SAMUEL B. ST. CLAIR

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RESEARCH INTERESTS

Plant-environment interactions; plant physiological ecology; herbivory and plant defense; plant and ecosystem responses to climate change; fire ecology, pollination biology

EDUCATION

Ecological and Molecular Plant Physiology, Penn State University, Ph.D (2004)
Botany, Brigham Young University, M.S. (1999)
Botany, Brigham Young University, B.S. (1998)
Statistics and Spanish, Brigham Young University, Minors (1998)

PROFESSIONAL EXPERIENCE

Associate Professor, Dept. of Plant & Wildlife Sciences, Brigham Young University (2013-present)
Assistant Professor, Dept. of Plant & Wildlife Sciences, Brigham Young University (2007-2013)
Postdoctoral Researcher, University of California Berkeley (2005-2007)
Postdoctoral Researcher, Stanford University, Carnegie Institution of Washington (2004-2005)

AWARDS AND SERVICE

Karl and Mollie Butler Endowed Young Scholar Award ($25,000) (2013-2015)
Life Sciences Graduate Fellowship, Penn State University ($36,000) (1999-2001)
Walter Thomas Fellowship, Penn State University ($16,000) (2002)
Associate Editor: *Rangeland Ecology and Management* (2011-present)
Associate Editor: *PLoS ONE* (2011-present)
Guest Editor: special issue on aspen forests, *Forest Ecology & Management* (May 2013)
Science Advisory Panel Chair for the Western Aspen Alliance (2009-present)

PUBLICATIONS (37 total, 27 since arriving at BYU, 2 in review)

*graduate, #undergraduate student in the St.Clair research group

*Horn K, #Wilkinson J, #White S, St. Clair SB (2012) Changes in plant community composition and function following widespread desert wildfires. In review.

St.Clair SB, Cavard X, Bergeron Y (2013) The role of facilitation and competition in the development and resilience of aspen forests. *Forest Ecology and Management* 299: 91-99 .

Seager T, Eisenberg C, St. Clair SB (2013) Patterns and consequences of ungulate herbivory in aspen forests of North America. *Forest Ecology and Management* 299: 81-90.

Lindroth R, St.Clair SB (2013) Adaptation of quaking aspen (*Populus tremuloides*

Michx.) for defense against herbivores. *Forest Ecology and Management* 299:14-21.
Rogers PC, Eisenberg C, St.Clair SB. (2013) Resilience in quaking aspen: recent advances and future needs. *Forest Ecology and Management* 299:1-5.
*Buck J, St.Clair SB (2012) Aspen increases soil moisture, nutrients, organic matter and respiration in Rocky Mountain forest communities. *PLoS ONE* 7(12) e52369.
Sudderth E, St.Clair SB et al. (2012) Sensitivity of resource pools and fluxes to dry periods under low and high rain treatments. *Ecosphere* 3 (8): 70.
*Calder WJ, St.Clair SB. (2012) Facilitation drives mortality patterns on succession gradients of aspen-conifer forests. *Ecosphere* 3 (6): 57.
*Horn K, McMillan B & St.Clair SB (2012) Expansive fire in Mojave Desert reduces small mammal abundance & diversity. *Journal of Arid Environments* 77: 54-58.
Salve R, Sudderth E, St.Clair SB and Torn M (2011) Effect of grassland vegetation type on the response of hydrological processes to seasonal precipitation patterns. *Journal of Hydrology* 410: 51-61.
*Calder W, *Horn K and St.Clair SB (2011) Conifer expansion compromises the competitive ability and herbivore defense of aspen by modifying light environment and soil chemistry. *Tree Physiology* 31: 582-591.
*Smith E, #O'loughlin D, #Buck J, St.Clair SB (2011) The influences of conifer succession, physiographic conditions and herbivory on quaking aspen regeneration after fire. *Forest Ecology and Management* 262: 325-330.
#Clark A, and St.Clair SB (2011) Mycorrhizas and secondary succession in aspen-conifer forests: light limitation differentially affects a dominant early and late successional species. *Forest Ecology and Management* 262:203-207.
*Smith E, #Collette S, #Boynton T, #Lillrose T, Stevens M, Bekker M, St. Clair SB (2011) Developmental contributions to phenotypic variation in functional leaf traits within quaking aspen clones. *Tree Physiology* 31: 68-77.
Swarbreck S, Sudderth E, St.Clair SB, Salve R, Castanha C, Torn M, Ackerly D, Anderson G (2011) Linking leaf transcripts levels to whole plant analysis provides mechanistic insights to the impact of warming and altered water availability in an annual grass. *Global Change Biology* 17: 1577-1594.
St.Clair SB and Lynch JP (2010). The opening of Pandora's Box: climate change impacts on soil fertility and crop nutrition in developing countries. *Plant and Soil* 335: 101-115. Invited paper.
*Calder W, #Lifferth G, Moritz M and St.Clair SB (2010) Physiological effects of smoke exposure on deciduous and evergreen tree species. *International Journal of Forest Research* 438930: 1-7.
St.Clair SB, Mock K, Lamalfa E, Campbell R and Ryel R (2010) Genetic contributions to phenotypic variation in physiology, growth and vigor of aspen (*Populus tremuloides*) clones. *Forest Science* 56: 222-230.
Currit N and St.Clair SB (2010) Assessing the impact of extreme climatic events on aspen defoliation using MODIS imagery. *Geocarto International* 25: 133-147.
St.Clair SB, Guyon J and Donaldson J (2010) Quaking aspen's current and future status in western North America: the role of succession, climate, biotic agents and its clonal nature. *Progress in Botany* 71: 371-400. Commissioned review.
St.Clair SB, #Monson S, #Smith E, # Cahill D and *Calder W. (2009) Altered leaf morphology, leaf resource dilution and defense chemistry induction in frost-defoliated aspen (*Populus tremuloides*). *Tree Physiology* 29: 1259-1268.

