

# Appendix A. Template Records Reference

All the product text generated by RiverPro is generated using template files. Each template file uses a keyword approach to identify each record of the template file, with the keywords having associated values. The keywords, or record types, which are permitted for a template depend on the section/subsection for which the template applies. Each template record should begin with a keyword. If one is not specified, then a PHRASE keyword is assumed.

The template files allow for comment symbols and continuation lines. Comment lines begin with the symbol "#". Continuation lines are designated by the continuation symbol("&") as the last character on the template line.

The template keywords are given below with a brief statement regarding which section/subsection templates can use the keyword. A detailed description of the template keywords follows in the subsequent sections.

NAME -	Required in all templates.
CONDITION -	Required in summary section and roundup subsection templates.
PHRASESTR -	Required in all templates except the tabular section.
FORMATS, VARLIST -	Supported in all templates except the basis section, the call-to-action section templates.
SPECTIME -	Supported in the roundup and tabular templates. This keyword has an alternative name of SPECSTAGETIME.
LITERAL -	Supported in the tabular template only.
ID -	Supported in the tabular template only.
FP_ID -	Supported in the tabular template only.
MISCWRT -	Supported in the tabular template only.
GRPNAME -	Supported in the tabular template only.
MSGDATA -	Supported in the tabular template only.

Figure A-1 Available Template Record Types

## A.1 NAME Records

The NAME keyword identifies the name of a template. Multiple templates can be stored in a single template file; the name uniquely identifies the template. The keyword value is the name of the template.

## A.2 CONDITION Records

The CONDITION record specifies a condition which is basically an "IF statement" that must evaluate to TRUE for the phrase in the succeeding PHRASE record to be generated.

Conditions must begin and end with left and right parenthesis, respectively. Within these bounding parentheses is the complete conditional expression which allow the following items:

- Relational operators - "LT", "LE", "EQ", "NE", "GE", "GT"
- Logical operators - "AND", "OR"
- String operators - "SEQ", "SNE"
- Integer and float constants (e.g. 12, 28.5)
- Variables (surrounded by angle brackets)
- String constants (surrounded by double quotes)
- Delimiting parentheses

A condition consists of one or more relational expressions, with each expression surrounded by parentheses, and with logical operators between any successive relational expressions. Relational expressions must be enclosed within parentheses; this is optional for logical expressions. Also, it is mandatory that all individual entries in the condition be separated by a blank(s)! This means that all parentheses must be surrounded by blanks.

There are limitations on which template variables can be specified depending on which product section is using the template. See Appendix B for more information on these access limitations. If the phrase is to always be included, the CONDITION record is still required but can have a special keyword value of "TRUE".

## A.3 PHRASESTR Records

The PHRASESTR keyword value give the phrase which is output to the product. Therefore, it is arguably the most important type of template record. For templates which require CONDITION records, each PHRASESTR record must be preceded by an associated CONDITION. The phrase is generated for output only if the condition is true.

For all sections that support variable substitution, the phrase can contain embedded variable names. The value of the embedded variable is automatically inserted to form the output phrase. There are restrictions on some variables that prevent their use in

certain sections/subsections of the product as described in Appendix B. The names of variables are given as a string surrounded by angle brackets as in "<MaxStg>".

The phrase itself begins immediately after the colon that terminates the keyword PHRASESTR, and ends at the end of the record (unless continuation lines are used), so be thoughtful in the use of leading and trailing blanks.

The user can specify a special sequence of characters in the PHRASESTR record that will result in the current line being terminated, and the subsequent output appearing on a new line. This feature is referred to as the forced newline feature. The special sequence is a pair of vertical bars ("||"). Anytime this sequence is encountered, a newline character is written to the product output.

#### **A.4 FORMATS and VARLIST Records**

The VARLIST and FORMATS keywords are paired keywords that complement each other. Therefore their discussion is presented in the same section. The way they are used depends upon whether they are in a template used for the tabular section or whether the template is for one of the other product sections/subsections.

In the non-tabular section templates, the two records work together to define the format to use for a corresponding variable. The number of formats in the FORMATS record must match the number of variables in the VARLIST record. The first variable name listed for the VARLIST is output in a format specified by the first format specification in the FORMATS; the second with the second, etc. So when formatting the value of a variable encountered when processing a PHRASESTR record, the format used is either: (1) the default format defined in RiverPro for that variable type (e.g. float) or, (2) it is the format defined in the FORMATS record for the particular. Only one FORMATS and VARLIST keyword is allowed per non-tabular template. The use of these paired keywords in the non-tabular section template is optional.

In the tabular section template, the FORMATS record not only gives the formats for corresponding variables, but also serves as the primary instructions for which data to output in the tabular text. The number of VARLIST variables must equal the number of FORMATS formats that are for variables, not necessarily the total number of format items. This is noteworthy since it is probable that the X (i.e. blank space) and literal string formats are used. The FORMATS keyword is mandatory in the tabular section template if the FP\_ID keyword is used. If the FORMATS keyword contains formats for variables, then the VARLIST keyword is also mandatory. It is important that integer formats be given for integer variables, float formats for float variables, etc.

Unpredictable output results if a mismatch exists. Make sure that the format for the Nth variable in the FORMATS list matches the data type of the Nth variable in the VARLIST

list. The FORMATS and VARLIST paired keywords can be repeated throughout the template because the tabular template is processed "on-the-fly". For a description of how the specified formats and variables are used for the tabular section, refer to the explanation given with the FP\_ID keyword or refer to the discussion of how the tabular section text is created.

The FORMATS specifiers support many different format types, with a naming convention similar to that used in computer languages. A list of the supported formats is given below.

"I#"

Integer format, where "#" is the field width.

"I#.#"

Integer format, where "#" is the field width and any leading zeroes are included. The two numbers (#) must be equal.

"F#.d"

Float format, where "#" is the total field width and "d" is the number of digits to the right of the decimal point. The "d" value may be given as "0" to have a float value displayed as an integer. When using F#.0 formats, any leading zeroes are stripped off and the number is right-justified.

"S#"

String format, where "#" is the field width

"sss"

Literal string format, where "sss" is a string constant and may contain embedded blanks. This format is not associated with a variable. It is permitted only for the tabular template. The continuation symbol("&") can be contained as a literal within quoted literal strings of FORMATS, and will not be interpreted as a continuation symbol.

"X#"

Blank spaces, where # is the number of blanks. This format is not associated with a variable. It is permitted only for the tabular template. A variation of this format can be used to force a newline character to be written to the product output, and have subsequent text written to a new line. This feature is referred to as the forced newline feature. To use this, specify a X0 format, as in "insert 0 blank spaces".

"T\_xxx"

Date/time format where xxx is from a list of allowable date/time formats that are

provided. In addition to these predefined date/time formats, the user can create their own format through use of the T\_Uxxx format. First, the T\_Uxxx format is described, followed by the predefined formats.

## T\_Uxxx format:

The general form of this format specifier is: T\_Uxxx, where xxx is any collection of characters, and which can include any of the formatting directives listed below. These directives are based on the formatting directives available via the UNIX C function strftime(). One additional directive is also supported by RiverPro - the caret character (^) is used to represent the space character since the xxx string can not include any embedded blanks. The xxx string typically includes a combination of these directives, which are characterized by a leading percent sign. String literals can also be incorporated into the xxx string; a typical use would be for a comma. The figure below details the T\_U format specifiers.

