

Chapter 11

Book Reviews: Natural Resources



Lawrence K. Wang and Mu-Hao Sung Wang

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Abstract The authors have reviewed seven technical books published by WIT Press, Ashurst, Southampton, UK; CRC Press, Taylor & Francis Group, Boca Raton, Florida, USA; and ASCE Press, American Society of Civil Engineers, Reston, Virginia 20,191, USA. These seven books are: (1) Flood Risk Assessment and Management, WIT Press, 2012; (2) Groundwater Assessment, Modeling, and

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Management. CRC Press, Taylor & Francis Group, 2016; (3) Natural Decadal Climate Variability: Societal Impacts. CRC Press, Taylor & Francis Group, 2017; (4) Sustainable Water Management and Technologies: Volume I, Sustainable Water Management; Volume II, Sustainable Water Technologies; CRC Press, Taylor & Francis Group, 2017; (5) Underground Aqueducts Handbook. CRC Press, Taylor & Francis Group, 2017; (6) Urban Storm Water Management, Second Edition, CRC Press, Taylor & Francis Group, 2016; and (7) Water Engineering with the Spreadsheet, ASCE Press, 2016. All seven reviewed books are in the professional areas of natural resources, management, treatment, and resources recovery. In each book review, the authors introduce the publisher, authors, editors, and previous old editions of the book, if they exist. Each book is reviewed and discussed in terms of its technical coverage, professional level, area of applications, affordability to readers, advantages, disadvantages, suitability for international distribution, recommended readership, possible improvements, etc.

Keywords Book review · WIT Press · CRC Press · ASCE Press · Lenox Institute of Water Technology · Flood · Risk assessment · Risk management · Groundwater assessment · Modeling · Groundwater management · Natural decadal climate variability · Societal impacts · Sustainable water management · Sustainability technologies · Sustainable water technologies · Underground aqueducts · Urban storm water management · Water engineering · Spreadsheet

Abbreviations

ASCE	American Society of Civil Engineers
CRCES	Center for Research on the Changing Earth System
DCV	Decadal climate variability
FE	Fundamentals of engineering
GIS	Geographical information systems
LIWT	Lenox Institute of Water Technology
PE	Professional engineering
RMP	Risk management plan
WIT	Wessex Institute of Technology

1 Flood Risk Assessment and Management. S. Mambretti (editor). (2012). WIT Press, Ashurst, Southampton, SO40 7AA, UK (Headquarters), Billerica, MA 01821, USA (North American Office). 137 pp., ISBN: 978-1-84564-646-2

WIT Press is a book publisher of the Wessex Institute of Technology (WIT), which publishes high-end scientific books and journals, available both electronically and in print. With over 30 years of experience in science and technology publishing, WIT Press produces a series of books enabling researchers, engineers, scientists, graduate students, and managers within industry to remain up-to-date with the latest developments in the field of safety and security engineering.

Since one-third of the annual natural disasters and economic losses, and more than half of the respective victims and flood-related, this book is devoted to flood control engineering, being the first book in the Safety and Security Engineering series. The book contains selected technical papers presented at the Conferences organized by the WIT.

Editor S. Mambretti (Politecnico di Milano, Italy) is an experienced scholar who has published many other related books in the field of environmental engineering, such as *Urban Water* (2012), *Landsides* (2012), *Tsunami: From Fundamentals to Damage Mitigation* (2013), *Water Hammer Simulations* (2013), *Dam-Break Problems Solutions and Case Studies* (2009), *Urban Water II* (2014), etc.

This book has 12 chapters all written by the experienced professionals: (1) flood risk assessment; (2) mathematical models in flood management; (3) effects of topographic data resolution and spatial model resolution on hydraulic and hydro-morphological models for flood risk assessment; (4) an investigation of the relationship between perceptions of social responsibility and community resilience to flood; (5) decision-making methods for operational flood management; (6) European and Chinese integrated river basin management: experiences and perspectives; (7) advantage of using risk curves to assess flood protection measures; (8) real-time environmental information for the public and public safety organizations in case of flood events; (9) alternatives in flood protection; (10) psychological factors affecting flood coping strategies; (11) a model for simulating event scenarios and estimating expected economic losses for residential buildings; (12) flooding tendencies for the City of Ensenada, Baja, California, Mexico, 1948–2004. The technical presentation style by the different chapter authors is same and smooth throughout the entire book.

The reviewers appreciate the high quality of the technical materials in this fine book which is one of the most valuable tools for flood control engineers and managers.

