

# --Hydrologist (GS-1315) Competency Model--

## KNOWLEDGE

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### **Bureau-specific mission, vision, goals, and values**

### **Bureau-specific policies and procedures**

- Knowledge of NWS hydrologic services program policies (including operations, products and services)
- Knowledge of NWS/NOAA/DOC policy objectives as they apply to hydrologic operations

### **Standards of ethical conduct for U.S. Government employees**

### **Hydrology (Land Phase)**

- Knowledge of theoretical & applied hydrologic principles
- Knowledge of hydrologic modeling (theories & assumptions)
- Knowledge of infiltration processes, including modeling
- Understanding of flash flood processes
- Knowledge of river forecast verification procedures
- Knowledge of water supply forecasting procedures
- Knowledge of the impacts of climate change on surface water systems

### **Hydrology (Hydraulics)**

- Knowledge of theoretical & applied hydraulic principles
- Knowledge of hydraulic modeling (theories & assumptions)
- Understanding of dam failure processes

### **Hydrology (Cold Regions)**

- Knowledge of snow processes (accumulation, melt, ablation, etc.)
- Knowledge of snow modeling (theories & assumptions)
- Understanding of river ice processes (breakup, formation, etc.)
- Understanding effects of frozen ground including permafrost
- Understanding of glacial processes (movement, breakup, melt, etc.)

### **Hydrology (Coastal Areas)**

- Understanding of salt water-fresh water interactions in groundwater systems
- Understanding of estuarine modeling (theories & assumptions)
- Understanding of estuarine and coastal water quality
- Understanding of tidal influences, including storm tide, on river systems

### **Hydrology (Groundwater)**

- Knowledge of ground water environments
- Knowledge of ground water storage including withdrawal
- Knowledge of ground water-surface water interactions (including infiltration)

## **Hydrometeorology**

- Understanding of meteorological science and forecasting practices as applied to hydrology
- Knowledge of climatological and meteorological characteristics of hydrologic events
- Knowledge of the impacts of climate change on meteorologic drivers of hydrologic systems
- Knowledge of measurement systems (e.g., satellite, radar, gage) and estimation processes

## **Water Resources**

- Knowledge of competing demands for water use
- Knowledge of institutional arrangements for water management

<b>SKILL</b>	<b>DEFINITION</b>
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<b>Coordination</b>	<i>Works cooperatively to ensure that roles and responsibilities are understood, activities are synchronized with others, and process improvements are discussed.</i>
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1. Participate in setting goals that are consistent with organizational priorities.
2. Plan work activities to complete assignments in an effective and efficient manner.
3. Manage activities to avoid conflicts, meet established deadlines, and achieve objectives.
4. Adjust plans, activities, or priorities to adapt to changing situations.
5. Communicate responsibilities and accountabilities to others.
6. Synchronize schedules and activities with others.
7. Inform supervisor of project status, problems, and significant developments.
8. Organize meetings and other activities (e.g., conference calls, visits) for internal and external personnel.
9. Coordinate with partners in preparation for joint activities or events.
10. Ability to collaborate both internally and externally.

<b>Hydrologic Analysis, Interpretation, and Forecasting</b>	<i>Determines appropriate method to analyze or describe hydrologic data; conducts analyses of data; displays data in a compelling manner to support conclusions; interprets results of analyses; develops computer models and simulations of data; uses computer models and simulations to predict future conditions.</i>
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1. Ability to evaluate/interpret data, techniques, systems, issues.
2. Skill in using NWS operational hydrologic forecast systems.
3. Ability to perform short range forecast operations.
4. Ability to perform long range forecast operations.
5. Skill identifying strengths and weaknesses of NWS forecast processes and hydrologic models.

6. Skill performing and analyzing hydrologic verification information.
7. Skill in executing appropriate dam failure procedures (e.g., models).
8. Skill in interpreting internal guidance products.
9. Skill using available information to issue appropriate products.
10. Skill in assimilating and analyzing information needed to support program decisions.
11. Skill in hydrologic and hydraulic model calibration.
12. Skill in establishing and calibrating statistical water supply procedures.
13. Skill in conducting research on a wide range of hydrologic topics.

**Hydrologic Field Work and Data Collection** *Demonstrates thorough knowledge of and skill in the application of techniques and methodologies used to collect hydrologic data; maintains hydrologic data collection instruments and troubleshoots problems; is aware of limitations of and artifacts associated with instruments; identifies emerging technologies and their possible application to hydrologic data collection.*

1. Skill conducting hydrologic field work, including surveying, identifying high water marks, assessing flood damage, etc.
2. Skill coordinating criteria, location, and density of gage networks.
3. Skill maintaining hydrologic data collection systems and relational databases.
4. Adhering to safety principles and regulations associated with hydrologic field work.

**Hydrometeorologic Analysis Interpretation, and Forecasting** *Determines appropriate method to analyze or describe hydrometeorologic data; conducts analyses of data; displays data in a compelling manner to support conclusions; interprets results of analyses; develops computer models and simulations of data; uses computer models and simulations to predict future conditions.*

1. Ability to analyze, assimilate, and mosaic past, present, and forecast hydrometeorological information.
2. Ability to operate and maintain local/mesoscale numerical weather prediction models.
3. Skill in integrating synoptic and mesoscale meteorological model output.
4. Skills in conducting hydrometeorological post analysis.
5. Ability to perform hydrometeorological verification activities.

