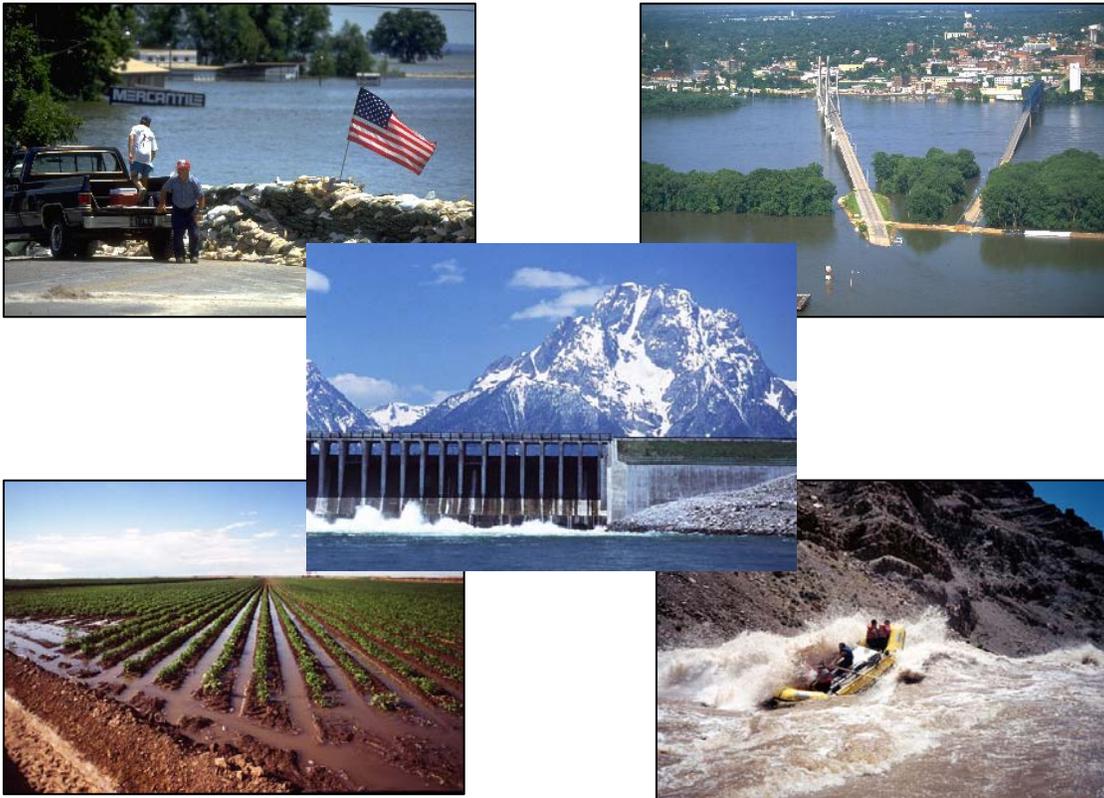




Advanced Hydrologic Prediction Service Quarterly Report 3rd Quarter FY 2011



August 01, 2011

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*Project funding restored FY11 Q3

Innovation/Collaborative Research

On-going Competitive and Collaborative Research (Grants and CREST)

Theme: Innovation

Management Lead: Pedro J. Restrepo

Objective: Coordinate the evaluation and management of the collaborative grants program

Milestones

Task	Due Date	Status
- None presently defined -		

1st Quarter FY10

- Projects are on-going. The two river regulation projects will be finishing on Q3. The PIs will give a presentation to the HICs before the HIC meeting.

2nd Quarter FY10

- Forwarded the continuing funding request to the two on-going collaborative projects, and to the NOAA-CREST projects as well

3rd Quarter FY10

- All projects are funded now. Received the draft final report from HRC, and are expecting the one from Aptima any day now.

4th Quarter FY10

- Reviewed and accepted all progress report. Final reports from HRC and Aptima. Progress report from UC-Irvine, U. Arizona and Boise State.

1st Quarter FY11

- Received and reviewed progress reports from UCLA, UC Irvine, U. Arizona, and Arizona State University. Returned all reports with comments. Held a project meeting via teleconference with Boise State University. Their progress report is due shortly.

2nd Quarter FY11

- Received progress report from Boise State and approved it. Interacted with the UC Irvine team to clarify our priorities.

3rd Quarter FY11

- Received the final reports from UCI and U. of Arizona. Approved the report from UCI, and we are in the process of reviewing the reports.

Problems Encountered/Issues

1st Quarter FY10 – None

2nd Quarter FY10 – None

3rd Quarter FY10 – None

4th Quarter FY10 – None

1st Quarter FY11 – None

2nd Quarter FY11 – None

3rd Quarter FY11 – None

OHD – NCEP Coordination

Core Goal: Provide, then improve, gridded water resource data production capability and quantify uncertainty of our forecast information

Management Lead: Pedro Restrepo

[Note: for FY11, this project constitutes a merger of AHPS projects “**OHD-NCP Coordination**” and “**THORPEX-HYDRO**” that were reported on individually in FY10 and earlier years. As of FY11 Q3, activities on those earlier, independent projects will no longer be included in this report. Please refer to AHPS Quarterly Reports for FY2010 Quarter 4, or for FY2011 Quarters 1 or 2, for prior-year details on those projects.]

- Objective:** Coordinate OHD and NCEP hydrologic modeling efforts, including the following objectives
- 1) Accelerate development of reliable and skillful hydrometeorological (precipitation, temperature, and potential evaporation) ensemble forecast products for hydrology and water resources applications (THORPEX-HYDRO project)
 - 2) Fast-track infusion of new and improved hydrometeorological ensemble and probabilistic guidance products into the RFC operations through the EXperimental Ensemble Forecast System (XEFS) to support the Hydrologic Ensemble Forecast Service (HEFS) (THORPEX-HYDRO project)
 - 3) Evaluate the NCEP-OHD National High-Resolution modeling using the 30-year SNOW17/SAC-HT model outputs at the HRAP scale and investigate uncertainties in high resolution water resource products using different land surface models or model physics to support drought and flood monitoring (OHD-NCEP joint project).

Milestones:

FY11 Milestones for Merged Project:

Task	Due Date	Status
Implement downscaled NAEFS forecasts for Alaska domain, including additional new near-surface variables for CONUS (2m min/max & dewpoint temp, 10m wind speed and direction). (?)	FY11 Q1	Completed (12/07/2010)
Include FNMOC ensemble into NAEFS (NUOPC IOC)	FY11 Q3	Completed (01/22/2011)
Produce verification metrics for RFC-based spatial areas (e.g., RFC areas, main carryover groups, and main forecast groups) for GEFS and NAEFS	FY11 Q3	Ongoing
Evaluate climatology-calibrated precipitation analysis (combined RFC-CPC) datasets over CONUS	FY11 Q3	Ongoing
Implement pseudo-precipitation for ensemble forecasts to convert precipitation into a continuous variable and improve bias correction	FY11 Q3	Ongoing
Test climatological downscaling of NAEFS precipitation forecasts over CONUS.	FY11 Q3	Ongoing
Implement bias correction for NAEFS precipitation forecasts over CONUS. Complete downscaling of precipitation from model grid to NDFD grid using CCPA precipitation over CONUS.	FY11 Q4	Ongoing NAEFS upgraded (03/01/2011)
Increase resolution for global and regional ensembles. Implement hindcast system that uses the latest version of the data assimilation and numerical modeling system, allowing high-quality bias correction of precipitation and river flow.	FY11 Q4	Ongoing

Introduce ESRL/NCEP reforecast and hindcast for ensemble control for GEFS using the latest version of the data assimilation and numerical modeling system for improved bias correction of precipitation and river flow.	FY12	
Implement the Bayesian Ensemble Processor for 6-hourly precipitation for NAEFS and SREF to reduce systematic errors	FY12	
Include ECMWF ensembles into NAEFS	FY12	
Collaborate with NCEP EMC and CPC to make use of forecasts and reforecasts from new Climate Forecast System version 2 (CFSv2) in the Atmospheric Ensemble Pre-Processor for XEFS/HEFS	FY12 Q1	Ongoing
Collaborate with NCEP EMC and ESRL to make use of new GEFS forecasts and reforecasts in the Atmospheric Ensemble Pre-Processor for XEFS/HEFS	FY12	Ongoing
Collaborate with NCEP EMC on production and hydrologic evaluation of water resource products at HRAP scale over CONUS	FY11	Ongoing

Accomplishments/Actions

1st Quarter FY11

- OHD and NCEP EMC discussed current activities for the THORPEX-HYDRO project on 12/02/2010, including the assessment of CCPA precipitation datasets and SREF ensembles on selected RFC basins.
- OHD and NCEP EMC discussed the high-resolution modeling and hydrologic assessment of SNOW17/SAC-HT model outputs at the HRAP scale on 12/06/2010.

2nd Quarter FY11

- OHD and NCEP EMC discussed recent activities for the THORPEX-HYDRO project on 03/24/2011, including the recent EMC ensemble implementations (NUOPC ICO implementation and NAEFS upgrade), the next GEFS implementation, the next NAEFS upgrade, and the reforecast datasets for CFSv2 and GEFS.
- Continued to coordinate with NCEP CPC and EMC the retrieval of the CFSv2 reforecast datasets and archiving of CFSv2 real-time forecasts.
- Coordinated with NCEP EMC, DJ Seo (Univ. of Texas), and Yuqiong Liu (NASA) the preparation of papers to describe the generation of the high-resolution SNOW17/SAC-HT model outputs and initial results from the hydrological analysis and evaluation.

3rd Quarter FY11

- Due to Julie's departure, Core project report deadline was extended to the end of September.
- Received funding from OAR under the new proposal

Problems Encountered/Issues

1st Quarter FY11 – The funding situation is still unclear. Pedro Restrepo contacted Jin Huang to inquire about the status of the grant proposals. She mentioned that no decision would be made before OAR knew how much funding they would receive.

2nd Quarter FY11 – Funding is still unclear but at least one of the CPO proposals for the OHD-NCEP joint project was not funded.

3rd Quarter FY11 – Funding now has been confirmed from OAR

Quantify Uncertainty (Ensembles)

Hydrologic Data Assimilation

Core Goal: Quantify uncertainty of our forecast information

Management Lead: Julie Demargne (Project Lead: Haksu Lee; previously Yuqiong Liu)

Note: for FY11, this project constitutes a merger of AHPS projects that were reported on individually in FY10 and earlier years, as follows:

- Hydrologic Routing DA
- Snow & Streamflow DA
- DA for RDHM

Please refer to AHPS Quarterly Report for FY2010 Quarter 4 for prior-year details on those projects.

Objective: Develop hydrologic data assimilation (DA) capabilities that can be implemented in the Community Hydrologic Prediction System (CHPS) to support the Hydrologic Ensemble Forecast Service (HEFS).

The DA capabilities are designed to generate optimal initial states for the hydrologic models to produce improved snowmelt and hydrologic forecast outputs. Once implemented in operations, the DA techniques can provide objective guidance for the manual modifications (run-time MODs) done by the forecasters and automate these modifications by using the latest available observations and quantifying various sources of uncertainty to reduce forecast bias and improve forecast skill.

The DA techniques need to be objectively evaluated on selected test basins for both deterministic forecasting and ensemble forecasting to determine the cost-benefit effectiveness for their implementation in CHPS. This evaluation should include the comparison with the techniques used in the current operations to demonstrate the value of these DA techniques. Also the DA techniques need to be compared with statistical post-processing techniques developed for HEFS to establish their individual and combined impacts on reducing and quantifying the uncertainty in the initial conditions and the hydrologic model uncertainty.

The integration of DA techniques in CHPS is based on the open source data assimilation software (OpenDA) developed by Deltares with its partners, with collaborative R&D efforts by Deltares and OHD under the CRADA project. OpenDA provides a generic interfacing protocol for describing the interactions between models, observations, and data assimilation algorithms. Therefore it facilitates the integration and testing of multiple DA techniques using techniques already implemented in OpenDA, thus accelerating the advances of DA capabilities for operational hydrologic forecasting.

This project also includes collaborating with partners such as University of Texas, NASA, and Deltares, and participants of the international workshop on “Data Assimilation for Operational Hydrologic Forecasting and Water Resources Management”. This workshop is co-organized by OHD and Deltares and held at Deltares in Delft, the Netherlands, on Nov 1-3, 2010. Follow-up activities include organizing a 2nd DA workshop and preparing joint papers to help improve the DA capabilities for implementation into operations.

This project includes the following tasks:

- 1) Improve the integration of the CHPS-compatible hydrologic routing DA prototype via OpenDA, and evaluate its performance within CHPS for both deterministic and ensemble forecasting by running it as part of the EXperimental Ensemble Forecast System (XEFS) on selected test basins under different conditions. The prototype employs the one-dimensional variational data assimilation technique (or 1DVAR), which assimilates real-time streamflow observations at the upstream and downstream locations over the predefined assimilation (time) window to adjust the three-parameters of the Muskingum routing technique to bring the downstream streamflow simulation (which is a combination of routed upstream flows and local runoff) into better agreement with the downstream streamflow observations. The 1DVAR technique needs to be compared with the operational Lag/K to demonstrate its added value in river flow forecasting. The evaluation of 1DVAR as a part of the

XEFS includes the comparison with XEFS statistical post-processing (e.g., EnsPost) to reduce biases in the streamflow ensemble forecasts. This will be coordinated with the project “XEFS Evaluation and Improvement”.

- 2) Develop a prototype data assimilator that assimilates streamflow, precipitation, and potential evapotranspiration data into the lumped Sacramento Soil Moisture Accounting (SAC-SMA) and Unit Hydrograph (UH) models to improve streamflow forecasting. The existing prototype data assimilator for the SAC-SMA and UH models employs the two-dimensional variational data assimilation technique (or 2DVAR), which aims to improve streamflow forecasts by reducing the uncertainty in the initial soil moisture conditions of the SAC-SMA. The existing prototype needs to be expanded to include ensemble data assimilation techniques, such as the Maximum Likelihood Ensemble Filter (MLEF), the Ensemble Kalman Filter (EnKF), and the Ensemble Kalman Smoother (EnKS). This also needs to be expanded to additionally assimilate snow observations into the coupled SNOW17/SAC-SMA system to improve streamflow predictions in snow-dominated basins. The DA capabilities need to be integrated in CHPS via OpenDA and evaluated at test basins for different situations. The snow-streamflow assimilation technique needs to be compared with the regression-based snow updating method that is currently used in the RFC operations, to demonstrate its value.

- 3) Plan the enhancements of the prototype data assimilator for the gridded SAC-SMA to support future operational distributed modeling. The current prototype employs the four-dimensional variational data assimilation technique (or 4DVAR) that assimilates streamflow observations at the basin outlet as well as interior locations, gridded precipitation, potential evapotranspiration, and, if available, in-situ soil moisture observations into the distributed SAC-SMA and kinematic-wave routing models of RDHM to improve streamflow forecasting at the outlet as well as interior locations in a basin. The current prototype needs to be expanded to incorporate ensemble data assimilation techniques (e.g., EnKF, EnKS, MLEF) to more efficiently support ensemble forecasting. This work will leverage the development, OpenDA integration, testing, and enhancements of the DA capabilities for lumped modeling in the two sub-projects described above.

Milestones

Task	Due Date	Status
Prepare a scientific manuscript on the multi-basin evaluation of DA for RDHM	FY11 Q3	Ongoing
Run the prototype 1DVAR in hindcasting mode in the CHPS environment	FY11 Q4	Ongoing
Carry out the performance evaluation of direct insertion method based on multi-basin simulations in terms of streamflow forecasting via inserting regression-based snow water equivalent data into the SNOW17	FY11 Q4	Ongoing
Evaluate the performance of direct insertion method and EnKF technique in the context of streamflow forecasting via assimilating snow water equivalent data into the SNOW17	FY11 Q4	Ongoing
Evaluate the performance of 2D-MLEF based on multi-basin simulations	FY11 Q4	Ongoing
Develop and test an on-line timing error estimation procedure for the research prototype DA for RDHM	FY12	
Design and develop a prototype data assimilation code for snow and streamflow DA	FY12	
Generate results from both the regression-based snow updating methods and direct insertion for comparison with those from the snow/streamflow DA prototype	FY12	
Design 2DVAR interface with OpenDA and enhance the 2DVAR code for OpenDA compliance	FY13	
Coordinate with partners and collaborators for writing joint papers and/or organizing the 2 nd DA workshop	FY13	Ongoing

Accomplishments/Actions

1st Quarter FY11

- 1DVAR-OpenDA was successfully tested within CHPS, based on the CHPS configuration obtained from ABRFC.
- The new adjoint code of 4DVAR with ability to adjust routing parameters was generated and tested in an attempt to improve the DA performance in the presence of timing errors
- An ensemble Kalman filter (EnKF) code for the distributed SAC was developed. Inter-comparison of the EnKF and 4DVAR performance was carried out for Eldon, OK. The results were presented in the 2010 AGU Fall meeting held in San Francisco, CA.
- An initial performance evaluation of 2D-MLEF (ensemble extension of 2DVAR) was carried out, based on multi-basin simulations with hydrologic and hydrometeorologic dataset from TX basins in the WGRFC service area. The results were presented in the 2010 AGU Fall meeting held in San Francisco, CA.
- A multiple linear regression (MLR) technique was developed to derive areal snow water equivalent (SWE) data from point SNOTEL measurements. A Principle Component Analysis (PCA) analogous to the regression algorithm of the RFC operational snow updating system was developed. MLR- and PCA-derived SWEs were evaluated against SNOW17-simulated SWE for Stehekin river basin in the NWRFC service area. The direct insertion method was applied to assimilate both MLR- and PCA-derived SWEs into the coupled SNOW17/SAC-SMA model to produce streamflow predictions. The results were presented in the 2010 AGU Fall meeting held in San Francisco, CA.
- The 4DVAR manuscript on simultaneous assimilation of soil moisture and streamflow was revised based on reviewers' comments from *Advances in Water Resources*. The revised manuscript will be submitted to the journal after co-author review.

2nd Quarter FY11

- CHPS 1DVAR configuration files were augmented and adapted to import long-term hourly streamflow data for ABRFC test basins.
- Both 1DVAR and Lag/K are applied to a river reach in the ABRFC service area and their performances are compared one another. The results are presented in the 2011 EGU meeting held in Vienna, Austria.
- The MLR and PCA techniques were applied to produce areal SWE estimates over a 20-year period. These SWE estimates were evaluated against SNOW17-simulated SWE for Stehekin river basin in the NWRFC service area as well as SWE observations from three SNOTEL sites located in this basin. The direct insertion method was applied to assimilate both MLR- and PCA-derived SWEs into the coupled SNOW17/SAC-SMA model to produce streamflow predictions in the same period. The EnKF was employed to assimilate PCA-derived SWE into the coupled model to generate streamflow predictions in three preventative years during this period. The results were presented in the 2011 EGU meeting held in Vienna, Austria.
- The draft manuscript on the multi-basin evaluation of DA for RDHM has been written and under co-author review. The manuscript is planned to be submitted to the *Hydrology and Earth System Sciences Special Issue on "[Latest advances and developments in data assimilation for operational hydrologic forecasting and water resources management.](#)"*
- Wavelet-based timing error analysis FORTRAN code has been under development and test.

3rd Quarter FY11

- Based on the snow data assimilation results (for NWRFC) presented at the 2011 EGU meeting, the work is extended to CBRFC with the goal to evaluate the performance of their operational Snow Estimation and Updating System – Lite (SEUS-Lite) against the EnKF in the context of improving streamflow predictions. Eight CBRFC watershed were selected for this evaluation (SEUS-Lite against EnKF) based on the availability of data (particularly the snow data to be assimilated).
- The display issue associated with 1DVAR-CHPS has been resolved with the help of Deltares. 1DVAR-OpenDA source codes recompilation is underway to solve the problem on 1DVAR-CHPS implementation in a hindcast mode.
- The manuscript on the multi-basin evaluation of DA for RDHM has been improved based on

co-author review.

- Discussed with NIER on organizing the 2nd data assimilation workshop.

Problems Encountered/Issues

1st Quarter FY11

- Schedules for DA activities have been adjusted due to Yuqiong Liu's departure in Jan 2011. The new schedule is focused on DA activities for lumped models in support of RFC operations and the development of Hydrologic Ensemble Forecast Service as described in the project "HEFS Phase 1 Implementation".

2nd Quarter FY11

- None.

3rd Quarter FY11

- None.

XEFS Evaluation and Improvement

Core Goal: Quantify uncertainty of our forecast information

Management Lead: Julie Demargne

Note: for FY11, this project constitutes a merger of AHPS projects that were reported on individually in FY10 and earlier years, as follows:

- XEFS Evaluation and Improvement
- XEFS Implementation
- XEFS Operational Support
- Evaluate Climate Forecasts
- Improve Hydrologic Hindcasting

Objective: Improve the components of the eXperimental Ensemble Forecast System (XEFS) to quantify and reduce the atmospheric and hydrologic uncertainties for short- to long-range hydrologic forecasting to support the operational implementation of the Hydrologic Ensemble Forecast Service (HEFS).

The current XEFS includes the following components: 1) an atmospheric ensemble pre-processor prototype to produce reliable and skillful short- to long-term precipitation and temperature ensembles at the basin scale using the RFC operational single-valued forecasts and ensemble forecasts from NCEP's Global Forecast System (GFS) and Climate Forecast System (CFS); 2) the hydrologic processor that propagates the atmospheric uncertainties to the hydrologic outputs via running a suite of hydrologic, hydraulic, and routing models; 3) data assimilator prototypes to produce improved estimates of model initial conditions by assimilating various types of observations of precipitation, evapotranspiration, soil moisture, and streamflow via variational techniques; 4) hydrologic ensemble post-processor prototypes (e.g., EnsPost, Hydrologic Model Output Statistics, and Multi-scale CDF Matching) to produce reliable and skillful hydrologic ensemble forecasts that reflect the hydrologic uncertainty; and 5) the Ensemble Verification System (EVS) to perform comprehensive diagnostic verification of atmospheric and hydrologic ensemble forecasts.

The development and improvement of XEFS requires the evaluation of the individual XEFS prototypes and the end-to-end XEFS through multi-year hindcasting and verification on multiple RFC test basins with different characteristics. Such verification helps identify the factors responsible for model error and skill in different situations and demonstrate how the different XEFS uncertainty components could improve the quality of short- to long-term hydrologic ensemble forecasts. It helps establish the biases present in the forcing and flow forecasts at various temporal and spatial scales, including unconditional and conditional biases from key controls or conditioning variables (e.g., seasonality, precipitation/flow magnitude, forecast time, lead time, basin location and size). Also the XEFS testing includes different RFC pilot projects for the RFCs to test the XEFS prototypes in an operational forecast environment and assess the enhancements necessary to produce hydrologic ensemble products meaningful for diverse applications. To accelerate the implementation of XEFS at the RFCs, the XEFS prototypes have been interfaced with the NWS Community Hydrologic Prediction System (CHPS) through developing CHPS model adapters for the individual prototypes. The improvement of XEFS is also based on the outcome of the Hydrologic Ensemble Prediction Experiment project (<http://www.hepex.org>), which includes international collaborative ensemble research and community test bed projects to advance probabilistic hydrologic forecast techniques and identify the best ways for the user community to utilize ensemble forecasts.

This project will leverage: 1) the development and improvement of hydrologic data assimilation techniques developed in the project "Hydrologic Data Assimilation"; 2) the improvement of the ensemble verification and post-processing techniques from the project "Ensemble verification and post-processing improvements". This project will be coordinated with the project "HEFS Phase 1

Implementation” to support the development of the first operational HEFS at the RFCs.

This project includes the following tasks:

- 1) Evaluate the current atmospheric Ensemble Pre-Processor (EPP) prototype based on multi-year hindcasting using HPC/RFC operational single-valued forecasts and GFS ensemble means for a larger set of RFC test basins (i.e., with various regimes) and for multiple temporal scales (i.e., time steps and forecast horizon, from 6-hr to seasonal). This includes the evaluation of the Schaake shuffle technique for extreme events and the performance of the multi-scale component using different user-defined multi-scale (“canonical”) events. This will establish the baseline performance of EPP-produced precipitation and temperature ensembles.
- 2) Improve the EPP prototype to make use of newly available climate forecasts for the long range (Climate Forecast System version 2 – CFSv2) and weather forecasts for the medium range (Global Ensemble Forecast System) once reforecasts datasets are available for the EPP calibration. This includes the documentation of the upgraded EPP prototype.
- 3) Evaluate the EPP-produced ensembles of precipitation and temperature using the new CFSv2 reforecasts (obtained from NCEP EMC, CPC, and NCDC) and GEFS reforecasts (obtained from ESRL) on selected test basins. This also includes evaluating the quality of the CFSv2 reforecasts and the CPC consolidation forecast products (if forecasts made available by NCEP CPC) to maximize their utility in EPP.
- 4) Evaluate the current hydrologic Ensemble Post-Processor (EnsPost) prototype and the current Hydrologic Model Output Statistics (HMOS) prototype for the short range using a larger set of RFC test basins. These 2 post-processing techniques will be included in the HEPEX post-processing testbed project to be inter-compared with other post-processing techniques.
- 5) Help organize the HEPEX post-processing workshop planned for June 2011 at UNESCO-IHT and coordinate the testbed project (including providing testbed datasets). Present initial results from EnsPost and HMOS at the workshop. Plan for enhancing the post-processing capability of HEFS based on the HEPEX testbed results of the inter-comparison of different post-processing techniques.
- 6) Evaluate the Multi-Scale CDF Matching (MSCM) prototype on these test basins. Develop a unified post-processor prototype that comprises both EnsPost and MSCM and expands the utility of post-processing from the short range to the long range.
- 7) Evaluate the end-to-end XEFS prototype using the current EPP prototype, the hydrologic processor, and the current EnsPost and HMOS prototypes via multi-year hindcasting and ensemble verification using a larger set of RFC test basins. The evaluation will include multiple temporal scales and various forecast scenarios (e.g., different forecast sources for EPP). It will also include the evaluation of the sampling uncertainties in the verification metrics using the experimental EVS-R prototype for confidence intervals. The verification results will be documented in scientific manuscripts for publication in international journals.
- 8) Document the end-to-end XEFS hindcasting in CHPS and support ensemble hindcasting at the RFCs to perform verification using large samples of forecasts.
- 9) Evaluate the end-to-end enhanced XEFS prototype using the latest pre-processing and post-processing prototypes (to be coordinated with the project “Ensemble verification and post-processing improvements”) and the data assimilation prototypes (to be coordinated with the project “Hydrologic Data Assimilation) via multi-year hindcasting and ensemble verification. This includes the analysis of the combined impacts of data assimilation and hydrologic post-processing to reduce and quantify the hydrologic uncertainties.
- 10) Support the integration of XEFS prototypes into CHPS and the development of the operational HEFS; this includes supporting the development of calibration processors and MODs for real-time operations.
- 11) Support the calibration, implementation, and testing of the XEFS prototypes in pilot RFC projects at selected RFCs (AB-, CB-, CN-, NW-, MA-, and NE-RFCs) to expand the XEFS evaluation to an operational environment and improve the RFC experimental ensemble forecasting capabilities.

Milestones

Task	Due Date	Status
Evaluate EPP prototype using RFC and GFS forecasts to establish its baseline performance	FY11 Q3	Completed
Finalize the EPP paper for publication in Journal of Hydrology	FY11 Q1	Completed
Upgrade EPP prototype to make use of new CFSv2 hindcasts and forecasts and document upgraded prototype	FY12 Q1	Ongoing
Evaluate upgraded EPP prototype using CFS and CFSv2 hindcasts to establish its baseline performance at long range	FY12 Q4	
Upgrade EPP prototype to make use of new GEFS hindcasts and forecasts and document upgraded prototype	FY12 Q4	Ongoing
Evaluate upgraded EPP prototype using new GEFS hindcasts to establish its baseline performance at medium range	FY12 Q4	
Evaluate EnsPost and HMOS prototypes on test basins to establish their baseline performance	FY11 Q3	Ongoing
Prepare a draft manuscript on the HMOS technique and verification of ensemble outputs	FY11 Q2	Ongoing
Evaluate MSCM prototype on test basins and develop unified MSCM-EnsPost prototype to expand post-processing to long-range	FY12 Q1	
Evaluate the end-to-end XEFS prototype using EPP and EnsPost to establish its baseline performance	FY11 Q3	Ongoing
Prepare a draft manuscript on the quality of XEFS ensembles	FY11 Q4	Ongoing
Document XEFS hindcasting in CHPS	FY11 Q4	
Evaluate the end-to-end XEFS prototype using upgraded EPP, new/enhanced hydrologic post-processors, and data assimilation prototypes to establish XEFS baseline performance	FY12	
Support integration of XEFS prototypes into CHPS and development of operational Phase 1 HEFS	FY12	Ongoing
Support RFC pilot projects	FY12	Ongoing
Support HEPEX project, including post-processing workshop and testbed project	FY12	Ongoing

Accomplishments/Actions

1st Quarter FY11

- Released the new ensemble generation and calibration prototype programs for EPP, EnsPost, and HMOS components on 11/15/2010; this included user's manuals for EPP, EnsPost, and HMOS, as well as a report on XEFS performance on selected test basins and for selected forecast scenarios. All documents were made available on the XEFS web page (www.weather.gov/oh/XEFS/).
- Expanded EPP calibration to additional RFC test basins using HPC/RFC operational forecasts and GFS ensemble means. Carried out hindcasting experiments for 4 ABRFC test basins, 5 CNRFC test basins, and 4 NWRFC test basins. Verification results for the GFS-based ensembles were produced for the 24-hr scale up to 14 lead days into the future. The verification results using GFS ensemble means were presented at the 2010 AGU Fall meeting in San Francisco.
- Submitted the final revisions of the EPP manuscript to the Journal of Hydrology for publication.
- Discussed with NCEP EMC and CPC the transition to the new CFSv2 system. Obtained reforecast datasets from NCEP to start working on the monthly CFSv2 datasets available for 10 months into the future. Developed plan to upgrade the EPP prototype to make use of CFSv2 reforecast and forecast datasets.

- Finalized HMOS calibration using the new stratification approach for 6 ABRFC test basins and 5 CNRFC test basins. Provided the RFCs with the calibration parameters to support their XEFS testing.
- Carried out verification of the HMOS hindcasts using EVS for 6 ABRFC test basins and 2 CNRFC test basins. The verification results for the ABRFC test basins are included in the HMOS manuscript, for which a draft is expected by FY11-Q2.
- Expanded EnsPost calibration to 3 ABRFC test basins, 7 CNRFC test basins, and 2 NWRFC test basins. Provided the RFCs with the calibration parameters to support their XEFS testing.
- Carried out hindcasting experiments with EPP, Hydrologic Processor, and EnsPost for 5 CNRFC test basins using RFC and GFS forecasts. The verification results of short-term streamflow ensembles from EPP-Hydro-EnsPost and from HMOS for one CNRFC test basin were presented at the 2010 AGU Fall meeting in San Francisco.

2nd Quarter FY11

- Continued to expand EPP calibration to additional RFC test basins using HPC/RFC operational forecasts and GFS ensemble means. Produced precipitation and temperature ensemble hindcasts, and EVS results for 2 ABRFC test basins, 2 NWRFC test basins, and 4 CNRFC.
- The EPP manuscript entitled “Generation of ensemble precipitation forecast from single-valued quantitative precipitation forecast for hydrologic ensemble prediction“ has been published in the Journal of Hydrology.
- Continued to discuss with NCEP EMC, NCEP CPC, NCDC, and Princeton University the transition to the new CFSv2 system and the archiving of the real-time forecasts and reforecasts. On 03/08/2011, gave an OHD-RFC joint presentation at the CFSv2 User Need Assessment workshop on the current use of CFSv1 in hydrologic ensemble prediction and needs for using CFSv2 model. Filled out a survey developed by the NOAA Climate Program to describe the OHD-RFC needs for climate forecast information to support hydrologic forecasting.
- Participated in the Seasonal to Two Year Forecasting Workshop for the Colorado Basin on March 21-22 at CBRFC. Gave an OHD-CBRFC joint presentation on the HEFS and XEFS current and planned work for long-term ensemble prediction based on CFSv1 and CFSv2.
- Obtained from NCEP CFSv2 reforecast datasets stored as 6-hr times series for 10 months into the future for precipitation and temperature. Started to process the reforecast files to generate ASCII files for the extended CONUS domain, which will be used for EPP calibration.
- Updated the CFSv2 work plan for upgrading the EPP prototype and started working on design analysis of EPP3 CFSv2 upgrade.
- Continued to analyze verification results of the HMOS ensemble hindcasts for 6 ABRFC test basins to provide additional results for the HMOS manuscript. The draft manuscript has been reviewed by co-authors.
- Continued to produce ensemble hindcasts with EPP, Hydrologic Processor, and EnsPost for 5 CNRFC test basins and 2 ABRFC test basins and to analyze verification results. Prepared a presentation on XEFS and verification results for the EGU conference in April in Vienna, Austria. The streamflow ensemble hindcasts using GFS-based ensembles and climatology-based ensembles for 2 CNRFC test basins were included in the HEPEX testbed project datasets.
- Coordinated with ABRFC, CBRFC, CNRFC, MARFC, and NWRFC the identification of test basins for XEFS hindcasting experiments (including EPP, EnsPost, and hydrologic routing data assimilation), the retrieval of hydrometeorological and hydrological input datasets, as well as the CHPS configuration. Started to modify CHPS configuration for XEFS hindcasting experiments.
- Started to prepare the manuscript on the quality of XEFS ensembles; reviewed recent papers on hydrologic ensemble forecasting and verification.
- Provided support for the XEFS testing at CBRFC, CNRFC, NCRFC, and NWRFC.
- Provided input to the HEFS Requirements Team on the different XEFS prototypes and reviewed the team report to support the implementation of the HEFS version 1.

3rd Quarter FY11

- Obtained temperature (variables tmax and tmin) and precipitation CFSv2 reforecast datasets for the entire hindcast period (i.e., 1982 - 2010) from the NCEP, and continued data processing that includes extracting data for the extended CONUS and writing reforecast data into ASCII format for each grid point of the CONUS.
- Updated the document entitled "Work Analysis for Transitioning to CFSv2" with the information related to CFSv2 datasets for 9-month hindcast runs. Updated the procedure to convert raw CFSv2 data into monthly ASCII data.
- Started working on evaluation of CFSv2 forecasts; as part of this analysis, produced climatological forecast mean and spread among different combinations of ensemble members for the entire CONUS.
- Identified a few issues (related to inconsistency between hindcast data format and EPP3 program) in sub-monthly CFSv1 precipitation hindcast datasets used by EPP3 application, and produced new datasets addressing these issues.
- Applied EnsPost on 12 MOEPX test locations and presented results at the HEPEX workshop.
- Adapted CHPS configuration files to import EPP3 derived MAP and MAT ensembles and produced corresponding ESP streamflow hindcasts at two test basins at ABRFC.
- Provided support for ESP hindcasting in CHPS at MARFC and NERFC in terms of providing step-wise demonstration and (documented) guidance on how to conduct the hindcasting.
- Conducted analysis on the format of the CFSv2 processed reforecast files for parameter estimation.
- Provided support to CBRFC in setting up EPP3 hindcast runs. provided support to CBRFC in error diagnosis.
- Presented results of EPP3 and XEFS streamflow ensembles at EGU (Vienna, April 4-8).
- Discussed EPP3 issues with HSEB members on CVSv2 upgrade.
- Generated EPP3 parameter files and hindcasts for AB-, CB-, CNRFC test basins.
- Worked on high level design for EPP3 upgrade to use CFSv2. Created pseudo-code for EPP3 temperature components for CFSv2 upgrade. Conducted code review for EPP3 calibration CFSv2 code.
- Attended the 5th NCEP Ensemble Users' Workshop.
- Examined the sample GEFS data sets from Dingchen Hou of NCEP.
- Fixed bugs in the EPP3 ensemble generation program for CFS hindcasting.
- Continued to work on the precipitation intermittency problem for daily and larger time scales.

Problems Encountered/Issues

1st Quarter FY11

- Schedules for the XEFS activities have been adjusted due to Yuqiong Liu's departure in Jan 2011. All activities will continue to be coordinated with the project "HEFS Phase 1 Implementation" to support the development of the first operational HEFS at the RFCs.

2nd Quarter FY11

- None.

3rd Quarter FY11

- None

HEFS Phase I Implementation

Core Goal: Quantify uncertainty of our forecast information

Management Lead: Jon Roe, Mark Fresch

Objective: Implement Phase 1 Hydrological Ensemble Forecast Service (HEFS) into the operational baseline. The operational ensemble functionality will be based on prototypes developed and tested in the eXperimental Ensemble Forecast System. The capabilities included in this first operational HEFS will be decided based on high-level requirements and concept of operations created by a team of scientists, software engineers, and RFC forecasters.

Milestones

Task	Due Date	Status
HEFS Graphics Generator: Pass HOSIP Gate 2	FY10, Q2	Milestones and HOSIP project management will be rolled up into new HEFS planning
HEFS Graphics Generator: Pass OSIP combined Gate 1/2	FY10, Q2	Milestones and HOSIP project management will be rolled up into new HEFS planning
Complete the Phase 1 Graphics Generator Implementation	FY10, Q1	Completed March 2010
Complete the Phase 2 Graphics Generator Implementation	FY10, Q4	Postponed until a FEWS graphics API is implemented
Complete the HEFS high-level requirements and concept of operations	FY 11 Q2	Draft completed in FY11 Q2. A final version was sent to the NWS River Forecast Centers for comment.
Complete software development project plan for EPP3 and EnsPost	FY11Q3	On going, as part of the HEFS project plan. Will be completed in Q4.

Accomplishments/Actions

3rd Quarter FY09

- A new HOSIP project P-2009-007 "Implementation of Hydrologic Ensemble Forecast Service (HEFS) passed HOSIP Gate 1 was created to replace HOSIP project 2007-019, Experimental Ensemble Forecasting System (XEFS). The new HEFS project is the implementation of new ensemble related functionality into the CHPS baseline. Whereas XEFS encompasses several experimental ensemble sub-projects. The new HEFS project is an umbrella projects, and as a result, it will not continue through HOSIP. However, the XEFS components ready for implementation into the CHPS operational baseline will be sub-projects of the HEFS umbrella project which will go through HOSIP and OSIP. The Graphics Generator is the first of these sub-projects and also passed HOSIP Gate 1 during the quarter.

4th Quarter FY09

- The Graphics Generator Phase 1 code is nearly complete. An early limited functionality version was provided to the steering team for feedback. The completed Phase 1 code will be released in coming weeks to get feedback from RFCs. In addition, the Graphics Generator Phase 2 requirements were drafted.

1st Quarter FY10

- Additional preliminary versions of the Graphics Generator Phase 1 were made available to RFCs for feedback. Additional Phase 1 functionality was added, and the Graphics Generator was rebuilt using the latest CHPS and IFD releases. Installation instructions were written. More thorough in-house testing has been done and several minor bugs were fixed. As a result of these activities and on-going testing, the final Phase 1 delivery has been delayed until the end of February.

2nd Quarter FY10

- The Graphics Generator Phase 1 was made available to CAT RFCs at the end of March to provide basic ESPADP functionality. During the next few months, we plan to incorporate minor functionality improvements, bug fixes and improved user documentation based on feedback from RFCs. We will continue to provide monthly updates to incorporate those changes and keep up with FEWS and CHPS releases.

3rd Quarter FY10

- Over the past few months, we've continued to make changes to the Graphics Generator based on feedback from the RFCs, although our release frequency of the Graphics Generator has gone down from once per month to once per quarter. We also tested the Graphics Generator within an operational setting. We started making changes to make the Graphics Generator easier to use, including improving the User's Manual. For the next few months, we'll create plot templates which very closely match ESPADP products and can be automatically applied to all segments. Over the next few months, we will work with Forecast Decision Training Branch to develop Graphics Generator training. In addition, we're working with AHPS Web-Team to compare Graphics Generator and ESPADP output.

4th Quarter FY10

- During the last quarter, OHD has tested and improved the Graphics Generator functionality as an operational replacement to ESPADP with some additional displays for probabilistic information. Recently, we've gotten good feedback from CNRFC and NWRFC and from the NWS Regions through the AHPS web-team. The next delivery of the Graphics Generator (and XEFS) is scheduled for November 2010. Following this delivery, there will be a one-month period to develop must-have changes with a follow-up delivery with those changes in January 2011.
- At the beginning of October, OHD kicked-off the Hydrologic Ensemble Forecast Service (HEFS) project. This project is OHD's first effort to improve the way we plan, develop, and deliver new functionality to the field. It involves the creation of end-to-end packages where everything needed for successful implementation in the field office has been integrated in the package, including scientifically sound, well engineered software, information for dissemination, training, and support.
- The HEFS project has become one of OHD's top priorities and has a firm end date just 3 years away. By late 2013, the project is to be completely operational at NE and MA RFCs and providing data to NYC. A beta version will be provided to NE and MA RFCs by early fall 2013. OHD management, led by Don Cline (HL Lab Chief), is currently having weekly meetings to complete more detailed planning.

