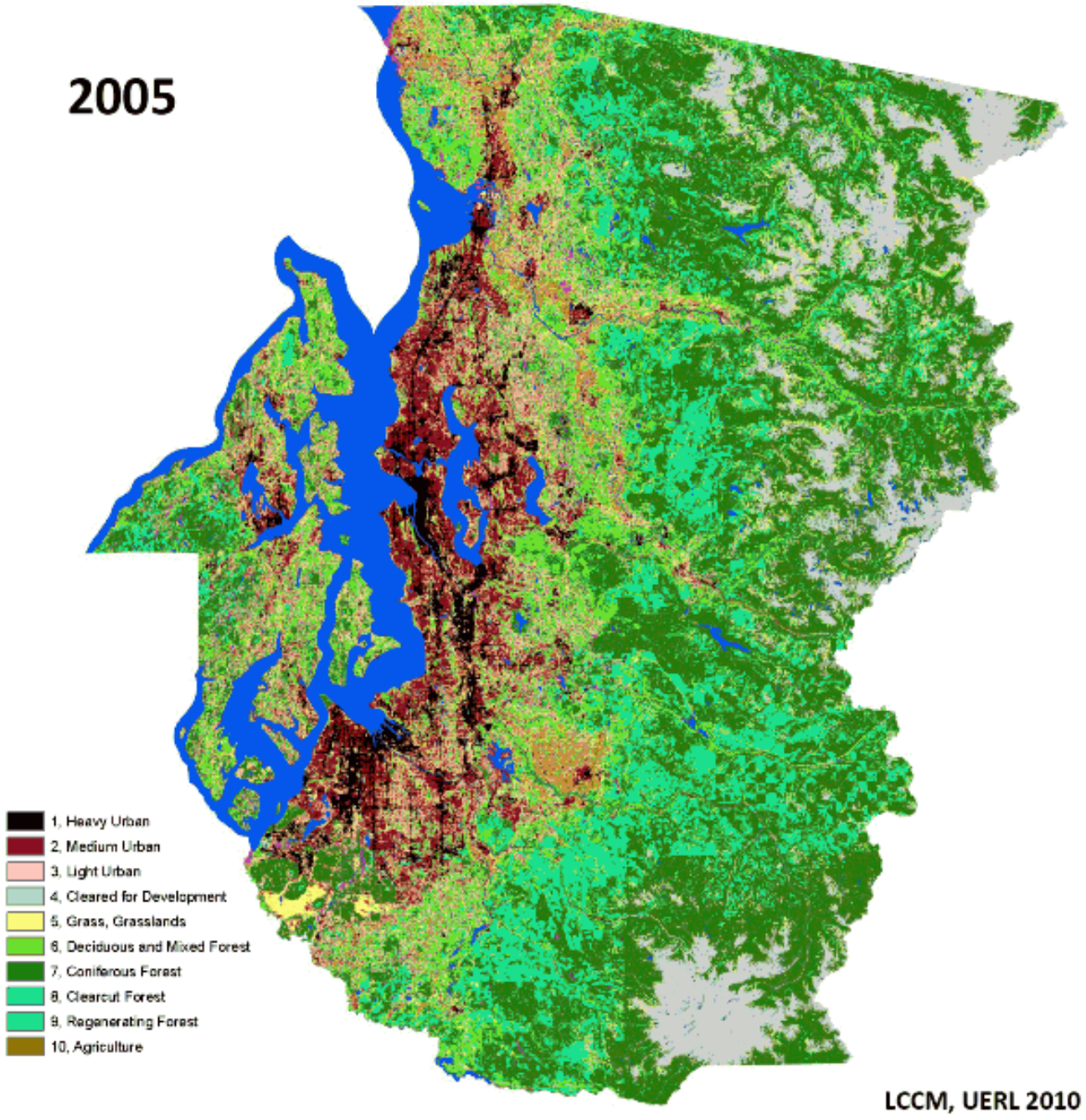
Water Efficency -
The WaterSence Home Program

Instructor: Robbi Currey

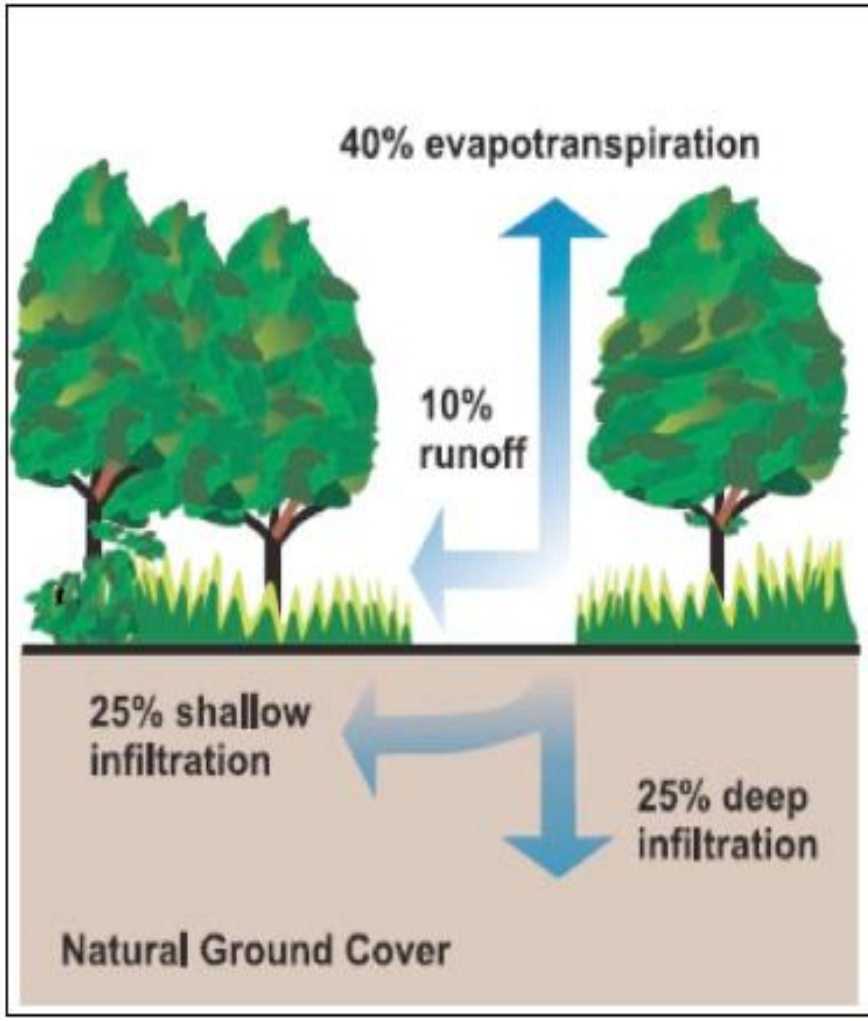
SEEC LLC
Social, Environmental & Economic Consulting

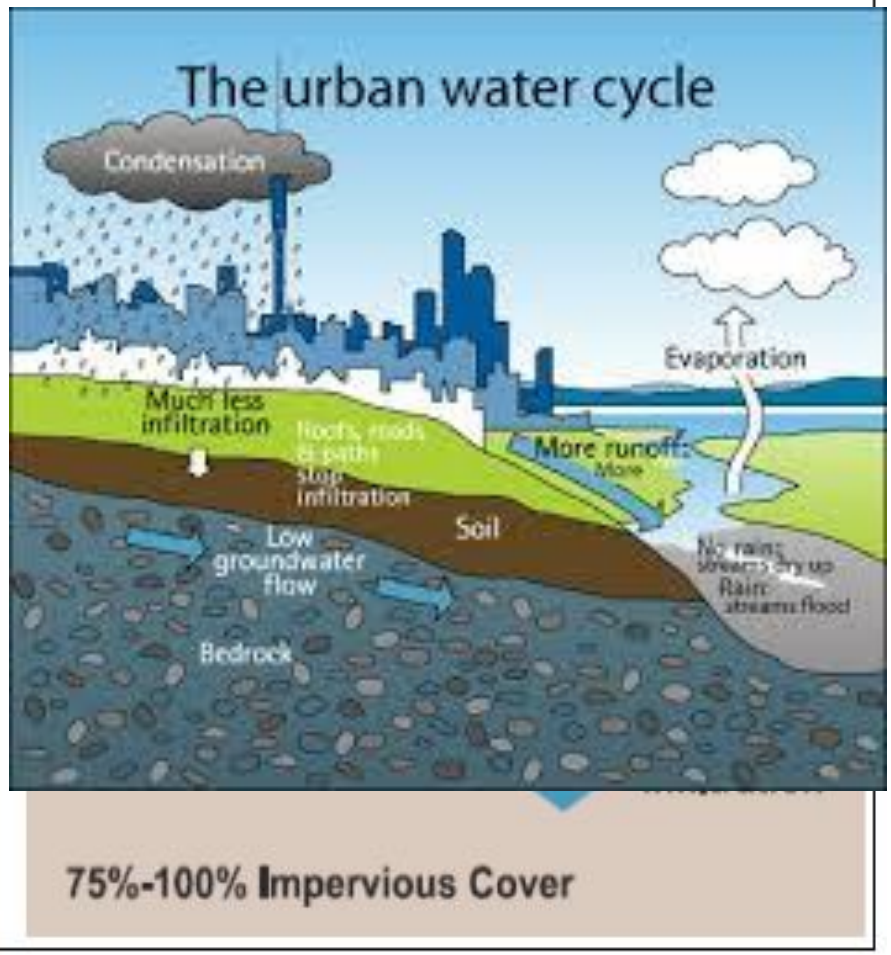
THE IMPACT OF THE BUILT ENVIRONMENT ON OUR WATER SOURCES

SEEC LLC
Social, Environmental & Economic Consulting



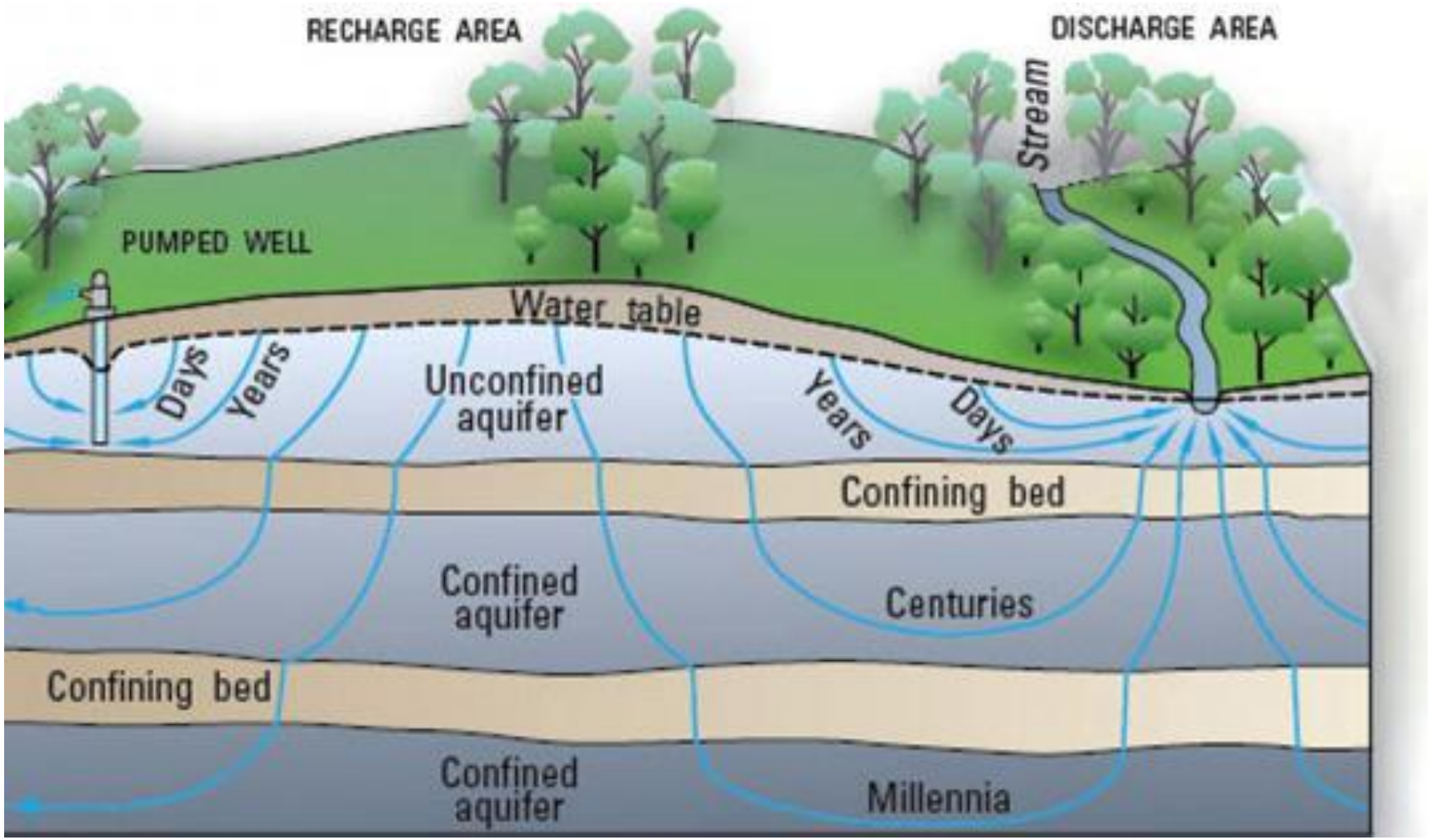
SEEC LLC
Social, Environmental & Economic Consulting





75%-100% Impervious Cover

SEEC LLC
Social, Environmental & Economic Consulting



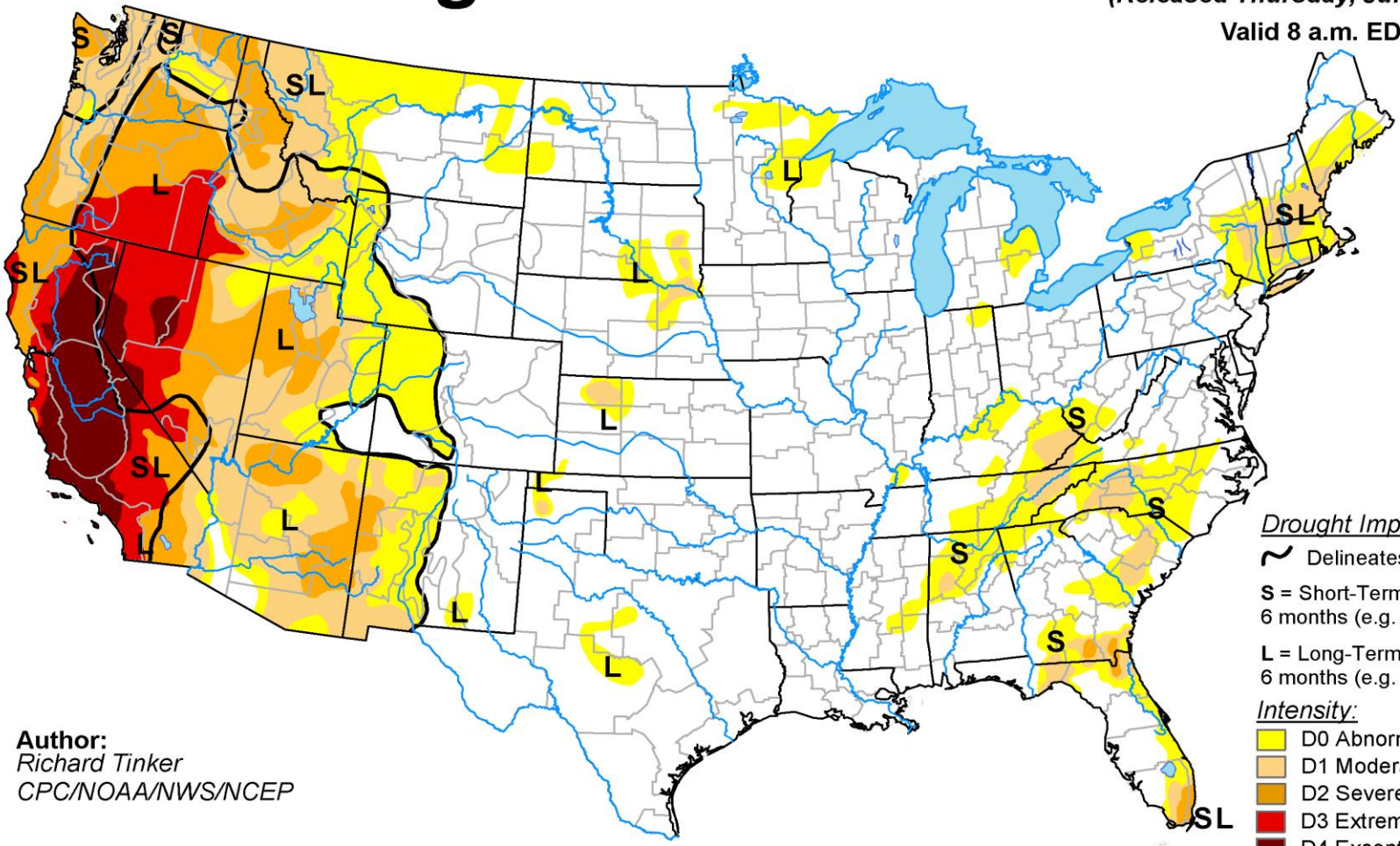
SEEC LLC
Social, Environmental & Economic Consulting

U.S. Drought Monitor

June 23, 2015

(Released Thursday, Jun. 25, 2015)

Valid 8 a.m. EDT



Author:
Richard Tinker
CPC/NOAA/NWS/NCEP

Drought Impact Types:

~ Delineates dominant impacts

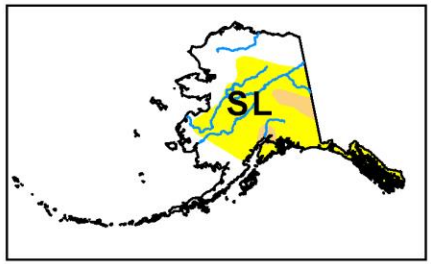
S = Short-Term, typically less than 6 months (e.g. agriculture, grasslands)

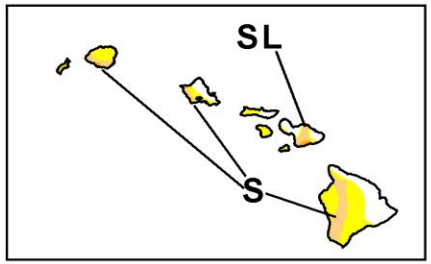
L = Long-Term, typically greater than 6 months (e.g. hydrology, ecology)

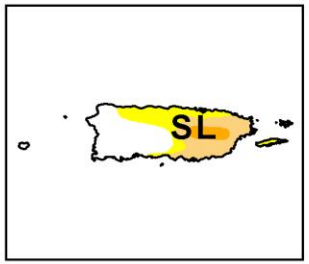
Intensity:

- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.