An example RiverPro usage of this format is: T\_U%Y^%b^%d,^%H:%M, which would produce something with the form of: 2000 APR 6, 11:00.

^	single blank character
%a	Locale's abbreviated weekday name.
%A	Locale's full weekday name.
%b	Locale's abbreviated month name.
%B	Locale's full month name.
%c	Locale's appropriate date and time representation.
%C	The century number (the year divided by 100 and truncated to an integer) as a decimal number [00-99].
%d	Day of the month as a decimal number [01,31].
%D	Equivalent to the directive string %_m/%_d/%_y.
%e	Day of the month as a decimal number [1,31]; a single digit is preceded by a space.
%h	Equivalent to %b.
%H	Hour (24-hour clock) as a decimal number [00,23].
%I	Hour (12-hour clock) as a decimal number [01,12].
%j	Day of the year as a decimal number [001,366].
%m	Month as a decimal number [01,12].
%M	Minute as a decimal number [00,59].
%n	The new-line character.
%p	Locale's equivalent of either AM or PM.
%r	The time in AM and PM notation; in the POSIX locale this is equivalent to %_I:%_M:%_S %_p.
%R	The time in 24 hour notation (%H:%M).
%S	Second as a decimal number [00,61].
%t	The Tab character.
%T	The time in hours, minutes, and seconds (%H:%M:%S).
%u	The weekday as a decimal number [1(Monday),7].

%U	Week number of the year (Sunday as the first day of the week) as a decimal number [00,53]. All days in a new year preceding the first Sunday are considered to be in week 0.
%V	The week number of the year (Monday as the first day of the week) as a decimal number [01,53]. If the week containing January 1st has four or more days in the new year, then it is considered week 1; otherwise, it is week 53 of the previous year, and the next week is week 1.
%w	Weekday as a decimal number [0(Sunday),6].
%W	Week number of the year (Monday as the first day of the week) as a decimal number [00,53]. All days in a new year preceding the first Monday are considered to be in week 0.
%x	Locale's appropriate date representation.
%X	Locale's appropriate time representation.
%y	Year without century as a decimal number [00,99].
%Y	Year with century as a decimal number.
%Z	Time zone name (or by no characters if no time zone exists).
%%	The percent (%) character.

Figure A-2 T-Uxxx Time Format Specifiers

The remaining date/time format specifiers are given below and use a naming convention where the following abbreviations are used:

HH = two-digit hour,	H = one/two-digit hour	
M = month,	D = day,	Y = year,
W = weekday,	X = AM/PM indicator.	
C = character,	A = abbreviated.	

A field which can be either numeric or character is numeric unless the "C" qualifier is before it, as in "CM". A field which can be abbreviated is assumed to be unabbreviated unless the "A" qualifier precedes it as in "CAM" for character-abbreviated-month. The default format gives date-times as DD/MM HH:MM as in 03/30 22:00.

"T_Uxxx"	user_specifiable
"T_MMDD"	04/05
"T_MMDDYY"	04/05/97
"T_MMDDYYYY"	04/05/1997
"T_MMDDXM"	05/13 PM

"T_CAMDD"	JAN 12
"T_CMDD"	JANUARY 12
"T_CAMDDYYYY"	JAN 12 1994
"T_CMDDYYYY"	JANUARY 12 1994
"T_AWH"	WED 1 AM
"T_AWHH"	WED 10 AM
"T_WHH"	WEDNESDAY 10 AM
"T_AWHHNN"	TUE 12:30 AM
"T_WCAMDD"	WEDNESDAY JAN 12
"T_WCMDD"	WEDNESDAY JANUARY 12
"T_WCAMDDYYYY"	WEDNESDAY JAN 12 1994
"T_WCMDDYYYY"	WEDNESDAY JANUARY 12 1994
"T_AWCAMDDYYYY"	WED JAN 12 1994
"T_AWCAMDD"	WED JAN 12
"T_DDHHNN"	312359
"T_HW"	7 AM MONDAY
"T_HHW"	10 AM WEDNESDAY
"T_HHAW"	10 AM WED
"T_HHMMDD"	10 AM 01/12
"T_HHXM"	11 AM
"T_AW"	WED
"T_W"	WEDNESDAY
"T_MMDDS"	1231
"T_AWXM"	Thu PM
"T_WXM"	Thursday PM
"T_PHRASE"	(See Section D.1.3)
"T_HEADER"	1050 AM CST MON FEB 14 1994
"T_DEFAULT"	03/30 14:00

Figure A-3 RiverPro Time Formats

## A.5 SPECTIME Records

The SPECTIME record provides the means of defining the specific times for observed and forecast stages. These times are specified in the following manner.

After the keyword, the next two values together specify the reference, or base, time. These two values are the date, given as either MM/DD/YYYY or by the keyword value "TODAY", and the time, given as HH:MM. Following these two values are one or more sets of three values, where the first of these three values gives a day count offset relative to the base time; the second gives an hour count offset relative to the base

time, and the third gives a time window size in hours. For example, if the base time is given as 5/13/1993 07:00, and the day, hour, and window values are +1 -3 1, then this implies a stage value closest to 5/14/1993 04:00 and between 03:00 and 05:00. The SPECTIME record can contain multiple sets of these three values.

These values are then used only when a <SpecObsStg> or <SpecFcstStg> variable is specified. When these variables are specified either in a PHRASESTR record (for a non-tabular template) or a VARIABLE record (for a tabular template), then the first usage of one of these variables results in a search for a value for the time range specified by the first set of information in the SPECTIME record, the second usage uses the second set, etc. For certain stage data requests in tabular templates, the user can choose between using the <Spec...Stg> variables in conjunction with the SPECTIME records or using the observed data variables. It is suggested that the observed data variables be used instead of the <Spec...Stg> variables because of the greater flexibility and their ease of use.

## **A.6 LITERAL Records**

The text that follows is the keyword value. It is inserted into the output tabular text verbatim, without any inserted text from a variable substitution.

## **A.7 FP\_ID Records**

The required keyword value is an identifier for a forecast point location. An FP\_ID record forces output of a line of information for the forecast point, using the format given by the FORMATS record. Each format for a variable in the FORMATS record corresponds to a variable in the variables in the VARLIST record. The FP\_ID record indicates the id of the forecast point to use when generating output data. Each time it is encountered, then the current FORMATS and VARLIST definitions are used.

## **A.8 ID Records**

The required keyword value is a location. This template record is a generalized version of the "FP\_ID:" record. Whereas the FP\_ID record type is limited for use with forecast points, the ID record type can be used with any data location.

However, the variables associated with the ID record (via a preceding "VARLIST:" record) can only include either the <ObsPE> type variables, and a few other select variables. The other variables supported by the ID record type are: <Id>, <IdName>, <County>, <Stateld>, <StateName>, <River>, <BankStg>, <WStg>, <FldStg>,

<FldFlow>, <ZDatum>, <Reach>, <Proximity>.

The ID record type can be particularly helpful when presenting a table of the same data for each station. In this case the FORMATS and VARLIST record can be specified once, and the ID record then used over and over for each line. The alternate method requires a separate VARLIST record for each station to allow the station to be uniquely specified, which makes for much “busier” templates.

### **A.9 GRPNAME Records**

The required keyword value is the skip option. If the value is SKIP or NOSKIP, then a forecast group name is written anytime the forecast group for a forecast point specified in an FP\_ID does not match the previous forecast group. If the value is SKIP, then a blank line is inserted anytime a forecast group name is written to the output product. If the value is NOSKIP, then no blank line is written.

