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EDUCATION

Bachelor of Science, 1983, Utah State University, Logan, Utah

PROFESSIONAL EXPERIENCE

1990 to 2016 Biological Consultant, Principal of Mountain West Ecological Consulting, Inc., Providence, Utah

1980 to 1990 Research Technician, Department of Range Science, Utah State University, Logan, Utah

WORK EXPERIENCE

Revegetation Monitoring

Monitored upland, stream and wetland revegetation success in southwest Wyoming and northern Utah on the Ruby Pipeline project in Uinta and Lincoln counties, Wyoming and Rich, Cache and Box Elder Counties, Utah. Tasks included collecting vegetation data and photos on Trimble GPS with ArcPad and more recently with iPads.

Monitored wetland revegetation success on the Green River Country Club Golf Course Expansion project in Sweetwater County, Wyoming.

Evaluated riparian shrub transplant success on the Swaner Nature Preserve in Summit County, Utah.

Participated in monitoring efforts for a bitterbrush transplant pilot study on Colorado Division of Wildlife property in Moffat County, Colorado.

Participated in revegetation monitoring efforts at riparian locations along a Colorado Interstate (El Paso Energy) natural gas right of way in Douglas and El Paso Counties, Colorado. Tasks included field data collection of plant cover by species using 1- meter square quadrats, including frequency and density, data analyses of the field data, and subsequent report writeup.

Participated in revegetation monitoring at riparian locations along a Colorado Interstate (El Paso Energy) natural gas right of way in Laramie, Platte, and Converse Counties in southeastern Wyoming. Tasks included field data collection of plant cover by species using 1- meter square quadrats, including frequency and density, data analyses of the field data, and subsequent report writeup.

Evaluated revegetation success and potential erosion on natural gas well pads in Garfield County, Colorado.

Evaluated revegetation efforts in Coastal Sage/Scrub communities re-establishment areas in Orange County, California. This data was taken in conjunction with a study looking at roto-discing reclaimed areas to enhance native seed establishment. Point intercept data by plant species was taken and analyzed for cover by native versus weedy plant species.

Participated in an ongoing wetland monitoring project for the Salt Lake Airport Authority in Salt Lake County, Utah. Wetlands removed by a new runway were mitigated for by creating a wet meadow, marsh, mudflat, and small lake habitats in a previous greasewood community site northwest of the Salt Lake City International Airport. Tasks include bi-annual monitoring of the revegetation efforts through sampling the various created community types and sampling similar native communities in the vicinity.

Evaluated upland and wetland reclamation monitoring sites for revegetation success along a Colorado Interstate natural gas pipeline in eastern Utah, northwestern Colorado, and southern Wyoming. Tasks included data collection for five years enumerating percent live cover by plant species in 1- meter square quadrats in random locations both on the pipeline right of way and in adjacent relatively undisturbed plant communities. Evaluation of data will be made to determine sufficient environmental compliance for revegetation according to Federal Energy Regulatory Commission (FERC) guidelines.

Evaluated native and created wet meadow and wetland community types in a monitoring effort on the Logan River Golf Course in Cache County, Utah. To monitor revegetation success, permanent sites in the two wetland native and created community types were sampled and transects were evaluated for cover by species and species density.

Monitored wetland establishment along an improved road over Wolf Creek Pass in Summit County, Utah. Tasks include surveying of the constructed wetlands and ongoing annual collections of herbaceous and shrub cover, density, and frequency by plant species.

Evaluated reclamation success along two natural gas pipeline right-of-ways to determine sufficient environmental compliance for revegetation according to Federal Energy Regulatory Commission (FERC) guidelines. Tasks included enumerating percent cover by plant species in 1-meter square quadrats in random locations both on the pipeline right of way and in adjacent undisturbed plant communities. A subsequent data analysis, written report, and recommendations were made to encourage successful revegetation results.

Waters and Wetland Reconnaissance and Delineation

Participated in wetland and waters of the United States delineations on a proposed 1700 acre mine project in the Independence Mountains in Elko County, Nevada. Tasks included field delineation of wetlands and waters of the United States and identification of seeps and springs. Data was collected with the use of Trimble global positioning units.

