COLUMBIA RIVER TREATY

HYDROMETEOROLOGICAL COMMITTEE

2008

ANNUAL

REPORT

Columbia River near Mica

FEBRUARY 2009

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Introduction

The Columbia River Treaty Hydrometeorological Committee (CRTHC) was established in September 1968 by the Entities. The CRTHC is responsible for planning and monitoring the operation of data facilities in accord with the Columbia River Treaty (CRT). It also assists the Entities in matters related to hydrometeorological and water supply forecasting.

This report summarizes CRTHC activities during the 2008 Water Year (October 1, 2007 – September 30, 2008). The Annual Report focuses on:

- action taken on proposed changes to the hydrometeorological network
- CRT communications and data storage systems
- data exchange requirements
- forecasting procedures
- miscellaneous activities of the CRTHC

The CRTHC Annual Reports has two parts; the first part reports on activities for the current Water Year; and the second part consists of more general background information that is organized into a Supplemental Report. The Supplemental Report contains general information that does not typically

change from year to year. Appendices in the 2008 supplemental document include:

- Appendix A – Introduction to the CRTHC terms of reference
- Appendix B – Terms of reference for the CRTHC
- Appendix C – Process for reviewing hydrometeorological data networks
- Appendix D – List of contributors of hydrometeorological data
- Appendix E – Data communication and storage systems
- Appendix F – Data exchange reports
- Appendix G – Treaty studies, models, and forecast requirements

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See 2008 Supplemental Report for a list of Acronyms used in this report

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2008 Annual Summary

The Columbia River Treaty Hydrometeorological Committee (CRTHC) was established in September 1968 by the Entities and is responsible for planning and monitoring the operation of data facilities in accord with the Treaty and otherwise assisting the Entities as needed. The CRTHC consists of four members as follows:

UNITED STATES SECTION	CANADIAN SECTION
Brian P. Kuepper*, BPA Co-Chair	Stephanie Smith, B.C. Hydro, Chair
Peter Brooks, USACE Co-Chair	Frank Weber*, B.C. Hydro, Member

* There were two changes in the U.S. Membership in 2008. Robert Allerman replaced Nancy Stephan as BPA Co-Chair on March 2, 2008 for a six-month period, who was subsequently replaced by Brian Kuepper effective September 15, 2008

The CRTHC met twice in the 2007-2008 water year. The first meeting took place via teleconference August 7, 2008. The second meeting took place November 3, 2008 in the BC Hydro offices in Burnaby.

The CRTHC completed the Annual Reports for 2006 and 2007 and submitted them to the Columbia River Operating Committee (CRTOC) in the fall of 2008.

Stations

The CRTHC dealt with a number of station closure notifications in 2008.

Environment Canada notified BC Hydro of the termination of contracts for two climate stations in the Columbia River Basin in 2008, neither of which is a Treaty station. The Grand Forks observer retired after 50 years of service as a climate observer, and the Wasa observer decided to continue to operate the station on a voluntary basis for the time being.

The Natural Resource Conservation Service (NRCS) in Washington State completed a review of their Snotel network and notified BPA of the potential for nine snow station closures in Washington and Oregon. Currently NRCS is consulting with water management agencies in the region, including the members of CRTHC to determine whether stations should continue to be operated. BC Hydro is not impacted by the potential closures, and BPA is following up.

The Seattle office of the Corps, BPA, and BC Hydro are coordinating to install two new water temperature sensors in the Kootenay River at Fort Steele and Elk River at Fernie hydrometric gauging stations to aid in water temperature modeling for Koocanusa reservoir. The Corps is providing the sensors, BPA will pay for the operating costs, and BC Hydro will arrange for installation and maintenance by Water Survey of Canada at the sites. The probes will be installed in the spring of 2009.

The CRTHC process for reviewing proposed changes to the operation of stations within the hydrometeorological network is described in Appendix C of the 2008 Supplemental Report. The process is intended to ensure that changes made to the network do not negatively affect the monitoring, planning, and operations of Treaty facilities. Schedule 1 summarizes the CRTHC's response to changes to stations of the CRT hydrometeorological network in 2008.

Communication And Data Storage Systems

The Columbia Basin Telecommunications (CBT) system, other communication systems, and the Columbia River Operational Hydromet System (CROHMS) are described in Appendix E of the 2008 Supplemental Report. The CBT system, operated by the US Army Corps of Engineers (USACE) in Portland, is the primary communications system for transmitting project operating data and instructions among Columbia River projects. Agencies, including the Northwest River Forecast Center (NWRFC), USACE, and BC Hydro, also use other communication systems to exchange data. CROHMS is the central system for collecting and re-distributing hydrometeorological data used to support the operations of Treaty projects. There were no changes in the data communications or storage systems in 2008.

Data Exchange

Appendix F of the 2008 Supplemental Report describes current data exchange procedures. Data exchanged among operational projects and entity agencies may be categorized according to the type of data and the frequency of transmission. Types of data include project operating information, weather and streamflows , forecasts, and reports and messages. The frequency of transmission may be hourly, daily, or monthly.

BC Hydro adopted a new routing procedure for calculating the inflows to Kootenay Lake by implementing a 30-hour delay in the outflows from Libby Dam effective March 26, 2008. Previously there was no delay assumed for the travel time for water released from Libby, which caused inaccuracies in the Kootenay Lake inflow calculations. The new routing delay significantly improves the inflow calculation for Kootenay Lake. The change was implemented during a time when Libby discharges were constant.

In addition to the standard reporting, there were additional actions and issues during 2008. These are summarized as follows:

- A BCH CROHMS program which sends data to CROHMS has become unsupportable by their IT department. BCH will re-write their program in a more supportable programming structure in February 2009, and will investigate incorporating the whole functionality into their new data management system in 2010.

