

GUIDELINES

For Preparation and Submittal of Proposals for the
State Water Resources
Competitive Grants Program

FY 2023 PROPOSALS
DEADLINE: 5:00 p.m., Wednesday, March 15, 2023

Alabama Water Resources Research Institute
ALFA Building
961 S. Donahue Drive
Auburn, AL 36849

TELEPHONE: (334) 844-1163

January
2023

The Alabama Water Resources Research Institute (AWRRI) is the federally authorized and funded entity that encourages, facilitates, and assists multi-disciplinary water resources research at all Alabama universities. The purpose of the Institute program is to respond to identified water resources problems of the state and region and to encourage and broaden faculty participation in research and other scholarly pursuits. The AWRRI has an obligation to fund proposals having the best probability of producing meaningful results, and/or have good promise of follow-on funding. Such projects will directly benefit the researcher and their profession, and indirectly their students and the Institute's overall mission.

The AWRRI receives funding from the Geological Survey (USGS) of the U.S. Department of the Interior under Section 104 of P.L. 106-374, the Water Resources Research Act of 1984. Research proposals selected will be supported as projects in the State Water Resources Competitive Grants Program, subject to the approval of the USGS. Faculty members from any university or college in Alabama, public or private, are eligible to submit a research proposal to this program. You are invited to submit proposals for grants under this Announcement. There are some conditions which must be adhered to that are addressed in the following Guidelines.

The intent of the State Program is to foster collaboration by two or more researchers at colleges and universities within Alabama. However, proposals submitted by a single researcher will receive the same consideration as one submitted by a team of researchers. Through this program, the Institute hopes to form partnerships between universities to address a broad range of water resources problems affecting the state and region.

DEI Statement: The AWRRI highly encourages proposals from principal investigators who are from underrepresented or underserved groups in STEM, and from institutions that serve majority minority populations (e.g., HBCUs, MSIs, TCUs, HSIs, and community colleges). Additionally, proposals are encouraged that support diversity, equity, inclusion, and justice, which intersect with water research and resources and/or address issues in historically marginalized or underserved communities.

[More information on Auburn University's Institutional DEI Strategy Overview](#)

GENERAL INFORMATION

1. **AVAILABLE FUNDING:** In 2023, the proposals may request up to \$25,000 (in Federal funds) and can focus on any of Alabama's water resources research priority areas (see Attachment A). We anticipate funding at least 3 proposals in 2023. *Junior faculty members are strongly encouraged to apply for this funding.* A junior faculty member is defined as an individual who has been in his/her tenure-track position less than seven years at a higher education institution in Alabama. Alabama Cooperative Extension specialists that have been in their current position less than seven years are also considered junior faculty members.
2. **SUBMITTAL DEADLINE: 5:00 p.m., Wednesday, March 15, 2023.** Your proposal must be received by the AWRRRI office by the above time/date to be available for review. Proposals received after the deadline will not be considered for the FY 2023 program.
3. **NOTIFICATION:** You will be notified as soon as possible regarding the status of your proposal. Typically, the AWRRRI notifies faculty of their proposal status within 4-6 weeks of the submission deadline.
4. **EVALUATIONS:** Proposals will be evaluated based on:
 - a. **Relevance and Importance (15 points).** Does the proposal directly address research topics of significance to our state? If so, does it deal with a subject of particularly high importance to present and future water resources management programs? Does the proposal itself do a convincing job of describing the relevance and importance of the proposed research?
 - b. **Scientific/Technical Merit (30 points).** Does the proposal have potential to expand the fundamental knowledge in its specific area? Is it scientifically and technically sound? Are the investigators cognizant of past work? Is the proposal well written, organized, and complete?
 - c. **Feasibility (15 points).** Does the proposal demonstrate substantive and important collaboration among investigators? Are the objectives, methodologies, designs, and techniques adequate and completely described? What is the likelihood of success given the methods and time frame proposed? Is the budget reasonable and adequate for the work proposed? Will the expected results lend themselves to a more comprehensive proposal with additional funding?
 - d. **Professional Competence of the Investigators (10 points).** Are the qualifications of the investigators commensurate with the proposed research? Are the facilities and equipment adequate? If appropriate, have external cooperators been identified? Has the nature of such cooperation been described? Are the roles and advantages of involving the different investigators clearly described?

