

Attachment 2
Drought Impacts

Project A –Ash Valley Irrigation Infrastructure Efficiency Project

Ash Valley Ranch Irrigation Infrastructure Efficiency project

At risk of not meeting existing drinking water demands

Currently, the drought has already had a major impact to drinking water in the intermountain area. There were domestic wells that were sucking air starting in February this year. Many residences have had to have their pumps lowered so they have adequate water. If the drought does not end, there will be more and more wells impacted. Many homeowners adjacent to agricultural wells have seen the impacts to their domestic wells when the agricultural wells are being used. This is a direct impact to drinking water. Any improvement to an irrigation system's efficiency will reduce the amount of ground water being pumped. These water savings directly benefit the domestic wells by increasing the amount of water available for domestic purposes.

At risk of not meeting existing agricultural water demands

Reservoirs are drying up and farmers need to increase the depth from which irrigation water is pumped to meet agricultural demands. Agricultural water use at current levels will not be sustainable if drought continues. Increases in irrigation efficiency are a means of conserving water now and into the future. The current irrigation system in the proposed project does not meet the demands of the crop. To meet the crop needs during the middle of summer, the irrigation system would need to be able to apply an inch of water every four days over every irrigated acre. The current system cannot meet the crop needs due to the inefficiency of the open ditches and the lack of water in Spooner Reservoir. During this current drought, Spooner Reservoir has failed to fill and all irrigation water is being pumped by diesel engines on agricultural wells. The replacement of the diesel engines and conversion of the open ditches to a closed system will better meet the crop needs during these drought conditions. The proposed irrigation system will use less water while more efficiently irrigating more acres.

At risk of not meeting ecosystem water demands

Surface water and wetlands have dried up as a result of the drought resulting in adverse impacts to both agriculture and wildlife. The current drought has degraded the hydrological function of montane meadow and sagebrush steppe ecological sites on Ash Valley Ranch, the primary locations for grazing and watering by cattle and wildlife. The area is critical habitat for upland game species such as sage grouse, mule deer and pronghorn antelope. Spooner reservoir is used as a water source for a variety of wildlife and waterfowl, including the state listed/threatened sand hill crane. In addition to the cattle that rely on the irrigated acreage a diversity of wildlife species also depend on this area for forage.

Drinking water MCL violations

Not applicable

Groundwater basin overdraft

During these drought conditions the groundwater supply is being utilized more and more every day. With surface water supplies diminishing or nonexistent, the only available water source is the ground water. These groundwater basins have not had a chance to recharge with abnormally dry winters and springs over the last few years. By improving the overall efficiency of the irrigation system, the demand on groundwater resources will be reduced, and valuable groundwater will be conserved.

Discharge water TMDL violations

The proposed project is not in a TMDL watershed. However, water quality has drastically been impacted by the drought. The surface water that is flowing has higher temperatures and pH depending upon location. Over the last two years, many producers utilizing surface water are discovering a problem not seen before, high pH. These producers are beginning to treat irrigation water pre application to offset the high pH that is being attributed to the drought and lower surface water flows. Historically, most of the surface water in the region is dependent upon springs and not snow melt. With the reduced flows the concentrations of micro nutrients and other elements from this nutrient rich groundwater have increased.

The irrigation system improvements will create an efficient closed irrigation system that prevents the sudden release of sediment and other nutrients when ditches blow out. The efficient use and application of irrigation water will increase the overall production of the pastureland. This increase in production is critical in times of drought. With minimal production on the native range due to diminished rainfall, cattle rely on the irrigated pasture for forage. With cattle and open ditches come significant issues related to degraded water quality. Cattle tend to loaf around and trample ditch banks which lead to blow outs that contain E. coli and coliform

bacteria along with increased turbidity. The proposed project will substantially reduce the release of turbidity, E. coli and total coliform bacteria into surface water bodies.

