



Australian Government

NWPHYD017 Develop and maintain ratings

Release: 1

NWPHYD017 Develop and maintain ratings

Modification History

Release	Comments
1	These Assessment Requirements were released in NWP Water Training Package release 1.0 and meet the Standards for Training Packages. This unit supersedes and is equivalent to NWP510A Develop and maintain ratings. • Unit code updated • Content and formatting updated to comply with the new standards • All PC transitioned from passive to active voice • One new PC added in Element 2 • PC 4.1 removed • PC 1.1 and 1.2 revised

Application

This unit of competency describes the skills required to establish relationships between variables including stage versus flow and conductivity versus salinity. This unit requires understanding of the processes required to collect data, interpret data, verify data and produce clear reports that conform with organisational and industry standards.

This unit applies to hydrographers employed by the water industry and water operators involved in the monitoring of all the elements of the water cycle and their impact on the related environment.

The skills and knowledge described in this unit must be applied within the legislative, regulatory and policy environment in which they are carried out. Organisational policies and procedures must be consulted and adhered to, particularly those related to WHS, Bureau of Meteorology, World Meteorological Organisation and Australian Standards.

Those undertaking this unit would work autonomously, supervising staff, while performing complex tasks in a broad range of contexts, that could be unpredictable, including remote, confined spaces, near water and/or at heights.

No licensing, legislative or certification requirements apply to unit at the time of publication.

Competency Field

Hydrography

Elements and Performance Criteria

ELEMENTS	PERFORMANCE CRITERIA
Elements describe the essential outcomes	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the range of conditions section.
1. Review individual measurements	1.1 Identify monitoring objectives of site and stage discharge ratings requirements. 1.2 Review historical discharge measurements, time series data and stage discharge rating curves and compare against expected trends. 1.3 Use standard processes and software to check, edit and verify field data. 1.4 Correct and adjust inconsistent data.
2. Develop rating curves	2.1 Analyse existing measurements to establish trends and compare with existing ratings. 2.2 Identify events at monitoring site that can affect stage discharge curve. 2.3 Identify sources of error in ratings. 2.4 Prepare rating curves based on measurements, agreed formulae and mathematical techniques, under a variety of hydraulic conditions and control types. 2.5 Confirm and verify existing trend or define new trend. 2.6 Develop rating curves that comply with industry and client requirements. 2.7 Use theoretical methods to create or extend ratings. 2.8 Document processes and observations to provide traceability and accountability for quality assurance. 2.9 Apply standard formulae to create ratings for pre-calibrated measuring structures. 2.10 Apply quality codes to rating curves.
3. Maintain rating curves	3.1 Confirm accuracy of rating curves using recent measurements and review trends and rating applicability. 3.2 Develop rating curves based on new information from reviews and changed conditions. 3.3 Retrieve and analyse current, historic and trend data using appropriate mathematical techniques. 3.4 Document processes, observations and adjustments made.

4. Report rating curves	4.1 Prepare and store required archival data to guarantee data security. 4.2 Prepare and disseminate ratings in accordance with client requirements. 4.3 Make recommendations for future observations.
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Foundation Skills

The foundation skills demands of this unit have been mapped for alignment with the Australian Core Skills Framework (ACSF). The following tables outline the performance levels indicated for successful attainment of the unit.

ACSF levels indicative of performance:

1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Learning					Reading					Writing					Oral communication					Numeracy				

Performance variables:

1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Support					Context					Text complexity					Task complexity				

Further information on ACSF and the foundation skills underpinning this unit can be found in the Foundation Skills Guide on the GSA website.

Unit Mapping Information

This unit supersedes and is equivalent to NWP510A Develop and maintain ratings.

Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=26336bc0-04e5-49d9-8c31-46c49b6a0037>

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Assessment Requirements for NWPHYD017 Develop and maintain ratings

Modification History

Release	Comments
1	These Assessment Requirements were released in NWP Water Training Package release 1.0 and meet the Standards for Training Packages. Assessment Requirements created drawing upon specified assessment information from superseded unit

Performance Evidence

Evidence required to demonstrate competence must satisfy all of the requirements of the elements and performance criteria. If not otherwise specified the candidate must demonstrate evidence of performance of the following on at least one occasion.

- collecting, storing, archiving and analysing data
- applying mathematical modelling and analytical tools
- interpreting and applying technical documentation to the collection, analysis and reporting of hydrometric data
- identifying and addressing potential or actual operational problems
- recording information
- interpreting a range of organisational documents
- using computer systems to create ratings
- using remote work communication systems
- checking hydrographic data for correctness and accuracy in preparation for creating ratings
- identifying characteristics of ratings appropriate to various cross-section types and flow
- identifying errors in rating, and incorrect and impossible ratings
- adjusting gaugings, hydrograph trace and ratings to a common datum
- creating ratings manually using various methods and for standard measuring structures
- developing rating techniques to handle seasonal rating changes
- identifying the possibilities and limitations of scale models for generating ratings
- identifying and recognising causes of progressive, cyclical and sudden rating changes
- identifying backwater-affected stations and using techniques to rate them
- identifying gradual stream changes and adopting rating techniques
- identifying short-term rating changes, their causes and means of correctly processing them
- applying Student's *t*-test to determine whether a new rating is required

- drawing an accurate rating by hand
- fitting a rating curve using a number of mathematical techniques available in relevant software packages
- identifying gross errors in ratings and the data used to compile them
- applying appropriate quality codes to a rating
- identifying the elements of a stream bed and channel that affect ratings
- estimating channel roughness from photographs
- calculating the overall roughness coefficient of a channel consisting of a number of elements
- using graphical logarithmic methods to extend a rating
- identifying appropriate sections to use for slope-area flow calculations
- calculating flow rates manually using a set of cross-sections and a long-section
- using a spreadsheet to perform calculations
- calculating flow rates through and over various structures
- establishing relationships between variables including stage versus flow and conductivity versus salinity
- gathering and interpreting complex documentation and applying it to the development and maintenance of rating curves
- identifying, reporting and providing solutions to a range of flow conditions

Knowledge Evidence

Evidence required to demonstrate competence must satisfy all of the requirements of the elements and performance criteria. If not otherwise specified the depth of knowledge demonstrated must be appropriate to the job context of the candidate.

- mathematical and other scientific techniques relevant to the analysis of hydrographic data
- Student's *t*-test
- elements of a stream bed and channel that affect the rating
- relationship between Chezy and Manning roughness coefficients
- computer software relevant to the analysis and archiving of hydrographic data
- the basis of statistical goodness of fit tests
- WHS procedures

Assessment Conditions

Competency should be assessed in an actual workplace or in a simulated environment, with access to equipment and infrastructure appropriate to the outcome. Competency should be demonstrated over time to ensure the candidate is assessed across a variety of situations.

Consideration must be given to holistic assessment for this unit. Refer to advice in the companion volumes.

Assessors must satisfy the NVR/AQTF mandatory competency requirements for assessors.

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