- e. **Student Educational and Training Opportunities (10 points).** Does the proposal contain the opportunity for student participation (graduate and/or undergraduate)?
- f. **Technology Transfer* and Outreach** (20 points).** Does the proposal actively address the eventual transfer of results to user groups? Does it actively address the impact the results could have? Does the proposal identify relevant stakeholder audiences and include stakeholder engagement? Does the proposal include and adequately describe outreach effort(s)?

**Technology transfer is considered the process of conveying results stemming from scientific and technological research to the marketplace and/or wider society, along with associated skills and procedures.*

***Examples of outreach may include public presentations to student clubs or community organizations, participation in the annual Alabama Water Resources Conference, meeting and engaging with local stakeholders or state agencies, developing a factsheet to be shared with decision-makers, hosting a public workshop, developing an ArcGIS StoryMap for a general audience, or demonstrating that associated data will be made accessible to the public (e.g., open-source, easily transferable data formatting), etc. Be as specific as possible about intended outreach deliverables and audiences.*

- 5. **PARTICIPATION RESTRICTIONS:** You may not participate in the program if you have failed to submit a technical completion report for any prior project in the AWRRI program.
- 6. **PROGRAM FOCUS:** The purpose of the State Water Resources Research program is to address major state water resources problems by motivating and supporting research by qualified scientists from the State's colleges and universities.

The focus of our program is directed by those state priority areas addressed in **Attachment A**, which have been developed by the Institute's Council. Research proposals submitted to our program **MUST** be responsive to at least one of these priority areas. A project should not consist solely of conventional data collection, tabulation, analysis, or equipment development.

- 7. **PERFORMANCE PERIOD:** Research projects supported by FY 2023 funds are anticipated to start September 1, 2023 and should be 12 months in duration. Projects designed to continue beyond that period must be supported by funds from subsequent fiscal year appropriations.
- 8. **DISSEMINATION OF INFORMATION:** Although not required, FY 2023 projects are *highly encouraged* to present project findings at the annual Alabama Water Resources Conference (ALWRC) held on the Alabama Coast in early September. Travel expenses to

attend the ALWRC are acceptable for federal funds in this proposal. *The AWRRI strongly encourages applicants to explicitly describe how results from the proposed research will be conveyed to end users* (i.e., the public, private stakeholders, state agencies, water resources managers, etc.)

9. **FUNDING:** Grants from FY 2023 funds will be limited to \$25,000 (in Federal funds) for a 12-month budget period. We anticipate funding at least 3 projects. Projects may be designed to run beyond the 12-month period, provided they contain a reportable element to be included in the Institute's annual report to the granting agency. Funding for subsequent years of a multi-year project **is not guaranteed** and continuation proposals for such projects will be evaluated along with all other proposals received each year. Evidence of satisfactory performance will be considered in evaluating continuation proposals.
10. **COST SHARING:** The Federal authorizing legislation (P.L. 106-374) requires **at least one non-Federal dollar for each FY 2023 grant dollar** to be met on each grant award.
11. **PROPOSAL SUBMISSION:** Email your proposal to the AWRRI, including a letter signed by your department head confirming cost sharing funds will be available if your proposal is funded. **Please use 12-point, Times New Roman Font, and submit as a PDF.**

Email proposals to Rachel McGuire: rem@auburn.edu

CHARGES ALLOWABLE TO FEDERAL FUNDS

- A. Costs will be allowable in accordance with 2 CFR Part 200-OMB Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards.
- B. This program is modestly funded and should not be perceived as a source of funds for acquisition of major equipment items. Non-expendable personal property (e.g., office furniture, and computers) **may not** be purchased with grant funds. Special purpose equipment used for research, scientific, or other technical activities may be proposed for purchase if each item is identified and justified and the acquisition cost is stated.
- C. The portion of benefits paid to individuals cannot exceed the proportion of their salaries paid from the grant.
- D. **INDIRECT COSTS MAY NOT BE CHARGED AGAINST THE FEDERAL GRANT FUNDS.** The Indirect Costs normally charged against Federal grant funds should be used to meet your cost sharing requirement. The U.S. Geological Survey will accept indirect cost rates approved by your university's cognizant auditing agency. Applicants must provide a copy of the approved Indirect Cost Rate Agreement or other approving documentation.
- E. Travel costs are allowable subject to the conditions established in OMB Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal

Awards and the travel regulations of your college or university. Travel outside the United States, its territories and possessions, and Canada is considered as foreign travel and requires advance written approval of our office and the U.S. Geological Survey.

