

Resume

Bruce A. Buchanan

January 2010

BEFORE THE OIL CONSERVATION COMMISSION
CASE NO. 14784 NMOGA EXHIBIT 16
OFFERED BY BRUCE A. BUCHANAN
HEARING DATE: MAY 14, 2012

PERSONAL

President
Buchanan Consultants, Ltd.
P.O. Box 2549
Farmington, NM 87499-2549

Phone: Office: (505) 327-2486
 Home: (505) 326-1150

EXPERTISE

Personnel and project management, mine reclamation, surface mining regulations, reforestation, soil resource management, soil salinity, oil and gas regulations and reclamation.

EDUCATION

1966: B.S. in Botany minor Zoology, University of Utah
1969: M.S. in Plant Ecology, University of Utah
1971: Ph.D. in Forest Soils minor Statistics, Montana State University

WORK EXPERIENCE

1991 - Present Buchanan Consultants, Ltd.
Farmington, New Mexico
Duties: President and CEO of environmental consulting firm. Currently manager of 4 employees providing environmental services including monitoring programs, research, interacting with regulatory agencies, developing mine permits, pit closures and closeout plans and reclamation of oil and gas well sites..

1980 – 1991 Associate Professor, Forest Soils: Department of Agronomy and Horticulture, New Mexico State University – Retired August 1991.
Duties: Teaching soils as related to Agronomy, Forestry and Land Use. Research associated with forestry and disturbed land reclamation.

- 1971 – 1980 Assistant Professor, Forest Soils; Department of Agronomy (Crop and Soil Science), New Mexico State University.
Duties: Teaching soils as related to Agronomy, Forestry and Land Use. Research associated with forestry and reforestation of Ponderosa Pine.
- 1968 – 1971 Graduate Student; Department of Crop and Soil Science, Montana State University.
Duties: Graduate Teaching Assistant, responsible for introduction to Soil Laboratory.
- 1967 – 1968 Graduate Student: Department of Botany, University of Utah.
Duties: Graduate Teaching Assistant, responsible for introduction to Botany Laboratory.
- 1963 – 1967 Summer Employee:
1966-67 Intermountain Forest and Range Experimental Station, USDA, Research Technician – Benmore Station, Utah.
1964-65 Park Service, USDI Ranger Naturalist, Craters of the Moon, Arco, Idaho.
1963 Forest Service, USDA Forest Technician, Manti-La Sal National Forest, Utah.

PROFESSIONAL SERVICE

NMSU – Teaching

A) Teaching responsibilities included the following courses (1974-1991):

Title	Level
Introduction to Soils	Sophomore-Junior
Forest and Range Soils	Junior–Senior
Soils and Land Use	Junior-Senior
Soil Morphology	Senior-Graduate
Soil Survey	Senior-Graduate
Soil Classification	Senior-Graduate
Soil Genesis	Graduate
Advanced Soil Classification	Graduate
Research Orientation	Graduate
Seminar	Graduate

I initiated the following courses for the Agronomy Department: Soils and Land Use (1974), Soil Morphology (1978), Forest and Range Soils (1979), Soil Survey (1983), and Research Orientation (1988).

In 17 years over 1500 students were taught in these classes. Student evaluations were always above average and in the upper 10% in most years.

- B) Teaching Committees
 - 1981 – 1984 University Discipline – Chairman 1983 – 1984
 - 1986 – 1991 College Discipline – Chairman 1987 – 1988
 - 1987 – 1991 University Admissions
 - 1988 – 1991 University Teaching Improvement – Chairman 1990 – 1991
- C) Student Organizations
 - 1971 – 1977 Advisor Natural Resource Conservation Society
 - 1974 – 1975 Advisor Plant and Soil Association
 - 1978 – 1979 Advisor Plant and Soil Association
 - 1985 – 1991 Advisor Plant and Soil Association
 - 1983 – 1987 Advisor Agriculture and Home Economics Student Council
 - 1986 – 1989 Advisor Associated Students – Student Senate
- D) Graduate Students – Major Advisor
 - Dan Vogt, MS (1975)
 - Wayne Robbie, MS (1978)
 - Robert DeVelice, MS (1978)
 - Douglas Cryer, MS (1979)
 - Richard White, MS (1981)
 - Joe Vinson, MS (1984)
 - Paul Shelton, MS (1984)
 - Barry Hunyadi, MS (1987)
 - Chris Gannon, MS (1989)
 - Steve Van Vactor, MS (1989)
 - Zuhar Kahn, MS (1990)
 - Luci Davis, MS (1991)