1st Quarter FY11

- OHD provided an updated Graphics Generator which included some added functionality requested by RFCs and bug fixes. In addition, OHD and the Forecast Decision Training Branch developed video training for the Graphics Generator and held a ½ day workshop for users at CAT RFCs. Next quarter, OHD will solicit a 'must-have' list of changes from RFCs on using the Graphics Generator as a replacement to ESPADP.
- An HEFS Assessment Team (A-Team) was formed to determine the high level requirements (such as major components) and concept of operations for the HEFS. The team met with the OHD scientists and software engineers to discuss the strengths and weaknesses of the existing prototypes for the different XEFS components and the planned enhancements. A report is expected in Q2-FY11.
- OHD started analyzing computer resources used by the end-to-end XEFS using the existing ensemble pre-processor prototype (EPP3), the existing hydrologic processor (i.e., the suite of hydrologic and routing models that generate hydrologic forecast outputs), the existing hydrologic post-processor prototype (EnsPost). The goal is to estimate computer resource needs for HEFS. OHD also completed an analysis of FEWS components which could be used in HEFS; this was passed to Deltares for review.

2nd Quarter FY11

- The HEFS Assessment Team (A-Team) completed a draft report on the HEFS high level requirements (such as major components) and concept of operations. Among the high level requirements are the required components of HEFS, including EPP3. The final report is expected within weeks.
- OHD completed their analysis of computer resources used by the end-to-end XEFS using the existing ensemble pre-processor prototype (EPP3), the existing hydrologic processor (i.e., the suite of hydrologic and routing models that generate hydrologic forecast outputs), the existing hydrologic post-processor prototype (EnsPost). The goal is to estimate computer resource needs for HEFS. The analysis showed that run-times for EPP3 and EnsPost added ~29% to ESP runs. In addition, the analysis showed that EPP storage requirements increased by 18.5 GB for operational execution and by 12 Tb for archive (non-operational) execution.
- OHD provided an updated Graphics Generator which included changes from a 'must-have' list of functionality from RFCs. This Graphics Generator can be used as a replacement to ESPADP created products.
- OHD completed evaluating and documenting the XEFS prototype code and design. In addition, OHD created a list of potential HEFS tasks to increase software maintainability and usability. Next quarter, OHD will provide a preliminary HEFS design.

3rd Quarter FY11

- The HEFS A-Team final report was reviewed by OHD Management and sent to the NWS RFCs for comment. The final report contains the HEFS high-level requirements and concept of operations. The high-level requirements include the required HEFS components for the first version of HEFS (HEFSv1), including Meteorological Ensemble Forecasting Processing (MEFP, formerly called EPP), EnsPost, Ensemble Verification Service (EVS), Graphics Generator, and Product Dissemination.
- A project plan strategy was approved, and a project plan has been drafted. The project plan will be presented to the Hydrologist In-Charge (HIC) meeting in August 2011.
- OHD completed further analysis of EPP and EnsPost software.
 - OHD started changing software MEFP to ingest version 2 of NCEP's Climate Forecast System (CFSv2).
 - New designs for MEFP and EnsPost were approved for HEFS. The new designs will improve usability and maintainability, and these changes will begin after the CFSv2 changes are completed. In addition, both components will come with GUI to facilitate parameter estimation.
 - The HEFS configuration management environment was created. The environment will provide a separate (from other OHD projects) repository for HEFS software and associated data and documentation and a location to run daily automated builds and tests.
- The New York City Department of Environmental Protection (NYCDEP) is entering into an MOA with OHD to accelerate HEFS.
 - We've been working with MARFC and NERFC to create climate-based Ensemble Streamflow Prediction (ESP) hind-casts covering their ~ 50 years of historical data. These hind-casts will be used by NYCDEP for post-processing.

Problems Encountered/Issues

3rd Quarter FY09

- None

4th Quarter FY09

- Extra Graphics Generator coding was needed to provide better usability with the CHPS Interactive Forecast Display (IFD).
- Due to the risk and resources associated with beginning of CHPS BOC operations, the milestone of making the Graphics Generator part of the CHPS baseline may need to be delayed.

1st Quarter FY10

- Due to the high priority nature of CHPS development and migration, little feedback was received

from the field and some IFD functionality was not available to the Graphics Generator. As a result, more thorough testing was done, and some IFD functionality was reproduced and customized within the Graphics Generator. In addition, software development activities were underestimated.

2nd Quarter FY10

- The feedback from the CAT RFCs continues to be limited due to the high priority nature of CHPS development and migration.
- The CAT directed that before the Graphics Generator goes into Phase 2, FEWS should be enhanced with an Application Program Interface (API) for common graphics functionality and information which the Graphics Generator and other planned GUIs should use.

3rd Quarter FY10

- The feedback from the CAT RFCs continues to be limited due to the high priority nature of CHPS development and migration.

4th Quarter FY10

- None

1st Quarter FY11

- None

2nd Quarter FY11

- None

3rd Quarter FY11

- Converting CFSv2 re-forecasts grids from native (NCEP) GRIB format to ASCII (for use by MEFP) is taking much longer than anticipated. The slowness of the conversion is due to a) the large volume of data and b) the slowness of the IT systems.
- Hind-casting at MARFC and NERFC is going very slowly due primarily to the large amount of data being processed (50 years of daily forecasts with a 1-year forecast horizon). OHD is investigating ways to improve performance.

Gridded Water Resources

Auto Calibration for Distributed Model

Core Goal: Provide, then improve, gridded water resource data production capability

Management Lead: Mike Smith

Objective: The objectives of this work include developing tools and procedures for auto-calibrating the HL-RDHM to generate parameters for the AWIPS DHM delivered in OB7.2. Two phases are identified for this area of research. First, initial work will focus on auto-optimization of the scalar multipliers of all the gridded parameters (SAC, Snow-17, and routing) so that all parameters are adjusted uniformly. This was done manually in DMIP 1 with good success. A prerequisite for this work is the development of sound lumped hourly parameters. Second, future funding will support work to optimize individual gridded parameters for groups of grids.

Milestones

Task	Due Date	Status
1. Investigated separate procedures for elevation zones for mountainous areas.	TBD	On hold
2. Develop outline for overall strategy for distributed model calibration	TBD	On hold
3. Develop approach for auto calibration of elevation zone parameters; parameter limits, and routing model parameters	TBD	Delayed to put HL-RDHM components into FEWS

Accomplishments/Actions

1st Quarter FY10

- Various bugs fixed in the auto calibration routine: most notable was the improper handling of scalar multipliers.
- Hydro group developed and presented AHPS/WR proposal to investigate U. Arizona's parameterization (regularization) approach and to explore their MATLAB version of HL-RDHM containing multi-objective calibration routines.
- Mike evaluated the uncalibrated and calibrated results of DMIP 2 in the Oklahoma basins. Results indicate that the strategy used for HL-RDHM works well. Other results from DMIP 2 show that if a model does not perform well with initial parameters, then calibration alone cannot greatly improve its performance compared to other DMIP 2 models.

2nd Quarter FY10

- Hydro group met with JJ Gourley to discuss his results of using the global optimization approach Differential Evolution Adaptive Metropolis (DREAM) autocalibration approach with HL-RDHM on the Tar River basin. JJ also ran SLS and manual calibration. His results show that parameter limits are important. DREAM has promise but takes a very long time. Hydro group provided guidance on the proper order of parameters for SLS. JJ will follow the guidance as the Tar Basin is re-calibrated on a sub-basin basis. Hydro group also provided guidance on how to use the 'calb' versions of the SAC and routing models to reduce the autocalibration run times with DREAM.
- Portions of the FY-10 AHPS/WR proposed projects were approved for incorporation even though not specifically funded: parameter limits will be examined in the FEW/CHPS version of HL-RDHM and autocalibration. Also, an approach for manually adjusting the routing parameters (similar to the ICP Percolation Analysis) will be investigated in FEWS.

3rd Quarter FY10

- Analysis of DMIP 2 results shows that several of the uncalibrated HL-RDHM simulations have better statistics (correlation, bias) than simulations from other calibrated distributed models from DMIP 2 participants. This highlights the importance of *a priori* parameters in the implementation

of the distributed model.

4th Quarter FY10

- Basic HL-RDHM components migrated to CHPS/FEWS. A data flow path was developed to facilitate efficient multi-year calibration runs in the CHPS/FEWS framework. Gate 3 decision made to wait for CHPS/FEWS calibration tools before implementing the HL-RDHM autocalibration.

1st Quarter FY11

- None this quarter

2nd Quarter FY11

- Deltares interested in adding auto-calibration schemes to FEWS, including HL-RDHM approach. This would be done via the Open DA approach.

3rd Quarter FY11

- No work this period; focusing migrating SAC-HTET into CHPS/FEWS.

Problems Encountered/Issues

1st Quarter FY10

- Limited work as HL-RDHM components are being migrated to FEWS environment.

2nd Quarter FY10

- Limited work as HL-RDHM components are being migrated to FEWS environment.

3rd Quarter FY10

- The development of a strategy for distributed model calibration may need to be coordinated via the to-be-formed Distributed Modeling Investment Team.

4th Quarter FY10

- Limited work as HL-RDHM components are being migrated to FEWS environment.
- Autocalibration component of HL-RDHM to wait for CHPS/FEWS calibration tools.

1st Quarter FY11

- None this quarter

2nd Quarter FY11

- None this quarter

3rd Quarter FY11

- No work this quarter

Distributed Model Intercomparison Project (DMIP II)

[Note: Reporting on project “**Calibration - Complete IDMA Study**” is merged into this project as of FY11 Q1]

Core Goal: Provide, then improve, gridded water resource data production capability

Management Lead: Mike Smith

Objective: Develop then Refine Gridded Water Resources Products.

Milestones

Task	Due Date	Status
1. Complete analysis of simulations from the Oklahoma experiments	FY-10 Q4	Completed
2. Submit Oklahoma basin papers for DMIP 2 Special Issue	FY10 Q3	Submitted to OHD review August, 2010
3. Design OK forecast mode experiment (this experiment postponed)	FY09 Q1	withdrawn
4. DMIP 2 Western Basin Experiments: generate and analyze basic (w/o HMT data) distributed and lumped simulations	FY10 Q4	Complete
5. Finalize the ‘basic’ (non-HMT) gridded QPE and QTE data and make available to DMIP 2 participants.	FY10 Q2	Complete
6. Complete analyses of participants’ western basin ‘basic’ simulations.	FY10 Q4	Interim analysis of submitted simulations completed
7. (Jointly with Hydrometeorology Group) Support ESRL and NSSL in the derivation and evaluation of the HMT products for DMIP 2.	FY10 Q4	On track
8. Deliver to DMIP 2 the HMT advanced data for 2005-2006 with new modeling instructions.	FY10 Q4	Withdrawn as DMIP 2 is officially over
9. OHD support for DMIP 2 participants	FY10 Q4	Complete
10. Submit overview and results papers for DMIP 2 Western Basin experiments	FY-11 Q4	On track
11. Develop and deliver recommendations on the use of biased and inconsistent precipitation data	FY10 Q4	Completed

Accomplishments/Actions

Calibration - Complete IDMA Study project:

1st Quarter FY10

- Completed QC of NCDC data for North Fork American River and began QC of data for East Fork Carson River. Encountered many cases of -999 values that should be -998.
- Mike Smith gave a presentation to the HMT leaders on the impact of not correcting the problems with the NCDC data. Daily precipitation values that can’t be time-disaggregated by the new Calibration MAP preprocessor are put into one hour of the station time series and can create ‘bull’s-eyes’ in the resultant MPE hourly grids and lead to anomalous hydrograph peaks.

2nd Quarter FY10

- Mike and Hydrogroup completed the data QC for the DMIP 2 Western Basins. Analyses show that the correct time distribution of daily station precipitation totals is very important when deriving gridded historical hourly QPE fields. Such non-distributed daily values cause anomalous hydrograph rises which calibration can’t correct. NCDC station data erroneously flagged as missing (-999) when the values are missing accumulations (-998) should also be

corrected.

- Naoki Mizukami revised his paper on identifying and diagnosing non-stationarities in gridded precipitation forcings. This paper is the result of analyzing the flawed initial QPE data for DMIP 2.

3rd Quarter FY10

- Mike analyzed the HL-RDHM simulations in DMIP 2 that used biased QPE data from 1993-1996 in ABRFC. Results indicate that the HL-RDHM model calibrated using this data with known biases generates biased simulations compared to the model calibrated with the 1996-2002 ABRFC QPE data. This was one of the DMIP 2 Oklahoma basin experiments.
- Naoki completed all reviews of his western basin QPE paper and submitted to OHD for review. Favorable comments were received from Pedro. This paper deals with the impact of biased and non-stationary data in mountainous areas.

4th Quarter FY10

- Naoki completed all reviews of his western basin QPE paper and submitted to the Journal of Hydrometeorology.
- DMIP 2 Oklahoma results paper submitted to OHD management for review. The paper contains the results of the experiment to calibrated distributed models with inconsistent data.

1st Quarter FY11

- Naoki presented a poster at the AGU in San Francisco on the analysis of Western basin gridded QPE data consistency.

2nd Quarter FY11

- Along with other OHD AGU attendees, Naoki Mizukami presented his AGU poster to the RFCs on Jan 19. This poster covered the analysis of historical, gridded QPE for consistency.
- Mike sent the DMIP 2 results paper to all RFCs and Regions. This paper covered the analysis of biased multi-sensor precipitation grids for model calibration.

3rd Quarter FY11

- This task is completed

DMIP II project:

1st Quarter FY10

- Hydro group continued to make progress with a new method for deriving hourly gridded gauge-only QPE fields. Zhengtao Cui made several modifications to the Calibration MAP preprocessor: it outputs hourly times series at each station, it flags non-distributed daily values over 0.5" in depth. Zhengtao wrote a script to time-disaggregate the flagged values uniformly over a user-specified time interval of say 12 or 24 hours.
- Feng Ding created gauge-only gridded QPE fields for the North Fork American and the East Fork Carson basins.
- Mike Smith announced to the RFCs the availability of the modified MAP code and the use of MPE to create historical gridded hourly precipitation fields. NWRFC began using the approach and requested several updates which Zhengtao performed. They derived gridded 6-hour historical data sets for their entire RFC domain.
- Ziya Zhang performed QC of NCDC and Snotel data for the Carson basin. He downloaded and processed precipitation data for 68 stations in and around Carson River Basin used as input to MAP and MPE. Manually quality controlled procedures have been done and xmrg grids have been generated. Ran HL-RDHM and stat_q programs to check consistency of generated precipitation data.
- He began evaluating the QPE grids via cumulative plots and runs with HL-RDHM. Initial tests indicate the data and approach to deriving gridded QPE are sound
- Mike completed the data QC of the North Fork data (300 corrections in 20 years). The goal here is to provide guidance to the RFCs on how much data QC is needed when deriving hourly gridded QPE fields.

- Brian Cosgrove used Google Earth display software developed for the DHM-TF project to display gridded precip fields to analyze errors in the time distribution of NCDC and SNOTEL data. Mike announced that the RFCs could use this tool as well.

2nd Quarter FY10

- Hydro and Hydromet groups finalized the revised QPE for the DMIP 2 western basins. They followed CNRFC guidance and re-generated the QPE using the 1971-2000 high resolution PRISM climatology to generate the grids. Mike announced the restart of DMIP 2 western basin experiments and the new data and documentation were placed on the DMIP 2 web pages. To date, the following institutions will participate in the western basin experiments: 1) Hydrologic Research Center with K. Georgakakos, 2) CEMAGREF, France with Vazken Andreassian, 3) NCEP/EMC with Jairui Dong, and 4) U. Washington with Jessica Lundquist. CEMAGREF and U. Washington are new participants.
- Hydro group analyzed the QPEs derived using the 1961-1990 and 1971-2000 PRISM data: the later period seems to result in different precipitation patterns. Results were sent to CNRFC.
- NWRFC tested the DMIP 2 gridded QPE approach (Calb MAP and MPE) for their CHPS forcings evaluation. They developed 50 year gridded 6hour and daily QPEs with the method.
- Hydro and Hydromet groups coordinated with HMT on the processing of the 2005-2006 'gap-filling' radar data.
- As a by-product of the derivation of using the Calibration MAP preprocessor and MPE, Mike looked at the Calibration MAT code to see if the station time series of 6-hour temperatures could be written out and used as input to a gridded interpolation algorithm.
- Mike processed remaining non-OHD papers for the Journal of Hydrology Special Issue on the Oklahoma Experiments. Only one non-OHD paper remains.
- Mike, with help from the Hydro group, resumed work on the DMIP 2 Oklahoma overview and results papers.

3rd Quarter FY10

- Mike, with help from the Hydro group, analyzed the results of the routing experiment and experiment for calibration with biased data. Mike finished a draft version of the DMIP 2 Oklahoma overview results paper and sent it to ABRFC and all participants for review June 23. Comments received from received from several participants. Mike revised the results paper for submission to OHD review by Aug 2.
- Hydro group provided support to CEMAGREF, U. Washington, and others for data processing for the western basin experiments.
- Victor Koren began recalibrating HL-RDHM for the East Fork of the Carson River basin using the revised QPE data.
- Ziya set up Eric Anderson's lumped models for the Carson Basin to generate final lumped simulations for analysis.
- Mike and Naoki made several runs of HL-RDHM to compare to lumped simulations.
- As Guest Editor, Mike completed all the non-OHD paper reviews for the DMIP 2 Special Issue of the Journal of Hydrology.
- The Hydromet group developed three QPE cases for two events from the 2005-2006 HMT West season: radar only (88D), gauge only, and radar-gauge mosaic. Naoki successfully generated HL-RDHM simulations with the three cases and compared to the HL-RDHM simulation with the QPE from the dense DMIP 2 data set. The preliminary results indicate that the radar-gauge mosaic QPE led to the best simulation of the flood event. This was a milestone for a HMT-West: to evaluate the QPE methodology for two events before processing the entire 2005-2006 data period.
- Mike presented a paper at the ASCE EWRI conference in Rhode Island on the derivation of historical gridded QPE fields for mountainous areas. Presentation was later given to RFCs via GoToMeeting.
- Mike and Zhengtao Cui worked on modifying the MAT calibration preprocessor to write out station 6-hour temperature time series for input to a grid interpolation program for historical gridded QTE generation.

4th Quarter FY10

- Mike and Zhengtao worked on modifying the MAT calibration preprocessor to write out station 6-hour temperature time series for input to a grid interpolation program for historical gridded QTE generation.
- Mike conducted OHD seminar on derivation of historical gridded QPE July 26
- Hydrology Group received and analyzed simulations from six institutions (U. Bologna Italy, CEMAGREF France, U. Valencia Spain, U. Ca. Irvine, U. Washington, and OHD). The Hydrologic Research Center and NCEP/EMC are finalizing their simulations. NCEP/EMC is generating gridded runoff volumes to be routed using HL-RDHM.
- Hydrology group performed an interim analysis of the results and submitted the report to OHD management and later to CNRFC.
- Mike, Julie Demargne, Naoki Mizukami, and Andy Wood (DOH, CBRFC) finalized plans for a session on Advances in Hydrologic Forecasting at the Fall Meeting of the AGU in December, 2010.
- Hydrology Group submitted the overview and results papers for the Oklahoma Experiments to OHD management for review.
- DMIP 2 officially ended as a project on September 30, 2010.

1st Quarter FY11

- Mike presented an overview of the Western Basin results at the HMT-West meeting October 6 and 7.
- Mike presented the Western Basin DMIP 2 results in a poster at the Fall AGU in San Francisco. The poster was sent to all DMIP 2 Western Basin participants for comments.
- Naoki presented his poster on the analysis of gridded, historical gridded QPE for consistency
- Mike received comments from Geoff Bonnin on the DMIP 2 Oklahoma results paper. The overview paper for the Oklahoma experiments was approved by OHD.
- Mike Julie Demargne, Naoki Mizukami, and Andy Wood (DOH, CBRFC) chaired a session at the AGU meeting on Advances in Operational River Forecasting. Rob Hartman gave an invited oral presentation on hydrologic forecasting in mountainous areas.
- Analyses continued of the OHD distributed model simulation improvements compared to the lumped model in the North Fork American. The analyses for three events show that the OHD distributed model improvement is from the generation of more runoff due to better modeling of the rain/snow line. The Hydrology Group began the analysis of the HMT 'precipitation type on the surface' grids for 2005-2006.
- The DMIP 2 methodology for generating hourly 4km gridded QPE data sets was considered for inclusion into the AOR project.

2nd Quarter FY11

- Introduction and results papers for the Oklahoma experiments were approved by OHD and officially submitted to the Journal of Hydrology in March. Mike Smith sent out the papers to the RFCs and Regions.
- Hydrology Group completed 90% of the analyses of the 2005-2006 HMT radar-derived rain-snow data. Naoki Mizukami began writing summary report. The HMT data were tested with lumped and distributed models.
- Along with other OHD AGU attendees, Mike Smith presented his DMIP 2 AGU poster to the RFCs on Jan 19.
- Hydrology and Hydromet groups evaluated the gap-filling radar QPE data for 2005-2006. The Hydromet group developed several QPE data sets
- Hydrology group began writing the introduction and results papers for the DMIP 2 Western Basins experiments.

3rd Quarter FY11

- Journal of Hydrology provided comments provided for Introduction and Results papers for the Oklahoma experiments. Reviewers called for only moderate revision, mostly to paper structure. Mike and co-authors began review process.
- Hydrology and Hydromet groups presented HMT QPE results analysis on June 30 via OHD seminar.
- Naoki nearly finished with draft report on use of HMT BBH-derived precipitation type data.

Problems Encountered/Issues

Calibration - Complete IDMA Study project:

1st Quarter FY10

- Group leader review of Naoki's paper delayed.

2nd Quarter FY10

- None

3rd Quarter FY10

- None

4th Quarter FY10

- None

1st Quarter FY11

- Delays by the Journal of Hydrometeorology in the review of the Western basin QPE analysis paper (4 months).

2nd Quarter FY11

- Paper by the Hydrology Group on the analysis of gridded historical QPE was not accepted by the Journal of Hydrometeorology. Paper being revised for re-submission.

3rd Quarter FY11

- None

DMIP II project:

1st Quarter FY10

- Longer than expected time required to QC the NCDC data for both the American and Carson basins.

2nd Quarter FY10

- None

3rd Quarter FY10

- Delays in delivery of HMT West QPE data
- Delays requested by DMIP 2 participants to submit simulations. Deadline was Aug 15. Late submission of simulations will allow for only a preliminary analysis of results by Q4. Full analysis of results will occur in FY11.

4th Quarter FY10

- Delays in delivery of HMT West QPE data
- Delays by HRC and NCEP/EMC in submitting simulations for the western basin experiments.

1st Quarter FY11

- Delays in the OHD review of the DMIP 2 Oklahoma experiment results paper (5 months).
- Delays in the delivery to OHD of the HMT-West advanced QPE from the 'gap-filling' radars.

2nd Quarter FY11

- OHD Review of DMIP 2 Oklahoma experiment results paper completed after 7 months.

3rd Quarter FY11

- Journal of Hydrology reviews on DMIP 2 papers took 3 months

Support Distributed Model Implementation

Core Goal: Provide, then improve, gridded water resource data production capability

Management Lead: Mike Smith

Objective: Provide training and support to RFCs as necessary to support implementation for river, flash flood, and new product forecasting.

Milestones

Task	Due Date	Status
1. Provide training and support to RFCs as necessary to support implementation for river, flash flood, and new product forecasting.	Ongoing	

Accomplishments/Actions

1st Quarter FY10

- Zhengtao made multiple bug fixes to HL-RDHM per field and OHD researcher requests. These were put on the AWIPS LAD for availability to the RFCs. He and Victor fixed a bug in the auto-calibration routine in which the scalar multipliers were not stored correctly.
- Zhengtao was nominated by one of the RFCs for his 'tireless' efforts to support their distributed model implementation.
- Zhengtao assisted OHRFC with getting HL-RDHM to run the Snow-17 model in their area.
- Zhengtao assisted CBRFC with a routing problem.
- Zhengtao located the source of slowness when running HL-RDHM over CONUS at NOHRSC. He fixed the bug and now a 6-hour run of HL-RDHM over CONUS at an hourly time step takes under 5 minutes when before it was 88 minutes.

2nd Quarter FY10

- Incorporated surface water freezing option into HL-RDHM and provided to NCRFC for a potential use for the Red River flood prediction scenarios
- Brian provided RFCs with updated scripts to process the USGS flow measurements for deriving *a priori* routing parameter estimates.
- Victor and Zhengtao provided assistance to John Halquist on CONUS executions of the SAC-HT.

3rd Quarter FY10

- Victor and Zhengtao resolved problems with RFC wide runs of HL-RDHM at NCRFC. Scott Stockhaus is implementing GFFG and needed to run HL-RDHM over a long period to get states correct. Scott reported that the issue were resolved
- Hydro group provided guidance to John Halquist for CONUS runs of HL-RDHM.
- Zhengtao and Mike worked on MAT preprocessor to write out 6-hour temperatures per request of NWRFC.

4th Quarter FY10

- Zhengtao and Mike finalized the modified MAT code and sent it to NWRFC for testing. They provided several bug fixes and guidance to NWRFC.
- Zhengtao developed and delivered the configuration files for two basins in ABRFC for the CHPS/FEWS version of the basic HL-RDHM components. Zhengtao worked with Eric Jones to select the basins and derive the configuration files.

1st Quarter FY11

- The Hydrologic Modeling Group provided support to CBRFC to move to 1km grid modeling for better modeling with Snow-17 in steep terrain.

- Zhengtao Cui provided support to ABRFC in the CHPS handling of static gridded parameters.

2nd Quarter FY11

- Hydrology group provided guidance to NWRFC as they started a project with the co-located WFO. The goal is to implement the CHPS HL-RDHM components on a few fast responding basins.

3rd Quarter FY11

- Hydrology group developed plan for NWRFC and Portland WFO to implement the CHPS HL-RDHM components on a few fast responding basins. Working details of historical and real time gridded forcings and relation to AOR.

Problems Encountered/Issues

1st Quarter FY10

- None

2nd Quarter FY10

- None

3rd Quarter FY10

- NCRFC reported problems running HL-RDHM for a two year period. The problems were resolved

4th Quarter FY10

- None

1st Quarter FY11

- None

2nd Quarter FY11

- None

3rd Quarter FY11

- None

Migration of HL-RDHM Components to CHPS

Core Goal: Provide, then improve, gridded water resource data production capability

Management Lead: Mike Smith

Objective: This proposal covers work to implement the basic HL-RDHM components into the CHPS/FEWS architecture. Work began in FY-09 but funding did not begin until FY-10. It includes the science development, implementation, and testing of the SAC-HTET into CHPS. This project includes elements previously listed under the AHPS Project “Physically-based Modifications to the SAC-SMA”.

Milestones:

Major Task	Due Date	Status
2. Performance testing, prepare for and conduct Gate 4: Basic HL-RDHM components in CHPS.	FY11 Q1	Complete except for Gate 4
3. Implement SAC-HTET into CHPS HL-RDHM: including derivation of soil texture parameters; analysis/evaluation of Noah parametric data extension of SAC-HTET during and specifically after HL-RDHM software modification	FY11 Q4	On track
4. RFC testing of CHPS HL-RDHM	FY11 Q3	On track Delayed due to RFCs' focus on BOC CHPS implementation
5. Submit a journal article describing the change in the evapotranspiration processes of SAC-HT	FY11 Q4	On track

Accomplishments/Actions

1st Quarter FY10

- Developed JNI codes
- Added HL-RDHM basic components

2nd Quarter FY10

- Design review with Geoff Bonnin, Jon Roe, Peter Gijsbers, Zhengtao Cui, Lee Cajina, and Mike Smith. The group approved the use of a separate data flow path for multi-year calibration runs.
- Developed general adaptor to convert NetCDF files to XMRG' files.

3rd Quarter FY10

- Design workflow schemes and configuration files for various distributed model simulation scenarios

4th Quarter FY10

- Successfully completed Gate 3 meeting September 22, 2010
- Zhengtao Cui developed FEWS configuration files for two basins in ABRFC to help Eric Jones implement and test the FEWS version. Delivered the configuration files and provided updates and assistance to Eric Jones.
- Zhengtao began performance testing of the real-time data flow option involving converting xmrgr input grids to the native FEWS gridded format.
- CBRFC offered to test the FEWS version starting in the November 2010 time frame.

1st Quarter FY11

- Zhengtao Cui and Victor Koren began work to implement SAC-HTET into CHPS as a component for gridded distributed modeling.

- Zhengtao provided ESRL with CHPS version of HL-RDHM to work on HMT-West follow-on project using WARF QPF.
- Victor and Mike began writing journal papers on the SAC-HT and the SAC-HTET. These will be written as companion journal articles.

2nd Quarter FY11

- Implementing SAC-HTET into CHPS progressed according to schedule with some slight delays. Significant coding was accomplished to read in and process many gridded data and parameter fields, and for evaporation options using precipitation and temperature or the full suite of meteorologic forcings. Victor Koren generated a number of required CONUS parametric grids and developed a utility to generate HRAP grids of max/min air temperature from hourly grids of temperature
- SAC-HT paper completed and ready for OHD review

3rd Quarter FY11

- SAC-HT paper passed OHD review
- Mike and Victor wrote 90% of SAC-HTET paper.
- Zhengtao on track for implementing gridded SAC-HTET in CHPS.
- Hydrology Group to work with NOHRSC to test SAC-HTET over CONUS in quasi-operational mode. Don Cline approved plan.

Problems Encountered/Issues

1st Quarter FY 10

- None

2nd Quarter FY10

- None

3rd quarter FY10

- Discovered the need to modify HL-RDHM codes so that error messages were passed to FEWS. Zhengtao performed the necessary coding to facilitate this.

4th Quarter FY10

- None

1st Quarter FY11

- Testing at ABRFC of CHPS HL-RDHM components delayed until the RFC gets to a good point in its CHPS operational transition. This will delay the HOSIP Gate 4 meeting covering the migration of the basic HL-RDHM components.

2nd Quarter FY11

- Some delays due to Linux disk problems. The disk problems caused very long program run times or prevented programs from completing.

3rd Quarter FY11

- Very long Linux run times for testing SAC-HTET delaying the development and testing of the gridded SAC-HTET.

Hydrologic Verification

Ensemble Forecast Verification and Post-Processing Improvements

Core Goal: Verify our forecast and uncertainty information

Management Lead: Julie Demargne (Project Lead: James Brown)

Note: for FY11, this project constitutes a merger of AHPS projects that were reported on individually in FY10 and earlier years, as follows:

- Improve Ensemble Forecast Verification
- Improve Verification Strategies
- Compare Post-Processors

Please refer to AHPS Quarterly Reports for FY2010 Quarter 4, or for FY2011 Quarters 1 or 2, for prior-year details on those projects.

Activities described below are coordinated with the activities of the project “XEFS Evaluation and Improvement”.

- Objective:**
- 1) Conduct a systematic evaluation of hydrometeorological ensemble forecasts from different forecasting models and across several climate regions to help improve the atmospheric Ensemble Pre-Processor (EPP) component of the Experimental Ensemble Forecast System (XEFS). Including:
 - ⇒ to undertake verification of the SREF and GEFS precipitation forecasts in order to evaluate and improve the Eastern Region Meteorological Model Ensemble Forecast System (MMEFS).
 - ⇒ to evaluate the sampling uncertainties of the verification metrics using the experimental prototype for confidence intervals.
 - ⇒ to document the results in a scientific manuscript for publication in international journals.
 - 2) Based upon comprehensive verification of the temperature and precipitation forcing ensembles from the XEFS (see project “XEFS Evaluation and Improvement”), identify, improve, and evaluate appropriate techniques for bias correcting these forcing ensemble forecasts. Including:
 - ⇒ to evaluate the indicator co-kriging (ICK) statistical post-processor for a large sample (30 years) of precipitation ensemble hindcasts from the GEFS.
 - ⇒ to extend the ICK post-processor to allow for space-time ensemble generation.
 - ⇒ improve the objective function in the ICK post-processor to reduce the type-II conditional biases; investigate the Conditional Bias Penalized Kriging technique of D-J Seo as a possible means to reduce the conditional biases.
 - ⇒ to compare the ICK technique with other statistical post-processors (including EPP) for bias correcting precipitation ensemble forecasts in selected study basins across different climate regions.
 - ⇒ to document the results in scientific manuscripts for publication in international journals.
 - 3) Based upon comprehensive verification of the XEFS streamflow ensemble forecasts (see project “XEFS Evaluation and Improvement”), including dynamical ensembles generated by the ESP-type approach and statistical ensembles generated by Hydrologic Model Output Statistics (HMOS), identify, improve, and evaluate appropriate techniques for bias correcting these streamflow ensemble forecasts. Including:
 - ⇒ to evaluate the indicator co-kriging (ICK) statistical post-processor for streamflow ensemble hindcasts from selected basins with river regulations.
 - ⇒ to compare the ICK technique with other statistical post-processors (including EnsPost and HMOS) for bias correcting streamflow ensemble forecasts in selected study basins across different climate regions.

- ⇒ to extend the HMOS technique with single-valued predictors from multiple hydrologic models and to evaluate the multi-model HMOS for test basins in the MARFC using forecasts from the SAC and Continuous API models.
 - ⇒ to help coordinate the HEPEX post-processing testbed activities (in collaboration with John Schaake and others) on comparing statistical post-processors for single-valued and ensemble streamflow forecasts, including a planned workshop at UNESCO-IHT in June 2011.
 - ⇒ to document the results in scientific manuscripts for publication in international journals.
- 4) Develop and evaluate methods for quantifying the sampling uncertainties of various ensemble verification metrics (e.g. through confidence intervals), focusing on the metrics available in the EVS. Including:
- ⇒ to develop an improved prototype for computing confidence intervals for the EVS verification metrics.
 - ⇒ to develop improved prototype displays for the sampling uncertainties surrounding the EVS metrics.
- 5) Develop additional, simple, diagnostic verification measures for the EVS, including measures for rare events, and examine integrated measures of forecast quality that combine information from several metrics. Including:
- ⇒ to extend the research version of the EVS (EVS-R) in which a few candidate measures are included for evaluation at the RFCs.
 - ⇒ to collaborate with the Verification Testbed of the Hydrological Ensemble Prediction EXperiment (HEPEX) and the National Centers for Environmental Prediction (NCEP), under the auspices of THORPEX-HYDRO.
- 6) Evaluate and extend methods for diagnosing the phase (timing) and amplitude errors in flow forecasts, initially focusing on single-valued flow forecasts, then extending the technique to ensemble forecasts. Including:
- ⇒ to extend the XWT tool for diagnosing timing errors in hydrologic ensemble forecasts.
 - ⇒ to document the potential uses and pitfalls of timing-error decomposition in an operational context.
- 7) Identify and evaluate criteria for selecting historic analogs to real-time ensemble forecasts in collaboration with the NWS Hydrologic Forecast Verification team. Including:
- ⇒ solicitation of feedback from operational forecasters at the RFCs about the forecasting situations under which historic analogs would be most useful, and the parameters on which specific queries should be built.
 - ⇒ a software prototype for evaluating analog queries against a file database.
 - ⇒ a brief report documenting the results from the example queries, problems identified, anticipated value and future work.
- 8) Develop prototype displays of real-time verification information (which include historic analogs and summary verification maps) to be implemented in the NWS's Community Hydrologic Prediction System CHPS Verification Service (CHPS-VS) in collaboration with the NWS Hydrologic Forecast Verification team. Including:
- ⇒ solicitation of feedback from operational forecasters at the RFCs about the summary verification statistics and products that would be the most useful and for which forecasting situations.
 - ⇒ improved prototype map displays for selected verification measures and additional map displays for new verification measures.
 - ⇒ prototype displays for historic analog events, together with a report on the software enhancements necessary to implement these within CHPS (specifically, the Graphics Generator component).

⇒ guidance for the RFCs on how to extract summary verification information for various verification scenarios.

9) Extend the EVS with known and ongoing feature requirements and bug-fixes. Including:

- ⇒ the inclusion of additional metrics and integrated measures of forecast quality.
- ⇒ enhancements in the Graphical User Interface (GUI) and software operation, such as the ability to predefine metrics to be displayed in the GUI.
- ⇒ enhancements to the documentation that accompanies the EVS, including the developer documentation and user's manual.
- ⇒ delivery of a new version of the EVS (3.0) to the public.

10) Extended testing of the EVS within the CHPS environment. Including:

- ⇒ testing the prototype EVS-CHPS Model Adapter for the EVS within a workflow context.
- ⇒ making any necessary bug fixes or enhancements to the EVS-CHPS Model Adapter.
- ⇒ delivery of a new version of the EVS-CHPS Model Adapter to the RFCs.

11) Maintain and extend external collaborations with COMET (verification training modules), academia, Deltares, NCEP, NWS Performance Branch, and HEPEX participants to advance verification science and software. Including:

- ⇒ to help identify core verification measures to inter-compare the different post-processing techniques in the HEPEX post-processing testbed.

Milestones for FY11

Task	Due Date	Status
Implement into EVS-R an improved prototype for computing confidence intervals for the EVS verification metrics (based on the stationary block bootstrap) and release for internal testing.	FY11 Q2	Completed
Implement additional diagnostic measures in the EVS-R for experimental testing at the RFCs, including metrics for the verification of rare events.	FY11 Q4	Ongoing
Investigate how to extend the Cross Wavelet Transform (XWT) prototype for timing error decomposition of ensemble forecasts.	FY11 Q4	Ongoing
Maintain and extend external collaborations to advance verification science and software.	Ongoing	Ongoing
Enhance the GUI/software operation of the EVS	FY11 Q4	Ongoing
Enhance the documentation of the EVS	FY11 Q4	Ongoing
Release an enhanced version of the EVS (4.0) and associated documentation	FY11 Q4	Ongoing
Conduct extended testing of the EVS Model Adapter within a workflow context	FY11 Q3	Completed
Release an enhanced version of the EVS to CHPS Model Adapter and associated documentation	FY11 Q4	Ongoing
To conduct verification of the SREF ensemble forecasts for selected basins in MA, AB, CN and NW RFCs	FY11 Q3	Completed
To produce a draft scientific manuscript for an international journal on the results from the SREF verification work.	FY11 Q3	Completed early
Obtain and archive the GEFS ensemble forecasts of precipitation and temperature.	FY11 Q4	Ongoing

Improve the objective function in the ICK post-processor to reduce conditional bias.	FY11 Q4	Completed early
Help coordinate HEPEX post-processing testbed project	Ongoing	Ongoing

New AHPS reporting

The current AHPS project, “Ensemble Forecast Verification and Post-processing Improvements” was developed in Q1 FY11. This project merges three earlier AHPS projects, namely “Improve Ensemble Forecast Verification”, “Improve Verification Strategies”, and “Compare Post-Processors.” The new AHPS project includes some redefined objectives, deliverables and milestones. For clarity, the Milestones and Accomplishments/Actions associated with the two old projects are given separately (at the end of this document) and cover the reporting period Q1 FY10 to Q1 FY11, when the new project became active.

Accomplishments/Actions

1st Quarter FY11

- Developed a parallel track of the EVS for research enhancements, EVS-R, and added an associated project to SVN for storage of the source code.
- Implemented a first version of the stationary block bootstrap (SBB) for evaluating the sampling uncertainties of the verification metrics in the EVS. The SBB involved sampling, with replacement, blocks of verification pairs whose block length is proportional to the correlation length of the underlying variable being verified. In addition, the block lengths are randomized by assigning a random variable, L , corresponding to the block length, with geometric pdf and mean equal to the required block length. This avoids non-stationarity from assigning a constant block length.
- Implemented first versions of the GUI features for defining confidence intervals, including the ability to specify a number of samples, mean block length, and a list of confidence bounds that should be computed.
- Implemented first versions of the graphical and numerical outputs in the EVS with confidence intervals.
- Developed R scripts for plotting all of the EVS verification metrics with associated confidence intervals.
- Made several bug fixes to the EVS 3.0, including fixed to reading of the OHD CS binary files and OHD Datacard files. Uploaded the new code to the public website.
- Assisted HEP and the RFCs with their use of the EVS 3.0 and EVS-R, including Andrew P. of MARFC with his evaluation of the SREF forecasts for the MMEFS project.
- Conducted comprehensive verification of the SREF ensemble forecasts for 10-20 basins in each of 4 RFCs, namely MA, AB, CN and NW RFCs. This included running EVS-R project files with bootstrapped confidence intervals for a large number of verification thresholds.
- Started working on the manuscript reporting the verification results for the SREF ensemble forecasts. This manuscript will provide valuable input to the Eastern Region MMEFS project.
- Compared the NCEP QPE-derived MAP (“CCPA” dataset) to the RFC-derived MAP (gauge only) and MAPX (radar) by pooling observations across the 10-20 basins in each RFC. Found reasonable agreement between the CCPA and RFC datasets for MA, AB and CN RFCs, but a consistent (35%) apparent over-estimation by CCPA for NW RFC. Through discussion with NWRFC, this was deemed to be likely caused by manual modification of the RFC MAPS during hydrologic model calibration and, hence, not a bias in the CCPA dataset, but in the RCF MAPS.

2nd Quarter FY11

- Developed a parallel track of the EVS for research enhancements, EVS-R, and added an associated project to SVN for storage of the source code.
- Completed coding and evaluating the first version of the stationary block bootstrap (SBB) algorithm for computing the sampling uncertainties of the verification metrics in the EVS.
- Enhanced the R scripts for plotting all of the EVS verification metrics with associated confidence

intervals.

