MONITORING REVIEW
FOR
DEVINE CANYON UPLAND
RESTORATION PROJECT
(2008)

Neilson Natural Resources Consulting, Inc.
62123 Chandler Loop
La Grande, Oregon 97850
541-910-4999
fbneilson@aol.com
Project Description

A watershed restoration project was completed in 2005 and 2006 in the Silvies River Watershed (Divine Canyon) approximately 15 miles north and east of the town of Burns, Oregon on lands owned by Clinton and Dave Purdy. (See Location Map) The project was to remove juniper from native grass stands and restore the native vegetation to a higher environmental condition nearer climax.

Grant funding was sought from the Oregon Watershed Enhancement Board (OWEB) and the cooperator contributed to the effort with in-kind services and other appropriate means. The streams and drainages affected are the head waters for the Silvies River which are on the State of Oregon 303(d) list which are not meeting temperature or biological criteria and are contributing sediment to downstream water systems.

Site Description

The project location is Township 21 South, Range 31 East, W.M. Section 14 and parts of section 13, 23, and 24 for a total of 1320 acres. Primary land use in the project area is grazing and timber production. The vegetation was characterized by a high percentage of Western Juniper interspersed with native vegetation. There were 3 photo monitoring plots established within the project area on three separate Ecological Sites. (OWEB Effectiveness Monitoring Reports)

Below is the original inventory of vegetation in the three ecological sites that the study plots are established. Attached in this document is the range inventory for current vegetation, production by weight, species composition, species comparison to climax species, site condition and erosion rates. Also the health assessment, trend, soil site stability, hydrologic function, and biotic integrity is included.

<table>
<thead>
<tr>
<th>ECOLOGICAL SITE</th>
<th>PRESENT VEGETATION</th>
<th>PERCENTAGE PRESENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dry Pine 14 – 16</td>
<td>Western Juniper</td>
<td>55%</td>
</tr>
<tr>
<td></td>
<td>Idaho Fescue</td>
<td>5%</td>
</tr>
<tr>
<td></td>
<td>Bluebunch Wheatgrass</td>
<td>5%</td>
</tr>
<tr>
<td></td>
<td>Antelope Bitterbrush</td>
<td>5%</td>
</tr>
<tr>
<td></td>
<td>Mountain Big Sagebrush</td>
<td>10%</td>
</tr>
<tr>
<td></td>
<td>Ponderosa Pine</td>
<td>10%</td>
</tr>
<tr>
<td></td>
<td>Cheatgrass</td>
<td>5%</td>
</tr>
</tbody>
</table>
| Mahogany Mountain Loam 14 – 18 | Western Juniper  
| Curl-Leaf Mountain  
| Mahogony  
| Rubber Rabbitbrush  
| Mountain Big Sagebrush  
| Antelope Bitterbrush  
| Idaho Fescue  
| Ponderosa Pine  
| Cheatgrass | 50% |
| Mountain Meadow | Tufted Hairgrass  
| Sedge  
| Bluegrass  
| Cinquefoil  
| Buttercup  
| Groundsel  
| Western Yarrow  
| Aster | 22%  
| 2% | 57%  
| 6% | 1% | 2%  
| 5% | 5% |

As of the date of completion of the project there has been no maintenance items performed. The project still meets the goals of the original grant agreement. Last year the site appeared to be somewhat over grazed, this year utilization appears to be light or about right.

It should be also noted that there was a very big growth response by shrubby vegetation such as Antelope Bitterbrush within the project area.

