

**RICHARD N. PALMER**

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**Academic Background**

Ph.D.	Environmental Engineering, Johns Hopkins University	1979
M.S.	Environmental Engineering, Stanford University	1973
B.S.	Civil Engineering, Lamar University	1972

**Professional Registration and Academies**

Registered Professional Civil Engineer, State of Washington, #21154  
National Water Academy, #106  
American Academy of Water Resources Engineers, #00191

**Professional History**

Director, Northeast Climate Science Center, Funded by the US Department of Interior/USGS, October 2012 to September 2021. one of 8 National Climate Science Centers fund by Interior

Professor and Head, Department of Civil and Environmental Engineering, University of Massachusetts Amherst, March 2008 to August 2019.

Professor, University of Washington, Department of Civil and Environmental Engineering, 1990-2008.

Associate Professor, University of Washington, Department of Civil and Environmental Engineering, 1985-1990.

Assistant Professor, University of Washington, Department of Civil and Environmental Engineering, 1979-1985.

Intergovernmental Personal Assignment, Institute for Water Resources, US Army Corps of Engineers, Ft. Belvoir, Virginia, 1997.

Visiting Scholar, Centro de Estudios Avanzados de Blanes, Spain, and Visiting Senior Research Fellow, Department of Civil Engineering, Heriot-Watt University, Edinburgh, Scotland, 1987 - 1988.

Postdoctoral Fellow/Research Assistant/Ph.D. Candidate, The Johns Hopkins University, Department of Geography and Environmental Engineering, 1975-1979.

## **Awards and Honors**

American Society of Civil Engineers, Distinguished Member, 2017

J. William Fulbright Foreign Scholarship Awardee, 2015-2016.

Distinguished Faculty Lecturer, University of Massachusetts Amherst, 2014.

American Society of Civil Engineers, Fellow, 2014

ASCE Julian Hinds Award, 2006.

Service to the Profession Award, Water Resources Planning and Management Division, American Society of Civil Engineers, 1998.

Certificate of Recognition, American Society of Civil Engineers, Editing Excellence, 1997

Huber Award for Research Excellence, American Society of Civil Engineers, 1992

Best Practice-Oriented Paper of the Year, American Society of Civil Engineers, Water Resources Planning and Management Division, 1988-1989.

Member of Research Team that was a Finalist in American Society of Civil Engineers for Engineering Achievement of the Year, 1983.

## **Refereed Journal Publications**

1. Palmer, R.N., James, I.C., and Hirsch, R.M. (1978) Comparative assessment of water use and environmental implications of coal slurry pipelines, *Hydrological Science Bulletin*, Vol. 23, No. 4, 455-469.
2. Palmer, R.N., Smith, J.A., Cohon, J.L. and ReVelle, C.S. (1982) Reservoir management in the Potomac River basin, *Journal of Water Resources Planning and Management Division*, ASCE, Vol. 108, No. 1, 47-66.
3. Palmer, R.N., and Lettenmaier, D.P. (1983) The use of screening models in determining water supply reliability, *Civil Engineering Systems*, Vol. 1, No. 1, 15-22.
4. Palmer, R.N., and Lund, J.R. (1985) Multiobjective analysis with subjective information, *Journal of Water Resources Planning and Management Division*, ASCE, Vol. 111, No. 4, 399-416.
5. Palmer, R.N., and MacKenzie, M.C. (1985) Optimization of water quality monitoring networks, *Journal of Water Resources Planning and Management Division*, ASCE, Vol. 111, No. 4, 478-493.
6. Palmer, R.N., and Snyder, R.M. (1985) Evaluation of instream flow requirements on water supply reliability, *Water Resources Research*, Vol. 21, No. 4, 439-446.
7. Lund, J.R., and Palmer, R.N. (1986) Subjective evaluation: Linguistic scales in pairwise comparison methods, *Civil Engineering Systems*, Vol. 3, No. 4, 181-186.
8. Palmer, R.N., and Cohan, J.L. (1986) Complexity as a measure of model appropriateness, *Journal of Water Resources Planning and Management Division*, ASCE, Vol. 112, No. 4, 453-468.

9. Palmer, R.N. and Lund, J.R. (1986) Drought and power production, *Journal of Water Resources Planning and Management Division*, ASCE, Vol. 112, No. 4, 469-484.
10. Mar, B.W., Horner, R.R., Richey, J.S., Palmer, R.N. and Lettenmaier, D.P. (1986) Cost-effective methods for obtaining data on water quality, *Environmental Science and Technology*, Vol. 20, No. 6, 545-551.
11. Palmer, R. N., and Tull, R. M. (1987) Expert system for drought management planning, *Journal of Computing in Civil Engineering*, ASCE, Vol. 1, No. 4, 284-297.
12. Palmer, R.N. (1987) Editorial and introduction to journal of computing in civil engineering: Special Issue On Expert Systems, *Journal of Computing in Civil Engineering*, ASCE, Vol. 1, No. 4, 1-2.
13. MacKenzie, M.C., Palmer, R.N. and Millard, S.P. (1987) Analysis of statistical monitoring network designs, *Journal of Water Resources Planning and Management Division*, ASCE, Vol. 113, No. 5, 599-615.
14. Johnston, D. M., and Palmer, R. N. (1988) Application of fuzzy decision making: An evaluation, *Journal of Civil Engineering Systems*, Vol. 5, No. 2, 87-92.
15. Palmer, R. N., and Holmes, K. J. (1988) Operational guidance during droughts: An expert system approach, *Journal of Water Resources Planning and Management Division*, ASCE, Vol. 114, No. 6, 647-666.
16. Mishalani, N. R., and Palmer, R. N. (1988) Forecast uncertainty in reservoir operation, *Water Resources Bulletin.*, Vol. 24, No. 6, 1237-1245.
17. Palmer, R.N., and Mar, B.W. (1988) Expert systems software for civil engineering applications, *Journal of Civil Engineering Systems*, Vol. 5, No. 4, 170-180.
18. Mar, B.W., and Palmer, R. N. (1989) Does civil engineering need system engineering?, *Journal of Professional Issues in Engineering*, ASCE, Vol. 115, No. 1, 45-52.
19. Palmer, R.N., and Mar, B.W. (1989) The automation of civil engineers: Some observations, *Journal of Management in Engineering*, ASCE, Vol. 5, No. 3, 286-300.
20. Mar, B.W., and Palmer, R. N. (1989) Workstations for systems engineers, *Systems Practice*, Vol. 2, No. 2, 239-245.
21. Keyes, A. M., and Palmer, R. N. (1993) Development of a decision support system for the prioritization of multimedia dischargers, *Journal of Environmental Management*, 601-612.
22. Pacanovsky, D.L., Jahren, C.T., Palmer, R.N. Newman, R.R. and Howland, D. (1995) Decision support system to load containers to double stack rail cars, *Civil Engineering Systems*, Vol., 12, 247-263.
23. Jahren, C.T., Rolle, S.S., Spurgeon, L.E., Palmer, R.N., Newman, R.R, and Howland, D. (1995) Automatic assignment algorithms for loading double stack rail cars, *Transportation Research Record*, Vol. 151, 10-18.
24. Wood, A.W., Lettenmaier, D.P., and Palmer, R.N. (1997) Assessing climate change implications for water resources planning, *Journal of Climatic Change*, Vol. 37, No. 1, 203-228.

25. Wood, A.W., Palmer, R.N., and Petroff, C. (1997) An assessment of a zero rise floodplain ordinance, *Journal of Water Resources Planning and Management Division, ASCE*, Vol. 123, No. 4, 239-245.
26. Kim, Y.O., and Palmer, R.N. (1997) The value of seasonal flow forecasts in Bayesian stochastic programming, *Journal of Water Resources Planning and Management Division, ASCE*, Vol. 123, No. 6, 327-335.
27. Fisher, S., and Palmer, R.N. (1997) Managing water supplies during drought: Triggers for operational responses, *Water Resources Update*, Vol. 3, No. 108, 14-31.
28. Lund, J.R., and Palmer, R.N. (1997) Water resource system modeling for conflict resolution, *Water Resources Update*, Vol. 3, No. 108, 70-82.
29. Lettenmaier, D.P., Wood, A. W., Palmer, R.N., Wood, E., and Stakhiv, E.Z. (1999) Water resources implications of global warming: A U.S. regional perspective, *Climatic Change*, Vol. 43, 537-579.
30. Palmer, R.N., A.G. Reese, and S.E. Nelligan-Droan, (2001) Tied by Water, *Civil Engineering*, Vol. 71, No. 2, 50-53.
31. Harmsen, P., R.N. Palmer, and G. Turkiyyah, (2001) Development and application of an expert system for evaluation of scour and stream stability, *Civil and Environmental Systems*, 18 (3).
32. Hahn, M.A., R.N. Palmer, M.S. Merrill, and A.B. Lukas, (2002) An expert system for prioritizing inspection of sewers, *ASCE Journal of Water Resources Planning and Management*, Vol. 128, No. 2, 121-129.
33. Jeong, S. M., J.H. Ryu, J.H. Lee, and R.N. Palmer, (2003) Development of a shared vision model for optimal water distribution, *Korean Society of Civil Engineers*, 23(3B), 191-199.
34. VanRheenen, N.T., R.N. Palmer, and R.N. Hahn, (2003) Evaluating potential climate change impacts on water resource systems operations: Case studies of Portland, Oregon and the Central Valley, California, *Water Resources Update*, Issue 124, 35-50.
35. VanRheenen, N. T., A.W. Wood, A.F. Hamlet, R.N. Palmer, and D.P. Lettenmaier, (2004) Potential implications of PCM climate change scenarios for Sacramento - San Joaquin River Basin hydrology and water resources, *Climatic Change*, 62(1-3), 257-281.
36. Payne, J. T., A.W. Wood, A.F. Hamlet, R.N. Palmer, and D.P. Lettenmaier, (2004) Mitigating the effects of climate change on the water resources of the Columbia River basin, *Climatic Change*, 62(1-3), 233-256.
37. Christensen, N. S., A.W. Wood, D.P. Lettenmaier, and R.N. Palmer, (2004) Effects of climate change on the hydrology and water resources of the Colorado River basin, *Climatic Change*, 62(1-3), 337-363.
38. Battin, J., Wiley, M.W., Ruckelshaus, M.H., Palmer, R.N., Korb, E., Bartz, K.K., and Imaki, H., (2007) Projected impacts of future climate change on salmon habitat restoration actions in a Puget Sound river, *Proceedings of the National Academy of Sciences*, 104:6720-6725.

39. Palmer, R.N., (2007) The Confluence of a Career: Virtual Droughts, Shared-Vision Planning, and Climate Change, *ASCE Journal of Water Resources Planning and Management*, 133 (4), 287-288.
40. Werick, W.J. and Palmer, R.N., (2008) It's Time for Standards of Practice in Water Resources Planning, *ASCE Journal of Water Resources Planning and Management*, 134 (1), 1-2.
41. Wiley, M.W., and Palmer, R.N. (2008) Estimating the Impacts and Uncertainty of Climate Change on a Municipal Water Supply System, *ASCE Journal of Water Resources Planning and Management*, Vol. 134, 3, 239-246.
42. Ryu, J.H., R.N. Palmer, M.W. Wiley, and S. Jeong, (2009) Mid-range streamflow forecasts based on climate modeling – Statistical Correction and Evaluation, *Journal of the American Water Resources Association*, 45(2), 355-368.
43. Ryu, J.H., R.N. Palmer, S. Jeong, J. Lee, and Y.O. Kim, (2009) Sustainable Water Resources Management in a Conflict Resolution Framework, *Journal of the American Water Resources Association*, 45(3), 485-499.
44. Ostendorf, D.W., Palmer, R.N., and Hinlein, E.S. (2009) Seasonally Varying Highway Deicing Agent Contamination in a Groundwater Plume from an Infiltration Basin, *Hydrology Research*, Vol. 40, 6, pp. 520-532.
45. Polebitski, A. S., and R. N. Palmer (2010). Seasonal Residential Water Demand Forecasting for Census Tracts. *Journal of Water Resources Planning and Management*, Vol.136, 1, pp.27-36.
46. Vano, J.A., Voisin, N., Cuo, L., Hamlet, A.F., McGuire Elsner, M., Palmer, R.N., Polebitski, A.S., and D.P. Lettenmaier (2010) "Climate change impacts on water management in the Puget Sound region, Washington, USA." *Climatic Change*. 102:261–286.
47. Alemu, E.T., Palmer R. N., Polebitski A. S., and Meaker B.A. (2011) "Decision Support System for Optimizing Reservoir Operations Using Ensemble Streamflow Predictions," *ASCE Journal of Water Resources Planning and Management*, Vol. 137, 1, pp. 72-82.
48. Eum, H.I., Kim, Y.O., and Palmer, R.N. (2011) "Optimal Drought Management Using Sampling Stochastic Dynamic Programming with a Hedging Rule," *ASCE Journal of Water Resources Planning and Management*, Vol. 137, 1, pp. 113-122.
49. Polebitski, A.S., Palmer, R.N., and Waddell, P. (2011) "Evaluating Water Demands Incorporating Climate Change and Transitions in the Urban Environment," *ASCE Journal of Water Resources Planning and Management*, Vol.137, 3, pp. 249-257.  
[https://ascelibrary.org/doi/pdf/10.1061/\(ASCE\)WR.1943-5452.0000112](https://ascelibrary.org/doi/pdf/10.1061/(ASCE)WR.1943-5452.0000112)
50. Traynham, L., Palmer, R. N. and Polebitski, A. S. (2011) "Impacts of Future Climate Conditions and Forecasted Population Growth on Water Supply Systems in the Puget Sound Region." *ASCE Journal of Water Resources Planning and Management*, Vol. 137, 4, pp. 318-326. [DOI: 10.1061/\(ASCE\)WR.1943-5452.0000114](https://doi.org/10.1061/(ASCE)WR.1943-5452.0000114)
51. Kim, Y.O., Lee, J.K., and Palmer, R.N., (2012). A Drought Outlook Study in Korea, *Hydrological Sciences Journal*, 57:6, 1141-1153. [DOI: 10.1080/02626667.2012.702212](https://doi.org/10.1080/02626667.2012.702212)
52. Polebitski, A. S., and Palmer, R. N. (2013). Analysis and Predictive Models of Single-Family

