Neil S. Grigg

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Education and experience:

Ph.D.	1969	Colorado State University (Hydraulic Engineering; focus on river mechanics and sedimentation)
M.S.	1965	Auburn University (Hydraulic/Structural Engineering; focus on open channel hydraulics)
B.S.	1961	US Military Academy (Engineering)

Current. Professor of Civil and Environmental Engineering at Colorado State University. Teaching and research subjects: water resources management, river management and flood control, utility management, stormwater, infrastructure finance and management, pipeline engineering and hydraulics.

<u>1982–date</u>. Colorado State University: Professor of Civil and Environmental Engineering (1982-); Department Head, Civil Engineering (1991-2000). Director, Colorado Water Resources Research Institute (1988-91) and Water Center (1991-1995); Director, International School for Water Resources (1985-88). Also serve as River Master of Pecos River for U.S. Supreme Court case No.65, Original (1988-date).

<u>1979–82</u>. State of North Carolina Assistant Secretary for Natural Resources (1979-82) and Director of Environmental Management (1979-80). Responsible for natural resources agencies within Department of Natural Resources and Community Development. Supervised planning, permitting and enforcement programs for water quality, water resources, and air quality. Delivered nationwide short courses on stormwater and flood control engineering and management.

<u>1977–82.</u> Director of University of North Carolina Water Resources Research Institute. Member, NC Sediment Control Commission. Professor of Civil Engineering, North Carolina State University; Adjunct Professor of Environmental Sciences and Engineering, University of North Carolina at Chapel Hill. Research focus on rivers, estuaries and coastal waters. On leave 1979-1982.

<u>1972–77.</u> Colorado State University. Principal investigator for research into combined sewer control, stormwater management and flood control, and hydrology for transportation engineers. CSU Director of International Education (1976-1977).

<u>1968–76.</u> Co-founder and vice-president of Sellards & Grigg Inc, a Denver-area civil and environmental engineering firm. Focus of work on stormwater management, flood control, urban water issues. The firm was bought out in 2006 by Short Elliott Hendrickson Inc.

1964–72. University of Denver. Assistant Dean of Engineering (1970-2). Assistant Professor of Civil and Environmental Engineering. Colorado State University Ph.D.

student. Research associate and research hydraulic engineer with US Geological Survey. Engineer for Ken R. White Company, Denver, (1965-7); Auburn University M.S. student (1964-5).

<u>1961–64.</u> Military service with US Army Corps of Engineers. Assignments with engineering battalion in Germany and as instructor, US Army School, Europe.

Specific areas of experience

River management. Involved with litigation concerning flooding and river controls. Directed project to review water law and integrated water resources management in Colombia. Principal consultant in Alabama Water Resources Policy Commission and in establishment of Alabama Office of Water Resources. UNDP expert on Egypt Master Plan for Nile water use; visit to study UK reorganization of river basin authorities; FAO expert on Somalia water policy; China Water Tour under American Association for Advancement of Science to study river basin planning and related topics; tour of Japan to study public works, including river basin planning; tour of Vietnam to study water management; led water management tour of South Africa; invited speaker to Korea Water Resources Association on Integrated Water Resources Management; visits to Indonesia to consult on water policy.

Interstate river basin and transboundary water management. Served since 1988 as River Master of Pecos River under U.S. Supreme Court appointment. Involves annual accounting for water and overseeing modifications of interstate water rights accounting process. Active participation in Apalachicola–Chattahoochee–Flint system river basin planning activities involving Alabama, Georgia, and Florida, including interstate compact negotiations. Had oversight in 1980 of the Yadkin–Pee Dee Level B study, funded by US Water Resources Council, and involving NC and SC.

Infrastructure and public works management. Over forty years of experience in infrastructure and public works industry as: state and local official or member of advisory board, member of American Public Works Association Board of Directors, consulting engineer, participant in national infrastructure policy boards and activities, author of several books about infrastructure management and policy. Taught graduate class on infrastructure management for over 30 years. Recently served as member of Quality Council for American Public Works Association to implement public agency management certification program.

