

Turf Trade Tool

User Guide

August 2026

The Turf Trade Tool is an Excel-based tool designed to support water practitioners, landscape & irrigation professionals, and municipalities in calculating both the potential water savings and the water conservation return on investment (ROI) of a Turf Trade Program.

The Tool evaluates two components of turf programs:

1. **Lower water use converted turf** - a trade of higher water use turfgrass for lower water use turfgrass, and
2. **Removed turf** - turf removal for an alternative low water use landscape (non-turf), also sometimes called *cash for grass*.

The Tool estimates two main outputs for turf trade programs: total water savings and return on investment (ROI) for water conservation. The Tool estimates these values at both the household and the municipality levels. Water savings are expressed in kilogallons per year (kgal/yr), and ROI for water conservation is calculated as a function of gallons of water saved per dollar spent on turf trade programs.

The converted turf is classified as seed planting and sod laying to capture the financial costs of both approaches.

The Turf Trade Tool was developed by the Turfgrass Water Conservation Alliance and Utah State University Center for Water-Efficient Landscaping in association with the Alliance for Water Efficiency's Resource Positive Landscapes Project funded by The Scotts Miracle-Gro Foundation. The Tool was designed to support a Salt Lake City pilot turf trade program ([SLC Turf Trade](#)) in 2022 and has been updated for use by a wider audience.

Required Data Inputs

- Local demographic information
- Landscape size
- Program cost details
- Annual evapotranspiration measurements

User Guide Sections

- Tool navigation
- Key Terms
- Demographic Information section
- Average Landscape Project section
- Program Costs and Savings
- Tool Calculations

How to Cite

Alliance for Water Efficiency, Turfgrass Water Conservation Alliance, Utah State University. *Turf Trade Tool*. Chicago, IL: Alliance for Water Efficiency, 2026.

Tool Navigation

This section provides an overview of how to navigate the Turf Trade Tool. All data inputs, outputs, calculations, and visuals are on the same Excel sheet. The sheet is protected. If users wish to modify text or calculation cells, the sheet can be unprotected by navigating to File – Information – Protect Workbook – Unprotect.

Section	Purpose
Key Terms	Informative: Key variables, corresponding terms, and equations that are denoted to assist the user in understanding Tool calculations.
Demographics	User Input: Demographic information to inform the water savings and ROI calculations
Average Landscape Project	User Input: Information on an average landscape project to inform the water savings and ROI calculations
Program Costs	Tool Output: The cost of the Turf Trade Program to the organization
Calculations	Tool Output: The calculations that inform the estimated water savings and conservation ROI for participation type.
Visuals	Tool Output: Figures show the estimated total water savings and conservation ROI for participation type.

Cell Color Orientation

Purple cells are input fields for U.S. Census Bureau or an alternative demographic source data provided by the user

Blue cells are input fields for localized data provided by the user

White cells are calculation output cells.

Steps to Use Tool

1. Enter demographic information
 - See Demographic Information Section for details
2. Enter average landscape project information
 - See Average Landscape Project information for details
3. Review calculations and program costs. Modify variables if negative water use is calculated. Water use, savings, and ROI values will appear **red** if calculated values are negative.
4. Charts provide a visual display of estimated water savings and water conservation ROI.

Key Terms

The following key variables and terms inform the Tool calculations and are provided directly in the Turf Trade Tool Excel Spreadsheet.

Variable	Term	Equation
P	Population ⁺	—
Hr	Home ownership rate ⁺	People = $P \times Hr$
f*	Residence population ⁺	—
At	Total audience	At = $(P \times Hr) / f$
kp	Participation factor	Households = $At \times kp$
Ps	Seed participation factor	Households = $(At \times kp) \times Ps$
Pv	Sod participation Factor	Households = $(At \times kp) \times (1 - Ps)$
ALP	Average landscape project	—
La	Landscape area	—
R	Turf area reduction	Turf Remaining = $La \times (1 - R)$
Sr	Seeding Rate	See Conversions
b	Bag size	Number of Bags = $(La \times (1 - R)) / b$
c	Cost per bag	\$/sqft = $(Bags \times c) / \text{Turf Remaining}$
c_s	Sod cost	Cost per household = $c_s \times \text{Turf Remaining}$
c_r	Turf replacement cost	Cost per household = $c_r \times La \times R$

*Variables sourced from U.S. Census or alternative demographic data source

Demographic & Program Information

Users must enter demographic data and can modify the Turf Trade program participation rate based on total population, seed planting, and sod laying. The section is populated by the user with data sourced from the U.S. Census Bureau¹ or local demographic information and with localized, program-specific data. Programmatic datasets can be modified to determine the program water savings and ROI.

