

WATER:

Earth's Most Precious and
Spectacular Substance!

WATER IS SPECIAL

Essential for Life



Beautiful!

Powerful!



WATER IS UNIQUE

The only substance on Earth that occurs in 3 different states naturally:

**SOLID
(ICE)**



LIQUID

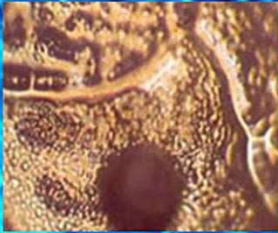


**ICE
FLOATS!**

GAS



WATER CRYSTALS



polluted water
Yodo River, Japan



NEGATIVE



POSITIVE



spring water
Yusui Mountain Spring, Japan



you fool



heavy metal music



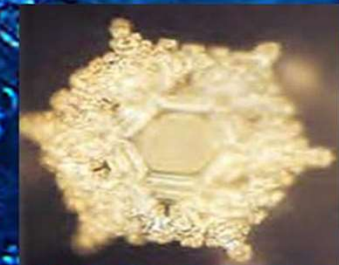
Beethoven's music
Pastoral



thank you



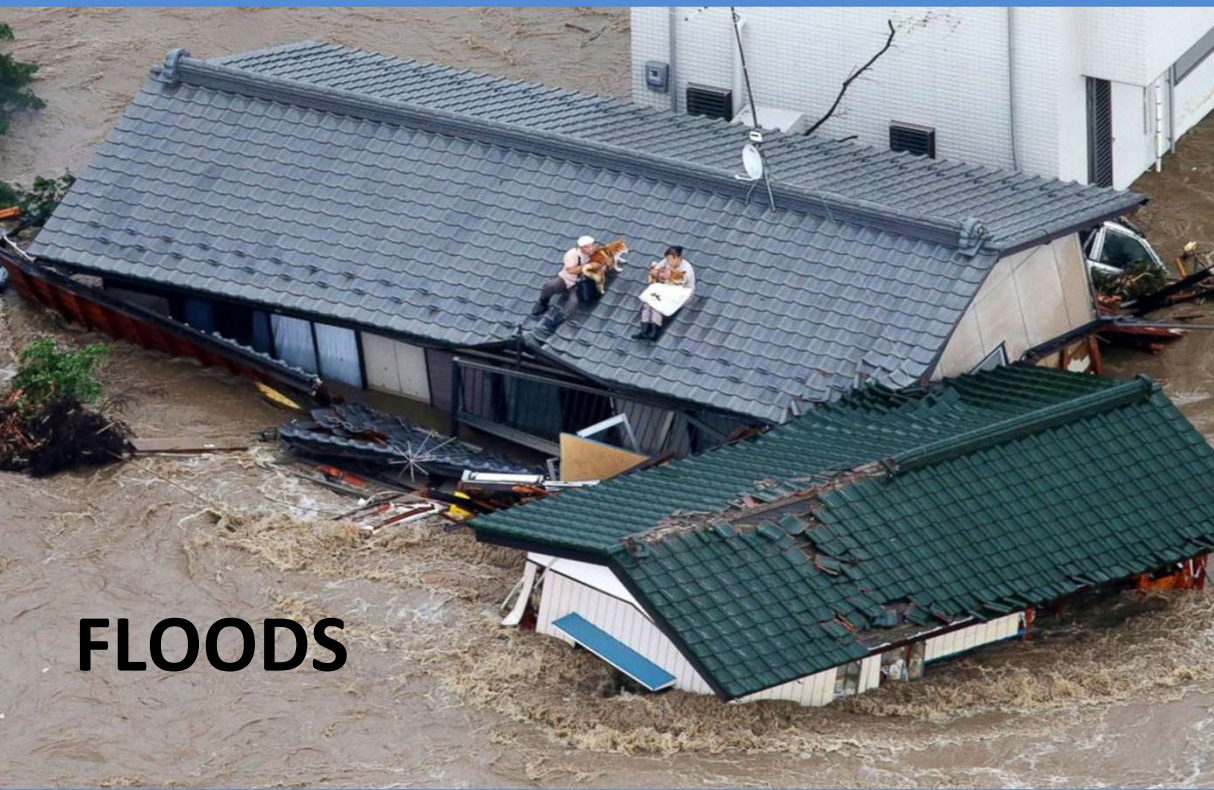
you make me sick



love & appreciation

Water has memory

Water Crystals as photographed
by Dr. Masaru Emoto



FLOODS

**WATER
IS
POWERFUL**

Tidal Waves: Tsunamis

