



# **METHODOLOGY**

for GRACE's

Water Footprint Calculator

**GRACE's Water Footprint Calculator (WFC)** provides a snapshot of how your daily activities and routines impact your water use. The results, reported as your water footprint, are meant to be an estimate that can help you better understand your habits and behaviors and their contribution to your overall water footprint.

**Assumptions:** The calculations used in the WFC are an estimate. The data is the latest available at the time of creation of the calculator. In some cases, we have used data from studies that looked at personal water use based on individual behaviors. In other cases, we took national data and created statistical averages and values to calculate individual water use. The research pointed out that there is a lack of consistent, high quality water use data collected in this country, so please view your results with this in mind. The value of the Water Footprint Calculator lies in its ability to help users understand how they use water and how they can use less.

Some of these questions do not technically fall within the guidelines for conducting a proper water footprint assessment. Although we try to focus the questions on consumption, the line between withdrawal and consumption is not always clear for direct use. Also, the pet food question is based solely on withdrawals because no consumption data is available at this time (to learn more about the difference between withdrawals and consumption, [read this post](#)).

Average values shown in the spreadsheet results of the calculator are subject to rounding. Values under 1.0 gallon are shown as "0."

**Our calculator is based on international and US data and all data has been converted to US units (gallons, pounds and feet). Use the Water Footprint Network's [calculator](#) for international data and metric units.**

For questions regarding these methods, please email [programs@gracelinks.org](mailto:programs@gracelinks.org)

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# Household

## **QUESTION: HOW MANY PEOPLE ARE IN YOUR HOUSEHOLD?**

Calculations for some of the questions involve all the people in your household.

If you live alone or choose to take the calculator as an individual, then you're a household of 1.

If you're a household of two or more, your water footprint is an average of water use among all household members (so if someone in your household uses more water than the others they might be bringing your results up!). This would be a good opportunity to get them to conserve water. This is because some resources like dishwashers, pools and lawn water are shared among all family members so you answer those questions as an average for your household. Other questions ask you to figure out collectively how long or how often members of your household do something. In that case, think about the behavior of each household member.

# Direct Water Use Questions

The first set of questions is about direct water use - the water you use when you turn on a tap. It includes water used indoors, in the bathroom, kitchen and laundry. It also includes greywater reuse as an offset to your result. Outdoor water use includes the water you use on your lawn and garden and in your pool and includes xeriscaping and rain barrels as an offset. It also includes car washing.

## Indoor Direct Use

### BATHROOMS

#### SHOWERS

##### QUESTION: HOW LONG IS THE AVERAGE SHOWER IN YOUR HOUSEHOLD?

###### DISCUSSION:

Choose which of the following intervals best represents someone in your household's average shower length. We use either a midpoint or an endpoint to get the minutes used in the calculation:

| INTERVAL    | VALUE USED |
|-------------|------------|
| Under 5 min | 4 minutes  |
| 5-10 min    | 8 minutes  |
| 11-15 min   | 13 minutes |
| Over 15 min | 15 minutes |

##### QUESTION: DO YOU HAVE LOW-FLOW SHOWER HEADS?

###### DISCUSSION:

Low-flow shower heads flow at 2.5 gallons per minute (gpm) (some go as low as 1.5 gpm). Conventional shower heads use 5.0 gpm (or more!).

If your answer is "some", we use the average of 2.5 and 5.0 gpm for a flow rate of 3.8 gpm.

| SHOWER HEAD TYPE | FLOW RATE |
|------------------|-----------|
| Yes              | 2.5 gpm   |
| Some             | 3.8 gpm   |
| No               | 5 gpm     |

###### SOURCE OF DATA:

Residential Water Use, Fixtures, and Appliances: Residential Shower and Bath Introduction  
[http://www.allianceforwaterefficiency.org/residential\\_shower\\_introduction.aspx](http://www.allianceforwaterefficiency.org/residential_shower_introduction.aspx)

**CALCULATION:**

Multiply the number of minutes for the chosen interval by the flow rate based on the showerhead type to get the gallons of water per person per day.

**AVERAGE:** 12 gallons per person per day

**SOURCE FOR AVERAGE:**

Residential End Uses of Water Study

<http://www.waterdm.com/sites/default/files/WRF%20%281999%29%20Residential%20End%20Uses%20of%20Water.pdf>

**BATHTUB**

**QUESTION: DO YOU TAKE BATHS? IF SO, HOW OFTEN?**

**DISCUSSION:**

The average bath uses 35 gallons of water.

Think about how often people in your household take baths. Also select a time period in order to complete your answer (we give you options for daily, weekly, monthly and annually).

**SOURCE OF DATA:**

Residential Water Use, Fixtures, and Appliances: Residential Shower and Bath Introduction

[http://www.allianceforwaterefficiency.org/residential\\_shower\\_introduction.aspx](http://www.allianceforwaterefficiency.org/residential_shower_introduction.aspx)

| TIME PERIOD | MULTIPLIER    |
|-------------|---------------|
| per day     | 1/1 = 1.0     |
| per week    | 1/7 = 0.14    |
| per month   | 1/30 = 0.033  |
| per year    | 1/365 = 0.003 |

**CALCULATION:**

Multiply 35 gallons by the number of baths taken in your household, multiply that by the time period multiplier, then divide by the number of people in your household to get the gallons of water per person per day.

As you can see, taking a bath once in a while doesn't affect your results significantly, but a daily bath could add a lot to your direct water use.

**AVERAGE:** 1 gallon per person per day

**SOURCE FOR AVERAGE:**

Residential End Uses of Water Study

<http://www.waterdm.com/sites/default/files/WRF%20%281999%29%20Residential%20End%20Uses%20of%20Water.pdf>

**BATHROOM SINKS**

**QUESTION: HOW LONG DO YOU LEAVE YOUR BATHROOM FAUCETS RUNNING EACH DAY? (INCLUDE BRUSHING YOUR TEETH AND SHAVING.)**

**DISCUSSION:**

Choose which of the following intervals best represents how long someone in your household lets the water in the bathroom sink run each day. We use either a midpoint or an endpoint to get the minutes used in the calculation:

| INTERVAL    | VALUE USED |
|-------------|------------|
| Under 4 min | 4 minutes  |
| 5 -10 min   | 8 minutes  |
| 11-30 min   | 20 minutes |
| Over 30 min | 30 minutes |

## QUESTION: DO YOUR BATHROOM SINKS HAVE LOW-FLOW FAUCETS?

### DISCUSSION:

Low-flow faucets flow at 1.5 gpm (some go lower). Conventional faucets can flow as much as 5 gpm (or more).

If your answer is “some/not all”, we use the average of 1.5 and 5.0 gpm for a flowrate of 3.3 gpm.

| FAUCET TYPE  | FLOWRATE |
|--------------|----------|
| Yes          | 1.5 gpm  |
| Some/Not All | 3.3 gpm  |
| No           | 5.0 gpm  |

### SOURCE OF DATA:

Residential Water Use, Fixtures, and Appliances: Faucet Fixtures Introduction  
[http://www.allianceforwaterefficiency.org/Faucet\\_Fixtures\\_Introduction.aspx](http://www.allianceforwaterefficiency.org/Faucet_Fixtures_Introduction.aspx)

### CALCULATION:

Multiply the number of minutes that goes with the chosen category by the flow rate that goes with the faucet type you chose to get the gallons of water per person per day.

