

Water Resources & Watershed Science is the discipline focused on understanding, managing, and protecting freshwater systems, including rivers, streams, lakes, wetlands, estuaries, groundwater, and the watersheds that connect them. Professionals in this field study the movement of water through natural and human systems, the cycling of nutrients and contaminants, ecosystem responses to environmental change, and the management of water resources to support both ecological health and human needs. As climate change, population growth, aging infrastructure, and land-use change place increasing pressure on freshwater systems, water resource professionals play a critical role in protecting water quality, maintaining ecosystem services, improving resilience to floods and droughts, restoring aquatic habitats, and ensuring sustainable water supplies for future generations. Some of the critical questions that might be addressed with a career in these fields include:

- *How do land use, climate, and human activities influence water quality and watershed health?*
- *How do nutrients, sediments, and contaminants move through watersheds and aquatic ecosystems?*
- *How will climate change alter streamflow, flooding, drought, and water availability?*
- *What management strategies best support sustainable water resources and aquatic ecosystems?*
- *How can science guide restoration and protection of rivers, wetlands, estuaries, and watersheds?*



Careers

Careers in **Water Resources & Watershed Science** involve research, environmental consulting, water quality monitoring, watershed management, ecosystem restoration, environmental regulation, and resource planning.

Career	Potential Employers
Research and Applied Science	
Watershed Scientist	Universities, Government Agencies, NGOs
Hydrologist	USGS, EPA, NOAA, Consulting Firms
Aquatic Scientist	Research Institutes, Universities, Consulting Firms
Water Quality Scientist	Consulting Firms, Watershed Organizations
Wetland Scientist	Consulting Firms, Regulatory Agencies
Environmental Scientist	Consulting Firms, Industry, Government Agencies
Water Resource Management	
Watershed Manager	Watershed Organizations, Conservation Districts
Water Resource Specialist	State and Federal Agencies
River Basin Planner	Water Management Agencies, Consulting Firms
Stormwater Program Manager	Municipal Governments, Utilities
Environmental Consulting and Restoration	
Environmental Consultant	Environmental and Engineering Consulting Firms
Ecological Restoration Specialist	Consulting Firms, NGOs, Government Agencies
Stream Restoration Scientist	Consulting Firms, Watershed Organizations
Policy and Regulation	
Water Resources Planner	Government Agencies, Consulting Firms
Environmental Protection Specialist	EPA, State Environmental Agencies
Permit and Compliance Specialist	Government Agencies, Consulting Firms
Watershed Policy Analyst	NGOs, Government Agencies, Think Tanks

Coursework & Degree Options

The **Water Resources & Watershed Science** pathway is particularly well suited for Environmental Science majors, though Environmental Studies and Geography majors interested in hydrology, water quality, environmental consulting, ecosystem restoration, climate resilience, or resource management may also pursue this pathway. Students interested in careers in water resources and watershed science may wish to consider the following courses to fill elective requirements within the Environmental majors:



4-cr. Science & Technology laboratory courses:

- GEV 4323 – Watershed Biogeochemistry
- GEV 4324 – Wetland Science and Management
- GEV 4363 – GIS for Conservation Management

3-cr. Science & Technology elective courses:

- GEV 4514 – Geomorphology
- GEV 4511 – Climate Variability
- GEV 3760 – Geospatial Applications in Environmental Science
- GEV 4301 – QGIS, Story Maps, Dashboarding, Drones, Google Earth Engine (1 credit)
- GEV 4357 – Applied Environmental Science
- GEV 4358 – Environmental Project Management



3-credit elective Environmental Policy & Management courses:

- GEV 3570 – Land Use Planning and Management
- GEV 3580 – Natural Resources and Conservation
- GEV 4331 – Environmental Policy and Management



3-credit elective Environmental Social Science and Humanities courses:

- GEV 3004 – Geographies of Environmental Justice

Degree Options

- Students may wish to consider a **Double Major in Geography**.
- Students should consider applying for the **Undergraduate Geospatial Information Sciences Specialization**.

Notes:

- Students should seek opportunities to participate in field research, independent studies, undergraduate research experiences, and internships.
- Many study abroad programs offer coursework related to geology, coastal systems, water resources, climate science, and environmental management that may complement this pathway.
- There are additional thematic courses offered every semester that may support this pathway.

Alumni Spotlight

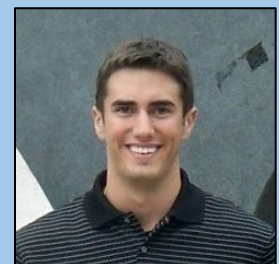
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Justin earned his M.S. in Environmental Science at the University of Maryland after graduating from Villanova. He worked at the Smithsonian Environmental Research Center before joining the City of Bloomington as a water quality analyst. He has since been promoted to water quality coordinator for the city, where he oversees programs that provide clean and reliable drinking water to over 150,000 people.

<https://www.linkedin.com/in/justin-meschter/>



To learn more about this and other career pathways, use the QR code, contact your academic advisor, or contact the Chair of the Department of Geography and the Environment for guidance.

The GEV Career Pathways Page:

