Hydroview_MPE
Implementation Document
AWIPS Release OB3

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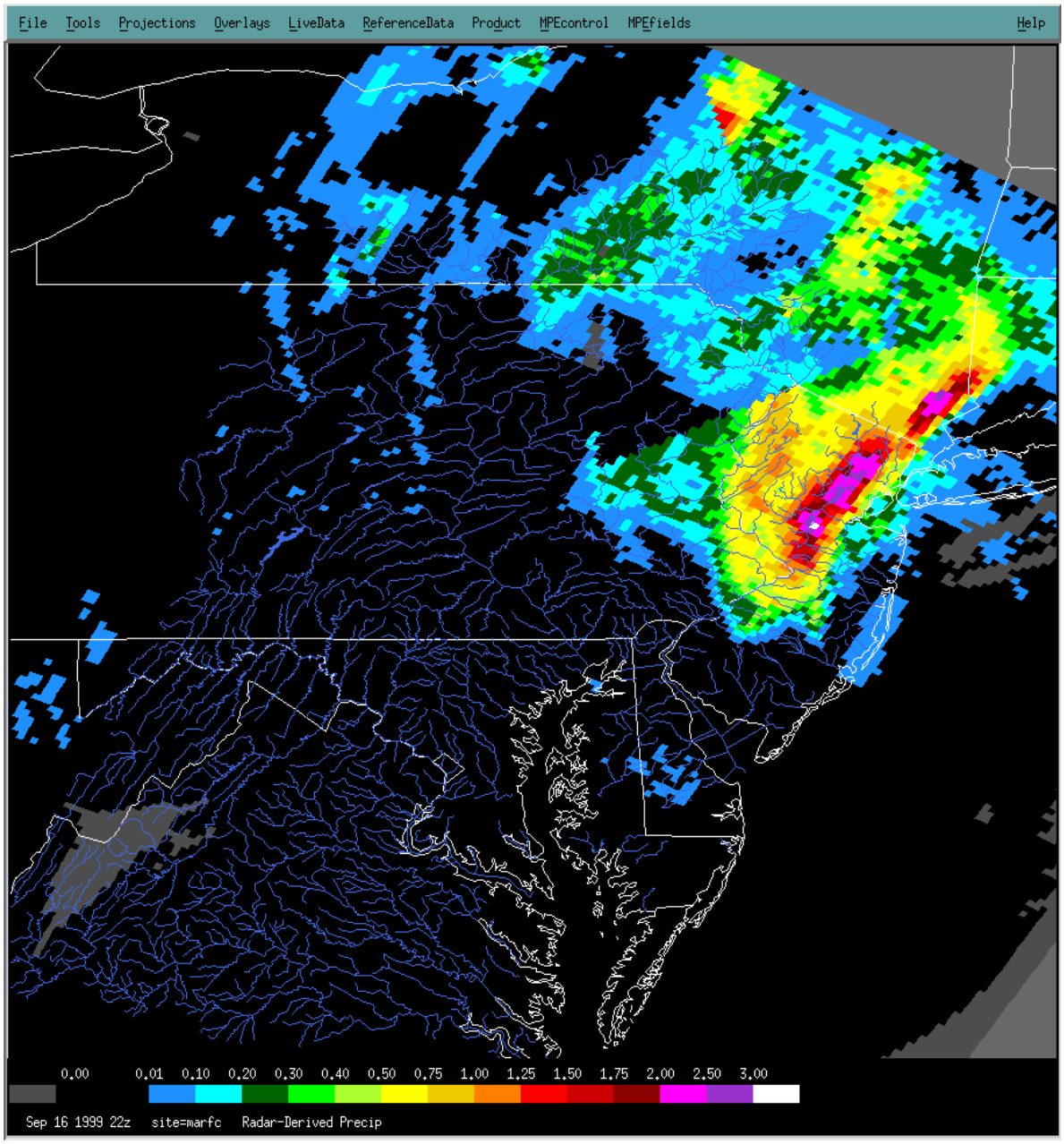
NWS Office of Hydrologic Development



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I Introduction

The Hydroview_MPE application is the result of an effort to consolidate the Hydroview and MPE programs into a single versatile utility that can be used at both RFCs and WFOs. Hydroview's focus is primarily on the display of point hydrometeorological data such as river and stream gage readings, precipitation amounts and similar environmental information that is typically observed and forecast for a specific location.

MPE's focus is on areal estimations of rainfall amounts based on both remote sensing techniques (radar) and actual observations (rain gages). MPE is comprised of two separate applications, MPE_FieldGen and the MPE viewer. MPE_FieldGen is a non interactive program which creates hourly, gridded, multi-sensor precipitation estimates on a 4-km HRAP grid. The primary inputs to MPE_FieldGen are the gridded Digital Precipitation Array (DPA) products, which provide radar estimates on a 4-km grid, and precipitation gage data. The main steps involved in creating the multi-sensor estimate include creating a multi-radar mosaic, determining a mean-field bias adjustment, and merging the grids with precipitation gage observations. In the process of performing these operations, multiple types of precipitation grids are generated, with one of these designated as the "best precipitation estimate".

Once the gridded precipitation mosaics have been created, the MPE portion of Hydroview_MPE can be used to view them. One of the most important features of MPE is the ability to edit the gridded data fields as well as the point gage observations

The Hydroview_MPE application relies on the proper configuration of a number of resources. These resources include tables which reside in the IHFS database, disk files, and user-controlled application tokens (also known as Apps_defaults). The purpose of this document is to outline these dependencies by describing which database tables this application relies upon, in which directories files must reside on disk in order to be found and read, and the required values of tokens which control the program's execution. This information will allow the Hydroview_MPE application to be properly installed and executed.

This write-up will focus upon the MPE portion of the Hydroview_MPE application.

II Discussion about Tables, Tokens, and Data Files

The Hydroview_MPE and MPE_FieldGen programs draw upon a large number of system resources during the course of their execution. They utilize many tables in the Integrated Hydrologic Forecast System (IHFS) database, read from and write to a large number of disk files, and integrate the flexibility of Apps defaults tokens into their design. The use of these resources makes these programs flexible enough so that they can be tailored to the needs and preferences of individual forecast sites and users. It is important that the user of Hydroview_MPE and MPE_FieldGen becomes acquainted with the database tables, files and tokens that these applications require. If any of these sources of information are missing, then Hydroview_MPE and MPE_FieldGen may not perform to their fullest potential.

II.1 Tables

The IHFS database is a collection of over 160 tables. Hydroview_MPE and MPE_FieldGen use many of these tables, as shown in Figures 1a and 1b. Specifically, these tables are a source of hourly rain gauge data derived from processed SHEF reports, application configuration information such as the colors of certain overlays, information used to locate raw radar derived precipitation fields (DPA products), information related to the status and operating modes of individual radars, and information pertaining to user-created "pseudo gages". Appendix C provides the database schemas corresponding to the IHFS tables used by MPE_FieldGen and Hydroview_MPE. The IHFS database is the subject of a paper written for the 78th Annual AMS Meeting in Phoenix, Arizona in January 1998 entitled "Recent Database Developments at the National Weather Service Office of Hydrology".

II.2 Tokens

The Apps defaults token is a powerful user-configurable value used throughout the Hydroview_MPE and MPE_FieldGen applications. Tokens may be easily changed by the user and directly affect the performance and appearance of Hydroview_MPE. Changing a token does not require the recompilation of the program. All that is required is that it be restarted once the token has been modified.

Tokens are defined in one or more of four different locations: a national apps defaults file, a site apps defaults file, a user apps defaults file, or in the environment of the shell that the application is running under. If the token is defined in more than one of these locations, then a set of rules of precedence decide which token value is actually used. These rules are simple. The value of a token defined in the shell environment overrides the value of a token defined in a user's apps defaults file which takes precedence over a token defined in the site's apps defaults file which takes precedence over a token defined in the national apps defaults file. Since many Hydroview_MPE and MPE_FieldGen tokens are, by default, defined in the national apps defaults file, the user may override these values by adding the modified token definition to the site apps defaults file, the user apps defaults file or by setting it in the shell environment. The user must never modify the national apps defaults file. This file is overwritten with every software build, and local changes made to it will be lost.

The paths and filenames of the national, site and user apps defaults files are defined by the environmental variables APPS_DEFAULTS, APPS_DEFAULTS_SITE, and APPS_DEFAULTS_USER, respectively. The APPS_DEFAULTS and APPS_DEFAULTS_SITE variables are set in the /awips/hydroapps/set_hydro_env file which is sourced by the start scripts of all WHFS applications. Start scripts which also source the /awips/fxa/readenv.sh, which includes the Hydroview_MPE startscript start_hmap_mpe, define the APPS_DEFAULTS_USER variable as well. The value it is set to depends on platform. For Hydroview_MPE and MPE_FieldGen, the national apps defaults file is defined as /awips/hydroapps/.Apps_defaults while the site file is set as /awips/hydroapps/.Apps_defaults_site. This means that when Hydroview_MPE and MPE_FieldGen lookup a token's value, they will look in these files (unless, of course the token is defined in the environment).

In order to change the .app_defaults, .app_defaults_site, or .apps_defaults_user files used by Hyrdroview_MPE, the user must modify the set_hydro_env file where the APPS_DEFAULTS and APPS_DEFAULTS_SITE definitions are specified. If desired, the APPS_DEFAULTS_USER variable must be defined after the line in set_hydro_env where the file /awips/fxa/readenv.sh file is sourced.

Appendix A lists and defines the tokens used by Hydroview_MPE and MPE_FieldGen.

II.3 Files

Both Hydroview_MPE and MPE_FieldGen make extensive use of disk files. These files are used for storing and retrieving the large gage and radar derived precipitation mosaics generated by MPE_FieldGen and viewed in Hydroview_MPE. These files also contain climatological rainfall information, data pertaining to radar coverage, and data pertaining to the computation of mean field and local radar biases. Appendix B describes the files used by Hydroview_MPE and MPE_FieldGen.

Figures 1a and 1b depict the files and IHFS database tables used by Hydroview_MPE and MPE_FieldGen, respectively.

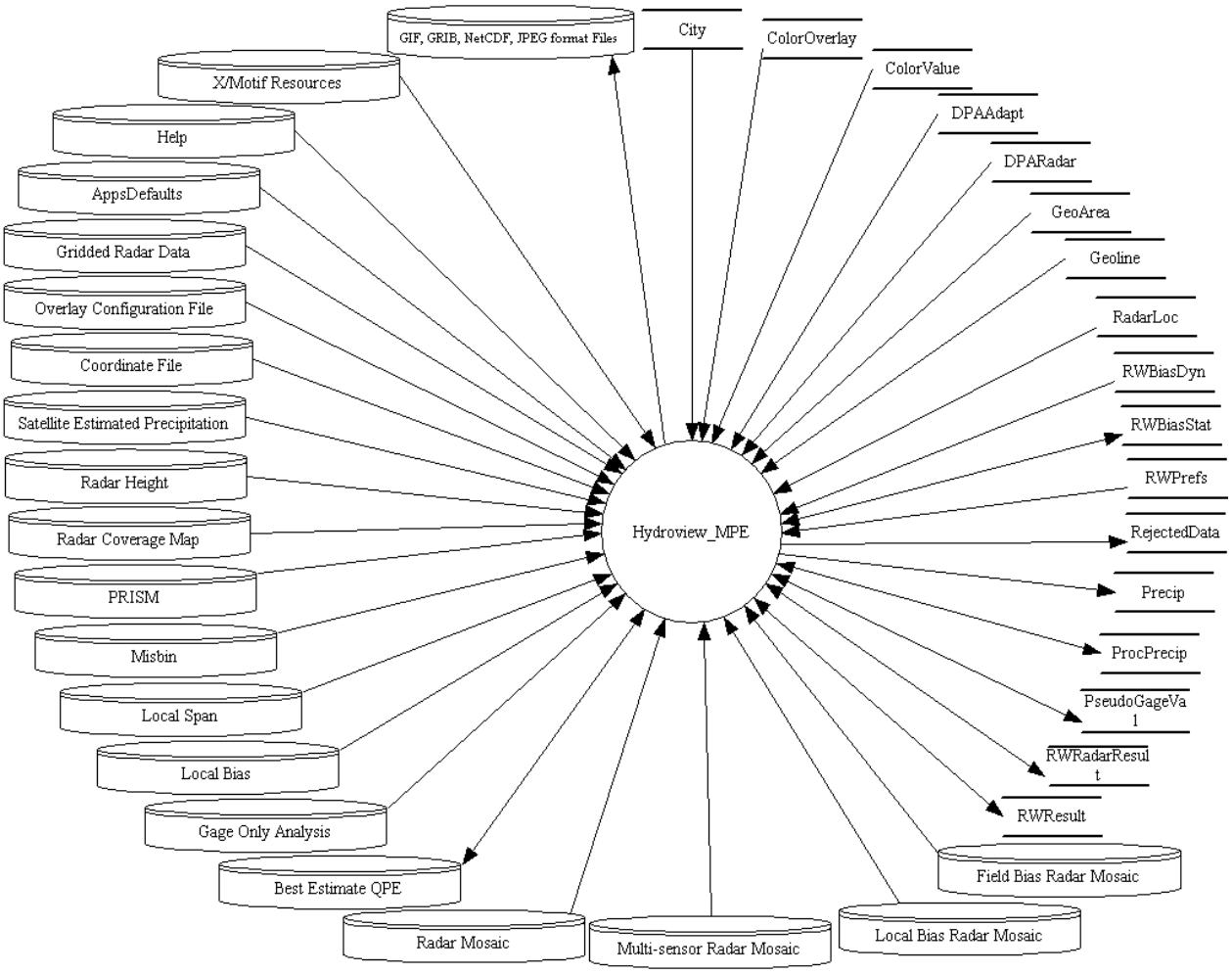

Figure 1a. Hydroview_MPE Dataflow diagram - Database tables and files used by the "MPE" component of Hydroview_MPE (Build OB3)

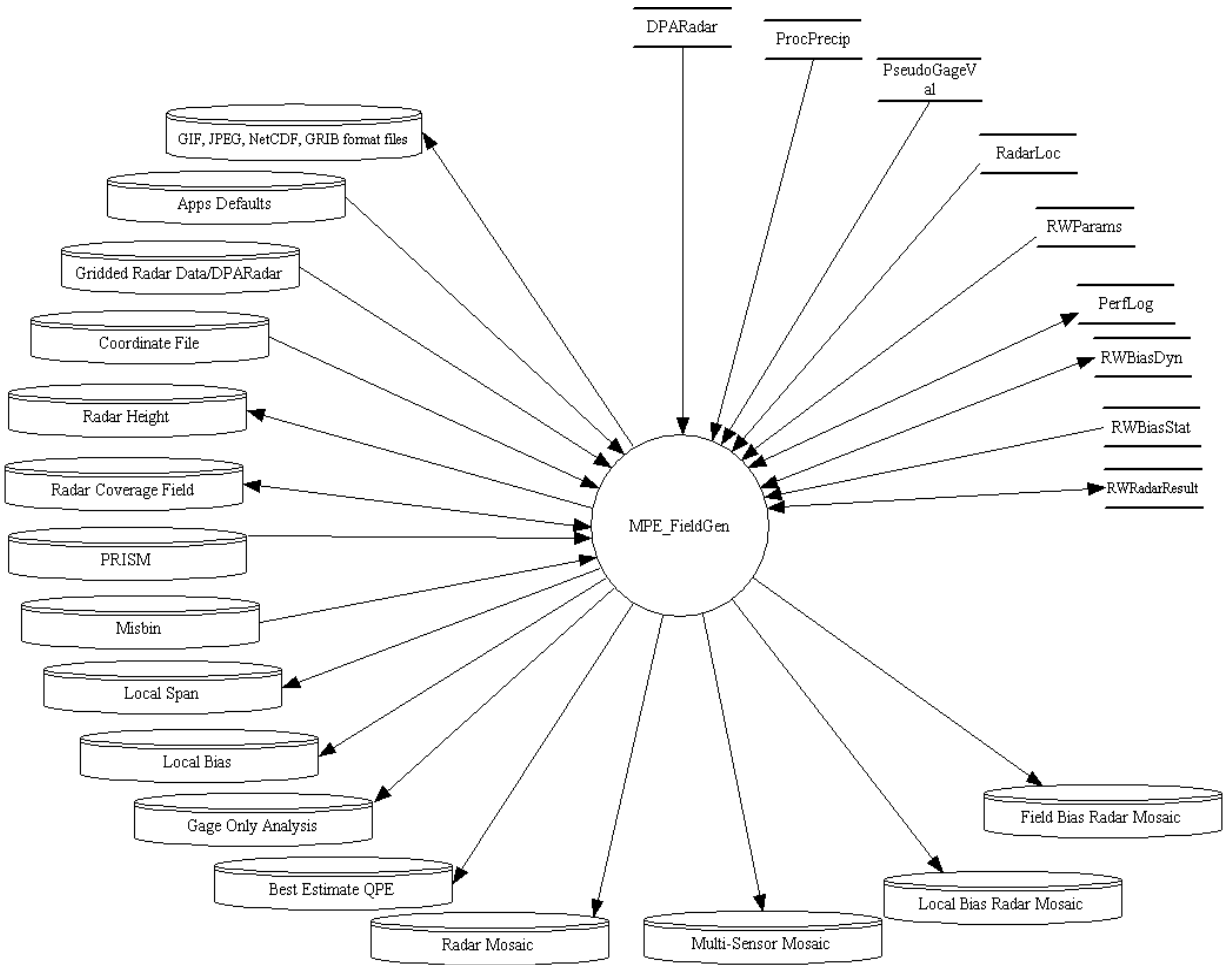

Figure 1b. MPE Fieldgen Data Flow Diagram - Files used by the MPE Fieldgen application (Build OB3)

III Implementation Instructions

In order to run Hydroview_MPE at WFO sites the following steps must be followed to set it up properly. Note that these steps are typically performed during the AWIPS installation. Once installed, the user should rarely have any reason to perform these setup operations.

III.1 Setup the Coordinate File:

Determine the HRAP grid which will cover the forecast area. The HRAP X and Y coordinates of the lower (southwest) corner of the grid must then be determined. Note that these coordinates are relative to the national HRAP grid. Also, the number of rows and columns in the HRAP grid must be determined. These four values must be in the coord_xxx.dat file in the /awips/hydroapps/geo_data/xxx/ascii directory where "xxx" represents the site identifier, as contained within the "st3_rfc" token. For WFOs, the value of this token should always be "host". The lines in this file should be as follows:

HRAP X Origin Coordinate Value (relative to the national HRAP grid)
HRAP Y Origin Coordinate Value (relative to the national HRAP grid)
Number of Columns in the HRAP Grid
Number of Rows in the HRAP Grid

As an example, the coord_host.dat file for WFO Baltimore/Washington contains the following four values:

899
487
99
90

These values mean that the southwest corner of the local HRAP grid box which covers this WFO's MPE area is located at the national HRAP grid coordinate 899, 487. The local box is 99 HRAP grid bins wide and 90 HRAP grid bins high.

III.2 Setup the Geodata:

III.2.1 Check the Hydroview_MPE configuration file.

The configuration file for Hydroview_MPE is in the following location:

/awips/hydroapps/whfs/local/data/app/hydroview/hmap_mpe_overlay_configuration.

Make certain that for each of the overlays specified in this file, any required files exist in the directories specified. For example, if the entry for the M_STATE overlay is as follows:

M_STATE|M_ON|M_ON|M_OFF|1|$FXA_HOME/data|conandsta.bcd|M_BCD||

Then, check in the directory /awips/fxa/data for file conandsta.bcd.

If any of the files do not exist, then they must be obtained from either FSL or OHD, or generated locally. The specifics of the overlay configuration file including its format are further discussed later in this document.

III.2.2 Setup the Center Latitude, Longitude and Width of the Application Viewing Area.

The tokens "hv_center_lat" and "hv_center_lon" control the center latitude and longitude of the Hydroview_MPE viewing area. These must be set in the .Apps_defaults_site file to the appropriate center latitude and longitude for the forecast site. Longitude values must be negative.

The token "hv_map_width" controls the width in nautical miles of the initial Hydroview_MPE viewing area. This controls how much of the forecast area is initially visible when Hydroview_MPE is launched. The value for hv_map_width must be set in the .Apps_defaults_site file.

III.2.3 Obtain the "PRISM" and "MISBIN" data for the site.

This data may be obtained from OCWWS. OCWWS will generate the PRISM and MISBIN files and place them on the NOAA1 ftp server for retrieval and placement in the proper directories at the given office.

The PRISM files must be placed in the directory :
/awips/hydroapps/precip_proc/local/data/app/mpe/prism,

which is normally represented by the "rfcwide_prism_dir" token.

The misbin files must be placed in the directory:
/awips/hydroapps/precip_proc/local/data/app/mpe/misbin,

which is normally represented by the "rfcwide_misbin_dir" token.

III.3 Modify or add the following token definitions in the .Apps_defaults_site file:

db_name - The appropriate database name. It will take the form hd5_22xxx, where xxx represents the site identifier in lower case characters. This value is defined during the AWIPS installation and should not be modified by the user.

st3_rfc - The site identifier, a string of characters normally 3 characters in length and expressed as lower case. At WFOs, this variable is set to "host". As RFCs, it is set to the RFC identifier (e.g. MARFC, WGRFC, etc.).

III.4 Generate the "grid_to_basin_hrap.[HP,LX]" and "grid_to_county_hrap.[HP,LX]" files

These files provide MPE locator information for the mouse pointer. This information includes which county and basin are currently under the mouse pointer in the main Hydroview_MPE display area.

These files may be created through the use of Hydrobase. From the Hydrobase main window, select the "Areal Definitions" option from the "Setup" item on the main menubar. This will launch the Areal Definitions GUI. In this GUI, choose either "Counties" or "Basins" from the drop down menu depending on which grid file needs to be created. Select the "Export Database Info into File" option. This will take the current contents of the IHFS geoarea table for the specified geoarea type and unload them into a flat file located in directory /awips/hydroapps/whfs/local/data/geo. The name of this flat file will be basins.dat for the basin geoarea type and counties.dat for the county areal type. Finally, select the "Import File into Database" option. This will cause the geoarea file to be loaded into the whfs geoarea table, and the grid file corresponding to it will be created.

The name of generated grid file depends on the operating system Hydrobase is running on and the geoarea type being processed. The grid files for the county and basin geoarea types will be named grid_to_county_hrap.HP and grid_to_basin_hrap.HP, respectively, on the HP-UX operating system.

The grid files created for the county and the basin geoarea types by running Hydrobase on a Linux system will be named grid_to_county_hrap.LX and grid_to_basin_hrap.LX, respectively.

It is important to note that these grid files are operating system specific. These steps will have to be performed on the HP-UX and Linux systems to ensure that the HP and Linux versions of these grid files are available.

Note that grid files are only created for the basin and county geoarea types. Also, care must be taken when loading and unloading data to and from the IHFS database. These operations overwrite both the datafiles residing in the /awips/hydroapps/whfs/local/data/geo directory and data residing in the IHFS geoarea table. Closing the Areal Definitions GUI causes the "load_linesegs" program to be run.

Hydrobase will place the grid_to_basin_hrap and grid_to_county_hrap files into the /awips/hydroapps/whfs/local/data/geo directory.

Leave Hydrobase open. It will be required in the next step.

III.5 Generate the IHFS database-based overlay files.

The GeoArea and GeoLine tables in the IHFS database contain overlay data which can be read and displayed by Hydroview_MPE. The GeoArea table provides overlay information for the basins and the reservoirs overlays. The GeoLine table provides overlay information for the rivers, streams, highways and roads overlays.

Hydroview_MPE is capable of reading the basins, reservoirs, rivers, and streams overlays directly from the database. However, this can result in significant delays the first time these overlays are read into memory. In order to avoid this delay, Hydrobase has been setup in OB3 to produce binary file versions of these overlays which are stored in the /awips/hydroapps/whfs/local/data/geo directory. Hydroview_MPE can read these overlay files directly, thus avoiding the performance bottlenecks incurred by reading them from the database.

These overlay files are operating system specific. If running Hydroview_MPE on Linux then the Linux versions of these files must be present and have the extension ".LX". If running Hyroview_MPE on HP-UX, then the HP versions of these files must be present and have the extension ".HP". The easiest way to ensure that the overlay files required by the Linux and HP-UX versions of Hydroview_MPE are created is to run Hydrobase from HP and then from Linux following the procedures outlined below.

GeoArea Overlay Files:

The basins and reservoirs are the only overlays Hydroview_MPE uses from the GeoArea table.

The creation of the IHFS-based basins file should have been done automatically when creating the grid_to_basins_hrap.HP and grid_to_basins_hrap.LX files in step III.4. To verify this, check the

/awips/hydroapps/whfs/local/data/geo directory for the basins_latlon.HP and the basins_latlon.LX files. If these files have not been created, then follow steps 1 through 8 below using Basins instead of Reservoirs as the areal type.

To produce the reservoirs overlay file:

1) Start Hydrobase
2) Under the Setup menu select Areal Definitions. This will launch the Areal Definitions GUI.
3) From the list of geoarea types, select Reservoirs.
4) Press the "Export Database Info into File"
5) A popup warning dialog box will verify that you want to overwrite the existing reservs.dat in the /awips/hydroapps/whfs/local/data/geo directory. Select OK.
6) Press "Import File into Database"
7) A popup warning dialog box will verify that you want to overwrite the existing reservoir data in the GeoArea database table. Select OK.
8) The reservoirs overlay file will be created in the /awips/hydroapps/whfs/local/data/geo directory. It will be named resvrs_latlon.HP on HP-UX and resvrs_latlon.LX on Linux.

GeoLine Overlay Files:

Hydroview_MPE uses the Rivers, Streams, Highways, and Roads overlays from the GeoLine table.

These overlays can be created by following these steps:

1) Start Hydrobase
2) Under the Setup menu select Vector Definitions. This will launch the Vector Definitions GUI.
3) From the list of geoline types select the desired overlay to be processed.
4) Press the "Export Database Info into File" option.
5) A popup warning box will confirm if you really want to overwrite the geoline data file in the /awips/hydroapps/whfs/local/data/geo directory. Select "OK".
6) Press the "Import File into Database" button.
7) A popup warning box will confirm if you really want to overwrite the data for the geoline overlay in the GeoLine database table. Select "OK".
8) The geoline overlay file will be created in the /awips/hydroapps/whfs/local/data/geo directory. The names of the files will be as follows:

Overlay	HP-UX Filename	Linux Filename
Highways	hiways_latlon.HP	hiways_latlon.LX
Rivers	rivers_latlon.HP	rivers_latlon.LX
Roads	roads_latlon.HP	roads_latlon.LX
Streams	streams_latlon.HP	streams_latlon.LX

III.6 Make certain that the script file "run_mpe_whfs" is defined in the crontab.

This will run siipp and mpe_fieldgen automatically once an hour. For optimized data availability this should be set to run 20 to 25 minutes past the top of the hour.

III.7 Run the script "start_hmap_mpe".

This will set up the environment so that Hydroview_MPE can run correctly. Then it will launch the Hydroview_MPE application from which the gridded data fields may be displayed, edited, and regenerated.

IV Overlay Configuration File

The files defining the geographic overlays used by Hydroview_MPE are not collocated in the same directory. In fact, they span many different directories and have different formats. In order to facilitate the management of these files, the overlay configuration file has been developed. The path and name of this file is /awips/hydroapps/whfs/local/data/app/hydroview/hmap_mpe_overlay_configuration.

Each entry in the overlay configuration file corresponds to an overlay displayable in the Hydroview_MPE application. It tells the Hydroview_MPE application the following information about the overlay. Each line in the table will consist of several pipe ('|') delimited fields:

1) The identifier of the overlay to which the line in the overlay file corresponds
2) The initial state of the overlay. This determines whether or not the overlay is shown when the Hydroview_MPE application is first started.
3) Whether or not the overlay is to be stored in memory or if it should be read from a disk file or database table each time it is displayed.
4) Whether or not the overlay contains polygons which should be filled.
5) The number of files which contribute to the overlay.
6) The diectory path which contains the overlay file.
7) The name of the file which contains the overlay.
8) The type of the overlay.
9) If applicable, the name of the routine that is used to display the overlay.

Note that fields 6 and 7 above are repeated for each of the files indicated in field 5 .

Each of these fields is described in detail below:

IV.1 Overlay Identifiers

The valid overlay identifiers as of build OB3 are:

M_STATE	State boundaries
M_BASINS	Basin boundaries
M_CITY_TOWN	Cities and towns
M_COUNTY	County boundaries
M_CWA	County warning area boundaries
M_HIGHWAYS	Highways definitions
M_ROADS	Road definitions
M_HRAP_GRID	The HRAP grid which encloses the site's forecast area.
M_LAKES	Lake and reservoir definitions
M_RIVERS	Major river definitions
M_STREAMS	Minor streams
M_LAT_LON_LINES	The latitude / longitude lines

M_RADAR_LOCATIONS	The locations of the radar sites
M_RADAR_RINGS	The rings around the radar sites which indicate their effective range
M_RFC_BOUNDARY	The boundaries of the RFC's.
M_TIMEZONE	The boundaries representing the timezones.
M_ZONES	The boundaries of the forecast zones.

IV.2 Initial Overlay State

The initial state of the overlay may be either "M_OFF" or "M_ON" which indicates, respectively, if the overlay is initially off or on when the Hydroview_MPE application is started.

IV.3 Memory Storage Flag

The memory storage flag indicates whether or not the overlay is stored in memory the first time it is displayed. When set to "M_OFF", the overlay is not stored in memory and must be read from the disk or the IHFS database every time it is displayed. When set to "M_ON", the overlay is stored in memory the first time it is read from disk or the database. Having the overlay in memory means that when it is subsequently redisplayed, it will be drawn faster because there is no file I/O or database interactions. The drawback to storing many large overlays in memory is that they consume large quantities of memory, memory which may be critical for the operation of Hydroview_MPE and other applications running on the same machine. For quick displaying overlays choose "M_ON". For memory conservation choose "M_OFF".

IV.4 Fill Polygon Flag

The fill polygon flag indicates whether or not an overlay contains polygons which should be filled. When set to "M_ON", the overlay will be filled (provided it really does contain polygons, something that the software is capable of determining). When set to "M_OFF", the polygons in the overlay will not be filled.

IV.5 Number of Files

This number indicates how many files must be read to create the overlay. There may be up to 3 files. The paths and names of these files are specified by items 6 and 7. These fields are repeated for each of the files, meaning that each file may have a unique path. If the number of files is zero, then an overlay drawing routine must be specified in field 9. That is, if the overlay is not read in directly from a file, then a routine must be specified that either calculates or reads the overlay from the database or a file format that is not directly supported by Hydroview_MPE.

IV.6 Overlay File Paths

This is the path of the overlay file. This may contain tokens or environmental variables. Token and environmental names must be preceded by a "$" and end at a "/".

IV.7 Overlay File Name

The name of the file containing the overlay.

IV.8 Type of Overlay

The type of the overlay. The allowable types are:

M_BCD	FSL Binary Cartographic Data files.
M_SHAPE	A file format developed by the Environmental Systems Research Institute, Inc. (ESRI).
M_CALCULATE	This means that the overlay is entirely computed by software or read by software from a file whose format is something other than BCD or SHAPE. As a rule, overlays of type M_CALCULATE are not stored in memory. The routine performs the drawing directly, and the source of the overlay is read every time the overlay is displayed.
M_EXTERNAL	M_EXTERNAL means that the overlay is read by software either from a file whose format is something other than BCD or SHAPE or from the IHFS database. Overlays of type M_EXTERNAL may be stored in memory after being initially read from their file or database source. The M_EXTERNAL routine does not perform the drawing itself. Instead, it returns the overlay data in a format which the mapping routines of Hydroview_MPE can understand and draw. M_EXTERNAL routines are currently used to read WHFS river, stream, reservoir, and basin data from the IHFS database. They are also used to read the binary file versions of these database overlays.

IV.9 M_CALCULATE or M_EXTERNAL

In the case where the file type is either M_CALCULATE or M_EXTERNAL, the last field in the record must contain the name of the software routine that is to be used to display the data.

Available M_CALCULATE routines:

DRAW_RADAR_RINGS
DRAW_LAT_LON_LINES
DRAW_RADAR_LOCATIONS

DRAW_FSL_CITY_LOCATIONS
DRAW_MPE_CITY_LOCATIONS
DRAW_WHFS_CITY_LOCATIONS
DRAW_HRAP_GRID

Available M_EXTERNAL routines:

PLOT_DATABASE_BASINS
PLOT_DATABASE_LAKES
PLOT_DATABASE_RIVERS
PLOT_BINFILE_BASINS
PLOT_BINFILE_LAKES
PLOT_BINFILE_RIVERS_STREAMS
PLOT_BINFILE_HIWAYS_ROADS

Note that for drawing city and town locations, there are three different routines that may be chosen from. Each routine represents a different source of town and city data. By changing the name of the routine used to draw the overlay (field 9) of the hmap_mpe_overlay_configuration record corresponding to the town and city overlay to DRAW_FSL_CITY_LOCATIONS, DRAW_MPE_CITY_LOCATIONS, or DRAW_WHFS_CITY_LOCATIONS and providing the proper paths for the FSL and MPE datasets, Hydroview_MPE can be made to display FSL, MPE or WHFS town and city data.

To plot WHFS city and town information the entry in the hmap_mpe_overlay_configuration file should be as follows:

M_CITY_TOWN|M_OFF|M_OFF|M_OFF|0|||M_CALCULATE|DRAW_WHFS_CITY_LOCATIONS|

To plot geo_data town and city data, the entry in the hmap_mpe_overlay_configuration file should be as follows:

M_CITY_TOWN|M_OFF|M_OFF|M_OFF|2|$geo_data/$st3_rfc/ascii|town.dat|$geo_data/$st3_rfc/ascii|town_zoom.dat|M_CACULATE|DRAW_MPE_CITY_LOCATIONS|

To plot FSL town and city data, the entry in the hmap_mpe_overlay_configuration file should be as follows:

M_CITY_TOWN|M_OFF|M_OFF|M_OFF|1|$FXA_LOCALIZATION_ROOT/$FXA_LOCAL_SITE|cities.lpi|M_CALCULATE|DRAW_FSL_CITY_LOCATION|

The basins, reservoirs, rivers, and streams overlays may be read in from the GeoArea and GeoLine tables in the IHFS database. Or they may be read in from binary files generated from

the data in these tables. It is more efficient to read these overlays from the binary files than from the database, and in OB3 the overlay configuration file will be set up to retrieve these overlays from these binary files. The following are examples of how to setup the overlay configuration to retrieve the basins, reservoirs, rivers, and streams overlays from the database or from a the binary file.

Basins:

Database:

M_BASINS|M_OFF|M_ON|M_OFF|0|||M_EXTERNAL|PLOT_DATABASE_BASINS|

File:

M_BASINS|M_OFF|M_ON|M_OFF|1|$WHFS_GEODATA_DIR|basins_latlon$OS_SUFFIX|M_EXTERNAL|PLOT_BINFILE_BASINS|

Reservoirs:

Database:

M_LAKES|M_OFF|M_ON|M_OFF|0|||M_EXTERNAL|PLOT_DATABASE_LAKES|

File:

M_LAKES|M_OFF|M_ON|M_OFF|1|$WHFS_GEODATA_DIR|resvrs_latlon$OS_SUFFIX|M_EXTERNAL|PLOT_BINFILE_LAKES|

Rivers:

Database:

M_RIVERS|M_OFF|M_ON|M_OFF|0|||M_EXTERNAL|PLOT_DATABASE_RIVERS|

File:

M_RIVERS|M_OFF|M_ON|M_OFF|1|$WHFS_GEODATA_DIR|rivers_latlon$OS_SUFFIX|M_EXTERNAL|PLOT_BINFILE_RIVERS_STREAMS|

Streams:

Database:

M_STREAMS|M_OFF|M_ON|M_OFF|0|||M_EXTERNAL|PLOT_DATABASE_STREAMS|

File:

M_STREAMS|M_OFF|M_ON|M_OFF|1|$WHFS_GEODATA_DIR|streams_latlon$OS_SUFFIX|M_EXTERNAL|PLOT_BINFILE_RIVERS_STREAMS|

The overlay configuration file makes it easy to use different bcd and shapefile overlays. In fact, Hydroview_MPE can display any shape or bcd file the user provides. It allows the user to decide which overlays are displayed upon startup of the application.

V Reducing Disk Space Usage by MPE Files

The Multi-sensor Precipitation Estimator (MPE) application uses flat file disk storage as the basis for most of its data storage. The accumulated storage of these files is directly related to the geographic area for which MPE is analyzing. For WFOs with large forecast areas of consideration, and for which available disk space is minimal, there may be a need to reduce the disk space requirements of MPE.

There are two basic ways to reduce disk space usage, ingest less data and/or keep less data. Each of these two aspects of disk use are discussed below.

V.1 Reducing Amount of Ingested Data

The primary data set ingested by the MPE application are the DPA radar products (a.k.a. Stage 1 grids). These are processed by the decodedpa application. This program recognizes tokens that allow the filtering of products based on whether they are around the top-of-the-hour. MPE only uses top-of-the-hour or near top-of-the-hour products.

The Area-Wide feature provided in the legacy HydroView application allowed display and analysis of these products. With the advent of the "new" HydroView merged with MPE (a.k.a. HydroMap/MPE), this function of Area-Wide is no longer provided. The user is now directed to use SCAN/FFMP for this feature.

To prevent sites from getting all DPA volume scans for all radars, the following three tokens used by decodepda, should be set as follows:

```
dpa_filter_window  : 5          # number of minutes around top
                                # of hour for filtering products
                                # allowable values = 0 - 30

dpa_filter_archive  : ON        # on/off flag for non-top-of-hour filter for archiving
                                # products

dpa_filter_decode   : ON        # on/off flag for non-top-of-hour
                                #  for decoding products
```

The above values will cause only the DPA products within 5 minutes around the top of the hour to be decoded/saved and archived.

FYI-1: An undesirable side effect of these settings is that the top-of-the-hour products are now archived. For WFOs, this is unnecessary and will only add to the disk space usage. Therefore, for R522, the purge_files script was modifed to purge the entire contents of this directory, which is /awips/hydroapps/precip_proc/local/data/stage1_archive. The above decodedpa tokens are being replaced in AWIPS Build OB1, and this side effect will not occur after OB1.

