CSR Natural Resources Consulting, Inc.

OWEB Juniper Treatment Effectiveness Monitoring Final Report

This report is submitted to the Oregon Watershed Enhancement Board (OWEB) as a summary of findings made during the summer of 2005 on seven OWEB-funded western juniper treatment projects in the John Day/Clarno Ecoregion of central Oregon. The purpose of this effort is to determine the effectiveness of the OWEB Juniper Treatment Program. The sites reviewed are in private ownership and are located in the Deschutes and John Day River Basins. Since all treatments had been applied during 2001 through 2003, the sites visited had at least two years of response time before being monitored. This study was funded under OWEB Contract No. 204-937, as amended and was conducted by CSR Natural Resources Consulting, Inc. of Vancouver, Washington.

The report summarizes the observations and measurements made at each project location and are presented in a format similar to that contained in the individual project monitoring summaries. Included in the report are a description of methodology employed in monitoring, a set of recommendations intended to support OWEB grant program effectiveness, technical quality, the success of future projects and the sound investment of public funds.

I want to thank Glen Hudspeth of the Crook County Soil and Water Conservation District and Sue Greer of the Wheeler County Soil and Water Conservation District for their assistance in arranging site visits, in helping to locate the project sites and providing additional information that added valuable background and detail to this report. Thank you, Pete Jameson, OWEB grantee, for your contagious enthusiasm for OWEB Program and this monitoring project.

I want to recognize and thank John and Lynn Breese of Prineville for their kind hospitality during the 2005 field season. Their support helped keep costs down which meant more projects monitored and resulted in a broader array of information for this report.

Submitted in satisfaction of OWEB Contract No. 204-937, as amended,

Richard H. Barrett, Jr.
CSR Natural Resource Consulting, Inc.

Introduction

In the late 1990's the Oregon Watershed Enhancement Board (OWEB) began funding grants to promote watershed restoration in the uplands of central and eastern Oregon. Among the projects OWEB began to fund was the control of western juniper, a species native to Oregon in post-glacial times. Miller, in his recently published compendium on western juniper: The Biology, Ecology and Management of Western Juniper, states that western juniper woodlands occupy about 2.2 million acres in Oregon and is increasing in extent at about 3 percent per year, its greatest rate of expansion in the past 130 years - the period of European settlement and occupation (Miller, et al., 2005). He further states that this expansion is the result of a number of factors working in combination: a period of wet, mild climatic conditions in the late 1800's and early 1900's coinciding with the post-settlement period; the introduction of, and season-long grazing by, large numbers of domestic livestock beginning in the late 1800's that reduced fine fuels and reduced the frequency and effect of naturally occurring fires, exacerbated by increasingly sophisticated fire suppression, and the increase in industrial carbon dioxide as identified by significant increases in annual sapwood growth since the 1950's when compared with earlier periods. Additionally, the cessation of aboriginal burning is considered to have had significant influence in the expansion of western juniper (Dr. Lee Eddleman, OSU Rangeland Ecologist, personal communication. 2003). Eddleman also suggested that the primary mechanisms of seed dispersal supporting the expansion are birds that ingest the seed and disperse it through the environment and the downslope transport of seed by overland flow and concentrated flow in ephemeral gullies and washes – all common in juniper dominated sites.

An interest in controlling juniper has been held by rangeland managers and landowners for many decades. Initially, the control of juniper was a way to improve forage production for grazing livestock by reclaiming lands encroached upon and dominated by juniper. But in recent years, with the growing appreciation of ecosystem function and the understanding of the importance of the hydrologic function as a major driver in functioning systems, the negative effects of in Oregon and the West is better appreciated.

Juniper, once established in the rangeland plant communities is a shrewd competitor for moisture, for space, sunlight and nutrients. Its affects are not only negative to native plant community integrity and the hydrologic function of arid and semi-arid watersheds, but also detrimental to valuable wildlife habitat, and the productive capabilities of private lands.

Juniper belongs in the landscape but, being intolerant of fire, is most suited to places in the landscape of low fire frequency or that do not produce ground fuels capable of carrying fire or producing flame lengths that lift fire into the tree canopy. These locations are readily identified as shallow or unproductive soils, rock outcrops, and rim rock.

Juniper control should not aim at juniper eradication but to back juniper out of the deep, productive soils it has encroached upon with the reduction in normal fire frequency and the other factors promoting its spread.

Project Methodology and Results

This monitoring effort was undertaken to determine the effectiveness of OWEB-funded juniper treatments in restoring hydrologic function to juniper dominated lands in Oregon as well as project effects on other important aspects of ecological function including soil stability and condition, biotic integrity, plant community composition and production.

Methodology

Projects to be monitored were selected from a list of about 17 projects provided by OWEB staff. Approximately 12 of the treatments involved felling juniper with chainsaws without any further treatment; three projects were accomplished with larger equipment (dozer, track hoe and brush beater) and incorporated seeding, and two projects included felling with chainsaws and dozing into piles for burning. From these three groups, seven projects were selected that would provide the opportunity to observe the effects these treatment categories. The sites selected for review are located within watersheds associated with anadromous fisheries in the Columbia Basin system in the Deschutes and John Day River Basins.

Sites were located on the ground with the assistance of Soil and Water Conservation District representatives (Glen Hudspeth of Crook SWCD and Sue Greer of Wheeler SWCD) who had first hand knowledge of the projects in their respective districts, or by the landowners (the grant applicants) themselves.

During a site visit, the treated and adjacent un-treated areas were walked and general observations made. Typifying areas within both the treated and un-treated sites were chosen for more detailed analysis. Soil pits were dug in each representative area to determine soil depth, surface and sub-surface soil texture and other distinguishing soil characteristics or limitations, if any. Adjacent, un-treated sites were considered for sampling only when their soil, steepness of slope and slope orientation were the same as those on the treatment area. Two projects lacked these un-treated comparison areas.

Vegetation sampling was done using the pace transect method described by Herrick (Herrick, et al., 2005). Photographs of the transect areas in both the treated and un-treated areas were taken and included an identifying marker containing the project number and date of the visit.

A rangeland health assessment was conducted for both the treated site and un-treated comparison area. The assessment was based on the method described in *Interpreting Indicators of Rangeland Health* (Pellant, et al., 2000) which resulted in determinations of ecosystem function relating to soil stability, hydrologic function and biological integrity for each site.

Individual project reports containing the data and information recorded at the site, along with a summary discussion of observed and measured effects, landowner comments and resource management implications were then drafted.

Summary of Effects

The following summarizes the general changes observed on a project-wide basis with significant exceptions noted. For more specific details regarding project effects at the various project sites, please refer to the individual project reports:

Changes in Plant Community Composition

Of all the changes observed in this monitoring project, change in plant community composition is the most obvious but, nonetheless, rich with information. While the reduction in, or removal of the juniper canopy was common to all sites, the responses of the previously existing understory vegetation or subsequent seedings varied considerably.

Four projects (#'s: 18-02-014, 18-02-013, 201-253 and 99-604) included tree removal only and relied on the existing understory vegetation for site reoccupation. In three of these cases, there had been a sufficient amount of native grasses, forbs and shrubs in the juniper understory to support their full reoccupation of the site. However, one project (# 99-604) had an apparently (no comparison area available) very sparse stand of native perennial plants in the pre-treatment understory. In this case the treatment exposed the site to occupation by annual grasses and forbs with only scattered remnants of desirable native grasses, forbs and shrubs found on the site.

Three projects (#'s: 18-02-009, 18-04-003 and 200-166) were seeded with grass and forb mixtures, two of which were seeded with a seed drill following tree removal - both seedings are successfully established. Project # 200-166 was broadcast seeded before tree removal but it appears that the released, existing native grasses forbs and shrubs may have been able to re-occupy the site. This left some question regarding the need for the seeding at this location. There appeared to be an adequate stand of live native perennial grasses in the adjoining un-treated area to indicate an adequate stand already existed in the treated area.

Changes to Soil Surface Conditions

There were two situations in which changes to soil surface conditions were most apparent: where downed trees were pushed into piles with a dozer or the site was seeded with a drill seeder after felling and piling. Where trees were dozed into piles, plant litter and soil surface organic matter was removed or displaced, creating bare soil and an erodible condition in the short term and, in one case (Project 99-604); the un-seeded site was open to invasion by non-native annual grasses and forbs (weeds).

Drilled seedings continue to show furrows or drill rows which contribute to the surface roughness aiding in detention of overland flow and supporting infiltration and subsequent soil moisture storage.

Sites on which trees were felled and left in place showed no surface disturbance and in all cases the release of understory vegetation, accumulating plant litter (including downed trees) and biological crusts were protecting the soil surface from raindrop impact, detaining overland flow, promoting infiltration and aiding in soil moisture retention. Sheet erosion, which was common in the un-treated comparison area, was not in evidence on these treatment areas. Active rills and gullies were common in the un-treated areas, whereas in the treated areas no rills were observed and gullies were healing as native perennial plants were re-establishing and sediment was being trapped by the recovering vegetation.

A brush-beater was used to control the young (less than 40 years old), small diameter trees at the site of project # 18-04-003. Prior to treatment, the site had been dominated by mountain big sagebrush. Juniper was subordinate in the plant community at the time of treatment - Phase 1 of Miller's woodland succession (Miller, et al. 2005). Both species were controlled by brush beating and the resulting slash and plant litter effectively dissipate raindrop impact, detain overland flow, promote infiltration and, by shading the soil surface, aid in retaining soil moisture for the seeding that was done following treatment.

Changes to Site Hydrology

All grant applications addressed the restoration of hydrologic function as a major project objective. In all cases, plant responses following release or seeding appear to provide effective soil surface protection against raindrop impact. In addition, accumulating plant litter is detaining overland flow, promoting infiltration and aiding in soil moisture retention by shading and insulating the soil surface. Often overlooked is the effect of removing the intercepting canopy cover of juniper. According to Dr. John Buckhouse, OSU Rangeland Hydrologist, a juniper canopy cover of 25 percent on a site can intercept and thereby reduce the amount of moisture reaching the soil surface and understory vegetation layers by 25 percent (Personal comm. 2004), a significant amount in the 12 to 14 inch annual precipitation zone where most western juniper occurs. The intercepted moisture is lost back to the atmosphere by evaporation or sublimation, or through stemflow, which is directed to the base of the individual tree for its sole benefit. Most treatment locations are estimated to have supported juniper canopy covers in the range of 15 to 30 percent prior to treatment.

