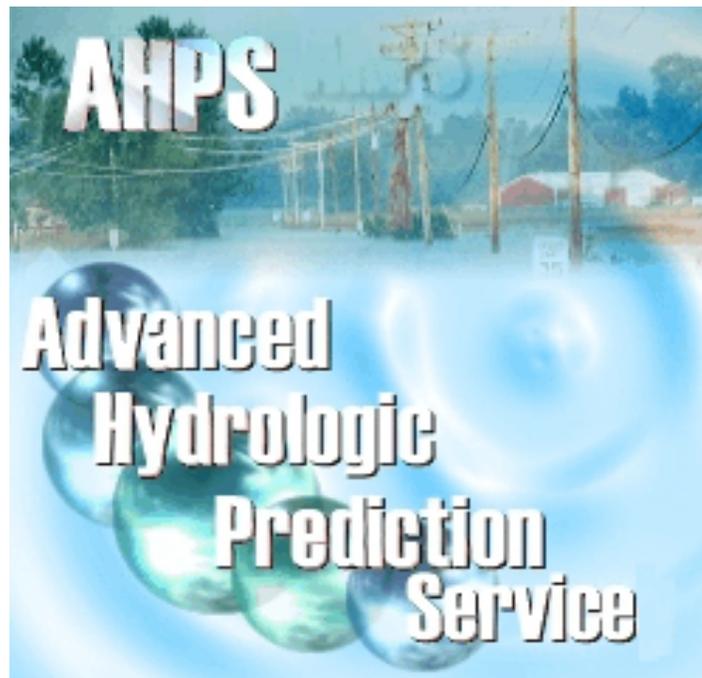




Advanced Hydrologic Prediction Service Quarterly Report 4th Quarter FY 2005



September 30, 2005

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Flash Flood Services

Flash Flood Monitoring and Prediction (FFMP)

Theme: Flash Flood Services

Management Lead: Stephan Smith

Objective: To develop a full monitoring capability for high resolution gridded QPEs for FFMP

Milestones

Task	Due Date	Status
1. The Point Data Control GUI delivered in OB5	12//31/2004	Complete
2. Begin initial design work for gridded QPE monitoring	12/31/2004	Complete
3. Basin Layering enhancement for OB6	02/01/2005	Complete
4. Multiple Frames enhancement for OB6	02/01/2005	Complete
5. Basin Trace capability for OB6	03/31/2005	Complete
6. Provide a method to remove unwanted rain gages form FFMP consideration (OB6)	03/31/2005	Complete
7. Continue work on gridded QPE monitoring for OB7	09/31/2005	On-track

Accomplishments/Actions

1st Quarter FY05

- Completed Point Data Control GUI for OB5
- Began initial design work for gridded QPE monitoring

2nd Quarter FY05

- Completed Basin Trace capability for OB6
- Provided a method to remove unwanted rain gages form FFMP consideration for OB6

3rd Quarter FY05

- Continue development of variable gridded precip ingest.

4th Quarter FY05

- Enhanced design concept.
- Communication with NSSL yielded details which allowed for certain initial streamlining.
- First step will be for a known grid type (lat/lon). Further flexibility may be added later.
- Alpha Test deadline is when AWIPS OB7 gets fielded, which is around September, 2006.

Problems Encountered/Issues

1st Quarter FY05 - None

2nd Quarter FY05

- Gridded precip ingest (OB7): Need to ingest a ***variable grid***, as users will be able to define their grid when acquiring their small basins from an NSSL web page.
- Limited number of attributes the SFAccessor class can access (AWIPS foundation, not FFMP software). This seems to be arbitrary and will affect the contents of ***customized*** basin shapefiles ***and potentially*** the basins that are retrieved from the NSSL web page. The affect will be an inoperable FFMP

3rd Quarter FY05 - None

4th Quarter FY05

- Data transfer is unresolved for operational deployment. For alpha testing, temporary method available.

Western Region Mountain Mapper (Daily QC) Integrated with MPE

Theme: Flash Flood Services

Management Lead: Jon Roe

Objective: Integrate existing Western Region Mountain Mapper Daily QC (DQC) functionality and OHD Multi-Sensor Precipitation Estimator (MPE) application functionality into a single set of operational applications. A Western Region memo dated 11/18/2003 states the need for MPE to emulate Mountain Mapper in these areas:

- Provide a check based on PRISM, elevation, climate and spatial consistency.
- Estimate point precipitation based on PRISM climatology.
- Display thresholds of values like precipitation or elevation.
- Color code sites based on a statistical qualification using surrounding stations (i.e., computation of standard deviation to denote screened, bad, manual, questionable points).
- Allow user to control threshold for which questionable data is flagged.
- Filter for point data, i.e., use raw or processed data.
- Subdivide the RFC area allowing for multiple, simultaneous quality control processes.
- Add site identifier to error log.
- Generate Mean Areal Precipitation based on discontinuous basins.
- Aggregate six- and 24-hour data time steps.
- Provide the same functionality for temperature quality control.
- Provide the same functionality for freezing level quality control.

Milestones

Task	Due Date	Status
Write HOSIP Stage 1 documents.	Q1	Complete
Pass HOSIP Gate 1.	Q1	Complete
Visit CNRFC to observe operational use of DQC.	Q2	Complete
Inventory existing DQC components.	Q4	Complete
Conduct Validation and write HOSIP Stage 2 documents.	Q4	Complete
Pass HOSIP Gate 2.	Q1,FY06	Upcoming (Moved from Q4,FY05)
Install DQC at NWSHQ/OHD (via on site visit of Craig Peterson from WR).	Q4	Complete
Conduct Research & Analysis and write HOSIP Stage 3 documents.	Q1,FY06	Not Started (Moved from Q4,FY05)
Complete reverse engineering analysis of DQC.	Q1,FY06	Ongoing
Pass HOSIP Gate 3.	Q1,FY06	Upcoming
Conduct Operational Development (for an initial partial implementation of DQC into MPE) and write HOSIP Stage 4 documents for that implementation. Design the first partial implementation and develop it.	Q1-Q2, FY06	Not Started (Date moved to Q1, FY06)
Pass HOSIP Gate 4.	Q2, FY06	Upcoming

Accomplishments/Actions

1st Quarter FY05

- Work did not begin until December 2004. OHD is coordinating with Kevin Werner of Western Region Headquarters. First, there is a need to better understand the existing Mountain Mapper applications and data sets in order to understand the detailed requirements. Documentation, field consultation, and the installation of Mountain Mapper at NWS Headquarters will provide the information needed to identify requirements and complete the design. As much as possible, existing code will be re-used in the integrated operations.
- We completed the HOSIP Stage 1 NID and passed HOSIP Gate 1.

2nd Quarter FY05

- Minimal progress was made in the 2nd quarter. Some general design discussions were communicated between WR personnel and OHD. A visit to CNRFC by OHD staff was conducted, where we discussed and viewed demonstrations of DQC. Significant progress was made on porting the MPE FieldGeneration program from FORTRAN to C, which will help with the integration of the DQC field generation (i.e. gage-only objective analysis) methods with MPE. We have discussed the installation of DQC at OHD by CNRFC staff; it was decided to have CNRFC do this remotely, rather than via a visit from CNRFC.
- The delay is caused by the sequencing of efforts involving national QPE software; OHD is focused on completing most of the ABRFC P3 functional integration with MPE before doing serious design work on the DQC integration. We recently hired an additional contractor who is tasked with working solely on the P3-DQC-MPE applications.

3rd Quarter FY05

- Minimal progress was achieved this quarter. CNRFC was assigned a user ID and password for the purposes of installing the DQC application at OHD. Initial work on installing DQC was begun. OHD staff continued general design discussions. An outline of the DQC processing was prepared by CNRFC and sent to OHD.
- P3 integration into MPE was wrapping up during Q3 which will allow more work on DQC to move forward in Q4.

4th Quarter FY05

- Completed draft of the CONOPS and Project Plan for Stage 3.
- Craig Peterson visited OHD in July and installed the Daily QC software along with a canned data case.
- Daily QC code was moved to the WHFS OB7 development environment. This allowed the code to be compiled using the gcc 3.4.3 compiler and an executable to be created for testing.
- Replaced all directory references in code with .Apps_defaults tokens.
- Completed the review the functionality of Daily QC. Began compilation of specific requirements related to the integration of Daily QC functionality into the HydroView/MPE GUI.

Problems Encountered/Issues

1st Quarter FY05

- In order to effectively implement the integration of Mountain Mapper and MPE, detailed requirements must be identified, and the design must be formulated to address these requirements.

2nd Quarter FY05

- Significant design work must be completed to address the integration issues, and to account for the enhanced time resolution being proposed for the DQC functions. Currently DQC operates at a minimum of 6-hour durations. For this project, we will be supporting 1-hour durations.

3rd Quarter FY05

- Work on this project was very slow this period due to two main reasons.
 - First, key resources within OHD/HL needed to perform the DQC analysis and subsequent HydroView/MPE design were unexpectedly tied up most of the last several months with high priority AWIPS-directed activities including getting hydro VTEC ready for OB6 and performing the large conversion of all hydro software from using Informix to using PostgreSQL. The extent of the AWIPS activities were not only larger (in effort and on the calendar) than previously expected but the series of AWIPS releases between OB4 and OB6 were highly changeable in content from week to week.
 - Second, the labor effort expected to analyze the existing DQC functionality and to incorporate its design into HydroView/MPE was underestimated at the beginning of FY05.
- The stretch goal is still to try to get this work into AWIPS OB7.

4th Quarter FY05

- AWIPS OB6 activities related to the PostgreSQL upgrade continued to tie up personnel needed for this project.
- Work to update the Post Analysis application for OB6 diverted resources from this project.
- The goal remains getting Daily QC into OB7.

ABRFC P3 Integrated with MPE

Theme: Flash Flood Services

Management Lead: Jon Roe

Objective: Integrate existing ABRFC P3 and OHD Multi-Sensor Precipitation Estimator (MPE) application functionality into a single set of operational applications. This includes alternate methods for generating multi-sensor precipitation, additional interactive quality control methods, including a more powerful polygon edit feature.

Milestones

Task	Due Date	Status
Write HOSIP Stage 1 documents.	Q1	Complete
Pass HOSIP Gate 1.	Q2	Complete
Inventory existing P3 components.	Q2	Complete
Complete document describing existing functionality.	Q2	Complete
Conduct Validation and write HOSIP Stage 2 documents.	Q4	Complete (Date moved to Q4)
Complete requirements on enhanced polygon feature.	Q3	Complete
Pass HOSIP Gate 2.	Q4	Complete
Conduct Research & Analysis and write HOSIP Stage 3 documents.	Q1, FY06	Ongoing (Date moved to Q1, FY06)
Pass HOSIP Gate 3.	Q1, FY06	Upcoming (Date moved from Q4)
Conduct Operational Development and write HOSIP Stage 4 documents. Modify design of MPE FieldGen application to handle new grids. Convert MPE Fieldgen from Fortran to C. Complete the integration of P3 functionality into MPE.	Q1, FY06	Operational development completed and the beta prototype delivered to ABRFC on October 13, 2005. (Date moved from Q4)
Pass HOSIP Gate 4.	Q1, FY06	Upcoming (Date moved to Q1, FY06)
Deliver P3-enhanced MPE to AWIPS OB7.	Q2, FY06	Upcoming (Date moved to Q2, FY06)

Accomplishments/Actions

1st Quarter FY05

- We obtained assorted information from ABRFC to document existing P3 functionality.
- We nearly completed documentation that is an inventory of P3 operations.
- We installed P3 software at NWS HQ/OHD and established a data flow for it.
- We completed documentation describing the design of a new polygon feature for MPE. This will be shared with ABRFC for discussion.
- We completed the HOSIP Stage 1 NID and passed HOSIP Gate 1.

2nd Quarter FY05

- We have modified the runtime environment of the P3 applications so they operate in the standard AWIPS environment used by the OHD national applications.
- We have established the “create_triangles” application in our baseline; this application will remain as-is as part of the final project deliverables.
- We have fixed a few bugs discovered during our operation of the P3 application.
- We have made significant progress on the port of the MPE_FieldGen program from the FORTRAN language to the C language. The use of the C language will greatly facilitate the insertion of the new grid generation methods used by P3 (i.e. average radar mosaic, maximum radar mosaic, local triangulated bias multi-sensor mosaic).

3rd Quarter FY05

- We have completed the MPE Fieldgen modifications necessary to generate the P3 Local Bias Mosaic. This also includes the generation of two new radar mosaics. These radar mosaics differ in how radar data is chosen for grid bins covered by multiple radar sites. The average radar mosaic takes the average radar value for each grid bin covered by more than one radar. The max radar mosaic takes the maximum radar value for each grid bin covered by more than one radar. These P3 fields are being tested and debugged.
- The polygon management feature design document has been completed and approved by ABRFC. The implementation of these enhancements in Hydroview/MPE is nearly complete.
- The implementation of a split-screen viewing mode in Hydroview/MPE is underway.
- MPE Fieldgen has been completely converted from FORTRAN to C. It is now being tested to ensure that it produces the same output as the FORTRAN version.
- Modifications are being made to MPE Fieldgen to improve its performance. This is being done by caching data which is static in nature.

4th Quarter FY05

- Completed modifications to MPE Fieldgen to make it easier to add new products, including the P3 Local Bias Mosaic.
- Ported MPE Fieldgen from FORTRAN 77 to C. This was done because C offers user-defined data types and stricter compile-time code checking. It also provides a better environment for structured programming and the use of software debugging and metric tools. This opens the door for software portability and better maintenance.
- Discovered and implemented optimizations for MPE Fieldgen code which will enhance its performance.
- Modified Hydroview/MPE to display the P3 Local Bias Radar Mosaic, the Average Radar Mosaic, the Maximum Radar Mosaic, and the P3 Gage Triangles overlay.
- Modified Hydroview/MPE to have a split screen mode to allow the user to compare base and derived fields when editing gage and bias values and drawing edit polygons.
- Improved the Hydroview/MPE polygon edit tools. Edit polygons are now stored in disk files and can be easily retrieved. The user has the ability to selectively delete polygons and toggle on/off polygons. The user has the ability to create polygons for a specific hour and polygons which persist over many hours.
- Changed MPE Fieldgen so that polygon edits to base fields (e.g. radar mosaic, field bias corrected mosaic) are applied before the field is used in the computation of derived fields (e.g. multisensor mosaic).

Problems Encountered/Issues

1st Quarter FY05

- We need to coordinate the detailed requirements of the P3 application with regard to existing MPE functionality, via communications with ABRFC.
- We need to distribute the polygon management feature design document for comments. Design work on the integration can then proceed, with actual development starting shortly thereafter.

2nd Quarter FY05 – None

3rd Quarter FY05

- The testing of the C version of MPE Fieldgen has been slower than expected. We have found it necessary to perform unit testing (testing on a routine by routine basis) especially for computationally intensive MPE products such as those which incorporate the mean field and local biases.

4th Quarter FY05

- Encountered some gage QC problems. Automated checks which are supposed to prevent bad gage values from getting into the mean field bias calculations don't always work. A better way of applying automated QC checks to gage data, especially PC data, are needed. Some of these problems are the result of replacing Siipp with GagePP.

Multisensor Precipitation Estimator Nowcaster

Theme: Flash Flood Services

Management Lead: Richard Fulton (David Kitzmiller through March 2005)

Objective: Increase flash flood warning lead time through short-range prediction of heavy rainfall

Milestones

Task	Due Date	Status
Demonstrate real-time prototype of prediction system	Jun 30 2005	Complete
Present verification statistics for prediction system	Sep 30, 2005	Complete

Accomplishments/Actions

1st Quarter FY05

- Demonstrated ability of nowcaster system to forecast time series of precipitation rate, such as can be used in advanced distributed hydrologic models.

2nd Quarter FY05

- Developed method to correct forecasted rainrate fields for artificial zero values in rainy areas, which arise due to spatially-varying motion vectors.
- Collecting verification statistics on forecast rainfall and rainrate amounts.

3rd Quarter FY05

- MARFC-area real-time 0-1h rainfall and rainrate forecasts and enhanced Multisensor Precipitation Estimator (MPE) fields are available at:
http://www.nws.noaa.gov/ohd/hrl/hag/ffp_marfc/prodesc.htm
- Above web page is password protected
- Products include precipitation analyses, forecasts, and comparisons with real-time flash flood guidance
- Flash flood case studies were conducted to optimize adaptable parameters of forecast algorithm
- Statistics for forecast verification are being collected routinely

4th Quarter FY05

- Prepared conference preprint documenting improvements offered by Nowcaster relative to simple extrapolation and persistence forecasts of rainrate
- Some Nowcaster forecast fields were sent to Hydrology Group (Seann Reed) for input to hydrologic model HL-RMS. Tests indicate the forecasts yield a realistic response in surface runoff in the hydrologic model.

Problems Encountered/Issues

1st Quarter FY05 - None

2nd Quarter FY05 - None

3rd Quarter FY05 - None

4th Quarter FY05 - None

Radar Based Probabilistic QPE

Theme: Flash Flood Services

Management Lead: Richard Fulton (David Kitzmiller through March 2005)

Objective: Improve flash flood detection through application of radar-based probabilistic quantitative precipitation estimation (PQPE) algorithms

Milestones

Task	Due Date	Status
Develop demonstration version of radar PQPE system	Jun 30, 2005	Complete
Demonstrate real-time prototype version of PQPE system	Sep 30, 2005	Complete
Present verification statistics showing advantages of PQPE over deterministic precipitation estimates	Sep 30, 2005	Complete

Accomplishments/Actions

1st Quarter FY05

- Accepted proposal for final phase of development/demonstration project from University of Iowa contractors.

2nd Quarter FY05

- Initiated validation study of U. Iowa work, and derived demonstration probability products: probability of rainfall exceeding 0.1 and 0.5 inch per hour, and 50th and 75th percentile rainfall amounts derived from radar rainfall estimates.

3rd Quarter FY05

- Received and began evaluation of U. Iowa mid-term report, which contains documentation on the statistical properties of 1-hour WSR-88D rainfall estimate errors
- Major findings: 1-hour radar rainfall estimates have a consistent rainrate-dependent bias component, and random errors in the estimates can be modeled as a Gaussian distribution
- Determined that statistical correction of 1-hour rainfall estimates reduces RMS errors relative to rain gauge reports, particularly for radar estimates in excess of 10 mm h⁻¹

4th Quarter FY05

- Enhanced existing real-time offline version of Multisensor Precipitation Estimator (MPE) to calculate probability that one-hour flash flood guidance amount has been exceeded, based on radar-estimated rainfall. Probabilities are shown under:
http://www.nws.noaa.gov/ohd/hrl/hag/ffp_marfc/mxprobo/mxprobo.htm
- Obtained statistics from 2004-2005 warm seasons showing effects of rainrate-dependent bias adjustment in improving RMS error in rainfall estimates.

Problems Encountered/Issues

1st Quarter FY05 - None

2nd Quarter FY05 – None

3rd Quarter FY05 – None

4th Quarter FY05 – None

Dual Polarization Radar Precipitation Estimates

Theme: Flash Flood Services

Management Lead: David Kitzmiller

Objective: Improve flash flood detection through application of dual-polarization radar estimation algorithms

Milestones

Task	Due Date	Status
Evaluate 2004 rainfall estimates from NSSL	Mar 31 2005	Complete
Obtain cool-season 2004-2005 precipitation estimates	Jun 30, 2005	Complete
Obtain and evaluate 2005 warm season estimates	Sep 30, 2005	On track

Accomplishments/Actions

1st Quarter FY05

- Finalized MOU with National Severe Storms Laboratory, for delivery of reports and dual-polarization precipitation estimates and edited reflectivity data.
- Obtained some retrospective data from 2003-2004 from NSSL.

2nd Quarter FY05

- Completed initial validation of 2004 warm-season NSSL dual-polarization rainfall estimates, and found that accuracy of these was superior to coincident operational estimates from nearby WSR-88D unit.
- Archived some winter precipitation estimates from NSSL experimental radar.
- Obtained some rainfall estimates from 2003-2004 period that have been reprocessed by NSSL to correct radar calibration errors.

3rd Quarter FY05

- Initiated monthly teleconferences with NSSL and Radar Operations Center (ROC) personnel on dual-pol verification studies
- Completed collection of 124 hours' dual-pol precipitation estimates during the cool-season (January – March) 2005
- Continuing verification of dual-pol estimates and cross-comparison with coincident WSR-88D (KTLX, Oklahoma City) estimates

4th Quarter FY05

- Later evaluations of 2005 warm season data suggested calibration problems with KOUN dual-polarization unit. NSSL provided reprocessed estimates from May-June 2004 and February, May, and June 2005, incorporating manual corrections to the calibration. Further evaluation still indicates that the current radar and precipitation algorithm are only competitive with operational WSR-88D, not necessarily superior.

Problems Encountered/Issues

1st Quarter FY05 - None

2nd Quarter FY05 – None

3rd Quarter FY05

- Discovered and partially corrected problems with real-time access to NSSL dual-pol precipitation products.

