

Chehalis Basin Flood Warning System Improvements

NATURAL RESOURCES CONSERVATION SERVICE

NEEDS ASSESSMENT MEETING MINUTES (phone interview)

Date: 1/7/2010

Location: Phone Interview

Present:

Jon Lea, NRCS, Oregon/Washington Snow Survey Manager, 503-414-3267
Greg Dutson, Engineered Monitoring Solutions

Discussion Items:

Jon's group coordinates the construction, maintenance, and operation of the SNOTEL sites in Washington, Oregon and northern California.

NRCS does not have a SNOTEL site within the upper Chehalis River Basin. A SNOTEL site in Boisfort Peak area would be a good addition to their network.

A typical SNOTEL site consists of instrument shelter, rocket style precipitation gage, snow pillow, solar panel, and antenna for telemetry. Meteor burst transmissions (41 MHz) are used for telemetry

Data from the site is collected hourly and transmitted to their Kansas City office where it is disseminated to the regional offices and also posted to the internet via their hardened web host. Their hardened web host includes a failover network and has >99% uptime with maximum down time being 2-3 minutes per outage. All data is transmitted in the Standard Hydrologic Encoded Format (SHEF) and is used by the National Weather Service River forecasting office.

All SNOTEL sites are constructed and maintained by the NRCS through a Cooperative Agreement with a sponsoring organization. Typical costs for the construction of the site are approximately \$25,000 depending on the site location and land ownership (public or private) and require a maintenance fee of \$3,000 to maintain. Site development and construction is typically a 12-18 month process.

Whatcom County and Pierce County have both installed SNOTEL sites at the upper end of drainage basins and have been very pleased with the increased ability to determine flood impacts from snow melt.

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NATIONAL WEATHER SERVICE – NORTHWEST RIVER FORECAST CENTER

NEEDS ASSESSMENT MEETING MINUTES (phone interview)

Date: 1/26/2010

Location: Phone Interview

Present:

Harold Opitz, Hydrologist in Charge, NW River Forecast Center, 206-526-6095 x228
Greg Dutson, Engineered Monitoring Solutions

Discussion Items:

Harold's group is responsible for creating and maintaining the river forecast model used by the National Weather Service (NWS) River Forecasting Center (RFC).

The model used by the RFC is a Conceptual Soil Moisture Model that produces forecasts for 9 or 10 location points. Currently, the number of forecast points for the model is limited by the staff resources he has available to work on the model.

Harold indicated that they would consider adjusting (relocating) some of their forecast points to other mainstem locations as long as the proposed locations had 8-10 years of validated flow data. They have been asked by agencies to move forecasting locations in the past but have been reluctant to do so because of the perceived unstable funding of the new gaging station location.

He suggested adding flow to the prospective locations and coming back the RFC once the historical data is available. Additional data points are always useful and he would like to know as soon as additional data is available.

Harold suggested talking to Brent Bower at the NWS Seattle Weather Forecast Office for information regarding what types of data and locations would be useful for their work.

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NATIONAL WEATHER SERVICE – SEATTLE WEATHER FORECAST OFFICE

NEEDS ASSESSMENT MEETING MINUTES (phone interview)

Date: 1/26/2010

Location: Phone Interview

Present:

J. Brent Bower, Hydrologic Program Manager/Hydrometeorologist, Seattle Weather Forecast Office, (206) 526-6095 x 228
Greg Dutson, Engineered Monitoring Solutions

Discussion Items:

Brent's group is responsible for producing weather forecasts for the western Washington region. These include a daily forecast discussion and event-based discussions. The event based discussions include a 3-day Outlook, a 1 to 2 day Watch, and flood Warning messages. When forecasts indicate severe weather or incoming storms, the NWS conducts webinars or conference calls to emergency personnel in the area. All forecast and climate related data is presented on the NOAA website at: <http://www.wrh.noaa.gov/sew/>

Brent identified a number of areas where additional precipitation and weather data would help to fill in gaps in their data. Additional automated precipitation gages would greatly help to further refine their forecasting models resulting in better forecasting capabilities in those areas. Brent faxed a map to us showing the locations where climate data is desired.