- BCH noted a change to a previous Revelstoke h/k value despite no apparent changes to the contributing data. BCH investigated the programming logic and found no errors, so is monitoring data closely to see if the discrepancy re-occurs

Forecasting

There were no changes to any of the forecasting procedures in 2008. There were two further updates to POP for the procedures updated last year. The first update was a correction to the ksfd values for errors and hedges listed in Table 1 for the June forecast for Dworshak. The second update was to add Arrow Local volume distribution factors to Table 2 in POP. Both updates were approved by CRTOC and implemented into POP.

The CRTHC is involved with various Treaty planning studies and models from time to time. These studies and models and associated forecasting requirements are described in Appendix G of the 2008 Supplement Report.

POSSIBLE LONG TERM FORECAST IMPROVEMENTS

The CRTHC discussed possible investments into the hydrometeorological forecasting network. Possible changes include adding addition automated snotel sites into regions that are relatively sparse with existing sites or in regions that might be enhanced with stations at varying elevations. Possible locations include the Upper Columbia and Upper Kootenay regions among others. Other ideas include upgrading existing sites, converting snow courses into automated sites, reestablishing sites that have closed and upgrading communications are

other potential improvements. The CRTHC recognizes that more automated sites do not necessarily result in an automatic improvement in forecasting. Forecasting volumes and streamflows is a complex process involving qualitative as well as quantitative analysis. The CRTHC is pursuing a network review and evaluate possible forecasting improvements including a sense of cost-benefit associated with investments. The CRTHC will also explore possible funding mechanisms including a partnership in funding between the U.S and BC Hydro.

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Schedule 1 Changes to the hydrometeorological network in 2008

The following pages document some of the station issues for the Columbia River Treaty Hydrometeorological Network that were dealt with by the CRTHC in Water Year 2008. All of the stations listed below are in Canada. There were no issues reported for Treaty stations in the U.S.

- **Morrissey Ridge snow pillow** was damaged by elk in August. A special service trip was arranged to repair the station and the snow pillow was operational in October in time for the snow season.
- **Grand Forks climate station** closed when the observer retired after 50 years of service. The station was not a Treaty station and will not be replaced.
- **Wasa climate station** observer is no longer under contract with Environment Canada but as of January 2009 was still submitting observations on a voluntary basis. The station is not a Treaty station. It was once considered for inclusion to the Libby forecast procedures, but the uncertain future of the station eliminates it as a possibility.

Action Items

The CRTHC was successful in working through the Action Item tasks to trim the number of total action items from 57 to an active list of 12. The following action items remain active:

Table 2: Active Action Items

Meeting Source	Description	Notes/Updates	Assigned To	Due Date	Completed
57.2.c.2	Explore options to clarify HGH storage tables used for various uses and modeling.	Peter to follow up. Mtg 59: has this been done? **USBR trying to consolidate and standardize to single table (with and without storage) for TSR**	Peter Brooks		refer back to CRTOC
57.3.a	Set up meeting with RFC, COE, BPA and USGS to discuss USGS rating table issue	Meeting delayed due to the fact the USGS to continue providing data through 2006. Still need to meet on this issue. Mtg 59: Deferred to Fall 2006 **Mtg 60: USGS Ratings Depot Live. Still a few issues to resolve around timing of updates.**	Nancy Stephan	Fall 2006	Brian K to check if done
58.5.c	Peter to pursue putting electronic versions of forecast reports on FTP site	Mtg 59.1.a: Peter to assign someone to give access details to BPA / BCH	Peter Brooks		
59.4.a	Stephanie to provide updated list of Environment Canada reference climate stations and core temperature and precip. Stations. Will cross-reference with Treaty station list. Will also include indication if stations are potentially vulnerable		Stephanie Smith	2009	
60.4.b	Establish a data working group to address ongoing data issues, document and improve data transfer protocols, and coordinate communication around changes and updates to data management systems.	NWS reps will be Harold Opitz and Kevin Berghoff	All - with Corps as lead agency.	revisit in 2009	
60.4.c	Disaster Recovery plans - Stephanie to determine what, if anything, BC Hydro will do about data recovery in the event of a major system interruption		Stephanie Smith	By meeting 62	
61.2	Streamflow workshop for Fall 2008. Peter has draft requirements for BiOp	changed to Volume forecast workshop in 09	Nancy & Randy	early 2009	
61.4.b	Potential SNOTEL closures in Pac NW. Follow up with RFC. Keep updated by NRCS (Jon Lea)	BCH has no issue with potential station closures. BPA reviewed potebtial closure listing and sent response back to Rashawn Tama-Sweet-NRCS on Dec. 29. BPA requested that the NRCS maintain the existing snow courses	Brian		
62.7.b	Kootenay Lake Freshet declaration methodology - form technical committee to make a recommendation of method prior to Spring 09 Freshet. Present draft recommendation at the PEB meeting Feb 25.		Frank Weber, Randy Wortman	Draft by end Jan 09	
62.7.c	Pacific NW RFC briefing on changes to forecast procedures. BPA to keep BCH informed	Harold Opitz - NWS, met with BPA forecasting staff on Nov. 19. Harold presented a status report on the NWS implementation of their new forecasting system, FEWS (will elaborate). Brian to followup with a second update to BPA-PGPW as well as BCH and COE interested	Brian Kuepper	winter 09	
62.7.f	CRTHMC to collaberate on respective climate change studies. Identify gaps and overlap between methodologies. Inform CRTOC of collaberation.		Doug Smith / Doug McCollor (?) and Nancy Stephan		
62.8.c	Include action items in annual reports starting with 2008. Consider adding station performance stats and forecest verification to 2009 report		Stephanie Smith to send completed 2008 actions to Brian		