

2012 Planted Tree Report
October 25, 2012
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Introduction and Tree Count

We planted 23,630 trees in three years at MPG (10884 in 2010, 6780 in 2011, and 5966 in 2012). Fifty percent of the planted trees survived to Fall 2012. Without water, plants perish during our hot and dry summers. This year we explored efficient irrigation methods to maximize growth and survival. First, we used wells, springs, and stock tanks to provide drip irrigation to 30% of our trees. This allowed the watering crew to focus elsewhere while the drip systems irrigated. Second, we applied fertilizers to plants and reduced weed competition with herbicides.

Between July and mid-October we received 0.5” of rain, yet we maintained an 82.6% plant survival rate. Limber pines, white pines, and oaks in higher elevation sites suffered the highest mortality. The aggressive spread of madwort last year could explain why Lower Woodchuck Creek trees had high mortality.

Text Colors

Black—Handwater

Red—Drip via stock tanks

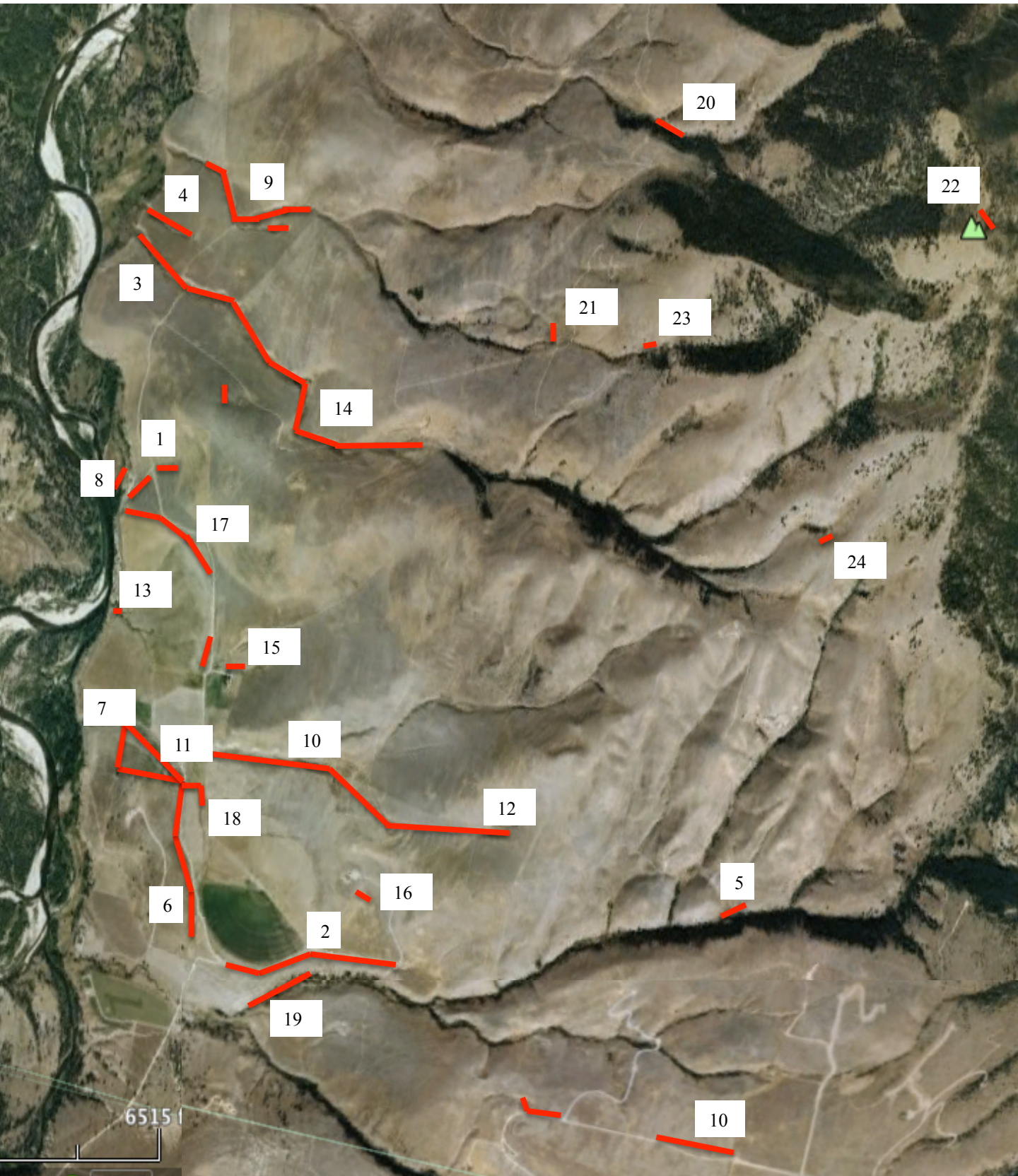
Blue—Drip via well or spring