Flood risk assessment focuses on the likelihood of adverse effects of floods as a basic philosophy for making environmental decisions related to flood measurements in the watershed. Making good watershed management decisions requires

some science-based information presented in this book that can be evaluated and priority ranked in terms of the risks to the watershed. Modern flood risk management is affected by global population growth wealth growth, climate change predictions, and urban development. The book may be further improved by adding more technical information on the effects of these factors, individually and in various combinations, on the flood risk assessment and control.

A minor deficiency of this 2012-book is that the references are slightly outdated. The most recent references cited by the chapter authors are: 2006 (1 chapter), 2007 (1 chapter), 2008 (3 chapters), 2009 (4 chapters), 2010 (2 chapters), and 2011 (1 chapter). Editor Mambretti should have asked the chapter authors to update their chapter manuscripts all to 2011 before publishing the book.

2 Groundwater Assessment, Modeling, and Management. **M. Thangarajan and Vijay P. Singh (2016). CRC Press,** **Taylor & Francis Group; 6000 Broken Sound Parkway** **NW, Suite 300, Boca Raton, FL 33487-2742, USA. www.crcpress.com; 511 pp., ISBN: 978-1-4987-4284-9**

The ever-increasing water demand, global warming, and water pollution have a significant, negative impact on groundwater quantity and quality, leading to the problems of continuous groundwater depletion and contamination.

Under the leadership of two award-winning editors, M. Thangarajan (PhD in Geophysics) and Vijay P. Singh (PhD in Engineering), 14 American experts and 70 international experts have contributed to this timely engineering book mainly for water resource managers, decision makers, professors, and researchers.

In general, this new book has contributed the following in the field of water resources engineering: (1) providing an international perspective on effective groundwater assessment, modeling, and management; (2) addressing best available water resources management methods, groundwater decontamination technologies, and environmental impact analyses of climate change on groundwater availability in arid and semiarid regions; (3) describing remote sensing applications, geographical information systems (GIS), and electrical resistivity methods to delineate groundwater potential zones; (4) introducing 30 case studies and six hypothetical studies to reflect a wide range of groundwater management themes including groundwater basics/flow, resources exploration & assessment, aquifer parameterization, aquifer augmentation, water environment, and agricultural utilization; (5) introducing the inverse models, simulation optimization models, mass transport models, mapping groundwater potential models, and vertical 2-D and 3-D groundwater flow models; and (6) catering to the needs of water engineers, managers, and scientists to enhance their knowledge of both theory and theory's applications under real-life situations.

Specifically, the book is divided into six sections and 32 chapters: (1) Section I has 3 chapters discussing groundwater resources and assessment; (2) Section II has 4 chapters discussing groundwater exploration; (3) Section III has 7 chapters presenting groundwater flow modeling methods and applications; (4) Section IV has 5 chapters presenting groundwater transport modeling methods and applications; (5) Section V has 6 chapters discussing groundwater pollution and remediation; and (6) Section VI has 7 chapters covering the topics of water resources management and climate change's impact on groundwater.

The book has been written and edited very well because all chapters are uniform in presentation format/style, share the same groundwater theme, and are updated to the publication year. Each chapter is independent with its own chapter title, author(s), table of contents, text, related tables/figures, summary/conclusions, and references. It is very interesting that the same new book can be mail-ordered from India with about one-half of the publisher's cost.

It is the reviewers' conclusion that this is an outstanding reference book for practicing engineers/scientists as well as a very useful supplemental textbook for water resources engineering courses. The reviewers offer the following recommendations for further improvement when it is time to publish a second edition: (1) inclusion of each chapter author's email address and affiliation on the first page of each chapter, so the readers may contact the author directly for enhancing their academic communications; (2) inclusion of an abstract (with key words) for each chapter immediately below the chapter's table of contents; (3) inclusion of the publisher's name, publication year, editors' names, book title, etc., at the bottom of each chapter's first page because each chapter is independent and available to be downloaded online; (4) inclusion of a Nomenclature section (with dimensional units, or metric units, or a note of dimensions) for each chapter having many equations or mathematical models; and (5) inclusion of a Glossary section in any chapter whenever new methods, technologies, definitions, or laws are introduced.

