Advanced Hydrologic Prediction Service
Quarterly Report
3rd Quarter FY 2004
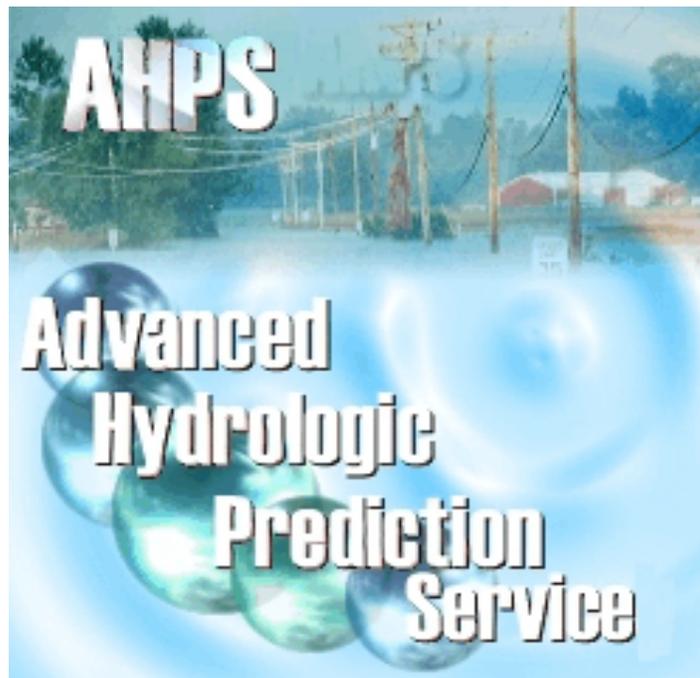
June 30, 2004

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Flood Forecast Mapping

AHPS Program Support

COMET Training - HSD2

Team Lead   Jeff Zimmerman, OCWWS/HSD

Objective   Develop Hydrologic Science Training for WFOs and RFCs

Milestones

Task	Due Date	Status
Hire COMET Staff for Hydro Team	10/01/03	Complete
Deliver Flash Flood Workshop	09/04	On Track
Deliver Basin Customization Workshop	09/04	On Track

Accomplishments/Actions – 3rd Quarter FY04

- Continued development on Flash Flood workshop and Basin Customization workshop

Problems Encountered/Issues – 3rd Quarter FY04

- None

Program Planning, Monitoring and Contract Management - OHD1

Team Lead John Ingram, OHD, AHPS Program Manager

Objective Provide national program management; coordinate and track AHPS budgets and project plans; and manage AHPS contracts

Milestones

Task	Due Date	Status
Budget formulation and program planning		
Provide support to NWS and NOAA budget and legislative offices		on going
Provide draft program theme plans to ARC	April 2004	complete
Formulate budget to support AHPS FY05 initiatives	June 2004	complete
Provide FY05 project proposals to ARC	July 2004	on schedule
Propose allocation of FY05 funds to ARC	August 2004	on schedule
Coordinate and monitor AHPS activities		
AHPS Quad Charts	Monthly	on schedule
AHPS quarterly status reports	Quarterly	on schedule
Contract Management		
Coordinate Statements of Objectives for task activities		on going
Track task activities against proposed plans	Monthly	on going

Accomplishments/Actions – 3rd Quarter FY04

Budget Formulation and Program Planning

- Worked in conjunction with OCWWS/HSD and OHD personnel to draft theme plans for Flash-Flood Services, Short- to Long-Term Forecasts and Flood-Forecast Mapping for presentation at the May 2004 ARC meeting.
- Prepared and circulated for comment a draft proposal for a new performance measure along with a methodology for taking the measurements.
- Prepared Exhibit 300 documentation (planning, budgeting, acquisition and management of capital assets) for presentation to the NOAA IT Review Board on the NOAA Water Resources Program.
- Worked with the NOAA CIO Office and NWS Budget Office to develop a single Exhibit 300 to meet the CIO's requirements and support future (FY07 and beyond) hydrology budget requests.

- Continued work to define the Hydrologic Operations Service Improvement Process for

OHD. The process is in line with the NOAA requirements-based development process.
- Provided technical representation to the NWS Team defining the Operations Service Improvement Process (OSIP).
- Reviewed OSIP documentation to provide constructive comments and assure interests of the hydrology program are being address.
- Supported preparation of Programming, Budgeting, and Evaluation System (PPBES) documentation for FY06 program activities.

Coordinate and Monitor

- Worked with Regional offices and Project Leads to track project activities and develop monthly Quad Charts and quarterly reports.
- Tracked AHPS expenditures and prepared reports detailing expenditures and variances against planned expenditures.

Contact Management

- Developed Statement of Objectives (SOO) for new AHPS contract activities
- Coordinated AHPS contract task proposal evaluations

Problems Encountered/Issues – 3rd Quarter FY04

None

National Web Management - OHD6

Team Lead   Donna Page, OHD/RDM
                Jon Roe, OHD/HSEB
Tech Lead   John Bollinger, contractor

Objective   Provide a standard look and feel for the presentation of AHPS river observation
                and forecast information on the World Wide Web by all NWS weather offices.

Milestones

Task	Due Date	Status
Implement new AHPS Web presence software at ERH.	June 1, 2004	Complete
Convert all AHPS Web configuration data to Perl storable format.	June 1, 2004	Complete
Rivdat rsync/scp AHPS data transfer process replacement of FTP at WFOs and RFCs to meet AWIPS OB4.1 deployment and DOC security requirements.	Sept 1, 2004	In progress
Implement new AHPS Web presence software at remaining NWS Regional Web farms.	Sept 1, 2004	In progress
Implement national AHPS configuration database and Web configuration database interface.	Sept 1, 2004	In progress

Accomplishments/Actions - 3rd Quarter FY04

OHD contractor met with OHRFC personnel on May 13th to discuss HydroGen software
requirements and process flow. The HydroGen software package is expected to replace the
Rivdat processes that are currently running at WFOs and RFCs throughout the NWS Regions. It
is anticipated that HydroGen will be deployed during the fall of CY04. OHD contractor has
provided extensive Perl development support to main HydroGen developer at OHRFC.

OHD met with contractor on May 26th and 27th where contractor gave OHD a briefing on the
status of various AHPS Web projects. The parties then discussed technical matters and OHD
gave additional guidance to contractor on configuration database schema design.

Problems Encountered/Issues – 3rd Quarter FY04

Format issues with field office maintained web configuration files along with AWIPS upgrade
system changes caused some HSA level AHPS webpage outages during this period. OHD's
development of the AHPS configuration database will solve problems that have arisen from
malformed flat-file configuration data.

AHPS Hydrologic Science Review - OHD14

Team Lead   Pedro Restrepo, OHD/HL

Objective   Obtain an in-depth review and recommendations from an independent Science Advisory Board on the merit of AHPS science activities and strategies

Milestones

Task	Due Date	Status
Form Committee and hold initial meetings with OHD representatives	Jul 2003	completed
Initiate Committee internal reviews and prepare draft report	Sep 2003	on-going
Conduct initial Committee meeting at NRC HQ, Washington, D.C.	Feb 2004	completed
Conduct 2nd Committee meeting in Irvine, CA	May 2004	completed
Conduct 3rd Committee meeting in Woods Hole, MA	Sep 2004	scheduled
Conduct final Committee meeting at NRC HQ, Washington, D.C.	Nov 2004	scheduled
Deliver report and provide briefings on findings and recommendations	Mar 2005	

Accomplishments/Actions – 3rd Quarter FY04

•   A meeting with the Science Advisory Board was carried out on May 3 at the University of California, Irvine. The 3rd meeting is scheduled for September, 2004 in Woods Hole, MA.

Problems Encountered/Issues – 3rd Quarter FY04

None

Collaborative Research - OHD22

Team Lead Pedro Restrepo, OHD/HL

Objective   Develop/continue partnerships with universities to collaborate on research for AHPS science activities

Milestones

Task	Due Date	Status
Solicit proposals	June 2003	Complete
Evaluate and rank proposals	March 2004	Complete
Make final awards	July 2004	In Progress

Accomplishments/Actions – 3rd Quarter FY04

The Grants Management Division is in process of making the final awards.

Problems Encountered/Issues – 3rd Quarter FY04

None

AHPS Implementation APRFC - AR6

Team Lead   Larry Rundquist, APRFC

Objectives   To calibrate NWSRFS basins and validate quality of resulting probabilistic forecasts generated at those locations to allow implementation of advanced hydrologic prediction services (AHPS) at six forecast points; to enhance the capabilities of the APRFC to calibrate additional basins in data sparse areas.

