

Associate Professor and Extension Irrigation Specialist

December 15, 2016

Utah State University
Civil and Environmental Engineering Department
UMC 4110
Logan, Utah 84322
435-797-3926, cell 435-994-4369
n.allen@usu.edu
<https://extension.usu.edu/irrigation/>

Appointment - 80% Extension, 15% Research, and 5% Service
Utah State University

Special Skills and Expertise

Estimation of irrigation water requirements, irrigation system design, operation, and evaluation, irrigation suitability analysis, conjunctive groundwater and surface water use, groundwater analysis, economics of irrigation, preparation of water right claims, preparation of water conservation and management plans, agriculture and landscape irrigation system assessment, water resources planning, technical litigation support, water rights negotiation support, and water management policy. In role as an Extension Specialist Dr. Allen presents water resources and irrigation information at workshops and provides technical support to Cooperative Extension County Agents and farmers, ranchers, gardeners, and landscaper managers.

Education

Ph.D., Civil Engineering

University of Idaho, Moscow, Idaho. 1991

M.S., Agricultural & Irrigation Engineering

Utah State University, Logan, Utah. 1980

B.S., Agricultural & Irrigation Engineering

Utah State University, Logan, Utah. 1979

Professional Registrations

Professional Civil Engineer, California, No. C51308, 1994

Professional Civil Engineer, Nevada, No. 011476, 1995

Professional Civil Engineer, Utah, No. 172734-2202, 1987

Professional Civil Engineer, New Mexico, No.15602, 2002

Experience

**Associate Professor and Extension Irrigation Specialist
Utah State University. Logan, Utah**

November 2012 - present

Major objectives are to help facilitate the effective utilization of Utah's water resources to benefit the citizens based on established water rights, current water uses, and future water use needs and opportunities; teach and provide information to students, irrigators, water users, and water organization managers to solve specific problems associated with irrigation and water management; conduct practical research on irrigation management to improve the efficiency of water use in agriculture and landscaping. Current research is to determine the impacts of deficit irrigation based on irrigation cutoff dates on yield and health of pastures and safflower. Other research concerning water use of urban irrigated agriculture and water use in home gardens.

**Senior Engineer
Natural Resources Consulting Engineers, Inc.**

**January 1997-October 2012
Fort Collins, Colorado**

**Senior Engineer
Bookman-Edmonston Engineering, Inc.**

**March 1993-January 1997
Sacramento, California**

**Extension Water Specialist for Southern Nevada
Cooperative Extension Service, University of Nevada**

**March 1992-March 1993
Reno, Nevada**

**Extension Irrigation Engineer and Research Engineer
Utah State University**

**1985-1992
Logan, Utah**

**Irrigation Engineer
Snyder Irrigation and Agri-Services, Inc.**

**1981-1985
Salt Lake City, Utah**

**Irrigation Engineer
Pitcher Irrigation Company**

**1980
Preston, Idaho**

**Research and Teaching Assistant
Utah State University**

**1979-1980
Logan, Utah**

(More detail on experience in Description of Prior Work Experience section.)

Independent Consulting Experience

Dr. Allen provided irrigation management information to irrigators concerning the reclamation of salt-affected soils and irrigation with poor quality saline or sodic water. In addition, he assisted in the design, management, rehabilitation, and construction of irrigation projects. He continues to provide support on water right cases as an irrigation expert witness.

Computer Skills

- *Hydrologic and Crop Water Requirement Models:* Operated several models
- *Hydraulic Models:* Operated a hydraulic pipeline network program
- *Software and Model Development:* Irrigation Scheduling Models, Crop Water Use Models, Irrigation Depletion Models

- *Programming Languages: BASIC, FORTRAN*

Professional Memberships

- American Society of Civil Engineers
- United States Committee on Irrigation and Drainage

Publications and Proceedings (2013-2016)

- Allen, L. Niel (2013). [*Water Settlements Involving Agriculture and Urban Water Users – An Engineer’s Perspective*](#), Proceedings of United States Committee on Irrigation and Drainage (USCID) Water Management Conference, The Agricultural/Urban Water Interface – Conflicts and Opportunities, Denver, Colorado October 22-25, 2013, pages 81-82. Also published in the Issue No. 144 of the USCID Newsletter, pages 5-10.
- Strong, C., Khatri, K. B., Kochanski, A. K., Lewis, C. S., Allen, L. Reference evapotranspiration from coarse-scale and dynamically downscaled data in complex terrain: sensitivity to interpolation, resolution and bias. *Journal of Hydrology* September 2016. Submitted under review.
- Lewis, C. S., Allen, L. [*Potential Crop Evapotranspiration and Surface Evaporation Estimates via a Gridded Weather Forcing Dataset*](#). *Journal of Hydrology*. Accepted for publication November 24, 2016.
- Tyler Pratt, L. Niel Allen, David E. Rosenberg, Andrew A. Keller, Kelly Kopp. Urban agriculture and small farm irrigation efficiency: Case studies and trends from Cache Valley, Utah. *Journal of Agricultural Water Management*, Submitted November 2016.

Extension Factsheets (2013-2016) Total of 36 factsheets

- Maughan, T., Allen, L. Niel, Drost, D. T. [*Soil Moisture Measurement and Sensors for Irrigation Management*](#) Utah State University Extension (AG/Irrigation/2015-01pr), December 2015.
- Allen, N., Creech, J. E., Pace, M., Israelsen, C. E. [*Irrigation of Safflower in Northern Utah*](#). Utah State University Extension DOI: AG/OilseedCrops/2015-03pr, June 2015.
- Maughan, T., Drost, D. T., Allen, N. [*Vegetable Irrigation – Sweet Pepper and Tomato*](#). USU Cooperative Extension, June 2015.
- Maughan, T., Drost, D. T., Allen, N. [*Vegetable Irrigation: Squash and Pumpkin*](#). USU Cooperative Extension, June 2015.
- Maughan, T., Drost, D. T., Allen, N. [*Vegetable Irrigation – Onion*](#). USU Cooperative Extension, June 2015.
- Pace, M., Israelsen, C. E., Creech, J. E., Allen, N. [*Growing Safflower in Utah*](#). Utah State University Extension DOI: AG/OilseedCrops/2015-02pr, February 2015.
- Maughan, T., Drost, D. T., Allen, N., Black, B. L. [*Vegetable Irrigation – Melon*](#). USU Extension, February 2015.

- Israelsen, C. E., Pace, M., Creech, J. E., Allen, N. [Dryland Safflower Response to Dormant Seeding in Utah](#), Utah State University Extension DOI: AG/OilseedCrops/2015-01pr, February 2015.
- Kopp, K., Allen, N., Nelson, M. [Simple sprinkler performance testing for Beaver County](#), Utah State University Extension, May 2013.
- Kopp, K., Allen, N., Johnson, M. S. [Simple sprinkler performance testing for Blanding, Utah](#), Utah State University Extension, May 2013.
- Kopp, K., Allen, N., Pace, M. [Simple sprinkler performance testing for Box Elder County](#), Utah State University Extension, May 2013.
- Kopp, K., Allen, N., Beddes, T. [Simple sprinkler performance testing for Cache County](#), Utah State University Extension, May 2013.
- Kopp, K., Allen, N., Patterson, R. [Simple sprinkler performance testing for Carbon County](#), Utah State University Extension, May 2013.
- Kopp, K., Allen, N., Cooper, T. D. [Simple sprinkler performance testing for Duchesne County](#), Utah State University Extension, May 2013.
- Kopp, K., Allen, N., Worwood, D. R. [Simple sprinkler performance testing for Emery County](#), Utah State University Extension, May 2013.
- Kopp, K., Allen, N., Wilde, T. [Simple sprinkler performance testing for Fillmore, Utah](#), Utah State University Extension, May 2013.
- Kopp, K., Allen, N., Heaton, K. [Simple sprinkler performance testing for Garfield County](#), Utah State University Extension, May 2013.
- Kopp, K., Allen, N., Johnson, M. S. [Simple sprinkler performance testing for Hanksville, Utah](#), Utah State University Extension, May 2013.
- Kopp, K., Allen, N., Schaible, C. [Simple sprinkler performance testing for Iron County](#), Utah State University Extension, May 2013.
- Kopp, K., Allen, N., Heaton, K. [Simple sprinkler performance testing for Kane County](#), Utah State University Extension, May 2013.
- Kopp, K., Allen, N., Wilde, T. [Simple sprinkler performance testing for Millard County](#), Utah State University Extension, May 2013.
- Kopp, K., Allen, N., Johnson, M. S. [Simple sprinkler performance testing for Moab, Utah](#), Utah State University Extension, May 2013.
- Kopp, K., Allen, N., Johnson, M. S. [Simple sprinkler performance testing for Monticello, Utah](#), Utah State University Extension, May 2013.
- Kopp, K., Allen, N., Barnhill, J. V. [Simple sprinkler performance testing for Morgan County](#), Utah State University Extension, May 2013.
- Kopp, K., Allen, N., Wagner, K. M. [Simple sprinkler performance testing for Salt Lake County](#), Utah State University Extension, May 2013.
- Kopp, K., Allen, N., Palmer, M. D. [Simple sprinkler performance testing for Sanpete County](#), Utah State University Extension, May 2013.

- Kopp, K., Allen, N., Greenhalgh, L. [Simple sprinkler performance testing for Tooele County](#), Utah State University Extension, May 2013.
- Kopp, K., Allen, N., Seaver, M. [Simple sprinkler performance testing for Utah County](#), Utah State University Extension, May 2013.
- Kopp, K., Allen, N., Sulser, A. R. [Simple sprinkler performance testing for Wasatch County](#), Utah State University Extension, May 2013.
- Kopp, K., Allen, N., Goodspeed, J. [Simple sprinkler performance testing for Weber County](#), Utah State University Extension, May 2013.
- Kopp, K., Hunter, B., Allen, N. [Simpler Sprinkler Performance Testing for Davis County](#), Utah State University Extension, May 2013.
- Kopp, K., Allen, N., Banks, J. E. [Simple Sprinkler Performance Testing for Juab County](#), Utah State University Extension, May 2013.
- Kopp, K., Allen, N., Gale, J. A. [Simple Sprinkler Performance Testing for Sevier County](#), Utah State University Extension, May 2013.
- Banks, S. J., Kopp, K., Allen, N. [Simple Sprinkler Performance Testing for Summit County](#), Utah State University Extension, May 2013.
- Kopp, K., Allen, N., Kitchen, B. M. [Simple sprinkler performance testing for Uintah County](#), Utah State University Extension, May 2013.
- Kopp, K., Allen, N., Heflebower, R. [Simple sprinkler performance testing for Washington County](#), Utah State University Extension, May 2013.

Factsheets in Preparation

Allen, L. Niel, [Field Crop Irrigation Strategies for Water-Short Years](#)

Allen, L. Niel, [Drip Irrigation of Small Plots](#)

Allen, L. Niel, [Garden Irrigation Basics](#)

Book Chapter and Reviews (2013-2016)

Steinitz, T., Wagner, K. M., Drost, D. T., Alston, D. G., Hunter, B., Nischwitz, C., Ramirez, R., Allen, N., Barnhill, J. V., Frame, D., Pace, M., Durward, C., Reeve, J., Jewkes, M., Heflebower, [A Guide to Common Organic Gardening Questions](#) – (Irrigation Section) Utah State University Cooperative Extension, Published Summer 2014.

Assisted in the review of 4 chapters in a book [How Sub-Saharan Africa Can Achieve Food Security and Ascend Its Economy to the Initial Stages of Light Industrialization](#). The chapters included Crop Nutrient Management, Weed Management for Sustainable Crop Production, Insect, Pests and Disease Control and Crop Establishment. The book is by Woldezion Mesghinna, 890 pages, Dog Ear Publishing (April 15, 2016) ISBN-10: 1457539632, ISBN-13: 978-1457539633

Reviewer for manuscript in November 2013, submitted to Irrigation and Drainage, ScholarOne Manuscripts.

Reviewer for Journal of Urban Planning and Development, January 2014.

Reviewer for Irrigation and Drainage Journal, October 2015.
Reviewer for USDA NIFA irrigation industry development proposal, February 2016.
Reviewer for Irrigation Science Journal, July 2016.
Reviewer for ASCE Irrigation and Drainage Journal, August 2016.
Reviewer for Journal of Hydrology, September 2016.
Reviewer of several Utah State University Extension factsheets.

Newsletters (2013-2016)

- L. N. Allen. [*Irrigation Strategies – Water and Land for Agriculture*](#), News article for Northern Utah Water Users. A Newsletter of the Blacksmith Fork, North Cache, and Northern Utah and West Box Elder Conservation Districts’ Spring 2015 Specialist Edition.
- L. N. Allen. [*Irrigation Strategies for Water-Short Years*](#) – Published in the May 2014 Utah Farm Bureau News (Volume 60, Number 4. Pages 13 and 21.
- L. N. Allen. [*Water Settlements Involving Agriculture and Urban Water Users - An Engineer's Perspective*](#) – Published in the United States Committee on Irrigation and Drainage (U.S. Society for Irrigation and Drainage Professionals) Newsletter – Spring 2013, Issue No. 114.
- L. N. Allen. [*Water Bank Use in Cache County Utah*](#) News article for the Blacksmith Fork, North Cache, and Northern Utah and West Box Elder Conservation Districts’ newsletter at the request of the Cache County Water Department Manager. Spring 2013.
- L. N. Allen. [*Water Markets*](#) News article for the Blacksmith Fork, North Cache, and Northern Utah and West Box Elder Conservation Districts’ newsletter at the request of the Cache County Water Department Manager. Spring 2013.

Media (2013-2016)

Utah Public Radio, [*The Source: Ditch Water – The Pioneer Gift We Hope Will Keep on Giving*](#). September 25, 2015.
[*USU Extension Water Impacts*](#). Video by featuring Extension Specialist. June 2015.
Utah Public Radio, [*Irrigation Research Will Help Farmers Manage Water*](#). June 12, 2015. A 20-minute interview was aired on June 12, 2015.
KSL Channel 5 News. Portions of interview on [*Irrigation Research*](#) was part of the 6:00 PM and 6:30 PM news on June 12, 2015. The viewership is about 98,000 households.
Allen, N., Drost, D. T., [*Onion Drip Irrigation*](#). YouTube USU Extension. February 2015. (14,300 views October 2016)
Allen, N., [*Onion Furrow Irrigation*](#). YouTube USU Extension, February 2105. (2,600 views October 2016)
Agriculture Irrigation factsheets prepared in 2015 were downloaded 1,220 times (September 2016)

Website (2013-2016)

Established an Extension Irrigation Website in 2014. <https://extension.usu.edu/irrigation/>.
During the past year there have been about 6,300 page views.

Funded Grants and Research (2013-2016)

Twenty-one funded proposal for a total of \$1,028,325 plus cost-share of approximately \$54,000 from cooperators, industry, and Utah Water Research Laboratory, including \$208,663 through Sponsored Programs, with the balance from Utah Agriculture Experiment Station, Extension, and Utah Mineral Lease Fund for Water Related Research. Funding in 2016 is \$104,967 which includes Utah Agriculture Experiment Station, plus cost-share of approximately \$54,000.

Utah State University Extension Water Conservation Initiative funding approved by the state legislators. The appropriation of \$950,000 per year of on-going funding began in 2016. Part of Extension Water Conservation Initiative Committee fostering support for the funding.

Documenting the Human Health Impacts of Exposure to Microbial and Chemical Hazards in Reclaimed Wastewater Used in Urban Agriculture, Cache Valley, Utah. Dupont, R. R., McLean, J. E., Allen, L., Flint, C., Martin, R. S., USDA NIR Water for Agriculture submitted August 2016. \$500,000, (USU portion \$370,000). Notification of funding December 2016.

Evaluation of Low Energy Precision Application (LEPA) Irrigation with Center Pivots, Allen, L., Creech, J. E., Utah State University Extension Grant, September 2016, \$21,509.

Management of Drip Irrigation for Saline Soils in Utah, Allen, L., Patterson, R., Worwood, D. R., Utah State University Extension Grant, September 2016, \$15,525.

Using High Resolution Remote Sensing Information for Yield Estimation under Deficit Irrigation for Water Conservation, Allen, L., Torres-Rua, A., Utah State University Extension Grant, \$25,260.

Pasture Water Use Efficiency and Irrigation Management to Conserve Water, July 2016. The research is at the Utah Agricultural Experiment Station at the Intermountain Irrigated Pasture Project in Lewiston, Utah. L. Niel Allen, Utah Agriculture Experiment Station Grant. \$9,060.

Extension Internship - Irrigation Research Assistant. USU Extension. N. Allen. March 2016, \$4,000.

Irrigation Management Concerning the Food Safety Modernization Act, Allen, L., Black, B. L., Drost, D. T., Allen, K., Curtis, K., Olsen, S. H., Barnhill, J. V., Pace, M., Wagner, K. M., USU Extension, April 2016, \$10,000 (funded).

Technical Paper concerning GridET Software including Methodology, Comparison of Reference ET, Results, and Modeling, L. Niel Allen and Clayton Lewis, funded by

Utah Division of Water Resources and Utah Division of Water Rights October 2015
\$17,000.

[Verification of Water Conservation from Deficit Irrigation Pilot Projects in the Upper Colorado River Basin.](#) S. D. Bechtel Jr Foundation. Allen, N., Torres-Rua, A. September 2015, \$50,000.

[Verification of Water Conservation from Deficit Irrigation Pilot Projects in the Upper Colorado River Basin.](#) Walton Family Foundation. Allen, N., Torres-Rua, A. September 2015, \$96,000.

[Pasture Water Use Efficiency and Irrigation Management to Conserve Water,](#) July 2015.
The research is at the Utah Agricultural Experiment Station at the Intermountain Irrigated Pasture Project in Lewiston, Utah. L. Niel Allen, Utah Agriculture Experiment Station Grant. \$7,800.

[Developing Resources and Extension Curriculum for Urban Food Producers.](#) USU Extension. Allen, N., Black, B. L. (PI), Drost, D. T. March 2015. \$9,996

[Extension Internship - Irrigation Research Assistant.](#) USU Extension. N. Allen. March 2015, \$4,000.

[Impact of Urban Irrigated Agriculture on Utah's per Capita Water Use,](#) Utah Mineral Lease funding through the Utah Water Research Laboratory, L. Niel Allen and A. Tyler Pratt (MS student), August 2014. \$65,041.

[Effects of Irrigation Management on Safflower Production and Alternaria Leaf Spot Disease,](#) Niel Allen (PI), Earl Creech, Clark Israelsen, and Michael Pace. April 2014, Extension Grant \$7,460.

[Pasture Water Use Efficiency and Irrigation Management to Conserve Water,](#) July 2014.
The research is at the Utah Agricultural Experiment Station at the Intermountain Irrigated Pasture Project in Lewiston, Utah. L. Niel Allen, Utah Agriculture Experiment Station Grant. \$9,270.

[Water Use in Home Gardens,](#) State Legislator Grant through Utah State University Extension part of \$500,000 water initiative grant, July 2014 \$30,000.

[Plant Potential Consumptive Use and Surface Evapotranspiration Estimates for Utah Using a Gridded Weather Forcing Dataset,](#) funded by Utah Division of Water Resources and Utah Division of Water Rights, L. Niel Allen and Clayton Lewis, October 2014 \$45,663.

[Effects of Irrigation Management on Safflower Production and Alternaria Leaf Spot Disease,](#) Niel Allen (PI), Earl Creech, Clark Israelsen, and Michael Pace. April 2013, Extension Grant. \$7,200.

[Pasture Water Use Efficiency and Irrigation Management to Conserve Water,](#) July 2013.
The research is at the Utah Agricultural Experiment Station at the Intermountain Irrigated Pasture Project in Lewiston, Utah. L. Niel Allen, Utah Agriculture Experiment Station Grant. \$13,550.

[Impact of Short-Season Irrigation on Pasture Yield](#), Utah Agriculture Experiment Station. L. Niel Allen, Five-year project which began in 2013. \$80,011 (4 years of 5-year project.)

Proposal that were not Funded or Pending (2013-2016) Total \$8,566,285 (\$7,757,653 USU Portion)

Kopp, K., Edwards, E., Allen, L., Hammill, E., Rosenberg, D. E., Sutherland, S., Tarboton, D. G., [Incentives, Markets, and Management to Sustain Water for Agriculture in the Upper Colorado River Basin](#), USDA National Institute of Food and Agriculture, August 2016, \$4,994,152 (USU portion \$3,919,852). (not funded).

Agblevor, F., Allen, L., Sun, Y., Chang, C. W. T., Takemoto, J. Y., Youngberg, L. T., Creech, J. E., Britt, D. W. *Solar Chemical Research Center (SOCHEM)* US Department of Energy, June 2016, (not funded)

Blair Stringam, New Mexico State University, L. N. Allen, G. Paige University of Wyoming [Remote Sensing ET Internet tool for Managing and Conserving Irrigation Water](#), NASA ROSES Earth Science: Water Resources Application. May 2016. \$350,000 (USU \$80,000) (not funded).

(PI) Budge, S. (Co-PIs) Allen, N. McKee, M. Marchant, A. [MRI: Development of MicroLIDAR for Small Unmanned Aerial Vehicles in Precision Ag and Public Safety Environments](#), NFS, January 2016. \$545,402. (not funded)

Allen, L. N., Torres-Rua, A. Using Landsat Imagery to Develop Center Pivot Variable Rate Irrigation Prescriptions, Valmont Industries - Valley Irrigation, submitted November 2015, \$72,252, (not funded).