- F. Project expenses may not be charged to the grant accounts prior to the official project start date.
- G. All FY 2023 funds must be spent or obligated within the twelve-month period of the project.
NO CARRY-OVER OF FUNDS OR EXTENSIONS WILL BE ALLOWED.

PROPOSAL CONTENT AND FORMAT

TITLE PAGE. (See sample, Attachment D)

The body of each proposal (excluding resumes) should be no longer than 20 pages and consist of the following 18 elements. The first 11 (A-K) constitute the synopsis (not to exceed two pages). **BEGIN A NEW PAGE WITH ELEMENT L.**

- A. Project Number. Leave blank - AWRRI will add the number.
- B. Title.
- C. Focus Category. Select a maximum of three, with the most preferred category first.
- D. Keywords. Select six to eight keywords in descending order of importance, separated by commas.
- E. Duration. Month/year to month/year. Use the actual beginning and ending dates.
- F. Fiscal Year 2023 Federal Funds.

Total	Direct	Indirect
-------	--------	----------
- G. Non-Federal Funds Allocated.

Total	Direct	Indirect
-------	--------	----------
- H. Name, University and City of Principal Investigator(s).
- I. Congressional District of University Performing the Research.
- J. Identification and Statement of the Major Regional Water Problem (2 paragraphs maximum) to be addressed by the project, including explanation of the need for the research. (Who wants it? Why?) NOTE: This will be a significant factor in scoring the proposal.
- K. Statement of the Results, Benefits, and/or Information expected to be gained during the initial performance period and by the end of the project, and how they will be used (2 paragraphs maximum). NOTE: This will be a significant factor in scoring the proposal.

START A NEW PAGE HERE

- L. Nature, Scope, and Objectives of the Research.
- M. Methods, Procedures, and Facilities.
- N. Related Research. Show by literature review and communication citations the similarities and differences of the proposed project to completed or on-going research on the same topic.
- O. Progress Review. (Required only if you had a prior year project)
- P. Investigator's Qualifications. Include resumes of all participating investigators. **No resume shall exceed 3 pages or list more than 15 pertinent publications.**
- Q. Training Potential. Estimate the number of graduate and/or undergraduate students, fields of study, graduation date, and degrees expected to result from participation in the project.
- R. Budget Form. Budget information should be included by cost categories on the attached budget form (Attachment B). **An Excel template of the budget form is available on the [AWRRI Webpage](#).** Also provide a budget justification for items 4 through 8 on the budget form.
 - (1) AWRRI grants from FY 2023 funds to support research projects will not exceed \$25,000 (in Federal funds). We anticipate funding at least 3 projects in 2023.
 - (2) Cost Sharing. Federal funds provided for the Institute program will be on a cost sharing basis of **one non-Federal dollar for each Federal dollar allotted**. This cost sharing basis must be reflected in the budget for each proposed project.
 - (3) Indirect Costs. Federal funds made available under this program **MAY NOT** be used for support of indirect costs **but may be used to meet part of your Cost Sharing requirement**.
 - (4) Staff Benefit Costs. Staff benefits include those employer contributions (employee insurance, pension plan, etc.) which are granted in accordance with established institutional employment policies. Federal funds may be used to support benefit costs in proportion to the extent that the salary or wages to which the benefits relate are also paid from Federal funds.
 - (5) Your budget should include funds for preparation and submittal of one copy of a final technical completion report and a two-page project synopsis for inclusion in the Institutes program report to the U.S. Geological Survey.

WATER RESOURCES RESEARCH PRIORITY AREAS IN ALABAMA

Research projects funded in the (AWRRI) program address those areas which constitute major problems not only with respect to Alabama's water resources, but also regional and national water resources concerns. Alabama experiences a multitude of water quality, quantity, and management problems which cannot all be addressed at once. Therefore, the AWRRI program focuses its research and information transfer efforts in specific areas. The water resources research priority areas in the State of Alabama (as adopted by the Water Resources Council) are listed below.