FYI-2: Decoded files are created in the /awips/hydroapps/precip_proc/local/data/stage1_decoded dir directory only in the case where > 0.0 precip is detected in the product when it is decoded. The maxvald field in the DPARadar table records contains the maximum precip value under the radar umbrella. When precip is occurring at a WFO, this directory will quickly become the largest directory in terms of bytes. It is for this reason that this directory should be scrutinized for saving space.

V.2 Reducing Amount of Retained Data

The file data created by MPE is purged in two different ways. First, some of the files are associated with an entry in an Informix database table. When the data are purged, what really happens is that the parent record in the database tables is purged, then the associated file (which is specified as a field in the record), is also deleted. Note that for the DPARadar table, there is not necessarily always an associated file. As mentioned above, if the radar product indicates no rain, then a file is not created, since it would only contain an array of all all zeroes. The db_purge job is what deletes these data records, and associated files.

Second, some of the files are not associated with a database record, these files are deleted via the purge_mpe_files script. Both of these purge methods are described below, with instructions on how to configure them to reduce the amount of retained data.

V.2.1 db_purge

In db_purge, the delete of flat files in a directory is tied to the delete of records from related tables. The following is a list of these directories (specified by token values) and the related tables:

directory (token)	table
dpa_grid_dir	DPARadar
pproc_s2_grid_dir	Stage2Result
ofs_griddb_dir	Stage3Result

The dpa_grid_dir token “points” to the directory containing the stage1 decoded files. Each file in this directory is 68652 bytes (131x131x4).

For WFOs running MPE, only the purge from the dpa_grid_dir directory is important. The number of hours to hold data is controlled by the PurgeDynData table. Currently, the default value for the number of hours to hold data files for the dpa_grid_dir is 36 hours. This could be scaled back to 24 hours for WFOs with large areas. This change can be accomplished using the HydroBase application, which has an interface to the PurgDynData table.

Db_purge is submitted via the cron, typically once per day at 0745 z. WFOs could run db_purge twice or even four times per day to minimize a buildup of files. The times for running db_purge would have to be scheduled according to the daily work load at the site.

Note that with the implementation of MPE, the Stage2Result and Stage3Result tables are not used anymore. The entries should still be left in the PurgDynData table until MPE is fully implemented; they are harmless and do not result in any mentionable performance hit.

V.2.2 purge_mpe_files

The main script for purging MPE related flat files is the purge_mpe_files script, typically submitted from the cron, typically once per day at 1201 z. It is located in the directory /awips/hydroapps/precip_proc/bin.

This script executes a UNIX find command with a "-mtime + 1" option to locate and delete files older than one day. Since the script is run only once per day, two days worth of files build up before the purge occurs. Changing this parameter to "-mtime +0" will allow half as many files to build up in the directory. Another suggestion is to run the current purge_mpe_files script multiple times throughout the day, thereby minimizing the buildup of files.

Appendix A: Tokens Used By Hydroview_MPE

General Tokens:

apps_dir:	/awips/hydroapps
whfs_base_dir:	$(apps_dir)/whfs
whfs_local_dir:	$(whfs_base_dir)/local
whfs_local_data_dir:	$(whfs_local_dir)/data
whfs_image_dir	$(whfs_local_data_dir)/image # This is where GIF images # are saved from the “Save as Gif” option on the “File” # menu by default.
server_name:	ONLINE #Informix database server name
db_name:	hd5_22empty #IHFS database name
geo_data:	$(apps_dir)/geo_data
hydro_publicbin:	/awips/hydroapps/public/bin

Precip_proc Tokens:

pproc_dir:	$(apps_dir)/precip_proc
pproc_bin:	$(pproc_dir)/bin #Used for locating FieldGen executable for reruns.
pproc_local:	$(pproc_dir)/local
pproc_local_data:	$(pproc_local)/data

DPA Tokens:

dpa_grid_dir:	$(pproc_local_data)/stage1_decoded

MPE Data Grid Tokens:

mpe_gif_dir:	$(rfcwide_output_dir)/qpe_gif
mpe_gif_id:	# Optional identification string which can be prepended to the # image date information.
mpe_grib_dir:	$(rfcwide_output_dir)/qpe_grib
mpe_grib_id:	#The optional prefix for the output MPE grib filename.
mpe_jpeg_dir:	$(rfcwide_output_dir)/qpe_jpeg
mpe_jpeg_id:	#The optional prefix for the output MPE jpeg filename
mpe_netcdf_dir:	$(rfcwide_output_dir)/qpe_netcdf
mpe_netcdf_id:	#The optional prefix for the output MPE netcdf file
mpe_qpe_fieldtype:	# The type of MPE field that is, by default, used as the qpe best # estimate precipitation field.
mpe_rerun_siipp_with_fieldgen	ON # Sets the default state of the rerun siipp toggle button on # the rerun MPEfieldgen GUI. Can be ON or OFF.
mpe_save_gif:	#Indicates whether or not a GIF image is created when the “Save

```
                        #Data" option is selected.
mpe_save_grib:          #Indicates whether or not a GRIB message is created when the
                        #when the "Save Data" option is selected.
mpe_save_jpeg:          #Indicates whether or not a JPEG image is created when the
                        #"Save Data" option is selected.
mpe_save_netcdf:        #Indicates whether or no a NetCDF file is created when the
                        #"Save Data" option is selected.
rfcwide_output_dir:     $(pproc_local_data)/mpe    # MPE writes files to here.
rfcwide_input_dir:      $(pproc_local_data)/app/mpe # MPE reads files from here.
rfcwide_bmosaic_dir:    $(rfcwide_output_dir)/bmosaic
rfcwide_gageonly_dir:   $(rfcwide_output_dir)/gageonly
rfcwide_height_dir:     $(rfcwide_output_dir)/height
rfcwide_help_dir:       $(rfcwide_input_dir)/help/
rfcwide_index_dir:      $(rfcwide_index_dir)/index
rfcwide_lmosaic_dir     $(rfcwide_output_dir)/lmosaic
rfcwide_locbias_dir     $(rfcwide_output_dir)/locbias
rfcwide_locspan_dir     $(rfcwide_output_dir)/locspan

rfcwide_misbin_dir:     $(rfcwide_input_dir)/misbin
rfcwide_mmosaic_dir:    $(rfcwide_output_dir)/mmosaic
rfcwide_prism_dir:      $(rfcwide_input_dir)/prism
rfcwide_rmosaic_dir:    $(rfcwide_output_dir)/rmosaic
rfcwide_satpre_dir:     /data/fxa/img/SBN/netCDF/HRAP/SPE/AE/CONUS
rfcwide_xmrg_dir:       $(rfcwide_output_dir)/qpe


st3_date_form:          #Can either be Ymd or mdY.  Specifies how the datetime
                        #information appears in the name of an xmrg file.
st3_rfc:                ABRFC   # RFC's or WFO's id
st3_mkimage:            /awips/hydroapps/public/bin #Directory containing executables
                        # for creating image files.
st3_netcdf_loc          # The name of the office creating the netcdf file.
st3_netcdf_swlat        33.603 #Defines the latitude of the southwest NetCDF box corner.
st3_netcdf_swlon        106.456 # Defines the longitude of the southwest NetCDF box
                        # corner.
st3_netcdf_selat        32.433 #Defines the latitude of the southeast corner of the
                        # NetCDF box.
st3_netcdf_selon        92.322 #Defines the longitude of the southeast corner of the
                        # NetCDF box.
st3_netcdf_nelat        38.027 #Defines the latitude of the northeast corner of the
                        # NetCDF box.
st3_netcdf_nelon        90.678 # Defines the longitude of the northeast corner of the
                                # NetCDF box.
st3_netcdf_nwlat        39.420 # Defines the latitude of the northwest corner of the
                                # NetCDF box.
```

st3_netcdf_nwlon 106.652# Defines the longitude of the northwest corner of the
NetCDF box.

FFG tokens:

gaff_mosaic_dir: $(whfs_misc_grid_dir)

WHFS Tokens:

whfs_base_dir: $(apps_dir)/whfs
whfs_local_dir: $(whfs_base_dir)/local
whfs_local_data_dir: $(whfs_local_dir)/data
whfs_local_grid_dir: $(whfs_local_data_dir)/grid
whfs_misc_grid_dir: $(whfs_local_grid_dir)/misc
whfs_bin_dir: $(whfs_base_dir)/bin
whfs_config_dir: $(whfs_local_data_dir)/app
whfs_geodata_dir: $(whfs_local_data_dir)/geo
whfs_min_area_covered: 0.80 # WHFS min fractional area needed to compute maps.

Hydroview Tokens:

hmap_mpe_timelapse: 150 # The time, in tenths of a second, between consecutively
displayed images in a time lapse.
hv_center_lat 35.0 # The latitude of the center point of the forecast area.
hv_center_lon -97.8 # The longitude of the center point of the forecast area.
hv_config_dir $(whfs_config_dir)/hydroview
hv_help_dir $(hv_congif_dir)/help/
hv_map_width 320 # The width in nautical miles of the map viewing area.
hv_pointdata_display YES # Specifies whether or not to show point data upon
startup of Hydroview_MPE.
hv_zoom_threshold 150 # Nautical mile; detail level for cities/towns

Appendix B. File Locations

In the following file and directory definitions:

CCC is the forecast office identifier in upper case letters
ccc is the forecast office identifier in lower case letters
DD is the day
HH is the two digit hour
HHHH is the four digit hour
II is an hourly interval
MM is the month
OS is "HP" for a program that can be run on a HP workstation and LX for a program that can be run on a Linux workstation
RRR is the RADAR identifier in uppercase letters
YYYY is the year

Basin Overlay

Filename:	basins_latlon.HP or basins_latlon.LX
Location:	/awips/hydroapps/whfs/local/data/geo
Path token:	whfs_geodata_dir
Endian:	Named basins_latlon.HP on HP-UX and is big endian. Named basins_latlon.LX on Linux and is little endian.
Description:	This file contains basin data. It is created from the basin data in the GeoArea table by Hydrobase.

Best Estimate QPE File (formerly xmrg):

Filename:	xmrgMMDDYYYYHHz
Location:	/awips/hydroapps/precip_proc/local/data/mpe/qpe
Path token:	rfcwide_xmrg_dir
Endian:	May be either big endian or little endian.
Description:	These files contain the best estimated quantitative precipitation product. They are initially created by the MPE_FieldGen process and represent the field specified by the token "mpe_qpe_fieldtype". So, for example, if token "mpe_qpe_fieldtype" is set to MMOSAIC, then the best estimate QPE field will be the multi-sensor mosaic generated by FieldGen. The best estimate QPE field is ultimately used in the MAPX model. One of the main goals of the MPE portion of the Hydroview_MPE application is to produce this best estimate precipitation field so that it may be used in hydrologic models.

Best Estimate QPE GRIB File:

Filename:	[mpe grib id]YYYYMMDDHHz.grib
Location:	/awips/hydroapps/precip_proc/local/data/mpe/qpe_grib
Path token:	mpe_grib_dir
Endian:	Will be big endian if generated on an HP workstation. Will be little endian if created on a Linux workstation.
Comments:	The "mpe grib id" is an optional identification string based on the value of the "mpe_grib_id" apps defaults token.
Description:	When the "mpe_save_grib" token is set to "save", then the Best Estimate QPE data are saved in GRIB format. When the "mpe_save_grid" token is set to "nosave" no action is taken.

Best Estimate QPE NetCDF File:

Filename:	[mpe netcdf id]YYYYMMDDHHz.nc
Location:	/awips/hydroapps/precip_proc/local/data/mpe/qpe_netcdf
Path token:	mpe_netcdf_dir
Endian:	Does not apply.
Comments:	The "mpe netcdf id" is an optional identification string based on the value of the "mpe_netcdf_id" apps defaults token.
Description:	When the "mpe_save_netcdf" token is set to "save", then the Best Estimate QPE data are saved in NetCDF format. If the "mpe_save_netcdf" token is set to "nosave", then no action is taken.

Best Estimate QPE Screen-captured GIF File:

Filename:	[mpe gif id]YYYYMMDDHH.gif
Location:	/awips/hydroapps/precip_proc/local/data/mpe/qpe_gif
Path token:	mpe_gif_dir
Endian:	Does not apply.
Comments:	The "mpe gif id" is an optional identification string based on the value of the "mpe_gif_id" apps defaults token.
Description:	When the "mpe_save_gif" token is set to "save", then the Best Estimate QPE data are saved in GIF format. Otherwise, setting the "mpe_save_gif" token to "nosave" will prevent the GIF from being generated. This option is only available on the HP workstations.