- Made several bug fixes to the EVS 3.0 and EVS-R (research version). Uploaded the new EVS 3.0 code to the public website.
- Assisted HEP and the RFCs with their use of the EVS 3.0 and EVS-R.
- Completed verification of the SREF precipitation forecasts for selected basins in MA-, CN-, NW- and AB-RFCs.
- Completed a draft manuscript reporting the verification results for the SREF precipitation ensemble forecasts. This manuscript will provide valuable input to the Eastern Region MMEFS project. The internal reviews of the manuscript were completed, the necessary changes made, and the final version was submitted to Journal of Hydrometeorology on 04/01/11. The full reference is:

Brown, J.D., Seo, D-J and Du, J. (submitted) Verification of precipitation forecasts from NCEP's Short Range Ensemble Forecast (SREF) system with reference to hydrologic forecasting in lumped basins. Submitted to Journal of Hydrometeorology.

- Implemented a mixed objective function for the Indicator Co-Kriging postprocessor (ICK), which reduces the Type-II conditional bias in the post-processed ensemble forecasts. The Type-II conditional bias concerns the bias in the forecast probabilities, conditional upon the observed event occurring (or not occurring). This is the opposite of "reliability" or Type-I bias, which is concerned with the bias in forecast probabilities conditional upon the forecast event being predicted with given probability. The results of the mixed objective function were very promising, with significantly reduced Type-II conditional bias in all test cases with only minor increases in Type-I bias and unconditional bias.
- Continued preparing for the HEPEX streamflow post-processing workshop to be held at UNESCO-IHE in June 2011. Coordinated with John Schaake in preparing the workshop materials. Started running the ICK post-processor for the two scenarios under investigation by the international team (a scenario with an ensemble of predictors and a scenario with single-valued predictors for selected MOPEX basins and hydrologic simulations). Initial results with ICK are extremely promising.
- Started comparing the ICK post-processor with John Schaake's GLM-PP (Generalized Linear Model Post-Processor). Started evaluating the relative skill of ICK for selected MOPEX basins and found that ICK was significantly more skillful. However, further investigation will be required as ICK benefited from using simulated flows from 7 different models (i.e. a multi-model ensemble of simulated flows) whereas GLM-PP was calibrated with simulations from the SAC model only.

3rd Quarter FY11

- Continued enhancing the EVS R in preparation for the upcoming release of EVS 4.0. Added additional score decompositions for the Brier Skill Score and fixed several minor bugs in the code (mainly in the GUI).
- Enhanced the R scripts for plotting all of the EVS verification metrics with associated confidence intervals and designed several new scripts for plotting the results from EVS.
- Completed additional testing of the EVS R within the CHPS environment. This involved testing multiple EVS projects and datasets of varying size, as well as reading of different input file formats (including the PI-XML). All tests were completed successfully.
- Assisted HEP and the RFCs with their use of the EVS 3.0 and EVS-R.
- Received the reviews of the draft manuscript on the SREF precipitation ensembles and started working on the minor corrections requested for Journal of Hydrometeorology:

Brown, J.D., Seo, D-J and Du, J. (submitted) Verification of precipitation forecasts from NCEP's Short Range Ensemble Forecast (SREF) system with reference to hydrologic forecasting in lumped basins. Submitted to Journal of Hydrometeorology.

- Continued testing the mixed objective function for the Indicator Co-Kriging postprocessor (ICK), which reduces the Type-II conditional bias in the post-processed ensemble forecasts. The technique will be documented in a paper for a special issue of Hydrological Processes, for which

- an abstract was submitted and accepted.
- Brown and Regonda attended the HEPEX streamflow post-processing and verification workshop at UNESCO-IHE in June 2011, delivering presentations on ICK and HMOS, respectively.
 - Started working on the draft manuscript for the special issue of hydrological processes. Completed all runs with ICK (including conditional bias minimization) and all verification, including the computation of bootstrap confidence intervals for the verification metrics. Completed all figures for the manuscript and started working on the results and analysis section.
 - Coordinate with COMET on the upcoming AHPS Advanced Hydrologic Sciences workshop in August 2011. Started work on a draft presentation of the verification material to be presented at the workshop.
 - Coordinated with Deltares on conducting an intercomparison of statistical post-processing techniques following discussion at the HEPEX meeting. Brown will visit Deltares from 8th-12th August, 2011. A planning document was produced and iterated between Brown and Jan Verkade of Deltares, identifying the tasks to be completed during the visit. This work will contribute to a more coordinated effort between Deltares and OHD in performing streamflow post-processing within the CHPS environment.

Problems Encountered/Issues

1st Quarter FY11

- Major problems were encountered with OHD computing resources, which affected all aspects of the statistical post-processing and verification work, likely contributing to delays of several weeks. These comprise a combination of lack of reliability of the physical and virtual machines and inadequate Linux resources as a whole, including repeated crashes and system instability (leading to jobs being killed many times).
- In addition to problems with the Linux computer systems, several mistakes and delays in the ordering and assembly of the new GP-GPU computer system impacted the post-processing and verification work. The initial order for this machine was placed in Summer 2010 and the machine is still not ready for use by HEP.
- The activities done in collaboration with the NWS Hydrologic Forecast Verification team have been reduced due to limited resources available for FY11.

2nd Quarter FY11

- None.

3rd Quarter FY11

- None.

Inundation Mapping

Static Flood Inundation Maps Web-Page Development and Deployment

Core Goal: Improve Flood forecast Inundation Maps – Static Maps

Management Lead: Victor Hom

- Objectives:**
- 1) Develop AHPS web page interface,
 - 2) Deploy flood inundation maps in a nationally consistent, scientifically sound, and objective manner, and
 - 3) Implement program elements to assure quality deliverables and maintenance of viability.

Team Members:

Jay Breidenbach – Western Region
 Laurie Hogan – Eastern Region
 Victor Hom – Office of Climate Water and Weather Services / HSD
 Kris Lander – Central Region
 Doug Marcy – National Ocean Service / Coastal Services Center
 Seann Reed – Office of Hydrologic Development / HSMB
 Wendy Pearson – Central Region
 Vacant – Southern Region

This AHPS Core Goals team has been in operations since Q4 of FY07.

I. FY11 Main Objectives and Task Areas

- Main FY11 Objectives:**
- (1) Update AHPS Flood Mapping Web Portal and Display
 - (2) Update the NOAA Flood Inundation Map Guidelines to document the recommended methods and standards to produce Flood Inundation Map Libraries affected by levees and bridges.
 - (3) Implement, via the AHPS web portal, additional flood inundation mapping libraries and provide assistance to the regions for development/implementation of other AHPS flood inundation mapping.

Prioritized Task Areas	Responsible Organization
1. AHPS Flood Mapping Web Portal and Display	NOAA NWS and NOAA CSC
2. Quality Assurance and Consistency of Regional Flood Maps	NOAA NWS and NOAA CSC
3. National Flood Inundation Mapping Guidelines and Program Standards	NOAA NWS, NOAA CSC, and Federal Partners
4. Regional Flood Mapping Development	NOAA NWS, NOAA CSC, FEMA, USGS, USACE, and local Partnerships
5. Maintenance and Servicing Maps	NOAA NWS and NOAA CSC

II. FY11 Milestones

Task Area #1 - AHPS Flood Mapping Web Portal and Display		
Subtask 1-1 AHPS Web Portal for Bridges (Continuation)	Due Date	Status
Evaluate and Prioritize Changes to AHPS Portal for bridges and roadway infrastructure.	FY10Q1	Completed
Work with Contractor on Project Scope	FY10Q2	Completed
Contractor Delivers FY10 AHPS Web Changes	FY10Q3	Completed
Evaluate and Prioritize Changes to AHPS Portal for extended mapping for bridges and roadway infrastructure at risk.	FY10Q4	Completed
Work with Contractor on Project Scope	FY11Q1	Completed
Contractor Delivers FY11 AHPS Web Changes	FY11Q4	Delayed due to NIDS Moved to FY11Q4
Subtask 1-2 AHPS Web Portal for Levees and Flood Risk Areas (Continuation)	Due Date	Status
Evaluate and Prioritize Changes to AHPS Portal for Levees/Risk Areas	FY10Q1	Completed
Work with Contractor on Project Scope	FY10Q4	Completed
Contractor Delivers FY10 AHPS Web Changes	FY11Q2	Revised from FY10Q2 to FY11Q2
Evaluate and Prioritize Changes to AHPS Portal for extended mapping of E-19 impacts	FY10Q4	Completed
Work with Contractor on Project Scope	FY11Q1	Completed
Contractor Delivers FY11 AHPS Web Changes	FY11Q4	Delayed due to NIDS Moved to FY11Q4
Subtask 1-3 Provide more geospatial intelligence to NWS AHPS Products	Due Date	Status
Work with Contractor on Defining Requirements of Google Interface	FY11Q2	Completed
Demonstrate existing AHPS Flood Mapping Capabilities on Google Interface and enhanced current interface to meet AHPS FIM Partner Needs	FY11Q4	Delayed due to NIDS Moved to FY11Q4
Contractor provides beta version of Google interface for review	FY11Q4	-

Task Area #2 Quality Assurance and Consistency of Regional Flood Maps		
Subtask 2-1 Quality Assurance and Phase 2 Quality Control Training Workshop	Due Date	Status
Overview of Flood Mapping Process	FY10Q1	Completed
Flood Mapping: Hydraulics & Hydrology	FY10Q1	Completed
Flood Mapping: GIS Analysis	FY10Q1	Completed
Quality Assurance and Checking: Phase 2	FY10Q1	Completed
CSC will create training modules for Residence Workshop.	FY10Q2	Completed
Conduct Webinars and QAQC Hands-on Workshop	FY10Q2	Completed
Work with CSC on Logistics fro Webinar and Workshop	FY11Q4	Moved to FY11Q4
Conduct Flood Mapping Webinars	FY12Q2	Moved to FY12Q2
Conduct QAQC Hands-on Workshop	FY12Q3	Moved to FY12Q3

Task Area #3 - National Flood Inundation Mapping Guidelines and Program Standards			
Subtask 3-1	Federal Guidelines and Statement of Work Templates (FIM08-2P)	Due Date	Status
	Review Federal Guidelines V.2	FY11Q1	Ongoing, Revised to FY11Q1
	Evaluate Changes to SOW V.2	FY11Q2	Ongoing, Revised to FY11Q2
	Meet with FEMA Stakeholders and NFIP Coordinators	FY10Q3	Completed, Ongoing
	Update Federal Guidelines and SOW Templates	FY10Q4	Completed in FY10Q2
	Update Federal Guidelines to V.3	FY11Q4	On schedule
	Update SOW to V.3	FY11Q4	-
Subtask 3-2	Partnered Program/Project Management Support Tool (FIM09-7P)	Due Date	Status
	Define Scope and Deliverables	FY11Q1	Onhold, Unfunded
	Review QAQC Reports, Lessons Learned, Guidelines, SOW Templates, QAQC Training Modules	FY11Q2	Onhold, unfunded, In-kind Support
	Complete AHPS Management System Tools	FY11Q4	Onhold, unfunded In-kind Support
	Complete QA Inundation/Depth Tools	FY12Q1	Onhold, unfunded, In-kind Support
	Complete QA Metadata Tools	FY12Q2	Onhold, unfunded In-kind Support

Task Area #4 - Regional Flood Mapping Development			
Subtask 4-1	Southern Region's Gulf Coast Libraries	Due Date	Status
	Implement remaining Flood Inundation Map Libraries	FY11Q4	Ontrack
Subtask 4-2	Eastern Region's Susquehanna River Flood Inundation Libraries (FIM08-4P)	Due Date	Status
	Implement up to 3 Flood Inundation Map Libraries	FY10Q4	On-hold
Subtask 4-3	Eastern Region's Delaware River Flood Inundation Libraries (FIM08-4P)	Due Date	Status
	Implement remaining DRBC Flood Inundation Map Libraries	FY11Q4	Ontrack
Subtask 4-4	Central Region's Indiana Inundation Libraries (FIM08-4P)	Due Date	Status
	Implement up to 2 Flood Inundation Map Libraries	FY12Q2	Delayed due to State DOT Funds and USGS. Moved from FY11Q4.
Subtask 4-5	Western Region's Truckee River Flood Mapping	Due Date	Status
	Implement 1 Demonstration Flood Inundation Map Library	FY11Q4	Ontrack
Subtask 4-6	Central Region's Iowa Inundation Libraries (FIM10-1P)	Due Date	Status
	Implement 1 Flood Inundation Map Libraries	FY11Q2	Ontrack
Subtask 4-7	QAQC Technical Review and Oversight Support (FIM10-2P)	Due Date	Status
	Provide assistance to the regions for development/implementation of AHPS flood inundation mapping.	FY11Q4	Ontrack
Subtask 4-8	Demonstration AHPS Flood Map Libraries (FIM10-3P)	Due Date	Status

Implement 2 AHPS Flood Map Libraries one in Central and one in Western Region	FY11Q4	Ontrack
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Task Area #5 - Maintenance and Servicing Maps		
Subtask 5-1 Maintain AHPS Flood Maps (FIM09-10P)	Due Date	Status
Evaluate and Prioritize Map Updates	FY10Q3	Completed in FY10Q4
Work with WFO and RFC to update NC Libraries	FY11Q2	Onhold, to be combined with Google Deliverables
Supply Revisions on Test Platform for NWS Evaluation	FY11Q4	Onhold, to be combined with Google Deliverables
Implement Updates on Regional Servers	FY12Q1	Onhold, to be combined with Google Deliverables

III. FY11 Accomplishments/Actions

FY11 Q3

Task Area #1 - AHPS Flood Mapping Web Portal and Display

Google Display

- Orion has worked on Google Maps code for AHPS FIM and will be demonstrating capabilities in next quarter. After the demonstration and evaluation period, migrating AHPS FIM to Google is expected to begin in late FY11 or early FY12.

Task Area #2 - Quality Assurance and Consistency of Regional Flood Maps

Quality Assurance and Phase 2 Quality Control Training Workshop

- In May 2011, Kris Lander presented at ASFPM 2011 Conference on NOAA National Weather Service Flood Inundation Mapping Program, the benefits, and the QA/QC process. Victor Hom made presentations on the same themes at the NHWC 2011 Conference.

Task Area #3 - National Flood Inundation Mapping Guidelines and Program Standards

Federal Guidelines and Statement of Work Templates

- In May 2010, Dewberry submitted a draft of the Flood Mapping Guidelines for NWS to review.
- In June 2011, NWS Core Goals team submitted review comments to HSD. Victor Hom of HSD has the action to review, understand, and coordinate all comments/suggestions with Dewberry.
-

Partnered Program/Project Management Support Tool

- In June 2011, Kris Lander provided training on a set of ESRI QC tools which he had developed for NWS flood mapping projects. These GIS tools were designed to help to expedite the GIS QC process and facilitate better QA/QC workflow.
- In June 2011, HSD and OHD hosted a Freshwater Inundation Mapping Meeting/Workshop with FEMA, USACE, and USGS. The overarching goal of the meeting was to enhance inter-agency collaboration to better communicate flood risk and reduce repetitive flood losses.

The actions include:

- USGS and NOAA will demonstrate the capability to host a subset of AHPS Static Flood Inundation Map Libraries onto the USGS Flood Inundation Mapper
- USGS, FEMA, and NOAA will expand the USGS Flood Inundation Mapper capability to demonstrate a direct linkage between the static flood inundation map libraries and FEMA

HAZUS

- o FEMA to provide other Federal Agencies (OFA) access to FEMA Coordinated Needs Management System (CNMS) Database
- o NOAA, USGS and USACE to work with FEMA to collaboratively promote the creation of Flood Inundation Map libraries in concert with the creation of Detailed Flood Insurance Studies (FIS).

Task Area #4 - Regional Flood Mapping Development

Gulf Coast Libraries

- Orion delivered following libraries onto development test server for NWS to perform phase 3 QAQC review:

SEGT2	Guadalupe River - Seguin, TX	(EWX)	
DUPT2	Guadalupe River - Bloomington, TX		(CRP)
VICT2	Guadalupe River- Victoria, TX	(CRP)	
TKSN7	Tuckasegee River at Bryson City, NC	(GSP)	

Southern Region’s Rio Grande/Rio Bravo Projects

- Projects are undergoing Phase 3 QAQC. Orion has implemented prototype libraries on development test server and made the libraries available for review:

LDOT2	Rio Grande @ Laredo/Nuevo Laredo	(CRP)	
EPPT2	Rio Grande @ Eagle Pass		(EWX)
DLRT2	Rio Grande @ Del Rio/Ciudad Acuna	(EWX)	
RGDT2	Rio Grande @ Rio Grande City	(BRO)	

 and contractor is working to put these onto the dev server for Phase 3 QC Review.

Eastern Region’s Delaware River Flood Inundation Libraries

- ERH completed phase 3 QAQC review with the partners and local stakeholders and will be delivering 4 DRBC libraries in FY11Q4.

BVDN4	Delaware River at Belvidere, NJ	(PHI)
ESTN4	Delaware River at Easton, PA	(PHI)
MTGN4	Delaware River at Montague, NJ	(BGM)
MTMP1	Delaware River at Matamoras, PA	(BGM)

Central Region’s Inundation Libraries

- The University of Iowa is waiting on NWS to post flood maps for the Iowa River at Iowa City, IA ([IOWI4](#)) to AHPS. The NIDS has frozen delivery to AHPS. The library is now expected to be posted onto AHPS in early FY11Q4.
- CR coordinated and led discussions with NWS and USGS Staff on Phase 1A review of Indiana’s Fort Wayne flood inundation map on the St. Mary’s River ([SASI3](#)) and Indiana’s Camp Atterbury on Driftwood Creek ([DREI3](#)). The purpose was to review and give final approval to the project scope, general modeling approach, gage\rating suitability, range of inundation depths and schedule.

Western Region’s Flood Inundation Libraries

- During this quarter, USACE and Ada County Emergency Management agreed to perform Phase 2 activities, which include H&H work and the delivery of inundation mapping shapefiles/depth rasters to NWS for the Boise River near Eagle Island ([BIGI1](#)). Jay Breidenbach was instrumental in working with USACE and Ada County Emergency Management to understand the AHPS FIM process and also identify the AHPS FIM requirements for Phase 2.

FY11 Q2

Task Area #1 - AHPS Flood Mapping Web Portal and Display

Google Display for Name

- The core goals team developed an inventory of requirements in order to display AHPS Flood Inundation Maps in Google Maps. The inventory was marked to show requirements that

duplicate existing capabilities and others which enhance current capabilities. All requirements were then evaluated based on the team's understanding of field/stakeholder needs and ranked accordingly. The ranked list has been provided to Orion for a cost estimate.

Task Area #3 - National Flood Inundation Mapping Guidelines and Program Standards

Federal Guidelines and Statement of Work Templates

- The core goals team evaluated the list of proposed Federal Guideline revisions, Dewberry suggestions, and task work order costs. From this evaluation, the team put together a prioritization schema to tackle the largest number of revisions. As a result, 42 of the 50 suggestions will be revised in the FY2011 Federal Guideline. Of the 42 revisions, three of the revisions will be addressed directly by NOAA. These include areas which NOAA has developed expertise: (1) DEM resolution, (2) medium of delivery and the associated file deliverables, and (3) bridge clipping requirements and procedures.

Task Area #4 - Regional Flood Mapping Development

Gulf Coast Libraries

- Plans for additional implementations in FY11 includes:

SEGT2	Guadalupe River - Seguin, TX	(EWX)	
DUPT2	Guadalupe River - Bloomington, TX		(CRP)
VICT2	Guadalupe River- Victoria, TX	(CRP)	
TKSN7	Tuckasegee River at Bryson City, NC	(GSP)	

Southern Region's Rio Grande/Rio Bravo Projects

- WGRFC has submitted Phase 2 deliverables to Orion for Phase 3 development for the following:

LDOT2	Rio Grande @ Laredo/Nuevo Laredo	(CRP)	
EPPT2	Rio Grande @ Eagle Pass		(EWX)
DLRT2	Rio Grande @ Del Rio/Ciudad Acuna	(EWX)	
RGDT2	Rio Grande @ Rio Grande City	(BRO)	

 and contractor is working to put these onto the dev server for Phase 3 QC Review.

Eastern Region's Delaware River Flood Inundation Libraries

- ERH is working with the partners and local stakeholders to deliver up to 4 DRBC libraries for FY11. Work is progressing for the following locations:

BVDN4	Delaware River at Belvidere, NJ	(PHI)
ESTN4	Delaware River at Easton, PA	(PHI)
MTGN4	Delaware River at Montague, NJ	(BGM)
MTMP1	Delaware River at Matamoras, PA	(BGM)
- Maps for BVDN4 and MTGN1 are undergoing Phase 3 QC. RFC and WFO concerns are related to poor quality in the hydrography and transportation overlays, which will be addressed before posting onto AHPS.
- ESTN4 is on the dev site and is in QC3 now
- Phase 2 QC for MTMP1 is completed and will be on the dev site by April 22.
- JRSP1 - Jersey Shore, PA (raster-based) is undergoing Phase 3 QC.

Central Region's Inundation Libraries

- The University of Iowa is working with NWS on developing flood maps for the Iowa River at Iowa City, IA ([IOW14](#)). Maps are currently in Phase 3 QAQC review, awaiting final implementation by Orion. The NIDS freeze had delayed implementation by approximately 2 months, and the final implementation is expected to be in place in FY11 Q3.
- The Indiana USGS is working with NWS on developing flood maps for 11 locations across Indiana. The USGS has obtained firm funding for the 11 locations, which will be developed throughout FY2011 to FY2013. AHPS implementation will likely take place from FY2012 through

FY2014. The NWS\USGS project team has begun Phase 1 of the QC process for Camp Atterbury, IN ([DREI3](#)) and Fort Wayne, IN ([SASI3](#)).

- CRH have recently been coordinating with various federal, public, and private groups that have expressed interest in partnering to develop flood inundation maps. Barr Engineering, a private engineering firm in MN, is interested in developing five maps in the City of Rochester, MN. The Kansas City District Corp of Engineers has expressed interest in developing two maps in the Kansas City area. USGS MN Water Science Center has also enquired about developing maps in Minnesota. CRH also provided an overview of technical requirements to these groups.

Western Region’s Flood Inundation Libraries

- WFO Reno has been working with the Truckee River Flood Project (TRFP) to provide flood inundation maps for the Truckee River for both the Reno ([TRRN2](#)) and Vista ([VISN2](#)) gage reaches at one foot intervals. This would provide inundations maps from west of downtown Reno through the Truckee Meadows to east of Sparks, NV. TRFP is also working with Washoe County GIS personnel to provide NWS with detailed (0.5-1.0' contour) topographic data for these reaches so that depths can be determined.
- WFO Oxnard and CNRFC have been coordinating with Ventura County Watershed Protection District to develop flood inundation maps for 4 river forecast locations following Federal Guidelines and NWS QA/QC procedures. VCWPD has indicated a desire to display the inundation maps on a Google Maps background.
- WR Staff members have been coordinating with Federal, State, and local partners on the Boise River near Eagle Island ([BIGI1](#)) and the necessary deliverables to NWS for implementation onto AHPS. Currently, six flow levels have already been mapped and 7 more have been proposed. Ada County emergency management has budgetary approval from the Mayors and Commissioners to move forward and complete the map library. The work is also dependent on a signed cost-share agreement with the USACE, which is likely to move forward with target completion expected in late FY-11 or early FY-12. NWS will also need to enhance AHPS Flood Inundation Mapping Interface and allow for the display of flows.

FY11 Q1

Task Area #1 - AHPS Flood Mapping Web Portal and Display

AHPS Web Portal

- Orion demonstrated the enhanced AHPS Depth Grid Raster display which uses HTML version 5 standards and allows AHPS Water Depth Maps to be created directly from Ascii Depth Raster with software such as HECRAS/GeoRAS.

Task Area #3 - National Flood Inundation Mapping Guidelines and Program Standards

Federal Guidelines and Statement of Work Templates

- Dewberry completed review of NWS suggestions for revisions to Flood Mapping Guideline Revisions and also provided an assessment of areas for guideline enhancements.
- NOAA has accepted this assessment and is now coordinating with Dewberry on a schedule and the priority for these revisions.

Task Area #4 - Regional Flood Mapping Development

Gulf Coast Libraries

- Plans for additional implementations in FY11 includes:

SEGT2	Guadalupe River - Seguin, TX	(EWX)	
DUPT2	Guadalupe River - Bloomington, TX		(CRP)
VICT2	Guadalupe River- Victoria, TX	(CRP)	
SHEA1	Aldridge Creek at Sherwood Dr - Huntsville, AL	(HUN)	
TKSN7	Tuckasegee River at Bryson City, NC	(GSP)	

Southern Region’s Rio Grande/Rio Bravo Projects

- In partnership with the International Boundary and Water Commission (IBWC), NOAA NWS agreed to develop up to 7 web-based flood inundation maps for FY2011, which will provide information on the spatial extent and depth of flood waters in the vicinity of NWS river forecast locations on the Rio Grande/Rio Bravo along the Texas/Mexico border.
- WGRFC is conducting and coordinating Phase 2 QAQC of the maps for the following locations:

LDOT2	Rio Grande @ Laredo/Nuevo Laredo	(CRP)	
EPPT2	Rio Grande @ Eagle Pass		(EWX)
DLRT2	Rio Grande @ Del Rio/Ciudad Acuna	(EWX)	
RGDT2	Rio Grande @ Rio Grande City	(BRO)	
- In consultation with the engineering contractor, WGRFC has developed a series of PDF files for Phase 2 Review. This additional step is an alternative and enhancement from the normal phase 2 QAQC. It will make the communication easier with the partners and does not rely-on having ArcGIS. The PDFs represent mock ups of the inundation maps as they will appear on the AHPS pages.

Eastern Region’s Delaware River Flood Inundation Libraries

- ERH is working with the partners and local stakeholders to deliver up to 4 DRBC libraries for FY11. Work is progressing for the following locations:

BVDN4	Delaware River at Belvidere, NJ	(PHI)
ESTN4	Delaware River at Easton, PA	(PHI)
MTGN4	Delaware River at Matamoras, NJ	(BGM)
MTMP1	Delaware River at Montague, PA	(BGM)

Central Region’s Iowa Inundation Libraries

- University of Iowa is working with NWS on AHPS Flood Maps for the Iowa River in the vicinity of Iowa City, IA ([IOWI4](#))
- The project is currently in Phase 3 QAQC review.
- NWS identified and suggested some revisions and enhancements to the mapped shapefiles and depth grids, which the partners are adjusting.

Western Region’s Flood Inundation Libraries

- WR Staff members have been consulting with OCWWS HSD in performing site selection of a suitable demonstration AHPS Flood map library for Western Region: During this period, reviews of the Truckee River near Vista, NV ([VISN2](#)) were conducted. Meetings with the Washoe County are being planned.
- WR Staff members have been coordinating with Federal, State, and local partners on the review of the Hydraulics Model for the Boise River near Eagle Island ([BIGI1](#)) and the necessary deliverables to NWS for implementation onto AHPS. Based on the review of the models and the results, additional work, such as extra flood inundation maps, will need to be generated for other flow conditions.

IV. Problems Encountered/Remaining Issues

FY11

3rd Quarter FY11

General

- Due to NIDS sustainment system changes, AHPS Flood Inundation Mapping code had to be revised by AHPS contractor. AHPS contractor also had to rebuild several missing libraries and data downloads.

2nd Quarter FY11

General

- Due to ongoing NIDS sustainment project activities AHPS Flood Inundation Mapping had to

be delayed so that core AHPS modifications could be made to meet NIDS changes in requirements for AHPS during the sustainment project period.

Gulf Coast Libraries

- Due to the coarseness of DEM used in the hydraulic analyses, the shapefiles and depth rasters generated in Phase 2 did not capture flooding and resulted in poor resolution. LMRFC provided exceptional support to confirm and verify the lack of resolution in the hydraulic analyses. The recommendation is to discontinue development for:
[SHEA1](#) Aldridge Creek at Sherwood Dr - Huntsville, AL (HUN)

1st Quarter FY11

General

- Moratorium on new web implementation and AHPS contractor priorities for the NIDS will result in delayed implementation of AHPS Flood Map Libraries. The earliest expected Library deployment onto AHPS will be in the spring of FY11 around Q2.

Remaining Issues from FY10

None at this time.

The ARC and Core Goal Team Lead need to ensure funds are available.

Inputs and Forcings

Prototyping NMQ for FFMP

Core Goal: Improve the quality of physical inputs and forcings

Management Lead: Ken Howard and Jian Zhang, NSSL; Mary Mullusky and David Kitzmiller, NWS

[**Note:** AHPS funding restored in FY11 Q3 after a period when the project was on hold.]

Objective: To test a high resolution Cartesian based regional multisensor QPE and QPF as input into FFMP and to facilitate a NCEP implementation of NMQ system for the national creation of QPI products and prototype dissemination to individual RFCs and weather forecast offices. The following project builds upon the FY05 NMQ to FFMP demonstration project and a FAA sponsored project for the implementation of the NMQ 3-D reflectivity mosaic code set within NCEP operational environment. Through an NCEP implementation, the full NMQ product suite can be prototyped and enhanced for potential utilization within RFC operations as well as within WFOs in FFMP.

Milestones FY10

Task	Due Date	Status
Dissemination of NMQ Q2 products in 'real time'	Q2/Continuous	Completed
Assessment of Cool Season Q2 performance for RFC and selected FO operations	Q1/FY11	Ongoing
Assessment of Warm Season Q2 performance for RFC and FO operations	Q1/FY11	Ongoing
Compilation of RFC and FO feedback and recommendations	Final Report Q4	Conducting quarterly conference calls.
Conducting testing of wdss-ii build within the NCEP Dell server environment	Q3	Completed with report submitted to NCEP, OHD, and FAA

Milestones FY11-12

Task	Due Date	Status
Enable real-time ingest of NMQ products at WFO's: Obtain and review results of regional survey on communications capabilities for staging of NMQ products to WFOs for flash flood monitoring:	Q4/FY11	Initiated
Based on results, enable communications between National Weather Center MRMS prototype system and regional or field offices	Q1/FY12	
Coordinate with regional headquarters and MDL staff regarding instructions on enabling NMQ ingest to FFMP-A: FY12Q3	Q3/FY12	

Accomplishments/Actions

1st Quarter FY10

- A Q2 feed was established for the MARFC
- Q2 performance Input from RFCs was obtained through conference calls held on 16 September and 4 November. Comments included issues related to MPE and SSHP in addition to more general meteorological issues. Minutes from the conference calls have been compiled and provided to OHD as well as the Q2 development team.
- NSSL has been working with ESRL and NCDC to formulate a robust gauge QC program based on manual efforts at RFCs. Efforts are ongoing to compare NSSL automatic gauge QC with

manual RFC bad gauge lists.

- David Kitzmiller delivered an OSIP briefing on progress on December 1 - an extension for the OSIP Gate 3 review for the NMQ implementation project 06-039 has been granted to CY 2010.

2nd Quarter FY10

- Real time Q2 feeds continue to RFCs as outlined in 4th quarter FY09.
- Final coding and testing completed for VPR corrected Q2 QPE product suite. VPR corrected QPE product will be implemented in real time during Q3 with products available to RFCs beginning May 1.
- Q2 performance input from RFCs was obtained through conference call held on February 17th. Minutes from the conference call have been compiled and provided to OHD as well as the Q2 development team.
- Four NCEP hardware test trials completed, however, additional testing is underway to assess issues with running VMware for system management.
- After initial FY10 RFC conference call NSSL undertook a major effort to assess the degree in which light precipitation was being removed from Q2 products. After a nearly a daily review of Q2 performance during Q1 it was found the wdssii reflectivity quality control was removing valid reflectivity echo especially during cool season events. Refinements were made to the quality control logic and a reduction of light precipitation has been realized but assessments will continue.

3rd Quarter FY10

- Real time Q2 feeds continue to RFCs as outlined in 4th quarter FY09.
- During Q3 NSSL implemented within the real time Q2 MRMS system ten new products related to quantitative precipitation estimation. The products include:
 - Radar Quality Index
 - Tilt Based Vertical Profile Reflectivity
 - Seamless Hybrid Scan Reflectivity (SHSR)
 - Seamless Hybrid Scan Reflectivity with power adjustment
 - Seamless Hybrid Scan with Vertical Profile Reflectivity correction
 - Height (MSL) of the Seamless Hybrid Scan Reflectivity
 - Q2 QPE using the SHSR with power adjustment
 - Q2 QPE using the SHSR with Tilt based Vertical Profile Reflectivity correction
- The new products are being generated in real time CONUS at 1-km horizontal resolution with a 5-minute update rate.
- NSSL is currently assessing the performance and limitations of the new products. Initial evaluations show
 - SHSR was able to mitigating blockage artifacts, but also introduced BB contamination and thus needs refinements.
 - The VPR correction is successful in mitigating the BB-lead QPE overestimation. The VPR correction is limited by the assumption of horizontal uniformity.
 - The VPR correction reduced underestimation in areas where the radar sampled ice regions.
- Further evaluations and refinements are ongoing.
- The new QPE products are available to OHD, RFCs and FOs in AWIPS NetCDF format in real time. All new products are viewable within the QVS webpage (nmq.ou.edu)

4th Quarter FY10

- Real time Q2 feeds continue to RFCs.
- Established feed of CONUS Mountain Mapper QPE to ARBRFC for CONUS analysis.
- A new verification tool set was created for conducting long-term verification statistics for individual RFCs, CWAs, and custom regions per the FY10 milestones. The url for the new verification tools is <http://nmq.ou.edu/beta/q2-tools.html>.
- The appearance of wind farm contamination in QPEs has been increasing and an issue for RFCs and FOs. A comprehensive effort was undertaken at NSSL to identify the wind farm locations

impacting QPEs. After a 4-month effort all wind farms impacting radar visibility were identified with GIS shape files developed along with the Meta data for wind farm locations. The shape files and metadata have been provided to the Radar Operations Center for distribution to individual offices and RFCs.

- Comprehensive verification of all products in the NMQ system is ongoing within the HMRG group. Results from the verification efforts have and will continue to be sent to OHD in the form of PowerPoint's and performance statistics. Additionally OHD and other NOAA individuals can easily obtain performance statistics in real time for all Q2 products in addition to Stage 2,3, and 4.
- New gauge QC tools were implemented in the system for real time automated quality control for HADS and mesonet gauges.
- Q2 products were provided as part of the NextGen NWS demo.

1st Quarter FY11

- NSSL staff contributed substantial time to preparation for NWS/OAR senior managers' review of MRMS-NMQ project on December 10, which resulted in NMQ being identified as a line office transition project.
- There is presently no AHPS funding for this project. We continue to maintain the distribution feeds and address RFC questions.

2nd Quarter FY11

- Project temporarily on hold due to lack of funding.

3rd Quarter FY11

- Allocation and receipt of FY11 funding was confirmed
- Real time Q2 feeds continue to RFCs
- Based on requests from several WFOs and an initiative suggested by Eastern Region Headquarters, a survey of potential methods for forwarding a subset of the NMQ precipitation products to WFOs in real time will be undertaken
- Task list above has been updated to include this initiative

Problems Encountered/Issues

1st Quarter FY10 – None

2nd Quarter FY10 – None

3rd Quarter FY10 – None

4th Quarter FY10 – A position error was found in the radar polar to Cartesian gridding. The references files within the wsdii system were incorrect. New references files were created and implemented on the NMQ system on October 10th

1st Quarter FY11

- There is presently no AHPS funding for this project. Some work continues on a limited basis.

2nd Quarter FY11

- There is presently no AHPS funding for this project. Some work continues on a limited basis.

3rd Quarter FY11

- Funding restored; no problems presently

Short-range radar-based quantitative precipitation forecasts

Core Goal: Improve the quality of physical inputs and forcings

Management Lead: David Kitzmiller

Objective: To develop and deliver a statistically-based 0-6 hour probabilistic quantitative precipitation forecasting system using remote-sensor and numerical prediction model input. The system is based on a Model Output Statistics approach requiring several years' data. Most work for which funding is requested is to be done in first two years.

Milestones

Task	Due Date	Status
1. Archive necessary radar, lightning, and RUC2 numerical model output	Continuous	Ongoing – started FY09 Q2
2. Develop 6-h extrapolation prediction algorithm and codes based on operational High-Resolution Precipitation Nowcaster (HPN)	FY09/Q4	Done
3. Construct dataset with collocated radar extrapolation forecasts, satellite precipitation extrapolation forecasts, RUC2 precipitation forecasts, and Stage4 verifying precipitation, for available CY2009 data	FY10/Q1	Done
4. Deliver interim report on data evaluation, including CONUS-wide statistics on RUC2 and radar forecast correlations with observed precipitation	FY10/Q2	Done – EWRI conference preprint
5. Prepare and submit OSIP documents for implementation process – Completed HOSIP Gate2 review as a research project, to be followed on by an implementation task	FY10/Q3	HOSIP Gate2 review passed in FY10/Q2
6. Assemble statistical dataset and develop regionalized probability equations based on CY2009-2010 input data	FY10/Q4	Completed
7. Prepare and journal article on initial results from CY2009-CY2011 data	FY11/Q1	Now in Q4

Accomplishments/Actions

2nd Quarter FY09

- Began collecting necessary input radar data from NMQ sources
- Began collecting necessary RUC2 forecasts (precipitation and other fields)

3rd Quarter FY09

- Continued data collection
- Began adapting operational HPN code to make extrapolation radar forecasts out to 6 hours

4th Quarter FY09

- Continued data collection
- Got radar extrapolation forecast code working
- Collected input from field sponsors to refine operational requirements (timing, product suite)
- Began work on preparing extrapolation forecasts of satellite rainfall rate based on operational Hydroestimator fields
- Abstract on the project submitted for presentation at EWRI congress in 2010

1st Quarter FY10

- Continued data collection

- Got verification statistics for RUC2 and radar extrapolation QPF in the 0-3, 3-6, and 0-6h timeframes (warm season, 1800-0000 UTC) demonstrating the manner in which radar and physical-dynamical QPFs complement each other
- Began preparation of preprint article for EWRI Congress scheduled May 2010

2nd Quarter FY10

- Passed HOSIP gate2 review, for research project, March
- Revised milestones above per approved HOSIP research project research plan and FY10 AHPS submission
- Completed and submitted preprint article for EWRI Congress scheduled May 2010
- Presented seminars on initial results at Norman National Weather Center, ABRFC

3rd Quarter FY10

- Presented results, demonstrating probability and QPF amount fields, at EWRI congress May 2010
- Obtained verification statistics demonstrating approximate parity with skill of HPC 0-6h update forecasts, for 2009 data
- New results presented in preprint for European Radar Conference, submitted July 2010
- Continuing data collection, refinement of probability and amount equations, methodology for probability matching to insure a realistic distribution of forecasts

4th Quarter FY10

- Presented results for comment by HPC staff, including Forecast Branch chief and SOO. They confirmed that verification statistics appeared correct.
- Presented results, demonstrating probability and QPF amount fields, at European Radar Conference (September)
- Continued collecting-collocating data for 2010
- Expanded initial predictor dataset to include stability and humidity indices from RUC model

1st Quarter FY11

- Continued data collection for CY 2010
- Developed local-regional probability and QPF equations from warm (2009-2010 data) and cool (2009-2010) season input data. Developed codes for spatial interpolation of regression equation coefficients to obtain spatially-continuous equation output on the 4-km HRAP grid
- Developed scripts for real-time operation of the forecast system

2nd Quarter FY11

- Continued data collection for CY 2011
- Have capability to generate real-time forecasts from NMQ radar, Hydroestimator satellite, and RUC2 numerical model input. Running sequence on NHDR takes ~7-8 minutes, but could be accelerated by obtaining RUC2 input earlier than radar and satellite
- Found some artifacts in the real-time output, unrealistic spatial patterns in some of the probability fields. We determined a new approach to spatially interpolating the regression coefficients which will be tested in Q3.

3rd Quarter FY11

- Began regular examination of real-time forecast products. These showed some unrealistic results among the probability products, which are being corrected in Q4
- Introductory and methodology explanation sections of a journal article manuscript have been drafted
- Acceptance of a presentation at upcoming AMS radar conference (September)

Problems Encountered/Issues

2nd Quarter FY09

- Funding not committed until FY09 Q3

3rd Quarter FY09

- None

4th Quarter FY09

- None

1st Quarter FY10

- None

2nd Quarter FY10

- Have revised initial milestones (above) to reflect approved HOSIP research plan, latest FY10 AHPS funding plan

3rd Quarter FY10

- None

4th Quarter FY10

- None

1st Quarter FY11

- Delivery of final development report slipped to Q2

2nd Quarter FY11

- Delivery of final development report further slipped to Q3 – some problems appeared in the output when tested on real-time data

3rd Quarter FY11

- Imminent departure of a contract support staffer necessitated delays in finalizing the products, in order to concentrate on code and data documentation

Evaluation of Radar Precipitation Estimates from NMQ and from WSR-88D DPA Products over Conterminous United States

Core Goal: Improve the quality of physical inputs and forcings

Management Lead: Project lead Wanru Wu

Objective: To assess strengths and weaknesses of NMQ radar-only and NEXRAD PPS precipitation estimates over the conterminous United States, in a variety of weather situations, and to determine effective limits of areal coverage of both products

Milestones

Task	Due Date	Status
Literature review	FY09Q4	Complete
Data collection (NMQ radar-only, NCEP Stage2 radar-only, ASOS rain gauge reports)	Through FY10/Q3	Complete
Analysis and evaluation (spatial characteristics of radar/gauge errors, regions of effective radar coverage, radar QPE errors in cold weather situations)	FY10/Q3	Complete
Review of research results	FY10/Q4	Complete; OFC seminar delivered in July
Prepare journal article	FY10/Q4	Completed Jan 2011

Accomplishments/Actions

3rd Quarter FY09

- Began data archiving
- Began preparation of HOSIP project plan

4th Quarter FY09

- Project plan approved, passed HOSIP Gate2 review (project P-2009-006)
- Collected initial results of evaluation; presented results in AMS Radar Conference preprint and poster (early October 2009)

1st Quarter FY10

- Continued data collection in real time
- Got NSSL assistance to retrieve NMQ data covering some missing periods in early 2009
- Collected fresh statistics using recent NCEP StageII radar-only data without any gauge bias correction; there was only minor influence on StageII (DPA) verification statistics, generally positive
- Processed and applied mosaic data to replace bias-corrected Stage2 data as original DPA products from January 1st - September 31, 2009 and reevaluated NMQ radar-only QPE during the period, with ASOS rain gauge 24-h precipitation as the verification.