The GRPNAME record type also supports the value of OFF, which suppresses writing the group name to the file. Because the tabular template is processed in a sequential mode, this allows the group name (typically defined as the basin name) to be turned on or off within different parts of the tabular output.

### **A.10 MISCWRT Records**

No keyword value exists for this keyword. When this line is encountered, the FORMATS and VARLIST records are processed to generate an output line in the product, similar to the FP\_ID keyword. The variables specified in the VARLIST can not be any of the forecast point variables listed in Table 6-1, although the observed data variables can be used, which allow any location identifiers including forecast points.

### **A.11 MSGDATA Records**

The required keyword value indicates what to do in the event that missing data are encountered. The value of the keyword is either a) SKIP or b) a user-defined string to insert into the place of a missing value. If a value of "SKIP" is given, then any line in the tabular section which has a missing value in it is NOT written to the output product. Otherwise, the specified string is written to the output product in place of a value that is missing.

### **A.12 Sample Templates for Header Section**

```

#
# HEADER SECTION TEMPLATES
#
#-----
# RIVER STATEMENT
name: rvs
formats: T_HEADER
varlist: <CurDate>
phrasestr:<UGCListC>
phrasestr:RIVER STATEMENT
phrasestr:NATIONAL WEATHER SERVICE SILVER SPRING, MD
phrasestr:<CurDate>
#
#-----
# FLOOD STATEMENT
name: fls
formats: T_HEADER
varlist: <CurDate>
phrasestr:<UGCListC>
phrasestr:RIVER FLOOD STATEMENT
phrasestr:ISSUANCE NUMBER <IssuanceNumber>
phrasestr:NATIONAL WEATHER SERVICE SILVER SPRING, MD
phrasestr:<CurDate>
#

```

### A.13 Sample Templates for Tabular Section

```

# TABULAR SECTION TEMPLATE
#
name: default
grpname: skip
literal:          FLD OBSERVED          FORECAST 6AM    CREST
formats:"LOCATION  STG  STG  DAY TIME" T_AW T_AW "STG TIME"
varlist: <Day1> <Day2>
miscwrt:
literal:
specstagetime: TODAY 06:00          +1 0 4  +2 0 4
formats: X2 S9 X2 F2.0 X2 F4.1 X1 T_AWHH X2 F5.1 X2 F5.1 X3 &
F5.1 X2 T_AWHH
varlist: <IdName> <FldStg> <ObsStg> <ObsTime> <SpecFcstStg> & <SpecFcstStg>
<FcstCrestStg> <FcstCrestTime>
literal:UPPER TEST RIVER:
fp_id: BLK02
fp_id: TONO2
#
literal:
literal:LOWER TEST RIVER:
fp_id: WANO2
fp_id: DOVO2

```

### A.14 Sample Templates for Data Roundup Subsection

```

# ROUNDUP SUBSECTION TEMPLATES
#
name: default
formats: T_HHW  T_HHW T_HHW T_HHW T_HHW T_HHW T_HHW
varlist: <ObsTime> <MaxFcstTime> <ObsRiseFSTime> <ObsFallFSTime> &

```

```

<FcstRiseFSTime> <FcstFallFSTime> <FcstCrestTime>
condition: ( <ObsCat> EQ 0 )
phrasestr:FOR <IdName>, THE LATEST READING IS <ObsStg> FEET &
AT <ObsTime>.
condition: ( <ObsCat> GT 0 )
phrasestr:FOR <IdName>, <ObsCatName> FLOODING IS OCCURRING, WITH &
A STAGE OF <ObsStg> FEET MEASURED AT <ObsTime>.
condition: ( <ObsStg> EQ MISSING )
phrasestr:For <IdName>, NO OBSERVED STAGE VALUE IS AVAILABLE.
#
condition: ( <MaxFcstCat> EQ 0 )
phrasestr:NO FLOODING IS FORECAST.
condition: ( ( <MaxFcstCat> GT 0 ) AND ( <FcstFSDeparture> GT 0 ) )
phrasestr:<MaxFcstCatName> FLOODING IS FORECASTED, WITH A MAXIMUM & STAGE OF
<MaxFcstStg> FEET AT <MaxFcstTime>, WHICH IS & <FcstFSDeparture> FEET ABOVE
FLOOD STAGE.
condition: ( ( <MaxFcstCat> GT 0 ) AND ( <FcstFSDeparture> EQ 0 ) )
phrasestr:<MaxFcstCatName> FLOODING IS FORECASTED, WITH A MAXIMUM & STAGE OF
<MaxFcstStg> FEET AT <MaxFcstTime>, WHICH IS EQUAL TO &
THE FLOOD STAGE.
condition: ( ( <MaxFcstCat> GT 0 ) AND ( <FcstFSDeparture> LT 0 ) )
phrasestr:<MaxFcstCatName> FLOODING IS FORECASTED, WITH A MAXIMUM & STAGE OF
<MaxFcstStg> FEET AT <MaxFcstTime>, WHICH IS & <FcstFSDeparture> FEET BELOW
FLOOD STAGE.
#
condition: ( <ObsRiseFSTime> NE MISSING )
phrasestr:THE RIVER ROSE ABOVE THE FLOOD STAGE OF <FldStg> &
AT <ObsRiseFSTime>.
condition: ( <ObsFallFSTime> NE MISSING )
phrasestr:THE RIVER FELL BELOW FLOOD STAGE OF <FldStg> AT & <ObsFallFSTime>.
condition: ( ( <FcstRiseFSTime> NE MISSING ) AND &
( <FcstFallFSTime> NE MISSING ) )
phrasestr:THE RIVER IS EXPECTED TO RISE ABOVE THE FLOOD STAGE OF <FldStg> AT
<FcstRiseFSTime> AND FALL BELOW FLOOD STAGE AT & <FcstFallFSTime>.
condition: ( ( <FcstRiseFSTime> NE MISSING ) AND &
( <FcstFallFSTime> EQ MISSING ) )
phrasestr:THE RIVER IS EXPECTED TO RISE ABOVE THE FLOOD STAGE OF <FldStg> AT
<FcstRiseFSTime>.
condition: ( ( <FcstFallFSTime> NE MISSING ) AND &
( <FcstRiseFSTime> EQ MISSING ) )
phrasestr:THE RIVER IS EXPECTED TO FALL BELOW THE FLOOD STAGE OF & <FldStg> AT
<FcstFallFSTime>.
#

```

## Appendix B. Template Variables

A quick-reference list of all the variables available within the RiverPro application are listed in Table 4-1. A detailed description of each variable is given below in Table B-1. The variables are listed in logical groupings, such as listing together all variables associated with forecast point stage data. In some cases, variables are so similar that they are listed on the same line. The variable names must be given exactly as listed; the names are case-sensitive. Listed after each variable are the:

- Variable Type.

These can be either integer, float, string, time, or date. The length of some strings is fixed, but for most strings it is variable. The time and date formats are very similar. The time type is more commonly used as it provides better flexibility when formatting their values. A time type is used for any date that is always after January 1, 1970; this is a special date for the RiverPro application. Any date that is before this special date uses the date format.

- Variable Product Section/Subsection Access.

Not all variables are permitted for use in all the templates that support variable substitution. This limitation is imposed because: (a) certain variables are associated with a given forecast point or forecast group and are therefore only relevant when the template is associated with a given forecast point (point-specific subsections) or forecast group (summary section); (b) it is not logical to include certain variables in certain product sections. The access list codes are:

H	= header
S	= summary
T	= tabular
R	= data roundup
I	= impact statement
C	= historical comparison

- Variable Template Condition Access.