Best Estimate QPE Screen-captured JPEG File:

Filename:	[mpe jpeg id]YYYYMMDDHH.jpeg
Location:	/awips/hydroapps/precip_proc/local/data/mpe/qpe_jpeg

Path token:	mpe_jpeg_dir
Endian:	Does not apply.
Comments:	The “mpe jpeg id” is an optional identification string based on the value of the “mpe_jpeg_id” apps defaults token.
Description:	When the “mpe_save_jpeg” token is set to “save”, then the Best Estimate QPE data are saved in JPEG format. If the “mpe_save_jpeg” token is set to “nosave”, then no action is taken. This option is only available on the Linux operating system.

Center Image Button Pixmap File

Filename:	center.xpm
Location:	/awips/hydroapps/whfs/local/data/app/hydroview
Path token:	hv_config_dir
Endian:	Does not apply.
Description:	This is the image on the drop-down toolbar button which allows the Hydroview_MPE image to be recentered.

City / Town Overlay

Filename:	town.dat
Location:	/awips/hydroapps/geo_data/[ccc]/ascii
Path token:	[geo_data]/ccc/ascii
Endian:	Does not apply.
Description:	This text file contains city and town location and name information which is plotted on the Hydroview_MPE viewing area.

Coordinate File

Filename:	coord_host.dat
Location:	/awips/hydroapps/geo_data/[ccc]/ascii/
Path Token:	[geo_data]/ccc/ascii
Endian:	Does not apply.
Description:	This file is key to the operation of the MPE portion of the Hydroview_MPE application. It supplies the HRAP coordinates and size of the forecast site’s MPE area. This file is covered in detail in Section V of this document.

County Overlay

Filename:	reg_county.bcd
Location:	/awips/fxa/data/localizationDataSets/CCC
Path env variable:	$FXA_LOCALIZATION_ROOT/$FXA_LOCAL_SITE
Endian:	Must be big endian when Hydroview_MPE is being run on a HP

	workstation. Must be little endian when running on a Linux system.
Description:	This file contains county overlay binary cartographic data which is used to plot the counties on the Hydroview_MPE viewing area.

County Warning Area (CWA) Overlay

Filename:	cwaDefault.bcd
Location:	/awips/fxa/data/localizationDataSets/CCC
Path env variable:	$FXA_LOCALIZATION_ROOT/$FXA_LOCAL_SITE
Endian:	Must be big endian when Hydroview_MPE is being run on a HP workstation. Must be little endian when running on a Linux system.
Description:	This file contains the County Warning Area overlay. It is in binary data cartographic (BCD) format.

Draw Polygon Data Mosaic Files

Filename:	DrawPreRMOSAICYYYYMMDDHHz
Location:	/awips/hydroapps/precip_proc/local/data/mpe/draw_precip
Path token:	rfcwide_drawpre_dir
Endian:	May be either big endian or little endian.
Description:	Polygons drawn to the screen while in MPE "draw polygon" mode are saved to this file. This file is a simple text file containing the value of the drawn precipitation area, the number of points used to define the border of the polygon, and the HRAP coordinates of these points.

FieldGen Log Files

In the "/awips/hydroapps/precip_proc/local/data/log/mpe_fieldgen" directory:

Path token:	rfcwide_logs_dir
Endian:	Does not apply.
Description:	These are text log files containing useful diagnostic information for each run of the MPE_FieldGen application. These are human-readable.

Gage Only Analysis Field Files

Filename:	GAGEONLYYYYMMDDHHz
Location:	/awips/hydroapps/precip_proc/local/data/mpe/gageonly
Path token:	rfcwide_gageonly_dir
Endian:	May be either big endian or little endian.
Description:	These files are an analysis of all of the precipitation gages in the

forecast area. The gage values are transposed onto the local HRAP grid of the forecast site. An attempt is made to spatially average the gage values which can result in a "bull's eye" appearance around precipitation gage locations. This product does not include any radar-based precipitation estimates.

Gridded Radar Data:

In the "/awips/hydroapps/precip_proc/local/data/stage1_decoded" directory:

Filename:	RRRMMDDYYYYHHMMZ
Location:	/awips/hydroapps/precip_proc/local/data/stage1_decoded
Path token:	dpa_grid_dir
Endian:	Must be big Endian.
Description:	Gridded radar data represents the raw the digital precipitation array (DPA) product generated at a radar site. The precipitation values do not have any bias factors applied to them and so reflect the precipitation amounts as directly computed using the Z-R relationship. This field is used by FieldGen to create the radar mosaic product. This product can be displayed on a site by site basis through the use of the single site radar window.

Height Field Files

Filename:	HEIGHTYYYYMMDDHHz
Location:	/awips/hydroapps/precip_proc /local/data/mpe/height
Path token:	rfcwide_height_dir
Endian:	May be big or little endian.
Description:	For each of the radar site's providing coverage over the forecast area, this data field portrays the height in feet of the radar beam above each of the HRAP bins that fall under that radar's umbrella. This radar field is used for determining from which radar site data is used for a particular HRAP bin in the HRAP grid. See the definition of the Radar Coverage Grid below.

Help Files

Location:	/awips/hydroapps/whfs/local/data/app/hydroview/help
Path token:	hv_help_dir
Endian:	Does not apply
Description:	The help files contain detailed explanations and instructions about the various MPE windows contained within Hydroview_MPE. Appendix C explains where these files are stored. Basically, each help topic is stored in a separate file with a name that easily distinguishes it from all of the other help files. A special file, named

"help_topics", contains the names of all of the help files along with a brief text title. Another special file, named "helpKeyword_file" contains special keywords for the purpose of searching through the help files.

Highway Overlays

Filename:	us_inter.shp
Location:	/awips/fxa/data/localization/nationalData
Path env variable:	$FXA_HOME/data/localization/nationalData
Endian:	May be big or little endian.
Description:	This binary file contains data for the highway overlay. It follows the shapefile format guidelines.

Filename:	hiways_latlon.HP or hiways_latlon.LX
Location:	/awips/hydroapps/whfs/local/data/geo
Path token:	whfs_geodata_dir
Endian:	Named hiways_latlon.HP on HP-UX and is big endian. Named hiways_latlon.LX on Linux and is little endian.
Description:	This file contains highway data. It is created from the highway data in the GeoLine table by Hydrobase.

Hydoview Images

Location:	/awips/hydroapps/whfs/local/data/image
Path token:	whfs_image_dir
Endian:	Does not apply.
Description:	In the case of saving the gif from the "File" menu, a popup window allows the user to specify the directory and filename to save the screen-captured gif in. If the user does not choose a directory, then by default it is stored in the directory "/awips/hydroapps/whfs/local/data/image", which is specified by token "whfs_image_dir".

Hydroview_MPE Executable

Filename:	hmap_mpe.OS
Location:	/awips/hydroapps/whfs/bin
Endian:	Must be big endian on HP and little endian on Linux.
Description:	This is the executable for the Hydroview_MPE program.

Hydroview_MPE Start Script

Filename:	start_hmap_mpe
Location:	/awips/hydroapps/whfs/bin

Endian: Does not apply.
Description: This is the start script for the Hydroview_MPE application. It ensures that the environment is set up properly for running the program, and it configures apps defaults to use the proper national and site apps defaults definition files.

Lakes Overlay

Filename: resvrs_latlon.HP or resvrs_latlon.LX
Location: /awips/hydroapps/whfs/local/data/geo
Path token: whfs_geodata_dir
Endian: Named resvrs_latlon.HP on HP-UX and is big endian.
Named resvrs_latlon.LX on Linux and is little endian.
Description: This file contains reservoir data. It is created from the reservoir data in the GeoArea table by Hydrobase.

Local Bias Files

Filename: LOCBIASYYYYMMDDHHz
Location: /awips/hydroapps/precip_proc/local/data/mpe/locbias
Path token: rfcwide_locbias_dir
Endian: May be big endian or little endian.
Description: Formerly named "Locbias" in MPE, each HRAP bin in this grid contains a local bias value. FieldGen applies these values to the radar mosaic field to create the local bias radar mosaic product (see below). The local bias is an attempt to minimize orographic and other local influences on rainfall estimates that can not be addressed using a general field bias value.

Local Bias Radar Mosaic Files

Filename: LMOSAICYYYYMMDDHHz
Location: /awips/hydroapps/precip_proc/local/data/mpe/lmosaic
Path token: rfcwide_lmosaic_dir
Endian: May be big endian or little endian.
Description: Formerly called LMOSIAC in the original MPE, this data field represents the radar mosaic product with the local bias values applied to it. The local bias values are specified on a HRAP grid basis and these individual values are displayable through the Local Bias grid (see above).

Local Span Files

Filename: LOCSPANYYYYMMDDHHz
Location: /awips/hydroapps/precip_proc/local/data/mpe/locspan

Path token: rfcwide_locspan_dir
Endian: May be big endian or little endian
Description: Formerly referred to as "Locspan" in the original MPE, each HRAP bin in this data grid contains a memory span value which corresponds to the HRAP bin's local bias value as specified in the Local Bias field. The local span demonstrates the period of time over which gage and radar data was compared in order to arrive at the local bias value. Generally, areas in which there are few rain gages will have longer memory spans in order to arrive at a reliable bias value. Data rich regions with many rain gages can feature shorter memory spans since a much smaller time span is required to find a reliable bias value.

Mean Field Bias Radar Mosaic Files

Filename: BMOSAICYYYYMMDDHHz
Location: /awips/hydroapps/precip_proc/local/data/mpe/bmosaic
Path token: rfcwide_bmosaic_dir
Endian: May be big endian or little endian
Description: These files are created by MPE_FieldGen by applying the individual mean field radar biases to the raw radar mosaic. Exactly which radar bias is applied to a portion of the radar mosaic is dictated by the radar coverage field which indicates which radar site provides the best coverage for each of the HRAP bins in the grid covering the forecast area.

Misbin Files

Filename: misbin.RRR
Location: /awips/hydroapps/precip_proc/local/data/app/mpe/misbin
Path token: rfcwide_misbin_dir
Endian: Must be big endian.
Description: The misbin file is provided on a radar by radar basis. It represents which HRAP bins, within the radar's umbrella, are blocked due to ground features. The misbin file is generated for 0.5 degree radar beam elevation, the lowest used tilt. FieldGen takes the misbin file into consideration when generating products. If data is missing at the 0.5 degree beam tilt, then it attempts to use either the radar data from the next higher beam tilt or radar data from an adjacent radar site's 0.5 degree tilt. The decision on which to use is based on which provides the lowest altitude radar beam coverage for the HRAP bins in question.

Mosaicked FFG Grid Files

Filename: CCCYYYYMMDD_HHHH_II.ffg
Location: /awips/hydroapps/whfs/local/data/grid/misc
Path token: whfs_misc_grid_dir
Endian: Does not apply.
Description: Mosaicked FFG files are tailored to fit a WFO's MPE area. Since the forecast area of a WFO can straddle two or more RFCs, it is sometimes necessary to mosaic the individual RFC FFG data grids to provide full coverage for the WFO's MPE area.

The mosaicking of the RFC FFG files is performed by the "gen_areal_ffg" program which is run from the "process_dpa_files: cron-driven script.

MPE_FieldGen Executable

Filename: mpe_fieldgen.OS
Location: /awips/hydroapps/precip_proc/bin
Endian: Must be big endian when run on a HP workstation. Must be little endian when run on a Linux workstation.
Description: This program generates the radar and rain gauge-based precipitation mosaics which can then be viewed using Hydroview_MPE. MPE_FieldGen is the program responsible for producing the MPE data grids and performing all of the necessary science and number crunching that must go into doing this task. MPE_FieldGen may be rerun from it to incorporate edited gage values, pseudo gages, ignored radars, and modified bias values into an updated set of MPE data grids.

Multi-sensor Mosaic Files

Filename: MMOSAICYYYYMMDDHHz
Location: /awips/hydroapps/precip_proc/local/data/mpe/mmosaic
Path token: rfcwide_mmosaic_dir
Endian: May be either big or little endian.
Description: Formerly named "MMOSAIC" in the original MPE, this data field is a powerful tool for estimating rainfall amounts. It is a merging of the field biased radar mosaic rainfall estimates and the gage analysis field. It is important because it provides a mixture of remote sensed (radar) and ground truth (rain gage) rainfall amounts which can complement each other in order to produce a more accurate rainfall map. The merging of these products is performed in FieldGen.

Overlay Configuration File

Filename: hmap_mpe_overlay_configuration

Location: /awips/hydroapps/whfs/local/data/app/hydroview
Path token: hv_config_dir
Endian: Does not apply.
Description: This file controls all of the overlays displayable on Hydroview_MPE. It is described in detail in Section IV of this document.

Pan Image East Button Pixmap File

Filename: east.xpm
Location: /awips/hydroapps/whfs/local/data/app/hydroview
Path token: hv_config_dir
Endian: Does not apply.
Description: This file contains the graphic which is displayed on the drop-down toolbar button to pan east (right) on the Hydroview_MPE map viewing.