FY23 SPECIAL PRIORITY AREA:

Climate Change & Resiliency

Precipitation and streamflow relationships | Weather forecasting; climate modification | Drought forecasting | Meteorological processes linking atmospheric water, solar energy, water use by plants, and available soil moisture | Hydrologic and hydraulic modeling and processes

Surface Water – Quantity and Quality

Environmental In-Stream Flows | Point-source and non-point source contamination | Storage and conservation of surface water supplies | Nutrient loading | HABs and emerging contaminants (i.e., PFAS)

Groundwater Resources and Contamination

Flooding impacts on drinking water | well contamination | saltwater intrusion | agricultural groundwater withdrawals

Infrastructure Water Management

Wastewater treatment techniques | Stormwater management | Drinking water | Gray infrastructure (i.e., dams, seawalls, roads, and pipelines) | Green infrastructure

Coastal Water Research and Policy Issues

Coastal development | Mineral resource exploration and extraction | Commercial fishing | shoreline erosion | Wetland, beach, and dune protection | Wildlife habitat protection | Cultural resources protection | Impacts of freshwater inflows on Mobile Bay | Sea Level Rise

Innovative Technologies

Remote sensing technology to monitor and assess waterbodies/watershed conditions (i.e., pathogen pollution sources, sediment impairment) | Development of comprehensive geodatabases (i.e., Alabama's freshwater springs, structures that potentially create stream habitat fragmentation issues, existing withdrawals in Alabama for both ground and surface water, etc.)

BUDGET FORM
ALABAMA WATER RESOURCES
RESEARCH INSTITUTE
PROJECT FISCAL YEAR 2023

PI Name & University:				
Project Title:				
Cost Category		Federal	Non-Federal (match)	Total
1. Salaries and Wages				
Principal Investigator(s)				\$0.00
Other Professional Staff				\$0.00
Graduate Student(s)				\$0.00
Undergraduate Student(s)				\$0.00
Total Salaries and Wages		\$0.00	\$0.00	\$0.00
2. Fringe Benefits				
	Rate (%)			
Principal Investigator(s)		0.00%		\$0.00
Other Professional Staff		0.00%		\$0.00
Graduate Student(s)		0.00%		\$0.00
Undergraduate Student(s)		0.00%		\$0.00
Total Fringe Benefits		\$0.00	\$0.00	\$0.00
3. Tuition				
Graduate Student(s)				\$0.00
Undergraduate Student(s)				\$0.00
Total Tuition		\$0.00	\$0.00	\$0.00
4. Supplies				\$0.00
5. Equipment				\$0.00
6. Services or Consultants				\$0.00
7. Travel				\$0.00
8. Other direct costs				\$0.00
9. Total direct costs		\$0.00	\$0.00	\$0.00
		Rate (%)		
10a. Indirect costs on federal share		0.00%	XXXXXXXXXX	\$0.00
10b. Indirect costs on non-federal share		0.00%	XXXXXXXXXX	\$0.00
11. Total estimated costs		\$0.00	\$0.00	\$0.00

NOTE: an Excel template of this budget form is available on the [AWRRI Webpage](#).

<i>Total Federal for grants - maximum of \$25,000</i>
<i>Total Non-Federal for grants - minimum of \$25,000</i>
<i>Total estimated costs for grants - \$50,000</i>

PI Name & Project Title:

<p>Salaries and Wages for PIs. Provide personnel, title/position, estimated hours and the rate of compensation proposed for each individual.</p>
<p>Federal:</p> <p>Non-Federal (match):</p>
<p>Salaries and Wages for Other Professionals. Provide personnel, title/position, estimated hours and the rate of compensation proposed for each individual.</p>
<p>Federal:</p> <p>Non-Federal (match):</p>
<p>Salaries and Wages for Graduate Students. Provide personnel, title/position, estimated hours and the rate of compensation proposed for each individual. (Other forms of compensation paid as or in lieu of wages to students performing necessary work are allowable provided that the other payments are reasonable compensation for the work performed and are conditioned explicitly upon the performance of necessary work. Also, note that tuition has its own category below and that health insurance, if provided, is to be included under fringe benefits.)</p>
<p>Federal:</p> <p>Non-Federal (match):</p>
<p>Salaries and Wages for Undergraduate Students. Provide personnel, title/position, estimated hours and the rate of compensation proposed for each individual. (Other forms of compensation paid as or in lieu of wages to students performing necessary work are allowable provided that the other payments are reasonable compensation for the work performed and are conditioned explicitly upon the performance of necessary work. Also, note that tuition has its own category below and that health insurance, if provided, is to be included under fringe benefits.)</p>
<p>Federal:</p> <p>Non-Federal (match):</p>

<p>Fringe Benefits for PIs. Provide the overall fringe benefit rate applicable to each category of employee proposed in the projects. Note: include health insurance here, if applicable.</p>
<p>Fringe Benefit Rate for PIs = Federal:</p> <p>Non-Federal (match):</p>
<p>Fringe Benefits for Other Professionals. Provide the overall fringe benefit rate applicable to each category of employee proposed in the projects. Note: include health insurance here, if applicable.</p>
<p>Fringe Benefit Rate for PIs = Federal:</p> <p>Non-Federal (match):</p>
<p>Fringe Benefits for Graduate Students. Provide the overall fringe benefit rate applicable to each category of employee proposed in the projects. Note: include health insurance here, if applicable.</p>
<p>Fringe Benefit Rate for Graduate Students = Federal:</p> <p>Non-Federal (match):</p>
<p>Fringe Benefits for Undergraduate Students. Provide the overall fringe benefit rate applicable to each category of employee proposed in the projects. Note: include health insurance here, if applicable.</p>
<p>Fringe Benefit Rate for Undergraduate Students = Federal:</p> <p>Non-Federal (match):</p>
<p>Tuition for Graduate Students. Provide time & amount. In-state or Out-of-state tuition?</p>
<p>Federal:</p> <p>Non-Federal (match):</p>
<p>Tuition for Undergraduate Students. Provide time & amount. In-state or Out-of-state tuition?</p>

Federal:

Non-Federal (match):

Supplies. Indicate separately the amounts proposal for laboratory and field supplies followed by a breakdown of the supplies in each category.

Laboratory supplies (itemized list):

Field supplies (itemized list):

Equipment. Identify non-expendable personal property having a useful life of more than one (1) year and an acquisition cost of more than \$5,000 per unit. If fabrication of equipment is proposed, list parts and materials required for each, and show costs separately from the other items. A detailed breakdown is required.

Detailed breakdown:

Services or Consultants. Identify the specific tasks for which these services, consultants, or subcontracts would be used. Provide a detailed breakdown of the services or consultants to include personnel, time, salary, supplies, travel, etc. A breakdown is required for each cost.

Detailed breakdown for each cost:

Indirect Costs. Provide negotiated indirect (“Facilities and Administration”) cost rate.

Indirect Cost Rate (F&A) =

Project
Proposal for
Water Resources Research Institute
Program under
Section 104, Water Resources Research Act of
1984 to the
Alabama Water Resources Research Institute

in support of the
Research Proposal

TITLE IN ALL CAPS

by

John/Mary Doe
Principal Investigator
Academic Rank
Department Name
School or College
Name University
Name
Email
Address
Telephone
Date

Sample Format for Synopsis Portion of Research Proposal*

RESEARCH PROPOSAL

A. Project Number: *(to be inserted by AWRRRI)*

B. Title:

C. Focus Category: List a maximum of three categories, with the most preferred category first

D. Descriptors: List descriptor words, separated by commas.

E. Duration: From _____ To _____

F. Federal Funds:

Total	Direct	Indirect
-------	--------	----------

G. Non-Federal Funds:

Total	Direct	Indirect
-------	--------	----------

H. Principal Investigator(s), University, and City:

I. Congressional District:

J. Water Problem and Need for Research:

K. Expected Results, Benefits, Information, etc.:

*Note: Synopsis may be single spaced and is limited to two pages. Please use letters and titles as shown on this sample.

