INTERAGENCY HYDROLOGY COMMITTEE FOR ALASKA
Fall 2010 Meeting Minutes
October 26 - 27, 2010
USGS Conference Room
4230 University Drive, Anchorage

Minutes by MWK

Attendees:

Paul Berger	National Park Service
Lee Koss	Bureau of Land Management
Greg Barrett	Bureau of Land Management, GIS
Cory Black	Bureau of Land Management, GIS
Rick McClure	Natural Resources Conservation Service
Steve Frenzel	U.S. Geological Survey
Dave Meyer	U.S. Geological Survey
Janet Curran	U.S. Geological Survey
Karen Hanson	U.S. Geological Survey (WRD), Utah District
Sheryl Boyack	U.S. Geological Survey (WRD), Utah District
Tom Sturn	U.S. Geological Survey, Menlo Park
John Trawicki	U.S. Fish and Wildlife Service
Bill Rice	U.S. Fish and Wildlife Service
Crane Johnson	U.S. Army Corps of Engineers
John Zufelt	U.S. Army Cold Regions Research and Engineering Laboratory
Larry Rundquist	National Oceanic and Atmospheric Administration, National Weather Service, Alaska Pacific River Forecast Center
Scott Lindsey	National Oceanic and Atmospheric Administration, National Weather Service, Alaska Pacific River Forecast Center
Eric Rothwell	National Oceanic and Atmospheric Administration, National Marine Fisheries Service
Jessica Cherry	University of Alaska Fairbanks
William Schnabel	University of Alaska Fairbanks
Charlie Palmer	Alaska Department of Environmental Conservation, Environmental Health Drinking Water Program
Roy Ireland	Alaska Department of Natural Resources, Division of Mining, Land, and Water
Michael Knapp	Alaska Department of Transportation & Public Facilities

Special Guests:

Greg Balogh	D.O.I. Arctic Landscape Conservation Center
Mark Shasby	D.O.I. Climate Change Science Center

Action Items:

- John Trawicki will seek a formal cost proposal for scanning and indexing of IHCA documents through the Alaska Regional Library and Information Service (ARLIS).
- Crane Johnson to prepare a Vision Paper on sharing spatial data of hydrologic data sites by all agencies.

- Michael Knapp to query membership on availability to meet in Juneau at the next IHCA meeting (Spring 2011).
- All to provide Lee Koss with agency contact information for NHD/WBD stewardship coordination.

Legislative Updates

Agency Reports: (See attached):

Presentations and discussions:

ARLIS IHCA Records, by John Trawicki.

- John reported that document scanning services by ARLIS staff *may* cost money. Since many of the IHCA member's agencies help to fund ARLIS, we decided to investigate the costs more formally.

Hydrography Stewardship, by Lee Koss and others. We heard about…

- Efforts to link the NHD & WBD.
- The need for coordinated dataset stewardship, update protocols, and communication avenues. Utah reportedly has a successful inter-agency process in play that Alaska might wish to emulate. Dedicated resources from user agencies are required – funding and staff.
- Dataset refinement needs. The USGS Quadrangle Maps reportedly were not developed to official mapping standards. One participant countered that perhaps acquiring better data should precede stewardship efforts.
- Currently a Statewide Digital Mapping Initiative (SDMI) is moving forward and will provide improved topographic data for future NHD and WBD updates.
- <u>ACTION</u>: Everyone should provide Lee Koss contact information for the mapping staff in your agency.

Precipitation Frequency Estimates ("TP47"), by Larry Rundquist. We heard about…

- The status of the project
- Road Weather Information System data having been excluded. Members of IHCA requested information on excluded data sources and data sites that were merged for the analysis.
- NWS and USACE will investigate catchment errors by field verification at an RWIS near Fairbanks.

IHCA Executive Board Changes. The new officers are listed below:

CHAIR – Crane Johnson, USACE
VICE-CHAIR – Michael Knapp, ADOT&PF
SECRETARY – Jessie Cherry, UAF

USGS Stream Gage Studies, by Janet Curran. We heard about…

- Recent calls for updates to the 2003 publications:

1. “Estimating annual high-flow statistics and monthly and seasonal low-flow statistics for ungaged sites on streams in Alaska and conterminous basins in Canada”, Water-Resources Investigations Report 03-4114.
2. “Estimating the magnitude and frequency of peak streamflows for ungaged sites on streams in Alaska and conterminous basins in Canada”, Water-Resources Investigations Report 03-4188.

- Current interest in WRIR 03-4114 as a hydrologic tool for fish passage assessments. The USGS inquired about how the WRIR 03-4114 publication is being used by IHCA members. Proponents of an update need to clarify the purpose and need.
- The proposed schedule for updating WRIR 03-4188 (peak streamflows) is FFY 2012.
- The update(s) would benefit from more gage data, improved basin delineations, and PRISM data.
- USGS is developing a Stream Stats pilot project for the Cook Inlet. A description of Stream Stats can be found here : http://water.usgs.gov/osw/streamstats/

Arctic Landscape Conservation Coop., by Greg Balogh. We heard about…

- The Department of Interior’s LCC initiative to address landscape level changes driven by climate, with a focus on applied science.
- Arctic LCC’s interest in prioritizing data gaps and science needs.
- The role of the Alaska Climate Executive Round Table
- The possible role IHCA could play as collection of Alaska hydrology experts, in lieu of multiple LCC technical committees of the same people.

Localized storm-event analyses for stormwater management, by Bill Rice. We heard about…

- Interest in developing design guidance for stormwater management, perhaps supplemental to DEC’s Alaska Stormwater Guide.
- The possible benefits of method-based design and compliance criteria.
- The need to better define the “design storm” for stormwater volume control measures.

Climate Change Science Centers, by Mark Shasby. We heard about…

- An overview of the Department of Interiors Climate Change Science Centers, and how they relate to the LCCs discussed by Greg Balogh earlier.

General discussion. We heard about…

- The benefits of sharing coordinate-based information on gage locations – meteorological, snow, or stream gages. We discussed the use of Google Earth (.kml, .kmz) and ArcGIS as tools for illustrating the spatial coverage of available Alaska data. “Sensitive infrastructure” concerns were discussed. <u>ACTION</u>: Crane Johnson offered to prepare a 1-2 page Vision Paper on this idea. IHCA will revisit the topic at the next meeting.

INTERAGENCY HYDROLOGY COMMITTEE FOR ALASKA
Fall 2010 Meeting Agenda
October 26 - 27, 2010
USGS Conference Room
4230 University Drive, Anchorage

Tuesday (Oct 26)

10:00 a.m. Opening of Meeting

Agency Representative Identification & Introductions
Additions/Changes to Meeting Agenda

Secretaries Report

On-going Project/Committee Reports

- Federal Legislation/Regulation Update (Trawicki)
- State Legislation/Regulation Update (Prokosch)

Old Business

- Update from ARLIS regarding status of documents provided to be inventoried approximately 6 years ago (Trawicki)
- Update on list of past officers (Klein)
- Update on position paper regarding recommended protocols and procedures for agencies to provide stewardship for the editing and maintaining the Alaska Watershed Boundary Dataset (Koss)

10:30 a.m. New Business

- Statewide HUC watershed delineations and next steps, funding needs (Curran)
- Statewide topography and hydrography layers, where do we go from here (Curran)
- Update on the TP47 precipitation project (Rundquist)

Lunch 12:00 – 1:30

- Update of ungaged stream statistics (Curran/Meyer)
- Discussion of how to fund a localized storm-event analysis for major towns and villages for public use in stormwater/drainage studies (Rice)
- How can IHCA inform and help coordinate hydrologic studies for statewide climate change initiatives and landscape cooperatives (Rice)
- Progress update of fish passage high and low flow requirements (Rice)
- IHCA Meeting schedule and location (Knapp)

Agency Reports (up to 10 minutes per agency.) Highlight important issues and projects in your agency; prepare a summary prior to meeting and bring a minimum of 20 copies for distribution. Send an electronic copy to the Secretary before the meeting.

FEDERAL

U.S. Army Cold Regions Research and Engineering Laboratory (John Zufelt)
U.S. Army Corps of Engineers (Crane Johnson)
U.S.D.A. Forest Service
U.S.D.A. Natural Resources Conservation Service (Rick McClure)
U.S.D.C. National Weather Service (Larry Rundquist)
U.S.D.C. National Marine Fisheries Service (Eric Rothwell)
U.S.D.I. Bureau of Indian Affairs (Keith Kahklen)
U.S.D.I. Bureau of Land Management (Lee Koss)
U.S.D.I. Fish & Wildlife Service (John Trawicki)
U.S.D.I. Geological Survey (Steve Frenzel)
U.S.D.I. National Park Service (Trey Simmons)
U.S. Environmental Protection Agency

STATE

Department of Commerce, Community & Economic Development (Taunnie Boothby)
Department of Environmental Conservation (Charley Palmer)
Department of Fish & Game (Joe Klein)
Department of Military and Veterans Affairs – Division of Homeland Security and Emergency Management or Alaska Army National Guard
Department of Natural Resources (Gary Prokosh)
Department of Transportation & Public Facilities (Mike Knapp)

UNIVERSITY

UAA/ENRI (John Zufelt)
UAF (Jessica Cherry)

Wednesday, October 27

8:30 a.m. – 11:30 a.m. Continuation of agencies reports

Announcements

Meeting Adjournment

USGS Alaska Science Center
FY 2010 Annual Report
Water Resources Office

Hydrologic Conditions

Streamflow in Alaska was unremarkable during Water Year 2010, with only a few exceptions. Winter snowpack ranged from historic lows in parts of the western Yukon to above normal in the Kenai Mountains. Southeast Alaska was near normal. Warm, dry weather across the state in May threatened an early breakup and intense fire season, but the June turned cool and wet. Although breakup was early, very few streams experienced higher than average flow. The significant exception is the streams along the Taylor Highway. Beginning in early July, three storms produced runoff that washed out roads between Chicken and Eagle. As of late October, repairs are still not complete. Fieldwork for indirect measurements at four sites was undertaken between road closures, but two sites remain flagged but un-surveyed at freeze-up.

Twelve new or reactivated gages (mostly crest-stage gages) were installed as part of the Small Streams program, replacing gages with 10 or more years of peak flow record. New gages around the Tower Hill Mine near Livengood, on the freshwater reservoir at Fort Knox, and on the Glacier Fork of Knik River were installed during late summer.

Scientific Accomplishments

Providing streamflow information for the public: The Alaska Science Center Water Resources Office provided real-time streamflow information at 110 sites in 2010. These data are used by the public and resource managers for a variety of needs. The National Weather Service relies on this information to provide timely flood forecasting. Long-term records of streamflow are extremely valuable in understanding effects of climate change on the hydrologic cycle.

Monitoring streambed scour at Alaska bridges: In cooperation with the Alaska Department of Transportation and Public Facilities (ADOT&PF), the USGS monitors streambed scour in real time at 19 bridges in Alaska. Data from sonar equipment located at bridges deemed scour critical are transmitted to the USGS and ADOT&PF during the open-water season. Comparisons of streambed elevation at the bridge piers are made to footing elevations to determine whether the integrity of the pier potentially has been compromised. One bridge, Bridge 339, on the Copper River delta was monitored very closely this summer with multiple soundings made per day during some high-flow conditions when ADOT&PF believed that bridge failure was a real threat. The real-time monitoring and constant communications allowed ADOT&PF to make informed decisions about bridge safety. Multi-dimensional hydraulic models are being developed for specific, scour-critical bridges from bathymetric and velocity data collected during this project. Soundings are made at numerous bridges statewide annually that are not equipped for real-time monitoring. In 2010, an analysis of scour potential at tidally affected bridges was begun.