NMSU – Research

Research responsibilities were mainly associated with McIntire-Stennis funding for forestry related research. Field of study:

- Soil water relations
- Reforestation
- Mycorrhizal studies
- Mine reclamation

Consulting Activities 1971 – 2010

- 1971 Sibbald Agri-Business Ltd. Alberta, Canada. Provided reforestation recommendations documented logging impacts.
- 1972 El Paso Natural Gas. Texas. Conducted a soil survey of proposed strip-mining area, San Juan Basin, New Mexico.
- 1973 Environmental Institute. New Mexico State University. EIS for a transmission line in southern New Mexico.

- 1973 Public Service Company of New Mexico. Prepared an EIS for a proposed transmission line in north central New Mexico.
- 1974 Environmental Institute. New Mexico State University. Expert witness, Santa Fe, New Mexico.
- 1974 Public Service Company of New Mexico. Prepared an EIS for a proposed transmission line in the Albuquerque area, New Mexico.
- 1974 El Paso Natural Gas. Texas. Soil survey of proposed strip-mining. San Juan Basin, New Mexico.
- 1975 Public Service Company of New Mexico. Prepared an EIS for a proposed transmission line in southwestern New Mexico.
- 1975 Environmental Institute. New Mexico State University. Soil survey of an area in the Tularosa Basin.
- 1976 Western Coal Company. New Mexico. Conducted a soil survey of proposed strip-mining area in the Bisti Area, New Mexico.
- 1976 Mountain Valley Nursery. Lincoln, New Mexico. Soil management for nursery establishment.
- 1977 Public Service Company of New Mexico. Conducted a soil survey of northwestern New Mexico and the Bisti Area.
- 1978 Consolidation Coal Company. New Mexico. Soil survey of the Burnham Lease.
- 1979 Pennzoil Oil. Vermejo Park, New Mexico. Documented the effects of logging at Vermejo Park.
- 1979 Consolidation Coal Company. New Mexico. Soil survey of the Burnham Lease.
- 1979 Photographic Interpretation. New Hampshire. Soil interpretation of Fort Bliss survey area.
- 1980 Consolidation Coal Company. New Mexico. Conducted topdressing sampling. Burnham Mine.
- 1980 Western Coal. New Mexico. Conducted a soil survey of San Juan and La Plata Mines.
- 1980 Pennzoil Oil. Vermejo Park, New Mexico. Effect of logging, Vermejo Park.
- 1981 Consolidation Coal Company. New Mexico. Prepared a topdressing condition report for the Office of Surface Mining.
- 1981 Sunbelt Coal. New Mexico. Conducted a soil survey of Bisti and Gateway Mine.
- 1981 Pennzoil Oil. Vermejo Park, New Mexico. Expert witness: Vermejo Park vs. Pacific Lumber Company.
- 1982 Consolidation Coal Company. New Mexico. Designed, implemented, and evaluated a soil reclamation project, Burnham Mine.
- 1982 Boliden Mining Company. New Mexico. Conducted a soil survey of Boliden Mine. Silver City, New Mexico.
- 1982 Sunbelt Mining Company. New Mexico. Gateway Mine Permit, Gateway Mine.
- 1983 Utah International, Inc. Farmington, New Mexico. San Juan Mine. Soil survey.