Allen, N., A., Hill, R. W., Walker, W. [Proposal to Provide On-Farm Water Management Training - USAID Training for Pakistan](#), World Learning, February 2015, \$98,935.

(PI) Budge, S. (Co-PIs) Allen, N. McKee, M. Marchant, A. [MRI: Development of MicroLIDAR for Small Unmanned Aerial Vehicles in Precision Ag and Public Safety Environments](#), NFS, January 2015. \$476,288. (not funded)

(PI) Moon, T. (Co-PIs) Allen, N. McKee, M. Qi, X. Torres-Rua, A. [PFI: BIC: SUAS Human-Interface and Orthorectification Challenges for Precision Agriculture](#). NFS, March 2015, \$881,249. (not funded)

Allen, N. (PI), Creech, J. E., Torres-Rua, A. F., Jensen, A. [Improvement of On-Farm Irrigation Water Use Using Aerial Imagery from Small Unmanned Aerial Systems](#). UDSA, April 2014, \$488,970. (not funded)

McKee, M. (PI), Moon, T. K., Allen, N., Jensen, A., Sharma, R. [NRI: Co-Farmers: Small, Intelligent Unmanned Aerial Systems for Precision Agriculture](#), USDA and NSF, January 2014. \$1,040,286. (not funded)

Consulting Partnerships (2013-2016)

USU Contact and Coordinator for Water and Development IDIQ, [Solicitation Number: SOL-OAA-13-000033](#), Agency for International Development (USAID), Washington D.C. Utah State University is a member of the Natural Resources Consulting Engineers Team that was awarded a contract. Assad Safadi, Senior Vice President, ASafadi@nrce.com

USU Contact and Coordinator for MCC Water, Sanitation and Irrigation BPA - MCC-15-RFQ-0045, USU is a member of the Tetra Tech Team that was awarded a contract. Jane Carpenito, Senior Vice President jane.carpenito@tetrattech.com

Academic and Research Mentoring (2013-2016) 15 students

Culumber, Catherine Mae. PhD Committee Member. *Soil Nutrient Cycling and Water Use in Response to Orchard Floor Management in Stone Fruit Orchards in the Intermountain West*. Plant Soil and Climate Department. November 2015-August 2016.

Diaz, Manuel. PhD Committee Chair. Civil and Environmental Engineering Department. August 2015 – June 2016.

Parajuli, Kshitij. PhD Committee Member. *Advance Methods to Quantify Actual Evapotranspiration in Montane Ecosystems*. Plant Soil and Climate Department. August 2015 – Present.

Stott, Lance. MS Committee Member. *Techniques for Achieving Precision Drought Stress in Orchards*. Plant, Soil, and Climate Department. October 2014 – Present.

Fulton, Ryan. MS Committee Member. Plan C Course Work. Civil and Environmental Engineering Department. October 2014 – Present.

Pratt, Arthur Tyler. MS Committee Chair. *Impact of Urban Irrigated Agriculture on Utah's per Capita Water Use*. Civil and Environmental Engineering Department. August 2014 – August 2016.

Davanny, Nicki. MS Committee Member. *Effectiveness of Agricultural Best Management Practices at Reducing Nutrient Loading in Watershed Runoff*. Watershed Science Department. January 2014 – Present.

Masoudiahstiani, Saeid Ph.D. committee Member. Civil and Environmental Engineering Department. October 2013 – Present.

Salha, Ali. PhD Committee Member. *Irrigated Watershed Modeling*. Civil and Environmental Engineering Department October 2013 – Present.

Elarab, Manal. PhD Committee Member. *The application of unmanned aerial vehicle to precision agriculture: Chlorophyll, nitrogen and evapotranspiration estimation*. Civil and Environmental Engineering Department April 2013 – June 2016.

- Ruckert, Alice. *Interaction between Water Stress and Neonicotinoid Insecticides on Spider Mite Infestations in Corn.* Biology Department. PhD Committee Member. February 2013 – Present.
- Urzagaste, Paul. MS Committee Member. *Performance Evaluation of Climate-Based Controllers for Landscape Irrigation in the Intermountain West Plant, Soil, and Climate Department.* November 2012 – 2014.
- Bachour, Roula. PhD Committee Member. *Evapotranspiration Modeling and Forecasting for Efficient Management of Irrigation Command Areas.* Civil and Environmental Engineering Department. October 2012 – August 2013.
- Aboutalebji, Mahyar. PhD Committee Member. Civil and Environmental Engineering Department. November 2016 – Present.
- Gill, Gunbharpur Singh PhD Committee Member. *General topic interaction between Water Stress, Spider Mite Infestations, and yield in Corn* Biology Department. November 2016 – Present.

Research Support (2013-2016) 9 students

- Jarman, Jeffery – Research BS, Internship through Extension Grant (Food and Safety Modernization Act as related to irrigation water quality). July 2016 – present.
- Saunder, Bradley, Research BS, Internship funded by Extension Grant and research grants. June 2016 – present.
- Olson, Alex - Internship funded by Extension grant and research grants. May 2015-May 2016
- Saunders, Jason - Irrigation Research Assistant funded by research grants – May 2015-Present
- Pratt, A. Tyler – MS research Civil and Environmental Engineering Department funded by Utah Water Research Lab for urban irrigation analysis. August 2014 August 2016.
- Lewis, Clayton - Research PhD funded by Utah Division of Water Rights and Water Resources for potential crop water use gridded model. October 2014 – February 2016
- Masoudiahstiani, Saeid funded from startup funds PhD student. November 2013-May 2014.
- Castro, Phillip -Research Assistant funded by research grants. May 2013- April 2015
- Lloyd (Kent), Holly - Research Assistant - Internship funded by Extension Grant and research grants. May 2013- December 2014

Service/Committees (2013-2016) 15 Committees

- Extension Service – Selection Committee for Southern Region Water Conservation Extension Professional Practice Assistant Professor November 2016-present

- Plant Soil and Climate Department Faculty Search, Agricultural Climate Extension Specialist. August 2016 – present.
- Extension – Chair of Extension Small Farm Committee. March 2016 – Present.
- Extension – Selection Committee for Bear River Watershed Coordinator December 2015- January 2016.
- Civil and Environmental Engineering Department Faculty Search, Irrigation Engineering Position. October 2015 – April 2014.
- USDA National Institution of Food and Agriculture proposal reviewer (January 2015).
- Institute of Electrical and Electronic Engineers (IEEE), IEEE SusTech 2015 Conference, Co-Chair of Agriculture Sustainability Sessions, Invited speakers and paper submissions. July 30-31, 2015. Ogden, Utah. April 2015-July 2015.
- Urban and Small Farm Conference Planning Committee, July 2014 – Present.
- Utah State University 2015 Year of Water, June 2014 – February 2015.
- Utah Hay and Forage Symposium Committee, May 2014 – Present.
- Extension Water Initiative Committee, March 2014 – Present.
- [Irrigation Division Planning Committee](#) August 2013 – December 2014.
- Civil and Environmental Engineering Department Faculty Search, Agriculture Water Management Position search committee, October 2014- April 2015.
- Northern Utah Water Conference Planning Committee, February 2013-Present.
- Utah Water User's Workshop Planning Committee November 2012-Present.
- Cache County Water Master Plan Steering Committee. 2013.