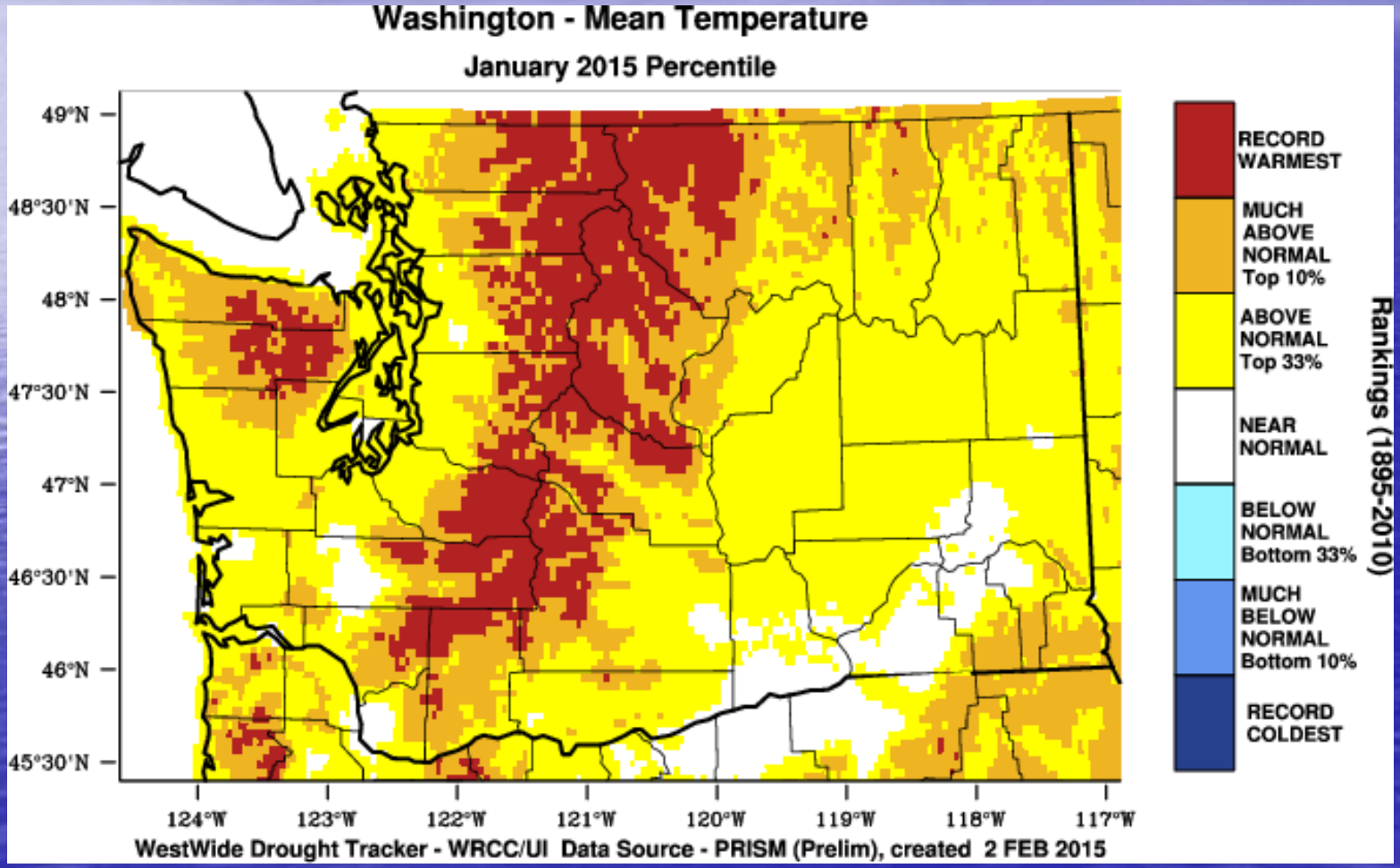
USDA

National Drought Mitigation Center

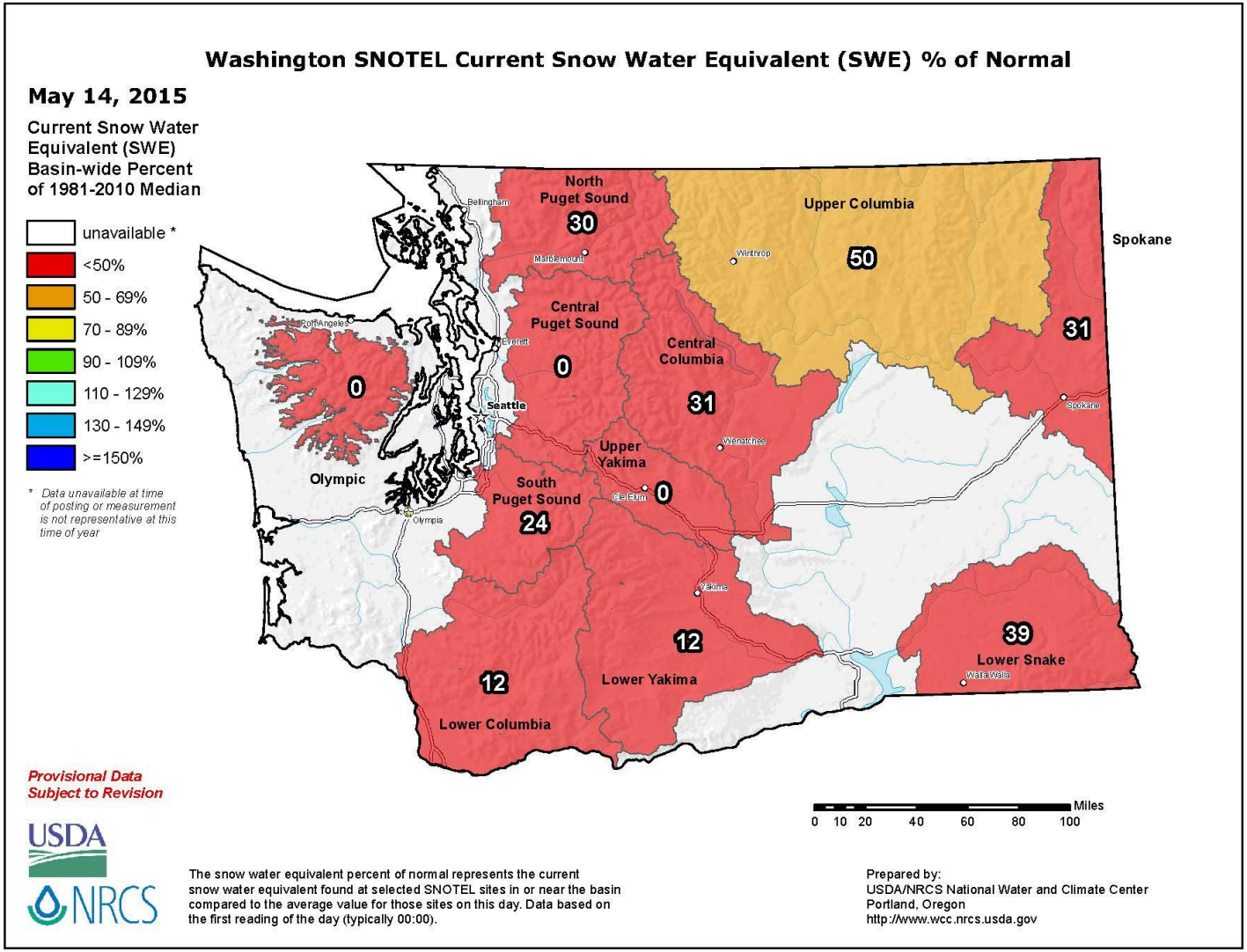
http://droughtmonitor.unl.edu/

Abnormal Weather conditions

Winter temperatures

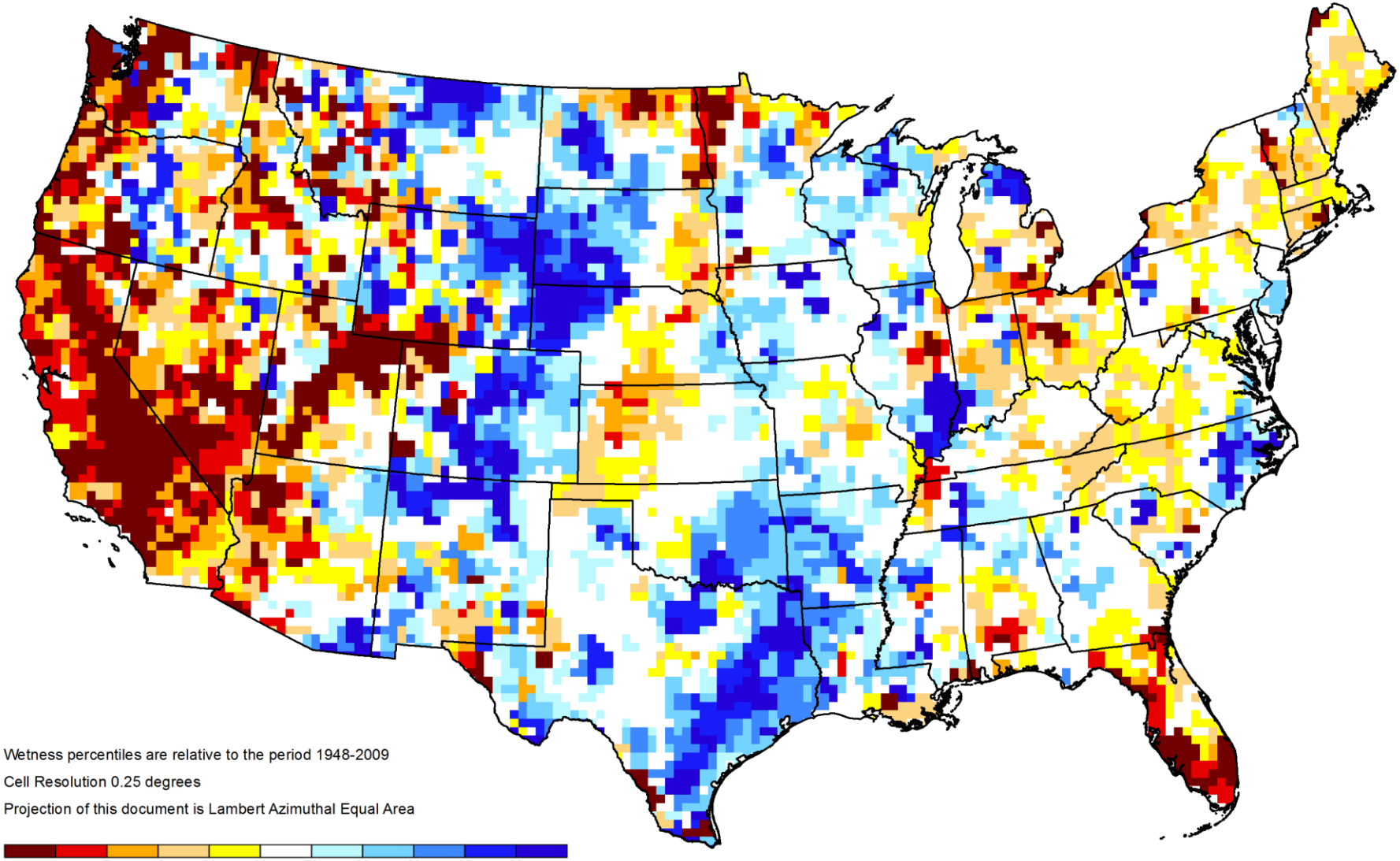


Snow Pack May 14, 2015



GRACE-Based Shallow Groundwater Drought Indicator

June 22, 2015