- 1985 Utah International, Inc. Farmington, New Mexico. Conducted a soil survey of Navajo Mine–North
- 1985 Conoco Oil Company. Texas. Conducted a survey of Mescalero sand dunes. New Mexico.
- 1985 Utah International, Inc. Farmington, New Mexico. Conducted a soil survey of Navajo Mine-South.
- 1986 BHP – Utah International, Inc. Farmington, New Mexico. Navajo Mine. Rooting characteristics of Fourwing Saltbush.
- 1987 Museum of New Mexico. Santa Fe, New Mexico. Soils for Highway 273, Sunland Park, New Mexico
- 1988 USDA Forest Service. Gila National Forest, New Mexico. Determined the suitability of the Mimbres River for the Gila Club.
- 1988 BHP – Utah International; Inc. Farmington, New Mexico. La Plata Mine. Conducted a hydrologic comparison of reclaimed and native area.
- 1988 Human Systems Research, Inc. New Mexico. Soils of the MAR – ARKY area, White Sands Missile Range, New Mexico.
- 1989-2000. BHP. New Mexico. Navajo, San Juan and La Plata Mines. Conducted pre-mine soil surveys for Navajo and San Juan Mines. Conducted spoil suitability surveys and evaluated suitability. Conducted topdressing and regolith surveys and evaluated suitability.
- 1990 Engineers Incorporated. Siler City, New Mexico. Conducted a soil survey. Hurley, New Mexico.
- 1990 Fort Bliss. El Paso, Texas. Soil survey correlation for Fort Bliss.
- 1993 BHP. Farmington, New Mexico. Conducted a threatened and endangered vegetation survey to determine the presence of Mancos saltplant (*Proatriplex pleiantha*).
- 1993 Beazer, Inc. Long Beach, California. Conducted a soil evaluation of AMCOAL Mine. Gallup, New Mexico.
- 1993 Western Energy Company. Rosebud Mine, Montana. Evaluated reclamation and reforestation practices.
- 1993 El Paso Gas Company. Farmington, New Mexico. Evaluated soils and vegetation for the Blanco pipeline.
- 1994-2000. BHP. New Mexico. Navajo, La Plata and San Juan Mines. Mapping pre-mine vegetation to develop revegetation success standards, monitoring post-mining revegetation to evaluate success.
- 1994-2000. BHP. New Mexico. Navajo and San Juan Mines. Participated in the design and implementation of grazing research/demonstration projects to determine grazing impacts on growth and sustainability of revegetation.
- 1995 BHP. Farmington, New Mexico. Conducted soil survey of San Juan Mine-South Lease Extension.
- 1995 Dugan Production Corp. Farmington, New Mexico. Conducted a threatened and endangered vegetation survey to determine if two listed species were present at three proposed well sites.
- 1995 Peabody Coal Company – Black Mesa Mine. Evaluation of mycorrhiza development on pines and occurrence of fungi on reclaimed areas. Black Mesa, Arizona.

- 1996 BHP. Farmington, New Mexico. Conducted soil survey of La Plata Mine and new haul-road corridor.
- 1996-1997. Phelps Dodge – Tyrone Mine. Develop closure/closeout plan – copper mine. Silver City, New Mexico.
- 1997 BHP. Farmington, New Mexico. San Juan Coal Company. Topsoil depth and sodium mitigation studies.
- 1997 El Paso Natural Gas. Expert witness concerning reclamation of Blanco Gas Line. Farmington, New Mexico.
- 1997 Peabody Coal Company – Black Mesa Mine. Evaluation of erosion on reclaimed areas. Black Mesa, Arizona.
- 1997 Burlington Resources. Farmington, New Mexico. Barker Dome Well Head Survey.
- 1997 Peabody Coal Company – Black Mesa Mine. Rill & Gully Survey. Black Mesa, Arizona
- 1998 ABC Concrete. Farmington, New Mexico. Expert witness concerning runoff and erosion for new housing development.
- 1998 Zia Sporting Goods. Farmington, New Mexico. Environmental Assessment Report.
- 1998-2000. Tohono O’odham Indian Nation. Tucson, Arizona. Develop land use plan and Mine Plan of Operations.
- 1998 BHP. Farmington, New Mexico. Navajo Mine. “No Name” Soil Survey and Transportation Corridor.
- 1999 BHP. Farmington, New Mexico. Cinder Buttes Soil Survey.
- 1999 Santa Ana Indian Pueblo. Bernalillo, New Mexico. Bosque Restoration Project.
- 2000 David Evans and Associates, Inc. Portland, Oregon. Wetland creation/restoration and agriculture feasibility assessment for the Santa Ana Pueblo. Bernalillo, New Mexico.
- 2000 Dimmick Realty. Farmington, New Mexico. Septic tank design for new development.
- 2000 BHP. Farmington, New Mexico. San Juan Coal Company. Develop Se and SAR standards.
- 2000 Santa Ana Indian Pueblo. Bernalillo, New Mexico. Bosque Restoration Project.
- 2001 BHP. Farmington, New Mexico. San Juan Coal Company and Navajo Mine. Develop reclamation plans.
- 2001 Century 21 Real Estate. Farmington, New Mexico. Home site evaluations.
- 2001 Peabody Coal Company. Kayenta & Black Mesa Mine. Spoil sampling, erosion assessment and GIS programming.
- 2001 Santa Ana Indian Pueblo. Bernalillo, New Mexico. Bosque Restoration Project.
- 2002 BHP. Farmington, New Mexico. San Juan Coal Company and Navajo Mine. Develop reclamation plans.
- 2002 Molycorp. Questa, New Mexico. Develop reclamation plan, test plot design, tailings evaluation and subsidence reclamation