Milestones

Task	Due Date	Status
Implement AHPS forecasts for Kenai River at Soldotna	Oct 2003	Completed
Prepare data sets for evaluation by Dr. Anderson	Dec 2003	Completed
Validate AHPS forecasts for Tanana River at Nenana, Salcha River near Salcha, Chena River near Chena Lakes, and Sixmile River near Hope.	May 2004	In progress
Calibration seminar by Dr. Anderson	June 2004	Completed March 17, 2004
Implement AHPS forecasts for Tanana River at Nenana, Salcha River near Salcha, Chena River near Chena Lakes, and Sixmile River near Hope	June 2004	Completed May 2004; also implemented Mendenhall River near Juneau
Complete 4-7 additional basin calibrations	July 2004	Completed 3 by May 2004
Validate and implement one additional AHPS forecast point	Sept 2004	Completed May 2004

Accomplishments/Actions – 3rd Quarter FY04

Calibrations were completed for the Mendenhall River near Juneau, Situk River at Yakutat, and Jordan Creek near Juneau. Additional calibrations were nearing completion. AHPS sites were implemented for Tanana River at Nenana, Salcha River near Salcha, Chena River near Chena Lakes, Sixmile River near Hope, and Mendenhall River near Juneau.

Problems Encountered/Issues – 3rd Quarter FY04

None

AHPS Implementation for NCRFC – CR8

Team Lead   Dan Luna, HIC/NCRFC

Objective   Implement probabilistic hydrologic forecasts for basins in the North Central River Forecast Center's (NCRFC) area of responsibility. The NCRFC goal is to have 49AHPS points implemented for long-term forecasts by the end of FY 2004.

Milestones

Implementation Area	Forecast Points Planned	Due Date	Actual to Date (3rd Qtr FY04)	Variance
southern Michigan	43	2nd Qtr FY04	43	0
Minnesota and Wisconsin	6	3rd Qtr FY04	6	0
Total	49	**FY04**	49	0

Accomplishments/Actions – 3rd Quarter FY04

- The 6 Minnesota and Wisconsin AHPS forecast points were implemented on schedule.

Problems Encountered/Issues – 3rd Quarter FY04

- No problems or issues.

AHPS Implementation for MBRFC – CR12

Team 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 23 additional AHPS points implemented for long-term forecasts by the end of FY 2004.

Milestones

Implementation Area	Forecast Points Planned	Due Date	Actual to Date (3rd Qtr FY04)	Variance
Upper Missouri River Tributaries	22	4th Qtr FY04	0	0
James River Basin	1	4th Qtr FY04	1	+1
Upper Dakota Tributaries	0	N/A	3	+3
Total	**23**	**FY04**	4	+4

Accomplishments/Actions – 3rd Quarter FY04

- Data preparation, analyses, and calibration efforts in the Upper Missouri remain on schedule.
- Three new River Forecast Points were added in the Upper Dakota Tributaries per WFO request. Full AHPS implementation was accomplished for these three new sites.

Problems Encountered/Issues – 3rd Quarter FY04

- No problems or issues have been encountered.

AHPS Implementation for OHRFC – ER1

Team 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 *(Revised milestones based on 01/06/04 memo on AHPS implementation and 2/27/04 coordination with OHRFC)*

Implementation Area	Forecast Points Planned	Due Date	Actual to Date (3rd Qtr FY04)	Variance
New Fcst Points (Miami, Muskingum, Miami)	7	1st Qtr	7 (1st Qtr)	0
Ohio River (OHL - through Louisville, KY)	6	2nd Qtr	6 (2nd Qtr)	0
East Fork White R.	8	3rd Qtr	8 (3rd Qtr)	0
White R.	15	4th Qtr	0	0
Green R.	12	4th Qtr	0	0
Total	**48**	**FY04**	**21**	**0**

Accomplishments/Actions – 3rd Quarter FY04

AHPS products are now available for the East Fork White River (sub-basin of the Ohio River) in Indiana (8 points).

RTI is on-track for calibrating the reservoirs in the Green River Basin.

All remaining basins scheduled for implementation during the remainder of FY-2004 within the Ohio RFC area have been placed into TEST mode.   These include the White and Green River basins. Full calibration of these basins proceeds on track

OHRFC is also beginning work on SAC-SMA calibrations on the Cumberland, lower Ohio River mainstem (which includes the Wabash River).   These are scheduled for implementation in FY-2005. Producing AHPS probability forecasts for the Cumberland will require calibration of about 8 reservoirs through support by RTI.

Problems Encountered/Issues – 3rd Quarter FY04

None

AHPS Implementation for NERFC – ER2

Team Lead   Gregg Rishell (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 2011.

Milestones

(Revised milestones based on 01/06/04 memo on AHPS imlementation)

Implementation Area	Forecast Points Planned	Due Date FY04	Actual to Date (3rd Qtr FY04)	Variance
St. Lawrence R. Basin	17	1st Qtr.	17 (1st Qtr)	0
Complete Merrimack R. Basin	7	2nd Qtr.	7 (2nd Qtr)	0
Total	**24**	**FY04**	**24**	**0**

Accomplishments/Actions – 3rd Quarter FY04

In-house calibration work continues. Five locations in the Great Lakes Basin have been completed. Calibration work also continues in the Saint John River Basin in Maine. Calibration for one location is completed and another underway.

Work with RTi continues on the calibrations on the middle and lower Hudson River Basin. This task order, if fully implemented will result in calibration at 15 locations. The NERFC is working with the NY Canal Corporation and New York City Department of Environmental Protection to obtain and format reservoir data for RTi to use in the calibration process. A visit by RTi to the NERFC is planned in August. Representatives of the NYC DEP have expressed interest in attending this meeting.

The funding process for calibration of five river locations in the St. Lawrence River Basin draining the Adirondack region of New York State is nearly complete. The funding is from the International Joint Commission (IJC). The NERFC will provide forecasts and AHPS products for these locations, once the calibrations are complete. This information will support the St Lawrence River Operating Plan which is currently under revision by the IJC.

Problems Encountered/Issues – 3rd Quarter FY04
None

AHPS Implementation for MARFC – ER3

Team Lead   Peter Ahnert (HIC/OHRFC), 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

(Revised milestones based on 01/06/04 memo on AHPS implementation)

Implementation Area	Forecast Points Planned	Due Date	Actual to Date (3rd Qtr FY04)	Variance
Lehigh sub-basin	5	1st Qtr	5 (1st Qtr)	0
Delaware River Basin	15	2nd Qtr	15 (2nd Qtr)	0
Schuylkill sub-basin	8	2nd Qtr	8 (2nd Qtr)	0
New Jersey Streams	18	4th Qtr	18 (3rd Qtr)	+18
Potomac River Basin	20	4th Qtr	20 (3rd Qtr)	+20
Shenandoah River Basin	6	4th Qtr	6 (3rd Qtr)	+6
Total	**72**	**FY04**	**72**	**+44**

Accomplishments/Actions – 3rd Quarter FY04

With the addition of the points in the Potomac, Shenandoah, and New Jersey basins, MARFC has completed AHPS requirements for FY04 (3 months ahead of schedule).

In addition, 30-day mean inflow forecasts are being generated for the U.S. Corps of Engineers at two locations on the Potomac - Jennings Randolph and Savage River dams.

MARFC implemented a new release of ensemble generation software. This includes new software used to generate short-term probability forecasts. This includes a new control file structure for the software used to generate short-term probabilistic temperature/precipitation files and a new ESPADP to overlay deterministic forecast on top of the expected value plot.

MARFC attended a Baltimore County (UMBC) meeting on urban flash flooding.
There is a joint UMBC/Princeton University project to model two small scale watersheds in Baltimore City. Some of the distributed modeling techniques used in this project represent the types of algorithms that could ultimately be used in future AHPS initiatives.

A MARFC staff-member has begun a 6- week detail with NOAA's National Ocean Service's Office of Coastal Survey. They are exploring a partnership for modeling and data sharing, including a study of the sensitivity of water surface elevations and currents in the Port of New York/New Jersey to inflows from the Passaic and Raritan rivers.

MARFC participated in an OHD sponsored Ensemble Forecasting Meeting in Silver Spring. They gave an overview presentation of MARFC's probabilistic forecasting program. One of the major points of discussion was the need to start a verification program for probabilistic forecasts. MARFC volunteered to participate on a national verification team headed by the HIC/CNRFC.

MARFC rewrote their ESPADP files to change the units on the standard AHPS weekly volume histograms from CFSD to Acre-FT in accordance with national standards.

MARFC continued to work with the New Cumberland, PA USGS office on their low flow prediction project. They generated 50 year Historical Simulations for Neshaminy and Tunkhannock creeks.

Problems Encountered/Issues – 3rd Quarter FY04

None

AHPS Implementation for LMRFC - SR1

Team Lead   Dave Reed, HIC

Objective   Implement probabilistic hydrologic forecasts for basins in the Lower Mississippi
River Forecast Center's (LMRFC) area of responsibility. The LMRFC goal is to
have AHP basic service implemented for the entire LMRFC area of responsibility
by the end of FY2010 (assumes full AHPS funding).