Pan Image North Button Pixmap File

Filename: north.xpm
Location: /awips/hydroapps/whfs/local/data/app/hydroview
Path token: hv_config_dir
Default: Does not apply
Description: This file contains the graphic which is displayed on the drop-down toolbar button to pan north (up) the Hydroview_MPE viewing area.

Pan Image South Pixmap File

Filename: south.xpm
Location: /awips/hydroapps/whfs/local/data/app/hydroview
Path token: hv_config_dir
Endian: Does not apply
Description: This file contains the graphic which is displayed on the drop-down toolbar button that allows the Hydroview_MPE map area to be panned to the south (downward).

Pan Image West Pixmap File

Filename: west.xpm
Location: /awips/hydroapps/whfs/local/data/app/hydroview
Path token: hv_config_dir
Endian: Does not apply
Description: This file contains the graphic which is displayed on the drop-down toolbar button that allows the user to pan the Hydroview_MPE map area westward (to the left).

PRISM Files

Filename:	PRISM_XX
Location:	/awips/hydroapps/precip_proc/local/data/app/mpe/prism
Path token:	rfcwide_prism_dir
Endian:	Must be big endian
Comments:	"XX" is one of the following values: "01", "02", "03", "04", "05", "06", "07", "08", "09", "10", "11", "12", and "14"
Description:	This data grid provides a map of climatological precipitation across the forecast area. This product is especially useful in mountainous regions where the effectiveness of radar is reduced due to terrain features blocking the beam and precipitation gages may be few and far between. Grid points with no radar coverage or rain gage data are estimated from nearby grid points that have good coverage. These estimated values are then scaled by the PRISM data. Grid points that are well covered by a radar or rain gauge are not scaled. PRISM data represents annual mean precipitation values.

Radar Coverage Field Files

Filename:	INDEXYYYYMMDDHHz
Location:	/awips/hydroapps/precip_proc/local/data/mpe/index
Path token:	rfcwide_index_dir
Endian:	May be either big or little endian
Description:	Formerly named "Index" in the original MPE, this data grid displays over which portions of a forecast area a radar site provides coverage. The driving factor which determines which radar site shall provide coverage for a specific grid point is the altitude of the radar beam. The radar which can provide coverage for a grid point at the lowest altitude will be chosen. This field is used in determining which radar bias is applied when generating the field bias radar mosaic and the multi-sensor radar mosaic.

Radar Location Overlay

Filename:	88D.lpi
Location:	/awips/fxa/data/localizationDataSets/CCC
Path env variable:	$FXA_LOCALIZATION_ROOT/$FXA_LOCAL_SITE
Endian:	Does not apply
Description:	This text file contains the coordinates and identifiers of the WSR-88D radar sites across the United States and its territories.

Radar Mosaic Files

Filename:	RMOSAICYYYYMMDDHHz
Location:	/awips/hydroapps/precip_proc/local/data/mpe/rmosaic
Path token:	rfcwide_rmosaic_dir
Endian:	May be either big or little endian
Description:	Formerly named "RMOSAIC" in the original MPE, this data grid represents the rainfall estimates as computed from the Z-R relationships at the individual radar sites providing radar coverage across the forecast area. There are no bias values applied to these precipitation estimates, so this field may be thought of as the "raw" radar estimated precipitation mosaic. It serves as the base for the field bias radar mosaic and the local bias radar mosaic.

Raw FFG Files (Unmosaicked)

Filename:	YYYYMMDD_HHHH.multi
Location:	/data/fxa/img/SBN/netCDF/HRAP/FFG/[XX]RFC/[D]hr
Endian:	Does not apply.
Comments:	"XX" represents "AB", "AK", "CB", "CN", "LM", "MA", "MB", "NC", "NE", "NW", "OH", "SE", or "WG". "D" represents the FFG product duration value "1", "3", "6", "12", or "24"
Description:	The raw FFG files are produced at RFCs. These files contain flash flood guidance for a specific duration of time, which may be 1, 3, 6, 12, or 24 hours. The product indicates how much rainfall over the duration is required to initiate flash flooding over a specific HRAP grid box. The ability to display this data has been provided for RFCs using Hydroview_MPE. WFOs will generally use the Mosaicked FFG product for their flash flood monitoring needs.

RFC Overlay

Filename:	usa_rfc.bcd
Location:	/awips/fxa/data/localization/nationalData
Endian:	Must be big endian for use in HydroviewMPE on HP workstations and little endian for use in Hydroview_MPE on Linux workstations.
Path env variable:	$FXA_HOME/data/localization/nationalData
Description:	This file contains the binary cartographic data for the RFC boundary overlay. The boundaries of all RFCs are included in this file. Likewise, the boundaries of all RFCs are displayed when this overlay is chosen.

Rivers Overlay

Filename:	rivers_latlon.HP or rivers_latlon.LX
Location:	/awips/hydroapps/whfs/local/data/geo

Path token:	whfs_geodata_dir
Endian:	Named rivers_latlon.HP on HP-UX and is big endian. Named rivers_latlon.LX on Linux and is little endian.
Description:	This file contains river data. It is created from the river data in the GeoLine table by Hydrobase.

Roads Overlay

Filename:	roads_latlon.HP or roads_latlon.LX
Location:	/awips/hydroapps/whfs/local/data/geo
Path token:	whfs_geodata_dir
Endian:	Named roads_latlon.HP on HP-UX and is big endian. Named roads_latlon.LX on Linux and is little endian.
Description:	This file contains basin data. It is created from the roads data in the GeoLine table by Hydrobase.

Satellite Precipitation Estimate (SPE)

Filename:	YYYYMMDD_HH00.multi
Location:	/data/fxa/img/SBN/netCDF/HRAP/SPE/AE/CONUS
Path Token:	rfcwide_satpre_dir
Endian:	Does not apply
Description:	This file contains satellite precipitation estimates. These estimates are projected on a national HRAP, but are clipped to the forecast site's MPE forecast area.

Siipp Executable

Filename:	siipp.OS
Location:	/awips/hydroapps/precip_proc/bin
Endian:	Must be big endian when run on a HP workstation. Must be little endian when run on a Linux workstation.
Description:	The "Siipp" program is responsible for preprocessing rain gauge amounts for use by MPE_FieldGen and for viewing in Hydroview_MPE. The Siipp executable takes rain gauge amounts from the CurPrecip table in the IHFS database, creates discrete, hourly rainfall reports and places these reports into the ProcPrecip database table.

State Overlay

Filename:	conandsta.bcd
Location:	/awips/fxa
Path env variable:	$FXA_HOME
Endian:	Must be big endian when used in Hydroview_MPE on a HP workstation. Must be little endian when used in Hydroview_MPE

being run on a Linux workstation.

Description: This file contains the BCD data defining the U.S. state boundaries, Canadian provinces, and Mexico state boundaries. This file is maintained by FSL.

State Variable Files:

Filenames: YYYYMMDDHHz, state_variables
Location: /awips/hydroapps/precip_proc/local/data/mpe/state_var
Path token: rfcwide_statevar_dir
Endian: Will be big endian for a MPE_FieldGen executable running on a HP workstation. Will be little endian for a MPE_FieldGen executable running on a Linux workstation.
Description: Information is passed between subsequent runs of MPE_FieldGen through the use of these direct access files.

Streams Overlay

Filename: streams_latlon.HP or streams_latlon.LX
Location: /awips/hydroapps/whfs/local/data/geo
Path token: whfs_geodata_dir
Endian: Named streams_latlon.HP on HP-UX and is big endian.
Named streams_latlon.LX on Linux and is little endian.
Description: This file contains stream data. It is created from the streams data in the GeoLine table by Hydrobase.

Timezones Overlay

Filename: timezones.shp
Location: /awips/hydroapps/whfs/local/data/app/hydroview
Path token: hv_config_dir
Endian: Does not apply.
Description: This shapefile contains the data used to plot the timezones overlay on the Hydroview_MPE map area.

Zones Overlay

Filename: reg_zones.bcd
Location: /awips/fxa/data/localizationDataSets/CCC
Path env variable: $FXA_LOCALIZATION_ROOT/$FXA_LOCAL_SITE
Endian: Must be big endian when running Hydroview_MPE on a HP workstation and little endian on a Linux computer system.
Description: This BCD file contains the data used to plot the zones overlay.

“Zoom In” Image Pixmap File

Filename:	zoomin.xpm
Location:	/awips/hydroapps/whfs/local/data/app/hydroview
Path token:	hv_config_dir
Endian:	Does not apply
Description:	This is the image drawn onto the drop-down toolbar button which allows the user to zoom into the Hydroview_MPE map area.

“Zoom Out” Pixmap File

Filename:	zoomout.xpm
Location:	/awips/hydroapps/whfs/local/data/app/hydroview
Path token:	hv_config_dir
Endian:	Does not apply.
Description:	This is the image drawn onto the drop-down toolbar button which allows the Hydroview_MPE map area to be “zoomed out”.

X/Motif Resource File

Filename:	**RFCWide_res File**
Location:	/awips/hydroapps/whfs/bin
Endian:	Does not apply.
Description:	This is the X/Motif resource file for the Hydroview_MPE application. It controls the appearance and fonts of the GUI’s various labels and widgets.

Appendix C. Database Table Schemas

City - Contains cities and the information necessary to plot them on a map. Hydroview_MPE offers a choice between three sources of city information: IHFS database city table, FSL city file or MPE city data. The user can choose between these three sources using the hmap_mpe_overlay_configuration file. See section IV of this document for more information about the overlay configuration file.

name	char (20)	The name of the town or city
state	char (2)	The state of the city
lat	float	The latitude of the city
lon	float	The longitude of the city
disp_precedence	integer	Value which controls density of displayed cities
population	integer	The population of the city

ColorOverlay - Contains the colors assigned to MPE overlays on a user by user basis. This allows individual users of MPE to set the overlay colors to satisfy their personal taste. This is currently used only for the radar ring colors which indicate whether or not a radar site's data is available for display and use in creating radar mosaics.

userid	char (32)	The UNIX user identifier
application_name	char (20)	The name of the application the overlay info pertains to
overlay_type	char (20)	The name of the overlay
color_name	char (25)	The color to make the overlay.

ColorValue - Contains the colors associated with the colors of the gage points displayed by point control, the FFG data, and the color levels associated with the data displayed on the various MPE fields.

userid	char(32)	The UNIX user identifier
application_name	char(20)	The name of the application the overlay info pertains to
color_use_name	char(15)	The name of the product the color pertains to
duration	integer	The time duration of the product
threshold_value	float	The threshold value which controls the display of the color
threshold_unit	char(1)	English 'E' or Metric 'M' units flag
color_name	char(25)	The name of the color from the ColorName table.

DPAAdapt - This table contains the radar adaptable parameters which describe the radar used in the construction of an hourly DPA product. These values may be displayed from the "Display Adaptable Param" option on the single site radar window. Hydroview_MPE reads this table to retrieve the multiplicative and power coefficients of the Z-R relationship. That is, the Z-R relationship takes the form $Z=AR^B$, where Z is the radar-estimated rainfall rate, A is the multiplicative coefficient, and B is the power coefficient. The adaptable parameters can all be displayed from the "Display Adaptable Param" option on the Single Site Radar window.

radid	char(3)	The three character identifier of the radar site.
obstime	datetime year to second	The DPA product endtime
min_reflth	smallfloat	
max_reflth	smallfloat	
ref_tltest	smallfloat	
rng_tltin	smallfloat	
rng_tltout	smallfloat	
max_birng	smallfloat	
min_birng	smallfloat	
min_echoar	smallfloat	
min_awrefl	smallfloat	
max_pctred	smallfloat	
mlt_zrcoef	smallfloat	
pwr_zrcoef	smallfloat	
min_zrefl	smallfloat	
max_zrefl	smallfloat	
max_stmspd	smallfloat	
max_timdif	smallfloat	
min_arctcon	smallfloat	
tim_p1cont	smallfloat	
tim_p2cont	smallfloat	
max_ecarch	smallfloat	
rng_cutoff	smallfloat	
rng_e1coef	smallfloat	
rng_e2coef	smallfloat	
rng_e3coef	smallfloat	
min_prate	smallfloat	
max_prate	smallfloat	
tim_restrt	smallfloat	
max_timint	smallfloat	
min_timprd	smallfloat	
thr_hlyout	smallfloat	
end_timgag	smallfloat	
max_prdval	smallfloat	
max_hlyval	smallfloat	
tim_biest	smallfloat	
thr_nosets	smallfloat	
res_bias	smallfloat	
longest_lag	smallfloat	Defines the longest amount of time (hours) for using the Bias Table information in the DPA product
bias_applied	char(1)	

DPARadar - This table contains information about the gridded radar-based digital precipitation array (DPA) files contained in the decoded DPA radar directory,

/awips/hydroapps/precip_proc/local/data/stage1_decoded. Of particular interest to Hydroview_MPE is the observation time of the radar product and its corresponding filename.