Wetness percentiles are relative to the period 1948-2009

Cell Resolution 0.25 degrees

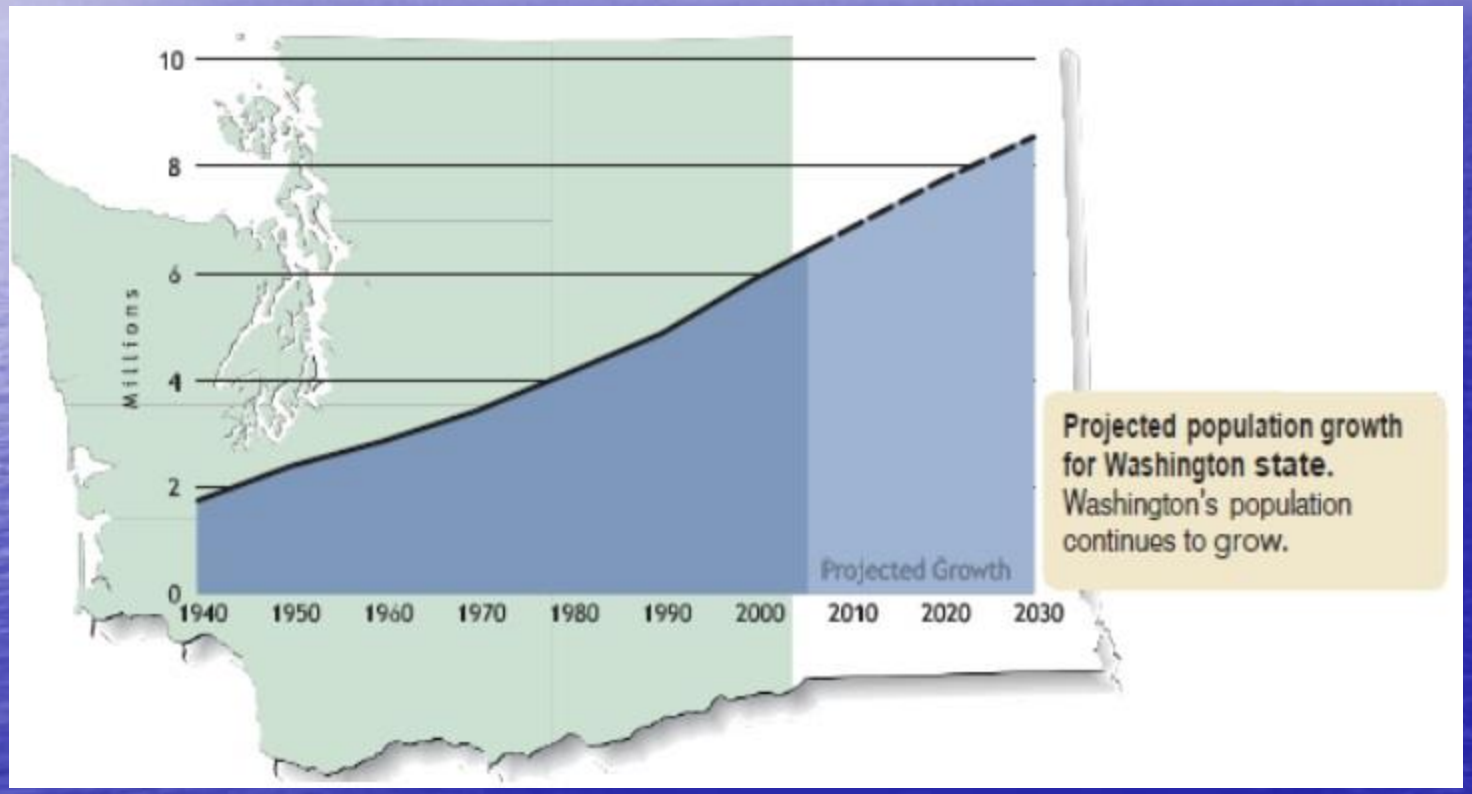
Projection of this document is Lambert Azimuthal Equal Area

2 5 10 20 30 70 80 90 95 98

Wetness Percentile

http://drought.unl.edu/MonitoringTools/NASAGRACEDataAssimilation.aspx

Why are water issues important?