ACID DEPOSITION	ACD
AGRICULTURE	AG
CLIMATOLOGICAL PROCESSES	CP
CONSERVATION	COV
DROUGHT	DROU
ECOLOGY	ECL
ECONOMICS	ECON
EDUCATION	EDU
FLOODS	FL
GEOMORPOLOGICAL PROCESSES	GEOMOR
GEOCHEMICAL PROCESSES	GEOCHE
GROUNDWATER	GW
HYDROGEOCHEMISTRY	HYDGEO
HYDROLOGY	HYDROL
IRRIGATION	IG
LAW, INSTITUTIONS, AND POLICY	LIP
MANAGEMENT AND PLANNING	M&P
METHODS	MET
MODELS	MOD
NITRATE CONTAMINATION	NC
NON POINT POLLUTION	NPP
NUTRIENTS	NU
RADIOACTIVE SUBSTANCES	RAD
RECREATION	REC
SEDIMENTS	SED
SOLUTE TRANSPORT	ST
SURFACE WATER	SW
TOXIC SUBSTANCES	TS
TREATMENT	TRT
WASTEWATER	WW
WATER QUALITY	WQL
WATER QUANTITY	WQN
WATER SUPPLY	WS
WATER USE	WU
WETLANDS	WL

KEYWORDS/DESCRIPTORS

A.

1. Acid Deposition
2. Acid Rain
3. Activated Carbon
4. Activated Sludge
5. Adsorption and Exchange
6. Aeration
7. Agriculture
8. Algae
9. Alkaline Scale
10. Anaerobic Treatment
11. Animal Waste
12. Aquaculture
13. Arid Climates
14. Aquatic Plants
15. Aquifer Characteristics
16. Aquifer Parameters
17. Atmospheric Models
18. Atmospheric Processes

B.

19. Bacteria
20. Basalt Hydrology
21. Base Flow
22. Bays
23. Beaches
24. Benefit-cost Analysis
25. Benthos
26. Biodegradation
27. Bioindicators
28. Biological Control
29. Biological Treatment
30. Biomonitoring
31. Biotechnology
32. Birds
33. Boating
34. Blackish Water
35. Brines

C.

36. Cartography
37. Channels
38. Chemigation
39. Chlorination
40. Climate
41. Cloud Seeding
42. Coastal Engineering
43. Coastal Zone
44. Computers
45. Conflict Management
46. Conjunctive Use
47. Conservation
48. Contaminant Transport
49. Conveyance System
50. Cooling

51. Crop Water Use
52. Crustaceans

D.

53. Dairy Waste Management
54. Dams
55. Data Analysis
56. Data Storage and Retrieval
57. Decision Models
58. Demand Management
59. Denitrification
60. Desalination
61. Developing Countries
62. Disinfection
63. Distillation
64. Distribution System
65. Drainage
66. Drilling
67. Drought
68. Dynamic Programming

E.

69. Earth Dams
70. Economics
71. Ecosystems
72. Education
73. Energy Budget
74. Energy Use and Conservation
75. Environmental Sanitation
76. Epidemiology
77. Estuaries
78. Estuarine Modeling
79. Eutrophication
80. Evaporation
81. Evapotranspiration

F.

82. Fertilizers
83. Fish Ecology
84. Fisheries
85. Flood Control
86. Flood Plan Management
87. Fluid Flow
88. Fluid Mechanics
89. Fungicides

G.

90. Geochemistry
91. Geographic Information
92. Geomorphology
93. Geophysics
94. Geothermal Power
95. Glaciers
96. Great Lake

97. Groundwater Hydrology
98. Groundwater Management
99. Groundwater Modeling
100. Groundwater Movement
101. Groundwater Quality
102. Groundwater Recharge

H.

103. Hazardous Waste
104. Health Effects
105. Heat Budget
106. Heavy Metals
107. Herbicides
108. History
109. Hydraulic Structures
110. Hydraulics
111. Hydrobiology
112. Hydrogeology
113. Hydrologic Models
114. Hydropower
115. Hypothermia

I.

116. Ice
117. Impoundments
118. Indian Water Issues
119. Industrial Wastewater
120. Infiltration
121. Information Dissemination
122. Insecticides
123. Insects
124. Institutional Relationships
125. Instream Flow
126. Interbasin Transfers
127. Invertebrates
128. Ion Exchange
129. Irrigation
130. Irrigation Management
131. Irrigation Scheduling
132. Irrigation System
133. Isotopes

K.