Demographic data variables can be sourced from the following datasets:

Population	U.S. Census Table P1 (Link)
Home ownership rate	U.S. Census Table DP04 (Link)
Residence population	U.S. Census Table DP04 (Link)

These demographic data are used to calculate the Total Audience (households) for the turf trade program. If the user has a known target audience (households) the equation can be overwritten by entering the number of households.

Program-specific data is defined as follows:

Participation factor	The percentage of households that participate in the turf trade program
Seed participation factor	The percentage of households that participate in the turf trade program by planting seed
Sod participation factor	The percentage of households that participate in the turf trade program by laying sod <i>Calculated based on total participation factor and seed participation factor</i>

These program-specific participation data are used to calculate the households that participate in the turf trade program. If the user has a known number of households that participate in the turf trade program as a function of seeding or sodding, the equations can be overwritten by entering the number of households.

¹ <https://data.census.gov/>

Average Landscape Project Input (ALP)

The Average Landscape Project (ALP) section defines an average landscape project per household area and cost. This section calculates water savings for an average landscape project for converted turf, removed turf, and total water savings. These data are used to calculate the estimated total water savings and water conservation ROI for the program.

Landscape Project Input Terms

Landscape area (sqft)	The average landscape project (ALP) area per household that is included in turf trade program projects. The ALP area includes all converted and removed turf area. This area may be estimated to calculate potential savings associated with a program or calculated with program participant information.
Turf area reduction (%)	The percentage of project landscape area where turf is removed and replaced with an alternative landscape.
Seeding rate (lbs/1000 sqft)	The rate of seed application as lbs per 1000 sqft. This will be provided on most seed bags. For most turfgrass varieties, seedings rates vary from 2 – 10 lbs/1000 sqft. Resources ² provide more detail on seeding rates for different varieties. <i>If bag coverage area is less than or greater than 1000 sqft see Conversion section for calculation.</i>
Bag size	The size of the bag in pounds (lbs). This is printed on the bag along with the recommended seeding rate.
Cost per bag	The cost of one bag of seed.
Sod roll size	The size of the sod roll in square feet (sqft). The sod roll size informs the number of roles needed for the average project. The sod roll size does not directly relate to the water conservation ROI calculation. However, it may be useful to know the average number of rolls needed per project. Users should always round up to calculate the number of sod rolls needed per project.
Sod cost	The cost of sod per square foot (sqft).
Turf removal	The cost of turf removal and replacement of an alternative landscape per square foot (sqft). This cost may only be the cost to remove turf, or it may incorporate an average cost to plant low water use vegetation.

² University of Illinois Extension. 2026. "Lawns". Accessed August 2026.

<https://extension.illinois.edu/lawns/planting-new-lawn>

Virginia Cooperative Extension. 2023. "Turfgrass". Accessed August 2026.

<https://www.pubs.ext.vt.edu/424/424-100/424-100-C.html>

Colorado State University Extension Master Gardener Program. 2025. "Turfgrass Species Selection Guidelines". Accessed August 2026. <https://extension.colostate.edu/resource/turfgrass-species-selection-guidelines/>

Additional resources may be found through academic institutions and other research publications.

Evapotranspiration (ET) (in/yr)	The measure of combined evaporation from the Earth's surface and transpiration from plants. It is the amount of water needed so that plants can grow.
Reference ET	The evapotranspiration from a uniform, green, well-watered grass surface ³ <i>Daily Forecast Reference Evapotranspiration (FRET) can be accessed through the National Weather Foundation.⁴ Global reference ET can be accessed through USGS.⁵ Many published reference ET data are available through university, state and province, or federal research institutions.</i>
Grass Type	Drop down for cool season grasses (fescues, bluegrasses and ryegrasses) or warm season grasses (zoysia, centipede, bermudagrasses, and St Augustine grasses)

Water Savings for Average Landscape Project (ALP) Output Terms

TWCA Qualified turf water demand	The water demand of TWCA Qualified turfgrass based on reference ET represented in inches/year.
Area (sqft)	The total ALP area divided by converted turfgrass and removed turfgrass
Water Reduction (100 ft ³)	The ALP estimated total water use reduction divided by converted turfgrass and removed turfgrass
Water Reduction from Turf Removal (gal/\$)	The ALP estimated water use reduction resulting from turfgrass removal
Water Reduction from Turf Seed (gal/\$)	The ALP estimated water use reduction for planted turf seed for converted turfgrass.
Water Reduction from Turf Sod (gal/\$)	The ALP estimated water use reduction for turf sod for converted turfgrass.