Extension Workshops and Presentations (46 Presentations)

(Total Attendance of 2,911 in 47 Workshop Presentations)

2013 – Presented at 9 workshops/conference with a total attendance of 577.

2014 – Presented at 9 workshops/conferences with a total attendance of 415.

2015 - Presented at 18 workshops/conferences with a total attendance of 1,372.

2016 - Presented at 11 workshops/conferences with a total attendance of 632.

Presentation Title	Date	Attendance
USCID Improving Irrigation Water Management - Latest Methods in Evapotranspiration and Supporting Technologies (speaker) Verification of Reduced Consumptive Use from Deficit Irrigated Pastures in the Upper Colorado River Basin Using Landsat Data	October 12, 2016	98
Onion Field Days (Food Safety Modernization Act biological water quality standards for irrigation)	August 9, 2016	25
Water Resources and Climate Change (Argentina Delegation, Western United States and Utah Water Management)	May 31, 2016	7
Spring Runoff Conference (Laws, Markets, and Institutions Related to Water Transfer)	April 6, 2016	140
Green River Canal Company (Canal Operation and Management and Sediment Control)	March 11, 2016	23

Presentation Title	Date	Attendance
Using Data to Solve the West's Greatest Water Challenges Consumptive Use Strategy Workshop (Upper Colorado River Water Conservation Pilot Project)	March 24, 2016	36
Rich County Crop School (Pasture and Crop Irrigation Management)	February 24, 2016	20
Seed Oil School (Safflower Irrigation Management)	February 21, 2016	115
Urban and Small Farm Conference Drip Irrigation	February 17, 2016	38
Onion Workshop (drip irrigation)	February 9, 2016	35
Sevier County Crop School (Weather and Irrigation)	January 21, 2016	90
Utah League of Cities and Townes, Extension Water Programs, Salt Lake City, Utah	September 17, 2015	75
WERA 1022 Utah Research Report – Meteorological and Climate Data to Support ET-Based Irrigation Scheduling, Water Conservation, and Water Resources Management. Western Extension Research Association (WERA), Fort Collins, Colorado.	September 3-4, 2015	29
Egyptian Delegation, Western US Irrigation Overview, Logan, Utah	August 18, 2015	7
Onion Field Day, Onion Irrigation, various locations Box Elder County, Utah	August 11, 2015	50
IEEE SusTech Conference (Ag Sustainability Session Co-Chair 2 sessions) and Speaker on Irrigation Scheduling based on Plant and Climate Measurements , Ogden, Utah	July 31, 2015	6
Cache Water District Exploratory Meeting (participant) North Logan, Utah	July 14, 2015	60
Agriculture and Natural Resource Legislative Committee Meeting, Extension Water Programs, Logan, Utah	July 10, 2015	30
2015 Western Society of Crop Science Annual Meeting Safflower Irrigation Research , Wellsville, Utah	June 16-17, 2015	30
Six County Government Organization, Extension Water Programs, Richfield, Utah	June 3, 2015	50
Cache Highline Canal, Urban Irrigation Research, Hyde Park Utah	April 7, 2015	500
Utah Water Users Workshop, Irrigation Scheduling Using Electronic Measurements, St. George, Utah	March 17-18, 2015	54
Utah Water Users Workshop, Extension Initiatives, St. George, Utah	March 17-18, 2015	97
Rich County Crop School, Irrigation Management for Water-Short Years , Randolph, Utah	February 25, 2015	25
Oilseed School, Safflower Irrigation Research , Logan Utah	February 24, 2015	160
Utah Division of Water Rights and Water Resources (Crop Evapotranspiration Training) Salt Lake City, Utah	February 23, 2015	13
Urban and Small Farm Workshop – Drip Irrigation , Speaker and chaired a session, West Jordan, Utah	February 18, 2015	71

Presentation Title	Date	Attendance
Utah Horticulture Conference (Fruit Growers) Using Climate Measurement to Predict Peach Tree Evapotranspiration , Spanish Fork, Utah	January 22, 2015	35
Sevier County Crop School (Irrigation Management) Richfield, Utah	January 22, 2015	80
International Visitor Leadership Program, USU Office of Global Engagement - Water Resources Management	August 22, 2014	8
Wheeler Historical Farms - Drip Irrigation Workshop	August 16, 2014	21
USU Office of Global Engagement - Irrigation in Utah and United States	August 7, 2014	6
Biofuel National Board - Field Presentation on Safflower Irrigation Management	June 25, 2014	9
Agriculture Irrigation Management - Northern Utah Mini Water Conference	April 2, 2014	110
Garden and Landscape Irrigation, Brigham City, Utah	March 11, 2014	18
Annual Extension Conference - Safflower Irrigation Presentation of Results, Logan, Utah	March 6, 2014	28
Oilseed Growers School - Research Report on Irrigation of Safflower , Logan, Utah	February 21, 2014	140
Onion Growers Meeting - Irrigation Strategies for Water Short Years, Brigham City, Utah	February 11, 2014	75
Utah Division of Water Rights - Water Measurement Training and Workshop , Professional Development, Salt Lake City and Video Broadcast to other locations.	December 11, 2013	75
US Committee on Irrigation and Drainage Meeting - Water Settlements, Denver, Colorado	October 23, 2013	45
Workshop on Irrigation of Landscape and Gardens, Hyde Park, Utah	May 8, 2013	23
Utah Water Users Workshop - Water Marketing, Saint George, Utah	March 20, 2013	40
Utah Irrigation Expo - Presentation on Irrigation Water Use, Spanish Fork, Utah	February 28, 2013	30
Urban and Small Farm Conference - Small Plot Irrigation, Salt Lake City, Utah	February 27, 2013	40
2013 Oil Seed School - Irrigation of Safflower, Logan, Utah	February 26, 2013	140
2013 Utah Hay and Forage Symposium - Irrigation Strategies for Water-short Years, Saint George, Utah	February 1, 2013	145
Water Banks - Cache County Water Master Plan Public Meeting, Nibley, Utah	January 16, 2013	39

Teaching

Field Irrigation System Design and Evaluation (CEE 5001/6001) 3 semester credits.
Evaluation, design and management of surface, sprinkle, and drip irrigation systems including system automation and maintenance. Taught fall 2015.

Guest Lecture – **ASTE 1010 – Introduction to Agricultural Systems Technology** - School of Applied Sciences, Technology and Education, Irrigation Fundamental Lecture, Fall 2014

Guest Lecture for PSC 4320 - **Forage Production and Pasture Ecology** (*Irrigation and Water Use of Forage and Pasture*) Logan, Utah. Fall 2016.

Description of Prior Work Experience

Senior Engineer

January 1997-October 2012

Natural Resources Consulting Engineers, Inc.

Fort Collins, Colorado

Technical Group Leader and Project Manager of Natural Resources Consulting Engineers, Inc. (NRCE) Agricultural Engineering Group. Managed numerous consulting contracts and professional staff on projects totaling around \$1,000,000 per year in fees. Prepared the proposals, scopes of work, and cost estimates for many of these projects.

- Estimated crop water and irrigation diversion requirements.
- Designed on-farm irrigation, water conveyance, and water distribution systems.
- Provided cost estimates for practicably irrigable acreage (PIA) projects.
- Identified and mapped presently and historically irrigated lands.
- Evaluated historical irrigation water use and estimates future irrigation water requirements.
- Assessed irrigation systems and provides information on water conservation and system rehabilitation.
- Provided expert witness reports and testimony concerning irrigation projects and water rights.