- Customer Response to Water Curtailments During Drought. *Journal of the American Water Resources Association*, 49, 1, 40-51. <https://doi.org/10.1111/j.1752-1688.2012.00691.x>.
53. Palmer, R. N., Cardwell, H. E., Lorie, M. A., and Werick, W. (2013). Disciplined Planning, Structured Participation, and Collaborative Modeling – Applying Shared Vision Planning to Water Resources. *Journal of the American Water Resources Association*, 49, 3, 614-628. <https://doi.org/10.1111/jawr.12067>.
  54. Langsdale, S., Beall, A., Bourget, E., Hagen, E., Kudlas, S., Palmer, R., Tate, D., and Werick, W. (2013). Collaborative Modeling for Decision Support in Water Resources: Principles and Best Practices. *Journal of the American Water Resources Association*, 49(3), 629-638. <https://onlinelibrary.wiley.com/doi/full/10.1111/jawr.12065>.
  55. Steinschneider, S., Bernstein, A., Palmer, R. N., and Polebitski, A. (2013). Reservoir Management Optimization for Basin-Wide Ecological Restoration in the Connecticut River. *ASCE Journal of Water Resources Planning and Management*, 140(9), September 2014. [https://doi.org/10.1061/\(ASCE\)WR.1943-5452.0000399](https://doi.org/10.1061/(ASCE)WR.1943-5452.0000399).
  56. Whateley, S., Palmer, R. N., and Brown, C. (2014). Seasonal Hydroclimatic Forecasts as Innovations and the Challenges of Adoption by Water Managers. *ASCE Journal of Water Resources Planning and Management*, 141(5), May 2015. [https://doi.org/10.1061/\(ASCE\)WR.1943-5452.0000466](https://doi.org/10.1061/(ASCE)WR.1943-5452.0000466).
  57. Rossi, N., Decristofaro, L., Steinschneider, S., Brown, C., and Palmer, R. (2015). Potential Impacts of Changes in Climate on Turbidity in New York City's Ashokan Reservoir. *ASCE Journal of Water Resources Planning and Management*, 142(3), March 2016. [https://doi.org/10.1061/\(ASCE\)WR.1943-5452.0000614](https://doi.org/10.1061/(ASCE)WR.1943-5452.0000614).
  58. Bernstein, A., Anleiter, J., Steinschneider, and Palmer, R. (2015) Sustainable Water Management Using Environmental Flows in the Connecticut River. Reviewed by *ASCE Journal of Water Resources Planning and Management*, minor revisions requested.
  59. Demaria, E. M. C., Palmer, R. N., and Roundy, J. K. (2016). Regional climate change projections of streamflow characteristics in the Northeast and Midwest U.S. *Journal of Hydrology: Regional Studies*, 5, March 2016, 309-323. <https://doi.org/10.1016/j.ejrh.2015.11.007>.
  60. Ahn, K., and Palmer, R. N. (2016). Trend and Variability in Observed Hydrological Extremes in the United States. *Journal of Hydrologic Engineering*, 21(2), February 2016. [https://doi.org/10.1061/\(ASCE\)HE.1943-5584.0001286](https://doi.org/10.1061/(ASCE)HE.1943-5584.0001286).
  61. Ahn, K. H., and Palmer, R. N. (2016). Use of a nonstationary copula to predict future bivariate low flow frequency in the Connecticut river basin. *Hydrologic Processes*, 30(19), June 2016, 3518–3532. <https://doi.org/10.1002/hyp.10876>.
  62. Demaria, E. M. C., Roundy, J. K., Palmer, R. N., and Wi, S. (2016). The Effects of Climate Change on Seasonal Snowpack and the Hydrology of the Northeastern and Upper Midwest United States. *Journal of Climate*, June 2016. <https://doi.org/10.1175/JCLI-D-15-0632.1>.
  63. Ahn, K. H., and Palmer, R. N. (2016). Regional flood frequency analysis using spatial proximity and basin characteristics: Quantile regression vs. parameter regression technique. *Journal of Hydrology*, 540, September 2016, 515-526.

<https://doi.org/10.1016/j.jhydrol.2016.06.047>.

64. Ahn, K. H., Merwade, V., Ojha, C. S. P., and Palmer, R. N. (2016). Quantifying relative uncertainties in the detection and attribution of human-induced climate change on winter streamflow. *Journal of Hydrology*, 542, 304-316. <https://doi.org/10.1016/j.jhydrol.2016.09.015>.
65. Falconi, S. M., and Palmer, R. N. (2017). An interdisciplinary framework for participatory modeling design and evaluation - What makes models effective participatory decision tools? *Water Resources Research*, 53, 1625–1645. <https://doi.org/10.1002/2016WR019373>.
66. Clark, G., Ahn, K. H., and Palmer, R. N. (2017). Assessing a Regression-Based Regionalization Approach to Ungauged Sites with Various Hydrologic Models in a Forested, Catchment in the Northeastern United States. *Journal of Hydrologic Engineering*, 22(12). [https://doi.org/10.1061/\(ASCE\)HE.1943-5584.0001582](https://doi.org/10.1061/(ASCE)HE.1943-5584.0001582).
67. Ahn, K. H., Steinschneider, S., and Palmer, R. N. (2017). A hierarchical Bayesian model for regionalized seasonal forecasts of low flows in the northeastern United States. *Water Resources Research*, 53, 503–521. <https://doi.org/10.1002/2016WR019605>.
68. Booras, K., McIntyre, A., Weiss, W., Howells, C., and Palmer, R. N. (2017). Incorporating Streamflow Forecasts with Aggregate Drought Indices for the Management of Water Supply. *ASCE Journal of Water Resources Planning and Management*, 144(1): 04017078. [https://doi.org/10.1061/\(ASCE\)WR.1943-5452.0000849](https://doi.org/10.1061/(ASCE)WR.1943-5452.0000849).
69. Somos-Valenzuela, M.A., and Palmer, R.N. (2018). Use of WRF-Hydro over the Northeast of the US to Estimate Water Budget Tendencies in Small Watersheds. *Water*, 10 (12). <https://doi.org/10.3390/w10121709>
70. Crausbay, S.D., Betancourt, J., Bradford, J., Cartwright, J., Dennison, W.C., Dunham, J., Enquist, C.A.F., Frazier, A.G., Hall, K.R., Littell, J.S., Luce, C.H., Palmer, R.N., Ramirez, A.R., Rangwala, I., Thompson, L., Walsh, B.M. and Shawn Carter. 2020. Unfamiliar Territory: Emerging Themes for Ecological Drought Research and Management, *One Earth*, Volume 3, Issue 3, pp. 337-353, <https://doi.org/10.1016/j.oneear.2020.08.019>
71. Siddique, R., Karmalkar, A., Sun, F., and Palmer, R. N., 2020. Hydrological extremes across Commonwealth of Massachusetts in a changing climate, *Journal of Hydrology Regional Studies*, Volume 32, Dec., 2020, <https://doi.org/10.1016/j.ejrh.2020.100733>
72. Siddique, R. and Palmer, R.N. 2020. Impacts of Global Warming of 1.5, 2.0 and 3.0° C on Hydrologic Regimes in the Northeastern U.S., *Climate*, <https://doi.org/10.3390/cli9010009>.
73. Siddique, R. and Palmer, R. N., 2021. Climate change impacts on local flood risks in the U.S. northeast: A case study on the Connecticut and Merrimack River basins, *Journal of American Water Resources Association*, <https://doi.org/10.1111/1752-1688.12886>
74. Alexander M. Roper, A.M. and Palmer, R.N., Assessing the Impact of Climate Change and Water Conservation on Municipal Water Demand, 2021, Submitted to the *ASCE Journal of Water Resources Planning and Management*, August.

## Papers in Preparation

1. Siddique, R. A. Karmalkar & R. Palmer, 2019. Effects of GCM uncertainties in extreme precipitations across U.S. northeast. (In preparation, to be submitted to Geophysical Research Letter)

## Abstract and Non-Refereed Conference Proceedings

1. Walker, W. and R.N. Palmer, Nutrient pollution from agriculture and forested lands, *Proceedings of the Spring Meeting of the Interstate Commission on the Potomac River Basin*, Cacapon, WV, November, 1974.
2. Wright, J., R.N. Palmer, J.L. Cohon, and C.S. ReVelle, Interactive computer simulation applied to reservoir management, *Proceedings of the Summer Computer Simulation Conference*, Seattle, WA, 507-512, August, 1980.
3. Cohon, J.L., C.S. ReVelle, S.J. Ratick, and R.N. Palmer, Approaches and techniques for resolution of conflict situations in regional water management, *Issues in Regional Water Resources Management*, Januz Kindler, ed., International Institute for Applied Systems Analysis, Luxenburg, Austria, 343-367, 1982.
4. Palmer, R.N., Evaluation of water supply lifelines using fuzzy sets, *Proceedings of the Workshop on Civil Engineering Applications of Fuzzy Sets*, C.B. Brown, J. Chameau, R.N. Palmer, and J.T.P. Yao, eds., Purdue University, 1985.
5. Palmer, R.N., A review of artificial intelligence, *Proceedings of ASCE Specialty Conference on Computer Applications in Water Resources*, Buffalo, NY, 591-600, June, 1985.
6. Palmer, R.N., K. J. Holmes, R. Menard, and D. Parkinson, An expert system for drought management, *Critical Water Issues and Computer Applications, Proceeding of the 15th Annual Water Resources Conference, ASCE*, Norfolk, VA, 1-4, June, 1988.
7. Palmer, R.N., A natural language database for a drought management expert system, Closing the Gap between Theory and Practice, *Proceedings of the Baltimore Symposium*, International Association of Hydrological Sciences, Publication no. 180, 233-246, May, 1989.
8. Palmer, R.N., and C. R. Jackson, Risk management and operational guidance for municipal water supplies, *Water Resources Planning and Management, Proceeding of the 16th Annual, ASCE*, Sacramento, California, 622-625, May, 1989.
9. Palmer, R.N., and L.R. Spence, A natural environment for a water resource management database, *Water Resources Planning and Management, Proceeding of the 16th Annual, ASCE*, Sacramento, California, 481-484, May, 1989.
10. Palmer, R.N., and L. R. Spence, INLET: Access to water resources management data through a natural language interface, *Proceedings of the NATO ASI: Optimization and Decision Support Systems in Civil Engineering*, Edinburgh, Scotland, 205-216, June 25-July 7, 1989.
11. Palmer, R.N., The development and application of an expert system for drought management, *Proceedings of the NATO ASI: Optimization and Decision Support Systems in Civil Engineering*, Edinburgh, Scotland, 177-188, June 25 - July 7, 1989.
12. Palmer, R.N., Approaches to risk management and operational guidance for municipal water supplies, *Proceedings of the NATO ASI: Optimization and Decision Support Systems in Civil Engineering*, Edinburgh, Scotland, 567-576, June 25 - July 7, 1989.