4th Quarter FY05

- While initial results reported in 2nd quarter were promising, later comparisons between KOUN dual-polarization estimates and operational WSR-88D estimates were not. NSSL requested time to reprocess dual-pol data from later in 2004 and 2005, due to apparent problems with radar miscalibration. This has delayed our evaluation of the 2004-2005 cold season data.

Statistical Distributed Model

Theme: Flash Flood Services

Management Lead: Michael Smith

Objective The objective of FY05 work will be to conduct a scientific validation study to evaluate whether the statistical-distributed modeling approach can improve upon the existing Flash Flood Guidance (FFG) approach and, if so, recommend a path for prototype testing and implementation. Work in 2005 will focus on higher resolution analysis and smaller basins than the preliminary work done in 2004 with no AHPS funds.

Milestones

Task	Due Date	Status
1. COMET Flash Flood Training. At no cost to AHPS, this provides and introduction to distributed modeling and its potential operational uses for flash flood modeling. Class members are WFO staff and their feedback may benefit project planning.	Jan. 27, 2005	Complete
2. International Association of Hydrological Sciences (IAHS) meeting presentation. This will provide a forum for peer review from the international scientific community to further validate the basic approach.	April 9, 2005	Complete
3. Data collection	Sept. 30, 2005	Completed for first study area as planned; more data collection will be done in FY06 according to the Project Plan
4. Prototype science code. Code developed for validation will be in the research version of the distributed model (HL-RMS) and thus poised for transfer into the operational version.	Sept. 30, 2005	Codes for validation have been developed. Some revisions will be necessary (see item 5).
5. Report summarizing the results and recommendations from FY05 investigations.	Sept. 30, 2005	A draft report was written during August, 2005. The draft was reviewed by John Schaake and substantial revisions were suggested. Due to a number of factors, it was decided to focus on another aspect of the flash flood work during September, 2005, delaying the completion of this report until 1 st Quarter FY06. The work done in September (begin testing the use of Nowcaster grids to drive the distributed model) was planned for 1 st Quarter FY06 so overall the project is still on schedule (only the order of a few tasks has changed). A HOSIP Project Plan has been developed containing the recommended path for FY06 investigations.
6. Develop the Concept of Operations (CONOPS) document required for passing through HOSIP Gate 2.	Sept. 30, 2005	Complete

Accomplishments/Actions

1st Quarter FY05

- Task 1. Refined training materials.
- Task 2. Submitted abstract.
- Task 3. Most data for initial study basins in ABRFC are in place.
- Task 4. Began development of science code.

2nd Quarter FY05

- Task 1. Presented flash flood hydrology related material at COMET
- Task 2. Prepared a poster for presentation at IAHS. A follow on presentation was also made at OHD on 4/21/2005.
- Task 3. Data for initial study basins gathered and processed.
- Task 4. Methodology and science code ~80% developed. The next major step will be compiling documentation to allow for wider peer review.
- Task 6. NID and SON HOSIP documents submitted to HSMB branch chief.

3rd Quarter FY05

- Task 3. Data collection and QC is approximately 94% complete.
- Task 4. Extensive code for model validation has been developed. This is about 90% complete and initial analysis of results is now proceeding while this is completed. Application of these codes to analyze results is approximately 20% complete and is on schedule to be completed by the end of the project because the application of the codes will be relatively rapid compared with developing the codes.
- Task 5. Rough paper has been developed.
- Task 6. Draft CONOPS developed as part of the FY06 AHPS planning/proposal process. This document will be revised before the end of the project based on final results from the study.

4th Quarter FY05

- Task 4. Science code to perform validation have been developed and include the capability to (1) extract peaks from simulated and observed time series for multiple stations and multiple, split-sample analysis periods, (2) convert flow to frequency and frequency to flow using two methodologies, (3) summarize event peak statistics for multiple events, from multiple basins, and for multiple split-sample analysis periods, (4) perform retrospective forecast scenarios (hindcasts) (this uses continuous simulations for state maintenance but allows different forecasts with scenarios of future precipitation to be issued at selected times) and (5) model different temporal and spatial resolutions for state maintenance compared with the forecasts during hindcasting to emulate FFG procedures.
- Task 5. A comprehensive draft report was completed at the end of August. Necessary revisions have been identified. As explained in the Milestones table, these revisions have been postponed to 1st Quarter FY06, but work slated for 1st Quarter FY06 in the Project Plan has been done in lieu of these revisions during September. Therefore, the project is still on schedule.

Problems Encountered/Issues

1st Quarter FY05 - None

2nd Quarter FY05 – None

3rd Quarter FY05 – None

4th Quarter FY05 – See status explanation on Task 5 above.

National Basin Repository

Theme: Flash Flood Services

Management Lead: Ami Arthur, CIMMS and Ken Howard, NSSL

Objective: To create a National Basin Repository for the FFMP GIS dataset and provide data access through a web interface.

Milestones

Task	Due Date	Status
Establishment of the National Basin Repository computer server hardware and communications infrastructure	May 1,2005	Completed
Implementation of software for web interface to FFMP GIS dataset	July 31, 2005	In Progress – Changed from Q4 to FY06 Q1
Creation of a seamless hydrologically-connected FFMP basin and stream dataset for the United States, including Alaska, Hawaii, Puerto Rico, and Guam.	August 30,2005	In Progress—Changed from Q4 to FY06 Q1
Creation of instructions for users to download data and prepare it for localization in AWIPS.	Sept 30, 2005	Changed from Q4 to FY06 Q1

Accomplishments/Actions

1st Quarter FY05

- Notification of funding availability not received until after first QR. No activities performed during first QR.

2nd Quarter FY05

- Progress has been made toward establishing hardware and communications infrastructure for the repository. The ESRI ArcIMS and Data Delivery Extension software for the web interface have been procured.
- NSSL continues to provide FFMP dataset technical support in the form of basin customization assistance and data delivery to various users.

3rd Quarter FY05

- The ESRI ArcIMS and Data Delivery Extension software have been installed. A few issues with the Data Delivery Extension are being worked out with the help of ESRI Technical Support.
- Creation of a seamless hydrologically-connected basin and stream dataset for the U.S. is underway.
- NSSL continues to provide FFMP dataset technical support. This quarter, varying degrees of assistance were provided to fill 15 requests for additional data and basin customization support.

4th Quarter FY05

- The Data Delivery Extension installation has been completed. Creation of the National Basin Repository website is in progress.
- The national seamless hydrologically-connected basin and stream dataset has been completed with the exception of a few areas where re-delineation was required. Previous errors of significance in these areas are being corrected using the improved elevation data that is now available. This will further improve the accuracy of the small basin boundaries and delineated streams.

Problems Encountered/Issues

1st Quarter FY05 - None

2nd Quarter FY05 - None

3rd Quarter FY05

- Data Delivery Extension configuration issues are still being worked out.

4th Quarter FY05

- Delays in completing the seamless dataset were encountered due to the need for re-delineation in some areas. The re-delineation is critical for ensuring a high-quality dataset.

Prototyping NMQ for FFMP

Theme: Flash Flood Services

Management Lead: Ken Howard and Jian Zhang, NSSL; Steve Smith and Mary Mullusky, NWS

Objective: To test a Cartesian based regional multisensor QPE and QPF as input into FFMP.

Milestones

Task	Due Date	Status
Establishment of computing hardware and communications infrastructure (using CRAFT and NCEP data feeds).	April 1,2005	Complete
The creation and dissemination of 3-D reflectivity products and 2-D severe weather products (HAD, VIL, etc.) as diagnostic fields towards QPE uncertainty evaluation.	May 1,2005	Completed
Creation of multisensor QPE products on a Cartesian grid of 1-kilometer resolution refresh rate of five minutes CONUS.	July1, 2005	In Progress—Changed from Q4 to FY06 Q1
Dissemination of 5 minute QPE and QPF on a Cartesian grid of 1-kilometer resolution updated every five minutes for two CWA (Phoenix and Oklahoma) regions for ingest into FFMP.	August 1, 2005	Changed from Q4 to FY06 Q1
Development and access to web based interface for the real time verification of QPE estimates and associated uncertainties.	September 1, 2005	In Progress from Q4 to FY06 Q1

Accomplishments/Actions

1st Quarter FY05

- Notification of funding availability not received until after first QR. No activities performed during first QR.

2nd Quarter FY05

- The NMQ hardware was procured, delivered and configured for software implementation. Communications feeds from CRAFT network were established with the full complement of level two WSR-88D flowing into the NMQ system. Communication for the receiving of external data sets has been established with NCEP, NCDC and NESDIS.

3rd Quarter FY05

- The NMQ system is producing in 'real time' experimental 3D radar reflectivity grids with CONUS coverage at 1x1 km horizontal resolution for 31 vertical levels using a five-minute refresh cycle. The NMQ system is also producing 2-D severe weather products CONUS at 1x1 km resolution updated every 5 minutes. Severe weather products currently being produced include but are not limited to CREF, POSH, HSR, VIL, VILD, MEHS, and SHI. The NMQ 3D and 2D products are being generated and disseminated using an AWIPS 'version' multivariable NetCDF format in addition to WDSS-II binary and NIDS formats. The NMQ 2D and 3D products are viewable on a developmental NMQ/Q2 webpage - <http://129.15.40.200/~qpeverif/Internal/>. The NMQ 2D and 3D products are being disseminated to and/or accessed by UCAR, NCAR, FSL and two RFCs. During this Quarter, NSSL in collaboration with OHD and OCWWS conducted a next generation QPE (Q2) Science workshop – see www.nssl.noaa.gov/wrd/wish/q2/workshop.shtml.

4th Quarter FY05

- The NMQ system is producing in 'real time' a multisensor QPE product suite with a CONUS coverage of 1x1km horizontal resolution using five minute refresh cycle. The multisensor QPE products are based on the legacy QPESUMS application. The objective of continual running of the QPESUMS legacy is to serve as a baseline in which to quantify improved performance of NSSL/OHD's initial Q2 application product suite currently in research and development. A Q2

'radar only' QPE product has been coded and is currently under testing and evaluation using several cases including Hurricane Isabel. The Q2 'radar only' QPE grids will be generated on a 1x1km CONUS scale with a 5-minute refresh cycle with real time implementation during 1st QR FY06. NSSL will meet with the ABRFC in earlier November to discuss dissemination and evaluation protocol for the Q2 products in addition to the PHX and OKC forecast offices.

- Strategies and requirements for infusion of NMQ/Q2 products into FFMP for testing and evaluation have been defined Tom Filiaggi with the assistance of Ami Arthur. Testing of the infusion methodology will occur during 1st QR FY06.
- Initial designs of Q2 components have been completed and are currently in review internally at NSSL.
- Mary Mullusky and Dave Kitzmiller have drafted an initial Q2 'statement of need' as part of the OSIP process for Q2.

Problems Encountered/Issues

1st Quarter FY05 - None

2nd Quarter FY05 – None

3rd Quarter FY05

- The NMQ product generation and as well as the NMQ webpage display of the NMQ 2D and 3D products are dynamic and should be considered experimental. The NMQ product suite and applications will continue to evolve as enhancements are implemented in addition to code corrections. A second NMQ product suite will be added prior to the end of next quarter to include a non-QC'd version of the 3D and 2D products. The current NMQ products are produce after the level two data under goes reflectivity quality control. The addition of a non-QC'd product suite will allow researchers and operational personal the opportunity to assess QC robustness as well as the identification of 'trouble' areas and situations. The NMQ webpage also includes data ingest status as well as radar diagnostic display; which provides information as to which WSR-88Ds are operating 'hotter' or 'cooler' relative to their neighbors.

4th Quarter FY05

- The NMQ servers to be utilized for creation and dissemination of the full suite NMQ and Q2 products were shipped to NSSL from the manufacture with only one of the four CPUs original specified in addition to incorrect power supply configuration. This resulted in only receiving ¼ of the initial computing capability specified as well as requiring changes in the computer systems room power to accommodate the new servers. While the remaining CPUs have been received (currently being installed and tested) and the correct power installed, full development and implementation of high resolution NMQ and initial Q2 products was delayed by three months.
- Additionally NSSL has begun the process of standardizing the code development and testing using the WDSS-II architecture and system. The NMQ and Q2 code developers are currently undergoing training to utilize the WDSS-II for code development and testing prior to installation on the NMQ system. While the transition to a WDSS-II development environment will improve code efficiency and production of NMQ and Q2 components, it will result in a quarter delay in current MOU deliverables for the dissemination and evaluation of 'experimental' NMQ and Q2 products to the OKC and PHX field offices and interested RFCs.

Hydraulic Modeling and Analysis Tools

Theme: Flash Flood Theme

Management Lead: Dan Urban

Objective: Develop tools to improve dam break flood forecasting

Milestones

Task	Due Date	Status
Quality check geographic info in the dams database	Q4	Completed
Add rule of thumb computation to Dam Break Analysis Tool	Q4	On-hold

Accomplishments/Actions

1st Quarter FY05

- Updated data from the National Inventory of Dams website has been obtained in addition to GIS data with geographic info has been obtained and is being evaluated; started putting project through HOSIP.

2nd Quarter FY05

- Validation of the geographic information is 80% done. Since the project began, the NID has been updated (it gets updated quarterly) and contains approx 2,500 dams that were modified since the previous update. It was decided to freeze the NID data and complete the current quality control activity. When this task is done, the latest NID database will be obtained and any modified dams will be checked.

3rd Quarter FY05

- After the validation was completed to determine which dam information was different, work began on correcting the wrong information.
- Work began on integrating the rule of thumb capability into DamAT. The application developed by David Welch at LMRFC is being used as the prototype.

4th Quarter FY05

- The existing dam database was compared to both the 2004 and 2005 versions of the NID and a process was developed to identify, investigate and verify differences found between the various versions. During this process, we discovered nearly 6,000 new dams, and over 3,000 dams that were "missing". We determined the cause to be that the NID identifiers were reassigned in the 2005 data, and verified this with our contact at the US Army Corps of Engineers (USACE). We agreed to share our work products with USACE, who indicated an interest in our quality control procedures.
- The prototype code for the rules of thumb capability was completed as a stand-alone application, but the code has not yet been integrated with DamAT.

Problems Encountered/Issues

1st Quarter FY05 - None

2nd Quarter FY05 - None

3rd Quarter FY05 - None

4th Quarter FY05

- Because of turnover within the River Mechanics group, and subsequent reassignment of tasks, the rules of thumb integration is now on hold, awaiting reprioritization.

Confidence Factor for QPE Forecasts

Theme: Flash Flood Services

Management Lead: Ed Danaher, HPC Development and Training Branch

Objective: To develop procedures based on the use of short and medium range ensemble predictions, to quantify the measure of uncertainty in the manually produced HPC 6 and 24-hr forecasts

Milestones

Task	Due Date	Status
1. Review short-range and global ensemble QPF forecasts for the period Oct. 2001 to Sept 2003. Compare this to HPC gridded QPF. Determine areas where ensembles provide low, moderate and high confidence in the QPF issued. Categorize by regions and time from model initialization. Calibrate these confidence factors using this data set.	March 2004	Completed
2. Run a one-year test and evaluation of this methodology with several RFCs from diverse geographic and hydrologic areas of the country. This includes verification of the forecasts.	Changed from March 2005 to May 2005	Completed
3. Validate that this process has allowed hydrologist to increase numbers of 6-hr QPFS used in flow forecast and has in fact increased the lead time and POD of flood forecasts.	June 2005	Completed
4. Implement nationally if supported by results from Task 3.	Rescheduled from July 2005 to January 2006	Scheduled for January 2006

Accomplishments/Actions

1st Quarter FY05

- During this quarter we added a third RFC (NCRFC) to assist in the evaluation of these products. NCRFC joins ABRFC and LMRFC in a daily evaluation of the usefulness of these products in the RFC. The evaluation will continue through the winter. HPC has also submitted a revised paper describing this research to the AMS for publication in *Weather and Forecasting*. This experimental output is available at <http://www.hpc.ncep.noaa.gov/qpfci/qpfci.shtml> and is updated twice a day.

2nd Quarter FY05

- The contractor and HPC staff continue to work with NCRFC, ABRFC, and LMRFC to evaluate these products. This testing was extended two months beyond the original March 2005 deadline in order to include the entire winter season and allow NCRFC more time for the evaluation. The contractor is also completing the second revision of the paper submitted to *Weather and Forecasting*.

3rd Quarter FY05

- The RFCs evaluating the product agree that the product is useful and should be implemented operationally and distributed over the SBN. In order to ensure a more timely delivery, the product will not be implemented until January 2006 after changes in the data flow are put in place that will allow earlier calculation and delivery of the product.

4th Quarter FY05

- Development work is complete. No additional ARC funding is necessary. HPC staff has been trained to maintain the software needed to generate the products. Plans are underway to provide a subset of products to AWIPS this winter after the freeze on new products is lifted. A paper describing the Confidence Interval has been accepted by the AMS for publication in *Weather and Forecasting*.

Problems Encountered/Issues

1st Quarter FY05 - None

2nd Quarter FY05 – None

3rd Quarter FY05 – None

4th Quarter FY05 - None

Site Specific, Add VAR and SAC Calibration Tools

Theme: Flash Flood Services

Management Lead: Jon Roe

Objective: To add variational assimilation (VAR) capabilities to the Site-Specific Hydrologic Predictor (SSHP) application within the WHFS. To enhance calibration tools to support the VAR implementation in the SSHP.

Milestones

Task	Due Date	Status
Write HOSIP Stage 1 documents.	Q3	In Progress (Suspended)
Pass HOSIP Gate 1.	Q3	Suspended
Determine the relevant operational details with regard to state maintenance when using VAR (i.e., WFO vs RFC responsibilities).	Q2	Complete (Determined that software development is premature)
Clarify SAC calibration tools to add and/or enhance. Likely enhancement is the inclusion of AB_OPT in some baselined software.	Q3	In Progress (Suspended, see detail below)
Write HOSIP Stage 2 documents.	N/A	Suspended
Pass HOSIP Gate 2.	N/A	Suspended
Conduct Research & Analysis and write HOSIP Stage 3 documents.	N/A	Suspended
Pass HOSIP Gate 3.	N/A	Suspended
Conduct Operational Development and write HOSIP Stage 4 documents for VAR implementation and calibration tools.	N/A	Suspended
Pass HOSIP Gate 4.	N/A	Suspended
Deliver new SSHP functionality to AWIPS.	N/A	Suspended

Accomplishments/Actions

1st Quarter FY05

- Discussed scope of proposed project with OCWWS. More discussions are needed.
- Discussed with management the HOSIP procedures needed to move forward with the project.

2nd Quarter FY05

- Made HOSIP sponsorship requests and explained meaning of sponsorship to field sites.
- Began HOSIP Stage I documentation.
- Held discussions on possible implementation and operational details for putting VAR in SSHP. Decided on a general approach.

3rd Quarter FY05

- At the beginning of Q3 (in April) it was determined that SSHP software development for both of these topics (VAR and calibration) was premature at this time and direct work on this project was suspended.
- FY05 AHPS budget for this project was re-allocated in Q3 away from this project and toward more science work necessary before direct improvements can be made on the Site-Specific model.

- In light of the retooling of the these FY05 AHPS tasks, "Calibration Tool for Site-Specific" and "VAR for Site-Specific.", Mike Smith and DJ Seo had a conference call with Bob Corby and Tracy Howieson of WGRFC to adjust the scope of the VAR VV&E HOSIP project. The VAR VV&E HOSIP project is a part of the FY05 AHPS task "(Deterministic) Data Assimilation". The disposition of the two (formerly) Site-Specific tasks is as follows:
 - The "Calibration Tool for Site-Specific" task is now directed by Mike Smith in collaboration with WGRFC under its sponsorship of VAR VV&E toward ultimately developing a suitable enhancement for the Interactive Calibration Program. Mike Smith, the Research & Development lead for Site-Specific, is to report on the task.
 - The "VAR for Site-Specific" task is now carried out by the Hydrology Laboratory's Hydrologic Ensemble Prediction (HEP) special team as a part of the VAR VV&E HOSIP project. Mike Smith, the Research & Development lead for Site-Specific, is to report on the task with DJ Seo, the VAR VV&E lead, providing input.

4th Quarter FY05 - N/A

Problems Encountered/Issues

1st Quarter FY05

- Need further clarification on the calibration tools from OCWWS/HSD and the field offices.

2nd Quarter FY05

- Field knowledge of HOSIP process would be useful since we have field staff participating as sponsors.
- Need decisions on exactly with which HOSIP project the AB_OPT functionality piece should belong. It is a larger topic than just for SSHP.
- Need involvement of OCWWS/HSD to help refine the requirements.

3rd Quarter FY05

- Determination was made that this "software development" project was premature.
- Work was suspended and budget was re-allocated to more appropriate science tasks.
- There will be no more reports on this project.

4th Quarter FY05 - N/A

Short- to Long-Term Forecasts

Deterministic Verification

Theme: Short- to Long-Term Forecasts

Management Lead: Jon Roe

Objective: Deliver a state-of-the-art deterministic verification system. We will be working on three functions in this project: developing displays, generating automated (or No Mod) forecasts, and creating confidence intervals. All functions will be pushed through the HOSIP process as a single project.