2004 Indonesian Tsunami:
Killed almost 250,000 In
Indonesia, Sri Lanka, India,
Maldives and Thailand





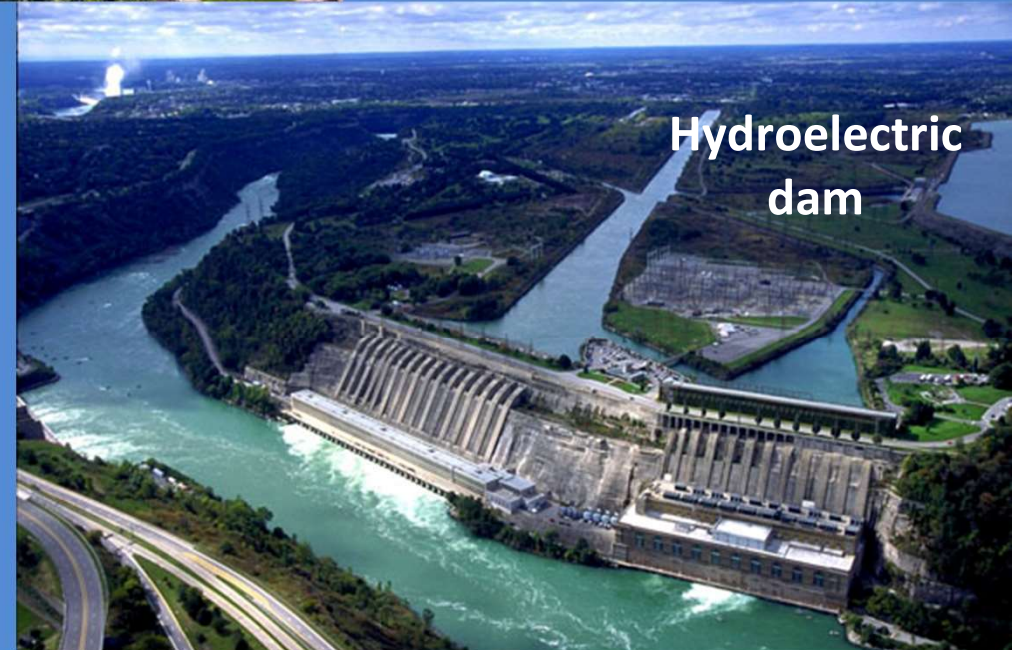
Niagara Falls

**176' high
>1,000' wide**

**The power
of water
generates
electricity!**

**Niagara Falls Dam
provides power for over 4
million homes in the
U.S. and Canada!**

The Niagara River connects 2
Great Lakes – Erie and Ontario



**Hydroelectric
dam**

WATER USES



Putting out
fires
&
Growing food

A satellite view of Earth from space, showing the Americas, the Moon, and a yellow dot in the central US. The Earth is the central focus, with the Moon visible in the upper left. A small yellow dot is located in the central United States. The background is a solid blue color.

OUR BIG BLUE
PLANET EARTH

Water

HOW
MUCH?