3 Natural Decadal Climate Variability: Societal Impacts. **Vikram M. Mehta. (2017), CRC Press/Taylor & Francis** **Group, Boca Raton, FL, USA. 33487-2742; 326 pp.; ISBN:** **978-1-46655-4528; CAT #K15322**

This is a beautiful book with 42 color and 47 black-and-white illustrations, detailed text, glossary terms, and updated references. It is one of five books in a book series entitled, "*Drought and Water Crises: Science, Technology and Management Issues*", which is managed by Series Editor Donald A. Wilhite, and published by CRC Press. Dr. Wilhite is a Professor Emeritus of Applied Climate Science at the University of Nebraska-Lincoln, and has been managing this series since 2005. The author, Dr. Vikram Mehta, earned his MS in Physics from Gujarat University, India, and his MS and PhD in Meteorology from Florida State University, USA. Dr. Mehta

is the founder and the President of the Center for Research on the Changing Earth System (CRCES) which specializes in research on natural decadal climate variability (DCV), and its impacts on water, food, energy, and water-borne transportation.

This exceptionally well-written book has eight chapters covering the following important but largely overlooked academic subjects: (1) a prologue with stories of devastating droughts in the US, France, and India several centuries ago; and an introduction to water, food, water-borne transportation, natural DCV, caveats, etc.; (2) an introduction to DCV phenomena; (3) ancient observers riding decadal hydrologic cycles; (4) modern observers riding decadal hydrologic cycles; (5) worldwide river flow variability and its impacts on water-borne transportation and hydroelectricity generation; (6) land's bounty, climate-related stresses on agriculture, climate variability on agriculture, irrigation, DCV impacts on production variability in over 100 crops, DCV consistency with variability in high winds, precipitation, dryness/wetness in 10 countries; (7) ocean's bounty, ocean science, DCV impacts on fish and crustacean capture in Pacific, Atlantic, and Indian Oceans; and (8) an epilogue with stories of such droughts and wet epochs in the current decade of twenty-first century.

Dr. Mehta has adopted a scientist's way to write his memoir which summarizes his lifelong professional experience and accomplishment in climate science, and climate information applications for water resources management.

The book is useful for (1) understanding and prediction of DCV, (2) assessment and prediction of DCV impacts on regional and global water-food-energy-public health securities, and (3) development of international climate and public policy. The reviewers (LK Wang and MHS Wang) highly recommend this 5-star reference book to environmental and water resources engineers, scientists, managers, and researchers.

4 Sustainable Water Management and Technologies: Volume I, Sustainable Water Management; Volume II, Sustainable Water Technologies. Daniel H. Chen (Editor), (2017). CRC Press, Taylor & Francis Group, 6000 Broken Sound Parkway, NW, Suite 300, Boca Raton, FL 33487, USA. Volume I: 429 pp., ISBN 978-1-4822-1518-2. Volume II: 391 pp., ISBN 978-1-4822-1510-6

This two-volume book set, *Sustainable Water Management and Technologies*, is a part of *Green Chemistry and Chemical Engineering* book series, managed by CRC Press Series Editor Sunggyu Lee. The book set has been contributed by 40 experts for Volume I and 35 experts for Volume II, and successfully edited by Dr. Daniel H. Chen, who is an experienced chemical engineering professor of Lamar University, TX, USA.

Volume I of the book set has 15 chapters covering the sustainable water management subjects of: water quality management; water monitoring and diagnosis; sustainable monitoring of algal blooms; groundwater management of aquifer storage, recovery, and overdraft; reservoir system management; sustainable urban water management; water management for shale oil and gas development; outreach programs for awareness of water resources sustainability and adoption of best management practices; water scarcity in developing regions; perspectives on managing freshwater systems; climate change and future water supply; adapting water infrastructure to nonstationary climate changes; integration of water and energy sustainability; water, energy, and ecosystem sustainability; and optimum, sustainable, and integrated water management.

Volume II of the book set has 12 chapters covering the sustainable water technology subjects of: water transport; groundwater contaminant transport mechanisms; groundwater protection and remediation; GIS, GPS, and satellite data; nanotechnology applications; industrial water usage and wastewater treatment/reuse; wastewater treatment, reuse and disposal; wastewater treatment and disposal for unconventional oil and gas development; membrane technology for water purification and desalination; biotechnology for water sustainability; biodegradation-bioremediation for soil and water; and sustainable manufacturing and water sustainability.

Both Volumes I and II discuss the current most pressing issues of water, energy, and climate interactions and are very uniform in chapter format, style, and length. Each chapter includes the chapter title, author(s), table of contents, text, and a list of useful references. Most of the chapter authors adopt both the US customary units and the metric units for international academic references.