13. Nishida, S., R.N. Palmer, C. Slaughterbeck, and S. Walker, An expert system for control curve evaluation during drought, optimizing the resources for water management, *Proceedings of the 17th Annual National Conference, Water Resources Planning and Management Division of ASCE*, Ft Worth, Texas, 294-297, April, 1990.
14. Keyes, A.M., D.J. Jabs, and R.N. Palmer, Development of a prioritization tool for multimedia enforcement, *Proceedings of the 18th Annual National Conference, Water Resources Planning and Management Division of ASCE*, New Orleans, LA, 630-634, May 1991.
15. Palmer, R.N., and L.L. Holden, MORE-A multi-objective ranking environment for risk assessment, *Proceedings of the 18th Annual National Conference, Water Resources Planning and Management Division of ASCE*, New Orleans, LA, 489-493, May 1991.
16. Regan, T.M., P.A. Minderman, and R.N. Palmer, Network interactions and packaged software: A win-win opportunity, *Proceedings of the Conference on Frontiers in Education, IEEE/ASEE*, Nashville, Tennessee, 1991.
17. Palmer, R.N. and G. R. Miller, The use of computers as an aid to modular learning in Civil Engineering, *Proceedings of the 8th Annual National Conference on Computing in Civil Engineering*, Dallas, Texas, 634-637, June, 1992.
18. Vives, L., J. Carrera, and R.N. Palmer, An approach for incorporating inflows uncertainty in management models, *Proceedings the 19th Annual National Conference, Water Resources Planning and Management Division of ASCE*, Baltimore, Maryland, 84-89, August, 1992.
19. Keyes, A.M., and R.N. Palmer, Use of interactive simulation environments for the development of negotiation tools, *Proceedings the 19th Annual National Conference, Water Resources Planning and Management Division of ASCE*, Baltimore, MD, 68-73, August, 1992.
20. Karpack, L. M., and R.N. Palmer, Use of interactive simulation environments for evaluation of water supply reliability, *Proceedings of the 19th Annual National Conference, Water Resources Planning and Management Division of ASCE*, Baltimore, Maryland, 144-149, August, 1992.
21. Palmer, R.N., A.M. Keyes, S.M. Fisher and W J. Werick, Advances in computer simulation for water resources planning, Nile 2002 Conference, Aswan, Egypt, KN-IV-1-20, February, 1993.
22. Keyes, A.M., and R.N. Palmer, The role of object-oriented simulation models in the drought preparedness studies, *Proceedings of the 20th Annual National Conference, Water Resources Planning and Management Division of ASCE*, Seattle, Washington, 479-482, April 1993.
23. J.R. Stedinger, M. Karamouz, B. McCrodden, G.McMahon, R.Palmer, and J. Valdes, Using forecasts to improve reservoir operations, *Proceedings of the 20th Annual National Conference, Water Resources Planning and Management, Division of ASCE*, 240-243, April 1993.
24. Palmer, R.N., A.M. Keyes, and S.M. Fisher, Empowering stakeholders through simulation in water resources planning, *Proceedings of the 20th Annual National Conference, Water Resources Planning and Management Division of ASCE*, Seattle, WA, 451-454, April 1993.

25. Keyes, A. M., and R.N. Palmer, An assessment of shared vision model effectiveness in water resources planning, *Proceedings of the 22nd Annual National Conference, Water Resources Planning and Management Division of ASCE*, Cambridge, Massachusetts, 532-535, May 1995.
26. Keyes, A. M., and R.N. Palmer, Practicing for droughts, guidelines for virtual droughts exercises, *Proceedings of the 22nd Annual National Conference, Water Resources Planning and Management Division of ASCE*, Cambridge, Massachusetts, 1005-1009, May 1995.
27. Fisher, S.M., and R.N. Palmer, Managing water supplies during drought, The search for triggers, *Proceedings of the 22nd Annual National Conference, Water Resources Planning and Management Division of ASCE*, Cambridge, Massachusetts, 1001-1004, May 1995.
28. Palmer, R.N., J.M. Kersnar, and D. Choi, Estimating demand variability, *Proceedings of the 22nd Annual National Conference, Water Resources Planning and Management Division of ASCE*, Cambridge, Massachusetts, 997-1000, May 1995.
29. Adams, L., R.N. Palmer, and G. Turkiyyah, An expert system for evaluating scour potential and stream stability at bridges, *Proceedings of the 22nd Annual National Conference, Water Resources Planning and Management Division of ASCE*, Cambridge, Massachusetts, 786-789, May 1995.
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31. Kim, Y-O and R.N. Palmer, The value of hydrologic information in the hydropower systems operations, *Proceedings of the 24<sup>th</sup> Annual National Conference, Water Resources Planning and Management Division of ASCE*, Houston, TX, 532-536, April 1997.
32. Palmer, R.N., A history of shared vision modeling in the ACT-ACF comprehensive study: A modeler's perspective, *Proceedings of Special Session of ASCE's 25<sup>th</sup> Annual Conference on Water Resources Planning and Management and the 1998 Annual Conference on Environmental Engineering*, W. Whipple, Jr., ed., Chicago, IL, 221-226, June 1998.
33. Palmer, R.N., Werick, W.J., MacEwan, A., and Woods, A.W., Modeling water resources opportunities, challenges, and trade-offs: The use of shared vision modeling for negotiation and conflict resolution, *Proceedings of the ASCE's 26<sup>th</sup> Annual Conference on Water Resources Planning and Management*, Tempe, AZ, June, 1999.
34. Hahn, M. A., R.N. Palmer, and G. Knot, Prioritizing sewer line inspection with an expert system, *Proceedings of the ASCE's 26<sup>th</sup> Annual Conference on Water Resources Planning and Management*, Tempe, AZ, June, 1999.
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36. Groome, A., R.N. Palmer, and S. Nelligan-Doran, Potential benefits of water supply regionalization: A case study of the Seattle and Everett water systems, *Proceedings of the ASCE's 2000 Joint Conference on Water Resources Engineering and Water Resources Planning and Management*, Minneapolis, MN, August 2000.

37. Myers, A., and R. Palmer, Incorporating long-term streamflow forecasting into Cascade regional yield simulation model, *Proceedings of the ASCE's 2000 Joint Conference on Water Resources Engineering and Water Resources Planning and Management*, Minneapolis, MN, August 2000.
38. Hahn, M. A., R.N. Palmer, M.S. Merrill, and A.B. Lukas, Sewer inspection prioritization with a regional expert system, *Proceedings of the ASCE's Joint Conference on Water Resources Engineering and Water Resources Planning and Management*, Minn., MN, August 2000.
39. Palmer, R.N., A. Mohammadi, M.A. Hahn, J. Dvorak, and D. Kessler, Computer assisted decision support system for high level infrastructure master planning: Case of the City of Portland Supply and Transmission Model (STM), *Proceedings of the ASCE's 2000 Joint Conference on Water Resources Engineering and Water Resources Planning and Management*, Minneapolis, MN, August 2000.
40. VanRheenen, N.T., A.W. Wood, R.N. Palmer, J.T. Payne, and D.P. Lettenmaier, The effects of climate change on water management strategies and demands in the Central Valley of California, *Proceedings of the ASCE's 2000 World Water and Environmental Resources Conference*, Orlando, FL, May 20-24, 2001.
41. Hahn, M. A., R.N. Palmer, A.F. Hamlet, and P. Storck, Preliminary analysis of the impacts of climate change on the reliability of the Seattle water supply, *Proceedings of the ASCE's 2000 World Water and Environmental Resources Conference*, Orlando, FL, May 20-24, 2001.
42. Palmer, R.N., S.L. Kutzing, and A.C. Steinemann, Developing drought triggers and drought responses: An application in Georgia, *Proceedings of the ASCE's 2002 Conference on Water Resources Planning & Management*. Roanoke, Virginia, May 2002.
43. VanRheenen, N.T., and R.N. Palmer, Preparing for an uncertain future: Adaptive management strategies and alternative approaches to mitigate the impacts of climate change in California's Central Valley, *Proceedings of the ASCE's 2002 Conference on Water Resources Planning & Management*. Roanoke, Virginia, May 2002.
44. Hahn, M.A., and R.N. Palmer, Climate change impacts on municipal supplies: When are capital investments justified? *Proceedings of the ASCE's 2002 Conference on Water Resources Planning & Management*. Roanoke, Virginia, May 2002.
45. Palmer, R.N., J.H. Ryu, S. Jeong, and Y.O. Kim, An application of water conflict resolution in the Kum River Basin, Korea, *Proceedings of the ASCE's 2002 Conference on Water Resources Planning & Management*. Roanoke, Virginia, May 2002.
46. Palmer, R.N., and M.A. Hahn, An investigation of the potential hydrologic and management impacts of climate change, *Proceedings of the 2002 Seminar on Water Resources, Disaster Prevention Research Institution*, Kyoto University, November, 2002.
47. Palmer, R.N., and M.A. Hahn, Managing droughts in the future: The impacts of climate change, *Proceedings of the 83<sup>rd</sup> Annual Meeting of the AMS*, Long Beach, CA, February 2003.
48. VanRheenen, N.T., R.N. Palmer, D.P. Lettenmaier, and A.F. Hamlet, Climate change, fish, agriculture, and power: Impacts and implications for future Snake River water resources management, *Proceedings of ASCE's 2003 World Water Resources Conference*, Philadelphia, PA, June, 2003.

49. Miller, M.L., and R.N. Palmer, Developing an extended streamflow forecast for the Pacific Northwest, *Proceedings of ASCE's 2003 World Water Resources Conference*, Philadelphia, PA, June, 2003.
50. Ryu, J.H., R.N. Palmer, S. Jeong, and Y-O Kim, An optimization model to mitigate conflicts in the Kum River Basin, Korea, *Proceedings of ASCE's 2003 World Water Resources Conference*, Philadelphia, PA, June, 2003.
51. VanRheenen, N.T. and R.N. Palmer, D.P. Lettenmaier, and A.F. Hamlet, Incorporating Long-Lead Climate Forecasts into Risk-Based Management and Decision Analysis: A Case for the Snake River Basin, *Proceedings of ASCE's 2004 World Water and Environmental Resources Congress*, Salt Lake City, Utah, June, 2004.
52. Palmer, R.N., and W. Werick, When Should Shared Vision Planning Be Used?, *Proceedings of ASCE's 2004 World Water and Environmental Resources Congress*, Salt Lake City, Utah, June, 2004.
53. Palmer, R.N., and M. Miller, Determining the Skill of Meteorological and Hydrological Forecasts in the Pacific Northwest, *Proceedings of ASCE's 2004 World Water and Environmental Resources Congress*, Salt Lake City, Utah, June, 2004.
54. Ryu, J.H, Palmer, R.N., Jeong, S., and Lee, J., Determining the Skill of Meteorological and Hydrological Forecasts in the Pacific Northwest, *Proceedings of ASCE's 2004 World Water and Environmental Resources Congress*, Salt Lake City, Utah, June, 2004.
55. Wiley, M., Palmer, R.N., and Ryu, J.H., Climate Based Streamflow Forecasts for Water Resource Managers, *Proceedings of the American Water Resources Association Specialty Conference on Adaptive Management*, Missoula, Montana, June 2006.
56. Ryu, J.H., Palmer, R.N., and Wiley, M., Mid-range Streamflow Prediction: An Application Using a Dynamic Climate Model, *Proceedings of the American Water Resources Association, Specialty Conference on Adaptive Management*, Missoula, Montana, June 2006.
57. Palmer, R. N., Evaluation of Climate Change Impacts to Water Supply and Demand in the Puget Sound Region, *Proceedings of ASCE's 2009 World Environmental and Water Resources Congress*, Kansas City, Missouri, May 2009.
58. Palmer, R. N., and Polebitski, A., "A Decision Support System for Optimizing Reservoir Operations Using Ensemble Streamflow Predictions (ESP), *Proceedings of ASCE's 2009 World Environmental and Water Resources Congress*, Kansas City, Missouri, May 2009.
59. Palmer, R. N., Evaluating the Impacts of Climate Change on Water Supplies: Approaches and Examples, *Proceeding of the 33<sup>rd</sup> International Association of Hydraulic Engineering and Research Congress*, Vancouver, British Columbia, August, 2009.
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61. Polebitski, A, and Palmer, R.N., Impacts of Climate Change and Growth on Water Demands in the Puget Sound Region, *Proceedings of ASCE's 2010 World Environmental and Water Resources Congress*, pp. 125-134, Providence, RI, May 2010.
62. Steinschneider, S., Brown, C., and Palmer, R.N., Relations between Large-Scale Atmospheric Circulation Patterns and New England River Flow, *Proceedings of ASCE's 2010 World Environmental and Water Resources Congress*, pp. 2231-2240, Providence, RI, May 2010.
63. Pitta, B., Palmer, R.N., Adamec, K., Polebitski, A., and Steinschneider, S., "Optimizing Reservoir Operations in the Connecticut River Basin," *Proceedings of ASCE's 2010 World Environmental and Water Resources Congress*, pp. 2241-2250, Providence, RI, May 2010.
64. Pitta, B., and Palmer, R.N., "Utilizing a Decision Support System to Optimize Reservoir Operations to Restore the Natural Flow Distribution in the Connecticut River Watershed, ," *Proceedings of ASCE's 2011 World Environmental and Water Resources Congress*, pp. 4597-4604, Palm Springs, CA, May 2011.
65. Adamec, K, Ahlfeld, D., Palmer, R.N., and Polebitski, A., "Comparisons of a Daily and Sub-Daily Optimization Model for Hydropower Generation: Does Greater Resolution Result in Greater Operational Insight?, *Proceedings of ASCE's 2011 World Environmental and Water Resources Congress*, pp. 3036-3047, Palm Springs, CA, May 2011.
66. Steinschneider, S., Brown, C., and Palmer, R.N., and Ahlfeld, D., "Hydrology Models for Climate Change Assessment: Inter-Decadal Climate Variability and Parameter Calibration, *Proceedings of ASCE's 2011 World Environmental and Water Resources Congress*, pp. 4121-4123. Palm Springs, CA, May 2011.
67. Steinschneider, S., Brown, C., and Palmer, R.N., and Ahlfeld, D., "Seasonal hydrologic Forecasts in Multi-Objective Water Resources Management: Safeguards Against Forecast Failure," *Proceedings of ASCE's 2011 World Environmental and Water Resources Congress*, pp. 1375-1378, Palm Springs, CA, May 2011.
68. Polebitski, A., Steinschneider, S, Palmer, R.N., Brown, C., and Ahlfeld, D., "Climate Change Response of Three Physically Based Hydrologic Models in the Connecticut River Basin," *Proceedings of ASCE's 2011 World Environmental and Water Resources Congress*, pp. 1233-1236, Palm Springs, CA, May 2011.
69. Steinschneider, S, Palmer, R.N., Brown, C., and Ahlfeld, D., (2012) "Coordinated Reservoir Management Planning for Large-Scale Ecological Restoration," *Proceedings of ASCE's 2012 World Environmental and Water Resources Congress*, pp. 3378-3382, May 2012. (doi: <http://dx.doi.org/10.1061/9780784412312.340>)
70. Pica, J., and Palmer, R.N., (2012) "Climate Impacts on Municipal Water Supplies in New England: A Comparison of Two Systems," *Proceedings of ASCE's 2012 World Environmental and Water Resources Congress*, pp. 3361-3365, May 2012. (doi: <http://dx.doi.org/10.1061/9780784412312.338>)
71. O'Neil, K., Polebitski, A., Yang, Y.C., and Palmer, R.N., (2013) "Bringing People, Data, and Models Together – Addressing Impacts of Climate," *Proceedings of ASCE's 2013 World Environmental and Water Resources Congress*, pp. 1099-1109.