Milestones

Task	Due Date	Status
Write HOSIP Stage 1 documents.	Q2	Complete
Pass HOSIP Gate 1.	Q2	Complete
Conduct Validation and write HOSIP Stage 2 documents.	Q4	Complete
Pass HOSIP Gate 2.	Q4	Complete
Conduct Research & Analysis and write HOSIP Stage 3 documents.	Q1, FY06	Not Started
Pass HOSIP Gate 3.	Q1, FY06	Not Started
Conduct Operational Development and write HOSIP Stage 4 documents.	Q2, FY06	Not Started (Date moved to Q2, FY06)
Pass HOSIP Gate 4.	Q2, FY06	Not Started (Date moved to Q2, FY06)
Deliver new functions to AWIPS (target Release OB7).	Q3, FY06	Not Started

Accomplishments/Actions

1st Quarter FY05

- We completed project identification, budgeting, and planning.

2nd Quarter FY05

- We completed HOSIP Stage 1. We are working with ABRFC and MARFC to specify the requirements for a "Raw Model Run." Thanks to both of them.

3rd Quarter FY05

- We are working on HOSIP Stage 2. We have expanded the RFCs who are participating in the derivation of requirements for a "Raw Model Run" to include NWRFC and NCRFC in addition to ABRFC and MARFC. Requirements are being derived for verification displays with the help of ABRFC, CBRFC, NERFC, and NWRFC. Basic requirements derivation and HOSIP Gate 2 will be completed in 4th Quarter FY05. Thanks to all RFCs for participating in this project.

4th Quarter FY05

- We have completed HOSIP Stage 2. We have split off the "Raw Model Run" project from the verification displays project and pushed back the requirements phase of the raw model project to FY06. We have also begun investigations into programming choices for displaying verification graphics and have created a few model displays for the GUI we are to produce, which should help in further requirements derivation and software design in HOSIP Stages 3 and 4, which will commence in 1st Quarter FY06.

Problems Encountered/Issues

1st Quarter FY05 - None

2nd Quarter FY05

- From our initial investigation of the requirements, it is very clear that the work estimates for the tasks to complete the deterministic verification system were gross underestimates. They were underestimates in terms of the time to complete the tasks listed in the initial set of requirements and in terms of determining which requirements have to be met. For example, the "Raw Model Run" is proving to be trickier than initially expected and the verification software will need to be updated to evaluate variables other than stage and support sorting by additional fields, like issuance times.
- Another complicating issue is that during Q2 it was determined that the entire RFC Archive Server database and software suite will have to be converted to run with a PostgreSQL RDBMS in place of today's Informix RDBMS because Informix will not run with the latest AWIPS operating system, Linux RHEL 3u4. The newly identified conversion project will require conversion work to be done on the RFC Verification software in addition to this work and must be done for AWIPS OB7. This complication will most likely affect the milestone calendar for this Deterministic Verification project.

3rd Quarter FY05

- From on going investigations of the requirements, it is clear that deriving the requirements for the "Raw Model Run" will take more time than originally thought, as each RFC seems to use different techniques when generating forecasts, causing some confusion over which forecaster mods are actually allowable in a "Raw Model Run" and which are not. This has forced the completion of the Gate 2 documents to be delayed to the 4th Quarter of FY05.
- The effect of the PostgreSQL conversion of the verification software has yet to be determined, since conversion has not yet commenced.

4th Quarter FY05

- We discovered that the requirements derivation for the "Raw Model Run" is too complicated to complete in FY05 and should be treated a separate project from the verification displays portion of this project. The requirements phase for the raw model has been delayed until FY06.
- The PostgreSQL conversion of the verification software is complete and had minimal effect on the completion of this project.

Ensemble Research

Theme: Short- to Long-Term Forecasts

Management Lead: Pedro Restrepo

Objective: Support RFC ensemble activities and improve short-term ensemble prediction capabilities

Milestones

Task	Due Date	Status
Develop Ensemble Hindcaster, integrate verification tools	Q2	Complete
Develop, integrate, test and verify ENS_PRE_GFS (ensemble pre-processor for GFS reforecast and obs)	Q3	In progress
Develop, integrate, test and verify ENS_GFS_RFC (ensemble pre-processor for GFS and RFC forecasts)	Q3	In progress
Integration-test, -verify, -validate and -benchmark the prototype short-term ensemble application	Q4	Complete
Document	Q4	Complete

Accomplishments/Actions

1st Quarter FY05

- Delivered an enhanced prototype ensemble pre-processor to AB-,CN- and MARFC
- Completed a paper "Precipitation and temperature short-term ensemble forecasts from existing operational single-value forecasts" by Schaake et al. for submission to Journal of Hydrometeorology

2nd Quarter FY05

- Initial versions of the two primary components of the Ensemble Hindcaster, the ensemble preprocessor (for generation of precipitation and temperature ensembles) and the ensemble streamflow processor (for generation of streamflow ensembles) have been developed.
- Two verification tools, EnsVerify and JProbVS, have been evaluated and tested for interface with the Hindercaster.
- Developed 3 HOSIP projects for this task and submitted them to Gate 1.

3rd Quarter FY05

- The two components, ENS_PRE_GFS and ENS_GFS_RFC, have been merged into a single GFS Subsystem. The parameter estimation and ensemble generation components for precipitation of the GFS Subsystem have been developed and integrated into the Ensemble Preprocessor II. Testing and verification are in progress.

4th Quarter FY05

- Integrated, tested and evaluated the prototype Ensemble Pre-Processor II (EPP2), the prototype GFS Subsystem, the prototype Ensemble Hindcaster and the prototype Ensemble Verification System (EVS).

Problems Encountered/Issues

1st Quarter FY05 – None

2nd Quarter FY05

- Some inconsistencies and lack of conditioning/thresholding options were identified in the two verification tools in calculating certain performance measures. Additional evaluation and/or enhancement is likely to be necessary to resolve them.
- The AHPS contract for development of the GFS components has not been finalized. It is expected that minor adjustments to the milestones may be necessary that reflect the deliverables.

3rd Quarter FY05

- The AHPS contract for development of the GFS Subsystem has been finalized after significant delays. It is expected that some adjustments to the deliverable may be necessary.

4th Quarter FY05 - None

Deterministic Data Assimilation

Theme: Short- to Long-Term Forecasts

Management Lead: Pedro Restrepo

Objective: Complete development, testing and evaluation of the prototype variational assimilator (VAR) for headwater 1-hr SAC-UH, and develop a prototype Data Assimilator (DA) for DHMS

Milestones

Task	Due Date	Status
Address VAR Version 1 issues, produce Version 2	Q2	Complete
Develop prototype Data Assimilator (DA) for DHMS	Q3	In progress
Test and evaluate DA	Q3	In progress
Verify, validate and benchmark the prototypes	Q4	Completed
Document	Q4	Completed

Accomplishments/Actions

1st Quarter FY05

- Continued monitoring of VAR V1 for real time evaluation and data collection for verification
- Started Development of a particle filter-based DA for proof of concept and demonstration

2nd Quarter FY05

- Investigated the Version 2 issues in assimilating very low to no flows. Developed Version 3 that improves the low-flow performance. Installed at WGRFC.
- Developed a prototype Unscented Kalman Filter (UKF)-based data assimilator (DA) for lumped SAC-UH, as a precursor to a UKF-DA for distributed model.
- Developed and submitted two HOSIP projects that support this task.

3rd Quarter FY05

- Tested the UKF-based DA for lumped SAC-UH.
- Carried out extensive sensitivity analysis to understand and to verify the performance and behavior of UKF.
- Investigated the frozen ground version of SAC for a possible early integration into the prototype DA version of the HL-Research Modeling System (RMS).

4th Quarter FY05

- Completed development, testing and evaluation of the prototype VAR for headwater 1-hr SAC-UH and the supporting prototype application for parameter estimation and calibration, the Adjoint-Based OPTimizer (AB_OPT). Submitted the algorithm description and science documents to HOSIP Gate 3.
- Made adjustments to the DA tasks to adjust for the loss of personnel (see 3rd Quarter FY05 Problems Encountered/Issues below): 1) the additional investigation with the prototype DA for lumped SAC-UH has been dropped, and 2) the prototype DA Version 1 is based on the original SAC, rather than the frozen ground version.
- Developed and tested a prototype DA for SAC and kinematic-wave hillslope and channel routing components of RMS.

Problems Encountered/Issues

1st Quarter FY05 – None

2nd Quarter FY05

- Additional science issues were identified while investigating the VAR Version 2 issues in assimilating very low or no flows. They are related to model structural and parametric uncertainties and uncertainties in rating curves and observations. As their impact is limited only to very low flow situations, no further actions are being taken.

3rd Quarter FY05

- Initial evaluation of the UKF-based DA for lumped SAC-UH suggests that iterative filtering may be necessary to achieve performance comparable to VAR (this is because, in general, KF is only suboptimal for nonlinear systems). If this holds true, further development on the lumped system may be necessary to ensure satisfactory performance on the distributed system. While this will not compromise the expected outcome at the end of the two-year project, the extent of prototyping of UKF-based DA for RMS may have to be reduced to allow time for additional development on the lumped system in FY05.
- The appointment of Vadim Kuzmin, the UCAR scientist who has been working on this project, will end as of Aug 1, 2005. DJ Seo, who has been collaborating with Vadim Kuzmin, will carry out the project for the remainder of FY05. It is expected that, while the overall scope and expected outcome of the two-year project will not change, rebalancing of some FY05 and FY06 tasks may be necessary.

4th Quarter FY05 - None

Distributed Modeling - Snow Model Research

Theme: Short- to-Long Term Forecasts

Management Lead: Mike Smith

Objective: The objective of FY05 work will be to conduct scientific evaluations of new data for energy budget snow modeling. This project will overlap with the data preparation for DMIP 2.

Milestones

Task	Due Date	Status
1. Project start up; familiarization with ICP; verify Linux version of energy budget snow model; meet with Dr. R. Pinker of U. Md.	11/1/2004	Complete
2. Select Study basin	12/1/2004	Complete
3. Identify data sources	9/30/2005	Ongoing as new sources emerge
4. Obtain and pre-process data to desired spatial/temporal scale	3/31/2005	Complete
5. Process data for quality control	6/31/2005	Complete
6. Run Snow-17 and energy budget models	12/31/2005	Date moved from 7/31/05
7. Analyze results	12/31/2005	Date moved from 8/31/05
8. Document with recommendations on potential utilization of new meteorological data for driving the energy-based snow and frozen ground model operationally.	1/31/2006	Date moved from 9/30/05

Accomplishments/Actions

1st Quarter FY05

- Ms. Sun met with Dr. Rachel Pinker of U. of Md. to discuss her GOES satellite data.
- A bug in the Linux version of the energy budget model was identified and fixed.
- Analysis will be for the Carson River in California/Nevada. This is one of the DMIP 2 test basins.

2nd Quarter FY05

- Task 4. Much solar radiation data and temperature data were located and downloaded.

3rd Quarter FY05

- New employee is getting up to speed with previous work.

4th Quarter FY05

- Fan Lei running energy budget model at selected points in Carson River basins. This will also contribute to DMIP 2. Began setting up NWSRFS/ICP to run Snow-17 at same sites.

Problems Encountered/Issues

1st Quarter FY05 - None

2nd Quarter FY05

- Contractor resigned Feb. 17. Slow process finding replacement

3rd Quarter FY05

- New contractor started in late May. Work is progressing.

4th Quarter FY05

- Fan Lei, new contract employee, rapidly coming up to speed on operation of NWSRFC/ICP to run Snow-17 at the selected sites.

Distributed Model - SAC-SMA Parameters

Theme: Short- to Long-Term Forecasts

Management Lead: Mike Smith

Objective: The objective of FY05 work will be to conduct research on usage of SSURGO data and verify whether the use of the data can improve current SAC-SMA parameter estimation and further our distributed modeling. Download data for various projects. Procedures will be developed to store and process the massive data sets.

Milestones

Task	Due Date	Status
1. Obtain high resolution SSURGO and Land Use Land Cover data for DMIP1 basins	Jan. 31, 2005	completed
2. Derive new a priori SAC-SMA parameters using high resolution data for some research basins	March 31, 2005	Completed
3. Review, understand theory of a priori parameter estimation procedure	April 30, 2005	completed
4. Streamline parameter updating (add newly derived data in current grid data sets)	Sept. 30, 2005	completed
5. Test new parameters against those derived from STATSGO (both for lumped and distributed)	Sept. 30, 2005	completed
6. Modify, extend theory of SAC-SMA parameter estimation (e.g. use of CN number explicitly)	Sept. 30, 2005	completed

Accomplishments/Actions

1st Quarter FY05

- Task 1: Most of GIS data for DMIP1 basins are downloaded
- Task 2: Began processing of GIS data to generate SSURGO-based SAC-SMA parameters for IAHS conference

2nd Quarter FY05

- Tasks 2 & 3 have been completed. Fine scale parameters have been derived for some basins in Oklahoma.

3rd Quarter FY05

- Ziya Zhang, Seann Reed, and Victor Koren ran 2km x 2km scale distributed modeling tests with new parameters. Results show improvement over STATSGO based parameters.

4th Quarter FY05

- New version of soil-based SAC-SMA parameters was developed that uses a high resolution CN grid in addition to soil texture. Testing of this new procedure will commence.

Problems Encountered/Issues

1st Quarter FY05 - None

2nd Quarter FY05 - None

3rd Quarter FY05 - None

4th Quarter FY05 - none

Distributed Model - Probabilistic Channel Routing Parameters

Theme: Short- to Long-Term Forecasts

Management Lead: Mike Smith

Objective: The activity will help to improve definition of channel properties in distributed modeling, and evaluate its effect on high river flow simulations

Milestones

Task	Due Date	Status
1. Finalize implementation of a new version of kinematic channel routing that uses flood plain definition	Feb. 31, 2005	complete
2. Generate probabilistic parameter grids for the DMIP1 basins	March 31, 2005	complete
3. Test the new channel routing version and compare with an original power law parameter version	Sept. 30, 2005	Complete early

Accomplishments/Actions

1st Quarter FY05

- Task 1: Simplified version was developed and tested for the Blue basin

2nd Quarter FY05

- Task 1. Victor has developed this.
- Task 2. Parameter grids were delivered from contractor on schedule.
- Task 3. Preliminary testing has been completed. OHD implemented a new version of kinematic routing that used flood plain definition based on the new parameters and procedures. Testing shows that the probabilistic method can improve simulations beyond the one-power-law representation of a channel. Results of tests for DMIP-1 basins were presented at an OHD seminar.

3rd Quarter FY05

- No activity this period

4th Quarter FY05

- No activity

Problems Encountered/Issues

1st Quarter FY05 - None

2nd Quarter FY05 - None

3rd Quarter FY05

- Contract with U. Minnesota not extended, so parameter grids were not generated to test method in other geographic areas. For future work, methodology needs to be streamlined...it is very computationally complex.

4th Quarter FY05 - None

Distributed Model - Evaluate New Parameter Approaches

Theme: Short- to Long Term Forecasts

Management Lead: Mike Smith

Objective: The objective will be to evaluate a parameter regionalization approach using lumped calibrated parameters. Value of soil moisture data for evaluation and calibration of a priori parameters will be also analyzed.

Milestones

Task	Due Date	Status
1. Derive relationships between lumped calibrated SNOW-17 parameters and watershed properties	Mar. 31, 2005	On schedule
2. Generate SNOW-17 parameter grids over Susquehanna River basin	Apr. 30, 2005	On schedule
3. Evaluate and calibrate derived SNOW-17 parameter grids using snow observations and streamflow	Dec. 30, 2005	On schedule
4. Evaluate a priori SAC-SMA parameters over Oklahoma mesonet using runoff and soil moisture data at different spatial scales	Sep. 30, 2005	Completed April 2005
5. Test possibility of using soil moisture data to calibrate a priori SAC-SMA parameters	Sep. 30, 2005	completed

Accomplishments/Actions

1st Quarter FY05

- Task 1: Similar analysis was performed for Cont-API model
- Task 4: Runoff and soil moisture data for the Oklahoma mesonet region are collected.

2nd Quarter FY05

- Task 1. Basic relationships developed.
- Task 2, 3. Completed. Fekadu Moreda and Zhengtao Cui delivered distributed model and all parameter grids to MARFC. Fekadu presented paper on this work at the conference of the International Association of Hydrologic Science (IAHS) in Brazil in April.
- Task 4. Ziya Zhang has acquired and processed fine scale soils data for the Oklahoma areas. Victor completed this task and presented work at the conference of the International Association of Hydrologic Science (IAHS) in Brazil in April.

3rd Quarter FY05

- Victor and Fekadu tested the distributed model for a multiyear period over the OK. Mesonet domain to evaluate against soil moisture estimates from the NLDAS project run by NCEP.

4th Quarter FY05

- Victor extended the analysis of Oklahoma Mesonet simulation results. Developed climate adjustment factor to modify the existing a-priori parameters. A grid of these adjustment factors was developed for CONUS. Testing with OK Mesonet soil moisture justifies again the physics of the modified SAC-SMA model. Hypothesis is that the climate index can improve a-priori parameter identification and thus simplify the calibration of distributed and other models.

Problems Encountered/Issues

1st Quarter FY05 - None

2nd Quarter FY05 – None

3rd Quarter FY05 – None

4th Quarter FY05 - None

Short-Term Ensemble Software

Theme: Short- to Long-Term Forecasts

Management Lead: Jon Roe

Objective: To begin developing the infrastructure needed to modernize the RFC ensemble computational architecture.

Milestones

Task	Due Date	Status
Write HOSIP Stage 1 documents.	Q2	Documents Require Revision
Pass HOSIP Gate 1.	Q1 FY06	Documents Require Revision (Date changed from Q4 to Q1 FY06)
Write Statement Of Objectives (SOO) for contractor tasking.	Q3	Complete
Review Statement Of Work (SOW) from contractor.	Q4	Complete
Contractor conducts Validation and writes HOSIP Stage 2 documents.	Q2 FY06	Not Started (Date changed from Q4 to Q2 FY06)
Pass HOSIP Gate 2.	Q2 FY06	Not Started (Date changed from Q4 to Q2 FY06)
Contractor conducts Research & Analysis and writes HOSIP Stage 3 documents.	TBD	Not Started (Date changed from Q4 to TBD)
Pass HOSIP Gate 3.	TBD	Not Started (Date changed from Q4 to TBD)
Contractor conducts Operational Development and writes HOSIP Stage 4 documents.	TBD	Not Started (Date changed from Q4 to TBD)
Conduct tests with RFS ensemble programs.	TBD	Not Started (Date changed from Q1 FY06 to TBD)
Pass HOSIP Gate 4.	TBD	Not Started

Accomplishments/Actions

1st Quarter FY05

- We completed project identification, budgeting, and planning.

2nd Quarter FY05

- The HOSIP Stage 1 documents have been written, but they require revision.

3rd Quarter FY05

- SOO was completed and forwarded to Contracts for final processing.

4th Quarter FY05

- Contractor's SOW accepted in August
- Task was awarded late in Q4

Problems Encountered/Issues

1st Quarter FY05 - None

2nd Quarter FY05

- One of our key contractors found a new (and better) job. This has delayed us while we look for a replacement. We expect to find a replacement by the end of April and then we will be able to move forwards with this task again.

3rd Quarter FY05

- Our new contractor started June 6 but requires little spin-up time since he was intimately involved with development of Apex's Proof Of Concept (POC) for a services oriented architecture.
- Edwin Welles's departure from OHD has delayed completion of the contract task order. To mitigate risk of further delays to this project, the SOO requires the contractor (not OHD) to deliver all HOSIP documentation and successfully steer the project through HOSIP Gates 2-4 by the end of FY06.
- No progress on rewriting the HOSIP Gate 1 documents; now expected during Q4.

4th Quarter FY05

- Contracts delay means Task was awarded late in Q4.
- Staff shortages resulted in no progress being made on rewriting HOSIP Gate 1 documents; delayed until Q1 FY06.
- Contractor's SOW shows HOSIP Gate 2 scheduled for 3 months after start of task – due dates above have been adjusted to reflect.
- Work for HOSIP Stages 3 and 4 requires that a new SOO be written. Due dates above have been set to TBD, subject to Contractor's schedule in response to the new SOO.

Distributed Hydrologic Model Software

Theme: Short- to Long-Term Forecasts

Management Lead: Jon Roe

Objective: Incrementally develop and nationally deliver components of distributed hydrologic modeling software within the evolving CHPS architecture.

Milestones

Task	Due Date	Status
Expose this project to the larger NWS OSI Process in order to eventually make use of existing AWIPS capabilities for grid display and manipulation.	Q1	Complete
Adjust HOSIP Stage 1 documents and submit to OSIP.	Q1	Complete
Pass OSIP Gate 1.	Q2	Complete
Identification of first increment high-priority requirements, including requirements related to model computations, data display and manipulation, and operational considerations.	Q2	Complete
Adjust HOSIP Stage 2 documents and submit to OSIP.	Q2	Complete
Perform due diligence of a selection of existing hydrologic modeling systems used to process, display and manipulate grid-based data.	Q2	Complete
Pass OSIP Gate 2.	Q2	Complete
Pass HOSIP Gate 2	Q3	Complete
Adjust HOSIP Stage 3 documents and submit to OSIP.	Q4	Complete
Pass OSIP Gate 3.	Q1, FY06	Upcoming
Perform architectural design development for first increment, including database, computational, display, calibration and operational considerations.	Q1, FY06	In progress
Develop first increment prototype architecture.	Q1, FY06	In progress
Evaluate architectural design and make updates to architectural scheme and implementation.	Q1, FY06	In progress
Perform HOSIP Stage 4 development for first increment targeted for AWIPS Release OB7.	Q1 – Q2, FY06	In progress
Pass HOSIP Gate 4 for first increment.	Q2, FY06	Not Started
Iterate back for the next increment of operational development against the Gate 3 requirements.	TBD	Not Started

Accomplishments/Actions

1st Quarter FY05

- WGRFC, ABRFC, and OHD agreed on a subset of high-priority functional requirements for the first increment of software development.

