

# Ratings & Gaugings

## Provisional model overview

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WIRADA deliverable 1.4.2.2





# 1 Introduction

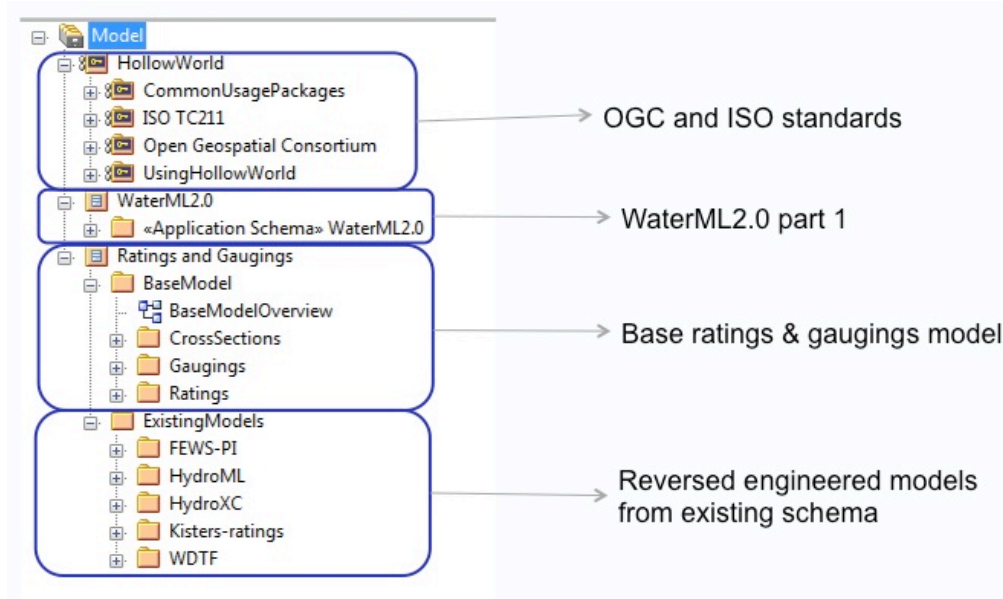
This brief report provides an overview of a provisional information model for hydrological ratings and gaugings, developed as an input to an international workshop being held in Reading, UK in June 2012. The report describes the model environment, the two key components to the model and identifies a number of areas that need to be covered in the workshop.

This first-cut model may be used as a basis for the modelling undertaken in the workshop, pending agreement within the working group.

## 2 Model Overview

### 2.1 The model environment

The UML environment has been setup with all relevant models using the standard ISO and OGC imports from HollowWorld along with the WaterML2.0 part 1 model. Existing schema from a background report<sup>1</sup> have been imported through XSD import and cleaned to be more consistent with the UML-ISO modelling style; XSD artefacts still remain however. Having the models represented in one place allows for quicker comparison of concepts and their properties – fully compliant ISO UML models are not required.



### 2.2 Base ('straw-man') model

An initial model for ratings and gaugings has been worked on to provide an initial discussion point for the Reading workshop. The model attempts to capture the core concepts from the existing models as a first step towards harmonisation. A quick overview is given here with some key points for discussion identified for addressing in the Reading workshop. Some obvious relationships to relevant existing standards (e.g. WaterML2.0 part 1 and Observations & Measurements) are identified for discussion. Cross sections are not covered in this deliverable as they are yet to be included in scope.

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<sup>1</sup> Taylor, P. Rating curve and gauging information: Report on data exchange formats. CSIRO. June 2011.