**AVERAGE:** 4 gallons per person per day\*

### SOURCE FOR AVERAGE:

Residential End Uses of Water Study  
<http://www.waterdm.com/sites/default/files/WRF%20%281999%29%20Residential%20End%20Uses%20of%20Water.pdf>

\*The study found an average of 11 gallons per person per day for all faucets. We apportioned that between bathroom and kitchen faucets for 4 and 7 gallons per person per day, respectively figuring that most households will use more water in the kitchen than in the bathroom.

## TOILETS

### QUESTION: DO YOU “LET IT MELLOW”?

### DISCUSSION:

People can have bowel movements from 3 times per day to 3 times per week, for an average of 1.7 movements per day.

### SOURCE OF DATA:

Mayo Clinic: Frequent Bowel Movements  
<http://www.mayoclinic.org/symptoms/frequent-bowel-movements/basics/definition/sym-20050720>

The average person flushes 5 times per day.

**SOURCE OF DATA:**

Residential End Uses of Water Study

<http://www.waterdm.com/sites/default/files/WRF%20%281999%29%20Residential%20End%20Uses%20of%20Water.pdf>

Think about how people in your home flush the toilet. Do they let it mellow and only flush for bowel movements? If they don't, they should consider it because "letting it mellow" can save 1.5 gallons (or more) per flush. For those that do, we took the average of 1.7 flushes per day.

If your answer is "sometimes", we use the average of 1.7 and 5, or 3.4 flushes per day.

| LETTING IT MELLOW | FLUSHES PER DAY |
|-------------------|-----------------|
| Always            | 1.7 flushes     |
| Sometimes         | 3.4 flushes     |
| Never             | 5.0 flushes     |

**QUESTION: DO YOU HAVE LOW-FLOW TOILETS?**

**DISCUSSION:**

Older, conventional toilets use 5 gallons or more. Low-flow toilets are now required in new construction or if you remodel your bathroom. They use 1.5 gallons (or less).

If your answer is "some/not all" we use the average of 1.5 and 5, or 3.3 gallons per flush.

| TOILET TYPE  | VALUE USED  |
|--------------|-------------|
| Yes          | 1.5 gallons |
| Some/Not All | 3.3 gallons |
| No           | 5.0 gallons |

**SOURCE OF DATA:**

WaterSense Labeled Toilets

<https://www.epa.gov/watersense/residential-toilets>

**CALCULATION:**

Decide whether or not you let it mellow and determine the number of flushes and multiply that by the flow rate based on the toilet type to get the gallons of water per person per day.

**AVERAGE:** 19 (rounded from 18.5) gallons per person per day

**SOURCE FOR AVERAGE:**

Residential End Uses of Water Study

<http://www.waterdm.com/sites/default/files/WRF%20%281999%29%20Residential%20End%20Uses%20of%20Water.pdf>

## KITCHEN

### KITCHEN SINK

#### QUESTION: HOW LONG DO YOU LEAVE THE KITCHEN FAUCET RUNNING EACH DAY? (INCLUDE



## RINSING FOOD AND CLEANING BUT NOT WASHING DISHES)?

### DISCUSSION:

Choose which of the following intervals best represents how long someone in your household lets the kitchen sink run each day. We use either a midpoint or an endpoint to get the minutes used in the calculation:

| INTERVAL    | VALUE USED |
|-------------|------------|
| Under 5 min | 4 minutes  |
| 5 -20 min   | 13 minutes |
| 21-45 min   | 33 minutes |
| Over 45 min | 45 minutes |

## QUESTION: DOES YOUR KITCHEN SINK HAVE A LOW-FLOW FAUCET?

### DISCUSSION:

Water-saving faucets flow at 1.5 gpm (some even lower). Conventional faucets flow up to 5 gpm (or more). We assume you only have one kitchen faucet.

| FAUCET TYPE | VALUE USED |
|-------------|------------|
| Yes         | 1.5 gpm    |
| No          | 5.0 gpm    |

### SOURCE OF DATA:

Residential Water Use, Fixtures, and Appliances: Faucet Fixtures Introduction  
[http://www.allianceforwaterefficiency.org/Faucet\\_Fixtures\\_Introduction.aspx](http://www.allianceforwaterefficiency.org/Faucet_Fixtures_Introduction.aspx)

### CALCULATION:

Multiply the number of minutes that go with the chosen interval by the flow rate based on the faucet type to get the gallons of water per person per day.

**AVERAGE:** 7 gallons per person per day\*

### SOURCE FOR AVERAGE:

Residential End Uses of Water Study  
<http://www.waterdm.com/sites/default/files/WRF%20%281999%29%20Residential%20End%20Uses%20of%20Water.pdf>

\*The study found an average of 11 gallons per person per day for all faucets. We apportioned that between bathroom and kitchen faucets for 4 and 7 gallons per person per day, respectively figuring that most households will use more water in the kitchen than in the bathroom.

## WASHING DISHES

### QUESTION: HOW DO YOU WASH YOUR DISHES?

**DISCUSSION:** Many people use their kitchen on a daily basis, but some people might not wash their dishes every day, so we've given you multiple time options.

| TIME PERIOD | MULTIPLIER    |
|-------------|---------------|
| per day     | 1/1 = 1.0     |
| per week    | 1/7 = 0.14    |
| per month   | 1/30 = 0.033  |
| per year    | 1/365 = 0.003 |

People can wash their dishes in a variety of ways, so we've given you multiple options that you add together.

Conventional dishwashers use 15 gallons or more. Energy/water-efficient dishwashers use just over 4 gallons to wash dishes.

**SOURCE OF DATA:**

ENERGY STAR: Dishwashers for Consumers

<http://www.energystar.gov/products/certified-products/detail/dishwashers>

A European Comparison of Cleaning Dishes by Hand

[http://www.landtechnik-alt.uni-bonn.de/ifl\\_research/ht\\_1/EEDAL\\_03\\_ManualDishwashing.pdf](http://www.landtechnik-alt.uni-bonn.de/ifl_research/ht_1/EEDAL_03_ManualDishwashing.pdf)

Plasticware - for those who only use plasticware from delivery or eat most of their meals out, we used an average value. If you have most of your food delivered, there is water involved in making the plastic utensils. It takes 22 gallons to make a pound of plastic.

**SOURCE OF DATA:**

Water Wise: Hidden Waters

[http://www.waterfootprint.org/Reports/Zygmunt\\_2007.pdf](http://www.waterfootprint.org/Reports/Zygmunt_2007.pdf)

Using a kitchen scale, we determined that a place setting of plasticware weighs about 1 ounce. A pound of plastic takes 22 gallons of water so 1 ounce takes 22 gallons/pound plastic x 1 pound/16 ounces = 1.4 gallons of water. If you use plastic at each meal you'd use three place settings per day, for 3 x 1.4 = 4.2 gallons per person per day.

Eating out - if you eat most of your meals in restaurants, there is water used to wash dishes at the restaurant. According to EnergyStar, it takes 600 to 1000 gallons of water for 300 to 600 meals prepared in a day at a restaurant. Using the midpoints of 800 gallons for 450 meals, this equates to 800 / 450 = 1.8 gallons per meal. If you eat three meals per day, 3 x 1.8 = 5.4 gallons of water per person per day are used.

