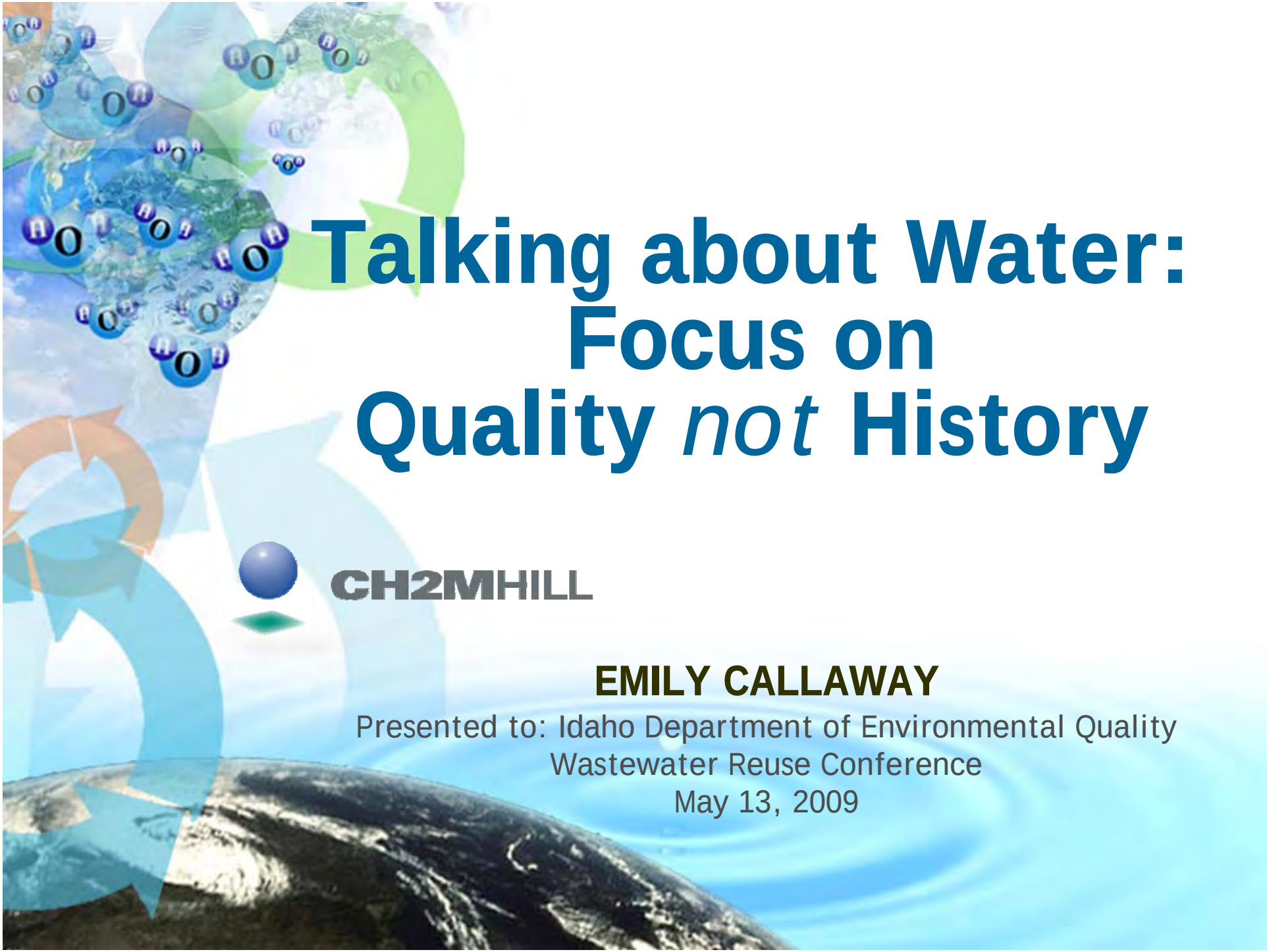

Talking about Water: Focus on Quality *not* History

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EMILY CALLAWAY

Presented to: Idaho Department of Environmental Quality
Wastewater Reuse Conference
May 13, 2009

Linda Macpherson

an international advocate and strategist for water reuse information and acceptance...

- Involved in water education around the globe
  - Boise WaterShed Environmental Education Center
  - NEWater, Singapore
  - Tianjin, China

bridging the gap between the engineering/scientific community and the general public

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Agenda

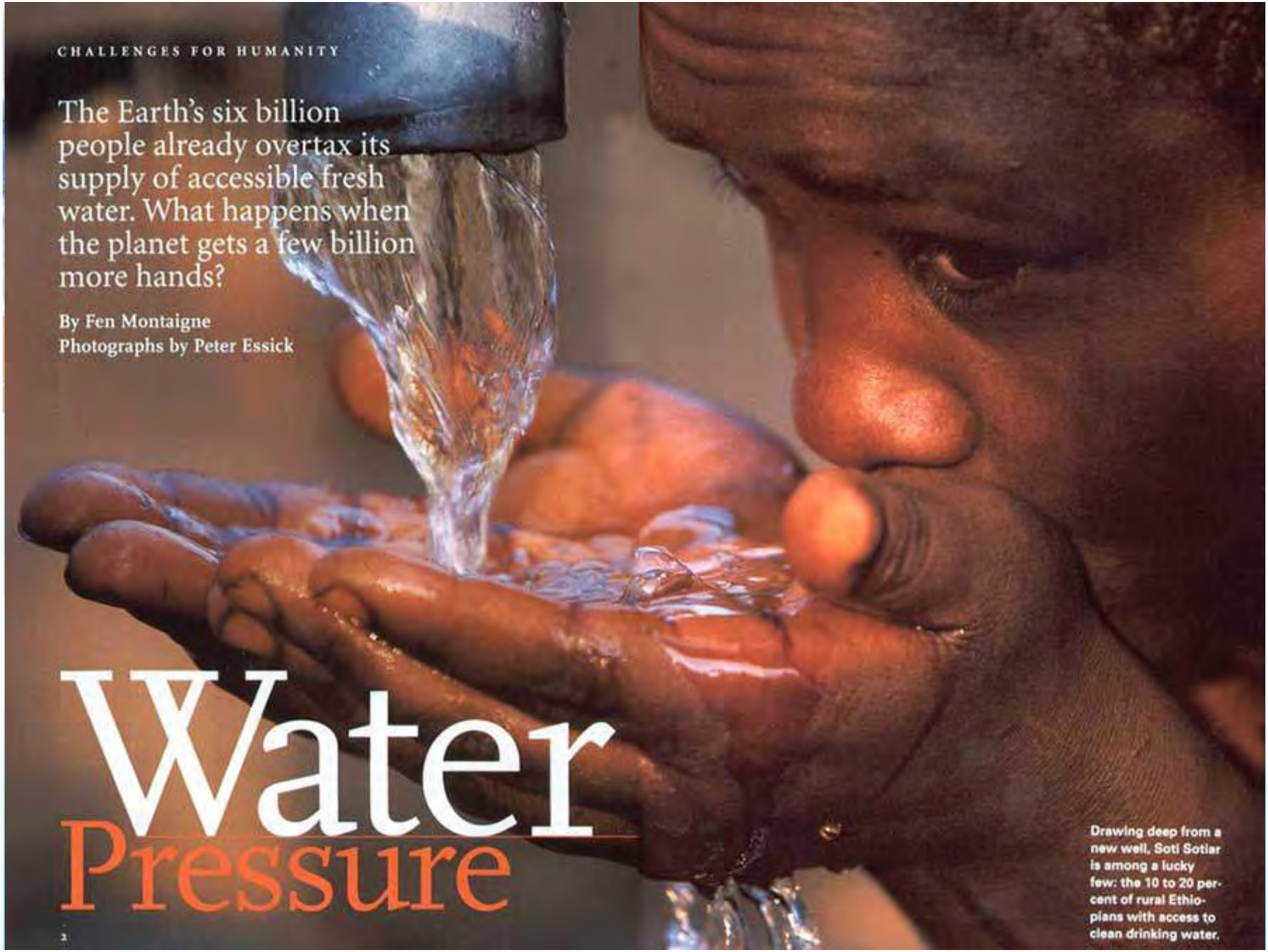
- Water is a Center Stage Issue But Is Our Understanding of Water Clear?
- What Should Determine the Appropriate Use of Water – It's Quality or It's History?
- Won't Stigmatizing Water Have Predictable Results?
- Can Shared Understanding Keep Issues in Context and Promote Sustainable Water Solutions?
- Choosing Our Path Forward


Water is a Center Stage Issue
But Is Our Understanding of Water Clear?

The Earth's six billion people already overtax its supply of accessible fresh water. What happens when the planet gets a few billion more hands?