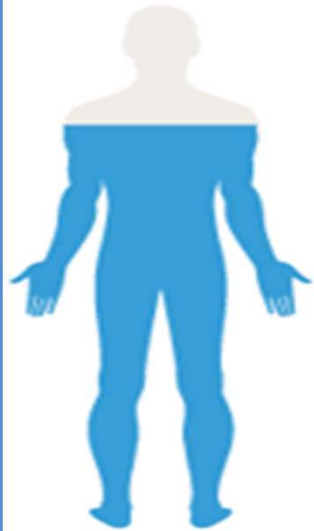
WE ARE WATER



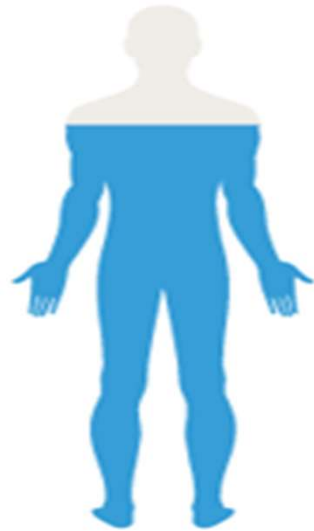
Blood
85% water



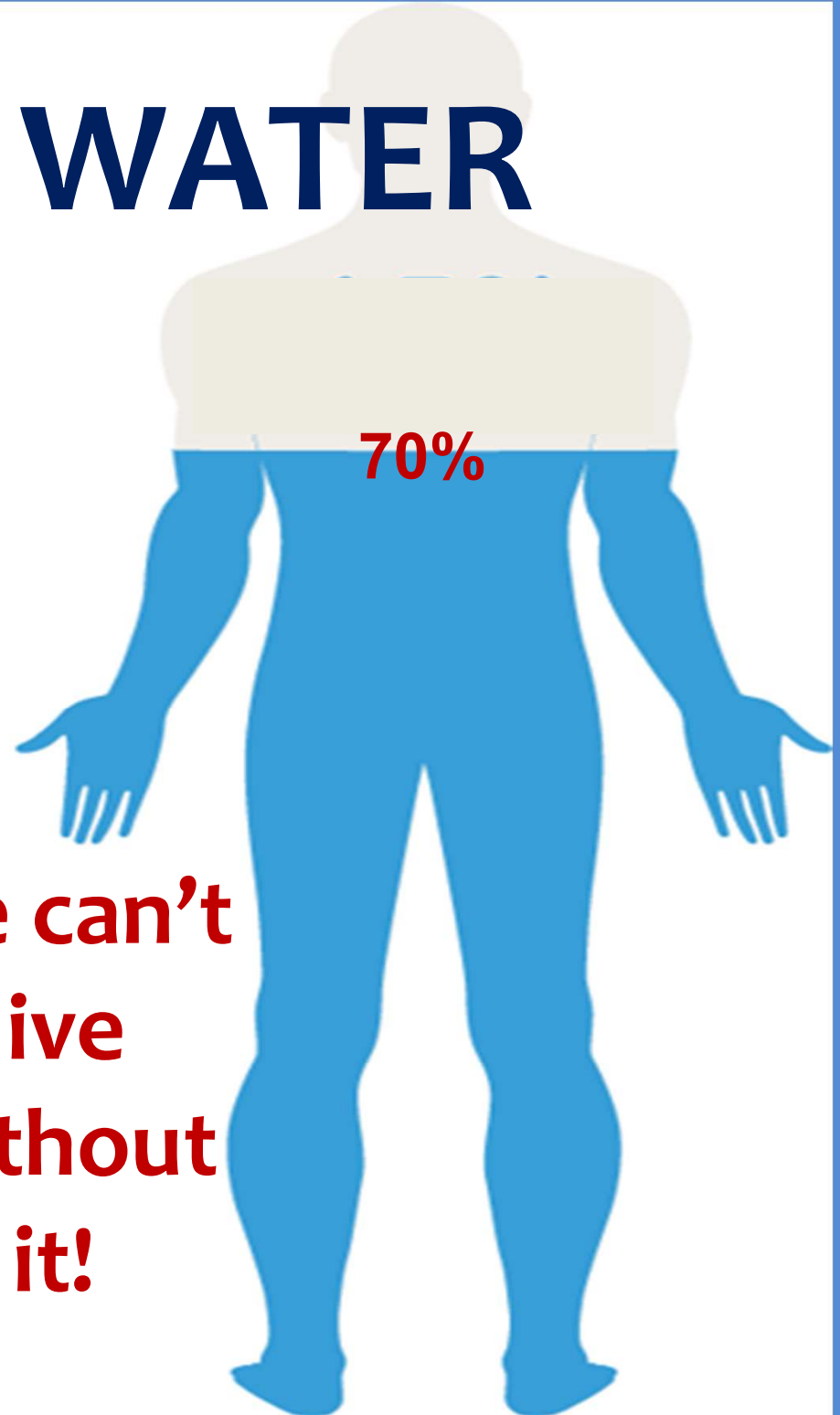
Bone
22% water



Brain
74% water



Muscles
75% water



We can't
live
without
it!

