

US EPA ARCHIVE DOCUMENT

## Resource Conserving Landscaping



This Cost Calculator is designed to estimate the cost of converting your current landscape to one that requires less irrigation and produces less waste by replacing trees, turf, shrubs, and flowers that require more irrigation and grow faster with varieties that require less irrigation and grow slower. The Cost Calculator demonstrates that converting to a water saving landscape is often cost competitive. Although the initial cost of converting a landscape is significant, it is an investment that often leads to net cost savings over time from lower water bills and lower landscaping maintenance costs.

To use the Cost Calculator, you will need to have information on the configuration of your current landscape, including the proportion that is comprised of flowers, turf, shrubs, and ground cover. You will need to know the length of the growing season in your region, which can be found at: [http://www.warnercnr.colostate.edu/avprojects/globe/phenology/images/layout\\_growing.jpg](http://www.warnercnr.colostate.edu/avprojects/globe/phenology/images/layout_growing.jpg).

You will also need to divide your landscape into three zones: a regular watering zone, an occasional watering zone, and a natural rainfall (or zero watering) zone. Information on watering zones can be found at: <http://agnewsarchive.tamu.edu/drought/drghtpak98/drght52.html>. The calculator defines the regular watering zone as an area that is watered four to eight times per month during the growing season; the occasional watering zone is an area watered between one and three times per month during the growing season; and the natural rainfall zone is an area that is never watered. Irrigation frequency for the three zones can be changed in the Cost Data tab if you have site-specific data.

Based on the size of the project, the Cost Calculator tab estimates the initial, 3 year, 6 year, 10 year, and average annual costs for your original landscape and a water saving retrofit. To use the Cost Calculator, fill in the blue cells on the "Inputs" tab.

In the Cost Data tab, EPA provides national averages or ranges of costs. Cost data collected from sources dated before 2006 are adjusted for inflation. If you prefer, you can substitute your own cost data into the green cells. If you have a single cost estimate instead of a range, enter it in both the Low Cost Estimate and High Cost Estimate cells. Because the initial costs of a landscaping retrofit are greatly dependent on individual site decisions, EPA encourages users to assess the suitability of initial cost data for their site.

The EHS Benefits tab provides a summary of the environmental, health, and safety benefits of converting to a water saving landscape.

Please direct questions or comments on this Cost Calculator to: Jean Schwab, U.S. EPA GreenScapes Program Manager, [schwab.jean@epa.gov](mailto:schwab.jean@epa.gov) or 703-308-8669.



**Instructions** *(You may want to print these.)*

To start, click on the **Inputs tab** at the bottom of the spreadsheet.

**General Information.** The landscaped area includes all vegetated or mulched areas of your property. Decks, driveways, patios, gazebos, and other hardscapes are not included in this area. If you do not know the length of the growing season at your site, click on the hyperlink for a reference map.

**Water Bill.** If you do not pay for water, answer "no" in the first drop-down box and move on to the next step. If you do pay for water, indicate the type of rate you have. A fixed rate charges a constant amount every month, regardless of how much water you use. A per gallon rate charges per volume of water used, usually per 1000 gallons. A fixed, then per gallon, rate charges a minimum fee and then an incremental charge based on the volume of water used. After selecting your rate, fill in the blue cells indicated with your rate information. Depending on what rate type you choose, some cells may not need to be filled in.

**Landscape Maintenance.** Select who maintains your landscape from the drop-down box. If it is maintained by an onsite employee, you can move on to the next step. If it is maintained by a private firm, fill in travel time and the frequency of visits.

**Current Landscape.** Fill in all of the blue cells for the configuration of your landscape. The regular watering zone is the area that is watered between 4 and 8 times per month during the growing season. The occasional watering zone is the area that is watered between 1 and 3 times per month during the growing season. The natural rainfall zone is the area that is never watered. You can change irrigation frequency for the regular and occasional watering zones on the Cost Data tab if you think a different irrigation frequency would be more appropriate.

