HYDROMETEOROLOGICAL DESIGN STUDIES CENTER
QUARTERLY PROGRESS REPORT

1 January 2009 to 31 March 2009

Office of Hydrologic Development

U.S. National Weather Service

National Oceanic and Atmospheric Administration

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DISCLAIMER

The data and information presented in this report are provided only to demonstrate current progress on the various technical tasks associated with these projects. Values presented herein are NOT intended for any other use beyond the scope of this progress report. Anyone using any data or information presented in this report for any other purpose does so at their own risk.

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I. INTRODUCTION

The Hydrometeorological Design Studies Center (HDSC) within the Office of Hydrologic Development of National Oceanic and Atmospheric Administration's (NOAA) National Weather Service (NWS) is updating precipitation frequency estimates for various parts of the United States. Updated precipitation frequency estimates for durations from 5 minutes to 60 days and selected average recurrence intervals (1-year to 1,000-years) accompanied by additional information (e.g., 90% confidence intervals, temporal distributions, seasonality) are published in NOAA Atlas 14. The Atlas is divided into volumes based on geographic sections of the country. NOAA Atlas 14 is a web-based document available through the Precipitation Frequency Data Server (http://hdsc.nws.noaa.gov/hdsc/pfds/index.html).

HDSC recently completed updating precipitation frequency estimates for the Hawaiian Islands (NOAA Atlas 14, Volume 4) and is currently updating estimates for the remainder of California (not included in NOAA Atlas 14, Volume 1), the U.S. Pacific Islands, and Alaska. While formal agreements are being put into place and funds transferred, we initiated precipitation frequency projects for the following Southeastern and Midwestern states: Alabama, Arkansas, Georgia, Florida, Louisiana and Mississippi, Colorado, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, South Dakota, and Wisconsin. Figure 1 shows new project areas as well as project areas included in NOAA Atlas 14, Volumes 1 to 4.