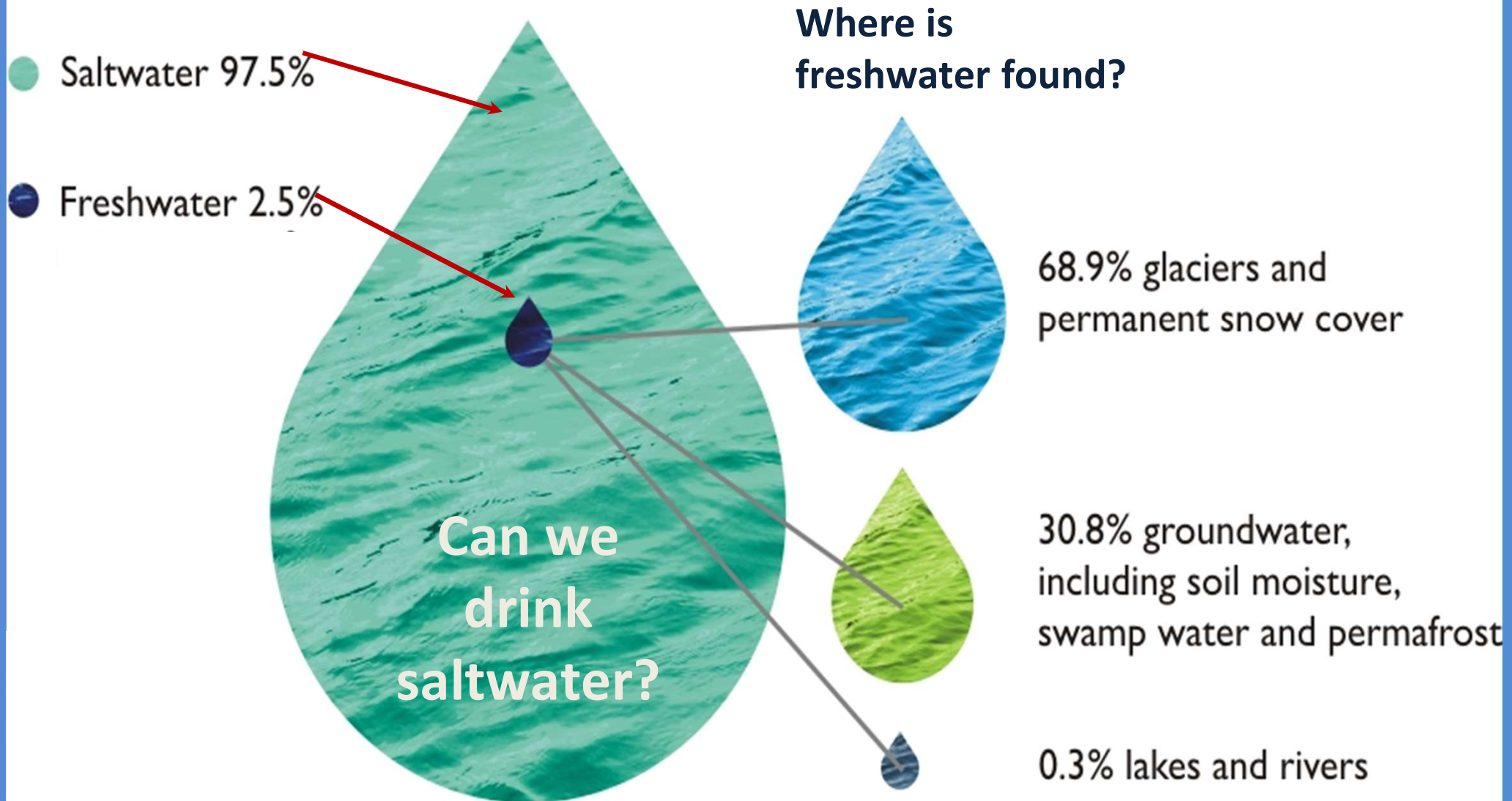
THEY ARE MOSTLY WATER TOO



Where's the Freshwater?



WORLD'S WATER – 2 TYPES



That's not much freshwater!



IS FRESHWATER

that's available for 8 BILLION people
and even more animals!

That's not much!



