (EMD) explained the warning systems in place for tsunamis and Mount Rainier lahars.

Jon Koloski of GeoEngineers, Inc., talked about deep-seated landslides in western Washington, using examples from Aldercrest in Cowlitz County and Carlyon Beach in Thurston County. State Geologist Ron Teissere closed with a presentation on how cities and counties use geoscience information for land-use planning under the Growth Management Act and how emergency managers can use geoscience information for preparedness and mitigation planning, to guide response efforts, and to aid in recovery

planning. He explained how DGER plays a key role in all of the above and needs funding to be restored to continue that role.

Participants left knowing that Washington State:

- has the second largest population at risk from earthquakes in the nation
- has experienced earthquakes, tsunamis, landslides, and volcanic eruptions large enough to be catastrophic to the state's people and economy should they recur without the proper geological, land-use, and emergency management planning
- has suffered at least 20 damaging earthquakes during the past 125 years, the most recent of which caused billions of dollars in damage

- has five major active volcanoes that threaten millions of people
- has landslides along hillsides and shorelines that cause millions of dollars in property damage each year
- has a coast at risk from a devastating tsunami that could cause thousands of deaths
- has inadequate funding to do the jobs that need to be done.

As a result of the trip, several legislators have become interested in geological hazards and at least one hearing has been scheduled. ■

STATE GEOLOGIST *Continued from p. 1*

important component of our work, Washington is ranked second in the nation for earthquake risk and is vulnerable to volcanic eruptions, landslides, and tsunamis. The proposed legislation would charge the survey with the tasks of addressing these hazards, basic geological mapping, and the collection, preservation, and dissemination of information about the geology of the state.

While the proposed revision of the enabling legislation does not include a specific budget request, it does include an analysis of the cost to fully implement the programs described in the bill. Full funding would allow the Division to add more than 12 positions over the next two or three years. The Division has also requested a specific supplemental budget for fiscal year 2007, beginning July 2006. This request is for about \$500,000 to address some specific seismic and slope stability hazard projects.

We urge you to contact your legislators if you have an interest in any of these proposals. We do not yet have specific bill numbers. As soon as we have them, we will get them up on our website with a brief description of each proposal. ■

DGER CELEBRATES EARTH SCIENCE WEEK

In honor of Earth Science Week (Oct. 9–15), DGER donated geology-related educational materials to the Office of the Superintendent of Public Instruction, the Washington State Library, and the Timberland Regional Library on Oct. 12 at the State Library in Olympia.

"These materials will help open a world of discovery for students," said Doug Sutherland, Commissioner of Public Lands. "They tie closely to the theme of this year's Earth Science Week, which focuses on earth science careers and their importance to society."

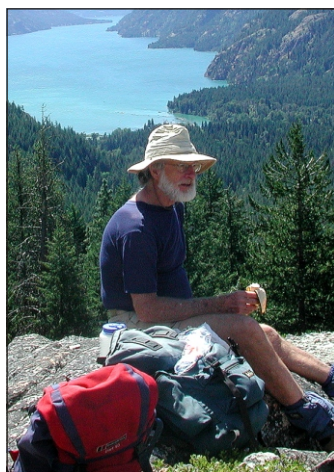
The American Geological Institute (<http://www.agiweb.org/> and <http://www.earthscienceworld.org/>) organizes this event to educate the public about the earth sciences. The USGS also supports Earth Science Week (www.earthsciweek.org).

During the week, DGER hosted a lecture by Bruce Bjornstad of Pacific Northwest National Laboratory and the Ice Age Floods Institute (www.iceagefloodsinstitute.org/) on the proposed multi-state National Ice Age Geological Trail. The proposed trail would tell the story of the cataclysmic Ice Age floods. ■

2005 DIBBLEE MEDAL AWARDED TO ROWLAND W. TABOR

The 2005 Dibblee Medal, which recognizes outstanding geologic field mapping, has been awarded to Dr. Rowland W. Tabor of the U.S. Geological Survey. The Dibblee Medal is given annually in recognition of the field geologist's extraordinary geologic mapping contributions to the geologic profession and to society. The award was presented at the annual meeting of the American Institute of Professional Geologists in Lexington, Kentucky, on October 10, 2005.

Tabor received his Ph.D. from the University of Washington in 1961. An accomplished mountain climber, he mapped a previously unmapped area in the future North Cascades National Park for his dissertation, working under the direction of the legendary Alpine and Himalayan field geologist, Peter Misch. After joining the U.S. Geological Survey, he led projects to map proposed wilderness areas in Washington, followed by mapping and compiling the entire Olympic Peninsula. He and his team described the accretionary-wedge origin of the core rocks of the Olympic Mountains, a geologic complex that previously had resisted characterization because of a lack of detailed mapping. He then embarked on mapping the



Rowland Tabor above Lake Chelan in 2002. Photo by Bjorn Larsen.