By Fen Montaigne
Photographs by Peter Essick

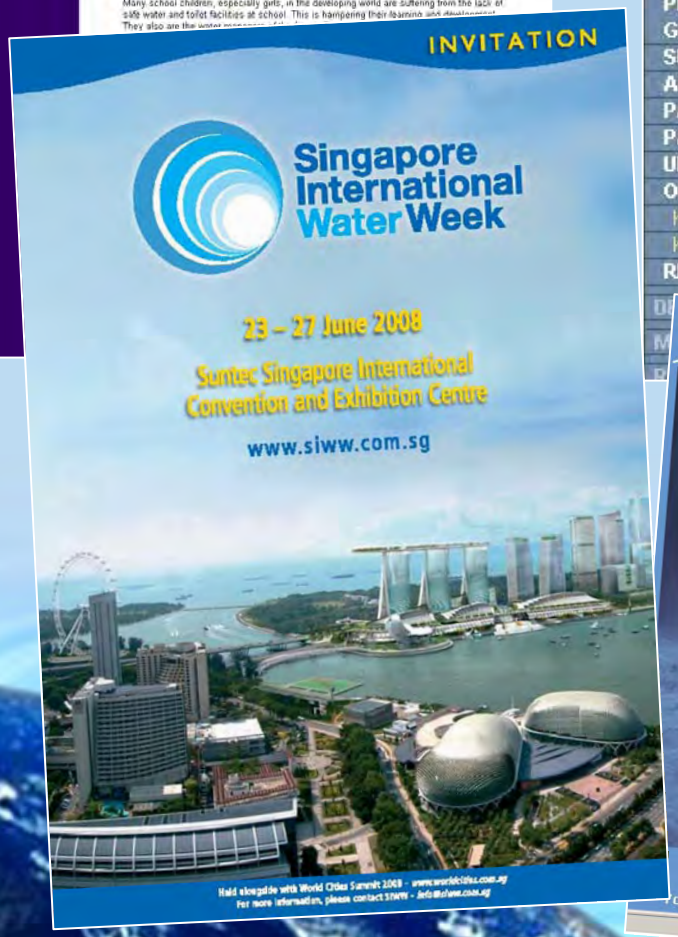
Water Pressure



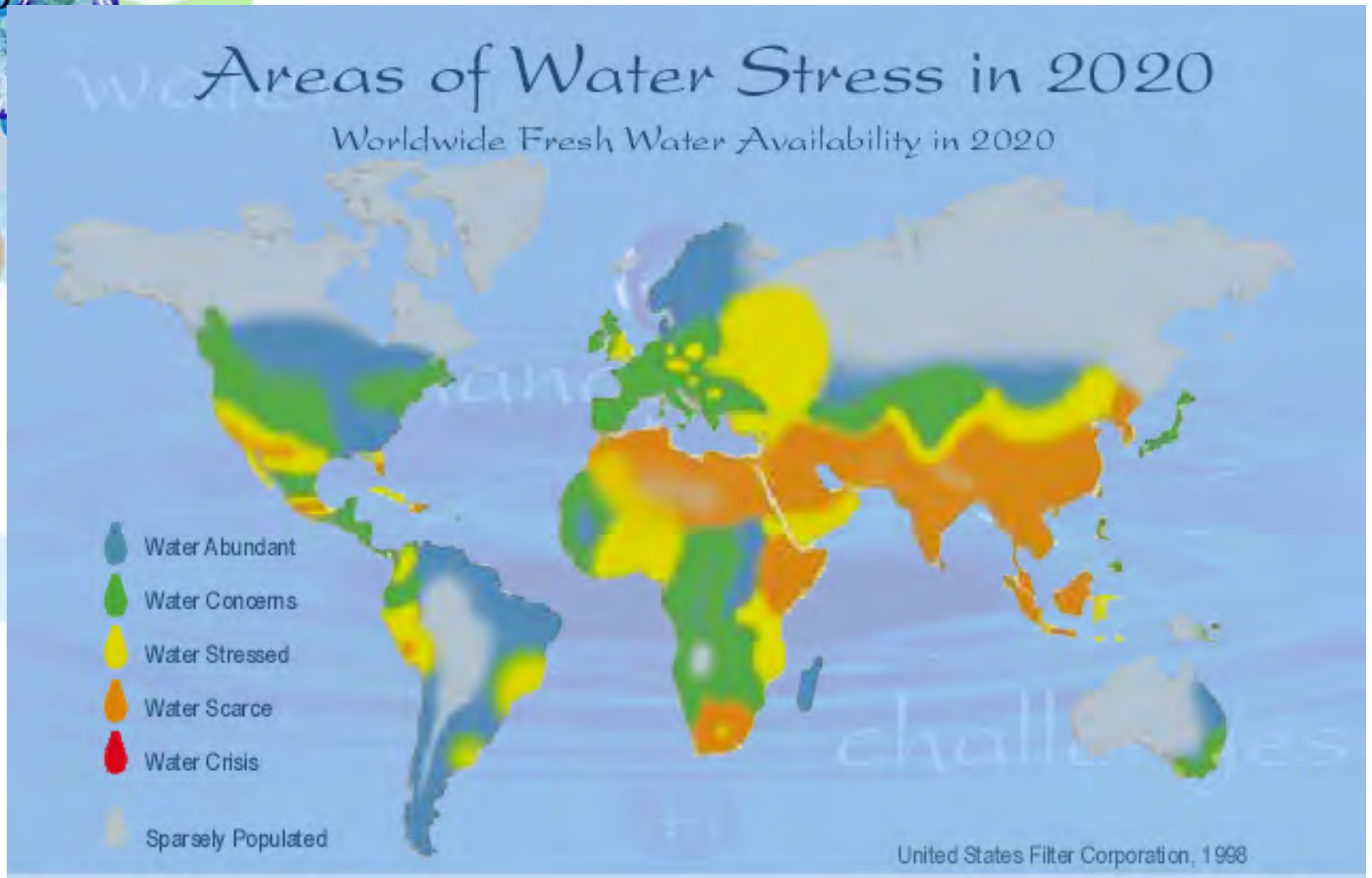
Drawing deep from a new well, Soti Sotiar is among a lucky few: the 10 to 20 percent of rural Ethiopians with access to clean drinking water.

