

Bethany Neilson, Ph.D.
Assistant Professor
Civil and Environmental Engineering
Utah Water Research Laboratory
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Education

Ph.D. Utah State University, Logan, Utah – October 2006: Civil and Environmental Engineering, “Dynamic Stream Temperature Modeling: Understanding the Causes and Effects of Temperature Impairments and Uncertainty in Predictions”

M.S. Utah State University, Logan, Utah – May 2001: Civil and Environmental Engineering, “Critical Assessment of Guidance and Technical Support, and Bayesian Decision Networks for Total Maximum Daily Loads”

B.S. Utah State University, Logan, Utah – May 1998: Environmental Engineering

Passed Fundamentals of Engineering Exam 1997

Academic Experience

- 2008-Current: Assistant Professor, Civil and Environmental Engineering, Utah Water Research Laboratory, Utah State University, Logan, UT.
- 2006 – 2007: Research Assistant Professor, Utah Water Research Laboratory, Utah State University, Logan, UT.
- 2001-2006: Research Engineer, Utah Water Research Laboratory, Utah State University, Logan, UT.
- Summer 2002: Research Scientist, Under Dr. Steven C. Chapra, Tufts University, Medford, MA.
- 2000: Research Technician, Utah Water Research Laboratory, Utah State University, Logan, UT.
- 1998-2000: Research Assistant, Utah Water Research Laboratory, Utah State University, Logan, UT.

Areas of Expertise

Water quality data collection and modeling

- Develop data collection strategies for quantifying solute and heat transport in streams and rivers.
- Develop, test, and calibrate instream models based on detailed process data.
- Determine the role of groundwater/surface water interactions in mass and heat transport in rivers and streams.
- Research data analysis and surface water quality modeling approaches for TMDL development.
- Research the use of optimization procedures for parameter estimation and uncertainty analysis for instream water quality models.
- Develop new and implement available surface water quality models to understand the fate and transport of point and nonpoint source pollutants.
- Testing and developing new monitoring technologies.

Watershed Modeling and Training-

- Developing general water quality training materials to assist developing countries in establishment of watershed management strategies.

- Develop and conduct training on the use of EPA endorsed watershed management tools (e.g., BASINS, HSPF, QUAL2E).

Integrated Watershed Management

- Research the integration of policy and science in TMDL decision-making and quantification of the uncertainty associated with watershed management decisions through the use of Bayesian Decision Networks.
- Research the utility of watershed modeling tools to assist in meeting requirements of the Clean Water Act through water quality trading.

Peer Reviewed Publications

Refereed Journals:

Neilson, B.T., D.K. Stevens. 2002. "Issues Related to the Success of the TMDL Program." *Water Resources Update*. 122:55-61.

Neilson, B.T., S.C. Chapra. 2003. "Integration of Water Quality Monitoring and Modeling for TMDL Development." *Water Resources Impact*. 5(1), 9-11.

Ames, D.P., B.T. Neilson, D.K. Stevens, U.L. Lall. 2005. "Using Bayesian networks to model watershed management decisions: an East Canyon Creek case study." *Hydroinformatics*. 7(4),267-282. (IF = 0.979)

Neilson, B.T., D.K. Stevens, S.C. Chapra, C. Bandaragoda. 2009. "Data Collection Methodology for Dynamic Temperature Model Testing and Corroboration." *Hydrological Processes*. 23:2902-2914. (IF = 1.87)

Neilson, B. T., C. E. Hatch, H. Ban, and S. W. Tyler. 2010. "Solar radiative heating of fiber-optic cables used to monitor temperatures in water." *Water Resources Research*. 46, W08540, doi:10.1029/2009WR008354. (IF = 2.737)

Neilson, B.T., S.C. Chapra, D. K. Stevens, C. Bandaragoda. 2010. "Two-zone Transient Storage Zone Modeling Using Temperature and Solute Data with Multi-Objective Calibration: Part 1 –Temperature" *Water Resources Research*, 46, W12520. doi:10.1029/2009WR008756. (IF = 2.737)

Neilson, B.T., D. K. Stevens, S.C. Chapra, C. Bandaragoda. 2010. "Two-zone Transient Storage Zone Modeling Using Temperature and Solute Data with Multi-Objective Calibration: Part 2 – Temperature and Solute" *Water Resources Research*, 46, W12521, doi:10.1029/2009WR008759. (IF = 2.737)

Schmadel*, N.M., B.T. Neilson, D.K. Stevens. 2010. "Approaches to estimate uncertainty in longitudinal channel water balances." *Journal of Hydrology*. 394:357-369. doi: 10.1016/j.jhydrol.2010.09.011 (IF = 2.433)

Bandaragoda, C. and B.T. Neilson. 2011."Increasing Parameter Certainty and Data Utility Through Multi-Objective Calibration of a Spatially Distributed Temperature and Solute Model" *Hydrology and Earth System Sciences*. 15, 1547-1561, doi:10.5194/hess-15-1547-2011 (IF = 2.167).