Understanding bank erosion on the Matanuska River: Bank erosion along the glacial, braided Matanuska River in southcentral Alaska has periodically damaged or destroyed properties and structures for decades. Hydrologists are gaining an understanding of channel processes and variations in bank erodibility as part of an ongoing study to provide a basis for managing areas near such active rivers. Models of river formation, bank material mapping, and historical aerial photo research are guiding development of the project's goal of creating erosion hazard maps. Maps of the extent of the river's braid plain, the distribution of terraces, tributary fans, and other erodible features, and the location of erosion-resistant bedrock banks have proved essential tools for engaging land managers and agency representatives. This work has directly contributed to the Matanuska-Susitna Borough's management plan for the river.

Glaciers and climate in Alaska: The USGS Benchmark Glacier Monitoring Program continued collection of mass balance data at Gulkana and Wolverine Glaciers. Measurements of mass gains and losses describe the state of health of the glaciers making it possible to interpret each glaciers interaction with local climate conditions. A significant re-analysis of the data from Wolverine Glacier was completed in 2010. These revised analyses show strong agreement with geodetic measures of ice volumes measured periodically throughout our long-term monitoring program. Our research shows that both glaciers have undergone mass loss trends for over 100 years since the end of the Little Ice Age, with recent acceleration in mass loss between 30 to 50 percent. This program provides valuable data for understanding global ice volumes, which are required for socio-economic issues including water resources, sea level rise, ocean circulation, and recreation economy. Additional work was begun at Columbia Glacier, a dynamic tidewater glacier where the USGS pioneered glacier studies decades earlier.

Understanding freshwater ecosystems in permafrost dominated landscapes: Ongoing work on beaded stream systems on the Arctic Coastal Plain is aiding the BLM in understanding the functions of these systems in supporting fisheries on the North Slope. Three new streamgages were installed and pressure transducers were sited at lakes in the Yukon Flats area to support inter-disciplinary work conducted in the area for the USGS Climate Effects Network.

Describing water-quality conditions in National Parks: Water-quality data were collected from sites in Denali, Wrangell-St. Elias, Glacier Bay, and Lake Clark National Parks. In Denali National Park, sampling was focused on streams in historically mined drainages in the Kantishna Hills area of the Park. In Wrangell-St. Elias National Park, streams along the McCarthy Road were examined for their physical, chemical, and biological characteristics that define baseline water-quality conditions. A study of mercury concentrations in water, sediment, and biological tissues from streams in Glacier Bay National Park was begun in 2010. A new streamgage with real-time water quality monitoring capability was installed on the Chulitna River in Lake Clark National Park to provide information in an area with extensive mining claims that have yet to be developed.

Understanding groundwater availability and movement in the Matanuska-Susitna Valley: Groundwater interaction with surface water was investigated in detail during 2010. Seepage meters were installed in the streambed of Lucile Creek and synoptic measures of streamflow were made in Lucile Creek and the Little Susitna River to gain understanding on areas of exchange between surface and groundwater as well as to document rates of exchange. These data are instrumental in the development of local scale groundwater flow models that will be produced during the project. Additionally, water temperature is being used to estimate groundwater flux.

Investigating affects of climate change on productivity in the Gulf of Alaska: As part of a multi-center, inter-disciplinary study, changes in the glaciated Copper River basin are being examined to determine the potential effects on productivity. The USGS watershed model, PRMS (Precipitation and Runoff Modeling System), is being modified to account for changing glacier mass as part of this project. This is a key feature that will make the model more applicable to Alaska, and specifically the Copper River basin.

Workshops

Janet Curran presented a workshop on streamflow statistics to the ADOT&PF, Alaska Department of Natural Resources, and US Fish and Wildlife Service on January 29, 2010 in Juneau. The workshop covered the use of USGS software PEAKFQ, and USGS reports containing regional streamflow regression equations as well as the accuracy and limitation of streamflow statistics in Alaska.

Publications (Published 2010) (USGS Author in bold, use format below; includes Journals, Book Chapters, Reports, Theses)

Arp, C.D., Jones, B.M., Whitman, M. Larsen, A., and **Urban, F.E.,** 2010, Lake Temperature and Ice Cover Regimes in the Alaskan Subarctic and Arctic: Integrated Monitoring, Remote Sensing, and Modeling: *Journal of the American Water Resources Association* (JAWRA) 46(4): 777-791. DOI: 10.1111/j.1752-1688.2010.00451.x

Arp, C.D., Jones, B.M., Schmutz, J.A., Urban, F.E., and Jorgenson, Torre, 2010, Two distinct mechanisms of aquatic and terrestrial habitat change along an Alaskan Arctic coastline: *Polar Biology*, DOI 10.1007/s00300-010-0800-5.

Brabets, T.P., and **Conaway, J.S.**, 2009, Geomorphology and river dynamics of the lower Copper River, Alaska: U.S. Geological Survey Scientific Investigations Report 2009-5257, 42 p.

Neal, E.G, Hood, Eran, and Smikrud, Kathy, 2010, Contribution of glacier runoff to freshwater discharge into the Gulf of Alaska: *Geophysical Research Letters*, v. 37, DOI:10.1029/2010GL042385.

West, M.E., Larsen, C.F., Truffer, M., **O'Neel, S.R.**, and LeBlanc, L., 2010, Glacier Microseismicity: *Geology*, v. 38, no. 4, pp. 319-322.

Scientific Presentations (Presentations that have an abstract, other presentations submit under “Outreach”)

Arp, C.D., Curran, J.H., and **McTeague, M.L.,** 2009, Hydrologic regimes of peatlands near Big Lake, Alaska: presented at the Mat-Su Salmon Science and Conservation Symposium, November 18-19, 2009, Wasilla, AK.

Arp, C.D., Whitman, Matthew, **Jones, B.M., and** Grosse, Guido, 2010, Beaded streams morphology, regimes, and feedbacks in a lake-rich, permafrost landscape of the Alaskan Arctic Coastal Plain: presented at the Alaska Section American Water Resources Association annual meeting, March 31- April 2, 2010, Anchorage, AK.

Arp, C.D., Whitman, Matthew, **Jones, B.M., and** Grosse, Guido, 2010, Headwater stream morphology, evolution, and feedbacks in a lake-rich, permafrost landscape of the Alaskan Arctic Coastal Plain in a changing climate: presented at the Fall Meeting of the American Geophysical Union, December 14-18, 2009, San Francisco, CA.

Brabets, T.P., 2010, Application of the USGS multi-dimensional surface water modeling system (MD_SWMS) at bridge 339, Copper River Highway, Alaska: presented at the Alaska Section American Water Resources Association annual meeting, March 31- April 2, 2010, Anchorage, AK.

Conaway, J.S., 2010, Climate signals in streambed elevations of glacial rivers in southcentral Alaska: presented at the Alaska Section American Water Resources Association annual meeting, March 31- April 2, 2010, Anchorage, AK.

Conaway, J.S., and Knapp, M., 2010, Summary of ongoing streambed scour evaluation at tidal bridges in Alaska: presented at the 2010 National Hydraulic Engineering Conference, August 31 – September 3, 2010, Park City, UT.

Conaway, J.S., and **Zimmerman, C.E.,** 2010, Streamflow hydraulics of a Sheefish spawning reach of the Selawik River, Alaska: presented at the Alaska Section American Water Resources Association annual meeting, March 31- April 2, 2010, Anchorage, AK.

Curran, J.H., 2010, Evidence of paleofloods from LIDAR imagery of the Matanuska River, Alaska: presented at the Alaska Section American Water Resources Association annual meeting, March 31- April 2, 2010, Anchorage, AK.

Curran, J.H., and **McTeague, M.L.,** 2009, Braid plains, bedrock, and boxcars—assessing bank erosion hazards along the Matanuska River: presented at the the Mat-Su Salmon Science and Conservation Symposium, November 18-19, 2009, Wasilla, AK.

Frenzel, S.A., 2009, Shallow groundwater in the Matanuska-Susitna Valley: presented at the Mat-Su Salmon Science and Conservation Symposium, November 18-19, 2009, Wasilla, AK.

March, R.S., Van Beusekom, A.E., and **O'Neel, S.R.,** 2009, Assessment of errors in long-term mass balance records from Alaska: presented at the Fall Meeting of the American Geophysical Union, December 14-18, 2009, San Francisco, CA.

McTeague, M.L, and **Curran, J.H.**, 2009, Landscape level historical analysis of braided river braid plain composition, age, and formation, Matanuska River, Alaska: presented at the Mat-Su Salmon Science and Conservation Symposium, November 18-19, 2009, Wasilla, AK.

Kluskiewicz, Dan, **O'Neel, S.R.,** Larsen, C.F., West, Michael, and Walter, Fabian, 2009, Ussing passive seismicity to characterize and quantify glacier dynamics: presented at the Fall Meeting of the American Geophysical Union, December 14-18, 2009, San Francisco, CA.

Larquier, A.M., Loso, M.G., **Sass, L.C.,** MacGregor, J.A., and Larsen, C.F., 2010, Glacial Influences on Water Resources of the Eklutna Basin, Alaska: presented at the Alaska Section American Water Resources Association annual meeting, March 31- April 2, 2010, Anchorage, AK.

Larsen, C.F., Bartholomaus, Tim, **O'Neel, S.R.,** West, Michael, Walter, Fabian, and Kluskiewicz, Dan, 2009, Geophysical investigation of Yahtse Glacier, Alaska, USA: presented at the Fall Meeting of the American Geophysical Union, December 14-18, 2009, San Francisco, CA.

O'Neel, S.R., Van Beusekom, A.E., and **Josberger, E.G.**, 2010, Climate and glacier mass balance components: presented at the U.S. Geological Survey Global Change Conference, March 9-11, 2010, Denver, CO.

O'Neel, S.R., Walter, Fabian, Kluskiewicz, Dan, Pfeffer, W.T., Larsen, C.F., West, Michael, and McNamara, D.E., 2009, Seismic signatures of advancing and retreating tidewater glaciers: presented at the Fall Meeting of the American Geophysical Union, December 14-18, 2009, San Francisco, CA.

Sass, L.C., Loso, M.G., **O'Neel, S.R.,** MacGregor, J.A., Catania, G.A., and Larsen, C.F., 2010, Dynamic controls on Eklutna Glacier mass loss: presented at the Alaska Section American Water Resources Association annual meeting, March 31- April 2, 2010, Anchorage, AK.

Sass, L.C., O'Neel, S.R., Loso, M.G., MacGregor, J.A., Catania, G.A., and Larsen, C.F., 2010, Contributions of climate and dynamics to mass wastage and accumulation zone thinning of Eklutna Glacier, Alaska: presented at the Fall Meeting of the American Geophysical Union, December 14-18, 2009, San Francisco, CA.

Van Beusekom, A.E., O'Neel, S.R., and **Josberger, E.G.,** 2010, Climatic and dynamic glacier mass balance components: presented at the Alaska Section American Water Resources Association annual meeting, March 31-April 2, 2010, Anchorage, AK.