Sustainable Water Management:
Critical to a Secure Future

Water
is a critical part of the international agenda

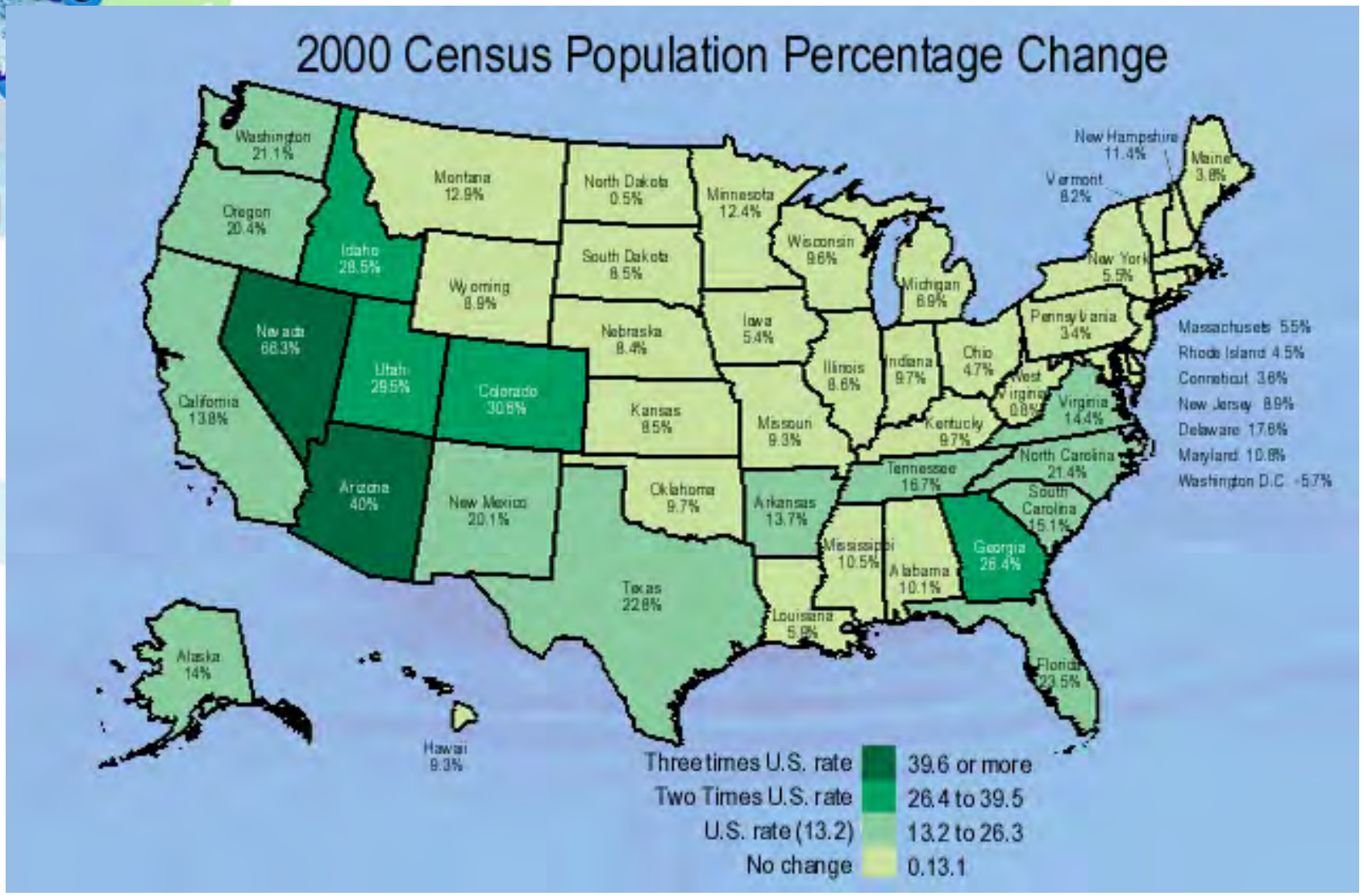


Stress on water supplies continues to increase world wide

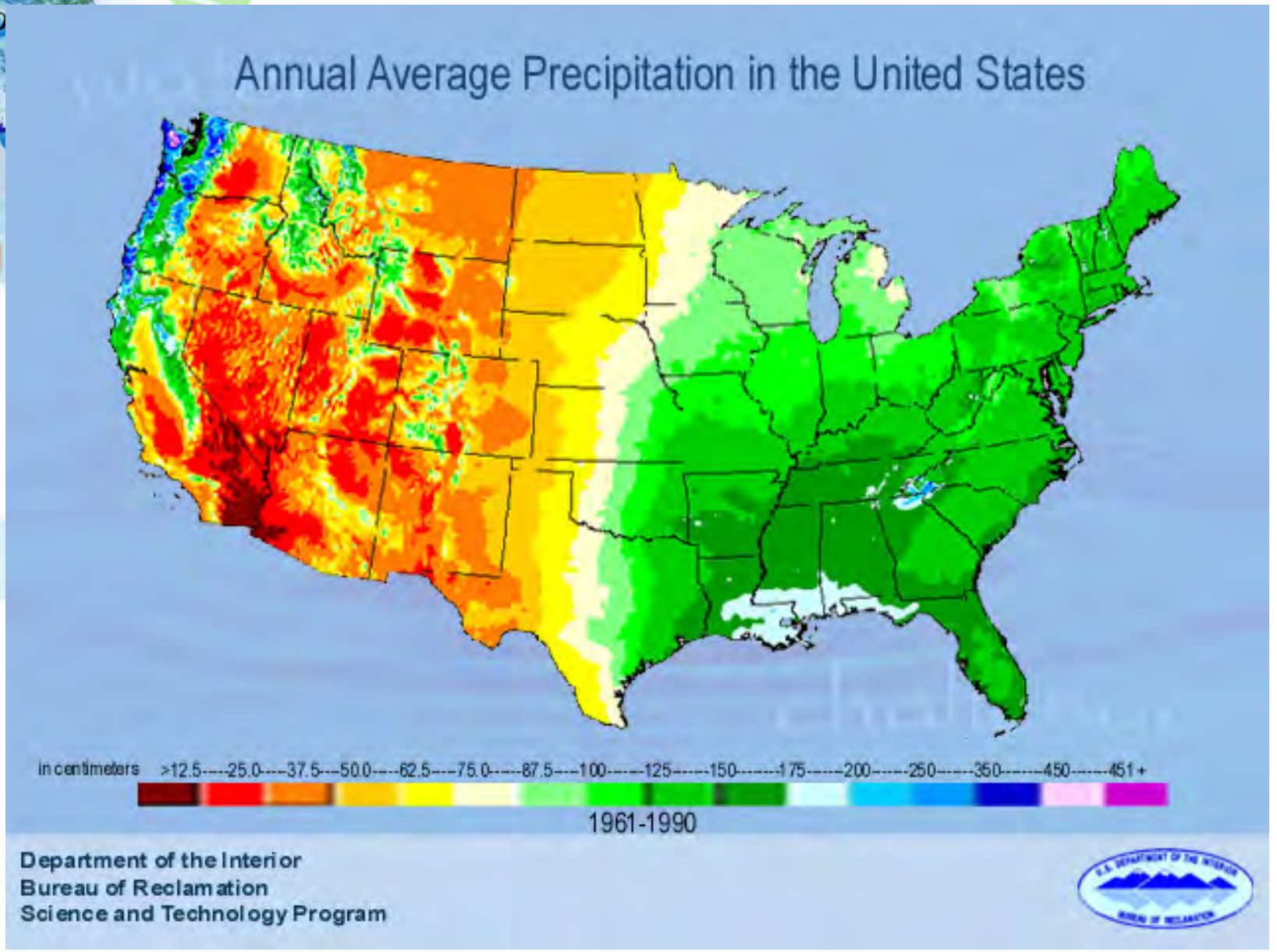


Department of the Interior
Bureau of Reclamation
Science and Technology Program

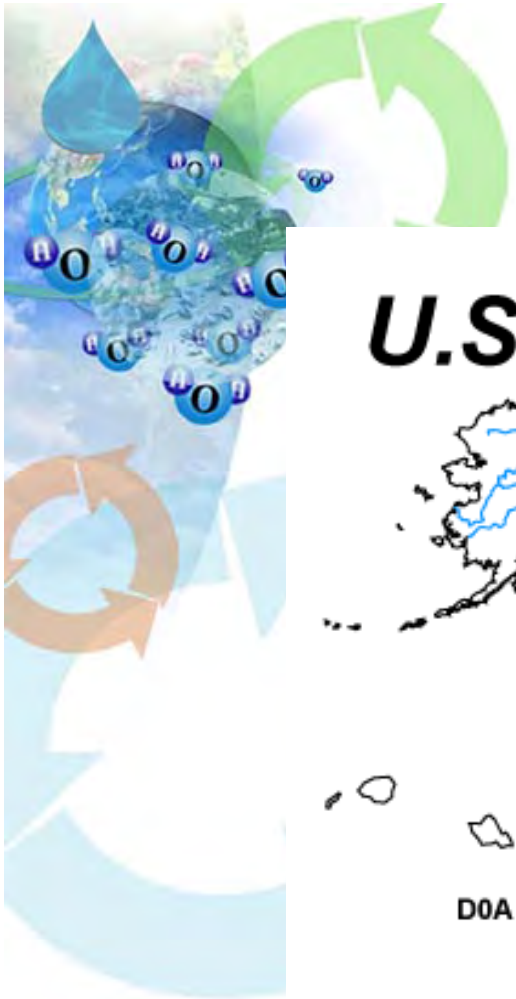
Population growth

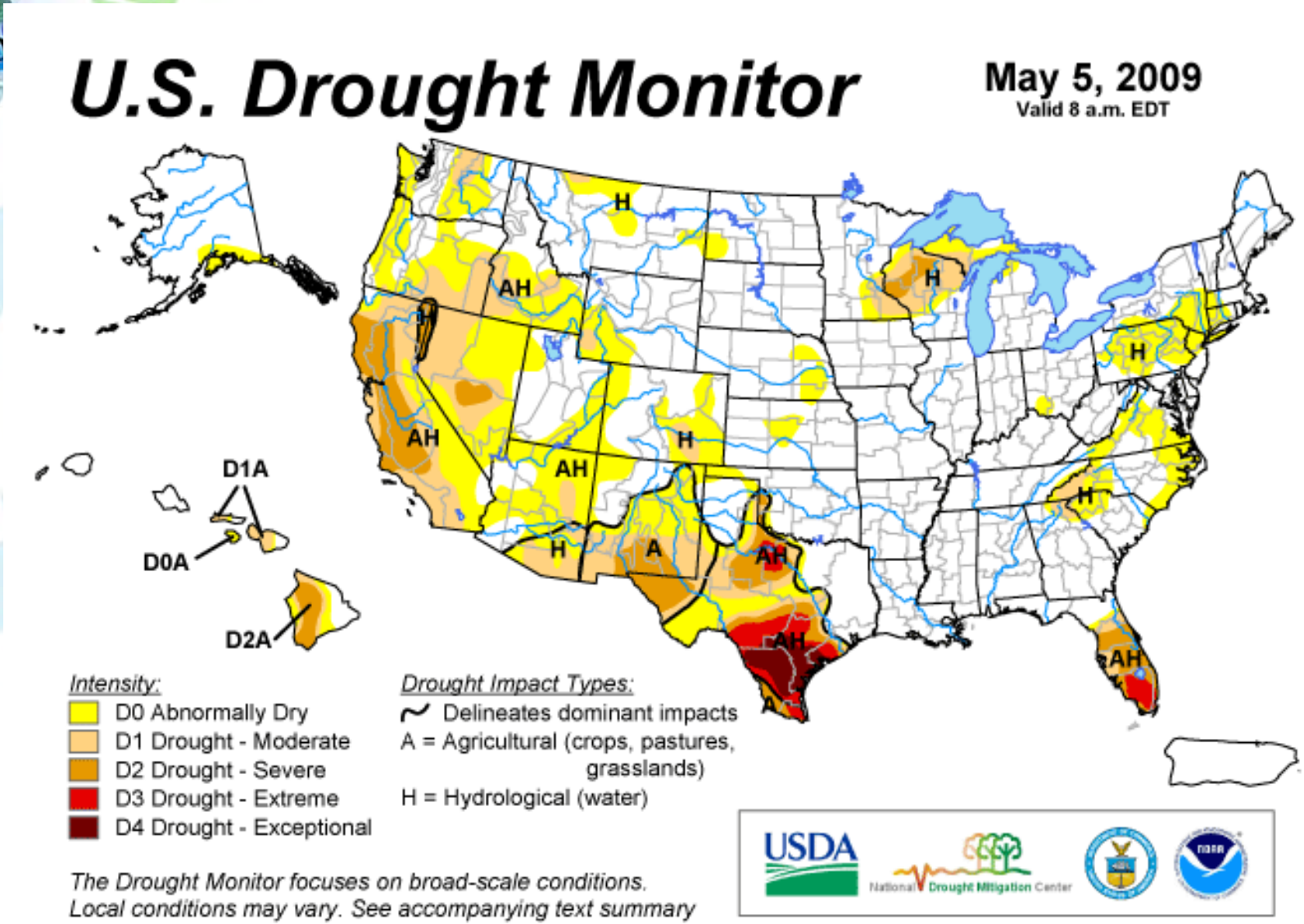


Growing population centers are located in some of the dryer areas of the nation



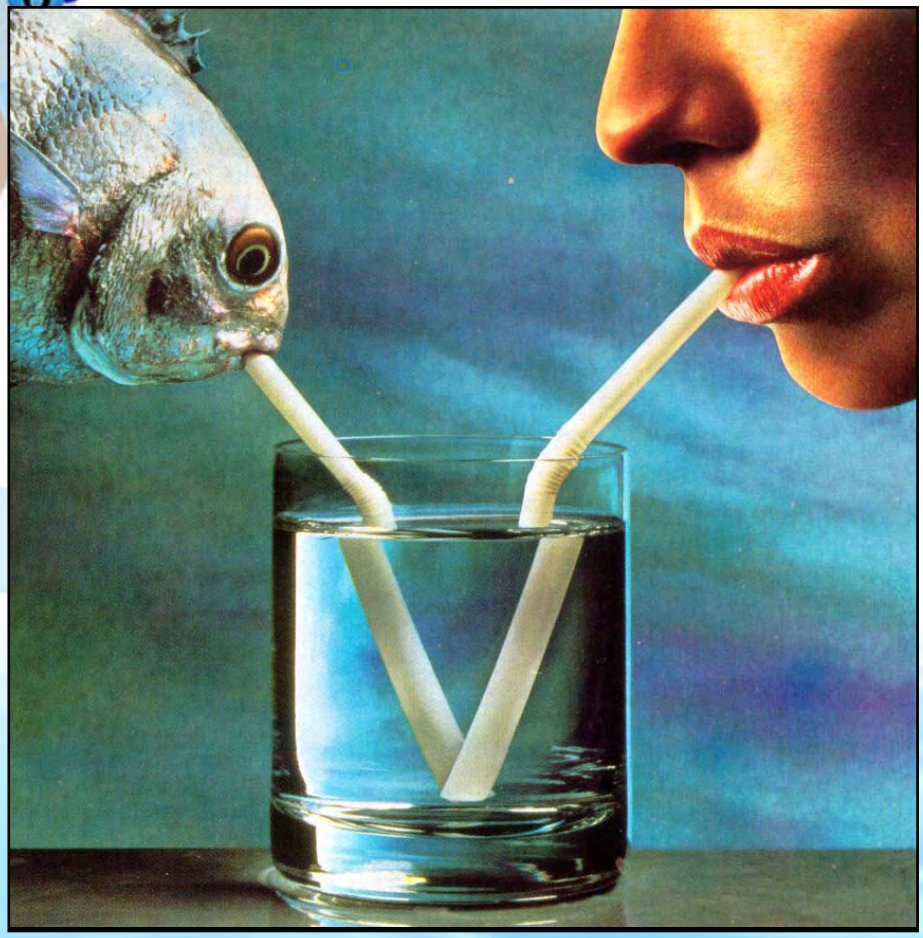
Many of these growth areas are experiencing an extreme drought





Climate and Water are *interlinked*

Our industry faces new challenges. Should reuse be a part of the solution? Isn't it *already*?



Adapted from Du Pont PERMASEP Permeators

- Water quality
- Population growth
- Endangered species
- Climate change

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One key challenge is that our information and images don't inform...

Wastewater anyone?

Beattie ready to embrace 'Armageddon solution

Des Houghton
Tuck Thompson

A taste for waste

By MICHAEL THOMSON

San Diego should flush "toilet to tap" plan

July 24, 2006

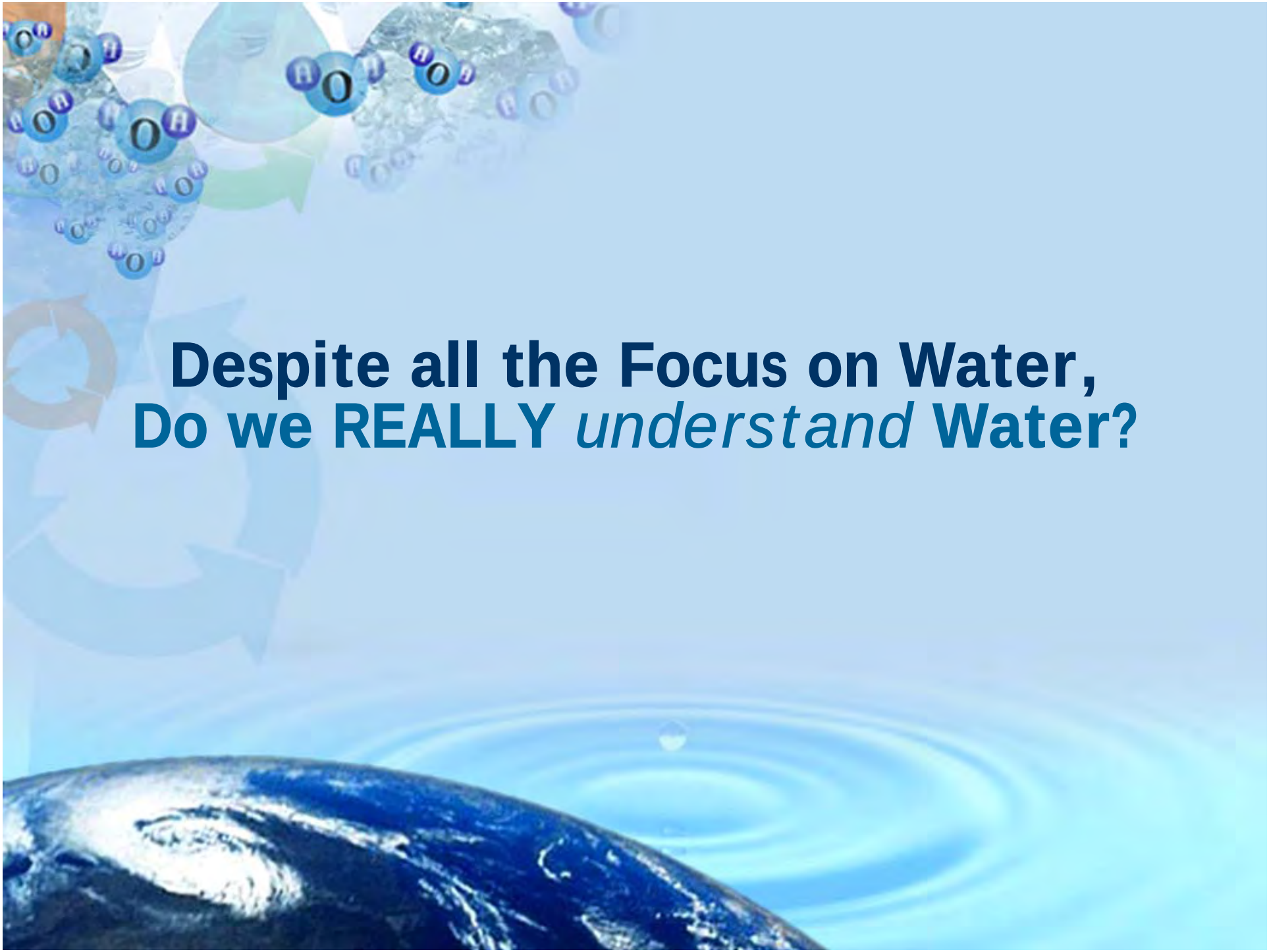
Your golden retriever may drink out of the toilet with no ill effects. But that doesn't mean humans should do the same.

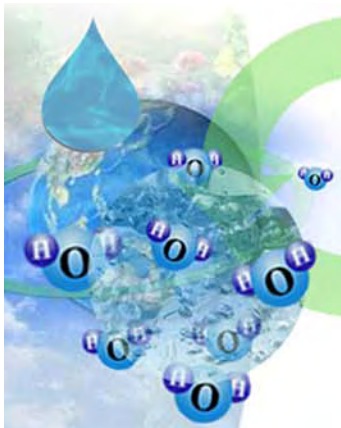
San Diego's infamous "toilet to tap" plan is back once again, courtesy of Water Department bureaucrats who are prodding the City Council to adopt this very costly boondoggle. The project was rightly shelved seven years ago amid a public [illegible] potential health hazards and the

CADS gathers to voice defiance

If You Vote YES Look At The PURIFIED WATER You WILL BE Drinking from

WAte
the w
starts


Despite all the Focus on Water,
Do we REALLY *understand* Water?



Are Snap Judgments Being Made from Sound Bites and Cartoons?

- Are we making decisions quickly on the basis of emotion or
- Are we considering all options rationally and making choices carefully?

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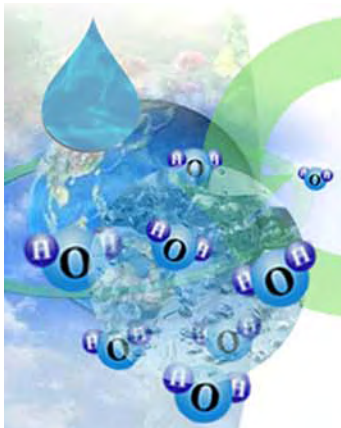

What Should Determine the Appropriate Use of Water – It's Quality or It's History?