St.Clair SB, Sudderth E, Fischer M, Torn M, Stuart S, Salve R, Eggett D and Ackerly D. (2009) Soil drying and nitrogen availability modulate carbon and water exchange over a range of annual precipitation totals and grassland community types. *Global Change Biology* 15: 3018-3030.

St.Clair SB, Sudderth E, Castanha C, Torn M and Ackerly D. (2009) Plant response to variation in precipitation and nitrogen is consistent across the diversity of a California annual grassland. *Journal of Vegetation Science* 20: 860-870.

Thayer SS, St.Clair SB, Somerville S and Field CB (2008) Accentuation of phosphorus limitation by nitrogen deposition in *Geranium dissectum*: an ecological genomics study. *Global Change Biology* 14: 1877-1890.

St.Clair SB, Sharpe WE and Lynch JP (2008) Key interactions between nutrient limitation and climatic factors in temperate forests: a synthesis of the sugar maple literature. *Canadian Journal of Forest Research* 38: 401-414.

Wullschleger SD, Leakey A and St.Clair SB (2007) Functional genomics and ecology: a tale of two scales. *New Phytologist* 176: 735-739.

St.Clair LL, Johansen JR, St.Clair SB and Knight KB (2007) The influence of grazing and abiotic factors on vascular plant and lichen community structure along an alpine tundra ridge in the Uinta Mountains, Utah, USA. *Arctic, Antarctic and Alpine Research* 39: 603-613.

St.Clair SB and Lynch JP (2007) The differential success of sugar maple and red maple seedlings on acid soils is influenced by nutrient dynamics and light environment. *In* Adjustment of photosynthetic processes of plants and cells to light environment, ed. Tom Sharkey. *Plant, Cell and Environment 30 virtual issue*.

St.Clair SB, Carlson JE and Lynch JP. (2005) Evidence for oxidative stress in sugar maple stands on acidic, nutrient imbalanced forest soils. *Oecologia* 145: 258-269.

St.Clair SB and Lynch JP (2005) The differential success of sugar maple and red maple seedlings on acid soils is influenced by nutrient dynamics and light environment. *Plant, Cell and Environment* 28: 874-885.

St.Clair SB and Lynch JP (2005) Base cation stimulation of mycorrhization and photosynthesis of sugar maple on acid soils are coupled by foliar nutrient dynamics. *New Phytologist* 165: 581-590.

St.Clair SB and Lynch JP (2005) Element accumulation patterns of deciduous and evergreen tree seedlings on acid soils and its implications for sensitivity to manganese toxicity. *Tree Physiology* 25: 85-92.

St.Clair SB and Lynch JP (2004) Photosynthetic and antioxidant enzyme responses of sugar maple and red maple to excess manganese in contrasting light environments. *Functional Plant Biology* 31: 1005-1014.

Lynch JP and St.Clair SB (2004) Mineral stress: the missing link in understanding how global climate change will affect plants in real world soils. *Field Crops Research* 90: 101-115.