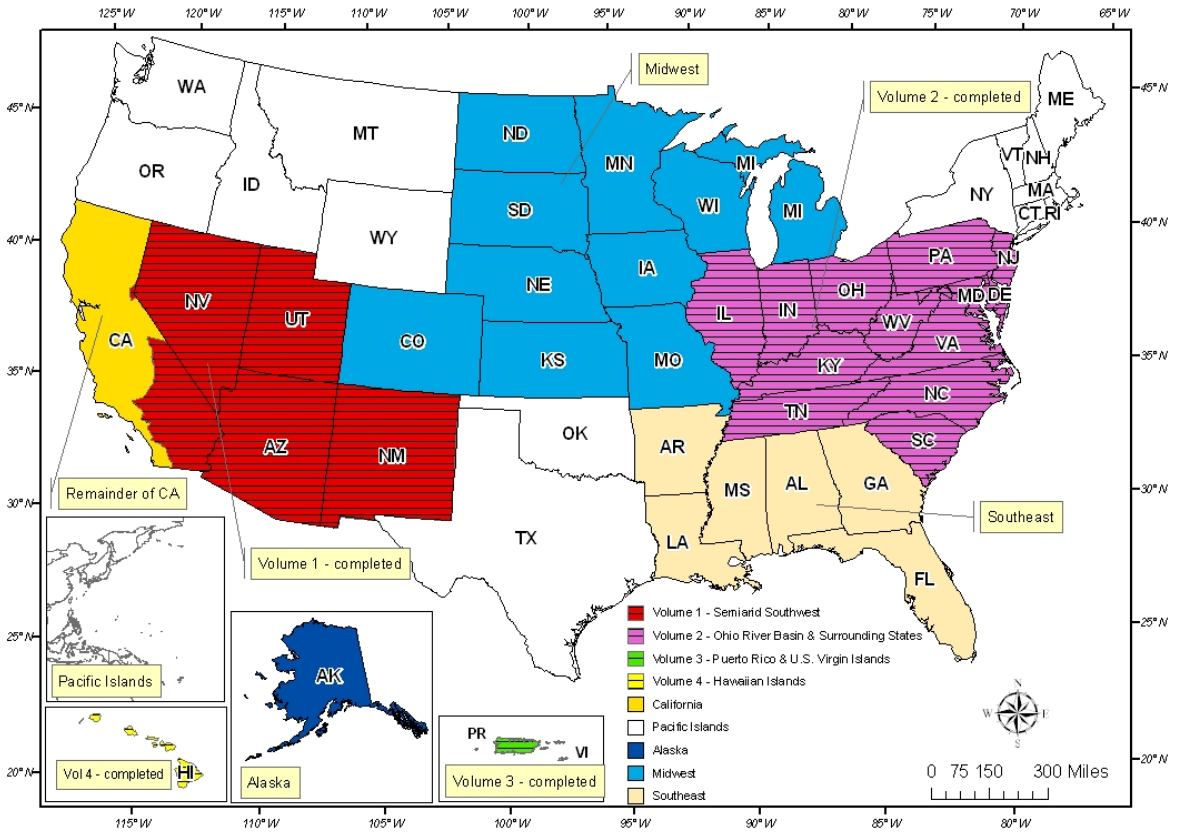

Figure 1. Map showing current project areas and project areas included in NOAA Atlas 14, Volumes 1-4.

II. CURRENT PROJECTS

1. PRECIPITATION FREQUENCY PROJECT FOR HAWAIIAN ISLANDS

1.1. PROGRESS IN THIS REPORTING PERIOD (Jan - Mar 2009)

1.1.1. Publication

On March 30th, HDSC released NOAA Atlas 14, Volume 4: Precipitation-Frequency Atlas of the United States, Hawaiian Islands. The estimates were published through HDSC's Precipitation Frequency Data Server at http://hdsc.nws.noaa.gov/hdsc/pfds/.

The release includes:

- precipitation frequency (PF) estimates with 90% confidence intervals for durations from 5-minutes through 60-days, and average recurrence intervals (ARI) from 1-year through 1,000-years (http://hdsc.nws.noaa.gov/hdsc/pfds/hi/hi_pfds.html);
- cartographic maps of PF estimates for select durations and ARI (http://hdsc.nws.noaa.gov/hdsc/pfds/pfds_maps.html);
- PF estimates in GIS compatible forms (http://hdsc.nws.noaa.gov/hdsc/pfds/pfds_gis.html);
- annual maximum series data used in the precipitation frequency analysis (http://hdsc.nws.noaa.gov/hdsc/pfds/pfds_series.html);
- temporal distribution analysis of heavy precipitation for selected durations (http://hdsc.nws.noaa.gov/hdsc/pfds/pfds_temporal.html);
- seasonality of extreme precipitation – graphs of the number of cases that exceed selected ARI in each month for selected durations (http://hdsc.nws.noaa.gov/hdsc/pfds/hi/hi_pfds.html).

Accompanying documentation will be released in May 2009 (http://www.nws.noaa.gov/oh/hdsc/currentpf.htm).

1.1.2. Final review of precipitation frequency estimates and confidence intervals

At-site precipitation frequency estimates as well as spatially interpolated patterns were carefully reviewed for reasonableness and consistency across durations and ARI. This investigation led to several changes. Station 51-2462 (Kahana 883) on Oahu was deleted due to its inconsistent PF estimates relative to nearby stations and probable incorrect coordinates. Station 51-8155 (PH Wainiha 1115) in northern Kauai was regrouped from daily region 8 to region 14 based on climatological and statistical considerations.

Locations where we previously included stations with limited data to interpolate mean annual maximum (MAM) estimates were carefully examined to confirm the resulting MAM and PF spatial patterns and to justify their inclusion. Eastern Maui in particular was heavily scrutinized because 1,000-year estimates neared or exceeded probable maximum precipitation estimates. A decision was made to exclude the majority of stations with short records due to their disproportionately large impact on the PF spatial patterns. Only the following three high

elevation stations were kept: 51-8433 (Puu Kukui 380) in western Maui, 56-0164 (HaleNet's Big Bog) in eastern Maui and 51-6565 (Mount Waialeale) in central Kauai.

Grids/maps of the precipitation frequency estimates and corresponding confidence intervals for all durations and ARI were created and reviewed.

1.1.3. Temporal distributions

The temporal distribution analysis of heavy precipitation was performed for durations of 6, 12, 24, and 96 hours. The results are based on analysis of annual maxima with a continuous dry period under 20% of the duration. The digital data for the temporal distributions for durations of 6, 12, 24, and 96 hours are now available through the Precipitation Frequency Data Server (http://hdsc.nws.noaa.gov/hdsc/pfds/pfds_temporal.html). Documentation describing the analysis and results in detail will be included in the NOAA Atlas 14, Volume 4 documentation that will be published in May 2009.