2nd Quarter FY10

- Continued data collection in real time
- Derived evaluation statistics for 1-h, 6-h, 24-h point data (ASOS rain gauge verification)
- Began evaluation of statistics in cold-rain situations (surface temperature 34-40°F)
- Began evaluation of spatial correlation statistics of DPA-based and NMQ-based radar-only gridded fields, relative to StageIV multisensor and gauge-only precipitation

3rd Quarter FY10

- Completed statistical analyses
- Began preparation of tech report and OFC seminar material (seminar delivered in July)
- HOSIP Gate3 scheduled 1 September

4th Quarter FY10

- HOSIP Gate3 review presented on September 1
- Awaiting final approval of technical report from gatekeeper

1st Quarter FY11

- Worked report in journal article format; got initial internal reviews
- Awaiting final approval of technical report from gatekeeper

2nd Quarter FY11

- HOSIP gate process was completed
- Awaiting final internal approval of journal manuscript from OHD management, as of April

3rd Quarter FY11

- Journal article approved by OHD management and submitted to J. Hydrometeorology for publication
- HOSIP project completed;

Problems Encountered/Issues

3rd Quarter FY09

- Funding not committed until FY09 Q3

4th Quarter FY09

- Discovered error in NCEP StageII processing that introduced gauge/radar bias correction into gridded radar QPE products; worked on alternative methods of getting around the problem (an alternative data source for mosaicked DPA data appeared in Oct 2009)

1st Quarter FY10

- None this quarter

2nd Quarter FY10

- None this quarter

3rd Quarter FY10

- None this quarter

4th Quarter FY10

- Awaiting gatekeeper's final review of technical report

1st Quarter FY11

- Awaiting final approval of technical report from gatekeeper

2nd Quarter FY11

- Awaiting final internal approval of journal manuscript from OHD management, as of April

3rd Quarter FY11

- None

Gridded Hydrometeorological Forcings for Community Hydrologic Prediction System (CHPS) – FY10-FY11

Core Goal: Improve the quality of physical inputs and forcings

Management Lead: David Kitzmiller

Note: for FY11, reporting on the following project has been merged into this report:

- Satellite Based Analysis for Potential Evaporation

Objectives: To facilitate RFC studies on biases or statistical differences between current operational basin-average forcings (precipitation, temperature, potential evapotranspiration [PET], and freezing level) and new gridded versions such as are intended to be used in CHPS. In many instances the forcings now entering the river forecast system are calculated from a weighted sum of point measurements; operational practice is shifting to calculating all basin-average forcings from grids, and in some documented instances the grid calculation is biased relative to point-based values, or relative to the calibration dataset. We will consolidate and summarize results reported by RFCs into a final document;

To consolidate and summarize any results on the impact of the new gridded forcings on hydrologic simulations with NWSRFS;

Identify methodologies and any ongoing projects for deriving a gridded calibration dataset of precipitation, temperature, and PET for all RFCs, based on in-house reanalysis, Analysis of Record (AOR), or other means; produce a report on preferred options for generating long-term calibration datasets for these variables at 4-km, 1-hour resolution;

Assist and coordinate with RFCs in cataloging archives of point and gridded hydrometeorological data using in constructing calibration datasets.

Proposed Milestones:

Task	Due Date	Status
8. Archive forcings data from CAT sites (ABRFC, NERFC, CNRFC, NWRFC)	Continuous	Ongoing – started FY09 Q4
9. Initiate real-time archive development from all remaining RFCs)	Initiate FY10/Q2	Ongoing at most sites – FY10 Q2
10. Document statistical differences between point-based and gridded forcings from MPE, Mountain Mapper/Daily QC, GFE, and report on findings.	FY10/Q3	Results reported from all CAT RFCs
11. Execute parallel streamflow simulations driven by point-based and grid-based basin average precipitation, temperature; report on magnitude of differences in simulations and differences in quality relative to gauge observations	FY10/Q3	Results reported from ABRFC, CNRFC, NERFC
12. Coordinate with RFC staff to locate historical point or gridded inputs (precipitation, temperature, cloud cover, winds, relative humidity) used to construct hydrologic calibration datasets – needed for either development of new datasets or verification of calibration datasets from an outside source such as AOR.	FY11/Q4	Revised later when OHD management requested time to review this plan

<p>13. Report on potential and preferred methods of deriving gridded calibration datasets (other than precipitation and PET) of at least 50 year duration – possibly a re-analysis of historical data, or an external source such as the Analysis of Record (AOR) now under development, possibly other methods of reanalysis. Calibration datasets will be ~4-km mesh length, 1-h time series.</p>	<p>FY11/Q4</p>	<p>Revised timeline based on start of full-time contract support</p>
<p>14. Report on potential and preferred methods of deriving gridded precipitation calibration dataset, 50-year duration, including reanalysis with archive of RFC rain gauge and radar data; available satellite products, and disaggregation of climatic datasets with daily-to-monthly total precipitation</p>	<p>FY11/Q4</p>	<p>Revised timeline based on start of full-time contract support</p>
<p>15. Report on potential and methods of deriving gridded potential evapotranspiration (PET) calibration dataset, focusing on geostationary satellite estimates of cloud cover and/or surface radiation balance, and reanalysis estimates of radiation balance, wind, temperature, and humidity.</p>	<p>FY11/Q4</p>	<p>Now includes tasks from original CHPS PET task from FY09</p>
<p>16. (Tentative as of FY11 Q1): report on potential impact of PET forcings in calibration, to assess any impact of use of real-time estimates vs. application of local climatic values on hydrologic simulations</p>	<p>FY12/Q1</p>	
<p>17. Evaluate methods of improving MPE/DQC disaggregation of multi-hour precip accumulations to 1-h, including spatial interpolation of 1-h radar QPE when necessary, use of reanalysis precipitation forecasts</p>	<p>FY12/Q1</p>	
<p>18. Re-analysis for precipitation from point (gauge) observations: develop offline capability for gridded record of precipitation for ≥ 10 years. Report on methods for further disaggregating to hourly time series.</p>	<p>FY12/Q2</p>	
<p>19. Re-analysis for precipitation from radar/remote sensor observations: Determine if CPC and/or NCDC efforts to produce long-term high-resolution gridded precipitation are moving forward. Depending on schedules, either prepare to utilize one of these sources or re-analyze existing StageIII/StageIV grids using external high-reliability sources such as PRISM monthly totals.</p>	<p>FY12/Q2</p>	
<p>20. Reanalysis for sky cover and remote-sensor PET: Determine availability/reliability of RTMA or research sky cover datasets; create PET grids from these data and temperature, wind and relative humidity information from NARR</p>	<p>FY12/Q4</p>	

Accomplishments/Actions

1st Quarter FY10

- Project plan reviewed and refined based on RFC staff input
- Presentations to ARC and other NWS staff in December
- Data collection (gridded and basin average forcings, some other hydrometeorological inputs) was organized by RFC staff and hosted at NOHRSC
- OHD and field staff met at AMS conference to open dialog on science possibilities for long-term (50-year) reanalysis of precipitation and temperature, yielding hourly high-resolution grids for hydrologic model calibration

2nd Quarter FY10

- Final review of project plan during January HIC meetings, ARC meetings
- Reviewed results of comparison of gridded temperature forcings with legacy point-based forcings at ABRFC, during site visit in March (Kitzmilller)
- Results of gridded forcings comparisons at CNRFC, NWRFC, ABRFC, NERFC reviewed during DOH conference call, April (lead Don Laurine)
- Collected information on multiple NWS operations and projects creating real-time and retrospective precipitation grids; also reviewed availability and characteristics of datasets created by PRISM group and U. Washington (Hamlet and Letternmaier, *J. Hydrometeorology*, 2005)

3rd Quarter FY10

- Ongoing work to hire a contractor to assist with remainder of study
- Determined approximate schedule for upcoming meetings associated with defining requirements for the 2nd phase Analysis of Record (AOR), an effort headed by OST staff. Meetings to be lead by NCEP-EMC and WR staff
- Delivered an OFC seminar on CAT RFC forcings results, ongoing precipitation analysis activities in NWS, and possibilities for expanding data records (July 19)

4th Quarter FY10

- Limited work – contractor still not hired
- Prepared abstract for CLIVAR program conference on reanalysis and user needs for reanalyses, November 2010
- Joined CPC-led effort to gather user input on general needs for Analysis of Record data

1st Quarter FY11

- Presented a poster at CLIVAR program conference on reanalysis and user needs for reanalyses, Baltimore, in November 2010. Presentation entitled “Requirements for Long-term Retrospective Analyses of Hydrometeorological Data to Support Hydrologic Operations and Development” by Kitzmilller, Wu, Zhang, and Adams
- Obtained some valuable information about the availability, limitations, and potential uses of various reanalyses in our effort, particularly for higher latitudes and North America as a whole
- Gathered a basic outline plan for creating calibration datasets from quality-controlled point precip and temperature input, radar QPE and reflectivity input, and existing reanalysis datasets – presented the outline to HICs (January)
- Drafted HOSIP Statement of Need and project plan
- In early January, received some new direction involving real-time gridded data forcings needed at National Water Center, from OHD management
- Got commitment of initial contract support starting in January

2nd Quarter FY11

- Assembled a summary report on the CAT RFC forcings studies – sent out for comment with final version to be ready in May
- Worked on adapting existing temperature (MAT) calibration preprocessor code to producing point 1-h temperature values for application in distributed modeling and possibly lumped modeling.

- Drafted a development plan for historic gridded forcings datasets applicable to both the CHPS project and subsequent IWRSS applications such as USGS water census – sent to OHD management for comment in early March
- Began meeting with gridded forcings team for IWRSS/Water Center (Schneider, Kitzmiller, Fall) to plan initial steps for demonstrating a new centralized capability for very high resolution (500-m grid mesh, hourly) meteorological datasets
- Now working on coordinating the QPE part of these efforts with ESRL/PSD (Rob Cifelli) who has produced a general QPE improvement plan involving in situ and remote sensor inputs

3rd Quarter FY11

- Staff of the IWRSS forcings team (Schneider, Fall, Kitzmiller) met at NOHRSC in April to plan for forcings part of National Water Center IOC. This has implications for supplying data for a historical water census, hydrologic model calibration, and real-time operations
- A HOSIP plan for the calibration analysis of record, including precipitation, temperature, solar radiation, is under revision. The plan includes a tie-in to real-time operations
- Work is ongoing to modify an existing OHD preprocessor for Mean Areal Temperature estimates to generate time series and grids of 1-h temperature. The logic is designed to match that of the Mountain Mapper/DailyQC application presently in operational use for 6-h temperature grids.
- Work is ongoing to develop and demonstrate a method of objectively identifying zones of adequate and poor radar coverage based on multi-year precipitation climatology, and for long-term bias correction of radar-only StageII precipitation. This approach has applications to both historical and real-time analysis of radar precipitation estimates.
- An effort to create a multidecade record of 1-km, 1-h interval temperature and precipitation grids for a portion of the NWRFC area has been started; this complements a demonstration project for distributed hydrologic modeling of fast-reacting basins in the area
- Initial discussion of statement of work with RTi staff; they will work on literature survey for the calibration effort and provide recommendations on preferred methods of developing gridded analyses of meteorological data for calibration. Work on their literature survey began Q4

Problems Encountered/Issues

1st Quarter FY10

- Final disposition of funding still at issue – but proceeding on the assumption the plan will see only minor changes

2nd Quarter FY10

- Working to hire new contractor to collect reports and carry out literature and operations searches to develop plan for long-term forcings calibration datasets

3rd Quarter FY10

- Contractor hire still pending as of the end of the quarter – expect some delays in milestones for items 6, 7, 8

4th Quarter FY10

- Limited work – contractor still not hired

1st Quarter FY11

- Work still limited by lack of a full-time contractor for support

2nd Quarter FY11

- Partial resolution of contractor support issue – Ziya Zhang started on the project in January. We began an effort to identify tasks for performance by another, offsite contractor.

3rd Quarter FY11

- Contract staffing issues are resolved; onsite UCAR staff and offsite Riverside Technology Inc. staff are now at work on the project

ARSR/ASR radar QPE evaluation

Core Goal: Improve the quality of physical inputs and forcings

Management Lead: David Kitzmiller

Objective: To verify the reliability of single-polarization radar quantitative precipitation estimates (QPEs) derived from Air Route Surveillance Radar (ARSR-4) and Airport Surveillance (ASR-11) units. Staff in HSEB have updated a local radar Supplemental Product Generator (SPG) to generate precipitation fields from ASR data, in the format of regular Precipitation Processing System products. Data from radar sites at Erie PA and Makah WA are being ingested and tested.

Milestones

Task	Due Date	Status
21. Collect ARSR- and ASR- based 1-h QPE product files for multiple precipitation events	FY10/Q4	Started FY10 Q3
22. Validate FAA radar QPEs via comparison with RFC precipitation and available rain gauge reports; report on results at HOSIP gate meeting	FY09/Q4	HOSIP or other review delayed, will try FY11-Q2

Accomplishments/Actions

2nd Quarter FY10

- Initial HSMB subjective assessment of products generated by HSEB during software development
- Began collection of data product files, from ASR-11 at Erie PA and ARSR-4 in Makah WA (April 2010). Aim to collect data for at least three months.

3rd Quarter FY10

- Continued collection of data products – initial analysis started
- Discovered that while the QPE products appear accurate in terms of placement and timing of precipitation, the Erie unit has a significant low bias

4th Quarter FY10

- Evaluated multiple hours of product data from each of the Makah WA, Watford ND, and Erie PA sites, in terms of correlation with StageIV gauge-radar gridded precipitation analyses and StageII radar-only precipitation
- Erie data has best correlation with WSR-88D and gauge-radar data overall
- Makah WA output difficult to interpret because of lack of gauge or radar ground truth on the west side of the Olympic Peninsula, and over Pacific Ocean
- Results were forwarded to HSEB staff for comment (October)

1st Quarter FY11

- Received initial review of results from HSEB and OST staff. Based on comments, we must repeat some of the data analysis within a 60 nm range of the radar units at Makah and Watford. These will be reviewed again FY11 Q2. Also, there is very little ground truth for the Makah unit, which has an effective coverage area limited to the Pacific off the Olympic Peninsula of Washington

2nd Quarter FY11

- No progress; communications problems have prevented further analysis of data from the 3 test sites (see below)

3rd Quarter FY10

- OHD management directed HSEB and HSMB staff to cease work on most radar tasks – this one is terminated

Problems Encountered/Issues

2nd Quarter FY10

- Funding not committed until FY10 Q2

3rd Quarter FY10

- Initial indications are that data quality is poor – investigation is continuing
- Limited number of sites means that few cases are being collected

4th Quarter FY10

- Requested HSEB review of results; some data artifacts might have gotten into the precipitation products.

1st Quarter FY11

- Must repeat some of the data analysis within a 60 nm range of the radar units at Makah and Watford. These will be reviewed again FY11 Q2

2nd Quarter FY11

- No progress; communications problems have prevented further analysis of data from the 3 test sites. It is not apparent that required further funding needed for software support will be forthcoming. The only apparent possibility is to re-scope the project to use FTE resources within the Hydrologic Science and Modeling Branch.

3rd Quarter FY10

- OHD management directed HSEB and HSMB staff to cease work on most radar tasks – this one is terminated

Flash Flood Services

Distributed Hydrologic Model with Threshold Frequencies (DHM-TF)

[Note: Reporting on project “**Distributed Modeling Spatial Display and Analysis Tool**” is merged into this project as of FY11 Q1]

Core Goal: Improve forecasts of fast response hydrologic events and improve relevant distributed hydrologic model spatial display and analysis tools (DHM-SDAT)

Management Lead: Michael Smith

Objective: Understand the nature of the model errors when running a distributed hydrologic model forced by WFO type data streams (e.g. 15 minute resolution observations and nowcasts). Do additional historical precipitation analysis to support the threshold frequency approach. Collaborate with the Baltimore/Washington, Binghamton, and Pittsburgh WFOs to evaluate real-time and retrospective DHM-TF simulations. Create and modify DHM output visualization tools guided by input from OHD and field offices.

Milestones

Task	Due Date	Status
1. Implement Snow17 within BGM WFO DHM-TF operations	FY10 Q2	Ongoing
2. Implement DHM-TF at Baltimore/Washington WFO	FY10 Q3	Complete
3. Create and/or modify data visualization tools as needed	FY11 Q4	Ongoing
4. Recommend high level requirements for operational development	FY11 Q4	Ongoing
5. Publish results	FY12 Q1	Ongoing

Accomplishments/Actions

DHM-SDAT project:

1st Quarter FY10

- Refined Google Earth conversion tool to enable use in visualizing DMIP2 related data

2nd Quarter FY10

- Further refined Google Earth conversion tool to enable use in visualizing DMIP2 related data
- Modified color schemes used to display Pittsburgh WFO return period data per user feedback

3rd Quarter FY10

- Modified color schemes and title wording used to display Pittsburgh WFO return period data per user feedback
- Provided support to Hydromet group in use of xmrgtokml conversion program

4th Quarter FY10

- Provided support to IT staff at BGM WFO in the installation and alteration of DHM-TF visualization tools
- Modified color schemes and title wording used to display Binghamton WFO return period data per user feedback

1st Quarter FY11

- Discussed use of Google Earth visualization tools with staff at Baltimore/Washington WFO

DHM-TF project:

1st Quarter FY10

- Further enhanced GRASS GIS and Google Earth programs and scripts needed to visualize DHM-TF output at Pittsburgh WFO
- Gathered feedback from WFO concerning Google Earth and GRASS GIS plots, and altered image production as necessary
- Continued to monitor operation of model on Pittsburgh's server. Altered scripts as necessary to account for minor bug fixes and for server reconfiguration.
- Worked with Bob Davis at PBZ on analysis of 2007 Millvale flash flood event, determining that standard precipitation forcing under represents the precipitation that actually fell during the event. Bob has provided more realistic gridded AMBER precipitation which will soon be used in a comparison model run.
- Began selection process of next WFO location for installation of DHM-TF.
- With Seann Reed, began derivation and validation of CONUS-wide a priori routing parameters which will be used in DHM-TF operations (and by the broader RDHM modeling community as well)

2nd Quarter FY10

- With Pittsburgh, began investigation of May 2010 flash flood event—planned visit to PBZ WFO to discuss this event, broader DHM-TF issues, as well as to give a talk at PBZ flash flood workshop.
- Delivered DHM-TF lecture to WFO/RFC forecaster audience at COMET workshop in Boulder, CO.
- Continued to monitor operation of model on Pittsburgh's and OHD's servers. Altered scripts as necessary to account for minor bug fixes and for server reconfiguration.
- Worked with Eastern Region and BGM WFO personnel to plan DHM-TF prototype implementation at BGM WFO.
- Coordinated DHM-TF and DHM-FSR research with CBRFC, coming up with joint plan to implement FSR-style surface runoff post-processing into DHM-TF.
- With Seann Reed, continued derivation and validation of CONUS-wide a priori routing parameters which will be used in DHM-TF operations (and by the broader RDHM modeling community as well)

3rd Quarter FY10

- Visited PBZ WFO to talk with staff about current and future DHM-TF operations
- With Seann Reed, continued derivation and validation of CONUS-wide a priori routing parameters which will be used in DHM-TF operations (and by the broader RDHM modeling community as well)
- Delivered DHM-TF talk to WFO/RFC/Academic audience at Eastern Region flash flood conference
- Worked with staff at BGM WFO in a continuing effort to set up DHM-TF on BGM server. Work included derivation of routing parameters, bias correction of forcing data, and establishment of necessary HPN, HPE, and MPE data feeds. Process is nearing completion pending a change in BGM's MPE domain size.
- Continued to monitor operation of model on Pittsburgh's and OHD's servers. Altered scripts as necessary to account for minor bug fixes and for disk space limitations.

4th Quarter FY10

- Completed setup of DHM-TF at BGM WFO. System is now running (and producing visualizations) in a real-time automated mode.
- Began to analyze October 1st flood event in conjunction with BGM WFO staff
- Worked with Ed Clark to create a questionnaire which will be used by WFO/RFC staff to record their usage of DHM-TF and to provide feedback concerning the system.
- With input from Seann Reed, completed set of CONUS a priori routing parameters and produced initial parameter report per OHD AOP item.
- Responding to initial contact by LWX WFO, planned visit to LWX to discuss installation of DHM-TF at their location. Sent DHM-TF output to them during DC/Balt-area flood event.

1st Quarter FY11

- With Ed Clark, met with staff at LWX (Baltimore/Washington WFO) to plan DHM-TF deployment at their WFO.
- Delivered DHM-TF presentation at NOAA/CREST institute in New York City
- Worked with NERFC and BGM WFO staff to enable transfer of MPE precipitation data from the RFC to the WFO. Efforts are still ongoing.
- Created DHM-TF presentation for use by Mike Schaffner at BGM WFO
- Worked with EMC to create 30 years dataset of 2m temperature for use in Snow17 simulations at BGM WFO. Processing work is ongoing, as is work on obtaining real-time 2m temperature data

2nd Quarter FY11

- Continued to work with staff at WFO LWX to install DHM-TF
- Worked with EMC to debug code used to reproject and interpolate RTMA data for use with DHM-TF
- Continued to work with staff at WFO BGM to resolve problems related to transmission of MPE data to the WFO from the surrounding RFCs.
- Finished processing EMC 30-year temperature data set which will be used to support Snow17 simulations
- Began calibration of DHM-TF for WFO BGM and installation of Snow17 at WFO BGM

3rd Quarter FY11

- Finished initial installation of DHM-TF at WFO LWX
- Continued to work with staff at WFO BGM and WFO LWX to resolve problems related to transmission of MPE data to the WFO from the surrounding RFCs
- Ran several DHM-TF test cases over the BGM domain using the version of DHM-TF which includes Snow17 (and which ingests temperature data)
- Presented BGM case studies at BGM hydrology workshop
- Gathered test case validation information from WFOs BGM and LWX
- Presented DHM-TF overview to FFG conference call participants
- Finished auto-calibrating BGM basins. Will install calibrated version of DHM-TF at BGM when BGM is able to receive feed of temperature data

Problems Encountered/Issues

DHM-SDAT project:

1st Quarter FY10

- None

2nd Quarter FY10

- None

3rd Quarter FY10

- None

4th Quarter FY10

- While GRASS was installed on the operational dx machine at the PBZ WFO, this proved not to be possible at the BGM WFO. The solution implemented by the BGM WFO IT staff was to install it on a separate machine, shuttling the data back and forth between the dx machine and the visualization machine.

1st Quarter FY11

- None

DHM-TF project:

1st Quarter FY10

- Initial approach for derivation of CONUS-wide routing parameters was unstable and has necessitated a comparison of several additional techniques.

2nd Quarter FY10

- Instability of OHD computer system has hampered the continuity of real-time Sterling-domain runs at OHD.
- System upgrade (OB) at Pittsburgh WFO led to a changed scripting environment and an interruption in prototype operations.

3rd Quarter FY10

- Instability of OHD computer system has hampered the continuity of real-time Sterling-domain runs at OHD as well as the ability to run baseline simulations to support prototype operations at PBZ and BGM.

4th Quarter FY10

- MPE product used as forcing for DHM-TF operations at BGM WFO was found not to cover the entire BGM CWA (NERFC precipitation data is missing). NERFC will coordinate with BGM WFO to fix the data supply issue. DHM-TF baseline run will be re-run once precipitation data is fixed.

1st Quarter FY11

- Problems continue to be experienced with the transfer of MPE data from NERFC to BGM. In addition, the production of real-time and retrospective 2m temperature data (needed for Snow17 simulations at BGM) has proven to be extremely time consuming and challenging.

2nd Quarter FY11

- Severe disk instability problems at OHD continued to hamper DHM-TF baseline and calibration runs at OHD. This prevented the implementation of a calibrated version of DHM-TF at WFO BGM and has greatly delayed the installation of DHM-TF at WFO BGM.
- A bug in the NCEP code used to interpolate and reproject the RTMA data for use with Snow17 has delayed the activation of Snow17 (in support of DHM-TF) at WFO BGM
- Problems in the transmission of MPE data from MARFC/NERFC to WFO BGM continued to delay operations of DHM-TF at the WFO
- The need to enlarge the MPE domain covering WFO LWX delayed the installation of DHM-TF at the WFO

3rd Quarter FY11

- Severe disk instability problems at OHD are now fixed, although they continued to hamper DHM-TF baseline and calibration runs at OHD through the beginning of this quarter.
- It has proven to be extremely difficult to establish transfers of MPE data from the RFCs to the WFOs
- It has also proven to be very difficult (due to network capacity issues) to establish a stream of RTMA 2m temperature data that is necessary (at BGM) to run the Snow17-enabled version of DHM-TF.

Evaluate Gridded Flash Flood Guidance (GFFG) Approaches

Core Goal: Improve forecasts of fast response hydrologic events

Management Lead: Michael Smith (Project Lead: J.J. Gourley)

Objective: Quantitatively evaluate the ABRFC and OHD TF-GFFG approaches. Use observed streamflow data from small basins, grid inter-comparison techniques, and new verification data collected by NSSL. Evaluate NOAA-NESDIS percent impervious surface area (ISA) data for modeling applications in urban/suburban basins.

Milestones

Task	Due Date	Status
6. Finalize and check TF-GFFG codes	FY10 Q3	Complete for 1 hr GFFG
7. Complete initial assessment of impervious surface area data for small basins	FY10 Q3	This should be re-scoped as a separate project.
8. Continue assessment of flash flood events and utility of SHAVE data	FY10 Q4	Complete
9. Assemble flash flood guidance values from 2006-present for all RFCs	FY11 Q2	Complete
10. Create CONUS-wide flash flood database using USGS streamflow observations	FY11 Q2	Ongoing
11. Produce DHM-TF values for RFCs with sufficient StageIV archive	FY11 Q3	Ongoing
12. Establish benchmark skill of operational FFG and GFFG methods over CONUS	FY11 Q4	
13. Compare DHM-TF skill to operational FFG and GFFG skill	FY11 Q4	

Accomplishments/Actions

1st Quarter FY10

- Journal article describing data collection strategy and an analysis of flash flood observations from SHAVE and how they can contribute to NWS Storm Data for building flash flood climatologies and conducting rainfall-runoff process studies has been submitted to the Journal of Hydrology's special issue on flash flooding.
- Downloaded the polygons from the StormDat FF event database, provided by Ernie Wells. The csv data have been downloaded and converted into shapefile format for use in GIS.

2nd Quarter FY10

- Journal article describing data collection strategy and an analysis of flash flood observations from SHAVE and how they can contribute to NWS Storm Data for building flash flood climatologies and conducting rainfall-runoff process studies has undergone two revisions and is conditionally accepted to the Journal of Hydrology's special issue on flash flooding.
- We have included the polygons from the StormDat FF event database into our analysis of FFG and GFFG. A complete analysis of the results is pending.

3rd Quarter FY10

- Evaluated skill of FFG and ABRFC-GFFG methods using NSSL flash flood verification database.
- Submitted article to Weather and Forecasting describing ABRFC-GFFG and FFG results, emphasizing thresholds used to maximize skill.
- Created CONUS-wide flash flood database using NWS Storm Data reports.
- Collected dense flash flood observations for a number of cases throughout the summer,

including an OKC flash flooding event.

- Software has been developed to automatically classify SHAVE flooding reports as detailed in Gourley et al. (2010). The 2010 SHAVE reports will be added to the existing database of SHAVE observations from summers 2008-2009.

4th Quarter FY10

- Hosted Ernie Wells and Ed Clark from the Office of Climate, Water, and Weather Services at the National Weather Center in Norman, OK. We met over the course of 2 days to discuss last year's progress and ideas for future work. We invited Dr. Eve Grunfest and her students to participate in the meetings regarding the inclusion of social science in flash flooding research. We were joined by Scott Watson from the Kansas City Forecast Office who presented results from his MS thesis work on evaluating the MBRFC's high-resolution experimental FFG products.

1st Quarter FY11

- Completed quality control of 2010 SHAVE flash flood observations and made all data available from 2008-2010 in comma-delimited files and shapefile format here: http://ftp.nssl.noaa.gov/users/gourley/ffg/ff_conus_databases/shave/
- Requested and obtained 10-yr archive of StageIV hourly rainfall estimates over the CONUS
- Requested and obtained archive of operational, hourly FFG values from 9/2006 to 09/2010. These CONUS mosaics contain whichever version of FFG or GFFG was running operationally at each RFC.

2nd Quarter FY11

- Identified ABRFC as having unbiased, complete StageIV rainfall archive from 1996-present.
- Produced simulated flow frequencies over ABRFC for period of record, and then compared skill of exceeding 2-yr return period from DHM-TF to FFG and GFFG using flash flood observations.
- Presented results from FFG, GFFG, and DHM-TF methods to forecasters at ABRFC and at Weather Radar and Hydrology Symposium in Exeter, UK.
- Ed Clark put us in contact with USGS personnel and we now have a strategy in place for obtaining instantaneous data archive for all stations in US.
- Assisted in an HPCC proposal to potentially demonstrate and evaluate DHM-TF method in NWS Western Region.

3rd Quarter FY11

- Purchased 2 Tb hard drive and sent it to USGS contact in Illinois.
- Received entire archive of USGS 15-min discharge over the US.
- Downloaded all NWS Stormdat reports of flash flooding and river flooding from 2006-2010.
- Article describing the past, present, and future skill of flash flood prediction tools in the US has been accepted for publication in IAHS redbook series. Invitation for developing article into a full-length manuscript has been granted.
- Developed procedure to convert text file containing recorded flood polygons and points to GIS shapefile format. Quality controlled SHAVE reports from 2008-2010 and NWS point and polygon shapefiles from 2006-2010 have been put on an ftp site for community use.

Problems Encountered/Issues

1st Quarter FY10

- Previously, we were working with the FF event locations specified by county and were not aware the polygon-specific events were available for our dataset. We will need to conduct our analysis of FFG and GFFG skill for the NWS StormDat FF polygons.

2nd Quarter FY10

- We had initially conducted our analysis of GFFG and FFG by comparing the rainfall exceedance associated to the FFG and GFFG values precisely coincident with the StormDat polygon location. The results were rather unsatisfactory due to either uncertainties in the

spatial assignments of the FF polygons, displacement of intense rainfall from the location where FF impacts were recorded, or both. Revisions were made to the analysis software to search for the most intense rainfall; i.e., that which was most likely associated with the recorded FF event, in pixels surrounding each polygon.

3rd Quarter FY10

- None

4th Quarter FY10

- One challenge that was identified in current CONUS-wide FFG and GFFG evaluation methodologies is the need for recent years' 15-min streamflow observations from the USGS. There is a website that enables users to request data site-by-site (<http://ida.water.usgs.gov/ida/>), but a much greater offline request for data will be required. Once details of the requested data are identified (i.e., station IDs, time period) Ed Clark has agreed to put us in touch with a contact at the USGS who can assist with the request.

1st Quarter FY11

- We will need to get some documentation about which versions of FFG or GFFG were running in real time for each RFC. This must be known because our CONUS FFG dataset is comprised of each RFC's FFG or GFFG values, all stitched together.
- Similarly, before attempting to derive DHM-TF values using StageIV data, we will need to get some information about the details of the rainfall algorithms that were running in real-time at each RFC to yield the mosaicked rainfall fields.

2nd Quarter FY11

- Details about FFG, GFFG, and StageIV generation are still lacking. We discovered with some RFCs that the hourly StageIV products do not sum to the daily rainfall product. It is likely additional/different procedures go into the daily products.
- The USGS streamflow data archive will need to be obtained by purchasing a 2 Tb hard drive and shipping to USGS. They are presently processing all stations in 2010 and will be finished in June. At this time, we will send them the hard drive and obtain the archive.

3rd Quarter FY11

- Details about FFG, GFFG, and StageIV generation are still lacking. Need to coordinate details with RFCs. Perhaps a survey or questionnaire will need to be developed and disseminated.
- In tests over the ABRFC, for which we have a StageIV rainfall archive going back to 1996, we discovered the HL-RDHM simulated flows and derived threshold frequencies are sensitive to the 4-km/hourly scale of the forcing data (and model resolution). Thus, when we shift our forcing data and model to utilize the 5-min/1-km Q2 data, the frequencies will need to be adjusted to account for the resolution differences.

Improve Guidance for DamBreak Forecasting

Core Goal: Improve forecasts of fast response hydrologic events

Management Lead: Seann Reed

Objective: Identify a nationally supportable, consensus set of dam break modeling procedures and document them in a NWS Dam Break Forecasting Guidance Document. Provide any prototype tools necessary to implement these procedures. Identify formal software engineering requirements to develop improved tools

Milestones*

* FY10 milestones in this project were substantially delayed. See “Problems Encountered” for explanation. Revised due dates are provided below.

Task	Due Date (original)	Status
1. Coordinate with Army Corps of Engineers to get updates on the NID database and identify how these updates are used at RFCs and WFOs.	FY09 Q4	Complete
2. Write guidance document for existing procedures (first draft)	FY11 Q2 (FY10 Q3)	Complete.
3. Deliver prototype GIS-based SMPDBK tool (GeoSMPDBK)	FY11 Q2 (FY10 Q3)	Complete
4. Add ability to quickly map SMPDBK results to ArcGIS Toolkit	? (FY10 Q4)	Replaced by higher priority Tasks 5 and 6; this task should be folded into a larger Inundation Mapping Project
5. Revisit Rules of Thumb and include findings in final report	FY11 Q2 (FY10 Q4)	Complete
6. Examine deficiencies in DamCrest data; recommend short-term workarounds and medium term functional requirements for software enhancements	FY11 Q3 (FY10 Q4)	Complete
7. Peer review of guidance and GeoSMPDBK.	FY11 Q3 (FY10 Q3)	Complete.
8. Revisions to guidance document and GeoSMPDBK	FY11 Q3 (FY10 Q4)	Revisions will be complete July 29..
9. HOSIP Gate 3	FY11 Q4 (FY10 Q4)	On track..
10. Conference presentation (ASDSO)	FY11 Q4	On track.

Accomplishments/Actions

1st Quarter FY10

- Presented project updates and plans to Hydraulics AHPS Theme, HICs and ARC. Adapted plans based on feedback.
- Analyzed results from FLDWAV, HEC-RAS, and SMPDBK simulations.
- Wrote a program that prepares input data for SMPDBK from RAS/HEC-GEO-RAS format cross-section file. This tool will be part of the GIS tool that will be used quickly prepare cross-sections data for SMPDBK

2nd Quarter FY10

- Prepared a paper for an ASCE-EWRI conference: “Towards Improved Guidance And Tools For NWS Dam Break Forecasting”.
- The paper for the ASCE-EWRI conference was not approved by Geoff and Pedro because they believed the content was useful to an NWS audience but not necessarily to the larger

- ASCE audience; however, we discussed revised content and still plan to put together a presentation for ASCE. Written information from the paper will contribute to Task 6. .
- Fekadu, Seann, and Cecile prepared a draft Quick Reference document for SMPDK runs to provide NCRFC short-term assistance in preparation for potential dam break scenarios this Spring. Fekadu provided informal training on this topic via GoToMeeting to NCRFC hydrologists (Andrea, Laura and Bill). This information will be used for Task 6.
 - Seann investigated a concern Steve Predmore (MBRFC) raised about DamCrest during the HIC meeting. He identified the cause of the problem and met with Steve to explain and discuss solutions. Steve provided useful input that we can include in our “Best Practices” material we are preparing.
 - We also gathered more information from David Welch on DamCrest and how DamCrest data can be updated (Task 5). Next quarter we will gather additional feedback on DamCrest from Service Hydrologists in Eastern Region and document our findings.
 - Fekadu helped Ed Capone (NERFC) modify the Gilboa Dam HEC-RAS model to include a spillway.
 - Fekadu and Seann worked on writing the Guidance Document for Task 6.
 - Cecile has worked on Task 7 -- Develop and document tool to quickly derive cross-sections for SMPDBK and HEC-RAS applications. Seann reviewed software alternatives and concluded that our ArcGIS-based approach makes sense.
 - We acquired disk storage space necessary to complete this project but it is still being configured by NWS IT staff.

3rd Quarter FY10

- Completed analysis of FLDWAV, HEC-RAS, and SMPDBK simulations for three dams.
- Prepared a presentation for an ASCE-EWRI conference: “Towards Improved Guidance and Tools For NWS Dam Break Forecasting”. Delivered an expanded presentation at an NWS Webinar.
- A document “Rapid Preparation of a SMPDBK Model Using HEC-GeoRAS to Cut Cross Sections” is 95% complete. The procedures include a new Spreadsheet program to make it easy to create a SMPDBK input deck. A very limited and early version of these procedures was provided to NCRFC in February.
- Collected questions on DamCrest (primarily from WFOs) and began compiling answers.
- 80% of final project document is complete.

4th Quarter FY10

- Collected data from the literature on historical failures to review and potentially improve Rules of Thumb.
- Identified a revised set of tasks required to complete the project. Critical among these are experiments to determine if very approximate default DamCrest assumptions have any value.
- Determined that “Rapid Preparation of a SMPDBK Model Using HEC-GeoRAS to Cut Cross Sections” is too complicated in the form from Q3 work. Began creating new scripts to simplify further.
- Cecile will return for 1 month in October. New time estimates for project completion are provided in the table above.

1st Quarter FY11

- Building on scripts developed by Fekadu and Seann, James developed a much improved tool to rapidly develop a SMPBK model within ArcGIS.
- With assistance from James, Seann used the tool to compare results from GIS derived cross-sections with DamCrest default cross section assumptions for historical dam failures. Initial analysis suggests the approach has benefits. The approach is much more viable than full HEC-RAS modeling in an emergency. This is critical information to provide guidance on appropriate assumptions and whether further development of the tool would improve RFC response in the event of a flood.

2nd Quarter FY11

- James delivered and supported testing of GeoSMPDBK beta to three RFCs. He made

substantial improvements based on feedback received.

- James wrote documentation for GeoSMPDBK.
- Seann completed analysis of seven historical failures and identified the need for an enhancement to GeoSMPDBK to allow easier estimation of storage areas.
- Seann and James worked on “Recommended Procedures for Providing Quantitative Forecast Information for Dam Break Floods”.
- Seann and James prepared and submitted an abstract for ASDSO.

3rd Quarter FY11

- James enhanced GeoSMPDBK to include a mechanism to easily account for inactive storage.
- James worked on an improvement to the aesthetics of the symmetric cross-section shapes derived from the DEM.
- Seann and James delivered a Webinar.
- Seann and James provided GeoSMPDBK default data DVDs to RFCs.
- Seann revisited validation analysis using elevation high water marks.
- Seann and James prepared a paper for ASDSO.

Problems Encountered/Issues

1st Quarter FY10

- Some schedule delay is due to extended sick leave for a team member.
- FY10 milestones have also been adjusted anticipating that team members will need to spend time on more urgent tasks for the “Transition to HEC-RAS: Model Development and Implementation” project early in the year. The total resource requirement is unchanged.

2nd Quarter FY10

- Task 5 is delayed and will be completed at the same time as Task 6.
- Some schedule delays are due to extended sick leave for a team member.
- It has taken more time than anticipated to acquire the necessary disk storage to complete Tasks 7 and 8.

3rd Quarter FY10

- Both contractors working on this project have left OHD causing delays as indicated in the Table.

4th Quarter FY10

- Both contractors working on this project have left OHD causing delays indicated above. We anticipate getting time from Cecile and a new RTi employee (James Halgren) to complete this project during FY11 Q1 and Q2.

1st Quarter FY11

- Original milestones are delayed primarily due to personnel changes and unanticipated complications (e.g. discovering there has been no quantitative assessment of DamCrest default cross-sections assumptions and there is very limited documentation on NWS Rules of Thumb). Also, other activities with more critical deadlines have taken precedence (e.g. support for HEC-RAS transitions).

2nd Quarter FY11

- Finishing first version of “Recommended Procedures Document” is delayed approximately one month due to unexpected higher priority tasks – Seann’s involvement in extra help to NCRFC on CHPS transition tasks and addressing computer resource problems (e.g. GIS server confiscation by N-CIRT and purchasing a replacement machine).