Merck*, M. F., B.T. Neilson, R. Cory, G.W. Kling. 2012. "Variability of Instream and Riparian Storage in a Beaded Arctic Stream." *Hydrological Processes*. 26:2938-2950. doi:10.1002/hyp.8323 (published online 16 Dec 2011).(IF = 2.488)

* Indicates student

Merck*, M. F. and B.T. Neilson. 2011. "Modeling Instream Temperature Variability in a Beaded Arctic Stream." *Hydrological Processes*. doi: 10.1002/hyp.8419. (IF = 2.488)

D. Epstein*, B.T. Neilson, K. Goodman, D.K. Stevens, W. Wurtsbaugh. 2012. "A modeling approach for assessing the effect of multiple alpine lakes in sequence on nutrient transport" *Aquatic Sciences*. doi: 10.1007/s00027-012-0267-2. (IF = 2.106)

Alminagorta*, O., B. Tesfatsion*, D. Rosenberg, B.T. Neilson. 2012. "Simple Optimization Method to Determine Best Management Practices to Reduce Phosphorus Loading in Echo Reservoir, Utah." *Journal of Water Resources Planning and Management*, doi:10.1061/(ASCE)WR.1943-5452.0000224. (IF = 1.164)

Heavilin, J. and B.T. Neilson. 2012. "An Analytical Solution to Main Channel Heat Transport with Surface Heat Flux." *Advances in Water Resources*, 47, 67-75, doi: <http://dx.doi.org/10.1016/j.advwatres.2012.06.006>. (IF = 2.449)

Bingham*, Q.G., B.T. Neilson, C.M.U. Neale, M.B. Cardenas. 2012. "Using high resolution remotely sensed data to estimate parameters for transient storage modeling." *Water Resources Research*, 48, 8, doi:10.1029/2011WR011594. (IF = 2.957)

Heavilin, J. and B.T. Neilson. "Simple Method to Determine Downstream Propagation of Changing Boundary Conditions on Instream Temperatures" *Water Resources Research*, in press. (IF = 2.957)

von Stackelberg, N.O. and B.T. Neilson "A Collaborative Approach to Calibration of a Riverine Water Quality Model." *Journal of Water Resources Planning and Management*, under revision. (IF = 1.164)

Wörman, A., J. Riml*, N. Schmadel*, B. Neilson, A. Bottacin-Busolin, and J. Heavilin. "Spectral Scaling of Heat Fluxes in Streambed Sediments" *Geophysical Research Letters*. In review. (IF = 3.792)

Schmadel*, N. M., B.T. Neilson, T. Kasahara. "Deducing the spatial variability of exchange within a longitudinal channel water balance" *Hydrological Processes*, in review. (IF = 2.488)

Book Chapters/Sections:

Neilson, B.T. and R. Kinerson. 2003. "The Role of Models" and portion of "Tools for Developing and Implementing Watershed Plans and TMDLs." Jarrell, W.M. Water Quality Monitoring for Watershed Planning and TMDLs. YSI Incorporated.

Neilson, B.T., D.K. Stevens, J.S. Horsburgh. 2005. "TMDL Development Approaches", Total Maximum Daily Load: Approaches and Challenges. PennWell. Tulsa.

Conference Papers (2008-2012)

Bingham*, J.D. and B.T. Neilson. "Data Collection and Modeling for Determining Stream Bed Conduction Parameters." March 2009. Lessons from Continuity and Change in the Fourth International Polar Year Symposium. Synopsis Paper. Fairbanks, AK.

Bingham*, Q.G. and B.T. Neilson. "Incorporation of Thermal Imagery in Parameter Estimation and Model Calibration" March 2009. Lessons from Continuity and Change in the Fourth International Polar Year Symposium. Synopsis Paper. Fairbanks, AK.