radid	char(3)	The radar identifier
obstime	datetime year to second	The endtime of the DPA product
minoff	smallint	
maxvalh	smallfloat	
maxvald	smallfloat	
s1_bias_value	smallfloat	
producttime	datetime year to second	
nisolbin	smallint	
noutint	smallint	
noutrep	smallint	
areared	smallfloat	
biscanr	smallfloat	
nbadscan	smallint	
nhourout	smallint	
volcovpat	smallint	
opermode	smallint	The operational weather mode of the radar
missper	char(1)	
supplmess	smallint	
grid_filename	char(20)	

GeoArea - Contains the definitions of the WHFS county, basin, reservoir, and zone overlays.

area_id	char(8)	The identifier of the area being processed
name	char(40)	The full name of the area being processed
boundary_type	char(6)	The type of area, e.g. COUNTY or BASIN
interior_lat	float	The latitude of the center point of the area
interior_lon	float	The longitude of the center point of the area
num_points	integer	The number of points defining the area's boundary
boundary_points	byte	The actual boundary points

GeoLine - Contains the definitions of the WHFS highway, stream, and river overlays.

line_id	char(8)	The identifier of the vector feature being processed
name	char(20)	The full name of the vector feature
vector_type	char(6)	The type of the vector, e.g. RIVER
feature_rank	integer	A value determining the display density of the feature
stream_order	integer	For streams and rivers, this value represents the stream order (how ranks against all of the tributaries for the river system).
num_points	integer	The number of points defining the vector feature
vector_points	byte	The actual points making up the vector

Precip - This table contains the rain gauge reports collected from decoded SHEF reports.

lid	char(8)	The location identifier
pe	char(2)	The SHEF physical element code
dur	smallint	The SHEF duration of the observation/forecast
ts	char(2)	The SHEF type source of the observation/forecast
extremum	char(1)	The SHEF extremum code of the reported value
obstime	datetime year to second	The observation / forecast date and time
value	float	The value of the observation/forecast
shef_qual_code	char(1)	The quality code decoded from the SHEF message
quality_code	integer	A quality code based on a combination of quality checks that have been applied to the observation
revision	smallint	The revision number of the reported value
product_id	char(10)	The AWIPS product identifier
producttime	datetime year to second	The time the product was generated
postingtime	datetime year to second	The time the product was transmitted

ProcPrecip - Contains processed rain gauge values. The observation times of these processed rain gauge amounts are also set to be exactly at the top of the hour. This is done so that they can be recognized by the MPE portion of Hydroview_MPE.

In addition to hourly rain gage values this table also contains flags indicating whether or not the gage has been modified using the hmap_MPE program. This table is used as the primary source of rain gage data for the gage overlay and gage table portions of the Hydroview_MPE application. The values in this table may represent actual observed hourly rainfall amounts, estimated hourly rainfall amounts, time disaggregate values, or manually edited rainfall amounts. The manual editing of gage values can be accomplished through the gage table or 7 X 7 display of Hydroview_MPE.

lid	char(8)	The location identifier
pe	char(2)	The processed SHEF physical element code
dur	smallint	The processed SHEF duration of the observation
ts	char(2)	The processed SHEF type source code
extremum	char(1)	The processed SHEF extremum code
obstime	datetime year to second	The observation/forecast time
value	float	The observed/forecast value
quality_code	integer	The quality control code
orig_pe	char(2)	The original SHEF physical element code
orig_dur	smallint	The original SHEF duration code
orig_obstime1	datetime year to second	The beginning time of the value's duration
orig_obstime2	datetime year to second	The ending time of the value's duration
man_edited	char(1)	A flag indicating if the report has been manually edited
time_distribution	char(1)	A flag indicating if the value has been estimated from a time distribution

PseudoGageVal - This table stores information about user-created pseudo gages and their values. Note that a pseudo gage may be edited just like any other gage value, and so it has flags that indicate whether or not its value has been manually edited and what its previous value was.

pseudo_gage_id	char(8)	The identifier of the pseudo gage
obstime	datetime year to second	The date and time of the pseudo gage observation
lat	float	The latitude of the pseudo gage
lon	float	The longitude of the pseudo gage
gage_value	smallfloat	The value of the gage
man_edited	char(1)	A flag indicating whether or not the pseudo gage value has been manually edited
prev_gage_value.	smallfloat	If the gage has been edited, this value is its previous value

RadarLoc

This table is the primary source of radar site information. In particular, Hydroview_MPE retrieves the identifier, latitude, and longitude for each radar site that provides DPA radar information for the WFO or RFC's forecast area. The software converts this latitude and longitude information into HRAP coordinates for plotting purposes. Note that only those radar sites with a "use_radar" of "T" are read from this table.

radid	char(3)	The three character identifier of the radar site
name	char(20)	The full name of the radar location
radar_num	smallint	The radar's unique number
state	char(2)	The state the site is located in
lat	float	The latitude of the site
lon	float	The longitude of the site
elev	float	The elevation of the site
tower_ht	float	The height of the tower
use_radar.	char(1)	Flag indicating whether or not the radar is used in calculations at this site.

RejectedData - Contains data that have been manually quality controlled and eliminated. Note that this does not happen automatically. Questionable data are automatically flagged and viewable in the "Questionable and Bad Data" interface launched from the "ReferenceData" menu on Hydroview_MPE. From this interface, the user may select reports that seem erroneous and send them to the RejectedData table.

lid	char(8)	The location identifier of the gage site
pe	char(2)	The SHEF physical element
dur	smallint	The duration of the

		observed/forecast SHEF element
ts	char(2)	The type source of the observed/forecast SHEF element
extremum	char(1)	The SHEF extremum code
probability	smallfloat	As related to forecast products, the probability of a value's occurrence
validtime	datetime year to second	The valid time of the SHEF product.
basistime	datetime year to second	The basis time of the SHEF product
postingtime	datetime year to second	The issuance time of the SHEF product
value	float	The value decocoded from the SHEF message
revision	smallint	The revision number of the observed/forecast value
shef_qual_code	char(1)	The quality code as found in the SHEF message
product_id	char(10)	The AWIPS product id
producttime	datetime year to second	The time this product was created.
quality_code	integer	The quality code as arrived at by a series of qc checks external to the actual SHEF message itself
reject_type	char(1)	Flag indicating whether this value was rejected by a manned or an automated process.
userid	char(32)	The identifier of the user who manually rejected this nugget of data.

RWBiasDyn - The purpose of this table is keep track of parameters used in the calculation of mean field bias values. These bias values are stored on a per radar site per hour per memory span basis. In addition to the actual bias value used, the program also reads in the memory span index, the number of gage/radar pairs in the sample set, the sum of the gage values, and the sum of the radar values. These parameters are displayed in the "Display Bias Table..." option of the MPEcontrol menu of Hydroview_MPE..

radid	char(3)	The three character radar identifier
obstime	datetime year to second	The radar scan hour
memspan_ind	smallint	The memory span index
numpairs	float	The number of radar/gage value pairs tallied during this memory span
sumgag	smallfloat	The sum of the gage values
sumrad	smallfloat	The sum of the radar value
bias	smallfloat	The bias created by dividing the sumgag value by the sumrad value

RWBiasStat -This table contains the time durations of each of the memory spans used in determining the optimal bias of radar estimated precipitation data. Hydroview_MPE uses the

memory span values along with the “npair_bias_select” value in the bias table, which is launched from the “Display Bias Table...” option of the MPEcontrol menu of Hydroview_MPE. The “npair_bias_select” value is displayed as the “Npairs Threshold” value while each of the memory span durations are displayed as a multiple of hours.

min_gr_value_bias	smallfloat	
npair_bias_select	integer	
npair_svar_update	integer	
std_cutlag_cut	integer	
init_span	integer	First choice memory span
bias_qc_opt	integer	
num_span	integer	The total number of memory spans
mem_span1	smallfloat	Memory span 1's duration
mem_span2	smallfloat	Memory span 2's duration
mem_span3	smallfloat	Memory span 3's duration
mem_span4	smallfloat	Memory span 4's duration
mem_span5	smallfloat	Memory span 5's duration
mem_span6	smallfloat	Memory span 6's duration
mem_span7	smallfloat	Memory span 7's duration
mem_span8	smallfloat	Memory span 8's duration
mem_span9	smallfloat	Memory span 9's duration
mem_span10	smallfloat	Memory span 10's duration

RWPrefs - Contains the preferences for which overlays to show upon start up of the Hydroview_MPE application on a user by user basis. This is not used by Hydroview_MPE at this time.

userid	char(32)	The UNIX user identifier
state_overlay	char(3)	States “on” or “off”
city_overlay	char(3)	Cities “on” or “off”
county_overlay	char(3)	Counties “on” or “off”
river_overlay	char(3)	Rivers “on” or “off”
basin_overlay	char(3)	Basins “on” or “off”
radar_overlay	char(3)	Radar Rings “on” or “off”
num_hours_wind	smallint	The number of hours to display in the “choose hour” selection box
def_display_type	char(10)	The MPE field to display in the viewing area when the application is first started.

RWRadarResult - This table contains data pertaining to the availability of a particular radar site’s data, along with the number of gages reporting in the radar’s umbrella for the hour, the radar bias used at the site, the memory span that was used to arrive at this bias, and flags indicating whether or not the bias value has been modified by the user and if the user wants the radar’s data to be ignored for the hour. The “rw_bias_val_used” and “edit_bias” values are used in the display bias table. The ignore radar flag is controlled from the “Ignore Radar” item on the “Options” menu of

the Single Radar Site window. The bias value may be edited from either the bias table or by selecting the "Edit Bias Value" item on the Single Radar Site window's "Options" menu.

radid	char(3)	The three-character radar identifier
obstime	datetime year to second	The time of the radar generate DPA product
num_gages	smallint	The number of non-zero precipitation gages
rad_avail	char(1)	The radar availability flag indicating whether there is radar with data "y", there is radar with no data "z", or the radar is unavailable "n".
rw_bias_val_used	float	The radar bias used.
mem_span_used	float	The memory span that was used to compute the bias value
edit_bias	char(1)	Flag indicating if the bias value has been edited
ignore_radar	char(1)	Flag indicating if the user has chosen to ignore this radar's data

RWResult - This table is used to populate the "Choose Hour" window with the dates and times of available MPE products.

Rfc	char(8)	The RFC identifier
obstime	datetime year to second	The hour for which MPE data were created
num_gag_avail	smallint	The number of gages reporting precipitation
num_rad_avail	integer	The number of radar grid points with data
num_pseudogages	integer	The number of user-created psuedogages
sat_avail	char(1)	The satellite data availability flag
mapx_field_type	char(10)	The MPE-generated field which will be passed into MAPX
draw_precip	char(1)	Flag indicating if data were modified by manually drawing precipitation polygons
auto_save	char(1)	Was the field last saved by a manual or automatic save?
last_exec_time	datetime year to second	The last time the field was saved
last_save_time	datetime year to second	The last time the field was saved

Appendix D. Changing the Coordinate, PRISM and Misbin Files

This appendix provides information for OCWWS about the process of modifying the orientation of the Hydroview_MPE HRAP grid which encompasses the WFO's forecast area. It describes how to recreate the coordinate and PRISM files and retrieve misbin files. It also outlines which data files must be deleted at the WFO whenever the coordinate file is modified.

Hydroview_MPE and MPE_fieldgen rely heavily on the existence of the coordinate, PRISM, and misbin files for successful operation. OHD AWIPS personnel maintain the software to create these files. For each of the WFOs, the coordinate and PRISM files have been generated. Also, the misbin files corresponding to the radars providing coverage for each WFO's County Warning Area (CWA) have been collected. These files have been placed onto the NOAA1 FTP site. As Hydroview_MPE is installed at the individual WFOs, these files may be retrieved from this FTP server on a site by site basis, as explained in the R5.2.2 Install Notes.

If a change needs to be made to a site's coordinate file, a request should be sent to the OCWWS team specifying the latitude/longitude coordinates defining the new rectangle which completely contains the site's forecast area. The coordinate and PRISM files which are generated as a result of the OCWWS's rerun will then be placed on the NOAA1 FTP site for retrieval by the site. If any additional misbin files are required, then they, too, will be placed on the NOAA1 FTP server.

1 Changing Coordinate, PRISM, and Misbin files for Hydroview_MPE at OHD

2 Edit the Master WFO Information File

Each WFO has defined a box which completely encloses its CWA. It is defined by the latitude/longitude of its southwest corner and the latitude/longitude of its northeast corner. These definitions can be seen in the following file on the nhdr:

/fs/awips/whfs/mpe_data/sitecoords/wfo_info.txt.