2nd Quarter FY05

- We have reviewed several existing distributed modeling systems: the USGS/USDA Object Modeling System (OMS), the NASA Land Information System, the Danish Hydraulic Institute MIKE 11 model, and the NOHRSC SNODAS modeling system. We will be working through simple experiments with the OMS and the NOHRSC system to further our understanding and to select one as the platform for our distributed modeling development.

- We have initiated an OSIP project to look at the existing AWIPS grid editing and display tools to determine if we can take advantage of them for our grids. Using existing tools will speed our development considerably.

3rd Quarter FY05

- We collaborated with NOHRSC in the development of a prototype distributed Sacramento model with the goal of better understanding the pluses and minuses of using the NOHRSC framework at the RFCs.
- We worked with SEC and FSL to determine the feasibility and level of effort required to update D2D and/or GFE to meet DHM's grid and spatial data display related requirements.

4th Quarter FY05

- We completed the analysis of a prototype DHM architecture using NOHRSC's GISRS modeling environment. Due to AWIPS constraints and differences in how NOHRSC does modeling and how DHM would be used at RFCs, we have decided to not pursue using GISRS for DHM at the RFCs.
- We started in-house development of DHM for AWIPS OB7.
- We completed, sent for review, and updated the OSIP documents to enter OSIP Gate 3 Based on the review of the documents by OCWWS, ABRFC, WGRFC, OHD, and SEC, all indications are we will get approval to commence OSIP Stage 4 in early October 2005. In fact, the OSIP Gate 3 was passed on 11 October 2005.

Problems Encountered/Issues

1st Quarter FY05

- Because some of the identified operational functional requirements are closely related to issues being addressed through software development in other parts of the NWS (e.g., developing software to display and manipulate grids), the project was promoted into the NWS's, Operational Service Improvement Process (OSIP) during the first quarter. This required adjustments to already existing HOSIP documentation which was performed in the first quarter and continues into the second quarter.
- Since this AHPS project was lightly funded for FY05, progress will be slower than seen in FY04. OHD is adding some AWIPS funding support to keep the project moving. The weak funding profile could cause milestones above to slip over time.

2nd Quarter FY05

- One of our contractors found a new (and better) job, so we have been delayed in completing our review of the modeling systems. We expect to have found a replacement by the end of April.

3rd Quarter FY05

- A more thorough review of the ARS/USGS object modeling system (OMS) led us to classify it as not mature enough for operational distributed hydrologic modeling. We will reassess it in the future.

4th Quarter FY05

- After determining NOHRSC's modeling environment (GISRS) is not useful for our purposes, we have started DHM development using the remaining alternative, which is to internally develop DHM architecture/software. We plan to use the existing research prototype and focus our efforts for AWIPS OB7 on integrating it into NWSRFS using a Java-based control structure. As documented in the OSIP documents, choosing this approach may result in reducing the number of DHM features implemented in AWIPS OB7.
- A principal OHD representative in formulating the CHPS architecture is helping to lead DHM development. Our approach for integrating DHM into NWSRFS will take advantage of the ideas being considered in the CHPS project.

Graphical Dissemination of Hydrologic Information

Flood Inundation Map Development

Theme: Graphical Dissemination of Hydrologic Information

Management Lead: Dan Urban

Objective: Develop the capability to generate and display flood inundation maps

Milestones

Task	Due Date	Status
Evaluate PA flood maps	Q4	Completed
Merge OHD and NOS flood inundation maps	Q1 FY06	On Schedule
Integrate SHRT into the AWIPS (HOSIP Gate 3)	Q4	Completed

Accomplishments/Actions

1st Quarter FY05

- Evaluate PA Flood Maps: High water marks for a few areas in the Susquehanna River System and orthophoto image data for the state of PA during Hurricane Ivan were obtained; preliminary flood forecast maps were generated for the Hurricane Ivan event; and a preliminary comparison was made for the Harrisburg area; started developing HOSIP documents (NID) for FLDVIEW.
- Merge OHD & NOS Flood Inundation Maps: The NWS flood forecast map generated with FLDWAV is being compared to the NOS grid; preliminary results show that the water level data is essentially the same except near the mouth of the river which may be due to the use of different bathymetric data; currently investigating further; started developing HOSIP documents for the integrated flood map project.
- Integrate SHRT into AWIPS: Started developing HOSIP documents for SHRT (the development of the prototype was completed in FY04).

2nd Quarter FY05

- Evaluate PA Flood Maps: Flood maps for Harrisburg, Lewistown, and several locations along the West Branch of the Susquehanna River were generated using the highest quality data available for each area. Instantaneous maps were generated to match the data of the orthophoto flood maps; and the peak flood map was generated for the West Branch where high water marks were available. The generated maps matched the observed data rather well. In the Harrisburg area, it was noticed that two creeks which had not been modeled dynamically had problems and the FLDWAV model will be updated to add them as dynamic tributaries to improve the accuracy of the flood map. FLDVIEW was also enhanced to improve mapping around islands and under normal flow conditions.
- Merge OHD & NOS Flood Inundation Maps: Nothing was done with the flood maps this quarter – efforts went toward the operational implementation of FLDWAV for the St. Johns River System. The system was recalibrated using FLDWAV and operational local flow data, and the operational FLDWAV segment was built.
- Integrate SHRT into AWIPS: Preliminary HOSIP documents for Stage 1 and Stage 2 were developed and are being reviewed. A presentation describing the science behind SHRT was developed.

3rd Quarter FY05

- Evaluate PA Flood Maps: Flood maps for all of the areas have been generated using vector, 10 m DEM and 30 m DEM for all of the Susquehanna areas. This project was put on hold as noted in the Issues section.
- Merge OHD & NOS Flood Inundation Maps: A procedure to automate the generation of the NWS flood map was developed and the coding is nearly complete. OHD started working with

- SERFC on preparing them to generate the flood maps routinely at SERFC.
- Integrate SHRT into AWIPS: Work began on the development of the Concept of Operations document and the Program plan.

4th Quarter FY05

- Evaluate PA Flood Maps: A report titled "Harrisburg Map Analysis for Hurricane Ivan" was prepared based on an analysis of both observed and calibrated forecast for the weather event.
- Merge OHD & NOS Flood Inundation Maps: A procedure to automate the merging of NOS bathymetry data with the NWS water surface is approximately 90 % complete. Progress was demonstrated to both the Hydrology Laboratory and personnel at SERFC. The FLDVIEW software to build the inundation map has been installed at SERFC.
- Integrate SHRT into AWIPS: The Concept of Operations document, the Program plan, and the Algorithm Description document were completed and submitted to the HOSIP process..

Problems Encountered/Issues

1st Quarter FY05

- All maps will be validated but due to reduced funding the due date is moved to Q4

2nd Quarter FY05 - None

3rd Quarter FY05

- With the loss of Susquehanna funding for the flood map validation project, the deadline for this project will be delayed until FY06-Q1. We will complete the analysis, but the report will be written in Q1.

4th Quarter FY05

- In spite of the loss of Susquehanna funding for the flood map validation project, the deadline was upheld and the report completed on time.

Flood Map Evaluation and E-19 Map Development

Theme: Graphical Dissemination of Hydrologic Information

Management Lead: Doug Marcy, CSC

Objective: Provide new graphic tools for river and flood forecast operations; and deliver new GIS-based display of water resources information to better meet customer needs.

To produce and disseminate hydrologic and forecast information such as E-19's and inundation maps in a format that would help customers and managers to visualize the impact of water levels. This will aid the decision makers regarding actions to be taken to protect people and property.

Milestones

Task / Deliverables	Due Date	Status
<p>Evaluate Tar Flood Maps</p> <ul style="list-style-type: none"> Provide report documenting the evaluation of the accuracy of the forecast maps for the Tar River Basin and modeling and mapping methods and lessons learned. 	Q3	Complete: Final document was provided to SERFC and lessons learned executive summary was provided to SERFC and OHD and presented at the Hydrologic Program Managers Conference in December.
<p>Develop method to generated flood maps from E19 info</p> <ul style="list-style-type: none"> Provide report documenting the methodologies developed for E-19 mapping at selected forecast sites. This report will also include E-19 maps for the selected areas Provide GIS data layers from E-19 mapping effort to CRH for use in the ArcIMS mapping project. 	Q4 FY05 To Q2 FY06	<p>Changed from Q4 FY05 to Q3 FY06:</p> <ul style="list-style-type: none"> How to Workshop on E-19 development and usage given at HPMC conference completed in Q1 FY05. Contracting (using FY05 funds) creation of pilot maps at NC forecast points and development of methodologies and standards document in Q2 FY06. FEMA pilot in Johnson County, KS products will be given to CRH for ArcIMS prototype in Q3 FY06. FEMA awarded funds to Phelps Engineering in August of FY05. Mapping will be completed by beginning of Q3 FY06.
<p>Flood mapping implementation documentation</p> <ul style="list-style-type: none"> Develop materials to assist field offices in utilizing the flood mapping prototype software. Package to include information outlining sources of data, system requirements, software documentation and training materials for personnel to produce flood inundation maps for a new location. 	Q4	<p>Complete</p> <p>Presentations for flood forecast mapping and e-19 development and usage already compiled and available through 2nd HPMC website.</p> <p>Inland flood information now available to field offices through HURREVAC inland flood module, including hundreds of inundation maps at certain forecast points for coastal states.</p>
<p>Evaluate existing map dissemination processes</p> <ul style="list-style-type: none"> Report summarizing the evaluation of existing map dissemination processes. 	Q4	<p>Cancelled</p> <p>Collaboration with OHD and CRH to write report did not happen in FY05 due to staffing changes and shifting priorities. This effort will be led by OHD in FY06 and CSC may serve in a supporting role.</p>

Accomplishments/Actions

1st Quarter FY05

- Executive summary titled "Flood Forecast Mapping in the Tar River Basin, North Carolina: Project Summary and Lessons Learned" completed and submitted to SERFC and OHD.
- Presentation on NWS flood forecast mapping overview given at the Second Hydrologic Program Managers Conference (HPMC) in New Orleans December 6-10, 2004. PowerPoint slides are available through HPMC website.
http://www.nws.noaa.gov/om/water/hpm_conference/Presentations.shtml
- Workshop on graphical E-19 development and usage was given to over 60 hydrologic program managers at the Second HPMC in New Orleans December 6-10, 2004. PowerPoint slides, discussion points, and results from informal survey are available on HPMC website.
http://www.nws.noaa.gov/om/water/hpm_conference/subject.shtml
- Johnson County, KS pilot with FEMA began in November 2004 with a kickoff meeting with FEMA and Johnson County. County is in the process of getting a quote for mapping NWS flood categories. Pilot should finish before Quarter 4 and products will be made available to CRH for ArcIMS application.
- In addition, FEMA Q3 and DFIRM maps showing 1% and 0.2% chance flood inundation extents were created by CSC for FEMA Region IV and are added as downloadable extension to HURREVAC.

2nd Quarter FY05

- FEMA Q3 and DFIRM maps showing 1% and 0.2% annual chance flood inundation created for coastal states in FEMA regions I, and IV. A total of 298 maps at NWS river forecast point locations have been added to HURREVAC as downloadable extensions for individual states. See <http://hurrevac.com> for more information.
- Johnson County, KS pilot with FEMA is progressing. Steve Predmore, Service Hydrologist, has proposed revising flood stage at the Overland Park gage from 12 to 14 ft. Dan Miller, City of Overland Park Engineer, is coordinating with the mapping vendor to determine the cost associated with mapping all of the categories. Mapping of NWS categories should take place in Q3 and will be based on updated FEMA flood insurance study hydraulic analysis. Pilot should finish before Quarter 4 and products will be made available to CRH for ArcIMS application.
- Methodologies for E-19 mapping are being evaluated and are taking into account work going on in NC in cooperation with the NC Floodplain Mapping Program. Using inundation map libraries created by the State, we plan to create the e-19 maps. This is another option in the e-19 process. We will document these efforts in the final methodologies.

3rd Quarter FY05

- FEMA Q3 and DFIRM maps showing 1% and 0.2% annual chance flood inundation created for coastal states in FEMA Region VI. 98 maps at NWS river forecast point locations have been added to HURREVAC as downloadable extensions for individual states. See <http://hurrevac.com> for more information.
- Johnson County, KS pilot with FEMA is progressing. Steve Predmore, Service Hydrologist WFO Kansas City/Pleasant Hill, has worked with Dan Miller, City of Overland Park, to revise the NWS flood categories at the Overland Park gage.
- Dan Miller received a quote from the FEMA contractor, Phelps Engineering, to estimate the cost of running the HEC-RAS model and mapping all of the categories (3). We are now working with FEMA to determine how the vendor will be paid to do this work. Mapping of NWS categories should take place in Q4 and will be based on updated FEMA flood insurance study hydraulic analysis. Pilot should finish during Quarter 4 and products will be made available to CRH for ArcIMS application.
- Methodologies for E-19 mapping are being evaluated and are taking into account work going on in NC in cooperation with the NC Floodplain Mapping Program. Using inundation map libraries created by the State, we plan to create the e-19 maps. This is another option in the e-19 process. We will document these efforts in the final methodologies.
- Final document including executive summary and lessons learned from the Tar River Basin was

provided to the SERFC and presented at the Hydrologic Program Managers Meeting in December.

4th Quarter FY05

- A total of 396 FEMA Q3 and DFIRM maps showing 1% and 0.2% annual chance flood inundation created for coastal states in FEMA Region IV, I, and VI. These have been added to HURREVAC Inland Flood Planning and Response Tool as downloadable extensions for individual states. See <http://hurrevac.com> for more information.
- A contract was awarded to Watershed Concepts using AHPS funds via CSC for creation of pilot graphical E-19 NWS flood severity maps in North Carolina and for the development of a methods and standards document. The document will include cost estimates for NWS flood category mapping and inundation map libraries at forecast points. Methods and standards will be consistent with DHS/FEMA DFIRM standards. Work will be completed and document provided to CSC by Q2 in FY06. Final report will be submitted to the NWS to assist with national efforts and collaboration with FEMA Map Modernization Program.
- The Johnson County Kansas pilot mapping effort with FEMA will not be completed until Q3 in FY06. Reasons for this include the longer than anticipated time to coordinate efforts through Service Hydrologist at Pleasant Hill, MS WFO to revise flood stage and re-evaluate the NWS flood categories for Indian Creek, KS. FEMA Map Modernization program awarded additional funds to Phelps Engineering, the original Cooperating Technical Partner (CTP) contractor in late August. This delay was because funds had to flow through FEMA Region VII to the CTP to the contractor. Now that funds have been made available, work will commence and map products will likely be delivered by Q3 in FY06. Map data layers will still be provided to CRH for inclusion in ArcIMS application for Central Region AHPS effort.
- Collaboration with OHD and CRH to write report on evaluating existing map dissemination processes did not happen in FY05 due to staffing changes and shifting priorities. This effort will likely be led by OHD in FY06 and CSC may serve in a supporting role.

Problems Encountered/Issues

1st Quarter FY05

- None except transfer of AHPS funds to CSC for existing and completed work.

2nd Quarter FY05

- Waiting on project partners on the Johnson County, KS pilot to sort out NWS category changes.
- Release of LIDAR data from NC is behind schedule.
- Getting NC partners to share the new Hydraulic models for mapping E-19 has been difficult.
- No transfer of AHPS funds to CSC via BOP has occurred as of 04/22/05

3rd Quarter FY05

- Working with FEMA to establish payment method to get the mapping vendor in place to complete the work.

4th Quarter FY05

- Delay in methods and standards document because it was decided, to give more credibility, we would use AHPS funds to contract out the writing of this document to an accredited FEMA Map Mod contractor to assist us with developing mapping standards and methods and given cost estimates for inundation map libraries and/or NWS flood category layers. Final report will be provided in Q2 FY06.
- Delay in Johnson County, KS e-19 mapping project is due to re-evaluating NWS flood categories with NWS Service Hydrologist and County and City officials. Also, funding for additional mapping had to be secured at FEMA Headquarters and filtered to the region and ultimately to the CTP and contractor. Maps likely be delivered in Q3 FY06.
- Due to shifting priorities and staffing changes the report on the evaluation of existing map dissemination processes was not completed. This milestone has been cancelled. This effort will likely be led in FY06 by OHD and CSC may serve in a supporting role.

FLDVIEW Data Interface (XML)

Theme: Graphical Dissemination of Hydrologic Information

Management Lead: Jon Roe

Objective: To define a standard data interface, using XML, to be used to provide data from flood routing models (e.g., FLDWAV) to flood mapping applications (e.g., FLDVIEW).

Milestones

Task	Due Date	Status
Write the requirements of this project so as to incorporate them into the Statement Of Objectives (SOO) for the related AHPS task, "Expand HydroXC", within the CHPS project under the Software Infrastructure and Integration Theme. This FLDVIEW interface project will become a sub-task within the larger "Expand HydroXC" task.	Q3	Complete
Incorporate FLDVIEW SOO requirements into the "Expand HydroXC" parent SOO.	Q3	Complete, larger Expand HydroXC SOO issued
Review sections of the larger "CHPS: Expand HydroXC" Statement Of Work (SOW) from the contractor that pertain to this project.	Q4	Complete
All future milestones for this project are found in the "CHPS: Expand HydroXC" AHPS reports as this work will be absorbed there.	N/A	N/A

Accomplishments/Actions

1st Quarter FY05

- We completed project identification, budgeting, and planning.

2nd Quarter FY05

- We are allowing the first phase of the larger XML task to complete prior to moving forwards with this task. It should complete by early June 2005.

3rd Quarter FY05

- The first phase of the larger XML task did complete by June 2005.
- The larger HydroXC project SOO was updated for phases 2, 3, and 4 and issued to Contracts in June.
- The work specified by this AHPS project line item was included in Phases 2, 3, and 4 of that new SOO and will be worked from now on inside the larger Expand HydroXC project.

4th Quarter FY05

- A proposed Statement Of Work was received from the contractor which included tasks to do the analysis to define a standard data interface, using XML, to be used to provide data from flood routing models (e.g., FLDWAV) to flood mapping applications (e.g., FLDVIEW). These tasks are part of Phase 2 of the ongoing Hydrology XML Consortium work.
- The SOW was accepted by us and the task to move ahead on Phase 2 was awarded to RTi/Apex.

Problems Encountered/Issues

1st Quarter FY05

- The final completion of the AHPS project to incorporate the Simplified Hydrologic Routing Technique (SHRT) in NWSRFS depends on the results of this project as this project will define the output data interface between SHRT and FLDVIEW. A "pre-final" version of SHRT, without

the interface developed here, can be accomplished but will have to be re-visited and completed after this project.

- This FLDVIEW Data Interface (XML) AHPS project plan/report will only cover the integration of this work under the larger CHPS projects reported elsewhere (see the "Expand HydroXC" section of the CHPS AHPS reports).
- The allotted funding for this data interface task is well under what is required to complete the task. It will only get started in FY05 and must get completed in FY06 pending FY06 financial support.

2nd Quarter FY05

- Need the first phase of the FY04 xml task to complete so the second phase tasking can be properly written. This second phase xml tasking will incorporate the topic of this report.

3rd Quarter FY05

- Noting that FY05 funding is not sufficient to complete this HydroXC-compliant XML data interface between FLDWAV and FLDVIEW, FY06 funding was requested to continue the effort next FY.

4th Quarter FY05

- None.

GIS Based Information Dissemination System

Theme: Graphical Dissemination of Hydrologic Information

Management Lead: Wendy Pearson, CRH (Dr. Shripad Deo, CIRA, Brian Connelly, NCRFC and Eugene Derner, MBRFC)

Objective: Develop a GIS-based display system to present a variety of hydrologic information to meet the needs of local, regional, and national users

Milestones

Task	Due Date	Status
Provide training for IMS system team	Sep 2003	Complete
Hardware and software procured and installed	Sep 2003	Complete
Contract support allocated for IMS development work	Sep 2003	Complete
Develop GIS-based information dissemination system	Sep 2004	Ongoing
Additional Hardware and software procurement	July 2005	Complete
Modify national AHPS map service to use .xml files	Sep 2006	Moved to Q4 FY06
Install additional hardware and software	Jan 2006	Moved to Q1 FY06
Stress Test new hardware and software configuration	Sep 2006	Moved to Q4 FY06
Incorporate graphical E19	Sep 2006	Moved to Q4 FY06
Evaluation of prototype and recommendations	Sep 2006	Moved to Q4 FY06
Provide training for CRH IT staff to support ArcIMS 24/7	Sep 2006	Q4

Accomplishments/Actions

1st Quarter FY05

- Wrapped up development of ArcIMS web service (very similar to static national AHPS web page) fed real-time .mxd files. The ESRI ArcIMS system allows for customer selectable graphics to zoom to the level of interest and obtain information about the river gauge locations.
- Created project plans for FY05 to work with OHD and Coastal Services Center:
 - Evaluate prototype ArcIMS system design
 - Incorporate graphical E19s in CRH project
 - Recommend some products for ArcIMS dissemination
- Planned for MySQL database to feed ArcIMS.