Not all variables are permitted within the conditional statements of the templates, for reasons similar to those given above for the section/subsection access. A value of Yes means the variable can be in a conditional statement.

- Variable Description.

A brief explanation of how the value of the variable is assigned.

There are some unique features of the stage category variables which are noted here. These variables, which end with <...Cat> or <...CatName>, have six possible values. These variables can be represented in the templates as either numerical values or as named categories. If using these variables in condition statements, then make sure that the category value being checked against matches the value of the category as given below. For example, if checking if the category MINOR or higher, then a conditional statement may read as: ( <ObsCat> GT 0 ).

<u>Category Description</u>	<u>Category Name</u>	<u>Category Number</u>
Undefined	MSG	-1
No flooding	NONFLOOD	0
Minor	MINOR	1
Moderate	MODERATE	2
Major	MAJOR	3
Record	RECORD	4

Table B-1. Catalog of RiverPro Template Variables

Independent variables:

Note: These variables are independent of any forecast group or forecast point. Therefore, they are used in the header section and the summary prologue section (The <Day#> variables being the exception). The summary prologue section, unlike the main summary section, gives information pertinent to all forecast groups, not any individual groups.

<ProdId>

String      H      Yes

The full product identifier for the product being generated as specified in the product settings.

<ProdCateg>

String      H      Yes

The three character category name of the product generated, as specified in the product settings.

<CurDate>

Time      H      Yes

The current time, as given by the system clock.

<IssuanceNumber>

Integer      H      No

The issuance number determined by knowing the product being issued and then comparing it with the carryover data which contains issuance numbers for previous products.

<UGCListZ> <UGCListC>

String      H      No

The Universal Generic Codes (UGC) header codes for zones or counties, respectively. These codes consist of a list of UGCs, followed by the expiration time of the product. The list is assembled by combining the UGCs for each of the forecast points included in the product; the UGCs for each forecast point are specified in the database for the forecast point. A list of zone numbers or county numbers can be assembled.

<GrpsFPList>

String HS No

A list of the forecast groups, and their forecast points, for those groups and points that are included in the product. This is useful for the summary prologue section. It generates a string of the form: grpnameA at 1...2...3...grpnameB at 6...7...8...etc. If groups are named by river reaches, then this variable is in essence a listing of all affected rivers and their affected forecast points. This variable is supported for the generation of NWR/CRS products. \*\*\*

<GrpList>

String HS No

A list of the forecast groups that are referenced in the product. This list is formed by concatenating the forecast group names, where a group is included if it has at least one forecast point referenced in the product. The listing makes use of the ellipsis (...) to concatenate the items in the list. This variable is supported for the generation of NWR/CRS products.

<CountyList>

String HS No

A list of the counties that are considered in the product. This list is formed by concatenating the county names for those counties associated with the forecast points included in the product. Note that multiple counties may be associated with a single forecast point. The listing makes use of the ellipsis (...) to concatenate the items in the list. This variable is supported for the generation of NWR/CRS products.

<RiverList>

String HS No

A list of the rivers that are referenced in the product. This list is formed by concatenating the river names for the forecast points that are included in the product. The listing makes use of the ellipsis (...) to concatenate the items in the list. This variable is supported for the generation of NWR/CRS products.

<Day0> <Day1> <Day2> <Day3> <Day4> <Day5>

Time T No

These variables represent the time for the today, tomorrow, the next day, etc. They are useful in the MISCWRT keyword for headings for the tabular section.

Forecast group variables:

Note: These variables are intended for use in the main summary section, but not the summary prologue section.

<GrpId> <GrpIdName>

String S Yes/No

The id/name of the forecast group.

<GrpMaxCurCat> <GrpMaxCurCatName>

Integer/String S Yes/No

The current observed category number/name for the given forecast group. This is assigned the value of the maximum observed category number/name of all the forecast points in the group.

<GrpMaxFcstCat> <GrpMaxFcstCatName>

Integer/String S Yes/No

The maximum forecast category number/name for the given forecast group. This is assigned the value of the maximum forecast category number/name of all the forecast points in the group.

<GrpOMFCat> <GrpOMFCatName>  
Integer/String S Yes/No  
The maximum category number/name of the observed and forecast categories for the given group. This is assigned the value of the maximum category number/name of all the forecast points in the group, where each forecast point's maximum value if the maximum of the observed or maximum forecast category.

<GrpObsFound> <GrpFcstFound>  
Integer S Yes  
A flag indicating at least one observed/forecast stage value was processed for the forecast group.

<GrpFPList>  
String S No  
A concatenated list of forecast points, in the current forecast group, which are included in the product. The listing makes use of the ellipsis (...) to concatenate the items in the list. This variable is supported for the generation of NWR/CRS products.

<NumGrps>  
Integer S Yes  
The number of groups included in the product.

#### Forecast point's E-19 variables

<Id> <IdName>  
String TRIC Yes/No  
The location identifier/name.

<River>  
String TRIC No  
The name of the river on which the location is located.

<Reach>  
String TRIC No  
A description of the river reach which the location represents.

<County>  
String TRIC No  
The name of the county within which the location is located.

<StateId>  
String TRIC No  
The two-character abbreviation of the state within which the location is located.

<StateName>  
String TRIC No  
The name of the state within which the location is located.

<Proximity>  
String TRIC No  
A word, such as "AT" or "NEAR", indicating the proximity of the location to its descriptive name.

<FldFlow>  
Float TRIC Yes  
The flood flow for the location. Note that there is currently no variable available for action flow.

<FldStg>  
Float TRIC Yes  
The flood stage for the location.

<BankStg>  
Float TRIC Yes  
The bankfull stage for the location.

<WStg>  
Float TRIC Yes  
The warning stage for the location.

<ZDatum>  
Float TRIC Yes  
The zero datum value for the location.

<MinCatVal> <ModCatVal> <MajCatVal> <RecCatVal>  
Float TRIC Yes  
The stage or discharge values that define the lower limit of the minor, moderate, major, near-record, and record categorical stages.

<ImpactStg>  
Float I No  
The stage associated with the selected impact statement, determined automatically or specified explicitly.

<ImpactDescr>  
String I No  
A description of the impact for the associated impact stage.

<HistCrestDate>  
Date C No  
The date associated with the selected historical crest, determined automatically or specified explicitly.

<HistCrestStg>  
Float C No  
The stage associated with the selected historical crest.

#### Forecast point stage variables

Note: For almost all “stage” variables given below, the variable actually uses either stage or discharge, depending upon which is the designated primary physical element for the forecast point. The “stage” variables that do not operate in this fashion are the “rise above” and “fall below” variables.

<ObsStg>  
Float TRIC Yes  
The most recent observed stage.

<ObsCat> <ObsCatName>  
Integer/String TRIC Yes/No  
The category number/name for the most recent observed stage.

<ObsTime>  
Time TRIC Yes  
The time of the most recent observed stage.

<MaxFcstStg>  
Float TRIC Yes

The maximum forecast stage.

<MaxFcstCat> <MaxFcstCatName>  
Integer/String TRIC Yes/No  
The category number/name of the maximum forecast stage.

<MaxFcstTime>  
Time TRIC Yes  
The time of the maximum forecast stage.