Some of his specific projects include:

- Prepared PIA claims for the Pueblo of San Juan, Santa Clara, and San Ildefonso Indian Reservations in New Mexico (State of New Mexico v. Abbott and State of New Mexico v. Aragon).
- Prepared PIA claim and water right negotiations for the Crow Indian Reservation in Montana.

- Evaluated on-farm and district water use and water conservation measures for the Imperial Irrigation District (approximately 460,000 acres of irrigated land) in southern California. The work for Imperial Irrigation District also included analysis and preparation of information for a petition for approval of long-term water transfer of conserved water to San Diego County Water Authority and analysis and report preparation in 2003 for US Bureau of Reclamation Part 417 – Procedural Methods for Implementing Colorado River Water Conservation Measures with Lower Basin contractors and others in the water transfer agreements that are part of the California Colorado River Quantification Settlement Agreement. Participated in the preparation of an Irrigation System Improvement Study and an Integrated Water Resources Water Management Plan.
- Identified and mapped historically irrigated land on the Shivwits and Acoma Indian Reservations.
- Supervised the mapping and preparation of water right claims for the Duck Valley Indian Reservation in southern Idaho and northern Nevada. Prepared the water right claims that were submitted to the states of Idaho and Nevada.
- Prepared technical information and conducted field investigations concerning irrigation upstream of the Duck Valley Indian Reservation.
- Developed a deficit irrigation model to estimate historical depletion by the Hopi and Navajo Indian Reservations from the northern washes of the Little Colorado River in Arizona and New Mexico.
- Prepared a water conservation and management plan, as well as developed a water measurement program for the Wapato Irrigation Project in central Washington. The Wapato Irrigation Project is a 140,000-acre irrigation project on the Yakama Reservation.
- Directed the preparation of an agricultural economic database for the Platte River in Wyoming, Colorado, and Nebraska. The database was used in the preparation of a Platte River EIS concerning endangered and threatened species that live in and along the Platte River.
- Evaluated and assessed the impacts of the 1999 U.S. Bureau of Reclamation interim operating criteria of the Weber Reservoir in Nevada on the Walker River Indian Reservation irrigated lands. The reservoir was operated at a low level due to safety concerns.
- Evaluated the water right impacts of a proposed Ahtanum Creek off-stream reservoir in Central Washington.
- Assessed irrigation suitability and irrigation delivery system adequacy for approximately 20,000 acres of idle lands in the Wapato Irrigation Project in central Washington.
- Provided expert witness services for the Pueblo of Acoma concerning irrigation water requirements, historically irrigated lands, and water supply in the San Jose River Hydrographic Survey for the Acoma Pueblo (State of New Mexico v. Kerr-McGee Crop.).
- Provided expert testimony concerning water rights in the Ahtanum Creek basin of Washington (Washington State Department of Ecology v. Acquavella, et al.).

- Project Manager for the Zuni River Basin Hydrographic Survey in New Mexico (*United States and State of New Mexico v. State of New Mexico Commissioner of Public Lands and A & R Production, et al.*). The hydrographic survey is for the adjudication of the Zuni River Basin.
- Project Manager for the design and construction of the Moapa Band of Paiute Indians Valley of Fire Water System.
- Provided expert technical support in the Quechan Tribe's water rights settlement negotiation for the Fort Yuma Indian Reservation (No. 8, Original State of Arizona, Plaintiff v. State of California et al. in the Supreme Court of the United States). The results of the negotiations were included in the Consolidate Colorado River Decree.
- Provided expert opinion information on retirement of irrigated lands concerning the application for water rights of Tri-State Generation and Transmission Association, Inc. in Prowers County, Colorado (District Court, Water Division 2, Colorado Case No. 2007CW74).
- Prepared expert witness reports and testimony for the United States in *McGuire v. United States* case that was heard in the Federal Court of Claims in 2011. Testified before Honorable Bohdan A. Futey in the United States Court of Federal Claims in the Sandra Day O'Connor Federal Courthouse Phoenix, Arizona in hearing held September 13-15, 2011. The testimony was concerning access to irrigated lands on the Colorado River Indian Reservation and an economic damage claim. After over 10 years in litigation the Judge ruled in favor of the United States and no damages or costs were awarded.
- Provided expert reports and testimony concerning flooding and crop damage in the *O'Toole v. United States* case in Reese River Valley of Nevada. The work resulted in a negotiated settlement between the parties.
- Provided expert reports and testimony concerning beneficial water use in a water right hearing for the El Sur Ranch near Big Sur, California. Testified before the California State Water Resources Control Board concerning Water Right Application 30166 submitted by James J. Hill III for El Sur Ranch, during hearings held June 16, 17, and July 8 and 11, 2011. The testimony was concerning reasonable beneficial water use for irrigation of pasture.

Senior Engineer

Bookman-Edmonston Engineering, Inc.

March 1993-January 1997

Sacramento, California

- Provided analytical support concerning irrigation consumptive use, water rights, environmental considerations, and allocation of water resources for negotiation and litigation purposes.
- Assisted in the preparation of environmental reports concerning water reclamation and development projects.

On specific projects Dr. Allen:

- Provided technical information for negotiations concerning the Fort Belknap Indian Reservation (Montana) reserved water rights.
- Provided technical negotiation support for the Truckee-Carson Irrigation District and the Lahontan Valley Environmental Alliance in Fallon, Nevada concerning issues related to water allocation on the Truckee and Carson Rivers.

- Formulated and evaluated agricultural irrigation management and conservation opportunities in the Snake River basin of Idaho and Oregon, increasing Snake River flows by one million acre-feet per year during Salmon migration periods.
- Conducted on-farm irrigation and distribution system evaluations, supplied recommendations for irrigation system modifications and management improvements to increase irrigation efficiencies within five large Mexican irrigation districts.
- Prepared the description, economic analysis, and loan documentation for the construction of a groundwater/surface water conjunctive use and an in-lieu groundwater recharge system for Shafter-Wasco Irrigation District and Semitropic Water Storage District in Kern County, California.
- Determined potential agricultural irrigation demands and prepared cost estimates for facilities needing to recycle up to 290,000 acre-feet per year of water in the Sacramento and San Joaquin Counties of California, which was part of a study for the Sacramento Regional County Sanitation District.
- Evaluated institutional and physical transfer and exchange mechanisms required to recycle approximately 450,000 acre-feet per year of wastewater from the San Francisco Bay area.
- Evaluated the impact of fallowing irrigated agricultural lands in the Sacramento Valley on the water supply in the Sacramento River and the Sacramento-San Joaquin Delta.
- Prepared an Integrated Resource Plan for Arvin-Edison Water Storage District located in the Central Valley of California.
- Assisted in the preparation of the Definite Plan Report and DEIS for the Spanish Fork Canyon-Nephi System, which is a 510 cfs, 42-mile water conveyance pipeline and a component of the U.S. Department of the Interior Central Utah Project Bonneville Unit.