## 2.2.1 RATINGS MODEL

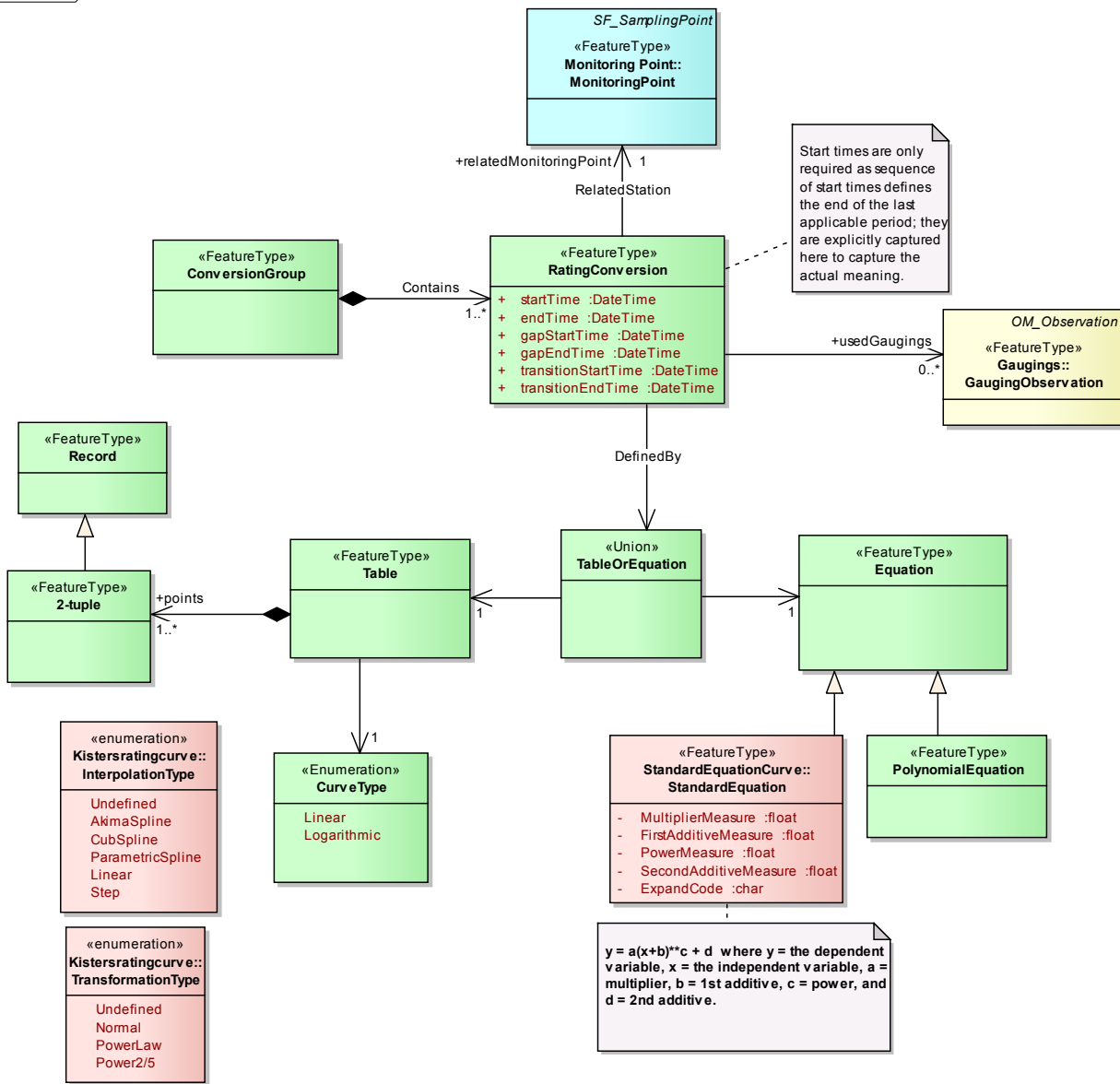


Figure 1 - ratings overview

### Colour key

- Defined in ratings model
- External type from reversed engineered model
- Defined in gaugings model
- WaterML2.0 part 1

The ratings model attempts to identify the key relationships for rating conversion concepts:

- Groups of conversions. These provide a logical collection of conversions that may represent all the available rating conversions for a period of time.

- Rating conversions. An x-y conversion between two phenomena that applies for a given time period, defined either through an equation of or a table of x-y pairs.
- Rating tables and equations. Representations of relationship curves through tables of points or equations.

### Topics for consideration

- Support for **3D rating tables** (and other non 2-tuple record types). Kisters is the only model that directly supports this, WDTF does implicitly.
- **Rating shifts.** US agencies may apply shifts to rating curves/tables to allow for changes in river bed structure or other factors affecting the stage-discharge relationship.
- **Applicable periods, gaps and transitions.** Each model handles these concepts slightly differently.
- **Relationship to monitoring points.** Exact relationship and edge cases should be covered.
- **Relationship to gauging observations.** The used Gaugings relationship needs discussion.
- **States.** Some models provide state vocabularies, e.g. obsolete, disabled, preliminary etc. Discuss harmonisation.
- **Interpolation and transformation.** All models support the interpolation type of a rating curve. Harmonisation and definition of these types should be covered. The concept of the transformation type is identified by the Kisters format.
- **Equations and their forms.** HydroML supports standard and polynomial equations. Simple text or specific encoding (e.g. MathML).
- **Definitions of the concepts.** Clearly define terms: conversion, rating, groups, applicable periods etc.
- **Storage relationships.** E.g. level-area-volume calculations.