Program Costs & Savings

The program costs include the cost of the seed, sod, and turf removal based on participation. Either Flat Rate Per Square Foot **or** Percent of Cost Rebate should be entered. Both values should not be entered.

³ Allen, R.G., L. S. Pereira, D. Raes, M. Smith. 1998. Reference evapotranspiration (ET₀). *Crop evapotranspiration – Guidelines for computing crop water requirements – FAO Irrigation and drainage paper 56*: Food and Agriculture Organization of the United Nations. Rome, Italy.

⁴ National Weather Service. 2026. Graphical Forecasts. Accessed July 2026. <https://digital.weather.gov/>

⁵ Hobbins, M. C. Dewes, T. Jansma. 2022. Global reference evapotranspiration for food-security monitoring (ver. 2.3, May 2026). Earth Resources Observation and Sciences (EROS) Cetner. DOI: [10.5066/P9IIQMV1](https://doi.org/10.5066/P9IIQMV1)

Program Cost Input Terms

Flat Rate Per Square Foot	The flat rate program cost that is incurred by the organization. This variable represents the cost of the seed, sod, and turf removal. The dollar amount is a flat rate rebate provided to program participants based on square footage area of standard turfgrass converted to lower water use turfgrass and turf removed. Values are used to calculate the total dollar value of the program activity and the gallons saved per dollar spent.
Percent of Cost Rebate	The percent of the program cost that is incurred by the organization. This variable represents the cost of the seed, sod, and turf removal. If an organization covers all program participant costs, the percent of cost rebate is 100%. If the organization provides a 50% rebate on participant program costs the percent of cost rebate is 50%. Values are used to calculate the total dollar value of the program activity and the gallons saved per dollar spent.

Calculations

Calculations are used to derive the estimated total water savings and the conservation ROI for the Turf Trade Program. There are no input data in this section of the Tool. The calculations allow the user to view the series of calculations conducted to arrive at the savings and ROI value.

Calculation Terms

Total Landscape Area	The ALP landscape area multiplied by the demographic factor.
Baseline Water Use	The annual reference ET divided by 12 (inches) and multiplied by the total landscape area.
Turf Area Converted	The ALP area of converted turf area multiplied by the demographic factor.
Estimated Converted Turf Water Use	The TWCA Qualified turf water demand for lower water use turfgrass divided by 12 (inches) and multiplied by the turf area converted. The TWCA Qualified turf water demand for cool season turf grass is 0.56 , and the TWCA Qualified turf water demand for warm season turf grass is 0.42 .
Turf Area Removed	The ALP landscape area minus remaining turf area and multiplied by the demographic factor.

Removed Turf Area Water Use	The annual reference ET divided by 12 (inches) and multiplied by the total landscape area. This value is multiplied by a value of 30% (0.3) because the Tool assumes that the alternative landcover uses 30% of the water used by higher water use turf grass.
Removed Turf Area Water Savings	Turf area removed multiplied by reference ET divided by 12 (inches) minus removed turf area water use.
Estimated Total Water Savings	Estimated converted turf water savings plus removed turf area water savings.
Estimated Conservation ROI	Estimated total water savings divided by the cost of the program.

Conversions

1 Square Foot (<i>sqft</i>)	43,560 Acres (<i>Acre</i>)
12 inches (<i>in</i>)	1 foot (<i>ft</i>)
1 cubic foot (<i>ft</i> ³)	7.48052 gallons (<i>gal</i>)
1 Acre Foot (<i>AF</i>)	325.851247 thousand gallons (<i>kgal</i>)
Seeding Rate Conversion to <i>lbs / 1000 sqft</i>	Example: 6 pound bag with coverage area of 500 square feet $\frac{6 \text{ lbs} \times 1000 \text{ sqft}}{500 \text{ sqft}} = \frac{12 \text{ lbs}}{1000 \text{ sqft}}$ Example: 30 pound bag with coverage area of 1500 square feet $\frac{30 \text{ lbs} \times 1000 \text{ sqft}}{1500 \text{ sqft}} = \frac{20 \text{ lbs}}{1000 \text{ sqft}}$