1.2. PROJECTED ACTIVITIES FOR THE NEXT REPORTING PERIOD (Apr - Jun 2009)

1.2.1. Final documentation

Documentation detailing the data used, analysis methods, and spatial interpolation methods will be released during the next reporting period. We expect to publish it in May 2009.

1.3. PROJECTED SCHEDULE

Development of final precipitation frequency grids for all durations based on PRISM deliverables and other remaining tasks (seasonality, temporal distributions, etc.) [Complete]

Web publication [Complete]

Web documentation [May 2009]

2. PRECIPITATION FREQUENCY PROJECT FOR THE REMAINDER OF CALIFORNIA

2.1. PROGRESS IN THIS REPORTING PERIOD (Jan - Mar 2009)

The formal agreement for this work has been signed and the transferring of funds from the State of California to NWS is in progress.

2.1.1. Data collection and formatting

During the past quarter, HDSC completed formatting another five datasets into a format suitable for our analysis software: daily data from Santa Clara Valley Water District, hourly and 5-minute data from Santa Barbara County Flood Control District, ALERT data from Orange County California Department of Parks and Recreation and ALERT data from San Diego County Flood Control District. After careful consideration, we decided not to include the following two datasets in our analysis: 5-minute data from the Ventura County Watershed District that did not have long enough records and ALERT data from Monterey County Water Resources Agency that were not available in a readily accessible digitized format. Both datasets cover areas that are already well represented by other datasets. We were also contacted by Alameda County Flood Control District who will provide us additional daily and hourly data from their county.

Table 1 provides basic information on the datasets, including data type, data source, number of stations in each processed dataset, and current status of data formatting. The numbers of stations are subject to change as we further review the data (eliminate duplicate stations, impose a minimum number of years of data, merge appropriate stations, etc.).

Table 1. List of data types, data sources, number of stations in each processed dataset, and current status of formatting (ALERT data are Automated Local Evaluation in Real Time gauges that measure precipitation using tipping buckets in increments of 0.04 in).

Data Type	Data Source	Number of Stations	Status of Formatting
Daily	National Climatic Data Center (NCDC)	1,356	Complete
	CA Department of Water Resources	382	Complete
	U.S. Army Corps of Engineers	43	Complete
	Santa Barbara County Flood Control District	161	Complete
	LA County Dept. of Public Works	1,180	Complete
	San Diego County Flood Control District	67	Complete
	California Nevada River Forecast Center	553	Complete
	Ventura County Watershed Protection District	104	Complete
	City of Roseville, Dept. of Public Works	6	Complete
	Santa Clara Valley Water District	130	Complete
	U.S. Geological Survey	10	Complete
	Contra Costa Flood Control District and Water Conservation District	15	Complete

Data Type	Data Source	Number of Stations	Status of Formatting
	SNOTEL	152	Complete
	NCDC's CLIMVIS Global Summary (Mexico)	33	Complete
	Alameda County Flood Control District	TBD	
Hourly	National Climatic Data Center	540	Complete
	CA Department of Water Resources	345	Complete
	U.S. Army Corps of Engineers	43	Complete
	Metro Flood Control District, Fresno	8	Complete
	Jim Goodridge, Retired State Climatologist	337	Complete
	RAWS	250	Complete
	City of Roseville, Dept. of Public Works	5	Complete
	USGS	6	Complete
	SNOTEL	64	Complete
	Santa Barbara County Flood Control District	19	Complete
	Alameda County Flood Control District	TBD	
15-min	National Climatic Data Center	477	Complete
5-min	National Climatic Data Center	24	Complete
	Santa Barbara County Flood Control District	36	Complete
	LA County Dept. of Public Works	62	Complete
	Riverside County Flood Control District	TBD	
	Contra Costa Flood Control District and Water Conservation District	5	In progress
ALERT	Orange County California Dept. of Parks & Recreation	45	Complete
	San Diego County Flood Control District	67	Complete
	Marin County Flood Control and Water Conservation District	5	Complete

2.1.2. Data quality control

a. Metadata

The quality control of metadata (latitude, longitude, elevation) continues. We are reviewing the metadata for 245 stations where the metadata elevation is 900 feet different from 90-meter resolution digital elevation model (DEM) elevation. We are also reviewing 1069 daily and hourly stations that have no seconds in their latitude and longitude coordinates to verify their locations. We are contacting the data sources to inquire upon the accuracy of the coordinates and elevations.