## 2.2.2 GAUGING OBSERVATIONS (ON-SITE STREAMFLOW MEASUREMENTS)

This model captures the basic aspects of an in-situ measurement that provides an x-y relationship as a result. Details for properties and metadata relating to the core concepts will be the key topic for the workshop.

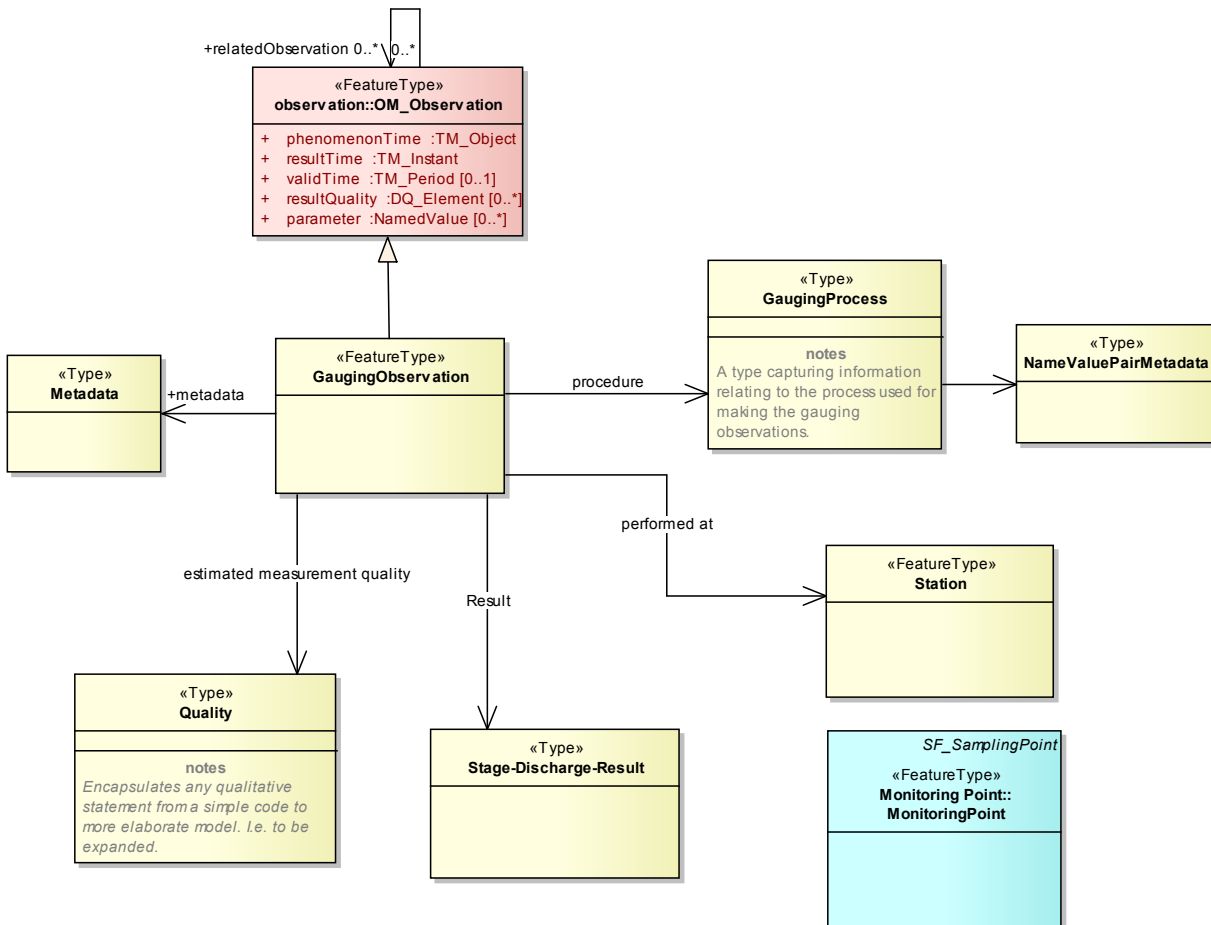


Figure 2 - Gaugings model overview

### Topics for consideration

- Support for **ADCP transects, controls, volumetric** and other complex observations.
- Level of detail of **velocity calculation** methods, if applicable.
- **Process level metadata.** Discussion of granularity by tying to the supported use cases and requirements.
- **Quality.** Similar to process metadata – level of granularity.



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