With one exception (Project # 99-604), all indicators: plant productivity, plant density, plant litter accumulation, biological crusts, minimal amounts of bare ground and the lack of evidence of overland flow, sheet, rill and gully erosion at all project locations, point to the recovery of infiltration rates expected in functioning systems. In the case of this exception, the site was re-occupied by annuals grasses and forbs that lack long-term dependability in soil surface protection and hydrologic function.

Western juniper is, according to Dr. Lee Eddleman, OSU Rangeland Ecologist, capable of taking up and transpiring soil moisture during every month of the year (Personal comm., 2003). The return to winter-dormant plant communities that occurred following

the treatments has improved the opportunity for the soil profile to store all (keep in mind the potential for additional moisture made available by reducing interception), or most, of the precipitation received on site during late fall, winter and early spring – which amounts to 60 to 70 percent of annual precipitation (USDA-SCS, 1990). It becomes axiomatic that, following these treatments and with the right conditions of soil texture and soil depth and sub-surface geology, there is the enhanced probability that surplus soil moisture contributes to groundwater recharge (e.g., in moderately deep soils over fractured basalt) or that surplus moisture may move safely downslope as lateral flow (sub-surface flow, parallel to the slope) to supply flow to seeps, springs and riparian areas and, eventually, may promote long duration flows of cool, quality water to streams and other water bodies. This is in contrast to the situation in which juniper, in the co-dominant and dominant stages of woodland succession (Miller, et al., 2005), is capable of consuming the available soil moisture stored in the soil during any season of the year.

The exception, Project # 99-604, is dominated by annual grasses and forbs which can be ephemeral by nature, with unpredictable annual productivity, and may not support long-term infiltration and soil surface protection. Fire will remove all accumulated litter and plant stems on annual sites, leaving the soil prone to heavy overland flow, severe erosion and sediment yield.

At project # 201-253, "young" (probably 20 – 60 year old) trees were removed while mature trees were left standing. It is expected that a short-term improvement in hydrologic conditions may have been served, but in the long-term there appears to be enough live mature trees remaining to fully occupy the site and have the competitive advantage in acquiring the available moisture and nutrients at the site. According to Dr. John Buckhouse, eight to nine mature, healthy trees per acre, because of the extensive root systems are capable of fully occupying a site and commandeering its resources (Personal comm., 2006).

It is interesting to note that at one project location, a stock pond was installed in an area of heavy juniper concentration. Before treatment, the pond filled every year with surface runoff from the bare soils in the juniper stand immediately upslope. Following the removal of juniper, the stock pond is dry year-round - the result of improved infiltration and deep moisture percolation, it is believed.

Changes in Spring, Seep, and Stream Flow

There has been limited research on the effects of juniper reduction on rangeland hydrology. Specific questions regarding changes in soil-plant-moisture relationships, groundwater recharge and changes to spring, seep and stream flow have not been well addressed by the research community. However, the anecdotal record is replete and growing with observations and evidence of the positive hydrologic effects of returning juniper to its rightful place in the landscape – relieving it of the awesome responsibility of dominance.

At two project locations, grant recipients credit juniper removal with restoring spring flows and in one case, reviving a wet meadow in areas downslope of the treatments. At project #18-02-009, a spring, formerly a seep, below the 240 acre juniper treatment now yields 20 gallons per minute year-round. A similar situation was reported, and observed on the same property in which an area of damp soil became a spring with a 20 gallon per minute year-round flow following the clearing of 40 acres of juniper immediately above the site. The landowner built a pond at the spring discharge point and now raises rainbow trout at the site of the spring.

At project # 18-02-013, the recovery of flow of several springs and the revival of a two to five acre meadow is attributed to upslope juniper control.

At the remaining project locations, no observations were reported nor are there records of past or present flows that would indicate change.

Changes in Wildlife Habitat

Pre-treatment conditions at all locations provided thermal and escape cover to deer and elk and habitat for several species of tree dwelling birds, however this form of cover and habitat is not believed to be a limiting factor for any of these wildlife species in this region of the state. The treatments have restored critical habitat elements including forage, water, important edge-effect and a mosaic of habitats for a broad complex of mammalian, avian and amphibian species. Un-treated areas adjacent to the projects continue to retain their limited habitat values and provide habitat connectivity throughout the landscape.

Changes in Forage Production

Of the seven projects monitored, all but one (Project # 201-253) are used for livestock grazing. Two projects (#'s 18-02-009 and 18-04-03) were seeded with a drill. On both seeded sites, forage production in the pre-treatment condition was so low (about 150 pounds per acre or less) that livestock were not grazed in the areas. Post-treatment forage production is estimated to be in the range of 1,000 to 1,200 pounds per acre (lbs/ac.), or about 1.0 to 1.5 acres per animal unit month (AUM).

Project # 200-166 was broadcast seeded before tree removal. Conditions in the adjacent comparison area indicate that seeding may not have been needed. According to Dr. Lee Eddleman, OSU Rangeland Ecologist, 2.5 plants (of desired native grasses) per square meter (or 2 plants per 10 sq. ft in Miller) indicate an adequate source of plant material and seed for the re-occupation of treated sites (Eddleman. Pers. comm. 2003 and Miller, et al., 2005).

The design of project #'s 18-02-014, 18-02-013 and 99-604 counted on the release of, and re-occupation by, the existing native understory vegetation. In both former instances,

forage production is estimated to have doubled or tripled following release: an estimated increase of from 500 pounds per acre to1, 000 lbs/ac., and from an estimated 300 lbs/ac. to 900 lbs/ac, respectively. Results differed on project 99-604 in that the site probably supported a less than optimum density of desirable species and was over-taken by annual grasses and forbs of limited seasonal value and with high variable and unpredictable annual production.

Results of Rangeland Health Assessment

Rangeland health was assessed at each site, in both the un-treated comparison area and in the treatment area. The assessment method uses a qualitative approach in determining the degree of function for three essential elements: soil stability, hydrologic function and biotic integrity (Pellant. 2000). Ratings descriptors used in this assessment are: functioning, functioning-at-risk and non-functioning. A "functioning" rating implies that the indicators for a specific element being assessed are at, or very near, the ecological potential expected for the site. A rating of "functioning-at-risk" means that evidence inferred from the observation of indicators suggests that the site departs to a moderate degree from its potential. Within this rating is the recognition of trend toward or away from site potential. Finally, a "non-functioning" rating means extreme or severe departure from potential.

Soil Stability

With few exceptions, soil stability in all pre-treatment or comparison areas rated as non-functioning with strong evidence of sheet, rill or gully erosion occurring in the juniper understory. The first exception was found on a flat slope with little potential for water erosion, with a stabilizing biological crust to protect against raindrop impact, and a dense stand of sagebrush to protect the soil from wind erosion. The second exception showed herbaceous vegetation in the inter-spaces between trees adequate of maintaining soil stability. In all cases but one, function was restored in the treated areas by increased plant cover and accumulating plant litter. Rills and evidence of sheet erosion were not observed and gullies were healed or healing. The exception is a site that was occupied by annual grasses and forbs which may, in the long term, not provide the mechanisms for soil protection offered by perennial vegetation. It was rated as functioning-at-risk with no apparent trend.

Hydrologic Function

Hydrologic function was rated as non-functioning at each pre-treatment comparison area. Canopy interception and low infiltration rates were the prevalent issues on these sites. Excessive soil moisture transpiration by juniper was also considered in the assessment - a common feature on most pre-treatment areas. Following treatment, all but two sites were determined to be fully functioning. Those were, once again the site dominated by

annuals which was rated as functioning-at-risk with no apparent trend. The other exception, rated as functioning-at-risk, was more of a juniper thinning project than control. It is anticipated that the excessive transpiration of soil moisture will increase in the near and mid-term.

Biotic Integrity

All pre-treatment or comparison areas rated as non-functioning in biotic integrity. Where potential vegetation would have included a wide array of perennial native grasses, perennial and annual native forbs and shrubs, these areas were dominated by shallow-rooted perennial grasses or very sparse stands of deep rooted grasses with some forbs and, in many cases, the skeletal remains of shrubs – victims of competition. In other words, the diversity of functional plant groups (e.g., deep rooted perennial grasses, mid- and shallow rooted perennial grasses, leguminous forbs, etc.) was sparse, or poorly represented – the crux issue in biotic integrity. Biotic recovery is slow. The physical parts of the system need to recover before the vegetation can respond. In all but one of the treatment areas ratings were, for the most part functioning-at-risk because limited but returning species diversity. One site is considered to be fully functioning and the last, the annual grass and forbs dominated site, is rated as non-functioning.

Recommendations

The site visits to the seven treatment areas illustrated the values accrued to the land and its ecological function; to wildlife, and to the economic sustainability of the landowner. There was not a landowner interviewed who was not ecstatic with the outcome of their project and proud to show its results. These landowners we all very positive about OWEB's role in promoting this activity and hoped the program flourished throughout the region.

Aside from the positive outcomes on the land and in the minds of the program participants, there are lessons to be learned from this review. If applied to future projects, these lessons could help improve the likelihood of greater project success at higher efficiencies of cost.

Among the projects reviewed, there were those whose design (including site selection), implementation and follow-up were flawless. There were projects, on the other hand, where a pre-treatment inventory and the application of the information derived therein, would perhaps have avoided higher than necessary costs or would have helped insure a more positive response from the treatment.

The findings and recommendations of the interim project report submitted in August, 2005 are incorporated herein by reference and further recommendations intended to improve program effectiveness follow:

Recommendation 1

Conduct a Juniper Management workshop which would include site visits for appropriate OWEB Regional Representatives and staff along with selected SWCD and Watershed Council staff. A workshop of this nature would allow those personnel most directly related to the grant application process to observe and to discuss project results as influenced by site selection, pre-treatment conditions, treatment methods and follow-up treatments related to the degree of projects success. Since these are the people working most directly with grant applicants, they are in the ideal position of influencing project design and implementation within OWEB standards.

Recommendation 2

Draft and distribute guidance for use by OWEB, SWCD and Watershed Council staff and landowners regarding the various elements to be considered and employed in the design, implementation and management of juniper treatments. The document might include discussions of: site selection, determination of project need and priority, pre-treatment assessment and inventory and their application to the selection of treatment methods and post-treatment management.

Recommendation 3

Establish a protocol for the pre-treatment collection of soil, plant and hydrologic information that would serve two purposes: 1) to be used as the basis of treatment design (e.g., the need for seeding, the disposal of slash, etc.) and, 2) to provide base data for future monitoring of changes in tree density and canopy cover, plant composition, overland flow and soil erosion and the presence and flow of springs and seeps. The use of such a protocol would help to insure that the essential elements of a project are considered in its design and that un-needed treatments are avoided. Such a protocol would have provided information that was either unavailable or indirectly available (through the examination of adjacent un-treated sites) to establish comparisons in the 2005 review.