**SOURCES OF DATA:**

Best Practices - How To Achieve The Most Efficient Use Of Water In Commercial Food Service Facilities

[https://www.energystar.gov/ia/business/healthcare/fisher\\_nickel\\_feb\\_2005.pdf](https://www.energystar.gov/ia/business/healthcare/fisher_nickel_feb_2005.pdf)

Average of Plasticware and Eating Out - we took the average - (4.2 gallons + 5.4 gallons) / 2 = 4.8 (rounded to 5) gallons per person per day.

| DISHWASHING METHOD                | GALLONS PER LOAD                         |
|-----------------------------------|--|
| Conventional dishwasher           | 15                                       |
| Energy/water-efficient dishwasher | 4.3                                      |
| Hand wash                         | 20                                       |
| Disposable dishes or eat out      | 5 times the number of household members. |

**CALCULATION:**

Figure out how many loads you wash using each method (dishwasher or by hand). Multiply the gallons for each method by the number of loads then multiply by the time multiplier listed above. If you choose the “disposable dishes or eat out” option, multiply that number by the number of people in your household. Add all the methods together and divide that by the number of people in your household to get the gallons of water per person per day.

**AVERAGE:** 1 gallon per person per day

**SOURCE FOR AVERAGE:**

Residential End Uses of Water Study

<http://www.waterdm.com/sites/default/files/WRF%20%281999%29%20Residential%20End%20Uses%20of%20Water.pdf>

## LAUNDRY

### QUESTION: HOW DO YOU DO LAUNDRY?

**DISCUSSION:**

Some people do laundry every day and some don’t, so we’ve given you multiple time options.

| TIME PERIOD | MULTIPLIER    |
|-------------|---------------|
| per day     | 1/1 = 1.0     |
| per week    | 1/7 = 0.14    |
| per month   | 1/30 = 0.033  |
| per year    | 1/365 = 0.003 |

People use different methods to wash their clothes so we’ve given you multiple options that you add together. Conventional machines use 41 gallons or more. Energy/water-efficient machines use just 27 gallons to wash clothes.

**SOURCE OF DATA:**

WaterSense: Indoor Water Use in the United States

<http://www.epa.gov/WaterSense/pubs/indoor.html>

The average water use for a load at the laundromat or wash and fold is 32 to 38 gallons per load. We took the average of 35 gallons per load. The average water use for a load in a shared laundry room is 35 to 45 gallons per load. We took the average of 40 gallons per load.  $(35 + 40)/2 = 37.5$  (rounded to 38) gallons per load.

**SOURCE OF DATA:**

Laundromats and Common Area Laundry Facilities

<http://allianceforwaterefficiency.org/laundromats.aspx>

| CLOTHES WASHING METHOD                            | GALLONS PER LOAD |
|---|------------------|
| Conventional washing machine                      | 41               |
| Energy/water-efficient washing machine            | 27               |
| Laundromat, wash and fold or shared laundry rooms | 38               |

**CALCULATION:**

Multiply the gallons used for each method you selected by the number of loads, then multiply by the time multiplier. Add the methods together and divide by the number of people in your household to get the gallons of water per person per day.

**AVERAGE:** 15 gallons per person per day

**SOURCE FOR AVERAGE:**

Residential End Uses of Water Study

<http://www.waterdm.com/sites/default/files/WRF%20%281999%29%20Residential%20End%20Uses%20of%20Water.pdf>

## GREYWATER

### **QUESTION: DO YOU HAVE A GREYWATER SYSTEM INSTALLED IN YOUR HOME?**

**DISCUSSION:**

A greywater system lets you collect and reuse water from your laundry, shower and bath to water your lawn and garden. There is no average system capacity but research has shown that the average household generates about 15,000 gallons of usable greywater per year.

**SOURCE OF DATA:**

GRAYWATER GARDENING: From Buckets to Irrigation Systems A Detailed Guide to Help You Determine What is Best for Your Garden!

<http://www.greywatercorps.com/files/Graywater-Gardening.pdf>

**CALCULATION:**

15,000 gallons per household per year / 365 days per year = 41 gallons per household per day. Divide this by the number of people in your household to get the gallons per person per day. Subtract this from your total.

**AVERAGE:** 2.4 gallons per person per day

Multiply 188 gallons per household per month by 12 months then divide that by 365 days per year and divide again by 2.6 people per household to get 2.4 gallons per person per day.

**SOURCE FOR AVERAGE:**

Graywater Awareness & Usage Study

[http://greywateraction.org/wp-content/uploads/2014/12/graywater\\_habits\\_\\_practices\\_survey.pdf](http://greywateraction.org/wp-content/uploads/2014/12/graywater_habits__practices_survey.pdf)

2010 Census Briefs: Households and Families: 2010

<http://www.census.gov/prod/cen2010/briefs/c2010br-14.pdf>

# Outdoor Direct Water Use

## LAWN & GARDEN

### WATERING

#### QUESTION: DO YOU WATER A LAWN OR GARDEN?

If you answer “yes” then:

| TIME PERIOD | MULTIPLIER      |
|-------------|-----------------|
| per day     | $1/1 = 1.0$     |
| per week    | $1/7 = 0.14$    |
| per month   | $1/30 = 0.033$  |
| per year    | $1/365 = 0.003$ |

It takes 330 gallons to water a 1000 square foot lawn to a depth of  $\frac{1}{2}$  inch.

#### SOURCE OF DATA:

Tips for Water Conservation

<http://web.extension.illinois.edu/state/newsdetail.cfm?NewsID=6721>

*DISCUSSION:* Most people don't water every day or even every week, so we give you options.

#### QUESTION: HOW MUCH DO YOU WATER?

We created area intervals and took the midpoint of each interval to figure out how many gallons it would take to water that area to a depth of 0.5 inches. We multiplied the midpoint by the ratio of 333 gallons/1000 square feet to get the gallons associated with the midpoint. If you water 40,000 square feet or more we call it an acre.

| INTERVAL              | VALUE USED     |
|-----------------------|----------------|
| one – 99 sq ft        | 17 gallons     |
| 100-500 sq ft         | 99 gallons     |
| 500-1,000 sq ft       | 248 gallons    |
| 1,000 - 5,000 sq ft   | 990 gallons    |
| 5,000 - 10,000 sq ft  | 2,470 gallons  |
| 10,000 - 40,000 sq ft | 8,250 gallons  |
| >40,000 sq ft         | 14,375 gallons |

#### CALCULATION:

Think about how much area you actually water and choose the interval from the table above that contains the square footage. Multiply the gallons for that interval by the number of times you water and multiply that by the multiplier, then divide that by the number of people in your household to get the gallons of water per person per day.

**AVERAGE:** 79 gallons per person per day

**SOURCE FOR AVERAGE:**

The Residential End Uses of Water study found that average outdoor water from irrigation and pools is 101 gallons per person per day. We subtracted the average water use for pools (22 gallons, calculations are shown below) to get an average of 79 gallons per person per day for lawn and garden watering.

Residential End Uses of Water Study

<http://www.waterdm.com/sites/default/files/WRF%20%281999%29%20Residential%20End%20Uses%20of%20Water.pdf>

## XERISCAPING

### QUESTION: DO YOU LANDSCAPE WITH PLANTS THAT REQUIRE LITTLE TO NO WATER?

**DISCUSSION:**

Planting native flowers and grasses, known as xeriscaping can reduce how much you water your landscape by about 33 percent.