Schmadel*, N. M. and B. T. Neilson. "Estimating Uncertainty in Approaches Used to Quantify Surface Water -Ground Water Exchange." March 2009. Lessons from Continuity and Change in the Fourth International Polar Year Symposium. Synopsis Paper. Fairbanks, AK.

Caplan, A. J., B. T. Neilson, M. E. Baker. " Water Quality Trading in an Integrated Hydrologic Modeling Framework." June, 2009. AWRA 2009 Summer Specialty Conference. Snowbird, UT.

Neilson, B.T., C. Bandaragoda, M.E. Baker, J.S. Horsburgh, D.K. Stevens. "Watershed Modeling for Water Quality Trading." June, 2009. AWRA 2009 Summer Specialty Conference. Snowbird, UT.

von Stackelberg, N.O., B.T. Neilson, H.N. Arens. "Collaborative Calibration of a Water Quality Model of an Urbanized River." November, 2010. ASABE TMDL 2010: Watershed Management to Improve Water Quality Conference. Baltimore, MD.

Jensen, A. B.T. Neilson, M. McKee, Y. Chen. 2012. "Thermal remote sensing with an autonomous unmanned aerial remote sensing platform for surface stream temperatures." 2012 IEEE International Geoscience and Remote Sensing Symposium. Munich, Germany.

Professional Presentations (2008-2012)

Neilson, B.T. and M. McKee. Water Resources Training Needs in Iraq: Experiences of Some American Water Engineers. July, 2008. UCOWR/NIWR Annual Conference. Durham, N.C.

Kasahara, T. and B. T. Neilson. Spring Inundation and Summer Water Temperature in a Restored Reach of the Provo River in Northern Utah. May 2008. NABS 56th Annual Meeting. Salt Lake City, UT.

Bingham*, Q. G., B. T. Neilson, C.M.U. Neale, B. Cardenas. Data Collection for Two-Zone Temperature and Solute Model Testing. March 2008. Utah State University Spring Runoff Conference 2008. Logan, UT.

Schmadel*, N. M., J. D. Bingham*, B.T. Neilson, A.J. Hobson*. Methods for Quantifying Groundwater and Surface Water Interactions in Curtis Creek. March 2008. Utah State University Spring Runoff Conference 2008. Logan, UT.

Schmadel*, N. M., B. T. Neilson, T. Kasahara. Comparison of Approaches used to Characterize Stream Water-Groundwater Exchange. *Eos Trans. AGU* 89(53) Fall Meet. Suppl., Abstract H33F-1083. 2008.

Neilson, B.T., C. Hatch, Q. Bingham*, S. Tyler. Effect of Solar Radiation on Fiber Optic Cables Used in Distributed Temperature Sensing (DTS) Applications. *Eos Trans. AGU* 89(53) Fall Meet. Suppl., Abstract H51H-0970. 2008.

Bingham*, J.D. and B.T. Neilson. "Data Collection and Modeling for Determining Stream Bed Conduction Parameters." March 2009. Lessons from Continuity and Change in the Fourth International Polar Year Symposium. Poster. Fairbanks, AK. (*Included Synopsis Paper*)

Bingham*, Q.G. and B.T. Neilson. "Incorporation of Thermal Imagery in Parameter Estimation and Model Calibration" March 2009. Lessons from Continuity and Change in the Fourth International Polar Year Symposium. Poster. Fairbanks, AK. (*Included Synopsis Paper*)

Schmadel*, N. M. and B. T. Neilson. "Estimating Uncertainty in Approaches Used to Quantify Surface Water -Ground Water Exchange." March 2009. Lessons from Continuity and Change in the Fourth International Polar Year Symposium. Poster. Fairbanks, AK. (*Included Synopsis Paper*)

Neilson, B.T. "Incorporation of Surface and Subsurface Storage in Stream Temperature Predictions" March 2009. Lessons from Continuity and Change in the Fourth International Polar Year Symposium. Fairbanks, AK.

Schmadel*, N. M. and B. T. Neilson. "Reliability of Approaches Used to Characterize Surface Water-Groundwater Exchange." April 2009. Utah State University Spring Runoff Conference 2009. Logan, UT. (Awarded 1st place in student oral presentation competition.)

Bingham*, J.D. and B.T. Neilson. "Data Collection and Modeling for Determining Stream Bed Conduction Parameters." April 2009. Utah State University Spring Runoff Conference 2009. Logan, UT. (Awarded 2nd place in student poster competition.)

Bingham*, Q.G. and B.T. Neilson. "Incorporation of Thermal Imagery in Parameter Estimation and Model Calibration" April 2009. Utah State University Spring Runoff Conference 2009. Logan, UT.

Neilson, B.T., C. Bandaragoda, M.E. Baker, J.S. Horsburgh, D.K. Stevens. "Watershed Modeling for Water Quality Trading." June, 2009. AWRA 2009 Summer Specialty Conference. Snowbird, UT.

Caplan, A. J., B. T. Neilson, M. E. Baker. "Water Quality Trading in an Integrated Hydrologic Modeling Framework." June, 2009. AWRA 2009 Summer Specialty Conference. Snowbird, UT.

Ghabayen, S., N. M. Schmadel*, B. T. Neilson. "Characterization of Groundwater-Surfacewater Interactions using GMS and differential gauging approaches." September 2009. AWRA Fall 2009 Annual Conference. Seattle, WA.

Schmadel*, N. M., B. T. Neilson, D. K. Stevens. "Reliability of Approaches Used to Quantify Surface Water-Groundwater Interactions." *Eos Trans. AGU* 92(52) Fall Meet. Suppl., Abstract H51I-0902. 2009.

Lyman*, C., B. T. Neilson, and N. M. Schmadel*. "Effects of Beaver Dams on Curtis Creek Temperature and Flow." April 2010. Utah State University Spring Runoff Conference 2010. Logan, UT.

Merck*, M. F. and B. T. Neilson. "Quantifying Instream Temperature Variability in Beaded Arctic Streams." April 2010. Utah State University Spring Runoff Conference 2010. Logan, UT.

Hobson*, A. J. and B.T. Neilson. "Effects of Turbidity on Shortwave Radiation and Instream Temperatures." March 2010. Utah State University Undergraduate Student Showcase 2010. Logan, UT. (Awarded 1st Place Poster for the College of Engineering)

Wilson*, E., B. T. Neilson, H. Ban. "Development of Technology for Streambed Thermal Property Instrument (SPI)." Utah State University Graduate Student Symposium 2010. Logan, UT.

Hobson*, A. J. and B.T. Neilson. "Effects of Turbidity on Shortwave Radiation and Instream Temperatures." April 2010. Utah State University Spring Runoff Conference 2010. Logan, UT.

Bingham*, Q.G., B.T. Neilson, C.M.U. Neale, M.B. Cardenas. "Delineation of dead zones in rivers using remotely-sensed data and their utility in improving two-zone temperature and solute transport model performance." 2010 ASLO/NABS Joint Meeting. June 2010. Santa Fe, NM.

von Stackelberg, N.O., B.T. Neilson, H.N. Arens. "Collaborative Calibration of a Water Quality Model of an Urbanized River." November, 2010. ASABE TMDL 2010: Watershed Management to Improve Water Quality Conference. Baltimore, MD.

Merck*, M. F. and B.T. Neilson. "Types and Variability of Instream and Bank Storage in Beaded Arctic Streams." *Eos Trans. AGU* Fall Meet. Suppl., Abstract H21B-1042. 2010.

Merck*, M. F. and B. T. Neilson. "Modeling Instream Temperature Dynamics in Beaded Arctic Streams." March 2011. Utah State University Spring Runoff Conference 2011. Logan, UT.

Schmadel*, N.M., J. Heavilin, B.T. Neilson, A. Wörman. "Incorporating Channel Spatial Variability into Two-Zone Transient Storage Modeling." March 2011. Utah State University Spring Runoff Conference 2011. Logan, UT.

Hobson*, A.J. and B.T. Neilson. "Investigating the effects of data resolution on QUAL2K predictions." March 2011. Utah State University Spring Runoff Conference 2011. Logan, UT.

Marquina*, O.A., B.T. Neilson, N.M. Schmadel*. "Seasonal Fluctuations of Stream Water-Groundwater Interactions." March 2011. Utah State University Spring Runoff Conference 2011. Logan, UT.

Heavilin, J., B.T. Neilson, N.M. Schmadel*, A. Wörman. "Advancing Solutions of the Two-Zone Temperature and Solute Transport Model by Solving A Simplified Temperature Transport Component." EGU2011-3914. European Geosciences Union, General Assembly 20. Vienna, Austria. April 3-8, 2011.

Schmadel*, N.M., J. Heavilin, B.T. Neilson, A. Wörman. "Investigating the Effects of Channel Spatial Variability on Two-Zone Transient Storage Modeling ." EGU2011-3749. European Geosciences Union, General Assembly 20. Vienna, Austria. April 3-8, 2011.

Alminagorta*, O., B. Tesfatsion*, D. Rosenberg, B.T. Neilson. "Simple Optimization Method to Determine Best Management Practices to Reduce Phosphorus Loading in Echo Reservoir, Utah" UCOWR/NIWR Conference Planning for Tomorrow's Water: Snowpack, Aquifers, and Reservoirs. Boulder, Colorado. July 11-14, 2011

Bowerman*, T., P. Budy, B.T. Neilson "Effects of Substrate Size, Hyporheic Exchange, and Spawning Site Selection on Bull Trout Egg and Alevin Survival." September 4-8, 2011. 141st National meeting of the American Fisheries Society, Seattle, WA.

Neilson, B.T., Bandaragoda, C., Chapra, S.C., Stevens, D.K., Schmadel, N.M., Bingham, Q.G., Neale, C.M.U., and Cardenas, M.B., "Use of Instream Heat Budgets and Supporting Data for Predicting Surface and Subsurface Transient Storage Influences" 2011 Geological Society of America Annual Meeting. October, 2011. Minneapolis, MN. (INVITED)

Neilson, B.T., M.F. Merck*, R.M. Cory, G.W. Kling. (2011), "Combining Various Natural Tracers to Identify Flow Paths in Arctic Beaded Streams", 2011 Fall Meeting, American Geophysical Union, San Francisco, CA. December 5-9., 2011. Abstract H51M-07.

Riml*, J., A.Wörman, N.M. Schmadel*, B.T. Neilson. "Temperature; a natural tracer to define residence time distributions in transient storage zones", 2011 Fall Meeting, American Geophysical Union, San Francisco, CA. December 5-9., 2011. Abstract H33I-01.

Bandaragoda, C. and B.T. Neilson. "A systematic approach for increasing parameter certainty in a spatially distributed temperature and solute model using multi-objective evolutionary optimization ", 2011 Fall Meeting, American Geophysical Union, San Francisco, CA. December 5-9., 2011. Abstract H34A-08.

Schmadel*, N.M., B.T. Neilson, T. Kasahara. "Combining conventional data collection techniques to identify surface-subsurface exchange components." March 2012. Utah State University Spring Runoff Conference 2012. Logan, UT.

Hobson*, A.J., B.T. Neilson, N. von Stackelberg. "Can consistent data collection and modeling strategies provide the information necessary to address instream water quality impairments?" March 2012. Utah State University Spring Runoff Conference 2012. Logan, UT.

Snow*, C. and B.T. Neilson. "Effects of dissolved organic carbon on sediment temperatures in beaver ponds." March 2012. Utah State University Spring Runoff Conference 2012. Logan, UT.

Consolati*, F., J. Wheaton, M. Pollock, N. Bouwes, and B. Neilson. "The role of beaver in shaping steelhead trout habitat complexity and thermal refugia in a central Oregon stream." March 2012. Utah State University Spring Runoff Conference 2012. Logan, UT.

Alminagorta*, O., B. Tesfatsion*, D. Rosenberg, B. Neilson. "Simple Optimization Method to Determine Best Management Practices to Reduce Phosphorus Loading in Echo Reservoir, Utah." April 2012. Water Environment Association of Utah Annual Conference 2012. St. George, UT.

Wörman, A., J. Riml*, N. Schmadel*, B. Neilson, A. Bottacin-Busolin, and J. Heavilin. "Evaluating thermal diffusivity in stream-beds from temperature spectra." 2012 EGU General Assembly, Vienna, Austria April 22-27, 2012. Vol. 14, EGU2012-6318-4, 2012.

Riml*, J., A. Wörman, N. Schmadel*, and B. Neilson. (2012), "Estimating residence time distributions in the hyporheic zone using heat" 2012 EGU General Assembly, Vienna, Austria April 22-27, 2012. Vol. 14, EGU2012-7283, 2012.

Jensen, A. B.T. Neilson, M. McKee, Y. Chen. 2012. "Thermal remote sensing with an autonomous unmanned aerial remote sensing platform for surface stream temperatures." 2012 IEEE International Geoscience and Remote Sensing Symposium. Munich, Germany.

