**Using RiverPro to Develop and Disseminate Flash Flood Watches and Warnings for Dams with Emergency Action Plans**

Greg Lamberty
WFO North Webster, IN

## 1. Introduction

Dams that have established Emergency Action Plans (EAPs) in place have specific information that needs to be disseminated to the public in the event of an emergency. Using other product generating programs, such as WARNGEN, will require editing of the product before disseminating. This can lead to errors that may cause the product not to be disseminated to the right location.

RiverPro provides ways to "hard code" this important information beforehand in an effort to eliminate mistakes. The product can also be generated and disseminated more easily and quickly using RiverPro.

## 2. Description of RiverPro

RiverPro was designed as a product formatter and disseminator of long-fused hydrological warnings...River Flood Warnings and Statements and Daily Hydrological Data and River Forecasts. RiverPro has also been used to format and send the new RTP Regional Temperature and Precipitation reports.

RiverPro uses several templates to create the products and then sends the finished product to the AWIPS WAN. There are 8 basic templates that are used to create products: Product Header, Summary of Groups, Hydromet Basis, Tabular, Call-to-Action, Data Roundup, Impact Statement and Crest Comparison. In developing the Flash Flood Warning and Flash Flood Watch messages, only Product Header, Summary of Groups, Call-to-Action, and Data Roundup templates were used. There are some basic key words that RiverPro uses in its templates. Theses key words tell RiverPro what to do. Each line begins with one of these key words. The ones that we use in this project area are as follows: name...name of the template formats, type of format RiverPro uses; varlist...list of variables; phrasestr...prints the following (? Not sure what "following" is here) into the finished product. phrasestr can print variables as well, and condition which carries the value TRUE or FALSE. In our case the value condition will always be set to true. All variables are surrounded by < >.

In order for RiverPro to be used in this process, the site must be established as a forecast point. This has to be done in the Hydrobase Database Manager Program. RiverPro will then generate the desired products using the templates mentioned above. See WHFS Support Page at http://www.nws.noa.gov/oh/hod_whfs/Hydrobase. In establishing these forecast points, a location on the Hydroview map will be plotted. If there are numerous dams in an HSA the map may become cluttered. To avoid this, just change the latitude/longitude of the point to some

place off of the main map.

## 3. Flash Flood Watches

### a. *Product Header*
A special Product Header has to be developed for the Flash Flood Watch. Flash Flood Watches use the zone or county coding.

The following is an example of the Flash Flood Watch Product Header found in a RiverPro template.

Example:
name:ffa_eap_dam
formats:T_HEADER
varlist:<Cur Date>
phrasestr:<UGCListZ>
phrasestr:
phrasestr  BULLETIN...IMMEDIATE BROADCAST REQUESTED
phrasestr: FLASH FLOOD WATCH
phrasestr: NATIONAL WEATHER SERVICE NORTHERN INDIANA
phrasestr: <CurDate>

One also needs to be done for the Flash Flood Warnings using the <UGCListC> variable.

### b. *Summary of Groups*
The Summary of Groups template needs to be set up to put together the headlines in the watch product. This template is divided into two groups: Prologue and Summary. For the Flash Flood Watch, do not use the Prologue group. The Summary template needs to be setup as follows:

Set  several conditional statements  to TRUE.

Variables used in this template are:

<GrpFPList> This variable is used to get the Dam Name into the product. The Dam Names have to be the same name as the forecast points defined earlier .

<CountyList> This variable is used to get the County Name where the dam is located into the text. This information has to be in Hydrobase as part of the establishment of the forecast point mentioned earlier. Hydrobase is where RiverPro goes to get the information it needs to put the message together.

<RiverList> This variable is used to get the name of the river or stream on which the dam is located.