St.Clair SB, Sharpe WE and Lynch JP (2003) Excess manganese reduces chlorophyll in sugar maple leaves. *Maple Syrup Digest* 15: 28-31.

St.Clair SB, St.Clair LL, Mangelson NF and Weber DJ (2002) Influence of growth form on the accumulation of airborne copper by lichens. *Atmospheric Environment* 36: 5637-5644.

St.Clair SB, St.Clair LL, Mangelson NF, Weber DJ and Eggett DL (2002) Element accumulation patterns in foliose and fruticose lichens from rock and bark substrates in Arizona. *Bryologist* 105: 415-421.

St.Clair SB, Cooper LS, Stewart LJ, Newberry CC and St.Clair LL (1998). The lichen flora of Stony Pass, an alpine tundra site in southwestern Colorado. *In* Lichenographia Thomsoniana: North American Lichenology eds. Glenn M, Cole M, Dirig R, Harris R, pp. 315-322. Ithaca NY.

INVITED SEMINARS (21)

St.Clair SB. Resilience of Utah's forest and desert communities to altered fire cycles. Wildland Resources Department, Utah State University, February 2012.
St.Clair SB. Facilitation and competition in aspen forests. Symposium: Resilience in aspen forests. Debeque, CO. June 2012.
Lindroth, R and St.Clair SB. Herbivore defense strategies in aspen. Symposium: Resilience in aspen forests. Debeque, CO. June 2012.
St. Clair SB. Quaking aspen defense strategies against herbivores and pathogens. Society of Ecological Restoration Meeting. Ephraim UT. June 2012
St.Clair SB. Responses of aspen forests to fire regimes and herbivory. Utah Bureau of Land Management Fire and Fuels Workshop. Torrey UT, May 2012.
St.Clair SB. Wildlife impacts on aspen forests. Utah Division of Wildlife Resources Research Conference, Midway UT, April 2012
St.Clair SB. Aspen resilience to large mammal browsing and its ecological implications for aspen forests. Monroe Mountain Working Group. Richfield UT, February 2012
St.Clair SB. The role of facilitation and competition in driving successional changes in aspen forests. Regional meeting of the Fishlake, Dixie and Manti-Lasal National Forest. Richfield, Utah, January 2012
St.Clair SB. The opening of Pandora's Box: climate change impacts on soil fertility and crop nutrition in developing countries. International Symposium: Improving nutrient management for food production and reduced environmental impacts. Bhubaneshwar, India , November 2009
St.Clair SB. Drivers of change in western aspen. Intermountain Native Plant Summit, Boise Idaho, March 2009.
Horn K, and St.Clair SB. Consequences of an emerging plant invasion-fire cycle in the Mojave Desert. Intermountain Native Plant Summit, Boise Idaho, March 2009.
St.Clair SB. The physiological ecology of aspen-conifer interactions in the Intermountain West. Restoring the West Conference, Logan UT, September 2008
St.Clair SB. Nutrient limitation: the missing link in understanding plant response to climate change. Brigham Young University, Plant and Animal Sciences, Oct. 2006.
St.Clair SB Nutrient limitation: unraveling plant responses to climate change. Texas Tech University, Department of Biology, November 2006.
St.Clair SB. Nutrient limitation: unraveling plant responses to climate change. Kansas State University, Division of Biology, October 2006.
St.Clair SB. Mineral stress: the missing link in understanding how plants respond to environmental change. UC Berkeley, Integrative Biology Department, May 2005.
St.Clair SB. The differential success of maples on acid soils. University of Vermont, School of Forest Resources. March 2005
St.Clair SB. Evidence for oxidative stress as a mechanism underlying sugar maple sensitivity to edaphic stress. Stanford University, Carnegie Institution of Washington, Department of Plant Biology, August 2004.
St.Clair SB. The role of nutrient-climate interactions in understanding compositional shifts

in maple species in the eastern deciduous forest. University of Illinois Urbana-Champagne, Department of Plant Biology, August 2004.

St.Clair SB. Key interactions between nutrient limitation and climatic factors in forests. Brigham Young University, Integrative Biology Department, April 2004.

St.Clair SB. Base cation stimulation of mycorrhization and photosynthesis of maples are coupled by foliar nutrient status. Penn State University, Intercollegiate Ecology Seminar, October 2003.

MEETING PRESENTATIONS (43 since 2007) (*grad, # undergrad in St.Clair lab)

St.Clair SB, *Horn K, McMillan B (2012) Fire alters top-down effects of small mammals on Mojave Desert plant communities Ecological Society of America Meeting. Portland, OR.