Conducted wetland and waters of the United States delineations for proposed oil and gas well sites, access roads, and connecting pipelines in the Uintah Basin in Eastern Utah located in Duchesne and Uintah Counties. Delineated jurisdictional wetland, ephemeral channels, and ditch/canal boundaries. Tasks included identification and delineation of features with global positioning data collection in the field and subsequent report production.

Participated in wetland and waters of the United States delineations on a proposed Ruby Limited Liability Company (El Paso Energy) natural gas pipeline project in Uinta and Lincoln Counties,

Wyoming and Rich, Cache, and Box Elder Counties, Utah. Tasks included field delineation of wetlands and identification of springs and seeps with global positioning data collection. Coordination with construction personnel was implemented to re-route the proposed pipeline corridor or minimize impact to the extent possible of these resources. Work also included the production of the Utah and Wyoming portions of the wetland delineation report for this project.

Performed a wetland delineation for the proposed Rolling Green River Golf Course Expansion in Sweetwater County, Utah. Tasks included field delineation of wetlands and wetland delineation report production with coordination with Corps of Engineers personnel and golf course designers.

Performed a wetland delineation for the proposed Millville Meadows Subdivision in Cache County, Utah.

Participated in wetland delineations on a proposed Colorado Interstate (El Paso Energy) High Plains Expansion natural gas pipeline project in Weld, Adams, and Morgan counties, Colorado.

Participated in wetland delineations on a proposed Utah Department of Transportation Interstate 15 highway expansion project in Utah County, Utah.

Participated in wetland delineations on a proposed Wyoming Interstate Company Piceance Expansion Project natural gas pipeline right of way in Sweetwater County, Wyoming, and Moffat and Rio Blanco Counties, Colorado. Tasks included field delineations and coordination with Corps of Engineers personnel and pipeline representatives for wetland protection measures, and subsequent participation in report production for the wetland delineation report and resource reports.

Participated in wetland delineations on a proposed Colorado Interstate (El Paso Energy) natural gas pipeline right of way for the Ruby project in Sweetwater and Uinta Counties, Wyoming, Rich, Cache, Box Elder Counties, Utah, and Elko and Eureka Counties, Nevada.

Conducted a wetland delineation for the proposed Snyderville Basin Special Recreation District trails project in Summit County, Utah.

Conducted a wetland delineation on a proposed Colorado Interstate natural gas pipeline right of way for the Midway Extension project in El Paso County, Colorado.

Participated in wetland delineations on a proposed Colorado Interstate natural gas pipeline right of way in Cimarron County in western Oklahoma and Sherman County in northwestern Texas.

Participated in wetland reconnaissance and subsequent delineation on a proposed Colorado Interstate natural gas pipeline right of way in Yuma, Kit Carson, Weld, Morgan, and Washington Counties in eastern Colorado and Sherman, Logan, Scott, Lane, Finney, Hodgeman, Ford, and Kiowa Counties in western Kansas.

Conducted a wetland delineation on a proposed Colorado Interstate natural gas pipeline right of way in El Paso County in eastern Colorado.

Participated in wetland delineations on a proposed Colorado Interstate natural gas pipeline right of way in Weld and Adams Counties in eastern Colorado.

Participated in wetland delineations on a proposed Colorado Interstate natural gas pipeline right of way in El Paso, Elbert, Douglas, Arapahoe, and Adams Counties in eastern Colorado.

Participated in a wetland reconnaissance of the proposed Light Rail East/West corridor in Salt Lake City, Utah. This wetland reconnaissance was conducted to evaluate wetland impacts in the proposed East/West corridor route.

Conducted wetland reconnaissance along a proposed Pennzoil natural gas pipeline right of way in Colfax County in northeastern New Mexico and Las Animas County in southeastern Colorado.

Participated in wetland delineations on three proposed Colorado Interstate natural gas pipeline right of ways in Fremont, Natrona, Carbon, Albany, Laramie, Platte, and Converse Counties in eastern Wyoming.

Participated in a preliminary wetland reconnaissance in the Richardson Flats area east of Park City in Summit County, Utah. This wetland reconnaissance was conducted for planning for future development in the area.

Participated in a wetland delineation for a proposed Colorado Interstate natural gas pipeline on the plains in Baca and Las Animas Counties in southeastern Colorado.

Participated in wetland delineations for two proposed Colorado Interstate natural gas pipelines in the Culebra mountain range in Las Animas and Costilla Counties in south central Colorado.