**Water Saving Retrofit.** Fill in the blue cells for the configuration of your retrofit. If you do not have a particular retrofit in mind yet, fill in realistic values for now (you can go back later and change numbers to see how different decisions drive water savings and cost). Bear in mind that water saving landscapes generally consist of high proportions of shrubs and trees and low proportions of flowers and turf. Converting vegetation to pavement, patios, or other hardscapes is not an option provided, as converting landscaped areas to impervious surfaces is generally not considered to be an environmentally preferable practice. In terms of the schedule for pruning trees and shrubs, note that drought resistant varieties will grow slower and require less maintenance.

**Government Rebate.** Some local governments offer rebates for converting conventional landscapes to water saving landscapes. If your site is eligible for a rebate, enter "yes" into the drop-down box and fill in the blue cells with the rebate amount. If not, enter "no" into the drop-down box and proceed to the next step.

**Yard Waste.** If you do not pay for yard waste removal, enter "no" into the drop-down box and proceed to the next step. If you do pay for yard waste removal, enter "yes" into the drop-down box, indicate whether you pay by weight or volume, and fill in the subsequent blue cells with information on waste quantities.

After entering inputs, click on the **Cost Data** tab at the bottom of the spreadsheet. If you have your own cost data, you can enter it into the green cells. Otherwise, leave the green cells as they are.

View the **Cost Calculator** and **Cost Graphs** tabs to view the costs associated with each landscape.

EPA encourages users to investigate how different proposed retrofits affect water usage and cost. The largest single determinant of water usage is the percentage of your landscape moved from the regular watering zone to the natural rainfall zone. A major cost driver is the area of flowers converted to shrubs and trees.

## Inputs



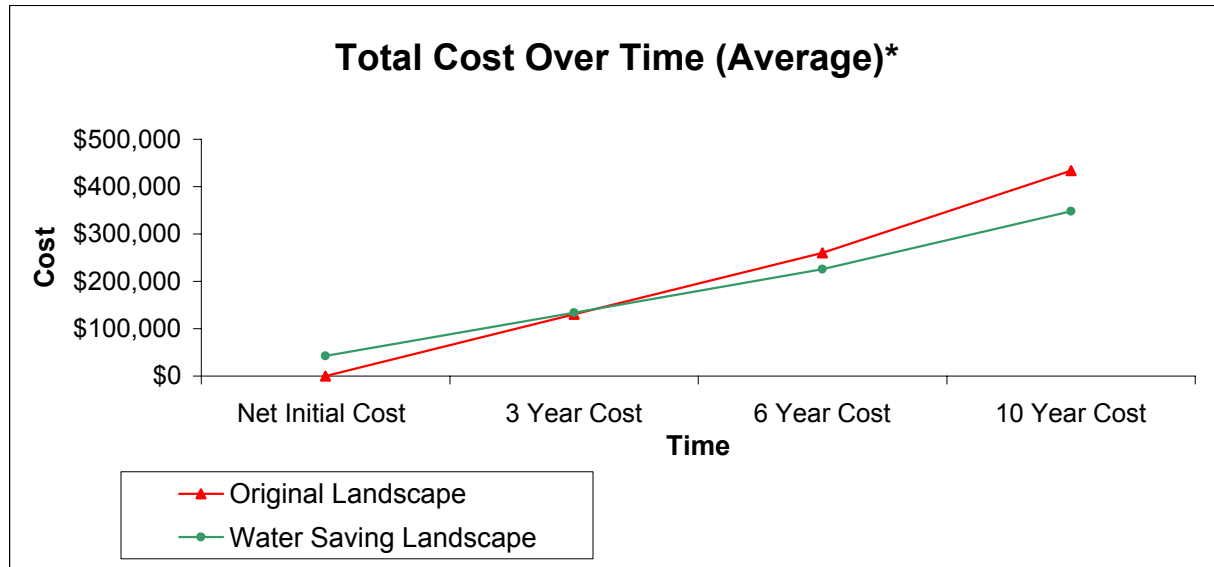
General Information	
Total Landscape Area (Sq. Feet)	30000
<a href="#">How long is your growing season (in months)?</a>	7
Your Water Bill	
Does your facility pay for water?	Yes
What type of rate do you have?	Per Gallon
Cost per 1000 gallons (\$)	\$3.00
-	
-	
Current Landscape Maintenance	
Who maintains your facility's landscape?	A private landscaping firm
What is the landscaper's travel time (in minutes)?	30
How many times does the firm visit per year?	6
Your Current Landscape	
Area in Regular Watering Zone (Sq. Feet)	20000
Area in Occasional Watering Zone (Sq. Feet)	5000
Area in Natural Rainfall Zone (Sq. Feet)	5000
Area of Flower Beds (Sq. Feet)	2500
Area of Turf (Sq. Feet)	24000
Area of Shrubs and Ground Cover (Sq. Feet)	2500
Area of Trees Outside Shrub Area (Sq. Feet)	1000
How many times do you currently prune your shrubs per year?	2
How many times do you currently prune your trees per year?	2
Water Saving Retrofit	
Overall, what is the area of your landscape would be converted to a more water saving zone? (e.g. from regular to occasional or natural, and from occasional to natural) (Sq. Feet)	15000
Area in Regular Watering Zone (Sq. Feet)	5000
Area in Occasional Watering Zone (Sq. Feet)	5000
Area in Natural Rainfall Zone (Sq. Feet)	20000
Area of Flower Beds (Sq. Feet)	1000
Area of Turf (Sq. Feet)	10500
Area of Shrubs and Ground Cover (Sq. Feet)	15000
Area of Trees Outside Shrub Area (Sq. Feet)	3500
How many times would you prune these shrubs per year?	1
How many times would you prune these trees per year?	1
Government Rebate	
Does your local government offer a rebate for converting to a water saving landscape?	Yes
\$/Square Foot	
Max Rebate (\$) (Leave blank if there is no max)	\$5,000
Yard Waste Disposal	
Do you pay for yard waste disposal by quantity?	Yes
Is your rate measured by weight or volume?	Volume
What is your rate? (\$/cubic foot)	\$20.00
Estimate cubic feet of yard waste your current landscape generates per month in the growing season.	200
Estimate cubic feet of yard waste your water saving retrofit will generate per month in the growing season	150