**Extension Water Specialist for Southern Nevada
Cooperative Extension Service, University of Nevada**

**March 1992-March 1993
Reno, Nevada**

- Participated in research to determine the suitability of using saline water from shallow perched aquifers in the Las Vegas Valley as an additional source of irrigation water for turf.
- Helped prepare a document to encourage public policy dialogue in forums on managing and allocating water in Nevada, and moderated a public forum in Las Vegas using this document.
- Organized and conducted a technical conference entitled Salinity Effects on Plant-Soil-Water Relationships, which was held in Las Vegas, Nevada in 1993, and concerned the Colorado River Salinity Control Program.
- Taught Irrigation Principles, Irrigation Scheduling, and Irrigation Audit Courses to irrigation and landscape managers in Las Vegas.

**Extension Irrigation Engineer and Research Engineer
Utah State University**

**1985-1992
Logan, Utah**

- Performed urban and agricultural irrigation audits that included evaluation of irrigation pumping plants, hydraulics of mainlines, and adequacy of irrigation systems for over 100 irrigation systems in Utah.

- Provided guidelines for the operation and management of gravity-pressurized sprinkler irrigation systems.
- Assisted in establishing an electronic weather station network in Utah, and helped develop software that allowed the data to be used for crop water requirements and irrigation scheduling.
- Aided in interdisciplinary research on crop growth and yield as affected by environmental conditions and water management. Studied evapotranspiration equations using climatic data and soil moisture measurements from neutron probe readings.
- Other areas of research include consumptive use estimation, nitrate movement determination, and evaluation of the Colorado River Salinity Control Program.
- Helped teach an irrigation management training course, and presented irrigation system management information to water users.

Irrigation Engineer

1981-1985

Snyder Irrigation and Agri-Services, Inc.

Salt Lake City, Utah

- Designed and managed the construction of numerous irrigation systems that considered economics, soils, topography, climate, crops, labor, energy, and water resources in Utah, Wyoming, and Idaho for individual farmers and irrigation companies. The work included the design of pumping plants, pipelines, canals, water control structures, and sprinkler systems.

Irrigation Engineer

1980

Pitcher Irrigation Company

Preston, Idaho

- Supervised the design, development, and construction of irrigation systems in Idaho and Utah.

Research and Teaching Assistant

1979-1980

Utah State University

Logan, Utah

- Conducted some of the first research concerning “surge irrigation”, with an emphasis on the advance rate of water down furrows.
- Assisted in teaching a Water Law and Institution course.

Publications (Old)

- Morris, R., Devitt, D., Crites, A., Borden, G., and Allen, L. (1997). "Urbanization and Water Conservation in Las Vegas Valley, Nevada." *J. Water Resoure Planning and Management*, 123(3), 189–195.
- Allen, L. N. (1992). *Economical and Statistical Based On-Farm Irrigation Scheduling*, ASCE Proceedings of the Irrigation and Drainage Session at Water Forum '92 - Saving a Threatened Resource - In Search of Solutions, Baltimore, Maryland.
- . (1992). *Directory of Available Assistance for Nevada's Rural Water Users*.
- . (1991). *Economic and Statistical Based On-Farm Irrigation Scheduling*, Ph.D. Dissertation, Department of Civil Engineering, University of Idaho.
- . (1980). *Advance Rates in Furrow Irrigation of Cycled Flow*, M.S. Thesis, Department of Agricultural and Irrigation Engineering, Utah State University, Logan, Utah.

- Allen, L. N., and Hill, R. W. (1988). *Crop Irrigation Requirement Model for Utah*, ASCE Irrigation and Drainage Division Specialty Conference, Lincoln, Nebraska.
- . (1988). *Electronic Weather Stations Help Determine Crop Water Needs*, Utah Farmer-Stockman, Special Insert, August.
- . (1987). *Field Evaluations of Sprinkler Uniformities in Utah*, Pacific Northwest Irrigation Research Workshop, Kennwick, Washington; November.
- Allen, L. N., and Morris, R. L. (1992). *Horticulture Handbook, Chapter 4 - Irrigation*, Southern Area, Nevada Cooperative Extension.
- . (1992). *Irrigation Water Quality for Urban Irrigation in the Las Vegas Valley*, Nevada Cooperative Extension, Fact Sheet Number 92-69.
- Allen, L. N., and Sorensen, R. (1991). *Fall - Good Time to Maintain Pumping Stations*, Utah Farmer-Stockman.
- Bishop, A. A., Allen, L. N., Poole, G., and Walker, W. R. (1981). *Furrow Advance Rates Under Surge Flow Systems*, Transactions of ASCE Irrigation and Drainage Division 107.
- Cobourn, J., Johnson, W., Ford, J., Reid, M., and Allen, L. N. (1992). *Nevada's Water Future: Making Tough Choices, A Guide for Public Policy Dialogue*, University of Nevada, Reno.
- Cox, D. M., and Allen, L. N. (1992). *Colorado River Basin Salinity Control Project Moapa Valley, Nevada*, Nevada Cooperative Extension, Fact Sheet Number 92-69.
- . (1992). *Irrigation Management and Agricultural Salinity*, Nevada Cooperative Extension, Fact Sheet Number 92-69.
- Hill, R. W., and Allen, L. N. (1991). *New Statewide Weather network Helps Answer Irrigation Questions*, Published as a Special Insert to the Utah Farmer-Stockman.
- . (1991). *Water-Table Lysimeter Data Interpretation*, ASCE Proceeding of the International Symposium of Lysimetry - Lysimeters for Evapotranspiration and Environmental Measurements, Honolulu, Hawaii.
- . (1990). *Irrigation Scheduling Using Neutron Moisture Meters*, ASCE Irrigation and Drainage Division Specialty Conference, Durango, Colorado.
- Hill, R. W., Allen, L. N., Brockway, C. E., Robinson, C. W., Allen, R. G., and Burman, R. D. (1989). *Duty of Water Under the Bear River Compact: Field Verification of Empirical Methods for Estimating Depletion*, Utah Agricultural Experiment Station, Project No. 801, Research Report 125; Logan, Utah.
- Hill, R. W., Allen, L. N., Burman, R. D., and Brockway, C. E. (1986). *Meadow ET in the Bear River Basin of Utah, Wyoming, and Idaho*, ASCE Irrigation and Drainage Division Specialty Conference, Long Beach, California.
- Nielson, C., and Allen, N. (1988). *Computer Scheduling Aids Irrigation Companies*, Utah Farmer-Stockman, Special Insert.
- Ranjha, A. Y., Peralta, R. C., Deer, H. M., Allen, L. N., and Hill, R. W. (1991). *Sprinkler Irrigation - Pesticide Best Management Systems*, Cooperative Extension Service, Utah State University.
- Sorensen, R. B., Allen, L. N., and Hill, R. W. (1990). *Extending Electric Motor Life*, Information Bulletin #14 prepared for The Colorado River Salinity Program.

Partial List of Disclosed Expert and Technical Reports by L. Niel Allen

New Mexico State Engineer v. Abbott et al., Santa Cruz River Adjudication

- *Diversion and Depletion for Pre-20th Century Irrigation on the San Ildefonso Reservation.* Memorandum to Bradley S. Bridgewater, Esq. dated August 31, 2004.
- *Water Use Rates for San Juan Pueblo for New Mexico v. Abbott.* Memorandum to Bradley S. Bridgewater, Esq. dated September 21, 2006.
- *Water Use Rates for Santa Clara Pueblo for New Mexico v. Abbott.* Memorandum to Bradley S. Bridgewater, Esq. dated February 8, 2008.