72. O'Neil, K., Bernstein, A., Steinschneider, S., Polebitski, and Palmer, R.N., (2013) "Modeling the Impact of Climate Change on Hydropower Operations in the Connecticut River Basin," Proceedings of ASCE's 2013 World Environmental and Water Resources Congress, pp. 1175-1184.
73. Guihan, R., Polebitski, A., Palmer, R., and Brown, C., (2013) "Integrating Climate Forecasts and Reforecast Products into Reservoir Operations Management," Proceedings of ASCE's 2013 World Environmental and Water Resources Congress, pp. 1574-1580.
74. Bernstein, A., Palmer, R.N., (2013) "Subdaily Hydropower Optimization for Relicensing in the Connecticut River," Proceedings of ASCE's 2013 World Environmental and Water Resources Congress, pp. 2096-2105.
75. Guihan, R., Polebitski, A., Palmer, R., and Wood, A. (2014) "The Value of Forecasts in Reservoir Operations Management," Proceedings of ASCE's 2014 World Environmental and Water Resources Congress, pp. 1041-1049.
76. Anleitner, J., Palmer, R., Lutz, K., and Kennedy, K. (2014) "Managing for Floodplains and Aquatic Species: A Framework for Multi-Objective Reservoir Operations," Proceedings of ASCE's 2014 World Environmental and Water Resources Congress, pp. 1060-1069.
77. DeCristofaro, L. and Palmer, R. (2015) Evaluating the Performance of Multiple Alternative Operating Rules under Climate Change: A Case Study of New York City. World Environmental and Water Resources Congress 2015: pp. 2147-2156. doi: 10.1061/9780784479162.210.

### **Books and Book Chapters**

1. Cohon, J.L., C.S. ReVelle, and Palmer, R.N. Palmer (1981) Multiobjective generating techniques for risk/benefit analysis, in **Risk/Benefit Analysis in Water Resources Planning and Management**, Yacov Haimes, ed., Plenum Press, New York, 123-134.
2. Palmer, R.N. (1989) Chapter 7, Teaching expert systems to civil engineers: An opportunity for assessment, in **Expert Systems for Civil Engineers: Education**, American Society of Civil Engineers, 45-53.
3. Palmer, R.N. (1989) Chapter 10, Teaching expert systems short courses: A personal perspective, in **Expert Systems for Civil Engineers: Education**, American Society of Civil Engineers, 70-78.
4. Palmer, R.N. (1992) Chapter 7, Using Prolog to develop a natural language interface for water resources management data, in **Expert Systems for Civil Engineers: Knowledge Representation**, American Society of Civil Engineers, 149-160.
5. Wood, A.W., D.P. Lettenmaier and R.N. Palmer (1997) Assessing the water resources implications of global warming, in **Climate Change and Water Resources Planning Criteria**, K.D. Frederick, D.C. Major and E.Z. Stakhiv, eds., Kluwer Academic Publishers.
6. Palmer, R.N., *Expert Systems for Civil Engineers*, Universitat Politecnica de Catalunya, Barcelona, Spain, 1988.

### **Editing and Other Scholarly Papers**

Palmer, R.N. Editor, (2010) World Environmental and Water Resources Congress 2010:

Challenges of Change, Proceedings of the Congress, May 16-20, 2010, Providence, Rhode Island; Sponsored By Environmental and Water Resources Institute (EWRI) of the American Society of Civil Engineers, Reston, VA: ASCE / EWRI, 978-0-7844-1114-8, 2010.

Review of the book, **Artificial Intelligence in Engineering** by Elsevier and Computational Mechanics Publications, edited by J.S. Gero, appearing in *Structural Engineering Review*, 1988.

Review of **Microcomputer Knowledge-Based Expert Systems in Civil Engineering**, proceedings of a symposium sponsored by the Structural Division of the American Society of Civil Engineers in conjunction with the ASCE National Convention, Nashville, Tennessee, May 10-11, 1988, ASCE, New York, NY, edited by Hojjat Adeli, appearing in *Structural Engineering Review*, Vol. 1, 179-184, 1988.

Mar, B.W., W.S. Miller, R.N. Palmer, and R.A. Carpenter, Cost-Effective Data Acquisition, Guidelines for Surveying and Monitoring Watersheds, East-West Environment and Policy Institute, Honolulu, Hawaii, 1987.

Review of the book, **Expert Systems for Civil Engineers: Technology and Application**, edited by M. L. Maher, appearing in *Structural Engineering Review*.

Special Issue on Expert Systems in Civil Engineering, *Journal of Computing in Civil Engineering*, ASCE, Vol. 1, No. 4 and Vol. 2, No. 1.

### **Funded Sponsored Research**

1. 1982 Application of Interactive Simulation, Seattle Water Department, \$5,000/9 months (Co-PI with D. Lettenmaier)
2. 1983 Subjective Uncertainty in Civil Engineering, National Science Foundation, \$71,365/2 years (Co-PI with C. Brown).
3. 1983 Strategies for Coping with Droughts, Electric Power Research Institute, \$122,322/5 months (Co-PI with D. Lettenmaier).
4. 1983 Complexity as a Measure of Model Appropriateness, Office of Water Research and Tech, \$13,250/1 year (Co-PI with D. Lettenmaier).
5. 1982 Evaluation of Instream Flow Requirements, Office of Water Research and Tech, \$12,000/10 months (Co-PI with D. Lettenmaier).
6. 1983 Simulation Development for Climate Change, Battelle Northwest, \$31,506/5 months (Co-PI with D. Lettenmaier).
7. 1984 Identification of Potential Water Supply Ventures, Washington Water Research Center, \$19,266/1 year.
8. 1984 Hydrologic/Hydraulic Study of Walsh Lake, Seattle Water Department, \$26,627/10 months (Co-PI with D. Lettenmaier).
9. 1985 The Place of Fuzzy Sets in Civil Engineering, National Science Foundation, \$81,396/30 months (Co-PI with C. Brown).
10. 1985 System Engineering Management Workstations, Boeing Aerospace, \$92,000/1 year (Co-PI with B. Mar).
11. 1986 Computer Models for Water Conservation, Seattle Water Department, \$30,814/1 year.
12. 1987 System Engineering Workstations, Boeing, \$120,000/1 year (Co-PI with B. Mar).
13. 1988 An Expert System for Drought Planning, OWRT, \$15,261/1 year.
14. 1988 System Engineering Management, Boeing Aerospace, \$120,000/1 year (Co-PI with B. Mar).
15. 1989 Expert System for Rule Curve Development, NWWA, \$12,000/10 months.
16. 1989 Expert Systems for Systems Engineering, Boeing Aerospace, \$50,000/1 year.
17. 1989 Expert System for Risk Analysis, Phases 1, 2, and 3, Environmental Protection Agency, \$80,000/18 months.
18. 1990 System Engineering Software for Management, Boeing Aerospace, \$100,000/1 year (Co-PI with B. Mar).



19. 1990 Water Supply Analysis Expert System, Graduate School Research Fund, \$7,998/6 months.
20. 1990 Double Stacked Planner: A Computerized Assignment Aid, TRANSNOW, \$96,300/16 months (Co-PI with C. Jahren and Schmitt).
21. 1991 Risk Prioritization Tool, Phases 1, 2, and 3, Environmental Protection Agency, \$10,000/3 months.
22. 1991 Intermodal Container Forecaster, Phase II, TRANSNOW, \$66,100/1 year (Co-PI with C. Jahren).
23. 1992 Using OOP Simulation for Drought Planning, ICPRB, \$73,498/20 months.
24. 1992 Simulation of Hydropower Performance Using OOP, Seattle City Light, \$21,500/8 months.
25. 1992 Double Stack Planner: Functional Version, TRANSNOW BN, \$105,000/1 year, (Co-PI with C. Jahren).
26. 1992 Using OOP Simulation for Drought Planning, Continuation, ICPRB, \$75,059/16 months.
27. 1992 Expert System for Stream Stability and Scour Evaluation, NCHRP, \$249,504/2 years (Co-PI with G. Turkiyyah).
28. 1994 Development of Shared Vision Model for ACF/ACT, US ARMY IWR, \$35,000/10 months.
29. 1994 Decision Support Tool for Bridge Inspection, WA DOT, \$70,000/14 months (Co-PI with G. Turkiyyah).
30. 1994 The Impact of a Zero Floodplain Rise Criterion on Bridge Design, WA DOT, \$70,000/20 months (CO-PI with C. Petroff).
31. 1994 Reservoir Reallocation on the Willamette River, Oregon Dept. of Water Resources, \$10,000/1 year.
32. 1994 Development of Shared Vision Model for ACF/ACT, US ARMY IWR, \$143,000/17 months.
33. 1996 Expert System for Stream Stability and Scour Evaluation, Phase 2, NCHRP, \$250,000/2 years (Co-PI with G. Turkiyyah).
34. 1996 Application of Shared Vision Model, GA Envir. Div., \$74,000/7 months.
35. 1997 Intergovernmental Personnel Agreement, US ACOE IUR, \$12,000/2 months.
36. 1996 Reservoir Reallocation on the Willamette River, Phase 2, Portland Dist. COE, \$17,000/1 year.

37. 1998 Expert System for Stream Stability and Scour Evaluation, Phase 3, NCHRP, \$25,000 addition, (Co-PI with G. Turkiyyah).
38. 1999 Expert System for Sewer Evaluation, WERF, \$40,000.
39. 2000 Predictive Methodologies for Determining Peak Flows after Sanitary Sewer Rehabilitation, WERF, \$35,000.
40. 2001 Modeling Water Quality in the King Abdullah Canal, CESAR, \$75,000 (Co-PI with M. Brett).
41. 2002 Evaluating the Impacts of Climate Change on Seattle Water Supply, Seattle Public Utilities, \$100,000, 24 months
42. 2003 An Evaluation of Computer Models for Conflict Resolution in the Kum River Basin, Korea, \$75,000, 18 months.
43. 2003 Evaluating the Impacts of Climate Change on Tualatin Water Supply, City of Tualatin, \$49,000, 12 months.
44. 2004 Using Climate Signals to Forecast Streamflows and Fish Needs \$60,000 12 months.
45. 2004 Columbia River Data Compilation Project I, Battelle Northwest, \$71,250, 6 Months.
46. 2004 Climate Change Impacts on Salmon, NOAA, \$23,000, 1 year.
47. 2005 Using Climate Signals to Forecast Streamflows and Fish Needs \$30,000, 6 months.
48. 2005 River Data Compilation Project II, Battelle Northwest, \$74,759, 6 Months.
49. 2005 River Data Compilation Project III, Battelle Northwest, \$25,363,.6 Months)
50. 2005 Climate Impacts on Water Management, King County, \$218,000 1 year.
51. 2005 Climate Change Impacts on Salmon, NOAA, \$8,000, 3 months.
52. 2006 Climate Impacts of Water Management II King County, \$291,674, Two years.
53. 2006 Impacts of El Nino-Southern Oscillation (ENSO) Events on Chinese Rice Production and the World Rice Market, with R. Naylor, S. Rozelle, W. Falcon, and D. Battisti, \$650,000 over three years total, \$210,000 to the University of Washington, National Science Foundation.
54. 2007 Hydropower Operations with Streamflows and Energy Forecasts, Snohomish Public Utility District (SnoPUD), \$68,900, One year.
55. 2008 Hydropower Operations with Streamflows and Energy Forecasts, Snohomish Public Utility District (SnoPUD), \$65,000, Two years.