Milestones

Implementation Area	Forecast Points Planned	Due Date	Actual to Date (**3rd Qtr FY04**)	Variance
UPPER TENNESSEE BASIN Planned 3rd Q Total =10 sites				
Powell Basin	2	4/30/2004	2	0
Clinch Basin	3	5/31/2004	3	0
Holston Basin	2	6/30/2004	2	0
Nolichucky Basin	1	6/30/2004	1	0
Little Pigeon Basin	1	6/30/2004	1	0
South Chickamauga Basin	1	6/30/2004	1	0
Planned 4th Q Total =15 sites				
Emory Basin	1	7/31/2004	0	0
Sequatchie Basin	1	7/31/2004	0	0
Paint Rock Basin	1	7/31/2004	0	0
Flint Basin	1	7/31/2004	0	0
Shoal Creek Basin	1	8/31/2004	0	0
Upper French Broad Basin	5	8/31/2004	0	0
Lower French Broad Basin	2	9/30/2004	0	0
Pigeon Basin	1	9/30/2004	0	0
Tusckaseegee Basin	2	9/30/2004	0	0
Total	**25**	**FY04**	**10**	**0**

Accomplishments/Actions – 3rd Quarter FY04

10 AHPS sites implemented during the 3rd quarter. Variance = 0

Received final approval for Task T4-005 in early April. LMRFC-RTi monthly conference calls have been scheduled to discuss contract calibration progress. Coordination calls were held on May 6 and June 24.

RTi making excellent progress. RTi has nearly completed all preliminary calibrations and will provide LMRFC with preliminary calibration decks by July 15. LMRFC to review preliminary calibration findings and provide comments NLT July 22. RTi to provide LMRFC with final calibration decks by July 31.   Variable Lag/K work by RTi for ROSN7-BLAN7 reach has been completed.

Provided AHPS Outreach Training to both TVA and WFO MRX, June 21-25.

Preparing for implementation of 4 additional AHPS sites due by July 31.   Two for WFO MRX and 2 for WFO HUN.

Completed local calibration for WHTT1 and BNAA1. Local calibration continues for OAKT1, WDVA1, and CHSA1.

Continuing historical data collection and double-mass analysis for the 27 FY05 AHPS implementation sites covering the West Tennessee drainages and the Yazoo Basin.

Problems Encountered/Issues – 3rd Quarter FY04

1. Based on water balance analysis, RTi determined that the Birdtown, NC (BIRN7) historical MAPs where too low relative to surrounding area MAP computations. LMRFC reworked and significantly improved the BIRN7 MAPs and ftp'd the adjusted MAP set to RTi on May 23. – **Issue closed.**

2. RTi analysis of ROC for Ivy Creek streamflow appears too low and requested any info we may have on the small hydroelectric plant located above the stream gage; and its effects on baseflow. LMRFC investigated findings and reported back to RTi on Monday, June 28. – **Issue closed.**

AHPS Implementation for WGRFC - SR2

Team Lead Jerry Nunn, HIC

Objective Implement probabilistic hydrologic forecasts for basins in the West Gulf River Forecast Center's (WGRFC) area of responsibility. The objective is to implement AHP basic services in the Trinity River Basin. Our goal is to complete AHP basic services implementation by the end of FY2011 (assumes full AHPS funding).

Milestones

Implementation Area	Forecast Points Planned	Due Date	Actual to Date (1st Qtr FY04)	Variance
Reservoir Inflow Forecasts	14	4th Qtr	0	0
RFC Head water Forecast Points	11	4th Qtr	0	0
Mainstem Forecast Points	8	4th Qtr	0	0
Total	**33**	**FY04**	**0**	**0**

Accomplishments/Actions –3rd Quarter FY04

WGRFC attended a coordination meeting with Riverside Technologies, Inc. at their office May 12th and 13th. The purpose of the meeting was to review the status of the work that had been done at RTi and at the WGRFC, and to develop a strategy to move ahead with the work that remained to be done to simulate coordinated reservoir operations in the Upper Trinity River.

Updated MAP and MAPX time series are being created by the AHPS Team at the WGRFC to be used in the calibration of the Trinity River basins that are part of the AHPS Basic Services Implementation.

Riverside Technologies delivered a model for the operation of Benbrook Reservoir.

Problems Encountered/Issues – 3rd Quarter FY04

None

AHPS Implementation for SERFC - SR3

Team 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 (3rd Qtr FY04)	Variance
Cape Fear	5 3	1st Qtr 2nd Qtr	5 (1st Qtr) 2 (2nd Qtr)	0 -1
Neuse	1	2nd Qtr	1 (2nd Qtr)	0
Roanoke	5 7	2nd Qtr 3rd Qtr	6 (2nd Qtr) 0 (3rd Qtr)	-6
Chowan	3 3	3rd Qtr 4th Qtr	6 (3rd Qtr)	+3
Peedee	4	4th Qtr	4 (3rd Qtr)	+4
Lumber	1	4th Qtr	0	0
Santee	1	4th Qtr	0	0
Flint	1	4th Qtr	0	0
Total	**34**	**FY04**	**24**	**0**

Accomplishments/Actions - 3rd Quarter FY04

AHPS basic services were implemented at 10 river forecast points during this period.

SERFC continues working with OHD to beta test the NWSRFS RES-J enhancements provided by RTi. Problems were encountered with the original software and RTi has had to make corrections and recompile the executable before testing can be started. SERFC will be doing the testing on-site (not via OHD computer system as was earlier planned).

Work is nearly complete to incorporate operationally into NWSRFS the calibrations provided by

RTi in October 2003.

Problems Encountered/Issues – 3rd Quarter FY04

None

AHPS Implementation for ABRFC - SR4

Team Lead Billy Olsen, HIC

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

Milestones

Implementation Area	Forecast Points Planned	Due Date	Actual to Date (3rd Qtr FY04)	Variance
Arkansas	5 43	1st Qtr 4th Qtr	5 (1st Qtr)	0
Cimarron	3	4th Qtr	0	0
Total	**51**	**FY04**	**5**	**0**

Accomplishments/Actions – 3rd Quarter FY04

ABRFC reviewed and approved all documents submitted to ABRFC by the AHPS Project
Manager.

ABRFC participated in project status conference calls with RTi.

ABRFC participated in a conference call with NOAA, OHD, SR RFCs and RTi to review the
contract process.

The FY-04 ABRFC data analysis project tasks were completed by RTi.

ABRFC is reviewing the RTi project report and the data analysis work.

Problems Encountered/Issues – 3rd Quarter FY04

None

AHPS Implementation for CBRFC - WR5

Team Lead David Brandon, HIC/CBRFC

Objective Implement probabilistic hydrologic forecasts for 28 basins in the Colorado Basin River Forecast Center's (CBRFC) area of responsibility.

Milestones

Implementation Area	Forecast Points Planned	Due Date	Actual to Date (3rd Qtr FY04)	Variance
Above Utah Lake	3	9/30/04	3	0
Above Great Salt Lake	14	9/30/04	14	0
Above Sevier Lake	5	9/30/04	3	0
Above Blue Mesa	2	9/30/04	2	0
Above Colorado at Glenwood Springs	3	9/30/04	3	0
Above Gunnison at Grand Junction	1	9/30/04	3	0
Total	**28**	**FY04**	28	0

Accomplishments/Actions – 3rd Quarter FY04

All sites have been implemented.

Problems Encountered/Issues – 3rd Quarter FY04

None

AHPS Implementation CNRFC - WR6

Team Lead Robert Hartman, HIC/CNRFC

Objective Implement probabilistic hydrologic forecasts for 17 basins in the California-Nevada River Forecast Center's (CNRFC) area of responsibility.

Milestones

Implementation Area	Forecast Points Planned	Due Date	Actual to Date (3nd Qtr FY04)	Variance
Smith River basin	2	9/30/04	2	0
Klamath River basin	5	9/30/04	1	0
Eel River basin	5	9/30/04	0	0
Napa River	2	9/30/04	0	0
other headwaters	3	9/30/04	3	0
Total	**17**	**FY04**	6	0

Accomplishments/Actions – 3rd Quarter FY04

6 calibrations complete, the other calibrations are ongoing. Implementation of AHPS suite of products will wait for completion of calibrations.

Problems Encountered/Issues – 3rd Quarter FY04

None

AHPS Implementation for NWRFC - WR7

Team Lead Harold Opitz, HIC/NWRFC

Objective Implement probabilistic hydrologic forecasts for 16 basins in the Northwest River Forecast Center's (NWRFC) area of responsibility.

Milestones

Implementation Area	Forecast Points Planned	Due Date	Actual to Date (3rd Qtr FY04)	Variance
Columbia River Basin	8	9/30/04	0	0
Snake River Basin	6	9/30/04	0	0
Northwest Washington	1	9/30/04	0	0
Coastal Oregon	1	9/30/04	0	0
Total	**16**	**FY04**	0	0

Accomplishments/Actions – 3rd Quarter FY04

Continuing operational ESP implementation.