Van Beusekom, A.E., March, R.S., and **O'Neel, S.R.,** 2009, Improving mass balance modeling of benchmark glaciers: presented at the Fall Meeting of the American Geophysical Union, December 14-18, 2009, San Francisco, CA.

Walter, Fabian, **O'Neel, S.R.,** Bassis, Jeremy, Fricker, Helen, and Pfeffer, W.T., 2009, Icequake tremors during glacier calving: presented at the Fall Meeting of the American Geophysical Union, December 14-18, 2009, San Francisco, CA.

Key Leadership in Professional Societies, Boards, Commissions

Conaway, J.S., Southcentral Director, Alaska Chapter, American Water Resources Association

Curran, J.H., Member, Science and Implementation Working Group of the Mat-Su Salmon Partnership

O'Neel S.R., American Geophysical Union. Member of Cryosphere focus Group Steering Committee, fall meeting scheduling chair.

University Affiliations

O'Neel S.R.: University of Colorado; Scripps Institution of Oceanography; University of Alaska; University of Chicago

Honors / Awards

A NASA Earth and Space Science Fellowship was awarded to Louis Sass, a student employee working on Eklutna Glacier.

NOAA NWS Agency Report

Presented by
Larry Rundquist
Service Coordination Hydrologist

National Weather Service
Alaska-Pacific River Forecast Center (APRFC)
http://aprfc.arh.noaa.gov
October 2010

Management and Staff

Current staffing and contacts are as follows:

Robin Radlein - Regional Hydrologist/Alaska Region & Hydrologist in Charge of APRFC
266-5151 or robin.radlein@noaa.gov
Larry Rundquist – Service Coordination Hydrologist
266-5152 or larry.rundquist@noaa.gov
Scott Lindsey - Development and Operations Hydrologist
266-5157 or scott.lindsey@noaa.gov
Becky Perry – Hydrologic Technician, 266-5162 or becky.perry@noaa.gov
Contact all APRFC staff via email at nws.ar.aprfc@noaa.gov

Hydrologists
Ben Balk, 266-5155
Jim Coe, 266-5159
Jamie Montesi, 266-5156

Hydrometeorological Analysis & Support Forecasters
Jeff Perry, 266-5158
Arleen Lunsford, 266-5153
Eric Holloway, 266-5154

Weather Forecast Office Hydrology Contacts:
Anchorage - John Papineau, Senior Service Hydrologist, 266-5165
Fairbanks - Ed Plumb, Service Hydrologist, 458-3714
Juneau - Mike Mitchell and Aaron Jacobs, Hydro Focal Points, 790-6824

Changes include departure of Jamie Montesi in early November to take a position with NOAA NMFS in Arcata, CA. It is a hydrologist position on a team working on the largest river restoration project ever undertaken on the Klamath River. Larry Rundquist plans to retire at the end of January 2011.

Operations/Flooding

The ice breakup flooding was relatively mild in 2010. Yukon River breakup caused minor flooding in Ruby, Marshall, Alakanuk, and Emmonak. An ice jam early in the Kuskokwim River breakup process caused minor flooding at Red Devil, but there was no flooding at any other village along the Kuskokwim River. There was moderate flooding at Buckland due to an ice jam on the Buckland River. Minor flooding was reported in the Colville River delta during breakup and on the Dalton Highway due to Sagavanirktok River snowmelt flow.

The Taylor Highway was damaged by heavy rains and flooding for much of the summer. Three significant rainfall events occurred in just over three weeks during July 2010 and wet weather continued into the first part of August. It is highly unusual to have multiple weather systems of this magnitude impact this otherwise climatologically dry region in such a short period of time. Several weather stations along the Taylor Highway reported close to their annual average precipitation of 12 inches during July and August. The Porcupine River also had multiple rises to overbank levels, but no reports of impacts were received from locals along this remote river. Numerous other minor flood events occurred throughout Alaska due to rain events or glacier dammed lake releases.

River/Rain Gauge Network

NWS made the following additions to our river gage network:

HNRA2 – Nenana River at Healy (automated gage)
EYAA2 - Eyak River at Copper River Highway (automated gage)
GAKA2 – Gakona River near Gakona (automated gage to supplement observer during construction)
GSCA2 – Goldstream Creek near Fairbanks (new observer at new location)

We had several field trips this past summer to take flow measurements to maintain the rating curves for NWS river gages. A borrowed SonTek M9 ADP was used to take flow measurements on the Koyukuk River at the villages of Allakaket, Bettles, Hughes, and Huslia, the Kobuk River at Kobuk and Ambler, and on the Yukon River at Galena, Nulato, Ruby, and Tanana.

No new ice thickness measurement observers were added to our network this year. We hope to continue to receive ice thickness data that are measured by other agencies during discharge measurements or other studies to augment ice data collected by our observers.

Climate Reference Network

Two new Alaska USCRN sites at Red Dog Mine and Kenai were installed this summer. Two sites installed last year at Port Alsworth and Sand Point became the first fully commissioned stations in the Alaska USCRN. Barrow, Fairbanks, Sitka, and St. Paul Island continue to operate as experimental USCRN sites, bringing the total of operational stations in Alaska to eight. A list of all USCRN stations can be found at: http://www.ncdc.noaa.gov/isis/stationlist?networkid=1. The USCRN Program has a completed permit for an installation in Tetlin National Wildlife Refuge (NWR), and been working on permit issues for sites at Yakutat Airport and Summit Airstrip. Other sites that have been surveyed in 2010 and are being considered by a site selection process include locations in Selawik NWR, Nowitna NWR, Katmai National Park, and one near Gustavas, AK.

Climate Services

NOAA has established six Regional Climate Services offices. The new regional climate services director for Anchorage is James Partain. The new directors are responsible for coordinating a cross-NOAA, regional approach to climate service delivery and interfacing with our partners and information users in other federal agencies, state and local governments, academia, business and other sectors. The regional directors are employees of NOAA's National Climatic Data Center, but each will be based at one of the six National Weather Service regional offices.

Projects

The open-water months were primarily occupied by forecast operations and field work and little time was available for project work. However, some progress was made on the installation and configuration of our new operating environment called Community Hydrologic Prediction System (CHPS). The CHPS environment was developed in collaboration with Deltares and the NWS model components were added into their Flood Early Warning System (Delft-FEWS) (http://www.wldelft.nl/soft/fews/int/index.html). We have it set up now and will work with it through this winter and start operations using CHPS next summer. This open shell operating system will allow us to access other hydrologic models and add new models easily. UAF is installing CHPS on their system and APRFC is collaborating with a graduate student to develop a new model component Other development this winter will include projects on model calibration and recalibration of our hydrologic model, further development of techniques for producing gridded precipitation, temperature, and freezing level products, web site improvements, flood stage assessment, computer system maintenance, and staff training.

NOHRSC Activities for Alaska

The airborne snow water equivalent program was conducted during April 9-22 of 2010. Fifty percent of the total defined flight lines were flown. Details of the 2011 flight planning are not yet available.

National Water Center

The NWS Hydrology Program was provided an opportunity this summer due to a Congressional mandate to form a NOAA Center at the University of Alabama in Tuscaloosa. In coordination with NWS and NOAA leadership, the Hydrology Program engaged the University in developing a vision for a new National Water Center (NWC). The vision is that this facility will combine operations, operational support, and research and development in water resources. The building is planned to be completed by November, 2013. The NWC will leverage the on-going Integrated Water Resources Science and Services (IWRSS) initiative to engage Federal water agencies. The USGS has committed to dedicating staff to the Center and the USACOE has also expressed interest. The Hydrology Program has developed strategies to staff the building. There are no plans to relocate any RFCs or WFOs to Tuscaloosa. The primary purpose of the center will be to provide national guidance and to support the transition of our River Forecast Centers into Water Resource Centers.

National Water Managers Meeting

The NWS is tentatively planning to have a meeting of its Hydrology Program managers in Anchorage next spring. As part of this meeting, it is desired to have a meeting with our hydrologic partners and we expect to invite IHCA members to this meeting. We will send out more details when the dates are finalized.

Flood Safety Awareness Week

The Alaska Flood Safety Awareness Week last spring was shifted from the National dates of March 15-19, 2010 to more appropriate dates of April 26-30, 2010. Each day of the week focused on a different hydrology element. APRFC will be shifting the dates again next spring from March to late April. The National Flood Safety Awareness Week webpage can be found at http://www.weather.gov/floodsafety/.

PRECIPITATION FREQUENCY PROJECT FOR ALASKA

The full status report can be found at the following link:

http://www.nws.noaa.gov/ohd/hdsc/current-projects/pdfs/HDSC_PR_Oct10.pdf

The University of Alaska, Fairbanks (UAF) and HDSC are jointly working on this project.

Data collection and formatting - UAF has completed data collection and a review of the datasets.

Rainfall under-catch correction - It was originally proposed for UAF to make bias corrections for undercatch to all Alaska precipitation gauges, but reliable metadata were not available for many of the gages. Therefore, UAF's conclusion was that bias corrections cannot be done accurately and therefore they will not be applied.

Precipitation versus rainfall annual maximum series (AMS) extraction - AMS will be extracted for both precipitation and for rainfall-only events. The approach to distinguish between rain and solid precipitation events can be summarized in the following three steps: 1) all precipitation during the cold season will be assumed to be snowfall; 2) precipitation during the warm season will be examined to see if the field observer designated it as solid precipitation or not; 3) if the form of precipitation was not noted by the observer, then a threshold daily mean air temperature will be used to determine whether it is solid or liquid precipitation.

Station screening – The screening process removed about 30% of the available stations.

a. **Station merging** - HDSC joined UAF in execution of this task. Stations that report data at the same time interval that were within 5 miles distance and maximum 300 feet elevation difference were considered for merging to increase record lengths in the 15-minute, hourly and daily datasets. There were no candidates for merging in the 15-minute dataset and only 1 merge in the hourly dataset. There were 84 merges identified and implemented in the daily dataset which are under closer review by UAF. Stations were also identified for deletion if they either had less than 10 years of data and could not be merged or had duplicate data of a nearby station with a longer record. 7 15-minute, 83 hourly and 187 daily stations were deleted.
b. **Co-located station clean-up** - Co-located stations are defined as stations that have the same metadata (or very similar) but report data at different time intervals (15-minute, 1-hour, and 1-day). HDSC joined UAF in execution of this task. 35 co-located 15-minute and hourly NCDC station pairs were screened for duplicate records. When AMS from co-located stations overlapped exactly, the hourly station was deleted; this led to 24 deleted hourly stations. There were no hourly stations whose records could be extended using aggregated 15-minute data. Work began on co-located 15-minute/ hourly and daily NCDC stations.

Quality control of AMS data - For this project, outliers are defined as annual maxima which depart significantly from the trend of the remaining maxima at a given station for a given duration. Since data at both high and low extremities can considerably affect precipitation frequency estimates, they have to be carefully investigated and either corrected or removed from the AMS if due to measurement errors. During this reporting period, high and low outliers were identified in the AMS of daily stations.

PROJECTED ACTIVITIES FOR THE NEXT REPORTING PERIOD (Oct - Dec 2010) - In the next reporting period, work on co-located station cleanup and an examination of geospatial data will be completed. The quality control of precipitation AMS outliers at base durations will be completed and regionalization will begin. Extraction of rainfall-only AMS using temperature data will also be completed.