North Cascades of Washington from Snoqualmie Pass to the Canadian border at 1:100,000 scale.

Just as Tom Dibblee has mapped more of California than any other geologist, Tabor has mapped more of the State of Washington than anyone else. He is held in awe by his colleagues at the Washington Division of Geology and Earth Resources. Many graduate students and junior geologists have worked

under his direction, inheriting his love of field geology and the importance of understanding geologic principles based on field work. In addition to his geologic maps, Tabor has published hiker's guides to the North Cascades and Olympic National Parks to help the traveler to the Washington back country understand and appreciate the magnificent geology that awaits the backpacker.

The Dibblee Geological Foundation was established in 1983 by a group of Tom Dibblee's friends intent on publishing his mapping. Covering more than one-quarter of California, Dibblee's life's work includes about 550 detailed 7.5-minute maps, which are remarkable for their consistency from map to map and region to region.

I was asked to write a letter of support for Rowland and am really pleased that he was awarded this honor. I think the world of Rowland and his amazing body of work. He has been an incredible help to the Division in general and me in particular; he has provided us with a foundation of geologic mapping and is always ready to ponder geologic problems (all scales), lend ideas, or provide data. He was a huge factor in helping the Division compile the 1:250,000-scale Northwest quadrant map. His 1:100,000-scale geologic mapping is of the highest quality, and together with his topical publications, provides the backbone for Cascade Range and Olympic Range research.

— Joe Dragovich

DGER dedicated the Northwest quadrant to Rowland Tabor in recognition and appreciation of his fundamental contributions to geologic mapping and geologic understanding in the Cascade Range and Olympic Mountains.

GM-50. Geologic map of Washington—Northwest quadrant, by J. D. Dragovich, R. L. Logan, H. W. Schasse, T. J. Walsh, W. S. Lingley, Jr., D. K. Norman, W. J. Gerstel, T. J. Lapen, J. E. Schuster, and K. D. Meyers. 2002. 72 p. text, 1 pl., scale 1:250,000, and two accompanying explanatory sheets.

To date, 170 maps covering about 200 quadrangles have been published. The Dibblee Geology Center—part of the Santa Barbara Museum of Natural History since 2003—is laboring to issue the remaining maps as quickly as possible. The Center plans to publish at least 60 new maps this year and quicken its release schedule for upcoming years. Dibblee maps may be purchased on the museum website at www.sbnature.org or by calling 805-231-8080. ■

WATER TYPE DATA FOR EASTERN WASHINGTON AVAILABLE FOR PUBLIC PREVIEW

The Washington State Department of Natural Resources (DNR) invites the public to preview its new water type maps and data for Eastern Washington and provide the agency with feedback. The new maps, a step toward a habitat-based system, are available on the Forest Practices website [<http://www3.wadnr.gov/dnrapp5/website/fpars/viewer.htm>].

"The public can help us assess the accuracy of the map information," said Commissioner of Public Lands Doug Sutherland. "We will then be able to adjust the maps according to what we learn."

On March 1, 2005, DNR implemented new water type maps and data for Western Washington, although water typing changes continue to be accepted. The improved maps for Eastern Washington will be implemented

on March 1, 2006. The new water type classifications (Table 1) will be used to identify streams for fish use when planning forest practices in Washington. The maps will be updated as information is verified on the ground.

The map data can be found at <http://www.dnr.wa.gov/forestpractices/waterotyping>. Geographic information systems (GIS) capability is required to view the data.

Paper copies of the maps may be obtained using a form available on the website or at DNR regional offices.

Feedback may be provided via a questionnaire, also available on the website or at DNR regional offices. Comments may be e-mailed to fpd@wadnr.gov or mailed to: Preliminary Fish Habitat Water Type Map;

DNR Forest Practices Division; PO Box 47012; Olympia, WA 98504-7012.

The new water type system was outlined in the Forests and Fish Report [<http://www.dnr.wa.gov/forestpractices/rules/forestsandfish.pdf>], then established into law (ESHB 2091) in May 1999 [http://www.leg.wa.gov/pub/billinfo/1999-00/house/2075-2099/2091-s_e.pdf]. The law was incorporated into the Forest Practices Rules on July 1, 2001. ■

Table 1. Water type equivalents in the old and new systems.

New water types	Old water types
Type "S" – shorelines	Type 1 water
Type "F" – fish	Type 2 and 3 water
Type "N" – non-fish	Type 4 and 5 water

LOGGING TRUCK ACCIDENT CLAIMS NORTHWEST GEOLOGISTS

Dr. Anthony Qamar (62) and Dr. Daniel J. Johnson (46) were killed at about 11:00 am on Tuesday, Oct. 4., 2005, when an apparent equipment failure on a logging truck dumped a load into the path of Johnson's Saturn wagon 13 miles north of Hoquiam on the Olympic Peninsula. The logs crushed the car, which was northbound on U.S. 101. The logging truck was headed southbound when the accident occurred.