Participated in a wetland delineation for a proposed expansion of the Logan Airport in Cache County, Utah. Tasks included delineating and mapping jurisdictional wetlands for planning purposes.

Participated in a wetland delineation for a proposed expansion of the Spanish Fork-Springville Airport in Utah County, Utah. Tasks included delineating and mapping jurisdictional wetlands for planning purposes.

Participated in a wetland delineation and Biological Evaluation(BE) for a proposed expansion of the Rexburg Airport in Madison County, Idaho. The preferred alternative investigated was runway expansion into the floodplain of the South Fork Teton River. Proposed wetland mitigation areas were also evaluated for suitability of mitigation sites. Plant community types on the floodplain were described and mapped for the Biological Evaluation.

Participated in a wetland delineation for a proposed housing development near Clinton in Davis County, Utah. Tasks included delineating and mapping wetland areas for planning purposes.

Performed a wetland delineation for a proposed housing development in Cache County, Utah. Tasks included wetland delineation and mapping and subsequent report writing and submittal to the US Corps of Engineers.

Participated in a preliminary wetland reconnaissance in drainages adjacent to the Jordanelle Dam in Wasatch County, Utah. This wetland reconnaissance was conducted for planning for future development in the area.

Participated in a preliminary reconnaissance for potential wetlands on a United Park City Mine property near Park City in Summit County, Utah. Locations of waters of the United States and

potential wetlands were described and mapped using aerial photos and ground surveys. Subsequent wetland delineation of the potential areas was conducted the following year.

Participated in a wetland delineation for a proposed Colorado Interstate natural gas pipeline along the Purgatory River and in the pinon-juniper plant community west of Trinidad in Las Animas County, Colorado.

Assisted in a wetland delineation for a proposed Colorado Interstate natural gas pipeline on the South Platte River in Morgan County, Colorado.

Assisted in a wetland delineation for a proposed Southpoint Golf Course on the Jordan River in Salt Lake County, Utah.

Performed initial wetland reconnaissance fieldwork and participated in subsequent field delineations for a proposed Northwest Pipeline natural gas pipeline project in Wyoming, Idaho, and Oregon. Assisted in project coordination and report writing.

Participated in a wetland delineation for a proposed Colorado Interstate natural gas pipeline from the Piceance Basin in Rio Blanco County south to the Colorado River in Garfield County in northwestern Colorado.

Participated in a wetland delineation for a proposed Colorado Interstate natural gas pipeline on the Canadian River and other drainages in the vicinity of the pipeline right of way northeast of Amarillo in Potter and Moore Counties, Texas.

Participated in a wetland delineation for proposed stream alteration plan at the Logan landfill in Cache County, Utah. Tasks included wetland delineation and mapping of the pertinent drainage and adjacent pastures.

Revegetation Plan Implementation

Wrote a shrub planting plan for the restoration of Lime Kiln drainage for the Ruby Pipeline in Cache County, Utah. Supervised and implemented planting efforts for this plan.

Supervised and implemented planting efforts of five species of native shrubs as wetland mitigation measures at the Swaner Nature Preserve in Summit County, Utah.

Organized and implemented riparian revegetation efforts at specific riparian locations along a Colorado Interstate natural gas right of way for the Valley Mainline located in Douglas and El Paso Counties, Colorado. Tasks included transplanting native herbaceous vegetation on to the right of way at uniform intervals to expedite revegetation efforts.

Coordinated and implemented shrub revegetation establishment at riparian locations along a Colorado Interstate natural gas pipeline right of way in Laramie, Platte, and Converse Counties, in southeastern Wyoming.

Coordinated and implemented revegetation of woody riparian shrubs at stream and river crossings along a Colorado Interstate natural gas pipeline in eastern Utah, northwestern Colorado, and southern Wyoming. Tasks included coordinating and supervising the transplanting of six native shrub species of nursery container plants and cuttings at eleven riparian locations along the pipeline right of way.

Participated in a woody riparian shrub revegetation project on Rock Creek, a tributary to the Snake River in Twin Falls County in southern Idaho.

Participated in a woody riparian shrub revegetation project for a wetland mitigation plan on Teton Creek in Fremont County, Idaho.