Reports

Neilson, B. T., Q. G. Bingham*. "Two-Zone Temperature and Solute Model Testing and Development in the Virgin River." USGS 104(b) Final Project Report. February 2008.

Neilson, B. T., D. K. Stevens, M. E. Baker, C. Bandaragoda, J. S. Horsburgh. "Scalability of the Selected Modeling Approach." USEPA Targeted Watersheds Grant, Technical Memo. August, 2008.

Neilson, B. T., D. K. Stevens, M. E. Baker, C. Bandaragoda, J. S. Horsburgh. "Integration of the Water Quality Modeling Results into the Watershed Information System." USEPA Targeted Watersheds Grant, Technical Memo. August, 2008.

Neilson, B. T., C. Bandaragoda, M. E. Baker, D. K. Stevens, J. S. Horsburgh. "Watershed Modeling for Water Quality Trading." USEPA Targeted Watersheds Grant, Technical Memo. September, 2008.

Neilson, B. T., D. K. Stevens, M. E. Baker, C. Bandaragoda, J. S. Horsburgh. "Flow Charts of the Water Quality Trading Modeling Framework." USEPA Targeted Watersheds Grant, Technical Memo. September, 2008.

Neilson, B. T. "Interdisciplinary Surface Water Quality Modeling Course." Water Initiative Grant, Final Project Report. November, 2008.

Neilson, B.T., Q.G. Bingham*. "Two-Zone Temperature and Solute Model Testing and Development in the Virgin River" MLF Report. FY 2008. January 2009.

Neilson, B.T. and T. B. Hardy. "Virgin River Water Temperature Modeling System." MLF Final Report. FY 2008. January 2009.

Neilson, B.T., N. Schmadel*, J.D. Bingham*. "Two-Zone Temperature and Solute Model Testing and Development in Curtis Creek." MLF Report. FY 2008. January 2009.

Neilson, B.T. and Q.G. Bingham*. "Incorporation of Thermal Imagery In Parameter Estimation and Model Calibration" MLF Report. FY 2008. January 2009.

Neilson, B.T., N. M. Schmadel*. "Two-Zone Temperature and Solute Data Collection and Modeling on Curtis Creek to Understand the Role of Groundwater/Surface Water Interactions on Instream Temperatures in High-Gradient Mountain Streams." New Faculty Research Grant Final Project Report. July 2009.

Neilson, B. T., and A. J. Hobson*. "Effects of Turbidity on Solar Radiation Reflection and Attenuation." Final Project Report. Washington County Water Conservancy District. February 2010.

Neilson, B. T. "Two-zone Dynamic Temperature Model Development and Calibration for the Jordan River " Final Project Report. Utah Department of Environmental Quality. Division of Water Quality. October 2011.

Neilson, B.T., A.J. Hobson*, N. von Stackelberg, J. Ostermiller. "Using Qual2K Modeling to Support Nutrient Criteria Development and Wasteload Analyses in Utah." Final Project Report. Utah Department of Environmental Quality. Division of Water Quality. September 2012.

Professional Activities

Journal Reviewer:

Water Resources Research
Ecohydrology
Hydrological Processes
Journal of Hydrology
Journal of Environmental Science and Health, Part A
Journal of Hydrological Engineering
ASCE Journal of Environmental Engineering
US Environmental Protection Agency
Oregon Sea Grant Administration
National Science Foundation

Invited Lectures/Presentations:

2006 – USEPA, Office of Research and Development, National Risk Management Research Laboratory, Hydrology and Land Use Team Sustainable Environments Branch. "Data Collection Methodology for Two-Zone Temperature and Solute Model Testing and Corroboration."

2009 - NOAA-National Weather Service, Alaska-Pacific River Forecast Center, Anchorage, AK. "Two-Zone Temperature and Solute (TZTS) Model Formulation, Data Collection, and Calibration." March 2009.

2009 - Jordan River Symposium, Comments and Discussion Regarding the Effects of Physical Processes on Dissolved Oxygen, April 2009.

2009 - NOAA-National Weather Service, Office of Hydrologic Development, Washington, D.C. "Instream Temperature Predictions and Forecasting Using the Two-Zone Temperature and Solute (TZTS) Model." June 2009.