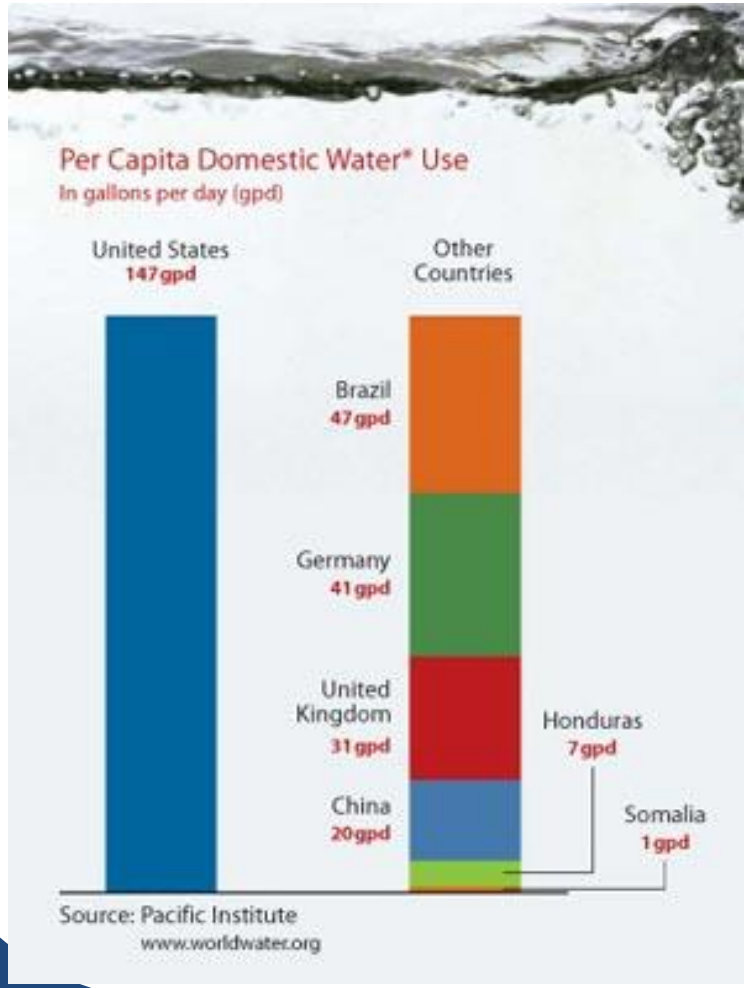
Washington's Growing Demand for Water

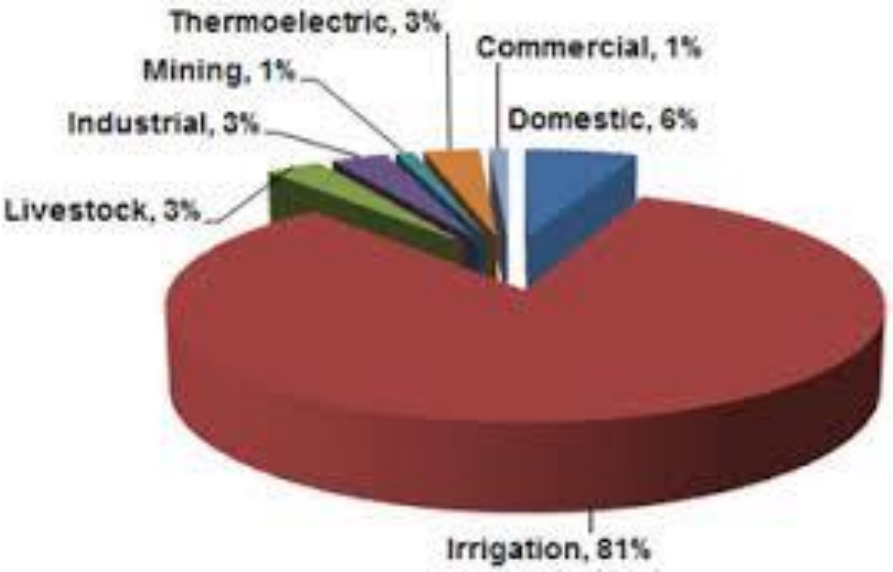
In the west, whiskey is for drinking, and water is for fighting over – Mark Twain.

WATER USE FACTS

SEEC LLC
Social, Environmental & Economic Consulting

US Per Capita Domestic Water Use





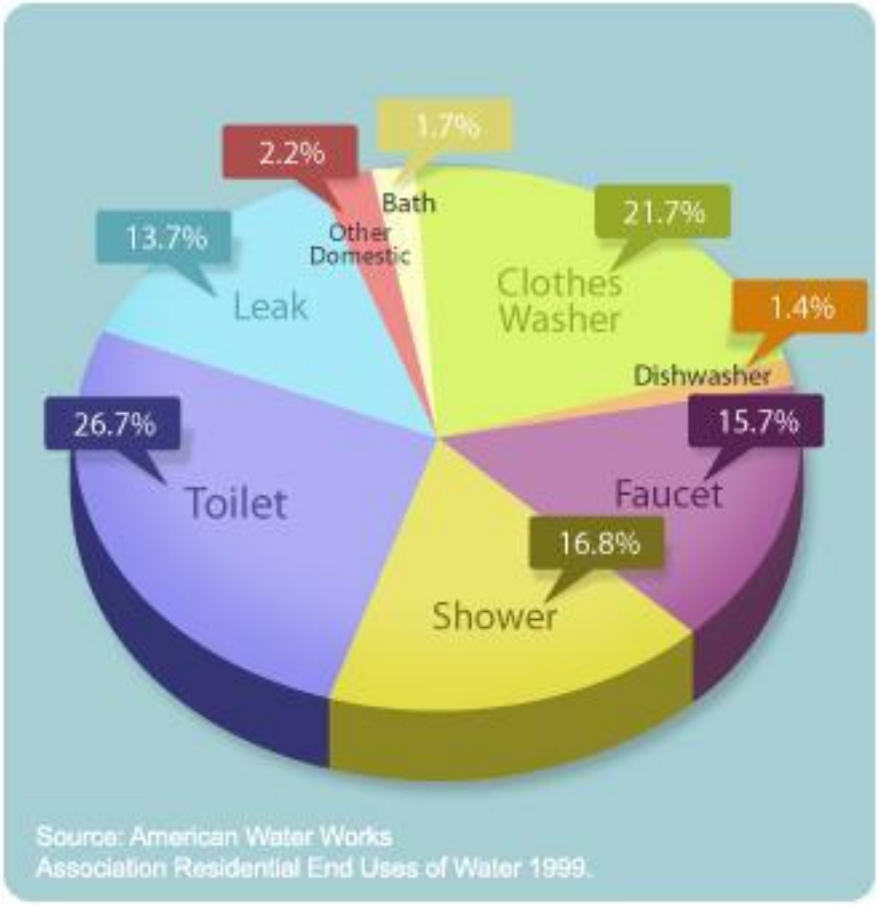
SEEC LLC
Social, Environmental & Economic Consulting

How much water does an average family use indoors?

Household Exercise

Go to:
www.home-water-works.org/calculator

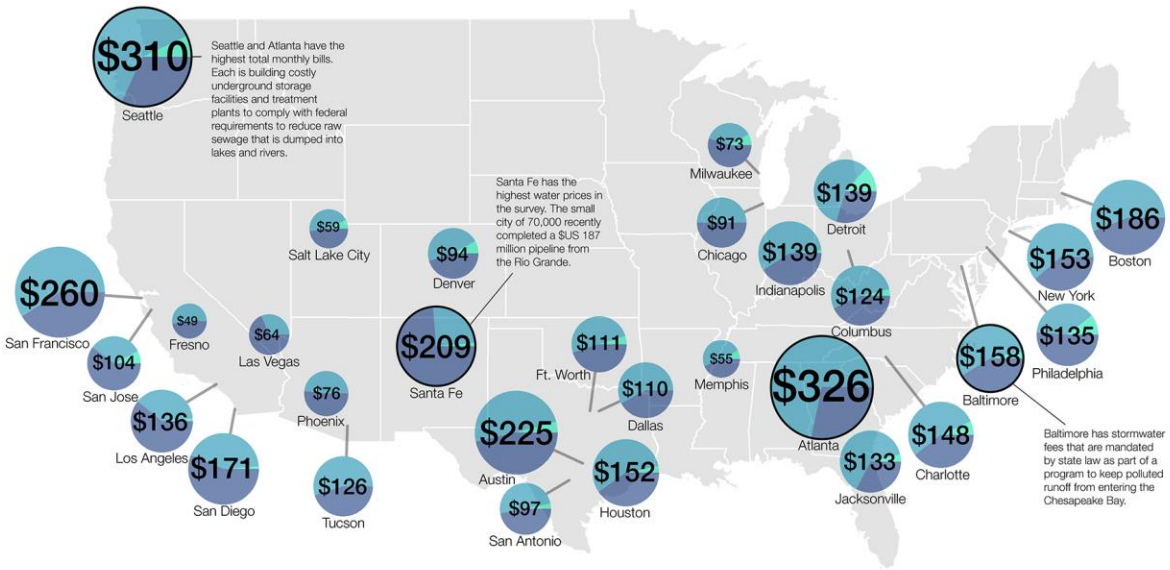
How much water do you use?
How do you compare?



SEEC LLC
Social, Environmental & Economic Consulting

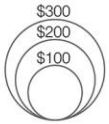
The Price of Water Up 41% Since 2010

THE PRICE OF WATER: 2015
Combined water, sewer and stormwater prices for households in 30 major U.S. cities.



We expect water rates to continue to grow above inflation for some time. We don't see an end in sight."

–Andrew Ward, director of U.S. public finance
Fitch Ratings



Water prices pay for treating, pumping, and delivering water, while sewer prices cover the cost of cleansing the water that goes down the drain.

Sewer prices are often higher than water prices because more energy and chemicals are required for treatment. Following the Clean Water Act, the federal government gave grants for new treatment plants during the 1970s and 1980s. Over the past three decades, however, new spending has been cut for local sewer infrastructure.

Stormwater fees are not included in every city's monthly bill. Some cities use general tax revenues to pay for projects to reduce polluted runoff from streets and parking lots. However, these projects must then compete for funds with other departments like police and schools.

Rates current as of April 1, 2015.
Monthly bill calculated for a family of four using 100 gallons per person per day.
Source: Circle of Blue research, based on utility water rates.

circle of blue

SEEC LLC
Social, Environmental & Economic Consulting

Sewer Prices Higher Than Water

PRICE OF WATER: 2010-2015

A survey of water prices for households in 30 major U.S. cities.

Since 2010, the price of a monthly water bill for a family of four has increased an average of 41% in 20 of the largest U.S. cities and in 10 regionally representative cities, as chosen by Circle of Blue staff. Over the last year alone, prices climbed an average of 6%, well above any other household staple.