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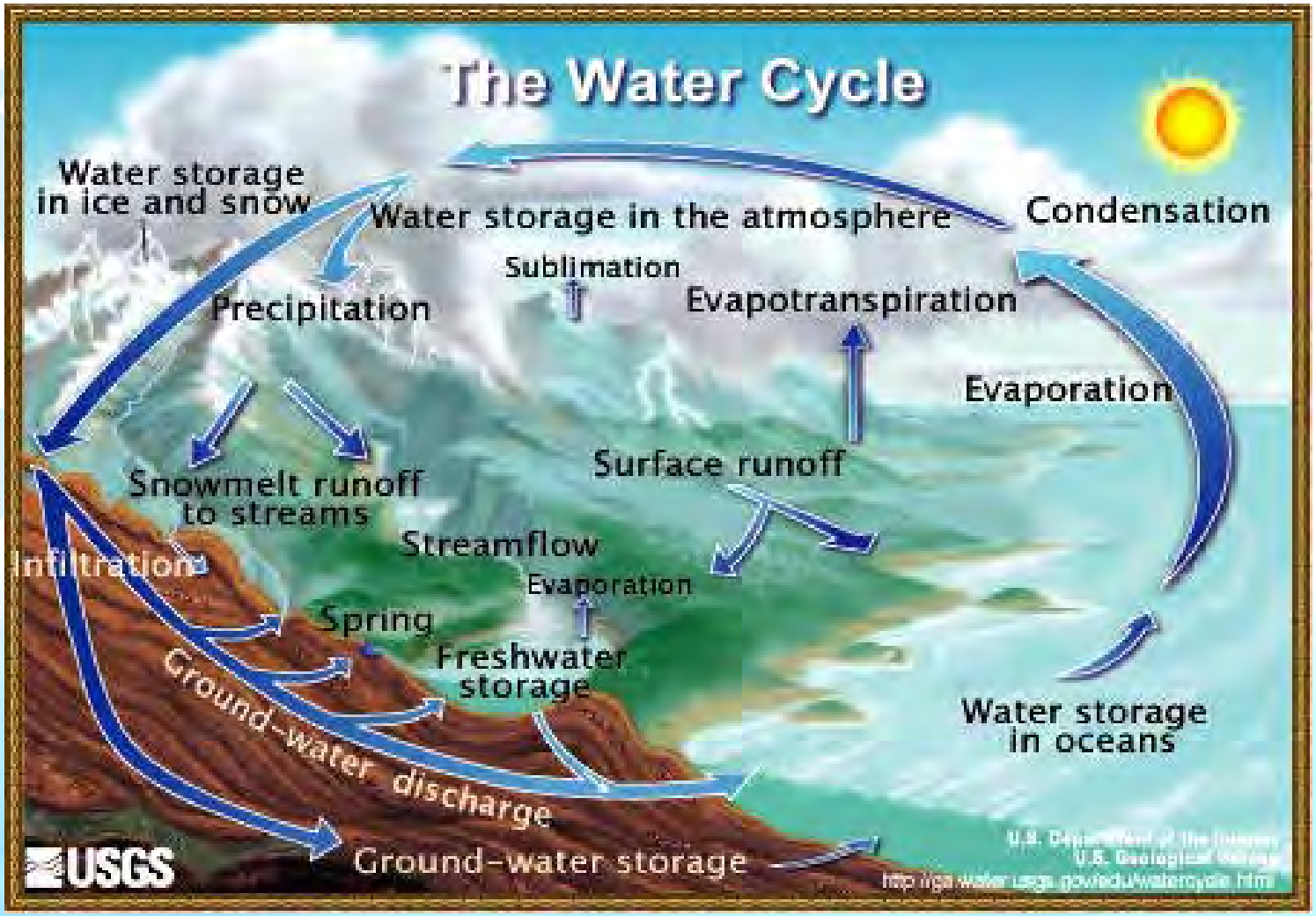
We understand the Water Cycle as the NATURAL water cycle



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The *Water Cycle* and the Life Cycle are the same

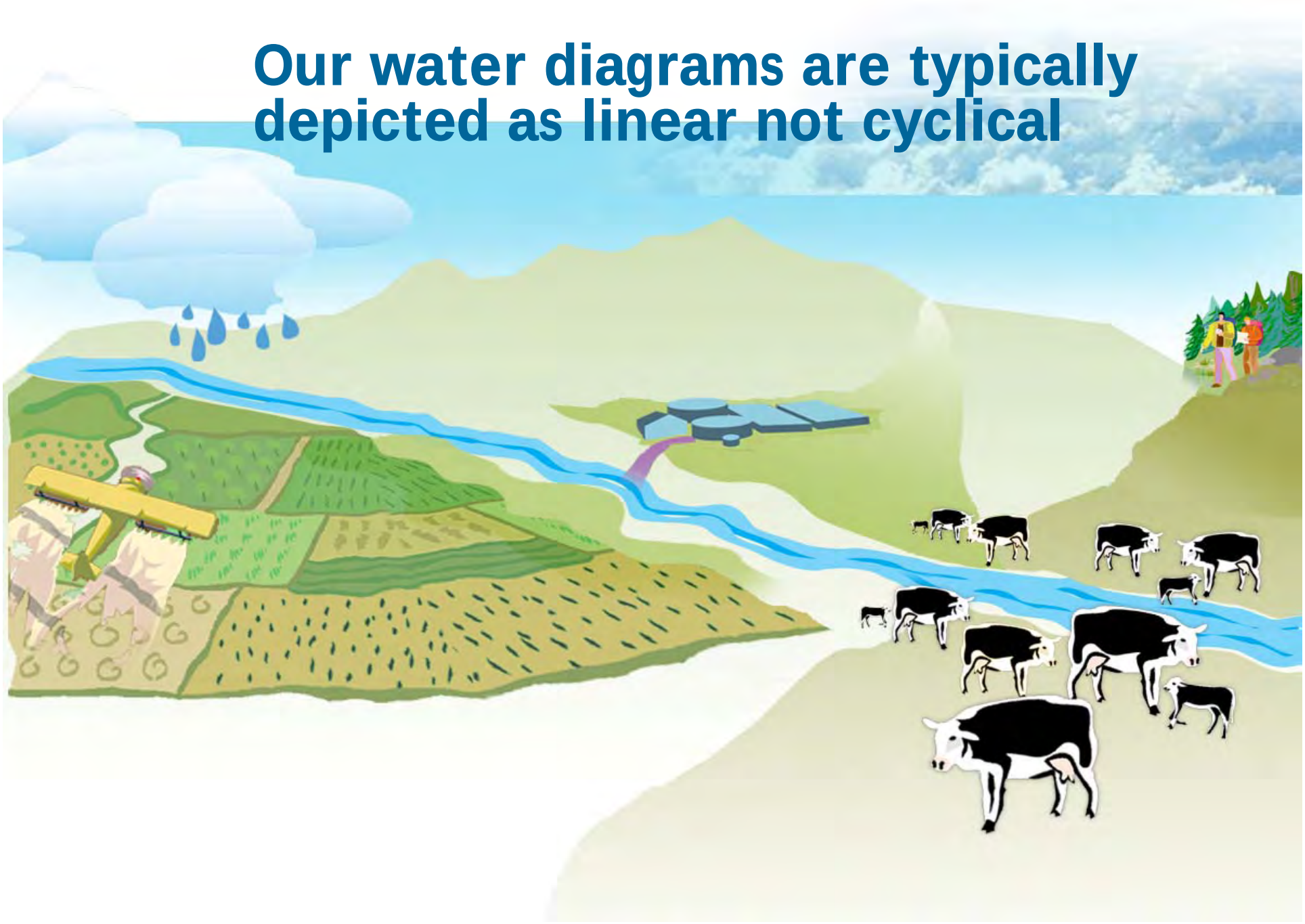
When water has been through a WASTEWATER treatment plant, we call it treated wastewater, treated sewage, indirect potable reuse, unplanned indirect potable reuse, sewerage influenced waters


All water is “influenced”—We need to change the way we talk about WATER –
Why do we stigmatize some WATER?
Isn’t ALL water reused?