Problems Encountered/Issues – 3rd Quarter FY04

None

AHPS Regional Implementation and Outreach

Snow Water Equivalent Data - AR1

Team Lead Larry Rundquist, APRFC

Objectives 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
Fly selected operational flight lines	April 2004	2 groups completed 4/18 and 4/21. Final runs completed 5/22
Incorporate data into operations	June 2004	Complete

Accomplishments/Actions – 3rd Quarter FY04

NOHRSC completed the flight lines. Data have been placed on APRFC intranet and were used for spring breakup forecasting.

Problems Encountered/Issues – 3rd Quarter FY04

None. Progress on this project is excellent.

OCWWS/HSD Outreach - HSD1 OCWWS/HSD Outreach - HSD1

Team Lead   Tom Graziano, OCWWS/HSD
Larry Wenzel, OCWWS/HSD

Objectives   Accomplish outreach for NWS offices where the AHPS will or are being
implemented. Develop clear and consistent AHPS outreach materials for use by
National, regional and local office personnel

Milestones

Task	Due Date	Status
Conduct/attended user forums/workshops to assess needs, validate requirements, and educate customers to maximize the value of NWS products and services	**Sept 2004**	On-Going
Produce/update components of the AHPS toolkit including writing/editing articles for publication.	Sept 2004	On-Going
Create/deliver materials (e.g. brochures, user guides, etc.) For use during public forums/workshops	Sept 2004	**On-Going**

Accomplishments/Actions – 3rd Quarter

May
- Updated AHPS Toolbox with headlines and news with a success story from Pennsylvania
- Hosted an AHPS exhibit at the Association of State Floodplain Managers meeting in Biloxi, MS
- Hosted an AHPS booth at the National Hurricane Conference in Orlando, FL
- Reprinted additional NOAA/AHPS brochures with the National Safety Council as a partner which are available to field personnel at the NWS logistic center
- Reprinted the "Floods the Awesome Power" brochure which includes AHPS information. Copies of the brochure are available to the field through the NWS Logistic Center
- Met with the Department of Transportation to partner in the NWS Turn Around Don't Drown campaign
- Duplicated and distributed copies of the NWS/The Weather Channel VHS/DVD "Water's Fury" to the NWS field. This program identifies AHPS as the cornerstone in mitigating the loss of life and property from floods and flash floods

June
- Met with the American Association of Motor Vehicles Administration to partner in the Turn Around Don't Drown campaign
- Submitted a one paragraph safe driving tip when encountering water covered roadways

for the next edition of the "Model Driver Licenses Manual and Student Workbook" All 50 States use this manual as the basis for their respective handbook
- Established a contract for the National Safety Council to develop and distribute additional AHPS related publications

Problems Encountered/Issues – 3rd Quarter FY04

- None

National Forecast Location Database - HSD3

Team Lead   Frank Richards, OCWWS/HSD

Objectives   Implement a single national database that aggregates information on hydrologic observation and service locations used by WFOs and RFCs. Provide information in a GIS format that is Web accessible for easy access by all users.

Milestones

Task	Due Date	Status
I. Develop National Forecast Location Database		
Prototype		
Collect information from field offices for prototype	Mar 2003	Completed
Integrate information into prototype national database	Mar 2003	Completed
IHFS		
Procure database software/system upgrades	Apr 2003	Completed
Specify requirements to post IHFS data to national database	Apr 2003	Completed
Develop software to post data to national database	Dec 2003	Ready for field testing
AHPS		
Determine attributes needed but not available in IHFS database	June 2003	In Process - not completed
Specify requirements to manage national location database	July 2003	In Process - not completed
Develop database schema to accommodate AHPS attributes	Nov 2003	In Process - not completed
Develop software to manage national location database	June 2004	Complete, except for AHPS attributes (will use ingest software an Db utilities)
II. Develop Interactive GIS Web Access for National Database		
Demonstrate concept using prototype database	Jan 2003	Completed
Identify and document user requirements	Aug 2003	In Process - not completed
Implement interactive Web access	Aug 2004	

Accomplishments/Actions – 3rd Quarter FY04

- Fixed comms bugs
- Completed initial version of documentation

Problems Encountered/Issues – 3rd Quarter FY04

- Looking at issues of moving from Informix to Postgress

RFC/HPC Visiting Forecaster - NCEP3

Team 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.Develop agenda for RFC visitors to HPC and HPC visitors to RFCs.	November 2003	Completed
2. Schedule and implement visits.	September 2004	On going

Accomplishments/Actions - 3rd Quarter FY04

Began scheduling visits.

Problems Encountered/Issues - 3rd Quarter FY04

None

River Ensemble Processor (REP) - OST2

Team Lead   Walter Scott, OST31
Tech Lead   George Smith, OHD/HL

Objective   Increase RFC computational performance to meet ensemble processing needs at the RFCs.

Milestones

Task	Due Date	Status
1.) Perform alternative design analysis, perform RFC benchmark tests, analyze benchmark results, conduct design reviews, and develop and submit proposal from NGIT to NWS	November 12, 2003	Complete
2.) Finalize vendor procurements for OAT activities and issue competitive purchase requests for hardware	February 29, 2004	Complete
3.) Prepare Field Modification Kit (FMK) and integrate in AWIPS baseline at NGIT	January 30, 2004	Complete
4.) Proof FMK on NWS HQ NMT-R system	February 13, 2004	Complete
5.) Ship FMKs and provide installation support, technical advice, and assistance	March 17, 2004	Complete
6.) Support four-week Operational Acceptance Test at NCRFC and OHRFC	March 17, 2004	Complete
7.) Complete delivery and installation of all 18 systems (13 RFCs, 3 HQ, 1 NGIT, and 1 spare)	April 30, 2004	Complete

Accomplishments/Actions – 3rd Quarter FY04

- See the schedule of major accomplishments above. All of the pre-delivery milestones (items 2 through 6) were completed by the end of Quarter 2. By the end of Quarter 3 all REP systems had been delivered and nearly all had been installed. The last two RFCs to install were KRF, about July 1 and ORN, about July 7 just after the end of this reporting period.

Problems Encountered/Issues – 3rd Quarter FY04

- None. All milestones have been completed as of end of Quarter 3 (plus one week).

AHPS Flash Flood Services

Confidence Factor for QPF Forecasts - NCEP1

Team 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.	March 2005	On schedule
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	On schedule
4. Implement nationally if supported by results from Task 3.	July 2005	On schedule

Accomplishments/Actions - 3rd Quarter FY04

During the third quarter we continued to refine the methodology for the generation of forecasts of confidence factor. This experimental output is available at http://www.hpc.ncep.noaa.gov/qpfci/qpfci.shtml and is updated twice a day. Training of RFC personnel at the ABRFC and LMRFC began in late June as the first step in a formal evaluation of the product by the RFCs.

Problems Encountered/Issues - 3rd Quarter FY04

None

Flash Flood Tools for FFMP in AWIPS - NSSL1

Team Lead   Ken Howard, NSSL

Objective   **A. Technical Support** - Provide technical support for WFOs in the development of base maps for the implementation of FFMP

B. Expanded Coverage for MPE - Provide conversion of mapped basin coverage to support MPE nationwide

Milestones

Task	Due Date	Status
Original development of basin maps for FFMP	Sep 03	delivered
Expanded Coverage for MPE	Dec 04	need specifications
Technical Support	Sep 05	in progress

Accomplishments/Actions – 3rd Quarter FY04

Provided basin customization support and data access for numerous WFOs. During this quarter, the requests for customization support continued to increase steadily. Some of the more complex basin customization tasks such as clipping basins with lake polygons and transferring stream names and previous edits to the new hydrologically-connected shapefiles were performed by NSSL for the WFOs. Instructions for several customization tasks were developed or updated to assist those WFOs who undertook these tasks themselves.

FFMP basin datasets with hydrologic connectivity attributes were delivered for 37 sites.

Problems Encountered/Issues – 3rd Quarter FY04

We now have the necessary HRAP grid specifications, but still need requirements for the "Expanded Coverage for MPE" task regarding CWA buffers and basin aggregation.

Distributed/Flash Flood Modeling - OHD3

Team Lead   Mike Smith, OHD/HSMB

Objective   DMIP proved the scientific validity of the basic HL-RMS. The objective is now to continue research, development, and prototype applications of the HL- RMS model for river and flash flood simulation

Milestones

Task	Due Date	Status
Hydro model parameter estimation		on going
Calibration, Var. assimilation		on going
Incorporate snow, frozen grnd. Capabilities		Snow-17 in HL-RMS, now being tested
SRBC Application	12/2004	on schedule
DMIP future phases	2005	on schedule
ABRFC support, E2E	2005	on schedule

Accomplishments/Actions -3rd Quarter FY04

Mike Smith continued to manage the DMIP special issue of Journal of Hydrology. The issue will be publicly available in September, 2004. He, Seann Reed, Victor Koren, and Ziya Zhang reviewed proof editions of the HL papers in this issue. Richard Anderson completed his work as an NRC Research Associate. His work involved deriving initial SAC-SMA parameters from SSURGO county level soils data. His parameters show improvement over the ones derived by Victor Koren, especially in the base flow parameters. His work shows promise for deriving parameters for distributed models. The HL distributed model was greatly modified in preparation for in-house large area daily runs to generate soil moisture grids. Seann Reed tested his statistical distributed model for flash flooding and compared the results to FFG. His results show improvement in some cases.