New Mexico State Engineer v. Kerr McGee Corporation et al. - Rio San Jose Adjudication

- *Summary of Past and Present Water Uses of the Acoma Pueblo - New Mexico State Engineer v. Kerr McGee Corporation et al.* Technical Memorandum by L. Niel Allen, Natural Resources Consulting Engineers, Inc., June 27, 2005.

United State of America, State of New Mexico (Plaintiffs), and Zuni Indian Tribe and Navajo Nation (Plaintiffs in Intervention) v. A & R Production, et al. (Defendants) – Zuni River Adjudication

- *Zuni River Basin Adjudication Hydrographic Survey Report for Sub Areas 4 and 8,* Natural Resources Consulting Engineers, Inc., July 14, 2004.
- *Zuni River Basin Adjudication Hydrographic Survey Report for Sub Areas 9 and 10,* Natural Resources Consulting Engineers, Inc., October 2005.
- *Zuni River Basin Adjudication Hydrographic Survey Report for Sub Area 7,* Natural Resources Consulting Engineers, Inc., January 2006.
- *Zuni River Basin Adjudication Hydrographic Survey Report for Sub Areas 1 & 2 & 3 Excluding Ramah,* Natural Resources Consulting Engineers, Inc., August 2006.
- *Zuni River Basin Adjudication Hydrographic Survey Report for Sub-Area Ramah,* Natural Resources Consulting Engineers, Inc., January 2007
- *Zuni Indian Reservation Identification of Lands and Estimation of Water Requirements for Past and Present Irrigated Lands Served by Permanent Irrigation Works* prepared by L. Niel Allen, Ph.D., P.E. Natural Resources Consulting Engineers, Inc. November 4, 2008.

El Sur Ranch, Big Sur, California

- *Reasonable Beneficial Use – Land Use Study for El Sur Ranch Irrigated Pastures, Water Right Application No. 30166.* Natural Resources Consulting Engineers, Inc. May 18, 2005. Submitted to the California State Water Control Board.
- *(Update of May 18, 2005 Report) Reasonable Beneficial Use – Land Use Study for El Sur Ranch Irrigated Pastures, Water Right Application No. 30166.* Natural Resources Consulting Engineers, Inc. March 2007.

- Written Testimony of L. Niel Allen Concerning Water Right Application #30166. Natural Resources Consulting Engineers, Inc. April 2011.

Imperial Irrigation District Reports, Imperial, California

- System Improvement Study - Imperial Irrigation District, Final Draft. *Natural Resources Consulting Engineers, Inc. January 2006.*
- Assessment of Imperial Irrigation District's Water Use, *Natural Resources Consulting Engineers, Inc., March 2002.*
- Imperial Irrigation District Integrated Water Resources Management Plan, GEI Consultants, Inc. and Natural Resources Consulting Engineers, Inc. September 2009.

Yakama Nation - State of Washington, Department of Ecology v. James A. Acquavella, et al. case Yakima River Basin Water Rights Adjudication

- Draft - Comprehensive Water Resources Management Plan for the Toppenish and Simcoe Basins Yakama Reservation, Washington. *Natural Resources Consulting Engineers, Inc., March 2002.*
- Assessment and Review of the Proposed Pine Hollow Reservoir Project near Wiley City and Tampico, Washington. Prepared by Yakama Nation Department of Natural Resources, Natural Resources Consulting Engineers, Inc. Fort Collins, Colorado, D. B. Simons and Associates, Inc. Daryl B. Simons, Ph.D., P.E. Fort Collins, Colorado, and Hardin-Davis, Inc. Tim Hardin, Ph.D., Fisheries Biologist, Corvallis, Oregon. August 31, 1999.
- Priority Irrigation Water Conservation and Management Plan for the Wapato Irrigation Project, Natural Resources Consulting Engineers, Inc., January 2002 (Revised June 2003).
- Wapato Irrigation Project Expanded Water Measurement Plan, Natural Resources Consulting Engineers, Inc., February 2001.
- Irrigation Water Conservation and Management Plan for the Wapato Irrigation Project Draft Report Natural Resources Consulting Engineers, Inc., May 4, 1999 (Revised July 2001).
- Declaration of L. Niel Allen in Support of the Yakama Nation's Reply to Ahtanum Irrigation District Exceptions Dated March 4, 2003 - Dated March 23, 2003.
- Declaration of L. Niel Allen in Support Of The Yakama Nation's Reply to Responses of Ahtanum Irrigation District and Responses of John Cox Ditch Company Responses Dated April 25, 2003 – Dated June, 12 2003.
- Declaration of L. Niel Allen in Support of the Yakama Nation's Reply to Ahtanum Irrigation District Exceptions Dated June 13, 2003 - dated August 13, 2003.

- Declaration of L. Niel Allen on Behalf of The United States and Yakama Nation - Comments Based on a Review of the Supplemental Report of the Court Concerning the Water Rights for Subbasin No. 23 – June 24, 2008
- Declaration of L. Niel Allen on Behalf of The United States and Yakama Nation - Comments Based on a Review Exceptions and Objections File by Others Concerning the Supplemental Report of the Court Concerning The Water Rights For Subbasin No. 23 – July 24, 2008
- Third Declaration of L. Niel Allen on Behalf of The United States and Yakama Nation - Comments Based on a Review Exceptions and Objections File by Others Concerning the Supplemental Report of the Court Concerning the Water Rights for Subbasin No. 23 – August 14, 2008.

Duck Valley Indian Reservation – Reports prepared for the US Department of Justice and Bureau of Indian Affairs.

- Comprehensive On-Reservation Consumptive Use Water Rights Claim on Behalf of the Shoshone and Paiute Tribes of the Duck Valley Indian Reservation. April 14, 2005. Reports submitted to the State of Idaho and others for the Owyhee River Adjudication.
- Appendix F: Historically Irrigated Lands – Michael Taylor, NEA, Niel Allen, Ph.D., P.E., and Assad Safadi, Ph.D. Natural Resources Consulting Engineers, Inc. April 14, 2005.
- Appendix H: Agricultural Engineering and Practicably Irrigable Acreage (PIA) Determination – Niel Allen, Ph.D., P.E. and Assad Safadi, Natural Resources Consulting Engineers, Inc. April 14, 2005.
- Appendix K: Wildlife Habitat Enhancement Plan for Blue Creek – Niel Allen, Ph.D., P.E. and Assad Safadi, Ph.D., P.E., Natural Resources Consulting Engineers, Inc. April 14, 2005.

Jerry McGuire v. United States of America (No. 09-380 L) in the United State Court of Federal Claims, for United States Department of Justice.

- Expert Technical Analysis Concerning McGuire v. United States Case No. 09-380 filed in the U.S. Court of Federal Claims, prepared by L. Niel Allen, Ph.D., P.E., Natural Resources Consulting Engineers, Inc. March 1, 2010.
- Supplement to the March 2010 Expert Technical Analysis Concerning McGuire v. United States Case No. 09-380 filed in the U.S. Court of Federal Claims, prepared by L. Niel Allen, Ph.D., P.E., Natural Resources Consulting Engineers, Inc. June 10, 2010.

In addition Dr. Allen has prepared dozens of other non-disclosed technical and confidential reports for clients during his 19 years working for engineering consulting companies.