Other drought related adverse impacts

Not applicable

Water Conservation Measures

Ash Valley Ranch Irrigation Infrastructure Efficiency project

There are some water use restrictions in place to conserve water on certain watersheds in the region. On Hat Creek and Burney Creek the amount of water available for irrigation is adjusted based on the flows of the creek. It has been a number of years since producers have been able to use their full water right throughout the summer. Many of these producers have been working with NRCS to do major improvements to their irrigation systems. Most of the water uses in these two water sheds use open ditches for irrigation. Now farmers would like to convert the ditches to pipes so they can better utilize the water they do get.

Voluntary water conservation measures are being taken throughout the entire Pit River Watershed. All irrigation system improvements being done, including NRCS assisted projects, are voluntary conservation measures. Over the past couple years there have been more and more projects with producers trying to conserve every little bit of water they get. There are quite a few producers in the region that have fallowed fields in order to have enough water to irrigate the remaining fields.

There is the potential for planned restrictions if the drought does not abate. There have been discussions that the many reservoirs throughout the region will not be allowed to store any water. This is a major impact as most of the water in the Pit River is from surface water storage at least until it hits the Fall River. Surface water rights could be restricted. If that is the case, then hundreds of producers would be severely impacted. If this did happen, it would more than likely put some family farms out of business and would be a tremendous impact to the regional economy.

Due to the drought Ash Valley Ranch has ceased all surface water diversions. The ephemeral stream channel that carries the irrigation surface water is basically a closed system and water would never leave the ranch unless it was a very major flood event. Any available water remains in the stream channel for ground water re-charge and wildlife use. In addition, the ranch is only irrigating about 60% of its irrigated pasture. In the event that the drought continues surface water diversions will not occur.

Project B – Restoring Hydrological Function to South Ash Valley

Restoring Hydrologic Function in South Ash Valley

Drought Impacts

At risk of not meeting existing drinking water demands

Over the past 100 years fire control has increased accompanied by an increase in forest fuels. Native western juniper was historically controlled by fire. Now juniper has expanded from its natural locations on ridge tops and rocky areas to all open ground. This expansion has caused a significant problem with respect to water. Juniper consumes large amounts of water compared to native grass communities. If juniper were not present on the landscape, the additional water taken up by juniper as compared to that taken up by native grasslands alone, would have made its way to springs, creeks and other surface waters or worked its way down to replenish ground water. As a result of many years of native grasslands being invaded by western juniper, precipitation does not make it to surface water, soil water, or ground water, thereby impacting availability of water for other uses like irrigation and drinking. During times of drought this impact is multiplied. By clearing juniper from its unnatural locations, improved hydrologic function will return to the area along with native plant communities.

At risk of not meeting existing agricultural water demands

As mentioned above there are large impacts to agricultural demands of water. Less surface water has prevented Spooner reservoir from filling thus impacting an important source of irrigation water. In addition to irrigation water, water necessary to support adequate forage production has also been affected, increasing juniper dominance on a site results in the die-off of shrubs and a reduction or die-off of native grasses and forbs. Once juniper is cleared, native grass, forb, and shrub seeds present in the soil germinate and the improved soil moisture in the absence of juniper allows the native grass community to thrive. Range production increases substantially with the juniper removal. Over time, an increase in forage production to levels present before the invasion of juniper allows for increased utilization by both livestock and wildlife. All of this production is based on the improved ability of native plants to use precipitation formally intercepted or taken up by juniper canopies.

At risk of not meeting ecosystem water demands

The current drought has degraded the hydrological function of montane meadow and sagebrush steppe ecological sites on Ash Valley Ranch, the predominant locations for cattle grazing and watering. The area is also critical habitat for upland game species such as sage grouse, mule deer and pronghorn antelope. The drought impact has been further exacerbated by the recent establishment of invasive western juniper into these ecological sites, sites that have not been historically occupied by juniper. As noted above, increasing juniper dominance on a site results in the die-off of shrubs and a reduction or die-off of native grasses and forbs. The ensuing loss of shrubs, grasses, and forbs reduces species richness and diversity and results in a loss of habitat value (cover, forage) for many wildlife species as well as a loss of forage for livestock. The loss of species diversity diminishes the function of the basic ecological processes of nutrient cycling and energy flow. The combined impacts of drought and the conversion of montane meadow and sagebrush steppe sites to juniper woodlands has caused springs to dry up, eliminating livestock and wildlife watering sources, and plant communities to decline, reducing feed stocks. The drought caused depletion of native plant communities has also disrupted the overall hydrologic cycle, decreasing the amount of water infiltrating the soil and thereby reducing aquifer recharge.