PROJECT SCHEDULE

- UAF: data collection, formatting, and initial quality control [Complete]
- UAF: extraction of annual maximum series (AMS) for precipitation and rainfall; additional quality control and data reliability tests (e.g., outliers, trend analysis, independence, consistency across durations, duplicate stations, candidates for merging). [February 2010; revised to December 2010*]
- HDSC: regionalization and frequency analysis [September 2010, revised to March 2011]
- HDSC: initial spatial interpolation of PF estimates and consistency checks across durations [January 2011, revised to April 2011]
- HDSC: peer review [March 2011, revised to May 2011]
- HDSC: revision of PF estimates [May 2011, revised to July 2011]
- HDSC and UAF: remaining tasks (e.g., development of precipitation frequency estimates for PD series, seasonality, temporal distributions, documentation) [August 2011]
- HDSC: web publication [September 2011]

** The schedule for this task has slipped due to delay in execution of data collection and formatting task. HDSC will join UAF in execution of this task to speed up the work. This will affect subsequent tasks, but the project is still expected to be completed on time.*

NOAA Fisheries Agency Report

Contact: Eric Rothwell – Regional Hydrologist
271-1937
Eric.Rothwell@noaa.gov

Restoration Center

Current Restoration Funding Opportunities

Open Rivers and Marine Debris grants are now open for new applicants.

Open Rivers: The Open Rivers Initiative supports our priorities to open streams and rivers for migratory fish. In the United States, millions of dams and other barriers block fish from reaching upstream spawning habitat. Dams often provide benefits, such as hydro-electric power and irrigation, but many are now obsolete. Removing these structures can improve the health of our rivers, fisheries, and our economy. NOAA is working to restore and protect the ecological health of the nation's rivers and streams by removing dams, installing fish passage structures such as fish ladders, and removing other migratory fish barriers such as undersized culverts from streams and rivers. Applications due November 17, 2010.

Trout Unlimited – NOAA Partnership: This grant will be open this fall. Alaska restoration was identified as a specific area of work in the national TU partnership application. This provides a great opportunity for expansion of TU in AK to get involved in more comprehensive restoration.

ARRA Project Status

Eyak Lake Restoration:

The Copper River Watershed Project will provide significant ecological impacts to the area, including benefits to important salmon spawning, rearing and wintering habitat by addressing several key habitats in Eyak Lake, a 2400-acre shallow lake in Cordova, AK. It will also improve water quality in Eyak Lake through implementing an oil and grit separator at the Lake's major storm water out fall as well as constructing an associated wetland. These projects will support sockeye, coho, pink salmon and cutthroat trout. The project will remove barriers to fish passage and improve spawning and rearing habitat. In this project 2,400 acres of lake habitat will be improved and 1 mile of river habitat will be opened for fish passage.

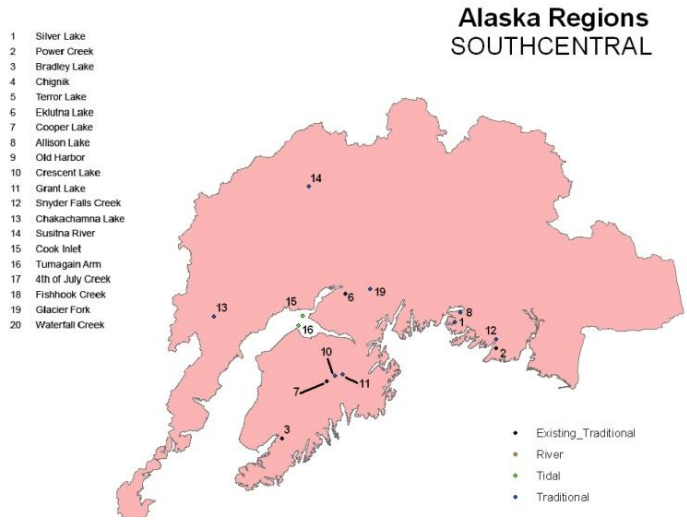
Kenai Peninsula Salmon Habitat Restoration:

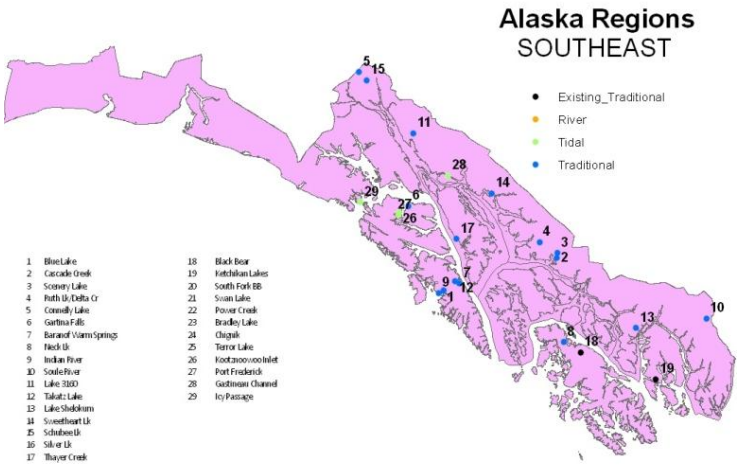
The Kenai Watershed Forum will restore a straightened, ditched section of Daves Creek to a functioning natural stream channel. This project includes removal of five barriers to fish passage, and will benefit Chinook, coho, pink and sockeye. The restored habitat will contribute to healthy salmon stocks, and consequently, will benefit the fishery, fishers, and the local communities on the Kenai Peninsula. The

impact of this restoration will be 11 acres restored and 11 miles of river opened to fish passage for anadromous species.

FERC Consultation

NOAA-Fisheries Alaska Region Hydropower website development; this site is intended to track project going through FERC licensing in anadromous habitat. There are several proposals going through scoping and study plans including: Allison Lake, Grant Lake, Sweetheart Lake, Silver Lake, and others. Our primary concerns are ecological flows in the bypass reaches that contain anadromous habitat. The goal of the web based tracking is to help collaboration of state and federal agencies in review of proposed projects and to serve as a communication aid with NOAA-Fisheries nationally.

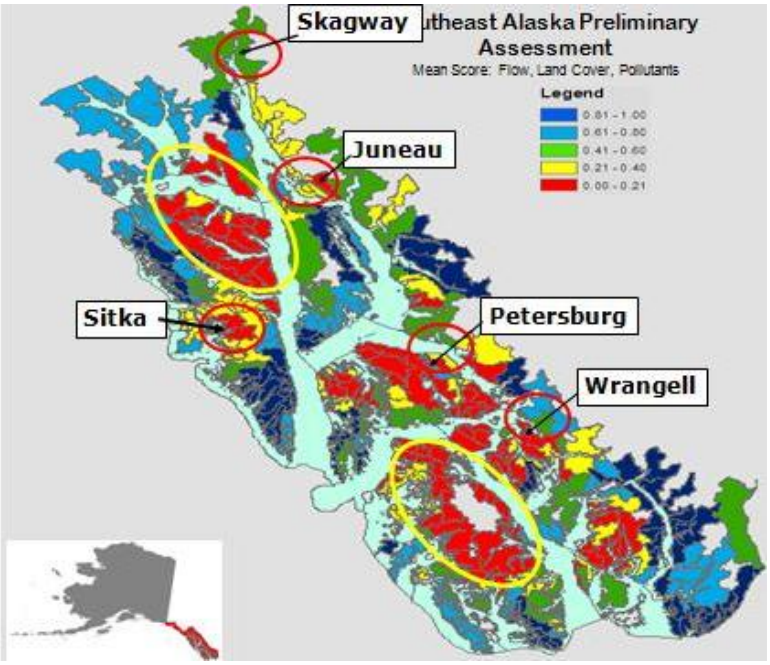




Coastal Data Assessment

The National Fish Habitat Action Plan (NFHAP) was developed in 2006 to bring new resources and realign existing resources to address the nation's fish habitat issues. The key to this effort is a science-based habitat assessment process covering freshwater, estuarine and nearshore marine waters. The National Oceanic and Atmospheric Administration (NOAA) has taken the lead on developing a national scale coastal spatial framework and database of existing indicators of habitat quality to support completion of the NFHAP Assessment in 2010. With 75,450 km of tidal shoreline adjoining the Arctic and Pacific Oceans and the Bering, Chukchi and Beaufort Seas, Alaska presents a substantial challenge for the development of a comprehensive spatial database. First attempt was in SE Alaska – challenges included scarcity of data, inconsistent data with the rest of the coastal US, and the need to adapt methods for Alaska. Next steps are to refine methodology, and start assessment in SC in 2011.

Contact – Katharine Miller; Katharine.Miller@noaa.gov



Annual Internal Habitat Funds

Annual NOAA Fisheries Habitat Conservation Funding – two separate pools of funds to support strategic investment to strengthen its national EFH and national hydro programs. We put in for hydro funds this year and are looking for partners for next year to develop a stream gage network, assist in hydrokinetic studies, others?

Interagency Hydrology Committee for Alaska

Fall 2010 National Park Service update

The biggest news is that, as you probably know by now, the Alaska Region has hired a regional hydrologist, a position that has been vacant for years. His name is Paul Burger, formerly the hydrologist/geologist at Carlsbad Caverns National Park – he's probably at the table, so if you want to know more, ask away.

The Alaska Regional Office has also launched an effort to replace the poorly documented and inaccurate National Hydrographic Dataset (NHD) digital coastline reach features for five Alaska coastal parks (Kenai Fjords, Cape Krusenstern, Bering Land Bridge, Aniakchak and Lake Clark) with the best available and largest scale NOAA Office of Coast Survey mean high water shorelines. The project is being conducted under a CESU agreement with St. Mary's University GeoSpatial Services (they are also conducting all of the Natural Resource Condition Assessments currently underway – Wrangell-St. Elias, Denali, Yukon-Charley Rivers and Klondike Gold Rush).

Klondike Gold Rush NHP – still operating Taiya River gage. Comparison of 2004-present data with data from 1970-1977 suggests that peak discharge is occurring earlier in the year and at lower volume. Spring snowmelt onset also occurring earlier in the year.

Kenai Fjords NP still having a recurring issue with flooding on Exit Creek and the Resurrection River. SWAN I&M Network monitoring stage height on Exit Creek, APRFC monitoring Resurrection River. Other lingering issues include FERC monitoring of the Bradley Lake diversion and an aggrading creek in Aialik Bay that looks like it may migrate to the point where it will wash the ranger station out to sea. They would like to know more about state monitoring of escapement in McCarty Fjord.

Denali NP contracted out for major stream restoration work in the Kantishna area this summer, I think primarily on Slate Creek (currently 303(d) listed).

The Southeast Alaska I&M Network has installed continuously recording sondes at Glacier Bay NP and Sitka NHP – Klondike Gold Rush will get one next spring.

The Southwest Alaska I&M Network continues gaging at outlets of Lake Clark, Naknek Lake and Brooks Lake. Rating curve development for tributaries to Lake Clark is ongoing. They have tested a RiverSurveyor M9 acoustic Doppler current profiler this summer and will be incorporating its use into the monitoring program including the development of SOPs.

The Arctic I&M Network is currently advertising for a GS-12 aquatic ecologist to monitor large lakes and streams. Contracted with ABR to look at mechanisms of lake drainage in Kobuk Valley NP and to build a vulnerability model.

The Central Alaska I&M Network stream monitoring program sampled in 39 streams in Wrangell-St. Elias and Denali NP. We are currently using the macroinvertebrate data we have collected since 2006, in conjunction with some data from USGS and EPA, to develop RIVPACS-style predictive models for water quality bioassessment of park streams.