3rd Quarter FY11

- None.

FFMP Small Basin Support

Core Goal: Improve forecasts of fast response hydrologic events

Management Lead: Ami Arthur, NSSL

Objective: To provide training and assistance to all WFOs for customization of the FFMPA small-basin shapefile datasets, to coordinate and facilitate the sharing of customized files to prevent duplication of effort among WFOs, and to establish a repository for base and derived datasets and other information relevant to Gridded Flash Flood Guidance.

Milestones

Task	Due Date	Status
6. FFMPA Dataset Tier II/ III Customization Webinars	Jan 2010	Completed
7. Develop a repository for base and derived datasets and other information relevant to Gridded Flash Flood Guidance (GFFG).	Sept. 30, 2010	Completed
8. Host, maintain, and update the National FFMP Basin Repository and the FFMP Basin Customization Repository, and continue to provide instructions, training, and technical assistance to FFMP dataset users.	Sept. 30, 2011	Ongoing

Accomplishments/Actions

1st Quarter FY10

- Three of the webinars were given during this quarter, and the Basin Customization Repository was updated with relevant training materials and data for the topics covered.
- Due to scheduling conflicts, the fourth webinar that was originally set for 17 Dec 2009 was rescheduled for Thursday, 28 Jan 2010.
- We also continued to provide technical assistance to FFMPA dataset users.

2nd Quarter FY10

- The fourth webinar was given during this quarter, and the Basin Customization Repository was updated with relevant training materials and data for the topics covered.
- Technical assistance on basin customization was provided to several FFMPA dataset users.
- Based on discussions with several RFCs, a prototype repository was established for Gridded Flash Flood Guidance base and derived datasets and other files. A plan for organization of the larger datasets in a hydrologically meaningful way that will allow easy download for GFFG and other projects has been developed and is being tested.

3rd Quarter FY10

- We continued to work with the RFCs to finalize the type and format of datasets to be included in the GFFG repository. Progress was made on gathering and formatting the gridded datasets including the National Elevation Dataset, Land Use/Land Cover dataset, and STATSGO soils data. These gridded datasets are being organized into hydrologic units roughly corresponding to the 4-digit USGS cataloging units. This will allow easy access for many hydrologic projects.
- We also continued to provide technical assistance to FFMPA dataset users.

4th Quarter FY10

- During this quarter, the Hydrologic and GFFG Data Repository was brought online. The following datasets and files are available for download from the repository:
 - National Elevation Dataset organized into hydrologic download units
 - National Land Cover Dataset organized into hydrologic download units
 - GFFG derived grids submitted by LMRFC (Curve Number, Threshold Runoff, Peak Flow, Critical Flow)--additional GFFG derived grids will be added as they are submitted by RFCs
 - GFFG scripts and documentation
- Several programs and GIS scripts were developed to extract soil parameters from the very complex high-resolution Soil Survey Geographic Database (SSURGO). The result of this work is a national Hydrologic Soil Group layer (the Hydrologic Soil Group is used in the derivation of GFFG). This layer was originally made available on the repository, but was taken offline after the most recent conference call with the RFCs when a request was made that this parameter be expressed in a slightly different way. This update is in progress.
- ArcGIS delineation instructions were written and contributed to the GFFG ThreshR procedure being developed at the ABRFC.
- Several FFMP basin/stream datasets were assembled and delivered for testing the version of FFMPA ported to AWIPS II.
- Continued to provide technical assistance to FFMPA dataset users.

1st Quarter FY11

- During this quarter, the SSURGO shapefiles with extracted Hydrologic Soil Group parameters were updated to include components and percentages as requested in Q4 FY10 by the RFCs. This update is near completion, and the shapefiles will soon be uploaded to the Hydrologic and GFFG Repository.
- Provided technical assistance to some of the first users of the Hydrologic and GFFG Repository.

2nd Quarter FY11

- The SSURGO update that began during the last quarter has been completed and is now available on the GFFG Repository.
- Additional data updates for the GFFG Repository are underway in numerous areas where the National Elevation Dataset has been updated in recent months.
- The previous CONUS land use/cover dataset is being replaced with the newly released NLCD 2006. This is the "latest and greatest" version of the high-resolution seamless land use/cover data. This task will be completed during the next quarter.

3rd Quarter FY11

- Completed the new NLCD 2006 dataset processing. In addition to the land use/cover data, an additional layer with "percent impervious" values has been included. These files are now being transferred to the GFFG Repository.
- Continued to provide customization assistance to FFMPA dataset users.
- Continued to provide test datasets to the AWIPS II FFMPA programmers and assist with related issues.

Problems Encountered/Issues

1st Quarter FY10

- none

2nd Quarter FY10

- none

3rd Quarter FY10

- none

4th Quarter FY10

- none

1st Quarter FY11

- none

2nd Quarter FY11

- none

3rd Quarter FY11

- none

Routing (Hydraulics)

Transition to HEC-RAS: Model Development and Implementation

Core Goal: Improve the routing techniques used to connect forecast locations

Management Lead: Seann Reed

Objective: Support RFCs in the transition to HEC-RAS.

Milestones*

*Some delays in FY10 due to personnel changes.

Task	Due Date (original due date)	Status
Support FLDWAV/DWOPER conversions for non-CAT RFCs.	FY11 Q4 (FY10 Q4)	Ongoing. Mostly complete.
Assist with HEC-RAS configuration in CHPS as needed and HEC-RAS troubleshooting during parallel operations.	FY11 Q4 (FY10 Q4)	Ongoing. See Accomplishments.
Assist in the transitioning of Red River flood mapping service to CHPS.	FY11 Q3 (FY10 Q4)	Plan to work with NCRFC on new Red River HEC-RAS model after 2011 flood season.
Recommend how to segment HEC-RAS models operationally.	FY11 Q2 (FY10 Q4)	Ongoing
Help coordinate a NWS HEC-RAS Workshop on advanced topics.	FY11 Q2 (FY11 Q1)	Complete.
HOSIP Gate 3	FY11 Q4	On track.

Accomplishments/Actions

1st Quarter FY10

- Seann converted the NCRFC M19 model to HEC-RAS with assistance from Angelica and did initial calibration work. Some additional work is recommended to examine different ways to account for the effects of the lock and dam structures.
- Seann participated in HEC-RAS/CHPS software acceptance testing.
- Seann reported on HEC-RAS transition status to the CAT RFCs and received feedback/suggestions.
- Fekadu answered questions from NERFC.
- HSMB Hydraulics Group had a conference call with NCRFC. Seann and Fekadu scheduled travel to NCRFC during January 2010.
- Seann prepared the HOSIP Statement of Need. This project follows on from the completed project: Transition from FLDWAV to HEC-RAS; Forecast Implications and Transition Tools” (HOSIP Project P2007-21).
- Hydraulics Theme Team and ARC members provided suggestions on scope of work.

2nd Quarter FY10

- Seann and Fekadu visited NCRFC during January to provide hands-on training and discuss what needs to be done to transition their DWOPER and FLDWAV models to HEC-RAS.
- Seann presented the status of HEC-RAS transition to the CAT.
- Seann assisted Deltares in troubleshooting a HEC-RAS adapter problem identified by NERFC

- and responded to a HEC-RAS Adapter question from NWRFC.
- Fekadu attended the CHPS migration training, and began bi-weekly training sessions for the Hydraulics Group.
- Seann completed Gate 2 documents for the “Transition to HEC-RAS: Model Development and Implementation” and the Gate 2 meeting has been scheduled.
- Fekadu and Seann held several GoToMeetings to assist NCRFC in converting their MISILO (Mississippi-Illinois) DWOPER model to HEC-RAS.
- Fekadu visited SERFC and discussed their needs with respect to HEC-RAS model development and implementation.

3rd Quarter FY10

- OHD has finished work on the NWRFC M1022DW Mississippi model and made substantial progress on the ABVSTPFW and M10FW models. Fekadu was the lead on the ABVSTPFW and M10FW models and is now gone, so there will be a delay in completing that task.
- Seann and Fekadu helped with a few ‘chps_ops’ questions.
- Seann prepared a presentation discussion HEC-RAS Transition issues for the ASCE-EWRI conference and then presented similar information to an NWS audience during a June 28 Webinar.
- Fekadu visited SERFC to help assess their needs with respect to HEC-RAS model development.

4th Quarter FY10

- Seann created a new model for LMRFC’s “Upper Mississippi” domain which incorporates data from the OHRFC community model and provided the model to LMRFC.
- Tested HEC-RAS 4.1 CHPS Adapter on Linux. Learned enough CHPS to answer several RFC support questions. Revised Deltares document: “How to Add HEC-RAS Models to CHPS”.
- A new RTi contractor, Alfonso Mejia, began work on this project. He will complete the conversion of the ABVSTPFW and M10FW models during FY11 Q1.
- Planned and advanced HEC-RAS training class with LMRFC.

1st Quarter FY11

- Seann and Alfonso led several modeling coordination calls with NCRFC.
- Alfonso refined the HEC-RAS model for the upper Mississippi River, from Anoka, MN, to Lock and Dam 10 (including major tributaries). He computed statistics, refined the calibration, and checked cross-section data.
- Seann and Alfonso reviewed and discussed three other Mississippi River models with NCRFC.
- Alfonso learned CHPS and worked with Varalakshmi Rajaram (HSEB) to create an example configuration for a small portion of the Mississippi river. They created a supplemental instructional document that will assist RFCs with configurations.
- Alfonso completed the ice jam exercise from Pedro.
- Seann coordinated with LMRFC, West Consultants, Dennis Johnson, and Mark Glaudemans on HEC-RAS training plans. The agenda is finalized.
- Seann and Alfonso assisted NWRFC with some HEC-RAS modeling instability problems.
- James assisted LMRFC with a HEC-RAS modeling boundary condition problem.
- James began learning CHPS.

2nd Quarter FY11

- Alfonso and Seann worked closely with NCRFC, Varalakshmi (HSEB), and Kuang (HSEB) to develop working standalone CHPS configurations for the ABVM10 and M1022RAS NCRFC models.
- Alfonso and Seann worked with RMA to explain problems with the HEC-RAS CHPS Adapter and test new Adapter versions.
- Alfonso began examining boundary condition and model segmentation issues for the Mississippi River models.
- Alfonso, Seann, and James answered HEC-RAS and CHPS questions from NCRFC, LMRFC, OHRFC, and MBRFC.

- Seann helped coordinate Unsteady Hydraulic Modeling HEC-RAS and GeoRAS Workshop. Four OHD Hydraulics Group traveled to the workshop, took the course, and interacted with RFCs and instructors on a number of key issues. One group member attended portions of the course remotely.
- The OHD Hydraulics Group participated in an HEC webinar on a new lower Columbia River model presented to NWRFC.

3rd Quarter FY11

- Alfonso continued to support NCRFC on testing HEC-RAS models in CHPS, refining their last Mississippi River model to be converted: MISILO, and completing statistical evaluations of model calibration performance.
- Seann and Alfonso worked with RMA to get bug fixes and test them – one related to reading DSS files, one related to passing time series directly to storage areas, one related to missing data at internal boundary locations. Alfonso and Seann wrote test procedures for HSEB. Seann also began coordinating a fix to the longitudinal profile output needed for Red River Inundation Mapping.
- Alfonso continued examining boundary condition and model segmentation issues for the Mississippi River models.
- LMRFC requested more assistance in preparing their lower Mississippi models for CHPS. Alfonso began working on this task.

Problems Encountered/Issues

1st Quarter FY10

- None

2nd Quarter FY10

- None

3rd Quarter FY10

- Both contractors working on this project have left OHD. We have initiated the process of finding replacements. The resulting delays for certain tasks are reflected in Table 1.

4th Quarter FY10

- Both contractors working on this project left OHD in June. A new RTi contractor, Alfonso Mejia, began work on Sept. 20, 2010.

1st Quarter FY11

- Found a problem with the HEC-RAS Adapter. The adapter will not allow users to specify time series as internal boundary conditions. We have provided a description of the problem and example data to RMA and they are working on a fix.
- Resolving some configuration and Adapter issues took longer than expected due to lack of complete documentation and/or lack of training among collaborators. Still, no show stoppers and all problems were eventually solved.

2nd Quarter FY11

- None

3rd Quarter FY11

- None

River-Estuary-Ocean Modeling to Enhance Operational River Forecasting -- Chesapeake Bay Study Area

Core Goal: Improve the routing techniques used to connect forecast locations. Improve the quality of physical inputs and forcings (e.g. wind data into hydraulic models).

Management Lead: Seann Reed

Objective: Provide an accurate hydraulics model that extends from river mouths upstream to at least existing forecast points and beyond if necessary to achieve accuracy. Provide accurate river flow forecasts to NOS operational estuary models. Evaluate 2D/3D models or a combination of HEC-RAS and 2D/3D models to meet the goals. Evaluate and document appropriate boundary conditions, including water level and flux boundary conditions at the downstream boundary and wind forcings on the water surface.

Milestones

FY10 Milestones for "Incorporate Wind Information into HEC-RAS" project (merged in):

Task	Due Date	Status
9. Compare models and document recommendations	FY10 Q2	Delayed, see Problems Encountered
10. Provide requirements to HEC	FY10 Q3	On hold until funding to work with HEC is identified
11. Publish Results documentation: presentation and paper	FY10 Q3	See "Merged Project" Tasks 2 and 3.

FY10 Milestones for River-Estuary-Ocean Modeling project (i.e. this project):

Task	Due Date	Status
12. Calibrate HEC-RAS	FY10 Q2	Complete
13. Calibrate ADCIRC (task revised to focus on comparisons with CIPS ELCIRC and CBOFS2)	FY10 Q3	N/A
14. Compare HEC-RAS and ADCIRC scenarios (now CIPS ELCIRC and CBOFS instead of ADCIRC)	FY10 Q4	Complete (see also extended work in next table Task 1)
15. Coordinate with NOAA Storm Surge Team	Ongoing	Ongoing

FY11 Milestones for Merged Project

Task	Due Date (original)	Comments
1. Compare HEC-RAS, CBOFS2, SLOSH/ET-Surge, Sobek 1D with wind	FY11 Q1	Complete but working on documentation..
2. Submit drafts of two journal articles	FY11 Q2 (FY11 Q1)	First article draft complete; 2 nd article in progress.
3. Finalize journal articles	FY11 Q3 (FY11 Q2)	On track with modified deadline
HOSIP Gate 3	FY11 Q3 (FY11 Q2)	On Track
4. Participate in broader CERIS planning efforts	Ongoing	
5. Provide documentation to RFCs on how to access gridded extra-tropical surge data to use as HEC-RAS model boundary conditions	FY11 Q2	Example provided to MARFC; more general documentation to all RFCs in Q4
6. Prepare and deliver lecture on "Downstream Boundary Conditions for Coastal Hydraulic Situations" at Advanced HEC-RAS course.	Feb. 14, 2011	Complete
7. Prepare and deliver lecture for COMET Advanced Hydro Sciences Training on this topic.	August, 2011	On track.

Accomplishments/Actions

Incorporate Wind Information into HEC-RAS project:

1st Quarter FY10

- Data analysis for Sobek runs partially completed
- Continued support for MARFC learning the Potomac HEC-RAS model
- Prepared preliminary draft of HEC recommendations.

2nd Quarter FY10

- Mashriqui and Cecile calibrated the Potomac HEC-RAS model (serves both this project and REO project). Sobek model still needs calibration for high wind period.
- Mashriqui updated some cross sections in the HEC-RAS model based on MARFC's feedback and worked with Deltares to convert this new HEC-RAS model to SOBEK for wind modeling experiments. Roughness factors must be checked in Sobek for each section.

3rd Quarter FY10

- This project received no AHPS funding after FY10 Quarter 2. Work continues with FTE resources. For further updates, please see the HOSIP Projects web page: https://bestpractices.nws.noaa.gov/contents/hosip/Pages/HOSIP_Projects/index.php, Project ID is **P-2008-007**.

4th Quarter FY10

- Plans made to revisit SOBEK work and analysis of 1D winds in FY11 Q1.

River-Estuary-Ocean Modeling project:

1st Quarter FY10

- HOSIP Project Plan revised again and submitted.
- Conference paper prepared for FIHMC: Toward Modeling Of River-Estuary-Ocean Interactions To Enhance Operational River Forecasting In The NOAA National Weather Service

2nd Quarter FY10

- Mashriqui and Cecile calibrated the Potomac HEC-RAS (Task 4)
- Seann and Mashriqui prepared a proposal to the HPCC Incubator Program to acquire funds so that we can develop a more robust computational framework for model testing and add CIPS ELCIRC to our suite of models being tested. The final decision on this proposal is not in but it does not look promising.
- Mashriqui presented the Gate 2 presentation for "Modeling River-Estuary-Ocean Interactions". Geoff and Pedro wanted some follow up discussion on how to document the broader effort in addition to the specifics of the one-year Project Plan provided. Seann and Mashriqui met with Pedro to discuss this. Additional discussion is needed.
- Seann and Mashriqui attended several presentations at the DHS Science and Technology for Intelligent Resilience workshop in D.C. Specifically, "Hazards Resilience: A New Approach for Forecasting the Coastal Impacts of Hurricanes". There were 3 presentations from Jackson State University in Mississippi and one from NASA.
- Mashriqui attended the NOAA-CMOP exchange meeting. CMOP is the Center for Coastal Margin Observation and Prediction, an NSF Science and Technology Center in the Pacific Northwest. This meeting was organized by Don Laurine.
- Mashriqui met with NOS/CSDL ADCIRC modeler Jiantao Xu and made progress on ADCIRC model runs on the NCEP computer. Specifically, they discussed ADCIRC capabilities to incorporate freshwater inflows (Task 5).
- Mashriqui and Seann worked with Ken Pavelle on CERIS and NOAA Storm Surge Team planning activities.

3rd Quarter FY10

- This project received no AHPS funding after FY10 Quarter 2. Work continues with FTE resources. For further updates, please see the HOSIP Projects web page: https://bestpractices.nws.noaa.gov/contents/hosip/Pages/HOSIP_Projects/index.php, Project ID is **P-2008-009**.

4th Quarter FY10

- Mashriqui delivered a seminar on August 25 discussing hydraulic modeling of the Potomac River with particular emphasis on the relative importance of tides and freshwater inflows in the transition zone and comparisons among HEC-RAS, CIPS - ELCIRC, and CBOFS2 models.
- Mashriqui drafted two documents outlining how we have met two AOP items related to this project: “Identify downstream river stage boundary conditions to use for initial, real-time testing of new hydraulic modeling techniques for the Potomac River.” and “Document the comparison of hydraulic and ocean model simulations for the southern extent of the Potomac River.”
- Seann Reed and Mashriqui participated in several CERIS planning meetings with Ken Pavelle, NOS/CSDL, and NSSL. In coordination with Mashriqui, Seann drafted three new mini-Project Plans for FY11 CERIS.

Merged Project:

1st Quarter FY11

- Using Sobek, Mashriqui made progress towards understanding the benefits of a wind force in modeling surge on the Potomac River.
- Mashriqui received and analyzed more CBOFS data to better understand the implications of 1D vs. 2D modeling on the Potomac River.
- James and Mashriqui learn more about ETSurge by collaborating with MDL. James collected and developed some initial pieces of code to help manage the ETSurge data.
- Mashriqui and James prepared lecture slides on “Downstream Boundary Conditions for Coastal Hydraulic Situations” in the Advanced HEC-RAS course.
- Mashriqui continued to write papers describing the HEC-RAS modeling, HEC-RAS vs. 2d model comparisons, and boundary condition data implications.
- James, Seann, and Mashriqui defined specifications for a new server computer with Windows to facilitate research.

2nd Quarter FY11

- Mashriqui and James delivered a lecture at the LMRFC-hosted HEC-RAS/Hydraulic Modeling Workshop Feb. 14 – 18, 2011.
- With assistance from James and Seann, Mashriqui prepared a draft paper for submission to the Journal of Hydraulic Engineering titled: “A HEC-RAS Model for Operational River Forecasting in the Tidal Potomac River”. The paper has been sent to MARFC for peer review.
- James learned much about CHPS and prepared a standalone MARFC CHPS configuration containing the Potomac HEC-RAS model and flexible enough to access multiple downstream boundary conditions. He worked closely with Edwin Welles of Deltares on this task.
- Mashriqui and James continued interactions with partners at NOS/CSDL and MDL. Mashriqui made test runs with an ADCIRC model on the Chesapeake Bay area and acquired a more extensive ADCIRC grid covering North Carolina that may be useful for future intercomparisons.

3rd Quarter FY11

- Mashriqui completed ADCIRC runs for Hurricane Isabel. This allows him to make more in depth comparisons with HEC-RAS and Sobek results.
- Mashriqui continued to analyze and document results using wind in several models.
- Mashriqui, James, and Seann attended SURA meeting to learn about latest research in coastal models (inundation and hypoxia).
- James helped MARFC implement the Potomac HEC-RAS model in their operational configuration.

- Mashriqui and James began collecting data and building models for next phases of REO R&D – dynamic coupling (e.g. using Mike Flood) and inundation mapping.
- Mashriqui (with assistance from James and Seann) prepared and submitted an abstract for the Estuarine and Coastal Modeling Conference, Nov. 7 – 9, 2011.
- Seann pushed through new hardware purchase for future REO work.

Problems Encountered/Issues

Incorporate Wind Information into HEC-RAS project:

1st Quarter FY10

- Data analysis for Sobek runs partially completed
- Continued support for MARFC learning the Potomac HEC-RAS model
- Prepared preliminary draft of HEC recommendations.

2nd Quarter FY10

- Mashriqui and Cecile calibrated the Potomac HEC-RAS model (serves both this project and REO project). Sobek model still needs calibration for high wind period.
- Mashriqui updated some cross sections in the HEC-RAS model based on MARFC's feedback and worked with Deltares to convert this new HEC-RAS model to SOBEK for wind modeling experiments. Roughness factors must be checked in Sobek for each section.

3rd Quarter FY10

- This project received no AHPS funding after FY10 Quarter 2. Work continues with FTE resources. For further updates, please see the HOSIP Projects web page: https://bestpractices.nws.noaa.gov/contents/hosip/Pages/HOSIP_Projects/index.php, Project ID is **P-2008-007**.

4th Quarter FY10

- Plans made to revisit SOBEK work and analysis of 1D winds in FY11 Q1.

River-Estuary-Ocean Modeling project:

1st Quarter FY10

- None

2nd Quarter FY10

- We are not expecting substantial FY10 AHPS/WR funds for this project. Some time from Cecile Aschwanden (contractor) is still available to wrap-up FY09 funded tasks.
- There will no longer be AHPS/WR funds supporting this work after FY10 Q2. All subsequent work will be funded through other resources.

3rd Quarter FY10

- See above

4th Quarter FY10

- No AHPS/WR funding.

Merged Project:

1st Quarter FY11

- Waiting for IT Summit to get approval for hardware to more efficiently examine 1D vs. 2D modeling questions and the impacts of wind forcings on 2D models.

2nd Quarter FY11

- Underestimated time required to complete journal articles; however, stronger conclusions will

result from the delayed papers.

3rd Quarter FY11

- None

Software Refresh

Community Hydrologic Prediction System (CHPS)

Core Goal: Enhance the usability and/or internal workings of existing software

Management Lead: Jon Roe

Project Manager: Chris Brunner

Objective: Provide an improved software infrastructure for operational use at RFCs, as a replacement for the existing NWSRFS, and which will meet the future forecasting needs of all RFCs.

FY11 Milestones:

Task/Subtask FY11 Milestones	FY11 Due Date	Current Status
1 CHPS Software Implementation		
1.1 Deltares: Confirm that ResSim capability works at CNRFC	FY11 Q2	Complete
1.2 Deltares: Implement Rating Curve Mod software in CHPS for NCRFC	FY11 Q3	Complete
1.3 Deltares & OHD contractors: Implement gridded FFG in CHPS using a distributed model approach for MARFC	FY11 Q4	FY11 Q3: ongoing
1.4 OHD contractors: Complete FFG/FFH capability for CAT-II RFCs and assist with migrations	FY11 Q4	FY11 Q3: ongoing
1.5 Deltares & OHD contractors: Implement an initial CHPS-based Calibration capability for use by all RFCs	FY12 Q2	FY11 Q3: ongoing
1.6 Deltares: Design and implement an initial graphical API for prototyping via one or more NWS projects, such as Calibration or Graphics Generator.	FY11 Q4	FY11 Q3: ongoing
2 CHPS Operational Support & Maintenance		
2.1 Deltares: provide as-needed CHPS support to all RFCs during migration, parallel operations, and after going operational. This might involve bug fixes to the Deltares-developed software.	FY11 Q1, Q2, Q3, Q4	FY11 Q1: complete FY11 Q2: complete FY11 Q3: complete
2.2 OCWWS HSD HSB contractors: hire 2 new contractors; provide as-needed CHPS troubleshooting support/solutions to all RFCs during migration, parallel operations, and after going operational.	FY11 Q2, Q3, Q4	FY11 Q2: complete FY11 Q3: complete
2.3 OHD contractors: provide as-needed CHPS troubleshooting support/solutions to all RFCs during migration, parallel operations, and after going operational. This might involve bug fixes to OHD-developed software.	FY11 Q1, Q2, Q3, Q4	FY11 Q1: complete FY11 Q2: complete FY11 Q3: complete
2.4 RMA contractors: provide as-needed troubleshooting support/solutions for the CHPS software adapter for HEC-RAS. This might involve bug fixes to the HEC/RMA-developed software.	FY11 Q1, Q2, Q3, Q4	FY11 Q1: complete FY11 Q2: complete FY11 Q3: complete
3 CHPS Training		

3.1 Deltares & CAT RFCs: Provide User (Forecaster) Training for CAT-II RFCs	FY11 Q1, Q2	FY11 Q1: complete
3.2 Deltares & CAT RFCs: Provide Advanced Configuration Training for CAT-II RFCs	FY11 Q2	FY11 Q2: incomplete
3.3 Deltares: Provide supplemental System Manager refresher training for all RFCs, in the form of classes or a series of conference calls	FY11 Q2	FY11 Q2: complete FY11 Q3: extended
3.4 Deltares: Provide extra training (3 or more classes, to be defined) for OCWWS HSD, OHD, and others in NWS who require training but who are not able to take advantage of training provided to RFCs.	FY11 Q1, Q2, Q3, Q4	FY11 Q1: None FY11 Q2: complete FY11 Q3: canceled
4 CHPS Workshops and Other Meetings		
4.1 Deltares: lead CHPS workshops for RFCs OHD, OCWWS HSD HSB, other: attend workshops led by Deltares	FY11 Q1, Q2, Q3, Q4	FY11 Q1: complete FY11 Q2: cancelled FY11 Q3: complete
4.2 OHD: participate in workshop(s) related to community development of a GUI-based API and a DB-based API	FY11 Q1, Q3	FY11 Q1: complete FY11 Q3: complete
4.3 CAT RFCs: provide on-site “buddy” support to CAT-II RFCs	FY11 Q1, Q2, Q3, Q4	FY11 Q1: complete FY11 Q2: complete FY11 Q3: complete
4.4 CAT RFCs: provide supplemental “buddy” support for CAT-II RFCs during the User (Forecaster) Training	FY11 Q1 & Q2	FY11 Q1: complete FY11 Q2: complete
4.5 CAT RFCs: provide supplemental “buddy” support for CAT-II RFCs during the Advanced Configuration Training	FY11 Q2	FY11 Q2: incomplete
4.6 OHD, OCWWS HSD HSB, other: attend training provided by Deltares to RFCs	FY11 Q1 & Q2	FY11 Q1: complete FY11 Q2: complete
4.7 CAT, CAT-II RFCs: meet with local partners to share information on CHPS	FY11 Q1, Q2, Q3, Q4	FY11 Q1: none required FY11 Q2: none required FY11 Q3: none required
5 CHPS Hardware		
5.1 OHD/OCWWS HSD HSB: Acquire extended warranties for the 1 st set of CHPS hardware originally purchased for the CAT RFCs	FY11 Q4	FY11 Q3: started
6 CHPS community building		
6.1 OHD contractor: Design & implement a web-based portal to share information and expertise on CHPS for the purpose of building a knowledge base and fostering community collaboration.	FY11 Q4	FY11 Q3: ongoing
7 CHPS Software Enhancements		

7.1 Deltares: Implement small FEWS software enhancements as requested by the NWS	FY11 Q4	FY11 Q3: ongoing
7.2 OHD contractors: Implement small software enhancements to the OHD models/adapters as requested by the NWS	FY11 Q4	FY11 Q3: ongoing
7.3 RMA contractors, HEC: Implement small software enhancements to ResSim and HEC-RAS and/or associated adapters as requested by the NWS	FY11 Q4	FY11 Q3: none required
8 RFC Archive Prototype		
8.1 NOHRSC contractor to support Archive DB programming	FY11 Q2	Complete
9 DB Tuning		
9.1 DB consultant: contractor to support tuning of CHPS central database and (possibly) OC database	FY11 Q4	Canceled
10 RFC Backup Prototype		
10.1 Define and purchase hardware for RFC Backup prototype. Provide recommendations for CHPS operational database improvements.	FY11 Q4	Canceled

Accomplishments/Actions:

1st Quarter FY11

- 1.1 CNRFC was too busy this Quarter to direct enough time on the ResSim configuration in CHPS. Activity is delayed until Q2.
- 1.3 Deltares hired a new employee, who will be trained next Quarter in the application of PCRaster to distributed modeling, with the goal of implementing MARFC's gridded FFG.
- 1.4 OHD contractors worked on FFG and FFH migrations for ABRFC, NERFC, LMRFC, MARFC, MBRFC, WGRFC
- 1.5 Calibration: Deltares provided assistance to OHD HSEB in configuring FEWS for calibration-related functionality.
- 2.1 Deltares provided 74 hours of CHPS support to the RFCs during Q1.
- 2.2 During Q1 OCWWS HSD HSB initiated the paperwork to solicit bids for 2 contracting positions to supplement CHPS support. Additionally, HSB supplied 3 people almost full-time for CHPS troubleshooting support/solutions to address a wide variety of issues related to migration, parallel operations, and operations.
- 2.3 OHD contractors provided approximately 1700 hours of CHPS support to the RFCs during Q1. Work focused on: October SAT testing, fixing various bugs, completing the FFG/FFH migration scripts and running those scripts at OHRFC, LMRFC, MBRFC, and WGRFC, finalizing and preparing CHPS-1.0.2, learning the MARFC gridded-FFG approach and investigating solution options, writing documentation, continuing to convert string time series to XML, and reviewing XEFS and EVS code for the HEFS project.
- 2.4 RMA contractors provided 3 hours of RAS-FEWS adapter support to the RFCs during Q1.
- 3.1 Deltares provided User Training to APRFC, CBRFC, NCRFC, SERFC, and LMRFC.
- 3.4 Extra training for OCWWS HSD, OHD, and others in NWS was identified, but no classes were planned in time for Q1. Classes will held in Q2.
- 4.1 Deltares led a workshop in Taunton, MA (at NERFC) during Q1. At that workshop the CAT agreed that no further CAT-only workshops would be needed. Hence the workshop in Q2 has been cancelled.
- 4.2 In Q1 Chris Brunner and Andy Rost traveled to Delft, NL to attend the annual FEWS User Days. At that workshop they participated in a series of meetings related to development of GUI and Database Application Programming Interfaces (APIs), which is viewed by OHD as key to the NWS's independence from Deltares for future software development, and which will provide low-

level access to existing FEWS capabilities without having to re-write them. It is different from the FEWS PI-service, which is a higher-level XML-based interface.

- 4.3 In November NERFC provided on-site buddy visits for MARFC.
- 4.4 NWRFC, ABRFC, and CNRFC attended the training classes (3.1 above) to provide buddy support.
- 4.6 OCWWS HSD HSB attended User Training at APRFC in November. NWSTC attended User Training at SERFC in November.
- 8.1 NOHRSC expects to hire a contractor to work on Archive Database programming in Q2 instead of Q1.

2nd Quarter FY11

- 1.1 On 2/1/2011 CNRFC confirmed that ResSim and its FEWS adapter work correctly.
- 1.2 Deltares deployed a test version of the new Rating Curve Mods feature in CHPS at NCRFC. On 4/5/2011 (start of Q3) NCRFC accepted the software. The feature will be included in the June CHPS BOC-II release.
- 1.3 Deltares completed most of the API-CONT model implementation in PCRaster. OHD began implementation of the SNOW-17 model in PCRaster. Together these will form the basis of a solution for MARFC's gridded FFG, expected to be ready in July 2011.
- 1.4 One OHD contractor (as well as one OHD federal employee) worked on FFG and FFH migrations for several CAT-II RFCs. This work is expected to finish in Q3.
- 1.5 Calibration: OHD began work on converting more of the MCP (NWSRFS) calibration functions to FEWS transformations. Most recently, CHPS calibration work has been side-tracked as resources are currently occupied with helping NCRFC get CHPS configurations in place.
- 1.6 The original plan was for OHD to attend an API workshop in Delft, NL; however the trip was canceled due to budgetary concerns. Instead, Deltares will visit Silver Spring in Q3.
- 2.1 Deltares provided a small amount of CHPS migration/operational support to the RFCs during Q2.
- 2.2 Through LEN Tech, two contractors joined HSD to provide supplemental operational CHPS support for the RFCs.
- 2.3 OHD contractors continued to provide CHPS support to the RFCs during Q2.
- 2.4 RMA corrected the CHPS/RAS model adapter to properly accept the internal stage boundary condition. Also, RMA notified HEC of performance issues with the Linux versions of some of the RAS compute engines relative to the Windows versions of the programs, and worked with HEC personnel to determine the source of the performance problems. The Linux version of the DSS utilities is being updated by HEC.
- 3.2 Deltares provide Advanced Configuration Training for 8 or the 9 CAT-II RFCs; OHRFC missed training due to flooding. Deltares has rescheduled training for OHRFC in Q3.
- 3.3 On 3/23/2011 Deltares held a System Manager conference call with the CAT RFCs. The next one (for all 13 RFCs) is scheduled for May 18.
- 3.4 On Feb 22-25 Deltares provided a Basic User & Configuration training class for the NWS in Silver Spring. OHD, OCWWS HSD, and the NWSTC all participated.
- 4.3 During the week of 3/14/2011, NWRFC sent one person to NCRFC to help set up their non-operational live system.
- 4.4 NWRFC and NERFC attended the User (Forecaster) training to provide buddy support.
- 4.5 ABRFC, NERFC, NWRFC, and CNRFC attended the Advanced Configuration training to provide buddy support.
- 4.6 OCWWS HSD attended User Training at MARFC and WGRFC in January and February. NWSTC, OCWWS HSD, and OHD attended Advanced Configuration training courses in February and March.
- 6.1 OHD contracted with Think Tank (via a LEN Tech contract) to design a CHPS community web portal. Phase 1 (discovery) of the task will begin in Q2.
- 7.1 Requirements gathering for small enhancements for the "Spring" FEWS release concluded in February; deployment will be in June.
- 7.2 There are no RFC-requested small enhancements in the June release of OHD's CHPS software; instead the focus will be on BOC-II requirements.
- 7.3 RMA will not work on small enhancements this FY; focus has been on fixing software bugs and shortcomings (see 2.4 above).
- 8.1 In Q2 NOHRSC hired a contractor to work on the Archive Database.

3rd Quarter FY11

- 1.2 Feature was included in the June CHPS BOC-II release (CHPS-1.1.1) and delivered on June 28 to all RFCs including NCRFC.
- 1.3 During Q3 it was determined that PCRaster will not provide a workable/maintainable and complete gridded FFG solution for MARFC. Instead Deltares implemented (completed) the API-CONT model using PCRaster, while OHD began re-coding the SNOW-17 model for gridded application. A complete integrated solution is expected to be delivered one month later than originally expected but still in FY11 Q4.
- 1.4 OHD HSEB support for FFG and FFH configurations continues and is now expected to extend into FY11 Q4 due to a higher demand for assistance from the CAT-II RFCs than anticipated.
- 1.5 Calibration: Working with HSEB, Deltares is developing an Application Programming Interface (API) which will permit HSEB to “plug in” custom transformations required for RFC calibration but not included in FEWS. For the additional user interface requirements, Deltares agreed to implement some changes to the FEWS Browser (GUI) to meet some basic needs. All are expected to be included in CHPS release (CHPS-1.2.1) to be distributed to the RFCs in December 2011. HSEB continues investigate the requirements for calibration optimization code (opt3).
- 1.6 Deltares visited Silver Spring in Q3 to discuss the requirements for an Application Programming Interface (API). The first version of a graphical API is expected in FEWS release 2011.02, which will lay the ground for re-structuring of the Graphics Generator source code in CY 2012. If HSEB does not meet the July 11 NOAA procurement deadline for preparing paperwork related to a new contract task, these activities may have to be delayed.
- 2.1 Deltares provided CHPS migration and operational support to the RFCs during Q3 on an as-needed basis.
- 2.2 The two LEN Tech contractors continued learning CHPS and providing HSD with supplemental operational support for all RFCs.
- 2.3 OHD contractors continued to provide CHPS support to the RFCs during Q3.
- 2.4 RMA provided an updated FEWS-RAS adapter in Q3, fixing one known problem. HSEB, RMA, and Deltares met in Q3 to discuss the formal transition of RAS and ResSim adapter ownership and maintenance from Deltares to RMA. RMA will then become the Tier 2 support group responsible for RAS and ResSim functionality. RAS transition is now considered complete; ResSim transition is also ongoing.
- 3.2 Deltares delayed Advanced Configuration training for OHRFC to Q4 (possibly FY12 Q1). HSEB, OHRFC, Deltares, and NERFC (buddy) have yet to finalize a date.
- 3.3 On 5/18/2011 Deltares held a System Manager conference call with all RFCs on the topic of Synchronization. Another is scheduled for August (Q4); topic is to be announced.
- 3.4 Lack of resources meant preparation for this activity was not completed in time to meet the July 11 NOAA procurement deadline. No other classes will be scheduled via the FY11 CHPS budget. Remaining balance of funds (approx \$55K) have been reallocated by PPC.
- 4.1 Deltares led the final CHPS implementation workshop in Boulder, CO on June 14-16. **There will be no further workshops dedicated to the implementation of CHPS at RFCs.**
- 4.2 International travel to a workshop originally planned for Q3 in Delft, Netherlands was canceled by the OHD Director. Instead Deltares (Andre) traveled to Silver Spring for discussions the week of June 6. In addition to discussions on the Calibration work (see 1.5 above) HSEB, NOHRSC, and Deltares discussed requirements for the CHPS Archive Database, and the requirements for a re-structured Graphics Generator.
- 4.3 During Q3 NERFC sent buddies to OHRFC and MARFC for CHPS support; and LMRFC sent one person to ABRFC for CHPS buddy support.
- 4.5 NERFC is still waiting for a date; see 3.2 above.
- 4.7 Since no funds for travel to partners was required this FY, funds (approx \$40K) have been reallocated by PPC.
- 5.1 Preparation for this activity began in May; the NOAA procurement deadline of July 11, paired with lack of HSEB resources, is causing complications; but HSEB expects to complete the purchase before some of the warranties begin to expire in September 2011 (at CAT RFCs only).
- 6.1 Phase 1 (discovery) of the task began in Q2 and continued in Q3. We are in a strategy and requirements gathering mode, preparing a questionnaire for non-NWS community members.

- However this task is likely to extend into FY12, due to HSEB resource crunches.
- 7.1 Requirements gathering for small enhancements for the “Fall” FEWS release (2011.02) began in June during Beta testing of 2011.01.
 - 7.2 There are no RFC-requested small enhancements in the next release of OHD’s CHPS software; instead the focus has been on gridded FFG for MARFC (see 1.3 above) and on converting models to Java to improve future maintainability (ResJ and ResSngl will NOT be converted).
 - 9.1 Since there were no clear requirements for this activity during FY11, funds (approx \$50K) have been reallocated by PPC.
 - 10.1 HSEB and Southern Region jointly agreed that the RFC backup approach should be addressed nationally, rather than via a CHPS prototype activity. Accordingly, no hardware purchase will be made this year, and FY11 funds (approx \$125K) have been reallocated by PPC.

Problems Encountered/Issues:

1st Quarter FY11

- The limited funding available has put some new Deltares tasks on hold until Q2 or later. This affects tasks 1.6 and 3.4.

2nd Quarter FY11

- None

3rd Quarter FY11

- The July 11 deadline imposed by NOAA procurement will potentially impact some CHPS hardware warranty extensions (see 5.1 above). Similar concern may impact the API work (see 1.6 above).

Dissemination (Web Pages)

AHPS Web Page Activities

Core Goal: Generate and disseminate information to and for our users

Management Lead: Donna Page

Objective: Provide a standard look and feel for the presentation of AHPS hydrologic and forecast information on the World Wide Web by all NWS weather offices. Also, complete the implementation of a single national database that aggregates information on hydrologic observation and service locations used by WFOs and RFCs (National Rivers Location Data Base - NRLDB).

