

Flash Flood Guidance Product Generator (PRODGEN)

1. Description of Algorithm

PRODGEN in CHPS is a ported version of PRODGEN in NWSRFS. It is used to

- a. Generate SHEF formatted text files (FFH and FFG)
- b. Generate a grib1 formatted grid file (FFG values on an HRAP grid)

Sample SHEF formatted FFG text product

```
ZCZC NEWFFGOHX CS
TTAA00 KORN DDHHMM
```

```
NATIONAL WEATHER SERVICE
LOWER MISSISSIPPI RIVER FORECAST CENTER, SLIDELL LA
957 AM CDT TUE MAR 23 2010
```

```
FLASH FLOOD GUIDANCE FOR CWA.....NASHVILLE TN
```

```
INCHES OF RAINFALL FOR SPECIFIED DURATIONS REQUIRED TO PRODUCE
FLASH FLOODING IN ANY SMALL STREAM WITHIN FORECAST ZONES.
```

```
LOWER
```

```
AMOUNTS MAY CAUSE FLASH FLOODING IN URBAN OR MOUNTAINOUS
AREAS.
```

```
.B SIL 090715 Z DH12/DC1003231457 /DUE/PPHCF/PPTCF/PPQCF
:IDENTIFIERS ARE STATE ID, Z FOR ZONE, NWS-MAR ZONE NUMBER.
```

```
:
```

```
...STATE DURATION
```

```
:IDENT 1HR 3HR 6HR ZONE NAME
```

```
:=====
```

```
:
```

```
.....TENNESSEE
```

```
:
```

```
TNZ075 1.8/ 2.2/ 2.9 :BEDFORD
TNZ022 1.8/ 2.3/ 2.9 :BENTON
TNZ077 1.8/ 2.3/ 2.8 :COFFEE
TNZ066 2.0/ 2.5/ 3.1 :CUMBERLAND
TNZ095 1.8/ 2.3/ 3.0 :GILES
TNZ079 1.9/ 2.5/ 3.1 :GRUNDY
TNZ057 1.9/ 2.4/ 3.1 :HICKMAN
TNZ023 1.8/ 2.3/ 2.9 :HOUSTON
TNZ024 1.9/ 2.4/ 3.0 :HUMPHREYS
TNZ094 1.9/ 2.4/ 3.1 :LAWRENCE
TNZ058 2.0/ 2.6/ 3.3 :LEWIS
TNZ061 1.8/ 2.3/ 2.9 :MARSHALL
TNZ060 1.9/ 2.4/ 3.1 :MAURY
TNZ056 1.9/ 2.4/ 3.1 :PERRY
TNZ093 2.0/ 2.6/ 3.3 :WAYNE
.END
```

2. Utility Parameters

TextProductGenerator uses a single parameter file (in FEWS xml format) to store the static parts of the products' configurations.

Name	Type	Required [Yes/No]	Comment
TEXT_PRODGEN	String	No	Group name for text information
PROD_PRODGEN	String	Yes	Group name for product information
LID_HNAME_SNAME_PRODGEN	String	No	Group name for headwater/stream name information, include LID_HNAME_SNAME_TABLE
LID_HNAME_SNAME_TABLE	String	No	Table name contains three columns – PRODGEN_LOCATION_ID, PRODGEN_HEADWATER_NAME, and PRODGEN_STREAM_NAME
FORECASTER_PRODGEN	String	Yes	Group name for forecaster duty information
FORECASTER_DUTY_FLAG	String	Yes	Four options are: INCLUDE_FORECASTER, FORECASTER_NOT_INCLUDE, INCLUDE_OFFICE, and INCLUDE_OFFICE_FORECASTER
COMMS_HEADER_END	String	Yes	Two options are: COMMS_AWIPS and COMMS_AFOS
PHYSICAL_ELEMENTS	String	Yes	Two options are: PP_PHYSICAL_ELEMENT and PF_PHYSICAL_ELEMENT
YEAR_DATE_FORMAT	String	Yes	Two options are: YY_DATE_FORMAT and YYYY_DATE_FORMAT
FORECASTER_TABLE	String	No	Contain forecaster initials and forecaster name
GROUP_PRODUCT_PRODGEN	String	No	Group name for a group of products
GROUP_PRODUCT_OUTPUT_FILE	String	No	Two options are: ONE_PRODUCT_PER_FILE and ALL_PRODUCT_ONE_FILE
LID_ZONE_PRODGEN	String	No	Group name for zone information, it contains LID_ZONE_TABLE
LID_ZONE_TABLE	String	No	Table name includes two columns – PRODGEN_LOC_ID and PRODGEN_ZONE_NAME

3. Utility States

ProductGenerator does not use states.