2009 - KTH Royal Institute of Technology, Stockholm, Sweden. "Identifying Transient Storage Zones Using Solute and Temperature Observations." October 2009.

2010 - United States Geological Survey, Salt Lake City, UT. "Using Temperature and Solute Information to Investigate the Influences of Transient Storage and Surface Water/Groundwater Interactions on Instream Processes." September 2010.

2011 - Geological Society of America Annual Meeting. Neilson, B.T., Bandaragoda, C., Chapra, S.C., Stevens, D.K., Schmadel, N.M., Bingham, Q.G., Neale, C.M.U., and Cardenas, M.B., "Use of Instream Heat Budgets and Supporting Data for Predicting Surface and Subsurface Transient Storage Influences" October, 2011.

2012 - American Geophysical Union Fall Meeting. Neilson, B.T. "Determining Key Heat Fluxes Necessary for Instream Temperature Predictions" December, 2012.

2012 - American Geophysical Union Fall Meeting. Neilson, B.T. "Supporting Roles of Heat Transport in Transient Storage Modeling" December, 2012.

External Service:

2008 – Current –Universities Council on Water Resources (UCOWR) Delegate
2007-Current - American Geophysical Union Water Quality Technical Committee
2009-2010 Salt Lake County Watershed Modeling Advisory Committee
2009-2012 Jordan River Technical Advisory Committee
American Water Resources Association Annual Water Resources Conference, Baltimore, MD (2006) – Session Moderator
Fall American Geophysical Union Conference, San Francisco, CA (2007) – Session Convener/Moderator
Fall American Geophysical Union Conference, San Francisco, CA (2010) –Session Convener/Moderator (2 different sessions)

Professional Societies

- American Geophysical Union – 2006-current
- American Water Resources Association – 2006-current
- American Society for Engineering Education - 2009 -2011
- American Society of Limnology and Oceanography - 2010 - current
- Geological Society of America - 2011-current
- American Society of Civil Engineers- 2012-current

Awards

- Recipient of “2007 UCOWR Ph.D. Dissertation Award in Natural Sciences and Engineering”
- Outstanding Student Paper - AGU Fall Conference 2005
- Graduate Assistance in Areas of National Need (GAANN) Fellowship 2003-2006
- USU Graduate Research Assistantship 1998-2001

Current/Recent Research Projects

1. Collaborative Research: Quantification of Dominant Heat Fluxes In Streams and Rivers in the Arctic (NSF - 1204220)
2. iUTAH - Urban Transitions and Aridregion Hydro-sustainability (NSF-1208732)
3. TZTS Model Adaptation and Application to Quantify the Influences of Pah Tempe Hot Springs Removal (Washington County Water Conservancy District)

4. Arctic Long Term Ecological Research (LTER): Climate Change and Changing Disturbance Regimes in Arctic Landscapes (NSF-1026843)
5. Hydrologic and Ecological Impacts of Changes in Human Water Resource Management (NSF-1038973)
6. Temperature Modeling and Analysis within the Jordan River in Salt Lake County, UT (Utah DEQ)
7. Modeling the Impacts of WWTP Effluents on Receiving Waters in Utah Using QUAL2K (Utah DEQ)
8. Comparison of Data Collection Approaches using Different Technologies and Modeling – Water Quality Monitoring
9. Incorporation of Heat Into Solute Transport Models
10. Development of Technology for Streambed Thermal Property Instrument (SPI) - Part 1 and 2
11. Understanding Processes Affecting Instream Temperatures in the Arctic
12. Salt Lake County Watershed Water Quality Modeling
13. Investigating Instream Temperature Forecasting
14. Comparison of Data Collection Approaches using Different Technologies and Modeling Techniques to Determine Surfacewater/Groundwater Interactions – Analysis and Modeling
15. EPA Targeted Watersheds Grant and Extension
16. Understanding Native Fishes Behavior Patterns During Periods of High Turbidity in the Virgin River
17. Effects of Solar Radiation Penetration on Fiber Optic Cables used in DTS Applications
18. Two-Zone Temperature and Solute Data Collection and Modeling on Curtis Creek to Understand the Role of Groundwater/Surface Water Interactions on Instream Temperatures in High-Gradient Mountain Streams
19. Two-Zone Temperature and Solute Model Testing and Development in the Bear River Basin (Curtis Creek), UT
20. Iraqi Agricultural Extension Revitalization Program
21. Incorporation of Thermal Imaging into the Data Collection Methodology for Two-Zone Temperature and Solute Modeling
22. Two-Zone Temperature and Solute Model Testing and Development in the Virgin River
23. Interdisciplinary Surface Water Quality Modeling Course
24. Virgin River real-time monitoring and temperature modeling project

