## Fundamental WMO Competency

## Requirements for a PWS Forecaster

The competency requirements for the work of an operational PWS forecaster[[1]](#footnote-1) can be divided into five top level competencies. Taking into consideration the following:

1. The nationally-defined PWS areas of responsibility;
2. meteorological and hydrological impacts on society; and
3. meteorological and hydrological user requirements, local procedures and priorities,

a PWS Forecaster should have successfully completed the BIP-M[[2]](#footnote-2) (as defined in the revised WMO-No 49, Volume I), and, in taking into account conditions a to c, should be able to perform the work indicated in the five top level competencies below:

* 1. Analyse and monitor continually the evolving meteorological and/or hydrological situation;
  2. Forecast meteorological and hydrological phenomena and parameters;
  3. Warn of hazardous phenomena;
  4. Ensure the quality of meteorological and hydrological information and services; and
  5. Communicate meteorological and hydrological information to internal and external users.

Each of these top-level competencies is expanded, below, into second-level competencies that are expressed and structured in such a manner as to facilitate the clear application of an assessment procedure. Each is also associated with a range of background knowledge and skills, some of which may not be particular to meteorology and/or hydrology, but which are nonetheless essential in the discharge of a forecaster’s duties.

1. **Analyse and monitor continually the evolving meteorological and/or hydrological situation**

**Competency Description:**

Observations and forecasts of weather parameters and significant weather phenomena are continuously monitored to determine the need for issuance, cancellation or amendment/update of forecasts and warnings according to documented thresholds and regulations.

**Performance Criteria**

1. *Analyse and interpret data to identify weather features pertinent to the area of forecast responsibility.*
2. *Monitor weather parameters and evolving significant weather phenomena and validate current forecasts and warnings based on these parameters.*
3. *Evaluate the need for amendments to forecasts and updates of warnings against documented criteria and thresholds.*

***1.1 Background knowledge and skills***

1. *An understanding of the key elements of synoptic, dynamical, and physical meteorology and core analytical/diagnostic skills to the level of a BIP-M;*
2. *Application of the theory, methods and practices of meteorological and/or hydrological analysis and diagnosis;*
3. *The ability to visualize/conceptualize meteorological and/or hydrological information in multiple dimensions (spatial, temporal);*
4. *The appreciation of the influence of topography, land cover, and   
   (if relevant) bodies of water and/or snow fields on local meteorology;*
5. *Interpretation in-situ and remote-sensed observations and data;*
6. *Understanding of the characteristics of meteorological and hydrological sensors and instruments; and*
7. *Familiarity with the acquisition, processing and assimilation of meteorological and hydrological data, including quality control.*
8. **Forecast meteorological and hydrological phenomena and parameters**

**Competency Description:**

Forecasts of meteorological parameters and phenomena are prepared and issued in accordance with documented requirements, priorities and deadlines.

**Performance Criteria**

* 1. *Forecast weather phenomena and parameters as required, including forecast uncertainties and using appropriate tools:*
  2. *Ensure that forecasts are prepared and issued in accordance with national practices, relevant codes and technical regulations on content, accuracy and timeliness.*
  3. *Ensure that forecasts of weather parameters and phenomena are consistent (spatially and temporally) across boundaries of the area of responsibility as far as practicable, whilst maintaining meteorological integrity. Monitor forecasts/warnings issued for other regions, and liaise with adjacent regions as required.*
  4. ***Background knowledge and skills***

1. *Core diagnostic and prognostic skills to a BIP-M level*
2. *Demonstrates a knowledge of the methods used in Numerical Weather Prediction (NWP), including EPS where used, and other forecast tools;*
3. *Knowledge of the strengths and limitations of the NWP models used in the forecast office, and forecast adjustments required to accommodate these;*
4. *Critical comparison of a variety of forecast models, interpretation of observational data, and climatological data and integration of this information to make a reasoned estimation of the most likely evolution of the weather, of alternative evolutions, and the uncertainties associated with each;*
5. *Interpretation of model outputs at different time ranges*
6. *Sound judgement and flexibility in determining which observational, model and contextual information is most relevant in a wide variety of circumstances; and*
7. *Knowledge of weather impact on the user.*
8. **Warn of hazardous weather**

**Competency Description:**

Warnings are issued in a timely manner when hazardous conditions are expected to occur, or when parameters are expected to reach documented threshold values, and updated or cancelled according to documented warning criteria.

**Performance Criteria**

1. Forecast hazardous weather phenomena, including spatial extent, onset/cessation, duration, intensity and temporal variations:
2. Ensure that warnings are prepared and issued in accordance with national thresholds for hazardous weather, national formats, practices, codes and technical regulations on content, accuracy and timeliness.
3. Ensure that warnings of hazardous weather phenomena are consistent (spatially and temporally) across boundaries of the area of responsibility as far as practicable, whilst maintaining meteorological integrity. Monitor forecasts/warnings issued for other regions, and liaise with adjacent regions as required.

***3.1 Background knowledge and skill***

1. *Knowledge of the specific product preparation and dissemination systems used in the forecast office;*
2. *Knowledge of the policies, procedures and criteria for issuing warnings.*

**4. Ensure the quality of meteorological and hydrological information and services**

**Competence description:**

**The** quality of meteorological and hydrological forecasts, warnings and related products is maintained by the application of approved quality management processes.

**Performance Criteria:**

1. *Apply the organization's quality management system and procedures*
2. *Organise the work required on each shift to ensure that forecasts and other output are issued in good time according to agreed policies and procedures;*
3. *Validate meteorological and hydrological data, products, forecasts and warnings (timeliness, completeness, accuracy).*
4. *Assess the impacts of known error characteristics (bias, achievable accuracy of observations and sensing methods).*
5. *Monitor the functioning of operational systems and take contingency actions when necessary*
6. *Contribute to the preparation and maintenance of operational manuals.*

***4.1 Background knowledge and skills***

1. *Has the ability to respond to changing work patterns and demand, ensuring continuity of service to users;*
2. *Necessary time and work flow management skills*
3. *An appreciation of the varied technical knowledge and methodologies necessary across a multi-disciplinary team;*
4. *The ability to respond to changing user requirements, to embrace innovative techniques and technology, and*
5. *The ability to learn from and apply past experience to improve the quality of forecasts and warnings.*

**5. Communicate meteorological and hydrological information to internal and external users**

**Competency Description:**

User requirements are fully understood and are addressed by communicating concise and complete forecasts/warnings in a manner that can be clearly understood by the users.

**Performance Criteria**

1. *Ensure that all forecasts/warnings are disseminated through the authorised communication means and channels to designated user groups as specified in relevant standard operating procedures.*
2. *Explain meteorological/hydrological data and information, including uncertainties where required, and deliver briefings and provide consultation to meet specific user needs as required.*

***5.1 Background knowledge and skills***

1. *Skills in the presentation of forecast and warning information to the public across all relevant media, including impact information as required;*
2. *Knowledge of protocols for presenting warning information to emergency management partners, including information on likely impacts and mitigation activities if relevant;*
3. *An awareness of user’s needs for, and use of, meteorological and/or hydrological information; and*
4. *Awareness of the application of meteorology and hydrology to human activities and specific users.*

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1. A PWS forecaster is defined as a forecaster responsible for the preparation and delivery of public weather forecasts and warnings [↑](#footnote-ref-1)
2. BIP-M: Basic Instruction Package for Meteorologists [↑](#footnote-ref-2)