Public agency management. As North Carolina's Assistant Secretary for Natural Resources and Director of Environmental Management had responsibility for river basin water quantity and quality, and groundwater management. Oversaw water permitting programs for water quality and quantity and initiated active enforcement actions with industries and cities for compliance. Led effort to create Office of Water Resources and took part in national efforts to strengthen state government water agencies. Coordinated efforts to promote regional interstate environmental and water issues. *Water Research Center and engagement:* Was founding Director, Colorado State University Water Center (1991-1995). Served as Director, Colorado Water Resources Research Institute (1988-91) and Director, University of North Carolina Water Resources Research Institute (1977–81). Organized national workshops for Water Research Foundation (2001, 2003). Organized Colorado Water Engineering and Management Conferences, 1987, 89, 90; Short courses in stormwater management; International Conference: Transfer of Water Resources Knowledge (1977); National Workshop on Drought Water Management 1988; Colorado Workshop on Dam Safety 1989; North Carolina Workshops on Stormwater and Sedimentation; Southeast regional conferences, including stormwater management, groundwater, water administration, toxic substances, water supply and conservation; Youth and Environmental Industry Conference, 1995; Water and Environmental Education Conference, 1992.

Water industry boards and associations. Big Thompson Water Forum (Vice Chair, then Chair, 2005); Ft Collins Water Board (1983-95; President 1991-5); Chair, ASCE Urban Water Resources Research Council (1978-9); Chair, Water Committee, Ft Collins Chamber of Commerce (1989-1991); Director, Association of State and Interstate Water Pollution Control Officials (1980-1); Fellow, International Water Resources Association. Chair, Advisory Council for Environment and Water Resources Institute (1998–); American Water Works Association.

Other qualifications

- Professional associations: American Society of Civil Engineers. Fellow and Life Member. American Academy of Water Resources Engineers (Founding Diplomate). Pan American Academy of Engineering (Charter Member); American Water Works Association, Life Member; American Public Works Association, Board of Directors, (1992-95); National Association of Water Institute Directors (1988-91); Ft Collins Water Board (1983-95; President 1991-5); Chair, ASCE Urban Water Resources Research Council (1978-9); Chair, Water Committee, Ft Collins Chamber of Commerce (1989-1991); Director, Association of State and Interstate Water Pollution Control Officials (1980-1); Member, International Water Resources Association. Member, Fort Collins Transportation Board (2003-2008).
- Registered professional engineer in Colorado, Alabama, North Carolina.

Awards

Honorary degree: Doctor Honoris Causa En Management, (GERENS, Peru)		
Service Award, CSU Department of Civil and Environmental Engineering		
ASCE EWRI Lifetime Achievement Award		
Oliver P. Pennock Distinguished Service Award, CSU		
International Water Resources Association, Best Paper Award		
American Water Works Association, Division Best Paper Award, Management		
Pan American Academy of Engineering, Charter Member		
George T. Abell Engineering Faculty Award		
APWA Reporter Magazine, Selected for Member Focus		
Distinguished Faculty Award, CSU Alumni Association		
CSU International Programs, Distinguished Service Award		
Public Works Magazine Trendsetter Award		

Faculty Award for Excellence in Teaching, CE		
AWWA, Life Member		
UCOWR Warren Hall Medal		
Donald Stone Award of APWA		
ASCE, WRPMD, Service to Profession Award		
Outstanding faculty award in Civil Engineering		
Fellow, IWR of APWA	1986	
Fellow, ASCE		
Fellow, AAAS		
NC Governor's Award for Environmental Protection		
UNC Public Service Fellow		
Consulting Engineer's Council research award		

Publications (2008-2021)

BOOKS

Grigg, Neil S. Total Water Management: practices for a sustainable future AWWA Press. 2008. Grigg, Neil S. and Zenzen, Mary. 2009. Water and Wastewater Workforce Planning, Design, and Action for Organizational Excellence. AWWA Press. Denver. Grigg, Neil S. 2010. Economics and Finance of Infrastructure and Natural Resources: A Guide for Engineers. ASCE Press. Reston VA. Grigg, Neil S. 2010. Infrastructure Finance: The Business of Infrastructure for a Sustainable Future. John Wiley & Sons. Grigg, Neil S. 2010. Governance and Management for Sustainable Water Systems. IWA Press. London. Grigg, Neil S. 2011. The Water Business: From the Global Environment to Your Tap. John Wiley & Sons. Grigg, Neil S. 2012. Water and Sewer Infrastructure Management. CRC Press/Lewis Publishers (Second edition). Grigg, Neil S. 2016. Integrated Water Resources Management: An Interdisciplinary

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Journal articles

MacDonnell, L. and Grigg, N. 2008. Establishing a Water Law Framework: The Colombia Example. Water International: Journal of International Water Resources Association.