**SOURCE OF DATA:**

Xeriscape Conversion Final Report

[http://www.snwa.com/assets/pdf/about\\_reports\\_xeriscape.pdf](http://www.snwa.com/assets/pdf/about_reports_xeriscape.pdf)

**CALCULATION:**

Multiply the result you get from watering your lawn and garden by 0.33 (33 percent) and divide by the number of people in your household to get the gallons of water per person per day. This is subtracted from your lawn and garden value.

**AVERAGE:** 26 gallons per person per day

Based on the calculations from the lawn and garden section, the average for lawn and garden watering is 79 gallons per person per day. Thirty-three (thirty) percent of 79 is 26 gallons per person per day. This is subtracted from your lawn and garden total.

**SOURCE FOR AVERAGE:**

Residential End Uses of Water Study

<http://www.waterdm.com/sites/default/files/WRF%20%281999%29%20Residential%20End%20Uses%20of%20Water.pdf>

Waste Not, Want Not: The Potential for Urban Water Conservation in California

[http://www.pacinst.org/wp-content/uploads/sites/21/2013/02/waste\\_not\\_want\\_not\\_full\\_report3.pdf](http://www.pacinst.org/wp-content/uploads/sites/21/2013/02/waste_not_want_not_full_report3.pdf)

## RAIN BARREL

### QUESTION: DO YOU HAVE A RAIN BARREL?

**DISCUSSION:**

Rain barrels vary in size, but on average you can collect about 1,300 gallons in a year to use on your lawn and garden. 1,300 gallons divided by 365 days per year gives a savings of about 4 gallons per day for your household.

**SOURCE:**

Conserving Water: Capture Rainwater

EPA: Capture Rainwater (rain barrels):

<http://www.epa.gov/greenhomes/ConserveWater.htm>

**CALCULATION:**

Divide 4 gallons by the number of people in your household to get the number of gallons per person per day. Subtract this from your total.

**AVERAGE:** 1.5 gallons per person per day

Divide 4 gallons per household per day by 2.6 people per household (on average) to get 1.5 gallons per person per day.

**SOURCE FOR AVERAGE:**

EPA: Conserving Water: Capture Rainwater

<http://www.epa.gov/greenhomes/ConserveWater.htm>

2010 Census Briefs: Households and Families: 2010

<http://www.census.gov/prod/cen2010/briefs/c2010br-14.pdf>

## SWIMMING POOL

### QUESTION: DO YOU HAVE A SWIMMING POOL?

If you answer “yes” then:

### QUESTION: HOW MANY MONTHS OUT OF THE YEAR DO YOU KEEP IT COVERED?

**CALCULATION:**

The average pool requires an initial volume of 18,000 gallons of water to fill.

**SOURCE OF DATA:**

Water Policy: What about All Those Swimming Pools in Los Angeles?

<http://pacinst.org/water-policy-what-about-all-those-swimming-pools-in-los-angeles/>

If you don't cover your pool when you're not using it you could lose 1,000 gallons per month or more from evaporation. The amount depends on where you live and how humid or dry your climate is.

**SOURCE OF DATA:**

Swimming Pool Cover Rebate Program Follow Up Customer Survey

[http://www.map-testing.com/assets/files/Pool\\_Covers\\_Consumer%20survey%202004.pdf](http://www.map-testing.com/assets/files/Pool_Covers_Consumer%20survey%202004.pdf)

We account for the water lost when you leave your pool uncovered.

| MONTHS | VALUE USED     |
|--------|----------------|
| 1      | 1,000 gallons  |
| 2      | 2,000 gallons  |
| 3      | 3,000 gallons  |
| 4      | 4,000 gallons  |
| 5      | 5,000 gallons  |
| 6      | 6,000 gallons  |
| 7      | 7,000 gallons  |
| 8      | 8,000 gallons  |
| 9      | 9,000 gallons  |
| 10     | 10,000 gallons |
| 11     | 11,000 gallons |
| 12     | 12,000 gallons |

**CALCULATION:**

Divide the initial 18,000 gallons by 365 days. Think about how many months per year you leave your pool uncovered and multiply that by 1000 gallons, then divide that by 365 days. Add those two numbers together and divide that by the number of people in your household to get the gallons of water per person per day.

**AVERAGE:** 22 gallons per person per day

**SOURCES FOR AVERAGE:**

Water Policy: What about All Those Swimming Pools in Los Angeles?

<http://pacinst.org/water-policy-what-about-all-those-swimming-pools-in-los-angeles/>

We assume that the average pool owner covers their pool nine months out of the year.

$$[(18,000 \text{ gallons} + (12 - 9 \text{ months}) * 1000 \text{ gallons/month})] / 365 \text{ days/year} / 2.6 \text{ people per household} = 22 \text{ gallons per person per day}$$

**SOURCE OF DATA:**

Swimming Pool Cover Rebate Program Follow Up Customer Survey

[http://www.map-testing.com/assets/files/Pool\\_Covers\\_Consumer%20survey%202004.pdf](http://www.map-testing.com/assets/files/Pool_Covers_Consumer%20survey%202004.pdf)

2010 Census Briefs: Households and Families: 2010

<http://www.census.gov/prod/cen2010/briefs/c2010br-14.pdf>

## CAR WASHING

### QUESTION: DO YOU HAVE A CAR?

**CALCULATION:**

Cars have both a direct and virtual water use component. We ask about the direct use component – car washing – first. The virtual component – gasoline – is in the virtual water section.

### QUESTION: HOW DO YOU WASH YOUR CAR?

**CALCULATION:**

Not everyone washes their car on a daily or weekly basis, so we provide multiple options.

| TIME PERIOD | MULTIPLIER    |
|-------------|---------------|
| per day     | 1/1 = 1.0     |
| per week    | 1/7 = 0.14    |
| per month   | 1/30 = 0.033  |
| per year    | 1/365 = 0.003 |

A hose at home without a spray nozzle could use as much as 100 gallons per wash. You can reduce this if you use a spray nozzle that lets you turn the spray on and off. An automatic or full-service car wash (where a machine sprays water over your car) varies from 30 gallons to 100 gallons per wash (numerous studies presented in the link below list various volumes; we averaged the values presented to get our average) and uses an average of 58 gallons per wash. A self-service car wash (where you use a high-pressure hose with a “trigger” spray nozzle) uses the least at 15 gallons per wash. These usually work on timers, which encourage conservation.



**SOURCE OF DATA:**

Water Conservation and Washing Vehicles

<http://mde.maryland.gov/programs/Water/waterconservation/Pages/carwashing.aspx>

We provide multiple options, which are added together.

| CAR WASHING METHOD    | GALLONS PER WASH |
|-----------------------|------------------|
| Garden Hose           | 100              |
| Full-service Car Wash | 58               |
| Self-service Car Wash | 15               |

**CALCULATION:**

Think about how you wash your car and how frequently. Multiply the gallons associated with each option by the number of times you wash your car and by the time multiplier. Add all the methods together and divide that by the number of people in your household to get the gallons of water per person per day.

**AVERAGE:** 1 gallon per person per day

**SOURCE FOR AVERAGE:**

Residential End Uses of Water Study

<http://www.waterdm.com/sites/default/files/WRF%20%281999%29%20Residential%20End%20Uses%20of%20Water.pdf>

# Indirect Water Use Questions

The rest of the questions are about your indirect water use. It takes water to make the energy you use, the products you buy and the food you eat. This is called virtual water. The remaining questions help you understand just how much virtual water you use.

