



Net Blue: Supporting Water-Neutral Community Growth



The Problem

- ▶ Many cities in North America are already challenged to meet their customer demands for water
- ▶ Growing population and economic growth will place even more pressure in arid and water-short areas
- ▶ As drought and water shortages occur, residents raise the issue about available water for new development when they are being restricted
- ▶ Some communities cannot accommodate growth with current water supplies



Business East Palo Alto imposes development moratorium due to lack of water



Some home building halted as counties react to water-rights case

Originally published December 10, 2016 at 1:52 pm | Updated December 10, 2016 at 3:05 pm

As counties across Washington respond to a far-reaching state Supreme Court decision involving water rights, angry and frustrated property owners are finding they cannot depend on groundwater wells to build new homes as they have in the past.

By PHUONG LE

The Associated Press

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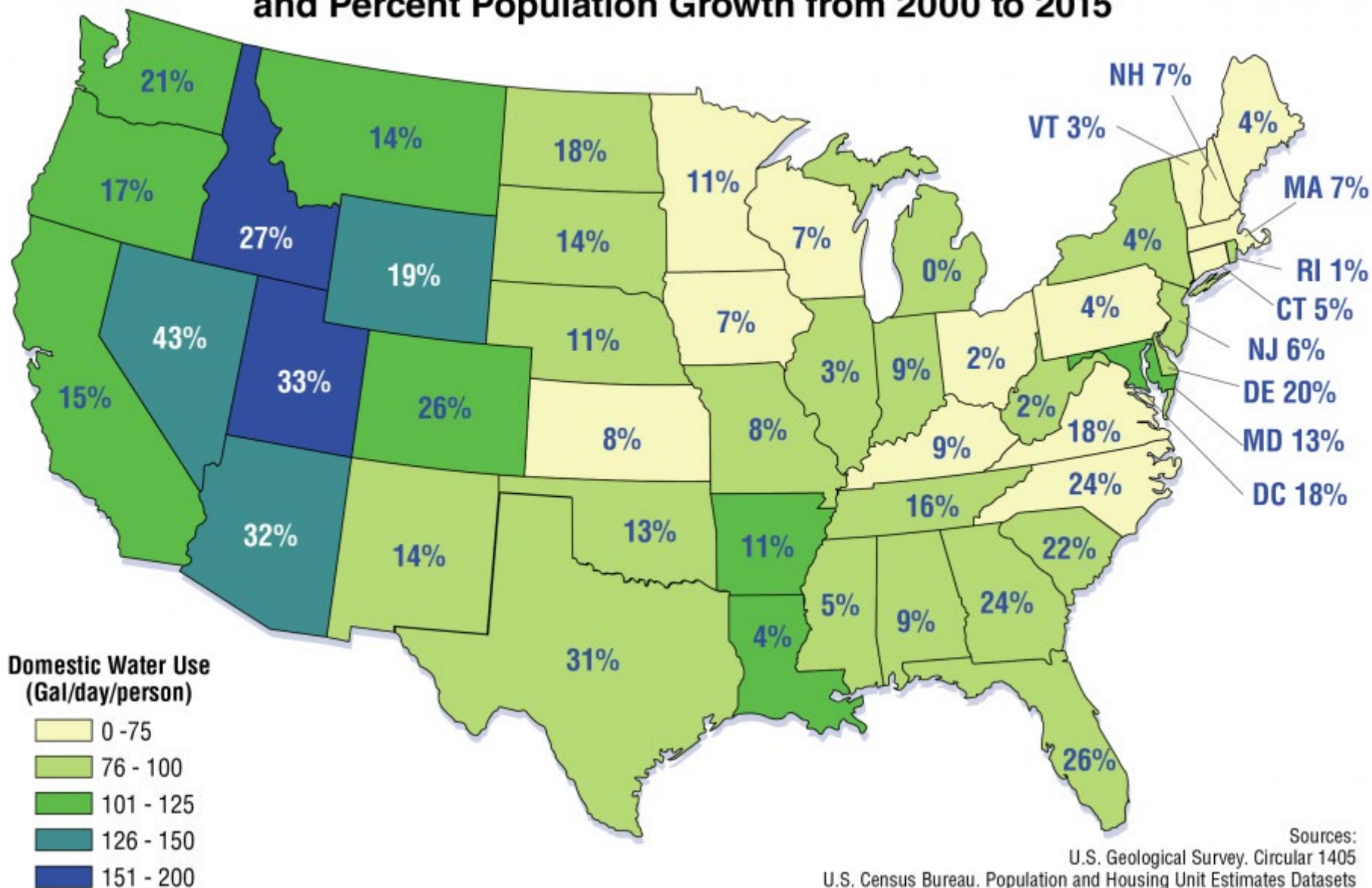
Email

As counties across Washington respond to a far-reaching state Supreme Court decision involving water rights, angry and frustrated property owners are finding they cannot depend on groundwater wells to build new homes as they have in the past.

State Water Board Issues Moratorium on New Water Connections



Domestic Water Use in Gallons per Day per Person and Percent Population Growth from 2000 to 2015



Sources:
U.S. Geological Survey. Circular 1405
U.S. Census Bureau. Population and Housing Unit Estimates Datasets

The Answer: Water Offsets

- ▶ Can allow growth without increasing system-wide water consumption across a community or a water supply service area
- ▶ Can be a combination of on-site water efficiency and off-site water efficiency
- ▶ Can reduce or completely eliminate impact of new development on water supply
- ▶ Can help avoid building moratoriums in resource-constrained communities



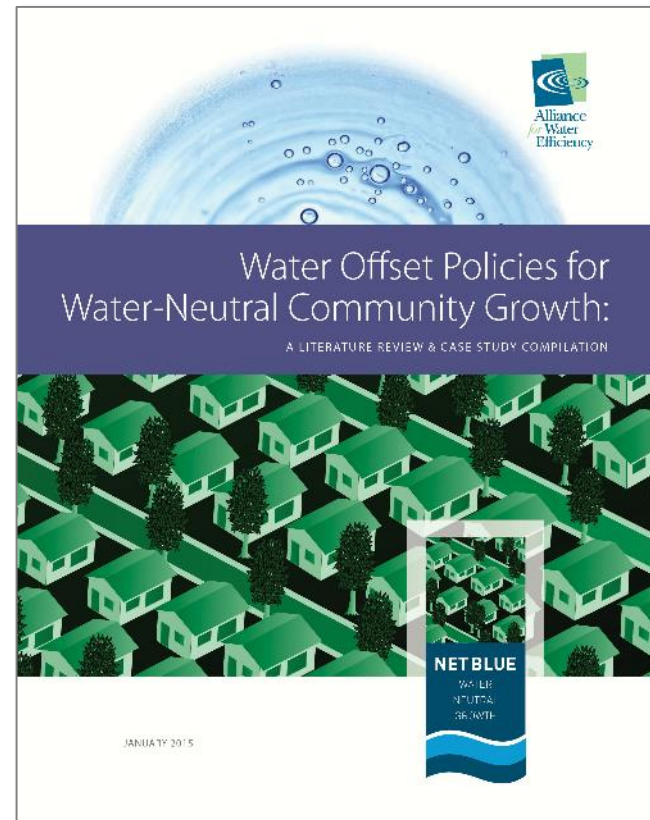
Approach

- ▶ Reviewed literature to identify potential water constraint scenarios where the ordinance may be used
- ▶ Dissected existing water offset ordinances
- ▶ Designed framework and needed decision points
- ▶ Drafted a model ordinance tool with:
 - Elements of existing water offset ordinances
 - Elements drawn from other laws
 - The results of AWE's water offset research

