



# Flood Warning Data Integrity Guide

Environment Agency

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## What is this document about?

This document is intended for users of the Environment Agency/Natural Resources Wales flood warning information.

This document explains the following:

- What are flood warnings and the context of the information held within them.
- How you should use the information and recommendations to retain the data integrity.

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## Who does this apply to?

Anyone that uses live flood warning data – either the live XML feed or Flood Alert/Flood Warning Polygons.

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# DATA GUIDE

## Section 1: FLOOD WARNINGS & FLOOD CODES

### 1.1: What are flood warnings?

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#### 1.1.1 Background

The EA Flood Warning Service operates in areas at risk of flooding from rivers and the sea. In select locations, the Environment Agency provides a groundwater flood warning/alert service in parts of England, targeted on communities that are known to be at risk in chalk catchments, and have previously experienced groundwater flooding. The groundwater warning service is located in the following Environment Agency Areas

- North East Thames
- West Thames
- Solent and South Downs
- Wessex
- Anglian Northern
- Kent and South London

At present we only raise awareness of the potential for surface water flooding through our web based flood awareness raising stage via the 3 Day Forecast.

EA flood warning codes were revised following the Pitt Report Review into the Summer 2007 flooding which recommended the move away from a 'one size fits all' Flood Warning Service.

Wide scale consultation supported the need for change and enabled the development of the codes and messages as described in this document.

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#### 1.1.2 Three warning stages

Flood warning codes are a shorthand term the EA uses to refer to three warning stages; each code has a strapline to indicate the general impact of flooding for each code:

- Flood Alert – Flooding is Possible. Be Prepared.
- Flood Warning - Flooding is Expected. Immediate Action Required.
- Severe Flood Warning – Severe Flooding, Danger to Life.

A 'Flood Warning No Longer in Force' message is also available.

Flood Alert and Flood Warning are used to pre-warn for different levels of impending flooding.

Severe Flood Warning is used when there is a significant risk to life or significant disruption to communities.

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### 1.1.3 Flood Service Coverage

**IMPORTANT!** The Environment Agency does not offer a Flood Warning Service in all locations at flood risk.

Flood Alerts are available for virtually all fluvial and coastal flood risk areas inland and coastal/tidal areas. In addition, Flood Alerts are also provided for groundwater flood risk in the following Environment Agency Areas:

- North East Thames
- West Thames
- Solent and South Downs
- Wessex
- Anglian Northern
- Kent and South London

Where it is technically feasible to do so we provide Flood Warnings in areas of highest risk. Therefore not all locations that receive Flood Alerts also receive Flood Warnings.

The Environment Agency improves and expands the Flood Warning Service each year so over time the number of locations serviced by Flood Warnings or coverage of the service increases.

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#### 1.1.4

##### Flood Warning icons

IMPORTANT! The Environment Agency has spent undertaken considerable research and engagement with communities to develop the Flood Alert/Flood Warning icons. **When using the Environment Agency Flood Alert, Flood Warning and Severe Flood Warning graphics, users should not change the colour or interpretation of the Flood Alert, Flood Warning and Severe Flood Warning Icons.**

#### 1.1.5

##### Flood Alert stage

The Flood Alert stage is to warn of the possibility of flooding and encourage people to be alert, stay vigilant and make early preparations for flooding.



#### 1.1.5.1

##### Flood Alert Usage

The Flood Alert stage is used to warn of the possibility of flooding. It is issued earlier than a flood warning, to give advance notice of the possibility of flooding, but before we are fully confident that flooding in Flood Warning Areas is expected.

A Flood Alert area can cover any of the following geographical areas:

- Catchment, sub-catchment or group of catchments;
- Stretch of coastline;
- A community.

The Flood Alert covers an area that is at risk from similar characteristics of flooding. Coastal locations may receive a Flood Alert for spray and overtopping for areas closest to the sea.

The EA aims to issue Flood Alerts in 'waking hours' and would rarely issue them before 6am or after 9pm.

The EA aims to provide between 2 and 12 hours lead time between a Flood Alert being issued and possible flooding occurring.

### 1.1.5.2

#### Impact on the affected area

A Flood Alert would be issued for flooding to low lying land and floodplain areas. The following impacts would be expected:

- Flooding of fields, recreation land and car parks;
  - Flooding of minor road infrastructure (A (non-trunk) B, C & Unclassified);
  - Farmland flooding (arable & pasture);
  - Spray/wave overtopping on coast;
  - Overland flow from rivers and streams;
  - Localised flooding due to heavy storms.
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### 1.1.6

#### Flood Warning stage

The Flood Warning stage is to warn of expected flooding and encourage people to take action to protect themselves and property.