# Resource Conserving Landscaping Cost Calculator

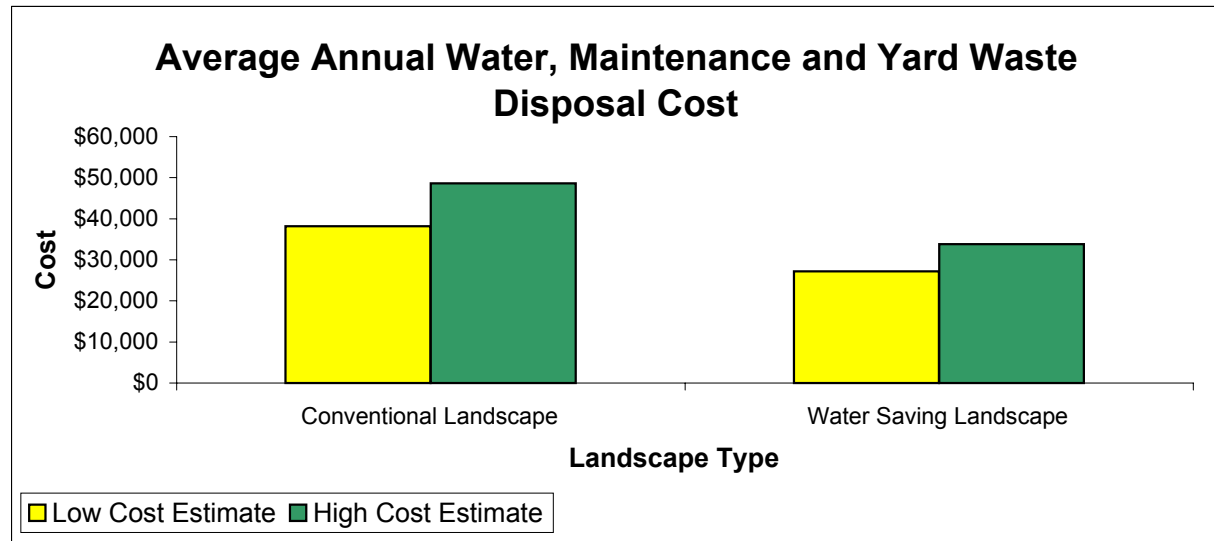


Conventional Landscape	Low Cost Estimate	High Cost Estimate
<i>Initial Cost</i>	\$0	\$0
Gallons of Water Used Annually	261,919	539,245
<i>Annual Water Cost Due to Irrigation</i>	\$786	\$1,618
Annual Flower Bed Maintenance	\$4,600	\$9,475
Annual Turf Maintenance	\$3,312	\$4,752
Annual Shrub and Ground Cover Maintenance	\$325	\$550
Annual Tree Maintenance	\$50	\$190
Landscape Firm's Travel Cost	\$228	\$228
Landscape Firm's Profit	\$851	\$3,799
<i>Annual Maintenance Cost</i>	\$9,366	\$18,993
<i>Annual Yard Waste Disposal Cost</i>	\$28,000.00	\$28,000.00
<b><i>Annual Water Maintenance and Disposal Cost</i></b>	<b>\$38,152</b>	<b>\$48,611</b>
<b>3 Year Cost</b>	<b>\$114,456</b>	<b>\$145,834</b>
<b>6 Year Cost</b>	<b>\$228,912</b>	<b>\$291,667</b>
<b>10 Year Cost</b>	<b>\$381,520</b>	<b>\$486,112</b>

Water Saving Landscape	Low Cost Estimate	High Cost Estimate
Initial Cost	\$28,800	\$55,800
Rebate	\$0	\$0
<i>Net Initial Cost</i>	<i>\$28,800</i>	<i>\$55,800</i>
Gallons of Water Used Annually	77,035	169,477
<i>Annual Water Cost Due to Irrigation</i>	<i>\$231</i>	<i>\$508</i>
Annual Flower Bed Maintenance	\$1,840	\$3,790
Annual Turf Maintenance Cost	\$1,449	\$2,079
Annual Shrub and Ground Cover Maintenance	\$1,800	\$3,150
Annual Tree Maintenance	\$140	\$630
Landscape Contractor's Travel Cost	\$228	\$228
Landscape Contractor's Profit	\$546	\$2,469
<i>Annual Maintenance Cost</i>	<i>\$6,002</i>	<i>\$12,346</i>
<i>Annual Yard Waste Disposal Cost</i>	<i>\$21,000.00</i>	<i>\$21,000.00</i>