Students

Graduate Students

Noah Schmadel, Ph.D., CEE (Advisor)
 Andrew Hobson, M.S., CEE (Advisor)
 Camilla Lyman, M.S., CEE (Advisor)
 Lisa Welsh, Ph.D., Department of Environment and Society (Committee Member)
 Tracy Bowerman, Ph.D., Department of Watershed Sciences (Committee Member)
 Eli Wilson, M.S., MAE (Committee Member)
 Stephen Klocubar, M.S., Department of Watershed Sciences (Committee Member)
 Ali Salha, Ph.D., CEE (Committee Member)
 Florence Consolati, M.S., Department of Watershed Sciences (Committee Member)
 Jonna van Opstal, Ph.D., CEE (Committee Member)

Undergraduate Students

Hayden Campbell, B.S., Biochemistry (Advisor)

Graduated Students

Amber Spackman, M.S., CEE 2008 (Committee Member)
 Molly VanAppledorn, M.S., Department of Watershed Sciences 2008 (Committee Member)
 Noah Schmadel, M.S., CEE 2009 (Advisor)
 Jonathan Bingham, M.S., CEE 2009 (Advisor)
 Kelli Goodman, Ph.D., Biology 2010 (Committee Member)
 Quin G. Bingham, M.S., CEE 2010 (Advisor)

Said Gabayen, Post-Doc, CEE 2009-2010 (Co-Advisor)
 Madeline Merck, M.S., CEE, Spring 2011 (Advisor)
 Andrew Hobson, B.S., CEE, Spring 2010 (Advisor)
 Oscar Marquina, B.S., CEE, Spring 2011 (Advisor)
 Camilla Lyman, B.S., CEE, Spring 2012 (Advisor)

Teaching

University

- CEE 6930 - Surface Water Quality Modeling , Spring 2006, 2008, 2009
- CEE 6740 - Environmental Quality Modeling 2010-2011
- CEE 3670 - Transport Phenomena, Spring 2011-2012

Workshops

- Iraqi Agriculture Extension Revitalization Training
 - Introduction to Water Quality, January 2008 (5 day workshop)
 - Introduction to Water Quality Modeling, April 2008 (1.5 day of 5 day workshop)
- USEPA Targeted Watersheds Grant Water Quality Trading Workshop, Fall 2007 (1 day)
- Co-taught USEPA BASINS/HSPF Trainings (4.5 day workshops)
 - Chicago, IL - February 2003
 - Santa Clara, CA - October 2003
 - Athens, GA - June 2004
 - Santa Clara, CA - September 2004
 - New York, NY - January 2005
 - Santa Clara, CA – October 2005
 - Santa Clara, CA – June 2006
 - Atlanta, GA – November 2006
 - Santa Clara, CA – June 2007
 - Atlanta, GA – October 2007
- BASINS/HSPF Training (3 day workshop for WK Dickson)
 - Raleigh, NC – August 2005
- BASINS Training
 - St. Croix, USVI - Aug 2004.
- Co-taught BASINS Trainings at Utah State University (5 day workshops)
 - Quarterly from 1999-2002
 - March 2003
 - May 2004
- Co-taught Preconference Workshop on HSPF at ASAE TMDL Conference - Nov 2003
- Co-taught CEE 6930 - Water quality modeling in EPA BASINS - 1999

Professional Development

- Integrated Modeling Workshop, Logan, UT, 2012.
- Proposal Writing Institute, Logan, UT, 2012.
- Stream Metabolism Workshop, Logan, UT, 2011.
- Write Winning Grants Workshop, Logan, UT, 2011.
- Region 8 Nutrient Criteria Workshop, Salt Lake City, UT, 2011.
- NSF Regional Workshop, Salt Lake City, UT, 2010.
- USU Teaching Academy, 2008.
- Fiber Optic Distributed Temperature Sensing for Ecological Characterization, HJ Andrews Experimental Forest, Blue River, OR. Sept. 10-15, 2007.
- Modular Modeling System (MMS) Workshop - Utah State University - 2003
- Watershed Analysis Risk Management Framework (WARMF) Workshop - Charlotte, NC - 2002