<OMFVal>  
Float TRIC Yes  
The maximum of current observed or maximum forecast.

<OMFCat> <OMFCatName>  
Integer/String TRIC Yes/No  
The category number/name of the maximum of the observed or maximum forecast stage.

<ObsStgTrend>  
String TRIC Yes  
The trend of the observed data is determined by comparing the most recent stage with a prior stage. To define the prior stage to use, the minimum and maximum values of the observed stage data, prior to the most recent stage, are determined. To be considered a maximum or minimum, the value must be greater than or less than, respectively, the current observed stage by at least 0.5 feet. This prevents small variations in the stage from dictating the computed trend, when what is more important is the larger scale trend. Once the maximum and minimum value are determined, then the most recent of these two values are used as the prior stage. This ensures that the most recent trend of the data are used, since the stage may be rising and falling and rising, etc. The resulting comparison yields one of the following values: "rising", "steady", or "falling". If not enough data are available to make a determination, the value is "unknown".

<StgTrend>  
String TRIC Yes  
This variable is the same as the observed trend except that it considers the overall trend and factors in the forecast data trend. It is determined by comparing the most recent stage with a forecast stage. If no forecast stage is available, the overall trend is set to the observed trend. The forecast stage value used is the earliest of either the maximum or minimum stage value which is outside a stage window of 0.5 feet, centered on the most recent stage. If no observed data are available, then the value is determined by comparing the first forecast value with the earliest of the maximum or minimum values outside the stage window, and that is later than the first forecast value.

<SpecObsStg>  
Float TR No  
A specific observed stage value. The time of the specific stage value to use is defined via the SPECTIME template keyword.

<SpecObsStgTime>  
Time TR No  
The time of a specific observed stage value.

<SpecFcstStg>  
Float TR No  
A specific forecast stage value. The time of the specific stage value to use is defined via the SPECTIME template keyword.

<SpecFcstStgTime>  
Time TR No  
The time of a specific forecast stage value.

<ObsCrestStg>

Float TRIC Yes

The most recent observed crest stage. The crest is defined by a stage value that is greater than the preceding and following stage values. The algorithm can detect sustained crests, where the stage rises to a crest level, remains there for some duration, then eventually drops below the crest level. If multiple observed crests exist, the most recent one is logged, regardless of whether other crests are higher than it. The algorithm is able to consider observed and forecast data together so that if the last observed value is the crest, then this will be correctly identified as a crest.

<ObsCrestTime>

Time TRIC Yes

The time of the observed crest.

<FcstCrestStg>

Float TRIC Yes

The earliest forecast crest stage. The algorithm is able to consider observed and forecast data together so that if the first forecast value is the crest, then this will be correctly identified as a crest.

<FcstCrestTime>

Time TRIC Yes

The time of the forecast crest.

<MaxObsStg24> <MaxObsStg06>

Float TRIC Yes

The maximum observed value in the previous 24/06 hours.

<ObsRiseFSTime> <ObsFallFSTime>

Time R Yes

The time that the observed stage rises/falls to or above/below the flood stage. This time is determined by checking observed stage values and checking if two consecutive stage values are such that the earlier is equal to or below/above the flood stage and the later is equal to or above/below the flood stage. A simple linear interpolation is used to determine the precise time. In the event of multiple observed rise above flood stage events, the most recent event is associated with this variable.

<FcstRiseFSTime> <FcstFallFSTime>

Time R Yes

The time that the forecast stage rises/falls to or above/below the flood stage. In the event of multiple forecast rise above flood stage events, the earliest event is associated with this variable. The algorithm considers the special case of a pass-thru flood stage occurring between the most recent observed value and the first forecast value.

<ObsFSDeparture> <FcstFSDeparture>

Float TR Yes

The difference value obtained when subtracting the flood stage from the current observed/maximum forecast stage.

<ObsFSDepartureA> <FcstFSDeparture>

Float TR Yes

The absolute value of the difference between the flood stage and the current observed/maximum forecast stage.

<NumObsStg> <NumFcstStg>

Integer R Yes

The number of observed/forecast stage values.

# Appendix C. Product Settings Files

The product settings used by RiverPro to generate a product are stored in files. They are read by RiverPro and its user interface then allows customization of the information and, if desired, the settings can be saved to a file for future use. The user of RiverPro does not need to be concerned with the format of the settings file because RiverPro provides a complete interface to the settings information.

Nonetheless, the settings file format is important and should be documented for reference purposes. This appendix provides a detailed description for all the information supported in the product settings. The information is broken down into blocks, where each block defines the settings for a given section/subsection of the product. There is one additional block for the product-wide settings that do not apply to a particular product section/subsection. If a particular setting is not provided, then RiverPro assigns default values. As a general rule, it is recommended that the information always be provided in the file so as not to rely on the default values.

The information can be either upper or lower case. The file allows for comment symbols by specifying a "#" sign in the first column. Otherwise, each record is identified by a keyword that is terminated by a colon. A sample settings file is given in Appendix D.

A list of the product settings is displayed in the main window of the RiverPro interface. The user can control the order of this list by specifying a numeric value, enclosed in brackets, on the first line of the settings file. The first line is a comment line which is not used to control any product generation settings. It is used to order the list given in the interface, and also contains a descriptive string that is displayed in the user interface to help identify the product settings specific purpose. The user can specify the numeric sort value using the RiverPro interface. If no sort number is given, then the default sort order is used which separates the OUP (i.e. non-NWR) entries from NWR entries, with all OUP products listed first, even if they are not one of the 4 primary product categories, followed by the NWR entries.

## C.1 Common Keywords

Each block must contain a pair of the following keywords that begin and end the definitions for the block of settings. The block must begin with SECTION or SUBSECTION and end with ENDSECTION or ENDSUBSECTION.

### SECTION:

Indicates the beginning of a block of information for a product section. The required keyword value is the name of the product section given as either

"PRODUCT", "SUMMARY", "BASIS", "TABULAR", "POINT\_SPECIFIC", or "CALL\_TO\_ACTION".

**ENDSECTION:**

Indicates the end of a block of information for a product section. No keyword value is required.

**SUBSECTION:**

Indicates the beginning of a block of information for a point-specific subsection. The required keyword value is the name of the subsection given as either: "DATA\_ROUNDUP", "IMPACT\_STATEMENT", or "HISTORICAL\_COMPARISON".

**ENDSUBSECTION:**

Indicates the end of a block of information for a product subsection. No keyword value is required.

Also, every section/subsection block requires the name of a template(s).

**TEMPLATE(S):**

Specifies the name of the template to use for the section/subsection. For all sections/subsections except the call-to-action section, the keyword is TEMPLATE and only one template name may be given. For the call-to-action section, the keyword is TEMPLATES and up to five names can be given.

## **C.2 Product Keywords**

For the product block, the file contains the following keywords, in addition to the SECTION, TEMPLATE, and ENDSECTION keywords mentioned earlier:

**PRODUCT\_ID:**

Specifies the 8-10 character product identifier for this product, which follows the NWS format of CCCCNNNXXX. This is used by the <ProdId> variable. For official products, it is used to identify the product when logging the product issuance to the database. For NWR/CRS products, it is used to help determine which transmitter towers to send the product. This is explained in detail in the section discussing NWR/CRS product generation.

**PRODUCT\_TYPE:**

Specifies the three character identifier for the NNN product category portion of the product. This NNN should match the NNN portion of the identifier given

with the PRODUCT\_ID keyword. It is used in the <ProdCateg> variable and used to track issuances of RiverPro products.