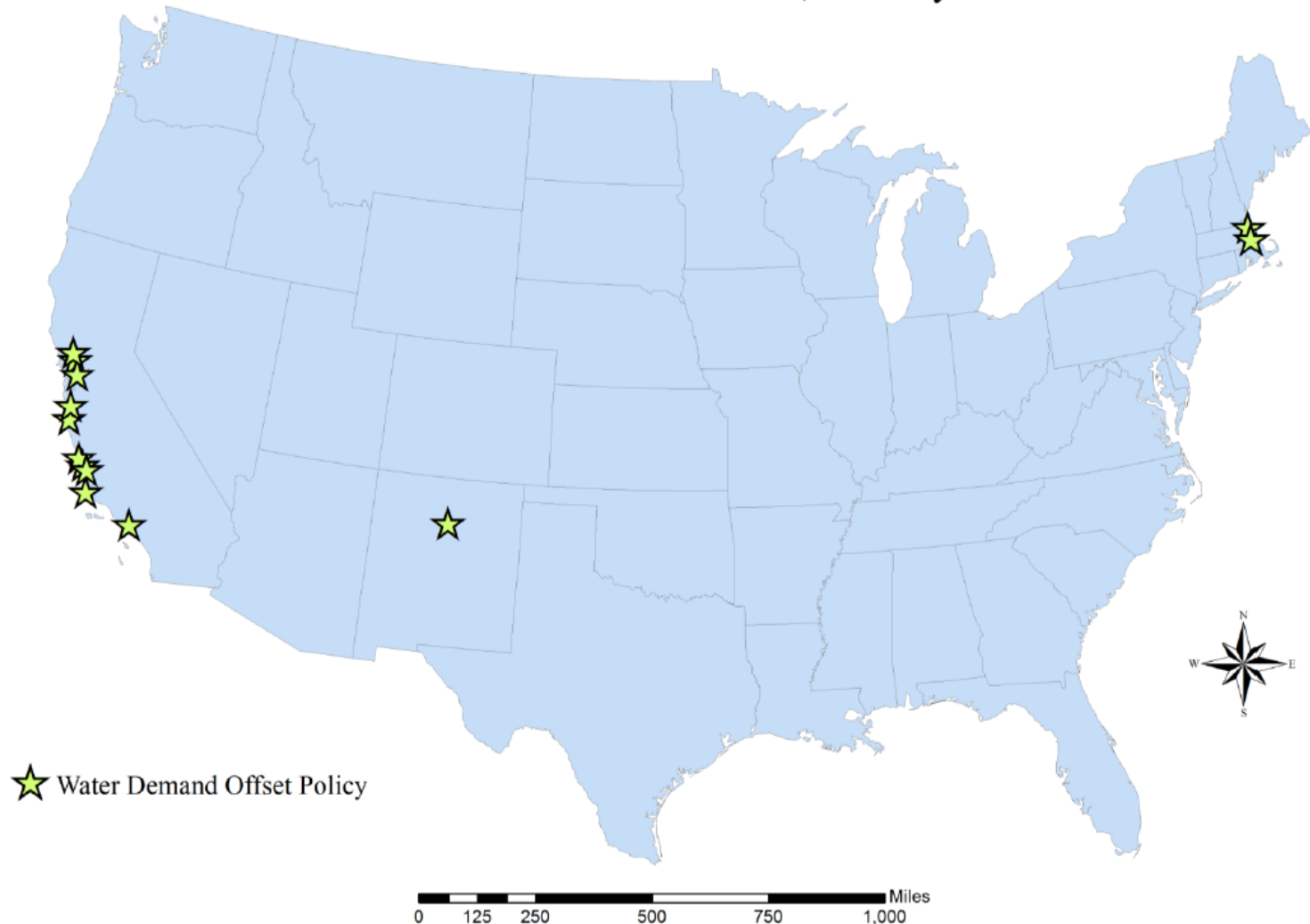


Reviewing Existing Examples

- ▶ AWE conducted research related to water demand offset policies
 - ✓ Reviewed terminology
 - ✓ Reviewed literature
 - ✓ Reviewed existing and past policies
- ▶ Purpose of review was to provide basis for the development of a national model planning and zoning ordinance