b. Station merging

The recently received and formatted daily data from the Santa Clara Valley Water District were inspected for potentially merging station data to form longer continuous records. 14 station pairs or groups were merged using methods described in the January 2009 Progress Report (http://www.nws.noaa.gov/ohd/hdsc/current-projects/pdfs/HDSC_PR_Jan09.pdf), section 2.1.2.b.

c. Station screening

All stations with at least 30 years of data will be used in the precipitation frequency analysis. Given the complexity of the terrain and a need for good spatial coverage, consideration was given to including some stations with 10 to 30 years of data in the initial dataset. A shorter record station was retained if no station with more than 30 years of data was found within a search radius of 5 miles. High elevation stations were also reviewed with respect to orientation on either side of a ridge to ensure retention of all spatially and climatologically relevant stations.

This process resulted in 3,463 daily and 720 hourly stations for initial analysis.

d. Annual maximum series (AMS) extraction

The procedure for extracting an annual maximum series from a dataset uses a set of criteria designed to extract only reasonable annual maxima from years with missing or accumulated data. One of the criteria is based on comparison of missing and/or accumulated data with the maximum allowable numbers during a “wet season”. The “wet season” is assigned for a climatologically homogeneous region and is defined as the months in which two-thirds of annual maxima occur. Preliminary “wet season” regions were delineated for 1-hour, 1-day and 30-day durations. The difference between the 1-day and 30-day regions was not significant enough to warrant different “wet season” regions for longer daily durations. Therefore, the extraction of annual maxima for durations 1 through 12 hours will use the 1-hour “wet season” regions and 1 through 60-days will use the 1-day “wet season” regions. This work is still in progress and the region delineation will be confirmed by assessing histograms of annual maximum events for each region.

e. Co-located station quality control

Co-located stations are defined as: a) any daily and hourly station pair with same station ID and location or b) any station pair within 100 meters in distance and 100 feet in elevation of each other with comparable annual maxima at the 24-hr duration for overlapping periods. Work began during this quarter to identify and quality control co-located stations. Correlation coefficients between annual maxima during overlapping periods of record were computed. Ratios of 24-hour maxima from the hourly data to 1-day maxima from daily data are being reviewed for each year for all station pairs. Years where the ratio is less than 0.95 or greater than 1.5 were identified for further quality control. In addition, where possible, we will extend the record of daily stations using data from co-located hourly station.

f. **Quality control of AMS**

Software to quality control AMS data by identifying statistically high or low outliers continues to undergo enhancements. Quality control of 1-day AMS is underway.

2.2. PROJECTED ACTIVITIES FOR THE NEXT REPORTING PERIOD (Apr - Jun 2009)

HDSC will complete formatting all data and work towards resolving remaining metadata concerns. We will complete the quality control of co-located stations and continue work on quality control of the AMS data for all durations.

2.3. PROJECTED SCHEDULE

Due to the unforeseen contractual delays and large volume of data collected to be quality controlled, the completion deadline for this project was extended to September 2010. There are currently over 4,000 stations to quality control and interested parties are still sending us data. The updated schedule is as follows:

Data collection, formatting and initial quality control [April 2009]

Extraction of annual maximum series (AMS); additional quality control and data reliability tests (e.g., outliers, trend analysis, independence, consistency across durations, duplicate stations, candidates for merging) [September 2009]

Regionalization and frequency analysis [January 2010]

Initial spatial interpolation of PF estimates and consistency checks across durations [March 2010]

Peer review [April 2010]

Revision of PF estimates [July 2010]

Remaining tasks (e.g., development of precipitation frequency estimates for PD series, seasonality, temporal distributions, documentation) [August 2010]

Web publication [September 2010]

3. PRECIPITATION FREQUENCY PROJECT FOR THE U.S. PACIFIC ISLANDS

3.1. PROGRESS IN THIS REPORTING PERIOD (Jan - Mar 2009)

HDSC continues a project to update the precipitation frequency estimates of the U.S. Pacific Islands. The project is being performed with funds provided by the NOAA Climate Program. It covers the following islands:

- Territory of Guam,
- Saipan, Rota and Tinian of the Commonwealth of Northern Mariana Islands,
- Yap, Chuuk, Pohnpei and Kosrae of the Federated States of Micronesia,
- Republic of Palau,
- Republic of the Marshall Islands,
- Tutuila and Manua of American Samoa,
- Wake Island.