Recommendation 4

Continue the current monitoring effort and expand the process to include other regions of the state beyond the anadromous fisheries basins. Support an effectiveness monitoring program in eastern and south central Oregon as those areas are also in need of ecological and especially, hydrologic recovery and rehabilitation – there are more lessons to be learned that will continually improve the effectiveness of the OWEB program.

Recommendation 5

Promote and support research in the rehabilitation (and maintenance) of watershed uplands in the juniper dominated regions of Oregon as OWEB has with the DeBoot Doctoral Paired-Watershed Research Project in central Oregon.

Conclusion

Uplands make up about 98 percent of the land area of most watersheds. It follows that uplands are in the position to receive and process that proportion of the precipitation falling in the watershed. When functioning to their potential, uplands effectively capture that moisture at the soil surface, store it in the soil profile for plant use and other forms of biological activity, and safely release any surplus moisture to recharge groundwater or support the flow of seeps, springs and streams. Followed to its logical conclusion, a functioning watershed can support vegetation and plant communities, habitats and economies according to its productive potential. Inasmuch as its potential provides, functioning uplands can contribute significantly to the quality and quantity of long duration seep, spring and stream flows.

In contrast, upland hydrologic dysfunction, or the inability of upland soils to capture, store, and/or safely release moisture, produces negative effects downslope and down stream. This contrast was evident in most of the treatment areas visited in this project where comparison areas were identified. While the identification of some effects (e.g., changes to site hydrology, etc.) is qualitative, they are based in concepts of climatology, soil science, soil-plant-water relationships and the dynamics of rangeland plant communities and rangeland ecology. Other identifiable effects such as changes in plant community composition and changes in forage production are readily quantified.

In the opinion of this observer, the project visited and the information gathered from conversations with landowners and from personal observation and measurement the value and effectiveness of the OWEB Juniper Treatment is clear.

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OWEB Effectiveness Monitoring Report – Juniper Treatment

OWEB Grant #: 18-02-014
18-04-008

General Information:
Grantee: Pilot Butte Hereford Ranch/Crook Co. SWCD
Reviewer: Hugh Barrett Date of review: June 21, 2005

Treatment Site Characterization:
Location:
Ecoregion: (Omernik, et.al) John Day/Clarno Uplands (11a)
Ave. Annual Ppt.:12 -14" Elevation: 4,000' Aspect: West
Landscape Position: Side-slope, 2 – 10 % slope
Dominant Soil: Depth: > 20" Texture: Surface: Sandy Loam, Sub-surface: Loamy Sand
Plant Assoc.: Big sagebrush/bluebunch wheatgrass/needleandthread
Soil Limitations for Management: Highly erodible to wind and water

Treatment Description:
Objective: (from grant application) Change vegetative cover from juniper to grass/forb/shrub cover to improve moisture availability to the site (reduce interception of precipitation by juniper), improve infiltration, reduce overland flow and sheet, rill and gully erosion.
Date(s) of treatment: June/July 2003 Acres treated: 40 acres Time spent: 260 hours
Method of treatment: Chainsaw
Slash disposal: (broadcast, piled, etc.) Trees dropped, boles removed, slash left in place.
Cost of initial treatment ($/ac): (from final report) $50.00/ac.
Post-treatment Burn? (Y/N) N Date: Planned for 2008 or 2009
Seeded? (Y/N) N
Costs ($/ac.): Burning: $

Notes: Burning of the treatment area is planned 5 to 6 years following the treatment to allow time for leaf drop and nutrient cycling, provide protection for recovering grasses and forbs, detain overland flow and increase infiltration. Burning will control juniper seedling recovery and juniper re-establishment.

Juniper bole wood and other wood products went to the wood cutter to defray project costs.

OWEB Grant #: 18-02-014
18-04-008

Treatment Evaluation:
Method of evaluation: Measured
Describe method(s) used: Step-point transect
Permanent plot established? (Y/N) N Photo plot Established? (Y/N) N

Results of evaluation: (attach copies of field notes, photos and monitoring data compiled during the evaluation)
Pre-treatment conditions: (if available)
Pre-treatment foliar cover: 64% Basal cover: 8%
Trees: 29% Forbs: 0% Stones/gravels: 4%
Shrubs: 12% Cryptogams: 20% Bare ground: 20%
Grasses/grass-likes: 32% Litter: 20%
Grazed? (Y/N) Y Rest/Deferment? (Y/N) N Timing: Fall Duration: 2 months
Evidence of overland flow? (Y/N) Y (gullies)
Springs and/or seeps in the area of influence of the stand? (Y/N) N
Long-term measurement of flow? (Y/N) N If yes, what were the flows? NA gpm
Ephemeral or intermittent streams in the area of influence of the stand? (Y/N) N
Long-term measurement of flow? (Y/N) N If yes, what were the flows? NA cfs

Post-treatment conditions:
Current foliar cover: 56% Basal cover: 4%
Slash/downed trees: 8% Grasses/grass-likes: 52% Cryptogams: 40%
Trees: 0% Forbs: 4% Stones/gravels: 0%
Shrubs: 0% Litter: 40% Bare ground: 20%
Evidence of overland flow? (Y/N) N
Springs and/or seeps in the area of influence of the stand? (Y/N) Y
Long-term measurement of flow? (Y/N) N If yes, what were the flows? NA gpm
Ephemeral or intermittent streams in the area of influence of the stand? (Y/N) N
Long-term measurement of flow? (Y/N) N If yes, what were the flows? NA cfs
Grazed? (Y/N) N Grazing mgt. plan in place? (Y/N) Y Rest/Deferment? (Y/N) Y
Timing: Sept./Oct. Duration: 3 weeks
Describe grazing system: Grazing is deferred annually until after seed-ripe and occurs only if there is livestock water available.

Conclusions:
Was the target species effectively controlled? (Y/N) Y (If no, explain on next page)
Were the objectives of the project achieved? (Y/N) Y (If no, explain on next page)

Notes: (include grantee's comments and observations; notes on further treatment needs, etc.)
(continue on next page, if necessary) Burning is planned for the site in the next 5 to 6 years to remove seedling juniper and to consume large woody material once leaf-drop and nutrient recycling are substantially complete. The stockwater pond immediately below the treatment area, which collected overland flow, is not as full as in years past most

likely because of drought conditions and perhaps because of detention of overland flow and improved infiltration resulting from the downed trees. Gullies in the treatment area are healing with perennial vegetation.

Summary

OWEB Effectiveness Monitoring Report – Juniper Treatment

OWEBGrant #: 18-02-014
18-04-008

General Information:
Project: Pilot Butte Hereford Ranch/Crook Co. SWCD
County: Crook

Treatment Effects

Changes in Plant Community Composition: The plant community has been converted from a juniper dominated site with and understory with many shallow-rooted perennial grasses and dead or dying shrubs to a diverse stand of shallow-, deep-rooted or rhizomatous grasses, and perennial forbs with some shrub recovery.

Changes to Soil Surface Conditions: The several active gullies in the area of treatment are healing. The perennial grasses now growing in the gullies are trapping sediment, helping to aggrade the gullies and keeping sediment from entering the stock water pond immediately below the treatment.

Changes to Site Hydrology: Gullies on the site indicate periods of concentrated overland flow. It appears that the downed juniper now detains overland flow, increasing the opportunity for infiltration and reducing the possibility of further gullying.

Changes in spring, seep, and stream flow: The stock water pond is reported to contain less water this year than in previous years. The current drought may be the reason for this but there may also be less overland flow, for the reasons stated above, to fill the pond. Further observation and/or measurement of spring flow duration and quantities are warranted.

Changes in Wildlife Habitat: Pre-treatment conditions offered thermal cover and hiding cover to deer and elk and habitat for several species of forest dwelling birds, however this kind of cover and habitat is not a limiting factor for any of these wildlife species in this part of the state. The treatment has restored critical habitat elements including forage, water, important edge-effect and a mosaic of habitats for a whole complex of mammalian and avian species. Untreated areas adjacent to the project retain all of their related habitat values and habitat connectivity throughout the landscape.

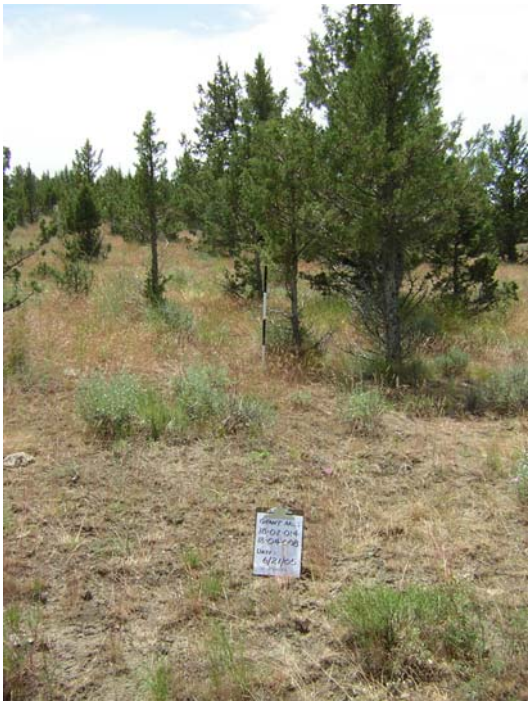
Changes in Forage Production: Foliar cover of forage species has increased by approximately 30% and annual production has increased from an estimated 500 lbs. per acre to about 900 to 1,000 lbs. per acre or from about 4 acres per Animal Unit Month (AUM) to about 1.5 acres per AUM.

Results of Rangeland Health Assessment:

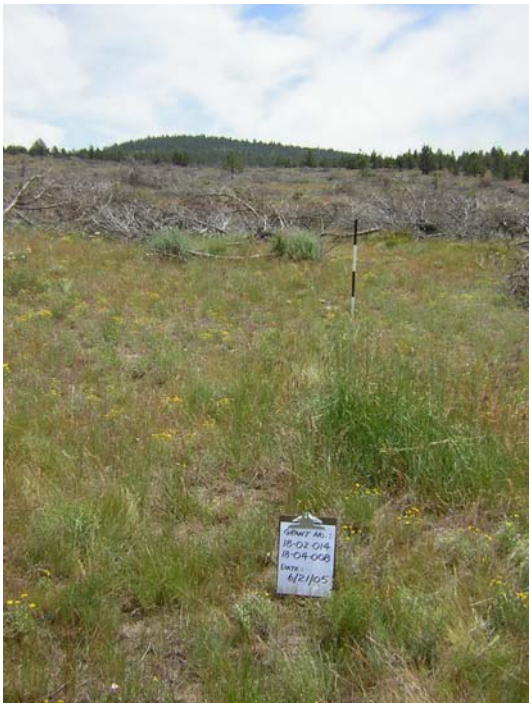
Pre-treatment: Soil stability: Non- functioning - Eroded
Hydrologic Function: Non-functioning - poor infiltration and gullying.
Biotic Integrity: Non-functioning – lack of species diversity

Post-treatment: Soil stability: Functioning
Hydrologic Function: Functioning.
Biotic Integrity: Functioning-at-risk. Upward trend in species diversity.