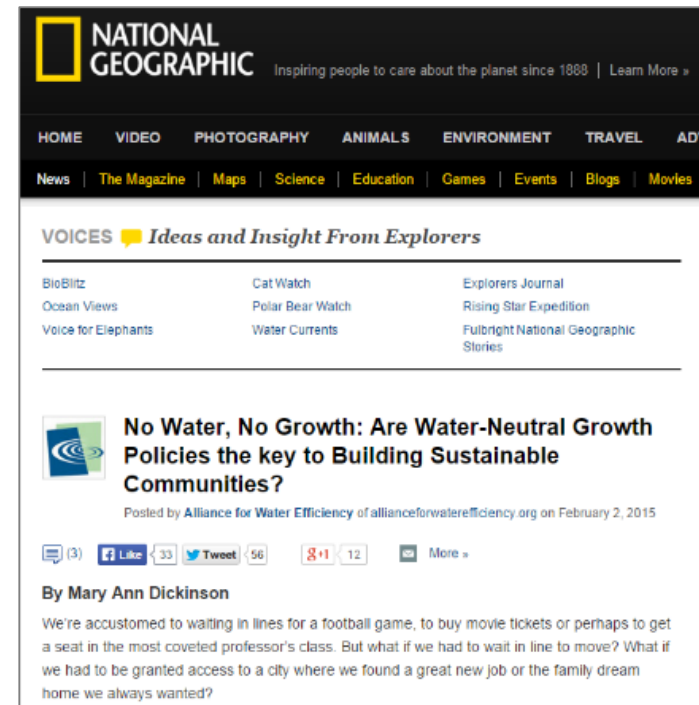


Water Demand Offset Policies Identified in the United States, January 2015

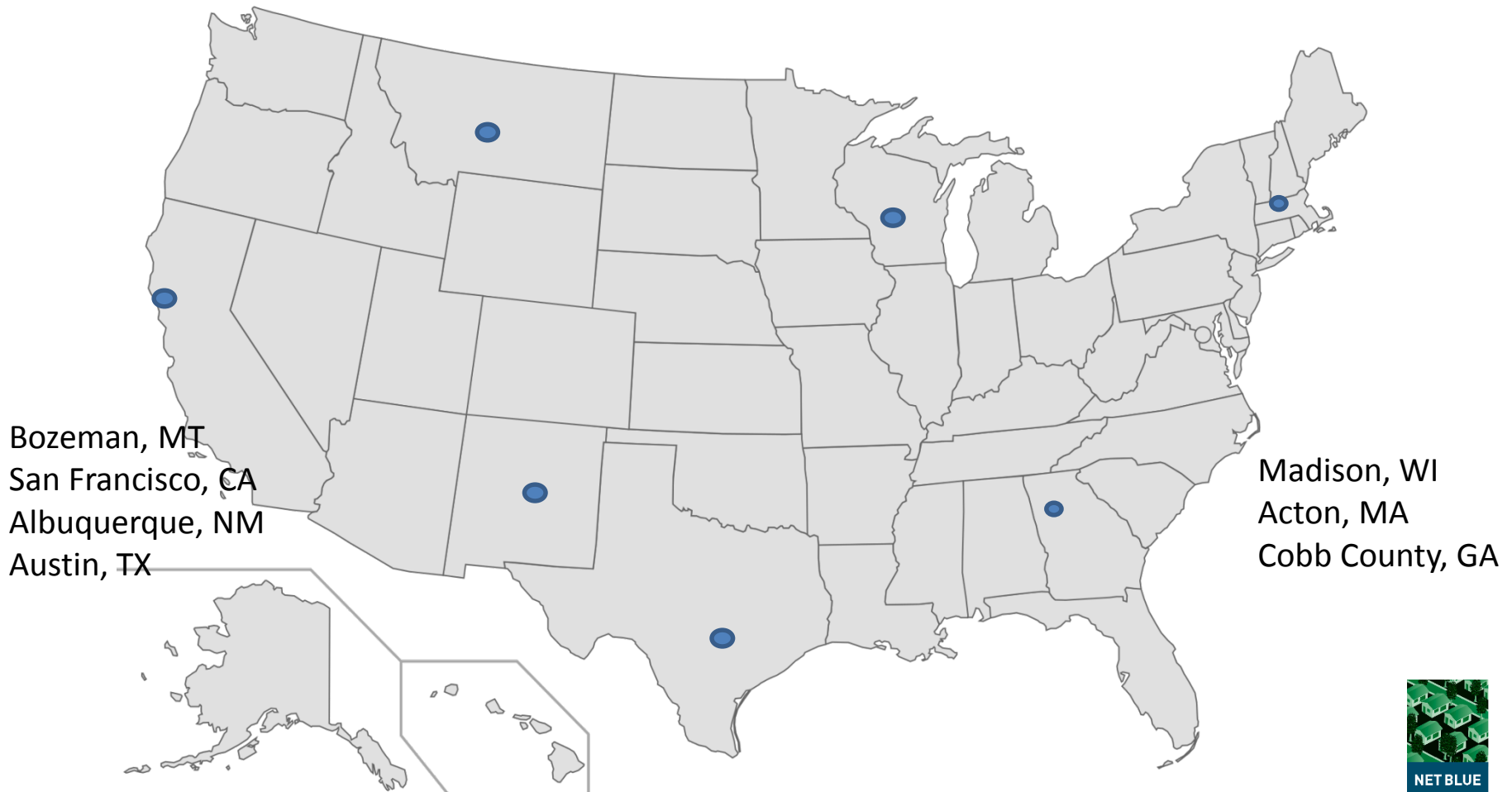


Net Blue: Water-Neutral Growth

- ▶ 3-year project to create a national ordinance development tool that can be tailored to create a customized water demand offset approach
- ▶ Partners: AWE, Environmental Law Institute, and River Network
- ▶ Funders: Scherman Foundation, Paul Johanson Foundation, and the Metropolitan Water District of Southern California
- ▶ Worked with 7 partner cities to vet the approach



Net Blue Partner Communities



Net Blue Project Advisory Committee

1. Dave Anderson (Planning & Zoning)
2. Jacob Atalla (Builder)
3. Sarah Bates (Water law)
4. Bill Cesanek (APA Water Task Force)
5. Doug Farr (Sustainability architect)
6. Kyle Harwood (Offset ordinance attorney)
7. Paula Kehoe (City)
8. Cooper Martin (League of Cities)
9. Dwight Merriam (Developer attorney)
10. Brian Richter (Environmental expert)



Launched Net Blue Toolkit 2017



The screenshot shows the website of the Alliance for Water Efficiency. The header features the organization's logo and the tagline "Promoting the Efficient and Sustainable Use of Water" over a city skyline. A navigation bar includes links for Home, Donate, News, Resource Library, Our Work, Committees, Join, Get E-News, and About, along with a search bar. The main content area displays a news article titled "Net Blue Toolkit to Help Communities Pursue Water-Neutral Growth" by the Alliance for Water Efficiency, Environmental Law Institute, and River Network. The article, dated 2017-05-01, discusses the launch of the Net Blue Ordinance Toolkit to help communities pursue sustainable development without increasing overall water demands. It mentions that 40 out of 50 states anticipate water shortages and that the toolkit provides a standardized methodology for pursuing water-neutral growth. A vertical graphic on the right side of the article reads "NET BLUE WATER NEUTRAL GROWTH".

home » news

Net Blue Toolkit to Help Communities Pursue Water-Neutral Growth

Alliance for Water Efficiency, Environmental Law Institute, and River Network Propose a Practical Path to Connect Land Use and Water Resources through Water Demand Offsets

2017-05-01

As population growth increases pressure on finite water supplies, the Alliance for Water Efficiency, Environmental Law Institute, and River Network today launched the **Net Blue Ordinance Toolkit** to help communities pursue sustainable development without increasing overall water demands.

Water managers in 40 out of 50 states anticipate water shortages within the coming years, according to a 2013 Government Accountability Office survey. Communities in some water-stressed areas already face limits to their development caused by insufficient water supplies.

"Communities urgently need to address the disconnect between land use decisions and water resources if they are to enjoy continued population and economic growth," said Mary Ann Dickinson, President and CEO, Alliance for Water Efficiency. "Water managers, planners, and developers must come together to think about growth differently. Net Blue makes it easier to connect these dots, with community-vetted tools, a standardized methodology, and a clear process for pursuing successful water-neutral growth."