3.1.1. Data collection

The Comprehensive Pacific Rainfall Data Base (http://pacrain.evac.ou.edu/PACRAIN) stations were excluded from the initial dataset since all stations have less than 10 years of data.

We have been in contact with the US Geological Survey's (USGS) Pacific Islands Water Science Center regarding their data. They have supplied 15-minute data for 5 stations on Palau, 3 stations on American Samoa, and 6 stations on Guam. We expect to receive 2 additional stations on Saipan as well. We have also downloaded daily precipitation data from the USGS (http://hi.water.usgs.gov/studies/project_waterdata.htm) for 17 stations with at least 10 years of data. Some of these stations are located in data sparse areas.

One station on Guam, available through the Remote Automated Weather Stations (RAWS) network, has too few data years and is located near stations with longer records, so it will not be used. We are also looking into one site through the National Atmospheric Deposition Precipitation (NADP) National Trends Network (NTN) on American Samoa's Tutuila.

We have been corresponding with the National Weather Service Forecast Office in Guam. They have provided recent daily data for several stations that has allowed us to extend records of NCDC stations. Table 2 provides basic information on datasets collected for this project.

Table 2. List of data sources, data types, number of stations in each dataset with comments.

Data Source	Data type	Number of stations	Status of Formatting
National Climatic Data Center	daily	55	Complete
	hourly	15	Complete
	15-min	13	Complete
	n-min	9	Complete
U.S. Geological Survey	15-min	14	Complete Expecting 2 stations on Saipan.
	daily	17	Complete

3.1.2. Data quality control and initial regionalization

Quality control of metadata and AMS data continues, as we obtain new data. Preliminary homogeneous regions for this project have been delineated using NCDC data and verified with statistical homogeneity tests and other checks.

3.2. PROJECTED ACTIVITIES FOR THE NEXT REPORTING PERIOD (Apr - Jun 2009)

Data collection, reformatting and quality control will be completed. Data reliability tests and regionalization of data for frequency analysis will be completed.

3.3. PROJECTED SCHEDULE

Data collection, formatting and initial quality control [April 2009]

Extraction of annual maximum series (AMS); additional quality control and data reliability tests (e.g., outliers, trend analysis, independence, consistency across durations, duplicate stations, candidates for merging) [May 2009]

Regionalization and frequency analysis [May 2009]

Initial spatial interpolation of PF estimates and consistency checks across durations [June 2009]

Peer review [June 2009]

Revision of PF estimates [July 2009]

Remaining tasks (e.g., development of precipitation frequency estimates for PD series, seasonality, temporal distributions, documentation) [August 2009]

Web publication [September 2009]

4. PRECIPITATION FREQUENCY PROJECT FOR THE SOUTHEASTERN STATES

4.1. PROGRESS IN THIS REPORTING PERIOD (Jan - Mar 2009)

A formal agreement for this project with the Federal Highway Administration (FHWA) Pooled Fund Program was signed in April 2009. Once the funds are in place, work will fully commence. While waiting on the transfer of funds, we continue data collection for the states of Alabama, Arkansas, Georgia, Florida, Louisiana and Mississippi and 1-degree buffer around those states.

We are exploring potential data sources from responses to our data solicitation email sent on 22 August 2008. Please let us know (email HDSC.Questions@noaa.gov) if you have or know of any other available data. Table 3 provides a current list of potential data sources and data types.

Table 3. Current list of potential precipitation data sources and data types.

Data Source	Data Type	Preliminary Number of Stations	Data Received Thus Far
National Climatic Data Center	daily; hourly; 15-min; n-min	TBD	
Natural Resources Management Office, Brevard County, Florida	daily	2	Metadata and data
Public Waters and Utilities Administration, City of Melbourne, Florida	daily	TBD	Data
University of Central Florida, Stormwater Academy	TBD	TBD	
Brevard County Utility Services Department, Florida	daily	TBD	Data
USGS, Georgia Water Science Center	daily	212	Metadata and data
Earth Science Office, NASA, Cooperative Huntsville Area Rainfall Measurements (Alabama) http://weather.msfc.nasa.gov/charm	daily	TBD	
U.S. Climate Reference Network (NCDC)	hourly; 15-min		
Department of Barefoot Bay Water and Sewer District	monthly	TBD	Data
Florida Automated Weather Network (FAWN), University of Florida	15-min	35	Data
Georgia Automated Environmental Monitoring Network, University of Georgia	15-min, daily	29	Metadata
Georgia Forestry Commission	hourly	22	Metadata
Community Collaborative Rain, Hail and Snow Network (CoCoRaHS)	daily	TBD	Metadata
Remote Automated Weather Stations (RAWS)	hourly	TBD	Metadata