Drinking water MCL violations

Not Applicable

Groundwater basin overdraft

With the current drought, there is an increase on the demand of ground water for both crop production and domestic use. This demand has had a huge impact on our groundwater resource. Every day there is word of another well sucking air or cavitating creating work for well drillers as pumps are lowered and wells deepened. With the juniper restoration project, the natural hydrologic cycle returns, thus increasing the production of forage without groundwater irrigation and allowing precipitation to reach and replenish our groundwater resources.

Discharge water TMDL violations

The proposed project is not in a TMDL watershed. However, the combined effects of drought and western juniper invasion negatively impact water quality. Sediment loads from areas dominated by juniper are much greater than those dominated by native sagebrush steppe or grassland vegetation. Production of all vegetation has been negatively impacted by the drought resulting in

less ground cover in many areas. This decrease in ground cover results in increased sediment loads in runoff following precipitation events, especially in areas dominated by western juniper and those recently impacted by wildfire. By restoring native plant communities, you are also restoring the hydrologic cycle. This cycle allows for infiltration of precipitation and in large rainfall events, serves as a sediment filter and soil stabilizer. With the native plant community established, soil erosion, including, Sheet, Rill, Wind and Stream Bank erosion is reduced. Native plants serve as a natural filter for runoff by slowing the flow and allowing for sediment to settle. This vegetation stabilizes stream banks and other areas that receive concentrated flows. When in drought years, vegetative growth is impacted, but the roots in the soil still serve as glue holding the soil together and reducing erosion. This native plant community which establishes after juniper removal, serves as a soil protector while also protecting water quality for other uses. Restoring native plant communities through juniper removal will also reduce the risk of wildfire, and its associated adverse effects, on the landscape.

Other drought related adverse impacts

Not applicable

Water Conservation Measures

There are some water use restrictions in place to conserve water on certain watersheds in the region. On Hat Creek and Burney Creek the amount of water available for irrigation is adjusted based on the flows of the creek. It has been a number of years since producers have been able to use their full water right throughout the summer. Many of these producers have been working with NRCS to do major improvements to their irrigation systems. Most of the water uses in these two water sheds use open ditches for irrigation. Now farmers would like to convert the ditches to pipes so they can better utilize the water they do get.

Voluntary water conservation measures are being taken throughout the entire Pit River Watershed. All irrigation system improvements being done, including NRCS assisted projects, are voluntary conservation measures. Over the past couple of years there have been more and more projects with producers trying to conserve every little bit of water they get. There are quite a few producers in the region that have fallowed fields in order to have enough water to irrigate the remaining fields.

There is the potential for planned restrictions if the drought does not abate. There have been discussions that the many reservoirs throughout the region will not be allowed to store any water. This is a major impact as most of the water in the Pit River is from surface water storage at least until it hits the Fall River. Surface water rights could be restricted. If that is the case, then hundreds of producers would be severely impacted. If this did happen, it would more than likely put some family farms out of business and would be a tremendous impact on the regional economy.

Drought has dried up most wet (formally) montane meadow systems on the ranch and many of the springs. Livestock grazing numbers have been reduced by 20% in order to reduce forage consumption by livestock so that wildlife needs are met, both for forage and water use. In the event that the drought continues livestock grazing numbers will be further reduced accordingly.