Key

Average Monthly Bill for Family of Four Using:

2010 2011 2012 2013 2014 2015

- 150 Gallons/ Person/Day
- 100 Gallons/Person/Day
- 50 Gallons/Person/Day

HIGHEST 2015 WATER BILL*
$153.78: Santa Fe

LOWEST 2015 WATER BILL*
$23.26: Fresno

*Based on 100 gallon per person daily use for a family of four.

HIGHEST INCREASES SINCE 2014

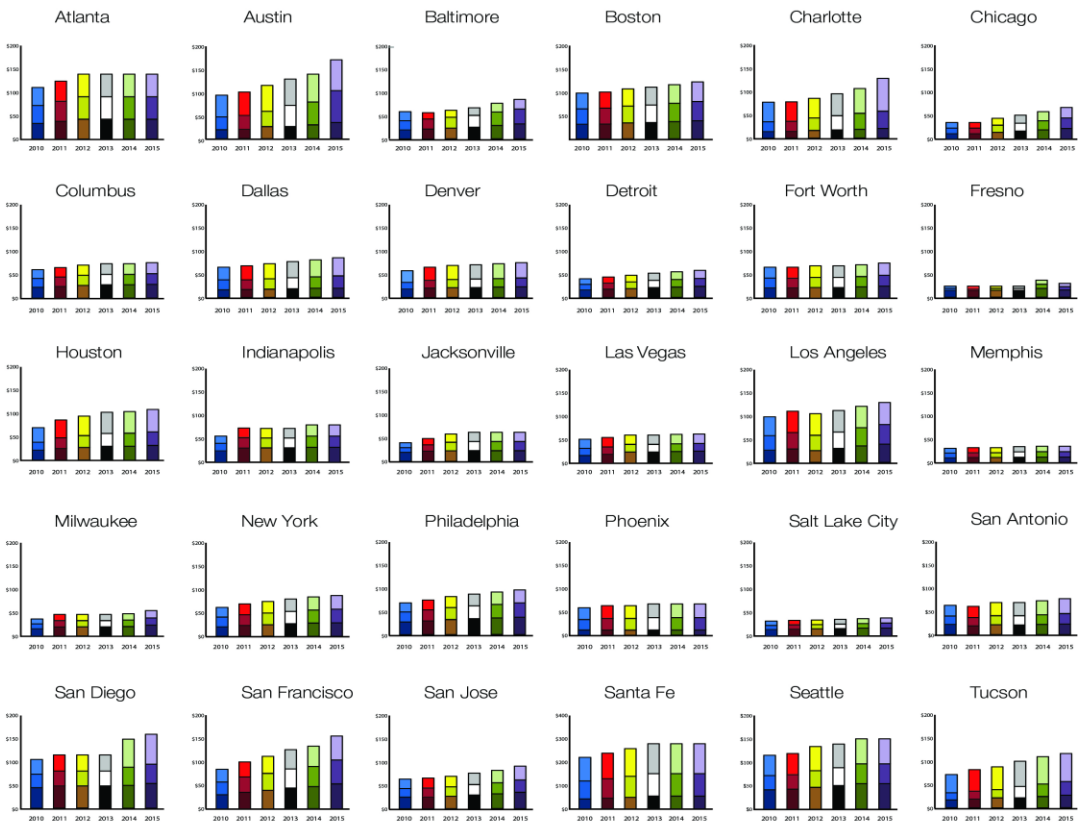
31%: Austin is increasing the cost of water for its highest-volume users. The city utility is also charging higher fixed fees so that revenue is stable, even as water use declines.

15%: Chicago is nearing the end of a 5-year plan to double water rates. The new revenue will help the city to double the rate at which it replaces old water pipes.

15%: San Francisco has steadily increased rates to pay for a $US 4.8 billion project to ensure that the city water system will be able to deliver water within 24 hours after a major earthquake.

Rates current as of April 1, 2015.
Prices calculated for three usage tiers: 50, 100, and 150 gallons per person per day.
Source: Circle of Blue research, based on utility water rates.

circle of blue



SEEC LLC
Social, Environmental & Economic Consulting

WaterSense® Labeled Homes

WaterSense Labeled New Homes Program

- First national new home labeling program for water efficiency
- Works with other green building programs
- Homes inspected & certified by independent third party to meet EPA criteria
- Units in multifamily buildings can now earn the label

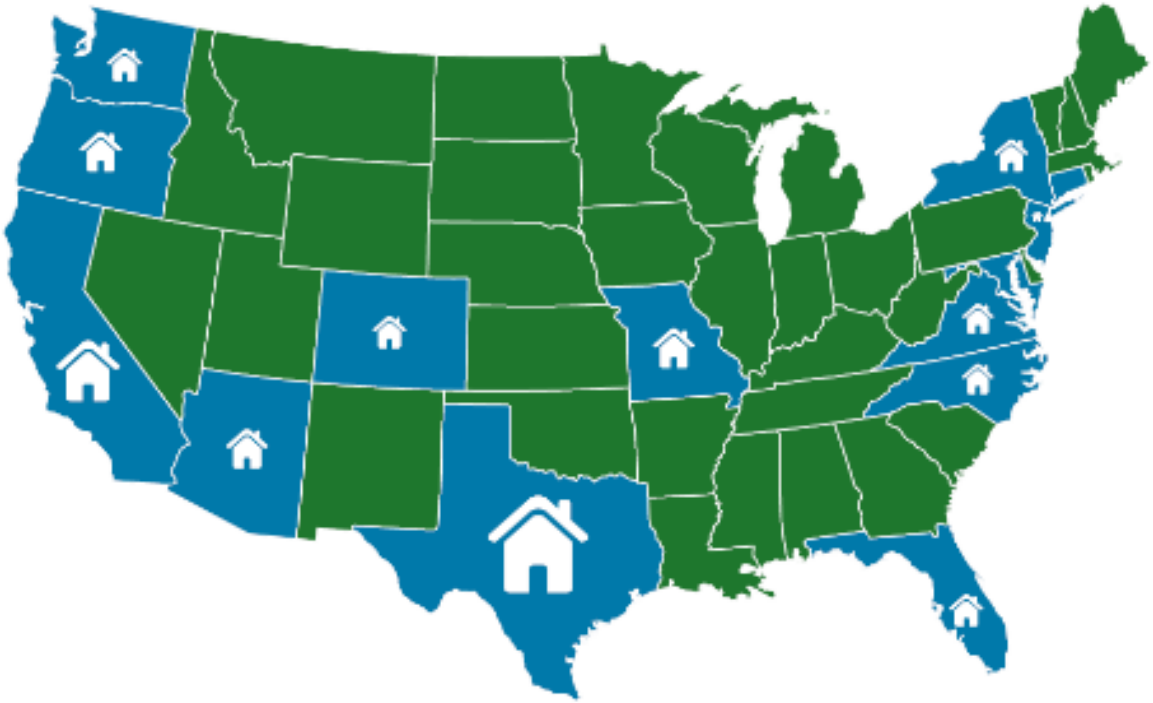
First community of all WaterSense labeled new homes in Issaquah, WA

SEEC LLC
Social, Environmental & Economic Consulting

Acceptance of WaterSense

- The WaterSense label is recognized by other green programs
  - FEMP Designated Products
  - U.S. Green Building Council's LEED Rating Systems
  - Green Globes' Green Building Initiative
  - National Association of Home Builders' National Green Building Standard
  - International Code Council's International Green Construction Code
  - IAPMO Green Technical Supplement
  - States and Municipalities

WaterSense Labeled New Homes



SEEC LLC
Social, Environmental & Economic Consulting

What Makes a WaterSense Labeled Home?

SEEC LLC
Social, Environmental & Economic Consulting

Indoor Criteria

- **Required items:**
  - Water service pressure maximum 60 psi
  - Leak prevention measures
  - WaterSense labeled plumbing fixtures
  - Efficient hot water distribution system

- Other items must meet efficiency criteria, if installed:

- ENERGY STAR qualified dishwasher or clothes washer (if appliances installed)
- Evaporative air conditioners
- Water softeners
- Drinking water treatment systems

WaterSense® Labeled New Homes

Outdoor Criteria

- Be designed using the WaterSense Water Budget Tool
- Irrigation system *(if installed)*
  - Designed or installed by a WaterSense irrigation partner
  - Audited by a WaterSense irrigation partner
- Other water features *(if installed)*
  - Pools/spas - require covers
  - Ornamental water features

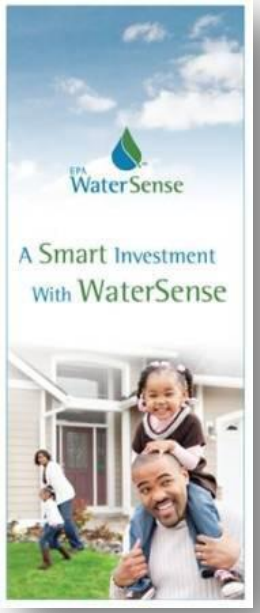
Healthy, beautiful landscapes that allow the homeowner to save water

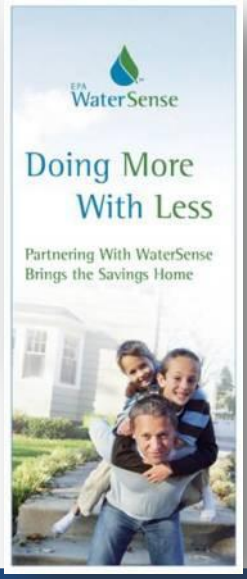
SEEC LLC
Social, Environmental & Economic Consulting

Benefits of a WaterSense Labeled Home

- **Inside:** a family of four could save big in a WaterSense labeled new home
  - **50,000** gallons of water - equal to 2,000 loads of laundry
  - More than $600 per year on water, sewer, and energy bills

- **Outside:** water-efficient landscapes are adaptable to local watering restrictions
  - Easily maintained
  - Offer long term curb appeal





SEEC LLC
Social, Environmental & Economic Consulting

Website & Resources

- Easy to find on the WaterSense homepage
  - Look for the "New Homes" tab
  - www.epa.gov/watersense/new_homes
- Inspection video
- Resources for plumbers
- Technical documents
  - http://www.epa.gov/watersense/new_homes/homes_final.html

SAMPLE

This home is certified to meet the U.S. Environmental Protection Agency's criteria for water-efficient new homes and has earned the WaterSense® label.