#Lybbert A, St.Clair SB (2012) Reproductive consequences of fire disturbance on native plant communities in the Mojave Desert. Ecological Society of America Meeting. Portland, OR.

#Nettles R, *Horn K, St.Clair SB (2012) The effects of temperature and water potential on the germination of *Bromus rubens*. Ecological Society of America Meeting. Portland, OR.

*Wan HY, St.Clair SB (2012) The effects of fire severity on tolerance and resistance of aspen against ungulate herbivores. Ecological Society of America Meeting. Portland, OR.

*Horn K, St.Clair SB, Jensen R (2012) Exotic grass invasions in western US desert alters landscape scale response to precipitation and temperature through fire. Ecological Society of America Meeting.Portland, OR.

*Rhodes A, *Buck JR, St.Clair SB (2012) Aspen facilitates subalpine fir regeneration by increasing germination success. Ecological Society of America Meeting. Portland, OR.

Bahr J, Aanderud Z, St.Clair (2012). Effects of fire and precipitation regime on microbial activity of desert soil crusts. Ecological Society of America Meeting. Portland, OR.

Aanderud, Z, St.Clair SB, McMillan B, Gill R (2012) Climate driven invasive grass-fire cycles: understanding ecosystem response for effective pre-and post-fire management of Great Basin and Mojave rangelands. Society of Range Management Meetings. Spokane, WA

Kitchen S, Petersen S, St.Clair SB. Mixed Aspen-Conifer Post-Fire Succession: the Twitchell Canyon Fire as a Long-term, Variable-Severity Case Study (2011) Restoring the West Conference. Logan, UT.

*Horn K, #Wilkinson J, #White S, St.Clair SB (2011) Fire results in increased physiological vigor for surviving Joshua trees (*Yucca brevifolia*) and creosote bushes (*Larrea tridentata*) in the Mojave Desert. Ecological Society of America Annual Meeting. Austin,TX

*Buck J, St.Clair SB (2011) Altered disturbance patterns promote facilitated competition in aspen-conifer forest. Ecological Society of American Annual Meeting. Austin,TX.

#Clark A, St.Clair SB (2011) Mycorrhizas and secondary succession in aspen-conifer forests Ecological Society of American Annual Meeting. Austin,TX.

Sudderth E, Byrne K, Gherardi L, Placella S, Herman D, St.Clair SB (2011) How do

linked plant-soil processes affect ecosystem responses to climate change? Ecological Society of American Annual Meeting. Austin,TX.

*Horn K, McMillan B, St.Clair SB (2010) Plant invasions and altered fire regimes in the Mojave Desert. American Society of Mammologists, Laramie, WY

*Horn K, McMillan B, St.Clair SB (2010) Small mammal responses to fire in the Mojave Desert Ecological Society of American Annual Meeting. Pittsburgh, PA.

*Buck J, St.Clair SB (2010) Impact of aspen on subalpine fir establishment and succession. Ecological Society of American Annual Meeting. Pittsburgh, PA.

St.Clair SB, *Smith EA 2010. Pre-fire successional status strongly impacts aspen regeneration success following fire. Ecological Society of American Annual Meeting. Pittsburgh, PA.

St.Clair SB, #Wilkinson J, #White S, *Horn K (2010) Potential for native plant community recovery following fire in the Mojave Desert (poster). Mojave Desert Restoration Workshop. Las Vegas, NV

St.Clair SB. (2010) Unraveling the aspen paradox. Department of Plant and Wildlife Sciences, Brigham Young University, Utah.

St.Clair SB (2009) Synthesis talk. Penn State University, Plant Biology Symposium, State College, PA.

#Carlisle B, Wooley S and St.Clair SB (2009) Impact of aphid feeding galls on cottonwood leaf physiology (poster). UCUR Conference. Salt Lake City, UT

#Smith, E and St.Clair S (2009) Age related shifts in defense strategies of quaking aspen. UCUR Conference. Salt Lake City, UT

#Lillrose T, #Smith E,# Ko A, Bekker M and St.Clair SB (2009) Reductions in water uptake and photosynthesis in aging Utah aspen stands. UCUR Conference. Salt Lake City, UT

#Collette S, #Boynton T, Stevens M and St.Clair SB (2009) Clonal vs. sexual regeneration patterns in Utah aspen. UCUR Conference. Salt Lake City, UT

#O'loughlin D, #Smith E, *Calder W, Webb B and St.Clair SB (2009) Conifer invasion of aspen modifies soil nitrogen and organic content (poster). UCUR Conference. Salt Lake City, UT

#Monson S, *Calder W and St.Clair SB (2009) Light availability and soil chemistry influence aspen's defense chemistry. UCUR Conference, Salt Lake City, UT

Wooley S, #Carlisle B and St.Clair SB (2009) Physiological responses to leaf galling in cottonwood. Cottonwood Symposium, Flagstaff, AZ.