**NWR\_FLAG:**

Specifies whether this product is intended for distribution via the NOAA Weather Radio Console Replacement System (NWR/CRS). This setting plays a major role in how the product is generated. The keyword value for this setting are either "YES" or "NO".

**INCLUDE\_SECTIONS:**

Specifies the sections to include in the product and their order in the product. One or more of the following keyword values are recognized: "PRODUCT", "SUMMARY", "BASIS", "TABULAR", "POINT\_SPECIFIC", and "CALL\_TO\_ACTION". For each of the product sections listed, its settings should be given later in the file.

**INCLUDE\_SUBSECTIONS:**

Specifies the point-specific subsections to include and the order in which the subsections are included within the point-specific section. One or more of the following keyword values are recognized: "DATA\_ROUNDUP", "IMPACT\_STATEMENT", or "HISTORICAL\_COMPARISON". For each of the product subsections listed, its settings should be given later in the file.

**INCLUDE\_POINTS:**

Specifies the forecast points that should be included in the product. The keyword values consist of either the special value "ALL" or a list of forecast point identifiers.

**TEXTCASE:**

Specifies the case of the text included in the product. The keyword value is either "FORCEUPPER" or "MIXED".

**GRPFP\_ORDER:**

Specifies the method by which the included forecast points are ordered within the summary, tabular, and point-specific sections. For the tabular section, the order is used for only those forecast points that are not explicitly ordered in the tabular template. For the summary section, only the forecast groups are ordered so any rules regarding ordering of forecast points do not apply. One of the following methods is used:

**"DEFAULT"**

Order the forecast points based on their default order defined in the database.

"GROUP\_DEFAULT"

Order the forecast points in their groups by the forecast point's maximum category (i.e. the maximum of the observed or maximum forecast category) value and then within each forecast group, by their default order given for the forecast point.

"GROUP\_FP"

Order the forecast points by their maximum category, and within each forecast group, order the forecast points by their maximum category.

### C.3 Header Section Keywords

For the header section, the SECTION and ENDSECTION keywords are always defined. The other keywords used depend on whether the settings are being defined for a official product or a NWR/CRS product, as defined by a Product keyword discussed above. If creating an official product, then the keyword TEMPLATE is used. If creating a NWR/CRS product, the keyword NWR\_HEADER is used.

NWR\_HEADER:

This keyword defines all the attributes associated with the header generated for the NWR/CRS products. There are seven values that are required for this keyword, each separated by a space or comma. The 7 fields are given in the following order:

Message Format -	A five-character descriptor that must match the CRS message format. Currently, this value must be set to T_ENG.
Periodicity -	An integer value that must be between 0 and 1440. It represents the period in minutes for transmission of messages based on time.
Active Switch -	A one-character field set to either A (active), I (inactive), or X (synthetic speech override).
Delete Switch -	A one-character field set to either D (delete) or S (save).
Confirmation Switch -	An integer value set to either 1 (confirmation requested) or 0 (confirmation not requested).
Interrupt Switch -	An integer value set to either 1 (interrupt requested) or 0 (interrupt not requested).
Alert Tone Option -	A variable-length string with either the value "BOTH" (implement Alert Tone and NWR SAME activation), "SAME_ONLY" (implement NWR SAME activation), or "NEITHER"

(implement neither mechanism).

#### **C.4 Summary Section Keywords**

For the summary block, the following keyword is supported, in addition to the SECTION, TEMPLATE, and ENDSECTION keywords discussed earlier:

**INCLUDE\_PROLOGUE:**

Specifies whether to include the summary prologue section in the product. The keyword value is either “YES” or “NO”.

**HEADER\_TEMPLATE:**

Specifies the name of the template to use for the summary prologue section. The name derives from the notion that the prologue is a “header” of the summary section. Do not confuse this “header” with the product header section.

**SPECIAL\_TEMPLATE:**

Specifies that a unique template be used for the given forecast group. The keyword values are the forecast group id and the name of the template.

#### **C.5 Tabular Section Keywords**

For the tabular block, only the SECTION, TEMPLATE, and ENDSECTION keywords mentioned earlier are supported.

#### **C.6 Data Roundup Subsection Keywords**

For the data roundup block, the file supports the following keyword, in addition to the SUBSECTION, TEMPLATE, ENDSUBSECTION keywords listed earlier:

**SPECIAL\_TEMPLATE:**

Specifies that a unique template be used for the given forecast point. The required keyword values are the forecast point id and the name of the template.

#### **C.7 Impact Statement Subsection Keywords**

For the impact statement block, the following keywords are supported, in addition to the SUBSECTION, TEMPLATE, and ENDSUBSECTION keywords listed earlier:

**REFERENCE\_STAGE\_TYPE:**

Specifies the reference stage to use in defining the stage window for the forecast point. The required value is one of the following fields:

"CUROBS"

Use the maximum observed stage value.

"MAXFCST"

Use the maximum forecast stage value.

"MAX"

Use the maximum of the current observed or maximum forecast value.

**STAGE\_WINDOW:**

Specifies the offsets from the reference stage to use when defining the lower and upper limits of the stage window. A negative numeric value is required for the lower offset.

**SEARCH\_TYPE:**

Specifies the type of search to perform when trying to find an impact statement. For all of the modes, the FLDSTAGE\_FILTER option applies and may limit which impact stages are considered. One of the following values is required:

"CLOSEST\_IN\_STGWINDOW"

Use the impact stage that is closest to the reference stage and within the stage window.

"HIGHEST\_IN\_STGWINDOW"

Use the highest impact stage that is within the stage window.

"BELOW\_UPPER\_STGWINDOW"

Use all the impact stages that are within the stage window.

**FLDSTAGE\_FILTER:**

Specifies the maximum distance below the flood stage which an impact statement may be in order for it to be considered.

## **C.8 Historical Comparison Subsection Keywords**

For the tabular block, the following keywords are supported, in addition to the SUBSECTION, TEMPLATE, and ENDSUBSECTION keywords listed earlier:

REFERENCE\_STAGE\_TYPE:

Specifies the reference stage to use in defining the stage window for the forecast point. The required value is one of the following fields:

"CUROBS"

Use the maximum observed stage value.

"MAXFCST"

Use the maximum forecast stage value.

"MAX"

Use the maximum of the current observed or the maximum forecast value.

STAGE\_WINDOW:

Specifies the offsets from the reference stage to use when defining the lower and upper limits of the stage window. A negative numeric value, followed by a positive numeric value, must be specified.

TIME\_WINDOW:

Specifies the number of "lookback" years for determining the time window. The required value is a numeric value.

SEARCH\_TYPE:

Specifies the type of search to perform when trying to find an historical crest. One of the following values is required:

"RECENT\_IN\_WINDOWS"

Use the most recent crest that is within the stage window and the time window.

"CLOSEST\_IN\_WINDOWS"

Use the crest closest to the reference crest that is within both the stage window and the time window.

"RECENT\_IN\_STGWINDOW"

Use the most recent crest that is within the stage window.

"CLOSEST\_IN\_STGWINDOW"

Use the crest closest to the reference stage and within the stage window.

"HIGHEST\_IN\_STGWINDOW"

Use the highest crest that is within the stage window.

FLDSTAGE\_FILTER:

Specifies the maximum distance below the flood stage which an impact statement may be in order for it to be considered.