Water-neutral growth ordinances can either require or incentivize residential and commercial developments to offset their projected additional water demand through water-efficient retrofits of existing development. Offset measures such as fixture and appliance replacements, rainwater harvesting and storm water capture, can allow development without increasing the overall water demand. Water efficiency stretches existing supplies, decreases the need for new infrastructure, and preserves water for fish, wildlife, and recreation.



Net Blue Toolkit

1. Model Ordinance Worksheet
2. Model Ordinance User Guide
3. Three Ordinance Examples
4. Offset Methodology Workbook
5. Offset Methodology User Guide
6. Three Offset Examples matching the ordinance examples
7. Outreach Materials



The Model Ordinance Worksheet

- ▶ We built an ordinance-development tool, not just a model ordinance, because:
 - Variety of settings: constraints, governing entities, enabling laws
 - We anticipate a variety of users (not just lawyers)
 - It is intended to assist with outreach
- ▶ This tool is intended to help the users identify and think about critical issues



The Ordinance Parts and Organization

Establishing the Legal Basis

Purpose

Findings

Authority

Fashioning the Ordinance

Requirement and Applicability
or Incentive

Definitions

Determining the Offset Amount

Identifying the Offset Activities

Enforcing the Ordinance

Compliance with the Offset

Verification

Monitoring (optional)

Enforcement

Options for the Ordinance

Offset Credit Bank (optional)

In-Lieu Fee (optional)

Administrative Fees (optional)

Modifications (optional)

Administering the Ordinance

Appeals

Severability

Consistency with Other Laws

Effective Date





NET BLUE WATER NEUTRAL GROWTH

Purpose:

The declaration of an ordinance's purpose primarily helps reviewing courts and officials charged with its administration to interpret the ordinance. A purpose section also can inform (a) elected officials as to why they are adopting the ordinance, and (b) the general public and property owners as to the intent of the ordinance.

Reference ordinances: [Dungeness River Watershed](#); [Monterey County](#); [Morro Bay \(Ch. 13.20\)](#); [San Luis Obispo County \(Title 26\)](#); [Soquel Creek Water District](#)

The purpose of this ordinance is to: **[select all that apply]**

- Protect and promote the public health, safety, and general welfare
- ☐ Ensure that there is enough water at all times to meet the basic needs of the community, including fighting fires
- ☐ Establish and assist in achieving sustainability goals and objectives
- ☐ Manage the demand for more water in **identified city, county, or district**, to ensure that **[select the applicable one]**
 - ☐ demand for water does not exceed available current or future supply
 - ☐ demand for water does not exceed the sustainable yield of the source
 - ☐ demand for water does not disproportionately adversely affect certain water user groups (e.g., low-income communities or the environment)
 - ☐ demands on water infrastructure do not exceed its capacity or impair its function
- ☐ Ensure a reasonable and orderly process and pace of making water **supply / infrastructure capacity** available to new users
- ☐ Minimize the adverse effects on the community of limitations on **identified city, county, or district's** water **supply / infrastructure**
- ☐ Manage **water / water infrastructure** to better satisfy both present and future human needs
- ☐ Manage **water / water infrastructure** to be more resilient to drought



This section clarifies the effect that this ordinance has on other laws, to what extent it is limited by other laws and to what extent it supersedes other laws.

Reference ordinances: [Dungeness River Watershed](#); [Morro Bay \(Ch. 13.20\)](#)

This ordinance shall not affect: **[select one or more]**

- ☐ Rights to surface water and groundwater in existence before the effective date of this ordinance
- ☐ Federal and tribal reserved rights
- ☐ State duty-to-serve laws
- ☐ **Other rights, laws, or plans**

[Select one or none]

- ☐ To the extent the provisions of this ordinance conflict with any provisions in the existing **laws and codes**, the provisions of this ordinance shall supersede and control.
- ☐ In the event of conflicts between the provisions of this ordinance and **laws and codes**, the more restrictive provisions shall prevail.

Effective Date:

This ordinance shall take effect **[select one]**

- ☐ immediately upon adoption.
- ☐ on **date**.
- ☐ upon **triggering event (e.g., declaration of drought)**.

Press Me


Press this button only once, and please be patient.

*It will take **up to a minute** to produce the new document (during which time Word will be unresponsive).*



Methodology Workbook

- Designed to help communities evaluate and select off-site offsets for development projects



NET BLUE
WATER
NEUTRAL
GROWTH

[Offset Strategies](#)

[Selected Offsets](#)

[Res-Toilet Stock Estimate](#)

[Rainwater Harvesting](#)

[Stormwater Calculator](#)

Net Blue is a collaborative initiative of the Alliance for Water Efficiency, the Environmental Law Institute, and River Network to support sustainable community growth.

This tool accompanies the model ordinance template and is intended to help communities evaluate and select strategies to offset the projected potable water use of new development or expanded use of existing connections. This workbook is related to offsite offsets and does not include calculations to determine the demand of new development, including onsite demand reduction measures.

This workbook contains the following worksheets:

Offset Strategies – The *Offset Strategies* worksheet can be used to evaluate and select a suite of measures to offset the demand of new or expanded water use. It contains example offset strategies related to indoor water fixture and appliance replacements and retrofits. Custom offset strategies can also be entered by the user.

Selected Offsets – This worksheet contains table that can be used to compile selected offset strategies for a new or expanded water use project. It can also be used to tally offset implementation. It is populated based on selections made on the *Offset Strategies Worksheet*.

Res-Toilet Stock Estimate – This worksheet can be used to create a general estimate of the stock of inefficient toilets in a given service area if such an estimate does not already exist. This can be helpful to determine the potential for inefficient toilet replacements which is typically a cost-effective and reliable strategy that provides theoretically permanent water savings.

Rainwater Harvesting – This worksheet contains a calculator for estimating the yield of rainwater harvesting (RWH is assumed to be the rain that falls on building roofs; rain not on roofs is considered stormwater.) It carefully addresses how much of the harvested rainwater is used on-site (and thus reducing on-site potable water demand) and how much rainwater is used off-site to offset potable water demand offsite.

Stormwater Calculator – This worksheet contains information and links to the USEPA Stormwater Calculator. If stormwater is captured and can be distributed off-site use, then this volume of water would qualify as a potable water demand offsite.

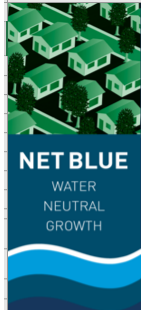


Workbook Components

- ▶ New demand information
- ▶ Offset strategy evaluation worksheet
 - Water conservation strategies
 - Rainwater harvesting
 - Stormwater capture
 - Custom offsets
- ▶ Selected offsets worksheet
- ▶ Supplemental sheets
 - Inefficient toilet stock estimator
 - Baths and Half Baths Housing Data



Offset Strategy Worksheet



Offset Strategies Worksheet

This worksheet can be used to evaluate and select a suite of measures to offset the demand of new or expanded water use. It contains example offset strategies related to indoor water fixture and appliance replacements and retrofits. Cooling tower retrofits are also included. Additionally, the user can enter custom measures. Example savings estimates are provided for the included offsets, but the user is encouraged to evaluate savings of offset strategies in relation to their service area.