Green—K-line and center pivot

Location	Year planted	# Alive in 2011	# Alive in 2012	Overall survival	Percent 2012 survival	Times Watered 2012
1. Clubhouse Draw	'12	228	199	87	96	3
2. South Center Pivot Hedge	'10, '12	477	1089		93	5
3. Lower Tongue Creek	12		688		94	7
4. Middle Draw	'12		297		94	7
5. Upper Woodchuck	11	159	105		94	15
6. Entrance Hedge	10	1244	1035		92	19
7. Partridge Hill	10, '11	2071	1454	70	92	2
8. Wetland	'12		574		90	5
9. Sheep Camp Draw	11-'12	139	618		89	18
10. South Hedge	'12		776		87	10
11. Lower Partridge Ally	10	1720	1219		86	3
12. Upper Partridge Ally	10, '12	584	670		84	14
13. North Center Pivot Draw	11-'12		250		83	7
14. Lower Tongue Creek	'12		417		82	4
15. Orchard House Draw	11	97	70		81	4
16. Educational Garden	'12		24		80	6
17. North Center Pivot	11	514	359	70	78	3
18. Turnaround Draws	10-'11	997	1068		78	4
19. Lower Woodchuck	10	597	391	65	62	1
20. North Draw White Pines	11	110	44	40	39	0
21. Sheep Camp Oaks	11	94	24	26	37	2
22. Baldy White Pines	11	94	5	5	5.8	0
23. Sheep Camp L. Pines	11	184	1	1	0.7	0
24. Tongue Creek L. Pines	11	188	0	0	0	0
Total		9497	11865		84	