56. 2009 Impacts of Climate Change and Reservoir Operations on the Connecticut River, The Nature Conservancy, \$351,134, Three years.
57. 2009 The Effects of Climate Change on the New England Environment, with Raymond Bradley, University of Massachusetts Science and Technology Fund, \$180,000, Two years.
58. 2010 Development and Refinement of Decision Support Systems for Hydroelectric Power Projects, Funded by Snohomish Public Utility District (SnoPUD), total funding \$20,000.00, One year.
59. 2010 Consortium for Climate Risk in the Urban Northeast (CCRUN), with Columbia University, Funded by NOAA, UMass Portion, \$130,000, One year.
60. 2011 Consortium for Climate Risk in the Urban Northeast (CCRUN), with Columbia University, Funded by NOAA, UMass Portion, \$108,000, One year.
61. 2012 DOI Northeast Climate Science Center (NECSC), with 6 other universities, Funded by USGS, total funding \$1,500,000, UMass Portion, \$900,000, One year.
62. 2012 Consortium for Climate Risk in the Urban Northeast (CCRUN), with Columbia University, Funded by NOAA, UMass Portion, \$80,000, One year.
63. 2012 Modeling Climate Change on the Connecticut River Basin, Funded by The Nature Conservancy, total funding \$202,000, 19 months.
64. 2012 Integrating Support for Scientific Activities for the DOI Climate Science Center, Funded by USGS, total funding \$260,000, One year.
65. 2012 Integrating Climate Forecasts and Re-Forecasts into Operations Management, Funded by NOAA, total funding \$148,000, One year.
66. 2013 DOI Northeast Climate Science Center (NECSC), with 6 other universities, Funded by USGS, total funding \$1,500,000, UMass Portion, \$900,000. One year.
67. 2013 Federal Energy Regulatory Commission Relicensing of Five Connecticut River Dams: Envisioning Alternate Futures and Facilitating the Process, Funded by The Nature Conservancy, total funding \$53,501, One year.
68. 2013 Integrating Climate Forecasts and Re-Forecasts into Operations Management, Funded by NOAA, total funding \$141,400, One year.
69. 2013 Narrative Shifting Seasons Summit – Second, Funded by USGS, total funding \$31,936.00, One year.
70. 2013 Changes in Forested Landscapes of the Northeastern US Under Alternative Climate Scenarios, Funded by USGS, total funding \$165,908.00, Two years.
71. 2013 NorEaST Stream Temperature Web Portal Demonstration and Application, Funded by USGS, total funding \$29,988.00, One year.

72. 2013 Northeast Coastal Project Collaboration NE/SE, Funded by USGS, total funding \$130,991.00, One year.
73. 2013 Support for Scientific Activities for the DOI Climate Science Center, Funded by USGS, total funding \$128,636.00, One year.
74. 2013 Year Four Research Proposal to CCRUN/NOAA, with Columbia University, Funded by NOAA, total funding \$80,002.00, One year.
75. 2014 Snopud Contract Amendment Snohomish County Public Utility District Extension 5, Funded by SnoPUD, total funding \$11,000.00, One year.
76. 2014 Communications and Outreach, Funded by USGS, total funding \$140,709.00, Two years.
77. 2014 and Development of Dynamically-Based 21st Century Projections of Snow, Lake Ice, and Winter Severity for the Great Lakes Basin to Guide Wildlife-Based Adaptation Planning, With Emphasis on Deer and Waterfowl, Funded by USGS, total funding \$70,210.00, One year.
78. 2014 Consortium for Climate Risk in the Urban Northeast Year 5 Funding, with Columbia University, Funded by NOAA, total funding \$65,601.00, One year.
79. 2014 NOAA SARP Coping with Drought In Support of NIDIS competition, with Hazen and Sawyer Engineers, Funded by NOAA, total funding \$142,000.00, One year.
80. 2014 DOI Northeast Climate Science Center (NECSC), with 6 other universities, Funded by USGS, total funding \$1,500,000, UMass Portion, \$900,000, One year.
81. 2015 DOI Northeast Climate Science Center (NECSC), with 6 other universities, Funded by USGS, total funding \$1,500,000, UMass Portion, \$900,000, One year.
82. 2015 Supporting cooperation between tribes and climate science in the Northeast Region to address climate change impacts, Funded by USGS, total funding \$149,898.00, Two years.
83. 2015 LINGO Model Study, Funded by The Nature Conservancy, total funding \$10,650.00, 11 months.
84. 2015 Dam Relicensing in the Connecticut River Watershed, Funded by The Nature Conservancy, total funding \$79,615.00, One year.
85. 2015 and Development of Dynamically-Based 21st Century Projections of Snow, Lake Ice, and Winter Severity for the Great Lakes Basin to Guide Wildlife-based Adaptation Planning, with Emphasis on Deer and Waterfowl, Funded by USGS, total funding \$71,742.00, One year.

86. 2015 Reconnecting Floodplains and Restoring Green Space as a Management Strategy to Minimize Risk and Increase Resilience in the Context of Climate and Landscape Change: Pre-Proposal, Funded by USGS, total funding \$149,998.00, Two years.
87. 2015 An Integrated Assessment of Lake and Stream Thermal Habitat Under Climate Change - University of Wisconsin-Madison, Funded by USGS, \$26,289.00, Two years.
88. 2015 Supporting the Hydrologic/Climate Needs of CCRUN, with Columbia University, Funded by NOAA, total funding \$85,000.00, One year.
89. 2016 Communications and Outreach, Funded by USGS, total funding \$73,841.00, One year.
90. 2016 Slowing the Flow for Climate Resilience (SFCR): Reducing Vulnerability to Extreme Flows and Providing Multiple Ecological Benefits in a Non-Stationary Climate, Funded by USGS, total funding \$155,886.00, One year.
91. 2016 National Climate Science Center Student and Early Career Training, Funded by USGS, total funding \$12,348.00, 4 months.
92. 2016 How and why is the timing and occurrence of seasonal migrants in the Gulf of Maine changing due to climate, Funded by USGS, total funding \$59,677.00, One year.
93. 2016 Supporting the Hydrologic/Climate Needs of CCRUN, with Columbia University, Funded by NOAA, total funding \$85,000.00, One year.
94. 2016 DOI Northeast Climate Science Center (NECSC), with 6 other universities, Funded by USGS, total funding \$1,500,000, UMass Portion, \$900,000, One year.
95. 2017 DOI Northeast Climate Science Center, Funded by USGS, total funding \$567,309.00, 4 months.
96. 2017 MA EOEEA Climate Change Assessment: Climate, Streamflows, and Sea Level Rise, Funded by MA Exec Off of Energy & Enviro Affairs, total funding \$242,147.00, 8 months.
97. 2017 Slowing the Flow for Climate Resilience (SFCR): Reducing Vulnerability to Extreme Flows and Providing Multiple Ecological Benefits in a Non-Stationary Climate, Funded by USGS, total funding \$156,880.00, One year.
98. 2017 How and why is the timing and occurrence of seasonal migrants in the Gulf of Maine Changing due to Climate?, Funded by USGS, total funding \$62,525.00, Two years.
99. 2017 DOI Northeast Climate Science Center, Funded by USGS, total funding \$747,855.00, 4 months.
100. 2017 The Nature Conservancy, Funded by The Nature Conservancy, total funding

\$61,069.00, Two years.

101. 2017 Supporting the Hydrologic/Climate Needs of CCRUN, with Columbia University, Funded by NOAA, total funding \$82,025.00, One year.
102. 2018 USGS Non-Competitive Assistance FY2018 National Grants Branch - G18AS00001, Funded by USGS, total funding \$712,319.00, 5 months.
103. 2018 Estimating Future Changes in 100-year Floods on the Connecticut and Merrimack Rivers, Funded by MA Dept. of Transportation, total funding \$57,312, 4 months.
104. 2018 DOI Northeast Climate Science Center, Funded by USGS, total funding \$4.5 million, 5 year base grant, 2020-2024

### **Project Reports (Reports to Sponsors)**

1. Non-point sources of pollution in the Potomac River basin, Interstate Commission on the Potomac River Basin, ICPRB Technical Publication 74-2, 1974.
2. Critical areas in the Potomac River basin, A review of the water pollution control in 1975, Interstate Commission on the Potomac River Basin, ICPRB Technical Publication 76-4, 1976.
3. Comparative assessment of water use and environmental implications of coal slurry pipelines, U.S. Geological Survey, Open-File Report 77-698, 1977 (with I.C. James and R.M. Hirsch).
4. Policy analysis of reservoir operation in the Potomac River basin, Volumes I, II, and III, Water Resources Series Technical Report No. 59, University of Maryland, 1979 (with J. Wright, J.A. Smith, J.L. Cohon and C.S. ReVelle).
5. Water resource system reliability under drought conditions: The Seattle water supply system as a case study, Harris Hydraulics Laboratory Technical Report No. 72, University of Washington, 1981 (with S.H. Draper, D.P. Lettenmaier, and S.J. Burges).
6. An interactive simulation model for the Cedar/Tolt water supply system, Harris Hydraulics Laboratory Technical Report No. 73, University of Washington, 1982 (with K.A. Erickson and D.P. Lettenmaier).
7. Strategies for coping with drought Phase I: Problem identification, Electric Power Research Institute, 1983 (with D.P. Lettenmaier, K.M. Leytham, D.M. Johnston, and S.J. Burges).
8. Sampling design for aquatic ecological monitoring, Water Resources Series Technical Report No. 85, University of Washington, 1983 (with B.W. Mar, D.P. Lettenmaier, D.M. Eggars, R.R. Horner, G. Portele, J.S. Richey, E.B. Welch, G. Weins, and J. Yearsley).
9. Snyder, R.M., R.N. Palmer, and D.P. Lettenmaier, Effects of instream flow requirements on water supply reliability: The Cedar/Tolt system as a case study, Water Resources Series Technical Report No. 83, University of Washington, 1983 (with R.M. Snyder and D.P. Lettenmaier).
10. The water budget: A step towards balancing fish and power in the Columbia River basin, Water Resources Series Technical Report No. 81, University of Washington, 1983 (with J. Lawrence and K.N. Lee).

11. Sampling design for aquatic ecological monitoring, Final Report, Handbook and Programmers Guide, Electric Power Research Institute, Environmental Assessment Department, Project RP 1729-1, Palo Alto, CA, 1984 (with B.W. Mar, D.P. Lettenmaier, R.R. Horner, J.S. Richey, S.P. Millard and M.C. MacKenzie).
12. Strategies for coping with drought Part II: Techniques for planning and reliability assessment, Project Report, University of Washington, 1984 (with D.P. Lettenmaier, K.M. Leytham, J.R.Lund, and S.J. Burges).
13. Complexity as a measure of simulation model appropriateness: Columbia River conflict resolution as a case study, Water Resources Series Technical Report No. 89, University of Washington, 1984 (with J.L. Cohan and D.P. Lettenmaier).
14. Evaluation of the expansion of Walsh Lake, Water Resources Series Technical Report No. 96, University of Washington, 1985 (with R.W. Schanz).
15. System cooperation in regional water supply planning, Water Resources Series Technical Report No. 95, University of Washington, 1985 (with J.R. Lund).
16. Strategies for coping with drought, Vol. 1, Problem Identification, EPRI EA-4944, Project 2194-1, Final Report, Electric Power Research Institute, Palo Alto, CA, 1986 (with D.P. Lettenmaier, K.M. Leytham, D.M. Johnston, and S.J. Burges).
17. An expert system for drought management: Case study and demonstration, Water Resources Series Technical Report No. 104, University of Washington, 1987 (with K.J. Holmes).
18. Forecast uncertainty in reservoir operation: A case study, Water Resources Series Technical Report No. 107, University of Washington, 1987 (with N.R. Mishalani).
19. Strategies for coping with drought: Part 2- Planning techniques and reliability assessment, EPRI P-5201, Project 2194-1, Final Report, Electric Power Research Institute, Palo Alto, CA, June, 1987 (with D.P. Lettenmaier, K.M. Leytham, J.R. Lund and S.J. Burges).
20. A review of expert system software, GRIAL, Research Report 88/2, Centro de Estudios Avanzados de Blanes, Spain, January, 1988.
21. A rule based system for operating municipal water supplies during droughts: An expert system approach, Research Report 88/1, Centro de Estudios Avanzados de Blanes, Spain, 1988.
22. INLET, A natural language environment for a water resources database, Water Resources Series Technical Report No. 112, University of Washington, 1989 (with L.R. Spence).
23. Development and Application of FRESH: A Fuzzy Reasoning Shell, Water Resources Series Technical Report No. 119, University of Washington, 1989 (with S. Nishida).
24. Knowledge Acquisition for a Drought Management Expert Systems, Water Resources Series Technical Report No. 120, University of WA, Seattle, Washington, 1990 (with C.D. Slaughterbeck).
25. The Ranking of Environmental Risk: A Multiobjective Approach, Water Resources Series Technical Report No. 122, University of WA, Seattle, Washington, 1990 (with L.L. Holden).