4. Utility Time Series

INPUT TIMESERIES:

Time Series Type	Internal Model Units	Time Step	Missing Values Allowed	Required [Yes or No]
Flash Flood Guidance for Headwaters (FFH)	Inches	1,3,6,12*,24*	Yes	No
Area-averaged Flash Flood Guidance (FFG)	Inches	1,3,6,12*,24*	Yes	No
Gridded Flash Flood Guidance (FFG)	Inches	1,3,6,12*,24*	Yes	No

Note: 12 and 24 hour time series data are optional. There is a longest duration value in each product, if the longest duration is 12, it means need to generate product with 1, 3, 6, 12hr FFH/FFG values, and if it is missing value for 12hr, then “-9.8” will be used.

5. Notes about configuring Model in FEWS workflow

TextProductGenerator uses a FEWS run_info.xml. It contains the following tags:

- startDateTime
- endDateTime
- lastObservationDateTime
- inputParameterFile
- inputTimeSeriesFile
- outputDiagnosticFile

It contains the following properties

- driver
- productId
- groupId

Where driver provides the main Java class to generate products, productId is mandatory if single product is generated while groupId is mandatory if multiple products are generated. However, both productId and groupId can not exist in the same time,

Below is an example runInfo.xml file

```
<?xml version="1.0" encoding="UTF-8"?>
.....
<timeZone>0.0</timeZone>
<startDateTime date="2009-07-15" time="12:00:00"/>
<endDateTime date="2009-07-26" time="12:00:00"/>
<time0 date="2009-07-15" time="12:00:00"/>
<lastObservationDateTime date="2009-07-15" time="12:00:00"/>
<workDir>Modules/prodgen/lmrfc_FFGBNA/work</workDir>
<inputParameterFile>Modules/prodgen/lmrfc_FFGBNA/input/params.xml</inputParameterFile>
<inputTimeSeriesFile>Modules/prodgen/lmrfc_FFGBNA/input/inputs.xml</inputTimeSeriesFile>
<outputDiagnosticFile>Modules/prodgen/lmrfc_FFGBNA/output/diag.xml</outputDiagnosticFile>
<properties>
  <int key="printDebugInfo" value="4"/>
  <string key="driver" value="ohd.hseb.ohdutilities.prodgen.ProductGeneratorDriver"/>
  <string key="outputDirectory" value="Modules/prodgen/lmrfc_FFGBNA/output"/>
  <string key="productId" value="PRODUCT_FFGBNA"/>
  <string key="forecasterInitials" value="aad"/>
</properties>
</Run>
```

The following FEWS configuration files are used for PRODGEN in CHPS

Workflow Configurations	
Configuration File	Description
Prodgen_*.xml	Definition of the logical sequences of running modules. 1 to N (where N represents the number of Prodgen locations) workflow files that executes its corresponding Prodgen module configurations
Module Configurations	
Configuration File	Description
Prodgen_*_*_Forecast.xml	Define the instance of modules. 1 to N (where N represents the number of Prodgen locations) module configurations used to execute the Prodgen algorithm for a given Prodgen location
Region Configurations	
Configuration File	Description
WorkflowDescriptors.xml	Used to provide a description of the workflows listed above
ModuleInstanceDescriptors.xml	Used to provide a description of modules listed above
Module Parameter Configurations	
ProdgenFFHFFG_PARAMS.xml	1 to N (where N represents the number of basins) parameter configurations containing the parameter information for each basin

Examples:

Configuration File

[Config File](#)

Parameter File

[Parameter File](#)

6. FEWS Adapter Used

The FFH utility uses the OHDfewsadapter to communicate. Information about this adapter can be found at [OHDfewsadapter](#).