Overall, this two-volume book set is an excellent technical reference for civil, environmental, chemical, and water resources engineers/managers/scientists/professors. The book set meets Editor Daniel H. Chen's expectation for educating young science and engineering students the basics of water technology and management and in turn developing the aspiration and skill set to contribute to an optimized solution of water sustainability.

Even the best-seller books will have room for further improvements. The following are simply some reviewers' humble recommendations for possible consideration by the publisher (CRC Press) and the editors (Daniel H. Chen and Sunggyu Lee) when the excellent book set is ready to have its new edition:

- (1) Practical design examples be added to some chapters that have many design equations, so these design equations may be easily understood by the intended young readers;
- (2) A Nomenclature section (including both the US customary units and international metric units) be added to some chapters that have many theoretical and design equations;
- (3) A Glossary section be added to some chapters that introduce new sustainability theories, technologies, and/or managerial skills;
- (4) An Abstract (including appropriate keywords) be added to each chapter immediately after the chapter Contents because each chapter is an independent publication;
- (5) The authors' affiliations and email addresses be added on the first pages of all chapters, so the readers may contact the authors directly for academic discussions and/or

possible collaborations; (6) The book title, book editor's name, chapter page range, publisher's name/address, publication year, etc., be printed at the bottom of each chapter's first page, because each chapter is an independent publication. With this important information, each chapter can be marketed by the publisher separately, and purchased/downloaded by the readers from the Internet individually. A reader may also properly quote the chapter as his/her reference in another publication; and (7) Current water sustainability regulatory requirements, professional association's certification program, case histories of water treatment plants, wastewater treatment plants, industrial plants, resources recovery facilities, Leadership in Energy and Environmental Design (LEED), etc., be included in the new edition.

5 Underground Aqueducts Handbook. Andreas N. Angelakis, Eustathios D. Chiotis, Saeid Eslamian, and Herbert Weingartner (2017). CRC Press, Taylor & Francis Group; 6000 Broken Sound Parkway NW, Suite 300, Boca Raton, FL 33487-2742, USA. www.crcpress.com; 522 pp., ISBN: 978-1-4987-4830-8

International collaboration for detailed introduction of various underground hydraulic works around the world has been successfully done and documented in this water resources engineering book. Editors AN Angelakes, Chiotis, S Eslamian, and H Weingartner are famous water resources experts in Greece, Greece, Iran, and Austria, respectively. Sixty-six contributors from nine disciplines (archaeology, hydrology, history, engineering, life sciences, public health, environment, biology, and geotechnology), four continents (Europe, Africa, Asia, and Americas), and 26 countries have collaborated together on this academic contribution.

This 2017 new handbook focuses on the technological development and management practices related to worldwide underground aqueduct technologies throughout the millennia. After a comparison of the water technological developments in several civilizations has been made and discussed, the future trends and technology advancement are predicted. Entire handbook is divided into eight sections and 29 chapters. Although all chapters share the same central theme "underground aqueducts", each chapter is independent consisting of chapter title, chapter author(s), table of contents, text, discussion, conclusions/summary, and updated references. Many useful and modern photos, maps, flow diagrams, and system design drawings are inserted in the text for detailed illustration. Only international metric units are adopted throughout the entire handbook.

The contents of this handbook are impressive. Section I introduces and concludes various types and definitions of underground aqueducts. Underground aqueduct history is reviewed, and its selection and classification scheme are proposed.

Section II has four chapters covering mainly the following topics in Europe: Roman underground hydraulic structures in Croatia; Roman underground aqueducts

in Germany; updated appraisal of ancient underground aqueducts in Greece; and the aqueduct of Eupalinos on Samos, Greece and its restoration.

Section III has three chapters covering some topics in Africa: the past and present of underground aqueducts in Algeria; the water supply history of underground aqueducts in Egypt; and qanat evolution and use in Libya.

Section IV has nine chapters covering many topics in Middle East: an ancient and sustainable water resources utilization in Iran; spring tunnels in Israel: the Jerusalem Hills perspective; an underground Roman water system in Syria and Jordan; the aqueducts of the Sultanate of Oman and sustainable water-supplying system irrigating Oases cities; aqueducts in Saudi Arabia; qanats of Syria; groundwater structures throughout Turkish history; history and factors affecting recharge, discharge, and water quality in the United Arab Emirates; and polycentric and multi-period innovation case studies in Iran and the United Arab Emirates.

Section V has three chapters covering ancient and historical topics in Eurasia: ancient aqueducts and the irrigation system in Armenia; evolution of the qanat systems in the arid countries of the Caucasus and Central Asia; and ancient water mining in tunnels and wells in West Central Asia.