Project C – South Fork Irrigation District Infrastructure Upgrade

Drought Impacts

At risk of not meeting existing drinking water demands

Not applicable

At risk of not meeting existing agricultural water demands

There are only two irrigation districts in the region that are legally authorized to regulate the use of irrigation water. They include the Hot Springs Irrigation District, which relies on the water from Big Sage Reservoir and South Fork Irrigation District which relies on the water from West Valley Reservoir. Big Sage Reservoir has a capacity for 77,000 acre feet of water for irrigation. West Valley Reservoir has a capacity of 23, 500 ac ft of irrigation water. Irrigation water is allotted to each land owner in proportion of their water right and the available water in the reservoirs. Currently, both reservoirs are below capacity, with Big Sage at about 0% of capacity and West Valley at 70% of capacity. This does not leave enough storage water to fill the water right demands of the land owners within each district. . The primary sources of irrigation water come from stream flow from the Pit River and its tributaries. The current impacts of the drought range from irrigation being curtailed now to irrigation season being two to four weeks shorter than normal.

South Fork Irrigation District

The proposed project is located in the South Fork Grazing District. The District was formed in 1933. There are 13 water users in the District. The District provides water for 13,000 acres for the production of grass pasture and hay, alfalfa, grain and wild rice. Water is diverted from the South Fork of the Pit River to West Valley Reservoir by means of a diversion ditch. Water can be diverted to the Reservoir from about Nov 1st to about April 1st. Irrigation water can be released from the Reservoir from about April 15 to Oct 30. The District can use 23, 500 ac ft of water each year. The Reservoir has a capacity for about one season of irrigation.

Of the thirteen land owners, all but one are cattle ranchers who use public grazing lands for grazing during the spring – summer season. They use their private irrigated lands for grass hay production and pasture once haying is complete. The hay produced is for feed cattle through the winter months. The irrigated pasture is used to produce fall forage for cattle come off the public range. Excess hay produced is sold. One land owner uses irrigated lands to produce hay and wild rice which is sold at the end of the season.

The South Fork Irrigation District is operating on a 20% reduction in available irrigation water this season. This shortage is the result of a lower level of stream flow coming from a small snowpack with a shorter spring runoff period. This is a critical time for the cattle producers because it is essential that they get a hay crop for winter feed, therefore the water shortage will be handled by shorting the irrigation season. This will allow them to get a hay crop for winter. However, when the cattle come off the public range, the pasture production for fall forage will be less than desired. Late summer early fall rains could offset the effects of shorter irrigation season. However, if there is no rain early in the fall of 2014, fall feed will be in short supply. This problem could become compounded if the federal agencies have them remove their cattle from the public lands earlier than normal. If this should happen, the serious impacts of the drought will begin to be felt by most of the livestock producers in this region. Some of the effects will be winter feeding of hay will start earlier, supplemental feed may have to be purchased and some of the base herd may have to be sold. If the drought should continue into 2015 the drought effects will be compounded even more. Water may be too short to produce enough hay and federal grazing permits may be significantly reduced or canceled for the 2015 grazing season.

This would put grass hay, rice and livestock production in a serious crisis. The livestock operations in the South Fork Irrigation District provide a good cross-section representation on how most of the livestock producers operate throughout this region. The impacts identified for this area will generally apply to all stream flow irrigation systems throughout the region. Everything hinges on the possibility for late season rains and the 2014-2015 winter snowpack.

At risk of not meeting ecosystem water demand

Private lands account for approximately 60% of the wet lands and wet meadow areas within this region. The private landowners with flood irrigation systems have helped maintain and enhance many of the meadow and wetland habitats by making their agricultural operations more compatible with the wetland ecosystem. This has been accomplished through improved irrigation systems, better designed water developments and adopting multiple use management principles. Compatible land management on private lands provides habitat for a large number of species that would not be otherwise available. Also, compatible agricultural land has compensated for some of the historic wetland losses due to commercial development, urban expansion, and other land disturbing activities. In this region, flood-irrigation of private pasture and hay meadows also provides critical seasonal habitat for migrating and breeding birds.

Cooperative projects between the land owner and cooperating government agencies have resulted in the improvement of wetland ponds, flood plain restoration, meadow rehydration and restoration of stream bank riparian habitat. The Central Modoc RCD assisted in the development of five projects within the South Fork Irrigation District, and many other projects along the Pit River and its tributaries. All of these projects have been designed to function cooperatively with the land owners flood irrigation system.