<b><i>Annual Water Maintenance and Disposal Cost</i></b>	<b>\$27,234</b>	<b>\$33,854</b>
<b>3 Year Cost</b>	<b>\$110,501</b>	<b>\$157,363</b>
<b>6 Year Cost</b>	<b>\$192,201</b>	<b>\$258,926</b>
<b>10 Year Cost</b>	<b>\$301,135</b>	<b>\$394,344</b>



\*This graph is generated using the average of the high and low cost estimates for each type of landscape.



Water Data	Value	Sources	Data Explanation
Inches of Water Per Irrigation	0.71	<i>Watering Wisely: Irrigation Ideas to Help You Save Water &amp; Money.</i> City of Sarasota Public Works Department. Sept. 5, 2006. < <a href="http://www.sarasotagov.com/LivingInSarasota/Contents/PublicWorks/PWPDDFiles/WaterBrochure.pdf">www.sarasotagov.com/LivingInSarasota/Contents/PublicWorks/PWPDDFiles/WaterBrochure.pdf</a> >	This source states that a good volume of water per irrigation is between 2/3 and 3/4 of an inch. These two values were averaged.
Inches to Gallons/Sq. Foot Conversion Factor	0.62	<i>Landscape Irrigation Formulas.</i> Oct. 3, 2006. < <a href="http://www.irrigationtutorials.com/formulas.htm">http://www.irrigationtutorials.com/formulas.htm</a> >	This source states that one gallon of water applied to one square foot is equivalent to 1.6 inches of rain.
Gallons of Water Per Square Foot Per Irrigation	0.44020		

Conversion Cost	Units	Low Estimate	High Estimate	Sources	Data Explanation
Planning, Materials and Installation Cost	\$/Sq. Foot	\$1.92	\$3.72	See additional "Initial Cost" worksheet	These values reflect averages of multiple data sources.