- 2002 Peabody Coal Company. Kayenta & Black Mesa Mine. Spoil sampling, erosion assessment and GIS programming.
- 2002 Various individual clients. Farmington, New Mexico. Home site evaluations.
- 2003 BHP. Farmington, New Mexico. San Juan Coal Company and Navajo Mine. Develop reclamation plans.
- 2003 Molycorp. Questa, New Mexico. Develop reclamation plan, test plot design, tailings evaluation and subsidence reclamation
- 2003 Peabody Coal Company. Kayenta & Black Mesa Mine. Spoil sampling, erosion assessment and GIS programming.
- 2003 Various individual clients. Farmington, New Mexico. Home site evaluations.
- 2004 BHP. Farmington, New Mexico. San Juan Coal Company and Navajo Min. Develop reclamation plans.
- 2004 Miller Engineers, Inc. Farmington, New Mexico. San Juan River outfall survey
- 2004 Molycorp. Questa, New Mexico. Develop reclamation plan, test plot design, tailings evaluation and subsidence reclamation
- 2004 Various individual clients. Farmington, New Mexico. Home site evaluations.
- 2005 BHP. Farmington, New Mexico. San Juan Coal Company and Navajo Mine. Develop reclamation plans.
- 2005 Consol Energy. Sesser, Illinois. Burnham Mine vegetation survey.
- 2005 Miller Engineers, Inc. Farmington, New Mexico. San Juan River outfall survey
- 2005 Molycorp. Questa, New Mexico. Develop reclamation plan, test plot design, tailings evaluation and subsidence reclamation
- 2005 Various individual clients. Farmington, New Mexico. Home site evaluations.
- 2006 BHP. Farmington, New Mexico. San Juan Coal Company and Navajo Mine. Develop reclamation plans.
- 2006 Consol Energy. Sesser, Illinois. Burnham Mine vegetation survey.
- 2006 Molycorp. Questa, New Mexico. Develop reclamation plan, test plot design, tailings evaluation and subsidence reclamation
- 2006 Peabody Coal Company. Kayenta & Black Mesa Mine. Spoil sampling, erosion assessment and GIS programming.
- 2006 Various individual clients. Farmington, New Mexico. Home site evaluations.
- 2006 White Mountain Apache Indian Reservation. Soil Survey.
- 2006 Burlington Resources/ConocoPhillips. Pit Reclamation Plan.
- 2007 BHP. Farmington, New Mexico. San Juan Coal Company and Navajo Mine. Develop reclamation plans.
- 2007 Consol Energy. Sesser, Illinois. Burnham Mine vegetation survey and bond release.
- 2007 Molycorp. Questa, New Mexico. Develop reclamation plan, test plot design, tailings evaluation and subsidence reclamation

- 2007 Peabody Coal Company. Kayenta & Black Mesa Mine. Spoil sampling, erosion assessment.
- 2007 Various individual clients. Farmington, New Mexico. Home site evaluations.
- 2007 ConocoPhillips. Pit Reclamation Plan.
- 2008 BHP. Farmington, New Mexico. San Juan Coal Company and Navajo Mine. Develop reclamation plans, soil salinity, reclamation evaluation, soil survey, spoil sampling and water sampling
- 2008 Consol Energy. Sesser, Illinois. Burnham Mine vegetation survey and bond release.
- 2008 Chevron Mining, Inc.. Questa, New Mexico. Develop reclamation plan, test plot design, tailings evaluation and subsidence reclamation, erosion studies and rooting study.
- 2008 Peabody Coal Company. Kayenta & Black Mesa Mine. Spoil sampling, erosion assessment, reclamation survey
- 2008 ConocoPhillips. Pit Reclamation Plan, pit rule evaluation, testify regarding salinity and salt movement (OCD)
- 2009 BHP. Farmington, New Mexico. San Juan Coal Company and Navajo Mine. Develop reclamation plans, soil salinity, reclamation evaluation, soil survey, spoil sampling.
- 2009 Chevron Mining, Inc.. Questa, New Mexico. Develop reclamation plan, test plot design, tailings evaluation and subsidence reclamation, erosion studies and rooting study.
- 2009 ConocoPhillips. Pit Reclamation Plan.
- 2009 Holland and Hart. Denver Colorado. Evaluation of Central Raton Basin Ground Water Modeling Project.
- 2009 Peabody Coal Company. Kayenta & Black Mesa Mine. Spoil sampling, erosion assessment, reclamation survey
- 2009 Wyoming Department of Environmental Quality. Laramie Wyoming. Prepared evaluation of the Tier System for the Wyoming DEQ/WQD.
- 2010 Barrett Corporation. Salinity assessment, Gillette, Wyoming
- 2010 BHP. Farmington, New Mexico. San Juan Coal Company and Navajo Mine. Develop reclamation plans, soil salinity, reclamation evaluation, soil survey, spoil sampling.
- 2010 Chevron Mining, Inc.. Questa, New Mexico. Develop reclamation plan, test plot design, tailings evaluation and subsidence reclamation, erosion studies and rooting study.
- 2010 Holland and Hart. Denver Colorado. Evaluation of Central Raton Basin Ground Water Modeling Project.
- 2010 Peabody Coal Company. Kayenta & Black Mesa Mine. Spoil sampling, erosion assessment, reclamation survey
- 2010 XTO/Pioneer Natural Resources. Evapotranspiration infiltration report, Raton Basin studies, Denver Colorado.