The reduction or loss of late summer flood irrigation due to the 2014 drought will have a moderate negative effect on all species dependent on flooded habitats. However, meadow and wetland vegetation will be less effected since they normally dry up in the winter, the dry season would begin sooner than normal. This effect could be offset by late summer or early fall rains. However, if the drought continues in to 2015, a portion of the meadow and wetland areas will be dry throughout the most of the summer. This dry period provides an opportunity for the surrounding upland vegetation to start occupying these sites. The acreage of flood irrigation dependent wet-meadow and wetland habitats is estimated at 3,000 acres in the South Fork District. The amount of wetland habitats that will be lost is dependent on many variables. However, a conservative estimate for the short term would put the loss at about 1% a year. The drought effects are not only in terms of ecosystem habitat losses but also an economic loss. This cooperative project effort has an estimated cost of 10 to 15 million dollars over the last 10 years. AS the drought continues through 2015 and beyond, a significant part of this investment could be lost.

Economic impacts resulting from the drought

Presently, the general public is more concerned about the economic impacts of the drought than the physical impacts resulting from the shortage of water. Potential agricultural economic impacts from the drought are one of the main reasons the Supervisors of Modoc County issued an emergency proclamation along with 20 other counties. The State of California has received a total of 45 proclamations from city, county, tribal governments and special districts. In addition, Modoc County along with 26 other counties has established a drought task force to coordinate the local drought response. The agricultural industry is an important part of the local economy. Potential economic impacts to the agricultural industry could be very devastating to the economy of Modoc County. A program being implemented to address economic impacts is the Drought food Assistance Program (DFAP). This is a temporary program developed in response to the Governor’s Drought Emergency Declaration in January 2014. DFAP is designed to provide food assistance to drought-affected communities that suffer high levels of unemployment. Counties receiving DFAP are those with unemployment rates that were above the state-wide average in 2013 and which have a higher share of agricultural workers than the average of California as a whole. For 2013, the average unemployment rate for California was 8.9 percent, and the share of workers employed in agriculture was 2.64 percent. Modoc’s current unemployment rate is 9.1 and the share of workers employed in agriculture is about 7.3 percent.

Resource Conflicts resulting from the drought

Wet meadows and wet lands are intermingled throughout the agricultural irrigated lands. When water has to be cut back on the pasture and meadow fields the dependent wet land areas will also be negatively affected. As this begins to occur, the arguments for more water to agriculture or more to the natural environment become more polarized. It becomes more difficult to bring a group of diverse interests together and reach a compromise decision concerning water use. This has the potential to hinder the development of several water related projects. Developing cooperative approaches to addressing potential solutions to water issues will be more difficult. This cooperative approach has been very successful in the past several years. This approach resulted in flood irrigation becoming more compatible with the wetland ecosystem.

Drinking water MCL violations

Not Applicable

Groundwater basin overdraft

With the current drought, there is an increase on the demand of ground water for both crop production and domestic use. This demand has had a huge impact on our groundwater resource. Every day there is word of another well sucking air or cavitating creating work for well drillers as pumps are lowered and wells deepened.

Discharge water TMDL violations

Not Applicable

Other drought related adverse impacts

Not applicable

Water Conservation Measures

The biggest and wide spread conservation measure being implemented at this time is the mandatory reduction in water use for flood irrigation. Many of the conservation measures for agriculture often take two to three years to implement. Therefore, it is necessary to start planning a year or two in advance to get agricultural water conservation measures implemented. Several projects were completed in the South Fork Irrigation District a few years ago as a response to drought conditions, but not specifically the 2014 drought. A deep water well was completed to help supplement the River when flows are low. Three pumps were installed to recycle irrigation "tail water" to other areas for re-use, Land treatment projects included land smoothing of one field to make flood irrigation more efficient. Flood plain restoration has resulted in the rehydration of meadow areas. This results in more efficient use of flood irrigation waters. More of these projects will be completed in the future as an effort to reduce impacts of drought conditions.

Please see attached documentation of Drought Declaration for Modoc County issued on March 4, 2014.