**Contextual Overview**

1. **Manipulation of Vegetation**

   Manipulating vegetation by artificially reintroducing the natural function of fire (mechanical juniper removal) in remnant aspen, mountain big sagebrush, bunchgrass and riparian communities is a natural part of the ecology of the ecological sites on the Purdy Ranch. These communities have lost or are losing watershed function because these ecological sites are becoming a more xeric community.
<table>
<thead>
<tr>
<th>Specific Problems</th>
<th>Root Cause(s) of the Problem</th>
</tr>
</thead>
<tbody>
<tr>
<td>Changes in Plant Community Composition</td>
<td>European settlement introduced changes into the various ecosystems that contribute to the juniper expansion. Fire suppression and grazing decreased vegetative competition, encouraging growth of shrubs with safe sites for juniper seedling establishment, and providing another vector for seed dispersal. Juniper competition leads to fewer plants, less soil cover, lower water infiltration rates, more opportunity for overland flow and soil erosion, greater nutrient loss, and a less productive site.</td>
</tr>
<tr>
<td>Changes in Soil Surface Conditions</td>
<td>A decrease in vegetation opens soil to more exposure from wind and water influences. Erosion becomes severe with sheet, rill, and gully erosion occurring due to the lack of vegetation and litter.</td>
</tr>
<tr>
<td>Changes in Site Hydrology</td>
<td>Juniper uses significant amounts of water through transpiration which decreases the amount of understory vegetation produced in juniper forests. The impact is two fold in that soil moisture is lost through transpiration and then erosion increases and what water there is runs off and limits moisture infiltration.</td>
</tr>
<tr>
<td>Changes in Spring, Seep, and Stream Flow</td>
<td>Juniper transpiration is a major problem with rangelands that are becoming fully developed juniper forest. Juniper can use upwards of 75 percent of the soil moisture which decreases (as an example) a 12 inch precipitation area into a 3 inch precipitation area.</td>
</tr>
<tr>
<td>Changes in Wildlife Habitat</td>
<td>A mosaic of plant communities and seral stages with tree, shrub, and herbaceous components resulting in a more diverse landscape increasing structural, biological, and habitat diversity are lost as ecological sites become western juniper mono-cultures.</td>
</tr>
<tr>
<td>Changes in Forage Production</td>
<td>Under story productivity, cover, biomass, diversity, and growth rate of other vegetation declines as juniper vegetative cover increases.</td>
</tr>
</tbody>
</table>
### Project Description

<table>
<thead>
<tr>
<th>Specific Problems</th>
<th>Measurable Objectives</th>
<th>Proposed Practices, Detailed Descriptions, and Root Causes</th>
</tr>
</thead>
</table>
| Changes in Plant Community Composition                 | • *Create a mosaic of plant communities and seral stages with tree, shrub, and herbaceous components resulting in a more diverse landscape increasing structural, biological, and habitat diversity.  
• Reintroduce fire into the identified plant communities with 65 percent to 85 percent of the identified upland communities in actual burned (black area) to create a mosaic of seral stages. Work with the adjacent public land managers to create a similar mosaic of communities.  
• Reestablish bunchgrass-mountain big sagebrush communities through the reintroduction of fire where western juniper is currently in transition to a fully developed juniper woodlands. | 1. Work with planers to remove juniper in an efficient cost effective manner. Mechanically remove juniper according to:  
  • Appropriate plan  
  • Agencies planners agree to implement Plan  
  • Removal plan is developed and implemented  
2. Adequate rest is implemented to restore desirable plant community, vigor, and system stability.  
3. Livestock water will be developed to improve distribution.  
4. Management after the juniper removal is an important component of the total plan to keep desirable plants in good numbers and vigor. |
| Changes in Soil Surface Conditions | • Increased understory will also increase litter to an acceptable level.  
• Reduce erosion to natural levels |
<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Changes in Site Hydrology</td>
<td>• *Enhance and protect the integrity of watershed function, improve watershed stability, and decrease accelerating erosion by reestablishing diverse plant communities. Increase vegetation cover, litter, and reduce the amount of exposed soil.</td>
</tr>
</tbody>
</table>
| Changes in Spring, Seep, and Stream Flow | • Maintain or improved water quality striving toward meeting the State of Oregon water quality standards.  
• Enhance the aesthetic quality of Mahon and Deep Creek with the reintroduction of fire by creating a diverse landscape. |
| Changes in Wildlife Habitat        | • Maintain and/or improved vegetation conditions beneficial to fish habitat in Mahon and Deep Creek and tributary streams with special considerations for Great Basin Redband Trout. |
- Improve riparian condition and maintain or improve stream functionality by expanding hydric herbaceous and deciduous riparian woody species within communities currently encroached by western juniper.
- Improve and/or maintain grassland and riparian communities to create diverse habitat for wildlife species. Create and maintain a dynamic mosaic of seral stages that will meet the forage requirements for elk, mule deer, antelope, sage grouse, neotropical birds, other mammals, amphibians, and reptiles. (It should be noted that the land owner manages these lands for livestock grazing. Good condition, and well managed rangelands and riparian areas can work together to meet requirements for both cattle and wildlife).
| Changes in Forage Production | • Increase amounts and quality of forage for livestock.  
|                             | • Improve distribution of livestock.  
|                             | • Increase grazing opportunities through proper management. |

* Applies to all categories
Conclusion

Scores are rated from 1 to 5 with 1 being None to Slight and 5 being Extreme. Another way of viewing this is 1-2 is Good, 3 is fair, and 4-5 is poor.