PUBLICATIONS

- Gould, W.L., V.W. Howard and **B.A. Buchanan**. 1972. Biotic composition and soil characteristics of an area to be strip-mined in San Juan County by El Paso Natural Gas Company. New Mexico Agricultural Experimental Station Special Report 24.
- Wollum, A.G., **B.A. Buchanan**, R.D. Rogers, S.E. Williams and R.K.E. Meisner. 1973. Containerized seedlings for the southwest. New Mexico Agricultural Experimental Station Res. Report. 269.
- Buchanan, B.A.** 1974. Containerized seedlings on the Lincoln National Forest. Great Plains Agric. Council Pub. 68:359-365. Presented at North American Containerized Forest Tree Seedling Symposium, Denver, Colorado, August 26-29, 1974.
- Gould, W.L., V.W. Howard and **B.A. Buchanan**. 1977. Biotic composition and soil properties on a Fruitland formation exposure in northwestern New Mexico. N.Mex. Ag. Exp. Sta. Spec. Rpt. 23
- Gould, W.L., V.W. Howard and **B.A. Buchanan**. 1977. Vegetation and soil characteristics of a portion of the Bisti coal field on northwestern New Mexico. N.Mex. Spec. Rpt. 34. February. 51 pp.
- Buchanan, B.A.**, M.F. Davault, and J.T. Fisher. 1977. Influence of artificial shade on water stress of containerized ponderosa pine seedlings. Can. Jour. For. Res. 7:537-540.
- Buchanan, B.A.**, R.L. DeVelice and N.S. Urquhart. 1978. An inexpensive precipitation gauge. SSSAJ 42:532-533.
- DeVelice, R.L. and **B.A. Buchanan**. 1978. Germinant reforestation: A promising new technique. Tree-Planters Notes 29:3-6.
- Munn, L.C., **B.A. Buchanan**, and G.A. Nielsen. 1978. Soil temperatures in adjacent high elevation forests and meadows of Montana. SSSAJ, volume 42, no. 6, 982-983.
- Buchanan, B.A.**, K.T. Harper, and N.C. Frischknecht. 1978. Alleopathic effects of Bur Buttercup tissue on germination and growth of various grasses and forbs in vitro and in soil. From Great Basin Naturalist, volume 38, no. 1, 90-96.
- Buchanan, B.A.** and L.A. Daugherty. 1979. Soil surveys for coal mine reclamation. *In* Proc. NM National Cooperative Soil Survey Workshop. USDA-Soil Conservation Service, Las Cruces.
- Buchanan, B.A.** 1979. Germinant reforestation: A technology for difficult sites in the southwest. *In* Proc. S.W. Soc. of Am. Forestry. Alamogordo, NM. May 1.