We documented apparently record flooding in the Nabesna area of Wrangell-St. Elias in late July – residents who had been in the area for 50 years and more said they'd never seen anything like it. Extensive damage to the Nabesna road. Unfortunately high water washed away 3 of my 4 apparently inadequately secured pressure transducer stations in the area (including one attached to a bridge pylon), so hydrologic record is incomplete.

Continued monitoring of shallow lakes in Wrangell-St. Elias, Yukon-Charley Rivers and Denali, including ongoing deployment of continuously recording sondes and thermistor arrays. Collected sediment cores from Six-Mile Lake in Yukon-Charley and Long Lake in Wrangell-St. Elias to determine basal lake ages in the Network, estimate lake sedimentation rates and generate a time line for lake succession.

DNR – DMLW -Water Resources Section, Fall 2010

MATSU Studies: This project is under the direction of the USGS - DNR provided the initial direction and ongoing funding. One DNR hydrologist is partly funded to support this project. While it is designed to answer specific water-management (ground water) questions by analyzing the complex hydrologic features found in the valley, it also ties into pre-existing studies by the USGS regarding the overall hydrologic situation. This is the third year of the study; funding was temporarily halted during the second year but was reinstated for the third year. DNR did not participate actively in the field work for this year, so that topic will be left to the USGS for discussion. DNR did purchase new instrumentation for monitoring of ground water and has ordered equipment specifically requested by the USGS for precipitation/evaporation studies on local lakes and ponds. An initial deployment this fall was anticipated but a delay in assembly of components by the vendor has made the project moot given the rapidly approaching freeze over. It is anticipated that the equipment will be deployed at a secure and isolated site early after break-up next year. It is anticipated that the state will fund the last year of the study so that the groundwater model can be completed.

Stream Stats.: This is a USGS based program funded through DNR and the Coastal Impact Assistance Program(CIAP). This project is designed to allow stream flow at specific points in the drainage to be modeled in real-time from current and antecedent meteorological conditions. The primary objective of this study is to provide a web-based interactive tool (StreamStats) for determining streamflow statistics at any stream location within the Cook Inlet Basin. StreamStats is a web-based geographic information system (GIS) application for computing streamflow statistics at any stream location. It is a nationally-standardized analytical tool that is being developed by the USGS and is simple to use, requiring only that the user click on a map to identify the stream location of interest. If the location is at or near a streamflow gaging station, the web tool will calculate streamflow statistics based on available streamflow records. If the location is ungaged; the web tool will delineate the basin boundary, determine basin characteristics, and calculate all streamflow statistics that can be estimated using regression equations reported by USGS. The user can then download a map of the basin and a streamflow statistics summary that includes confidence intervals and an explanation of the results. Currently about $375,000 has been applied for and approved through the grant process, although we are waiting for MMS to release the funds.

Pebble: "Nunamta Aulukestal et al vs. DNR and Pebble Limited Partnership". The hot topic of temporary water use at the proposed mine site for exploration drilling is under litigation . The trial date is set for December 6, 2010. The basic question under litigation is "should the Department of Natural Resources, prior to issuing a Temporary Water Use Authorization or a Miscellaneous Land Use Permit, conduct a public notice" There were lots of other issues related to the harm caused by the taking of water, and the drilling of exploration holes. These issues will be addressed during the trail as they relate to public notice. As the current Alaska Statutes and Regulations do not require public notice, the case is going to be decided on through an Alaska Constitutional basis. The activities associated with the TWUP and MLUP are temporary, can be withdrawn without cause, and no rights are gained under these authorizations. The trail date may or

may not hold up, as a decision of the Judge is being appealed to the Alaska Supreme Court, and if the Supreme Court decides to hear the appeal the original trial date will likely slide into next year. The litigation is at a point where "discovery" is nearing its final conclusion. The estimated cost to the State for the discovery process is in the millions of dollars.

Cooperative Projects: This is a collaboration between the USGS and the State of Alaska. DNR has participated in the Coop Program for 20 years. During the last legislative session, it was decided that this program should fall under DNR. The legislature required that Fish and Game transfer it Coop Projects to DNR. DNR has the Authority to collect from the private sector up to $850,000 per year to pass through to USGS. USGS will match as they deem appropriate.

Budget: The current budget is a basic "status-Quo" with some cuts - travel has been reduced by 10%. Severe financial controls have been implemented for the entire Division of Mining Land and Water due to a personal services shortfall for FY 2011. The Division is under a controlled hiring freeze, the Water Section has five vacancies and an authorization to fill only one of those vacancies. Recent retirement have, and upcoming retirements will further, dramatically change the presence of the Water Resources Section; however, it is anticipated that long term goals and approaches will remain unchanged. Until fully staffed, the range and scope of work will necessarily be restricted but the mandate is clear and current positions are staffed by well qualified personnel with sufficient experience to continue the tasks at hand.

Staffing: Kellie Westphal has retired and Mike Walton has taken that vacant position. Chrissy Plett has taken the Senior Adjudication position that had been vacated by the transfer of Patricia Bettis to Oil and Gas. Carolyn Curly has taken the vacant adjudication position in Fairbanks. The remaining positions remain unchanged. Vacant positions include three adjudicators, two hydrologists.

Interesting Water Rights: The WRS has received 7 water right application for the removal of water from Alaska. The Aleut Cooperation has applied to remove water from Adak Island to China (15,000,000 gallon per month), Ric Davidge has filed 4 application to remove water (30,000 af/y) from various location in Southeast Alaska to point yet to be determined. The City of Sitka, who has authorization to remove 29,000 af/y is working with a Canadian firm to remove water to India (West Coast), where it will be distributed to other areas in India, or wherever it is needed. Consultants have been hired, data being collected so that DNR can determine if the water applied for is in excess to the needs of the hydrologic unit, and so that DNR can establish reservation of water to protect the fish and their habitat.

Alaska Department of Environmental Conservation

Interagency Hydrology Committee for Alaska (IHCA), Fall 2010, Anchorage
http://ak.water.usgs.gov/ihca/

Agency Drinking Water Program Project Briefing Report

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Agency Briefing Disclaimer

This agency project briefing report is presented by a representative of the Drinking Water (DW) Program, within the Division of Environmental Health (EH), with limited collaboration with other functions within DEC. This briefing does not imply priority or preference.

Projects

DEC/Division of Environmental Health-Drinking Water Program

GIS Web Mapping Application

The Drinking Water Protection (DWP) group has recently published for public use a GIS web map and consumable mapping services through ArcGIS Online (www.arcgis.com, direct map link: http://bit.ly/dt7p2d). The public DWP map displays "State of Alaska- Public Drinking Water Protection Areas and Regulated Contaminated Sites". The map services may be brought into local GIS applications and layered with local datasets, and/or local web mapping applications. The web map and map services do not include the location of public water systems; however, if needed location data may be obtained by contacting DWP staff. The DWP web map is a useful starting point in identifying intersecting interests among entities and how this overlap can be used to help protect public drinking water supplies. The following entities have been provided public water system data:

Federal

- BLM
  - Data: Provided a statewide GIS data snapshot.
  - Use: Unknown.
- EPA-UIC Program
  - Data: Provided a statewide GIS data snapshot and recently directed to map services with the ability to load into their intranet mapping application.
  - Use: To help prioritize enforcement efforts.
- USFS
  - Data: Provided large –format geospatial PDF reference maps for Chugach and Tongass National Forests.
  - Use: Unknown.
- USGS/AVO
  - Data: Provided a regional GIS data snapshot.
  - Use: Drinking Water Protection Areas to be referenced during eruption events as part of their Interagency Operating Plan.

State

- DEC
  - Data: All data set types are available internally.
  - Use:
    - Division of Spill Prevention and Response (SPAR) – Contaminated Sites Program to help prioritize projects.
- DNR
  - Data: Various – depends on applicants preference. When contacted, staff is directing applicants to map services.
  - Use: By some Trail Grant applicants to answer application question regarding potential impact to public drinking water supply.
- DOT
  - Data: Provided a statewide GIS data snapshot. Recently directed to web map and map services.
  - Use: To help identify projects that may potentially impact public water supplies.

Local government

- City of Cordova
  - Data: Provided a regional GIS data snapshot.

- City of Valdez
  - Data: Provided a regional GIS data snapshot. Updated annually.
- Mat-Su Borough Planning Department
  - Data: Provided a regional GIS data snapshot.
- Municipality of Anchorage
  - Data: Provided a regional GIS data snapshot. Recently directed to web map and map services.

Non-government: Typically short-term use and project-specific.

- Consulting firms
- Nature Conservancy
- Watershed groups
- Others

DEC/Division of Environmental Health-Drinking Water Program

Public Drinking Water Protection Grant

The Drinking Water Protection (DWP) group has recently made available a modest amount of grant funding to be used for implementing public drinking water protection strategies that benefit Community water systems (CWS). The funds are administered by the Alaska Clean Water Actions (ACWA) grant process. This year, we are funded the following three projects for a total of $17,000:

1) Building a watershed display kiosk at the entrance to a watershed that is the immediate source for public drinking water;

2) Implementing an educational outreach program and web site for a subdivision that uses a public groundwater system; and

3) Properly decommissioning up to eighteen (18) abandoned wells near a public drinking water source.

The drinking water protection grant is embedded in the stewardship actions portion of the ACWA grant. No federal match is required and an in-kind match is optional. The minimum required project amount is $2,000. The next open application period begins January 2011, and closes mid-February.

Agency Report – US Army CRREL

U.S. Army Cold Regions Research and Engineering Laboratory

Report to the IHCA Fall Meeting, October 26-27, 2010, USGS Office, Anchorage

- Eagle River Flats White Phosphorous remediation project continues. No active pumping and now working on winter capping of hot spots. Duck mortality up in fall 2009 but back to long term goals in 2010. Fall population very large this year.
- Jarvis Creek aufeis study complete. No flooding during spring 2010 due to low aufeis growth (actually further downstream). 2-D flow modeling through Battle Area Complex very effective and results simulated past flooding events very well. Two options of flow diversion structures (berms in floodplain) modeled. US Army Alaska will be completing final design and place into future POM.
- Knik Arm sampling program to determine munitions constituent runoff from Eagle River Flats Impact Range (no detection over 5 years of sampling of either metals or explosives). This year was expanded in scope and samples (some on land).
- Initiative to construct a new permafrost tunnel at Fox, AK and a new permafrost research facility. Initial plus-up funding of $500K in Defense Appropriations bill for FY10. Test tunnel boring this December.
- Climate Change Impacts on Defense Assets in Alaska Workshop in Anchorage in July 2009. Resulted in FY11 Strategic Environmental Research and Development Program (SERDP) Statement of Need "Impacts of Climate Change on Alaskan Ecological Systems". Three proposals funded: one from University of Florida target of fire response; one from CRREL/UAF/ERDC on response of ecosystems to changes in hydrology and permafrost; and one from USGS/CRREL on permafrost changes.
- Permafrost Ecosystem Warming Experiment at Farmers Loop Road site with DOE-Oak Ridge National Lab. Warming soil to plus 4 degrees C above ambient conditions in 25 meter diameter plot to a depth of 4 meters. Precursor for large DOE program (10-yrs and $100M) investigating the potential changes to permafrost systems.
- Black Lake project with Alaska District (Crane)
- Chena River Basin Hydrology model with Alaska District (Crane)

CHENA RIVER LAKES FLOOD CONTROL PROJECT

- USACE Dam Safety Cadre Evaluated Moose Creek Dam, September 2009
    - Dam given a DSAC I rating and requires 'Urgent and Compelling' action.
- No Floods for 2010
- Lidar Mapping for FNSB Complete (final deliverable Oct 2010)
    - Data will be available through USGS 'CLICK', and we are working to get the data into the NED.
- Major dam modification study begins in the Fall 2010 (2-3 year study).
    - Probable Maximum Precipitation Re-Analysis
    - Floodway 2-D ADH Hydraulic Model
    - 1-D and 2-D dam break modeling
    - HEC-HMS Watershed Model Upgrade and PMF Re-analysis

- Continue to upgrade remote data collection platforms with NRCS, schedule to be complete in FY11.