Example:

```
name:ffa
condition: TRUE
phrasestr:...A POTENTIALLY HAZARDOUS SITUATION IS DEVELOPING...<GrpFPList> IS (STRUCTURALLY WEAK/NEAR
CAPACITY)...
condition: TRUE
phrasestr:
condition: TRUE
phrasestr:
condition: TRUE
phrasestr:    THE NATIONAL WEATHER SERVICE HAS ISSUED A FLASH FLOOD WATCH EFFECTIVE UNTIL XXXX XM EST &
FOR PEOPLE IN THE FOLLOWING <CountyList>...DOWNSTREAM OF <GrpFPList> ON THE  <RiverList>.  A &
FLASH FLOOD WATCH MEANS RAPIDLY RISING WATER OR FLOODING IS POSSIBLE WITHIN THE &
WATCH AREA.
```

(The & is a continuation character telling the computer to start a new line)

### c. *Call to Action*

The Call-to-Action template is used to store various Call to Action statements that are used by RiverPro.  Create Call-to-Action statements appropriate to your area.

Example:

```
name:ffa_dam_weakening
phrasestr: PLAN NOW SO YOU WILL KNOW WHAT TO DO IN AN EMERGENCY. BY ALL MEANS...
phrasestr: KEEP INFORMED OF THE STATUS OF THE DAM/S CONDITION BY LISTENING TO
phrasestr: LOCAL RADIO AND  TELEVISION FOR LATER STATEMENTS AND POSSIBLE WARNINGS.
phrasestr: FOLLOW THE ADVICE OF PUBLIC SAFETY OFFICIALS.
phrasestr:
phrasestr:
phrasestr: FURTHER STATEMENTS WILL BE ISSUED AS MORE INFORMATION BECOMES &
AVAILABLE.
```

### d. *Data Roundup*

The final template used is the data roundup template.  Variables that you need to use in this template are:

      <IdName>: Again this is the dam name.
      <GrpFPList> can not be used in this template
      <River> Name of the river or stream on which the dam is located.
      <RiverList> can not be used in this template
      <County> Name of the county in which the dam is located
      <StateName> Name of the state in which the dam is located
      <Reach> This variable contains the information as to the location of the dam vs. the nearest town.

The template is a series of conditional statements with the condition set to TRUE.

Example:

```
name:ffa
condition: TRUE
phrasestr:...IT HAS BEEN REPORTED BY (SOURCE OF INFORMATION) THAT THE <IdName> &
LOCATED ON THE <River> IN  <County> COUNTY <StateName>...IS (STRUCTURALLY WEAK/NEAR &
 CAPACITY). PEOPLE BELOW THE DAM SHOULD BE ALERT TO THE POSSIBILITY THAT THE DAM&
COULD FAIL.  DAM SAFETY EXPERTS IN COORDINATION WIT STATE AND LOCAL EMERGENCY &
SERVICES ARE MONITORING THE DAM AND WILL RELEASE A PUBLIC STATEMENT AS SOON AS &
AN INSPECTION IS COMPLETED.
condition: TRUE
phrasestr:
condition: TRUE
phrasestr:
condition: TRUE
phrasestr:
condition: TRUE
phrasestr: IN THE MEANTIME...PEOPLE BELOW THE DAM SHOULD BE READY TO EVACUATE &
IMMEDIATELY.  THE THREATENED <IdName> is <Reach>.
```

The <Reach> variable is located in Hydrobase under River Gauge/Description menu choice.

Examples of what can be in the reach variable.  "JUST UPSTREAM OF THE CITY OF ELKHART".  Unfortunately only 80 characters are allowed in this variable.

Now that you have all of this defined and completed, the various templates have to be put in the proper order.

**e.  *Order of Templates***
The Product Header has to be first.  The header is then followed by the Summary of Groups, the Data Roundup and Call to Action.   The Data Roundup is part of a three template group called Forecast Point Info.  Other than the Product Header which is always first, RiverPro does not restrict  the order of the templates..  The order the templates need to be are (? Confused...sounds like it IS restricted...suggested order maybe?)

> Product Header 1
> Summary of Groups 2
> Forecast Point Info...Data Roundup Choice 3
> Call To Action 4

**4. Flash Flood Warning**
As in Flash Flood Watches above, FFWs are created using a set of RiverPro templates.  The templates needed to formulate the Flash Flood Warning template are listed below.