Site #1: Soil Site Stability is a 2.2, Hydrologic Function is 2.2 and Biotic Integrity is 2.0. The range site is therefore determined to be in good condition with a upward trend.

Site #2: Soil Stability is a 1.8, Hydrologic Function is 1.9 and Biotic Integrity is 2.1. The range site is therefore in good condition with a slight upward trend.

Site #3: Soil Stability is a 2.1, Hydrologic Function is 2.1 and Biotic Integrity is 2.1. This range site is in good condition also with a upward trend.

As mentioned earlier in the text, the land owner did a good job of removing the Western Juniper and rangelands are improving with an upward trend.

It should be noted that I am not picking up new seedlings from the seeding that was done.
General Information:
Grantee: OWEB  Date of Initial Evaluation: 2004
Reviewer: F. Neilson  Date of Review: 8/1/2008

Treatment Site Characterization:
Location: N43°45'06.3" W118°57'17.3"
Ecoregion: (Northern Basin) High Lava Plains
Ave. Annual Ppt: 9-12"  Elevation: 5,428ft  Aspect: None
Landscape Position: Upland
Dominant Soil: Depth 2-4" Texture: Surface: Loam Subsurface: Rock
Plant Association: ARTRW/FEID/AGSP/POSE
Soil Limitations for Management: Shallow.

Treatment Description:
Objective: Improve watershed health by removing Western Juniper to improved range condition and health. The results would be less erosion, better water quality and quantity, improved infiltration, overland flow, and sediment yield.
Date(s) of Treatment: Spring/Summer 2006  Acres Treated: 1,320
Time Spent: 2 Months
Method of Treatment: Installation of Practice
Cost of Initial Treatment: $100,000

Treatment Evaluation:
Method of Evaluation: Rangeland Inventory Worksheet (NRCS) Measured
Describe Method(s) used: Inventory of Trend, Health Assessment, Similarity Index, Growth Curve, Cover Estimates, and Stocking Rates
Permanent Plot Established: Y  Photo Plot Established: Y

Results of Evaluation:
Pre-treatment conditions:
Pre-treatment canopy cover:
Trees: 50-60  Forbs:3  Stones/Gravels: 5
shrubs: 15-20  Cryptograms: 2  Bare Ground: 8
Grasses/Grass-likes: 20  Litter: 2
Grazed? Y  Rest/Deferment: Y  Timing: Spring/Fall  Duration: 1 Month
Evidence of Overland Flow: Y
Springs and/or seeps; indicator species in the area of influence of the stand:
Long Term measurement of flow: None  If yes, what were the flows?
Post-treatment conditions:
Current canopy cover:

Trees: 2  Forbs: 3  Stones/Gravels: 0
Shrubs: 30  Cryptograms: 2  Bare Ground: 8
Grasses/Grass-likes: 50  Litter: 2
Grazed? Y  Rest/Deferment: Y  Timing: Spring or Fall
Duration: Depending on production
Evidence of Overland Flow: Slight Springs and/or seeps; indicator species in the area of influence of the stand: Long Term measurement of flow: No  If yes, what were the flows?
General Information:

Grantee: OWEB
Reviewer: F. Neilson
Date of Initial Evaluation: 2004
Date of Review: 8/1/2008

Treatment Site Characterization:

Location: N43’45’’06.3’’ W118°57’17.3’’
Ecoregion: (Northern Basin) High Lava Plains
Ave. Annual Ppt: 9-12” Elevation: 5,428ft Aspect: None
Landscape Position: Upland Meadow
Dominant Soil: Depth 2-4” Texture: Surface: Loam Subsurface: Rock
Plant Association: DECA5/CAREX/JUNCU
Soil Limitations for Management: None