User inputs and selections are required in cells with a white background: User Input Green cells do not require any input or selection.

Selecting "Yes" in 'Column J' will include the offset measure in the *Selected Offsets* worksheet as long as 'Column D' is populated with a savings estimate value.

Step 1: Enter Information about New or Expanded Water Use

Project Name/Description	Example Development	
Projected New Potable Water Demand of New or Expanded Use	500,000	Gallons per Year
Does above estimate include adjustment for on-site rainwater harvesting?	No	
Use RWH_Calculator estimate of on-site rainwater harvesting?	No	
Are USEPA Stormwater calculator results used in this model?	No	
Percent of New or Expanded Use that Must be Offset	110%	
Total Offset Requirement for New or Expanded Water Use	550,000	Gallons per Year

Select Gallons, Million Gallons, Acre-Feet, Litres or Megalitres per Year

Step 2: Enter Persons Per Household for the Service Area (used to generate savings for toilet replacements)

Service Area Average Persons Per Household Single-Family	2.50
Service Area Average Persons Per Household Multifamily	2.00

Step 3: Define and Select Water Demand Offset Strategies

Offset Strategy	Example Savings Estimate Per Replacement/Retrofit in Gallons per Year*	User Specified Savings Estimate Per Replacement/Retrofit in Gallons per Year	Approximate Number of Replacements/Retrofits to Meet Offset if Sole Strategy?	Related Plumbing Code?	Useful Life	Seasonality of Water Savings	Percent of Total Offset Requirement per Replacement/Retrofit	Include in Selected Offset Table?
Single-Family High-Efficiency Toilet Replacements	9,541	9,500	58	Yes	Theoretically Permanent	Even throughout year	2%	Yes
Multifamily High-Efficiency Toilet Replacements	16,472	15,000	37	Yes	Theoretically Permanent	Even throughout year	3%	Yes
Showerhead Replacement Single-Family	2,062		-	Yes	Theoretically Permanent	Even throughout year	-	No
Showerhead Replacement Multifamily	1,898		-	Yes	Theoretically Permanent	Even throughout year	-	No
Single-Family Clothes Washer Replacement	7,043	7,000	79	Yes	Theoretically Permanent	Even throughout year	1%	Yes
Multifamily Clothes Washer Replacement	25,310	25,000	22	Yes	Theoretically Permanent	Even throughout year	5%	Yes
CII Urinal Replacements or Retrofits	6,206	6,000	92	Yes	Theoretically Permanent	Even throughout year	1%	Yes
CII High-Efficiency Toilet Replacements	13,020	13,000	42	Yes	Theoretically Permanent	Even throughout year	2%	Yes
Laundromat Clothes Washer Replacements	31,435		-	Yes	Theoretically Permanent	Even throughout year	-	No
Commercial Dishwasher Replacements	57,757		-	No	20 Years	Even throughout year	-	No

Intro **Offset Strategies** Selected_Offsets Res_Toilet_Slack RWH_Calculator Stormwater_Calculator RWH 10 ...



Selected Offset Table



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WATER
NEUTRAL
GROWTH

Selected Offsets

Update Selected
Offsets Table

This worksheet contains an auto-populating table based on user selections made in the *Offset Strategies* worksheet. The table can be populated using the "Update Selected Offsets Table" button to the right of the Net Blue logo. The user manually enters the implementation value (e.g., number of toilet replacements) in 'Column D.' The 'Percent of Total Offset Requirement' column is automatically calculated after the user specifies implementation. If changes are made in the *Offset Strategies* worksheet, the user must update the selected offsets table using the "Update Selected Offsets Table" button.

Offset Strategy	Savings Per Unit in Gallons per Year	Number to be Implemented	Percent of Total Offset Requirement
Single-Family High-Efficiency Toilet Replacements	9,500	15	13%
Multifamily High-Efficiency Toilet Replacements	15,000	10	13%
Single-Family Clothes Washer Replacement	7,000	10	6%
Multifamily Clothes Washer Replacement	25,000	5	11%
CII Urinal Replacements or Retrofits	6,000	10	5%
CII High-Efficiency Toilet Replacements	13,000	10	12%
Pre-Rinse Spray Valve Replacements	28,000	10	25%
Rainwater Harvesting (Off-site)	155,722	1	14%
Total			100%



Intro

Offset_Strategies

Selected_Offsets

Res_Toilet_Stock

RWH_Calculator


Stormwater_Calculator

RWH 10 ...



NET BLUE

Residential Inefficient Toilet Stock Estimate Worksheet

	A	B	C	D	E	F	G	H	I	J	K	L	M
1		Residential Inefficient Toilet Stock Estimate Worksheet											
2		<p>This worksheet can be used to create a general estimate of the stock of residential inefficient toilets (assumed flush volume 3.5 gallons or more) in a given service area if such an estimate does not already exist. The assumptions are based on natural replacement resulting from the Energy Policy Act of 1992. The Energy Policy Act of 1992 took effect in 1994 and required 1.6 gpf toilets for all point of sale and installations. California and Texas required 1.6 gpf toilets beginning in 1992. Utility implemented toilet replacement programs could be factored into the toilet fixture stock estimates as well. The estimates for single-family and multifamily are generated in rows 24 and 25 of 'Column C.'</p>											
3		Enter Current Year	2018	Assumed Annual Toilet Replacement Rate:	4%								
4		Community Located in California or Texas?	No										
5		Single-Family Housing Units Built before 1994	100,000										
6		Multifamily Housing Units Built before 1994	50,000										
7		Full Bathrooms Per Household - Single-Family	1.75										
8		Half Bathrooms Per Household - Single-Family	0.75										
9		Full Bathrooms Per Household - Multifamily	1.00										
10		Half Bathrooms Per Household - Multifamily	0.25										
11													
12													
13													
14													
15													
16													
17													
18													
19													
20													
21													
22													
23			2018										
24	Estimated Inefficient Single-Family Toilet Stock		93,850										
25	Estimated Inefficient Multifamily Toilet Stock		23,460										
26													

Bathroom Per Household Table

If bathrooms per household are unknown, the Bathroom per Household Table provides estimates

Rainwater Harvesting Calculator

- ▶ Calculates the amount of harvested rainwater available for on-site and off-site use
- ▶ Simulates daily cistern performance over 10-year period using weather data you import into the model
- ▶ Estimates potential on-site uses for landscape irrigation and indoor plumbing
- ▶ Calculates surplus harvested rainwater available for off-site uses
- ▶ Four steps to setup and use the calculator