2nd Quarter FY05

- Determined requirement for ESRI ArcInfo software.
- Researched system design options.
- Discovered .xml files would not be available in Q3 of FY05 (see below).
- Contractor wrote program to parse data from .xml when it becomes available.
- Determined SDE will be utilized to manage shape files to increase accessibility efficiency.

3rd Quarter FY05

- Purchased additional hardware and software.

4th Quarter FY05

- Began installation of second server and additional software.

Problems Encountered/Issues

1st Quarter FY05

- Halted work on IMS web service, very similar to static national AHPS web page, due to transition from .mxd files to .xml files by contractor, John Bollinger. Will resume work on this IMS web service when .xml files are fed to CR web farm.

2nd Quarter FY05

- The timeline for .xml files to be available for all forecast points has been delayed and will not be available until AWIPS OB6.0 installs are complete. We will continue development on .xml files that are available but will not be able to incorporate all sites due to the less aggressive timeline.
- Additional hardware and software procurement decisions were moved to Q3 due to further research needed into future system design. Need to determine whether focus should be on access and availability or high security standards at this time.

3rd Quarter FY05

- Contract project leader took a job in a different city with a different agency so, I will be spinning up a new contractor in Q4 FY05.
- Graphical E19 data for incorporation in this ArcIMS project will not be available until FY06.

4th Quarter FY05

- Began spinning up a new contractor in Q4 FY05.
- Graphical E19 data for incorporation in this ArcIMS project will not be available until FY06.
- National lead on FLDIMS project has changed hands.
- Hydrogen .xml data will not be available for all WFOs until Q3 of FY06 due to push back of installation of AWIPS OB6.0 Phase III.

Future Enhancements for FY06-FY09

- Ingest real-time .xml data into ArcIMS system to allow the display of current and forecast conditions.
- Link to live AHPS web pages for seamless Internet navigation.
- Implement MySQL and SDE in CRH ArcIMS prototype.
- Incorporate FLDIMS project into CRH ArcIMS prototype.
- Incorporate census data in this system to enhance hydrologic outlooks, watches, and warnings by taking today's NWS wording of a hazard of major flooding with river levels rising to 28 feet on the Missouri River in Jackson county Missouri, to... "***There is a threat of major flooding with the river rising to 28 feet on the Missouri River in Jackson county in Missouri with potentially 300,000 people and 75,000 homes and businesses likely to be affected.***"
- Work with CRH Climate Services, to incorporate low flow database information in graphical format utilizing ArcIMS.
- Explore graphical dissemination of ESPADP digital data, NDFD shapefiles, NWS Doppler radar shapefiles, precipitation data, water supply information, water quality information, and climate data.
- Research solution for data download capabilities via IMS.
- Obtain training for CRH IT staff for 24/7 support of ArcIMS system.

Product Dissemination

Theme: Graphical Dissemination of Hydrologic Information

Management Lead: Dan Urban

Objective: Identify products and ways of graphically disseminating hydrologic and forecast information in a format that would help customers and managers to visualize the impact of water levels. This will aid the decision makers regarding actions to be take to protect people and property.

Milestones

Task	Due Date	Status
Convert FLDIMS MapGuide templates to ArcIMS	Q4	On-hold
Develop FLDIMS template for St. Johns River	Q4	On-hold
Evaluate existing map dissemination processes	Q1 (FY06)	On-hold

Accomplishments/Actions

1st Quarter FY05

- Convert FLDIMS MapGuide Templates to ArcIMS: worked continued on the development of the template for Harrisburg
- Develop FLDIMS template for St. Johns River: A MapGuide template was developed for the SJR and populated with data for Hurricane Frances.
- Started developing HOSIP documents for FLDIMS

2nd Quarter FY05

- Convert FLDIMS MapGuide Templates to ArcIMS: a satisfactory template for Harrisburg was developed. Efforts are underway to populate this version of FLDIMS with operational data.
- Develop FLDIMS template for St. Johns River: A demonstration of FLDIMS for Jacksonville, FL was done as part of a Road Show hosted by the Coastal Storms Program. To speed up load time for the images, layering techniques are being investigated (i.e., use lower resolution data at the river system level and higher quality data at the town level).

3rd Quarter FY05

- Convert FLDIMS MapGuide Templates to ArcIMS: The ArcIMS template for Harrisburg was completed. The St. Johns River segment was modified to generate the FLDVIEW data (at OHD) and a flood map was generated using this data.
- Develop FLDIMS template for St. Johns River: No work done this quarter.

4th Quarter FY05

- Convert FLDIMS MapGuide Templates to ArcIMS: The code for the ArcIMS version to dynamically read, parse & display a deterministic forecast data file was completed. Work continues to convert Lewistown and West Branch to the ArcIMS template.
- Develop FLDIMS template for St. Johns River: The Jacksonville and Sanford locations can now be accessed as separate locations and then "panned" to the other location. However, there is still a need to add specific data layers to Sanford.

Problems Encountered/Issues

1st Quarter FY05

Because of reduced funding the following adjustments are made to tasks:

- In addition to the Harrisburg area, only the West Branch of the Susquehanna River area will be modeled due to limited funding; also the due date is moved to Q4.

- The St. Johns River FLDIMS template will be in the MapGuide format only due to limited funding.
- Due to the lateness of the allocation of funds, this task will begin in March and end in Dec '05.

2nd Quarter FY05 - None

3rd Quarter FY05

- The West Branch and Lewistown areas will be done because of addition Susquehanna funding.

4th Quarter FY05

- Due to turnover of two individuals most familiar with FLDIMS, the schedule has been placed on hold until the project work load and available resources have been evaluated.

Basic Service Implementation

AHPS Implementation APRFC

Management Lead: Scott Lindsey, APRFC

Objective: To calibrate NWSRFS data sparse basins and validate quality of resulting probabilistic forecasts generated at those locations to allow implementation of advanced hydrologic prediction services (AHPS) in the Koyukuk Basin; calibrate and implement AHPS at six new locations.

Milestones

Task	Due Date	Status
Implement two new AHPS sites	Dec. 2004	Complete – Anchor River and Willow Creek
Send additional data to Dr. Eric Anderson	March 2005	Final data sets assembled and provided to Dr. Anderson
Complete calibration of four new sites	June 2005	Calibration complete and implemented in NWSRS
Implement four new sites	Sept. 2005	Site implemented in June 2005
Report on status of calibration efforts on Koyukuk Basin	Sept. 2005	Calibration efforts on Koyukuk completed and delivered by Dr. Eric Anderson; results will be evaluated during forecast season

Accomplishments/Actions

1st Quarter FY05

- AHPS sites were implemented for the Anchor River at Anchor Point and Willow Creek at the Parks Highway.

2nd Quarter FY05

- The final data sets requested by Dr. Anderson were assembled, quality controlled and delivered. Additional data sets may be developed using new techniques if necessary later.

3rd Quarter FY05

- Dr. Eric Anderson delivered a completed set of calibrations with the data necessary to implement in NWSRFS. Calibrations will be implemented and evaluated this season.
- Calibrations completed and implemented for four AHPS points: UCHA2 (Chena River at Chena Hot Springs Road Bridge), CRHA2 (Chena River below Hunts Creek), CHFA2 (Chena River near Steese Bridge at Fairbanks), and CHLA2 (Little Chena River at Chena Hot Springs Road)

4th Quarter FY05

- The Koyukuk calibrations will be made operational for the 06 open water season. Time series will be updated with data through the 2005 season and ICP will be used to evaluate the calibrations this winter.

Problems Encountered/Issues

1st Quarter FY05 – None

2nd Quarter FY05 – None

3rd Quarter FY05 – None

4th Quarter FY05 - Operational and staffing constraints caused the implementation to slip.

Snow Water Equivalent Data

Management Lead: Larry Rundquist, APRFC

Objective: Acquire high quality, high resolution airborne gamma radiation snow water equivalent for flight lines in Alaska; this should improve accuracy and lead time of hydrologic forecasts by providing high quality input to forecast operations in data sparse areas

Milestones

Task	Due Date	Status
Identify priority of flight lines - APRFC	March 2005	Completed
Fly selected operational flight lines	April 2005	189 flight lines completed
Incorporate data into operations	June 2005	Snow water equivalent updates used

Accomplishments/Actions

1st Quarter FY05 - None

2nd Quarter FY05

- Staff reviewed the existing snow course information in conjunction with spring breakup flood outlooks to identify higher risk areas; these would influence the prioritization of Alaska flight lines if the number of flight hours is limited.

3rd Quarter FY05

- Staff reviewed the existing snow course information in conjunction with spring breakup flood outlooks to identify higher risk areas. 189 flight lines completed and data used to update snow water equivalent

4th Quarter FY05

- Influence of snowpack continued into early in 4th quarter but there were no significant new accomplishments or actions.

Problems Encountered/Issues

1st Quarter FY05 – None

2nd Quarter FY05

- The aircraft has been tentatively scheduled to begin the week of April 20 if maintenance can be completed.

3rd Quarter FY05

- None. Flight lines completed at all but one area; that area was unavailable due to restricted visibility that could have led to unsafe flying conditions.

4th Quarter FY05 - None

AHPS Implementation for NCRFC

Management Lead: Dan Luna, HIC/NCRFC

Objective: Implement probabilistic hydrologic forecasts for basins in the North Central River Forecast Center's (NCRFC) area of responsibility

Milestones

Implementation Area	Forecast Points Planned	Due Date	Actual to Date	Variance
None planned for FY05				
Total				

Accomplishments/Actions

1st Quarter FY05

- All AHPS points implemented for long-term forecasts

2nd Quarter FY05

- All AHPS points implemented for long-term forecasts

3rd Quarter FY05

- All AHPS points implemented for long-term forecasts

4th Quarter FY05

- All AHPS points implemented for long-term forecasts

Problems Encountered/Issues

1st Quarter FY05 - None

2nd Quarter FY05 - None

3rd Quarter FY05 - None

4th Quarter FY05 - None

AHPS Implementation for MBRFC

Management Lead: Larry Black, HIC/MBRFC

Objective: Implement probabilistic hydrologic forecasts for basins in the Missouri Basin River Forecast Center's (MBRFC) area of responsibility. The MBRFC goal is to have 21 additional AHPS points implemented for long-term forecasts by the end of FY 2005.

Milestones

Implementation Area	Forecast Points Planned	Due Date	Actual to Date (4 th Qtr FY05)	Variance
Grand-Chariton Basin	12	4 th Qtr FY05	11	-1
Middle Dakota Tributaries	9	4 th Qtr FY05	9	0
Bighorns	0	N/A	1	+1
Yellowstone	0	N/A	2	+2
Total	21	FY05	23	+2

Accomplishments/Actions

1st Quarter FY05

- Completed 80% of the headwater calibrations in the Middle Dakota Tribs
- Completed 40% of updates to reservoir operations in Middle Dakota Tribs
- Initiated headwater calibrations in the Grand

2nd Quarter FY05

- Completed 75% calibration and regionalization in the Middle Dakota Tribs
- Completed 60% of updates to reservoir operations in Middle Dakota Tribs
- Completed 35% subbasins calibrated in the Grand

3rd Quarter FY05

- Completed 90% calibration and regionalization in the Middle Dakota Tribs
- Completed 80% of updates to reservoir operations in Middle Dakota Tribs
- Completed 60% subbasins calibrated in the Grand
- New river forecast points were added in the Bighorns (1) and Yellowstone (2) basins per WFO request. AHPS implementation was accomplished for these three new sites

4th Quarter FY05

- Began operational services for 11 points in Grand and 9 points in Middle Dakota Tribs.
- Did not implement 1 point in Grand due to regulation issues (dependent on Mainstem Missouri flows which won't be available until 2014).

Problems Encountered/Issues

1st Quarter FY05 - None

2nd Quarter FY05 - None

3rd Quarter FY05

- Deficiency in regulation modeling that makes it difficult to model a diversion dam based on downstream conditions.

4th Quarter FY05 – None

AHPS Implementation for MARFC

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

Objective: Implement probabilistic hydrologic forecasts for basins in the Middle Atlantic River Forecast Center's (MARFC) area of responsibility. The MARFC goal is to have basic AHPS implementation for long-term forecasts for the entire MARFC area of responsibility by the end of FY 2005.

Milestones

Implementation Area	Forecast Points Planned	Due Date	Actual to Date (4th Qtr FY05)	Variance
James/Appomattox Basins	14	1 st Qtr	14 (1 st Qtr)	0
Delaware Basin*	0	-	2 (3 rd Qtr)	+2
Total	14	FY05	16	+2

* implemented 2 reservoir locations

Accomplishments/Actions

1st Quarter FY05

- MARFC added 14 points on the James/Appomattox basins to their suite of AHPS products. **With the addition of these products, MARFC has completed Basic AHPS implementation for their entire service area.**

Susquehanna Basin:	59 points	
Delaware Basin:	30 points	
NJ Basin:	19 points	
Potomac Basin:	29 points	
James Basin:	14 points	(completed in October 2004)

Total:	151 points	

- The NWS (OHD and ER) is in the final stages of developing GIS applications to demonstrate Flood Inundation Mapping in the Susquehanna River Basin at Harrisburg, PA.

2nd Quarter FY05

- MARFC has been beta-testing the latest version of the PQPF software provided by OHD. It incorporates day 2 QPF in the precipitation forecast distributions (the current method only uses the first day of QPF). Parallel testing with the current approach has been initiated, and results will be forwarded to OHD once a sufficient number of significant precipitation events have occurred. MARFC is using PQPF software to issue short-term probability forecasts on the Juniata and Schuylkill river basins in PA.
- Worked extensively with OHD and others in implementing FLDWAV/FLDVIEW changes to support the generation of inundation maps at multiple locations. Participated on national AHPS Flood Mapping and Graphical Dissemination Work-plan Team to help plan out work tasks and estimate resource costs for AHPS Review Committee (ARC) input for funding decisions.
- MARFC coordinated with ER regarding the review of the AHPS training package under development.
- AHPS display software (Rivdat) was upgraded and local modifications were made. Also, MARFC worked on changes to improve software handling and display of "expired" forecasts and caution-stage-only points.

- MARFC designed a system to monitor background AHPS generation and delivery of data. This system will be used for all background tasks to ensure reliable performance and delivery of data/products.

3rd Quarter FY05

- Per request from NYC Department of Environmental Protection, MARFC is now generating a table with the inflow exceedance quantiles for the inflows to Cannonsville and Pepacton Reservoirs. These two reservoirs are part of the NYC Water Supply System. MARFC has added placeholders on the AHPS web pages for these locations.
- MARFC continues to supply data to OHD for evaluation of the short term probabilistic forecasting program.
- A presentation on Flood Forecast Mapping was made by MARFC and OHD to the PA GIS Conference in Camp Hill, PA.

4th Quarter F Y05

- MARFC continues to supply data to OHD for evaluation of the short term probabilistic component of AHPS.
- MARFC has implemented 16 AHPS points in FY05, which exceeds the planned goal of 14.

Problems Encountered/Issues

1st Quarter FY05 - None

2nd Quarter FY05 - None

3rd Quarter FY05 - None

4th Quarter FY05 - None

AHPS Implementation for NERFC

Management Lead: Gregg Rishel (HIC/NERFC), Robert Shedd (DOH)

Objective: Implement probabilistic hydrologic forecasts for basins in the Northeast River Forecast Center's (NERFC) area of responsibility. The NERFC goal is to have AHPS implementation for long-term forecasts for the entire NERFC area of responsibility by the end of FY 2009.

Milestones

Implementation Area	Forecast Points Planned	Due Date FY05	Actual to Date (4th Qtr FY05)	Variance
Hudson R. Basin	22	14 (1 st Qtr) 8 (4 th Qtr)	16 (1 st Qtr) 13 (4 th Qtr)	+7
Adirondacks *	5*	4th Qtr.*	0	-5
Great Lakes Drainages **	0	0	8 (3 rd Qtr)	+8
Total	27	FY05	37	+10

* Adirondacks implementation delayed to FY06

** Great Lakes Drainage implemented ahead of schedule in FY05

Accomplishments/Actions

1st Quarter FY05

- 16 new forecast points were added this quarter in the upper Hudson River Basin.
- The Hudson River calibration task by RTI has been completed and accepted.
- Two NERFC staffers traveled to Ft Collins in October to meet with RTI representatives.... review progress and calibrations.
- NERFC staff met with the Hydraulics and Hydrology Technical Working Group (HHTWG) of the International Joint Commission (IJC) this past Summer in Montreal to discuss several items of the International Lake Ontario - Saint Lawrence River Study including the future forecasting by NERFC, and the future climate change scenarios. This 5 year study is to determine if and how improvements can be made in the way lake levels and outflows from the Lake Ontario-St. Lawrence River system are managed.
- In FY 2005, NERFC is planning new forecast capabilities, including AHPS, on five rivers originating in the Adirondack Mountains in New York that travel northward to the Saint Lawrence River. Although this is a data sparse area in upstate New York, enough is available to allow calibration of these watersheds using the Sacramento Soil Moisture Accounting Model (SAC-SMA). The NERFC is teaming with Riverside Technologies Inc. (RTi) with the calibration of each of these watersheds. The importance of forecasting for these five rivers was evident by the Canadian response to our involvement in this project. Even though these rivers comprise a small percentage of the entire Great Lakes/Ottawa River/Saint Lawrence basin, during the spring snow melt season they account for nearly 20 percent of the flow. Canadian Hydro users are also interested in this forecasting capability on a daily basis for their own power operations.
- The calibration work by RTI in the Adirondacks to support the IJC project is ongoing.

2nd Quarter FY05

- Adirondacks basin calibrations - The work on the Adirondacks continues. Carry
- Falls reservoir information was sent to RTi so they could complete calibration for the Raquette River portion of the basin. Data transfer for this reservoir has previously been delayed as a result of a change in ownership of the Carry Falls facility at the end of 2004. BrasCan Power

has now assumed ownership of this facility. The NERFC is now in the process of implementing the calibrated watersheds into the NWSRFS model. They have begun issuance of short-term forecasts (RVFs) for locations in the Adirondacks. The forecasts are not yet being issued on the AHPS pages, nor are any ESP probability runs being made.

- FY05 AHPS contract work – NERFC prepared a Statement of Objectives (SOO) for AHPS calibration activities for FY 2005. They are proposing that RTi provide calibration assistance for a number of locations within the Genesee and Black River basins.
- They are awaiting final approval for this work.
- In house calibration – NERFC is continuing to work on in-house calibrations. They have largely completed calibration work on the Buffalo area creeks and the headwaters of the Genesee. They are also working on calibrations in Maine, and on data preprocessing and basin delineation in the lower Connecticut and southern New England basins. They are working with Janice Sylvestre on FLDWAV calibration on the Connecticut River that will account for tidal fluctuations. They are running tests in the Hudson River Basin on a number of new locations.
- NERFC reviewed the proposed AHPS Implementation Map to be used by OHD in the next budget cycle. They also provided a graphic update for FY 2005 and FY 2006 implementation.

3rd Quarter FY05

- 8 new AHPS service locations were established this month in western New York in the Great Lakes drainages. Implementation is ahead of schedule, as this area was originally not planned for implementation until after FY05.
- NERFC staff is developing AHPS forecasts for a number of new locations in Maine, primarily in the St John River Basin.
- NERFC continues development of AHPS points in the Hudson River Basin.
- They are working with RTI on calibrations in the Genesee and Black River basins in New York State.
- RTI representatives traveled to Taunton, MA at the NERFC this June for a progress and review meeting on their calibration effort.
- NERFC has submitted a request to OHD for calibration support for FY06.
- The staff continues to do in-house data preprocessing and calibration on the lower Connecticut River and southern New England watersheds.

4th Quarter FY05

- 13 new forecast points were added this quarter in the Hudson River Basin.
- NERFC has implemented 37 AHPS points in FY05, which exceeds the planned goal of 27.
- RTI visited the NERFC to review early progress on their calibrations efforts in the Genesee and Black River basins. A number of action items were taken to review some data prior to beginning the actual calibration procedures.
- RTI is currently completing calibration activities in the Genesee and Black River basins. They will be visiting NERFC in October to do their review of the calibrations, as well as provide training on the calibration and use of the RES-J model. This should allow planned implementation at NERFC during the middle of FY06.
- NERFC has submitted a request to OHD for calibration support for FY06.

- NERFC staff is continuing to work on data pre-processing in Southern New England and Connecticut River basins.

Problems Encountered/Issues

1st Quarter FY05

- In the Adirondacks implementation sponsored by the IJC, there has been a problem in obtaining data to support calibrations at Cary Falls Reservoir. The reservoir is now under new ownership, and NERFC needs to go to FERC to get a release of the data. As a result, the Adirondacks calibration will be requesting a 2-month no-cost extension. Implementation is still expected in FY 2005.

