



Smart-Phone Technology Gives River Managers More Flexibility & Protects Salmon

NEW FIELD OFFICE CHIEF FOR UPPER COLUMBIA



USGS personnel remove an accelerometer from the Cedar River near Maple Valley, August 2011, using shovels and a clear-bottom box to locate the accelerometer. USGS photo.



Kevin Wright has been selected to lead the Upper Columbia field office, based in Spokane. Kevin graduated in 1992 from Spokane Community College with a AAS in Water Resources Technologies. His career with USGS started that year with the USGS California Water Science Center, where he quickly became a leader and instructor in new instrumentation installations and troubleshooting. Wright has served as chair of the USGS Western Region Technician Advisory Committee. In 2008, Wright accepted the position of field office chief of the Mid-Columbia Field Office, which operates and maintains gaging stations in southeast Washington and Northeast Oregon. Wright coordinated the move of the field office from Pasco to Kennewick. Contact him at kswright@usgs.gov

USGS scientists took high-tech sensors typically found in devices such as smart phones and embedded them into a new type of equipment to monitor riverbed movements that can help protect spawning habitat for endangered salmon.

Developed in cooperation with Seattle Public Utilities for the Cedar River, the new method is published in the *Journal of Hydrology*. The article (<http://dx.doi.org/10.1016/j.jhydrol.2013.05.012>) by USGS hydrologists Andy Gendaszek, Chris Magirl, Christiana Czuba, and Chris Konrad was recognized as one of the “Top 25 Hottest Articles” in the *Journal of Hydrology* between April and June 2013 by Elsevier.

Seattle Public Utilities manages the Cedar River for about 70 percent of Seattle’s drinking water, limited flood control, and to provide beneficial conditions for instream resources including spawning habitat for several species of salmon and trout. During spawning, female fish dig depressions in the gravel, called “redds,” where they lay their eggs to incubate and hatch. Several species lay eggs around the fall-winter flood season. To protect the water supply and endangered Chinook salmon, steelhead trout, bull trout and 80 other species, the City of Seattle is implementing the 50-year, Cedar River Watershed Habitat Conservation Plan. As part of the plan, Seattle works with the interagency Cedar River Instream Flow Commission to provide beneficial stream flows in the 35 miles of river downstream of Chester Morse Reservoir.

High-tech sensors called “accelerometers” are used in smart phones, for example, to detect a change in phone movement, such as turning it to get a wider view. Scientists took accelerometers, coupled with data-logging circuits, and placed them in tubes that were then buried in the Cedar River’s gravel in 26 salmon-spawning locations, at about the same depth in the gravel as salmon bury their eggs. During the 2010-11 flood season, when Cedar River high flows began moving gravel, the accelerometers

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SCIENCE SEMINAR SERIES: New for 2014

3/5/14: Contaminants of Emerging Concern in Puget Sound: A Comparison of Spatial and Temporal Levels and Occurrence. Justin Miller-Schulze, Center for Urban Waters, University of Washington, Tacoma. Abstract: <http://on.doi.gov/1igmp43>

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tilted as the river moved them, too. The accelerometers automatically recorded the time of tilt, which scientists could relate to how much flow was in the river then, based on recorded USGS streamflow data.

RECENT PUBLICATIONS

- Konrad, Christopher, and Sevier, Maria, 2013, **Physiographic and land cover attributes of the Puget Lowland and the active streamflow gaging network, Puget Sound Basin, Washington**: U.S. Geological Survey Data Series 815, <http://dx.doi.org/10.3133/ds815>.
- Johnson, K.H., 2014, **Effect of simulated tree canopy removal on a municipal well-field in the Puget Sound aquifer system, Thurston County, Washington**: U.S. Geological Survey Open-File Report 2013-1291, 32 p., <http://dx.doi.org/10.3133/ofr20131291>.
- Gendaszek, A.S., and Opatz, C.C., 2013, **Thermal profiles for reaches of Snee-Oosh and Fornsby Creeks, Swinomish Indian Reservation, northwestern Washington, July 2013**: U.S. Geological Survey Data Series 807, 6 p., <http://dx.doi.org/10.3133/ds807>.
- Jones, J.L., and Johnson, K.H., 2013, **Transient calibration of a groundwater-flow model of Chimacum Creek Basin and vicinity, Jefferson County, Washington: A supplement to Scientific Investigations Report 2013-5160**: U.S. Geological Survey Open-File Report 2013-1258, 44 p., <http://dx.doi.org/10.3133/ofr20131258>.
- Lane, R.C., Julich, R.J., and Justin, G.B., 2013, **Hydrographs showing groundwater levels for selected wells in the Puyallup River watershed and vicinity, Pierce and King Counties, Washington**: U.S. Geological Survey Data Series 791, <http://pubs.usgs.gov/ds/791/>.
- Jones, J.L., Johnson, K.H., and Frans, L.M., 2013, **Numerical simulation of the groundwater-flow system in Chimacum Creek Basin and vicinity, Jefferson County, Washington**: U.S. Geological Survey Scientific Investigations Report 2013-5160, 80 p., <http://pubs.usgs.gov/sir/2013/5160/>.
- Savoca, M.E., Senay, G.B., Maupin, M.A., Kenny, J.F., and Perry, C.A., 2013, **Actual evapotranspiration modeling using the operational Simplified Surface Energy Balance (SSEBop) approach**: U.S. Geological Survey Scientific Investigations Report 2013-5126, 16 p. <http://pubs.usgs.gov/sir/2013/5126/>
- Paulson, A.J., Conn, K.E., and DeWild, J.F., 2013, **Improved estimates of filtered total mercury loadings and total mercury concentrations of solid from potential sources to Sinclair Inlet, Kitsap County, Washington**: U.S. Geological Survey Scientific Investigations Report 2013-5081, 36 p. <http://pubs.usgs.gov/sir/2013/5081/>
- Gendaszek, A.S., Magirl, C.S., Czuba, C.R., and Konrad, C.P., 2013, **The timing of scour and fill in a gravel-bedded river measured with buried accelerometers**: Journal of Hydrology, v. 495, p. 186-196. <http://bit.ly/14bN64v>, <http://dx.doi.org/10.1016/j.jhydrol.2013.05.012>
- Kahle, S.C., Olsen, T.D., and Fasser, E.T., 2013, **Hydrogeology of the Little Spokane River Basin, Spokane, Stevens, and Pend Oreille Counties, Washington**: U.S. Geological Survey Scientific Investigations Report 2013-5124, 52 p. <http://pubs.usgs.gov/sir/2013/5124/>

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5/14/14: A Comparison of Emergency Signaling Devices for Boaters. Sandy Williamson, USGS retired.

5/28/14: 3D Flow Measurements of River Turbulent Flow Structures. Alex Sukhodolov, IGB--Leibniz Inst. of Freshwater Ecology and Inland Fisheries.

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QUICK LINKS

Statewide Streamflow Table:

<http://on.doi.gov/hDEq>

Real-Time Streamflow Map:

<http://on.doi.gov/XuVQyM>

Washington StreamStats (streamflow statistics for ungaged sites):

<http://on.doi.gov/SY3aTO>

River flows in the past 28 days:

<http://bit.ly/Y94Afi>

Real-time water temperatures:

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