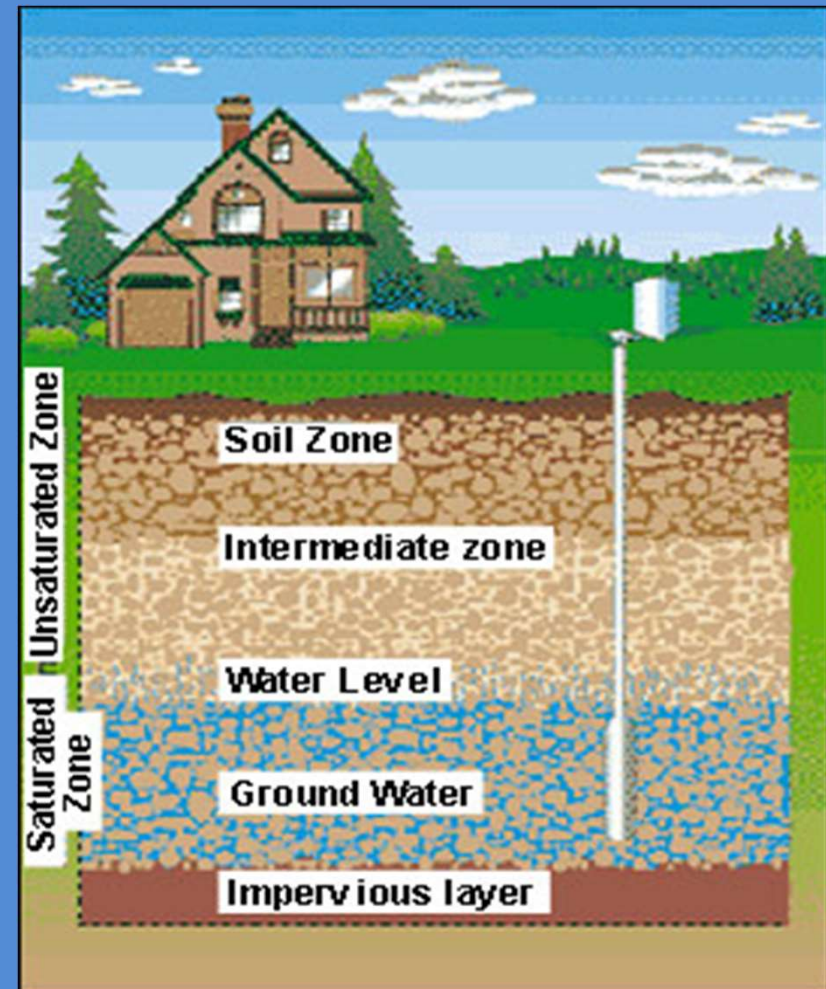
68.9% of the Freshwater

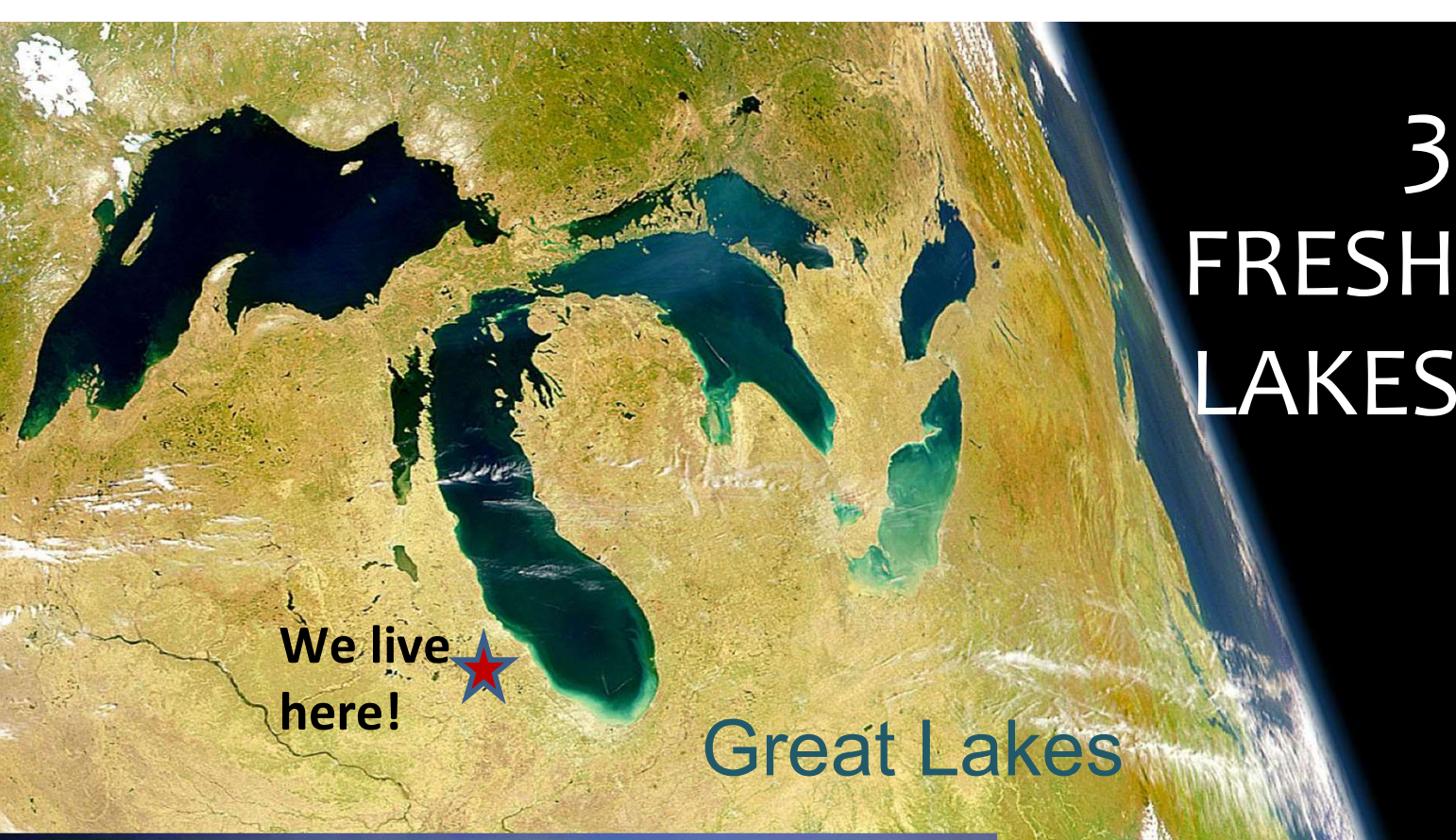
1. FRESHWATER IN GLACIERS

It's ice!