4.2. PROJECTED ACTIVITIES FOR THE NEXT REPORTING PERIOD (Apr - Jun 2009)

The main focus will continue to be data acquisition, evaluation, and reformatting.

4.3. PROJECTED SCHEDULE (as months from start)

Data collection, formatting, and initial quality control [+3 months]

Extraction of annual maximum series (AMS); additional quality control and data reliability tests (e.g., outliers, trend analysis, independence, consistency across durations, duplicate stations, candidates for merging) [+14 months]

Regionalization and frequency analysis [+18 months]

Initial spatial interpolation of PF estimates and consistency checks across durations [+24 months]

Peer review [+ 26 months]

Revision of PF estimates [+29 months]

Remaining tasks (e.g., development of precipitation frequency estimates for PD series, seasonality, temporal distributions, documentation) [+35 months]

Web publication [+36 months]

5. PRECIPITATION FREQUENCY PROJECT FOR THE MIDWESTERN STATES

5.1. PROGRESS IN THIS REPORTING PERIOD (Jan - Mar 2009)

A formal agreement for this project with the Federal Highway Administration (FHWA) Pooled Fund Program was signed in April 2009. Once funds are in place, work will fully commence. While waiting on the transfer of funds, we continue data collection for the states of Colorado, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, South Dakota, and Wisconsin and 1-degree buffer around the core states.

We are exploring potential data sources from responses to our data solicitation email sent on 22 August 2008. Please let us know (email HDSC.Questions@noaa.gov) if you have or know of any other available data. Table 4 provides a current list of potential data sources and data types available.

Table 4. Current list of potential precipitation data sources and data types.

Data Source	Data Type	Preliminary Number of Stations	Data Received Thus Far
National Climatic Data Center	daily; hourly; 15-min; n-min	TBD	
Minnesota State Climatology Office, Department of Natural Resources	daily	1544	Sample data format
North Dakota State Water Commission	daily	TBD	
Minnesota Department of Transportation	15-min	TBD	Metadata and data
Stormwater Management Program, Kansas Department of Transportation	daily	58	Metadata and data
Colorado Climate Center, Colorado State University	TBD	TBD	Metadata and data
Colorado Springs Utilities	daily	5	Metadata
Oklahoma Mesonet	n-min; hourly	TBD	6 years of data
Arkansas-Red Basin River Forecast Center, NWS	TBD	TBD	
University of Missouri, State Climate Office	daily; hourly	28	Metadata
North Dakota Agricultural Weather Network (NDAWN), North Dakota State University	daily; hourly; 10-min	70; 70	Metadata and data
US Army Corps of Engineers, Omaha District Office	daily; hourly	TBD	
Metropolitan Council Environmental Services, MN	15-min	TBD	Metadata and data
Community Collaborative Rain, Hail and Snow Network (CoCoRaHS)	daily	TBD	Metadata
Southeastern Wisconsin Regional Planning Commission, Milwaukee Metropolitan Sewerage District	hourly	21	Metadata and data
Kansas State University, State Climate Office	TBD	TBD	

Data Source	Data Type	Preliminary Number of Stations	Data Received Thus Far
HIDEN Network, MN	daily	TBD	
High Plains Regional Climate Center (HPRCC) Automated Weather Data Network (AWDN)	daily; hourly	167	Metadata
Remote Automated Weather Stations (RAWS)	hourly	TBD	Metadata

5.2. PROJECTED ACTIVITIES FOR THE NEXT REPORTING PERIOD (Apr - Jun 2009)

The main focus will continue to be data acquisition, evaluation, and reformatting.