## ENERGY

### GASOLINE

This is the virtual water component of the car question.

#### **QUESTION: HOW MANY MILES DO YOU DRIVE PER WEEK?**

##### **CALCULATION:**

For each mile you drive it takes 0.735 gallons of water to process and refine the gasoline.

##### **SOURCE:**

Water Intensity of Transportation

<http://pubs.acs.org/doi/full/10.1021/es800367m>

##### **CALCULATIONS:**

People drive 37 miles per day on average. Multiply that by 0.735 gallons per mile to get 27 gallons of water per person per day.

Multiply the number of miles you drive in a week by 0.735 gallons, divide that by 7 days per week, then divide that by the number of people in your household to get the gallons of water per person per day.

**AVERAGE:** 27 gallons of water per person per day

People drive 27 miles per day on average. Multiply that by 0.735 gallons and divide by 2.6 people per household (on average) to get 27 gallons of water per person per day.

##### **SOURCE FOR AVERAGE:**

Average Annual Miles per Driver by Age Group

<http://www.fhwa.dot.gov/ohim/onh00/bar8.htm>

2010 Census Briefs: Households and Families: 2010

<http://www.census.gov/prod/cen2010/briefs/c2010br-14.pdf>

### ELECTRICITY

#### **QUESTION: WHERE DO YOU LIVE?**

##### **CALCULATION:**

Where does your household's electricity come from?

If you get your electricity from a standard utility, it probably uses a mix of fuel sources (such as hydroelectric, thermoelectric and/or wind power) to generate the electricity delivered to you. Each state has a different mix, but most states predominantly use thermo- and hydroelectric power, which can have very high water footprints.

We used data from two national databases to figure out your state's water footprint (see the more detailed description below). Find your state to get the state value.

# State's Water Footprint

| STATE                | GALLONS PER PERSON PER DAY |
|----------------------|----------------------------|
| Alabama              | 33.4                       |
| Alaska               | 39.3                       |
| Arizona              | 20.8                       |
| Arkansas             | 55.5                       |
| California           | 24.5                       |
| Colorado             | 9.1                        |
| Connecticut          | 2.7                        |
| Delaware             | 15.8                       |
| District of Columbia | 0.1                        |
| Florida              | 2.3                        |
| Georgia              | 27.5                       |
| Hawaii               | 1.2                        |
| Idaho                | 4.6                        |
| Illinois             | 84.3                       |
| Indiana              | 10.4                       |
| Iowa                 | 6.2                        |
| Kansas               | 6.8                        |
| Kentucky             | 81.4                       |
| Louisiana            | 29.6                       |
| Maine                | 7.5                        |
| Maryland             | 4.0                        |
| Massachusetts        | 27.9                       |
| Michigan             | 5.9                        |
| Minnesota            | 6.8                        |
| Mississippi          | 8.8                        |
| Missouri             | 6.4                        |

| STATE          | GALLONS PER PERSON PER DAY |
|----------------|----------------------------|
| Montana        | 130.0                      |
| Nebraska       | 9.4                        |
| Nevada         | 52.4                       |
| New Hampshire  | 3.4                        |
| New Jersey     | 10.5                       |
| New Mexico     | 0.7                        |
| New York       | 8.3                        |
| North Carolina | 57.7                       |
| North Dakota   | 13.1                       |
| Ohio           | 11.7                       |
| Oklahoma       | 87.0                       |
| Oregon         | 33.4                       |
| Pennsylvania   | 7.9                        |
| Rhode Island   | 3.7                        |
| South Carolina | 11.1                       |
| South Dakota   | 790.1                      |
| Tennessee      | 83.2                       |
| Texas          | 7.0                        |
| Utah           | 17.4                       |
| Vermont        | 6.9                        |
| Virginia       | 28.9                       |
| Washington     | 28.4                       |
| West Virginia  | 9.5                        |
| Wisconsin      | 13.3                       |
| Wyoming        | 37.5                       |

We used data sets from the Energy Information Agency (EIA) to get state data. We used the number of residential customers and the residential sales in megawatt hours (MWh) to calculate daily kilowatt hours (kWh) per customer for each state. We noted what percentage of electricity comes from hydroelectric power versus thermoelectric power using EIA data for power generation type in each state.

**SOURCE OF DATA:**

Utility data for residential values: Number of Retail Customers and Sales by State by Sector for the year 2010

<http://www.eia.gov/electricity/data/state/>

We used net generation data to calculate the percentage of each state's electricity generation from thermoelectric sources, including coal, gas, natural gas, nuclear, other fuels for Total Electric Power Industry (2010).

Net Generation by Type of Producer by Energy Source (EIA-906)

[http://www.eia.gov/electricity/data/state/annual\\_generation\\_state.xls](http://www.eia.gov/electricity/data/state/annual_generation_state.xls)

Next we used values from the National Renewable Energy Labs (NREL) for water use by thermo- and hydroelectric power plants. We calculated water consumption by hydroelectric power in each state by multiplying the percentage of electricity generated from hydropower by the NREL value and by the kWh per customer per day. We calculated water consumption from thermoelectric power generation by multiplying the percentage of thermoelectric power generated by the NREL value by the kWh per customer per day.

**SOURCE OF DATA:**

Consumptive Water Use for US Power Production  
<http://www.nrel.gov/docs/fy04osti/33905.pdf>

Then we added the thermoelectric value to the hydroelectric value to find the total daily consumption of water use for each state for each customer.

Since there is no water required for the operation of distributed solar PV or wind power, we assumed a value of 0 gallons for the renewable energy system option.

**QUESTION: WHERE DOES YOUR ELECTRICITY COME FROM?**

**CALCULATION:**

Answer with the slider that goes from 0 to 100 percent, depending on which direction you're sliding. At the left end is renewables at home, which goes from 0 to 100 percent. On the right end is the utility, which goes from 100 to 0 percent. The default setting is 100 percent utility because that's where most people get their electricity.

**CALCULATION:**

Multiply your state value (from the table above) by the percentage of utility you selected (the renewable percentage will always equal 0) to get the gallons of water per person per day.

**EXAMPLES:**

If a user in Alaska selects 100% utility and 0% renewable, the calculation will look like this:  
 $(86.8 \times 100\%) + (0.0 \times 0\%) = 86.8$  gallons per person per day.

If a user in Hawaii selects 50% utility and 50% renewable, the calculation will look like this:  
 $(1.2 \times 50\%) + (0 \times 50\%) = 0.6$  gallons per person per day.

**AVERAGE:** 39 gallons per person per day

We determined the average household value for each state then added all of those values together (the result of 5,164.2 gallons per household per day, was from all 50 states plus Washington, DC), divided by 51, then divided by 2.6 people per household (on average) to get 39 gallons per person per day.

**SOURCES FOR AVERAGE:**

Number of Retail Customers and Sales by State by Sector for the year 2010:  
<http://www.eia.gov/electricity/data/state/>

Net Generation by Type of Producer by Energy Source (EIA-906)  
<http://www.eia.gov/electricity/>

Consumptive Water Use for US Power Production  
<http://www.nrel.gov/docs/fy04osti/33905.pdf>

2010 Census Briefs: Households and Families: 2010  
<http://www.census.gov/prod/cen2010/briefs/c2010br-14.pdf>

# CONSUMPTION (SHOPPING, RECYCLING, REUSING)

## SHOPPING

### QUESTION: HOW MUCH DO YOU SHOP?

#### CALCULATION:

This question covers shopping for everything but food (that's handled in the diet question).