Photos of Pre-treatment and Post-treatment Conditions:



Adjacent un-treated site. June 21, 2005



Treated site. June 21, 2005

OWEB Effectiveness Monitoring Report – Juniper Treatment

OWEB Grant #: 200-166

General Information:
Grantee: Mike Carroll/Wheeler SWCD
Reviewer: Barrett/Greer Date of review: August 23, 2005

Treatment Site Characterization:
Location:
Ecoregion: (Omernik, et.al) John Day/Clarno (11a)
Ave. Annual Ppt.: 9-12" Elevation: 3660' Aspect: N/NE
Landscape Position: (check applicable) Valley Bottom __ Riparian Area __ Alluvial Fan __ Toe Slope __ Side-slope X Ridge __ Other __ (describe) _____
Dominant Soil: Depth >20" Texture: Surface VFSL/SL Sub-surface SCL/CL
Plant Association: Mtn. big sagebrush/antelope bitterbrush/Idaho fescue/bluebunch wheatgrass
Soil Limitations for Management: Steep slopes (15% or greater)

Treatment Description:
Objective: (from grant application) Improve watershed health and water quality and quantity in west branch, Bridge Creek; improve infiltration, decrease juniper canopy interception, overland flow and sediment yield.
Date(s) of treatment: Winter 2001-02 Acres treated: 49 acres Time spent: 54 hrs
Method of treatment: Track-hoe pull and pile w/ pre-treatment broadcast seeding.
Slash disposal: (broadcast, piled, etc.) Piled
Cost of initial treatment ($/ac): (from final report) $160.50/ac ($7865.00 total)
Post-treatment Burn? (Y/N) N Date: Planned Method: Burn piles
Seeded? (Y/N) Y Date: Winter 2001-02 Method: Broadcast
Species Seeded: (include rates) Sherman big bluegrass(2#), Secar bluebunch wheatgrass(4#), Nordan crested wheatgrass(2#), small burnet(1#)
Costs ($/ac.): Burning: $ N/A Seeding: $20.33/ac ($996.00 total)

Treatment Evaluation:
Method of evaluation: (check applicable) Measured X Estimated ___
Describe method(s) used: Step-toe transect
Permanent plot established? (Y/N) X Photo plot Established? (Y/N) X

Results of evaluation: (attach copies of field notes, photos and monitoring data compiled during the evaluation)
Pre-treatment conditions: (if available)
Pre-treatment canopy cover (%): 72%

Trees 36%	Forbs 0	Stones/gravels 4%
Shrubs 0%	Cryptogams 16%	Bare ground 20%
Grasses/grass-likes 20%	Litter 60%*	

Grazed? (Y/N) Y Rest/Deferment? (Y/N) Y Timing: April-May Duration: 8 weeks
Evidence of overland flow? (Y/N) Y
Springs and/or seeps; indicator species in the area of influence of the stand? (Y/N) N
Long-term measurement of flow? (Y/N) N If yes, what were the flows? N/A gpm
Ephemeral or intermittent streams in the area of influence of the stand? (Y/N) N
Long-term measurement of flow? (Y/N) N If yes, what were the flows? N/A cfs
*Predominantly juniper duff beneath trees.

Post-treatment conditions:
Current canopy cover (%): 92%

Slash/downed trees 0	Grasses/grass-likes 84%	Cryptogams 16%
Trees 0	Forbs 8%	Stones/gravels 0
Shrubs 0	Litter 76%	Bare ground 0

Evidence of overland flow? (Y/N) N
Springs and/or seeps; indicator species in the area of influence of the stand? (Y/N) N
Long-term measurement of flow? (Y/N) N If yes, what were the flows? N/A gpm
Ephemeral or intermittent streams in the area of influence of the stand? (Y/N) N
Long-term measurement of flow? (Y/N) N If yes, what were the flows? N/A cfs
Grazed? (Y/N) Y Grazing mgt. plan in place? (Y/N) Y Rest/Deferment? (Y/N) Y, annual deferment , Timing April-May Duration 8 weeks
Describe grazing system: Grazed annually in April and May by 9 cow/calf pairs.

Conclusions:
Was the target species effectively controlled? (Y/N) Y (If no, explain on next page)
Were the objectives of the project achieved? (Y/N) Y (If no, explain on next page)

Notes: (include grantee's comments and observations; notes on further treatment needs, etc.)
A well planned and implemented project. Should follow up to determine spring, seep or stream flow changes, if any.

Summary

OWEB Effectiveness Monitoring Report – Juniper Treatment

OWEBGrant #: 200-166

General Information:
Project: Carrol Juniper Treatment
County: Wheeler

Treatment Effects

Changes in Plant Community Composition: The adjacent, untreated area used for the comparison supports a juniper stand with a canopy cover of about 35 to 40% which was beginning to exert its competitive influence on the site. Although they were not picked up in the transect, many dead bitterbrush and big sagebrush skeletons were seen about the site – an indication of strong competition by juniper. The pre-treatment understory vegetation had a strong component of Idaho fescue which was released by the treatment. Bitterbrush and mtn. big sagebrush are returning to the plant community following treatment.

Changes to Soil Surface Conditions: Pre-treatment conditions included about 20% bare soil and strong indication of sheet erosion as evidenced by 1" pedestals at the base of grass individual plants. In the post-treatment area no bare ground was noted nor was there any evidence of overland flow. Standing vegetation, plant litter and biological crusts adequately protect the soil surface and detain overland flow, if any.

Changes to Site Hydrology: As stated above, the un-treated area showed strong evidence of sheet erosion and concentrated flow, whereas the treated site shows indication of immediate infiltration and no overland flow. It also appears that retention winter moisture has lead to in increase in production of herbaceous plant species.

Changes in Spring, Seep, and Stream Flow: None observed or reported

Changes in Wildlife Habitat: Pre-treatment conditions offered thermal cover and hiding cover to deer and elk and habitat for several species of tree dwelling birds, however this form of cover and habitat is not believed to be a limiting factor for any of these wildlife species in this region of the state. The treatment has restored critical habitat elements including forage and important edge-effect and a mosaic of habitats for a whole complex of mammal and avian species. Untreated areas adjacent to the project retain their original habitat values and habitat connectivity throughout the landscape.

Changes in Forage Production: Annual plant production in the untreated site (excluding juniper) is estimated from observation and grazing records to be about 300 to 500 pounds per acre. Annual plant production in the treatment, estimated from observation and grazing records, is approximately 700 to 900 pounds per acre. The re-allocation of resources (water, sunlight and nutrients) in the treatment area has led to the release of shrubs, deep-rooted perennial grasses and other herbaceous vegetation available as livestock forage.

Results of Rangeland Health Assessment:

Pre-treatment: Soil stability: Non-functioning – sheet erosion
Hydrologic Function: Non-functioning – interception and poor infiltration
Biotic Integrity: Non-functioning – lack of species diversity

Post-treatment: Soil stability: Functioning
Hydrologic Function: Functioning
Biotic Integrity: Functioning-at-risk – upward trend in species diversity

Photos of Pre-treatment and Post-treatment Conditions:

Estimated pre-treatment condition
Area immediately adjacent to treatment.
Date: August 23, 2005

Post-treatment condition

Date: August 23, 2005

OWEB Effectiveness Monitoring Report – Juniper Treatment

OWEB Grant #: 18-02-013

General Information:
Grantee: Pete Jameson
Reviewer: Hugh Barrett Date of review: July 31, 2005

Treatment Site Characterization:
Location:
Ecoregion (Omernik, et.al): John Day/Clarno Uplands (11a)
Ave. Annual Ppt.: 12-14" Elevation: 4140' Aspect: East
Landscape Position: Mountain side-slope
Dominant Soil: Depth 14"
Texture: Surface: stony very fine sandy loam Sub-surface: clay
Plant Assoc.: Wyoming big sagebrush/antelope bitterbrush/bluebunch wheatgrass
Soil Limitations for Management: Stony surface, shallow to moderately deep over welded tuff.

Treatment Description:
Objective: (from grant application) Improve site hydrologic function, plant diversity and plant production through the removal of western juniper trees that have encroached on the site in the past 80 to 100 years.
Date(s) of treatment: October 2003 Acres treated: 25 ac. Time spent: 2 days/2 cutters
Method of treatment: Chainsaw
Slash disposal: (broadcast, piled, etc.) Trees dropped, boles removed, slash left in place.
Cost of initial treatment ($/ac): $50.00/ac.
Post-treatment Burn? (Y/N) N (planned for spring 2006)
Cost of burning:
Seeded? (Y/N) N

Notes: The western edge of the treatment area is the property boundary between the W.P. Jameson Ranch and BLM-administered lands. A comparison was made between the untreated stand on public land and the treated stand on private land, providing a realistic pre- and post-treatment comparison. Juniper trees were cut with chainsaws. The trees were dropped, most of the boles were removed and slash was left in-place. Burning is planned for the spring of 2006 or 2007.

Treatment Evaluation:
Method of evaluation: Measured
Describe method(s) used: Step-toe transect
Permanent plot established? (Y/N) N Photo plot Established? (Y/N) N

Results of evaluation:

Pre-treatment conditions:
Pre-treatment foliar cover: 64% Basal cover: 4%
Trees: 24% Forbs: 28% Stones/gravels: 8%
Shrubs: 4% Cryptogams: 4% Bare ground: 16%
Grasses/grass-likes: 40% Litter: 48%
Grazed? (Y/N) Y Rest/Deferment? (Y/N) Y Timing: Variable Duration: 3 weeks/yr
Evidence of overland flow? (Y/N) Y (sheet flow w/ gullies downslope)
Springs and/or seeps; indicator species in the area of influence of the stand? (Y/N) N
Long-term measurement of flow? (Y/N) N/A If yes, what were the flows? N/A gpm
Ephemeral or intermittent streams in the area of influence of the stand? (Y/N) N
Long-term measurement of flow? (Y/N) N If yes, what were the flows? N/A cfs
Estimated annual production of understory vegetation: 300 pounds per acre.