2. FRESHWATER IN GROUNDWATER

30.8% of the Freshwater





We live here! ★

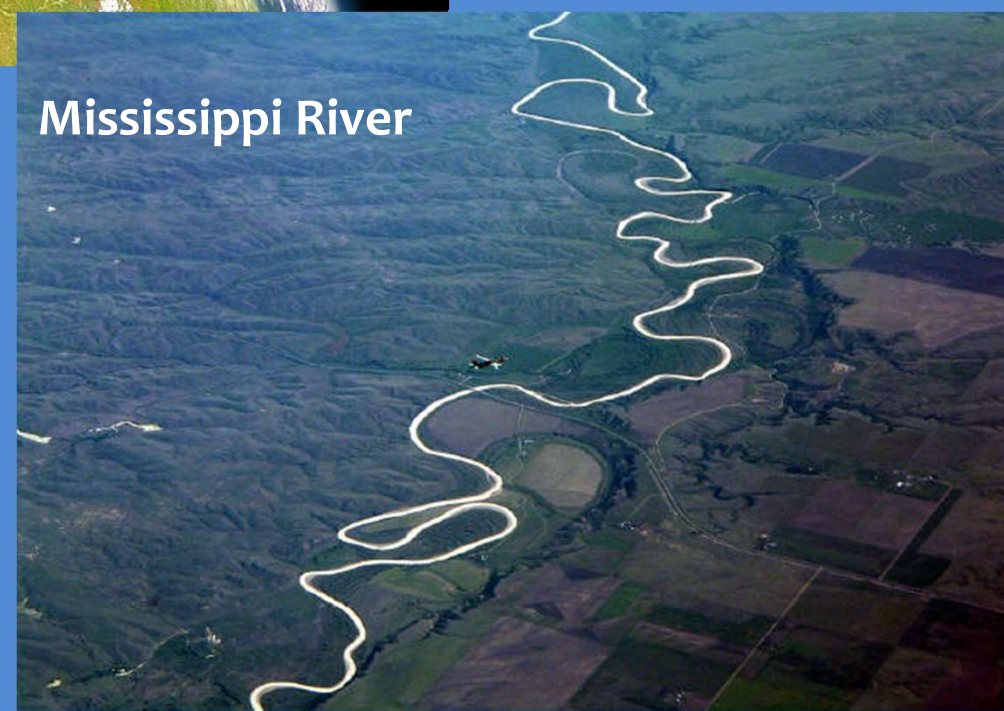
Great Lakes

3 & 4: FRESHWATER IN LAKES & RIVERS

0.3% of Freshwater



The Colorado River in the Grand Canyon



Mississippi River