The Water Footprint Network determined that the industrial water footprint of the US is 583 gallons per person per day. This is the total amount of freshwater used to produce the goods and services consumed by people who live in the US. Many of our goods were produced in other countries, and the industrial water footprint covers water used inside and outside of the country to produce those goods.

You may not see or feel this virtual water, but it was required to make all the “stuff” you buy and use in your life, including plastics (toys, food packaging, etc.), electronics, household goods (furniture, textiles, etc.) and the packaging and shipping for all of those items. You can offset this amount by reducing your consumption, reusing and re-purposing the items you already have, and by recycling or donating (where appropriate) the items you might otherwise put in the trash. Around the world, the US has the highest industrial water footprint.

#### SOURCE OF DATA:

The Water Footprints of Nations, Value of Water Research Report Series No.16, p. 55  
<http://www.waterfootprint.org/Reports/Report16Vol1.pdf>

We recognize that some people shop more or less than others, so there are three choices. Choose the category that best describes your household.

| SHOPPING FREQUENCY | GALLONS PER PERSON PER DAY |
|--------------------|----------------------------|
| Shop for basics    | 291                        |
| Like to shop       | 583                        |
| Shop ‘til you drop | 1,166                      |

If your shopping is typical of someone living in the US, then you have an industrial water footprint of 583 gallons per day, based on the Water Footprint Network research. We know that people shop more or less than the average so we made some assumptions. If you fall in the low category, you still have to buy essentials and it all has a water footprint. We assumed your use would equate to half of the average value, or 291 gallons per person per day. For those of you in the high category who *love* to shop, we assumed that your use is double the average, or 1,166 gallons per person per day.

#### CALCULATION:

Think about how your household shops, on average and choose the appropriate category to get the gallons of water per person per day.

**AVERAGE:** 583 gallons of water per person per day

#### SOURCE FOR AVERAGE:

Water Footprint of Nations; Vol. 2  
<http://www.waterfootprint.org/Reports/Report16Vol2.pdf>

# RECYCLING PAPER, PLASTIC, BOTTLES AND CANS

**CALCULATION:**

Recycling paper, plastic, cans and bottles can help reduce your indirect water use because recycled materials require less water and energy (and the water needed for energy) to produce than raw materials. We ask about each of these products individually then add them together to determine your daily water savings.

We used recycling data from 2012, from the municipal level. This includes households, institutions like universities and commercial facilities like office buildings. For consistency, we used census info from the same year.

## QUESTION: DO YOU RECYCLE PAPER?

**CALCULATION:**

68.62 million tons (136,400,000,000 pounds) of paper waste was generated in the US in 2012. 64.6% of that was recovered primarily through recycling.

**SOURCE OF DATA:**

Municipal Solid Waste Generation, Recycling, and Disposal in the United States: Facts and Figures for 2012

[https://www.epa.gov/sites/production/files/2015-09/documents/2012\\_msw\\_dat\\_tbls.pdf](https://www.epa.gov/sites/production/files/2015-09/documents/2012_msw_dat_tbls.pdf)

There were 315,073,604 people in the US in 2012.

**SOURCE OF DATA:**

US and World Population Clock, Dec. 31, 2012

<http://www.census.gov/popclock/>

Recycling 1 ton of paper saves 6,953 gallons water.

**SOURCE OF DATA:**

Wastes – Resource Conservation – Common Wastes & Materials – Paper Recycling

<http://www.epa.gov/osw/conserves/materials/paper/basics/>

**CALCULATIONS:**

$136,400,000,000 \text{ lbs paper/year} / 315,073,604 \text{ people} / 365 \text{ days/yr} = 1.19 \text{ lbs/person/day}$

$6,953 \text{ gallons water} / 2000 \text{ lbs recycled paper} \times 1.19 \text{ lbs/person/day} = 4.15 \text{ (4.2 with rounding) gal/person/day}$

If you say that you recycle some paper we assume you recycle half of the paper products you use and save 2.1 gallons per person per day.

| PAPER RECYCLING | GALLONS SAVED |
|-----------------|---------------|
| None            | 0             |
| Some            | (2.1)         |
| All             | (4.2)         |

Choose the answer that applies to your household to get the gallons per person per day. This number is subtracted from your score.

**AVERAGE:** 2.7 gallons per person per day

In the US, we recycle 64.6% of paper. 64.6% of 4.2 gallons is 2.7 gallons (3 gallons with rounding).

**SOURCE FOR AVERAGE:**

## QUESTION: DO YOU RECYCLE PLASTIC?

### **CALCULATION:**

31.75 million tons (6,350,000,000 pounds) of plastic waste were generated in the US in 2012. 8.8% of that was recovered through recycling.

### **SOURCE OF DATA:**

Municipal Solid Waste Generation, Recycling, and Disposal in the United States: Facts and Figures for 2012  
[https://www.epa.gov/sites/production/files/2015-09/documents/2012\\_msw\\_dat\\_tbls.pdf](https://www.epa.gov/sites/production/files/2015-09/documents/2012_msw_dat_tbls.pdf)

There were 315,073,604 people in the US in 2012.

### **SOURCE OF DATA:**

US and World Population Clock, Dec. 31, 2012  
<http://www.census.gov/popclock/>

It takes 22 gallons of water to produce a pound of plastic.

### **SOURCE OF DATA:**

Hidden Waters  
[http://www.waterfootprint.org/Reports/Zygmunt\\_2007.pdf](http://www.waterfootprint.org/Reports/Zygmunt_2007.pdf)

### **CALCULATION:**

$6,350,000,000 \text{ lbs} / 315,073,604 \text{ people} / 365 \text{ days/yr} = 0.55 \text{ lbs/person/day}$

$0.55 \text{ lb/person/day} \times 22 \text{ gallons water/lb} = 12.1 \text{ gallons/person/day}$

If you say that you recycle some plastics we assume you recycle half of the plastic products you use and save 6.0 gallons per person per day.

| PLASTIC RECYCLING | GALLONS SAVED |
|-------------------|---------------|
| None              | 0             |
| Some              | 6.0           |
| All               | 12.1          |

Choose the answer that applies to your household to get the gallons per person per day. This number is subtracted from your score.

**AVERAGE:** 1.1 gallons per person per day

In the US, we recycle 8.8% of our plastics. 8.8% of 12.1 gallons is 1.1 gallons (1 gallon with rounding).

### **SOURCE FOR AVERAGE:**

Municipal Solid Waste Generation, Recycling, and Disposal in the United States: Facts and Figures for 2012  
[https://www.epa.gov/sites/production/files/2015-09/documents/2012\\_msw\\_dat\\_tbls.pdf](https://www.epa.gov/sites/production/files/2015-09/documents/2012_msw_dat_tbls.pdf)

## QUESTION: DO YOU RECYCLE CANS AND BOTTLES?

### **CALCULATION:**

Although we ask about cans and bottles, the calculations cover recycling of aluminum and glass, which is more encompassing than just cans and bottles.