Post-treatment conditions:
Current foliar cover: 52% Basal cover: 8%
Slash/downed trees: 24% Grasses/grass-likes: 48% Cryptogams: 20%
Live trees: 0 Forbs: 32% Stones/gravels: 32%
Shrubs: 8% Litter: 48% Bare ground: 4%
Evidence of overland flow? (Y/N) N
Springs and/or seeps; indicator species in the area of influence of the stand? (Y/N) N*
Long-term measurement of flow? (Y/N) N If yes, what were the flows? N/A gpm
Ephemeral or intermittent streams in the area of influence of the stand? (Y/N) N*
Long-term measurement of flow? (Y/N) N If yes, what were the flows? N/A cfs
Estimated annual production of vegetation: 1100 pounds per acre.
Grazed? (Y/N) Y Grazing mgt. plan in place? (Y/N) Y Rest/Deferment? (Y/N) Y
Timing of grazing: Alternate seasons annually. Duration: Approximately three weeks per pasture with re-grazing in the fall on spring-grazed pastures where regrowth is adequate.

Conclusions:
Was the target species effectively controlled? (Y/N) Y (If no, explain on next page)
Were the objectives of the project achieved? (Y/N) Y (If no, explain on next page)

Notes: (include grantee's comments and observations; notes on further treatment needs, etc.)
(Continue on next page, if necessary) *While no springs have appeared in the area of influence of the treatment, a former meadow about 1 acre in size, is re-establishing at the immediate downslope end of the treatment area. Additionally, Mr. Jameson stated that

juniper treatment projects on another 900 acres of his property have resulted in the re-emergence of seven springs (dry before treatment) that now flow year-round at the rate of 3 – 4 gpm.

Estimates of site productivity on the treated and untreated areas in, or adjacent to, the treatment area, based on observation and grazing records, are: 300 pounds per acre (air dry weight) total annual production on the untreated site, and 900 to 1200 pounds per acre in the treatment area (both sites having the same ecological potential).

Mr. Jameson has had the forages analyzed from the treated and untreated areas (those with, and without a juniper overstory). He stated the analysis indicates protein levels in the forage in the treated areas are twice the level of protein in the untreated, juniper dominated areas.

A small soil pit dug in the center of a 60 foot diameter clearing in the untreated juniper stand exposed a network of juniper roots occupying the upper 6 to 8 inches of the soil profile (30 feet from the nearest tree). Die-off of mature sagebrush and antelope bitterbrush was common in the untreated area.

Summary

OWEB Effectiveness Monitoring Report – Juniper Treatment

OWEBGrant #: 18-02-013

General Information:
Project: Jameson Juniper Control
County: Crook

Treatment Effects

Changes in Plant Community Composition: The aspect of the un-treated comparison site is dominated by western juniper with understory vegetation represented by low-vigor native perennial grasses (Sandberg bluegrass and bluebunch wheatgrass). Idaho fescue, as is common, is present in the northeast quadrant of individual trees. Native shrubs (antelope bitterbrush and big sagebrush) are sparse and dead or dying. Native grasses in the treated area show a significant increase in production and vigor and new or recovering shrubs are widely evident. Idaho fescue is dropping out of the stand with the change in micro-climate formerly provided by the trees.

Changes in Soil Surface Conditions: There is a significant reduction in bare soil in the treated area when compared with the un-treated area (4% vs. 16%, respectively) resulting from the amount of slash and the increase in shrub and herbaceous production and cover. The soil surface in the un-treated comparison area is capped by physical soil crusts and there is little evidence of physical soil crusting in the treated area.

Changes in Site Hydrology: The treated area shows no indication of overland flow. There appears to be adequate plant density, litter and slash to detain flow that may occur, increasing the time available for infiltration. The un-treated comparison area displayed evidence of occasional sheet flow during rain-on-snow, or rain-on-frozen soil events as indicated by gullies on the steeper soils in the stand. A former meadow, about one acre in size, is beginning to re-establish at the bottom of the slope in the treated area probably because improvement in infiltration on the slope above has resulted in lateral sub-surface flow that is emerging at the break in slope at the meadow site. A similar situation was noted on an earlier, adjacent juniper control project where a stock pond which was ordinarily full in late winter and early spring has now been dry for several years (including the unusually wet spring of 2005). According to Mr. Jameson, the pond filled, in the past, with runoff from overland flow emanating from the juniper stand immediately upslope. With improved infiltration rates resulting from changes to plant cover and soil surface conditions, the moisture that once left the juniper stand as overland flow, now enters the soil profile and, according to Mr. Jameson, seems to be showing up as increased spring flow at the base of hill on which the treatment was made.

Changes in spring, seep, and stream flow: In addition to the above, Mr. Jameson has observed the emergence of seven new springs on his property that he associates with approximately 900 acres of juniper control he has completed. Mr. Jameson estimates flow from each of these springs to be about three to four gallons per minute throughout the year. It is believed that these new springs can be attributed to improved infiltration of rainfall and snow melt at the soil surface, a soil moisture surplus resulting from the removal of the intercepting canopy of juniper and a reduction in transpiration by juniper during late fall, winter and early spring.

Changes in Wildlife Habitat: Pre-treatment conditions offered thermal cover and hiding cover to deer and elk and habitat for several species of forest dwelling birds, however this form of cover and habitat is not believed to be a limiting factor for any of these wildlife species in this region of the state. The treatment has restored critical habitat elements including forage, water, important edge-effect and a mosaic of habitats for a whole complex of species, mammalian, avian and amphibian. Untreated areas adjacent to the project retain their original habitat values and habitat connectivity throughout the landscape.

Changes in Forage Production: Annual plant production in the untreated site (excluding juniper) is estimated from observation and grazing records to be about 300 to 400 pounds per acre. Annual plant production in the treatment, estimated from observation and grazing records, is approximately 900 to 1200 pounds per acre. The re-allocation of resources (water, sunlight and nutrients) in the treatment area has led to the release of deep-rooted perennial grasses and other herbaceous vegetation available as livestock forage – a three- to four-fold increase in potential stocking rates. In addition, Mr. Jameson has had the forages in the treated and untreated sites analyzed for nutritional value. He stated the analysis indicated protein content of forage in the treated site is twice the level as in the untreated area: 6% to 3%, respectively. To understand if this increase results from changes in plant composition, resource availability, soil chemistry or other influence, separately or in combination, further investigation is warranted.

Results of Rangeland Health Assessment:

Pre-treatment:

Soil stability: Non-functioning: eroded surface, overland flow, gullying.
Hydrologic Function: Non-functioning
Biotic Integrity: Non-functioning: low species diversity, low plant vigor.

Post-treatment:

Soil stability: Functioning
Hydrologic Function: Functioning
Biotic Integrity: Functioning

Photos of Pre-treatment and Post-treatment Conditions:

Date: July 31, 2005
Adjacent untreated area

Date: July 31, 2005
Treatment site.

OWEB Effectiveness Monitoring Report – Juniper Treatment

OWEB Grant #: 18-02-009

General Information:
Grantee: Rance Kaster
Reviewer: Hugh Barrett Date of review: June, 20, 2005

Treatment Site Characterization:
Location:
Ecoregion: (Omernik, et.al) John Day/Clarno Uplands (11a)
Ave. Annual Ppt.: 12 – 14" Elevation: 4300' Aspect: East
Landscape Position: Side-slope
Dominant Soil: Depth > 20"
Texture: Surface fine sandy loam, Sub-surface fine sandy clay loam
NRCS Ecological Site or Plant Assoc.:
big sagebrush/antelope bitterbrush/bluebunch wheatgrass/Idaho fescue
Soil Limitations for Management: stony; slopes 2-15%+

Treatment Description:
Objective: (from grant application) Improve hydrologic function: increase (restore) infiltration rates; reduce overland flow, reduce erosion and sediment yield to Pine Creek.
Date(s) of treatment: Sept/Oct 2002 Acres treated: 240 ac. Time spent: 62 Dozer hrs., 100 chainsaw hrs.
Method of treatment: Chainsaw and dozer.
Slash disposal: (broadcast, piled, etc.) Piled for burning
Cost of initial treatment ($/ac): (from final report) $ 29.60/ac. ($7108.00 total)
Post-treatment Burn? (Y/N) N Date: NA Method: NA
Seeded? (Y/N) Y Date: Oct, 2002 Method: Drilled
Species Seeded: Paiute orchardgrass, Luna pubescent wheatgrass, Oahe intermediate wheatgrass, Manchar smooth brome, Sherman big bluegrass, Ladak alfalfa, Delar small burnet, Regar meadow brome.
Costs ($/ac.): Burning: $ NA Seeding: $ 24.75/ac. ($5942.00 total) (tractor fuel and seed cost only)

Notes: Burning piles is planned in fall or winter of 2005-6

Treatment Evaluation:

Method of evaluation: Estimated

Describe method(s) used: Visual estimate

Permanent plot established? (Y/N) N Photo plot established? (Y/N) N

Results of evaluation: (attach copies of field notes, photos and monitoring data compiled during the evaluation)

Pre-treatment conditions: (if available)

Pretreatment cover (%): 75% Basal cover: 2%

Trees 20%	Forbs 2%	Stones/gravels 25%
Shrubs Trace	Cryptogams 10%	Bare ground 13%
Grasses/grass-likes 10%	Litter 20%	

Grazed? (Y/N) N Rest/Deferment? (Y/N) N Timing NA Duration NA

Evidence of overland flow? (Y/N) Y (Sheet flow)

Springs and/or seeps; indicator species in the area of influence of the stand? (Y/N) N

Long-term measurement of flow? (Y/N) N If yes, what were the flows? NA gpm

Ephemeral or intermittent streams in the area of influence of the stand? (Y/N) N

Long-term measurement of flow? (Y/N) N If yes, what were the flows? NA cfs

Post-treatment conditions:

Current cover (%): 70% Basal cover: 8%

Slash/downed trees 2%	Grasses/grass-likes 25%	Cryptogams T
Trees 1%	Forbs 30%	Stones/gravels 15
Shrubs 2%	Litter 5%	Bare ground 20

Evidence of overland flow? (Y/N) N

Springs and/or seeps; indicator species in the area of influence of the stand? (Y/N) Y

Long-term measurement of flow? (Y/N) N If yes, what were the flows? est. 15 -20 gpm

Ephemeral or intermittent streams in the area of influence of the stand? (Y/N) N

Long-term measurement of flow? (Y/N) NA If yes, what were the flows? NA cfs

Grazed? (Y/N) N Grazing mgt. plan in place? (Y/N) Y Rest/Deferment? (Y/N) Y

Timing: Summer 2006 Duration: 3 weeks

Describe grazing system: Alternate year grazing with a change in season of use in most grazing years.