**a. *Product Header***
The Product Header should look like:

```
name:ffw_eap_dam
formats:T_HEADER
varlist:<Cur Date>
phrasestr:<UGCListC>
```

phrasestr:
phrasestr  BULLETIN...EAS ACTIVATION REQUESTED
phrasestr: FLASH FLOOD WARNING
phrasestr: NATIONAL WEATHER SERVICE NORTHERN INDIANA
phrasestr: <CurDate>

The only difference between the Header for the Flash Flood Watch and Flash Flood Warning are in the 4th and 6th line.  The 4th line needs the <UGCListC> variable so the County Code is put in the product and the 6th line needs to say BULLETIN...EAS ACTIVATION REQUESTED.

## b. *Summary of Groups*

For the Flash Flood Warning both the Prologue and the Summary parts of the Summary of Group Template are needed.

The prologue is a conditional statement, again set to TRUE and looks like:

name:ffw_prologue
condition: TRUE
phrasestr:THE NATIONAL WEATHER SERVICE IN NORTHERN INDIANA HAS ISSUED A:

The Summary Part should look like:

Example:

name:ffw
condition:TRUE
phrarastr:*FLASH FLOOD WARNING FOR A DAM FAILURE FOR THE
condition: TRUE
phrasestr:   FOLLOWING <CountyList>

## c.  *Hydromet Basis*
The Hydromet Basis template is normally used to put a space in an FLW for the forecaster to type in the reasoning which prompted the River Flood Warning.  In our case it is used to add the phrase carrying the time the warning expires for.

Example:
name:ffw_dam
phrasestr:* UNTIL XXXX XM EST.

## d. *Data Roundup Template*
The Data Roundup section of the Forecast Point info group is again employed to finish the body of the warning.

Variables used are:

<IdName>: Again this is the dam name. <GrpFPList> can not be used in this template
<River> Name of the river or stream the dam is located on.  <RiverList> can not be used in this template

<County> Name of the county the dam is located in
<StateName> Name of the state the dam is located in
<Reach> This variable contains the information as to the location of the dam vs the nearest town.

These are the same ones used in the one designed for issuing flash flood waches.

Example:

```
name:ffw
condition: TRUE
phrasestr:*AT (XXXX XM) (SOURCE OF INFORMATION) REPORTED THAT THE
condition: TRUE
phrasestr: <IdName> in <County> COUNTY <StateName> HAD FAILED.
condition: TRUE
phrasestr:
condition: TRUE
phrasestr: THE FAILED <IdName>
condition: TRUE
phrasestr: IS <Reach>
condition: TRUE
phrasestr: ON THE <River>.
```

### e. *Call to Action Template*
The Call-to-Action Statement is used the same way as that used for the flash flood watch template and should be tailored to the Flash Flood Warning.

Example:

```
name:dam_failure
phrasestr:PEOPLE IN LOW LYING AREAS BELOW THE FAILED DAM ARE URGED TO
phrasestr: MOVE TO HIGHER GROUND IMMEDIATELY.  DO NOT ATTEMPT TO DRIVER ACROSS
phrasestr: FLOODED ROADWAYS.
phrasestr:
phrasestr:
phrasestr:FURTHER STATEMENTS WILL BE ISSUED AS MORE INFORMATION BECOMES &
AVAILABLE.
```

### f. *Order of Templates*
The order the template need to be in are:
Product Header 1
Summary of Groups 2
Hydromet Basis 3
Forecast Point Info...Data Roundup Choice 4
Call To Action 5

**5. Conclusion**:

RiverPro can be utilized to format products other than long fused hydro warnings and statements.  The advantages of using RiverPro in issuing Flash Flood Watches and Warnings are:

(a)  The FIPs and Zone codes are "hard coded" in to the product eliminating the probability that the wrong county would be coded.

(b)  Detailed information needed in a dam failure incident is already in the product thus eliminating possible mistakes in composing the product.

(c)  The templates make it possible to issue warning for all of the dams in an area with just a single set of templates rather than having one for each EAP dam an HSA.