The new automatic calibration procedure has been further tested and continues to show great promise for use with distributed models. Mike Smith continued to look for test data sets for use in DMIP Phase 2.

Problems Encountered/Issues – 3rd Quarter FY04

The DMIP Special Issue was delayed by author's vacations. There are still no good choices for western basins to use in DMIP 2. The issue is still precipitation quality.

Probabilistic/Ensemble QPE Algorithm - OHD7

Team Lead   David Kitzmiller, OHD/HSMB (Richard Fulton is on detail)

Objectives   To explore and develop innovative, operational, prototype techniques to generate uncertainty information for radar-based multisensor rainfall estimates and effective ways to present that information to users. This activity is expected to be accomplished primarily by contractors but in coordination with HL.

Milestones

Task	Due Date	Status
Evaluate possible techniques	June 2003	Done
Develop prototype technique	June 2004	July 2004
Refine, test, and deliver prototype technique	June 2005	
Validate and implement technique within NWS operational systems	Sept. 2006	

Accomplishments/Actions – 3rd Quarter FY04

- Trained U. Iowa contractors in use of ORPG/CODE to generate large samples of reflectivity and rainfall estimate products for use in PQPE development

- Delivered Linux computer to U. Iowa and began generation of development sample of radar products from Oklahoma data

- Started Phase 3 of development contract, to be completed in July 2004.

- Submitted Statement of Objectives for Phase 4 of development contract.

Problems Encountered/Issues – 3rd Quarter FY04

- Team Lead Richard Fulton detailed to PPI during the quarter, through January 2005. David Kitzmiller serving in his place.

- Some delay in delivery of computer to U. Iowa while software problems in Linux version of ORPG were worked out

Multisensor Precipitation Nowcaster - OHD17

Team Lead   David Kitzmiller, OHD/HSMB (Richard Fulton is on detail)

Objectives   Develop and implement within AWIPS the capability to produce short-term (0-1 hr) regional, multisensor, gridded precipitation forecasts ("nowcasts") to provide WFOs with additional guidance and lead-time for flash flood warnings

Milestones

Task	Due Date	Status
Develop MPN prototype to use regional MPE-WFO input	Sept. 2004	On track
Integrate MPN prototype and MPE-WFO	March 2005	
Implement MPN on NWS/WFO operational AWIPS system and link to FFMP and HL-RMS	Dec. 2005	
Develop technical and training materials	Dec. 2005	
Beta-test MPN/FFMP at WFO field sites and analyze results	Dec. 2006	

Accomplishments/Actions – 3rd Quarter FY04

- Can now run Nowcaster with mosaicked (rather than single-radar) input, for the Middle-Atlantic area

- Began collecting verification statistics for 0-1h forecasts

- Initiated work on methods for integrating analysis and nowcasting software

Problems Encountered/Issues – 3rd Quarter FY04

- Team Lead Richard Fulton detailed to PPI during the quarter, through January 2005. David Kitzmiller serving in his place.

Multisensor QPE for Flash Flooding - OHD18

Team Lead   David Kitzmiller, OHD/HSMB (Richard Fulton is on detail)

Objectives   Enhance the operational multisensor quantitative precipitation estimation (QPE) algorithm so that it serves the flash flood monitoring and warning needs of the Weather Forecast Offices (WFOs)

Milestones

Task	Due Date	Status
Enhance MPE processing for shorter time and space scales	Sept. 2004	On track
Enhance MPE graphical user interface	March 2005	
Implement MPE on NWS/WFO operational AWIPS systems and link to FFMP and HL-RMS	Sept. 2005	
Develop technical and training materials	Sept. 2005	

Accomplishments/Actions – 3rd Quarter FY04

- Investigated methods for creating multisensor mosaics on 15-minute update cycle. Gauge/radar inconsistencies at this short timescale render the updates unreliable. Will proceed with 15-minute updates of radar-only and bias-corrected radar mosaics.

- Made significant progress toward creation of 1-km resolution mosaics

- Obtained and set up new Linux machine which will be used for real-time generation of DSP radar precipitation products from two mid-Atlantic sites for testbed

Problems Encountered/Issues – 3rd Quarter FY04

- Team Lead Richard Fulton detailed to PPI during the quarter, through January 2005. David Kitzmiller serving in his place.

- Work on incorporating real-time GOES Hydroestimator delayed due to failure of NESDIS ftp server

Distributed Hydrologic Modeling Development - OHD23

Team Lead Jon Roe, OHD/HL/HSEB
Tech Lead Lee Cajina, OHD/HL/HSEB

Objective Initiate the development of a nationally delivered distributed hydrologic model.

Milestones

Task	Due Date	Status
1.) Complete updates to the HL-RMS prototype to create the hardened DHMS 1.0 prototype to be ready for field evaluation and requirements gathering for DHMS 2.0	September 2003	Complete
2.) Deliver DHMS 1.0 hardened prototype to ABRFC.	September 2003	Complete
3.) Deliver DHMS 1.0 hardened prototype to WGRFC.	October 2003	Complete
4.) Conduct initial investigation into new NWSRFS architecture to be able to build DHMS 2.0 in a flexible way.	December 2003	Complete
5.) Complete RFC field evaluation and operational requirements gathering for DHMS 2.0 from the DHMS 1.0 prototype.	February 2004	Complete
6.) Arrive at Key Decision Point to make decision to move forward to building DHMS 2.0.	February 2004	Complete
7.) Architectural Design development, including database, computational, display, data assimilation, calibration and operational considerations.	December 2004	In Progress
8.) Application of architectural design to meet specific distributed model prototype requirements.	August 2005	
9.) Evaluation of system prototype elements developed above and updates to architecture scheme and implementation.	October 2005	
10.) Iteration over steps 7, 8, and 9 to continue to integrate new science and system elements into DHMS 2.0 operations.	N/A, will define next round of 7, 8, & 9	

Accomplishments/Actions -3rd Quarter FY04

- Completed a preliminary detailed requirements analysis for DHMS 2.0 using the use case requirements derivation approach.

- Produced documentation showing the mapping of approximately 150 high-level user requirements to 26 high-level use cases and 8 user classes.

- Initiated a peer review of the use-cases and requirements using ABRFC, WGRFC, OHD/HL, and OCWWS/HSD as representative users.

- Continued investigation into new system architecture enhancements for NWSRFS needed for the follow-on phase of this project, the construction of DHMS 2.0 (i.e., the fully field deployed distributed hydrologic model).

Problems Encountered/Issues – **3rd Quarter FY04**

None

Site Specific Development - OHD32

Team Lead Jon Roe, OHD/HL/HSEB
Tech Lead Chip Gobs, OHD/HL/HSEB

Objective To enhance the Site Specific function in the WHFS baseline to include improved runoff modeling; improved routing; and snow modeling.

Milestones

Task	Due Date	Status
Integrate the SAC-SMA model into existing Site Specific.	November 2003	Complete.
Initial AWIPS delivery of the OB4 version of the application.	December 2003	Complete.
Begin Field Testing of the OB4 version of the application.	March 2004	Complete.
Final AWIPS delivery of the OB4 version of the application.	May 2004	Complete.

Accomplishments/Actions – 3rd Quarter FY04

- Completed all functionality and interface changes due to field feedback from alpha testing at SJU/SERFC and MBRFC.
- Delivered all final modifications to AWIPS for OB4 with official AWIPS beta testing to begin in the second half of July.
- As of June 30, 2004 this project is deemed complete. This is because we are at a stage where further significant enhancements to Site-Specific require NEW field consideration, OCWWS and ARC direction, and possibly the development of a detailed concept of operations.

Problems Encountered/Issues – 3rd Quarter FY04

- RFCs are concerned about the workload associated with developing SAC-SMA parameters and maintaining model states for WFOs. Development of parameters could be helped by easier access to one-hour historical stream flow and precipitation data. An integrated suite of calibration tools would also be useful. State maintenance could be helped with the addition of functionality, such as VAR to maintain model states locally at the WFO.

- Site-Specific uses MPE's best estimate QPE grids for calculating modeled basins' mean areal precipitation time series. Western Region offices are concerned about the

usefulness of this precipitation data source, since the current MPE precipitation output does not meet their needs. Mountain-Mapper functionality could be incorporated into MPE to help meet WR precipitation data needs.

- It may be useful to have additional API rainfall-runoff models available. This could help WFOs for which the RFC does not support their use of the SAC-SMA, and for which the use of the Kansas City API model is not desired or appropriate.