Tony and Dan were in the field to recover Global Positioning System (GPS) equipment as part of their research measuring episodic tremor and slip, ongoing deformation caused by the interaction of the Pacific and Juan de Fuca plates.



Tony Qamar recording GPS signals at Quilcine, Wash., in October 1998.

Tony Qamar

Tony earned his Ph.D. at the University of California at Berkeley in 1971. He taught geology at the University of Montana before joining the faculty at the University of Washington in 1983. At UW, Tony was a Research Associate Professor in the Earth and Space Science Department and co-principal

investigator for the Pacific Northwest Seismograph Network (PNSN). He also served as the Washington State Seismologist.

Tony was an early leader doing geodetic measurements in Washington with GPS technology. In cooperation with the Pacific Geoscience Centre in Canada, he installed one of the early GPS "tracking" instruments at Neah Bay. Collaboration with scientists at Central Washington University and others resulted in the establishment of the Pacific Northwest Geodetic Array (PANGA).

Tony was highly involved with the recent Mount St. Helens activity, contributing significant new data processing procedures and visual display techniques.

Dan Johnson

Dan Johnson was a Research Professor at the University of Puget Sound. While still an undergraduate at UPS, Dan became a field assistant at the USGS Cascades Volcano Observatory (CVO). From 1981 to 1986, he served as a member the CVO ground deformation group, where he began using gravity changes to study volcanic processes and developed new techniques for making very precise gravity measurements.

Dan earned his Ph.D. from the University of Hawaii in 1989. In his thesis research, he used gravity changes and surface deformation data to model the magma storage system beneath Kilauea and the larger rift system beneath the island of Hawaii.

Later Dan became expert in using GPS to measure ground-surface displacements caused by tectonic processes. In the early 90s, he worked with UNAVCO to conduct



Dan Johnson in Halemaumau Crater of Kilauea Volcano, Hawaii (2003)

GPS field studies in Indonesia, the Galapagos, and other exotic places. In 1996, he took a position at Central Washington University (CWU) to work on NASA-funded GPS research in the Pacific Northwest. At CWU Dan was a major contributor to pioneering GPS studies of ground deformation caused by North American/Juan de Fuca plate interaction, which led to the discovery of "slow earthquakes", now better known as episodic tremor and slip. His other work in progress included an NSF-funded gravity change study of the 20-mile-diameter growing bulge at the Three Sisters volcanic center, and a study on Kilauea that has identified a new and surprisingly shallow, active magma chamber.

For more information, see: <http://earthweb.ess.washington.edu/lnk/tony/>, http://www.pnsn.org/NEWS/PRESS_RELEASES/TONY_QAMAR.html, http://seattletimes.nwsource.com/html/localnews/2002542720_qamarobit06.html, http://seattlepi.nwsource.com/local/243579_scientists06.html, http://thedaily.washington.edu/news.lasso?-data+base=DailyWebSQL&-table=Articles&-response=newspage.lasso&-keyField=__Record_ID__&-keyValue=13856&-search, http://www.king5.com/localnews/stories/NW_100505WABloggingvictimsLJ.c4b33924.html. ■

ENGINEERING GEOLOGIST SIG SCHWARZ DIES AT 77

Geologist and geophysicist Sigmund (Sig) D. Schwarz passed away Oct. 4 in Kirkland, Wash., at the age of 77. Sig began his professional career as a geologist with the Oregon State Highway Department. In the 1950s, Sig and his colleague Boyd Bush pioneered the development of geophysical exploration techniques for highway locations, bridge foundations, landslides and blast vibration studies. They founded Geo-Recon of Oregon, Ltd., an innovative geophysical exploration company.

In 1958, Sig moved to the Seattle area and Geo-Recon became a subsidiary of Shannon & Wilson, Inc. Sig was a principal and senior geologist/geophysicist with Shannon & Wilson until 1979. He was a

private consultant at S.D. Schwarz & Associates, Inc., in Kenmore, Wash., until his retirement to Astoria, Ore., in 2002.

He conducted more than 1000 geophysical projects using land, marine, borehole, tunnel and airborne remote sensing techniques. This work was associated with site investigations for many major projects, including more than 100 dam sites and 20 nuclear power plant sites. The projects included site studies in North, Central and South America, the Marshall and Philippine Islands, and Thailand.

Sig was a founding member of the Washington State section of the Association of Engineering Geologists (AEG) and a fellow of the Geological Society of America. ■



DGER NEWS

Volume 2, Number 4

Published four times a year by the Washington Division of Geology and Earth Resources (DGER).

State Geologist
Ron Teissere

Assistant State Geologist
David K. Norman

MAILING ADDRESS

Washington Division of Geology and Earth Resources
PO Box 47007; Olympia, WA 98504-7007

Phone: (360) 902-1450; Fax: (360) 902-1785

E-mail: geology@wadnr.gov

Website: <http://www.dnr.wa.gov/geology/>