#### 1.1.6.1

##### Flood Warning Usage

Flood Warnings are used to warn that flooding is expected and individuals and organisations should take immediate action to protect themselves and/or their property.

A Flood Warning can cover one of the following:

- A community;
- Stretch of river.

Flood Warnings cover an area that is at risk from similar characteristics of flooding. Flood Warnings can be issued at any time to provide as much lead time as possible.

The EA/NRW aim to provide a minimum of 1-2 hours lead time for Flood Warnings on rivers and 6 hours for tidal or coastal locations.

#### 1.1.6.2

##### Impact on the affected area

A Flood Warning would be issued when flooding to homes and/or businesses where any of the following impacts are expected:

- Flooding of homes;
  - Flooding of businesses;
  - Flooding of cellars and basements;
  - Flooding of underground rail stations and lines;
  - Flooding to roads with Major impacts;
  - Flooding to infrastructure;
  - Wave/spray overtopping;
  - Extensive flooding on floodplains (including caravan parks or campsites);
  - Flooding of major tourist/recreational attractions.
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### 1.1.7

#### Severe Flood Warning stage

The Severe Flood Warning stage is to warn people of a significant risk to life or significant disruption to communities and to encourage them to take action to protect themselves and follow the advice of the emergency services.



## SEVERE FLOOD WARNING

SEVERE FLOODING. DANGER TO LIFE.

### 1.1.7.1

#### Severe Flood Warning Usage

Severe Flood Warnings are used to warn of significant risk to life or significant disruption to communities caused by widespread or prolonged flooding where any of the following impacts are expected:

- Significant risk to life. Death or serious injury is a likely risk for people in the area.
- Significant disruption to communities. Loss of essential services which could result in harm to their health, or people are put at risk by the extent of flooding and the capability of emergency services and the authorities to cope with it.

### 1.1.7.2

#### Severe Flood Warning Use Criteria

A Flood Warning may have already been issued for the area affected. Severe Flood Warnings are reserved for exceptional flooding situations where there is significant risk to life or disruption to communities. They are not used when flooding of property is expected, unless at least one of the following criteria are met:

- Significant risk to life caused by: deep and fast flowing water (e.g. caused by significant overtopping of defences or sudden onset flooding from dam/defence failure).
- The presence of debris in the water that could cause death or injury.
- Potential/observed collapse of buildings/structures.
- Vulnerability of the population or their surroundings (e.g. deep/fast flowing water through a caravan park).
- Significant disruption such as: communities isolated by floodwaters with no obvious means of escape.
- Critical resources/infrastructure for communities disabled (e.g. no access to food, water, electricity).
- Emergency services and authorities unable to cope with large volumes of evacuees and rest centres at full capacity.
- Mutual aid/military support necessary or called upon.

#### 1.1.7.3

##### Severe Flood Warning Co-operation & Forecasting

Severe Flood Warnings are generally issued in consultation with multi-agency partners i.e. through Silver (Tactical) or Gold (Strategic) command centres attended by Local Authorities, the EA and Blue Light Services.

In many cases Flood Warnings will have already been issued and on site observations can then help determine if the conditions are likely to reach, or have reached a level where the Severe Flood Warning is needed.

Where an area responds very rapidly to rainfall, and it is known that flooding can very quickly lead to severe conditions, a Severe Flood Warning can be issued from an EA forecast, before flooding has begun.

In exceptional circumstances, after flood waters have receded, secondary effects such as damaged infrastructure, dangerous buildings and loss of services may justify issuing a Severe Flood Warning in an area where only a Flood Warning was in force.

#### 1.1.7.4

##### Impact on the affected area

A Severe Flood Warning may be issued if any one of the following impacts were expected/required:

- Deep and fast flowing flood water;
  - Debris in the water that could cause death or injury;
  - Potential/observed collapse of buildings/structures;
  - Large town/city isolated by flood waters with no obvious means of escape;
  - Critical resources/infrastructure for communities disabled (no access to food, water, electricity);
  - Large volumes of evacuees;
  - Military intervention.
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## Section 2: THE DATA/DATA FEED

### 2.1 XML Structure

#### 2.1.1

##### XML Data

EA Data Feed from the Flood Warnings Hub is presented as an XML file which can be considered a 'live feed' as the Data Feed provides information on active flood warnings, every 15 minutes, 24 hours a day, 365 days a year. Users of the data must ensure they are using the latest flood warning information at all times.

The XML files are relatively small in size. If all 3,000 Flood Alerts/Warnings were in force then the file size would be approximately 1MB. When no Flood Alerts/Warnings are in force the file size is around 1KB in size. A small scale event of 30 Flood Alerts/Warnings in force would result in an XML file of around 6KB in size. We would estimate about 3-4 small scale events per year. As an example one of the largest XML files created to date was 38.9KB and was generated on 21/01/2008.

