NATIONAL DIGITAL FORECAST DATABASE (NDFD) PREPROCESSOR REQUIREMENTS

Letter of Transmittal

Tom Adams – OHRFC (Team Leader)
Brian Connelly - NCRFC
XiaoBiao Fan - OHD
John Lague - MBRFC
Kevin Lynott - OCWWS
Dan Matusiewicz - NWRFC
Dave Ruth – OST

Dear Reviewers:

The National Digital Forecast Database (NDFD) Preprocessor Requirements Team (NDFD PRT) convened in Silver Spring, MD in the NWS Office of Hydrologic Development (NWS OHD) April 9-10, 2003 for the initial team meeting to begin the Requirements process for the NDFD preprocessor. The Team subsequently met via teleconference and used email to draft the requirements for the NDFD preprocessor software for use of NDFD grids by NWSRFS models. Attached is a document containing the NDFD to NWSRFS Preprocessor Requirements proposed by the Team. The Team Charter is also included.

Several issues should be noted, namely:

(1)   A major factor in establishing the requirements is the feasibility of implementing the preprocessor quickly; this means that perhaps many (possible) features, while considered heavily, were relegated to the category of *design considerations* rather than *requirements*. A good example of this is meeting the future needs for distributed hydrologic modeling; few would doubt that distributed hydrologic modeling is the direction hydrologic forecasting is headed and that the need for gridded inputs of quantitative precipitation forecasts, forecast temperatures, relative humidity (or dew point), incident solar radiation, etc. are essential for driving distributed hydrologic models. However, these are not *immediate* concerns because the operational use of distributed hydrologic models is probably several years away — but, to be prudent and forward-looking, the needs of distributed hydrologic modeling ***must*** be considered in the design and coding of the software.

(2)   The team has attempted to adhere strictly to the Team Charter to keep the requirements in scope. Consequently, while it is absolutely essential that the NDFD grids are on hand for the Preprocessor to run, *how* the grids get to the RFC is considered outside the scope of the Preprocessor requirements, so there are no provisions for that process. However, a consistent (Nationally supported) process of retrieving the NDFD grids is critical and must be put into place.

(3)   Although considered thoroughly, the Requirements team felt that editing capability was also outside of the scope of the NDFDP. Nevertheless, the capability to view and possibly edit NDFD grids at RFCs is believed to be critical for operational use of NDFD grids at RFCs. Consequently, some software must be made available to RFCs for this purpose. One obvious candidate is the use of GFE for viewing and grid editing (if needed). As an alternative, a possible remedy to grid viewing and manipulation would be the use of a Geographic Information System (GIS). A major advantage is that a GIS is not single-purpose software. RFCs are already using GIS's extensively and the use of a GIS for NDFD grid viewing and possible manipulation would dove-tail into a mode of operation that field offices desire, namely, seamless integration of GIS throughout model calibration, operations, and training.

(4)   The Team members agreed that RFCs would want the preprocessor to run on-site in River Forecast Centers, but that the software would likely also run at Weather Forecast Offices (WFOs) to meet site specific modeling needs. Consequently, it seems best to require that the

preprocessor run as a process independent of NWSRFS. This would also allow the source code or Linux binary to be distributed freely to other agencies such as the U.S. Army Corps of Engineers, U.S. Geological Survey, Bureau of Reclamation, etc., and to University researchers.

(5)   For efficiency, the NDFDP will be required to write directly to NWSRFS as the MAPX preprocessor does. However, since users outside of RFCs are potential users of the NDFDP, the NDFDP will also have output capability to a SHEF file and to some other standard ASCII text file (format to be determined). It is also necessary that the NDFDP write to SHEF in order to meet the needs of the NWRFC (and perhaps other RFCs) for handling hydrometeorological inputs to NWSRFS as point station data.

(6)   The current Quantitative Precipitation Forecast (QPF) produced by WFOs and stored in the NDFD is conditioned on the occurrence of precipitation. How are RFCs to use NDFD conditional QPF. This is a significant issue that is outside of the scope of the NDFD to NWSRFS preprocessor requirements team charter and the design of the preprocessor.

(7)   An additional issue is time series inconsistencies between precipitation & temperature time series used for model calibration, those used operationally, and the NDFD derived time series. It does not appear possible to foresee what kind of adjustments should be made to these data within the NDFD Preprocessor to remove these inconsistencies. However, since the data will be archived — this will be done at both the National and local levels, it would appear necessary that a mechanism should be in place in the Operational Forecast System (OFS) of NWSRFS to identify the source of the forecast time series in a manner, perhaps, similar to what is currently done with NEXRAD radar derived precipitation time series with the MAPX data type. This will allow future analyses to be performed to determine how data adjustments should be made to NDFD derived time series to remove time series inconsistencies.

Schedule of Activity

Apr 9-10	NDFD-to-NWSRFS team meets at NWS HQ in Silver Spring, MD — ***COMPLETED***
Apr 30	Revised Requirements sent to team by Team Leader — ***COMPLETED***
May 1	Conference call (Thursday) — ***COMPLETED***
May 2	Team Members' individual Sections & revised requirements sent to Team Leader — ***COMPLETED***
May 6	Draft report sent back to NDFD-to-NWSRFS team members for review — ***COMPLETED***
May 9	Team member comments & changes due back to team leader — ***COMPLETED***
May 12	Composite Team comments & changes sent back to Team members — ***COMPLETED***
May 15	Conference Call to Finalize remaining issues (Thursday) — ***COMPLETED***
May 16	NDFD-to-NWSRFS preprocessor requirements report sent to RFCs & HSD chiefs for review — ***COMPLETED***
May 23	Comments & changes due back to team leader from RFCs & HSD chiefs— ***COMPLETED***
May 27	Pre-final draft with comments & changes from RFCs & HSD chiefs sent to Team Members— ***COMPLETED***
May 29	Conference call to finalize remaining issues (Thursday) — ***COMPLETED***
May 30	NDFD-to-NWSRFS preprocessor requirements report submitted to NWS OHD— ***COMPLETED***

The careful review, insights, and recommendations of the team members and those from the field that offered comments are greatly appreciated.

Sincerely,

Thomas E. Adams (Team Leader)