Rainwater Harvesting Calculator



Rainwater Harvest Calculator

This calculator can be used to estimate potential demand offsets from rainwater harvesting and use by a residential or non-residential development fitted with a rainwater collection and storage system (or multiple systems). Three potential demand offsets are estimated: (1) onsite irrigation demand, (2) onsite indoor plumbing demand, and (3) unspecified offsite demand. The calculator simulates daily rainwater collection, storage, and use over a 10-year period using weather data you import into the workbook. There are four steps to setup and use the calculator. The instructions on this worksheet will guide you through each step. Additional information about the calculator is available in the User Guide. The four steps are:

1. Import the weather data.
2. Enter information about onsite landscaping that would potentially use water from the rainwater collection and storage system for irrigation.
3. Enter information about indoor plumbing fixtures that would potentially use water from the rainwater collection and storage system for their operation.
4. Enter information on the design of the rainwater collection and storage system.

Step 1: Import the weather data

Note: to complete this step your computer must be connected to the internet.

In this step you will download the weather data used by the calculator to simulate rainwater collection and storage system performance. To download the data you will need to know the latitude, longitude, and elevation of the location where the rainwater collection and storage system would be installed. Enter these values in the indicated cells below. If you do not know these values, click on this link: [Get Latitude, Longitude, and Elevation](#). Use the navigation features on the map on the webpage to locate your site. Once you have located your site on the map, use your mouse's pointer and click the location. Copy the latitude and longitude coordinates and the elevation.

Latitude	38.600
Longitude	-121.500
Elevation	20 Feet

Now you are ready to download the weather data. Click this link to go to the website with the data you will download: [Get weather data](#). On this webpage you complete five steps to download the weather data for your site. Screen shots of each step are shown to the right of this text box. Follow these steps exactly. The calculator will not import the data unless it is formatted correctly.

STEP ONE: Set 'Select Frequency of Desired Data:' to **daily data**; set 'Select Scenario:' to **historical (1950-2005)**; set 'Min Year:' on the left to **1996** and the one on the right to **2005**.
STEP TWO: Enter your latitude (N) and longitude (E) values in the indicated fields. You can use the map on the webpage to confirm the coordinates correspond to your site location.
STEP THREE: Set the number of variables for CSV columns to **7**.
STEP FOUR: Set the first row of columns 2-7 to **MACAv2-METDATA (Climate)**. Set the first row of column 8 to **MACAv2-LIVNEH (Climate)**. See the example to the right.
Set the second row of all the columns to **GFDL-ESM2M (USA)**
Set the third row of the columns as follows: **col 2 pr(Precipitation)**, **col 3 rds(Downwelling Solar Radiation)**, **col 4 tasmax(Max Temperature)**, **col 5 tasmin(MinTemperature)**, **col 6 rhsmx(Max Rel Humidity)**, **col 7 rhsmn(Min Rel Humidity)**, **col 8 was(Wind Speed)**.
Warning: The columns must be specified exactly as described above or the calculator will not import the data.
STEP FIVE: Click the button **DOWNLOAD CSV**. A csv formatted file with the data will download to your default download folder. The default file name is 'data.csv.' However, if there is already a file in your default download folder with this name, a number in parentheses will be appended to the file name, like 'data (1).csv.'

Now you can import the weather data into the workbook. Click the 'Import Weather Data' button to the right and use the File Explorer to navigate to the data file you downloaded. It will be located in your default download folder, which is probably a folder named 'Downloads.' Once you have navigated to the folder with the file, highlight the file and click the Open button. If the data is imported successfully, you will receive a message telling you this. Otherwise you will receive a message telling you the data could not be imported and to try downloading and importing the data again.

Import
Weather
Data



Rainwater Harvesting Calculator

Step 2

Step 2: Enter information about site landscaping that would potentially be irrigated with harvested rainwater

In this step you will enter information on the area and type of landscaping that would potentially be irrigated with harvested rainwater on the site of the rainwater collection and storage system. The calculator will combine this information with the weather data you imported in Step 1 to calculate daily landscape irrigation requirement over the 10-year simulation period.

First enter the months that define the irrigation season. If irrigation occurs year round, enter Jan as the starting month and Dec as the ending month. Next enter the total landscaped area that would potentially be irrigated with harvested rainwater in the specified units (sq. ft. or sq. meters). Now use the Plant Type table to enter the percentage of total landscaped area that will be planted to each type of landscaping. Irrigation water demand depends on the distribution uniformity (DU) of the irrigation system. The calculator uses a default distribution uniformity of 75%. You can adjust this value to between 60% and 90%. Irrigation water demand is inversely related to DU -- the higher the DU, the lower the water requirement. Values below 70% indicate problems with the irrigation system. Values between 70% and 90% indicate acceptable performance. Values above 90% indicate exceptional performance. It is virtually impossible to attain 100% DU in practice. Irrigation water demands are calculated using the SLIDE method. Click this link for more information on the SLIDE method for estimating irrigation water demand: [Take me to the SLIDE webpage.](#)

Irrigation Water Demand Parameters

	Starting Month	Ending Month
Irrigation Season	Mar	Oct
Total area irrigated	3,000	Sq.Ft.

Month Range Okay

Plant Type	% of Area	Distrib. Uniformity	Plant Factor
General Turfgrass Lawns, cool-season (tall fescue, Ky. bluegrass, rye, bent)	50%	75%	0.8
General Turfgrass Lawns, warm-season (bermuda, zoysia, St. Augustine, buffalo)	0%	75%	0.6
Trees, Shrubs, Vines, Groundcovers	25%	75%	0.5
Herbaceous Perennials	10%	75%	0.5
Annual Flowers & Bedding Plants	5%	75%	0.8
Home Fruit and Vegetable Crops	0%	75%	1.0
Desert Adapted Plants	10%	75%	0.3

Total/Avg 100% 75% 0.645

Sum Check Okay



Rainwater Harvesting Calculator

Step 3

Step 3: Enter information about plumbing fixtures that would potentially use water from the rainwater collection and storage system for their operation

In this step you will enter information about onsite plumbing fixtures that would potentially be operated with water from the rainwater collection and storage system. You specify the plumbing fixture uses for a residential or non-residential site. If no such uses are contemplated, select 'None' for type of site. If you are modeling a non-residential site, you can choose from three types: (1) commercial/industrial facility, (2) school/museum/etc., or (3) retail store(s). After selecting the type of site, enter the average number of residents, employees, students/visitors, or customers for the site. Next, use the check boxes to select the plumbing fixtures that would potentially be operated with water from the rainwater collection and storage system and then enter the daily fixture utilization and water use values. You can copy the recommended values or enter your own. Lastly, enter the daily water use for any other potable water demands that would potentially be served with water from the rainwater collection and storage system. If none, enter zero or leave blank.

