

WATERSHED CONSULTING

Time and Motion Study Results Using an In-Woods Flame-Cap Kiln – Missoula, MT



We Specialize in Ecologic Restoration and Biophysical Assessments



Watershed Consulting, Missoula, Montana

www.watershedconsulting.com

Mark Vander Meer

- Restoration Ecologist
- Forester
- Soil Scientist
- Email: mark@watershedconsulting.com



SITE STATS

Pre-Thinning Conditions:

- Study Area: 21 Acres of Mixed Conifer Forest in Western Montana,
- Species Included Ponderosa Pine, Western Larch, Douglas Fir, & Lodgepole Pine
- Tree Density Varied Throughout the Unit, and Averaged about 1500 Stems/ Acre
- Elevation: 4500 feet.
- Topography: 0-10% slopes. Short pitches of 10% to 20% slopes.

Post-Thinning Conditions

- The Stand was Thinned in 2020.
- We Cut 1000 Stems / Acre, Most Stems Under 3" in Basal Diameter.
- Slash Treatment: Lop & Scatter, Allowing for One Year of Drying Time

Slash Treatment:

- Converted Slash to Biochar in the Spring and Fall of 2021
- Methods: Wilson Ring of Fire Biochar Kiln



RATES, EFFORT AND COSTS

Workforce, Equipement, Rates, Effort & Costs					
Workforce/ Equipment	Rates	Units	Amount	Units	Total
Project Manager/ Admin	\$65.00	hours	31	hours	\$2,015.00
Project Manager/ Crew Lead	\$65.00	hours	186	hours	\$12,090.00
Burn Crew	\$55.00	hours	403	hours	\$22,165.00
Kilns	\$25.00	\$/kiln/day	55	kiln days	\$1,375.00
Kubota UTV	\$150.00	\$/day	17	days	\$2,550.00
2-Ton Truck & Water Tank	\$75.00	\$/day	25	days	\$1,875.00
Misc. Tools & Equipment	\$232.00	\$/project	1	project	\$232.00
Total					\$42,302.00













PLOT RADIUS / ACRE

Plot Radius (Feet)	Area (sq.ft.)	Acre	% of Ac
25	1963.5	0.045	4.5%
30	2827.4	0.065	6.5%
35	3848.5	0.088	8.8%
40	5026.5	0.115	11.5%
45	6361.7	0.146	14.6%
50	7854.0	0.180	18.0%
55	9503.3	0.218	21.8%
60	11309.7	0.260	26.0%
65	13273.2	0.305	30.5%
70	15393.8	0.353	35.3%
75	17671.5	0.406	40.6%
80	20106.2	0.462	46.2%
85	22698.0	0.521	52.1%



SUMMARY

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Item	Amount	Units
Area Treated	21.0	Acres
Kilns Burned	85.0	Burns
Average Yield/ Kiln	1.3	Cubic Yards
Cost / Ac	\$2,014.38	\$/Acre
BioChar Total Yield	112.5	Cubicc Yards
BioChar Yield/Ac	5.4	Cu.Yds./Ac
BioChar Cost/cu.yd.	\$376.02	\$/Cu. Yd.
Area Treated Per Kiln	20-25%	of an Ac.