- Daugherty, L.A. and **B.A. Buchanan**. 1980. Soils of the Burnham Lease. N. Mex. Ag. Exp. Sta. Res. Rpt. 408.
- DeVelice, R.L., **B.A. Buchanan**, and J.T. Fisher. 1981. Rodent damage primary and secondary needled ponderosa pine seedlings. *Tree Planters Notes* 32:12-15.
- Buchanan, B.A.**, J.T. Fisher, J.G. Mexal, and R.D. Pieper. 1987. Pinyon-Juniper Woodlands of New Mexico: A Biological and Economic Appraisal. *Ag. Exp. Sta. Spec. Rpt.* 73.
- Buchanan, B.A.** 1987. Germinant Reforestation: A technology for mine spoil reclamation. *In Proc. Surface Mining and Reclamation in the Great Plains*, Billings, Montana, March 16. p. H-3-1.
- Buchanan, B.A.** 1988. Rangelands. Editor, University of New Mexico Press. p 89.
- Cotter, D.J., J.G. Mexal, and **B.A. Buchanan**. 1989. Teaching modular courses in agriculture. *NACTA J.* 33:11-12.
- Rubio, H.O., M.K. Wood, M. Cardenas and **B.A. Buchanan**. 1989. Effect of polyacrylamide on seedling emergence of three grass species. *J. Soil Sci.* 148:355-360.
- Buchanan, B.A.** and H.C. Stutz. 1990. Chemical and physical characteristics of 10-year-old mine spoils, Navajo Mine, New Mexico. *In Proc. Fifth Billings Symposium on Disturbed Land Rehabilitation*. Billings, Montana. March 25-30, 1990.
- Buchanan, B.A.**, M.K. Wood and W.J. Ruzzo. 1990. Vegetation associated with the major soils and reclamation areas on the Navajo Mine, New Mexico. *In Proc. Fifth Billings Symposium on Disturbed Land Rehabilitation*. Billings, Montana. March 25-30, 1990.
- Rubio, H.O., M.K. Wood, M. Cardenas and **B.A. Buchanan**. 1990. Seedling emergence and root elongation of four grass species and evaporation from bare soil as affected by polyacrylamide. *J. Arid Env.* 18:33-41.
- Samson, F., M.K. Wood and **B.A. Buchanan**. 1990. Plant species establishment for reclamation purposes on four soils at the La Plata Mine in Northwestern New Mexico. *In Proc. Fifth Billings Symposium on Disturbed Land Rehabilitation*. Billings, Montana. March 25-30, 1990.
- Stutz, H.C. and **B.A. Buchanan**. 1990. Rooting-depth of *Atriplex canescens* (fourwing saltbush) in mine spoils at the Navajo Mine, Northwestern New Mexico. *In Proc. Fifth Billings Symposium on Disturbed Land Rehabilitation*. Billings, Montana. March 25-30, 1990.

- Wood, M.K., **B.A. Buchanan**, and O.J. Estrada. 1990. Comparison of runoff and sediment yield for large and small plot rain simulators on the Navajo Mine, New Mexico. *In Proc. Fifth Billings Symposium on Disturbed Land Rehabilitation*. Billings, Montana. March 25-30, 1990.
- Buchanan, B.A.** 1991. Comparison of physical and chemical properties of overburden and spoil at Navajo Mine, New Mexico. *In Proc., American Society for Surface Mining and Reclamation. "Reclamation 2000 - Technologies for Success"*. May, 1991. Durango, Colorado.
- Mexal, J.G., **B.A. Buchanan**, M.K. Wood, and W. Skeet. 1991. Transplanting large Piñon and Juniper trees on reclaimed coalmine spoil in Northern New Mexico. *In Proc., American Society for Surface Mining and Reclamation. "Reclamation 2000 - Technologies for Success"*. May, 1991. Durango, Colorado.
- Wood, M.K., **B.A. Buchanan**, and W.J. Ruzzo. 1991. Revegetation success standards for the Navajo Mine, New Mexico. *In Proc., American Society for Surface Mining and Reclamation. "Reclamation 2000 - Technologies for Success"*. May 1991. Durango, Colorado.
- Hyder, D., **B.A. Buchanan**, and T.C. Ramsey. 1995. Effect of one and two seasons of irrigation on vegetal response, Navajo Mine, Northwest New Mexico. *In Proc., American Society for Surface Mining and Reclamation. "Decades Later: A Time for Reassessment"*. June 3-8, 1995. Gillette, Wyoming.
- Hyder, D., O.J. Estrada, H.C. Stutz, and **B.A. Buchanan**. 1995. Population trends of the Mancos Saltbush, Proatriplex pleintha from 1991 to 1995, Navajo Mine, Northwest New Mexico. *In Proc., American Society for Surface Mining and Reclamation. "Decades Later: A Time for Reassessment"*. June 3-8, 1995. Gillette, Wyoming.
- Hyder, D., D. Peete, T.C. Ramsey, and **B.A. Buchanan**. 1995. Evaluation of Desert Bloom Plus, ion oxide film in reclamation efforts, Navajo Mine, Northwest New Mexico. *In Proc., American Society for Surface Mining and Reclamation. "Decades Later: A Time for Reassessment"*. June 3-8, 1995. Gillette, Wyoming.
- Lane, J.R., **B.A. Buchanan**, and T.C. Ramsey. 1995. The effect of selenium on spoil suitability as root-zone material at Navajo Mine, New Mexico. *In Proc., American Society for Surface Mining and Reclamation. "Decades Later: A Time for Reassessment"*. June 3-8, 1995. Gillette, Wyoming.
- Wood, M.K., **B.A. Buchanan**, P. Denetclaw, and O.J. Estrada. 1995. Vegetation Surveys: A 12-year History, Navajo Mine. *In Proc., American Society for Surface Mining and Reclamation. "Decades Later: A Time for Reassessment"*. June 3-8, 1995. Gillette, Wyoming.