2nd Quarter FY05 - None

3rd Quarter FY05

- Adirondack's basins were calibrated by RTi under funding provided by the International Joint Commission in support of St Lawrence River operations. Short-term forecasts have been running the past several months, but full AHPS implementation will be made early in FY06 as a result of the delays in obtaining reservoir data in support of calibration (see comments under 1st quarter).

4th Quarter FY05 - None

AHPS Implementation for OHRFC

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

Objective Implement probabilistic hydrologic forecasts for basins in the Ohio River Forecast Center's (OHRFC) area of responsibility. The OHRFC goal is to have basic AHPS implementation for all existing long-term forecast points in the OHRFC area of responsibility by the end of FY 2006.

Milestones

Implementation Area	Forecast Points Planned	Due Date	Actual to Date 4th Qtr FY05	Variance
Lower Ohio River (OHS)	8	4 th Qtr	8 (4 th Qtr)	0
Wabash River	22	4 th Qtr	8 (3 rd Qtr) 15 (4 th Qtr)	+1
Total	30	FY05	31	+1

Accomplishments/Actions

1st Quarter FY05

- OHRFC is currently experiencing widespread flooding in their service area.
- In FY 2005, OHRFC will complete implementation of new AHPS forecast points in the Wabash River Basin and lower Ohio River (down to Shawneetown, IL).
- In FY 2005, OHRFC will start calibration on the lower Cumberland River. To accomplish this task, 9 Res-J (RTI assistance), 4 Res-SNGL (OHRFC staff) reservoir model implementation, along with SAC-SMA/SNOW-17/Routing model calibrations (OHRFC staff) are needed.
- OHRFC staff has begun work on SAC-SMA calibrations on the Cumberland and Wabash River basins.
- Full AHPS implementation of basins planned for implementation in FY2005 are proceeding on track.

2nd Quarter FY05

- OHRFC reviewed the proposed AHPS Implementation Map to be used by OHD in the next budget cycle. They also provided a graphic update for FY 2005 and FY 2006 implementation.
- OHRFC is continuing calibration activity associated with their overall AHPS implementation plans for FY05....*the Wabash River (upper and lower) and the Cumberland River (lower)*.
- OHRFC completed and submitted the Statement of Objectives (SOO) for RES-J calibrations for the Cumberland River Basin and has evaluated the proposal submitted by RTi.
- RTi has received all required data for RES-J model calibrations for the Cumberland River (lower).
- Full AHPS implementation of basins planned for implementation in FY2005 are proceeding on track.

3rd Quarter FY05

- 8 new forecast points were added this month in the upper Wabash River sub-basin of the Ohio River Basin.
- Coordinated on agenda with ERH HSD and WFO Wilmington, OH, and provided input for August Ohio AHPS conference with state flood plain managers. This conference will focus on future AHPS applications in Ohio.
- OHRFC is continuing calibration activity associated with their overall AHPS implementation

plans for FY05....*the Wabash River (lower) and the Cumberland River (lower)*.

- RTi has received all required data for RES-J model calibrations for the Cumberland River (lower). A trip to meet with RTi and the USACE Nashville District Office in Nashville, TN is being planned.

4th Quarter FY05

- OHRFC has completed 31 AHPS points in FY05, which exceeds their goal of 30.
- OHRFC added 23 new forecast points this quarter in the Ohio River Basin this quarter. They implemented 15 new locations on the lower Wabash River Basin, and 8 new points on the lower mainstem of the Ohio River (this completes the Ohio mainstem forecast points down to, and including Shawneetown, IL).
- RTi has received all required data for RES-J model calibrations for the Cumberland River (lower), and is proceeding with RES-J model calibrations for the Cumberland River (lower).
- OHRFC, US Army Corps of Engineers Nashville District, and RTi staff met in Nashville, TN to discuss progress on reservoir calibrations and operations on the Cumberland River.
- RTi is proceeding with RES-J model calibrations for the Cumberland River (lower) and is on track to complete calibration as scheduled, which should allow planned implementation at OHRFC during the 1st quarter of FY06.
- OHRFC and WFO Wilmington, OH made AHPS presentation and had AHPS display at State of Ohio Flood Plain Managers meeting in Columbus, OH.

Problems Encountered/Issues

1st Quarter FY05 - None

2nd Quarter FY05 - None

3rd Quarter FY05 - None

4th Quarter FY05 - None

AHPS Implementation for ABRFC

Management Lead: Billy Olsen, HIC

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

Milestones

Implementation Area	Forecast Points Planned	Due Date FY05	Actual to Date 3 rd Qtr FY05	Variance
Verdigris	9	3rd Qtr	9	0
Cottonwood	5	3rd Qtr	5	0
Neosho	9	3rd Qtr	9	0
Arkansas	2	1 st Qtr	2	0
Cimarron	11	1 st Qtr	11	0
Total	36	FY05	36	0

Accomplishments/Actions

1st Quarter FY05

- Work continues on the Short Term QPF Ensemble Forecast project in coordination with OHD.
- Provided comments on the AHPS Strategic Plan draft to Donna Page, Gary Carter and Tom Graziano.
- Participated in the conference calls of the national AHPS Short to Long Term Forecast Planning Team to produce a prioritized list of tasks for inclusion in team input to the ARC.
- Work continues on the DHMS project with three staff members involved in distributed model calibration activity. Tested the upgraded XDMS and HL-DMS software and provided comments to OHD. Reviewed XDMS documentation.
- Implemented a SR Intranet supported comment exchange area for DMS work. Coordinated with OHD concerning the archive of HL-DMS model output.
- Work continues with NWS-OHD concerning the AHPS task to include ABRFC P3 88-D precipitation estimation software functionality in MPE. Tasks completed included writing some P3 documentation for OHD and participating in conference calls.
- Submitted the SOO for ABRFC FY-05 data analysis contractor task.
- Implemented thirteen forecast points this quarter (carryover from FY-04).

2nd Quarter FY05

- Participated with NWSHQ in negotiating a limited scope of work by contractor for the ABRFC FY-05 data analysis contractor task because of insufficient funding. Approved the resultant contractor proposal. FY-2005 ABRFC data analysis contract work task was awarded this quarter. We had an initial kick-off conference call with RTi.
- Work continues on the Short Term QPF Ensemble Forecast project in coordination with OHD. Organized a conference call concerning the intent of OHD re-focus of efforts in looking at retrospective model runs to development pertinent statistical parameters.
- Work continues on the DHMS project with three staff members involved in distributed model calibration activity. Began verification and monitoring of distributed model hourly forecasts. Working with OHD, resolved some issues involving real-time running of the model. Developed guidelines for a local distributed model basin calibration report format. Participated in the Gate 2 OSIP distributed model conference call. Organized and conducted a Distributed Modeling

conference call with OHD and WGRFC for the purpose of continued coordination and development of future plans. Provided notes and action items from the call. Volunteered to take the lead in distributed modeling verification and began organizing a meeting and/or conference call with WGRFC.

- Work continues with NWS-OHD concerning the AHPS task to include ABRFC P3 88-D precipitation estimation software functionality in MPE.
- Organized a local office meeting concerning use of ESP pre-adjust techniques for CPC forecasts. Conclusions at this time are that ABRFC will use temperature adjustments to improve snowmelt timing but will not use precipitation adjustments due to negative effects at extreme probabilities. Coded and implemented a program to input CPC temperature anomalies into ESP runs.
- Provided comments to Donna Page concerning AHPS Theme Teams funding process.
- Submitted FY-2005 and FY-2006 AHPS implementation plans up the chain-of-command along with associated graphics.
- Made and disseminated appropriate AHPS forecasts for January, February and March 2005.
- Provided comments on the draft AHPS Program Plan.
- Provided suggestions and comments on the proposed AHPS Theme Team members and leaders.
- Provided comments to SRH concerning AHPS Phase II updates.
- Provided two sets of comments to OHD concerning the draft DMIP II Science Plan.

3rd Quarter FY05

- Made and disseminated appropriate AHPS forecasts for April, May and June 2005.
- Monitored status of Action Items generated during OHD/ABRFC/WGRFC HDMS Conference Call (3/2/05).
- Facilitated ABRFC/WGRFC Verification Conference Call on 4/27/05. Composed an agenda, conducted the call, composed minutes and assigned action items.
- Work continues on the Short Term QPF Ensemble Forecast project in coordination with OHD.
- Researched the problems we have had with the HPC ensemble QPF AHPS project. The v5 modern model ensemble run was not working. Changed the time the job ran on the cron and this has evidently fixed the problem. Participated in the latest HPC conference call concerning the ensemble QPF project with HPC.
- Work continues on the DHMS calibration and implementation. Continued analysis on the incorrect times of the "SHEFed" STGH Distributed Model time series. Wrote program to drop Distributed Model time series out of OFS database, put them in SHEF and then put into Informix database. This program resolves the problems that ABRFC was having with improper time series being applied to the wrong times. Now, we can proceed with more verification of the DM.
- Further researched Brightwork, a set of project management software, for the purpose of possible use in managing DHMS 2.
- Work continues with NWS-OHD concerning the AHPS task to include ABRFC P3 88-D precipitation estimation software functionality in MPE.
- Calibration of VERD forecast group continues for AHPS long term forecasts. Added ESP computations to the VERD segments.
- Added ESG AHPS forecast text product for Dodge City and Wichita WFOs. This product includes stage quantile information in table form.
- Participated in the AHPS Short to Long Term Forecast Services and the Flash Flood Services Theme Team activities.
- Participated in an OHD/ABRFC/WGRFC DHMS Conference Call.

- Work continues on the verification for various types of AHPS forecasts.
- Work was completed at ABRFC for the 23 remaining FY-05 forecast points but graphics have not been released at this time to WFO Topeka for eight of these forecast points.
- AHPS Precipitation Information Team – Ken Pavelle accepted position on the team, participated in first two conference call meetings and accepted role as team leader.
- AHPS training now scheduled for WFOs Topeka and Springfield for this FY.
- Completed formal FY-06 ABRFC AHPS work plan.
- Written comments provided for AHPS Streamflow Regulation project.

4th Quarter FY05

- FY-06 AHPS local basin calibration work began this quarter.
- FY-06 AHPS local discharge time series analysis work began this quarter.
- Ken Pavelle continues to lead the AHPS Precipitation Information Team. Work is nearly complete.
- Participated in the ARC conference call to represent SR RFC field views for Theme Teams.
- Work continues on the Short Term QPF Ensemble Forecast project in coordination with OHD. Provided OHD with QPF data to update QPF period of record.
- Work continues on the verification/validation for various types of AHPS forecasts. Information was shared with four offices in Central Region for feedback.
- Participated in the AHPS Short to Long Term Forecast Services and the Flash Flood Services Theme Team activities.
- Work continues with NWS-OHD concerning the AHPS task to include ABRFC P3 88-D precipitation estimation software functionality in MPE.
- Provided AHPS training and coordinated AHPS operational requirements with the staffs of WFO Topeka and WFO Springfield.
- Contractor (RTi) delivered ABRFC FY-05 data analysis work task.
- ABRFC AHPS brochure printing bid process completed, brochures printed and delivered to ABRFC. Copies distributed to appropriate WFOs.
- Work continues on the HDMS implementation. New basin calibration on hold until OHD delivers new a priori parameters. Reviewed and commented on final OB7 HDMS requirements. Continued work to add 15 new DMIP II test basins. Local DHMS verification and case study analysis work has commenced.

Problems Encountered/Issues

1st Quarter FY05

- FY05 funding has not been approved for the ABRFC historical data analysis task to be performed by contractor.

2nd Quarter FY05 - None

3rd Quarter FY05 - None

4th Quarter FY05 - None

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.

Milestones:

Implementation Area	Forecast Points Planned	Due Date FY05	Actual to Date (4th Qtr FY05)	Variance
Duck Basin, TN	3	3 rd Q	3	0
	1	4 th Q	1	
Buffalo Basin, TN	1	4 th Q	1	0
Elk Basin, TN	2	4 th Q	2	0
Total	7	FY05	7	0

Accomplishments/Actions

1st Quarter FY05

- All planned FY04 AHPS objectives were completed as scheduled.
- Initial preparations were made for FY05 RES-J and SAC-SMA basin calibration by RTi for 3 reservoirs and 5 headwater basins.
- LMRFC participating in market research calls with RTi. RTi reviewing LMRFC proposal for FY05.
- Draft SOO nearing completion.
- LMRFC has reviewed/revised all required AHPS Project Manager documents.

2nd Quarter FY05

- SOO T5-0007 was approved by COTR and awarded to RTi on March 24. Expect to begin monthly coordination calls with RTi.
- All SOO required LMRFC data/files were compiled and sent to RTi.
- Making preparation to implement three new AHPS sites during the 3rd Qtr.
- Local efforts continuing for in-house basin calibration.
- Historical data collection and double-mass analysis for FY06 AHPS implementation continues for basins in west Tennessee. Associated work also continues for the Sunflower basin; and when finished, will complete all Yazoo Basin historical MAP work.

3rd Quarter FY05

- Implemented three AHPS points in the Duck Basin.
- Preparations underway to implement 4 additional AHPS points during the 4th Q.
- Positive Contractor progress calls were held on May 26 and June 6.
- Contractor calibrations have been completed and calibration decks provided for local testing. LMRFC to provide feedback on calibration results by July 12.
- Completed four in-house SAC-SMA basin calibrations for ARTT1, TAZT1, PLKT1, and IRCT1
- Completed all historical MAP datasets in the Yazoo Basin for FY06 AHPS implementation. Historical data collection and double-mass analysis continues for basins in west Tennessee.

4th Quarter FY05

- All requirements for FY05 AHPS Task 5-0007 have been completed.
- All 7 AHPS sites scheduled for FY05 have been implemented.
- Implemented 4 AHPS points in the Duck and Elk Basins.
- In-house basin calibration activities continue in support of AHPS activities.

- All historical MAPs for the west Tennessee basins and the Yazoo Basin have been completed in preparation for FY06 AHPS activities. Data collection for FY06 AHPS calibration plans are in progress.

Problems Encountered/Issues

1st Quarter FY05 – None

2nd Quarter FY05 – None

3rd Quarter FY05 – None

4th Quarter FY05 – None

AHPS Implementation for SERFC

Management Lead: John Feldt, HIC

Objective Implement probabilistic hydrologic forecasts for basins in the Southeast River Forecast Center's (SERFC) area of responsibility. Our goal is to complete AHP basic services implementation by the end of FY2008 (assumes full AHPS funding).

Milestones

Implementation Area	Forecast Points Planned	Due Date	Actual to Date (2 nd Qtr FY05)	Variance
PeeDee	6	1 st Qtr	6	0
	2	2 nd Qtr	2	
Santee	4	2nd Qtr	4	
	2	3 rd Qtr	2	0
Total	14	FY05	14	0

Accomplishments/Actions

1st Quarter FY05

- Work is complete to incorporate operationally into NWSRFS the calibrations provided by RTi in October 2003.

2nd Quarter FY05

- Statement of Objective for FY05 AHPS contract work submitted to AHPS Program Office.

3rd Quarter FY05

- John Feldt attended a meeting in Raleigh on February 15, with North Carolina Flood Mapping officials to discuss the Tar River Project as well as other AHPS products.
- On February 19-20, Mark Love (Hydrologist) represented the SERFC at the annual Georgia River Network Conference in Milledgeville, GA. He displayed two posters showing a variety of AHPS products that might be of interest to conference attendees.
- Todd Hamill, SERFC senior hydrologist, made a presentation at the Interdepartmental Hurricane Conference in Jacksonville on March 8, 2005 that showed AHPS products that were used during the 2004 hurricane season.
- On March 14, 2005 John Feldt (HIC) made a presentation at the annual South Carolina Association for Hazard Mitigation conference in Myrtle Beach, S.C. He showed a number of AHPS products that would be of interest at attendees.
- John Feldt was moderator of a session at the National Hurricane Conference in New Orleans on March 21 – 24, 2005. His presentation showed AHPS products that were used during the 2004 hurricane season.
- The NWS Southeast River Forecast Center (SERFC) co-sponsored the 2005 Georgia Water Resources Conference. The biennial conference took place on the campus of the University of Georgia in Athens from April 25-27, 2005. The overall theme of the SERFC effort this year was the communication and response during September 2004, when Hurricanes Frances, Ivan, and Jeanne pounded Georgia. A focus was on available AHPS products. The AHPS theme was reflected in the SERFC exhibit prepared by hydrologist Rick Ullom and the session moderated by hydrologist Mark Fuchs. A portion of the SERFC-moderated session included a presentation by HAS forecaster Jack Bushong who provided an overview of Advanced Hydrologic Prediction Services (AHPS) web pages currently, along with a glimpse of graphical hydrographs to be available this summer.
- AHPS promotional items (luggage tags) were purchased to be used for AHPS outreach activities.

- Christine McGeheee, SERFC hydrologist, represented SERFC at the annual Florida Governor's Hurricane Conference May 10-12. In addition to the general sessions, she attended the training sessions on tropical meteorology, RACES training, and workshops on Inland Hurricane Hazards and Water Matters. AHPS products and services were discussed with emergency managers from across the state of Florida and also with a professor from Florida State University.
- Jack Bushong, HAS forecaster, participated in the annual Florida statewide EMA Hurricane Exercise May 18-20. Jack performed three daily hydrometeorology briefings at the Florida EOC on a mock hurricane affecting Florida. Jack used SERFC AHPS web graphics extensively in his briefings.
- The state of Florida was hit with four hurricanes in 2004 which resulted in widespread major flooding. SERFC and WFOs Melbourne and Tampa Bay hosted two workshops June 14-17, to bring together our federal, state and local partners and customers to discuss NWS products and services during the hurricanes of 2004 and investigated ways to make improvements for the upcoming 2005 hurricane season. AHPS was described in detail and AHPS web graphics were shown in the presentations. Reggina Cabrera and John Feldt participated at the east Florida workshop in Sanford, and Jonathan Atwell and John Feldt participated at the west Florida workshop at Brooksville and Arcadia.
- Three people from SERFC are participating on national AHPS Theme Teams. Conference calls have occurred with all three teams this month.
 - Reggina Cabrera – Graphical Dissemination of Hydrologic Information
 - Brad Gimmetstad – Software Architecture Enhancements
 - John Feldt – Innovation
- The FY06 AHPS outreach and training requests were submitted to Southern Region Headquarters.

4th Quarter FY05

- Todd Hamill traveled to WFOs Raleigh, NC and Blacksburg, VA and provided updates of SERFC AHPS activities to the WFO staffs.
- SERFC has provided the contractor (RTi) with requested data sets needed for this years contract work.

Problems Encountered/Issues

1st Quarter FY05 - None

2nd Quarter FY05 - None

3rd Quarter FY05

- FY05 contract work that we submitted final SOO for in March has not been awarded.

4th Quarter FY05 – None

AHPS Implementation for WGRFC

Management Lead: Jerry M. Nunn

Objective: Implementation of probabilistic hydrologic forecasts for the West Gulf River Forecast Center (WGRFC) area of responsibility.

Milestones

Implementation Area	Forecast Points Planned	Due Date FY05	Actual to Date (2 nd FY05)	Variance
Trinity River	2	1 st Quarter	2	0
	1	2 nd Quarter	1	0
	0	3 rd Quarter	0	0
	0	4 th Quarter	0	0
Total	3		3	0

Accomplishments/Actions

1st Quarter FY05

- RFC continues the calibration and dataset preparation for implementation of AHPS Basic Services on the remainder of the Trinity River – scheduled for 2nd Quarter FY05. We continue to develop and test selected watersheds on the Distributed Model as part of the DMIP. We are also working with OHD on testing and implementing VAR and the SSHP.

2nd Quarter FY05

- RFC completed implementation of AHPS Basic Services on the remainder of the Trinity River. We continue with activities on the DMIP, VAR and SSHP and implementation. In collaboration with WFO Houston, conducted AHPS outreach for the Trinity River Authority, county and regional emergency managers in southeast TX,. Continued market research with RTi.

3rd Quarter FY05

- Continuation of activities associated with development and implementation of the DMIP, VAR and SSHP. Market research completed with RTi, and input data sets of time series of precipitation and streamflow sent to RTi in conjunction with calibration effort on selected Neches River watersheds.

4th Quarter FY05

- Collected historical reservoir elevation and discharge information for the four reservoirs in the Angelina-Neches basin: B. A. Steinhagen; Sam Rayburn; Striker Creek; and Lake Palestine. Data was quality controlled and converted into datacard format. Calibration decks set up to assist in modeling reservoir releases using the RES-J operation. Also began working on MAP calculations. Bugs that initially were hampering the MAP calculation process were identified, and corrected, allowing the process to resume without additional delays.

Problems Encountered/Issues

1st Quarter FY05 – None.

2nd Quarter FY05 – None.

3rd Quarter FY05 – None.

4th Quarter FY05 – None.

AHPS Implementation for CBRFC

Management Lead: David Brandon, HIC/CBRFC

Objective: Implement probabilistic hydrologic forecasts for 22 basins in the Colorado Basin River Forecast Center's (CBRFC) area of responsibility.