St.Clair SB, #Monson SD, #Smith EA, #Cahill DG and *Calder WJ (2009) Altered leaf morphology, leaf resource dilution and defense chemistry induction in frost defoliated aspen (*Populus tremuloides*) (poster). PSU Plant Biology Symposium, State College, PA.

Salve R, Sudderth E, St. Clair SB and Torn M (2009) The impact of precipitation and grassland vegetation on soil moisture dynamics (poster). American Geophysical Union meeting, San Francisco, CA.

St.Clair SB, Bernard SM, Lunch C and Field CB (2008) Elevated CO_2 and N deposition modulate P acquisition and Rubisco activity in a California annual grassland. American Society of Plant Biologist, Western Section Meeting. Orem, UT.

Currit, N. and St.Clair SB (2008) Land-cover change due to a late spring frost: A MODIS analysis of the Wasatch Front. Association of American Geographers Annual Meeting, Boston, MA.

St.Clair SB, #Monson S, #Cahill D, #Smith E, *Calder J and Zou J (2008) Altered leaf morphology and defense chemistry induction in frost damaged trembling aspen. Ecological Society of American Annual Meeting. Milwaukee, WI.

*Calder J. and St.Clair SB (2008) Facilitation of subalpine fir regeneration by overstory aspen. Ecological Society of American Annual Meeting. Milwaukee,WI.

Sudderth EA, Bernard SM, Placella SA, St. Clair SB, Brodie EL, Salve R, Herman D, Fisher ML, Torn MS, Firestone MK and Ackerly DD (2008) The effects of changing precipitation on ecosystem function in Avena barbata grasslands: linking microbial and plant responses in contrasting soil types. Ecological Society of American Annual Meeting. Milwaukee, WI.

Bernard SM, St. Clair SB, Sudderth EA, Torn MS, Ackerly DD and Andersen GL (2008) The long-term effects of drought and high temperature on N metabolism in a C_3 grass (poster). American Society of Plant Biologists Annual Meeting. Merida, Mexico.

Bernard SM, St. Clair SB, Placella S, Firestone M, Salve R, Ackerly DD and Andersen G (2007) A molecular analysis of plant response to global climate change in an annual grassland. Ecological Society of America Annual Meeting. San Jose, CA.

Bernard SM, St. Clair SB, Placella S, Salve R, Brodie E, Firestone M, Torn MS, AckerlyDD, and Andersen G. (2007). A molecular analysis of plant response to long-term changes in water availability in an annual grassland. Plant Biology and Botany Joint Congress. Chicago, IL.

Brodie EL, Bernard SM, St. Clair SB**,** Placella SA, Herman DJ, Salve R, Torn MS, Ackerly DD, Firestone MK, Andersen GL (2007) 16S rRNA microarray analysis of shifts in microbial community composition in response to altered soil moisture and its implications for changes in nutrient cycling. Ecological Society of America Annual Meeting. San Jose, CA.

Firestone MK, Placella SA, Bernard SM, Herman DJ, Brodie EL, Andersen GL, St.Clair SB**,** and Ackerly DD. (2007). Connecting soil microbial N-transformations to plant N-processing. Ecological Society of America Annual Meeting. San Jose, CA.

Thayer S, St.Clair SB, Field, CB and Somerville S (2007) Accentuation of P limitation by N deposition: an ecological genomics study. Ecological Society of America Annual Meeting. San Jose, CA.

St. Clair SB, Castanha C, Sudderth E, Torn MS, Firestone MK and Ackerly DD (2007) The influence of cumulative and temporal variation in soil moisture on California grassland plant processes Ecological Society of America Annual Meeting. San Jose, CA.

Torn MS, St. Clair SB, Ackerly DD, Andersen GL, Bernard SM, Brody EL, Castanha C, Firestone MK, Fischer ML, Hopkins FM, Placella SA, and Salve R (2007) Annual grassland response to altered precipitation and temperature: genes, species, and ecosystem. *In* 'Ecosystem responses to experimental warming and other global climate change factors." Ecological Society of America Annual Meeting. San Jose, CA (Invited).