MPE Enhancements Development - OHD34

Team Lead Jon Roe, OHD/HL/HSEB
Tech Lead Mark Glaudemans, OHD/HL/HSEB

Objective To enhance the MPE operations to allow RFCs and WFOs to use the MPE
application to provide improved quantitative precipitation estimates (QPEs) for use
in hydrologic models, and to allow these QPEs to be used in other areas

Milestones

Task	Due Date	Status
1.) Optimize MPE field generation processing. Some MPE interactive processing and display operations do not complete in a timely manner. These operations need to be optimized through use of enhanced software and data store design changes. This applies to both the interactive operations and the background field generation analysis. Will facilitate more frequent runs, and for time spans shorter than one hour.	September 2004	Minor improvements made in OB4. Need help from Science staff to understand algorithm in order to improve performance. We are considering modifying MPE Fieldgen in OB5 to only generate explicitly selected grids.
2.) Additional interactive graphical editing features are needed to allow the forecaster to quality control and edit the point data and gridded precipitation estimates in order to produce the highest quality point gage data and gridded fields. This includes the incorporation of "post-analysis" tools to handle the integration of 24-hour data within the hourly precipitation fields.	September 2004	Early design work.
3.) Implement newly engineered solution to providing consistent up-to-date gage data reports by creating a point precipitation data server operation	August 2004	Development work in progress, planned for deployment in OB5.
4.) Provide additional documentation and training support on technical details and user interface operations of MPE processes, including bias computation operations	July 2004	Complete. Advanced course now includes MPE training.
5.) Provide automated method for providing resulting MPE grids to external application such as D2D and to external customers via web or other mechanisms	February 2005	Performing design for displaying grids in D2D possibly in OB5, with significant support from FSL.
6.) Provide improved method for integrating the interactive MPE operations with the analysis of river and other data sets and with the operations of the SiteSpecific model.	May 2005	Not started yet.

7.) National Implementation of RFC Enhancements - Various RFCs have adopted local methods for managing QPE grids. These methods can be adopted into MPE to create a national baseline application that will provide to all RFCs the unique benefits realized by individual RFCs.	January 2005	No new development this period. Continuing requirements discussion with RFCs.

Accomplishments/Actions – 3rd Quarter FY04

See accomplishments in Milestones Table status column

Problems Encountered/Issues – 3rd Quarter FY04

Progress is being made, however, at a slower pace than desired due to limited funding of this proposal in FY2004.

NEXRAD PPS Modernization - OHD35

Team Lead Jon Roe, OHD/HL/HSEB
Tech Lead Chris Dietz, OHD/HL/HSEB

Objective 1. To upgrade the PPS so that it can support multiple new VCPs, negative elevations, higher resolution data from the RDA, and migration to Linux.
2. To convert the PPS from FORTRAN to C, simultaneously generating accurate/complete documentation, and introducing local source code version control.

Milestones

Task	Due Date	Status
1.) Analyze the PPS tasks to determine the impact of proposed NEXRAD enhancements:		
a.) new/faster VCPs	12/04	COMPLETED late FY03
b.) port to Linux	6/05	Currently defining system specifications
c.) negative elevations	12/04	COMPLETE
d.) ORDA higher resolution data	12/04	ORDA delayed; waiting for sample data
2.) Convert the FORTRAN-based PPS tasks to POSIX-compliant C; place source code under local version control	6/05	Pilot effort underway using NESDIS software CM tool (CasaNOSA)
3.) Generate a complete set of baseline documentation consistent with NEXRAD standards:		
a.) design documents (DFDs, structure charts)	9/05	ONGOING
b.) RPG-AWIPS product specifications	9/05	ONGOING

Accomplishments/Actions – 3rd Quarter FY04

- Precipitation Rate & Accumulation task (prcprtac) Level 1 Data Flow Diagram (DFD) created
- 2nd RPG-AWIPS product specification begun
- PPS task prcprtac successfully imported into CasaNOSA

Problems Encountered/Issues – 3rd Quarter FY04
- None

Flash Flood Monitoring and Prediction (FFMP) - OST1

Team Lead   Stephan Smith, OST23

Objective   Fulfill NWS Requirements for the AWIPS Flash Flood Monitoring and Prediction (FFMP) Tool

Milestones

Task	Due Date	Status
Generalized "QPE/QPF" as a precipitation source to allow many gridded QPE/F (e.g. from NWP models) to be used as an input into FFMP. Add RFC QPF, Kitzmiller's 3-hr QPF, and Satellite Auto-Estimate QPE.	OB4	Complete
WHFS Point Data Control (PDC) GUI for gages to FFMP	OB5	On track
FFMP display partial re-design.	OB5	On track
Add on-the-fly basin layering and aggregation at the D2D display level of FFMP to allow users to look downstream flooding effects of heavy rainfall. Dependent on FFMP display re-design.	OB5	On track
Add 'all basins' display as a toggle in the basin table. Dependent on FFMP display re-design.	OB5	On track
Use MPE as a QPE source	Pushed to OB7 +	Waiting for MPE compliance
Add basin trace display to D2D	OB6	Partial design complete
Add nearby city functionality	Pushed to OB7	Preliminary work
FFMP site back-up.	OB5	On track – NEW REQUIREMENT!
FFMP collaboration with WarnGen	Pushed to OB7	Preliminary work
Multiple monitoring time frames and thresholds	OB6	On Track

Accomplishments/Actions – 3rd Quarter FY04

Extreme effort put forth to ensure FFMP Backup, Basin Layers (with Display partial re-design), and PDC remained on track!

Problems Encountered/Issues – 3rd Quarter FY04

New requirement for FFMP back-up caused several items to be pushed from OB6 to OB7

AHPS Short to Long-Term Forecasts

Streamflow Regulation Accounting - CR11

Team Lead   Larry Black, MBRFC
                      Janice Sylvestre, OHD/HSMB

Objective   To continue the development of a strategy for AHPS implementation for river basins where the regulation of streamflow 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
Prepare task schedule	Dec 2003	done
Prepare regulation Issues Identification Document	Jan 2004	done
Summarize findings and submit report	Mar 2004	done
Develop modeling strategic plan	May 2004	done
S. Platte data collection & inventory	Jun 2004	done

Accomplishments/Actions – 3rd Quarter FY04

A meeting was held with MBRFC, RTI and OHD staff at MBRFC in April to review the South Platte Implementation Strategy (SPIS). Based on input from all parties, the final SPIS document was completed which included an evaluation of the entire South Platte basin, recommendations for modeling it and an estimate of the amount of resources needed to implement it. Data collection and inventory of the South Platte was also completed. Because of the level of effort need to do the entire basin and the amount of uncertainty in how to model the regulated streamflow, it was decided to begin implementation by focusing on a pilot area to ensure that the lessons learned and the approaches used for implementation may be applied to other basins. It was decided to model the Cache la Poudre River sub-basin.

Problems Encountered/Issues – 3rd Quarter FY04

None

Ensemble System Enhancements - OHD2

Team Lead   Jon Roe, OHD/HL/HSEB & Janice Sylvestre, OHD/HL/HSMB
Tech Lead   Julie Demargne, OHD/HL/HSMB

Objective   Develop an operational and enhanced Ensemble Pre-Processor to generate precipitation and temperature ensemble forecasts from short to long term. The Ensemble Pre-Processor will be based on new science for short and medium range consistent with the long-term existing process. Three journal articles relative to the short-term ensemble pre-processor will provide a strong theoretical scientific basis to the prototypes. Test sites are relative to MARFC, ABRFC, and CNRFC.

Milestones

Task	Due Date	Status
1.) Development of enhanced short-term pre-processor for Linux (including calibration files)	December 2003	Complete
2.) Development of a unique short and long range pre-processor	April 2004	Complete
3.) Enhancements of the short and medium range processes , with the integration of gridded forecasts (including new calibration files)	November 2004	In progress
4.) Development of enhanced short term ensemble pre-processor to use CPC precipitation forecasts for days 2-5 (including new calibration files)	February 2005	In progress
5.) Evaluation and verification of days 1-5 precipitation and temperature ensembles	March 2005	In progress
6.) Enhancements of the medium range processes to use CPC days 6-14 precipitation and temperature forecasts	June 2005	
7.) Development of a calibration prototype for short to long range calibration	June 2005	
8.) Development of a research prototype to verify days 1-14 precipitation and temperature ensembles	June 2005	

Accomplishments/Actions – 3rd Quarter FY04

- Worked on the enhancements of the ensemble pre-processor, especially for short-term prediction and grid forecast integration.

- Developed the requirements document for the unified calibration program and reviewed the document with RFCs.

- Enhanced the verification program for precipitation and temperature short-term ensembles.

- Worked on finalizing the journal article which describes the short-term ensemble pre-processor methodology and results.

Problems Encountered/Issues - **3rd Quarter FY04**

Following the discussions held on this topic at the June 2004 DOH/RDM meeting at OHD, Pedro Restrepo is developing a comprehensive strategic plan for future ensemble work that will impact this project.