[Address of labeled home]

This WaterSense labeled home was built by

[Name of builder]

[Name of Inspector]
[Date]
Efficiency Home Inspector

[Name of License Certification Provider]
[Title]
Licensed Certification Provider

SEEC LLC
Social, Environmental & Economic Consulting

Who are local WaterSense® Builders?

- Sage Homes NW
- Habitat for Humanity Seattle-King County
- Dwell Development
- Ichijo USA
- RD Construction
- Creative Home Partners

SEEC LLC
Social, Environmental & Economic Consulting

Who are local Raters?

Pam Worner, Green Dog Enterprises
(206) 883-6688
Tadashi Shiga, Evergreen State Energy
(206) 491-7111
Tom Balderston, Balderston & Associates
(206) 715-6865

To become a WaterSense partner, visit:
www.epa.gov/WaterSense/partners/become_a_watersense_partner.html

Questions/Contact

- WaterSense Information
  - Web site: **www.epa.gov/watersense**
- For questions:
  - Helpline: **watersense@epa.gov**
  - Toll-free: (866) WTR-SENS
- And online:

  www.facebook.com/epawatersense
  www.twitter.com/epawatersense

Jonah Schein
schein.jonah@epa.gov
202.564.2720

Bevin Horn
horn.bevin@epa.gov
206.553.1566

SEEC LLC
Social, Environmental & Economic Consulting

GREEN BUILDING CERTIFICATIONS

SEEC LLC
Social, Environmental & Economic Consulting

Certification: Built Green

Site & Water	required	No zinc galvanized ridge caps, copper flashing or copper wires for moss prevention
Site & Water	required	Landscape with plants appropriate for site topography and soil types, emphasizing use of plants with low watering requirements [drought tolerant]
Site & Water	required	Use the most efficient aerator available for kitchen faucets, lavatory faucets and showerheads

Certification: LEED for Homes

Baseline water consumption of fixtures and fittings

Fixtures, Fittings, and Appliances	Current Baseline (IP Units)	Current Baseline (SI units)
Water closets (toilets)*	1.6 gallons per flush (gpf)	6 liters per flush (lpf)
Private lavatory faucet*	2.2 gpm at 60 psi	8.3 lpm at 415 kPa
Kitchen faucet	2.2 gpm at 60 psi	8.3 lpm at 415 kPa
Showerhead*	2.5 gpm at 80 psi per shower stall	9.5 lpm at 550 kPa per shower stall

Valuing the benefits

LOW IMPACT DEVELOPMENT CASE STUDY

SEEC LLC
Social, Environmental & Economic Consulting

Shamrock Heights

Photo Credit: Triad & Associates

SEEC LLC
Social, Environmental & Economic Consulting

Restore Wetlands

The site had documented flooding issues which Triad Associates then corrected with grading and restoration of the pre-existing wetland.

Rain Channels

CamWest ***"buyers are looking for more privacy"***

Windermere ***"people were very jazzed by the LID features"***

Camwest *"significant cost reductions only come when the streets can be designed at narrower widths"*

SEEC LLC
Social, Environmental & Economic Consulting

Original Paired Sales Analyses 2007-2009

Original Premium for Green Amenities: $7.50-$12.50 per sq.ft.

	Subject		Comparable #1		Comparable #2		Comparable #3	
Sale Price	$449,000	$449,000	$375,000	$375,000	$390,000	$390,000	$418,000	$418,000
Original List Price	$449,000		$350,000		$409,000		$429,950	
List to Sale Price	100%		107.14%		95.35%		97.22%	
Sale Date	8/17/2012		7/13/2012		3/16/2012		11/17/2011	
CDOM	[illegible]		[illegible]		[illegible]		120	
Style	2 Story		2 Story		2 Story		2 Story	
Quality of Construction	Q3		Q3		Q3		Q3	
Site	[illegible]		0.10		0.12		0.14	
Year Built	2009		2007	$3,000	2006	$4,500	2006	$4,500
GLA	2732		2670	$3,100	2810	-$3,900	3014	-$14,100
Bed	4		3	$4,000	4		4	
Bath	2.5		2.5		2.5		2.5	
Garage	[illegible]		[illegible]		[illegible]		2	
Green/Energy Rating	BG4, NWES		None		None		None	
Adjusted Sale Price	[illegible]			$385,100		$390,600		$408,400
Premium for Rating				$63,900		$58,400		$40,600
Original Price/Sf		$164.53		[illegible]		$138.79		$138.69
Adjusted Price/Sf				$144.23		$139.00		$135.50
Sf Prumium				$20.12		$25.35		$28.85

Average DOM for MLS Area 350 = 74

SEEC LLC
Social, Environmental & Economic Consulting

zHomes Case Study

DOMESTIC WATER USE AND CONSERVATION

SEEC LLC
Social, Environmental & Economic Consulting

zHomes (Issaquah) WaterSense Case Study

Photo Credit: King County Solid Waste Division

Target: 40% Overall Water Use Reduction

SEEC LLC
Social, Environmental & Economic Consulting

What Happened?

- Av. zHome resident used 16.07 gpd – over a 70% reduction
- Exceeds Net Zero benchmark

SEEC LLC
Social, Environmental & Economic Consulting

Fixtures and Appliances

Q1	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
The toilet works well.	√√√√	√√	√√√		

Q2	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
The bathroom faucets work well.	√√√√	√√√√	√		

Q3	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
The showerhead works well.	√√√√√√	√√	√		

Q4	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
The clothes washer works well.	√√√√	√√√√	√		

Q5	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
The dishwasher works well.	√√√√√√	√√√			

Positive Responses = 87%

SEEC LLC
Social, Environmental & Economic Consulting

Rainwater Harvesting

Q6	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
The cistern that supplies the toilet and clothes washer works well.	√√√	√√√√	√√		

Q7	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
The rainwater that comes from the cistern is relatively clean and odorless.	√√√√√√			√√	√

Q8	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
The cistern's water supply lasts through the summer.	√√√	√√	√	√√	

Positive Responses = 69%

SEEC LLC
Social, Environmental & Economic Consulting

Landscaping

Q9	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
I don't miss having a traditional grass lawn.	√√√√√√	√	√		

Q10	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
I enjoy the native landscaping.	√√√√√	√√	√		

Q11	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
The rain gardens absorb and manage storm water runoff effectively .	√√√√√	√√			