Environmental Assessment

Participated in the biological survey for the proposed Ruby Pipeline Project in Uinta and Lincoln Counties, Wyoming and Rich, Cache, and Box Elder Counties, Utah. Data collected for the project included wetlands, spring and seep, stream, wildlife (raptors, sage grouse, pygmy rabbits, etc), vegetation communities and weeds, construction obstacles, and land use information. Data points, lines, and polygons were collection using ArcPad.

Participated in vegetation or cover type mapping and weed survey for the proposed Cheyenne Plains Pipeline Company Yuma County Lateral Project in Washington and Yuma County, Colorado.

Participated in a Special Area Management Plan for Logan City in Cache County, Utah. Tasks included spring hydrology and potential jurisdictional wetland mapping.

Participated in a weed survey in Sweetwater County, Wyoming for the Wyoming Interstate Company Piceance Expansion project. Also participated in a rare and endangered plant survey for the same project in Sweetwater County, Wyoming, and Moffat and Rio Blanco Counties, Colorado.

Participated in a rare plant survey and vegetation community mapping for a proposed Colorado Interstate natural gas pipeline on the plains in Baca and Las Animas Counties in southeastern Colorado.

Participated in rare plant surveys and vegetation community mapping for two proposed Colorado Interstate natural gas pipelines in the Culebra mountain range in Las Animas and Costilla Counties in south central Colorado.

Evaluated two proposed locations for natural gas compressor stations in Moffat and Weld Counties, Colorado. Tasks included vegetation mapping and evaluation of potential erosion control measures at the proposed sites.

Evaluated two proposed natural gas pipeline right-of-ways and two proposed compressor station sites for storm water management measures in Sweetwater, Carbon, Fremont, and Natrona Counties, Wyoming. Tasks included vegetation mapping, recommended erosion control measures, and reclamation seed mix information for proposed projects.

Evaluated environmental impact on trees from a sulfuric acid spill north of Leadville in Eagle County, Colorado. Preliminary baseline data was taken on trees to evaluate by species for dead/alive status in the acid runout zone. In order to implement a reclamation plan, further impact to trees and understory vegetation will be taken after snowmelt.

Participated in a vegetation inventory for a proposed gold mine in Okanogan County in north central Washington. Tasks included collecting cover and production data by species for

herbaceous understory and enumerating cover and density data for shrub and tree species. Various vegetation/community types were determined and mapped from this data. A rare plant survey was also conducted in the vicinity of the proposed gold mine for the northern twayblade (*Listera borealis*), Mingan moonwort (*Botrychium crenulatum*), and small northern bog orchid (*Platanthera obtusata*).

Monitored reclaimed slopes on a oil shale project for UNOCAL(Union Oil of California) in Parachute Creek drainage, located in Garfield County in northwestern Colorado. Permanent plots are monitored yearly for cover by species and species density. Plants are also collected for heavy metal analyses.

Participated on a Forest Service ID team in preparation of an Environmental Assessment for a proposed California Gold Mine and Dump expansion near Elko, Nevada. Tasks included EA project coordination and participation in the report write up.

Evaluated vegetation damage from a soil fungicide spill along the Sacramento River in Shasta and Siskiyou Counties in northern California. Tasks included enumerating shrub density by species and assessing the level of shrub damage along the Sacramento and at other control sites. Also evaluated different parameters to characterize potential bird habitat along the river and at other control sites.

Evaluated wetland impacts from a grain spill along the Jordan River south of Salt Lake City, Utah in Salt Lake County. Tasks included evaluating extent of impact to associated wetlands of the Jordan River and subsequent cleanup procedures.

Participated in an upland vegetation inventory in the Bruneau River watershed in northeastern Nevada to describe and map vegetation types for the Humboldt National Forest. This project was a study to identify potential elk habitat for reintroduction of elk on the Bruneau River.

Assisted in the field assessment of restoration of woody riparian species at stream and river crossings along a proposed Colorado Interstate natural gas pipeline in eastern Utah, northwestern Colorado, and southern Wyoming.

Assisted in a rare plant survey for the San Juan milkweed (*Asclepias sanjuanensis*), Mesa Verde cactus (*Sclerocactus mesae-verdae*), Mancos milkvetch (*Astragalus humillimus*), Mancos saltplant (*Proatriplex pleiantha*), and the Aztec gilia (*Gilia formosa*) for the Navajo Indian Irrigation project near Farmington, New Mexico. Assisted with subsequent data organization, map production and text write up.