Conclusions:

Was the target species effectively controlled? (Y/N) Y (If no, explain on next page)

Were the objectives of the project achieved? (Y/N) Y (If no, explain on next page)

Notes: (include grantee's comments and observations; notes on further treatment needs, etc.)

Mr. Kastor is a highly skilled dozer operator and is able to remove juniper using this machinery with minimal ground disturbance. Once removed, the trees are pushed into piles which are burned after a year or two. Mr. Kastor stated that in many instances he has observed free water in the root balls and the surrounding soil as the trees are uprooted. He attests that this project has yielded flow of 15 – 20 gpm from a new spring immediately downslope of the treatment area in the year following the treatment in an

Kastor Conclusions cont'd.

area where no trace of spring flow or moist soil had been observed previously. This kind of flow has occurred downslope of other juniper removal treatments on other parts of the ranch. It is notable that these new springs have expressed themselves during the current drought. Mr. Kastor is strongly committed to continuing the treatment of western juniper to meet his objectives of improving or restoring infiltration rates, reducing overland flow and erosion, reducing sediment yield to Pine Creek, increasing soil moisture storage and water yield and increasing his livestock forage supply.

Summary

OWEB Effectiveness Monitoring Report – Juniper Treatment

OWEBGrant #:

General Information:
Project: Kastor Ranch
County: Crook

Treatment Effects:

Changes in Plant Community Composition: Before treatment, the site was dominated by western juniper. Most shrubs (big sagebrush and antelope bitterbrush) had died-off, after being out-competed by juniper for sunlight, nutrients, water and space. Bluebunch wheatgrass was sparse, low in vigor and not reproducing while Idaho fescue, as it commonly does, and occupied the shaded, duff-covered areas immediately beneath the trees. Following tree removal, the site was seeded to a mixture of introduced grasses, dryland alfalfa and small burnet (a wildlife forage species). Plant community composition has been shifted from juniper dominance to a grass/forb community interspersed with patches of big sagebrush.

Changes to Soil Surface Conditions: Before treatment, the soil surface conditions indicated low infiltration rates and showed the effects of sheet flow and sheet erosion. Exposed stones and gravel, bare ground, juniper duff, mosses and lichens occupied about 80% of the soil surface. Following treatment, reductions in surface stones and gravel, juniper duff, mosses and lichens was observed and there appeared to be a slight increase in the amount if bare ground (to be expected in the short term). Over time, the seeded vegetation is expected to contribute a significant amount of litter and organic matter to the soil, restoring infiltration and significantly reducing, or eliminating overland flow and soil erosion.

Changes to Site Hydrology: changes in spring, seep, and stream flow: Mr. Kastor stated that a spring has appeared downslope of the treatment with flows estimated to be 15 to 20 gallons per minute – during a west-wide drought. This effect was observed on other parts of the ranch where springs have appeared immediately downslope of similar juniper reduction treatments. In one case, the Kastors noticed a small area of damp soil in a small draw, treated about 40 acres of juniper immediately upslope and subsequently utilized spring flow of approximately 20 gallons per minute below the treatment to fill a new pond which has been stocked with rainbow trout.

Changes in Wildlife Habitat: Pre-treatment conditions offered thermal cover and hiding cover to deer and elk and habitat for several species of forest dwelling birds, however this kind of cover and habitat is not a limiting factor for any of these wildlife species in this

part of the state. The treatment has restored critical habitat elements including forage, water, important edge-effect and a mosaic of habitats for a whole complex of species, mammalian, avian and amphibian. Untreated areas adjacent to the project retain all of their related habitat values and habitat connectivity throughout the landscape.

Changes in Forage Production: When asked about previous livestock grazing in the treatment area, Mr. Kastor stated that there was no forage for livestock on the site and it was not grazed. Post-treatment forage production is estimated to be approximately 1200 pounds per acre or, at proper use levels, about 1.5 to 2 acres per animal unit month (AUM).

Results of Rangeland Health Assessment:

Pre-treatment: Soil stability: Non-functioning - Eroded
Hydrologic Function: Non-functioning - poor infiltration
Biotic Integrity: Non-functioning – lack of species diversity

Post-treatment: Soil stability: Functionig
Hydrologic Function: Functioning
Biotic Integrity: Functioning at risk – upward trend in species diversity

Photos of pre- and post-treatment conditions:

Date: June 20, 2005
Adjacent untreated area.

Date: June 20, 2005
Treated area.

OWEB Effectiveness Monitoring Report – Juniper Treatment

OWEB Grant #: 18-04-003

General Information:
Grantee: Chuck McGrath
Reviewer: Hugh Barrett Date of review: August 1, 2005

Treatment Site Characterization:
Location:
Ecoregion: (Omernik, et.al) John Day/Clarno Uplands (11a)
Ave. Annual Ppt.: 12-14" Elevation: 4250' Aspect: Nearly level to gently sloping northeast aspect.
Landscape Position: Mountain basin
Dominant Soil: Depth: > 20"
Texture: Surface: fine sandy loam Sub-surface: sandy clay loam
Plant Association: mountain big sagebrush/antelope bitterbrush/Idaho fescue/bluebunch wheatgrass
Soil Limitations for Management: None

Treatment Description:
Objective: (from grant application) Improve hydrologic function of the site: restore infiltration and reduce overland flow and sediment yield by converting sagebrush/juniper site to grass cover.
Date(s) of treatment: December –February 2002 Acres treated: 250 ac.
Time spent: 300hrs
Method of treatment: Brush-beating
Slash disposal: (broadcast, piled, etc.) Fine-chopped slash left in place.
Cost of initial treatment ($/ac): (from final report) $35.00/ac
Post-treatment Burn? (Y/N) N
Seeded? (Y/N) Y Date: November, 2004 Method: Drilled (rangeland drill)
Species Seeded: (include rates) Intermediate wheatgrass at 12 pounds per acre.
Costs ($/ac.): Seeding: $18.00/ac (seed cost),

Notes: The project was undertaken on abandoned cropland on which big sagebrush had become re-established and western juniper was invading. This project is part of a treatment strategy in the upper basin intended to improve infiltration of rainfall and snowmelt and retain moisture high in the watershed thereby decreasing high flow events and lengthening the duration of flow, promoting recovery of Long Hollow Creek, its stream channel and associated riparian areas. The creek is deeply entrenched and drains the funnel-shaped basin in which the project was accomplished. In a juniper dominated condition, which this and other projects on the property address, the stream is subject to extremely "flashy" events, preventing the recovery of riparian function and quickly draining the watershed of its moisture.

Brush-beating to control young, small diameter juniper appears to have been an effective method of control. However, the brush-beater may have left live juniper branches attached to stumps just above the soil surface. In this event, those branches will continue growing, resulting in an apparent re-establishment of juniper on the site. Occasional monitoring of the site for this problem is recommended.

In the pre-treatment condition, it is estimated that there were 20 to 50 trees per acre. The trees are estimated to be in the 20 to 40 year age range which corresponds with the period when cropping was discontinued on the site. The treatment was pre-emptive in that it removed juniper while it was a subordinate (Phase I) component of the plant community, requiring less intensive control efforts than is the case in of co-dominance (Phase II) or dominance (Phase III) in the plant community (Miller, 2005).

Literature cited:

Miller, R.F., J.D. Bates, T.J. Svejcar, F.B. Pierson, L.E. Eddleman. 2005. Biology, Ecology and Management of Western Juniper. Technical Bulletin 152. Oregon State University, Agricultural Experiment Station. Corvallis, OR

Treatment Evaluation:
Method of evaluation: Measured
Describe method(s) used: Step-point transect
Permanent plot established? (Y/N) N Photo plot Established? (Y/N) N

Results of evaluation:

Pre-treatment conditions:
Pre-treatment foliar cover: 64% Basal cover: 4%

Trees: 5%	Forbs: 16%	Stones/gravels: 0%
Shrubs: 40%	Cryptogams: 28%	Bare ground: 20%
Grasses/grass-likes: 16%	Litter: 28%	

Grazed? (Y/N) Y Rest/Deferment? (Y/N) Y Timing: Variable Duration: 10 days/year
Evidence of overland flow? (Y/N) N
Springs and/or seeps; indicator species in the area of influence of the stand? (Y/N) Y
Long-term measurement of flow? (Y/N) N If yes, what were the flows? NA gpm
Ephemeral or intermittent streams in the area of influence of the stand? (Y/N) Y
Long-term measurement of flow? (Y/N) N If yes, what were the flows? NA cfs

Post-treatment conditions:
Foliar cover: 56% Basal cover: 8%

Slash/downed trees: 60%	Grasses/grass-likes: 16%	Cryptogams: 4%
Trees: 0%	Forbs: 44%	Stones/gravels: 0%
Shrubs: 8%	Litter: 12%	Bare ground: 16%

Grazed? (Y/N) N Grazing mgt. plan in place? (Y/N) Y Rest/Deferment? (Y/N) Y
Timing: Will vary annually Duration: 10 days/year
Describe grazing system: Rapid movement through all pastures on the ranch.
Evidence of overland flow? (Y/N) N
Springs and/or seeps; indicator species in the area of influence of the stand? (Y/N) Y
Long-term measurement of flow? (Y/N) N If yes, what were the flows? 20 gpm*
Ephemeral or intermittent streams in the area of influence of the stand? (Y/N) Y
Long-term measurement of flow? (Y/N) N If yes, what were the flows? 0.5 cfs*

Conclusions:
Was the target species effectively controlled? (Y/N) Y (If no, explain on next page)
Were the objectives of the project achieved? (Y/N) Y (If no, explain on next page)

Notes: (include grantee's comments and observations; notes on further treatment needs, etc.) * Spring and stream flows in Long Hollow Creek have increased from an insignificant, unspecified amount to an estimated amount of 20 gallons /minute for the spring and about 0.5 cfs in the stream. Mr. McGrath stated that an un-treated "sister" drainage of similar size, soils and geology has shown no change in spring or stream yield. It is his

conclusion that juniper control in the Long Hollow watershed has had a positive effect on hydrologic function on that system.

Summary

OWEB Effectiveness Monitoring Report – Juniper Treatment

OWEBGrant #: 18-04-003

General Information:
Project: McGrath Ranch
County: Crook

Treatment Effects

Changes in Plant Community Composition: The site occurs on abandoned cropland which re-established to a dense stand of big sagebrush and Sandberg bluegrass. The site appears to have been seeded to crested wheatgrass after cropping was discontinued. Juniper encroachment was underway as evidenced by 20 to 40 year old trees occurring on the site. Following mechanical treatment the site was seeded to Intermediate wheatgrass. There was a significant reduction in sagebrush and complete removal of juniper and the seeding shows very early success. Older established seedings on the ranch on sites similar to the treatment area indicate that the new seeding will dominate the site with sagebrush in a co-dominant role, providing excellent soil cover with both live plants and litter.