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Grigg, Neil S. 2009. Water and wastewater workforce: The case for better data. JAWWA. August. (Also selected for AWWA book on The Business of Water).

Rogers, Peter D. and Grigg, Neil S. 2009. Failure Assessment Modeling to Prioritize Water Pipe Renewal – Two Case Studies. ASCE Journal of Infrastructure Systems. 15(3), 162–171.

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Iwan K. Hadihardajaa and Neil S. Grigg. 2011. Decision support system for irrigation maintenance in Indonesia: a multi-objective optimization study Water Policy 13 (2011) 18–27.

Grigg, N. 2012. Large-Scale Disasters: Leadership and Management Lessons. Leadership Manage. Eng., 12(3), 97–100. Also Editor of Special Issue: Large-Scale Disasters: Leadership and Management Lessons.

Grigg, Neil S. 2012. Water utility leadership and its key role in protecting aquatic ecosystems. JOURNAL AWWA. 104:10. October 5.

Grigg, Neil S. 2013. Water main breaks—risk assessment and investment strategies. Journal of Pipeline Systems, ASCE. 4(4)1-7.

Grigg, Neil S. 2013. Stormwater Programs: Organization, Finance, and Prospects. Public Works Management and Policy. Public Works Management Policy January 2013 vol. 18 no. 1 5-22

Grigg, Neil S. 2013. Infrastructure Stimulus Spending: Lessons for Assessment and Engineering Education. ASCE Journal of Engineering Education and Practice. April. 139(2)81-86.

Grigg, Neil S. 2013. Stormwater Programs: Organization, Finance, and Prospects. Public Works Management and Policy. Volume 18 Issue 1 January 2013 pp. 3 - 20.

Akhbari, Masih and Grigg, Neil S. 2013. "A Framework for an Agent-Based Model to Manage Water Resources Conflicts." Water Resources Management. (27)4039-4052.

Grigg, N. Water Resources Planning: An Integrative Framework for Multiple Purposes and Strategies. L'ACQUA 5-6/2013.

Grigg, N. (2014). "Infrastructure Report Card: Purpose and Results." *J. Infrastruct. Syst.*, 10.1061/(ASCE)IS.1943-555X.0000186, 02514001. 21(4)

Grigg, N. 2014. The 2011–2012 Drought in the United States: new lessons from a record event. International Journal of Water Resources Development. 30(2)183-199.

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Rogers, Peter and Grigg, N. 2015 (in press). Trends in Dual Water Systems. Journal of Water Reuse and Desalination.

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Mohammed S. Hashem Mehany, and Neil Grigg, Causes of Road and Bridge Construction Claims: Analysis of Colorado Department of Transportation Projects. Accepted by ASCE Journal of Legal Affairs and Dispute Resolution in Engineering and Construction. <u>10.1061/(ASCE)LA.1943-4170.0000162</u>, 04514006. September 2014.

Christos A. Karavitis, Demetrios E. Tsesmelis, Nikolaos A. Skondras, Demetrios Stamatakos, Stavros Alexandris, Vassilia Fassouli, Constantina G. Vasilakou, Panagiotis D. Oikonomou, Gregor Gregorič, Neil S. Grigg and Evan C. Vlachos. Linking Drought Characteristics to Impacts on a Spatial and Temporal Scale. Water Policy. Vol 16 No 6 pp 1172–1197.

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Am. Society of Civil Engineers. July 2017. Volume 143, Issue 3. Online publication date: November 15, 2016.

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Allen, Martin, Clark, Robert, Cotruvo, Joseph A., and Neil Grigg. 2018. Drinking Water and Public Health in an Era of Aging Distribution Infrastructure. Public Works Management & Policy. 1–9. DOI: 10.1177/1087724X18788368.

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Unbundling infrastructures to identify attractive public-private infrastructure partnerships. ASCE Journal of Infrastructure Systems. 2018 publication. Forum paper.

Grigg, N. S., Connor, T., & Maas, A. (2017). Financing Integration of Urban Water Systems: From Service Provision to Resource Management. Public Works Management & Policy, 1087724X17732789. https://doi.org/10.1177/1087724X17732789

Water-health nexus: modeling the pathways and barriers to water-related diseases. Water Resources Management. 2018.

Water supply organizations. Journal AWWA. Scheduled November 2018.