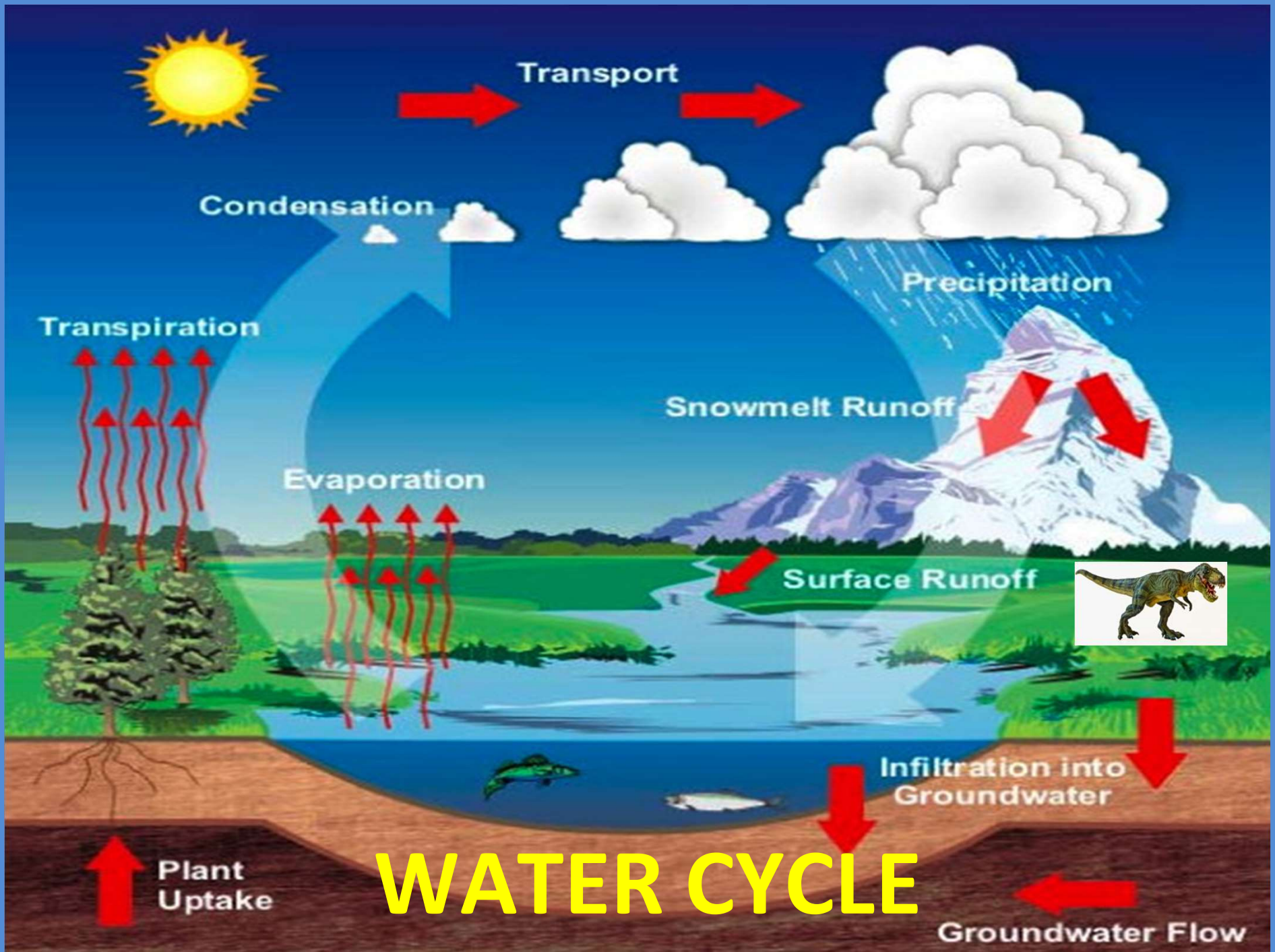
5. FRESHWATER IN AIR

CLOUDS, RAIN,
SNOW AND FOG



HUMIDITY

0.001%
FRESHWATER



WATER CYCLE



MILWAUKEE AREA



**The Freshwater Capitol
of the World!**

We're So
Lucky -
Milwaukee is
water-rich!