Placella SA, Bernard SM, St. Clair SB, Herman DJ, Andersen GL, Ackerly DD, and Firestone MK (2007). Plant-microbe interactions and global change. Oral presentation at the Environmental Science, Policy, and Management Graduate Research Symposium, Berkeley, CA.

RESEARCH SUPPORT

External Grant Funding (Total: $2,628,993; St.Clair spending authority: $1,023,993)

National Science Foundation
iUTAH – *innovative* **U**rban **T**ransition and **A**ridregion **H**ydro-sustainability
Funding period: 2012-2017
Funding amount: $20 M (Total), 1.4 M to BYU
PI: Todd Crowl Co-PIs (BYU): Zach Aanderud, Sam St.Clair, Rick Gill, Ryan Jensen

Division of Wildlife Resources
The role of fire and ecological conditions on wildlife impacts on aspen regeneration
Funding period: 2011-2016
FY 2012 funding: $198, 257
Total project funding: $470,655
PI: Sam St.Clair Co-PI: Randy Larsen

United States Forest Service
Influence of ecological conditions on herbivory of aspen
Funding period: 2012-2017
Funding amount: $71,000
PI: Sam St.Clair

United States Department of Agriculture, AFRI competitive grants program
Climate driven invasive grass-fire cycles: ecosystem responses
Funding period: 2010-2013
Funding amount: $420,000
PI: Sam St.Clair Co-PIs: Zach Aanderud, Brock McMillan, Rick Gill, Mark Brunson, Steve Petersen

United States Department of Interior
Invasive grass driven fire cycles in the Mojave Desert
Funding period: 2010-2013
Funding amount: $104,000
PI: Sam St.Clair Co-PIs: Brock McMillan, Zach Aanderud

United States Department of Energy
An annual grassland mesocosm exploration: scaling from genomes to ecosystem function
Funding period: 2008-2010
Funding amount: $28,338 ($28,338 to St.Clair)
Co-PI: Sam St.Clair

United States Department of Agriculture (AFRI)
Support for Symposium entitled: 'Regulatory roles of soil resources in plant and ecosystem responses to global change'
Funding period: 2009
Funding amount: $10,000
PI: Jonathan Lynch, Co-PIs: Sam St.Clair, Teh-Hui Kao

United States Department of Agriculture-National Research Initiative (NRI)
The role of Mn toxicity in sugar maple decline on acidic forest soils
Funding period: 2002-2004
Funding amount: $125,000 (Funded St.Clair's Ph.D dissertation)
PI: Jonathan Lynch, Co-PIs: John Carlson, Sam St.Clair

Mentoring Grants & Awards (Total: $175,000; St.Clair spending authority: $135,000)

Karl and Mollie Butler Endowed Young Scholar Award
Funding period: 2013-2015.
Award amount: $25,000

Brigham Young University, Mentoring Environment Grant
Consequences of fire on plant-pollinator relationships in Utah deserts
Funding period: 2010-2012.
Funding amount: $20,000
PI: Sam St.Clair

Brigham Young University, Mentoring Environment Grant
Mechanisms and consequences of conifer expansion in aspen forests
Funding period: 2010-2012.
Funding amount: $20,000
PI: Sam St.Clair

Brigham Young University, Mentoring Environment Grant
Effects of invasive plants, small mammals, fire, and climate on the Mojave Desert
Funding period: 2010-2012.
Funding amount: $20,000
PI: Brock McMillan, Co-PIs: Sam St.Clair, Zach Aanderud

Brigham Young University, Mentoring Environment Grant
Mechanisms and consequences of Aspen decline in the Rocky Mountains.
Funding period: 2008-2010.
Funding amount: $20,000
PI: Sam St.Clair

Brigham Young University, Mentoring Environment Grant
Comparative function genomics of salt tolerance Chenopodium and Brassicas
Funding period: 2008-2010.
Funding amount: $20,000; PI: Josh Udall

Sant Environmental Science Grant
Effects of an invasive plant/fire cycle on Mojave Desert ecosystem function: Funding period: 2008-2010.
Funding amount: $20,000
PI: Sam St.Clair, Co-PIs: Steve Petersen, Tom Smith, Val Anderson, Perry Hardin

Redd Foundation for Western Studies
Drought as a contributing factor to aspen decline in the Rocky Mountain region.
Funding period: 2008-2010.
Funding amount: $12,000
PI: Sam St.Clair

