NWS FLDWAV MODEL:

THEORETICAL DESCRIPTION by D.L. Fread

USER DOCUMENTATION by J.M. Lewis

November 28, 1998

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1. INTRODUCTION

The National Weather Service (NWS) hydrologic services program provides accurate and timely hydrologic information to the general public. This includes flood forecasts, as well as day-to-day river forecasts which are used for water supply, navigation, irrigation, hydropower, reservoir flood control operations, recreation, and water quality interests. Thirteen River Forecast Centers (RFC's) prepare the forecasts which are disseminated to the public throughout the United States via local Weather Forecast Offices (WFO's).

Within the National Weather Service River Forecast System (NWSRFS), the runoff generated by rainfall-runoff models is aggregated into fairly large, well defined channels (rivers), and then transmitted downstream by routing techniques of the hydrologic or storage routing variety, e.g., the Lag and K technique (Linsley, et al., 1958). Although the hydrologic routing techniques function adequately in many situations, they have serious shortcomings when the unsteady flows are subjected to backwater effects due to reservoirs, tides, or inflows from large tributaries. When channel bottom slopes are quite mild, the flow inertial effects ignored in the hydrologic techniques also become important. Also, levee overtoppings/failures add complexities which are not handled by the hydrologic routing techniques; and highly transient flow from dambreaks which often greatly exceed the flood-of-record are not treated adequately by hydrologic routing.

To improve the routing capabilities within NWS forecasting procedures, the Hydrologic Research Laboratory (HRL) of the NWS Office of Hydrology developed dynamic wave routing models suitable for efficient operational use in a wide variety of applications involving the