Based on this information it is estimated that for 90% of the time, file sizes will be less than 5KB, for 9% of the time file sizes will be between 5KB and 10KB and 1% of the time file sizes will be between 11KB and 40KB.

It is expected that on average a flood event that would generate a 40KB file would occur once in every 3-5 years. Subscribers to the Data Feed must be able to accommodate file sizes in the range 0 – 1MB.

Each XML data 'packet' replaces the previous version, i.e.: it contains all relevant information at time of issue. The information will not undergo any transformation by the Distribution Hub and will present the XML data as it was provided by EA systems.

The Data Feed comprises the following information:

- 'fwacode' = Unique Target Area Code e.g. 101WAFDF10
- 'fwakey' = Unique code created by FWIS
- 'region' = Environment Agency Region
- 'area' = Environment Agency Area
- 'description' = Target Area Name e.g. "Blyth and Walpole Rivers and the Bramfield Watercourse".
- 't' or 'f' = Identifier whether a Tidal or Fluvial Alert or Warning.
- 'Flood Alert', 'Flood Warning', 'Severe Flood Warning' or 'Warning no Longer in Force' = Severity.
- Severity Value = '1' = Severe Flood Warning, '2' = Flood Warning, '3' = Flood Alert, '4' = Warning no Longer in Force.
- 'warning key' = Unique code created by FWIS
- 'time raised' i.e. 29 10 2010 19 13 = Time the Alert or Warning was raised.
- 'severity\_changed' = Date and time of most recent severity change.
- <rim\_english> = Internet Situation Message (see Section 2.1.4 of User Manual – Real Time Commentary).
- <rim\_welsh> = Welsh Translation of the above where applicable.
- <rim\_changed> = This is the time of the most recent change to the <rim\_english> or <rim\_welsh>

### 2.1.2

#### XML Schema

The XML Schema Version 2.5 for the Data Feed is as follows

```
fwis-internet-2_5
<?xml version="1.0" encoding="utf-8" ?>
<!--Created with Liquid XML Studio - FREE Community Edition
7.1.0.1135
(http://www.liquid-technologies.com)-->
<xs:schema attributeFormDefault="unqualified"
elementFormDefault="qualified"
xmlns:xs="http://www.w3.org/2001/XMLSchema">
<xs:element name="warningreport">
<xs:complexType>
<xs:sequence>
<xs:element minOccurs="0" maxOccurs="unbounded"
name="warning">
<xs:complexType>
<xs:sequence>
<xs:element minOccurs="0" name="rim_english" type="xs:string"
/>
<xs:element minOccurs="0" name="rim_welsh" type="xs:string" />
</xs:sequence>
<xs:attribute name="fwacode" type="xs:string" use="required"/>
<xs:attribute name="fwakey" type="xs:string" use="required"/>
<xs:attribute name="region" type="xs:string" use="required"/>
<xs:attribute name="area" type="xs:string" use="required"/>
<xs:attribute name="description" type="xs:string"
use="required"/>
<xs:attribute name="tidal" type="xs:string" use="required"/>
<xs:attribute name="severity" type="xs:string"
use="required"/>
<xs:attribute name="severityvalue" type="xs:unsignedByte"
use="required"/>
<xs:attribute name="warningkey" type="xs:string"
use="required"/>
<xs:attribute name="timeraised" type="xs:string"
use="required"/>
<xs:attribute name="severity_changed" type="xs:string"
use="required"/>
<xs:attribute name="rim_changed" type="xs:string"
use="required"/>
</xs:complexType>
</xs:element>
</xs:sequence>
<xs:attribute name="version" type="xs:decimal" use="optional"
/>
</xs:complexType>
</xs:element>
</xs:schema>
```

### 2.1.3

#### Real Time Commentary

Following the launch of the Environment Agency's flood warning service changes in November 2010, the XML files now contain 'commentary' text.