Select type of site

Residential ▼

Avg persons per household 2.50

Select plumbing fixtures that would potentially be operated with water from the rainwater collection and storage system

☒ Toilets ☒ Clothes Washer

Enter daily plumbing fixture utilization

	User Value	Recommended Value
Toilet flushes/person/day	4.75	4.75
Clothes washer loads/person/day	0.3	0.3

Enter fixture water use

	User Value	Recommended Value	
Toilet water use per flush	1.28	1.28	gallons/flush
Clothes washer water use per load	31	31	gallons/load

Daily calculated water use

	User Estimate	Recommended Estimate	
Toilets	15	15	gallons/day
Clothes washer	23	23	gallons/day
Other potential water use	0	0	gallons/day
Total	38	38	gallons/day



Rainwater Harvesting Calculator

Step 4

Step 4: Enter design information for the rainwater collection and storage system

In this step you enter design information for the rainwater collection and storage system. Two types of information are needed: (1) the drainage area that will harvest rainwater and (2) the cistern design for storing harvested rainwater. The drainage area consists of roof and other impervious areas that will drain to the cistern. You can specify either a cylindrical or rectangular cistern. If you specify a rectangular cistern, you will enter its length, width, and depth. If you specify a cylindrical cistern, you will enter its diameter and depth. If your cistern design is oddly shaped, simply choose either rectangular or cylindrical and parameterize it so that the resulting volume matches the volume of your cistern design. The proposed cistern size should be sufficient to store a minimum of 0.25 inches of rainfall per square foot (0.635 cm of rainfall per square meter) of drainage area. You will be alerted if this is not the case.

	User Value	Recommended Value	
Average runoff coefficient	0.85	0.85	Recommend 0.85 for roofs.
Cistern drainage area	2,500		square feet
Cistern shape	Cylindrical		
Cistern diameter	5		feet
Cistern depth	9		feet
N/A. Does not apply to cylindrical shapes			
Cistern footprint area	20		square feet
Cistern volume	177		cubic feet
Cistern volume	1,322		gallons

Cistern volume check okay

Rainwater Harvesting Calculator

Results

Simulation Results

Enter the number of sites that will have the rainwater collection and storage system installed. The results of the rainwater harvesting simulation are summarized below. The first table shows the average annual onsite demand that would potentially be supplied by harvested rainwater. The second table shows the average annual harvested rainwater used onsite and the percent of onsite demand served. The third table shows the average annual amount of harvested rainwater overflow that could potentially be used offsite. The fourth table shows the monthly averages for rainfall, captured runoff, onsite demand, onsite use, and overflow for offsite use. You can also review the daily simulation for the entire 10-year period on the RWH 10-yr Simulation worksheet.

To use the simulation results on the Offset_Strategies worksheet, enter the number of systems that will be installed, use the drop-down to indicate if these systems will be installed on the development property or a different property, and click the 'Export Results to Offset_Strategies Worksheet' button.

Enter the number of structures that will have this rainwater collection and storage system

20

Use drop-down to select where system(s) will be installed

On the development property

Average annual onsite demand potentially supplied by harvested rainwater

Landscape irrigation	2,149,666 gallons
Indoor plumbing	280,839 gallons
Total	2,430,505 gallons

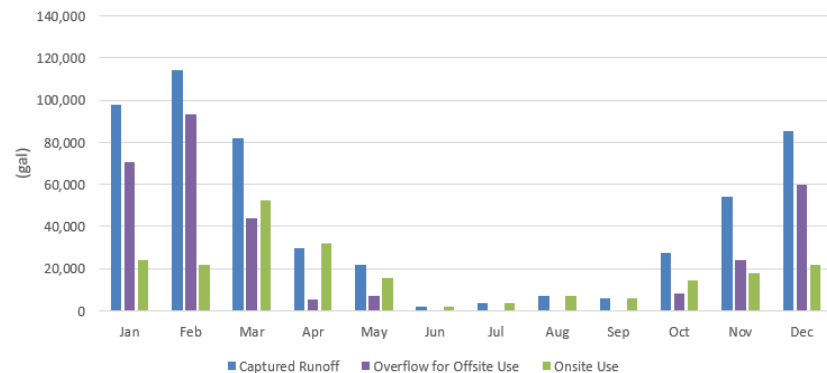
Average annual harvested rainwater used onsite

Site demand met with harvested rainwater	217,978 gallons
% of site demand met with harvested rainwater	9.0%

Average annual harvested rainwater overflow available for offsite use

Harvested rainwater overflow available for off-site use	311,444 gallons
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Simulated Monthly Harvested Rainwater



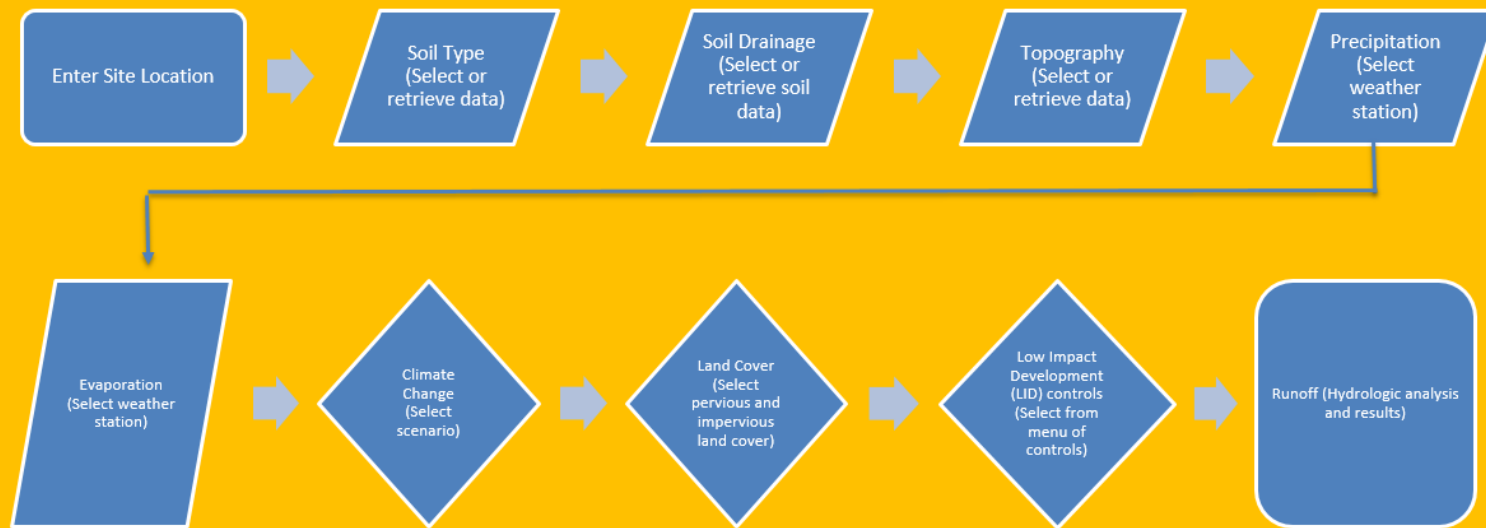
Simulated Monthly Onsite Demand Met with Harvested Rainwater