Treatment Description:

Objective: Improve watershed health by removing Western Juniper to improved range condition and health. The results would be less erosion, better water quality and quantity, improved infiltration, overland flow, and sediment yield.
Date(s) of Treatment: Spring/Summer 2006 Acres Treated: 1,320
Time Spent: 2 Months
Method of Treatment: Installation of Practice
Cost of Initial Treatment: $100,000

Treatment Evaluation:

Method of Evaluation: Rangeland Inventory Worksheet (NRCS) Measured
Describe Method(s) used: Inventory of Trend, Health Assessment, Similarity Index, Growth Curve, Cover Estimates, and Stocking Rates
Permanent Plot Established: Y Photo Plot Established: Y

Results of Evaluation:

Pre-treatment conditions:
Pre-treatment canopy cover:
Trees: 25-30 Forbs:3 Stones/Gravels: 0
Shrubs: 5-7 Cryptograms: 2 Bare Ground: 4
Grasses/Grass-likes: 75 Litter: 2
Grazed? Y Rest/Deferment: Y Timing: Spring/Fall Duration: 1 Month
Evidence of Overland Flow: Y
Springs and/or seeps; indicator species in the area of influence of the stand: Long Term measurement of flow: None If yes, what were the flows?
Post-treatment conditions:

Current canopy cover:

Trees: 0       Forbs: 3       Stones/Gravels: 0
Shrubs: 5-7    Cryptograms: 2   Bare Ground: 8
Grasses/Grass-likes: 89   Litter: 2
Grazed? Y       Rest/Deferment: Y  Timing: Spring or Fall
Duration: Depending on production
Evidence of Overland Flow: Slight Springs and/or seeps; indicator species in the area of influence of the stand: Long Term measurement of flow: No If yes, what were the flows?
SITE #2

2005 West

2008 WEST
General Information:
Grantee: OWEB Date of Initial Evaluation: 2004
Reviewer: F. Neilson Date of Review: 8/1/2008

Treatment Site Characterization:
Location: N43°45’06.3” W118°57’17.3”
Ecoregion: (Northern Basin) High Lava Plains
Ave. Annual Ppt: 9-12” Elevation: 5,428ft Aspect: None
Landscape Position: Upland
Dominant Soil: Depth 2-4” Texture: Surface: Loam Subsurface: Rock
Plant Association: ARTRW/AGSP/STTH2
Soil Limitations for Management: Shallow.

Treatment Description:
Objective: Improve watershed health by removing Western Juniper to improved range condition and health. The results would be less erosion, better water quality and quantity, improved infiltration, overland flow, and sediment yield.
Date(s) of Treatment: Spring/Summer 2006 Acres Treated: 1,320
Time Spent: 2 Months
Method of Treatment: Installation of Practice
Cost of Initial Treatment: $100,000

Treatment Evaluation:
Method of Evaluation: Rangeland Inventory Worksheet (NRCS) Measured
Describe Method(s) used: Inventory of Trend, Health Assessment, Similarity Index, Growth Curve, Cover Estimates, and Stocking Rates
Permanent Plot Established: Y Photo Plot Established: Y

Results of Evaluation:
Pre-treatment conditions:
Pre-treatment canopy cover:
Trees: 35-40 Forbs: 8 Stones/Gravels: 5
Shrubs: 15-20 Cryptograms: 2 Bare Ground: 8
Grasses/Grass-likes: 35 Litter: 2
Grazed? Y Rest/Deferment: Y Timing: Spring/Fall Duration: 1 Month
Evidence of Overland Flow: Y
Springs and/or seeps; indicator species in the area of influence of the stand:
Long Term measurement of flow: None If yes, what were the flows?
Post-treatment conditions:

Current canopy cover:

Trees: 2   Forbs: 3   Stones/Gravels: 0
Shrubs: 30   Cryptograms: 2   Bare Ground: 8
Grasses/Grass-likes: 50   Litter: 2
Grazed? Y   Rest/Deferment: Y   Timing: Spring or Fall
Duration: Depending on production
Evidence of Overland Flow: Slight Springs and/or seeps; indicator species in the area of influence of the stand: Long Term measurement of flow: No
If yes, what were the flows?