STUDIES & PROJECTS

- **Seward Area Study**
  The Corps has recently received several requests to help address erosion and flooding issues near Seward. To provide immediate assistance while awaiting project funding, the Corps is working with the Kenai Peninsula Borough, City of Seward, and Seward/Bear Creek Flood Service Area on a study to identify the most urgent flood and erosion problems in the Seward area and develop a comprehensive strategy to address them. The effort is being performed through the Corps' Section 22 Planning Assistance to States Program.

- **Black Lake Ecosystem Restoration**
    - 2011 work will include:
        - Sediment coring of Black Lake with Northern Arizona Univeristy and USGS/AVO
        - Lake thermal modeling, University of Washington
        - Cross section and bathymetric surveying
        - USGS lake water surface elevation monitoring

- **Alaska Barge Landing System Design –** Working for Denali Commission to plan, design and construct barge and boat facilities throughout Alaska.

- **General Hydropower Investigation:** The Alaska Energy Agency (AEA) has entered into a multi-year Planning Assistance to States (PAS) agreement to investigate potential hydropower projects. The initial task will be to create a GIS

database. This GIS product will allow users to access digitized reports that are currently available only in hard copy. A draft list of all hydropower reports is available now. Report scanning complete. Online database under development.

- **Matanuska Watershed Study:** Watershed study initiated with several ongoing initiatives.
    - A data gap analysis summary report was conducted for the Mat-Su Watershed study and recommended leveraging existing efforts, delivering public education, resolving institutional gaps, expanding research and extending mapping efforts. The specific findings to develop scopes of work are found in the report. If interested in an electronic copy, please email Lisa Rabbe, Mat-Su Watershed Study Manager at lisa.a.rabbe@usace.army.mil.

    - Wide area Lidar coverage is in progress (USGS - Lead, MatSu Borough, COE and others)

    - A wetlands map has been created for the Mat-Su Watershed. A functional assessment is in the works now and should be completed by April 2011.The map can be accessed by going to: http://CookInletWetlands.info/default.html

    - Ongoing Assistance to the Mat-Su Borough Planning Group. Recent success includes assemblies unanimous acceptance of the Matanuska River Management Plan. Next step will to reinvestigate erosion issues along the river.

- **Port of Anchorage:** Numerical and physical modeling of Upper Cook Inlet hydrodynamics complete. Sedimentation numerical modeling complete. Physical model available for outside use.
    - State of Alaska and Port of Anchorage visited and operated the model in August 2010.

- **Shaktoolik**: Coastal flood hazard determination, work based on the previous storm surge and wave hindcasts for western Alaska.

FY11 FUNDED STREAM GAGES (15 Total)

Chena River Lakes Project (Moose Creek Dam):

- Chena River MP40
- Chena River near Hunts Creek
- Chena River Below Moose Creek Dam
- Chena River Downtown Fairbanks
- Little Chena River
- Tanana River at Fairbanks
- Tanana River at the Floodway Control Sill (stage only)
- Tanana River at Big Delta (w/NWS)

USACE Cooperative Stream Gaging Program (Sites cost shared with USGS):

- Kenai River, near Soldotna
- Kuskokwim River, near Crooked Creek
- Yukon River, near Stevens Village
- Tanana River, near Nenana
- Kuskokwim River at Liskeys Crossing

Project Funded Gages:

- Whittier Creek (Start up October of 2009) – Funded for two years
- Buskin River – Funded for two years (ends Dec 2010)

COASTAL EROSION AND RELOCATION PROJECTS

- **Kivalina:** Construction Complete (2000' of shoreline protection)

- **Unalakleet:** Construction of 1600' of shoreline protection complete.

- **Western Alaska Storm Surge Modeling:** Study complete, results to be available Website address:
  http://www.poa.usace.army.mil/en/cw/index.htm

- **Western Alaska Wave Hindcast:** This study is complete.
  http://frf.usace.army.mil/wis/ak/ak_main.html

2010 Alaska District construction projects: Port of Anchorage, Kivalina, Chevak, Unalakleet, Unalaska Harbor, St. Paul Harbor, Akutan Harbor, Cordova Harbor, Seward Harbor and Chignik Harbor.

2011 Alaska District Construction Projects: Port of Anchorage, Unalaska Harbor, Douglas Harbor and Akutan Harbor

Alaska Department of Transportation & Public Facilities

AGENCY REPORT

Internal policy/practice:

- Stormwater management/regulations emphasis lately, particularly construction-related activities.
- Performance goals, evaluations, and reporting requirements – state and federal requirements.

Research endeavors:

- New research proposals are due in early November 2010. Coordinate proposals related to hydrology and hydraulics through the ADOT&PF Statewide Hydraulics Engineer.
- River bend erosion protection – UAF completed hydraulic modeling efforts to evaluate two projects to control lateral channel migration.
    - ADOT&PF's Sagavanirktok River, Dalton Highway
    - Alyeska's Hess Creek, Trans-Alaska Pipeline.
- Foothills West Project – UAF is conducting hydrologic research for ADOT&PF on the following rivers:
    - Itkillik River
    - Anaktuvuk River
    - Chandler River
- Bridge deck drainage in cold climates – UAF draft report submitted, currently in review.
- Precipitation Frequency Estimate Updates – ADOT&PF contributes funds with the Alaska University Transportation Center (AUTC) and NOAA.
- Climate change/variability in South-Central AK – UAF draft report submitted, currently in review.

Statewide Bridge (Hydraulics Squad) Programs:

STIP ID# 12579 – Scour Monitoring and Retrofit Program

- Ongoing bridge scour monitoring program with the USGS.
- Emphasis on bridge in the tidal environment (with the USGS), bridges for which the foundations are unknown, and other bridges requiring a scour vulnerability assessment.

STIP ID# 6450 – USGS Flood Frequency and Analysis

- Helps fund the USGS Small Streams Program
- We have, or are in the process of, relocating gages. We continue to look for collaboration opportunities.

STIP ID# 6455 – Small USGS Hydrologic Investigations

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ADOT&PF Statewide Research, Development, and Technology Transfer

See http://dot.alaska.ecatts.com/lmsTrainingCalendar

The following National Highway Institute (NHI) courses are being considered, not yet scheduled:

- 135067 – Practical Highway Hydrology
- 135027 – Urban Drainage Design
- 135065 – Introduction to Highway Hydraulics
- 135056 – Culvert Design
- 135071 – Surface Water Modeling System with FESWMS and SMS
- 135048 – Countermeasure Design for Bridge Scour and Stream Instability

The following non-NHI courses have been discussed with other state departments and federal agencies:

- Ordinary High Water – Delineation and overview
- Fish passage design – HEC 26 or other

ALASKA DEPARTMENT OF FISH & GAME
IHCA AGENCY REPORT
November 16-17, 2009

- ADF&G funding continues to remain flat. The department is seeking ways to increase licenses sales and has participated in some marketing efforts.

- Several key positions have either retired or announced retirement including: Commissioner Denby Lloyd, Commercial Fisheries Director John Hilsinger, and Christopher Estes.

- ADF&G is funding and/or contributing to USGS to operate Montana Creek and Wasilla Creek stream gages and with the NPS for the Indian River gage near Sitka. ADF&G is operating gages on Fish and Meadow Creeks in MatSu, Stariski Creek with Cook Inlet Keepers, and Sitkoh, Chilkoot, Cowee, and the Lost River in Southeast. ADF&G also received funding from the Western Native Trout Initiative to monitor 3 lakes in SE to protect cutthroat trout habitat and file for reservations.

- Monte Miller was recently hired as ADF&G's Hydropower Coordinator. Hydropower interest remains strong statewide. Potential projects include Grant Lake on the Kenai Peninsula, Chakachamna across the inlet, Thomas Bay in SE and Susistna-lite. The numbers of potential hydrokinetic projects (tidal and river) have shown a decline but some projects remain active including Cook Inlet, Nenana, and Eagle (Yukon).

- The National Fish Habitat Initiative (NFHI) was rolled out last year and a bill is in congress to provide additional funding. NFHI is a nationwide strategy to address fish habitat protection, restoration and enhancement through development of new partnerships. There are 3 partnerships in Alaska: Mat-Su, Southwest and Salmon in the City/Anchorage.

- The Division of Sport Fish is released a new strategic plan last summer. A copy can viewed at http://www.sf.adfg.state.ak.us/StratPlan/

- A report on the economic importance of sport fishing to Alaska was released last January. A brief summary report as well as the detailed technical report can be found on the ADF&G web site under "Economic Significance of Sportfishing in Alaska" at: http://www.sf.adfg.state.ak.us/statewide/economics/

NATURAL RESOURCES CONSERVATION SERVICE AGENCY UPDATE
IHCA –October 26-27 Anchorage, Alaska

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Emergency Watershed Protection

- City of McGrath – This is a levee repair and riprap armoring project (Phase I was approx. 1100 feet). Phase I work completed in August 2010. Phase 2 is another 1900 feet of the same work which NRCS anticipates putting out to bid mid-winter pending funding availability.

- Gwichyaa Zhee Gwich'in Tribal Government and Crowley are sponsoring an EWP project in Fort Yukon. Funding has been procured for this project. Design, site selection, and NEPA are currently in progress for this project. The project is to relocate the 650,000 gallon fuel tank farm away from the eroding bank of the Yukon River to prevent a catastrophic spill during a large erosion event like break-up in 2009. Work still progressing on this item with construction anticipated summer and fall 2011.

SNOW SURVEY ACTIVITES

NRCS Snow Survey appreciates the In-Kind Services provided annually to the Snow Survey Program from each of the agencies and private companies. The In-Kind contributions for personal, equipment and air charter are in excess of $250,000 annually with an additional $150,000 plus in reimbursable funds.

The following is brief summary of completed summer work for the Alaska Snow Survey/Water Supply Forecasting Program (SS/WSFP) for fiscal year 2010.

- We upgraded two SNOTEL and one automated site was retrofitted. The two SNOTEL sites were Mt. Ryan and Little Chena Ridge where new shelters and Met towers were installed along with the accompanying sensors (COE). They will be receiving GOES telemetry this coming year. The Kelly Station automated site was reactivated and retrofit with a new shelter and Met tower with accompanying sensors and prepared for Iridium telemetry installation next year (NPS).
- This Fall, we have installed 2of the Iridium Global Modems for the pilot project. The sites with current Iridium modems are Point Mackenzie and Fairbanks T.S. We are looking to install 3 more, Susitna Valley High, Turnagain Pass and McNeil Canyon School.