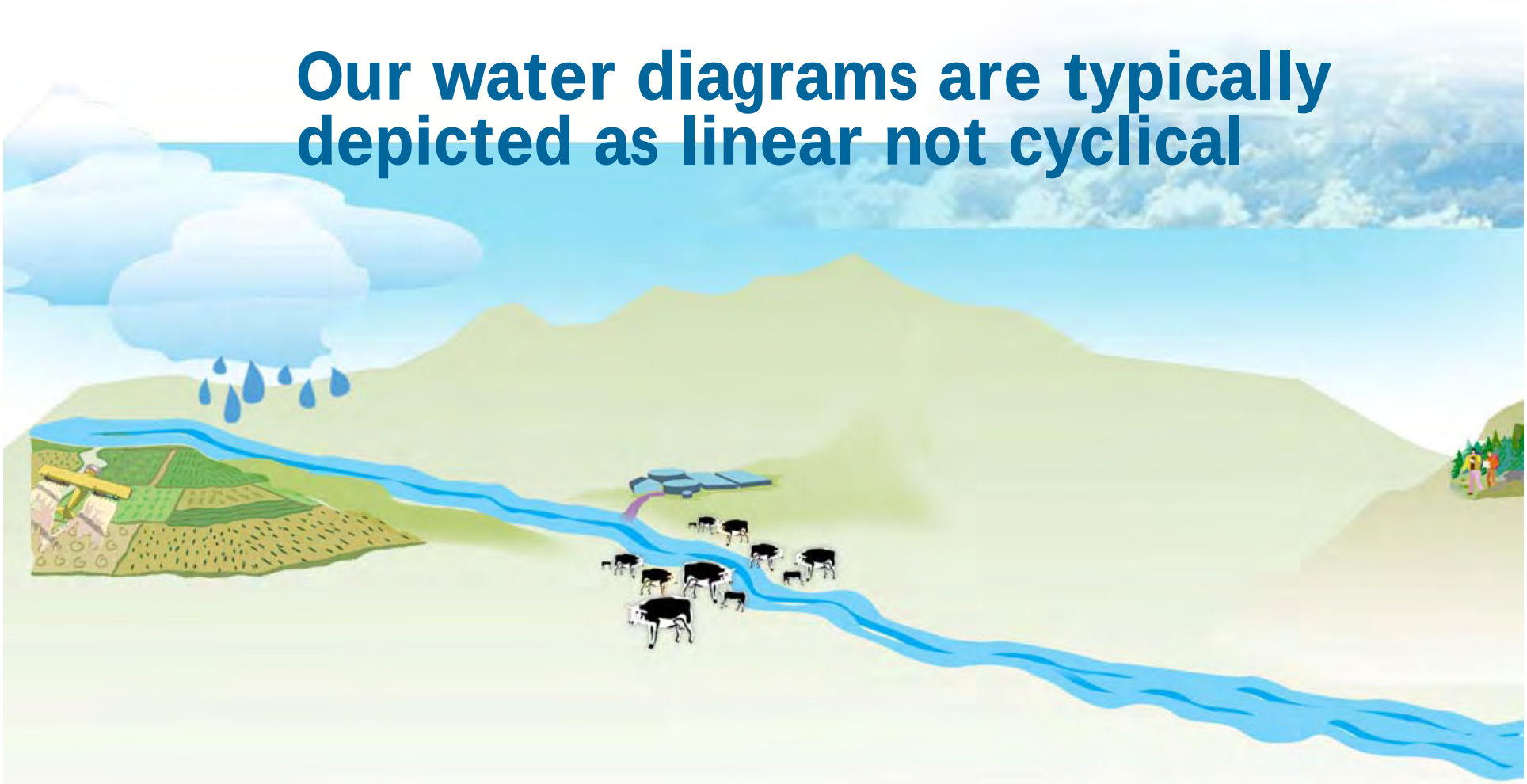
Most of us LIVE
downstream—

Most of us DRINK
downstream

Our water diagrams are typically depicted as linear not cyclical



Our water diagrams are typically depicted as linear not cyclical



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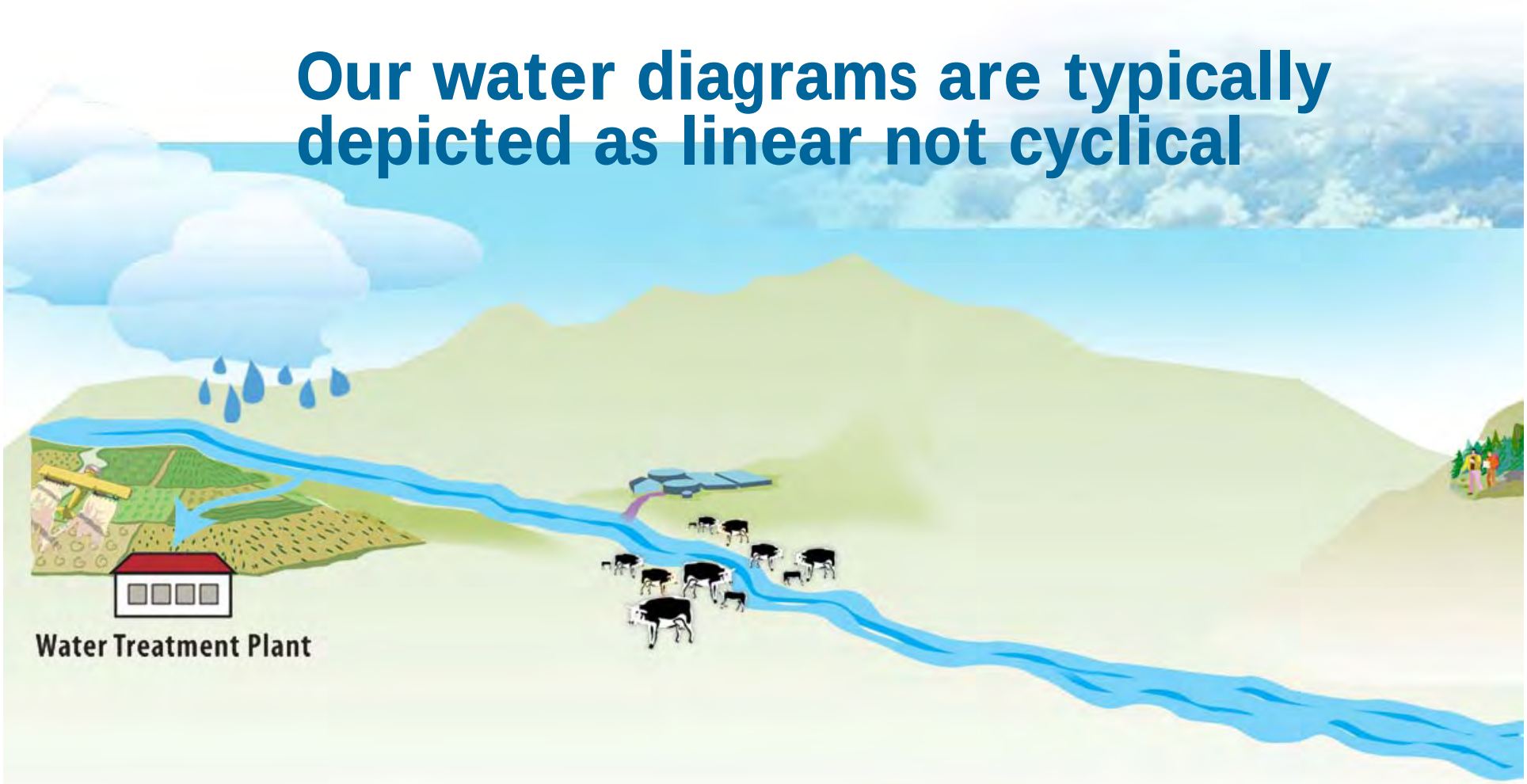
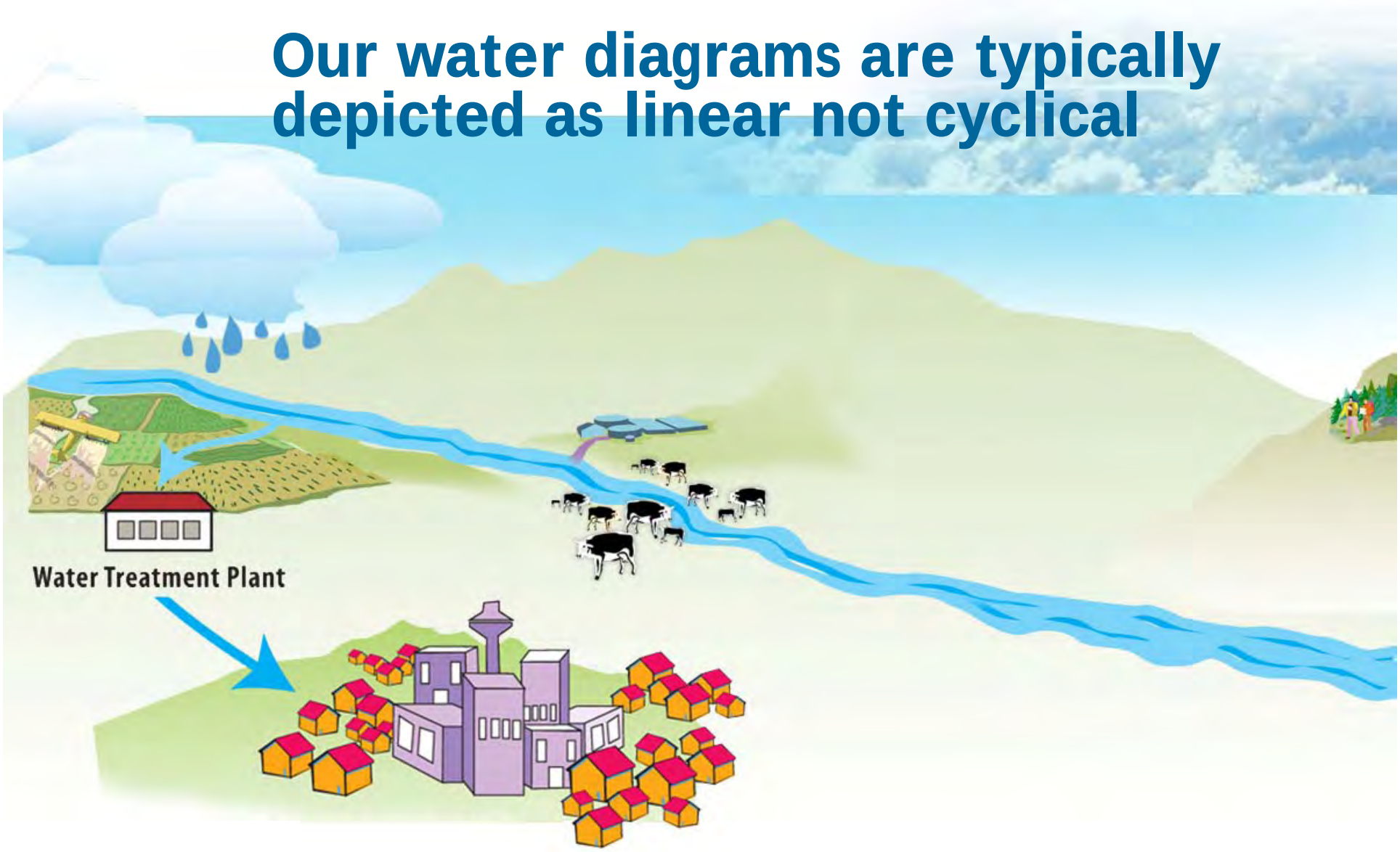
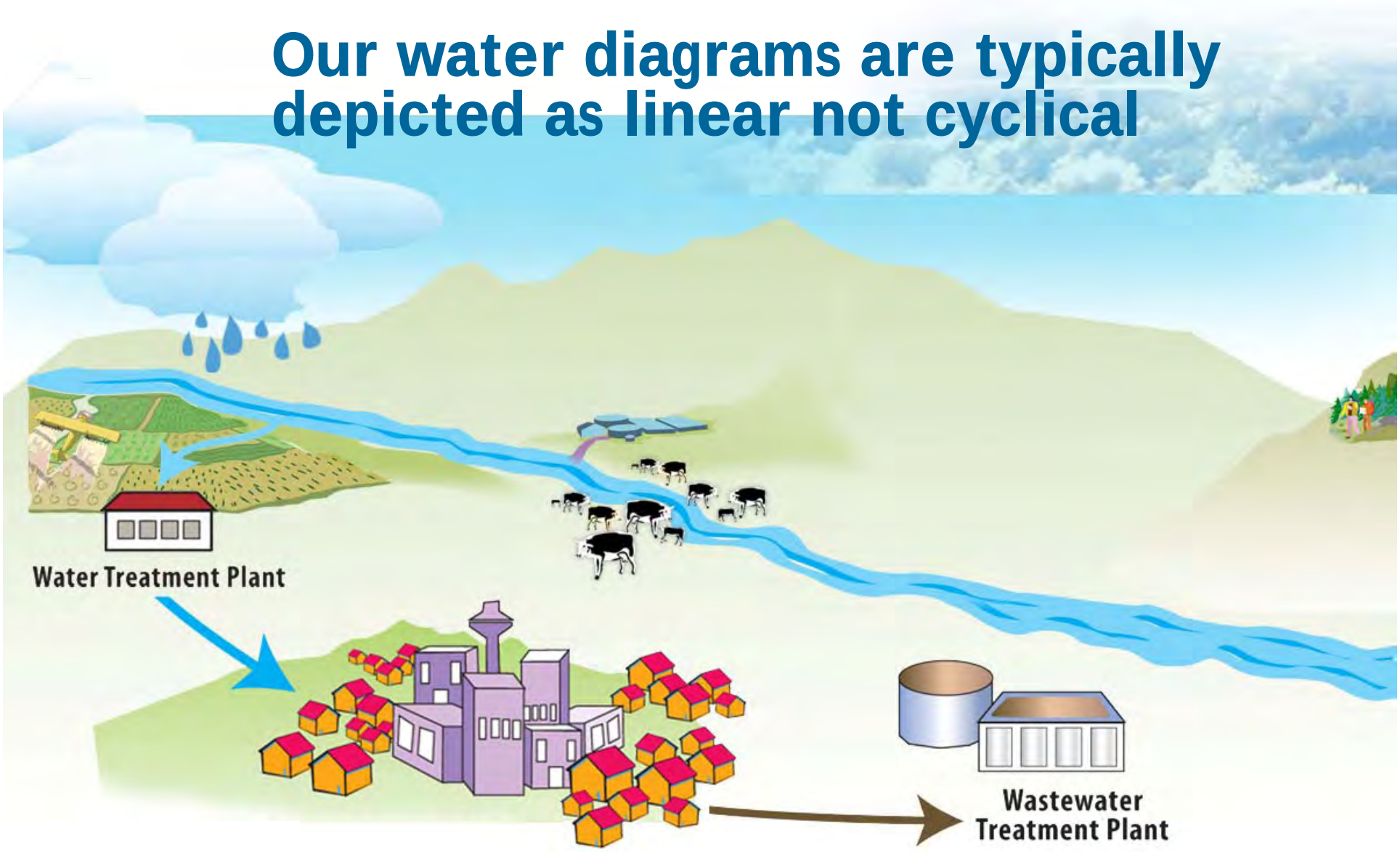
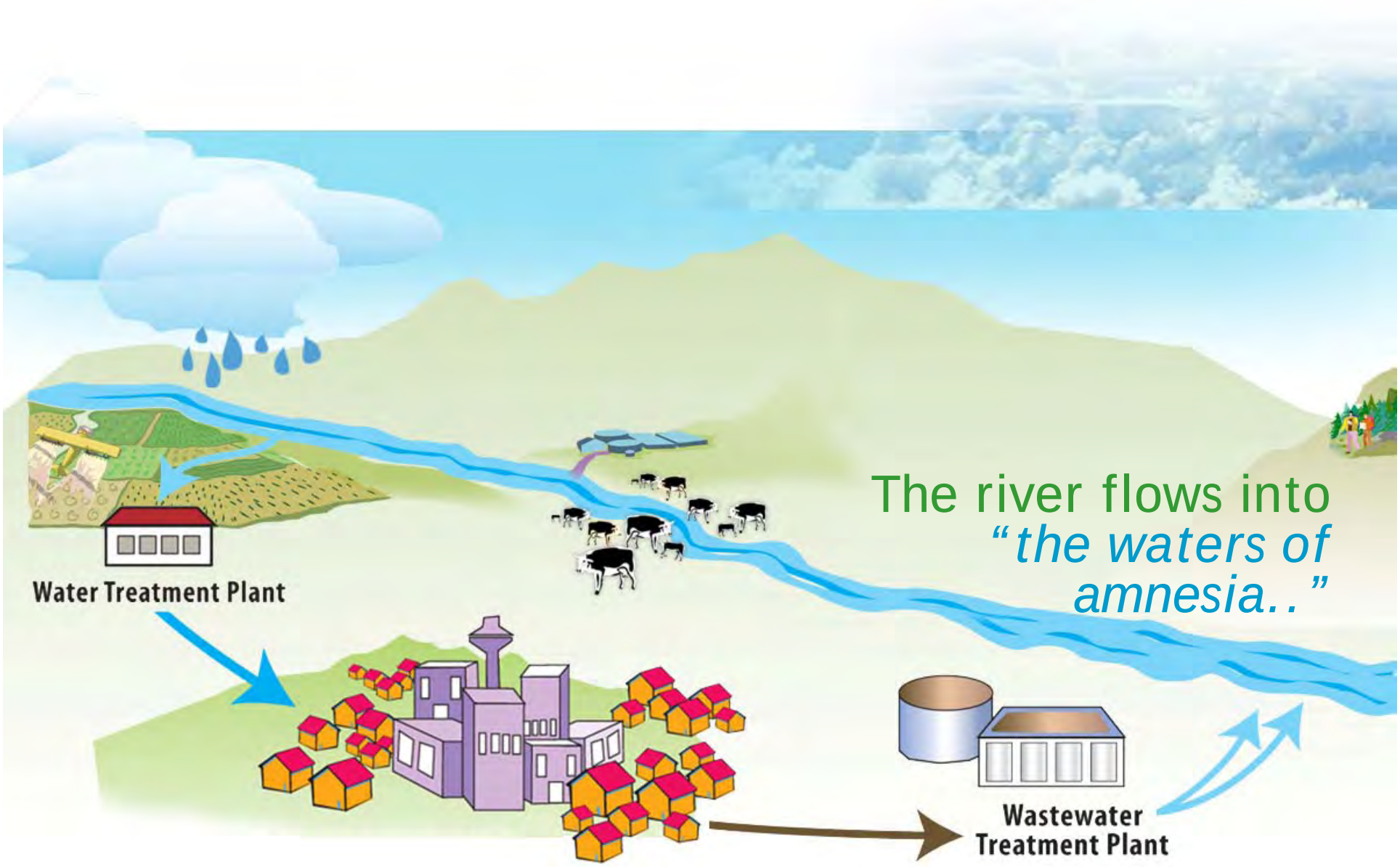