Changes to Soil Surface Conditions: The soil surface in the untreated area was strongly capped with a physical crust with some (about 28%) biological crusting at the surface. Slopes ranged from 0 to about 2% meaning that overland flow was not a problem; however the strong surface crusting indicates that precipitation often ponded at the surface and moisture loss from evaporation and capillary loss (wicking from the subsurface) was common. Treatment has put a large amount of plant litter at the soil surface which will protect the soil surface from raindrop impact, aid in the development of soil structure more conducive to infiltration, and reduce moisture loss by providing insulation from solar radiation and wind.

Changes to Site Hydrology: The soil surface conditions described above are expected to improve infiltration rates and result in the deeper percolation of soil moisture and increased soil moisture storage. The pre-emptive treatment of juniper will help retain moisture for plant growth.

Changes in Spring, Seep, and Stream Flow: None observed.

Changes in Wildlife Habitat: The untreated site has potential for providing winter habitat for sage grouse but the site's value for this use is in a downward trend with the increase in predator perches offered by the maturing juniper. The treated area will, in a

short time, provide excellent sage grouse brood-rearing habitat with its herbaceous cover of grasses and forbs.

Changes in Forage Production: Forage production in the untreated area is estimated to be about 150 to 200 pounds per acre or about 12 acres per animal unit month (AUM). Forage production in the treated area, when the seeding is fully established should average 1100 to 1200 pounds per acre per year, or about 1.5 acres per AUM.

Results of Rangeland Health Assessment:

Pre-treatment: Soil stability: Functioning
Hydrologic Function: Non-functioning - poor infiltration
Biotic Integrity: Non-functioning – lack of species diversity

Post-treatment: Soil stability: Functioning
Hydrologic Function: Functioning
Biotic Integrity: Functioning-at-risk – upward trend in species diversity

Photos of Pre-treatment and Post-treatment Conditions:

Date: August 1, 2005
Adjacent un-treated site.

Date: August 1, 2005
Treated site.

OWEB Effectiveness Monitoring Report – Juniper Treatment

OWEB Grant #: 99-604

General Information:
Grantee: Rodoni Ranch
Reviewer: Barrett/Greer Date: August 23, 2005

Treatment Site Characterization:
Location:
Lat.
Ecoregion: (Omernik, et.al) John Day/Clarno Uplands (11a)
Ave. Annual Ppt.: 12 – 14" Elevation: 3325' Aspect: SE
Landscape Position: Mtn. Side-slope, 2-5% slopes
Dominant Soil: Depth Mod. Deep to Deep Texture: Surface Silt loam, Sub-surface Sandy clay loam
Plant Association (Potential): Wyoming big sagebrush/bluebunch wheatgrass
Soil Limitations for Management: None

Treatment Description:
Objective: (from grant application) Increase infiltration, reduce overland flow and erosion, improve water quality, reduce juniper competition for moisture and nutrients and increase forage production
Date(s) of treatment: 2001 Acres treated: 360 acres Time spent: approx. 1695 hrs (1510 cutting; 185 piling)
Method of treatment: Felling by chainsaw
Slash disposal: (broadcast, piled, etc.) Dozed into piles and burned
Cost of initial treatment: (from final report) $104.00/ac, Post-treatment Burn? (Y/N) Y
Date: 2004, Method: Piles burned
Seeded? (Y/N) Y, Date: Not specified, Method: Broadcast seeding of burn piles only
Species Seeded: (include rates) Not specified
Costs ($/ac.): Burning: $ Not specified Seeding: $ Not specified

OWEB Grant # 99-604

Treatment Evaluation:

Method of evaluation: (check applicable) Measured X Estimated ___
Describe method(s) used: Step-toe transect
Permanent plot established? (Y/N) N, Photo plot Established? (Y/N) Y (by Wheeler SWCD)

Results of evaluation: (attach copies of field notes, photos and monitoring data compiled during the evaluation)

Pre-treatment conditions: (if available) **Not available**
Pre-treatment cover (%):

Trees ____	Forbs ____	Stones/gravels ____
Shrubs ____	Cryptogams ____	Bare ground ____
Grasses/grass-likes ____	Litter ____	

Grazed? (Y/N) Y Rest/Deferment? (Y/N) N Timing: Variable Duration: N
Evidence of overland flow? (Y/N) ___
Springs and/or seeps; indicator species in the area of influence of the stand? (Y/N) N
Long-term measurement of flow? (Y/N) N/A If yes, what were the flows? N/A gpm
Ephemeral or intermittent streams in the area of influence of the stand? (Y/N) N
Long-term measurement of flow? (Y/N) N/A If yes, what were the flows? N/A cfs

Post-treatment conditions:
Current cover (%): 68%

Slash/downed trees <1%	Grasses/grass-likes 30%	Cryptogams 0%
Trees <1%	Forbs 20%	Stones/gravels 0%
Shrubs <2%	Litter 92%	Bare ground 8%

Evidence of overland flow? (Y/N) N
Springs and/or seeps; indicator species in the area of influence of the stand? (Y/N) N
Long-term measurement of flow? (Y/N) N, If yes, what were the flows? NA gpm
Ephemeral or intermittent streams in the area of influence of the stand? (Y/N) N
Long-term measurement of flow? (Y/N) N, If yes, what were the flows? NA cfs
Grazed? (Y/N) Y, Grazing mgt. plan in place? (Y/N) Y, Rest/Deferment? Y Timing Spring Duration 3-6 weeks
Describe grazing system: The treatment area is grazed annually each spring. Native perennial grasses were lost on this site as a result of the apparently dense, competitive stand of juniper. Annual grasses and forbs now dominate the site and provide limited forage for livestock during the spring season.

Conclusions:

Was the target species effectively controlled? (Y/N) Y (If no, explain on next page)
Were the objectives of the project achieved? (Y/N) N (If no, explain on next page)

Notes: (include grantee's comments and observations; notes on further treatment needs, etc.)
Juniper was effectively cleared in the area, however the lack of perennial native grasses, and desirable forbs and shrubs in the pre-treatment understory and soil surface disturbance related to the dozing of felled juniper left the area vulnerable to occupation by annual grasses and forbs. The post-treatment vegetation is comprised of cheatgrass (*Bromus tectorum*), Japanese brome (*Bromus japonica*), medusahead (*Elymus caput-medusae*), mustards (*Sisymbrium spp.*), willow weed (*Epilobium spp.*) and other annuals. Sparsely scattered in the area are remnants of the potential native plant community including basin wildrye (*Elymus cinereus*), bluebunch wheatgrass (*Agropyron spicatum*), western wheatgrass (*Agropyron smithii*), Thurber needlegrass (*Stipa thurberiana*) and Wyoming big sagebrush (*Artemisia wyomingensis*).

A survey of the area before treatment would have indicated: 1) the risk of occupation by less than desirable annual vegetation because of the apparently sparse stand of desirable native plants in the understory, 2) the advisability of seeding desirable perennial species before, or immediately after treatment, and 3) the further risk of occupation by annuals caused by soil surface disturbance related to dozing.

The current grazing management is probably the most appropriate method available given the circumstances. In early spring, cattle will tend to select cheatgrass and some other annual plants over native grasses while they are green, lush and abundant. Grazing use during this season often favors the native perennial grasses as long as cattle are moved when their forage preference begins to shift from annuals to perennials (at about the "boot stage" in the cheatgrass growth cycle).

Recommendation: Inventory area to determine the potential for recovery of desirable plants, or the need to reseed. Leave downed trees in place to: 1) help detain overland flow, 2) provide physical protection from grazing or browsing use for recovering (or seeded) grasses forbs and shrubs, and 3) minimize soil surface disturbance that promotes weed invasion. If necessary, cut out and remove tree boles to reduce the amount of slash on site.

Summary

OWEB Effectiveness Monitoring Report – Juniper Treatment

OWEBGrant #: 99-604

General Information:
Project: Rodoni Ranch/Wheeler SWCD
County: Wheeler

Treatment Effects

Changes in Plant Community Composition: Soil, climate and landform indicate that the area originally supported a Wyoming big sagebrush, bluebunch wheatgrass, Thurber needlegrass plant community maintained by a 15 to 30+ year fire return interval (Miller, 2005). Interrupted fire cycles promoted the encroachment and maturation of an apparently dense stand of western juniper, estimated at 200+ trees per acre. This stand of trees fully occupied the area resulting in the extreme reduction or exclusion of the native shrubs, grasses and forbs. The treatment did not result in a release of desired species since the understory vegetation was apparently very sparse and unable to respond. Follow-up dozing to pile the felled trees disturbed the surface soil and exposed the area to quick invasion by opportunistic annual plants.

Changes to Soil Surface Conditions: It is assumed that a sparse stand of understory vegetation was unable to maintain infiltration rates at the soil surface and that overland flow was common. The soil surface texture, silt loam, is erodible by water so it is further assumed that rill and gully erosion were active. Post-treatment dozing removed obvious traces of erosion but created a broken soil surface micro-relief that supports infiltration by detaining overland flow.

Changes to Site Hydrology: Assumed pre-treatment hydrologic conditions indicate an extreme loss of precipitation to canopy interception, with subsequent evaporation and sublimation, by western juniper (a 25 to 40% loss depending on juniper canopy cover). Evapo-transpiration by juniper has ceased on the area thereby improving the opportunity for re-wetting of the soil profile by all, or most, of the dormant season precipitation. It is further assumed that the soil in the openings of the canopy were, because of the silt loam surface texture, capped with a physical crust that would have exhibited very low infiltration rates leading to overland flow, concentrated flow and erosion. Soil surface roughness resulting from the disturbance of dozing, and the accumulation of most annual plant litter promote infiltration and reduce overland flow. The exception is medusahead which, because of its stiff awns, sits above the soil surface and does not detain overland flow.

Changes in Spring, Seep, and Stream Flow: None reported or observed.

Changes in Wildlife Habitat: Pre-treatment conditions offered thermal cover and hiding cover to deer and elk and habitat for several species of forest dwelling birds, however this form of cover and habitat is not believed to be a limiting factor for any of these wildlife species in this region of the state. The treatment converted the dense stand of juniper to an expansive annual grassland which offers seasonal forage for deer and elk and perhaps some habitat for ground nesting birds, but not the diversity nor quality of habitat that would have been available with the recovery of native shrubs, grasses and forbs, or a well-chosen mixture of seeded species.