The Alaska Snow Survey Program data records are on the National Water and Climate Center web site http://www.wcc.nrcs.usda.gov/. Many products are now available to use at this National web site.

The Alaska staff currently consists of a Hydrologist, Hydro-tech and Data Collection Officer (DCO). The staff oversees and QC's the collection of the data from 53 SNOTEL sites, 8 additional sites with on site data loggers recording daily data, and 232 snow courses that have monthly readings throughout the winter. From this data, we generate 129 volume stream flow forecasts and snowmelt runoff indices.

UAF report to the IHCA Committee: Jessica Cherry & Bill Schnabel

Oct 26, 2010

Water and Environmental Research Center at UAF, Hydrology Overview – Bill Schnabel

- Foothills West/Umiat Corridor Project: WERC is providing hydrology support for the ADOT&PF Foothills West project. The work has been evolving from other ADOT&PF projects since 2006, and is now focused on characterizing the discharge in the Itkillik, Anaktuvuk, and Chandler river basins. Although we are measuring discharge in these basins during the entire open water season, we are particularly interested in characterizing the discharge and ice flow during breakup. Ancillary objectives are to better understand the floodplain dynamics (i.e., figure out whether we expect the channels to move) and perform runoff modeling. The project has installed 12 meteorological stations, 3 meteorological/surface water stations, and seven repeater stations in the proximity of the basins. Data is available in near-real time on the WERC website. Discharge measurements and observations were collected in the Spring/Fall 2009 and Spring 2010 on the Anaktuvuk, as well as Fall 2010 on the Anaktuvuk, Chandler, and Itkillik rivers. We are funded to continue discharge measurements in Spring and Summer 2011 on all three rivers. http://ine.uaf.edu/werc/projects/umiat_corridor/stations.html

- WERC is working with BLM on several gauging stations in the NPR-A in the Umiat area. We completed our first field season with BLM in 2010. Winter activities are related to QA/QC new data and work on old data collected by BLM.

- Flow modeling: WERC is working with ACEP on a Tanana River hydrokinetic project funded by the Alaska Energy Authority. The project involves development and field calibration of a numerical model designed to identify optimal locations for in-stream hydrokinetic devices. Researchers and graduate students are developing a new tool to calculate the power density function in rivers as well as the location of maximum velocity and maximum specific discharge along the computational domain. A similar modeling effort, funded by DOT&PF/AUTC/Alyeska, was just completed. This effort utilized numerical modeling to compare river bend protection structures.

- Alaska Transportation Network: WERC is working with Geo-Watersheds Scientific on the Alaska Transportation Network, funded by DOE. This project evaluates the impacts of snow distribution, soil temperatures, water use, and other factors on transportation infrastructure.

- WERC is also funded by DOE/NETL to investigate more efficient allocation of water resources for ice roads and ice pads. In this study, WERC researchers are investigating the use of snow

controls (snow fences) to enhance snow drift formation and provide sufficient melt water for lake recharge despite possible unfavorable climate and hydrology preconditions (i.e. surface storage deficit or/and low precipitation).

- NSDSS: WERC is entering Year 3 of a 3-year DOE project designed to help stakeholders obtain, evaluate, and communicate information related to ice road planning on Alaska's North Slope. The North Slope Decision Support System is a tool freely available to interested stakeholders that will provide a North Slope basemap, streams and lake information, and access to past, current, and projected climate data. The tool contains a model that will allow users to optimize ice road routes based upon length, water availability, construction time, and costs. It will allow users to evaluate related issues such as lake water balance, lake dissolved oxygen concentration, permitting requirements, and endangered species considerations.

- Methane Studies: WERC is evaluating methane emissions as they relate to hydrologic processes. Specifically, WERC researchers are collecting data on increased methane production related to expansion of thermokarst lakes, as well as increased methane production emitted from successional wetlands following lake drainage.

- Snow-Net: WERC is collaborating with CRREL and CSU to develop "A Prototype Network for Measuring Arctic Winter Precipitation and Snow Cover (Snow-Net)". Starting in Barrow, Alaska, and extending to Imnavait Creek in northeastern Alaska and NW Canada, we have installed a full suite of instruments that record all aspects of the winter water balance (precipitation, sublimation, lateral transport, snow on the ground). The full system is called SnowNet, part of the IPY-Arctic Observing Network. The hypothesis behind the system is that all winter measurements are flawed, but combined, errors in measurement can be minimized and reliable winter water balances achieved.

- Precipitation Frequency: WERC is working with NOAA to update precipitation frequency analysis for the state of Alaska. Rainfall frequency analysis was last performed for Alaska in the early 1960s when the length of record for the sparse network of rain gauges was quite short and the measurement shortcomings of the gauges were not known. Together with NOAA, we revisit this issue and carry out similar analysis using both the original data, plus the data collected in the past ~50 years since the last effort was published in 1963.

- WERC has a project with the Fish and Wildlife Service to look at the pattern and probability of low streamflows in regards to the impact on in-stream migrating fish (access to food (summer) and winter habitat (late fall)). Extensive periods of drought can result in very low flows (or no flow) in Arctic streams and rivers. The main physical reason for this is that the base flow in areas of continuous permafrost (like the North Slope) is derived from subsurface flow contributions from the active layer. The active layer, because of limited storage capacity, is a poor buffer to

both floods and drought. The summers of 2005 and 2007 both had extensive periods (generally 3 to 4 weeks) of drought that resulted in many higher order streams having no flow in channel reaches for part of the summer. Recall that the largest documented tundra fire occurred in 2007 during this drought period. Are these periods of drought normal or are they increasing due to climate change?

International Arctic Research Center/WERC at UAF, Hydrology Overview – Jessica Cherry

- Report near completion from NOAA-NMFS funded project on the impact of climate change and climate variability on hydroelectric power in Southeast Alaska.

- Continued management of Seward Peninsula Hydrometeorological Station Network. Minimal stream gauging at this time, transducers were pulled in 2006. Potentially may re-install some of these during the upcoming summer.

- Testing of the 'hot plate' total precipitation sensor as a gauge alternative. Funded by DOE/ARM program. Sites at Barrow, Atqasuk, and Gilmore Trail CRN (Steese Highway, north of Fairbanks). Installations planned for Umiat and Alpine (near Prudhoe). Initial results show undercatch for small snow particles. Wind Tunnel testing done at MIT with manufacturer.

- USFWS funded effort to perform a network analysis for the North Slope on historical weather and hydrologic measurements. This will help determine priority areas for future monitoring. We are building an extensive geodatabase to house these data that will be available publically via web services.

- NESDIS funded Proving Ground project with GINA and the NWS for the upcoming GOES-R and Joint Polar Satellite program. One of the products of emphasis is snow cover. Key end users for the new satellite products are the River Forecast Center, Weather Forecast Centers, and Aviation Weather Unit.

- Collaboration with River Forecast Center centered around their new FEWS modeling system. UAF has set up a copy of the system at the Arctic Region Supercomputing Center for model development.

- BLM funded effort to assess the status of current remote sensing technologies for use in water resource management on the North Slope. Held a recent workshop with folks from IARC, NSSI/GINA, ASF, WERC, USGS, and UAF's Geophysical Institute to discuss the abilities and limitations of Synthetic Aperture Radar (SAR).

- NSF funded project 'Pacific Area Climate Monitoring and Analysis Network' is supporting exploratory efforts to acquisition airborne hydrologic data. Sensors flown thus far include a water isotope analyzer (first ever use in flight), Forward Looking Infrared, Optical, and upcoming plans include a SAR.

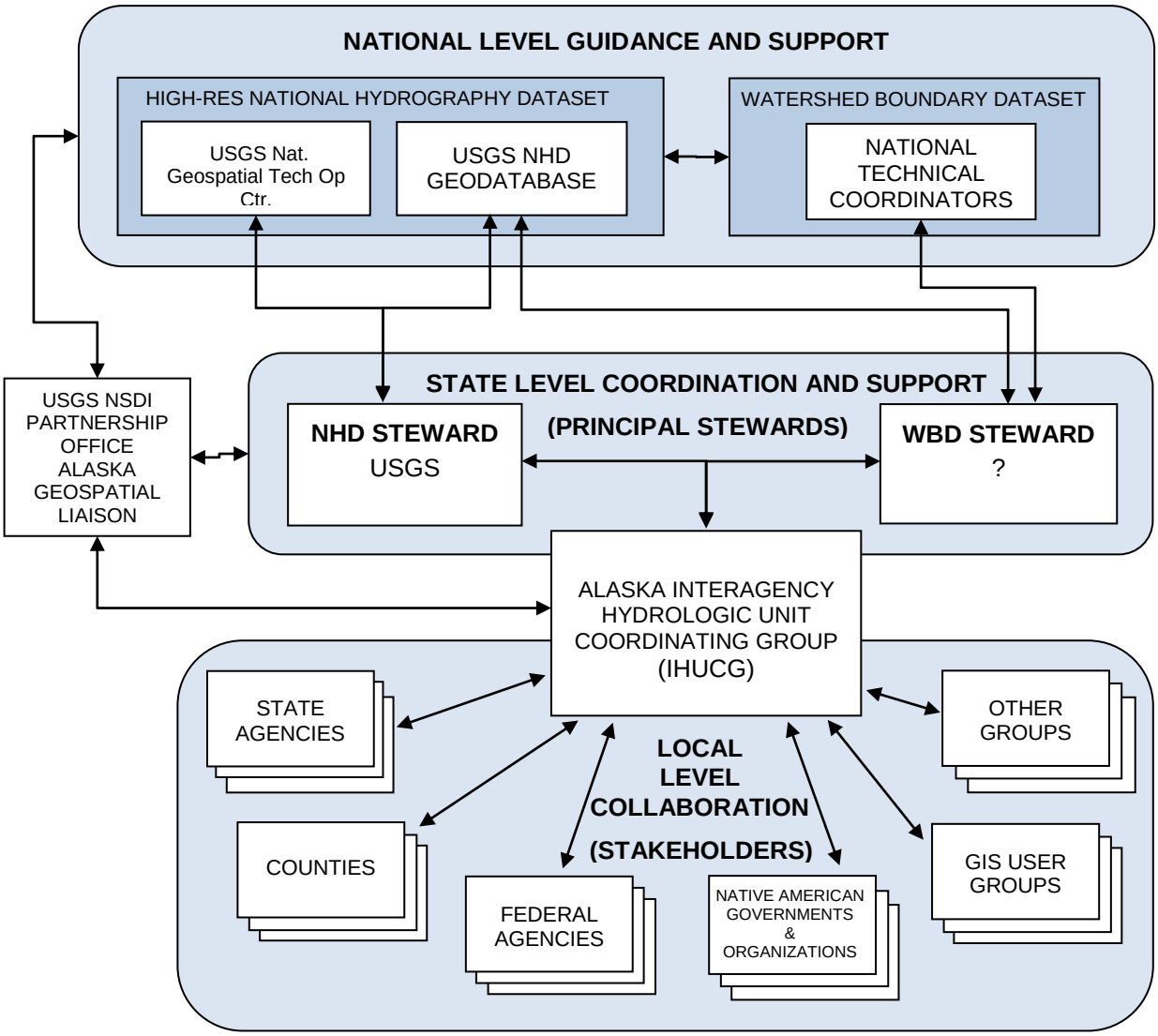
- Effort to model and test a small-scale prototype of a hydrokinetic power generator. Funded by the Arctic Region Supercomputing Center and IARC.