Probabilistic Verification - OHD4

Team Lead   Jon Roe, OHD/HL/HSEB
Tech Lead   Edwin Welles, OHD/HL/HSEB
                (with Dr. Soroosh Sorooshian, University of California)

Objective   Continue research and software development aimed at providing a graphical
                system for verifying probabilistic hydrologic forecasts.

Milestones

Task	Due Date	Status
1.) Continue research into methods for verifying NWS probabilistic hydrologic forecasts	May 2004	Ongoing
2.) Develop methods for evaluating ensemble forecasts	September 2004	
3.) Present research results to RFC/HSD/OHD staff	September 2004	Interim presentations to OHD have occurred.
4.) Continue software development for probabilistic forecast verification based on research completed in FY2002	August 2004	Ongoing

Accomplishments/Actions – 3rd Quarter FY04

The prototype software for conducting probabilistic verification written by Riverside
Technology, Inc. was delivered to the CBRFC and has been tested there. The prototype software
has passed the functional tests at CBRFC and it is possible for other RFCs to use it. This is not
fully operational software, but if you would like to use it, please contact OHD or CBRFC.

We have written a statement of objectives (SOO) for new work on this task which will be a
collaboration between Dr. Soroosh Sorooshian at the University of California, Irvine (UCI), the
CNRFC, and OHD. The UCI will work with the CNRFC to define methods to evaluate
ensemble products in a runtime environment – operational verification. This work will feed into
the ongoing ensemble development within the HL and provide a foundation for developing the
operational interfaces to be used by the RFCs for ensemble forecasting.

The contract for this task encountered a major hurdle when the University of California objected
to a clause in the standard contract language for the task. This matter was referred to the NWS
office of legal counsel, and they have proposed a solution to the University of California. We
are awaiting a response from the University.

Problems Encountered/Issues – 3rd Quarter FY04
Contract issues held up SOO processing for several weeks.

Calibration System Enhancements - OHD10

Team Lead   Mike Smith, OHD/HSMB

Objective   Update the hydrologic model Calibration System (CS) to increase efficiency of the calibration process. Support RFC calibration contract work by Eric Anderson

Milestones

Task	Due Date	Status
Develop functional system design	12/2003	completed
Assemble field requirements	12/2003	some already acquired, need updated versions
Evaluate current components against functional design, field requirements	2/2004	Delayed due to RTi presenting acceptable ICP scope of work.
Develop E2E project plan		
Calibration Workshop	July 27-30	On schedule
Historical data analysis research and paper	September	On schedule

Accomplishments/Actions – 3rd Quarter FY04

Work on ICP by the AHPS contractor was continued. RTi developed a scope of work that was further negotiated and reviewed. Functional requirements definition process begun by RTi Eric Anderson modified his study with NWRFC on the importance of performing consistency corrections. Eric Anderson also completed a study on the calibration, operational, and future MAT preprocessors and presented the results at the DOH/RDM conference. Mike Smith and Fekadu Moreda performed analyses of consistency corrections in the SERFC area. Mike Smith began work on a research paper on consistency corrections for the AMS Journal of Hydrometerology. To date, there is not a published paper on the details of NWS's historical data analysis procedures. Mike Smith provided comments on the functional requirements of a re-designed Historical Data Browser. Mike Smith and Fekadu Moreda prepared for the Basic Calibration Workshop at OHRFC July 27-30.

Problems Encountered/Issues – 3rd Quarter FY04

Delays encountered in having RTi prepare an acceptable scope of work for ICP functional requirements analysis.

Historical Data Preprocessor - OHD28

Team Lead   Pedro Restrepo, OHD/HL
John Schaake

Objectives   Reduce cost of data preparation for model calibration and ESP by reducing time required to process historical data, Increase the reliability of calibration data sets, Estimate the accuracy of MAP data sets, Integrate with calibration software.

Milestones

Task	Due Date	Status
1. Provide prototype historical data processing procedure for NWSRFS and test in 1 RFC	Sept 2004	
2. Modify prototype procedures based on RFC feedback, test in additional RFC and arrange for operational implementation	Sept 2005	

Accomplishments/Actions – 3rd Quarter FY04

- Updated historical max/min temperature data base.

- Made comparisons with MAP and MAT time series at CNRFC

Problems Encountered/Issues – 3rd Quarter FY04

- None

System Enhancements for Science Infusion - OHD33

Team Lead   Jon Roe, OHD/HL/HSEB

Objectives   The objective of this project is to provide the RFC and WFO field offices and our university collaborators with greater access to our software and with greater support for their own development, leading to faster turnaround of system enhancements and bug fixes. The end result will be web served source code, libraries, make files, and test procedures as well web served check-in procedures for all of the above.

Milestones:

Task	Due Date	Status
1.) Develop initial functional requirements for new generation OHD Configuration Management (CM) system.	December 2003	Complete.
2.) Define improved OHD software development processes and procedures to facilitate collaborative development.	April 2004	Complete. HOSIP being implemented on selected projects.
3.) Refine CM system functional requirements.	July 2004	CM Functional Requirements completed - Evaluation of CasaNOSA Product to meet requirements underway.
4.) Select new CM tool environment.	September 2004	Underway. See Item 3.
5.) Purchase new CM tools.	October 2004	Not started yet.
6.) Integrate new CM tools and software processes fully into OHD development & maintenance.	March 2005	CasaNOSA test projects and conversations with its developers.

Accomplishments/Actions – 3rd Quarter FY04

-- The OHD SISEPG investigated NESDIS's "CasaNOSA" (formerly "NOAAForge") collaborative project tool and found that it may meet a fair amount of the completed CM requirements. Started piloting the use of CasaNOSA for configuration management of all NEXRAD source code. Looked into feasibility of using CasaNOSA for the RFC oriented collaborative development of the RFC Archive Database server software.
-- Developed documentation templates and quality assurance checklists to be used in the HOSIP in support of configuration management procedures. Process flow checklists and document content shells have been produced and are being used.

Problems Encountered/Issues – 3rd Quarter FY04

We continue to encounter complications in finding CM tool environments that, both, support heavy OHD HQ software development and collaborative off-site software development. Due to its web interface and client-server architecture, there are some drawbacks to using CasaNOSA for normal NWSRFS software development at OHD. We are working with NESDIS personnel to try to overcome some of those drawbacks or come to a hybrid solution of some kind.

NDFD to NWSRFS Preprocessor - OHD36

Team Lead   Jon Roe, OHD/HL/HSEB
Tech Lead   Edwin Welles, OHD/HL/HSEB

Objective   Build a preprocessor based on the pre-existing requirements document that will ingest NWS National Digital Forecast Database (NDFD) temperature grids, compute areal averages for river basins, find element values at points, and output time series of areal averages and point values in formats compatible with NWSRFS and external user applications.

Milestones

Task	Due Date	Status
1.) Obtain validated test data sets from the AWIPS Program	April 2004	Obtained from MDL
2.) Analyze requirements document, create development plan	June 2004	Being finalized
3.) Design preprocessor	July 2004	Being finalized
4.) Code and unit test preprocessor	August 2004	
5.) Develop integration test procedures and data sets	August 2004	
6.) Perform integration testing (end-to-end)	September 2004	(possibly except actual grid downloads)
7.) Develop user and system documentation	September 2004	
8.) Field test preprocessor at two RFCs	October 2004	(depends on solution to grid downloads)
9.) Integrate into AWIPS release and support AWIPS testing	December 2004	(depends on solution to grid downloads)

Accomplishments/Actions -3rd Quarter FY04

- We provided the detailed requirements for our development to Tom Adams at OHRFC, the leader of the original requirements team for review. He identified the need to extract point values as an important function which is not included in the scope of this current development effort. The original requirements describe a comprehensive program for downloading, viewing, editing and averaging grids. This development will include only the areal averaging engine. In later phases, and with proper scientific validation, we will be able to implement additional functions including the point output. Requirements for

viewing, editing, and averaging may end up being satisfied from other parts of AWIPS besides OHD.

- We have developed the basic functions for the pre-processor and are now improving upon those functions to make them more robust. We have had a few discussions with Dave Ruth of OS&T/MDL who runs the NDFD Program.

- Currently, the NDFD grids reside *outside the AWIPS firewall* on the NDFD ftp site. The grids are available as a national CONUS grid, or in 16 sectors. We have requested, through OCWWS/HSD, the grids be made available *inside the AWIPS firewall* in sections which cover an individual RFC area of responsibility (the current 16 sectors do not). Until the grids are put inside the AWIPS firewall, the only option available to the RFCs is to download the national CONUS grid from the NDFD ftp site. OHD does not plan to deliver operational software to AWIPS to support the "outside-the-firewall" option for downloads as that option has serious problems in terms of robustness and impact on AWIPS system resources.

Problems Encountered/Issues – 3rd Quarter FY04

- No solution yet identified for RFCs to operationally receive NDFD grids in AWIPS.