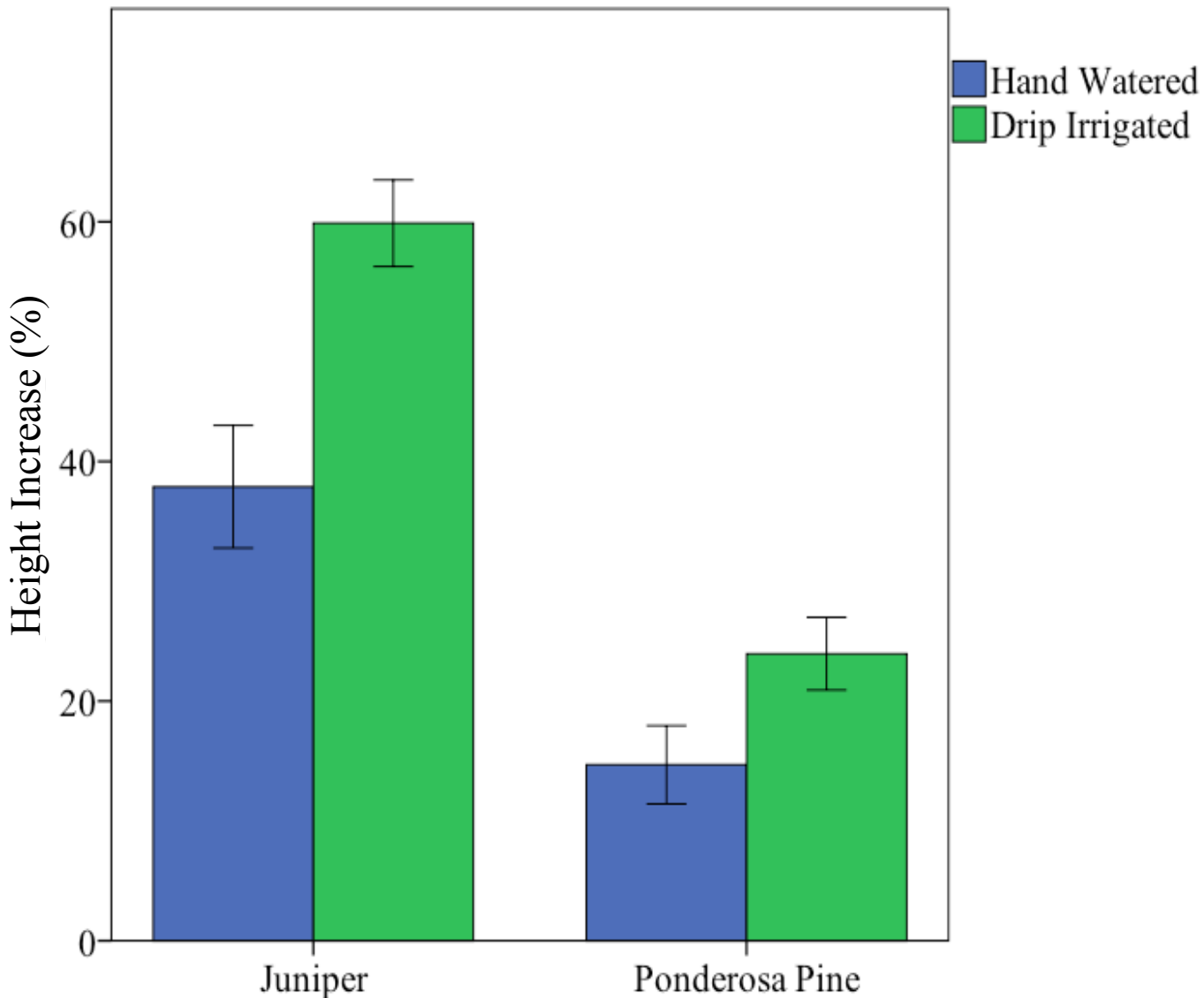
Map of Planted Areas

Red lines represent planted areas. Numbers correspond to the locations denoted on page 2.



Drip Irrigation vs. Hand watering

This year we used the Feed Lot Well for drip irrigation and watered 200 trees each day with 20 minutes of work. Hand watering the same trees took 3.25 hours. The simplicity of drip irrigation allowed for frequent watering with little effort. 400 trees along the entrance hedge were either hand watered nine times or drip irrigated 19 times. Forty-five seconds of hand watering with a fan sprayer delivered three to four gallons of water to the soil. Each drip emitter delivered one gallon per hour during eight-hour periods. This summer, hand watered trees received about 36 gallons of water and drip irrigated trees received about 152 gallons. Drip irrigated junipers increased their growth by 60%, and hand watered junipers increased by 38% ($F=7.686$; $P=0.006$). We measured no difference with ponderosa pine. Overall, growth rates were slow in this location. These soils are heterogeneous with varying levels of compaction and nutrient availability.