26. Development of a decision support system for the prioritization of multimedia dischargers, Water Resources Series Technical Report No. 122, University of Washington, Seattle, Washington, 1991 (with A.M. Keyes).
27. Evaluation of a decision support system for the prioritization of multimedia facilities, Water Resources Series Technical Report No. 132, University of Washington, Seattle, Washington, 1991 (with J.J. Jabs).
28. Use of simulation modeling to evaluate effects of regionalization on water supply performance, Water Resources Series Technical Report No. 134, University of Washington, Seattle, Washington, 1992 (with L.M. Karpack).
29. Water Management Implications of Global Warming: 1. The Boston Water Supply System, Report to the US Army Corps of Engineers, Institute for Water Resources, Alexandria, VA, 1997 (with D.P. Lettenmaier, A.E. Keizur, S.M. Fisher and A.W. Wood).
30. Water Management Implications of Global Warming: 2. The Tacoma Water Supply System, Report US Army Corps of Engineers, Institute for Water Resources, Alexandria, VA, 1997 (with D.P. Lettenmaier, S.M. Fisher, S.P. Millard, J.P. Hughes, J.C. Sias and A.W. Wood).
31. Water Management Implications of Global Warming: 3. The Savannah River System, Report to U.S. Army Corps of Engineers, Institute for Water Resources, Alexandria, VA, 1997 (with D.P. Lettenmaier, A. Wood, S.P. Millard, J.P. Hughes, E.F. Wood, and S. Fisher).
32. Water Management Implications of Global Warming: 4. The Columbia River System, Report to U.S. Army Corps of Engineers, Institute for Water Resources, Alexandria, VA , 1997 (with D.P. Lettenmaier, D. Ford, B. Nijssen, S.P. Millard, J.P. Hughes, and S. Fisher).
33. Water Management Implications of Global Warming: 5. The Missouri River System, Report to U.S. Army Corps of Engineers, Institute for Water Resources, Alexandria, VA, 1997 (with D.P. Lettenmaier, D. Ford, E.F. Wood, and S. Fisher).
34. Water Management Implications of Global Warming: 6. The Apalachicola-Chattahoochee-Flint River Basin, Report to U.S. Army Corps of Engineers, Institute for Water Resources, Alexandria, VA 1997 (with D.P. Lettenmaier, E.F. Wood, M.K. Zion, A.W. Wood, and A. Hamlet).
35. CAESAR: An Expert System for Evaluation of Scour and Stream Stability, Palmer, R.N., and Turkiyyah, G., NCHRP Report Number 426, ISBN#: 0-309-06320-5

#### **Invited Lectures and Seminars**

1. Palmer, R.N., "Society and the Water Cycle: What do Water System Managers Need from Scientists," The Ocean and Earth's Changing Water Cycle: Past, Present, Future, Woods Hole Institute, MA, May 16, 2012.
2. Palmer, R.N., "Climate Change and Water Resources: Characterizing Uncertainties for Decision Makers," W. John and Gail M. Hussey Commemorative Lectureship in Meteorology, Penn State University, Pennsylvania, April 25, 2012.



3. Palmer, R.N., "Climate Change and Water Resources: Characterizing Uncertainties for Decision Makers," Annual Freeman Lecture, Massachusetts Institute of Technology, Cambridge, MA, April 23, 2012.
4. Palmer, R.N., Pica, and Polebitski, A., "Impacts of Climate Change on Water Supply Systems in the US, Indo-US Bilateral Workshop on Global Challenges, Climate Change, Water, Environment, and Society, ITM University, March 5-6, 2012, Gurgaon, India.
5. Palmer, R.N. and Lutz, K., "Creating Alternative operating Policies for the Connecticut River." Connecticut River Research Forum, February 8<sup>th</sup>, 2011, Hadley, MA.
6. Palmer, R., "Integrating Simulation, Optimization, and Stakeholders," Water Degree Program, Distinguished Lecture Series, Texas A&M, November 3, 2010
7. Palmer, Richard, "ASDWA Annual Conference, Safe and Sustainable Drinking Water Through Partnerships and Collaboration," Pittsburg, PA, October 19, 2010.
8. Palmer, Richard, "Modeling the impacts of climate change in the Connecticut River Basin," 2010 isee User Conference, Providence, Rhode Island, October 4, 2010.
9. Palmer, R., "Shared Vision Planning: An Introduction," Water : Science, Society, and Systems Symposium, Tufts University, Keynote Address, May1, 2010.
10. Palmer, R.N., The confluence of a career: Structured Planning, Shared Vision, and Climate Change, ASCE Water Resources and Environmental Institute National Meeting, Omaha Nebraska, May 2006.
11. Palmer, R.N., Impacts of Climate Change on Municipal Water Supplies in Washington, King County Council, Seattle, Washington, October, 2005.
12. Palmer, R.N., Techniques for the evaluation of climate change, Department of Civil Engineering, Seoul Nation University, Seoul Korea, November 30, 2005.
13. Palmer, R.N., The Application of Shared Vision Planning to Drought Preparedness, The International Workshop on Drought Management, Seoul Korea, November 28, 2005.
14. Matthew W. Wiley, M.W., R.N. Palmer, and J.A. Ball, Incorporating Uncertainty in Water Resource Planning for Climate Change, American Water Resources Association 2005 Annual Water Research Conference, Seattle, Washington, November, 8, 2005.
15. Palmer, R.N., Impact of Climate Change on Water Supply in the Pacific Northwest: Is it an Issue?, Denman Lecture Series, Seattle, Washington, November 17, 2005.
16. Palmer, R.N., Rule base generation for expert systems, Centro de Estudios Avanzados de Blanes, Spain, October, 1987.
17. Palmer, R.N., Rule-base consistency in drought management, Norwegian Hydrotechnical Laboratory, Trondheim, Norway, September, 1988.

18. Palmer, R.N., SID- An expert system for drought management, Norwegian Institute for Water Research Oslo, Norway, September, 1988.
19. Palmer, R.N., Expert systems for rule curve development, NorthWest Water Authority, Warrington, England, August, 1988.
20. Palmer, R.N., Seattle integrated drought management system, Coping with the 1988 drought, Bristol University, Bristol, England, July, 1988.
21. Palmer, R.N., An expert system for drought management, Case study, American Society of Civil Engineers, Water Forum, Norfolk, VA, June, 1988.
22. Palmer, R.N., Expert systems for water resource management, Heriot-Watt University, Edinburgh, Scotland, May, 1988.
23. Palmer, R.N., Unsistema expert per tractar municipal d'agua durant uno seguera, de l'Escola Tecnica Superior d'Enginyers de Camins, Canals i Ports, Universitat Politecnica de Catalunya, Spain, March, 1988.

#### **Presentations Given at Conferences**

1. Walker, J., and R.N. Palmer, Nutrient pollution from agriculture and forested lands, Spring Meeting , Interstate Commission on the Potomac River Basin, Cacapon, W. VA, June, 1974.
2. Ratick, S., S. Boland, R.N. Palmer, and F. Berman, An evaluation of net energy analysis as a potential resource allocation tool, Atlantic Economic Conference, Washington, D.C., Oct., 1977.
3. Palmer, R.N., I.V. James and R.M. Hirsch, Comparative analysis of coal slurry pipelines and other energy transport alternatives, Symposium on Critical Water Problems and Slurry Pipelines, Washington, D.C., August, 1977.
4. Palmer, R.N., J.A. Smith, C.S. ReVelle and J.L. Cohon, Reservoir management in the Potomac River basin, TIMS/ORSA Conference, New Orleans, LA, May, 1979.
5. Wright, J., R.N. Palmer, J.L. Cohon, and C.S. ReVelle, Interactive computer simulation applied to reservoir management, Summer Computer Simulation Conference, Seattle, WA, Aug., 1980.
6. Palmer, R.N., and D.P. Lettenmaier, Indexing multiple site synthetic streamflow sequences using reliability indices, ASCE Specialty Conference, San Francisco, CA, August, 1981.
7. Palmer, R.N., and R.M. Snyder, Impacts of instream flow requirements on water supply reliability, AGU Fall Meeting, San Francisco, CA, December, 1983.
8. Palmer, R.N., and J.R. Lund, Impacts of drought on electric power production: Management options and strategies, AGU Fall Meeting, San Francisco, CA, December, 1984.
9. Palmer, R.N., Optimization techniques in decision-making, Systems Engineering and Project Management Symposium, Seattle, WA, October, 1984.
10. Palmer, R.N., Water resources planning, using linear programming, Symposium on Instructional Computing, Seattle, WA, November, 1985.

11. Palmer, R.N., Water supply lifeline evaluations, NSF Workshop on Fuzzy Sets, Purdue University, West Lafayette, IN, October, 1985.
12. Palmer, R.N., Evaluation of water supply lifelines using fuzzy sets, International Symposium on Fuzzy Mathematics in Earthquake Research, Beijing, China, September, 1985.
13. Johnston, D.M., R.N. Palmer, and C.B. Brown, An application of knowledge base systems to waste water treatment processes, International Fuzzy Set Association Congress, Palma de Majorca, Spain, July, 1985.
14. Palmer, R.N., A review of artificial intelligence applications in civil engineering, Computer Applications in Water Resources, ASCE, Specialty Conference, Buffalo, NY, June, 1985.
15. Palmer, R.N. and D.P. Parkinson, Risk analysis applied to water supply management, American Society of Civil Engineers Spring Meeting, Seattle, WA, April 7-11, 1986.
16. Palmer, R.N. and R.M. Tull, An expert system approach to water supply management, American Society of Civil Engineers Spring Meeting, Seattle, WA, April 7-11, 1986.
17. Palmer, R.N., Expert systems, Potential in civil engineering, ASCE National Spring Convention and Energy Specialty Conference, Atlantic City, NJ, April, 1987.
18. Palmer, R.N. and R. Tull, An expert systems tutorial with water resources management applications, ASCE, 14th Annual Water Forum, Kansas City, MO, March, 1987.
19. Palmer, R.N., The automation of rule curve generation, evaluation and implementation using expert systems, presented at the Sixth Conference on Computing in Civil Engineering, American Society of Civil Engineers, Atlanta, GA, September 11-13, 1989.
20. Palmer, R.N., A natural language interface for drought management, presented at the Sixth Conference on Computing in Civil Engineering, American Society of Civil Engineers, Atlanta, GA, September 11-13, 1989.
21. Palmer, R.N. and L. R. Spence, INLET: Access to water resources management data through a natural language interface, presented at the NATO ASI: Optimization and Decision Support Systems in Civil Engineering, June 25 - July 7, 1989, Edinburgh, Scotland.
22. Palmer, R.N., The development and application of an expert system for drought management, presented at the NATO ASI: Optimization and Decision Support Systems in Civil Engineering, June 25 - July 7, 1989, Edinburgh, Scotland.
23. Palmer, R.N., Approaches to risk management and operational guidance for municipal water supplies, presented at the NATO ASI: Optimization and Decision Support Systems in Civil Engineering, June 25 - July 7, 1989, Edinburgh, Scotland.
24. Palmer, R.N. and L. R. Spence, A natural environment for a water resource management database, presented at the Water Resources Planning and Management 16th Annual Meeting, ASCE , Sacramento, California, May, 1989.
25. Palmer, R.N., and C. R. Jackson, Risk Management and Operational Guidance for Municipal Water Supplies, presented at the Water Resources Planning and Management 16th Annual , ASCE , Sacramento, California, May, 1989.

26. Palmer, R.N., J. Wright, and K. Strzeppek, Workstations for teaching and research of water resources planning and management, presented at the 17th Annual National Conference, Water Resources Planning and Management Division of ASCE, Ft Worth, Texas, April, 1990.
27. Palmer, R.N., and Philippe Desroches, Introduction to object oriented programming applied to water resources, presented at the 17th Annual National Conference, Water Resources Planning and Management Division of ASCE, Ft Worth, Texas, April, 1990.
28. Nishida, S., R.N. Palmer, C. Slaughterbeck, and S. Walker, An expert system for control curve evaluation during drought, presented at the 17th Annual National Conference, Water Resources Planning and Management Division of ASCE, Ft Worth, Texas, April, 1990.
29. Palmer, R.N. and A.M. Keyes, An overview of water supply uncertainties, their identification, control, and management, presented at the 18th Annual National Conference, Water Resources Planning and Management Division of ASCE, New Orleans, LA, May, 1991.
30. Palmer, R.N. and L.L. Holden, MORE-A multi-objective ranking environment for risk assessment, presented at the 18th Annual National Conference, Water Resources Planning and Management Division of ASCE, New Orleans, LA, May, 1991.
31. Keyes, A.M., D.J. Jabs, and R.N. Palmer, Development of a prioritization tool for multimedia enforcement, presented at the 18th Annual National Conference, Water Resources Planning and Management Division of ASCE, New Orleans, LA, May, 1991.
32. Karpack, L. M. and R.N. Palmer, Use of interactive simulation environments for evaluation of water supply reliability, presented at the 19th Annual National Conference, Water Resources Planning and Management Division of ASCE, Baltimore, Maryland, August, 1992.
33. Keyes, A.M. and R.N. Palmer, Use of interactive simulation environments for the development of negotiation tools, presented at the 19th Annual National Conference, Water Resources Planning and Management Division of ASCE, Baltimore, Maryland, August, 1992.
34. Vives, L., J. Carrera, and R.N. Palmer, An approach for incorporating inflows uncertainty in management models, presented at the 19th Annual National Conference, Water Resources Planning and Management Division of ASCE, Baltimore, Maryland, August, 1992.
35. Palmer, R.N. and G. R. Miller, The use of computers as an aid to modular learning in Civil Engineering, 8th Annual National Conference on Computing in Civil Engineering, Dallas, Texas, June, 1992.
36. Palmer, R.N., A.M. Keyes, and S.M. Fisher, Empowering stakeholders through simulation in water resources planning, presented at the Proceedings of the 20th Annual National Conference, Water Resources Planning and Management Division of ASCE, Seattle, Washington, April, 1993.
37. R.N. Palmer, A.M. Keyes, S.M. Fisher and W J. Werick, Advances in computer simulation for water resources planning, Nile 2002 Conference, Aswan, Egypt, February, 1993.
38. Adams, L., R.N. Palmer, and G. Turkiyyah, An Expert System for Evaluating Scour Potential and Stream Stability at Bridges, presented at the Proceedings of the 22nd Annual National Conference, Water Resources Planning and Management Division of ASCE, Cambridge, Massachusetts, May, 1995.