Milestones

Task	Due Date	Status
1. Initial Phase VII definition	FY10Q4	Complete
2. Support AHPS web aspects of NIDS sustainment project	FY11Q2	In progress
3. Finalize Phase VII definition based on sustainment project progress	FY11 Q2	Waiting for new sustainment project plan/schedule
4. Phase VII development	FY11 Q3	Not started – depends on definition task and funding
4. Phase VII deployment	FY11 Q4	On track

Accomplishments/Actions

1st Quarter FY10

- Reprocessed inundation locations at the request of OCWWS HSD
- Worked on implementation of AHPS Phase VI checklist
- Worked on modifications to national precipitation interface and downloadable datasets

2nd Quarter FY10

- Phase VI web page implementation activities began in earnest this quarter.
- All Phase VI processes were installed and running on the CR and HQ webfarms
- Orion developed and provided training to the TOC and WHFS Support groups.
- Began parallel testing with field and regions looking at test site and providing feedback through support structure.
- Successfully tested the re-hosting AHPS web pages on Consolidated Internet Farm's (CIF) outside vendor's farm
- Successfully tested the failover from CR to HQ and from HQ to CR webfarms serving all AHPS content
- Made numerous modifications to address performance.
- Provided numerous briefings and email status reports.
- Deployment date scheduled for April 19.

3rd Quarter FY10

- Implemented AHPS Phase VI at two NWS Consolidated Internet Farm(s) in April
- Implemented webpage redirects at regional web-farms to transition users to the new water.weather.gov domain
- Implemented national AHPS monitoring webpage and RSS feeds for NWS TOC support activities
- Update AHPS observation and forecast RSS feeds to include GeoRSS (geographically tagged), which supports plotting of AHPS locations in third party mapping applications

4th Quarter FY10

- Implemented nine AHPS flood inundation locations
- Three additional beta AHPS flood inundation locations were worked on during this period
- Decommissioned pre-phase VI regional AHPS backend systems
- Worked with OCWWS HSD and Regions on AHPS Phase VI requirements and priority rankings

1st Quarter FY11

- Delivered five flood inundation locations for NWS review
- Attended Consolidated Internet Farms (CIF) meeting at CRH
 - Note: CIF was recently renamed the NWS Internet Dissemination System (NIDS)
- Worked to implement NIDS changes for AHPS systems and code
- Performed normal O&M activities during the period

2nd Quarter FY11

- Worked to implement NIDS web-farm sustainment code and systems modifications
- Delivered four inundation locations to NWS Eastern Region for review which will be implemented on AHPS pages in Q3
- Responded to emergency and non-urgent support requests which are tracked by NWS TOC
- Performed normal O&M activities during the period

3rd Quarter FY11

- Finished implementation NWS Web Sustainment version of all AHPS code and processes along with updated AHPS CMS module for sustainment at Central Region NIDS
- Implemented NWS Sustainment version of AHPS CMS and transferred hosting of master NWSCMS from HQ NIDS to CR NIDS
- Implemented IOWI4 inundation site which uses a new raster based water depth process
- Responded to emergency and non-urgent support requests which are tracked by NWS TOC
- Performed normal O&M activities during the period

Problems Encountered/Issues

1st Quarter FY10

- Waiting for several OCIO consolidated web-farm activities to be completed so that AHPS Phase VI can be tested/implemented

2nd Quarter FY10

- Reworked the national map and rss processes to address performance issues
- Moved all AHPS processes off the central filer to local processors to address filer issues.
- Rehosted the hydrogen data databases from the CIF cluster database to the AHPS CMS servers in CR and HQ to address issues with the stability of the CIF cluster database. Procurement of new server for SR in the works.
- Changed the HQ data feed from and LDM feed from SR to a direct gateway feed to address problems with dropped products

3rd Quarter FY10

- Resolved post AHPS Phase VI deployment issues at CIFs with NRLDB updates, hydrograph scaling, and ERH Intranet photo upload process

4th Quarter FY10

- Addressed AHPS support tickets submitted via NWS TOC. CIF operations performed as expected during this period with no major outages.

1st Quarter FY11

- Lack of NIDS documented plan for sustainment activities which affected AHPS workload
- NIDS Database and filer outages during the period

2nd Quarter FY11

- Worked to glean requirement from NIDS for sustainment activity work

3rd Quarter FY11

- Unexpected changes to NIDS environment required modification to AHPS code before NWS Web Sustainment could be implemented at CR NIDS
- NIDS System and network delays at HQ NIDS kept new Sustainment version from going online at HQ NIDS
- NIDS advised AHPS that IRIS database would not be available in until sometime after November 2011

Western Water Supply Forecast Service Improvement

Core Goal: Dissemination

Management Lead: Kevin Werner, Jeff Zimmerman, Don Laurine

Objective: Improve western water supply forecast services by incorporating all NWS water supply forecasts, ensemble forecasts, forecast verification, and data access into web services.

FY10 Milestones

Task	Due Date	Status
1a. Roll Out "Version 4"	Q2	Complete
1b. Maintain "Version 4"	Q4	Ongoing
2a. Develop social science methodologies to apply to WS/WRO services	Q3	Complete
2b. Test social science methods in CO and UT with user groups	Q4	CO user group done UT user group postponed (Q3FY11)
3. Hardware upgrades for NWRFC web farm	Q4	Complete
4. OSIP gate 2 passage	Q3	Delayed – Expected FY11Q2

FY11 Milestones

Task	Due Date	Status
1. Maintain (bug fix and minor enhancements) "Version 4"	Q4	Ongoing
2. Run user engagement workshops at: - AMS Meeting (Jan 11) - Utah Water Users Meeting (March 11) - Utah (June 11) - SE NIDIS pilot (TBD) - CA NIDIS pilot (TBD)	Q2-Q4	Planned
3. Hardware upgrades for NWRFC web farm	Q4	As Needed
4. OSIP gate 2 passage	Q3	Planned

Accomplishments/Actions

1st Quarter FY10

- Version 4 released (Jan 2010)
- Teleconferences held in October and November to update progress, collect requirements, and coordinate planning
- NOAA HPCC Incubator proposal drafted for hardware and back-end work
- Discussions held with NIDIS office on coordinating and funding future efforts
- OSIP gate 2 work ongoing with gate meeting expected FY10Q3
- Presented at 2009 Drought Monitor Forum in October, 2009

2nd Quarter FY10

- Task 1: Website development:
 - Version 4 released (Jan 2010)
 - Enhancement and bug tracking software (stormtrac) collecting new requirements and tracking work
- Task 2: User engagement:
 - Draft toolkit for user engagement developed in collaboration with NOAA RISAs (WWA and CLIMAS) includes decision gaming, usability surveys, and general discussion to identify decision making processes involving forecasts
 - Draft toolkit field tested at CBRFC (March 2010)
 - First application of toolkit planned for Grand Junction, CO (April 2010)
- Task 3: Hardware:
 - Specific new hardware for NWRFC webserver dependent on NOAA HPCC proposal funding. TBD
- Task 4: OSIP:
 - WRH/HCSO (Zimmerman) leading team to draft OSIP gate 2 materials. Materials nearing completion; expect gate 2 passage in Q3 or early Q4.
 - NWSH/HSD has agreed to lead gate 3 effort once gate 2 is passed
- Discussions on collaborations with NIDIS to integrate capabilities with drought portal and develop drought specific products are promising and ongoing.
- Presented project at CPASW meeting in San Diego (March 2010)

3rd Quarter FY10

- Task 1: Website development:
 - Minor bug fixes and modifications made.
- Task 2: User engagement:
 - First user engagement workshop held in Grand Junction, CO (April 2010)
 - CLIMAS/WWA/CBRFC are compiling an initial report. Organizing committee met in Boulder, CO to assess Grand Junction results and plan next workshop (June 2010)
 - Second workshop planned for Salt Lake City, UT (August 2010)
- Task 3: Hardware:
 - Hardware upgrade at NWRFC funded with remainder of AHPS project funds. The new system will have 2 quad processors, 24GB Ram and 1.5 TB of disk space. The design of this system addresses future scalability. Additional drives can be added more easily based on added requirements for storage.
- Task 4: OSIP:
 - WRH/HCSO (Zimmerman) leading team to draft OSIP gate 2 materials. Materials nearing completion; expect gate 2 passage in Q3 or early Q4.
 - NWSH/HSD has agreed to lead gate 3 effort once gate 2 is passed
- NIDIS funded integration work with NIDIS portal (~\$25k) and organizational workshop (~\$15k)
- Organizational workshop planned for August 4-5, 2010. Major goal is to identify drought related products, services, plots, and/or datasets based on RFC forecasts that could be included on webpage. Participants include representatives from all three NIDIS pilot areas, relevant RFCs, and WRH and NWSH.

4th Quarter FY10

- Task 1: Website development:
 - Minor bug fixes and modifications made.
- Task 2: User engagement:
 - CLIMAS developed initial report for August 2010 Grand Junction meeting
 - Utah user engagement workshop postponed pending new WWA hire
- Task 3: Hardware:
 - Hardware upgrade at NWRFC complete
- Task 4: OSIP:
 - WRH/HCSO (Zimmerman) leading team to draft OSIP gate 2 materials. Materials nearing completion; expect gate 2 passage FY11Q2.

- NWSH/HSD has agreed to lead gate 3 effort once gate 2 is passed
- Contract for integration with drought portal in place using NIDIS funding
- Organizational workshop held in August 2010 with key stakeholders from three NIDIS pilot areas and NWS staff. White paper developed documenting key recommendations from group. White paper also offers a consensus definition for water resources outlook addressing 3rd quarter issue. Will be submitted along with this report. Concise recommendations
 - Water demand forecast tools
 - Sophisticated low flow forecasts
 - Ensemble forecast services
 - Credible, high resolution precipitation analysis
 - Reservoir data
 - Partnership development and maintenance
 - Two way education to support decisions
 - Periodic independent review panels on all parts, as well as particular parts, of RFC efforts and products
- Key achievements to date:
 - Consolidation of NWS water supply forecast program
 - Verification tools for water supply forecasts enabled first systematic verification of forecasts
 - User engagement workshops have provided an iterative development process
 - Clearinghouse for reforecasts, archived forecasts, real time forecasts, and observed streamflow datasets
 - First step toward an objective national water resources outlook based on RFC ensemble forecasts

1st Quarter FY11

- Task 1: Website development:
 - All SERFC ESP points added
 - Minor bug fixes to multiple parts of webpage
- Task 2: User engagement:
 - New WWA hire for user engagement work selected and stationed at CBRFC
- Task 3: Hardware:
- Task 4: OSIP:
 - WRH/HCS (Zimmerman) leading team to draft OSIP gate 2 materials. Materials nearing completion; expect gate 2 passage FY11Q2.
 - NWSH/HSD has agreed to lead gate 3 effort once gate 2 is passed
- Contract for integration with drought portal in place using NIDIS funding
- Key achievements to date:
 - Consolidation of NWS water supply forecast program
 - Verification tools for water supply forecasts enabled first systematic verification of forecasts
 - User engagement workshops have provided an iterative development process
 - Clearinghouse for reforecasts, archived forecasts, real time forecasts, and observed streamflow datasets
 - First step toward an objective national water resources outlook based on RFC ensemble forecasts

2nd Quarter FY11

- No activity this quarter due to lack of funding

3rd Quarter FY11

- No activity this quarter due to lack of funding

Problems Encountered/Issues

1st Quarter FY10

- 1st quarter travel financed on “credit” since budget not available

2nd Quarter FY10

- ESP forecast inconsistencies between RFCs are a problem (e.g. forecast frequency, forecast duration, forecast type (regulated vs unregulated), etc).
- Web development capacity has been reduced with recent personnel changes; Have contacted Orion to scope out possible contract work via NOAA HPCC and NIDIS.

3rd Quarter FY10

- Web development / maintenance capabilities – Our lead developer, Andrew Murray, has left the NWS for a position in Boulder. Our lack of development and maintenance capabilities going forward will likely present a major obstacle to both new development as well as maintenance of existing capabilities. This lack of NWS capacity is especially acute given the recent evolution of the NIDIS collaboration with this project. Recommend identifying a combination of FTE and contract personnel to support project.
- ESP forecast inconsistencies between RFCs are a problem (e.g. forecast frequency, forecast duration, forecast type (regulated vs unregulated), etc). Preliminary discussions with OCWWS/HSD and informally among RFCs have raised awareness to the problem.
- “Water resources outlook” is not well defined. Some RFCs view this as a flood risk product while others view it as a water availability outlook. This needs to be better defined.

4th Quarter FY10

- Web development / maintenance capabilities – Our lead developer, Andrew Murray, has left the NWS for a position in Boulder. Our lack of development and maintenance capabilities going forward will present a major obstacle to both new development as well as maintenance of existing capabilities. This lack of NWS capacity is especially acute given the recent evolution of the NIDIS collaboration with this project. Recommend identifying a combination of FTE and contract personnel to support project.
- ESP forecast inconsistencies between RFCs are a problem (e.g. forecast frequency, forecast duration, forecast type (regulated vs unregulated), etc). Preliminary discussions with OCWWS/HSD and informally among RFCs have raised awareness to the problem.

1st Quarter FY11

- Web development / maintenance capabilities – Project is still without a lead web developer. Website capabilities are basically stable. However, without some capacity for further development, the capabilities on the webpage will lag those that have ongoing development and become increasingly less relevant. NIDIS is interested in funding some development this FY.
- ESP forecast inconsistencies between RFCs are a problem (e.g. forecast frequency, forecast duration, forecast type (regulated vs unregulated), etc). Preliminary discussions with OCWWS/HSD and informally among RFCs have raised awareness to the problem.

2nd Quarter FY11

- No activity this quarter due to lack of funding

3rd Quarter FY11

- No activity this quarter due to lack of funding

New Service Locations

AHPS Implementation APRFC

Management Lead: Ben Balk, APRFC

Objective: Implement probabilistic hydrologic forecasts for basins in the Alaska/Pacific Forecast Center's (APRFC) area of responsibility.

Milestones

Task	Forecast Points Planned	Due Date	Actual to Date 3 rd Qtr FY11	Variance
Identify 9 potential basins for new calibrations		1 st Qtr	Complete	
Calibrate 9 new basins for non-AHPS implementation	9	4 th Qtr	9 - Complete	0
Implement 9 new forecast points (non-AHPS)	9	4 th Qtr	9 - Complete	0
Identify 12 locations for AHPS implementation for FY11		1 st Qtr	Complete	
Implement 12 new AHPS points	12	4 th Qtr	12 - Complete	0
NEW - Identify 4 additional forecast points for FY11 AHPS implementation f	4	3 rd Qtr	4 - Complete	0
NEW - Implement 4 additional AHPS points	4	4 th Qtr	0	4
Total	16		12	4

Accomplishments/Actions

1st Quarter FY11

- Identified 12 new AHPS points that will be implemented this fiscal year.
- Identified 9 new basins to calibrate. Completed one of the nine calibrations and have established as a non-AHPS forecast point. Ongoing work on the other eight basin calibrations.
- Plan to implement 12 new AHPS points during 2nd Quarter FY11.

2nd Quarter FY11

- Completed eight additional calibrations and have established as non-AHPS forecast points. Now all 9 targeted calibrations are complete.
- Implemented 12 new AHPS points.

3rd Quarter FY11

- Identified 4 new AHPS points that will be implemented in the 4th Quarter FY11. This exceeds our requirement but will help boost the national total. We would request that these four points be deducted from the FY12 target for APRFC.

Problems Encountered/Issues

1st Quarter FY11

- None

2nd Quarter FY11

- None

3rd Quarter FY11

- None

FY11 AHPS Implementation for - NCRFC

Team Lead: Mike DeWeese

Objective: Implement AHPS for locations in the North Central River Forecast Center’s area of responsibility. AHPS locations include those with probabilistic forecast products, Site Specific Hydrologic Prediction, statistical (Western) water supply, and/or inundation mapping points. For FY11, this would include only those additional points implemented per Weather Forecast Office request.

Milestones

Implementation Area	Forecast Points Planned	Due Date	Actual to Date (2 nd Qtr FY11)	Variance
New, unplanned forecast points				
Total	0			0

Accomplishments/Actions

1st Quarter FY11 - none
 2nd Quarter FY11 - none
 3rd Quarter FY11 - none

Problems Encountered/Issues

1st Quarter FY11 – n/a
 2nd Quarter FY11 – n/a
 3rd Quarter FY11 – n/a

FY11 AHPS Implementation for - MBRFC

Team Lead: Tom Gurss, Gregg Schalk

Objective: Implement AHPS for locations in the MB River Forecast Center’s area of responsibility. AHPS locations include those with probabilistic forecast products, Site Specific Hydrologic Prediction, statistical (Western) water supply, and/or inundation mapping points. For FY11, this would include probabilistic forecast products for the Blue, South Platte, North Platte, Platte and Loup River Basins; Republican River points have been delayed until FY12.

Milestones

Implementation Area	Forecast Points Planned	Due Date	Actual to Date (3 rd Qtr FY11)	Variance
South Platte River Basin	2	2 nd Qtr	2	0
North Platte River Basin	7	2 nd Qtr	7	0
Loup/Platte River Basin	9	2 nd Qtr	9	0
Republican River Basin	0 (15)	FY12	0	0
Blue River Basin	7	2 nd Qtr	7	0
New, unplanned forecast points	0		5	+5
Total	25		30	+5

Accomplishments/Actions

1st Quarter FY11 – added two unplanned points: SPOI4 (Spencer, IA - Ocheyedan R) and YNNS2 (Yankton, SD - James R.)

2nd Quarter FY11 – added three unplanned points: Encampment (ECRW4) and Sinclair (SINW4), WY; Leshara (LESN1), NE

3rd Quarter FY11 - none

Problems Encountered/Issues

1st Quarter FY11 - none

2nd Quarter FY11 – none

3rd Quarter FY11 - Due to severe flooding and need for CHPS development, Republican forecast points will not be implemented until FY12. RTi’s calibration of the Republican was completed in 3rd Quarter FY11.

AHPS Implementation for MARFC

Management Lead: Peter Ahnert (HIC/MARFC), Joe Ostrowski (DOH), Patti Wnek (SCH)

Objective: Implement probabilistic hydrologic forecasts for basins in the Middle Atlantic River Forecast Center's (MARFC) area of responsibility. MARFC implemented basic AHPS for existing forecast points in the entire MARFC area of responsibility in FY 2006.

Milestones

Implementation Area	Forecast Points Planned	Due Date	Actual to Date (3 rd Qtr FY2011)	Variance
None				
Total	0		170	

Accomplishments/Actions

1st Quarter FY2011

River Forecasts and Hydrologic Modeling:

- RFC AHPS points: 170
- SSHP (SAC SMA) points: 0
- SSHP (API) points: 33
- Expanded forecast services provided during two flood events. Provided briefings to WFO(s), EMA(s), CAB and other partners. Completed post-flood reviews and improved model parameters as needed.
- Began issuing daily local inflow forecasts at points in the James and Susquehanna basins to the USACE Norfolk and Baltimore District offices for use in calibrating hydrologic model and assessing operational alternatives and effects of reservoir releases
- Investigated feasibility of creating a new forecast point at Delhi, NY, per request of NY USGS and WFO BGM. Determined better served by a site specific model such as KINEROS.
- Made changes to Flash Flood Guidance to account for new zone alignment between WFO(s) OKX & PHI in northern NJ
- Coordinating with WFO LWX to establish flood stages at five locations in the Potomac Basin

AHPS Outreach:

- Delaware River Basin Commission
 - Federal Agency Summit
 - Technical meeting on Marcellus Shale natural gas production impacts
 - Delaware River Basin Commissioner's briefing meeting
 - Flood Advisory Committee (FAC) quarterly meeting
- Susquehanna River Basin Commission (Susquehanna Flood Forecast and Warning System)
 - Drought coordination calls
 - Assisted WFO CTP providing weather briefings for drought committee
 - Federal Agency call
 - Mapping technical committee meeting; reviewed/commented on SIMV 2.0
 - MARFC Fact Sheets; final printing courtesy of SRBC
- Presented flood inundation mapping topic at the NJ Association of Floodplain Managers
- Obtained WARD's Stormwater Floodplain Simulation Model from ER HSD
- 1st meeting of the PA Association of Floodplain Managers
- Silver Jackets
 - 1st meeting of the Pennsylvania Silver Jackets
 - Briefed ER HPM(s), ER WCM(s), and DRBC FAC on Silver Jackets Initiative

- Coordinated ER resources to ensure NWS presence in all Silver Jackets meetings in PA, NJ, & VA
- Provided input to national Silver Jackets document
- Hosted familiarization visit by WFO RNK forecaster/ERLDP candidate
- Nurture Nature (NN)
 - NOAA grant to create a flood education campaign closed
 - Final deliverables received include kids coloring and activity pages, poster, video, tabletop exhibit and Know Your Number magnets
 - Notified external users of availability of outreach materials
 - Collected addressee list of interested agencies for NN postcard mailing
 - Facilitated a collaboration meeting with NN and CoCoRaHS representatives
 - Kickoff meeting of NN Science on a Sphere grant project at the Baltimore Science Center
 - Reviewed script for new NN outreach exhibit *"Understanding Flood Risk"*
- HIC presented *"U.S. National Weather Service Flash Flood Warning Program"* at the International Workshop on Early Warning for Flash Floods held in Prague, Czech Republic
- Provided office tours to students from Shippensburg University
- Three talks to visiting hydrology class from the University of Pittsburgh-Johnstown on how the NWS forecasts river stages, MMEFS and Flood Inundation Mapping
- Presentation with MD Department of the Environment on the use of NWS MPE data to support Healthy Beaches Program at the MD Water Monitoring Council annual meeting in Baltimore
- Bi-monthly Customer Advisory Board meetings
- Hosted Canadian scientist interested in learning about RFC forecast operations

AWIPS 2:

- Assisted electronic staff to localize AWIPS2 SCAT system as an RFC using a beta version of the AWIPS2 localization document. AWIPS2 system now is localized as RHA and non-RFC-specific applications will be tested within the new environment.
- RFC Testbed Platform (RFCTP) project: modified the code used to capture & distribute baseline RFC-specific application configuration files to handle files which can't be placed into compressed archive file due to operating system limitations. Code successfully tested at two RFC(s). This step concludes development of code working directly with AWIPS 1 systems. Goal of RFCTP project is to duplicate on AWIPS 2 the work successfully demonstrated using AWIPS 1 systems.
- Attended RFC FIT at NWS HQ. They were unable to get to their original intent, which was to do a "day-in-the-life" scenario on AWIPS 2 using the NMTR system, which was implemented as an AWIPS 2 site and localized as RHA, including data flow and application configuration. However, SHEFDECODE, which was re-written for A2, was failing, in that it was not posting data properly to various obs and forecast tables. Many hours were spent trying to gather evidence of its behavior to pass along to the Raytheon developers. The problem was not resolved by week's end. Without our data being posted in the correct tables, their review of the baseline A2 applications seemed premature.
- There also were other distractions of trying to determine if they could run AWIPS 2 test cases and to verify supposed fixed discrepancy reports (i.e. problems). Both of these distractions pointed out to a need for a WFO Hydro-oriented FIT.
- They were able to discuss a path to achieving a more robust RFC test of A2, which would require some minor engineering changes of the A2 ADAM (AWIPS2 Data and Application Migration) platform. In discussions with all who had interest or authority in the project viewed the suggestion as worthwhile. Should it be implemented, the 4 OT&E RFCs (MARFC, NCRFC, ABRFC and NWSRFS) would be able to construct a full A2 environment on their ADAM platforms to provide the environment RFCs would need to test the A2 applications and to determine changes needed to local applications to be integrated into the A2 environment.
- Started investigating the full AWIPS 2 environment (new AWIPS 2 software installed on a full AWIPS 1 platform) at NMTR. Working with Raytheon contractor and NMTR managers to understand the changes in AWIPS 2 which will affect the RFCTP program code.
- Hosted visit by Raytheon contractor Sean Bowser for AWIPS 2 testing. We reviewed and tested current capabilities of RFC-oriented AWIPS 2 applications. Discrepancies were noted and submitted to the Raytheon development team, who are working toward solutions.

- Helped prepare RFC FIT testing agenda for FIT session to be conducted 12/13-12/16 at NWS HQ. Reviewed RFC-oriented test cases to be run during the FIT.
- FIT will be conducted on AWIPS 2 system manually configured in joint NWS/Raytheon effort.
- RFC Testbed Platform (RFCTP) project is momentarily on hold, awaiting more stability on the AWIPS 2 file structure design and implementation. Expected return to RFCTP development in 1/2011. Note RFCTP completion is not a requirement for a successful FIT.

CHPS:

- Migration of basins nearly complete
- Coordinating w/ OHD to develop scripts to migrate FFG & FFH functions from NWSRFS to FEWS
- Buddy visit from NERFC assisted in set-up of ESP and gridded forcings
- New builds installed
- IFD familiarization training for each staff member in preparation for on-site CAT-II training
- Refinement to forcings, graphics, and workstation configurations

Inundation Mapping:

- Member of SRBC Technical Mapping Committee. Team advising SRBC on best methods to develop flood inundation mapping suite and conduct associated outreach.

Gages/Observations/Data:

- Participated with ER HSD, DRBC and USGS NJ & PA Water Science Centers to determine priorities for rating curve extensions
- Assisted Texas State University Water Resources providing stream gage information to be used to investigate potential hydrologic signature in the Susquehanna River basin due to hydraulic fracking (Marcellus Shale/Natural Gas extraction)
- Provided gage inventory and gap analysis feedback to SRBC contractor for Susquehanna Flood Forecast and Warning System Strategic Plan Project. Provided evaluation of system enhancement recommendations.

Training:

- WFO CTP Winter Weather workshop and Media workshop
- Visiting forecaster from WFO RNK gave two talks, 1) on hydrologic issues in the RNK HSA and 2) the research completed on heavy rain from tropical systems
- GFE Operational Readiness Exercise completed by entire staff
- COMET Course: Distributed Hydrologic Models for Flow Forecasts completed by staff hydrologist
- Provided input to COMET on need for social science training in hydrology
- Webinars attended:
 - “Nowcasting of Precipitation” & “Transboundary Cooperation in Flood Forecasting & Warning Services” by Institute of Atmospheric Physics & Czech Hydromet Institute
 - “Multi-partner Decision Support Lessons Learned: Experiences from the 2010 MN and Upper MS Valley’s Spring Flood” part of WFO BGM Winter Weather Workshop
 - IFLOWS and AFWS website

Ensemble River Forecasts (MMEFS):

- Added NAEFS ensemble suite to the MMEFS system
- Assisted/mentored students through two projects with the Penn State College of Information Sciences and Technology to improve MMEFS information and help meet ER implementation goal
- Assisted NE, OH, and SERFC add NAEFS ensemble suite to MMEFS systems
- Coordinated with ER SSD and RFC(s) to add SREF data to the ER LDM-delivery stream. IP changes at NCEP created data retrieval problems which can be avoided using the LDM delivery approach (this method used for NAEFS delivery).
- Participated in planning for MMEFS experimental rollout in January
- Leading ER team to develop online training module to ensure all forecasters understand how to interpret and explain MMEFS information. Course outline has been developed. First draft of Parts 1 and 2 of the module are in the review phase. Weekly team meeting are being conducted.

- Provided two MMEFS refresher training sessions for MARFC staff, WFO staff & CAB

2nd Quarter FY11

River Forecasts and Hydrologic Modeling:

- No changes from previous quarter
- RFC AHPS points: 170
- SSHP (SAC SMA) points: 0
- SSHP (API) points: 33
- Calibration of distributed model continues for Aughwick Creek at Shirleysburg, PA (SLYP1)
- Ongoing updating of the basin SWE estimates in the snow model. Adjustments are based on coordination with WFOs, reports from USACE, NOHRSC SNODAS assimilations, CoCoRaHS reports and visible satellite imagery.
- Testing newest version of Ensemble Verification Software, EVS 3.0. Identified a problem with taking in binary ensemble forecasts for verification.
- WFO BGM established forced FFG values for 9 FFMP basins in the greater Scranton, PA area
- Prioritization exercise of Susquehanna Flood Forecast and Warning System (SFFWS) stream and precipitation gages in anticipation of gage closures due to funding issues.
- Implemented into operations 10 new service change requests from WFO LWX

AHPS Outreach:

- NWS exhibit booth at PA Farm Show in Harrisburg. Booth included 3 activities: Stormwater Floodplain Simulation Model, Coloring/Activity Pages, and Know Your Number Campaign (flood stage look-up)
- Silver Jackets: reviewed & commented on national document that summarizes member agency programs. Coordinated NWS representation at PA & VA meeting.
- Advertised Nurture Nature's flood education materials; a NOAA grant deliverable
- In collaboration with WFO CTP, PSU and AccuWeather; developing a weather exhibit at Children's Museum "Discovery Space" in State College, PA
- Presented 2010 NWS' enhancements and service improvements to the Susquehanna Flood Forecast and Warning System at the Interagency Coordination Committee's annual meeting
- HIC attended National HIC meeting Tulsa, OK
- Outreach presentation to 7th & 8th graders from East Stroudsburg, PA
- HIC interviewed by AccuWeather on spring flood potential in the Mid-Atlantic
- Support WFO CTP at PEMA flood briefings
- Presentation of NWS Outreach Resources to PA Silver Jackets
- Poster presentation at Delaware Estuary Science and Environmental Summit: "The Use of MPE Data in Support of Public & Aquatic Health in the Estuary"
- Received new outreach exhibit from Nurture Nature consisting of a backdrop, table, monitor and new brochures to showcase their animated film, "The Day of the Flood"
- Hosted regional meeting of PA DCNR State Park Managers providing overview of NWS hydrologic services
- Coordinated with USGS to assist ICPRB with flood study
- Advising Nurture Nature re: development of Science on a Sphere flood exhibit
- AMS Distinguished Educator of the Year recognition awarded to MARFC nominee - Nurture Nature's Rachel Hogan Carr
- Office tours provided to: PA DCNR State Park Managers, State College Professional Development Group and PA Game Commission Wildland Fire Behavior students
- Hosted new SSH from WFO LWX for 2-day visit to identify, discuss, and plan how to resolve several outstanding forecast point issues
- Hosted USACE Baltimore District familiarization visit from 9 water control managers. Several actions for improving communication were identified which will improve river forecasts.
- Provided supported to WFO CTP & LWX during PEMA & MEMA flood briefings
- Provided flood briefings to partners

- Customer Advisory Board – held routine bimonthly meeting with discussion focused on recent flooding. Collected feedback on NWS products and services.
- MARFC’s MMEFS training presentation was made by WFO LWX WCM at the Virginia Emergency Managers annual meeting
- Received excellent feedback on NWS forecasts, warnings and services during recent major flooding

AWIPS 2:

- Working with Raytheon and AWIPS Program Office to get SHEF decode to work. DOH on the AWIPS Test Review Group assigning priorities to RFC-oriented bugs found in AWIPS 2.
- Currently supporting AWIPS2 planning/implementation in the following capacity: 1) Test Review Group member, 2) training consultant, 3) RFC FIT coordinator, 4) ADAM automation process tester, 5) AWIPS 2 tester, and 6) RFC Test bed Configuration programmer
- Working to help configure NWSTC RFC system for use in March FIT (NWRFC clone)
- Ongoing testing and problem reporting on NMTR system
- Assisted in coordination of April FIT session at NWSTC & NMTR

CHPS:

- Initial migration completed
- Routinely practicing forecast process in preparation for parallel operations
- Coordination with OHD to migrate FFG and FFH functions continues
- Refinements to forcings, graphics and workstation configurations continue
- CHPS/NWSRFS parallel operations began February 24, 2011
- GFE ISC implemented
- FFH migration to CHPS completed but not yet functional due to a national issue
- Implementation of gridded temperatures in GFE is halfway complete

Inundation Mapping:

- Final meeting of the Susquehanna Flood Forecast and Warning System (SFFWS) Flood Inundation Mapping Technical Advisory Team. Team was suspended due to funding issues.
- Quality control of AHPS flood inundation map libraries for Belvidere & Montague completed

Gages/Observations/Data:

- DailyQC program testing
 - Identified configuration issue assisting OHD to resolve problem
 - Creating daily gridded DQC MAP product and daily DQC MAP SHEF encoded product
 - DQC data is archived
 - Data monitoring and comparing ongoing
- Evaluated 128 CoCoRaHS precipitation stations for possible inclusion in forecast operations

Training:

- Staff completed 2-days of CHPS User Training
- Training received on Scientific Outreach & Education methods at Delaware Estuary Science and Environmental Summit
- Advanced XML Configuration Training for CHPS at WGRFC
- GOV Delivery training
- NWSSchat live webinar

Flood Climatology:

- Flood climatology included in COMET course taught by WFO CTP SOO & at CTP Media Workshop
- Flood climatology information used in scientific papers written by CTP and PSU
- Created new monthly flood rankings for CTP
- Flood climatology added to CTP historical rainfall database

Ensemble River Forecasts (MMEFS):

- Experimental product released to the public
- Leading Regional Training Team creating an online training module for the field forecaster
- Completed training refresher webinars for field forecasters and Customer Advisory Board
- Completed summary verification of MMEFS runs
- Began revision of main MMEFS page to provide a map-oriented view via Google Maps
- 2 of the 3 modules of the MMEFS recorded training course have been completed and recorded. Final case study section being finalized.
- Provided other ER RFCs with a demonstration of a Google Maps interface for the MMEFS webpage. Based on the feedback, a plan for implementation was made.
- Provided MMEFS training to WFO BGM's Customer Advisory Board and to the Delaware River Basin Commission Flood Advisory Committee
- Continued revisions of main MMEFS page to provide a map-oriented view via Google Maps
- Began revisions and enhancements to graphics
- 2 of the 3 modules of the MMEFS recorded training course completed and recorded
- Final section nearly complete

3rd Quarter FY11

River Forecasts and Hydrologic Modeling:

- No changes from previous quarter
- RFC AHPS points: 170
- SSHP (SAC SMA) points: 0
- SSHP (API) points: 33
- New forecast point established at Godeffroy, NY on the Neversink River. Non-AHPS, i.e., no probabilistic forecasts
- Forecast service enhanced at Fairview, MD as an official flood stage was established
- Extended hours of operation and extra staffing for several flood events
- Converted 27 flood-only points in the Delaware, Passaic and Raritan river basins to daily points. Extensive coordination with WFO OKX, BGM & PHI to accomplish this.
- NYC DEP water supply began use of MARFC forecasts in their DSS model to schedule their reservoir releases
- Upgraded forecast services at Leesburg, VA on the Goose Creek
- Received rating curve from USACE Baltimore for the outlet at Arkport Dam. This is part of the information exchange that began with the joint familiarization meeting last month.
- Utilized back-up capability to continue operations during AWIPS build upgrade
- Joined WFO PHI SSH in a conversation with Conowingo Dam operator to learn more about their operations to try to find a way to improve NWS downstream river forecasts
- Reviewed request for 5 new forecast points in NJ to support USGS flood inundation map activities

CHPS:

- CHPS/NWSRFS parallel operations resulted in several CHPS deficiencies being revealed and subsequently fixed
- Completed development of RVF product generator for CHPS
- Implementation of ESP 95% complete
- Added efficiencies in CHPS configurations
- Addressing HEC RAS implementation with OHD
- FFH implementation completed
- Involving more of staff in CHPS by training back-ups for our current CHPS implementation team and organizing 3 new CHPS-related operations teams
- Hosted final buddy visit
- Used CHPS to issue official forecasts on June 8th
- Testing of latest build nearly complete
- Participated in a CAT2 CHPS meeting in Boulder, CO

MMEFS:

- Revised graphics and created Google maps interface
- Led ER team that created an MMEFS recorded training for NWS users
- Decision made to schedule rollout of new graphics and Google maps interface

Outreach/Customer Service:

- Presentation “*Uncertainty in River Forecasts*” at WFO CTP Severe Weather Workshop
- Met with Penn State Climate Office to explore future collaboration. Soil moisture and runoff information is needed so that the Climate Office can develop “Fertilizer Forecasts” for the USDA. These forecasts will alert growers to maximizing the application of nutrients based on anticipated rainfall and warn them to the hazards of applying nutrients at a poor time relative to anticipated heavier rainfall.
- Provided recommendations to USGS NJ for preferred locations for new precipitation gages in the Ramapo River basin. Gages may be funded by NJ DEP to improve river forecasts.
- Demonstrated Ward’s Stormwater Floodplain Simulation Model for the new State College children’s science museum
- Provided DRBC with precipitation accumulation maps for several specific flood events
- Hosted visit by Safe Harbor officials, with WFO CTP.
- Supported several WFO CTP flood briefings for PEMA
- Collaborating with WFO PHI & OKX to manage NWS outreach at future Passaic Flood Warning Users Group meetings
- Hosted visit by the Interstate Commission on the Potomac River Basin. Provided familiarization training and discussed the exchange of new information to improve low flow forecasts.
- Had 2 exhibit booths at Hydromania, a Lehigh Valley, PA Water Suppliers annual outreach event attended by 1,200 3rd and 4th graders. The Ward Stormwater Floodplain Simulation Model and the Nurture Nature exhibit were used to teach simple flood safety lessons.
- Gave a talk on “*Contingency Planning for Floods*” to 58 people at the NJ Emergency Preparedness Association annual meeting in Atlantic City, NJ. Used the large time slot to generate discussions in the audience and listen to how people use NWS river information. Contacts made with Red Cross.
- Gave a presentation on ensemble river forecast verification at WFO BGM Hydrology Workshop via webinar
- Gave a talk on “*NWS Flood Safety Outreach*” to 120 emergency managers as part of their quarterly PEMA training. Provided RFC Operations tours to this same group.
- Collaborated with WFO PHI & OKX to make a recommendation to ER HSD to improve NWS outreach in the Passaic River basin
- Supported several WFO CTP flood briefings for PEMA
- Loaned the Nurture Nature flood safety exhibit to Blair County, PA EMA for a Summit comprising 50 businesses and industries that manufacture, use, store or transport hazardous chemicals and other facilities that would be affected by an accidental release. Loaned the exhibit to Tioga County, PA for multiple shows.
- Gave a copy of our MMEFS training presentation & speaker notes to WFO ALY SSH for use in a FEMA course, NY Silver Jackets meeting and EM training
- Presented AMS Distinguished Educator of the Year award to Nurture Nature Center Director
- Loaned Flood Safety exhibit to Tioga County, PA EM Training Officer for multiple public shows
- Science on a Sphere: installation completed at Easton, PA flood museum. Participated in meeting to plan 2 educational programs relating climate change to flooding.
- DRBC FAC: presentations given on flood inundation mapping & new agreement with the NJ Joint Toll bridge Commission to receive river ice photographs
- MARFC CAB: led monthly meetings to continue to increase awareness of our users needs
- USACE: fulfilled request for GIS layer data for the USACE Baltimore
- Penn State University: demonstrated WARD’S Stormwater Floodplain Simulation Model to 70+ students ranging from 6 to 12th grade to support the Meteorology Dept’s annual Weather Camp
- Began use of NWSChat with USGS & USACE
- Participated in HUD-USACE-FEMA webinar on partnership for sustainable communities
- Silver Jackets: coordinated NWS presence at NJ Silver Jackets meeting and participated in PA Silver Jackets webinar

- Corning, NY Flood Warning Services Group: gave MMEFS and outreach presentation
- Passaic Flood Warning Users Group: participated in a meeting in Wayne, NJ

Inundation Mapping:

- Completed QA/QC of Easton, PA and Port Jervis, NJ flood inundation map libraries
- Collaborated with DRBC & WFO PHI & BGM to present 2 flood inundation map training webinars to local officials along the Delaware River at Belvidere, Easton, Montague & Port Jervis. Their flood experience is needed to verify the inundation indicated by the maps.

AWIPS 2:

- Participated in several FIT sessions at both NWSTC & NMTR
- Continuing push to provide the AWIPS program with input for the field OT&E decision in late July

Training:

- WFO CTP Severe Weather Workshop
- DEP Course on Designing Education Projects
- New 1981-2010 Climate Normals webinar
- River Flood Warning Verification webinar
- Completed DEP/NOAA course on Designing Education Projects, which will be used to create a MARFC 101 course
- Hydraulics webinar
- Stevenson Dam familiarization tour
- Contributed to COMET's Advanced Hydrologic Sciences Course section on social sciences

Problems Encountered/Issues

1st Quarter FY2011

None

2nd Quarter FY2011

None

3rd Quarter FY2011

None

AHPS Implementation for NERFC

Management Lead: David Vallee (HIC/NERFC), Robert Shedd (DOH), Ed Capone (SCH)

Objective: Implement probabilistic hydrologic forecasts for basins in the Northeast River Forecast Center's (NERFC) area of responsibility. Goal is to have AHPS implementation for long-term forecasts for the entire NERFC area of responsibility by the end of FY 2012.