Section VI has six chapters covering several Asian topics: underground aqueducts in Japan; managing drought through qanat and water conservation in Afghanistan; utilization and contribution of underground aqueducts in the Turpan Oasis of China; traditional methods of groundwater abstraction and recharge along the windward side of the foothills of the Western Ghats of India; historical development of qanats and underground aqueducts in Pakistan; and underground aqueduct and water tunneling development in Thailand.

Section VII has two chapters briefly covering the topics in Americas: puquios and aqueducts in the Central Andes of South America; and the ancient hydraulic catchment systems of the Tepeaca-Acatzingo archaeological zone in Puebla, Mexico. Finally, Section VIII with one chapter concludes the past, present, and future trends of underground aqueducts. The book emphasizes that the future trends of underground aqueducts should consider the possibility and practicality of integrating older, proven technologies into modern infrastructure.

Overall, this is a very unique engineering book introducing the underground aqueduct technologies and practices which are not widely known among civil, environmental, and water resources engineers. It does help address the current issues of groundwater sustainability, construction cost-effectiveness, environment adaptation, water resources management, water supply system decentralization or centralization. It also helps engineers understand the underground aqueduct-related history, hydrology, geotechnology, and environmental sciences.

The reviewers highly recommend this handbook to practicing civil, environmental, and water resources engineers, government managers/planners, and university professors/researchers. The reviewers further suggest that the big underground aqueduct systems in the USA (such as the City of New York system, the City of Boston system, etc.) be introduced, analyzed, and discussed in the new edition of this book due to their engineering significance, and due to the fact that CRC Press is an American book company.

6 Urban Storm Water Management, Second Edition, Hormoz Pazwash (2016) CRC Press, Taylor & Francis Group, Boca Raton, FL 33487, USA. 684 pp., ISBN: 978-1-4822-9895-6

An older edition with identical book title (978-1-4398-1035-4) was published in 2011. The timing for publishing this second edition (978-1-4822-9895-6) in 2016 is very appropriate.

Dr. Pazwash, the author of both editions, is a municipal engineer as well as a professor. He has been involved in the field of storm water management since 1985. His extensive experience has included practical design of over one hundred of drainage and storm water management systems. He has summarized his lifelong experience in this very concise book. Since the book contains many case studies that illustrate methods and procedures for designing detention basins, infiltration basins, and underground retention/infiltration basins, it is an excellent reference book for guiding practicing engineers and planners in designing such storm water management elements. Since there are numerous engineering examples in the book to provide detailed hydrologic and hydraulic calculations for storm water system design and management, it may also serve as a very good water engineering textbook for university/college students.

The book has 10 chapters. Specific coverage of this book includes urbanization impact on runoff; pipe and open-channel flows; hydrologic calculations; storm drainage systems design; storm water management regulations; manufactured water treatment devices; structural storm water management systems; new trends in storm water management; hydraulic structure installation, inspection, and maintenance; storm water management systems; storm water conservation; and water reuse. Also included in the book are useful glossary terms and some technical information on the unified soil-classification system and nominal sizes of coarse and fine aggregates.

Although the chapter numbers and the chapter titles of the two editions are almost identical, there are many new elements in this second edition: (1) it provides an updated presentation of urbanization's impact on storm water; (2) it presents further analysis of the universal runoff model and the applications; (3) it offers a more detailed presentation of storm water management systems; (4) it includes a comparative analysis of the effectiveness and costs of best management practices; (5) it adds more than twice as many problems as before; and (6) it contains an in-depth discussion of the means of collecting storm water.

Overall, this is one of the best books in the field of civil and water resources engineering. The reviewers highly recommend this book to all water engineers, planners, and professors.

7 Water Engineering with the Spreadsheet. Ashok Pandit (2016). ASCE Press, American Society of Civil Engineers, 1801 Alexander Bell Drive, Reston, Virginia 20191, USA. 214 pp., ISBN: 978-0-7844-1404-0

This is one of the ASCE Press books helping civil engineering students use spreadsheets for various engineering calculations. ASCE is commended for publishing these books with spreadsheets for serving its members and general professional readers.