134. Karst Hydrology

L.

135. Lagoons
136. Lakes
137. Land Use
138. Landscape Management
139. Land-Water Interactions
140. Law
141. Leaching

- M.**
142. Marketing
143. Marinas
144. Marine Resources
145. Marshes
146. Mathematical Models
147. Membranes
148. Microclimatology
149. Mineralogy
150. Mining
151. Model Studies
152. Moisture Uptake
153. Mountain Lakes/Streams
154. Multiple-Objective Planning
- N.**
155. Navigation
156. Nitrogen
- O.**
159. Oil-Water Interfaces
160. Open Channels
161. Operation Research
162. Optimization
163. Organic Compounds
164. Osmosis
165. Oxidation
166. Ozonation
- P.**
167. Perched Water Table
168. Percolation
169. Pest Management
170. Pesticides
171. Phosphorus
172. Photosynthesis
173. Phreatophytes
174. Physical Chemistry
175. Planning
176. Plant Growth
177. Plant Pathology
178. Plant Stress
179. Plant-Water Relationships
180. Policy Analysis
181. Pollutants
182. Pollution Control
183. Ponds
184. Port Facilities
185. Powerplants
186. Public Health
187. Pumps
- R.**
188. Rainfall
189. Rainfall-Runoff Models
190. Rainfall-Runoff Processes
191. Range Management
192. Recreation
193. Reefs
194. Regulatory Permits
195. Remote Sensing
196. Reservoir Management
197. Reservoir Modeling
198. Resource Development
199. Resource Planning
200. Reverse Osmosis
201. Riparian Vegetation
202. Risk Analysis
203. Risk Management
204. River Basin Development
205. River Beds
- S.**
208. Saline Soils
209. Saline-Freshwater Interfaces
210. Salinity
211. Sanitary Landfills
212. Saturated Flow
213. Seawater
214. Sedimentation
215. Seismology
216. Septic Tanks
217. Sewer System
218. Shellfish
219. Shipping
220. Shore Birds
221. Shore Protection
222. Sludge
223. Snow
224. Socioeconomic Issues
225. Soil Chemistry
226. Soil Erosion
227. Soil Microbiology
228. Soil Physics
229. Soil-Water Relationships
230. Solar Energy
231. Solute Transport
232. Springs
233. Statistics
234. Stochastic Hydrology
235. Stochastic Processes
236. Storm Water Management
237. Streams
238. Subsidence
239. Subsurface Drainage
240. Surface Drainage
241. Surface-Ground Relationships
242. Suspended Sediments
243. Synthetic Hydrology
244. Synthetic Organics
245. Systems Analysis
246. System Engineering
- T.**
247. Thermodynamics
248. Tidelands
249. Time-Series Analysis
250. Tourism
251. Toxic Substances
252. Trace Elements
253. Trace Organics
254. Tropics
- U.**
258. Urban Hydrology
259. Urban Planning
260. Urban Water System
- V.**
261. Viruses
- W.**
262. Waste Disposal
262. Wastewater
263. Wastewater Irrigation
264. Wastewater Treatment
265. Water Chemistry
266. Water Demand
267. Water Harvesting
268. Water Law
269. Water Levels
270. Water Quality
271. Water Quality Control
272. Water Quality Management
273. Water Quality Modeling
274. Water Quality Monitoring
275. Water Quality Standards
276. Water Resources Development
277. Water Reuse
278. Water Rights
279. Water Softening
280. Water Treatment
281. Water Treatment Facilities

- | | | | | | |
|------|----------------------|------|----------------------|-----------|---------------------|
| 282. | Water Use Data | 287. | Weather Data | 293. | Wildlife Management |
| 283. | Water Use Efficiency | | Collection | | |
| 284. | Water Use Monitoring | 288. | Weather Forecasting | Z. | |
| 285. | Watershed | 289. | Weather Modification | 294. | Zooplankton |
| | Management | 290. | Weeds | 295. | Zoning |
| 286. | Waves | 291. | Well Hydraulics | | |
| | | 292. | Wetlands | | |