## **C.9 Call-to-Action Section Keywords**

For the call-to-action section, only the SECTION, TEMPLATES, and ENDSECTION keywords, that are discussed earlier, are supported.

# **Appendix D. Data Accessed by RiverPro**

This Appendix describes the input data sets accessed by the RiverPro application. There are two sources of data, the relational Informix-based database referred to as IHFS, and text files.

## **D.1 File-Based Input**

Two types of text files are used to control the content of the generated products:

- 1) the product settings, and
- 2) the template files.

These files must be set up before execution of RiverPro, although RiverPro allows interactive storing of customized product settings. A third text file is used for the time-of-day phrasing feature when formatting time variables in the templates. Each is discussed further in the following sections.

The file formats are designed to be flexible, although they do have some restrictions. All file information must not only use the proper format and structure, but the information itself must also be valid. This is particularly true for numeric and date fields. A problem which can occur is the use of blank records in a file; do not include blank records in the files. Verify that text begins in the first column of each record; do not use a blank character for the beginning of a record. The instances where the comments are allowed are noted below. Because some data fields in certain files are rather lengthy and may extend past 80 columns, certain records can be terminated by a continuation symbol ("&") and continue on the next record in the file. The format of the template files and product settings are discussed in Appendix A and C, respectively.

### **D.1.1 Product Settings files**

These are the product settings that provide the high level control of the product content. The primary information contained within this file is the name of the template(s) to use for product sections/subsections. The file used for a given execution is determined automatically by RiverPro, or can be specified interactively. A default set of these files are provided. The instructions embodied in these files can be customized and new data sets can be saved.

### **D.1.2 Template files**

The template files contain phrases for each of the product sections/subsections - i.e. the header, summary, basis, tabular, and call-to-action sections, and the data roundup, impact statement, and crest comparison subsections. The files are named as either: header, summary, basis, tabular, cta, roundup, impact, and compare, respectively; and have a suffix of “.tpl”. These files are located in the following directory:

`/awips/hydroapps/whfs/local/data/app/riverpro.`

### **D.1.3 Time-of-day phrase file**

Contains the phrases associated with the usage of the template time format specifier T\_PHRASE. The time phrase file is located in following location:

`/awips/hydroapps/whfs/local/data/app/riverpro/timephra.dat`

This file contains the specifications for the time phrase formats that are used when the T\_PHRASE format is given for a time type template variable. When the T\_PHRASE format is specified, this file is referenced and the format specified in the file for the given time period, if one is available, is used to generate the time phrase.

The file contains a single record for 3 days worth of 3-hour periods; the 3 days that are covered are yesterday, today, and tomorrow. Therefore, the file has 24 records [= 3 days x (24 hrs / day) x (1 record / 3 hrs)]. Each record begins with a keyword identifying the time period for which the format that follows it applies. These keywords are not used in any way; they are there to allow visual identification of the formats with the time periods. The format that follows uses a fixed string that supports variable substitution. The only supported variable is named <Weekday> and its value is the weekday as in MONDAY, TUESDAY, etc. This variable is supported for the time phrase feature only; it is not a template variable.

When the T\_PHRASE format is used for a time variable, the time period which includes the time value is retrieved and, if instructed, the weekday value is inserted and the

resulting string is then inserted as the formatted value of the time variable. If the time value is not for the three days covered in the file, then a formatted string is automatically formed instead. This default string includes the day of the week and a descriptive time of the day based on 6-hour durations. This divides a 24-hour day into 4 phrases of the form: EARLY tuesday MORNING, tuesday MORNING, tuesday AFTERNOON, and tuesday EVENING.

A sample template file is given below.

```
00-03: AFTER MIDNIGHT YESTERDAY
03-06: EARLY YESTERDAY
06-09: YESTERDAY MORNING
09-12: YESTERDAY LATE MORNING
12-15: YESTERDAY EARLY AFTERNOON
15-18: YESTERDAY AFTERNOON
18-21: YESTERDAY EVENING
21-24: YESTERDAY LATE EVENING
00-03: AFTER MIDNIGHT THIS MORNING
03-06: EARLY THIS MORNING
06-09: THIS MORNING
09-12: LATE THIS MORNING
12-15: THIS AFTERNOON
15-18: LATE THIS AFTERNOON
18-21: THIS EVENING
21-24: TONIGHT
00-03: EARLY <Weekday> MORNING
03-06: <Weekday> MORNING
06-09: <Weekday> MORNING
09-12: LATE <Weekday> MORNING
12-15: <Weekday> EARLY AFTERNOON
15-18: <Weekday> AFTERNOON
18-21: <Weekday> EVENING
21-24: <Weekday> BEFORE MIDNIGHT
```

Figure D-1 Sample Time Phrase File

## D.2 IHFS Database

The Integrated Hydrologic Forecast System (IHFS) database provides time-series data, carryover data, and static Form E-19 data to RiverPro. The remainder of this appendix summarizes the parametric and meta-data information used by the RiverPro application. The description is intended for use by those managing the data in the Integrated Hydrologic Forecast System (IHFS) database, in part to ensure that the data are defined in a manner usable by RiverPro. The WHFS HydroBase application provides a user interface to the management of the IHFS database. This appendix does not discuss the interface in detail nor does it discuss how RiverPro uses hydrometeorological data such as stage and precipitation data.

Throughout the summary below, specific database table names are given for reference purposes. Because HydroBase provides a data interface, the user need not be concerned with the actual table and field names. For those interested, the database tables and fields are described, complete with data dictionaries and entity-relationship diagrams, in documents in the Office of Hydrologic Development web page.

## D.3 Definition of RiverPro Parameters

There are two tables which are used by RiverPro to control certain high-level features of its operations. These two tables are described below.

The Admin table is used by RiverPro to determine the identifier for the hydrologic service area for which it is creating products. This field “hsa” in this table is used for information purposes only, although in future builds it is expected to play a major role in handling the duties associated with service backup of neighboring offices.

The RpfParams table is used by RiverPro to define various parameters that control RiverPro processing. The following fields are defined in this table:

obshrs -	Integer value giving the number of hours previous to the current time within which to consider observed data.
fcsthrs -	Integer value giving the number of hours forward from the current time within which to consider forecast data.
missval -	Character field defining the string indicating missing data values.
misscat -	Character field defining the string that indicates missing values for the stage category.
misstim -	Character field defining the string that indicates missing time values.
rvsexphrs -	The default expiration time, given as the number hours from the current time, for RVS products
flsexphrs -	The default expiration time, given as the number hours from the current time, for FLS products
flwexphrs -	The default expiration time, given as the number hours from the current time, for FLW products
fcst_typesrc -	The zero or two-character field used to indicate which type-source code to use for forecast stage data; the value is either blank (use the default implied by the IngestFilter definitions), FF (use QPF-based forecasts), or FZ (use non-QPF-based forecasts)
fcst_latest -	An integer switch indicating whether to use all forecast creation times or only the latest forecast time-series, when building the full stage forecast time series.
filter_qcrange-	An integer switch indicating whether to filter observed stage data by its quality control flag.

#### **D.4 Definition of Forecast Points**

The list of forecast points is extracted from the IHFS database by RiverPro for use in many RiverPro operations and features. Although RiverPro can support data for non-forecast points in the tabular section, the emphasis of the RiverPro is on forecast points. For a location to be considered a forecast point by RiverPro, the following

conditions must be met:

- 1) The location must be defined as a location by defining it in the Location table. In this table, the location table must be defined as being Active. Inactive locations are ignored.
- 2) The location must be defined as a river location by defining it in the RiverStat table.
- 3) The location must be defined as a forecast point by defining it in the RpfFcstPoint table. This table requires the forecast point to be assigned to a forecast group; forecast groups are defined in the RpfFcstGroup table.

A location is defined via the WHFS HydroBase application; click on the Location option from the menu bar on the main window and select either Add or Modify location. To define the entry as a river location, click on the RiverStation menu bar option in the main window and select River Gage. To define the river station as a forecast point, use the Forecast Point Assignment button in the River Gage window.

The RpfFcstPoint table defines the forecast points recognized by RiverPro. It also defines which forecast group the forecast point is contained.. A forecast point can only be included in a single forecast group. A forecast group may contain zero, one, or an unlimited number of forecast points. The table contains the following fields:

lid -	Identifier of forecast point.
group_id -	Identifier of forecast group containing the forecast point.
pe -	Two-character SHEF physical element code indicating which stage variable to use in RiverPro. This is useful when more than one stage variable has data for a given forecast point.
ordinal -	The ordinal value for the forecast point, used for controlling the order of the forecast points.

The RpfFcstGroup table specifies the forecast point groups recognized by RiverPro. It contains the following fields:

group_id -	The forecast group identifier.
group_name -	The forecast group name.
ordinal -	The ordinal value used for ordering the forecast groups.

## D.5 Data Fields Accessed by RiverPro

Once a location is recognized as a forecast point, information from many other tables containing associated data are accessed by the RiverPro application. A summary of these tables and their relevant fields is given below. The tables containing the dynamic operational data for the location are not covered.

For some of these fields, a detailed explanation of their use is given, due to the importance of the field in RiverPro processing. For each table, only those fields of particular importance to RiverPro are listed. The field name is given first, followed by a description of the field.

Most of these fields are available for use as a template variable within RiverPro. For text fields, the string value specified in the database may be inserted directly into the generated product through use of the template operations, so it is imperative that the string be worded well and in the appropriate context. This is very important; example template usages are given below for some of these cases.

### Location table:

- name - Name of the location.
- county - County for the location.
- state - State for the location.

### RiverStat table

- stream - River or stream name.
- bf - Bankfull stage.
- wstg - Action stage.
- por - Period of record.
- fs - Flood stage. This value is not used in conjunction with the categorical stage determinations, although it is typically equal to the minor flood category. Certain template variables are derived using the flood stage.
- zd - Zero datum level for gage.

### Crest table:

RiverPro inserts the crest stage and crest date when generating the historical crest comparison subsection of the FLS or FLW products. RiverPro automatically recommends a reference crest stage/date that applies to the current situation, and

also displays the crest information and allows manual selection of the crest. The maximum crest value is a special crest in its use by RiverPro; it is considered to be the record stage and is used to define the record stage category threshold.

stage - Crest stage.

datcrst - Crest data.

#### Descrip table:

proximity -

Describes the proximity of the exact location of the forecast point with reference to its name. Can be used in the RiverPro templates as the lead-in to the forecast point name. A typical data roundup template could contain the phrase: "<Proximity> <IdName>, THE STAGE IS...". For example, if "AT" is the value of the proximity field for the forecast point named "MAGSBURG", the generated phrase would be: "AT MAGSBURG, THE STAGE IS...".

reach -

Description of river reach. Can be used in the RiverPro templates to describe the affected river reach. For example, a data roundup template could contain the phrase: "FLOODING WILL OCCUR <Reach>"; the resulting phrase might read: "FLOODING WILL OCCUR BETWEEN THE HIGHWAY 61 BRIDGE UPSTREAM AND THE TOWN OF ETHANITE DOWNSTREAM". This reach description should not include information that belongs in an impact statement; it should describe geographic areas, not the impact on those areas.

#### Floodcat table:

minor, moderate, major -

Defines the value of the categorical stages. These values are used in RiverPro to determine the categorical stage values, which play an important role in the algorithm that determines the recommended product and forecast points to include. The categorical stages also have many implications for template phrases and conditions within RiverPro. Typically, the minor stage is set equal to the flood stage. The stage values should be defined in increasing order although the record stages, determined by the maximum crest stage defined in the Crest table, may be less than the major stage for locations that have a short period-of-record.

#### Floodstmt table:

The impact statement information is used in the impact statement subsection of the FLS and FLW products, provided that the impact stage/statement variables are specified in the template. RiverPro automatically recommends an impact stage/statement that applies to the current situation, and also displays impact statements and allows manual selection of the impact stage(s).

stage -

The stage for the corresponding impact. Note that this is an absolute value and does not in any way imply a stage range.

datestart -

Start date for which the corresponding impact statement applies, given as the month and the day.

dateend -

Ending date for which the corresponding impact applies, given as the month and day.

statement -

The impact statement. A typical usage in the impact subsection template is to define the phrase: "At <ImpactStg> FEET, <ImpactDescr>", where the resulting phrase may read: "AT 20.0 FEET, THE FOLLOWING AREAS ARE INUNDATED...".

If mixed case text is to be used in the products, the text should be given in mixed case. RiverPro has the capability to convert mixed case to upper case, but it cannot convert upper case to mixed case. Therefore, if there is any chance that mixed case will be used in the future, specify the text in mixed case. The wording of the impact statements must agree with the context defined by the template phrase. All impact statements for all locations should be given in a similar context. Some guidelines for defining impact statements are:

- 1) Do not reference the corresponding flood stage value as this is already defined by the associated impact stage.
- 2) Do not reference the forecast point name unless appropriate, as this is already defined by the associated location identifier.
- 3) Do not reference the departure from flood stage for the current impact stage as this is available thru other means in the template processing and because the flood stage may be changed someday.
- 4) Present the impact in the active sense, not in the past, present, or future tense. If this is not practical, it is probably best to use the present tense. Use phrases such as "MAIN STREET FLOODS...", rather than "MAIN STREET WAS FLOODED", "MAIN STREET IS FLOODED...", or "MAIN STREET WILL BE FLOODED", etc..
- 5) Be thoughtful when inserting implied pauses or terminators such as "...",

- "-", etc.
- 6) Do not reference historical floods associated with the impacts. This information can be conveyed in most cases via the historical crest comparison subsection.

#### Zone and County Tables:

The EligZon and Counties tables contain a list of the zones and counties that are defined in the IHFS database, respectively. These tables should include all zones and counties within the service area of the office, but they can include other zones and counties also. The ZoneNum and CountyNum table define the zones and county number(s), respectively, to be associated with a given forecast point. If the forecast point is included in the product, RiverPro uses the number(s) to construct the UGC.

#### NOAA Weather Radio Tables:

The NWRTransmitter table lists all the NWR towers of interest to the office. This should include all towers whose signal area covers some portion of the office's area. RiverPro makes use of the tower's product code when determining the product identifier of products generated for the NWR/CRS. The CountyTransmit table defines the geographical relationship between the NWR towers and the counties. This is used to determine the Listening Area Codes contained in the header of NWR/CRS products.

#### Product Logging Tables:

When a product gets issued by RiverPro, a copy of the product is stored in the TextProduct table. The user can control how many versions of a given product to keep by defining the text product purge parameters in the table PurgeProduct.

Also stored after each product issuance is a set of carryover information that is used in the RiverPro recommendation algorithm. For each forecast point, the product category and observed and maximum forecast stage at the time of the product issuance, are stored in the table. The management of the data in this table is handled internally by RiverPro.