Milestones

Implementation Area	Forecast Points Planned	Due Date	Actual to Date (4 th Qtr FY05)	Variance
Green Basin	22	9/30/05	22	0
Total	22	FY05	22	0

Accomplishments/Actions

1st Quarter FY05

- All sites have been calibrated
- All sites are set up for ESP

2nd Quarter FY05 - None

3rd Quarter FY05 – Continue ESP implementation activities.

4th Quarter FY05 – Completed implementation of ESP at 22 points

Problems Encountered/Issues

1st Quarter FY05 - None

2nd Quarter FY05 - None

3rd Quarter FY05 – None

4th Quarter FY05 - None

AHPS Implementation CNRFC

Management Lead Robert Hartman, HIC/CNRFC

Objective Implement probabilistic hydrologic forecasts for 19 basins in the California-Nevada River Forecast Center's (CNRFC) area of responsibility.

Milestones

Implementation Area	Forecast Points Planned	Due Date	Actual to Date (4 th Qtr FY05)	Variance
Southern California and Central California coast	19	9/30/05	19	0
Total	19	FY05	19	0

Accomplishments/Actions

1st Quarter FY05

- Continuing operational ESP implementation

2nd Quarter FY05

- Continuing operational ESP implementation

3rd Quarter FY05

- Continuing operational ESP implementation

4th Quarter FY05

- Completed operational ESP implementation at 19 points

Problems Encountered/Issues

1st Quarter FY05 - None

2nd Quarter FY05 - None

3rd Quarter FY05 - None

4th Quarter FY05 - None

AHPS Implementation for NWRFC

Management Lead Harold Opitz, HIC/NWRFC

Objective Implement probabilistic hydrologic forecasts for 38 basins in the Northwest River Forecast Center's (NWRFC) area of responsibility.

Milestones

Implementation Area	Forecast Points Planned	Due Date	Actual to Date (4 th Qtr FY05)	Variance
Kootenay, Pend d'Oreille, Clark Fork, Upper Columbia	38	9/30/05	38	0
Total	38	FY05	38	0

Accomplishments/Actions

1st Quarter FY05

- Continuing operational ESP implementation.

2nd Quarter FY05

- Continuing operational ESP implementation.

3rd Quarter FY05

- Continuing operational ESP implementation.

4th Quarter FY05

- Completed operational implementation of ESP at 38 points.

Problems Encountered/Issues

1st Quarter FY05 – None

2nd Quarter FY05 - None

3rd Quarter FY05 – None

4th Quarter FY05 - None

Training

Hydrologic Science Training - COMET

Theme: Training

Management Lead – Jeff Zimmerman

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

Milestones

Task	Due Date	Status
Flash Flood Hydrology/QPE Workshop	1 st Q	Complete
Flash Flood Hydrology/QPE Workshop	2 nd Q	Complete
Develop Basic Hydro Science Distance Learning Course	4 th Q	On-going

Accomplishments/Actions

1st Quarter FY05

- Completed delivery of the first of two Flash Flood Hydrology/QPE workshops.

2nd Quarter FY05

- Completed delivery of the second of two Flash Flood Hydrology/QPE Workshops.
- Work continues on the development of the Basic Hydro Science Distance Learning modules.

3rd Quarter FY05

- Work continues on the development of the Basic Hydro Science Distance Learning modules
- Flash Flood teletraining sessions have been conducted with Eastern and Southern Regions

4th Quarter FY05

- Work continues on the development of the Basic Hydro Science Distance Learning modules. It is expected that these modules will be available in FY 2006.
- Activity has resumed on the development of the Advanced Hydrologic Science residence course. There will be one offering of this course in FY 2006.

Problems Encountered/Issues

1st Quarter FY05

- Due to budget shortfalls, the first offering of the Advanced Hydrologic Science residence course was cancelled in FY 2005. Work will continue on the development of the course, which will be proposed to be offered in FY 2006.

2nd Quarter FY05 - None

3rd Quarter FY05 - None

4th Quarter FY05 - None

RFC/WFO Training

Theme: Training

Management Lead: Jeff Zimmerman

Objective: Provide a basic level of knowledge and understanding for WFO staff regarding the implementation of AHP services in their Hydrologic Service Area.

Milestones

Task	Due Date	Status
WGRFC/WFO HGX	2 nd Q	Complete
CR RFC/WFO Activity	3 rd Q	Not funded by AHPS
SERFC/WFO TBW	3 rd Q	Complete
SERFC/WFO MLB & JAX	3 rd Q	Complete
ABRFC/WFO TOP	4 th Q	Moved to 4 th Q
ABRFC/WFO SGF	4 th Q	Moved to 4 th Q
LMRFC/WFO JAN	3 rd Q	Cancelled
LMRFC/WFO MEG	3 rd Q	Cancelled
CR RFC/WFO Activity	4 th Q	Not funded by AHPS
APRFC/WFO AFG/AJK	4 th Q	Completed AJK
CBRFC/Supporting WFOs	4 th Q	Cancelled

Accomplishments/Actions

1st Quarter FY05 - None

2nd Quarter FY05

- Completed WGRFC/WFO HGX training activity.

3rd Quarter FY05

- Completed SERFC/WFO TBW and SERFC/WFO MLB/JAX training activities

4th Quarter FY05

- Completed APRFC/AJK training activity

Problems Encountered/Issues

1st Quarter FY05 – None

2nd Quarter FY05 - None

3rd Quarter FY05

- Cancelled LMRFC/WFO JAN and LMRFC/WFO MEG training activities. Central Region will fund their WFO/RFC workshops out of Regional funds. The \$2K allocated to CR has been spent on other items.

4th Quarter FY05

- Cancelled WR CBRFC activity. Cancelled APRFC/AFG activity.

RFC/HPC Visiting Forecaster

Theme: Training

Management Lead: Peter Manousos, HPC Development and Training Branch

Objective: To improve understanding and cooperation between HPC forecasters and RFC hydrologists

Milestones

Task	Due Date	Status
1.Revise agenda for RFC visitors to HPC and HPC visitors to RFCs.	February 2005	Completed
2. Schedule and implement visits.	September 2005	Completed

Accomplishments/Actions

1st Quarter FY05

- Began planning for FY05 visits

2nd Quarter FY05

- All visits have been determined and all but two visits have been scheduled. They include visits to the HPC from NCRFC, ABRFC WGRFC, MARFC, OHRFC, and NERFC. HPC will send forecasters to LMRFC, NCRFC, and SERFC.

3rd Quarter FY05

- Three trips took place during May and June. Two trips are scheduled for July and 4 trips for August.

4th Quarter FY05

- All trips were successfully completed.

Problems Encountered/Issues

1st Quarter FY05 - None

2nd Quarter FY05 - None

3rd Quarter FY05 - None

4th Quarter FY05 - None

River Hydraulics Tutorial

Theme: Training

Management Lead: Jeff Zimmerman

Objective: Develop tutorial that explains how to run the Simplified Dam Break model including data acquisition (i.e., cross section selection and the selection of dam break parameters).

Milestones

Task	Due Date	Status
Cross section tutorial	Q4	Incomplete
How to run SMPDBK tutorial	Q4	Incomplete

Accomplishments/Actions

1st Quarter FY05

- Currently doing project planning
- Started developing HOSIP documents.

2nd Quarter FY05

- Work began on the development of the SMPDBK tutorial. The tutorial will have three components: 1) general dam break forecasting and the science behind it; 2) simplifications made to SMPDBK to generate a forecast as well as how to do a detailed SMPDBK forecast; and 3) a quick and dirty guide to running SMPDBK for someone with a limited or no hydraulics background. Technical information was gathered and a storyboard is being created to describe dam break forecasting in general.

3rd Quarter FY05

- Work continued on the first component of the tutorial which provides general information about dam, reservoirs, and how dams fail. Work began on the third component which explains how to generate a "quick and dirty forecast."

4th Quarter FY05

- Work was completed on the first and third components of the tutorial which provide a general overview of the overall process of predicting dam failure, and explains how to do a "quick and dirty" forecast. Work began on the second component which provides detailed instructions for running SMPDBK, but this component is currently incomplete. The work of integrating the components into a finished product is also still outstanding.

Problems Encountered/Issues

1st Quarter FY05 – None

2nd Quarter FY05 - None

3rd Quarter FY05

- Task leader is leaving NWS as of July 22. Ability to finish deliverables on schedule is now an issue.

4th Quarter FY05

- Both the contractor assigned to oversee the project and all the student interns working on the tutorial have left NWS as of August 31. Staff will need to be identified and re-assigned in order to complete the project. In addition, there will need to be a detailed assessment of work completed to date, and a new projection of the delivery schedule.

Outreach

Outreach Work Plan

Theme: Outreach

Management Lead: Tom Graziano

- Objectives:**
- Accomplish outreach with national, regional, and local partners and customers with local emphasis on locations where AHPS is being or will soon be implemented
 - Develop clear and consistent AHPS outreach materials for use by national, regional, and local personnel

Milestones

Task	Org.	Due Date	Status
Turn Around Don't Drown Brochure <ul style="list-style-type: none"> • Develop brochure w/National Safety Council • Printing approx 300,000 copies • Distribution via NSC (4,000 copies) 	OCWWS	2 nd 2 nd 2 nd	Complete Complete Complete
Floods the Awesome Power Brochure <ul style="list-style-type: none"> • Develop brochure w/National Safety Council • Printing approx 100,000 copies • Distribution via NSC (4,000 copies) 	OCWWS	2 nd 3 rd 3 rd	Complete Complete Complete
Tropical Cyclone Inland Flooding Brochure <ul style="list-style-type: none"> • Develop brochure • Printing approx 200,000 copies • Distribution 	OCWWS	2 nd 2 nd 2 nd	Complete Complete Complete
Customer Regional Workshop (Columbus, OH)	ER	3 rd	Completed
Customer Regional Workshop (Albany, NY)	ER	3 rd	Completed
Customer Regional Workshop (Boston, MA)	ER	3 rd	Completed
Customer Regional Workshop (Minneapolis, MN)	CR	4 th	Completed
Customer Regional Workshop (Chicago, IL)	CR	4 th	Completed
Customer Regional Workshop (Milwaukee, WI)	CR	4 th	Completed
SERFC AHPS Educational Outreach	SR	4 th	On track
SERFC AHPS Briefings Hurricane Conference (travel 4,560 booth 1,000)	SR	3 rd	Complete
LMRFC WFO Jackson, COE District Office, MVD, MEMA, Pearl River Water Supply District AHPS Educational Material	SR	3 rd	Postponed due to revisions in AHPS point targets for FY05
LMRFC AHPS Brochures	SR	4 th	Complete
WGRFC Trinity River Authority Educational Outreach	SR	3 rd	Complete
WGRFC Outreach – Texas Flood Plain Managers Meeting (TFPMM)	SR	3 rd	Complete
LMRFC WFO Memphis, Memphis COE District AHPS Educational Outreach	SR	3 rd	Postponed due to revisions in AHPS point targets for FY05
Brochure: AHPS Water Supply	WR	4 th	Completed
ABRFC AHPS Brochures	SR	4 th	Complete
ABRFC AHPS Customer Service Workshop	SR	4 th	Complete

TEXAS DEM AHPS Outreach	SR	3 rd	Complete
WFO MRX AHPS Outreach	SR	4 th	Complete

Accomplishments/Actions

1st Quarter FY05

- **Turn Around and Don't Drown** brochure development completed and PDF available via HSD homepage
- Updated AHPS Toolbox with new outreach resources including PSAs
- Established outreach resource page in support of Flood Safety Awareness week (<http://weather.gov/floodsafety/>)

2nd Quarter FY05

- 284,000 copies of **Turn Around and Don't Drown** brochures printed and available for distribution
- **Floods the Awesome Power** brochure development completed, 148,000 copies being printed and PDF available via HSD homepage.
- 200,000 copies of **Tropical Cyclone Inland Flooding** brochures printed and available for distribution
- Arrangements finalized for initial CR Customer Regional Workshops to be held the week of 02 May.
- Conducted AHPS outreach meeting with Trinity River Authority officials and county and regional emergency managers from southeast and east Texas
- Updated AHPS booth exhibit. SERFC personnel attended National Hurricane Conference and Interdepartmental Hurricane Conference and provided AHPS briefings.

3rd Quarter FY05

- Conducted AHPS outreach at the TX DEM facility. The TX DEM invited other state agency representatives to the meeting and also made our presentations accessible to the county EMs across the state. Provided an overview of the AHPS program and information about the AHPS web page and our probabilistic hydrologic information.
- SERFC personnel completed AHPS outreach activities at national/state hurricane conferences.
- WGRFC personnel conducted AHPS outreach at the annual Texas Flood Plain Managers meeting.
- SERFC personnel gave presentations about AHPS at the annual SC Emergency Managers conference and the biannual Georgia Water Resource Conference.

4th Quarter FY05

- OCWWS submitted a Turn Around Don't Drown article to the American Association of Motor Vehicle Administrators (AAMVA) that was printed in MOVE Magazine.

Problems Encountered/Issues

1st Quarter FY05 - None

2nd Quarter FY05 - None

3rd Quarter FY05

- ER conferences were changed due to scheduling conflicts
- Two CR Regional Workshops scheduled for the 3rd quarter have been rescheduled for August

4th Quarter FY05 - None

Program Management

Program Management Activities

Theme: Program Management

Management Lead: John Ingram, OHD

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

Milestones

Deliverable	Quarter			
	1st	2nd	3rd	4th
AHPS Planning/Execution/Reporting <ul style="list-style-type: none"> • Planning <ul style="list-style-type: none"> o Update Implementation Plan o Define goals and required resources for enhanced AHPS implementation o Develop Standards for ESP products o Update 'OMB 300' Documentation • Execution/Reporting <ul style="list-style-type: none"> o Quad Charts (monthly) o Financial Status Report (monthly) o Quarterly Status Report o Earned Value Report to OMB (monthly) 		X	X X	X
NOAA PPBES Hydrology Program Support <ul style="list-style-type: none"> • Planning <ul style="list-style-type: none"> o Provide input to NOAA Strategic Plan and Annual Guidance Memorandum o Conduct Program Baseline Assessment o Update Program Plan • Execution/Reporting <ul style="list-style-type: none"> o Provide Performance Charts (monthly) o Quad Charts (monthly) o Quarterly Program Review 		X	X	X X
Agency/Departmental/Legislative Interfaces <ul style="list-style-type: none"> • Develop Budget documentation <ul style="list-style-type: none"> o Budget Fact Sheet o Prepare and submit Budget Request • Support NWS/NOAA/DOC Budget submission <ul style="list-style-type: none"> o Prepare briefings and support OMB/Congressional meetings o Prepare response to NOAA/DOC/OMB Pass Backs o Prepare response to Budget Hearing questions 	X	X	X X	X
Hydrology Operations & Service Improvement <ul style="list-style-type: none"> • OHD System Management (HOSIP, Hydrology Operations & Service Improvement) <ul style="list-style-type: none"> o HOSIP Instructions o HOSIP Templates o HOSIP Guidelines & Standards o Performance Statistics • NWS System Management (OSIP, Operations & Service Improvement) <ul style="list-style-type: none"> o NWS Gate Status Reports o NWS OSIP Validation & Recommendation Report 	X	X X	X X	X X
Probabilistic Performance Measure <ul style="list-style-type: none"> • Description of probabilistic performance measure • Define data collection requirements 			X	X

Accomplishments/Actions

1st Quarter FY05

- All 1st Quarter deliverables were provided.

2nd Quarter FY05

- All 2nd Quarter deliverables were provided.

3rd Quarter FY05

- OCWWS/HSD obtaining requirements for new ESP products
- Remaining 3rd Quarter deliverables were provided.

4th Quarter FY05

- All 4th Quarter deliverables were provided.

Problems Encountered/Issues

1st Quarter FY05 - None

2nd Quarter FY05 - None

3rd Quarter FY05 - None

4th Quarter FY05 - None

Web Page Deployment

AHPS Web Page Activities

Theme: Web Page Deployment

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.

Milestones

Task	Due Date	Status
AHPS Web Page Maintenance/Support	September, 2005	Ongoing
Phase I Development/Implementation		
• HydroGen available on LAD (field offices, web farm)	August, 2005	Complete – Sept. 13
• HydroGen delivery to AWIPS	February, 2005	Complete
• Standardize National Map	March, 2005	Complete – Sept. 7
• Standard Map background	May, 2005	Complete – Sept. 7
National River Locations database (Phase 1)	March, 2006	Changed - Awaiting Impl. after OB6 delivery
Systems Architecture Document	July, 2005	Complete – Aug. 8
Implementation Meeting (Phase I)	March, 2005	Cancelled
AHPS Web Page Enhancements (Phase II)		
TBD by March, 2005	September, 2005	Phases I&II have been implemented in all regions – Sept. 7
According to Consistent Web Framework		
Implementation Meeting (Phase III)	September, 2005	Cancelled

Accomplishments/Actions

1st Quarter FY05

- Phase I development of AHPS Configuration Management System (AHPS CMS) interface was completed. AHPS CGI and HSA PHP map scripts modified to use data from AHPS CMS database. AHPS CMS was implemented in AR, CR, ER, and WR. Over 170 users added to AHPS CMS during this period. In addition, Phase II planning began with the OCWWS/HSD delivery of the requirements in mid December. OHD will respond with a proposed work plan in January.

2nd Quarter Fy05

- A work plan based on the Phase II requirements document from OCWWS/HSD was developed and approved. The HydroGen software was delivered to AWIPS for inclusion in OB6. Work continues to develop and test a version to put on the Local Applications Database (LAD) for use before OB6. Major work began on converting the infrastructure of the web pages to php to satisfy web administrators' security concerns. A new look and feel is being built into the pages which will incorporate new features presented in a meeting in Feb. 2004. In preparation for the new php version, the National Map has been reconfigured to use the standard projection of other NWS pages and local maps have been redone to have the ability to be updated dynamically from data in the AHPS CMS (the CMS has been a big hit with users!). These are awaiting the implementation of the php web pages to be made available.

- The Software Architecture document was slipped from April to May (same quarter) based on the need for the contractor to work on other items.

3rd Quarter FY05

- The LAD version of the HydroGen software has been beta tested at field sites in Eastern and Western Regions. A few issues have been found and addressed to be included in the LAD version and the AWIPS version (where appropriate). Testing will continue with some sites in SR in July. Delivery to the LAD is now anticipated in August.
- Training on the AHPS CMS was developed by Mike Callahan who also delivered 8 visitview training sessions to over 180 people.
- The new php version of the AHPS web pages has been completed and is awaiting full implementation in all regions.
- Phase III requirements were delivered by OCWWS/HSD. A work plan will be proposed in July.
- The Software Architecture document was slipped from May to July (3rd quarter) based on the need for the contractor to work on other items.

4th Quarter FY05

- The AWIPS OB6 (Phase 3) Beta software was installed at one site (Morristown, TN) in August and the HydroGen included in it was configured with no major problems and is running.
- A Phase III web page work plan was agreed on in August. It will be modified as needed when the final budget for FY06 comes in.
- The new php version of the AHPS web pages was implemented at all regions on September 7. This version included the items in the work plans for Phases I and II.
- The HydroGen software was made available on the LAD on September 13.
- NRLDB software was alpha tested at OHRFC. Awaiting OB6 sites for beta testing.
- Systems Architecture Document was delivered to OCWWS/HSD, OHD, and OCIO in early August.

Problems Encountered/Issues

1st Quarter FY05

- A few delays in implementation of the CMS were encountered due to the active weather – mainly the hurricanes in SR. All regions have since implemented the CMS.

2nd Quarter FY05

- We've encountered a few delays in developing a HydroGen package for the LAD that will install on AWIPS machines. We are currently beta testing at additional WFOs.
- There have been delays the completion of the php conversion task to await a decision on the color scheme to use for flood levels. There are also concerns about the ability to implement the same code at all region web farms since they have inconsistent infrastructures. Additional coding may be needed to implement at some regions.

3rd Quarter FY05

- We encountered a few delays in completing beta testing of the HydroGen package for the LAD that will install on AWIPS machines. We plan to have the package ready for the LAD after completing the SR beta tests.
- There has been a delay in the php implementation in order to get all regions ready to go live at the same time. The current plan is to implement in mid-late July.

4th Quarter FY05

- NRLDB is to be delivered after AWIPS OB6 is released. AWIPS OB6 general delivery has been delayed until at least Jan. 2006. NRLDB software will be tested at a few AWIPS beta sites before general AWIPS release.