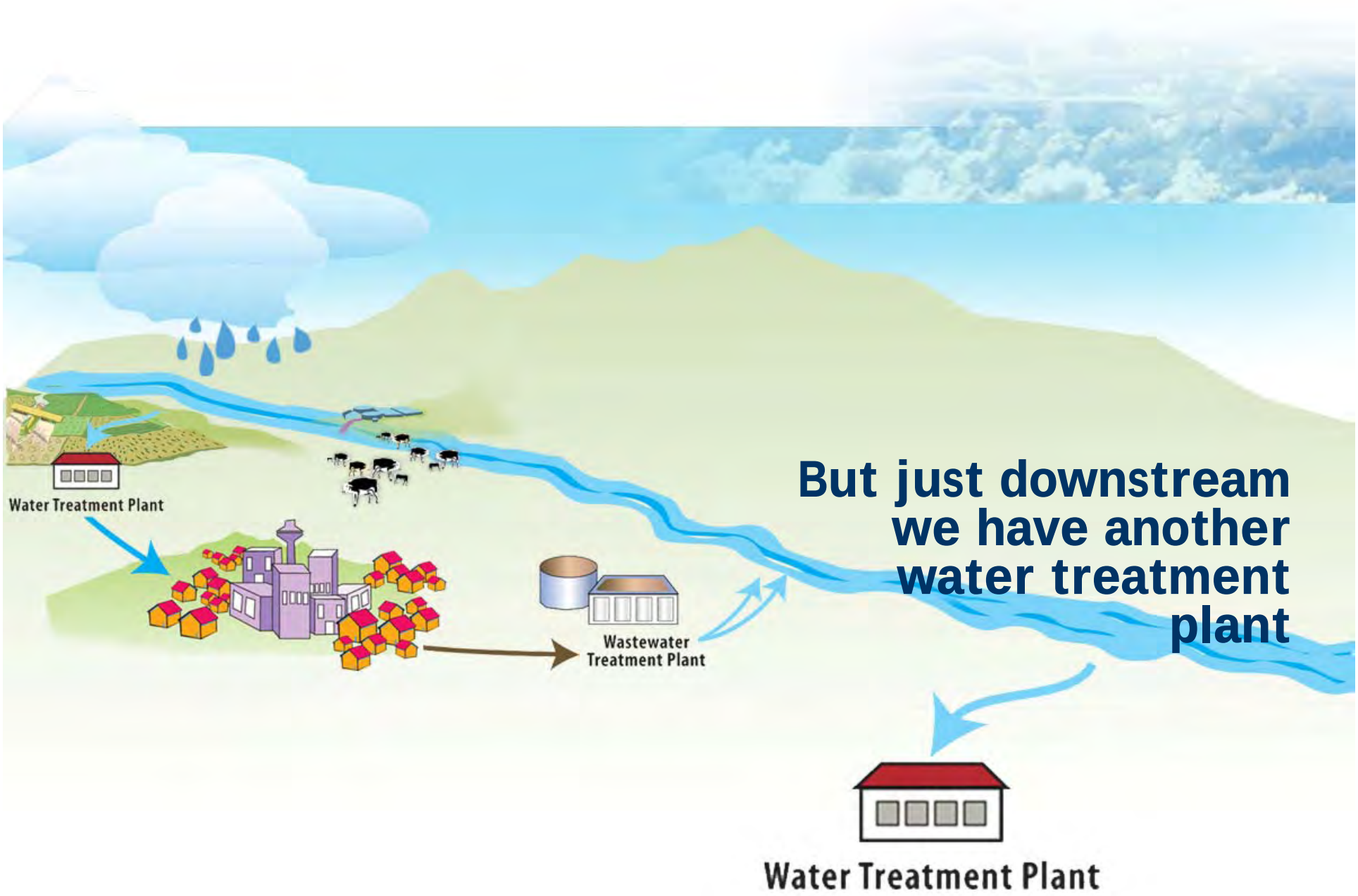
Our water diagrams are typically depicted as linear not cyclical



Our water diagrams are typically depicted as linear not cyclical

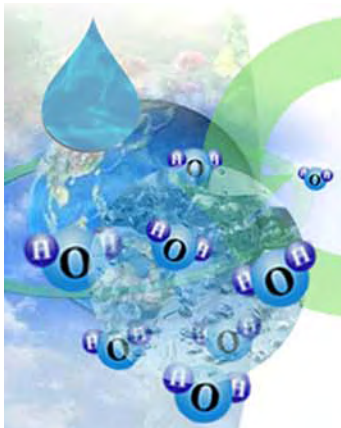



Water Treatment Plant
The river flows into
"the waters of
amnesia.."
Wastewater
Treatment Plant


Water Treatment Plant
Wastewater Treatment Plant
But just downstream we have another water treatment plant
Water Treatment Plant

another city and another wastewater treatment plant

Reuse Is a Reality for a Large Portion of the Population *Right Now*



Can a Linear System That Evolved:

- For global population < 2 billion
- Mostly rural
- Lacking modern technology

Be the Solution When:

- Global population ~ 10 billion
- Mostly urban
- Experiencing greater resource constraints?

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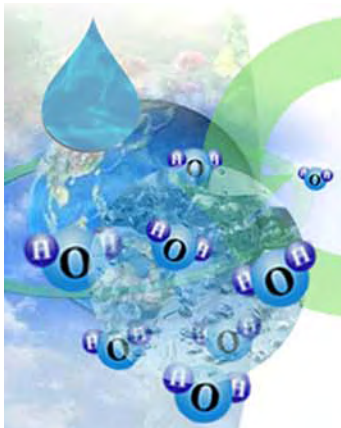

Indirect reuse is a reality now—whether it's "planned" or "unplanned"

- Isn't it appropriate that we (water, wastewater, and reuse) create projects, guidance, and regulations that promote sustainability and provide public health and environmental benefits?
- Or is it more important that we focus on the history of where the water has been – regardless of quality?

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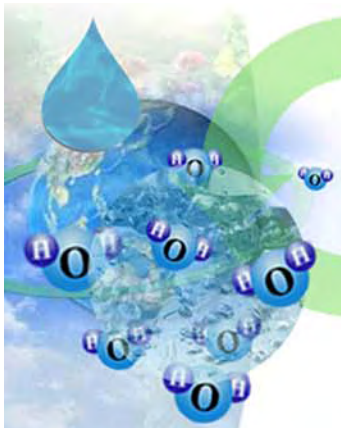

In our industry when we focus on who recycles water for drinking, we tend to emphasize only planned indirect potable use:

- **Orange County,** *California, USA*
- **UOSA,** *Virginia, USA*
- **Singapore's NEWater**
- **Clayton County,** *Georgia, USA*
- **Gwinnett County,** *Georgia, USA*
- **El Paso,** *Texas, USA*

But the REALITY is…

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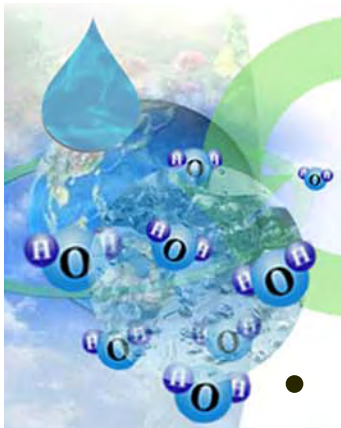
Planned and unplanned indirect potable uses have occurred for many years — with no known health issues



Global water reuse is the water industry's best kept secret

- A very large part of the population of the world's industrialized countries practices indirect potable reuse
- We only focus on it when it is OUR water intake that is below OUR discharge
- We take reuse out of context making it extraordinary and unusual
- Extraordinary things are more alarming to the public than those that are commonplace
- So, our language is actually scaring people away from reuse!

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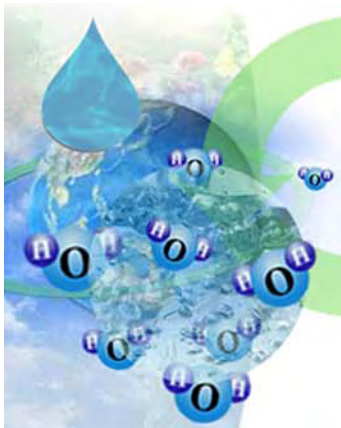

Won't Stigmatizing the Language of Water and Reuse Have Predictable Results?

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1 choice is continued discharge into Laguna; 3 go straight to ...
Santa Rosa Press Democrat - Santa Rosa,CA,USA
Most comments focused on "emerging contaminants," non-regulated levels of pharmaceuticals, personal care products and pesticides found in wastewater, ...

A closer look at the questions
Arizona Daily Star - Tucson,AZ,USA
Some critics say there may be troublesome compounds in wastewater, such as traces of pharmaceuticals, that won't be found until technology is more advanced. ...

Address threat to our water supply
Chicago Daily Herald - Chicago,IL,USA
The results of that testing showed that
percent of the streams tested positive fo
more organic wastewater contaminants. ...

Answering Questions On Emerging Contam
Water Online (press release) - Horsham,PA,
Trace organics are important challenges f
wastewater industry. Whether we are d
endocrine disruptors, microcon
pharmaceuticals, ...

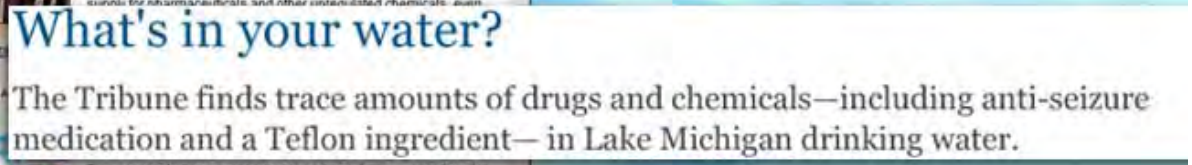
April Town Meeting cancelled
Easton Journal - Raynham,MA,USA
"The pharmaceuticals issue is an issue of
concern," Dombrowski said. The wa
treatment plant in the project could be up
needed in ...

Are you concerned about drinking water?
Atlanta Journal Constitution - GA, USA
A team of investigators discovered low-le
of two pharmaceuticals in the treated wa
Gwinnett County discharges into the Chatt
River ...