The following represents the first 15 lines of a typical wfo_info.txt file:

```
115
abq 32.40,109.10,37.2,102.90 ABX,FDX,PUX,AMA,LBB,HDX,EPZ,MAF,FSX,EMX
abr 43.46,102.14,46.10,96.10 UDX,FSD
akq 35.8,78.81,38.72,74.96 AKQ,DOX,LWX,MHX,RAX
aly 41.20,75.50,44.13,72.37 ENX,BGM,CXX,TYX,BOX,OKX
ama 32.99,104.14,37.32,99.05 AMA,TLX,FDX,LBB,DDC,FDR,VNX,PUX
apx 43.94,86.71,45.58,83.04 MQT
arx 42.60,92.19,45.45,89.55 MPX,MKX
bgm 40.85,77.97,43.76,74.34 BGM,BUF,TYX,CCX,DIX,ENX
bis 45.79,104.15,49.08,98.05 MVX
bmx 31.60,88.45,35.00,84.85 MXX,BMX,HTX,GWX,FFC,EOX,MOB,EVX,OHX,NQA,JAN
boi 41.8,120.1,45.4,113.8 CBX,LRX,SFX,PDT,MTX
```

bou 38.41,106.71,41.05,101.82 GLD,PUX
box 41.17,73.12,43.27,69.85 BOX,OKX,GYX,ENX,CXX
bro 23.85,99.70,27.85,95.05 BRO,CRP

The first line contains the number of WFOs represented in this file. If a WFO is added or removed from this file then this number must be updated. Each subsequent line has the following format:

{site_id} {sw_corner_latitude}, {sw_corner_longitude}, {ne_corner_latitude}, {ne_corner_longitude} {a comma separated list of radars providing coverage for the WFO area}

As mentioned above, the latitude/longitude pairs define a box which encloses the WFOs CWA. The list of radar identifiers is used to specify which misbin files to retrieve for each site.

When a site wishes to change the Hydroview_MPE HRAP grid which covers their forecast area, they must submit a new set of latitude/longitude pairs so these values may be manually incorporated into the wfo_info.txt file. Also, if the site wishes to add or remove radar sites which provide coverage for its forecast area, then they must supply the radar identifiers so that the wfo_info.txt file may be edited to include this information. Then the new coordinate and PRISM files may be recreated for this site as follows:

3 Recreate the Coordinate and PRISM Data for a Single WFO

From the command prompt in the /fs/awips/whfs/mpe_data/bin directory on the nhdr follow these two steps (note that WFO identifiers are typically three characters and must be lower case for use in the setup application):

> export single_office_id=<the identifier of the WFO the data are being regenerated for>
> run_single_site

Recreating a single site's data is the typical action, given that the initial data sets for almost all offices have already been created.

4 Recreate the Coordinate and PRISM Data for all WFOs

Be advised that this process can take upwards of an hour to complete, perhaps even longer based on the system and its load. This should rarely, if ever, need to be done.

To recreate the coordinate files and PRISM data for all of the WFOs represented in the wfo_info.txt file follow this step from the command prompt in the /fs/awips/whfs/mep_data/bin directory on the nhdr:

> run_all_offices

5 Locate the new coordinate, PRISM, and misbin files

The updated coordinate and PRISM files and copies of the necessary misbin files will be placed into the following directory on the nhdr when rerunning the setup on a HP workstation:

/fs/awips/whfs/mpe_data/office_data/<WFO identifier>/HP

6 Coordinate File

The coordinate file will have the name "coord_xxx.dat" where xxx is the WFO identifier (lower case characters). It will contain 4 numbers representing the following:

national HRAP grid X value of the southwest corner of the local Hydroview_MPE HRAP grid covering the WFO.
national HRAP grid Y value of the southwest corner of the local Hydroview_MPE HRAP grid covering the WFO
number of columns in the local Hydroview_MPE HRAP grid covering the WFO.
number of rows in the local Hydroview_MPE HRAP grid covering the WFO

As an example, the contents of "coord_aly.dat", the coordinate file for WFO Albany, New York, are as follows:

921
615
90
96

It is important to understand that while the coordinate files have the names of the WFO incorporated into them when generated, when they are place onto the site's computer, they must be renamed to coord_host.dat.

7 Prism Files

The PRISM files will be named PRISMnn, where nn is the number of the month. They are binary files and are only machine readable.

8 Misbin Files

A misbin file for each of the radars specified as providing coverage for the WFO's forecast area will be copied into the same directory as the coordinate and PRISM files. These files will have the name misbin.XXX, where XXX is the 3 letter identifier of the radar site it represents. These files are also binary formatted. They are always the same size, 131 x 131 HRAP bins, and as such are not directly affected by the resizing of the WFO's forecast area grid.

9 Placing the Coordinate, PRISM, and Misbin files into the Correct Directories at the WFO

The coordinate, PRISM, and misbin files have been placed onto the NOAA1 ftp server. The details of this process will not be provided here. However, from the ftp site these files must then be placed into the correct location on the computer at the WFO. This may be accomplished by following these steps:

10 Change the permissions of all of the files to 755. To do this, at the command prompt enter:

> chmod 775 coord_*.dat misbin.* PRISM*

11 Change the ownership of the files to oper and the group to users. To do this, at the command prompt enter the following:

> chown oper::users coord_*.dat misbin.* PRISM*

12 Rename the coordinate file to coord_host.dat.

> mv coord_xxx.dat coord_host.dat

where xxx is the 3 letter (lower case) identifer of the WFO

13 Place the coordinate file into the proper directory on the WFO's system. This directory is:

/awips/hydroapps/geo_data/host/ascii

14 Move the PRISM files to the appropriate directory. This directory is:

/awips/hydroapps/precip_proc/local/data/app/mpe/prism

15 Move the misbin files into the correct directory. This directory is:

/awips/hydroapps/precip_proc/local/data/app/mpe/misbin

16 Cleaning Out Directories and Files at the WFO

Whenever the coordinates in a coordinate file are altered, there are several directories which must be cleaned out. This is because the files in these directories were generated by MPE_FieldGen using the previous coordinate file values. If these files are not removed, then MPE_FieldGen and Hydroview_MPE will not operate correctly and could crash.

All files from the following directories must be removed from the WFO's computer:

/awips/hydroapps/precip_proc/local/data/app/prism
/awips/hydroapps/precip_proc/local/data/mpe/bmosaic
/awips/hydroapps/precip_proc/local/data/mpe/draw_precip
/awips/hydroapps/precip_proc/local/data/mpe/gageonly

/awips/hydroapps/precip_proc/local/data/mpe/height
/awips/hydroapps/precip_proc/local/data/mpe/index
/awips/hydroapps/precip_proc/local/data/mpe/lmosaic
/awips/hydroapps/precip_proc/local/data/mpe/locbias
/awips/hydroapps/precip_proc/local/data/mpe/locspan
/awips/hydroapps/precip_proc/local/data/mpe/mmosaic
/awips/hydroapps/precip_proc/local/data/mpe/rmosaic
/awips/hydroapps/precip_proc/local/data/mpe/state_var
/awips/hydroapps/precip_proc/local/data/mpe/qpe

The following files must be removed from the mosaicked ffg directory:

/awips/hydroapps/whfs/local/data/grid/misc/*.ffg

That is, all files ending with a suffix of ".ffg" must be removed from this directory. Once the new coordinate file has been installed at the WFO site, the mosaicked FFG file can be regenerated by running the following script in the /awips/hydroapps/precip_proc/bin directory:

run_gen_areal_ffg

Or new FFG files will be created automatically on the next cron run.

Appendix E. Setting the Colors of Displayed MPE Data

The colors of the displayed MPE data can be set to meet a user's taste and preference through the ColorValue table in the IHFS database. This table contains color information for each MPE product on a user by user basis. So, individual users may set up the MPE colors based on how they want to view the data. The procedure to do this involves several steps and should be followed with care.

This section first describes how to find the names of colors that are recognized by the X-Window System. It then presents the format of the ColorValue table. Following this, an outline of valid color use names and associated durations is provided. After this, a brief discussion of the MPE product legends and the thresholds and colors typically used to describe them is given. Finally, an example of modifying the colors of one MPE product is presented.

1 Valid Color Names

Valid color names may be retrieved from the "colorname" table in the IHFS database. A complete list of colors recognized by X Windows is contained in the file /usr/lib/X11/rgb.txt. Color names may be taken from this file and added to the colorname table if so desired.

2 The ColorValue table contains the following fields:

Name	Comments
userid	This may be up to 32 characters in length. It indicates the name of the user this color information pertains to.
application_name	This may be up to 20 characters in length. It names the application that this color information pertains to. For Hydroview/MPE this will always be "rfcwide".
color_use_name	This may be up to 15 characters in length. This names the product to which this color information pertains. The list of valid product names is provided below.
duration	This is an integer value representing the number of seconds spanned by the value represented by this color.
threshold_value	This is a floating point value representing the maximum data value represented by this color.
threshold_unit	This is a single character. It indicates the measurement system to use. "E" stands for the English System. "M" stands for the Metric System.
color_name	The name of the color. The color chosen must be one that is recognizable by X Windows.

The primary key on this table is userid, application_name, color_use_name, duration, threshold_value, threshold_unit.

3 Valid color use names and associated durations

MPE Product	Color Use Name	Duration
Mean Field Bias Mosaic	BMOSAIC	3600
Gage Only Field	GAGEONLY	3600
Radar Height Field	HEIGHT	0
Radar Coverage Field	INDEX	0
Local Bias Mosaic	LMOSAIC	3600
Local Bias Values Field	LOCBIAS	0
Local Span Values Field	LOCSPAN	0
Multisensor Mosaic	MMOSAIC	3600
Prism Climatology Field	PRISM	0
Single Site Radar Cimatology	RADCLIM	0 (Not available at this time)
Radar Mosaic	RMOSAIC	3600
Satellite Precipitation Field	SATPRE	3600
Best Estimate QPE	xmrg	3600

4 Legends and sample color thresholds

4.1 RMOSAIC, BMOSAIC, MMOSAIC, LMOSAIC, GAGEONLY, SATPRE, and xmrg color use types

The first color represents missing, the second color represents a value of exactly zero, the third color represents a value greater than zero but less than or equal to a given threshold, and subsequent colors represent progressively greater threshold amounts.

Example: Radar Mosaic

Threshold Value	Threshold Meaning	Color
-1	Missing	gray30
0.00	Exactly 0.00	black
0.01	Greater than 0 but less than or equal to .01	black
0.1	Greater than .01 but less than or equal to .1	DodgerBlue1
0.2	Greater than .1 but less than or equal to .2	cyan
0.3	Greater than .2 but less than or equal to .3	DarkGreen
0.4	Greater than .3 but less than or equal to .4	green
0.5	Greater than .4 but less than or equal to .5	greenyellow
...		
3.00	Greater than 3.0	white

4.2 HEIGHT: The first color is missing, the second and subsequent colors thresholds represent various heights in 100's of feet starting with a value of 0.

Example:

Threshold Value	Threshold Meaning	Color
-1	Missing	gray30
0.0	Exactly 0	black
250.	Greater than 0 but less than or equal to 250	orange
500.	Greater than 250 but less than or equal to 500	yellow
750.	Greater than 500 but less than or equal to 750	greenyellow
...		
10000.	Greater than 10000	white

4.3 INDEX: First color is missing, the second color means no radar coverage, and subsequent colors denote individual radars. Threshold values should be 1.0, 2.0, 3.0, etc. for successive colors.

Example:

Threshold Value	Threshold Meaning	Color
-1	Missing	gray30
1.0	1.0	black
2.0	2.0	yellow
3.0	3.0	greenyellow
4.0	4.0	yellowgreen
...		
16.0	16.0	orange

4.4 LOCBIAS: The first value represents missing, the second and subsequent colors represent local bias value thresholds starting with 0.0.

Example:

Threshold Value	Threshold Meaning	Color
-1	Missing	gray30
0.0	Exactly 0	black
0.4	Greater than 0 but less than or equal to 0.4	red
0.6	Greater than 0.4 but less than or equal to 0.6	dodgerblue1
0.8	Greater than 0.6 but less than or equal to 0.8	cyan
...		
3.0	Greater than 3.0	red4

4.5 LOCSPAN: The first value represents missing, the second color represents the case where precipitation has not occurred recently enough to compute a local memory span, subsequent colors represent the various memory spans.

Example:

Threshold Value	Threshold Meaning	Color
-1	Missing	gray30
-----	No recent precipitation	black
0.0	Memory span 0	red
1.0	Memory span 1	dodgerblue1
2.0	Memory span 2	cyan
...		
10.0	Memory span 10	white

4.6 PRISM: The first color represents missing, the second color represents a value of exactly 0, the third color represents a value greater than 0 but less than or equal to 10, and subsequent colors represent progressively larger thresholds.

Example:

Threshold Value	Threshold Meaning	Color
-1	Missing	gray30
0.0	Exactly 0	black
10	Greater than 0 but less than or equal to 10	black
20	Greater than 10 but less than or equal to 20	dodgerblue1
30	Greater than 20 but less than or equal to 30	cyan
...		
140	Greater than 140	white

4.7 RADCLIM: This product is not available at this time.

5 Example of customizing the color thresholds and values for a MPE product

In OB3, the option exists to modify a color directly from the Hydroview_MPE application. This is done by using the Color Thresholds GUI which is launched from the “Set Colors” item on the MPEfields menu.