Water and Climate: Charting the Path to a Sustainable Future. Declaration from 2016 Global Water & Climate Initiative. Larry Brazil, Neil Grigg, Chris Kummerow and Reagan Waskom. ASCE Journal of Water Resources Planning and Management. Editorial. 143(10). October.

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Uncertainty and legal foreseeability in flood risk management Technical Note, ASCE-ASME Journal of Risk and Uncertainty in Engineering Systems, Part A: Civil Engineering.

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Development of a Parametric Regional Multivariate Statistical Weather Generator for Risk Assessment Studies in Areas with Limited Data Availability. Authors: Saddam Q. Waheed, Neil S. Grigg, Jorge A. Ramirez. Climate (in Special Issue on Application of Climatic Data in Hydrologic Models)

Smart water management: can it improve accessibility and affordability of water for everyone? Water International Special Iss.

Characterizing influence of hydrologic data inter-correlation on decision variables: Evidence from Diyala River Basin in Iraq

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ASCE's Journal of Hydrologic Engineering.

U.S. flood insurance at 50 years: is the public–private partnership working? Water Policy. Water Policy (2019) 21 (3): 468–480. <u>https://doi.org/10.2166/wp.2019.004</u>

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Is a Stormwater Fee a Rain Tax? ASCE. J. Leg. Aff. Dispute Resolut. Eng. Constr., 2019, 11(3): 04519017

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Overcoming Obstacles to Deficit Irrigation: Colorado Case Study. Manijeh Mahmoudzadeh Varzi and Neil Grigg, ASCE Journal of Water Resources Planning and Management. Volume 145 Issue 10 - October 2019.

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Oikonomou, Panagiotis & Tsesmelis, Demetrios & M. Waskom, Reagan & Grigg, Neil & Karavitis, Christos. (2019). Enhancing the Standardized Drought Vulnerability Index by Integrating Spatiotemporal Information from Satellite and In Situ Data. Journal of Hydrology. 569. 265-277. 10.1016/j.jhydrol.2018.11.058.

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Goals. Global Water Security Issues (GWSI) Paper Series. UNESCO International Center for Water Security and Sustainable Development.

Floods, lawsuits and water infrastructure management. ASCE Journal of Legal Affairs and Dispute Resolution.

Providing Effective Means to Reform the National Flood Insurance Program through Risk Mapping. ASCE Journal of Sustainable Water Management in the Built Environment. Forum.

Transboundary Groundwater Cooperation among Countries of the Arabian Peninsula Mohamed J. Abdulrazzak, Ph.D.; Panagiotis D. Oikonomou, Ph.D.; Neil S. Grigg, Ph.D. ASCE Journal of Water Resources Planning and Management. 146(1)

Smart water management: can it improve accessibility and affordability of water for everyone? IWRA Special Issue.

Missouri River governance: collective action and basinwide problems. ASCE Journal of Water Resources Planning and Management.

Uncertainty and legal foreseeability in flood risk management. ASCE-ASME Journal of Risk and Uncertainty Analysis.

Variable Infiltration Capacity Model Sensitivity, Parameter Uncertainty, and Data Augmentation for the Diyala River Basin in Iraq. ASCE Journal of Hydrologic Engineering. Saddam Waheed, Neil Grigg, Jorge Ramirez.

Mohamed J. Abdulrazzak, Ph.D.; Panagiotis D. Oikonomou, Ph.D.; Neil S. Grigg, Ph.D.Transboundary Groundwater Cooperation among Countries of the Arabian Peninsula . Tentative acceptance. ASCE Journal of Water Resources Planning and Management. December, 2018.

Mahmoudzadeh Varzi, Manijeh and Grigg, Neil S. 2018. Alternative Water Transfer Methods: Review of Colorado Experiences. Submitted March 2018 to ASCE Journal of Irrigation and Drainage Engineering. Accepted for review by editor only.

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Neil S. Grigg (2018) Service levels for the four billion people with piped water on premises, Water International, 43:4, 531-547, DOI: <u>10.1080/02508060.2018.1452119</u>

Grigg, Neil S. Financing Integration of Urban Water Systems: From Service Provision to Resource Management. Public Works Management & Policy Volume 23 Issue 2, April 2018. doi.org/10.1177/1087724X17732789

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Grigg, Neil S. 2018. Civil Engineering Workforce and Education: Twenty Years of Change. Journal of Professional Issues in Engineering Education and Practice, 144(4), 04018010, 2018. <u>https://doi.org/10.1061/(asce)ei.1943-5541.0000387</u>

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