5.3. PROJECTED SCHEDULE (as months from start)

Data collection, formatting, and initial quality control [+3 months]

Extraction of annual maximum series (AMS); additional quality control and data reliability tests (e.g., outliers, trend analysis, independence, consistency across durations, duplicate stations, candidates for merging) [+14 months]

Regionalization and frequency analysis [+18 months]

Initial spatial interpolation of PF estimates and consistency checks across durations [+24 months]

Peer review [+ 26 months]

Revision of PF estimates [+29 months]

Remaining tasks (e.g., development of precipitation frequency estimates for PD series, seasonality, temporal distributions, documentation) [+35 months]

Web publication [+36 months]

6. PRECIPITATION FREQUENCY PROJECT FOR ALASKA

6.1. PROGRESS IN THIS REPORTING PERIOD (Jan - Mar 2009)

The University of Alaska, Fairbanks (UAF) is moving forward on the joint effort with NWS to update precipitation frequency estimates for Alaska. UAF continues with data collection and formatting.

Data from all major reporting agencies have been collected. Reformatting of these datasets has begun. Table 5 provides basic information on datasets: data type, data source, number of stations in each dataset, and current status of data formatting including some comments/notes. This table is subject to change as a result of quality control process to be performed after all data are collected.

Table 5. List of data types, data sources, number of stations in each dataset, current status of formatting and comments.

Data Type	Data Source	Number of Stations	Status of Formatting/ Comments
Daily	Arctic-Long Term Ecological Research Site (LTER)	3	In Progress
	Environment Canada	59	Completing data acquisition
	National Climate Data Center (NCDC)	674	In Progress
6-hourly	Environment Canada	13	Completing data acquisition
Hourly	Bonanza Creek LTER	2	In Progress
	NCDC	92	In Progress
	Environment Canada	12	Completing data acquisition
	ATLAS - UAF	8	In Progress
	RWIS - Alaska DOT	18	Completing data acquisition
	WERC - North Slope	12	In Progress
	RAWS	142	
15-min	NCDC	38	In Progress

6.2. PROJECTED ACTIVITIES FOR THE NEXT REPORTING PERIOD (Apr - Jun 2009)

The main focus during the next reporting period will be reformatting of collected data. Any remaining data acquisition is expected to be completed.

6.3. PROJECTED SCHEDULE

Data collection, formatting, and initial quality control [August 2009]

Extraction of annual maximum series (AMS); additional quality control and data reliability tests (e.g., outliers, trend analysis, independence, consistency across durations, duplicate stations, candidates for merging) [January 2010]

Regionalization and frequency analysis [September 2010]

Initial spatial interpolation of PF estimates and consistency checks across durations [January 2011]

Peer review [March 2001]

Revision of PF estimates [May 2011]

Remaining tasks (e.g., development of precipitation frequency estimates for PD series, seasonality, temporal distributions, documentation) [August 2011]

Web publication [September 2011]

7. AREAL REDUCTION FACTORS

7.1. PROGRESS IN THIS REPORTING PERIOD (Jan - Mar 2009)

HDSC is developing geographically-fixed areal reduction factors that can be used to convert point precipitation frequency estimates into corresponding areal estimates in the United States. For a given average recurrence interval, rainfall duration and area size, the areal reduction factor (ARF) is defined as a ratio of average point depth and areal depth with the same recurrence interval.

Insufficient time and resources have prevented this project from moving forward, but that is expected to change as HDSC expands its human resources.

7.2. PROJECTED ACTIVITIES FOR THE NEXT REPORTING PERIOD (Apr - Jun 2009)

No progress is expected to be made on this project during the next reporting period. When additional resources become available, HDSC will investigate an approach that utilizes radar-estimated precipitation.

III. OTHER

1. PERSONNEL

On January 5th, Dr. Kazungu Maitaria joined HDSC as a University Corporation for Atmospheric Research (UCAR) Project Scientist. Dr. Maitaria received his Doctorate in Hydrology and Water Resources from the University of Arizona and has advanced knowledge of civil engineering design principles for managing rainfall and runoff and statistical methods related to precipitation and flood frequency analysis that are critical for the HDSC work.

On February 16th, Tye Parzybok reduced his hours with HDSC to pursue other opportunities. Mr. Parzybok was primarily responsible for the GIS and spatial interpolation work as well as providing climate and meteorological expertise. HDSC will be actively seeking expertise to fill his role.

We were joined on March 16th by Carl Trypaluk. Mr. Trypaluk received his B.S. degree in Atmospheric Science from Lyndon State College, Lyndonville, Vermont in 2008. He has knowledge of various hydrometeorology topics and is proficient in several programming languages.