Irrigation Requirements	Units	Low Estimate	High Estimate	Sources	Data Explanation
Regular Watering Zone	Irrigations/Month	4	8	<i>Low: All Plants Have a Place in Xeriscape Landscapes.</i> Sept. 5, 2006. < <a href="http://agnewsarchive.tamu.edu/drought/drghtpak98/drght52.html">http://agnewsarchive.tamu.edu/drought/drghtpak98/drght52.html</a> >. <i>High: Watering Lawns the Right Way.</i> University of Illinois Extension. Accessed on Sept. 6, 2006. < <a href="http://www.urbanext.uiuc.edu/lawnchallenge/lesson4.html">http://www.urbanext.uiuc.edu/lawnchallenge/lesson4.html</a> >.	The high source states that the maximum amount of water that turf needs is 1.5 inches per week. This number was multiplied by 4 to derive 6 inches per month. 6 inches per month was divided by .71 inches of water per irrigation to arrive at 8.45, which was rounded to 8.
Occasional Watering Zone	Irrigations/Month	1	3	<i>All Plants Have a Place in Xeriscape Landscapes.</i> Sept. 5, 2006. < <a href="http://agnewsarchive.tamu.edu/drought/drghtpak98/drght52.html">http://agnewsarchive.tamu.edu/drought/drghtpak98/drght52.html</a> >.	Although the source states that plants in the occasional watering zone should be watered every 2 to 3 weeks, we have expanded the range to between 1 and 3 times per month to make sure all watering ranges are covered in the calculator.
Natural Rainfall Zone	Irrigations/Month	0	0	<i>All Plants Have a Place in Xeriscape Landscapes.</i> Sept. 5, 2006. < <a href="http://agnewsarchive.tamu.edu/drought/drghtpak98/drght52.html">http://agnewsarchive.tamu.edu/drought/drghtpak98/drght52.html</a> >.	

Maintenance Data	Units	Low Estimate	High Estimate	Sources	Data Explanation
Flower Bed Maintenance Cost	\$/Sq. Foot/Year	\$1.84	\$3.79	Wade, Gary L. and Winans, Elizabeth. <i>Hort Management 6.0.</i> Department of Horticulture. The University of Georgia. 2005.	In order to calculate high and low maintenance estimates, we used the inputs from this model for "well maintained landscapes" and a "minimally maintained landscapes".
Turf Maintenance Base Cost	\$/Sq. Foot/Year	\$0.04	\$0.10	Wade, Gary L. and Winans, Elizabeth. <i>Hort Management 6.0.</i> Department of Horticulture. The University of Georgia. 2005.	
Turf Maintenance Additional Cost	\$/Sq. Foot/Year/ Month of grow season	\$0.014	\$0.014	Wade, Gary L. and Winans, Elizabeth. <i>Hort Management 6.0.</i> Department of Horticulture. The University of Georgia. 2005.	
Shrub Maintenance Cost Without Pruning	\$/Sq. Foot/Year	\$0.11	\$0.20	Wade, Gary L. and Winans, Elizabeth. <i>Hort Management 6.0.</i> Department of Horticulture. The University of Georgia. 2005.	
Tree Maintenance Cost Without Pruning	\$/Sq. Foot/Year	\$0.03	\$0.17	Wade, Gary L. and Winans, Elizabeth. <i>Hort Management 6.0.</i> Department of Horticulture. The University of Georgia. 2005.	To develop a site-specific estimate based on <b>specific flowers, turf, shrubs, and trees</b> on your site, the most recent version of <i>Hort Management</i> can be purchased online at: <a href="http://pubs.caes.uga.edu/caespubs/hortmanage.htm">http://pubs.caes.uga.edu/caespubs/hortmanage.htm</a> or from:
Tree and Shrub Pruning Cost	\$/Sq. Foot/Year	\$0.01	\$0.01	Wade, Gary L. and Winans, Elizabeth. <i>Hort Management 6.0.</i> Department of Horticulture. The University of Georgia. 2005.	
Base Visit Cost for Private Landscaping Firms	\$/Visit/Hour Traveled	\$75.92	\$75.92	Wade, Gary L. and Winans, Elizabeth. <i>Hort Management 6.0.</i> Department of Horticulture. The University of Georgia. 2005.	Professional Grounds Management Society 720 Light Street Baltimore, MD 21230-3816
Profit for Private Landscaping Firms	% of Total Cost	10%	25%	<i>Low: Key Factors for Profitable Mowing.</i> Landscape Management. Sept. 1, 2005. <a href="http://landscapemanagement.net/landscape/article/articleDetail.jsp?id=183177">http://landscapemanagement.net/landscape/article/articleDetail.jsp?id=183177</a> <i>High:</i> Wade, Gary L. Personal communication. August 18, 2006.	