39. Palmer, R.N., J.M. Kersnar, and D. Choi, Estimating Demand Variability, presented at the Proceedings of the 22nd Annual National Conference, Water Resources Planning and Management Division of ASCE, Cambridge, Massachusetts, May, 1995.
40. Fisher, S.M. and R.N. Palmer, Managing Water Supplies During Drought, The Search for Triggers, presented at the Proceedings of the 22nd Annual National Conference, Water Resources Planning and Management Division of ASCE, Cambridge, Massachusetts, May, 1995.
41. Palmer, R.N. The maturing of the internet and its use in facilitating water resources planning, presented at the 24<sup>th</sup> Annual National Conference, Water Resources Planning and Management Division of ASCE, Houston, TX, April, 1997.
42. Kim, Y-O and R.N. Palmer, The value of hydrologic information in the hydropower systems operations, presented at the 24<sup>th</sup> Annual National Conference, Water Resources Planning and Management Division of ASCE, Houston, TX, April, 1997.
43. Palmer, R.N., A history of shared vision modeling in the ACT-ACF comprehensive study: A modeler's perspective, presented at the 25<sup>th</sup> Annual Conference on Water Resources Planning and Management, Chicago, IL, June, 1998.
44. R.N. Palmer, Modeling water resources opportunities, challenges, and trade-offs: The use of shared vision modeling for negotiation and conflict resolution, Keynote Invited Presentation, presented at the 26<sup>th</sup> Annual National Conference, Water Resources Planning and Management Division of ASCE, Tempe, AZ, June, 1999.
45. Werick, W., R.N. Palmer, and A. Wood, Conducting a virtual flood for Devils Lake, North Dakota, presented at the 26<sup>th</sup> Annual National Conference, Water Resources Planning and Management Division of ASCE, Tempe, AZ, June, 1999.
46. Hahn, M, R.N. Palmer, and G. Knot, Prioritizing sewer line inspection with an expert system, presented at the 26<sup>th</sup> Annual National Conference, Water Resources Planning and Management Division of ASCE, Tempe, AZ, June, 1999.
47. Palmer R.N., D. Parkinson, S. Haddadin, D. Kessler, L. Stickel, and J. Dovorak, Evaluating alternatives for capacity expansion: Ensuring reliable water for the Portland, Oregon area, presented at the 26<sup>th</sup> Annual National Conference, Water Resources Planning and Management Division of ASCE, Tempe, AZ, June, 1999.
48. Groome, A., R.N. Palmer, and S. Nelligan-Doran, Potential benefits of water supply regionalization: A case study of the Seattle and Everett water systems, Presented at ASCE's 2000 Joint Conference on Water Resources Engineering and Water Resources Planning and Management, Minneapolis, MN, August, 2000.
49. Marxen S, .R.N. Palmer, M.A. Hahn, W. Werick, and C. Rogers, Designing a web-based GIS to manage and monitor environmental programs, ASCE's 2000 Joint Conference on Water Resources Engineering and WRPM, Minneapolis, MN, August, 2000.
50. Myers, A. and R.N. Palmer, Modeling the impacts of the endangered Species Act on water resources in the Puget Sound, Presented at ASCE's 2000 Joint Conference on Water Resources Engineering and Water Resources Planning and Management, Minneapolis, MN, August, 2000.

51. Hahn, M. A., R.N. Palmer, M. Merrill, and A. Lukas, Sewer inspection prioritization with a Regional Expert System, Presented at ASCE's 2000 Joint Conference on Water Resources Engineering and Water Resources Planning and Management, Minneapolis, MN, August, 2000.
52. Palmer, R.N., A. Mohammadi, M.A. Hahn, J. Dvorak, and D. Kessler, Computer assisted decision support system for high level infrastructure master planning: Case of the City of Portland Supply and Transmission Model (STM), Presented at ASCE's 2000 Joint Conference on Water Resources Engineering and Water Resources Planning and Management, Minneapolis, MN, August, 2000.
53. VanRheenen, N.T., A.W. Wood, R.N. Palmer, J.T. Payne, and D.P. Lettenmaier, The effects of climate change on water management strategies and demands in the Central Valley of California, *Proceedings of the ASCE's 2000 World Water and Environmental Resources Conference*, Orlando, FL, May 20-24, 2001.
54. Hahn, M. A., R.N. Palmer, A.F. Hamlet, and P. Storck, Preliminary analysis of the impacts of climate change on the reliability of the Seattle water supply, *Proceedings of the ASCE's 2000 World Water and Environmental Resources Conference*, Orlando, FL, May 20-24, 2001.
55. Palmer, R.N., S.L. Kutzing, and A.C. Steinemann, Developing drought triggers and drought responses: An application in Georgia, *Proceedings of the ASCE's 2002 Conference on Water Resources Planning & Management*. Roanoke, Virginia, May 2002.
56. VanRheenen, N.T., and R.N. Palmer, Preparing for an uncertain future: Adaptive management strategies and alternative approaches to mitigate the impacts of climate change in California's Central Valley, *Proceedings of the ASCE's 2002 Conference on Water Resources Planning & Management*. Roanoke, Virginia, May 2002.
57. Hahn, M.A., and R.N. Palmer, Climate change impacts on municipal supplies: When are capital investments justified? *Proceedings of the ASCE's 2002 Conference on Water Resources Planning & Management*. Roanoke, Virginia, May 2002.
58. Palmer, R.N., J.H. Ryu, S.. Jeong, and Y.O. Kim, An application of water conflict resolution in the Kum River Basin, Korea, *Proceedings of the ASCE's 2002 Conference on Water Resources Planning & Management*. Roanoke, Virginia, May 2002.
59. Palmer, R.N., and M.A. Hahn, An investigation of the potential hydrologic and management impacts of climate change, *Proceedings of the 2002 Seminar on Water Resources, Disaster Prevention Research Institution*, Kyoto University, November, 2002.
60. Palmer, R.N., and M.A. Hahn, Managing droughts in the future: The impacts of climate change on municipal water supplies, *Proceedings of the 83<sup>rd</sup> Annual Meeting of the AMS*, Long Beach, CA, February 2003.
61. VanRheenen, N.T., R.N. Palmer, D.P. Lettenmaier, and A.F. Hamlet, Climate change, fish, agriculture, and power: Impacts and implications for future Snake River water resources management, *Proceedings of ASCE's 2003 World Water Resources Conference*, Philadelphia, PA, June, 2003.
62. Miller, M.L., and R.N. Palmer, Developing an extended streamflow forecast for the Pacific Northwest, *Proceedings of ASCE's 2003 World Water Resources Conference*, Philadelphia, PA, June, 2003.

63. Ryu, J.H., R.N. Palmer, S. Jeong, and Y-O Kim, An optimization model to mitigate conflicts in the Kum River Basin, Korea, *Proceedings of ASCE's 2003 World Water Resources Conference*, Philadelphia, PA, June, 2003.
64. VanRheenen, N.T. and R.N. Palmer, D.P. Lettenmaier, and A.F. Hamlet, Incorporating Long-Lead Climate Forecasts into Risk-Based Management and Decision Analysis: A Case for the Snake River Basin, *Proceedings of ASCE's 2004 World Water and Environmental Resources Congress*, Salt Lake City, Utah, June, 2004.
65. Palmer, R.N., and W. Werick, When Should Shared Vision Planning Be Used? *Proceedings of ASCE's 2004 World Water and Environmental Resources Congress*, Salt Lake City, Utah, June, 2004.
66. Palmer, R.N., and M. Miller, Determining the Skill of Meteorological and Hydrological Forecasts in the Pacific Northwest, *Proceedings of ASCE's 2004 World Water and Environmental Resources Congress*, Salt Lake City, Utah, June, 2004.
67. Ryu, J.H, Palmer, R.N., Jeong, S., and Lee, J., Determining the Skill of Meteorological and Hydrological Forecasts in the Pacific Northwest, *Proceedings of ASCE's 2004 World Water and Environmental Resources Congress*, Salt Lake City, Utah, June, 2004.
68. Palmer, R.N., Wiley, M., and Mote, P., Preparing Pacific Northwest Water Resources for Climate Change, Urban Water Supplies and Climate Change in the West Meeting, Hosted by Southern Nevada Water Authority, Desert Research Institute, and Natural Resources Defense Council, Las Vegas, Nevada, September 2005.
69. Palmer, R.N., Impacts of Climate Change on Municipal Water Supplies in the West, presented at Climate Change and the Future of the American West, Exploring the Legal and Policy Dimensions, University of Colorado Law School, Boulder, Colorado, June 7-9, 2006
70. Palmer, R.N., Impacts of Climate Change on Municipal Water Supplies: A Time for Action, presented at the American Water Works Association's Annual Conference and Exposition, San Antonio, Texas, June 11-15, 2006.
71. Wiley, M., Palmer, R.N., and Ryu, J.H., Climate Based Streamflow Forecasts for Water Resource Managers, *Proceedings of the American Water Resources Association Specialty Conference on Adaptive Management*, Missoula, Montana, June 2006.
72. Ryu, J.H., Palmer, R.N., and Wiley, M., Mid-range Streamflow Prediction: An Application Using a Dynamic Climate Model, *Proceedings of the American Water Resources Association Specialty Conference on Adaptive Management*, Missoula, Montana, June 2006.
73. Palmer, R.N., Impacts of Climate Change on US Water Supplies, Managing Drought and Water Scarcity in Vulnerable Environments, Creating a Roadmap for Change in the US, The Geological Society of America, Longmont, Colorado, September, 2006.
74. Palmer, R. N. and Polebitski, A.S., Planning for the Impacts of Climate Change on Municipal Water Supplies, University Council on Water Resources, Boise, ID, July 2007.
75. Palmer, R. N. Creating Scenarios for Evaluating Climate Change, University Council on Water Resources, Boise, ID, July 2007.