11.57 million tons (23,140,000,000 pounds) of glass waste and 3.58 million tons (7,160,000,000 pounds) of aluminum waste were generated in the US in 2012. 27.7% of glass and 19.8% of aluminum was recovered through recycling.

### **SOURCE OF DATA:**

Municipal Solid Waste Generation, Recycling, and Disposal in the United States: Facts and Figures for 2012

[https://www.epa.gov/sites/production/files/2015-09/documents/2012\\_msw\\_dat\\_tbls.pdf](https://www.epa.gov/sites/production/files/2015-09/documents/2012_msw_dat_tbls.pdf)

There were 315,073,604 people in the US in 2012.

### **SOURCE OF DATA:**

US and World Population Clock, Dec. 31, 2012

<http://www.census.gov/popclock/>

It takes 10.5 gallons of water to produce a pound of aluminum and 0.8 gallons of water to produce a pound of glass.

### **SOURCE OF DATA:**

Hidden Waters [http://www.waterfootprint.org/Reports/Zygmunt\\_2007.pdf](http://www.waterfootprint.org/Reports/Zygmunt_2007.pdf)

### **CALCULATION:**

## **BOTTLES**

$23,140,000,000 \text{ lbs} / 315,073,604 \text{ people} / 365 \text{ days/yr} = 0.20 \text{ lbs/person/day}$

$0.2 \text{ lbs/person/day} \times 0.8 \text{ gallons water/lb glass} = 0.16 \text{ gallons/person/day}$

## **CANS**

$7,160,000,000 \text{ lbs} / 315,073,604 \text{ people} / 365 \text{ days/yr} = 0.06 \text{ lbs/person/day}$

$0.06 \text{ lbs/person/day} \times 10.5 \text{ gallons water/lb glass} = 0.66 \text{ gallons/person/day}$

## **BOTTLES AND CANS**

$0.16 + 0.66 = 0.82 \text{ gallons per person per day}$

If you say that you recycle some bottles and cans we assume you recycle half of the bottles and cans you use and save 0.4 gallons per person per day.

| <b>CANS &amp; BOTTLES RECYCLING</b> | <b>GALLONS SAVED</b> |
|-------------------------------------|----------------------|
| None                                | 0                    |
| Some                                | 0.4                  |
| All                                 | 0.8                  |

Choose the answer that applies to your household to get the gallons per person per day. This number is subtracted from your score.



**AVERAGE** (for cans and bottles): 0.2 gallons per person per day.

In the US, we recycle 27.7% of glass per year. 27.7% of 0.16 is 0.04 gallons per person per day.

In the US, we recycle 19.8% of aluminum per year. 19.8% of 0.66 is 0.13 gallons per person per day.

$0.04 + 0.13 = 0.17$ , or 0.2 (0 with rounding) gallons per person per day

While it might not take that much water to make new aluminum and glass products, it does take a lot of energy and, as you just found out, when you save energy you save water so when you recycle you're saving more water than you think.

**SOURCE FOR AVERAGE:**

Municipal Solid Waste Generation, Recycling, and Disposal in the United States: Facts and Figures for 2012

[https://www.epa.gov/sites/production/files/2015-09/documents/2012\\_msw\\_dat\\_tbls.pdf](https://www.epa.gov/sites/production/files/2015-09/documents/2012_msw_dat_tbls.pdf)

US and World Population Clock, Dec. 31, 2012

<http://www.census.gov/popclock/>

## RECYCLING TEXTILES

### QUESTION: DO YOU DONATE OR RE-USE OLD CLOTHING, SHEETS, BLANKETS AND TOWELS?

**CALCULATION:**

Plant based textiles are produced from crops that require water. For example, cotton can be grown in arid locations that have little precipitation so it needs water for irrigation. It takes about 20 gallons of water to produce 1 pound of textile product (including all fabrics), and in the US, on average we purchase about 35 pounds per person of new cotton each year. Polyester textiles are made from petrochemicals and still have a water footprint.

**SOURCE OF DATA:**

<http://infohouse.p2ric.org/ref/06/05656.htm>

Reusing what you already have and buying fewer new items is a great way to lower your water footprint. If you find you're ready to part with what you have, consider donating and recycling your textiles – clothing, sheets and towels, etc. Keeping them out of the waste stream helps to reduce your water footprint.

14.33 million (28,660,000,000 pounds) tons of textile waste was generated in the US in 2012. 15.7% of textiles were recovered primarily through recycling.

**SOURCE OF DATA:**

Municipal Solid Waste Generation, Recycling, and Disposal in the United States: Facts and Figures for 2012

[https://www.epa.gov/sites/production/files/2015-09/documents/2012\\_msw\\_dat\\_tbls.pdf](https://www.epa.gov/sites/production/files/2015-09/documents/2012_msw_dat_tbls.pdf)

There were 315,073,604 people in the US in 2012.

**SOURCE OF DATA:**

US and World Population Clock, Dec. 31, 2012

<http://www.census.gov/popclock/>

**CALCULATIONS:**

$28,660,000,000 \text{ lbs} / 315,073,604 \text{ people} / 365 \text{ days/yr} = 0.25 \text{ lbs/person/day}$

$0.25 \text{ lbs/person/day} \times 20 \text{ gal water/lb textiles} = 5.0 \text{ gallons per person per day}$

If you say you recycle some textiles, we assume you recycle half the textiles you use and save 2.5 gallons.

| TEXTILES RECYCLING | GALLONS SAVED |
|--------------------|---------------|
| None               | 0             |
| Some               | 2.5           |
| All                | 5.0           |

**CALCULATION:**

Choose the answer that applies to your household to get the gallons per person per day. This number is subtracted from your score.

**AVERAGE:** 0.8 gallons per person per day

In the US, we recycle 15.7% of our textiles. 15.7% of 5 gallons is 0.8 gallons (1 gallon with rounding).

**SOURCE FOR AVERAGE:**

Municipal Solid Waste Generation, Recycling, and Disposal in the United States: Facts and Figures for 2012

[https://www.epa.gov/sites/production/files/2015-09/documents/2012\\_msw\\_dat\\_tbls.pdf](https://www.epa.gov/sites/production/files/2015-09/documents/2012_msw_dat_tbls.pdf)

## FOOD (HUMAN AND PET)

### DIET

#### QUESTION: WHAT’S YOUR DIET?

**CALCULATION:**

In this question we ask you to account for all vegans, vegetarians and meat eaters in your household. Meat eaters have higher water footprints than vegans or vegetarians because ounce for ounce it takes more water and resources to produce livestock than it does to produce fruits and vegetables (this gives dairy products a higher water footprint as well).

Livestock can be grass-fed or pasture-raised instead or grain-fed but grass-fed and pasture-raised meat still has a large total water footprint because it takes water from rain and soil moisture to grow the grass the animals eat. Because of this and because the Water Footprint Network (WFN) uses an average total water footprint for all production systems (grass-fed, industrial and mixed) in their estimate of the water footprint of meat, we didn’t differentiate between grain-fed and grass-fed meat.

#### QUESTION: HOW OFTEN DO YOU EAT MEAT?

**CALCULATION:**

On a daily basis, some people eat more meat than others, so we created four categories for eating a little, an average amount or a lot of meat.

In order to determine the values that go with each category, we built a profile of a diet typical for someone living in the US (someone who eats meat, dairy, fruits and vegetables). Using this profile as a basis, we derived all the other profiles.