Redd Foundation for Western Studies
Mechanisms and Consequences of Conifer Expansion in Aspen Forests of Utah
Funding period: 2009-2012.
Funding amount: $9,000
PI: Sam St.Clair

BYU Graduate Mentoring Grants
Funding period: BYU, 2008-2010.
Funding amount: $9,000
PI: Sam St.Clair

TEACHING ACTIVITIES

Courses taught

PWS 100 Living with Plants (3 credit course)
PWS 440 Plant Physiology (3 credit course)
PWS 494 Mentored Research for Undergraduates
PWS 540 Plant Response to the Environment (3 credit graduate course)

Teaching evaluations

	Living with Plants 100									Plant Physiology 440					Plant Resp. Env. 540		Mentored Res. 494
Semester	F07	F08	W09	F09	W10	F10	W11	F11	W12	W08	W09	W10	W11	W12	F08	F10	F07-S12
Enrollment	56	46	38	65	61	64	71	87	86	46	24	32	14	22	2	10	50
Course rating	6.4	7.2	7.1	7.3	6.9	7.1	7.0	6.9	6.8	6.1	7.4	7.4	7.5	6.3	7.0	7.2	7.7
Instructor rating	7.0	7.4	7.6	7.6	7.1	7.5	7.5	7.3	7.3	6.4	7.6	7.6	7.5	6.6	8.0	7.2	7.8
Amount learned	6.1	7.3	7.0	7.4	6.7	7.2	7.0	7.1	6.9	6.3	7.4	7.5	7.5	6.4	7.0	7.2	7.7
Explanation clarity	6.4	7.0	7.3	7.2	6.5	7.1	7.1	7.0	7.0	5.8	7.4	7.3	7.5	6.7	6.0	7.0	7.7
Student involve.	7.0	7.4	7.5	7.3	7.3	7.2	7.5	7.4	7.3	6.8	7.7	7.7	7.6	7.1	8.0	7.4	7.8
Intellect. develop.	6.0	7.0	6.9	7.1	6.6	7.0	7.0	7.2	7.0	6.1	7.1	7.3	7.5	6.2	8.0	7.8	7.8

Evaluation scale from 1-8 with 1 being very poor and 8 being exceptional

MENTORING AND ADVISEMENT

Graduate Students (9)

John Calder (M.S. Graduated December 2009)
Ecophysiology of conifer expansion in aspen forest
Publications: 3 first author, 1 co-author

Eric Smith (M.S. Graduated August 2010)
Developmental influences on quaking aspen fitness under altered disturbances regimes
Publications: 2 first author, 1 co-author

Josh Buck (M.S. Graduated August 2012)
Facilitative and competitive interactions in subalpine forests
Publications: 1 first author, 1 co-author, 1 in review

Kevin Horn (Ph.D. 2008 - present)
Ecosystem responses to emergence of invasive/plant fire cycles in Utah's deserts
Publications: 1 first author, 1 co-author

Ho Yi Wang (M.S. August 2011 - present)
Influence of fire size and behavior on wildlife herbivory of aspen

Aaron Rhodes (Ph.D. 2012-present)
Influences of facilitation, competition & herbivory on subalpine forest development

Rob Coleman (Ph.D. 2012-present)
Elevated CO_2 effects on plant invasions

Andrew Lybbert (M.S. 2012-present)
The effects of invasive plant-fire cycles on desert pollination

Rory O'Connor (M.S. 2012-present) co-advised with Rick Gill
Mechanisms and consequences of desert fire

Thesis/Dissertation Committee Member (12)

Patrice McNulty (M.S. 2008-2010) Aspen herbivory
Gajendra Shrestha (M.S. 2008-2010) Lichen biogeophraphy
Monica Proulx (M.S. 2008-present) Lichen ecology
Craig Johnson (M.S. 2009-2010) False Hellebore physiology
Katie Temus (M.S. 2009-2011) Cheatgrass ecology
Nathan Cline (Ph.D. 2008-present) Great Basin plant-water relations
Lafe Connor (Ph.D. 2009-present) Dust impacts on alpine plant water relations
Sabrina Saurey (M.S. 2010-present) Antarctic soil microbiology
Josh Raney: (M.S. 2010-present) Genetic characterization of drought tolerance in Quinoa
Jason Bahr: (M.S. 2011-present) Soil crust ecology
Steve Bergsten (M.S. 2012-present) Ecophysiology of Agave
Rory O'Connor (M.S. 2012-present) Functional responses of desert vegetation to fire

