

Water Recycling Economics - A Case Study

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Introduction

- Nursery production has potential to use lots of water
- Overhead irrigation is economical for #7 and smaller containers
- CA: required to capture all runoff water, treat before discharge

Nursery Site

- Altman Plants
- 420 acre site with outdoor, shade, and greenhouse production
- Growing space
 - 2010 = 50 acres
 - 2016 = 157 acres
- Untreated (non-potable) municipal water from Western Municipal Water District

Components of the Water Recycling System

- Pumps
- Pond liners
- Polyethylene sheeting
- Weed barrier fabric
- PVC pipe
- Labor and misc. supplies
- Rapid sand filters
- Chlorine dioxide injection

Water recycling system



Recycled Water System

Recycled Water System Component	Cost	% of total cost	Useful Life (years)	Cost/yr
27 ac-ft Pond Liner	\$91,320	8.8%	20	\$4,566
125- and 40-hp pumps (2 ea.)	\$159,040	15.3%	20	\$7,952
PVC Pipe between ponds	\$30,782	3.0%	10	\$3,078
Polyethylene sheeting	\$114,920	11.1%	10	\$11,492
Polypropylene Weed Barrier	\$278,064	26.8%	10	\$27,806
Labor and Misc. supplies	\$249,334	24.0%	40	\$6,233
Rapid Sand Filters	\$30,460	3.0%	10	\$3,046
Chlorine Dioxide Injection	\$82,800	8.2%	1	\$82,800
Total	\$1,036,721	100.0%		\$146,974