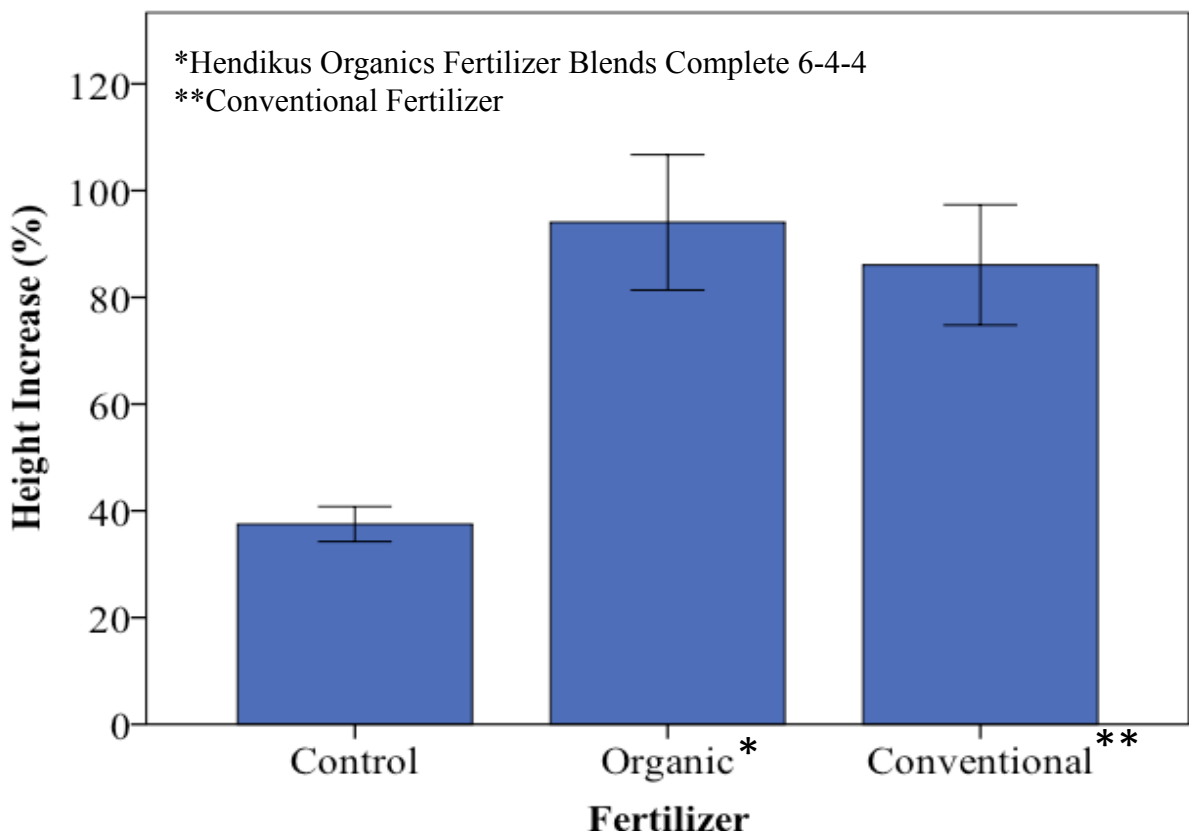


Fertilizer and Herbicides

To increase resource availability to plantings, we sprayed glyphosate on competing grasses at the entrance hedge, north center pivot hedge (right), and lower partridge hill. We measured a subset from this treatment, but our results showed no benefit to the plantings. Our small sample size limited our statistical power. We will further explore the effects of herbicide applications in the future.



We added organic and conventional fertilizers to junipers and ponderosa pines along the entrance hedge and lower partridge hill. Fertilized junipers on lower partridge hill grew by 90% compared to 38% for the control ($F=22.6$; $P<0.001$). This suggests that a nutrient deficiency limits juniper growth on lower partridge hill. This year's soil mapping may predict which locations require nutrient amendments.



Northern Draws

Cessation of cattle grazing allowed shrubs to begin recolonizing Middle, Tongue, and Sheep Camp draws. However, some areas remained devoid of shrubs. This year, crews planted 2000 trees on north-facing slopes and draw bottoms. These high organic matter soils were ideal for new plantings. We installed drip irrigation systems for efficient watering.

More than 89% of the trees survived through September. Buffaloberry and mountain mahogany both grew at least 30%. Elderberry (not graphed) grew up to 2000% of its spring height. Hawthorn and wild rose survived but grew little. Ponderosa pines at least doubled their heights. For comparison, Ponderosa pines grew about 30% in marginal soil on the entrance hedge. These plantings will eventually provide valuable cover for animals travelling between the floodplain and upland forests.