Mentored Undergraduate Researchers (44) **Bold** = student co-author on publication,
<u>Underlined</u> = student co-author on paper in review or in prep

Eric Smith (2007-2009) aspen, functional traits
Steve Monson (2007-2009) aspen, defense chemistry

David Cahill (2007-2008) aspen, elemental analysis
Dan O'Loughlin (2008-2009) aspen-conifer, soil analysis
Tiffany Lillrose (2008-2009) aspen, dendrochronology
Sean Collette (2008-2009) aspen, genetics
Tom Boynton (2008-2009) aspen, molecular biology
Greg Lifferth (2009) aspen, stress physiology
Josh Buck (2009-2010) forest hydrology
Amy Clark (2010-present) secondary succession, mycorrhizas
Joey Schmutz (2008) native trees, stress physiology
Dan Zvirzdin (2008) aspen, remote sensing/landscape analysis
Allison Ko (2008) aspen biochemistry
Brandon Carlisle (2008-2009) cottonwood, gall physiology
Joe Wilkinson (2009-2011) Mojave Desert, stress physiology
Steve White (2009-2011) Mojave Desert, biochemistry
Jonathan Vandermark (2009) aspen, genetics
Ryan Shannon (2010-2011) aspen physiology
Jared Johns (2010-2011) aspen genetics
Richard Curzon (2010-2011) biochemistry of carnivorous plants
Anson Call (2010-present) aspen root biology
Andrew Hollingshead (2010) plant-pathogen interactions
Logan Beebe (2010) aspen genetics
Braden Boyer (2010-2011) aspen genetics
Trevor Barney (2010-2012) aspen defense chemistry
Ben St.Clair (2011-present) dendrochronology
Roshni Khadji (2011) desert ecology
Ryan Williams (2011) aspen physiology
Andrew Lybbert (2011-2012) desert ecology
Ho Yi Wan (2011) aspen ecology
Jessica Flory (2011-2012) aspen genetics and biogeography
Jason Bartholomew (2011-present) dendrochronology
Rachel Nettles (2011-present) plant invasions and fire ecology
Alysa DeFranco (2012-present) desert ecology
Kerri Russell (2012) forest ecology
Ariel Hong (2012) desert herbivory
Brian Graham (2012-present) biochemistry
Nate Duncan (2012-present) forest ecology
Annie Xie (2012) seed ecology
Christian Boekweg (2012-present) ungulate herbivory
Jacob Engel (2012-present) aspen ecology
Adam Olson (2012-present) defense chemistry
Holly Waddel (2012-present) environmental biochemistry
Miriam Carr (2013-present)
Hannah Payne (2013-present)
Ivy Chatwin (2013-presents) plant hydraulics

MEETINGS ORGANIZED

Resilience in Quaking Aspen: linking ecological processes with management of aspen forests. Western Aspen Alliance Symposium, Debeque Colorado, June 2012.

Regulatory role of soil resources in plant and ecosystem response to climate change. Plant Biology Symposium, Penn State University, May 2009

Scaling from genes to ecosystems. Ecological Society of America Meeting, San Jose, CA, August 2007

REVIEWS

Grant proposal and review panels

United States Dept. of Agriculture NIFA, Panel Member, Washington D.C., March 2012
United States Dept. of Agriculture NIFA, Panel Member, Washington D.C., April 2011
National Science Foundation, Ecological Biology Panel, external review, 2010
Netherlands Organization for Scientific Research, external review, 2010
National Geographic, competitive grants, external review, 2010
External reviewer for faculty tenure packet, 2012

Peer manuscript reviews for the following journals

Ecology, Ecological Monographs, Plant Physiology, New Phytologist (2), Tree Physiology (4), American Journal of Botany, Annals of Botany, Functional Plant Biology (3), Forest Ecology and Management (6), Plant & Soil (3), Journal of Chemical Ecology, PLoS ONE (4), Journal of Arid Environments, Journal of Environmental Management, International Journal of Forestry Research, Photosynthetica, Rangeland Ecology and Management (4), Symbiosis, Plant Breeding, Canadian Journal of Botany, Environmental Science and Technology, Bryologist, Western North American Naturalist, IEEE Transactions on Instrumentation and Measurements, Annals of Applied Biology, Annales Botanici Fennici, Entomologia Experimentalis et Applicata, Nature Education: The Knowledge Project