76. Palmer, R., “Engaging Stakeholders in Evaluating the Impacts of Climate Change: Examples from the Pacific Northwest,” The Science, Technology, Engineering and Mathematics (STEM) Education Institute Seminar Series, February 2009.
77. Palmer, R., Ahlfled, D., and C. Brown, “Changing the Way Water is Managed in the Connecticut River Basin,” 6<sup>th</sup> Annual Water Center Conference, Water Dependences in New England, University of Massachusetts, April 2009.
78. Palmer, R. N., “Evaluation of Climate Change Impacts to Water Supply and Demand in the Puget Sound Region,” Proceedings of ASCE's 2009 World Environmental and Water Resources Congress, Kansas City, Missouri, May 2009.
79. Palmer, R. N., and Polebitski, “A Decision Support System for Optimizing Reservoir Operations Using Ensemble Streamflow Predictions (ESP), Proceedings of ASCE's 2009 World Environmental and Water Resources Congress, Kansas City, Missouri, May 2009.
80. Palmer, R. N., “Evaluating the Impacts of Climate Change on Water Supplies: Approaches and Examples”, Proceedings of the 33rd International Association of hydraulic Engineering and Research Congress, Water Engineering for a Sustainable Environment, Vancouver, British Columbia, August, 2009.
81. Palmer, R. “Using Climate Change Information for Water Resources Planning,” presented at the Data Needs to Monitor and Respond to Climate Change Impacts on Water Resources in New England Conference, University of Massachusetts, September, 2009.
82. Palmer, R. N., A. Polebitski, E. Alemu, and B. Meaker, A Decision Support System for Optimizing Reservoir Operations Using Ensemble Streamflow Predictions Creating Scenarios for Evaluating Climate Change, Management Science Seminar Series, Fall 2009, University of Massachusetts, November 6, 2009.
83. Alemu, E., A. Polebitski, R. Palmer, and B. Meaker , “A Decision Support System for Optimizing Reservoir Operations, 2009 Annual Water Resources Conference, Seattle, WA, November 9 - 12, 2009.
84. Adamec, K., Palmer, R.N., Polebitski, A., Ahlfeld, D., Steinschneider, S., Pitta, B., and Brown, C., “Evaluation of Climate Change Impacts to Reservoir Operations within the Connecticut River Basin,” Proceedings of ASCE's 2010 World Environmental and Water Resources Congress, Providence, RI, May 2010.
85. Polebitski, A, and Palmer, R.N., “Impacts of Climate Change and Growth on Water Demands in the Puget Sound Region,” Proceedings of ASCE's 2010 World Environmental and Water Resources Congress, pp. 125-134, Providence, RI, May 2010.
86. Steinschneider, S., Brown, C., and Palmer, R.N., “Relations between Large-Scale Atmospheric Circulation Patterns and New England River Flow,” Proceedings of ASCE's 2010 World Environmental and Water Resources Congress, pp. 2231-2240, Providence, RI, May 2010.
87. Polebitski, A., Steinschneider, S., Palmer, R.N., Brown, C., and Ahlfeld, D., “Climate Change Response of Three Physically Based Hydrology Models in the Connecticut River Watershed,” Proceedings of ASCE's 2011 World Environmental and Water Resources Congress, 1233-1236, Palm Springs, CA, May 2011



88. Adamec, K., Ahlfeld, D., Palmer, R.N., and Polebitski, A., "Comparison of a Daily and Sub-Daily Optimization Model for Hydropower Generation: Does Greater Resolution Result in Greater Operational Insight," Proceedings of ASCE's 2011 World Environmental and Water Resources Congress, pp. 3036-3047, Palm Springs, CA, May 2011.
89. Steinschneider, S., Brown, C., and Palmer, R.N., Ahlfeld, D., "Hydrology Models for Climate Change Assessment: Inter-Decadal Climate Variability and Parameter Calibration," Proceedings of ASCE's 2011 World Environmental and Water Resources Congress, pp. 4121-4123, Palm Springs, CA, May 2011
90. Steinschneider, S., Brown, C., and Palmer, R.N., Ahlfeld, D., "Seasonal Hydrologic Forecasts in Multi-Objective Water Resources Management: Safeguards against Forecast Failure," Proceedings of ASCE's 2011 World Environmental and Water Resources Congress, pp. 1375-1378, Palm Springs, CA, May 2011
91. Steinschneider, S., Brown, C., Polebitski, A. and Palmer, R.N., "Coordinated Reservoir Management Planning for Large-Scale Ecological Restoration," Proceedings of ASCE's 2012 World Environmental and Water Resources Congress, Albuquerque, NM, May 2012.
92. Palmer, R. N., Pica, J, and Polebitski, A., "A Shared Vision Planning Framework for Engaging Stakeholders in Evaluating the Impacts of Climate Change on Water Resources, Proceedings of ASCE's 2012 World Environmental and Water Resources Congress, Albuquerque, NM, May 2012.
93. Pica, J, and Palmer, R.N., A., "Climate Impacts on Municipal Water Supplies in New England: A Comparison of Two," Proceedings of ASCE's 2012 World Environmental and Water Resources Congress, Albuquerque, NM, May 2012.
94. O'Neil, K., Polebitski, A., Yang, Y.C., and Palmer, R.N., (2013) "Bringing People, Data, and Models Together – Addressing Impacts of Climate," Proceedings of ASCE's 2013 World Environmental and Water Resources Congress, pp. 1099-1109.
95. O'Neil, K., Bernstein, A., Steinschneider, S., Polebitski, and Palmer, R.N., (2013) "Modeling the Impact of Climate Change on Hydropower Operations in the Connecticut River Basin," Proceedings of ASCE's 2013 World Environmental and Water Resources Congress, pp. 1175-1184.
96. Guihan, R., Polebitski, A., Palmer, R., and Brown, C., (2013) "Integrating Climate Forecasts and Reforecast Products into Reservoir Operations Management," Proceedings of ASCE's 2013 World Environmental and Water Resources Congress, pp. 1574-1580.
97. Bernstein, A., Palmer, R.N., (2013) "Subdaily Hydropower Optimization for Relicensing in the Connecticut River," Proceedings of ASCE's 2013 World Environmental and Water Resources Congress, pp. 2096-2105.
98. Anleitner, J., Palmer, R.N., and Bernstein, A. (2013) "Subdaily Hydropower Reservoir Optimization of Ecological Flows in the Connecticut River Basin," AWRA Summer Specialty Conference - Environmental Flows, Hartford, CT, June.
99. Anleitner, J., Palmer, R.N., and Bernstein, A. (2013) "Subdaily Hydropower Reservoir Optimization of Ecological Flows in the Connecticut River Basin," AWRA Summer Specialty Conference - Environmental Flows, Hartford, CT, June.

100. Kennedy, K., Lutz, K., Palmer, R.N., Hatfield, C., and Archfield, S. (2013) “The Connecticut River Basin Study: A Basin-Scale Approach to Finding Water Management Solutions for People and Nature,” AWRA Summer Specialty Conference - Environmental Flows, Hartford, CT, June.
101. Anleitner, J., Bernstein, A., Palmer, R.N., and Lutz, K. (2013) “Translating Qualitative, Environmental Targets into Quantitative Mathematical Statements: A Case Study in the Connecticut River Basin,” AWRA Summer Specialty Conference - Environmental Flows, Hartford, CT, June.
102. Guihan, R., Polebitski, A., Palmer, R., and Wood, A. (2014) “The Value of Forecasts in Reservoir Operations Management,” Proceedings of ASCE's 2014 World Environmental and Water Resources Congress, pp. 1041-1049.
103. Anleitner, J., Palmer, R., Lutz, K., and Kennedy, K. (2014) “Managing for Floodplains and Aquatic Species: A Framework for Multi-Objective Reservoir Operations,” Proceedings of ASCE's 2014 World Environmental and Water Resources Congress, pp. 1060-1069.

## **Professional Licenses**

Registered Professional Engineer in the State of Washington, Registration No. 0021154

## **Professional Society Membership**

American Society of Civil Engineers  
American Water Resources Association

## **Professional Society and Other Service**

Chair of the session “Advances in Reservoir Operation Procedures” at the American Geophysical Union Annual Meeting, December, 1982.

Chair of the session “Instream Flow Requirements for Fish, Methodologies, Implementation and Impacts” at the American Geophysical Union Annual Meeting, December, 1983.

Chair of the session “Incorporation of Forecasts in Water Resources Systems Operation” at the American Water Resources Association Symposium on a Critical Assessment of Forecasting in Western Water Resources Management, June, 1984.

Chair of the session “Resource Management and Risk Analysis” at the American Society of Civil Engineers Spring Convention, Seattle, WA, April 7-11, 1986.

Chair of the session “Advances in Hydropower Operations” at the American Society of Civil Engineers Energy 87 Conference, Atlantic City, NJ, April, 1987.

Chair of the session “Expert Systems in Water Resources” at the American Society of Civil Engineers, Water Forum, Norfolk, VA, June, 1988.

Chair of the session “Successful Application of Expert System in Water Resources” at the American Society of Civil Engineers, Water Forum, Fort Worth, Texas, April, 1990.

Chair of the session “Planning Uncertainties in Municipal Water Supplies” at the American Society of Civil Engineers, Water Forum, New Orleans, LA, April, 1991.

Chair of the session “National Engineering Education Coalitions, Progress to Date” at the 19th Annual National Conference, Water Resources Planning and Management Division of ASCE, Baltimore, Maryland, August, 1992.

Served on Mini Symposium, National Drought Study at the 20th Annual National Conference, Water Resources Planning and Management Division of ASCE, Seattle, Washington, April, 1993.

Associate Editor, *Journal of Water Resources, Planning and Management*, ASCE, 1989-1993

Editor, *Journal of Water Resources, Planning and Management*, ASCE, from 1993-1997

Editorial Board, *Civil Engineering Systems*

Served as member on Expert Systems Committee, ASCE

Served as Control Group Member, Water Resource Systems, WRPM Division, ASCE

Served as Control Group Member, Computing in Civil Engineering, Education Committee of the Technical Council on Computer Practices, ASCE

National Research Council, Committee on Endangered and Threatened Species in the Platte River Basin (2003)

National Science Foundation, Engineering Controls for Ballast Water Discharge: Workshop to Develop Research Needs (2003)

Technical Chairman, ASCE's Environmental and Water Resources Institute Congress, Providence, RI, May 2010

### **Short Courses, Workshops, and Other Educational Programs**

Organizer of University of Washington Professional Engineer Review Course for Civil Engineering, 1983-1993 taught biannually

Systems Engineering and Trade Studies, for the Boeing Aerospace Company, 1986-present, taught biannually

Systems Engineering Overview, for the Boeing Aerospace Company, 1986-1987, taught biannually

Expert Systems for System Engineers, Boeing Aerospace Company, 1987-1992, biannually

Expert Systems in Water Resource Planning, a two day short course, sponsored by the Norwegian Institute of Water Research, Oslo, Norway, September 12-13, 1988.

Expert Systems for Civil Engineers, a four day short course, sponsored by the Universidad Politecnica de Catalunya and Centro Internacional Metodos Numericos en Ingenieria, Barcelona, Spain, June 20-23, 1988.

Expert Systems in Water Resources, a four day short course, sponsored by the University of Belgrade, Department of Civil Engineering, Dubrovnik, Yugoslavia, June, 1989.

Complex Decision Making for Managers, for Engineering Continuing Education, 1992

An Introduction to Drought Planning for the Institute for Water Resources, US ARMY Corps of Engineers, 1994

Managing For Droughts, for the American Water Works Association, 2003.

## Chaired Doctoral Degrees

Jay Lund	1986
Douglas Johnston	1986
Young-Oh Kim	1996
Jae Hyun Ryu	2006
Austin Polebitski	2010
Leslie Decristofaro	2018

## Chaired Master Degrees

1.	Peter Jowise	1982
2.	Regina Snyder	1983
3.	Gary Wiens	1983
4.	Jody Lawrence	1983
5.	Doug Berschauer	1984
6.	Julia Cohan	1984
7.	Mary MacKenzie	1985
8.	Robert Schanz	1985
9.	Robert Tull	1986
10.	Nabeel Mishalani	1987
11.	Paul Berkshire	1988
12.	John Holmes	1988
13.	Lynn Spence	1989
14.	Carol Slaughterbeck	1989
15.	Shinji Nishida	1989
16.	Mark Holt	1990
17.	Linda Holden	1990
18.	Allison Keyes	1991
19.	Donna Jabs	1991
20.	Larry Karpack	1991
21.	Diana Allen	1992
22.	Donna Pacanovsky	1993
23.	Keith Rivenbark	1993
24.	Lawrence Spurgeon	1993
25.	Selene Fisher	1993
26.	Lise Johannesen	1995
27.	Lea Adams	1995
28.	Andrew Wood	1995
29.	David Meyer	1995
30.	Jon Ford	1995
31.	Kjersti Dagestad	1996
32.	Diane Owen	1996
33.	Alan Hamlet	1996
34.	Joe Trungale	1996
35.	Sumaya Haddadin	1996
36.	Holly Coccoli	1996
37.	Erik Hagen	1996
38.	Paul Harmsen	1997
39.	Dennis Mekkers	1997
40.	Katherine Hilton	1998
41.	Victoria Ballard	1998
42.	Tom Camp	1998
43.	Diane Robertson	1999

44.	Sherrill Nelligen-Doran	1999
45.	Amy Groome	1999
46.	Margaret Hahn	2000
47.	Amie Myers	2000
48.	Sara Marxen	2000
49.	Seshagirirao Vaddey	2000
50.	Sandy Kutzing	2001
51.	Jeff Payne	2001
52.	Kari Vigerstol	2003
53.	Ani Kameenui	2003
54.	Matthew Wiley	2004
55.	Kasey S. Kudamik	2004
56.	Andre Ball	2005
57.	Erin Clancy	2005
58.	Liz Korb	2006
59.	Quentin Donnelly	2006
60.	Austin Polebitski	2006
61.	Lee Traynham	2007
62.	Kathleen King	2008
63.	Courtney O'Neil	2008
64.	Eset Alemu	2008
65.	Brian Pitta	2010
66.	Jessica Pica	2012
67.	Alec Bernstein	2013
68.	Kyle O'Neil	2013
69.	Jocelyn Anleitner	2014
70.	Nicholas Rossi	2014
71.	Rebecca Guihan	2014
72.	Lynn Brennan	2014
73.	Luke Detwiler	2016
74.	Kathryn Booras	2016
75.	Alexandra McIntyre	2016
76.	Gordon Clark	2016
77.	Grace Cambareri	2017
78.	Abigail Erickson	2017
79.	Christina Wu	2018
80.	Hannah Densten	2019 (non-thesis)
81.	Benjamin Jette	2019 (non-thesis)
82.	Mason Saleeba	2019
83.	Sarah Pfeifle	2020
84.	Marcia Rojas	2020
85.	Alexander Rope	2021
86.	Andrew Delsanto	2021