Dr. Pandit, the author, is currently head of the civil engineering department at the Florida Institute of Technology. He has 30+ years of professional experience in the areas of fluid mechanics, hydraulics, hydrology, groundwater modeling, and storm water drainage and management, and has been employing spreadsheets in the classroom and in practice for more than 20 years. The book is intended for use as a supplement to undergraduate and graduate texts and lectures. The print edition of this book contains a CD-ROM with unlocked Excel files. The e-book edition is accompanied by a downloadable ZIP file for the Excel files. Microsoft Excel software is not included. Only Microsoft Excel 2003 or above can be used. It is important to note that the book contains only the spreadsheets for organized water engineering calculations, but does not contain any computer programs for rapid calculations.

The book contains four chapters which are (1) fluid mechanics: force calculations under static and dynamic conditions, and flow in pressure pipes; (2) hydraulics: open channel flow, gradually varying flows, rapidly varying flows, and open channel design; (3) hydrology: lake evaporation, direct runoff hydrographs, and reservoir and channel routing; and (4) storm water management: system components for land development, and system design for land development.

Both students and professionals may find the book useful for the following reasons: (1) it provides a large spectrum of examples, from easy to difficult, to explain key fundamentals, analyses, and water engineering design; updated presentation of urbanization's impact on storm water; (2) its examples are solved with the help of spreadsheets; (3) it provides background information before each section to discuss the theory and equations covered in the examples; (4) it provides background information within each problem to emphasize some key points regarding the example; (5) it provides key assumptions, where needed, within each example; (6) it provides key equations to solve the problem when needed; (7) it provides a solution procedure within each example; (8) it provides the "what-if" analysis associated with every problem; (9) it adopts the trial-and-error solution procedures when necessary and such solution procedures are iterative by nature; (10) it uses the trendline equations to avoid the tedious task of interpolation while maintaining accuracy; and (11) it provides "assigned problems" to let readers create their own new spreadsheets.

Overall, this book is an excellent "supplemental" water engineering textbook for students, or a preparation tool for engineers to take the fundamentals of engineering (FE) and professional engineering (PE) examinations, if it is used correctly.

However, it is not a university/college's "main" water engineering textbook covering the subjects of fluid mechanics, hydraulics, hydrology, or storm water management. Since the book is entitled "Water Engineering with the Spreadsheet", and intended for both the US and worldwide distributions, its future edition may be improved by: (1) expansion of the book to include other important water engineering subjects, such as water distribution and drinking water treatment; and (2) adoption of both the US customary units and the metric units, side-by-side throughout the entire book.

Glossary [1–15]

Above ground aqueduct It is a conduit, at or above ground level, usually of considerable size and open to the air, used to convey water or other liquid by gravity flow.

Flood It is a relatively high water flow as measured by either gauge height or discharge quantity, or any water flow equal to or greater than a designated basic water flow.

Groundwater It is the water contained in interconnected pores located either below the land's water table in an unconfined aquifer or in a confined aquifer.

Modeling It is an act of developing a mathematical or physical representation of a real-world system, in order to study and understand the behavior of that system.

Natural resources They include all natural products, energy, forces, lights, biological lives, of the universe that support life and satisfy people's needs. Air, land, and water are natural resources, as are biological and physical resources in the air, on the land and in the water, such as solar heat, rains, birds, bees, flowers, bacteria, wild animals, and fish, as well as minerals, oil, coal, metals, stone, sand, lights, winds, magnetic forces, radioactivity, even elements, DNA, etc.

Nonrenewable or unsustainable natural resources They are natural resources that are not renewable, such as mineral and fossil fuels. Some renewable resources may become nonrenewable if they are destroyed or lost by bad resource management, e.g. farmland losing topsoil or denuding of watersheds.

Renewable or sustainable natural resources They are natural resources that are renewable, such as solar, wind, tidal energy, farmland, forests, fisheries, surface water, etc.

Risk assessment It is either a utility's assessment in the workplace of dangers or harm to employees, equipment, or both, or an individual's assessment of possible events that could lead to harm and danger or exposure to uncomfortable situations.

Risk management plan (RMP) It is a managerial plan intended to prevent and minimize the impact of accidental release of hazardous, infectious, or any other undesirable substances.

Risk management It is a managerial process of weighing policy alternatives, selecting the most appropriate regulatory action, and integrating the results of

risk assessment with scientific data and related social, economic, and political concerns to reach a low-risk decision.

Storm water runoff That portion of the rainfall over a given area that finds its way to natural or artificial drainage channels.

Storm water It is water that is collected as runoff from a rainfall event.

Underground aqueduct It is a conduit, below ground level, usually of considerable size and not open to the air, used to convey water or other liquid by gravity flow.

Water engineering It is an academic branch of engineering that studies, researches, or implements, or builds anything involving water.

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