Numerical Model (MRF) Forecast Ensembles - WR2
(Incorporate Precip., Temp. and Climate Forecasts into ESP for Days 1-14 and 14-365)

Team Lead	David Brandon, HIC CBRFC
Technical Support	Ed Clark, Hydrologist (SCEP), CBRFC
	Kevin Werner, Hydrologist - WR-SSD
Operational Imp	Jeff Smith, Senior Hydrologist, CBRFC
Web Support	Cass Goodman, CSA, CBRFC
Science/Develop	Martyn Clark, Geography, CIRES
Technical Support	Jeff Whitacker, Physical Scientist, CDC

Objective (1) Develop, test and implement a procedure to incorporate ensemble forecasts of precipitation and temperature from a meteorological numerical model (MRF-Medium Range Forecast) into ESP for days 1 through 14.
(2) Develop, test, and implement procedures to incorporate climate forecasts into ESP.
(3) Develop, test and implement a procedure to incorporate ensemble forecasts of precipitation and temperature from the meso-eta model into ESP for days 1-3 and connect them to the MRF for days 4 - 14.

Milestones

Task	Due Date	Status
1. Calibrate and evaluate ensembles of PP and TA from the reforecasts of the meso-eta. Connect these to the MRF ensembles which were developed earlier in the project to produce a seamless suite of inputs to ESP. Experiment with different downscaling techniques and procedures.	End of FY04	
2. Integrate climate forecasts as part of the seamless suite of ensembles produced from the first step. To the extent possible, produce and evaluate ESP reforecasts with this methodology. Expand WEB page displays of probabilistic forecasts. Continue to refine/development software to view and analyze time series data and flow forecasts. Develop a prototype to utilize reforcast ensembles, including some probabilistic verification. Work with RTI to assist in testing and evaluating changes to the ESPVS software.	End of FY04	
3. None at this time....put on hold due to less funds than expected.	End of FY05	

Accomplishments/Actions – 3rd Quarter FY04

The first paper reference above (i.e., "An Analysis of Weighting Schemes Using Climate…")

was reviewed, modified and has been accepted for publication in the Journal of Hydrometeorology.

The second paper referenced about (i.e., ""Incorporating Medium Range Numerical Weather Model Output into the Ensemble Streamflow Prediction System of the national Weather Service") has gone through the peer review process and is currently being modified. The changes for the most part are minor.

On April 21, we attended the national meeting on Ensembles and at which time made a presentation on our project, including the findings. The meeting was sponsored by HSD and included information about short, medium and long range ensemble creation. We felt obliged that we needed to report first hand and to show how the funding was being spent, and to report on what are results were. There was no clear decision and it was not conclusive about whether the work we have done on the medium range will be accepted as an alternative to the problem.

Another part of the project was to work with RTI on creating part of a probabilistic verification program. RTI has finished the prototype software and we have begun testing using their test data sets, and sets of our own. There are still some bugs to work out but the prototype works as advertised, at lest for the RTI test data set.

Funding was transferred to CDC and CIRES. The other funds were spent locally on travel and hardware. Of the $49K all has been spent accept for $100.

Problems Encountered/Issues – 3rd Quarter FY04

After the ensemble meeting it was not clear whether our work will be used in the broader picture of ensemble creation.

The meso-eta is still on hold pending data extraction.

AHPS Flood Forecast Mapping

GIS Based Information Dissemination System - CR3

Team Lead   Wendy Pearson, CRH (Dr. Shripad Deo, CIRA, Brain 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 GIS system	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

Accomplishments/Actions – 3rd Quarter FY04

- Software development licenses installed at NCRFC in February 2004. Now ArcIMS development can proceed at CRH, MBRFC and NCRFC.

- Data identified and obtained for an AHPS ArcIMS service. Plans for MySQL database to feed this ArcIMS service are underway.

- $8,335 of the $20K allocated from FY03 has been spent to date to support contract with Shafer, Kline and Warren, Inc. for IMS development work.

- $6,214.96 allocated from FY04 budget to procure ArcIMS server with Windows OS. Server has been purchased.

Problems Encountered/Issues –3rd Quarter FY04

- None

Flood Forecast Mapping - OHD5

Team Lead Janice Sylvestre, OHD/HSMB

Objective Further testing of the flood forecast mapping application (FLDVIEW) to address the issues of accuracy and data requirements. Test more complex capabilities in FLDVIEW and identify limitations of the various data used

Milestones

Task	Due Date	Status
Test FDLVIEW at new area	Sept 2004	on schedule
Test FLDIMS template in another Susquehanna River area	Sept 2004	on schedule
Investigate alternate methods to generate water surface profiles	Sept 2004	on schedule

Accomplishments/Actions – 3rd Quarter FY04

FLDWAV and FLDVIEW were modified to allow for a more flexible directory structure when mapping multiple scenarios; FLDVIEW is being converted from Arview to ArcGIS for Linux; OHD is working with ESRI to determine if the ArcGIS for Linux will be able to meet the need; the software has been installed on a Linux computer using NWS specified OS (Red Hat Enterprise 3.0). A series of basic GIS functions will be tested followed by the manual generation of a flood forecast map using FLDVIEW capabilities.

The templates for FLDIMS are being populated with data from three areas: West Branch of the Susquehanna River, Susquehanna River in the vicinity of Harrisburg, PA, and template the St. Johns River in FL. To address the plugin problem when using the current MapGuide version of FLDIMS, and ArcIMS version of FLDIMS is being developed using the Harrisburg data.

Final testing of SHRT was completed and draft documentation was written; a GUI for SHRT was also developed.

A Dam Analysis Tool (DamAT) is being developed which will allow the generation of the water surface profile and a flood forecast map during an emergency dam failure situation. All GIS data for the country (NED and NHD) except image data (DRG) have been obtained. DamAT integrate the data and the tools into one package which will allow an accurate dambreak flood forecast (including flood forecast map) to made in a timely manner. The methodology was tested on several dam failures which occurred during this quarter.

Problems Encountered/Issues – 3rd Quarter FY04
None

River Mechanics Modeling - OHD15

Team Lead   Janice Sylvestre, OHD/HSMB

Objective   Enhance FLDWAV to account for hydraulic situations not currently addressed by the model.

Milestones

Task	Due Date	Status
Account for ice effects	Sep 2004	on schedule
Improve the use of dynamic routing and ESP	Sep 2004	on schedule
Update operational FLDWAV with stand-alone capabilities	Ongoing	ongoing

Accomplishments/Actions - 3rd Quarter FY04

Ice data is currently being gathered from the USGS which will be used by CRREL to develop empirical relationship to account for ice effects in rivers; a comparison of NWSRFS reservoir modeling capabilities (RES-SNGL and RES-J) as well as USACE reservoir modeling capabilities (RES_SIM) was started to determine which reservoir rule curves should be added to FLDWAV.

Problems Encountered/Issues – 3rd Quarter FY04

None

River Mechanics Utilities - OHD16

Team Lead   Janice Sylverstre, OHD/HSMB

Objective   Provide a visual tool (FLDAT) to help the users understand the complexities of dynamic routing and to assist in the development of new methodologies being added to FLDWAV

Milestones

Task	Due Date	Status
Increase editing capabilities	December 2004	done
Add calibration capabilities	September 2004	on schedule
Continue debugging applications	ongoing	ongoing

Accomplishments/Actions - 3rd Quarter FY04

New features are being adding to support calibration and tested. FLDAT is undergoing thorough testing using all of the FLDWAV data sets (~250 files) and several operational segments; a Linux version was made available to RFCs upon request. The stand-alone version is currently being beta tested (a few RFCs are providing feedback); several bugs were fixed and enhancements made based on user feedback.

A series of tutorials are being developed to help users understand the complexities of dynamic routing; they will be evaluated for content and usability. The first one relates to dams and dam failure analysis.

Problems Encountered/Issues - 3rd Quarter FY04

None

Inundation Mapping Implementation - OHD31

Team Lead: Jon Roe, OHD/HL/HSEB
Tech Lead: Joseph Gofus, OHD/HL/HSEB

Objectives: Provide operational software to RFCs for computing inundation maps.

Milestones:

Task	Due Date	Status
1.) Update the FLDWAV model in NWSRFS to provide data needed for inundation mapping. Deliver with AWIPS OB4.	March 2004	Completed
2.) Update NWSRFS tests to provide stable baseline tests for the updated FLDWAV model for AWIPS OB4 delivery.	March 2004	Completed
3.) Develop a process for routinely migrating functionality from the FLDWAV Prototype to the NWSRFS baseline.	April 2004	Completed
4.) Follow the FLDWAV Migration Process to migrate the ability to generate FLDVIEW input data for multiple scenarios into the AWIPS OB5 baseline.	October 2004	In progress

Accomplishments/Actions – 3rd Quarter FY04

- Completed a plan for the process of migrating functionality from the FLDWAV Prototype to the NWSRFS baseline was nearing completion at the end of the quarter.

- Added two more FLDWAV segments to the standard FLDWAV regression test suite.

- Began migrating the ability to generate FLDVIEW input data for multiple scenarios to the AWIPS baseline for OB5.

Problems Encountered/Issues – 3rd Quarter FY04

- None.