First, we assembled a “basket” of common food items in six categories: cereal grains (wheat, corn/maize, rice, barley, oats sorghum); vegetables (tomato, broccoli/cauliflower, cucumber, lettuce, cabbage, green beans, carrots); fruits (apple, orange, banana); beans (soybeans); dairy (milk, cheese, butter); meat (poultry, pork and beef); and other (eggs, sugar, potatoes).

**SOURCE OF DATA:**

FAOSTAT Food Balance Sheets

<http://www.fao.org/economic/ess/fbs/en/>

Then, we identified each item’s water footprint value in the WFN dataset. These values are global averages that come from WFN statistical analyses of United Nations data.

**SOURCE OF DATA:**

The green, blue and grey water footprint of crops and derived crop products, Value of Water Research Report Series  
<http://www.waterfootprint.org/Reports/Report47-WaterFootprintCrops-Vol2.pdf>

The green, blue and grey water footprint of crops and derived crop products, Hydrology and Earth System Sciences  
<http://www.waterfootprint.org/Reports/Mekonnen-Hoekstra-2011-WaterFootprintCrops.pdf>

The green, blue and grey water footprint of farm animals and animal products. Value of Water Research Report Series  
<http://www.waterfootprint.org/Reports/Report-48-WaterFootprint-AnimalProducts-Vol2.pdf>

A global assessment of the water footprint of farm animal products, Ecosystems  
<http://www.waterfootprint.org/Reports/Mekonnen-Hoekstra-2012-WaterFootprintFarmAnimalProducts.pdf>

Next we divided the water footprint of a food item by US consumption per person, to get the item’s water footprint per person.

**SOURCE OF DATA:**

FAOSTAT Food Balance Sheets (consumption per person – US resident)

<http://faostat3.fao.org/browse/FB/FBS/E>

(The FAOSTAT data comes from a searchable database only and is not available as a spreadsheet or PDF.)

We combined the water footprint values of each item in the basket of goods to get the total water footprint of a typical US diet in gallons of water per day. This included 3 to 5 servings of meat per day.

**SOURCE OF DATA:**

FAOSTAT Food Balance Sheets

<http://www.fao.org/economic/ess/fbs/en/>

Meat serving sizes were calculated based on FDA-recommended portions (3-4 ounces per serving).

**SOURCE OF DATA:**

USDA: Choose <https://www.choosemyplate.gov/protein-foods>

To determine the dietary consumption patterns of vegans and vegetarians, we used survey findings and assumed that vegans eat no meat or dairy while vegetarians eat dairy but no meat. In all cases except for vegans, egg consumption holds constant.

**SOURCE OF DATA:**

What do vegetarians in the United States eat?

<http://ajcn.nutrition.org/content/78/3/626S.full.pdf+html>

| DIET OF HOUSEHOLD MEMBERS | GALLONS PER DAY |
|---------------------------|-----------------|
| Vegan                     | 638             |
| Vegetarian                | 790             |
| Meat Not Every Day        | 834             |
| Meat Once a Day           | 1081            |
| Meat Twice a Day          | 1444            |
| Meat Every Meal           | 2171            |

**CALCULATION:**

Figure out which category each member of your household falls into. Multiply the value associated with that category by how many members are in that category, then add those results together and divide that by the number of people in the household to get the gallons of water per person per day.

**AVERAGE:** 1395 gallons per person per day

To determine the average, we used data from a Gallup poll about the type of diet Americans say they follow:

- 2% of the US population is vegan
- 5% of the US population is vegetarian
- 93% of the US population is omnivorous

**SOURCE OF DATA:**

In US, 5% Consider Themselves Vegetarians

[http://www.gallup.com/poll/156215/Consider-Themselves-Vegetarians.aspx?utm\\_source=alert&utm\\_medium=email&utm\\_campaign=syndication&utm\\_content=morelink&utm\\_term=USA%20-%20Wellbeing](http://www.gallup.com/poll/156215/Consider-Themselves-Vegetarians.aspx?utm_source=alert&utm_medium=email&utm_campaign=syndication&utm_content=morelink&utm_term=USA%20-%20Wellbeing)

We multiplied those percentages by the water use associated with the type of diet, then added those together. In a group of 100 people, there would be 2 vegans, 5 vegetarians and 93 meat eaters.

|               |   |         |
|---------------|---|---------|
| (2*638)       | = | 1,276   |
| (5*790)       | = | 3,950   |
| (93*1444)     | = | 134,292 |
|               |   |         |
| Total         | = | 139,518 |
| Divide by 100 |   | 1,395   |

**DOG OR CAT FOOD**

**QUESTION: HOW MUCH MONEY DO YOU SPEND ON DOG AND CAT FOOD EACH MONTH?**

**CALCULATION:**

All food has a water footprint, even dog and cat food (which is usually meat-based and can have a high water footprint). While you may have other animals, the water footprint calculator only accounts for cats and dogs.

Our calculation comes from a study which showed that for every \$1 you spend on dog and cat food, 200 gallons of water were required to produce it. The study looked at withdrawals for pet food. At this time there is no consumption data for pet food.

**SOURCE OF DATA:**

Pet Food Sucking Up US Water

<http://news.nationalgeographic.com/news/2010/04/100423-pet-food-water-footprint/>

Direct and Indirect Water Withdrawals for US Industrial Sectors, p. 44

<http://pubs.acs.org/doi/abs/10.1021/es903147k>

Direct and Indirect Water Withdrawals for US Industrial Sectors – Supplemental Tables, p. S5

[http://pubs.acs.org/doi/suppl/10.1021/es903147k/suppl\\_file/es903147k\\_si\\_001.pdf](http://pubs.acs.org/doi/suppl/10.1021/es903147k/suppl_file/es903147k_si_001.pdf)

**CALCULATION:**

Multiply 200 gallons of water by the amount you spend each month, divide that by the number of people in your household, then divide that by 30 days to get the gallons of water per person per day.

**AVERAGE:** 37 gallons per person per day

In the US we spent \$21.57 billion on pet food in 2013.

**SOURCE FOR AVERAGE:**

Pet Industry Market Size & Ownership Statistics

[http://www.americanpetproducts.org/press\\_industrytrends.asp](http://www.americanpetproducts.org/press_industrytrends.asp)

There were 317,292,487 people in the US in 2013

**SOURCE FOR AVERAGE:**

US and World Population Clock, Dec. 31, 2013

<http://www.census.gov/popclock/>

200 gallons/\$1 spent x \$21.57 billion / 317,292,487 people / 365 days/yr = 37 gallons per person per day.

**SOURCE FOR AVERAGE:**

Pet Food Sucking Up US Water

<http://news.nationalgeographic.com/news/2010/04/100423-pet-food-water-footprint/>

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## US Average

We added the average values for a typical profile of someone in the US and got a value of 2,220 gallons per person per day. We excluded greywater, rain barrels, pools and all recycling, because most people in the US don't have or, on a regular basis, do those things.

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For questions regarding these methods, please email [programs@gracelinks.org](mailto:programs@gracelinks.org)



[watercalculator.org](http://watercalculator.org)

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## ABOUT US

GRACE Communications Foundation develops innovative strategies to increase public awareness of the critical environmental and public health issues created by our current industrial food system, and to advocate for more sustainable alternatives.”



[gracelinks.org](http://gracelinks.org)

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