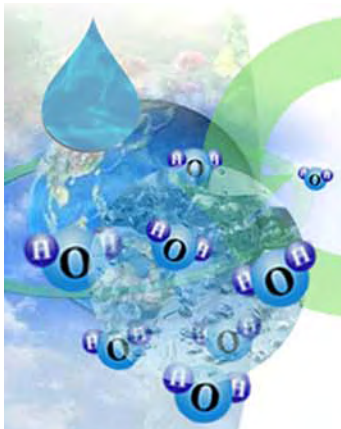

examiner.com
Tuesday, March 11, 2008
The Examiner
JOHN P. WILCOX
JAMES E. PIMENTEL
EDITORIAL
New Yor


EDITORIAL CARTOON *By Nate Beeler/The Examiner*
JACKPOT!
COOKIES
PRESCRIPTION DRUGS FOUND IN TAP WATER
NEWS


WHAT'S ON TAP
Drugs and chemicals found i Michigan drinking water
What's in the water? Tribune investigates tap water ...
VOICES
Photo Gallery
By Michael Hawthorne and Alexia Elejalde-Ruiz
Tribune, RedEye
Published April 17 2008
Chicago officials have never tested the city and suburban water
Stories
Links
Graphic: Test results Apr 17, 2008 (Acrobat file)
Trace concentrations—measured in parts per trillion—were found in water collected at City Hall, an elementary school on Chicago's South Side and a public library in Waukegan, which has its own treatment plant. The newspapers also had samples of the top three brands of bottled water tested, but no pharmaceuticals were found.
The Tribune/RedEye findings echo what authorities have detected in tap water supplies elsewhere in the country: dozens of prescription and over-the-counter drugs as well as chemicals from personal-care products, food packaging, clothing and household goods. The tests do not show that the drinking


What's in your water?
The Tribune finds trace amounts of drugs and chemicals—including anti-seizure medication and a Teflon ingredient— in Lake Michigan drinking water.

Making the familiar unfamiliar promotes anxiety



We've invented new terms as the industry evolved that make commonplace things sound unusual

- Indirect Potable Reuse
- Unplanned Indirect Potable Reuse
- Inadvertent Indirect Potable Reuse
- Incidental Reuse/Influenced Waters
- Water Reuse, Reclamation, Recycling *(no matter what the end use)*
- Sewage-Sourced Water

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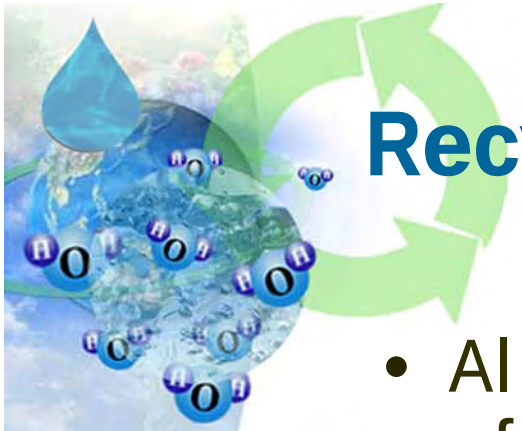

Recycling, reuse, repurification

- All of these words relate to the history of where the water has been
- Treated effluent that is discharged into a water body is recycled into the environment to be used again by someone
- Understandable information on water treatment is needed
- Understanding the water cycle is essential

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An understanding of The Water Cycle can lead to a better understanding of WATER REUSE – making reuse familiar

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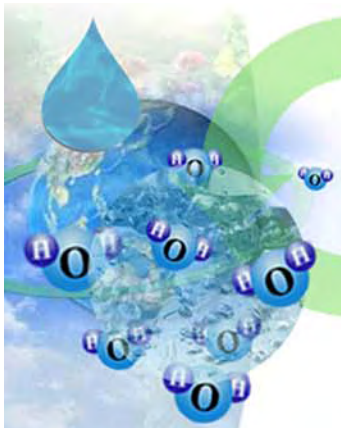

Is Our Alarm about Pharmaceuticals and Personal Care Products in Proportion to our Scientific Understanding?

- Is fear influencing our thinking – causing us to neglect the probability of harm
- "Fearmongering" is especially powerful in the absence of understanding of water quality and water uses

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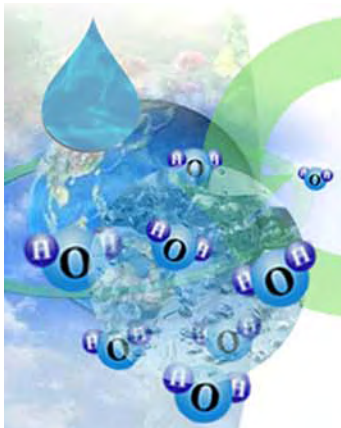

Framing the Issue of Microconstituents in the Water Environment Will be a Challenge

- Residual amounts of the substances we put in the air, on the land or in and on ourselves is likely to end up in the water environment even though it may be at nearly undetectable levels
- We need to promote greater public understanding about their water environment in a way that neither creates undue alarm or complacency

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It *is* true and will *remain* true...we add things to water

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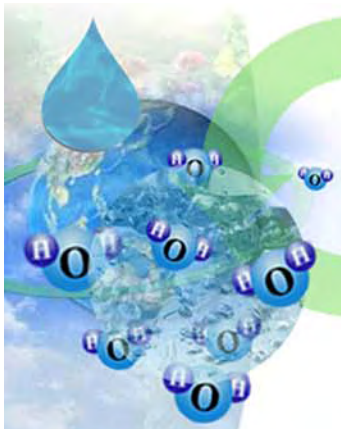

Our Capacity to Detect Ever Smaller Concentrations of Substances in Water has Outpaced Our Ability to Interpret Such Findings

- The nature of the compounds and exposure is as important as mere detection
- Concentration, dose, and duration are receiving less attention than detection in media accounts creating a cascading sense of alarm

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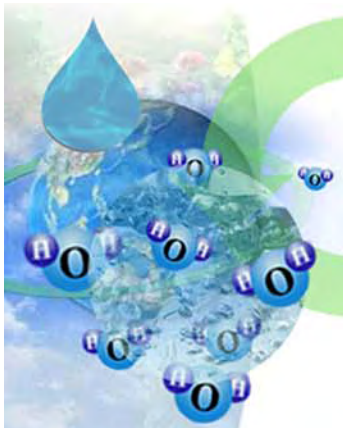

Could the result be a demand for higher levels of treatment due to emotion rather than scientific conclusions, logic or reason?

- Energy Costs Are Going Up at an Unsustainable Rate
- A Climate of Fear Can Create Global Warming
- Can our economy or environment afford less than truly thoughtful deliberation

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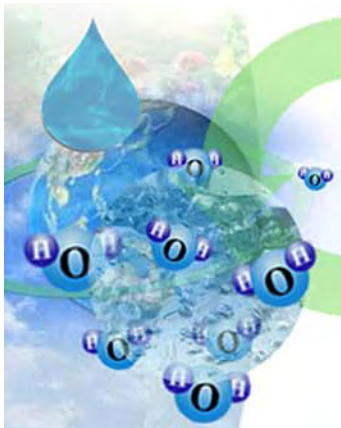
As we focus on sustainability and global warming–

shouldn't we be careful of the carbon footprint of the decisions we make?

Percent increase in energy

Technology	1 mgd	10 mgd	50 mgd	100 mgd
Conventional	N/A	N/A	N/A	N/A
Conventional + UV	10	20	20	10
Conventional + O_3 .5 log	30	100	110	120
Conventional + O_3 2 log	50	160	170	190
Conventional + MF/UF	60	170	190	190
Conventional + NF/RO	210	700	780	830



Generation of New Energy Has Significant Environmental Costs as Well

- This makes it important that we choose the right technology for the right use

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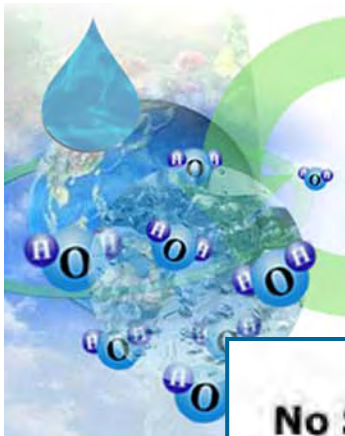
So, don't we need to focus on the quality of the water for the intended use—not the source of the water?

From Wastewater (no stars) to Six Star or Highly Purified Water



No Stars
Wastewater
- Domestic sewage and trade waste
- **USES:**
  - No discharge or use without treatment

One Star
Effluent
- Treated to remove large particles
- **USES:**
  - No discharge or use without further treatment

Two Star
Effluent
- Most biodegradable organic material has been removed
- Usually has been disinfected
- **USES:**
  - Discharge into some waterways
  - Apply to land in controlled conditions

Three Star
Effluent
- Nearly all biodegradable organic material has been removed
- Nutrient content has been reduced
- Usually has been disinfected
- **USES:**
  - Discharge to land or waterway with approval of regulating authority

Four Star
Reclaimed water
- Has received further treatment such as artificial wetlands, conventional, or membrane filtration so that its quality is fit-for-purpose for its intended use
- **USES:**
  - Industrial processes
  - Irrigation of public areas
  - Crops for consumption
  - Dual reticulation

Five Star
Drinking water
- Treated sufficiently for human consumption
- Conforms to Australian Drinking Water Guidelines
- Monitoring must conform to specified quality assurance procedures
- **USES:**
  - Can be blended with other drinking water supplies or used directly

Six Star
Purer than drinking water
- Treated to a very pure quality
- Lacks nutrients and minerals
- **USES:**
  - Kidney dialysis
  - Industrial processes such as pharmaceutical manufacturing
  - Can be blended with fresh water supplies

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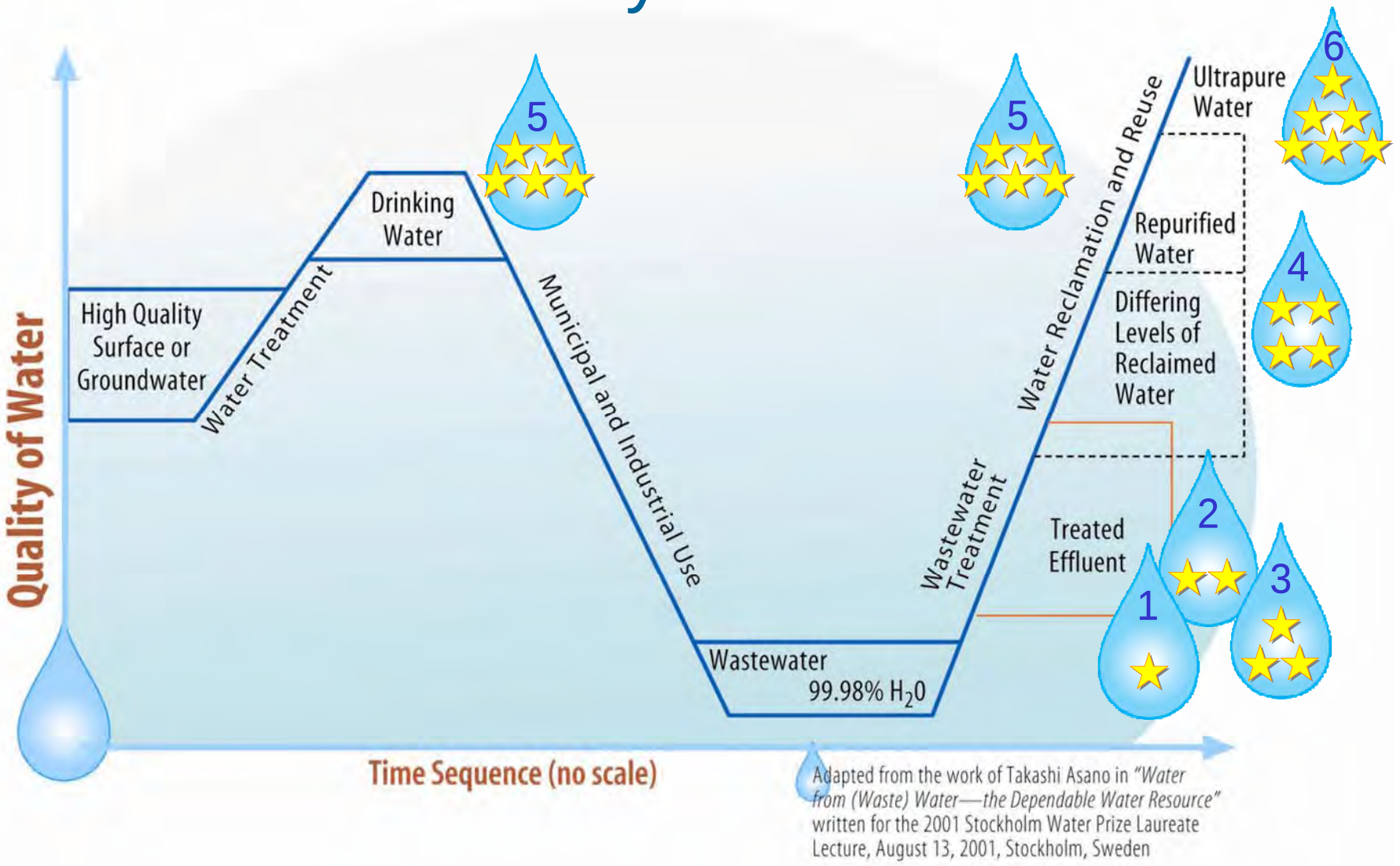
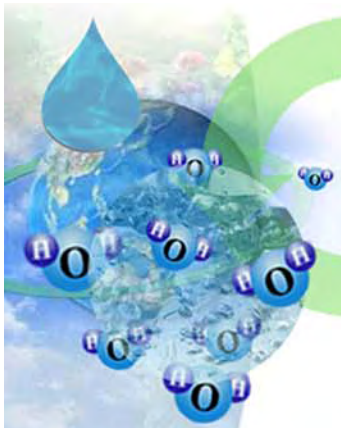
Understanding water qualities determines how water can be safely used!