Collaborative Research

On-going Competitive and Collaborative Research

Theme: Collaborative Research

Management Lead: Pedro J. Restrepo

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

Milestones

Task	Due Date	Status
On-going competitive grants- Renewal	March 4	Completed
Collaborative grants (Red River of the North)	June	Completed

Accomplishments/Actions

1st Quarter FY05

- We received 27 pre-proposals for new competitive grants. There was no money in the budget to award new grants. All proposers were notified and the process terminated.
- We received progress reports from 3 of the 4 on-going competitive grants. As of today, we also hosted a seminar on the research grant from the U. of Arizona. We will be hosting seminars from the U.of Colorado, U. of Iowa and Central Florida University on Monday, February 7.
- We received a proposal for continuation of a collaborative research from Shripad Deo at CIRA. We requested a re-scope of the proposal which was received and is being evaluated

2nd Quarter FY05

- All progress reports for the on-going competitive grants were received and the renewal process was complete and delivered to the Office of Grants.
- We received news of a Congressional earmark for the Red River Basin Institute. The RFA was published one week ago, and in a telephone conversation with the Institute Director (Chuck Fritz) he communicated that he was completing the proposal this afternoon (4/22)

3rd Quarter FY05

- All on-going competitive grants were submitted on-time to the Grants office.
- The non-competitive Red River earmark grant was received by the proponent on-time. OHD evaluated the grant with assistance of two outside reviewers, approved and forwarded the material to the grants office on time.

4th Quarter FY05

- All grants were awarded on time

Problems Encountered/Issues

1st Quarter FY05

- Apart from the reduced amount of funding, there have been no problems

2nd Quarter FY05 - None

3rd Quarter FY05 - None

4th Quarter FY05- None

Software Infrastructure and Integration

Streamflow Regulation Accounting

Theme: Software Infrastructure and Integration

Management Lead: Dan Urban

Objective: To continue the development of a strategy for AHPS implementation for river basins where the regulation of stream flow is substantial. This strategy will enable MBRFC and other RFCs to effectively account for the effects of this regulation in their conditional simulations in ESP and thereby provide consistent, accurate, science-infused long-range probabilistic forecasts.

Milestones

Task	Due Date	Status
Implement SRA on the Cache la Poudre River sub-basin	Q2	Completed on time
Implement SRA on a TDB area of the St. Platte River system	Q1 (FY06)	On schedule

Accomplishments/Actions

1st Quarter FY05

- Work began on the implementation of the Cache la Poudre sub basin; calibration of the system was done for the three approaches; two MBRFC staff members visited RTI to collaborate on regulation modeling of the Cache la Poudre sub-basin; a specific plan for implementation was developed, documented, and is now being executed.

2nd Quarter FY05

- The implementation plan for the Cache la Poudre sub-basin was executed. The draft report was submitted by RTi and reviewed by MBRFC and OHD. A training session and kickoff meeting to identify the next area to be modeled is planned for next quarter.
- Three approaches to modeling in the ensemble forecasting mode were applied to the Cache la Poudre sub-basin: (1) ignoring the effects of regulation, (2) utilizing aggregated historical records of the regulation practices, and (3) modeling the regulation using a combination of NWSRFS operations. Although the statistics did not show a marked improvement over using the observed data, it was determined that in order to do ensemble forecasting in the Cache la Poudre, modeling the streamflow regulation was the only viable option.

3rd Quarter FY05

- The SOO and the proposal for the next area of the South Platte to be modeled were processed.

4th Quarter FY05

- Work commenced on the Data Collection and Processing and Hydrologic Model Calibration subtasks. Significant regulations were identified and wastewater treatment plant flow information was incorporated in the flow naturalization process. Pool elevation and storage data were obtained for reservoirs in the system, and a water balance analysis was completed for the South Platte sub-basins.
- The hydrologic calibrations were reviewed for consistency and the hydrologic model parameters were finalized for each sub-basin. Modeling approaches for each sub-basin were determined and the initial regulation models for each sub-basin were calibrated.

Problems Encountered/Issues

1st Quarter FY05 – None

2nd Quarter FY05 – None

3rd Quarter FY05 – None

4th Quarter FY05 - None

Streamflow Regulation Tools

Theme: Software Infrastructure and Integration

Management Lead: Jon Roe

Objective: To enhance existing NWSRFS models to aid with modeling the Streamflow Regulation

Milestones

Task	Due Date	Status
OHD write HOSIP Need Identification Document	Q4	Complete
Pass HOSIP Gate 1.	Q1 FY06	Upcoming (delayed to Q1 FY06)
OHD write Statement of Objectives for task and deliver to Contracts.	Q3	Complete
OHD Review/Accept Statement of Work from Contractor	Q4	Complete
OHD Receive HOSIP Gate 2 documents	Q1 FY06	Upcoming (date moved from Q4 to Q1 FY06)
Pass HOSIP Gate 2.	Q1 FY06	Upcoming (date moved from Q4 to Q1 FY06)
OHD Receive HOSIP Gate 3 documents	Q1 FY06	Not started (date moved from Q4 to Q1 FY06)
Pass HOSIP Gate 3.	Q1 FY06	Not started (date moved from Q4 to Q1 FY06)
OHD receive/review HOSIP Gate 4 design documents	Q2 FY06	Not started (date moved from Q4 to Q2 FY06)
OHD receive and MBRFC review HOSIP Gate 4 test documents	Q2 FY06	Not started (date moved from Q4 to Q2 FY06)
OHD receive contractor developed code and deliver OHD compiled code to MBRFC	Q2 FY06	Not started (date moved from Q1 to Q2 FY06)
MBRFC test functions	Q2 FY06	Not started (date moved from Q1 to Q2 FY06)
OHD Receive remainder of HOSIP Gate 4 documents	Q2 FY06	Not started (date moved from Q1 to Q2 FY06)
Pass HOSIP Gate 4	Q2 FY06	Not started

Accomplishments/Actions

1st Quarter FY05

- Project planning

2nd Quarter FY05

- The SOO is currently being developed and will be available in early May.

3rd Quarter FY05

- The SOO was completed and delivered to Contracts.

4th Quarter FY05

- The task was awarded; work began on Sept 15
- HOSIP NID and SON written and submitted
- HOSIP Gate 1 delayed to Q1 FY06

Problems Encountered/Issues

1st Quarter FY05

- We will be asking the contractor to complete the enhancements listed below in our Statement of Objectives. The schedule and the number of tasks we complete will depend upon the response from the contractor.
 - (a) Currently, the CONS_USE operation requires specification of an input streamflow time series from which the diversion will be withdrawn. Make specification of the input time series optional to make it easier to simulate a case where the water source is a reservoir.
 - (b) Currently, CONS_USE return flows are assumed to return to the diversion point and are available for diversion. In many cases return flows return well downstream of the diversion point, or even exit the basin. Allow the user to specify if the return flows are available for diversion to provide the user more flexibility in the use of the operation.
 - (c) Include an option in the CONS_USE operation to have the operation compute return flows only, and to do so based on a given diversion time series. This would reflect situations where the actual diversion and subsequent return flow were limited by factors other than those currently considered in the operation.
 - (d) Enhance the LOOKUP3 operation to allow a date to be specified as one of the independent variables.
- The Contractor will also be responsible for writing all HOSIP Gate 2, 3, and 4 documents.
 - (a) Gate 2 documents include the Concept of Operations, Business Case, Operational Requirements Document, Statement of Need, Work Plan.
 - (b) Gate 3 documents include Detailed requirements
 - (c) Gate 4 documents include Design documents, Test Plan, Test Procedures, Test Results, code, Training Materials, User manuals, and System manuals.

2nd Quarter FY05 - None

3rd Quarter FY05

- The development of the SOO for the contractor was significantly delayed due to labor constraints within OHD for conducting many simultaneous contracting activities for task in progress and tasks to start up.
- The Contractor SOW was received in early July and will be accepted by OHD so work should commence by late July.

4th Quarter FY05

- HOSIP administration resource crunch delayed HOSIP Gate 1 to Q1 FY06
- Contractor's schedule in SOW calls for the following:
 - (a) Gate 2 documents and Gate 2 passage by Oct 15
 - (b) Gate 3 documents and Gate 3 passage by Nov 15
 - (c) Design, code, test, and integration by Jan 15 2006
 - (d) Gate 4 documents by Jan 15 2006
 - (e) Beta test at MBRFC by Feb 15 2006
 - (f) Gate 4 passage by Feb 15 2006

Due dates above have been updated to reflect Contractor's schedule.

River Ensemble Processor Software Architecture

Theme: Software Infrastructure and Integration

Management Lead: Jon Roe

Objective: To continue the definition and development of a new software architecture and infrastructure to support NWS hydrologic operations. Currently, there are four separate, yet related, areas of work. They are the Data Services prototype for RRS, the operational connection to USACE/HEC's ResSIM, the MAT architecture shell, and the expansion of the Hydrologic XML Consortium work. Specifically, the AHPS FY05 request is to move forward in the last two areas mentioned as outlined below. The Data Services for RRS prototype work is a continuation of AHPS FY04 CHPS tasking while the ResSIM connection work is being sponsored by a request from the Yuba County Water Agency in the State of California.

Milestones

Task	Due Date	Status
MAT Architecture Shell		
Write HOSIP Stage 1 documents.	Q2	Documents Revisions completed in Q4
Pass HOSIP Gate 1.	Q1 FY06	Documents Require further Revisions (Date moved from Q4 to Q1 FY06)
Write Statement Of Objectives (SOO) for contractor tasking.	Q4	Complete
Review Statement Of Work (SOW) from contractor.	Q4	Complete
Contractor and OHD conduct Validation and write HOSIP Stage 2 documents.	Q1 FY06	Not Started (Date moved from Q4 to Q1 FY06)
Pass HOSIP Gate 2.	Q1 FY06	Not Started (Date moved from Q4 to Q1 FY06)
Contractor conducts Research & Analysis and writes HOSIP Stage 3 documents.	Q2 FY06	Not Started (Date moved from Q4 to Q2 FY06)
Pass HOSIP Gate 3.	Q2 FY06	Not Started (Date moved from Q4 to Q2 FY06)
Expand HydroXC		
Write Statement Of Objectives (SOO) for contractor tasking to continue the overall expansion of the Hydrologic XML Consortium, Phases 2, 3, and 4.	Q3	Complete
Incorporate the requirements of the "FLDVIEW Data Interface (XML)" project into the SOO. The FLDVIEW interface project will become a sub-task within this larger "Expand HydroXC" task.	Q3	Complete
Review Statement Of Work (SOW) from contractor.	Q4	Not Started
For sub-task "FLDVIEW Data Interface (XML)", conduct complete four stage HOSIP project to be delivered to AWIPS (milestone details TBD at this time).	Q1 – Q2, FY06	Not Started
Survey RFCs on XML usage and needs and publish report of findings.	Q1, FY06	Upcoming
Obtain more data examples from HydroXC members	Q1, FY06	Upcoming

Task	Due Date	Status
Conduct 2 to 3 HydroXC member workshops	Q1 – Q2, FY06	Upcoming

Accomplishments/Actions

1st Quarter FY05

- We completed project identification, budgeting, and planning.

2nd Quarter FY05

- The HOSIP Stage 1 documents were completed for the MAT architecture shell work, however they require additional revisions.

3rd Quarter FY05

- No progress was made on the MAT architecture shell CHPS project this quarter mainly due to the departures of key contractor Martin Bennertz in April and Edwin Welles in June as well as an overwhelming amount of contract activities required by all the various FY05 AHPS projects.
- A new SOO to get this work going externally was being developed at the end of Q3 and will be completed and issued to Contracts in early July.
- The SOO for the overall HydroXC work, started in FY04, was completely updated to add Phases 2, 3, and 4 on top of the existing Phase 1 work which has nearly concluded as of June 30.
- The requirements to define and construct the HydroXC-compliant XML data interface between FLDWAV and FLDVIEW were written into the revised SOO.
- The revised SOO was submitted to Contracts and we are awaiting award.

4th Quarter FY05

- MAT Architecture Shell: SOO completed by Government.
- MAT Architecture Shell: SOW submitted by the Contractor was accepted by OHD.
- MAT Architecture Shell: Task awarded late in Q4.
- Expand HydroXC: SOWs submitted by two prime contractors.
- Expand HydroXC: RTi SOW chosen and accepted by Government.
- Expand HydroXC: Phase 2 of HydroXC work began late in Q4.

Problems Encountered/Issues

1st Quarter FY05

- This CHPS AHPS project plan/report will cover the sub-task FLDVIEW Data Integration (XML) as soon as the FLDVIEW Data Integration (XML) requirements are incorporated into this CHPS project.
- The allotted funding for the FLDVIEW Data Interface (XML) sub-task is well under what is required to complete the sub-task. It will only get started in FY05 and must get completed in FY06 pending FY06 financial support.

2nd Quarter FY05

- The XML phase 2 task will be scoped out closer to the end of the phase 1 of this task. In phase 1 (FY04 funded) we are working with several agencies to propose an XML schema for communicating data. We will be holding a workshop in May-June to discuss this schema, for participants in the HydroXC. In order to retain the inter-agency flavor (and not overwhelm our cooperators with NWS enthusiasm) we plan to limit NWS participation in the workshop. Prior to the workshop however, we will hold an NWS teleconference to be certain we collect input from those not here in Silver Spring.

3rd Quarter FY05

- The HydroXC workshop, intended for Spring 2005, was delayed out of Q3 because of OHD

resource constraints and scheduling difficulties among the Consortium members.

- A series of three workshops focusing on different Consortium members and their data examples is now planned for the last two weeks in July 2005.

4th Quarter FY05

- MAT Architecture Shell: Contracts was slow in awarding this task very late in Q4
- MAT Architecture Shell: HOSIP Stage 1 documents were revised to match SOO, but require further revisions based on Gate 1 feedback. Staff shortage resulting from Edwin Welles' departure delayed this effort until Q1 FY06.
- MAT Architecture Shell: Assuming a start date of late Sep 2005, the Contractor's SOW shows Stage 2/Gate 2 completion by early Dec 2005 and Stage 3/Gate 3 completion by mid Jan 2006. Due dates above have been revised to match.
- Expand HydroXC: Slow processing by Contracts created late Q4 award of Phase 2 work but it is now underway in earnest.

MAT Algorithms for NWRFC

Theme: Software Infrastructure and Integration

Management Lead: David Kitzmiller

Objective: Provide modified statistical weights for estimating 6-hour average temperature from maximum and minimum values, specific to NWRFC region

Milestones

Task	Due Date	Status
Derive new weights from NCDC hourly temperatures	Jan 31, 2005	Done
Implement option to select new sets of weights, in AWIPS	March 31, 2005	Done

Accomplishments/Actions

1st Quarter FY05

- Derived 4 sets of weights, for 3-month seasons, using data from NCDC.
- Results reviewed and approved by Don Laurine (NWRFC) and Eric Anderson.

2nd Quarter FY05

- OFS software upgraded to accept new weights.
- Delivered to field sites during March.

3rd Quarter FY05

- Completed in 2nd Quarter

4th Quarter FY05

- Completed in 2nd Quarter

Problems Encountered/Issues

1st Quarter FY05 – None

2nd Quarter FY05 - None

3rd Quarter FY05 - None

4th Quarter FY05 - None

Calibration - Complete IDMA Study

Theme: Software Infrastructure and Integration

Management Lead: Mike Smith

Objective: The objective of FY05 work will be to conduct a scientific study to evaluate the impacts of not performing (historical) data quality control procedures on during hydrologic model calibration. FY05 work will complement the initial results from Eric Anderson presented at the 2004 DOH/RDM workshop. The FY05 results will be posted on the HL Calibration web site and will also be submitted to a journal for publication.

Milestones

Task	Due Date	Status
1. Complete Eric Anderson's initial evaluation and put on HL web site	Jan. 27, 2005	Complete
2. Develop literature review to establish how NWS procedures fit into the published literature of accepted practices.	12/31/2004	Complete
3. Develop outline of journal paper.	12/31/2004	Complete
4. Obtain data for additional analyses	5/31/2005	Complete
5. Calibrate basin with uncorrected/corrected data	12/31/2005	Date moved from 8/31/05
6. Analyze calibration results	1/15/2006	Date moved from 10/31/05
7. Submit paper to peer-reviewed journal for potential publication.	2/28/ 2006	Date moved from 1/30/06

Accomplishments/Actions

1st Quarter FY05

- Determined that the NWS double mass analysis procedures fit well into the body of existing quality control procedures for historical data. Climate-change researchers regularly use such procedures and stress their importance.
- Eric Anderson's initial work shows that biases can result from not corrected data for man-made inconsistencies.

2nd Quarter FY05

- Given problem described in Q1 above, found study basin with hourly discharge data and a nearby station with a documented station move.
- Found more studies in the literature on the effects of calibration data on model calibration.
- Discussed with Seann Reed a strategy to test the effects of calibration data quality on model forecasts.

3rd Quarter FY05

- Found another peer-reviewed journal article to support the need for the analysis.
- Began hourly calibration of ELDO2 using MAP time series with and without the consistency correction.

4th Quarter FY05

- N/A

Problems Encountered/Issues

1st Quarter FY05

- Discovered that it is difficult to calibrate a basin using mean daily flow given minor changes in the MAP time series (caused by lack of consistency corrections). Proposed solution is to use hourly computations and data.

2nd Quarter FY05 - None

3rd Quarter FY05 – None

4th Quarter FY05

- Work delayed as Mike was assigned to lead River Mechanics Group as well as Hydrology group. George Smith ok'd the delay.

Calibration - Snow-17 Documentation

Theme: Software Infrastructure and Integration

Management Lead: Mike Smith

Objective: The objective of FY05 work will be to develop updated documentation on the Snow-17 model.

Milestones

Task	Due Date	Status
1. Develop updated Snow-17 documentation	12/31/2005	On schedule
2. Put documentation on HL-web site; other distribution	1/30/2006	On schedule

Accomplishments/Actions

1st Quarter FY05

- Discussed schedule on updated Snow-17 documentation with Eric Anderson.

2nd Quarter FY05

- Eric Anderson wrote a very detailed description of the Snow-17 ICP displays. This was routed to RFCs for comments. RFCs responded that they'd like the IFP Snow-17 display changed to be more similar to the ICP Snow-17 display.

3rd Quarter FY05

- Eric Anderson and Victor Koren wrote pertinent sections of updated Snow-17 documentation.

4th Quarter FY05

- Eric Anderson and Victor Koren discussed approach to name different Snow-17 versions. Eric Anderson modified and began testing Snow-17 code for different approach to compute snow depth.

Problems Encountered/Issues

1st Quarter FY05 - None

2nd Quarter FY05 - None

3rd Quarter FY05 - none

4th Quarter FY05

- Work delayed due to Mike Smith assignment to lead both Hydrologic Modeling and River Mechanics Group.

Calibration - Re-Implement ICP

Theme: Software Infrastructure and Integration

Management Lead: Jon Roe

Objective: Re-Implement the Interactive Calibration Program (ICP) from the new set of functional requirements generated from an FY04 contract task.

Milestones

Task	Due Date	Status
Write HOSIP Stage 1 documents.	Q3	Complete
Pass HOSIP Gate 1.	Q4	Complete
Write Statement Of Objectives (SOO) for contractor tasking.	Q3	Complete
Review Statement Of Work (SOW) from contractor.	Q4	Complete
Contractor writes HOSIP Stage 2 and 3 documents.	Q2, FY06	Not Started (date moved from Q4 to Q2 FY06)
Pass HOSIP Gates 2 & 3.	Q2, FY06	Not Started (date moved from Q4 to Q2 FY06)
Contractor conducts Operational Development and writes HOSIP Stage 4 documents.	Q3, FY06	Not Started (date moved from Q1 to Q3 FY06)
Conduct official acceptance test of new ICP.	Q3, FY06	Not Started (date moved from Q1 to Q3 FY06)
Pass HOSIP Gate 4.	Q4, FY06	Not Started (date moved from Q2 to Q4 FY06)

Accomplishments/Actions

1st Quarter FY05

- We completed project identification, budgeting, and planning.

2nd Quarter FY05

- We started writing the HOSIP Stage 1 documentation.

3rd Quarter FY05

- HOSIP Stage 1 NID and SON were completed.
- SOO was completed and forwarded to Contracts for final processing.

4th Quarter FY05

- HOSIP Gate 1 was passed
- Technical proposal submitted by Contractor was accepted by OHD
- The task for RTi was awarded very late in Q4

Problems Encountered/Issues

1st Quarter FY05

- We will be having an off-site contractor work on this project. The extent of the implementation to be completed with this work will depend upon the contractor's response to our Statement of Objectives (SOO). It is not clear at this point whether the allowed budget will cover complete re-implementation of the ICP by the contractor. This potential shortfall may be exacerbated by having to retrofit early HOSIP documents during this funded item.
- This project has essentially completed the technical work necessary to pass HOSIP Gates 1, 2, and 3 but the work was performed in FY04 (pre-HOSIP) by an outside contractor culminating in a complete functional requirements document. Now, the current task will have to fill in the required HOSIP deliverables and formally pass the Gates to get completed.

2nd Quarter FY05

- We have moved the expected date for passing HOSIP gate 1 to the third quarter.

3rd Quarter FY05

- Due to Edwin Welles' departure from OHD we have moved the expected date for passing HOSIP Gate 1 to the fourth quarter.

4th Quarter FY05

- We experienced a delay because the Contractor's first technical proposal was unacceptable to OHD and had to be re-written and re-submitted. The second proposal was acceptable, but Contracts was unable to award the task until the end of Q4.
- Due dates for HOSIP Stage 2 and 3 documents, and HOSIP Gates 2 and 3, have been moved to Q2, FY06 to match the Contractor's SOW schedule. Follow-on activities have been adjusted accordingly but are subject to negotiation under Phase 2 of the contract task.