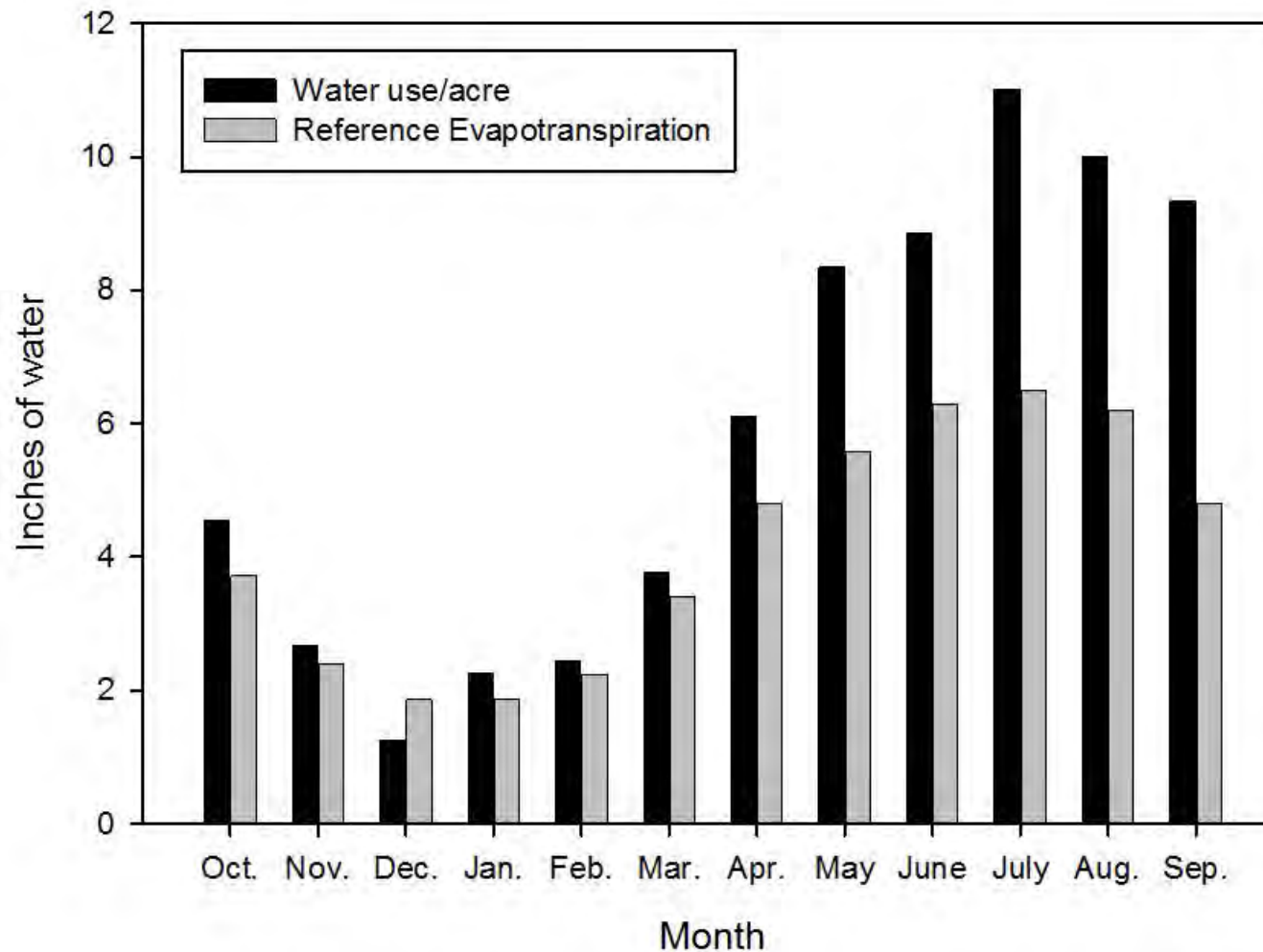
Runoff channel and lower pond



Upper recycle pond



Average Monthly Water Use and ET_0



Water Use

Water Year	Water Use (ac-ft)			
	Total	Western	Recycled	ft/ac
2010	240	240	-	4.79
2011	458	458	-	5.66
2012	730	730	-	6.17
2013	984	984	-	6.84
2014	1,031	1,031	-	6.68
2015	1,162	733	429	7.53
2016	1,194	601	593	7.59

Without grants and rebates

Water Year	Western		Recycled		Grand Total	Total per acre
	per ac-ft	Annual	per ac-ft	Annual		
2010	\$778.45	\$186,572	\$0.00	\$0	\$186,572	\$3,732
2011	\$762.16	\$349,194	\$0.00	\$0	\$349,194	\$4,312
2012	\$748.73	\$546,849	\$0.00	\$0	\$546,849	\$4,618
2013	\$737.89	\$725,729	\$0.00	\$0	\$725,729	\$5,044
2014	\$833.96	\$860,087	\$0.00	\$0	\$860,087	\$5,574
2015	\$944.86	\$693,048	\$394.98	\$169,250	\$862,298	\$5,588
2016	\$949.81	\$570,891	\$299.67	\$177,822	\$748,713	\$4,760

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Grant and Rebates

- NRCS grant = \$199,606
- Rebates from water providers
 - Metropolitan = \$366,455
 - Western = \$102,362
- Reduces cost of system
 - \$368,298
 - 36% of original
- Annual depreciation cost of recycling water infrastructure
 - \$146,974 (w/o rebates) to \$52,213 (w/ rebates)