- Wood, M.K., **B.A. Buchanan**, and W. Skeet. 1995. Shrub preference and utilization by big game on New Mexico reclaimed mine land. *J. Range Manage.* 48:431-437.
- Wood, M.K., **B.A. Buchanan**, O.J. Estrada. 1997. Livestock impacts for management of reclaimed land at Navajo Mine: Vegetation responses. *In Proc.*, American Society of Surface Mining and Reclamation, May 1997. Austin, Texas.
- Wood, M.K., **B.A. Buchanan**. 2000. Reclamation Considerations for Arid Regions of the Southwest Receiving Less than Twenty-Five Centimeters Annual Precipitation. *In Reclamation of Drastically Disturbed Lands*, published by the American Society of Agronomy, Crop Science Society of American and Soil Science Society of America. Agronomy Monograph 41
- Applegate, C.K., **B.A. Buchanan**, R Postle. 2001. Modifying Root-Zone Spoil Sampling Methods Using Vertical and Horizontal Composite Sampling Techniques. *In Proc.*, American Society for Surface Mining and Reclamation. "Land Reclamation – A Different Approach". June 3-7, 2001. Albuquerque, New Mexico.
- Brown, T.H., B.D. Musslewhite, **B.A. Buchanan**. 2001. Sodicity: A Reassessment of the Influence of Sodic/Saline Conditions on Mine Land Reclamation. *In Proc.*, American Society for Surface Mining and Reclamation. "Land Reclamation – A Different Approach". June 3-7, 2001. Albuquerque, New Mexico.
- Caplan, T.R., B.D. Musslewhite, **B.A. Buchanan**, J.M.H. Hendrickx. 2001. Reclaiming Sodic Soils Following Saltcedar Removal on the Pueblo of Santa Ana, New Mexico. *In Proc.*, American Society for Surface Mining and Reclamation. "Land Reclamation – A Different Approach". June 3-7, 2001. Albuquerque, New Mexico.
- Musslewhite, B.D., T.H. Brown, **B.A. Buchanan**, T.C. Ramsey. 2001. Weathering Characteristics of Spoil Materials at La Plata Mine, Northwestern New Mexico. An Eight Year Study. *In Proc.*, American Society for Surface Mining and Reclamation. "Land Reclamation – A Different Approach". June 3-7, 2001. Albuquerque, New Mexico.
- Musslewhite, B.D., **B.A. Buchanan**, T.C. Ramsey, J.S. Hamilton, and J. Luther. 2001. Creating Diverse Wildlife Habitat at La Plata Mine, Northwestern New Mexico, A Case Study: Part 2. Soils and Vegetation. *In Proc.*, American Society for Surface Mining and Reclamation. "Land Reclamation – A Different Approach". June 3-7, 2001. Albuquerque, New Mexico.