- Regional Climate Model Intercomparison project to examine the hydroclimatology of two different new regional models (WRF and CAM-HOMME). Funded by DOE-Sandia.

DRAFT

ALASKA HYDROGRAPHY STEWARDSHIP COMMUNICATION, COLLABORATION, AND COORDINATION SCHEMATIC

The following schematic shows the programmatic communication, collaboration, and coordination interaction for Alaska's hydrography stewardship program. See Appendix 3 for the stewardship workflow process.



DRAFT

ALASKA NHD/WBD EDITING AND REVISION CRITERIA

NHD/WBD Draft Definition of "Edit" (to be tested/reviewed as we begin edit activity)
Edits meeting these criteria do not need expanded review and concurrence by other stakeholders.

1. Alignment changes – realign existing line-work by +/- 100 feet to fit contours or imagery.
2. Repair gaps in existing network geometry.
3. Correct topology errors – overlap, intersect and multipart feature errors.
4. Remove obvious overshoots (short dangles) from geometry; connect undershoots.
5. Change flow direction.
6. Adding new streams – individual streams may be added when newly identified (adding large numbers of streams would need approval above some threshold).
7. Extending streams upslope when justified by new data (field, photo, etc.).
8. Reclassification of stream type – such as from canal/ditch to stream/river, pipeline to penstock, stream/river to artificial path, etc.
9. Reclassification of periodicity (FCode) – perennial, intermittent, ephemeral. Correct erroneous GNIS name and GNIS ID.
10. Correct erroneous reach codes (gapped and branched reaches).
11. Add connectors where an extensive stream network does not connect to the rest of the network (connectors are used when it is known that a stream flows into a network but the exact path is not known; they enable network tracing on streams that would otherwise be disconnected).

Definitions for Revisions

Complete revisions of a Subbasin would use the same 11 editing procedures as listed above in the "Edit" section. These edits would be throughout a complete Subbasin whereas edits could occur with only a few features within a Subbasin.

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ALASKA HYDROGRAPHY STEWARDSHIP
PROCEDURES FOR ASSESSING NHD/WBD DATASETS FOR EDITS AND/OR REVISIONS AND THE EDIT AND/OR REVISION PROCESS

Introduction

The purpose of the following (steps below and the schematic on page 4) is to lay out the programmatic procedures that are required for assessing NHD/WBD datasets for edits and/or revisions and the edit and/or revision process in Alaska. All Alaska partners participating in Alaska's stewardship program will follow this workflow process.

Steps

Note: the numbers below correspond to the circled numbers on the schematic.

1. The need for an edit and/or revision is identified by one of the following three groups:
- Local level stakeholder(s),
- Principal State level NHD and/or WBD steward,
- National level NHD and/or WBD points of contacts (POCs).

2. If the edit or revision proposal comes from either a local level stakeholder or national level POC, they will send an e-mail to the principal State level NHD and the WBD steward notifying them of the proposal. This e-mail will contain a simple description of the need for the edit or revision with a spatial representation attachment, e.g. shapefile. If the principal State NHD and/or WBD Steward identifies a need for an edit or revision, they will send a similar e-mail to the local level stakeholder where the edit or revision is. The other State steward, national level NHD and/or WBD POCs will be cc'd on this e-mail.

Upon receipt of the e-mail, the principal State NHD and/or WBD steward will convene a Alaska Interagency Hydrologic Unit Coordinating Group (IHUCG) meeting to determine the validity of the proposal (step 3) and the type, i.e. edit or revision (step 4).

3. If the edit or revision is not determined to be valid then the originator is notified via e-mail with an explanation. If the edit or revision is determined to be valid, then the type (edit or revision) is determined in the next step (4).

4. The State NHD and WBD stewards and the IHUCG determine whether it is an edit or revision. See Appendix 4 for information on determining NHD and/or WBD editing and revision. Edit decisions move forward to the edit process. Go to step 10. If the proposal is determined to be a revision then the next step (5) is required.

5. Because of the work involved and the potential requirement for funding, revisions require additional national, state level stewardship, and affected stakeholder(s) review. Those involved in the review will be:

a. The originator of the proposal.
b. Stakeholders with responsibilities for lands adjacent to the proposed revision.

c. Stakeholders with overlapping responsibilities (e.g. state regulatory agencies).
d. WBD stakeholders if the proposed NHD revision affects the WBD and conversely NHD stakeholders if the WBD revision will affect the NHD. This also include any interstate/Canadian stewards or stakeholders as necessary.

The originator is responsible for ensuring that the required contacts are made. The IHUCG membership list is a good source for these contacts.

NHD and WBD Stewardship Issues: The State WBD Steward) will be contacted when a major NHD revision results in the need to modify the WBD. Conversely, the State NHD Steward will be contacted when a major WBD revision results in the need to modify the NHD.

National Level Consultation:
Consultation with national level NHD or WBD POCs are made if the revision affects a national program or involves something else nationally. Consultation with national level NHD or WBD technical advisors are made if necessary.

Adjacency Issues: Concurrence by adjacent stakeholders is required if any changes are proposed on their lands. Adjacent stakeholders need to be notified if any changes are made upstream of their lands within a Watershed (10 digit Hydrologic Unit) or if any changes are made within a Subwatershed (12 digit Hydrologic Unit) where they also manage lands. Sharing of the populated template, phone conversations, emails, sharing of screen shots, may all be useful for this communication.

Proceed to step 6 once all the above has been completed.

6. The State NHD and WBD stewards, plus the affected stakeholder(s) determine whether the proposed revision moves forward to the revision process. Go to step 9 if the determination is made to proceed with the revision proposal. If the proposal needs to be modified, or require additional information proceed to the next step.

7. The revision proposal is modified as necessary. Consultation with national level NHD or WBD technical advisors is made if applicable. All affected stakeholders are involved in this step. Proceed to step 8 once the proposal has been modified and is ready to be reviewed again.

8. The State NHD and WBD stewards, plus the affected stakeholders reviews the modified revision proposal. Concurrence by all stewards and stakeholders is required for the decision made in this step. If the decision is made to proceed with the proposed revision then the State NHD and WBD stewards are notified. Go to step 9. If the modified revision proposal is rejected, then the proposal is returned to the originator with an explanation.

9. The State NHD and WBD stewards, depending on the complexity of the revision, makes arrangements for the NHD or WBD dataset to be revised.

10. Edits and revisions in Alaska are not performed at the local level, but at the state level. NHD Photorevisions are usually contracted out and resubmitted to the steward for QA/QC before it's sent on for review in step 11.

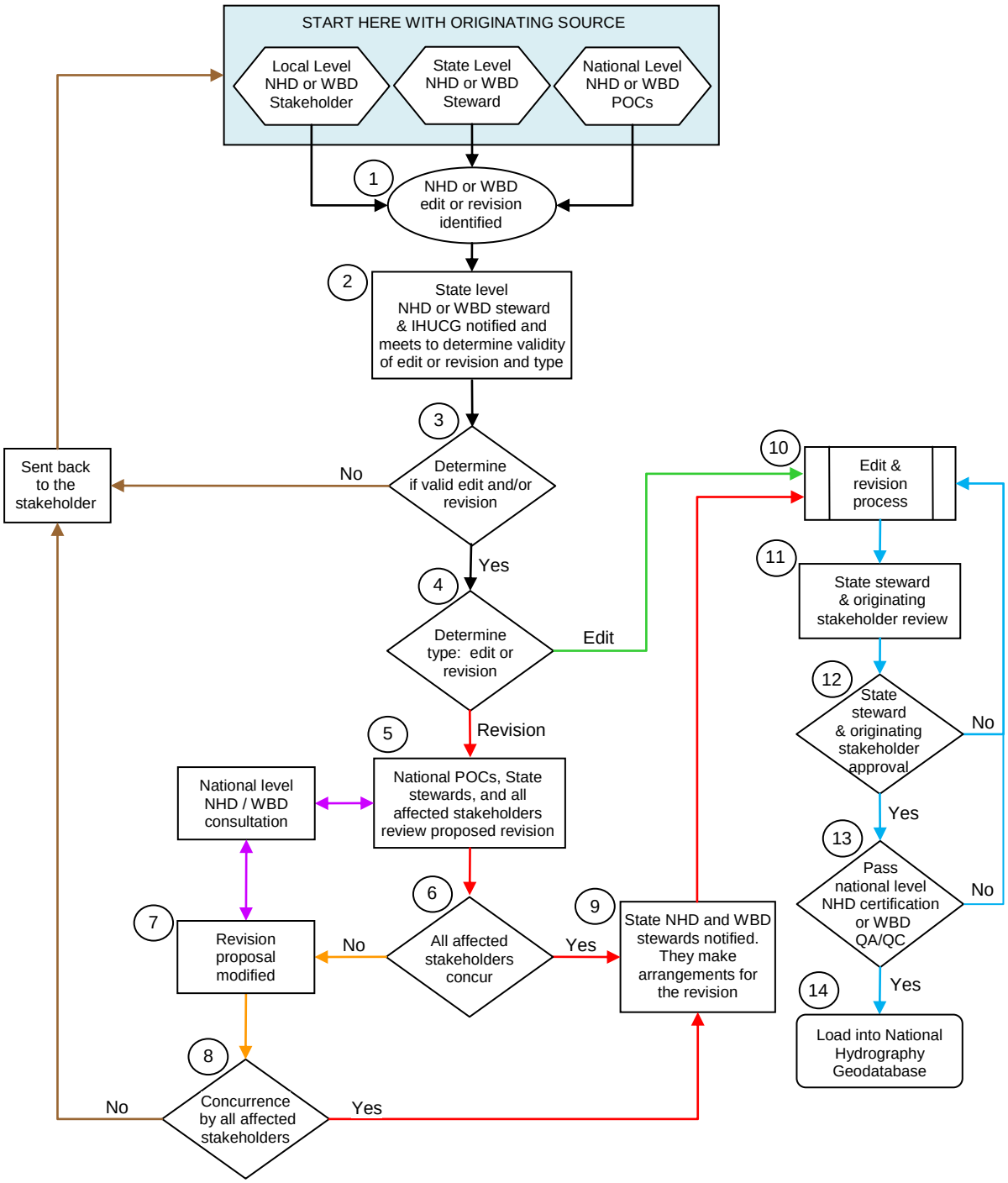
11. When the NHD or the WBD edit or revision has been completed or revised, the organization that did the edit or revision notifies the state level NHD and/or WBD stewards and the originating steward(s). A meeting (can also be via the web) is arranged to review the edit or revision as the next step (12).

12. The State NHD and WBD stewards, and the stakeholder(s) review the completed edit or the revised revision. If the edit or revision is approved then it is sent on to the national level for review (step 13). If it is rejected, then it's sent back to be re-edited or revised (step 10 again).

13. Edits must meet the national level certification standards for WBD. National level quality assurance/quality check (QA/QC) is required for NHD datasets.

14. Upon national approval, edits are loaded into the National Hydrography Geodatabase.

Schematic



CONNECTOR COLOR CODING: **Black** = initial edit and/or revision process; **Green** = edit flow path; **Red** = revision flow path for significant photorevision work; **Orange** = flow path for revisions where additional review of the proposed revision and concurrence are required; **Purple** = national level consultation; **Blue** = edit or revision, certification, and database procedures; **Brown** = notification flow path back to originating steward.