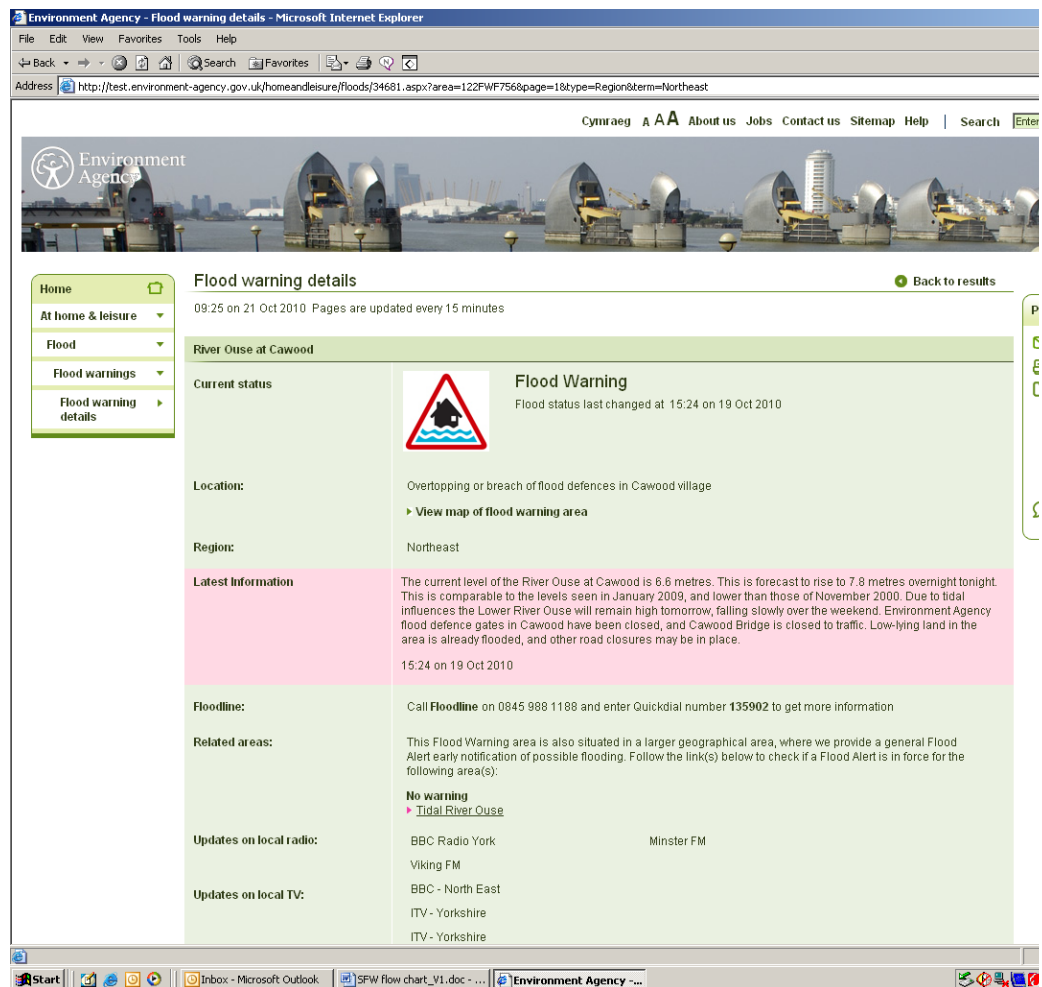
The commentary text is updated every 8 hours as a minimum or more frequently as the situation changes.

The commentary text can include information such as a description of the current river and sea conditions (at the time the commentary is issued). The commentary may also includes details of the flood forecast such as predicted river or tide levels and an estimate of the time flooding will occur in area.

This information is entered by Flood Warning Duty Officers based in the Area Incident Rooms, and is also added to the Environment Agency's Floodline recorded message service.

At all times this commentary text is based on the situation and forecast information available to the Flood Warning Duty Officers at the time of entry and reflects their judgement and experience. It is intended to provide additional information on the impacts of the flood in the flood warning area; it is not intended as a definitive summary of the incident, or the forecast or impacts as these can change rapidly during flood situations.

The screenshot below taken from the Environment Agency's website shows how this commentary text would appear (highlighted in pink).



## 2.1.4 Flood Warning Graphics and Images

2.1.5.1 The Flood Alert, Flood Warning and Severe Flood Warning Icons are available in high resolution format images in English and Welsh from the Environment Agency.

### IMPORTANT!

2.1.5.3 When using the Environment Agency Flood Alert, Flood Warning and Severe Flood Warning graphics, users should not change the colour or interpretation of the Flood Alert, Flood Warning and Severe Flood Warning Icons.

## 2.2

## Flood Alert / Warning Area Polygon Data

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### 2.2.1

#### Summary

The Data Feed provides the status of the EA Polygon Data for all Flood Alert and Flood Warning Areas across England and Wales.

The Data currently totals 3379 polygons.

The shapefiles are updated regularly to account for changes in the flood map and expansion to the flood warning service. The shapefiles define the boundary of the Flood Alert and Flood Warning areas.

The Polygon Data is presented via two data sets containing:

- (i) Flood Alert polygons: approx. 637 in number, file size approx 60 MB
- (ii) Flood Warning polygons: approx. 2742 in number, file size approx 50 MB

The expected annual growth in quantity and file size of these polygons is estimated to be 10%. The Polygon Data is currently refreshed three times per year.

**Important! - The Polygon Data should not be changed – these represent the boundary of the Environment Agency's warning service.**

Users should ensure they are using the current polygons or else the warning status may not relate to the right areas.

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