- Ramsey, T.C., J.S. Hamilton, B.D. Musslewhite, **B.A. Buchanan**, and V. Abiad. 2001. Creating Diverse Wildlife Habitat at La Plata Mine, Northwestern New Mexico, A Case Study: Page 1 Landscape Design. *In Proc.*, American Society for Surface Mining and Reclamation. "Land Reclamation – A Different Approach". June 3-7, 2001. Albuquerque, New Mexico.
- Ramsey, T.C., and **B.A. Buchanan**. 2003. Creating a Diverse and Erosionally Stable Habitat at La Plata Mine, Northwestern New Mexico. *In Proc. American Society of Mining and Reclamation*. June 3 – 6, 2003. Billings, Montana.
- Buchanan, B.A.**, M.P. Owens, J. Mexal, T.C. Ramsey and B.D. Musslewhite. 2005. Long-Term Effects of Cover Soil Depth on Plant Community Development for Reclaimed Mined Lands in New Mexico. *In Proc. American Society of Mining and Reclamation*. June 19 – 23, 2005. Breckenridge, Colorado.
- Buchanan, B.A.**, M.P. Owens, A. Wagner and E. Redente. 2005. Plant Establishment on Reclaimed Molybdenum Tailings, Questa Tailings Facility, Questa, New Mexico. *In Proc. American Society of Mining and Reclamation*. June 19 – 23, 2005. Breckenridge, Colorado.
- Wagner A., M.P. Owens, **B.A. Buchanan** and E. Redente. 2005. First Year Transplant Response on Constructed Test Plots, Questa Mine, Questa, New Mexico. . *In Proc. American Society of Mining and Reclamation*. June 19 – 23, 2005. Breckenridge, Colorado.
- Owens, M.P., **B.A. Buchanan**, T.C. Ramsey and B.D. Musslewhite. 2005. Results of Interseeding on Existing Shrub Populations, La Plata Mine, New Mexico. *In Proc. American Society of Mining and Reclamation*. June 19 – 23, 2005. Breckenridge, Colorado.
- Owens, M.P., **B.A. Buchanan**, B.D. Musslewhite and T.C. Ramsey. 2005. Shrub Base Unit Production Sampling Technique. *In Proc. American Society of Mining and Reclamation*. June 19 – 23, 2005. Breckenridge, Colorado.
- Buchanan, B.A.**, M.P. Owens, T.C. Ramsey and J.T. Mexal. 2006. Evaluating Effects of Spoil Thickness and Cover Soil Depth on Vegetation Using Three Years of Plant Cover and Production. *In Proc, Billings Land Reclamation Symposium*. June 4-8, 2006. Billings, Montana.
- Wagner A., M.P. Owens and **B.A. Buchanan**. 2006. Plant Community Establishment On Reclaimed Molybdenum Tailings, Questa Tailings Facility, Questa, New Mexico. *In Proc, Billings Land Reclamation Symposium*. June 4-8, 2006. Billings, Montana.

- Wagner A., **B.A. Buchanan**, M.P. Owens and E Redente. 2006. Second Year Transplant Survival On Constructed Test Plots, Questa Mine, Questa, New Mexico. In Proc, Billings Land Reclamation Symposium. June 4-8, 2006. Billings, Montana.
- Ramsey T.R., **B.A. Buchanan** and M.P. Owens. 2006. Surface Mine Reclamation, Northern New Mexico: First Year Response of Fall and Spring Seeding. In Proc, Billings Land Reclamation Symposium. June 4-8, 2006. Billings, Montana.
- Wagner A., J. Niemeier, **B. A. Buchanan** and J. Tucker. 2007. Comparison of Forest Regeneration In A Subsidence Zone To A Reference Area. In Proc. National Meeting of the American Society of Mining and Reclamation. June 2-7, 2007. Gillette, Wyoming.
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- Brown, T., **B.A. Buchanan**, S.R. Perkins and C.K. Applegate. 2008. Salt Redistribution Of Reclaimed Spoil After Two Years Of Irrigation At Navajo Mine, New Mexico. *Submitted* National Meeting of the American Society of Mining and Reclamation. May 30-June 5, 2009. Billings, Montana.
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PROFESSIONAL SOCIETIES

American Society of Agronomy
American Society of Mining and Reclamation
Certified Professional Soil Scientist/Classifier ARCPAC Cert. #02283
New Mexico Soil Science Society
Society of Range Management
Soil Science Society of America

HONOR SOCIETIES

Sigma Xi

AWARDS

1962 National Rifle Record, Gold Medal, National Rifle Association
1973 Outstanding Leadership – Soil Conservation Society of America,
Rio Grande Chapter
1973 Honorary Chapter Farmer – FFA New Mexico
1973 Honorary State Farmer – FFA New Mexico
1974 Outstanding Service Award – FFA New Mexico
1985 Outstanding Research Presentation – American Society of Agronomy
1985 Distinguished Teaching Award – College of Agriculture and Home
Economics, NMSU
1985 FFA Teacher of the Year – NMSU
1988 Distinguished Service Award – FFA New Mexico
1988 Outstanding Teaching Award – Burlington Northern Foundation, NMSU
1989 Teaching Excellence Award – Donald C. Roush Award, NMSU