“Uninformed people cannot make informed decisions”

Jenifer Simpson

- Agreement must be reached on a basic terminology that informs, does not inappropriately stigmatize, and can be understood by the general public to aide informed decision-making

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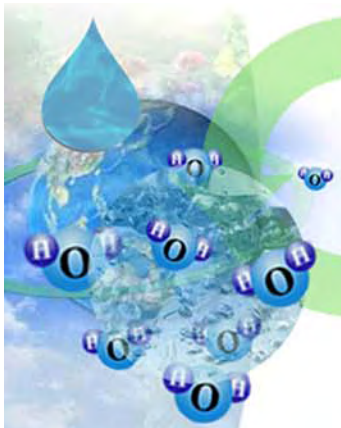
Choosing Our Path Forward



Sustainability Must Be Considered Carefully *(it isn't just a buzz word)*

- Included in treatment considerations is the need to address the sustainability of a given treatment process.
- Example: the idea that RO membranes can be used for all water and reuse applications may be impractical considering the brine disposal problems, the potential progressive salt buildup in our watersheds and energy/climate change implications

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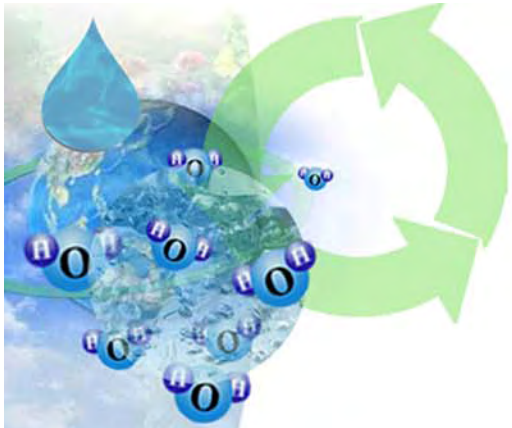

- Once all sustainable treatment options have been considered, the resultant water quality will be as good as the available treatment technologies can provide

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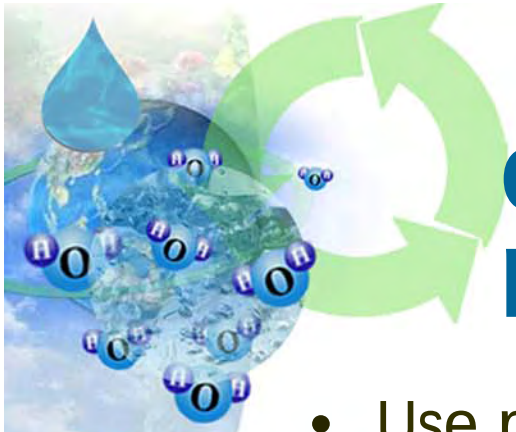

Overcoming negative perceptions is possible!

- Use positive, accurate terminology that avoids stigmatizing the product
- Provide knowledge and understanding of water quality and treatment
- Discuss the quality of water, make reuse “normal” — acknowledge where and how it already happens
- Realize that education and knowledge of water are important to establishing trust
- Have fun and use engaging education and outreach techniques

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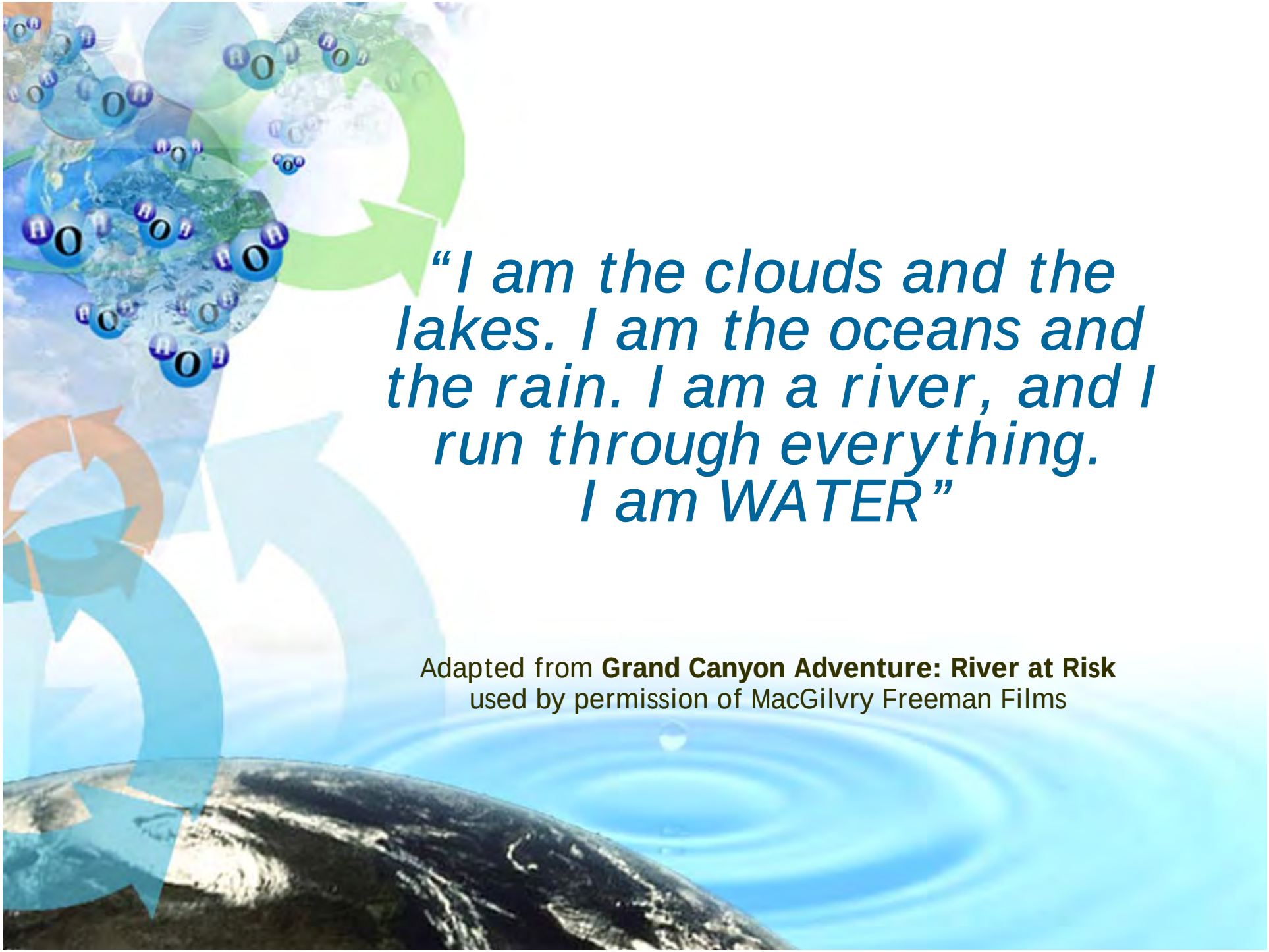
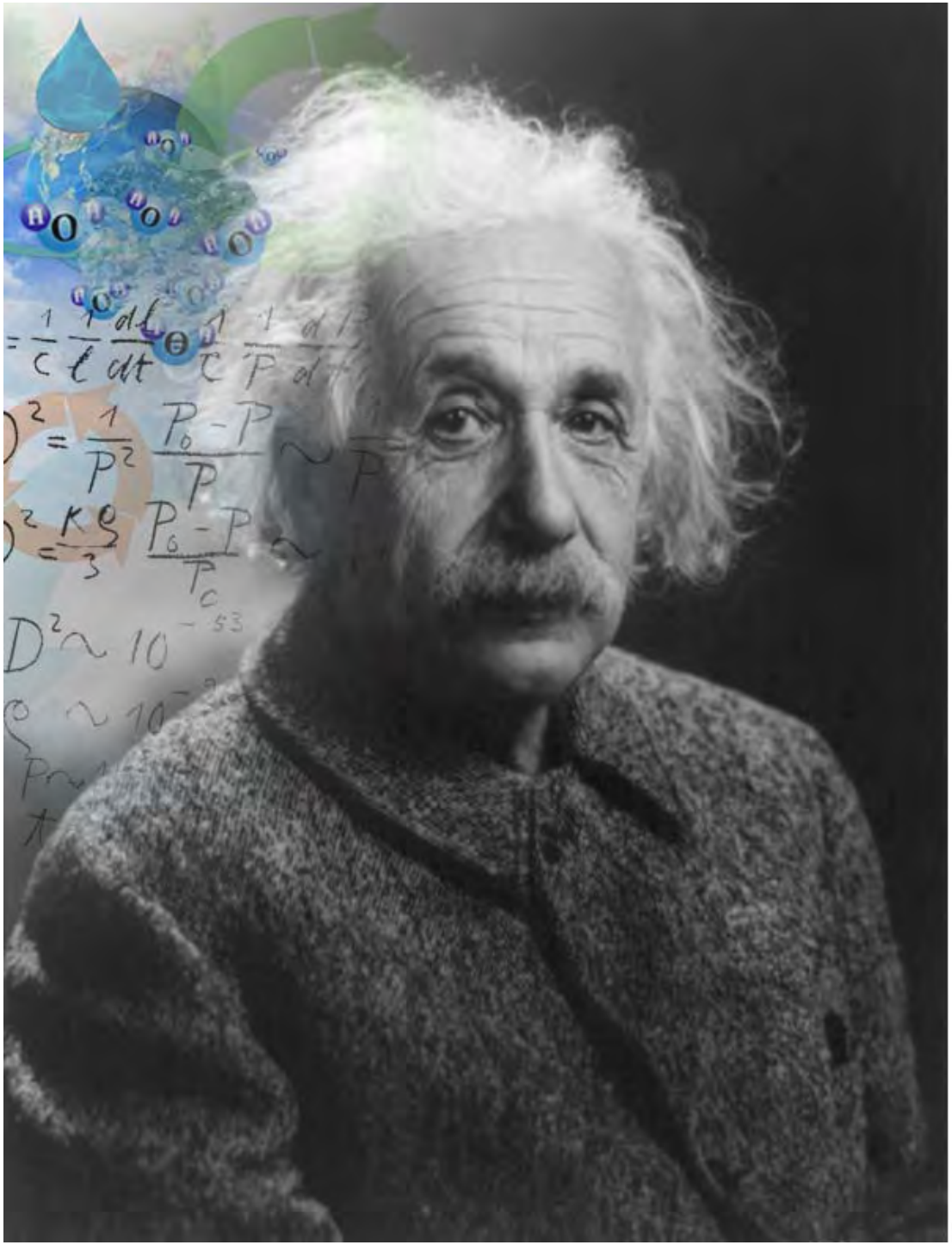


"I am the clouds and the lakes. I am the oceans and the rain. I am a river, and I run through everything. I am WATER"

Adapted from **Grand Canyon Adventure: River at Risk**
used by permission of MacGilvry Freeman Films



“Not everything that counts can be counted, and not everything that can be counted, counts.”

–Albert Einstein


A shared vision of the future
of water on this planet
is a shared vision for the
future of life on the planet.


H2OW will our generation and our community sustain the benefits of this precious resource?
Water:
Nature's Amazing Reusable Resource