Weyerhaeuser Precipitation Gages

Brent indicated that there are three precipitation gages currently owned and operated by Weyerhaeuser Company that would be very helpful to automate and add to the NWS dataset. He suggested contacting Maryanne Reiter at Weyerhaeuser regarding automating the Brooklyn, Rock Creek, and Raccoon Creek gages.

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TRANSALTA CORPORATION – SKOOKUMCHUCK DAM PROJECT

NEEDS ASSESSMENT MEETING MINUTES (phone interview)

Date: 2/4/2010

Location: Phone interview

Present:

Larry Webster, Skookumchuck Dam Operations Supervisor, 360-330-2320
Greg Dutson, Engineered Monitoring Solutions

Discussion Items:

Larry is the point of contact for issues related to sharing data from the Skookumchuck Dam project.

The dam currently has automated sensors for measurements such as valve positions, water levels etc. The data is transferred to the powerplant at Centralia via a wireless radio link.

During flood events, emergency managers call the TransAlta office, or in some cases, the operators at the dam for water levels etc. at the project.

Larry indicated that he did not feel there would be a problem supplying the data to the Flood Authority via an automated data transfer. If there is a security issue with sharing the data via a network connection then the Flood Authority may have to investigate installing a new reservoir level sensor and telemetry at the dam for their own use.

Larry will discuss the possible approaches and get back to the Flood Authority with a decision.

On 2/4/09, an email was sent to Larry outlining the possible approaches for sharing the data or installing a new sensor and telemetry.

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U.S. GEOLOGICAL SURVEY - WASHINGTON WATER SCIENCE CENTER

NEEDS ASSESSMENT MEETING MINUTES (phone interview)

Date: 1/21/2010

Location: Phone interview and email correspondence

Present:

Robert (Bob) Kimbrough, Assistant Director, (253) 552-1608
Greg Dutson, Engineered Monitoring Solutions

Discussion Items:

Bob is responsible for the construction and maintenance of the USGS gaging stations in the Chehalis River area. He is stationed in the Tacoma office.

Precipitation Gage Improvements:

The Satsop River near Satsop gage (12035000) has no suitable location for a precipitation gage, as an alternative, he recommends installing the precipitation gage at Wynoochee River above Black Creek (12037400), located about 8 miles west of the Satsop gage. This would run about \$1,800 and would have an annual operation cost of \$2,140.

Wynoochee River near Grisdale (12035400). He recommends using the existing precipitation gage at Wynoochee Lake, located about 0.5 miles upstream.

To add precipitation to the Skookumchuck River near Vail (12025700) site would be \$1,800. Reoccurring annual operation cost and posting of real-time data on the Web would be \$2,140.

Adding Flow Ratings to Existing Stations:

Chehalis River at WWTP (12025100). He does not recommend converting this station to report discharge. This particular stretch of the river is unsuitable for obtaining high-flow discharge measurements because of the large amount of water flowing out of the river banks at high stages. The flow results would not be meaningful.

Chehalis River at Centralia (12025500). This station is currently owned and operated by the National Weather Service. Bob indicates that the NWS has expressed interest in having USGS assume operation of the gage, however, funding has not yet been identified. To convert this station to report discharge, he recommends major improvements to existing gage instrumentation. The cost for the gage improvements would be \$12,000. The recurring annual costs would be \$16,870. It is preferable to have

AC power at this site. If it does not have AC power, there would be an additional cost for having a contractor run power to the gage.

Chehalis River near Adna (12021800). To convert this station to report discharge, a bank-operated cableway would need to be installed enabling USGS personnel to obtain high-flow discharge measurements. The cost to install the cableway would be about \$30,000 - \$50,000

Upgrading The Montesano Site Stage Measurements To Account For Tidal Influence
Since this reach of the river is affected by tides, traditional streamgaging techniques cannot be applied. Rather than just relating discharge to river stage, discharge would be related to velocity and area. Hydroacoustic technology is used to obtain velocity readings in the river. Acoustic Doppler Profilers are submerged in the water and typically mounted on the river bank or on a pylon. Acoustic devices are relatively expensive and acoustic sites typically cost more to operate. Converting this site to report discharge includes installing an acoustic profiler and constructing a walk-in gage house with elevated pedestal foundation. The installation costs would be around \$40,000 with an annual costs of \$22,500 to operate the station and post the data to the website.