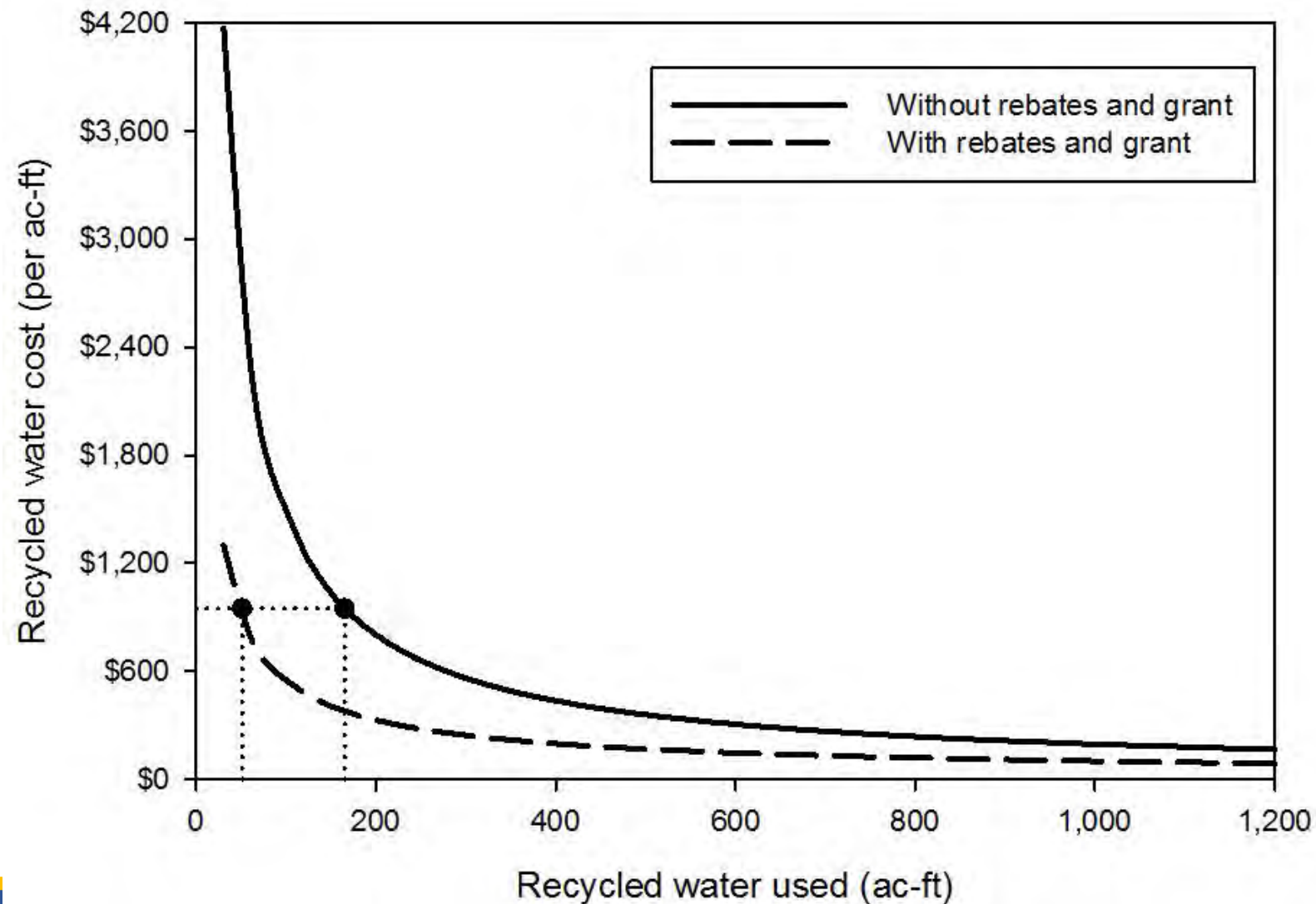
Water costs with grants and rebates

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2014	\$833.96	\$860,087	\$0.00	\$0	\$860,087	\$5,574
2015	\$944.86	\$693,048	\$173.83	\$74,489	\$767,537	\$4,974
2016	\$949.81	\$570,891	\$139.97	\$83,061	\$653,952	\$4,157

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Break-even point



Additional benefits

- Fertilizer capture and reuse
- Alternative water supply in event of shortage
- Increased marketability of sustainably-produced plants

Summary

- Recycled water is less expensive
 - Majority of cost is recycled water system infrastructure
- The more recycled water used, the cheaper it becomes
- Grants and rebates can reduce costs

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SCRI - CLEAN WATER³
REDUCE, REMEDIATE, RECYCLE