Participated in a rare plant survey and vegetation mapping for a proposed Colorado Interstate natural gas pipeline in eastern Utah, northwestern Colorado, and southern Wyoming.

Participated in a rare plant survey and vegetation mapping for a proposed Colorado Interstate natural gas pipeline on the Cimarron National Grasslands in Morton County (southwestern), Kansas. Follow up work included preparation of a Biological Evaluation (BE) prior to project abandonment.

Participated in a rare plant survey for a proposed WYCAL natural gas pipeline in Wyoming, Utah, and California.

Participated in a rare plant survey for the Nevada Heritage Program to enumerate known populations and search for new populations of *Cryptantha welshii* and *Frasera gypsicola* in the White River valley in Nye County, southeastern Nevada.

Participated in a rare plant survey for a proposed Colorado Interstate natural gas pipeline from the Piceance Basin in Rio Blanco County south to Parachute Creek in Garfield County in northwestern Colorado. Potential rare plant species in the area included Debeque phacelia (*Phacelia submutica*), Parachute penstemon (*Penstemon debilis*), Sevier blazing star (*Mentzelia argillosa*), Piceance bladderpod (*Lesquerella parviflora*), Piceance twinpod (*Physaria obcordata*), and Dudley bluffs bladderpod (*Lesquerella congesta*).

Participated in a project to evaluate sources of non-point pollution along the Bear River in Utah and Wyoming. Tasks for this project included evaluating range conditions at field sites in Wyoming, assisting in water quality sampling of the Bear River and associated tributaries in Cache Valley, Utah, photo documenting pollution sources on the Bear River, and conducting extensive literature searches in preparation for a water quality management plan for the Bear River Basin, Utah/Idaho.

Environmental Inspection/Monitoring

Participated as a biological monitor on the construction of the Ruby natural gas pipeline in Utah and Wyoming. Tasks included overseeing Federal Energy Regulatory Commission (FERC), and other federal and state guidelines on environmental impacts during construction and cleanup phases of the project.

Participated as an environmental inspector on the construction of a Colorado Interstate natural gas pipeline near Castlerock in Douglas County, Colorado. Tasks included complying with Federal Energy Regulatory Commission (FERC) guidelines on environmental impacts during construction, cleanup, and reclamation phases of the project.

Participated as an environmental inspector on the construction of a Colorado Interstate natural gas pipeline near Fort Morgan in Morgan County, Colorado. Tasks included complying with Federal Energy Regulatory Commission (FERC) guidelines on the reclamation stipulations for cleanup and revegetation phases of the project.

Participated as an environmental inspector on the construction of a Colorado Interstate natural gas pipeline near Battlement Mesa in Garfield and Rio Blanco County, Colorado. Tasks included complying with Federal Energy Regulatory Commission (FERC) environmental guidelines during construction.

Research

Participated in a biological inventory of the three hot deserts of the Western United States. Tasks from these various projects included mammal trapping, bird censuses, insect observations, and studies of seed consumption by birds, rodents, and ants.

Implemented and supervised vegetation sampling work for a National Science Foundation funded reclamation project on a strip coal mine near Kemmerer, Wyoming. Initiated and implemented the set up of a microphytic crust study in Capitol Reef National Park, Utah to evaluate the effects of livestock trampling on microphytic soils. Cooperated with subsequent project analyses. Extensively supervised field and lab technicians in field data collection and computer data entry.

Collected vegetation data for a National Science Foundation funded reclamation project on a strip coal mine near Kemmerer, Wyoming. Also collected vegetation data for a project looking at the effects on native grass growth with the suppression through herbicide of big sagebrush (*Artemisia tridentata*). Tasks included establishing field study plots for data collection and participating in extensive vegetation sampling, field and greenhouse experiments, and fence building.

Participated in a National Science Foundation project. Tasks included initiating and implementing research looking at, on a reproductive level, competition between big sagebrush (*Artemisia tridentata*) and some native grasses. Extensively supervised field technicians during the plant and plot establishment phase of the project.

Participated in a National Science Foundation funded project looking at the effects of the eruption of Mount Saint Helens in Washington State on various wildlife and bird species.