Milestones:

Implementation Area	Forecast Points Planned	Due Date	Actual to Date (1 st Qtr FY2011)	Variance
Thames River	4	FY12Q3	0	
Naugatuck River	1	FY12Q3	0	
Total	5		174	

Accomplishments/Actions:

1st Quarter FY2011

River Forecasts and Hydrologic Modeling:

- RFC AHPS points: 174
- SSHP (SAC SMA) points: 1
- SSHP (API) points: 57

CHPS:

- Parallel operations throughout Q1 with daily generation of internal products
- FFG and FFH working using new procedures from OHD
- ESPADP working and generating baseline set of graphics using CHPS data
- RVF formatter re-done due to data access problems and RFC requirements not met by gxsets
- Importing daily tidal data from Stevens Institute of Technology for the Hudson River

MMEFS:

- System converted to using GEFS and NAEFS instead of GEFSa meteorological ensembles
- Member of regional team developing a training module for field forecasters

Outreach:

- Provided verification data to University of Connecticut for a CSTAR study
- Posting QPF and QPE data for use by NHDES
- Met with FEMA Region I contractor (CDM) regarding a data exchange; their LIDAR and HEC-RAS models on new studies and our calibrated unit hydrographs for their review in new hydrologic analyses for FEMA Flood Insurance Studies (Concord River Basin)
- Met with NH DES to discuss forecast services for the Souhegan and Nashua Rivers
- Met with Plymouth State to discuss observation & forecast services for the Pemigewasset River
- Participated in Silver Jacket Team activities in New England and New York

XEFS/HEFS:

- Began work on implementation of Graphics Generator; replaces ESPADP functionality

2nd Quarter FY2011

River Forecasts and Hydrologic Modeling:

- No changes from previous quarter
- RFC AHPS points: 174
- SSHP (SAC SMA) points: 1
- SSHP (API) points: 57

AHPS Implementation - Connecticut River:

- Coordinating with RTi reviewing some reservoirs they calibrated a couple of years ago
- Some aren't working well primarily due to discrepancies between USACE reservoir operations and modeled operations

Calibration:

- Submitted updated Statement of Work (SOW) for AHPS calibration funding

CHPS:

- Preparations for full conversion to CHPS Operations on February 1, 2011.
- Ran two demonstrations of the software (January 6th and 28th) to fully test procedures
- Coordinated with OHD to fix issues with FFG grid found during the January 6th testing. Problems were addressed with software package within a week.
- Buddy visit/station training at MA & OH RFCs
- Ran verification comparisons between CHPS-based forecasts and NWSRFS-based forecasts. Results were comparable between 2 systems. Didn't find any gross bias from CHPS parallel operations
- Full transition to CHPS completed on February 8, 2011
- All graphics (RVF, FFG/FFH, and weekly AHPS ESP) are generated via CHPS
- Full CHPS operations throughout March
- This included some periods of significant flooding with system performance rated good
- One instance of a major system failure however it was resolved quickly
- Failure due to a recent configuration enhancement that generated an excessive amount of data that was unable to be processed

Corps of Engineers:

- Coordinating with ERH and USACE to implement data exchange process for providing to the Corps routine early forecasts of reservoir inflow
- Have begun providing an "early look" reservoir inflow forecasts to the New England District for about 10 of the operations in the region. The idea is to provide them an early forecast so they provide us regulation information that can be incorporated into our forecast procedures.
- Coordination with the Army Corps of Engineers during recent high water events on the Genesee River greatly assisted both agency operations. USACE operates Mt. Morris Dam. Currently working with the operators to effectively manage coordination during future high water events.

NYCDEP:

- Reviewed calibration plan for the Croton system developed by RTi
- Coordinated with RTi regards data and requirements to support development of the Croton and Kensico water supply reservoir systems in southeast New York

HEC-RAS:

- Two attended RFC HEC-RAS course

MPE:

- Coordinating with OHD developers on issues with MPE/DailyQC grids
- Problems with grids not displaying properly at the low ends and distance for gages included in analyses excessive
- Some progress with software patches during this quarter

NMFS:

- Coordinated with NMFS Bill McDavitt on how they might be able to use RFC ensembles to support fish

passage studies around hydro-electric facilities

Flood Outlook:

- Conducting biweekly Spring Flood Potential Outlook briefings (30-50 participants)
- Spring Flood Potential Outlook briefing for Massachusetts EMA
- Discussions with DHS on spatial info we might have to support their project to identify at-risk infrastructure due to snowmelt flooding

3rd Quarter FY2011

River Forecasts and Hydrologic Modeling:

- No changes from previous quarter
- RFC AHPS points: 174
- SSHP (SAC SMA) points: 1
- SSHP (API) points: 57
- RTi is currently calibrating 2 locations (Croton/Kensico) to support NYC DEP

CHPS:

- Full CHPS operations throughout the month
- Significant flooding during the month provided ideal training and system performance opportunities
- Attended national CAT2 meeting in Boulder, CO

USACE:

- Extensive coordination with the Army Corps of Engineers for Mt. Morris Dam flood operations

Lake Champlain:

- Lake Champlain has exceeded its 140+ year record flood stage by over a foot for several weeks and will likely continue over flood for another month or so. This has had a significant impact particularly downstream on the Richilieu River in Quebec.
- Began 3 times per week coordination calls with WFO BTV and Environment Canada to review the flooding and assess short to medium range concerns
- Extended AHPS graphics for Rouses Point from the normal 30 day outlook to 90 day outlook

Rhode Island:

- Continued a series of meetings with the State of Rhode Island to discuss follow-up activities from the flooding of March 2010

ASFPM:

- Presented "March 2010 Rhode Island Flooding" at the American Society of State Floodplain Managers Conference in Louisville KY
- Partnered with University of New Hampshire on Lamprey River project

NYCDEP:

- Several conference calls this month to get NYCDEP project started. In the short term, running some ESP re-forecasts and providing that data to RTi. Extending time horizon on regular ESP forecasts for the project area.

MMEFS:

- Configuration work continues to get MMEFS running in CHPS

Problems Encountered/Issues

1st Quarter FY2011

- Experienced problems attempting to stabilize CHPS following Oct10 release; worked with OHD/Deltares to resolve instability

- Problems with piService extracting correct datasets for RVF generation; nearly solved

2nd Quarter FY2011

- None

3rd Quarter FY2011

- Item of concern is the threatened gage closure of numerous gages in the Lake Champlain basin which would decimate our ability to provide forecasts in the region. Coincidentally the threat of gage closures comes at a time of record flooding in the Champlain basin.

FY2011 AHPS Implementation for OHRFC

Management Lead: Craig Hunter (HIC/OHRFC), Tom Adams (DOH), Jim Noel (SCH)

Objective: Implement AHPS and probabilistic hydrologic forecasts for new basins in the Ohio River Forecast Center's (OHRFC) area of responsibility.

Milestones:

Implementation Area	Forecast Points	Date	Actual to Date (3 rd Qtr FY2011)	Variance
None	0		0	
Total	0		278	

Accomplishments/Actions:

1st Quarter FY2011

Forecast Points and Hydrologic Modeling:

- No new forecast points. RFC point total = 278
- Upgraded two points from flood only to daily
 - Monongahela River at Point Marion (PMRP1)
 - Monongahela River at Maxwell (MAXP1)
- Two new SSHP points. SSHP point total = 82.
 - Drakes Creek near Alvaton, KY (ALVK2) for WFO Louisville (LMK)
 - Mill Creek at Woodbine, TN (WBNT1) for WFO Nashville (OHX)

NWSRFS Modeling:

- Added Lock 13 in the Kentucky River System
- Updated basin boundaries and sent to NOHRSC
- Removed USACE forecasts from Old Hickory (OHIT1) and Cordell Hull (CORT1)

HEC-RAS Ohio River Community Project with USACE Great Lakes and Ohio River Division (LRD):

- HEC-RAS Ohio River is run in daily operations
- HEC-RAS forecasts are displayed with operational forecasts but not transmitted
- HEC-RAS training for operations is ongoing

HEC-RAS Cumberland River Project:

- Received HEC-RAS LRN model of DamBreak for the Cumberland River
- Received RTi model for lower Cumberland River from LRD
- Researching how to proceed on conversion of Cumberland River below Wolf Creek to HEC-RAS
- Identified gate rating and rating issues on the Lower Cumberland River. Raised this to the Service Assessment Team, USACE and USGS

CHPS-FEWS Transition:

- Refining displays
- User training for staff completed

Service Backup:

- No additional progress for onsite and offsite service backups made

Ensemble River Forecasts (MMEFS) / ESP:

- Member of ER team to develop online training module to ensure all forecasters understand how to interpret and explain MMEFS information. Weekly team meeting are being conducted. Developed “Background” and “Theory” sections.
- Assisted FEMA Region V with interpretation of MMEFS product suite
- Added GEFS 21 members to MMEFS; now running SREF, NAEFS & GEFS Meteorological Ensembles
- Support to USACE for Dam Safety was converted from GEFSA to NAEFS
- Added Bolivar to MMEFS to support USACE Dam Safety projects

Gages/Observations/Data:

- Working with USACE LRD, LRN and LRH on data flow via LDM. Working to improve, add and delete data as needed.
- Worked with Ohio WFOs to ensure they were aware of potential bad gages with STORMS data from the State of Ohio
- Worked with WFO Pittsburgh to ensure OHRFC is using the latest and most complete rainfall network in Pittsburgh’s area
- Added OHHT1 HP redundant pool readings for Old Hickory Dam to improve Nashville forecasts
- Provided USACE LRD with NOAA/NWS/CPC winter outlook dates

Gridded Flash Flood Guidance:

- Flash Flood Guidance converted to AVTreshR for calculating threshold runoffs
- Provided training via recorded GoTo Webinar on recent FFG change

Climate/Flood Potential:

- Added new CRWESPTIR product for chances of minor, moderate, major and flood potential risk management decision support deviation from normal flood risk graphics to website <http://www.weather.gov/ohrfc/WRO.shtml>

Outreach:

- Site visits to new forecast service locations in Newark & Hebron, OH with USGS OH & WFO ILN
- Participated in the Mississippi Tri-Agency Water Control Meeting
- Participated in NOHRSC/Eastern Region coordination meeting
- Office visit to WFO Louisville
- Participated in Olmstead Dam project on the lower Ohio River providing long range outlooks
- Participated in Mississippi NWS-USACE Water Control Forecasters Training in New Orleans
- Participated in Virginia, Ohio, and Pennsylvania Silver Jacket meetings
- Office visit to WFO Pittsburgh which included tour of the Monongahela and parts of the Allegheny and upper Ohio River system
- On site visit USGS West Virginia Water Science Center
- Participated in USACE LRD/LRL low flow coordination call
- Participated in OSU Climate, Weather & Water outlook for Dept. of Crop and Soil Sciences
- Toured the Great Miami River System with the Miami Conservancy District & WFO Wilmington
- Presented at COMET COMAP Virtual Course on QPF Rapid Onset Floods
- Discussed potential flood inundation mapping opportunities in Nashville with the National Flood Inundation Mapping (FIM) Team & WFO Nashville
- Attended National Flood Inundation Mapping Initiative (FIMI)
- Attended USACE Nashville operations meeting with USACE LRD and District Offices (LRB, LRP, LRH, LRL, & LRN) and the Chicago and Detroit District Offices. Discussions on data flow, operations, use of data, etc. Presented on “Use of MMEFS” and “Coordination”.
- Office visit to WFO Nashville
- Attended State of Kentucky meeting on the Kentucky River project with WFO Louisville
- Staff visited Cincinnati Water and Sewer District
- Staff visited USACE Captain Anthony Meldhal Locks and Dam on the Ohio River
- Conducted coordination webinar with WFO Pittsburgh, USACE Pittsburgh, and USGS Pennsylvania on improving ratings along the Monongahela River
- Partnered with Ohio University on educational outreach to the high schools

Training:

- Provided NWS Chat training
- Annual Flood Workshop – Part 1 & 2 and Flood Table Top Exercise
- GIS Webinar
- Provided Flash Flood Guidance Webinar

2nd Quarter FY2011

River Forecast and Hydrologic Modeling:

- No changes from previous quarter
- RFC AHPS points: 278
- SSHP (SAC SMA) points: 83
 - SSHP only: 49
 - RFC AHPS + SSHP: 34
- SSHP (API) points: 0
- New SAC-SMA SSHP point added Eagle Creek at Phalanx Station (PHAO1)
- Raised flood stage from 28 to 33 feet at Falmouth, KY (FLMK2) on the Licking River
- Improved modeling in AGU on the French Creek at Meadville (MEDP1)
- Ran 2009 flood scenarios in NWSRFS for USGS National Flood Coordinator
- Improved modeling in CML (for WFO OHX at Port Royal – PORT1)
- Updated recommended unit hydrographs for NY, OH & PA rivers during floods in IFP Companion
- Added hourly reservoir projections from USACE LRP Pittsburgh District

NWSRFS Modeling:

- Collaborative effort with WFOs BUF & CTP and USGS PA Water Science Center to improve modeling in AGU (for Eldred-Olean-Salamanca stretch on the Allegheny River)
- Working with WFO CLE to improve the forecast AGU at Meadville (French Creek)

HEC-RAS Ohio River Community Project with USACE LRD:

- HEC-RAS Ohio River runs daily as part of forecast operations
- HEC-RAS forecast output is displayed with NWSRFS forecast output but isn't being disseminated
- HEC-RAS training is ongoing
- Working to ensure proper flows being sent from NWSRFS to HEC-RAS for the locals and tributaries

HEC-RAS Cumberland River Project:

- Research ongoing into how to proceed converting Cumberland River below Wolf Creek to HEC-RAS

CHPS-FEWS Transition:

- CHPS-FEWS staff training
- CHPS Team preparing for parallel operations
- CHPS Team doing final configuration

Ensemble River Forecasts (MMEFS) / ESP:

- Member Regional Training Team finalizing *Background & Theory* sections for online training module

Gages/Observations/Data:

- Coordinating with USACE LRD, LRN & LRD on data exchange flow via LDM to improve, add and/or delete data as needed

Gridded Flash Flood Guidance:

- Monitoring new threshold runoff values impact on FFG

Flood Inundation Mapping Projects:

- Conference call with OCCWS HSD regard status of flood inundation mapping projects in Nashville
- Coordinating flood inundation mapping opportunities in Indiana with CRH, USGS Indiana Water Science Center and WFO IND

Climate/Flood Potential:

- Water Resources Outlook issued for Jan-Mar
- Winter/Spring Flood Outlooks issued
- Drought Outlook coordination calls with CPC
- Snow coordination calls with NOHRSC
- Climate coordination call with OSU Dept of Crop & Soil Sciences and Dept. of Agronomy
- Media interview WNDH Napoleon, OH regards climate and spring flood potential outlook
- Winter/Spring Flood Outlook briefings (OH-NC-MB RFCs, USACE, FEMA, USGS)
- OSU presentation on 2011 Climate Outlook
- USACE LRD coordination call on flood potential outlook for upcoming storm
- Weekly call with USACE LRD/LRL Olmstead to discuss flows

Outreach:

- Bluestone Dam risk meeting with USACE, FEMA, and State of West Virginia
- Visited 3 AHPS forecast point locations:
 - Blanchard River at Ottawa, OH (OTTO1)
 - Maumee River at Defiance, OH (DEFO1) & Napoleon, OH (CPBO1)
- Conference calls with USACE on use of NWSChat
- NWS and USACE Fusion Team Meeting
- Coordination call with State of Kentucky, Kentucky River Authority and WFO Louisville on improvements to the Kentucky River forecasts and systems
- National NWSChat test with the NWS, USGS and USACE
- Media Interview with Indiana News Center
- Coordination call with USACE Olmstead
- Coordination call regards MMEFS Google Maps
- Flood Potential webinar calls with USACE LRP, LRB, LRL, LRD, LRN, USGS offices, FEMA 4/5, USCG, Pittsburgh Waterways, Huntington Waterways, Maumee River Basin Commission, Ohio River and Sanitation Commission, TEMA, OEMA, Indiana DHS, Ohio and Indiana DNR, City of Cincinnati and Findlay, Miami Conservancy District
- Flood Potential coordination calls with USACE LRN, TEMA, and City of Nashville
- Flood Potential coordination calls with PEMA
- WRKC-TV CBS Cincinnati Interview on How River Forecasts are Made
- Led flood potential coordination briefings for FEMA and Partners for the Red River of the North, Upper Mississippi, Ohio, Cumberland and Tennessee Rivers
- Participated in the Pennsylvania, Indiana and Ohio Silver Jackets meetings
- Provided National University Training on “How the NWS Makes River Forecasts” to the University of Illinois, University of Kentucky, University of Wisconsin, University of Tennessee, University of Missouri, Ohio State University, Kentucky State University, Missouri State University, South Dakota State University, North Dakota State University, and Purdue University

Training:

- CHPS-FEWS staff training
- USACE Levee Safety Training
- Provided NWSChat training to USACE LRN, LRP, LRB, LRL, LRD, LRC
- Participated in an MMEFS training module planning call with ER RFCs
- Provided MMEFS training to Indiana Silver Jackets
- Provided USACE LRD & WFO PBZ with new initial MMEFS training presentation slides

Visits to OHRFC:

- Jim Hoke, Director HPC

3rd Quarter FY2011

River Forecasts and Hydrologic Modeling:

- No changes from previous quarter
- RFC AHPS points: 278
- SSHP (SAC SMA) points: 83
 - SSHP only: 49
 - RFC AHPS + SSHP: 34
- SSHP (API) points: 0
- Coordination with WFO Northern Indiana on dam failure of Glendale Lake near Marion, IN
- Added USACE LRP projections to NWSRFS/IFP

NWSRFS Modeling:

- Switched official forecast point at Fremont, OH from FREO1 to FFMO1
- Upgraded BELT1, OTTO1 from flood only to daily
- Lowered flood stage at BEVW2 from 45 to 35 feet
- Raised flood stage at TFFO1 from 8 to 9 feet
- Changed moderate and major categories at PNVO1
- Improved modeling in Cumberland Lower upstream of Old Hickory to improve forecast services at Nashville. Modified unit hydrographs and timing at CELT1, GBTO1, CAFT1, MCGT1, CORT1 and CHTT1. Major improvements to timing of flow were made at Cordell Hull and Celina.
- Met with WFO PBZ and USACE Pittsburgh on ratings, hourly data, webinars and NWSChat. Goals of receiving new ratings for lower Monongahela basin are to improve forecast services. Main focus is on Morgantown and Maxwell ratings.
- Calibration changes were made in to increase runoff and response at Granville (GRNO1) for WFO ILN. Much better performance is now seen in NWSRFS/OFS and SSHP for WFO ILN.
- Final transition of NWSRFS model information to CHPS

CHPS-FEWS:

- Parallel operations of NWSRFS/IFP - CHPS/IFD began May 16, 2011
- CHPS Team attended training
- Configuration work continues

HEC-RAS Ohio River Community Project with USACE LRD:

- HEC-RAS remains experimental but was used during late April floods to assist in forecasting for OHRFC, LMRFC and USACE with close coordination of the agencies to improve forecast services.
- Successfully used HEC-RAS Ohio River Community Model to forecast flooding on the lower Ohio River down to Cairo, IL at the confluence to the Mississippi River
- Review HEC-RAS model performance during spring floods...excellent results

HEC-RAS Cumberland River Project:

- Development is ongoing

MMEFS:

- MMEFS training for State of West Virginia, DHS, FEMA Region III, WFO RLX & RNK, USGS WV, USACE LRH and other partners
- Provided training to Indiana DHS and IEMA
- Continued work on new probabilistic graphics

Gages/Observations/Data:

- New heated weighing gages added in USACE LRP area

Gridded Flash Flood Guidance:

- Reviewed comments submitted by WFO RLX & PBZ on GFFG issues

Outreach:

- Extensive flood coordination briefings – major to record flooding on the lower Ohio River and tributaries
- Media interview with USA Today and Associated Press (AP)
- Office visits to WFO(s) Louisville and Nashville
- Coordination with COMET on Ensemble Flood Virtual Course
- Provided input to HPC on improving coordination and QPF forecasts for RFC(s)
- Added 48-hour cumulative precipitation potential placement and 24-hour cumulative Euhlerian Water Transport Tools to D2D for flood briefings and forecasting
- Silver Jackets:
 - Ohio Silver Jackets Meeting at State of Ohio EMA
 - Indiana Silver Jackets conference call and webinar
 - Pennsylvania Silver Jackets conference call and webinar
- Provided Table Top Exercise documents to USACE LRH for Bluestone Dam exercise
- USACE Olmstead Support Conference call for 5 & 30 day weather & hydrology outlooks
- Participated in Fusion Team conference call
- Using GovDelivery for Water Resources Outlook to manage product subscriptions

Visits to OHRFC:

NERFC, Deltares, University of Cincinnati

Training:

- Calibration-free hydrologic models
- Deltares and CHPS
- MMEFS
- FEMA Coordination Tool
- Dam Break
- MPE
- National Levee Database

Problems Encountered/Issues

1st Quarter FY2011

- Configuration of displays and setup mainly at a holding pattern waiting for patches and upgrades as most of the focus is now with CAT 1 offices
- Experiencing loss of data from NCEP for MMEFS; not able to log into NCEP computer to get NDFD data for operations and NCEP having issues receiving FOP
- Data issues between USACE and OHRFC; using backup for LDM via USACE Huntington until USACE LRD and OHRFC data issues are solved

2nd Quarter FY2011

- Occasional MMEFS outages due to lack of data at NCEP/NOMADS
- HPM Conference & the Ohio River Basin Tri-Agency Meeting were cancelled due to budget shortfall

3rd Quarter FY2011

- None

AHPS Implementation for ABRFC

Management Lead: Bill Lawrence, HIC

Objective: Implement probabilistic forecasts for basins in the Arkansas-Red Basin River Forecast Center's (ABRFC) area of responsibility.

Milestones: Initial implementation of probabilistic forecasts for ABRFC was completed in 2009. **No new areas are planned for 2011.**

Implementation Area	Forecast Points Planned	Due Date	Actual to Date 2 nd Qtr FY11	Variance
Total	0		0	0

Accomplishments/Actions

1st Quarter FY11

- N/A – Implementation of probabilistic forecasts were completed in FY09. No new forecast services added.

2nd Quarter FY11

- N/A – Implementation of probabilistic forecasts were completed in FY09. No new forecast services added.

3rd Quarter FY11

- N/A – Implementation of probabilistic forecasts were completed in FY09. No new forecast services added.

4th Quarter FY11

-

Problems Encountered/Issues

1st Quarter FY11 – None

2nd Quarter FY11 – None

3rd Quarter FY11 – None

4th Quarter FY11 –

AHPS Implementation for LMRFC

Management Lead: Dave Reed, HIC

Objective: Implement probabilistic hydrologic forecasts for basins in the Lower Mississippi River Forecast Center's (LMRFC) area of responsibility. For FY11 this includes the Ouachita, Lower Arkansas, and Red River basins.

Milestones:

Implementation Area	Forecast Points Planned	Due Date	Actual to Date 3 rd Qtr FY10	Variance
New Services:				
Ouachita River Basin, AR/LA	5	Q1	5	0
Lower Arkansas River Basin, AR	1	Q1	1	0
Ouachita River Basin, LA	7	Q2	7	0
Ouachita River Basin, LA	1	Q3	1	0
Red River Basin, TX	5	Q3	5	0
Red River Basin, TX/LA	6	Q4	0	0
Total	25		19	0
Expanded Services:				
Probabilistic Forecasts	2	Q1	2	0
Flood Inundation Maps	4	Q4	0	0
Total	6		2	0

Accomplishments/Actions

1st Quarter FY11

- AHPS outreach activities this month.
 - October 4 – 7, Kai Roth presented at the NWA Annual Meeting in Tuscon, AZ.
 - October 4 – 8, Jeff Grascel and Dave Reed presented at the Tri-Agency and River Forecasters Meetings in St. Paul, MN.
 - October 5, David Welch and Amanda Roberts participated in Mississippi Silver Jackets conference call.
 - October 14, Jessica Smith, Ken Kleeschulte, and Gina Tillis-Nash participated in the FEB's close out meeting for the EAOC's August workshop in New Orleans.
 - October 16, Jeff Grascel, Jessica Smith, Ken Kleeschulte, and Gina Tillis-Nash participated in the US Fish and Wildlife Services' Annual Wild Things outreach event, with over 4,200 attendees.
 - October 18 – 19, David Welch attended the NASA/NWS/UCF Meeting in Manhattan, NY.
 - October 18, Dave Reed & Jeff Grascel along with WFO LIX's Ken Graham & Pat Brown met with Washington Parish Emergency Managers and Park Rangers at Bogue Chitto State Park.
 - October 24 – 26, David Welch presented at the National Flood Workshop
 - October 26, National Hurricane Center's Bill Read and Chris Landsea toured LMRFC operations and gave presentation.
 - October 27, Kai Roth showcased LMRFC products and services for Career day at Hancock North Central Elementary, MS.
 - November 2 – 3, David Welch, Jeff Grascel, Gina Tillis-Nash, and Angelo Dalessandro

- o participated in the Tri-Agency River Forecasters meeting in New Orleans, LA.
- o November 3, Katelyn Costanza, Kai Roth, and Dave Reed met with representatives of Pat Harrison Waterways on upcoming HEC-RAS modeling project.
- o November 4, Jeff Grascchel participated in the Fusion Team meeting in New Orleans, LA.
- o November 3 – 5, Dave Reed, Katelyn Costanza, and Kai Roth participated in the Mississippi Water Conference in Bay St. Louis, MS.
- o November 5, NCRFC's HIC Scott Dummer, toured LMRFC operations.
- o November 5, Jeff Grascchel participated in the TVA Interagency meeting in Nashville, TN.
- o November 9, Jeff Grascchel, Jessica Smith, Ken Kleeschulte, and Gina Tillis-Nash participated in LSU's Ocean Commotion, sponsored by the NOAA Sea Grant, with over 2400 attendees.
- o November 15 – 19, Gina Tillis-Nash attended the NWSTC's Field Operations Management Training in Kansas City, MO.
- o November 18, David Welch, Katelyn Costanza, and Dave Reed toured NCDDC operations at Stennis Space Center, MS and facility to host the NWS Advanced HEC-RAS/GeoRAS training course.
- o November 19, a Chinese delegation toured LMRFC operations.
- o November 23, The LMRFC participated on a conference call with OHD, SERFC and the NOS to discuss the verification and lessons learned from the Deepwater Horizon Gulf Inflow forecasts to support oil trajectory modeling and future plans.
- o November 30, Dave Reed participated in the Annual NGI meeting in Mobile, AL.
- o December 7, Scott Lincoln participated in the Camo Jackets conference call regarding development of static inundation map libraries by the USGS, Jackson, MS.
- o December 7, Gina Tillis-Nash, David Welch, Dave Reed, and Jeff Grascchel participated in the FY10 Calibration Status conference call with RTi.
- o December 8, Scott Lincoln continued with DLOC training
- o December 9, Dave Reed, David Welch, and Jeff Grascchel, along with WFO LIX's Ken Graham and Pat Brown, attended the Baton Rouge Flood Awareness meeting hosted by the East Baton Rouge Parish Homeland Security and Emergency Preparedness.
- o December 9, Gina Tillis-Nash, Ken Kleeschulte, and Jessica Smith participated in the FEB's EAOC meeting, New Orleans, LA
- o December 14, Dave Reed and David Welch participated in NWS Advanced HEC RAS/GeoRAS training course coordination call.
- o December 15, Dave Reed and Jeff Grascchel attended the Levee Demonstration meeting in Vicksburg, MS.
- Completed four in-house basin calibrations (ENGG1, LNDM6, AKFM7 and EMCM7).
- LMRFC continued CHPS migration activities, including in house training for expanded team members.
- LMRFC participated in numerous conference calls, including Gridded FFG workshop planning, LMS, CHPS, LOMRC, and Olmstead Construction Project.
- Ashley Hayes transferred from LIX to become LMRFC's newest hydrologist.
- CTPN7's flood stage lowered from 12 ft to 10 ft.
- Began flood only forecasts for ENGG1.
- Filled MAP data request for NGDC/Bureau of Mine Reclamation climatology study.
- CAT II CHPS training session led by Erik de Rooij and Eric Jones for LMRFC staff
- LMRFC CHPS 4/5/6 hardware installed, waiting on software mod-note.
- Implemented ESP graphics generation for 8 sites, 6 new and 2 expanded service sites (PFAA4 for WFO LZK, ENGG1 for WFO FFC, RYEA4 for WFO LZK, and FELA4, RHLL1, LDBL1, MLUL1, and COLL1 for WFO SHV), completing Q1 AHPS implementation requirement
- Completed historical MAPs time-series for the Upper Red, Lower Red, and Atchafalaya Basins.
- LMRFC continues support of AHPS activities with in-house calibrations for remaining basins east of the Mississippi River and generation of MAP calibrations for upcoming FY calibrations.

2nd Quarter FY11

- AHPS outreach activities this month.
 - o January 6, Scott Lincoln continued with DLOC training.

- January 7, GOSHEP officials, UC Berkley students, and Girl Scouts toured LMRFC operations.
- January 10-14, Dave Reed attended the National HIC meeting in Tulsa, OK.
- January 11, Jeff Grascel participated in the Gulf Coast DSS Workshop at Stennis Space Center, MS.
- January 11, Scott Lincoln presented Boeuf River connectivity to LMRFC and WFO JAN staff.
- January 13, USACE New Orleans personnel visited LMRFC and toured operations.
- January 13, Jeff Grascel attended NASA's Science Plan Meeting at Stennis, MS.
- January 18-21, David Welch and Jessica Smith visited NHC in Miami, FL.
- January 20, Jeff Grascel helped judge the Bonne Cole Elementary School Science Fair, Slidell, LA.
- January 5 and 25, Dave Reed, Katelyn Costanza, and David Welch participated in NWS Advanced HEC RAS/GeoRAS training course coordination call.
- January 26, Jeff Grascel participated in the Flood Potential conference call for the Upper Mississippi, Missouri, and Ohio Rivers with NCRFC, MBRFC and OHRFC.
- January 26, Gina Tillis-Nash, David Welch, and Dave Reed participated in the FY10 Calibration Review conference call with RTi.
- January 27, Ken Kleeschulte and Jessica Smith participated in the FEB's EOAC meeting, New Orleans, LA.
- January 28, LMRFC co-hosted a Chinese New Year's Celebration with WFO LIX.
- February 1, LMRFC staff participated in a brown bag discussion on the Nashville Service Assessment, including lessons learned and actions to implement
- February 7-8, MSU staff toured LMRFC operations and installed Flood Viz BETA.
- February 9, LMRFC hosted a webinar training session for WFO GSP covering LMRFC operations.
- February 11, David Welch and Jeff Grascel attended an Interviewing Training workshop at the National Finance Center in New Orleans, LA.
- February 14, LMRFC conducted an NWSChat Test for the Mississippi River Drainage basin.
- February 14-18, Katelyn Costanza, Gina Tillis-Nash, Kai Roth, and David Welch attended the NWS Advanced HEC RAS/GeoRAS training course at Stennis Space Center, MS.
- February 14-18, Scott Lincoln attended the DLOC workshop in Norman, OK.
- February 18, Dave Reed and Ken Graham attended the OPM Director's briefing at National Finance Center, New Orleans, LA
- February 20, Boy Scouts toured LMRFC operations.
- February 21-25, David Welch participated in the SOO-DOH Workshop in Norman, OK.
- February 28 – March 4, Katelyn Costanza and Kai Roth attended the Advanced CHPS Configuration workshop in Ft Worth, TX.
- March 1, Gina Tillis-Nash participated in the quarterly EEODIAC call and discussed diversity and outreach activities for LMRFC and LIX.
- March 3, Dave Reed and Pat Brown SSH WFO LIX attended the EPA Urban Waters meeting in New Orleans, LA.
- March 4, LMRFC participated in the Cumberland/TN Waterway conference call.
- March 8 & 10, Dave Reed, Kai Roth, and Jeff Grascel participated in the File Encryption Software webinar.
- March 15-16, David Welch, Katelyn Costanza, and Jessica Smith attended the Storm Surge Inundation Mapping workshop in Bay St. Louis, MS.
- March 17, Scott Lincoln began AWOC training.
- March 18, Floodplain Model Exchange with WFO LCH.
- March 18, Dave Bear of USCG-Memphis toured LMRFC operations.
- March 23 - 24, LMRFC began issuing daily forecasts for former site specific points CVEL1, CSQL1, MNLM6, CREM6, FLSL1 and CUSL1for WFO LIX in Louisiana and Mississippi.
- March 23, Gina Tillis-Nash and Jessica Smith attended the "Why Teams Fail" webinar by Ken Blanchard
- March 24, Jeff Grascel, Jessica Smith, Ken Kleeschulte, and Kai Roth hosted the NWS booth at the Wildlife Day outreach event in Picayune, MS.

- March 24, David Welch participated in the Hiring Reform Training webinar.
- March 29, LMRFC participated in the NWChat webinar.
- March 31, Jeff Graschel, David Welch, and Dave Reed attended and presented at the 2nd Annual Hypoxia Meeting in Bay St. Louis, MS.
- Replaced DX3/DX4.
- NAS LTO Tape Backup was replaced on January 25.
- RTi delivered final FY10 calibrations decks and report.
- Revised FY11 SOW and submitted to John Ingram.
- Completed two in-house basin calibrations (EMNM7 and VNBM7).
- Completed historical MAPs time-series for the Upper, Middle, and Lower Mississippi River forecast group basins.
- Worked with Jeff Dobur (SERFC) on expanding ESP products, including percent exceedance for action stage and minor, moderate, and major flood stages.
- LMRFC continued CHPS migration activities.
- LMRFC submitted SR, CR & ER Spring Flood Outlooks.
- Updated all historical MAP datasets for calibration and ESP through November 2010.
- Implemented ESP graphics generation for 7 sites, ALGL1, NECL1, TDGL1, NLGL1, COGL1, CYNL1, and JNEL1 for WFO JAN.
- LMRFC participated in numerous conference calls, including RFC Liaison Team, Fusion, SCH, HSB, SR GIS Web, SR QPF, SR WCM/SCH, AWIPS II, LMS, CHPS, LOMRC, LRD/MVD USACE, FEMA Spring flood, Sharepoint, FogBugz, Central Region Hydrologic Outlook, NWS/TVA CESMART BLAST, MMEFS, SCIIP, SERFC WRO, and Olmstead Construction.
- LMRFC continues support of AHPS activities with in-house calibrations for remaining basins east of the Mississippi River and generation of MAP calibrations for upcoming FY calibrations.

3rd Quarter FY11

- AHPS outreach activities this month.
 - April 1, Jeff Graschel, David Welch, and Dave Reed attended and presented at the 2nd Annual Hypoxia Meeting in Bay St. Louis, MS.
 - April 6, Dave Reed and Jeff Graschel participated in National FEMA Flood Meeting conference call
 - April 7, Provided Entergy's Ted Smethers long range precipitation forecast information for Rammel Dam operation planning
 - April 18 – 19, Katelyn Costanza, Jessica Smith, and David Welch participated in the ADCIRC Conference at Stennis Space Center, MS
 - April 18, Jeff Graschel participated in the WFO/RFC Media Workshop
 - April 20, Federal Benefits Training Network's Jeff Christian presented a TSP Seminar to the LMRFC staff
 - April 22, Katelyn Costanza and David Welch participated in numerous Birds Point HEC-RAS Modeling conference calls with OHRFC, LRD and HEC to support Mississippi River flooding.
 - April 22, Jeff Graschel participated in numerous FEMA VI conference call
 - April 22, Angelo Dalessandro's last day before ABRFC transfer
 - April 26, Scott Lincoln participated in AWOC tele-training
 - April 28, Scott Lincoln, Daniel Pearce, Ken Kleeschulte and Jessica Smith setup LMRFC's Facebook page.
 - May 3, Dave Reed and Jeff Graschel briefed DOC and OH on 2011 flood event
 - May 3, 9, 10, 14, and 16-20, Dave Reed, along with Ken Graham, briefed Governor Bobby Jindal and the Louisiana Governor's Office of Homeland Security and Emergency Preparedness (GOHSEP) Unified Command in Baton Rouge, LA on current and forecasted flood impacts
 - May 4, Ashley Hayes attended the FEB's PSRW training event "Shot Out of the Saddle: Dealing With Change" in New Orleans, LA
 - May 5, Jeff Graschel, and Shawn O'Neil (LIX) briefed SR on flooding and weather forecasts
 - May 5-7, numerous coordination calls with LZK on I-40 closure
 - May 6, Jeff Graschel provided flood briefing to the United States Congress, both the

- Senate and House of Representatives
- o May 9, David Welch participated in the Natural Resource Damage Assessment's Deepwater Field Operations team conference call on Atchafalaya issues
- o May 9, David Welch participated in NOAA's Ocean Service Office of Response and Restoration's Emergency Response Division (ORR ERD) conference call pertaining to the Atchafalaya
- o May 10, 13, 19, and 23, Jeff Grascchel briefed BP Oil on flooding conditions on the Mississippi River and expected impacts on transportation in the Atchafalaya
- o May 12, Dave Reed, Jeff Grascchel, and David Welch participated in the Service Assessment conference call.
- o May 12, Jeff Grascchel interviewed by NBC National News Janet Shamlian
- o May 14, USACE began Morganza Spillway operations
- o May 15, Jeff Grascchel briefed the Baton Rouge EOC
- o May 16, David Welch and Katelyn Costanza participated in the Ohio River Community Model conference call
- o May 17, Dave Reed briefed SR on the Epic Flood Event conference Call
- o May 17, Jeff Grascchel briefed the Nuclear Regulation Committee on MS River flooding impacts
- o May 18, Jeff Grascchel participated in the Gulf Intracoastal Canal Association (GICA) Industry High Water conference call
- o May 18, Glenn Carrin and Jessica Smith participated in DOC Ethics Training
- o May 18, David Welch and Katelyn Costanza participated in the FEWS MC Synchronization conference call
- o May 20, Dave Reed briefed the Baton Rouge Emergency Operations center
- o May 23, Jeff Grascchel interviewed with Fox New on MS River flooding
- o May 24 – 26, Jessica Smith participated in NOAA Storm Surge Road Map workshop in Mobile, AL
- o May 25, Jeff Grascchel participated in the AR DEM conference call
- o May 27, David Welch participated in the Advanced Hydro Course Topics conference call
- o May 27, Jeff Grascchel was interviewed in office by WWL TV
- o May 31, NGI Intern Katie Landry began internship at LMRFC
- o May 31, Dave Reed participated in the FEMA Presentation Internal Call
- o June 1, David Welch participated in the Ohio River Community Model conference call
- o June 3, 6, and 9, Jeff Grascchel participated in the Gulf Intracoastal Canal Association (GICA) Industry High Water conference call
- o June 7, Gina Tillis-Nash presented in WFO Tampa's Diversity Workshop
- o June 7, Dave Reed, Jeff Grascchel, and David Welch visited WFO Jackson, MS and participated in the Camo Jacket Meeting
- o June 10, Coordinated with Bill Fredrick (USACE MVN) on hydro scenarios with closing procedures for Bonnet Carre and Morganza, as well as ongoing briefing of Mississippi River flow forecasts
- o June 13 -17, David Welch and Kai Roth participated in the CAT 2 CHPS workshop in Boulder, CO
- o June 14, David Welch participated in the Advanced Hydro Course Topics conference call
- o June 15, Dave Reed and Jeff Grascchel visited USACE's Mississippi Valley Division and Vicksburg District offices
- o June 20 – 21, Glenn Carrin participated in Datum Training at the University of New Orleans, in New Orleans, LA
- o June 20 -24, Jeff Grascchel and Scott Lincoln conducted AHPS outreach with WFOs HUN and OHX
- o June 23, David Welch and Jessica Smith attended Hurricane Season Geospatial Data Mining Workshop in Lafayette, LA
- o June 27, Participated in MSU FloodViz Go-to-Meeting to discuss new enhancements with visualization software
- o June 28, Jessica Smith provided training to LMRFC staff on Storm Surge procedures
- o June 28, Gina Tillis-Nash gave a tour of LMRFC to the Louisiana Highway Patrol's Summer Camp Troop of 25 at risk kids and their 10 chaperons
- o June 29, Dave Reed's retirement luncheon.

- Numerous conference calls providing support and guidance for the numerous levee failures during the on-going flood event.
 - David Welch worked with SR Tech Infusion Branch and HSB to set up prototype website for significant Mississippi River and Tributary Flooding at <http://www.srh.noaa.gov/srh/ssd/mapping/RFC/>
 - Scott Lincoln developed a HEC-HMS model of Mississippi Mainstem flow diversion scenarios to facilitate New Orleans Corps spillway operations
 - LMRFC conducted extensive coordination during April and May with USACE Districts on record Mississippi forecasts and potential operation of Birds-Point Floodway, Bonnet Carre and Morganza structures. Coordination of potential use of New Madrid and other structures started a weeks prior to the 5/2 operation of New Madrid Spillway, 5/10 operation of Bonnet Carre, and 5/14 operation of Morganza Spillway.
 - Significant support and guidance for public safety/evacuation/levee reinforcement for WFOs LZK, PAH, MEG, JAN, and LIX, STL USACE coordination on WPPM7 issues, various military units work on civil works/evacuations, USCG Port coordination, and Entergy's St. Francisville Nuclear Power Plant.
 - Katelyn Costanza and David Welch participated in numerous HEC-RAS Modeling conference calls with OHRFC, LRD and HEC to support Mississippi River flooding.
 - Dave Reed, Jeff Graschel, and David Welch participated in numerous FEMA IV, V, and VI, MEMA, and TEMA conference calls
 - Numerous interviews and data requests for media, including CBS News Radio, WDSU's Margret Orr, CNN, AP, AP Radio, Baton Rouge Advocate, and LifesLittleMysteries.com
- Implemented ESP graphics generation for 6 sites, ACML1, COPT2, CPPT2, TLCT2, WOCT2, and NAPT2 for WFOs JAN, FWD, and SHV.
 - Implemented RTI's RES-J calibrations for NADA4, BMDA4, REDA4, and DGDA4 in to operational model.
 - Completed 1 in-house calibration at DNZM7.
 - LMRFC continued CHPS migration activities.
 - LMRFC submitted SR, CR & ER Spring Flood Outlooks.
 - LMRFC continues support of AHPS activities with in-house calibrations for remaining basins east of the Mississippi River and generation of MAP calibrations for upcoming FY calibrations.
 - Participated in Ross Barnett Reservoir Goto Meeting test with USACE Vicksburg, WFO Jackson, Ross Barnett, & USGS
 - LMRFC participated in numerous conference calls, including RFC Liaison Team, Fusion, SCH, HSB, SR GIS Web, SR QPF, SR WCM/SCH, AWIPS II, LMS, CHPS, LOMRC, LRD/MVD USACE, Sharepoint, FogBugz, Central Region Hydrologic Outlook, NWS/TVA, FEMA Spring flood, and Olmstead Construction.
 - Significant coordination via conference calls and NWSChat for the historic 2011 flood event with COE (MVD, LRD, MVS, MVK, MVM, MVN, and Little Rock), OHRFC, WFOs, SR, LA-GOHSEP, TEMA, MEMA, FEMA 4, 5, & 6, USGS, and USCG, and numerous media briefings.