**Information Gathering** *Gather information to satisfy overall job requirements from all applicable sources such as subject matter experts, organizational representatives, standard operating procedures (SOPs), manuals, other employee guidance, books, and the internet and intranet.*

1. Ability to identify and articulate user needs.
2. Research sources, select optimal collection methods, and gather information.
3. Document sources of information.

**Information Technology Skills**      *Demonstrates skill in the use of information technology applicable to the NWS hydrologic services program such as software development methods, computer languages and data management systems.*

1. Skill working with hydrologic data sources, interfaces, and protocols.
2. Skill using computer technology related to hydrologic/hydrometeorologic applications (geographic information systems, statistics, etc.)
3. Skill maintaining operational viability of local applications and databases.
4. Ability to perform computer programming in appropriate languages (C, HTML, Java, UNIX, etc.).

**Judgment and Decision-Making**      *Makes sound, well-informed and objective decisions; perceives the impact and implications of decisions; commits to action to accomplish organizational goals.*

1. Make sound decisions in a timely manner based on an analysis of the available information.
2. Consider the relative costs and benefits of potential actions.
3. Consider both long- and short-term implications of decisions.
4. Anticipate obstacles, possible outcomes, and consequences, including political consequences, of actions.
5. Make decisions when appropriate, accept responsibility for decisions, and inform higher levels as needed.
6. Present options and recommendations to higher levels when necessary.
7. Monitor implementation and impact of decisions.
8. Gather and consider input from multiple perspectives.
9. Make decisions consistent with existing policies, procedures, practices, etc.
10. Ability to work under pressure and make timely, high-impact decisions with incomplete information.

**Leveraging Diversity**      *Respect, understand and value individual differences to achieve the vision and mission of the organization; hold self and others accountable for achieving results that embody the principles of diversity; use the talents of all employees, customers, stakeholders, and other constituents to achieve business results and maximum effectiveness.*

1. Elicit multiple viewpoints to improve the quality of products and services.
2. Respect the opinions and perspectives of a diverse set of employees, customers, stakeholders, and other constituents when creating products and/or rendering services.

**Oral Communication** *Speak to individuals or groups effectively, taking into account the audience and nature of the information; listen to others, attend to nonverbal cues, and respond appropriately.*

1. Use oral communication methods (e.g., phone, in person, meetings) appropriate to the situation.
2. Listen to others without interrupting or dominating the conversation.
3. Encourage others to participate and offer their views.
4. Communicate information and data in language tailored to the intended audience, context, and needs.
5. Ask questions as appropriate to understand the points being made by others.
6. Ask questions to assess the audiences' level of understanding.
7. Respond to feedback from others to revise communication accordingly.
8. Ability to communicate effectively with the media.

**Partnering** *Develop networks and builds alliances with customers, vendors, and/or other partners to meet mission requirements and provide services and products by collaborating across boundaries.*

1. Manage partner expectations by providing realistic information and estimates.
2. Tailor products and services to meet unique, specific, and evolving partner requirements (e.g., format, classification, medium, timeliness, distribution).
3. Solicit partner feedback to improve products and services.
4. Ability to identify potential partners and conduct outreach activities.
5. Ability to furnish routine information to public and other partners
6. Ability to propose solutions meeting requirements of multiple stakeholders.

**Problem Solving** *Identify problems; determine the relevance and usefulness of information for addressing problems; use sound judgment to generate and evaluate alternatives to make recommendations and take necessary action.*

1. Analyze information and trends to anticipate or identify problems.
2. Examine multiple data sources to determine root cause(s) of a problem.
3. Divide complex problems into manageable parts.
4. Provide and evaluate alternate solutions.
5. Produce solutions in a timely manner.
6. Define problem resolution strategy.

**Project-Program Management** *Designs, implements, and manages multiple or ongoing programs, and directs the related resources, personnel, and activities.*

1. Ability to evaluate and execute plans, programs, projects to support and improve the Hydrologic Services program.
2. Ability to make recommendations and provide feedback concerning the Hydrologic Services program.

**Quality Focus**      *Conducts reviews of products, services, or processes to evaluate quality or performance.*

1. Ensure products, services, or information are in compliance with policy.
2. Check products, services, or information for required completeness, consistency, accuracy, and timeliness.

**Teamwork**            *Work with others to achieve goals; facilitate cooperation, trust, and group identity; foster commitment and team spirit; manage and resolve conflicts.*

1. Cooperate with field and/or HQ team members to achieve goals.
2. Demonstrate respect and courtesy for other team members.
3. Foster an organizational environment where team members trust, support, and cooperate with one another.
4. Manage conflicts in a constructive manner to achieve productive resolutions.
5. Ability to provide training, mentoring, and guidance in a team setting.

**Written Communications**      *Compose written materials in a succinct and organized manner; use correct English grammar, punctuation, and spelling; produce written information, including technical material, which is appropriate for the intended audience.*

1. Compose written materials (emails, memoranda, documents, etc.) in a succinct and organized manner.
2. Edit documents for grammar, punctuation, spelling, format, style, organization, flow, and content.
3. Tailor writing style to the intended audience.
4. Document and disseminate results and outcomes of meetings and discussions.
5. Skill in communicating information about complex hydrologic phenomena and processes.