Improvement for the Stream Gage at Doty:

Chehalis River near Doty (12020000). Throughout its 70 year history, this gage has typically performed very well. An exception was in December 2007 when the river rose 25 feet and flooded out the electronic instrumentation in the gage house. As a result the gage house was relocated to higher ground in 2008. Additionally, the manned cableway at this site (used to obtain high-flow discharge measurements) was washed out in December 2007. A new cableway was recently purchased using federal stimulus funds, however, the USGS is seeking \$10,000 to install the cableway during the summer of 2010.

Typical Costs For New Stage-Only Or Stage/Flow Station

The cost for installing new stage-only sites typically ranges from \$15,000-\$20,000. Stage/flow sites typically range from \$17,000-\$24,000, assuming a structure like a bridge exists for obtaining high-flow discharge measurements. If no suitable structure exists nearby, than a cableway would need to be installed. Cableways range from \$30,000 - \$50,000. The cableway cost is in addition to the \$17,000 - \$24,000.

Annual costs (for the current federal fiscal year) are:

Daily discharge with real-time data on the web; \$16,870 (year-round), \$10,800 (seasonal).

Stage-only with real-time stage on the web; \$6,870 (year round)

Precipitation with real-time data on the web; \$2,140 (year-round)

These costs typically increase about 3-4% per year:

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WEYERHAEUSER TIMBERLAND OPERATIONS Springfield Oregon Office

NEEDS ASSESSMENT MEETING MINUTES (phone interview)

Date: 1/26/2010

Location: Initial phone interview and subsequent emails

Present:

Maryanne Reiter, Hydrologist, Weyerhaeuser Timberland Operations, 541-746-2511
Greg Dutson, Engineered Monitoring Solutions

Discussion Items:

Maryanne is a hydrologist for Weyerhaeuser involved with the precipitation monitoring for their lands in Oregon and Washington. She is closely involved with the sites in the Chehalis River basin area.

She indicated that the Brooklyn, Rock Creek, and Racoon Creek are automated using a tipping bucket rain gage and Onset Hobo dataloggers. There is no telemetry to automatically download the data so each site is visited every 2 to 3 weeks to download the data.

Weyerhaeuser also owns the property at Boisfort Peak and would be interested in working with the Flood Authority and the NRCS for developing a SnoTel site at this location as well.

Maryanne thought that they own property in the area where the other new precip sites are needed as well. They already have a manually read precip station located in the upper Newaukum basin that could be automated as well.

Weyerhaeuser is very interested in adding telemetry to these sites to allow for real-time automated download of the weather data. She will be the initial point of contact for coordinating the effort and working through their internal process for site access issues.

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WASHINGTON DEPARTMENT OF TRANSPORTATION – SW REGION

NEEDS ASSESSMENT MEETING MINUTES (phone interview)

Date: 1/13/2010

Location: Phone Interview

Present:

Rick Sjolander, SW Region Supervisor, (360) 905-2020
Greg Dutson, Engineered Monitoring Solutions

Discussion Items:

Rick's jurisdiction runs from Oregon border along I-5 corridor to north end of Lewis County. John Nesbitt (360) 357-2612 from the Olympic region is responsible for coordinating road closures along Highway 12.

WSDOT has a representative on the Lewis County EOC to coordinate road closures with the County during storm events.

The road closure information on the WSDOT web site is initiated by the State Secretary of Transportation as soon as the decision to close the road is made. The State Secretary has the final authorization on any road closure.

Road closure information is posted to the WSDOT website within 5-10 minutes of the final authorization to close the road.

Linking to the information on the WSDOT website will provide the most timely road closure reports for the general public and the Flood Authority.