Stormwater Calculator

[[Click for link to EPA: National Stormwater Calculator](#)]

Conceptual Model of EPA National Stormwater Calculator



Are USEPA Stormwater calculator results used in this model? ☒ No ☐ Yes Values below not be linked to Offset Strategies

Enter output from National Stormwater Calculator:

Area:	2.00	acres
Runoff (inches) Current Scenario:	6.13	inches annual runoff
Proportion of Runoff that will be used off-site	50%	



Stormwater Calculator

[Environmental Topics](#)[Laws & Regulations](#)[About EPA](#)**Related Topics:** [Water Research](#)[CONTACT US](#)[SHARE](#)

National Stormwater Calculator

Register now for a [free webinar](#) on January 31, 2018 that will provide a demonstration and introduce new features.

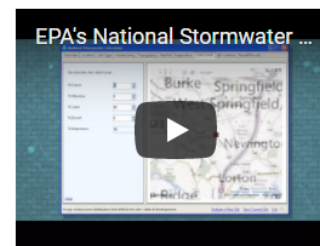
Tool to help control runoff and promote the natural movement of water

EPA's National Stormwater Calculator (SWC) is a software application that estimates the annual amount of rainwater and frequency of runoff from a specific site. Estimates are based on local soil conditions, land cover, and historic rainfall records. It is designed to be used by anyone interested in reducing runoff from a property, including site developers, landscape architects, urban planners, and homeowners.

The SWC accesses several national databases that provide soil, topography, rainfall, and evaporation information for a chosen site. The user supplies information about the site's land cover and selects low impact development (LID) controls they would like to use. The LID controls include seven green infrastructure practices.

[Access the
Mobile Web App](#)[Green Infrastructure as Low Impact Development Controls](#)[Capabilities](#)

Additional Information



Example #1: City of Smithville

- ▶ City Government with ongoing surface water shortage
- ▶ Offsets required of new buildings, remodels, and changes of use
- ▶ Compliance required at time of Certificate of Occupancy
- ▶ Monitoring required
- ▶ Offset amount 110%
- ▶ No in-lieu fee option



Example #1: Offset

- ▶ Five single-family dwelling units each having 4 bedrooms, 2 full bathrooms, and 2 half bathrooms
- ▶ Projected annual water demand: 500,000 gallons
- ▶ Required Offset amount: 110%, or 550,000 gallons per year
- ▶ Offset strategy: Single-family toilet replacements of 3.5 gpf or higher with WaterSense toilets at 1.28 gpf
- ▶ Each toilet estimated at 10,000 gallons/year saved
- ▶ Offset amount: 55 toilets



Outreach Materials

- ▶ Fact Sheet
- ▶ Frequently Asked Questions
- ▶ All outreach items online
- ▶ Requests for toolkit online

www.net-blue.org

**NET BLUE** Frequently Asked Questions

A collaborative initiative of the Alliance for Water Efficiency, the Environmental Law Institute, and River Network
www.net-blue.org



1. What is Net Blue?
"Net Blue" is an approach to keep water use at the same or reduced levels as a community continues to develop. This concept of "water neutral" growth is achieved by integrating land use planning and water management to require or incentivize water use offsets (e.g., water efficiency retrofits) that will equal or exceed the additional demand of new development or redevelopment (residential and commercial). By choosing to adopt an ordinance or incentive that requires or encourages this approach, communities can stretch their water supplies, decrease the need for new infrastructure, and help ensure more water for fish, wildlife and recreation as well as provide other benefits. The Net Blue team has created a model ordinance toolkit to assist communities interested in tailoring this approach for their specific needs and context at www.net-blue.org



2. Why might my community be interested in adopting Net Blue?
There are many benefits to Net Blue. Communities with high growth and stressed water supplies are finding that water scarcity is affecting their economic development potential. Water demand offset policies thus offer communities a meaningful and sustainable way to enable population and economic growth without increasing overall water demands in a utility service area. Making sure that additional development does not further increase demand for highly treated water will reduce the need to pump and treat additional water and the need for new withdrawals from local water sources, and thus reduce expenses for the community. Another benefit of Net Blue is to defer new and costly infrastructure investment. Water efficiency is often the least expensive form of new supply, especially when compared to developing new reservoirs, diversions or other infrastructure. Even in communities that are not immediately water-stressed, reducing water use helps to build in additional resilience for the future by stretching existing supplies. Net Blue also can benefit recreation and fish and wildlife by keeping more water flowing in streams and rivers.

3. How can Net Blue benefit local streams and rivers and other freshwater resources?
In many places, rivers, streams, groundwater and other waterbodies are suffering from depletion when the amount of water withdrawn is greater than the amount returned. When this happens, fish, wildlife, recreation and downstream communities all suffer. Using a Net Blue approach can help to prevent further depletion of our rivers, streams and aquifers by reducing the current amount of water withdrawn or preventing the need for increased withdrawals. Although this approach may not automatically translate into more water for our rivers, it is one important tool in the toolbox to reduce demand for highly treated water, taking some pressure off of our waterways and groundwater resources.



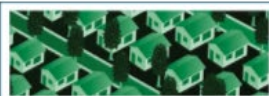


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NET BLUE WATER NEUTRAL GROWTH

Net Blue: Supporting Water-Neutral Community Growth

Net Blue is a collaborative initiative of the Alliance for Water Efficiency, the Environmental Law Institute, and River Network to support sustainable community growth. The project team members developed a model ordinance that communities can tailor and customize to create a water demand offset approach meeting local needs. Communities in different regions throughout the United States were consulted to help develop the model ordinance and the offset components, and to ensure that the program is adaptable to many different political climates, legal frameworks, and environmental challenges.

The Net Blue Project is divided into four parts:

1. Initial Offset Research
2. Model Ordinance
3. Offset Methodology
4. Community Outreach

Project Advisory Committee

A project advisory committee of experts in water resources, water law, and planning and zoning helped guide the project. The three organizations wish to express their heartfelt gratitude for the time and insights donated by these experts to the project.





**For More Information
and to order the Net
Blue Toolkit, visit:
www.net-blue.org**



<http://www.allianceforwaterefficiency.org/net-blue.aspx>