Problems Encountered/Issues

1st Quarter FY11 –

- None

2nd Quarter FY11 –

- None

3rd Quarter FY11 –

- Epic flood event involving operation of both the Birds Point-New Madrid Spillway, only used during the flood of 1937, and the Morganza Spillway, only used once during the flood of 1973
- Wide spread significant flood event, with 15 new record floods and a majority of flood points forecasted at or above moderate flood stage

- LMRFC CHPS migration and development activities were delayed due to significant flood operations.

AHPS Implementation for SERFC

Management Lead: John Feldt, HIC

2. Objective: Implement probabilistic forecasts for basins in the Tombigbee and Central Florida River Forecast Center’s area of responsibility. For FY11, this would include ...

3. FY 2011 calibration funding (\$K):

4. AHPS Implementation

Milestones

Implementation Area	Forecast Points Planned	Due Date	Actual to Date (4 th Qtr FY11)	Variance
New Services:				
Tombigbee	10	1 st Qtr	10	
	10	2 nd Qtr	10	0
Central Florida	8	3 rd Qtr	0	-8
	8	4 th Qtr	0	0
Total	36	FY11	20	-8
Expanded Services:				
Tombigbee	1	2 nd	1	0
Central Florida	3	4 th	0	0
Flood Mapping	2	4 th	1	0
Total	6	FY11	2	0

Accomplishments/Actions

1st Quarter FY11

- The first 12 points of this year’s ESP implementation are being worked on at this time. Should be caught up by the end of the second quarter.

2nd Quarter FY11

- Implementation of probabilistic forecast services planned for FY11 has been completed for the Tombigbee River system.

3rd Quarter FY11

- AHPS travel had slowed due to uncertainty of funds but will kick into high gear this quarter with many trips planned. Implementation of Florida points will begin in early August and will be finished before the end of Quarter 4.

4th Quarter FY11

Problems Encountered/Issues

1st Quarter FY11

2nd Quarter FY11

3rd Quarter FY11

4th Quarter FY11

AHPS Implementation for WGRFC

Management Lead: Thomas Donaldson, WGRFC

Objective: Implementation of probabilistic hydrologic forecasts for the San Jacinto and Pecos basins in the West Gulf River Forecast Center's area of responsibility.

Milestones

Implementation Area	Forecast Points Planned	Due Date	Actual to Date 2nd Qtr FY11	Variance
New Services:				
San Jacinto	16	31 Dec. 2010	16	0
Trinity	3	31 Dec. 2010	2	-1
Lavaca	1	31 Dec. 2010	1	0
Rio Grande	4	30 June 2011	0	-4
Total	24		19	-5
Expanded Services:				
San Jacinto	10	31 Dec. 2010	10	0
Pecos	4	30 June 2011	0	-4
Guadalupe	3	30 Sep. 2011	0	0
Total	17		10	-4

Accomplishments/Actions

1st Quarter FY11

- Continuing work towards operational implementation of Phase II calibrations. Two sites (Del Norte and Alamosa) will be officially available beginning in November as requested and coordinated with WFO Pueblo. There is significant in-house effort ongoing to reconcile/build OFS station definition, MAP, and MAT files used to define these within the model; Segment definitions being built from calibration decks are ongoing; Troubleshooting and resolving precipitation and temperature data flow issues to support model.
- Held monthly Pecos River project call with RTi for contract RTi T10-XXXX on 10/26. Discussed lingering station data real-time questions, status of model development, and other planned deliverables. Also discussed snow-17 training agenda for wgrfc.
- Reviewed basin and elevation zone delineations and unit hydrographs previously delivered.
- Completed OHD request to review/compile AHPS forecast locations and associated products available for the PECO and URIO.
- Completed FY11 AHPS implementation information for PECO requested by SRH.
- Coordination and planning for contracted RTi training scheduled for November 18th, 2010.
- Continued inquiries and discussions with NM State Engineer's office and Interstate Stream Commission to compile information about the Pecos Riverware model.
- Resolved snotel precipitation data flow problems that plagued operational modeling efforts last water supply season.
- Upgraded Buffalo Bayou modeling points to 3 hour model to match the rest of San Jacinto Forecast Group.
- Installed ESP generation for all points on the San Jacinto and Buffalo Bayou segments.
- Adjusted graphics generation program to create products for all site.

- Added Res-J operation to Lake Conroe and prepared Addicks and Barker reservoirs for RES-J installation.
- Added 4 new forecast points requested by Houston WFO to San Jacinto River system.
- Completed and installed new SAC-SMA calibrations on all basins for San Jacinto River and Buffalo Bayou.
- Ran system for 1 year to check for irregularities in the long range forecasts.
- Finalized all routings, especially for new simulation/forecast points.
- Continuing work towards operational implementation of Upper Rio Grande Phase II calibrations. Two sites (Del Norte and Alamosa) were scheduled to be available beginning in November as requested and coordinated with WFO Pueblo. There continues to be significant in-house effort to reconcile and resolve station precipitation and temperature data flow issues to support model and OFS problems with implementation. Segment definitions being built from calibration decks are ongoing with troubleshooting to resolve errors.
- Completed OFS station definition work; completed MAP and MAT files needed for OFS definitions, although unable to run do to OFS issues.
- Review other western RFC processes for handling precip/temp data flow issues; conference call with CBRFC to discuss and for guidance with dailyQC.
- Compile station list to support dailyQC application needed for data QA/QC to support operational forecasting.
- Setup calibration training decks to support inhouse snow-17 training; setup and tested IFP, ICP, snowupdating, and espadp applications needed for snow training exercises.
- Loveland/McKee completed pre-requisite training material (snow modules and required readings)
- Completed 1 day snow-17 training hosted at wgrfc on November 18th. Training led by RTi contractor Jay Day and covered general overview, calibration, esp, and operational review of 2009 water supply season.
- Held monthly Pecos River project call with RTi for contract RTi T10-XXXX on 11/30. Discussed of model data analysis; MAPs/MATs done, PET analysis discussion, Unregulated flows outstanding questions, and water balance ongoing. Also discussing other planned deliverables and provided feedback from recent snow-17 training at wgrfc.
- Continued inquiries and discussions with NM State Engineer's office and Interstate Stream Commission to compile information about the Pecos Riverware model.
- Installed and debugged RES-J operation for Addicks and Barker reservoirs.
- Determined the need for adding an additional modeling point on Buffalo Bayou (ADBT2) and created new segment definition for installation.
- Finalized all graphics for San Jacinto River forecast points.
- Implemented ESP for all sites on San Jacinto River.
- Set up calibration decks for Buffalo Bayou sites needing to be remodeled.
- Began development of new forecast point at Greens Bayou – Ley Rd.
- Continuing work towards operational implementation of Upper Rio Grande Phase II calibrations. Two sites (Del Norte and Alamosa) were scheduled to be available beginning in November as requested and coordinated with WFO Pueblo. There continues to be significant in-house effort to reconcile and resolve station precipitation and temperature data flow issues to support model and OFS problems with implementation. Segment definitions being built from calibration decks are ongoing with troubleshooting to resolve errors. Ten of sixteen segments are successfully defined in OFS with outstanding errors to resolve on the remaining six.
- Completed MAP, MAT, and FMAP definitions in OFS for Phase II implementation.
- Training student intern and 2 journey hydrologists about station data types, ingest, flow paths, and resource tools to build awareness and troubleshooting skills for project support.
- Updated all ratings for URIO in Colorado from CDWR to support anticipated successful Phase II implementation.
- Modified snow Updating tool to accommodate new forecast locations and snotel stations for Phase II snow update implementation. Compiled and reformatted historical NRCS snotel data needed for statistical computations.
- Reconciling WHFS and internal database tables with Pecos station analysis performed by RTi for

data flow and meta data checks.

- Held monthly Pecos River project call with RTi for contract RTi T10-XXXX on 12/16. Discussed model data analysis; analyzed two set of PET estimates with initial water balance, discussed unregulated flows outstanding questions, and initial water balance results. Verified task 2 deliverables (i.e. basin/elev zone delineations; MAP/MAT time-series). Now moving into task 3 with setting up initial calibration decks for assessment.
- Completed all work adding new modeling point at ADBT2.
- Completed calibration for Buffalo Bayou forecast points.
- Finalized all graphics for Buffalo Bayou forecast points.
- Implemented ESP for all sites on Buffalo Bayou system (3 new sites, 2 expanded sites).
- Continued calibration for new forecast point Greens Bayou – Ley Rd.

2nd Quarter FY11

- Continuing work towards operational implementation of Upper Rio Grande Phase II calibrations. Two sites (Del Norte and Alamosa) were scheduled to be available beginning in November as requested and coordinated with WFO Pueblo. There continues to be significant in-house effort to reconcile and resolve OFS problems with implementation. Segment definitions being built from calibration decks are ongoing with troubleshooting to resolve errors. Thirteen of sixteen segments are successfully defined in OFS with outstanding errors to resolve on the remaining three.
- Continued training student intern and 2 journey hydrologists about station data types, ingest, flow paths, and resource tools to build awareness and troubleshooting skills for project support.
- Began historical data compilation of NRCS observed flow volumes, monthly forecasts and normals to populate the westernwater web page which supports analysis tools for ESP and statistical water supply forecasts.
- Updated new ratings for the Pecos River Basin.
- Verify and reconcile IDs used in calibration decks to ensure validity and consistency.
- Held monthly Pecos River project call with RTi for contract RTi T10-XXXX on 01/20. Discussed model data analysis, initial calibration decks, and initial simulation statistics for headwater calibrations.
- Completed calibration for new forecast point Greens Bayou – Ley Rd.
- Added Greens Bayou – Ley Rd. to San Jacinto forecast group.
- Began adding Greens Bayou to doAHPS script for graphics generation.
- Continuing work towards operational implementation of Upper Rio Grande Phase II calibrations. Two sites (Del Norte and Alamosa) were scheduled to be available beginning in November as requested and coordinated with WFO Pueblo; only Alamosa remains officially outstanding. Routine monthly water supply forecasts have been available at Del Norte since January. In-house effort to reconcile and resolve OFS problems with implementation continues. Segment definitions being built from calibration decks are ongoing with troubleshooting to resolve errors. Thirteen of sixteen segments are successfully defined in OFS with outstanding errors to resolve on the remaining three.
- Continued historical data compilation of NRCS observed flow volumes, monthly forecasts and normals to populate the westernwater web page which supports analysis tools for ESP and statistical water supply forecasts.
- Verify and reconcile IDs used in calibration decks to ensure validity and consistency.
- Completed February 1 water supply forecast based on both statistical and ESP where available.
- Compiled and issued Feb 16th requested Spring Flood Outlook.
- Held monthly Pecos River project call with RTi on 02/23. Discussed model data analysis and headwater calibration results along with 2011 AHPS status update.
- Finalized new forecast point at Greens Bayou – Ley Rd in doAhps script.
- Implemented Greens Bayou – Ley Rd during February AHPS product issuance.
- Began preparation of new sites for Site Specific model implementation.
- Completed operational implementation of Upper Rio Grande Phase II calibrations. Two sites (Del Norte and Alamosa) were scheduled to be officially available as flood forecast points as requested and coordinated with WFO Pueblo. However, 15 other locations were also implemented this FY to

support the water supply forecasting services. To date, a total of 22 locations have been implemented on the Upper Rio Grande in Colorado from the headwaters to Lobatos, all of which were developed to forecast unregulated flows to support water supply and flood forecast services. All of these models are now being run weekly for evaluation during the remainder of the water supply season and results shared with stakeholders. These results compliment the legacy forecast process. Adjustments to operational implementation will continue as all the unregulated flow computations inside the segment definitions still need to be added.

- Reviewed station data OFS ingest to support the additional URIO modeled basins.
- Setup 16 new URIO locations to run ESP with associated seasonal tables and graphics.
- Modified snow update application to run with additional 16 new URIO locations.
- Reviewed remaining PECO work to evaluate current AHPS proposed SOW; made suggested changes to SOW concerning development task priorities to accommodate uncertainties in level of FY11 funding in order to maximize efficiencies for outstanding work to be completed in-house.
- Continued historical data compilation of NRCS observed flow volumes, monthly forecasts, and normals to populate the westernwater web page which supports analysis tools for ESP and statistical water supply forecasts.
- Completed March 1 water supply forecast based on both statistical and ESP where available.
- Began weekly ESP water supply forecast runs as trial test; made results available to NRCS and CO/NM state agencies.
- Began sending Upper Rio Grande ESP forecasts to westernwater web page.
- Compiled and issued March 1st requested Spring Flood Outlook.
- Held monthly Pecos River project call with RTi for contract RTi T10-XXXX on 02/24. Discussed local area calibration results and technical issues for continuing Pecos model development with possible FY11 AHPS funding.
- Begin process of developing MAPX for PECO basins (at least one) for RTi to compare with pre-weighted station method to determine if improves simulation.

3rd Quarter FY11

- Continued review and evaluation of Upper Rio Grande Phase II operational implementation. To date, a total of 22 locations have been implemented on the Upper Rio Grande in Colorado from the headwaters to Lobatos, all of which were developed to forecast unregulated flows to support water supply and flood forecast services. All of these models are running real-time with ESP forecasts run weekly for evaluation during the remainder of the water supply season and results provided to NRCS and CO/NM state agencies. These results compliment the legacy forecast process. Adjustments to operational implementation will continue as all the unregulated flow computations inside the segment definitions still need to be added.
- Modified ESP post-processing of espadp tables and graphics to extend beyond standard 90day window to include entire seasonal period.
- Created temporary webpage for easy stakeholder access to standard ESP graphics; continue sending weekly Upper Rio Grande ESP forecasts to Westernwater web page. Reviewed Westernwater web pages for quality-control; made necessary corrections and additions.
- Reviewed proposed FY11 AHPS SOW for Pecos River. Planning development task priorities to accommodate uncertainties in level of FY11 funding in order to maximize efficiencies for outstanding work to be completed in-house.
- Continued historical data compilation of NRCS observed flow volumes, monthly forecasts, and normals to populate the Westernwater web page which supports analysis tools for ESP and statistical water supply forecasts.
- Held monthly Pecos River project call with RTi for contract RTi T10-XXXX on 03/19. Discussed overview of final calibration results and draft products being delivered for review. Continued discussions about continued Pecos model development with possible FY11 AHPS funding.
- Generated MAPX for the 6 PECO phase I basins for RTi to compare with pre-weighted station method to determine if improves simulation of observed flows.
- Reviewed, modified, and submitted abstract for approval to SRH for presentation at AWRA special session on Upper Rio Grande model development. This is a collaborative effort between RTi, USACE, and NWS at request and invitation of AWRA special session organizer.

- Received Pecos Phase I deliverables from RTi including calibration decks, MAP/MAT time-series, and draft reports. Began setup and review of calibration decks and draft report. Documented and reviewed setup procedures for training and reference purposes. Finished review of Executive Summary.
- Received training and supported migration effort of water supply models to CHPS
- Continued review and evaluation of Upper Rio Grande Phase II operational implementation. To date, a total of 22 locations have been implemented on the Upper Rio Grande in Colorado from the headwaters to Lobatos, all of which were developed to forecast unregulated flows to support water supply and flood forecast services. All of these models are running real-time with ESP forecasts run weekly for evaluation during the remainder of the water supply season and results provided to NRCS and CO/NM state agencies. These results compliment the legacy forecast process. Adjustments to operational implementation will continue as all the unregulated flow computations inside the segment definitions still need to be added.
- Reviewed and re-modified ESP post-processing of espadp tables and graphics to automatically adjust for residual period once inside the standard seasonal period for which water supply volumes are computed.
- Continued sending standard ESP graphics available to temporary webpage for easy stakeholder access; continue sending weekly Upper Rio Grande ESP forecasts to westernwater web page.
- Continued historical data compilation of NRCS observed flow volumes, monthly forecasts, and normals to populate the westernwater web page which supports analysis tools for ESP and statistical water supply forecasts.
- Completed May 1 water supply forecast based on both statistical and ESP where available. Collaborated and coordinated with NRCS and other stakeholders.
- Held monthly Pecos River project call with RTi for contract RTi T10-XXXX on 05/18. Discussed timeline for completing review of final calibration results and draft report. Agreed to prioritize the URG-NM deliverable review and finish Pecos review by 6/9/2011.
- Coordination and planning for annual Upper Rio Grande snowmelt runoff meeting to support stakeholders. Compiled and prepared presentation of 2011 forecasts. Attended snowmelt runoff meeting in ABQ on 5/17/2011. Additionally met with USACE staff in support of URG-NM project.
- Reviewed and submitted final abstract for presentation at AWRA special session on Upper Rio Grande model development. This is a collaborative effort between RTi, USACE, and NWS at request and invitation of AWRA special session organizer.
- Continued review of Pecos Phase I deliverables from RTi including calibration decks, MAP/MAT time-series, and draft reports. Finished setup of calibration decks and began calibration and draft report review.
- Continued review and evaluation of Upper Rio Grande Phase II operational implementation. To date, a total of 22 locations have been implemented on the Upper Rio Grande in Colorado from the headwaters to Lobatos, all of which were developed to forecast unregulated flows to support water supply and flood forecast services. All of these models are running real-time with ESP forecasts run weekly for evaluation during the remainder of the water supply season and results provided to NRCS and CO/NM state agencies. These results compliment the legacy forecast process. Adjustments to operational implementation will continue as all the unregulated flow computations inside the segment definitions still need to be added.
- Continued sending standard ESP graphics available to temporary webpage for easy stakeholder access; continue sending weekly Upper Rio Grande ESP forecasts to westernwater web page.
- Continued historical data compilation of NRCS observed flow volumes, monthly forecasts, and normals to populate the westernwater web page which supports analysis tools for ESP and statistical water supply forecasts.
- Reviewed June 1 NRCS water supply forecast (official NWS forecasts ended in May) and compared with ESP forecasts where available.
- Finished review of Pecos Phase I deliverables from RTi including calibration decks, MAP/MAT time-series, and draft reports.
- Held monthly Pecos River project call with RTi for contract RTi T10-XXXX on 06/09/11. Discussed review of final deliverables for model development, calibration decks/data sets, and project report. Followed up with final comments and requested changes. All deliverables finalized and received.
- Abstract on Upper Rio Grande model development approved by AWRA for presentation at special

session. This is a collaborative effort between RTi, USACE, and NWS at request and invitation of AWRA special session organizer.

Problems Encountered/Issues

1st Quarter FY11 – Complications with OFS continue to slow progress toward phase II implementation of two sites (Del Norte and Alamosa) previously scheduled to be available in November as requested and coordinated with WFO Pueblo. Problems with OFS implementation are being resolved and successful operational implementation is anticipated by end of January. In addition, there continues to be significant in-house effort to reconcile and resolve station precipitation and temperature data flow issues to support model; requires addressing station data issues that have never been needed before at WGRFC (i.e. internal scripts to compute daily temperature max/min values from hourly data; also timestamp precip/temp data at 12Z for COOP data that are timestamped outside the acceptable OFS ingest window.) Also remaining is troubleshooting 6 segment definitions for successful operation, testing model simulations, and modifying files to run/generate ESP output and graphics.

2nd Quarter FY11 – Need to finish including all computations and methods for calculating/determining observed unregulated flow within the model segment definitions. Continuing to work with local office on 2 new site specific sites.

3rd Quarter FY11 – Although the contractor has completed their work on the Pecos River, we still need to implement in operational forecast system. This will likely not be completed until the end of August. Also, the 4 flood inundation map sites on the Rio Grande that were scheduled for the end of June are on hold because NWS HQ has put an indefinite hold on implementation until some problems with national system have been worked out.

AHPS Implementation for CBRFC

Management Lead: Michelle Schmidt, HIC/CBRFC

Objective: Implement probabilistic hydrologic forecasts in the Colorado Basin River Forecast Center's (CBRFC) area of responsibility.

Milestones

Implementation Area	Forecast Points Planned	Due Date	Actual to Date 2 nd Qtr FY11	Variance
Total	0		0	0

Accomplishments/Actions

1st Quarter FY11

- N/A

2nd Quarter FY11

- N/A

3rd Quarter FY11

- N/A

4th Quarter FY11

- N/A

Problems Encountered/Issues

1st Quarter FY11

- Implementation for regulated points is delayed until delivery of new software

2nd Quarter FY11

- Implementation for regulated points is delayed until delivery of new software

3rd Quarter FY11

- Implementation for regulated points is delayed until delivery of new software

4th Quarter FY11

-

AHPS Implementation CNRFC

Management Lead: Robert Hartman, HIC/CNRFC

Objective: Implement probabilistic hydrologic forecasts in the California-Nevada River Forecast Center's (CNRFC) area of responsibility.

Milestones

Implementation Area	Forecast Points Planned	Due Date	Actual to Date 2 nd Qtr FY11	Variance
Total	0		0	0

Accomplishments/Actions

1st Quarter FY11

- N/A

2nd Quarter FY11

- N/A

3rd Quarter FY11

- N/A

4th Quarter FY11

- N/A

Problems Encountered/Issues

1st Quarter FY10

- Implementation for regulated points is delayed until delivery of new software

2nd Quarter FY10

- Implementation for regulated points is delayed until delivery of new software

3rd Quarter FY10

- Implementation for regulated points is delayed until delivery of new software

4th Quarter FY10

-

AHPS Implementation for NWRFC

Management Lead: Harold Opitz, HIC/NWRFC

Objective: Implement probabilistic forecasts for basins in the Northwest River Forecast Center's (NWRFC) area of responsibility.

Milestones

Implementation Area	Forecast Points Planned	Due Date	Actual to Date 2 nd Qtr FY11	Variance
Total	0		0	0

Accomplishments/Actions

1st Quarter FY11

- N/A

2nd Quarter FY11

- N/A

3rd Quarter FY11

- N/A

4th Quarter FY11

- N/A

Problems Encountered/Issues

1st Quarter FY11

- Implementation for regulated points is delayed until delivery of new software

2nd Quarter FY11

- Implementation for regulated points is delayed until delivery of new software

3rd Quarter FY11

- Implementation for regulated points is delayed until delivery of new software

4th Quarter FY11

-

Training

Hydrologic Science Training - COMET

Core Goal: Provide science and software training on hydrology program applications throughout the research to operations cycle

Management Lead: Mark Glaudemans

Objective: Develop training and education materials to facilitate the implementation of new science and technologies into hydrologic operations.

Milestones:

<i>Task</i>	<i>Due Date</i>	<i>Status</i>
Techniques in Hydrologic Forecast Verification Distance Learning Module [HY21]	Q4 FY 2010	Delivered to LMS December, 2010
Advanced Hydrologic Science Course [HY14]. Funded COMET \$60K from AHPS. Virtual component July 25, residence component Aug 15, 2011.	Q4 FY11	Agenda and instructors on schedule.
CHPS Training Material Development [HY36]. Funded NWSTC \$110k from AHPS.	FY11	Basic Configuration module completed in mid-June. To be released on LMS in early August.
QPE/Flash Flood Operations Course. Funded COMET \$57k from AHPS. Residence course Mar 8-10, 2011	Q2 FY11	Delivered course successfully.
Communicating and Understanding Hydrologic Ensemble Information – Distance Learning Module (FDTB) [HY20]	Q3 FY10	Suspended indefinitely in Q3 FY10 in lieu of higher priority work for XEFS training development
QPF Verification II Distance Learning Module [HY29]	Q1 FY11	Suspended due to lack of AHPS funding to complete work
NCEP-HPC Visits	FY11	Funding received in late June. Visits being planned and executed.

Accomplishments/Actions:

1st Quarter FY11

- Techniques in Hydrologic Forecast Verification Distance Learning Module [HY21] delivered to LMS in December 2010.
- Planning for agenda and instructors continues for Advanced Hydro Science course. Coordinating with Matt Kelsch and Pedro Restrepo.
- CHPS training continues in multiple tracks. A CIMMS employee, Daniel Henz, was hired in October 2010. A Training Advisory Group (TAG) was formed with members from each of three CAT-I sites, Mark Glaudemans, and NWSTC staff. After discussions, the plan is to develop an online module on FEWS Basic Configuration, tailored to the NWS. This module is expected to be completed in May, 2011, with possible modifications after initial student review. A separate activity is the implementation of a CHPS configuration at the NWSTC. Hardware was purchased by the NWSTC and was installed in Jan 2011. Additional modules are planned, with topics TBD by the TAG.
- For QPE/Flash Flood Operations course, registration is complete and course agenda is set, with instructors and cases studies identified. Some final preparations still remain but this course is on track for presentation.

2nd Quarter FY11

- Weekly planning meetings for agenda and instructors continues for Advanced Hydro Science course. Coordinating with Matt Kelsch, Pedro Restrepo, and Rick Koehler. Draft agenda prepared.
- CHPS configuration established at NWSTC, using ABRFC configuration. Module material being created by instructional designer staff. Expect review in late May, 2011, by advisory group./
- Successfully held QPE/FF Ops course. The course was given a perfect 5.0 rating, the first COMET course to ever have such a rating.

3rd Quarter FY11

- Full AHPS funding for HPC totaling \$10,000 provided late June. In Q3, had visit July 5-8: Mike Eckert (HPC) TO ABRFC. For Q4, have following plans: July 18-22: Jessica Smith (LMRFC) to HPC ; August 8-12: Victor Stegemiller (NWRFC) to HPC; August 22-26: Bob Kelly (HPC) to OHRFC ; Sept 5-9: Andy Wood (CBRFC) to HPC.
- Significant planning and development for Advanced Hydro Science workshop. On track.

- NWSTC completed draft of CHPS Basic Configuration module. Demonstrated in June CHPS workshop in Boulder. Reviewed by CHPS Training Advisory Group and Mark Glaudemans. Comments delivered and discussed, with final version expected to be posted on LMS in early August.

Problems Encountered/Issues:

1st Quarter FY11

- No AHPS funding provided yet, so NCEP-HPC visits with RFCs have not taken place.

2nd Quarter FY11

- No AHPS funding provided yet, so NCEP-HPC visits with RFCs have not taken place.
- NWSTC training development not given full support from HSD because of RFC needs. This has delayed the implementation of a fully configured system, replicating an RFC, which is useful for training material development.

3rd Quarter FY11

- None

Outreach

FY11 Hydrology Program Outreach Work Plan

Theme: Hydrologic Services Outreach

Management Lead: Tom Graziano, Lora Mueller, Regional Hydrologic Services Program Representatives

Objectives: Accomplish outreach with national, regional, and local partners and customers with emphasis on locations where AHPS or water resource services are being or will soon be implemented. Develop clear and consistent outreach materials for use by national, regional, and local personnel.

Milestones

Tasks	Org	Cost (\$1000)	Quarter Due Date	Status
OCWWS/HSD				
Re-Print Floods the Awesome	OCWWS	7.0	1	Deferred
IWRSS Outreach Materials	OCWWS	3.0	1	Completed Q3
Begin planning the Annual National Flood Safety Awareness Week, March 2012	OCWWS	0	4	In Process
Annual FEMA National Flood Conference, (New Orleans, LA), May 1-4, 2011	OCWWS	0	3	Completed-OCWWS Outreach \$\$
Biennial National Hydrologic Warning Council (San Diego) May 9-12, 2011	OCWWS	18.7	3	Completed
Association of State Flood Plain Managers (ASFPM) Annual Conference, Louisville, KY; May 15 - 20, 2011	OCWWS	8.9	3	Completed
Kohler Award (Dave Reed-LMRFC)	OCWWS	0.2	3	Completed
TADD Sign Order	OCWWS	3.0	3	Completed
Student support for outreach to refine AHPS service location database.	OCWWS	1.0	4	Completed
HIC/HSD Meeting (Aug 8-12, 2011)	OCWWS	16.3	4	
TADD Sign Order	OCWWS	3.0	4	
Purchase <u>Unquenchable</u> by Robert Glennon	OCWWS	0.1	4	Completed
Begin revision of joint NWS, FEMA, and American Red Cross Floods the Awesome Power AHPS Safety Brochure	OCWWS	0		
Submit TADD Articles: 1) Move Magazine; 2) Road Safety Foundation	OCWWS	0		
Redesign TADD tri-fold with yellow TADD warning sign	OCWWS	0		Deferred
Sub Total		61.2		
Eastern Region				
South Carolina Water Resources Conference (SERFC); Columbia, SC	ER	1.0	1	Complete
Mississippi Basin Tri-Agency Meeting (OHRFC); Brainard, MN	ER	1.0	1	Complete
Silver Jacket Meeting & WFO Station Visit (OHRFC); Indianapolis, IN	ER	0.3	1	Complete
AHPS Outreach Office Visit to WFO BUF (OHRFC); Buffalo, NY	ER	New	1	Complete
Coordination Meeting with State of Kentucky (OHRFC); Frankfort, KY	ER	New	1	Complete
AHPS Outreach Office Visit to WFO LMK (OHRFC); Louisville, KY	ER	New	1	Complete
AHPS Outreach Office Visits to WFO GSP & WFO RNK (SERFC); Greenville, SC & Blacksburg, VA	ER	New	1	Complete
NWS-USACE Bluestone Dam Coordination Meeting (OHRFC); Huntington, WV	ER	New	2	Complete
Present at North Carolina Water Resources Conference (SERFC); Raleigh, NC	ER	1.2	2	Complete
Maumee River Basin Commission & WFO Station Visit (OHRFC); North Webster, IN	ER	0.2	3	Cancel

North Atlantic Tri-Agency Meeting (NERFC, MARFC, WFOs); State College, PA	ER	4	3	Move to Q4
NWS-USACE Coordination Meeting (OHRFC); Huntington, WV	ER	0.5	3	Move to Q4
Ohio Basin Tri-Agency Meeting (OHRFC, WFO); Cincinnati, OH	ER	1.0	3	Cancel
Coordination visit to WFO Wakefield and Dominion Power to review hydrologic services (SERFC); Columbia, SC and Wakefield, VA	ER	1.0	3	Complete
National Flood Conference (NERFC); New Orleans, LA	ER	1.3	3	Complete
Participate in WMO Sponsored-Saint John River Hydrology Committee Meeting. Share AHPS development and deployment activities in northern New England. (NERFC, HSD, WFOs); Location: TBD	ER	2.0	3	Cancel
Ohio Basin Water Resources Alliance (OHRFC); Nashville, TN	ER	0.3	4	
National HIC Meeting (NERFC, OHRFC, MARFC, HSD); Silver Springs, MD	ER	3.7	4	
Silver Jacket Meeting in ER (SERFC); Location: TBD	ER	0.5	4	
FEMA Regions III, IV, and V Coordination Meetings (OHRFC); Atlanta, Philadelphia and Chicago	ER	1.5	4	
Coordination Meeting with NYC DEP (NERFC); Location: Grahamsville, NY	ER	0.8	4	
Partner Meetings and WFO Station Visits (NERFC); Location: Merrimack River Basin	ER	1.0	4	
Sub Total		18.0		
Central Region				
Tri Agency Meeting (NCRFC and MBRFC) Location: Brainerd, MN	CR	0.8	Q1	Completed
Missouri Basin Forecaster Meeting (MBRFC and NCRFC) Location: KC or Nebraska City, NE	CR	1.3	Q1	Completed
AHPS presentation to MN Association of Flood Plain Managers (NCRFC) Location: Fergus Falls, MN	CR	0.4	Q1	Completed
Mississippi Basin Forecaster Meeting (MBRFC) Location: NO	CR	1.2	Q1	Completed
AHPS presentation at Red River Land & Water International Summit (NCRFC) Location: Fargo, ND	CR	0.8	Q2	Completed
AHPS & Flood Safety Promotional Outreach Items	CR	0.25	Q4	Moved from Q2 to Q4
NCRFC WFO Outreach MI/GLERL Outreach	CR	2.0	Q4	Moved from Q3 to Q4
Missouri R Natl. Resources/BiOp, Neb City	CR	0.3	Q3	Completed
MBRFC WFO Outreach (FSD, OAX, and DMX)	CR	1.0	Q4	
Coop Stream Gage Meeting (MBRFC) Location: Billings, MT	CR	0.6	Q4	
Montana DES Workshop (MBRFC) Location: TBD	CR	1.7	Q4	
Climate Forum (MBRFC) Location: TBD	CR	0.3	Q4	
Participate in Red River Basin Commission Ex-Officio Meeting (NCRFC) Location: Grand Forks, ND	CR	0.15	Q4	
3rd HIC meeting (MBRFC, NCRFC, and CRH) Location: TBD	CR	4.0	Q4	Cancelled
FSD SH to MBRFC	CR	0.6	Q4	
High Water Mark Signs	CR	1.0	Q4	
Stormwater Floodplain Simulation System	CR	1.6	Q4	
Sub Total		14.0		
Oklahoma Governor's Water Conference. (ABRFC) Location: Oklahoma City, OK	SR	.3	1	Completed
High Water Mark Sign Ceremony (ABRFC) Location: Amarillo, TX	SR	1.3	1	Completed
Mississippi River Tri-Agency Meeting (LMRFC) Location: Brainerd, MN	SR	1.5	1	Completed
Mississippi Water Resource Conference (LMRFC)	SR	.6	1	Completed

Location: Bay St. Louis, MS				
AHPS Outreach and Customer Requirements Meetings, (WGRFC) Location: Houston, TX San Jacinto River Authority, Harris County Flood Control District, and WFO HGX	SR	.75	1	Completed
NCDC Meeting (ABRFC) Location: Asheville, NC	SR	.65	2	Completed
AHPS Outreach Meetings with Tennessee USGS and WFO OHX, (LMRFC) Location: Nashville, TN	SR	2	3	Completed
International Boundary Water Commission Flood Workshops, (WGRFC) Location: South Texas	SR	.5	3	Completed
NWS/COE/USGS Tri-Agency Meeting (ABRFC) Location: Grapevine, TX	SR	.8	4	
Red River Valley Authority Meeting (ABRFC) Location:	SR	.2	4	
Texas DEM & FEMA Region VI Meeting, (ABRFC) Location: TX	SR	.7	4	
Visit to UCSG/COE/WFO (LMRFC) Location: Memphis	SR	2	4	
Texas DEM & FEMA Region VI Meeting, (LMRFC) Location: TX	SR	1.5	4	
Red River Valley Authority Meeting (LMRFC) Location:	SR	.6	4	
Flood Fight Workshop (SERFC) Location: Albany, GA	SR	.25	4	
Visit Alabama Power and WFO BMX (SERFC) Location: Birmingham, AL	SR	.25	4	
NWS/COE/USGS Tri-Agency Meeting (SERFC) Location:	SR	.6	4	
Upper Rio Grande Customer Meeting and WFO ABQ Visit (WGRFC) Location: CO	SR	2.5	4	
Interagency Recovery Task Force Meeting (SRH-HSB) Location: Memphis, TN	SR	.7	3	Completed
Water Resource Stakeholder Meeting, (SRH-HSB) Location: Tulsa, OK	SR	2	2	Completed
Sub Total		19.7		
Western Region				
OTX Wards Stormwater Floodplain Model	WR	1.4	4	On-going
LOX Global Monitoring Exhibit	WR	3.0	4	On-going
PHX Outreach Materials	WR	1.0	4	On-going
SEW Outreach Materials	WR	3.0	4	On-going
Travel to discuss forecast coordination between MBRFC and eastern MT WFOs	WR	3.6	4	On-going
TFX High Water Mark Signs and Outreach Materials	WR	1.0	4	On-going
PQR TADD signs and outreach materials	WR	2.0	4	On-going
Travel to NWRFC	WR	1.5	4	On-going
Travel to CNRFC	WR	1.5	4	On-going
Sub Total		18.0		
Alaska/Pacific Region				

—(additional \$5K for 1 day Stakeholder meeting in Anchorage (Summer — APRFC)	AR	5.0	4	Cancelled
IHCA and/or other outreach in Juneau	AR	.9	3	
AWRA and/or other outreach in Fairbanks	AR	1.0	4	
Attend NOAA Water Cycle Conference in Boulder	AR	2.5	4	
Watershed Model	AR	1.4	2	
High Water Mark Signs and/or Outreach Materials	AR	.6	3	
Outreach Visits to Explain Hydrologic Program to Partners and Customers	AR	1.5	4	
Sub Total		8.0		
Grand Total		15.9		

NOTE: Italics indicates current report not received and info is from previously received reports

Accomplishments/Actions

1st Quarter FY11

2nd Quarter FY11

- SR-Completed the first Water Resource Stakeholder Meeting in Tulsa, OK on January 11, 2011

3rd Quarter FY11

- SR-Revised the SR AHPS Outreach Plan to reflect final AHPS Funding Levels. This report/table has been revised to reflect these changes
- WR-Participation in the NHWC conference was supported by additional funds from NWSH
- AR- Attended Interagency Hydrology Committee of Alaska Meeting in Juneau in April.

4th Quarter FY11

Problems Encountered/Issues

1st Quarter - None

2nd Quarter - None

3rd Quarter

- AR- The additional 5K for the Stakeholder meeting was allocated when the HIC meeting was going to take place in Anchorage. That meeting is not going to take place. We were told in July that we had 8K for outreach activities. We have currently spent about 3K and have travel authorizations for about 4K more. Our plan is to spend a little under 8K by the end of Q4. I changed the subtotal for AR to reflect that, but not the grand total.

4th Quarter

Program Management

Program Management

Theme: Program Management

Management Lead: Donna Page

Objective: Provide national program management; coordinate and track AHPS budgets and project plans; manage AHPS contracts; and foster Agency, Departmental, and Legislative Interface.

Milestones

Tasks/Subtask FY11 Milestones	Responsible	FY11 Quarter Completion Date
OHD Portfolio Definition	OHD	Q4
AHPS Planning/ Execution/ Reporting <ul style="list-style-type: none"> • E-CPIC Updates • Monthly Status for NWS Monthly Report 	OHD OHD/Regions	Quarterly Monthly
NOAA SEE Hydrology Program Support <ul style="list-style-type: none"> • Program Operating Plan • Quarterly Program Review 	OHD OHD	3 rd Quarterly
Agency/ Department/ Legislative Interfaces <ul style="list-style-type: none"> • Budget Fact Sheet • Prepare and submit Budget Request • Prepare Briefings and Support OMB/Congressional Meetings • Prepare Response to Pass Back • Prepare Response to Budget Hearing Questions • Program Assessment Rating Tool Progress 	OHD OHD OHD OHD OHD OHD	1 st 2 nd 3 rd 3 rd 4 th Quarterly
HOSIP Process Improvement and Document Development <ul style="list-style-type: none"> • Instructions • Guidance & Standards • Performance Statistics • Quality Control Reports • Validation & Recommendation Reports • HOSIP Documents • Gate Status, Branch Chief Status Reports 	OHD OHD OHD OHD OHD OHD OHD	Quarterly Quarterly Quarterly Quarterly Quarterly Quarterly Weekly

Accomplishments/Actions

1st Quarter FY11

- Meeting in Hanover, NH at Corps of Engineers Cold Regions Research and Engineering Lab (Oct. 26-28) to learn about how they use Technical Readiness Levels as a tool for improved management. OHD will be adapting its internal management processes to incorporate TRLs in the coming months. Also looked at how CRREL develops and measures their research portfolio.
- Began process of defining OHD portfolio.
- All milestones are on schedule – all scheduled reports completed
- As a reminder, for FY11, there are no project management funds for the AHPS, NOAA or Agency parts of this task. All AHPS project management is being handled by government FTE - Quarterly AHPS reports are being compiled by Dennis Miller. Other reporting handled by other government FTE (John Ingram, Ken Pavelle).

2nd Quarter FY11

- Work continued on defining the OHD portfolio
- All scheduled reports completed
- All AHPS project management is being handled by government FTE - Quarterly AHPS reports are being compiled by Dennis Miller. Other reporting handled by other government FTE (John

Ingram, Ken Pavelle).

3rd Quarter FY11

- Work continued on defining the OHD portfolio
- All scheduled reports completed
- All AHPS project management is being handled by government FTE - Quarterly AHPS reports are being compiled by Dennis Miller. Other reporting handled by other government FTE
- Budget numbers received late Q3 – plans have been adjusted and execution is moving forward

Problems Encountered/Issues

1st Quarter FY11 – None

2nd Quarter FY11 – Budget uncertainties have delayed program execution and will require plan adjustment when final numbers are received.

3rd Quarter FY11 – No problems – some concern about ability of procurement to process all of requests in a timely manner. Will monitor situation.