Positive Responses = 92%

SEEC LLC
Social, Environmental & Economic Consulting

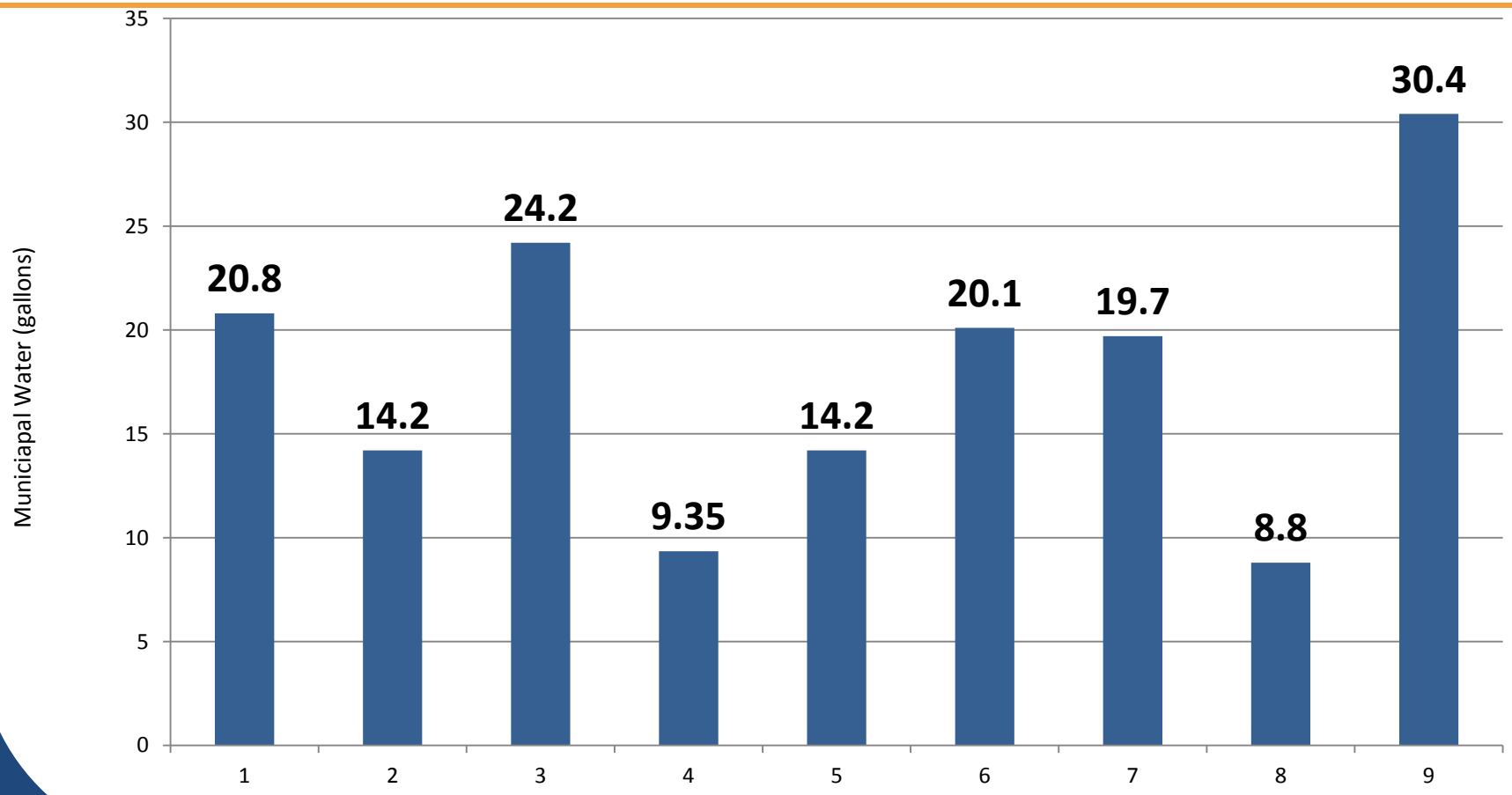
Values

Q12	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Conserving water is important to me.	√√√√√	√√√		√	
Q13	**Strongly Agree**	**Agree**	**Neutral**	**Disagree**	**Strongly Disagree**
Knowing that my zHome uses less water, less energy, and was built with low toxicity/green building materials is important to me.	√√√√√	√√√√			
Q14	**Strongly Agree**	**Agree**	**Neutral**	**Disagree**	**Strongly Disagree**
I enjoy living in my zHome.	√√√√√√√	√√			

Positive Responses = 96%

SEEC LLC
Social, Environmental & Economic Consulting

All Units - GPD



Average = 16.07

SEEC LLC
Social, Environmental & Economic Consulting

Peter’s Creek Retirement Center Case Study

WATERSENSE RETROFIT

SEEC LLC
Social, Environmental & Economic Consulting

Review of Strategies

- Peter's Creek retirement home using old, inefficient fixtures
- Cascade Water Alliance provided WaterSense toilets, showerheads and faucet aerators

OUTCOME:

- Sustained decrease in water use of about 40%

SEEC LLC
Social, Environmental & Economic Consulting

Water Usage & Rates

WATER VALUATION

SEEC LLC
Social, Environmental & Economic Consulting

APPRAISAL PRACTICES BOARD
THE APPRAISAL FOUNDATION
America's Valuation Resource

Appraisal Practices Board

Voluntary Guidance on Recognized Valuation Methods and Techniques:

Valuation of Green and High Performance Property:

1-to-4-Unit Residential

This communication is for the purpose of issuing voluntary guidance on recognized valuation methods and techniques.

SEEC LLC
Social, Environmental & Economic Consulting

3.2 Water Efficiency

Water efficiency relates to how efficiently a property manages, uses and disposes of water. Virtually every property makes efforts to control water. For example, when a property has indoor plumbing, it typically has pipes to control where the water goes, a controlled water heating mechanism, drains and even water storage devices. Efforts are also typically made to control how water is collected, disposed of (or recycled) and consumed. It would, for example, be highly unusual for a property to have a continually running hot-water faucet. In that regard, every property with indoor plumbing has some level of water efficiency. The task, then, is not to recognize all forms of water efficiency; rather, it is to recognize when special effort has been made (or when not enough effort has been made) to impact water efficiency. Questions to consider might include:

- How is water managed in the home? Is this normal for the area?
- Do the market participants appreciate or value special water efficiency features?
- Is the water efficiency too efficient (i.e., no indoor plumbing, gray water recycling systems in an area where they are not expected, having to collect all available water via rain barrels)?

If special efforts – or too few efforts – are made to manage water efficiency, proceed to research how the market values these particular features (if at all). Additionally, if certain features meet the expectation of a market segment, and those features are common and noted in every home, then a detailed documentation of those features is likely unnecessary.

Bellevue Single Family Variable Water Cost Example*				
Two-Month Billing Period				
0 - 20 CCF	21-30 CCF	31-100 CCF	Over 100 CFF	
$3.57	$4.93	$ 6.31	$ 9.40	

1. Older home using 83 CCF or about 620 gallons per day Family of Four = $523.73 (used av. US consumption of 157 gpd)

2. Newer home using 44 CCF or about 332 gallons per day Family of Four = $277.64 (used WA av. of 83 gpd)

3. WaterSense labeled home using 35 CCF or about 265 gallons per day Family of Four = $220.85

* Does not include connection (meter) charge

SEEC LLC
Social, Environmental & Economic Consulting

Capitalization of Energy & Water Savings

Subject Property ENERGY STAR home with anticipated $513 annual energy & water savings

Energy Savings Identified

- $250 divided by 6.55% = $3,817

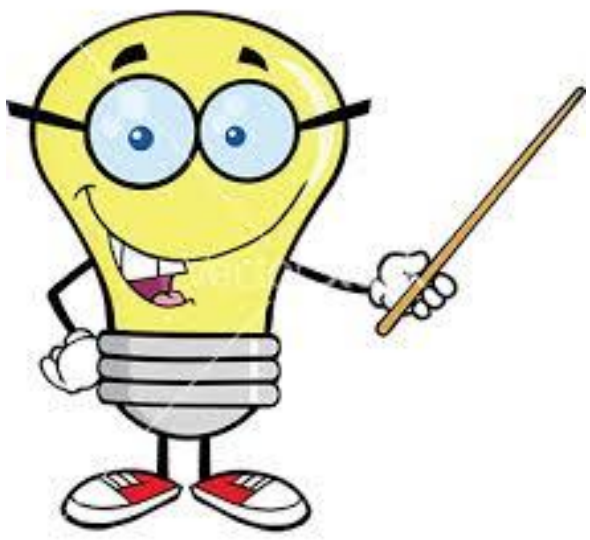
Water Savings Identified

- $263 divided by 5.9% = $4,458

8.3.1 DCF Analysis

A discounted cash flow analysis provides an indication of present value of future income. Energy cost savings can be capitalized using a reasonable capitalization rate (such as a local utility cap rate or a current mortgage interest rate).

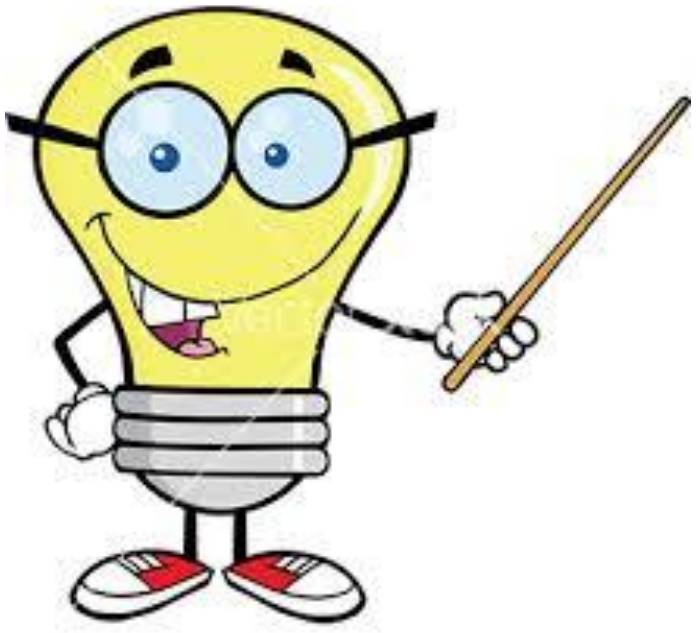
Review



- Which room typically accounts for the largest % of household water usage indoors
- Which area accounts for the largest % per capita of household water usage in the US

SEEC LLC
Social, Environmental & Economic Consulting

Review



- What % of water savings can a family of four expect with WaterSense?
- How much water does the average person in WA use per day?
- For a family of four, on average, how much water is saved annually living in a WaterSense certified home?

SEEC LLC
Social, Environmental & Economic Consulting

QUESTIONS?

To learn more or to register for one of our other courses go to:

WWW.SEECSOLUTIONS.COM

SEEC LLC School of Green Real Estate

Instructor: **Robbi Currey**

P: 1.360.894.6817

E: robbi@seecsolutions.com

SEEC LLC
Social, Environmental & Economic Consulting