## Inflation Adjustment Table

One Dollar in...	Equals this many 2006 Dollars
2005	\$1.04

Source: CPI Inflation Calculator. <<http://data.bls.gov/cgi-bin/cpi/calc.pl>>

## Resource Conserving Landscaping Initial Cost



Initial Cost			
Low Estimate (\$/Sq. Foot)	High Estimate (\$/Sq. Foot)	Sources	Data Explanation
\$3.40	\$3.40	Data Provided by Kent Sovocool, Senior Conservation Research Analyst, Southern Nevada Water Authority (SNWA). Sept. 15, 2006.	This is the result of a survey conducted by the SNWA on 87 residential conversions. The average conversion area of this survey was 1306 sq. feet.
\$1.13	\$4.52	Water Resources Engineering, Inc. <i>Overview of Retrofit Strategies: A Guide for Apartment Owners and Managers</i> . May 2002. p. 10. <a href="http://www.huduser.org/publications/pdf/Book1.pdf">www.huduser.org/publications/pdf/Book1.pdf</a> .	
\$2.00	\$4.00	Kent Sovocool, Senior Conservation Research Analyst, Southern Nevada Water Authority. Personal Communication. Sept. 15, 2006.	This source estimated that most conversions cost between two and four dollars. The initial cost is highly variable depending on project size and complexity. Larger, less complex projects tend to be less expensive per square foot.
\$1.14	\$2.97	Granger, William A. <i>Cash for Plants: Encouraging Homeowners and Homeowner Associations to Remove Unused Turf areas</i> . Feb. 7, 2006.	In the Otay Water District in southern California, the cost of water saving retrofits for homeowner associations was between \$1.14 and \$2.97 per square foot.
<b>1.92</b>	<b>3.72</b>	<b>Average</b>	

Inflation Adjustment Table	
One Dollar in...	Equals this many 2006 Dollars
2002	\$1.13
2003	\$1.10
2004	\$1.07
2005	\$1.04

Source: CPI Inflation Calculator. <http://data.bls.gov/cgi-bin/cpicalc.pl>

## Resource Conserving Landscaping Environmental, Health and Safety Benefits

Converting your landscape to a water saving landscape makes environmental and economic sense.

Converting to a water saving landscape:

**Conserves water** because water saving landscapes require less irrigation than conventional turfs and flowers.

**Conserves fossil fuels** because minimizing turf grasses and lawns reduces the need for mowing and trimming, and associated fuel use to power mowers and trimmers.

**Reduces waste/demand for landfill space** because water saving plants are often slow growing, especially compared to conventional turf grasses, creating less waste and reducing landfill demand in areas that landfill green waste.

**Reduces air pollution and improves air quality** because minimizing turf grass reduces the need for mowing and associated air emissions.

**Reduces runoff** because water-wise landscaping requires grouping turf areas and plants according to water needs, which reduces runoff losses.

**Retards erosion** because reducing runoff can retard erosion, depending on the surrounding landscape.

**Supports local ecology** because water saving plants are often native plants, which are uniquely adapted to the local ecosystem, and are better suited than non-native plants to support local flora and fauna, and to resist drought and disease.