Forage Production: Prior to treatment, the area afforded no appreciable amount of livestock forage and was not considered part of the forage base of the operation. Following treatment, the area supplies annual spring forage. However, production of annual grasses and forbs is highly variable since they are directly dependant on current growing season conditions and are, as a result, an undependable source of forage. Forage production in the area is estimated to range from 5 ac/Animal Unit Month (AUM) to 20+ ac/AUM.

Results of Rangeland Health Assessment:

Pre-treatment: Soil stability: Not observed. Apparent: Non-functioning
Hydrologic Function: Not observed. Apparent: Non-functioning
Biotic Integrity: Not observed. Apparent: Non-functioning

Post-treatment: Soil stability: Functioning at risk – annual cover; risk of fire/loss of cover
Hydrologic Function: Functioning at risk – annual cover
Biotic Integrity: Non-functioning, annual vegetation; lack of representation in functional plant groups; lack of structure.

Literature cited:

Miller, R.F., J.D. Bates, T.J. Svejcar, F.B. Pierson, L.E. Eddleman. 2005. Biology, Ecology and Management of Western Juniper. Technical Bulletin 152. Oregon State University, Agricultural Experiment Station. Corvallis, OR

Photo Post-treatment Condition:

August 23, 2005
Post-treatment
No pre-treatment comparison sites available

OWEB Effectiveness Monitoring Report – Juniper Treatment

OWEB Grant #: 201-253

General Information:
Grantee: Richard Ross
Reviewer: Barrett/Greer Date of review: August 23, 2005

Treatment Site Characterization:
Location:
Ecoregion: (Omernik, et.al) John Day/Clarno Uplands (11a)
Ave. Annual Ppt.: 9 – 12" Elevation: 1930' Aspect: E/SE
Landscape Position: (check applicable) Valley Bottom __ Riparian Area __ Alluvial Fan __ Toe Slope __ Side-slope __ Ridge __ Other X (describe) Toe-slope in deep basalt canyon
Dominant Soil: Depth Mod. Deep to deep Texture: Surface SiCL Sub-surface SiCL
Plant Association: Wyoming big sagebrush/Thurber needlegrass/bluebunch wheatgrass
Soil Limitations for Management: 10 – 20% slopes

Treatment Description:
Objective: (from grant application) Improve nutrient cycling and infiltration; reduce sediment yield from uplands and improve water quality by removing young juniper.
Date(s) of treatment: 2002 -03 Acres treated: 50 ac. Time spent: 260 hrs
Method of treatment: Chainsaw
Slash disposal: (broadcast, piled, etc.) Limbs lopped and scattered and some piled, some trees placed in gullies
Cost of initial treatment ($/ac): (from final report) $89.60/ac ($4,480.00 Total)
Post-treatment Burn? (Y/N) Y Date: Winter 2003 Method: Piles burned
Seeded? (Y/N) N Date: N Method: N/A
Species Seeded: (include rates) N/A
Costs ($/ac.): Burning: $ In-kind service Seeding: $ N/A

Treatment Evaluation:
Method of evaluation: (check applicable) Measured X Estimated ___
Describe method(s) used: Step-toe transect
Permanent plot established? (Y/N) N Photo plot Established? (Y/N) N

Results of evaluation: (attach copies of field notes, photos and monitoring data compiled during the evaluation)
Pre-treatment conditions: (if available)
Pretreatment cover (%): 80%

Trees 40%	Forbs 0	Stones/gravels 0
Shrubs 4%	Cryptogams 8%	Bare ground 8%
Grasses/grass-likes 36%	Litter 28%	

Grazed? (Y/N) Y* Rest/Deferment? (Y/N) Y Timing N/A Duration N/A
Evidence of overland flow? (Y/N) N
Springs and/or seeps; indicator species in the area of influence of the stand? (Y/N) N
Long-term measurement of flow? (Y/N) N/A If yes, what were the flows? N/A gpm
Ephemeral or intermittent streams in the area of influence of the stand? (Y/N) N
Long-term measurement of flow? (Y/N) N If yes, what were the flows? N/A cfs
* Trespass cattle

Post-treatment conditions:
Current cover (%): 88%

Slash/downed trees 0	Grasses/grass-likes 64%	Cryptogams 0
Trees 0	Forbs 16%	Stones/gravels 8%
Shrubs 8%	Litter 72%	Bare ground 8%

Evidence of overland flow? (Y/N) N
Springs and/or seeps; indicator species in the area of influence of the stand? (Y/N) N
Long-term measurement of flow? (Y/N) N/A If yes, what were the flows? N/A gpm
Ephemeral or intermittent streams in the area of influence of the stand? (Y/N) N
Long-term measurement of flow? (Y/N) N If yes, what were the flows? N/A cfs
Grazed? (Y/N) N Grazing mgt. plan in place? (Y/N) N/A Rest/Deferment? (Y/N) N/A
Timing N/A Duration N/A
Describe grazing system: Not grazed by livestock

Conclusions:
Was the target species effectively controlled? (Y/N) Y (If no, explain on next page)
Were the objectives of the project achieved? (Y/N) Y (If no, explain below)

Notes: (include grantee's comments and observations; notes on further treatment needs, etc.)
The treatment appears to have been done in patches of 2-10 acres in size. Many large trees (estimated in age to be 80 to 110 years old) remain standing on the treatment area. There are remnants of scattered limbs and some downed trees on-site. Trees were placed in larger gullies but did not appear to be anchored in place. The deep canyons in the area are subject to short duration, rapid runoff events and if not anchored, the "gully-plug" trees may dislodge and create downstream problems: stream diversion, bank erosion, etc.

Notes cont'd

The treated areas appear, in aspect, to be dominated by sand dropseed (Sporobolus cryptandrus) a perennial, warm-season grass which, to this observer, was unexpected since cool-season perennial bunch grasses such as bluebunch wheatgrass (Agropyron spicatum) are the norm in the region. Its presence may be explained by early-season warm temperatures imparted by the aspect of the site and radiant energy from the surrounding basalt formations. Cheatgrass (Bromus tectorum), six-weeks fescue (Festuca octoflora and medusahead (Taeniatherum asperum) are common throughout the site.

Summary

OWEB Effectiveness Monitoring Report – Juniper Treatment

OWEBGrant #: 201-253

General Information:
Project: Ross Juniper Treatment
County: Wheeler

Treatment Effects

Changes in Plant Community Composition: Remnants stands of trees in the treatment area were sampled as an indication of pre-treatment conditions. These sites support about 40% juniper canopy with an understory of annual grasses including cheatgrass and six-weeks fescue containing trace amount of broom snakeweed and buckwheats. The treated areas appear, in aspect, to be dominated by sand dropseed with an understory of cheatgrass, six-weeks fescue and medusahead.

Changes to Soil Surface Conditions: Juniper duff (leaf-fall and berries) was common form of plant litter at the soil surface in the untreated area. Other soil surface cover included cheatgrass and six-weeks fescue litter and biological crust. Little bare ground was observed. There was little or no evidence of overland flow or sheet/rill erosion but old, healing gullies are common. In the treated areas, plant litter from grasses is the dominant soil cover. This litter and the remnant juniper slash are maintaining soil surface integrity: impeding overland flow, supporting infiltration, and controlling erosion.

Changes to Site Hydrology: There has been no observable change in surface hydrology (infiltration, overland flow, etc.) but there is strong indication of a reduced use of soil moisture by juniper as evidenced by the increased density and production of sand dropseed and annual grasses. There is some question regarding the long term reduction in soil moisture consumption by juniper since many middle aged and mature trees remain on-site that are capable making use of resources (water and nutrients) and space made available by the treatment.

Changes in Spring, Seep, and Stream Flow: None observed or reported.

Changes in Wildlife Habitat: Pre-treatment conditions provided habitat for tree dwelling birds as well as cover and limited forage for grazing or browsing ungulates. The treatment prompted a positive response by annual and perennial grasses which may provide addition forage for grazing ungulates and nesting sites for ground-nesting birds. While tree removal may have reduced habitat for tree-dwelling birds and cover for mammals in a small area, this habitat is not a limited feature in the area.

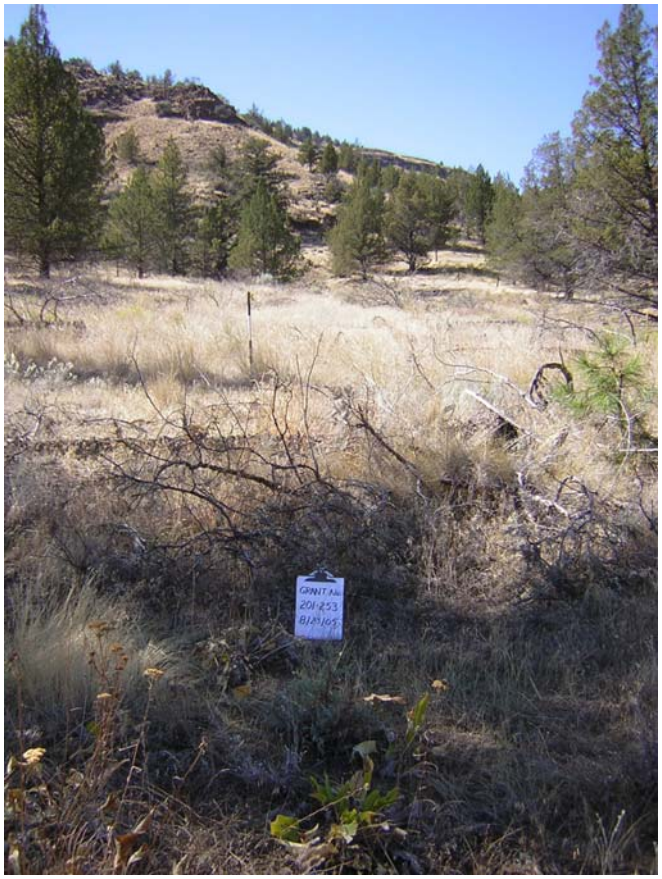
Changes in Forage Production: The property is not used for livestock grazing. However, annual above-ground biomass production (excluding trees) in the pre-treatment condition is estimated to be about 300 to 500 pounds per acre. In the treatment area, production is estimated to range from 700 to 1200 pounds per acre.

Results of Rangeland Health Assessment:

Pre-treatment: Soil stability: Functioning
Hydrologic Function: Non-functioning – excessive transpiration
Biotic Integrity: Non-functioning – lack of species diversity

Post-treatment: Soil stability: Functioning
Hydrologic Function: Functioning-at-risk – high transpiration
Biotic Integrity: Functioning-at-risk – upward trend in species diversity

Photo of Post-treatment Condition:



Date: August 23, 2005
View of treated and un-treated areas.