1 Great Lake,
3 rivers and
many
streams.

MILWAUKEE'S WATERS



3 Rivers

1. Milwaukee River

2. Menomonee River

3. Kinnickinnic River

Where do we get
our
drinking water?

MILWAUKEE'S WATERS



We're So Lucky!

WISCONSIN is surrounded by 3 major bodies of water



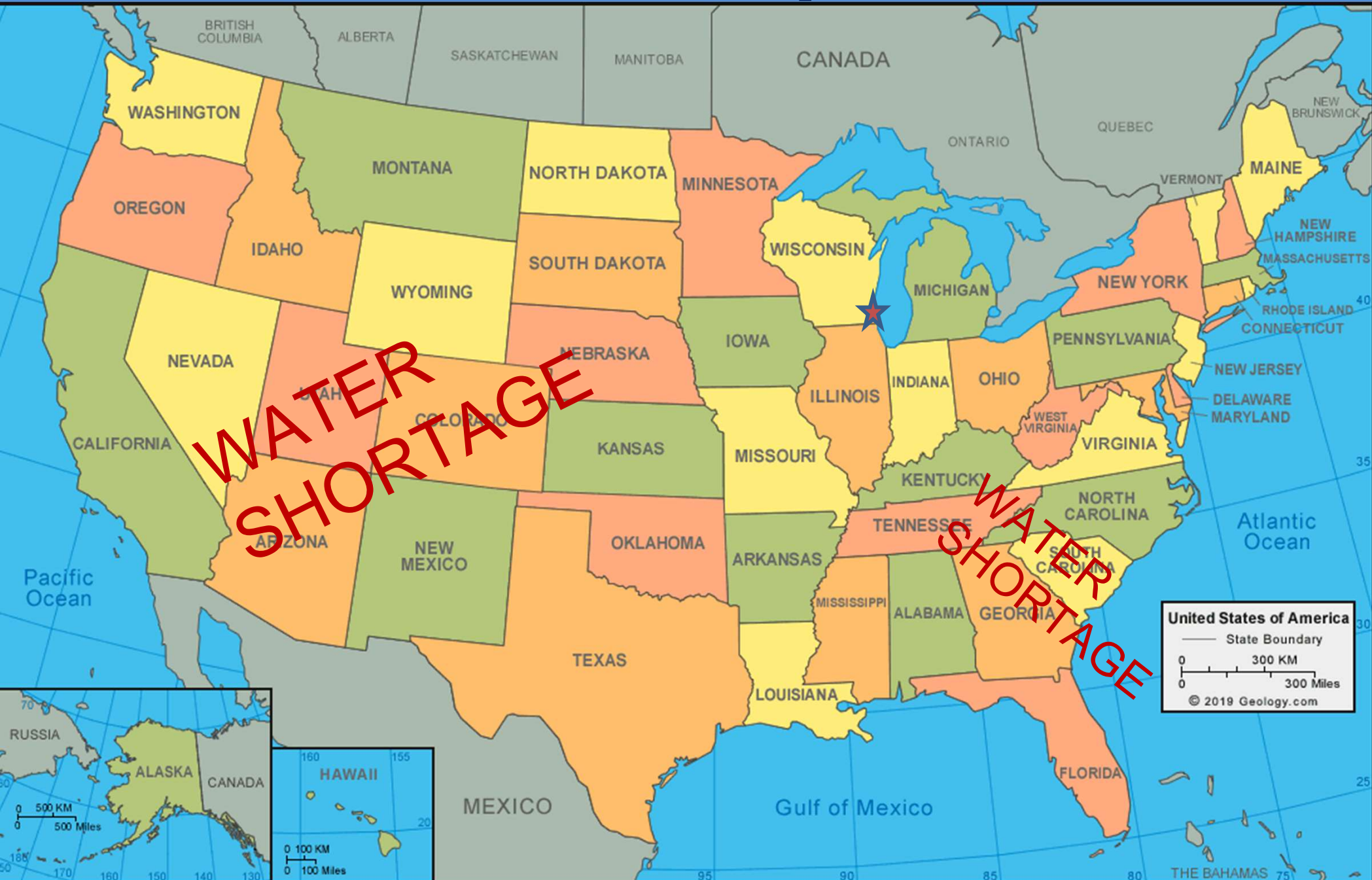
2. Lake Superior

3. Lake Michigan

WISCONSIN also has over **15,000 LAKES!**



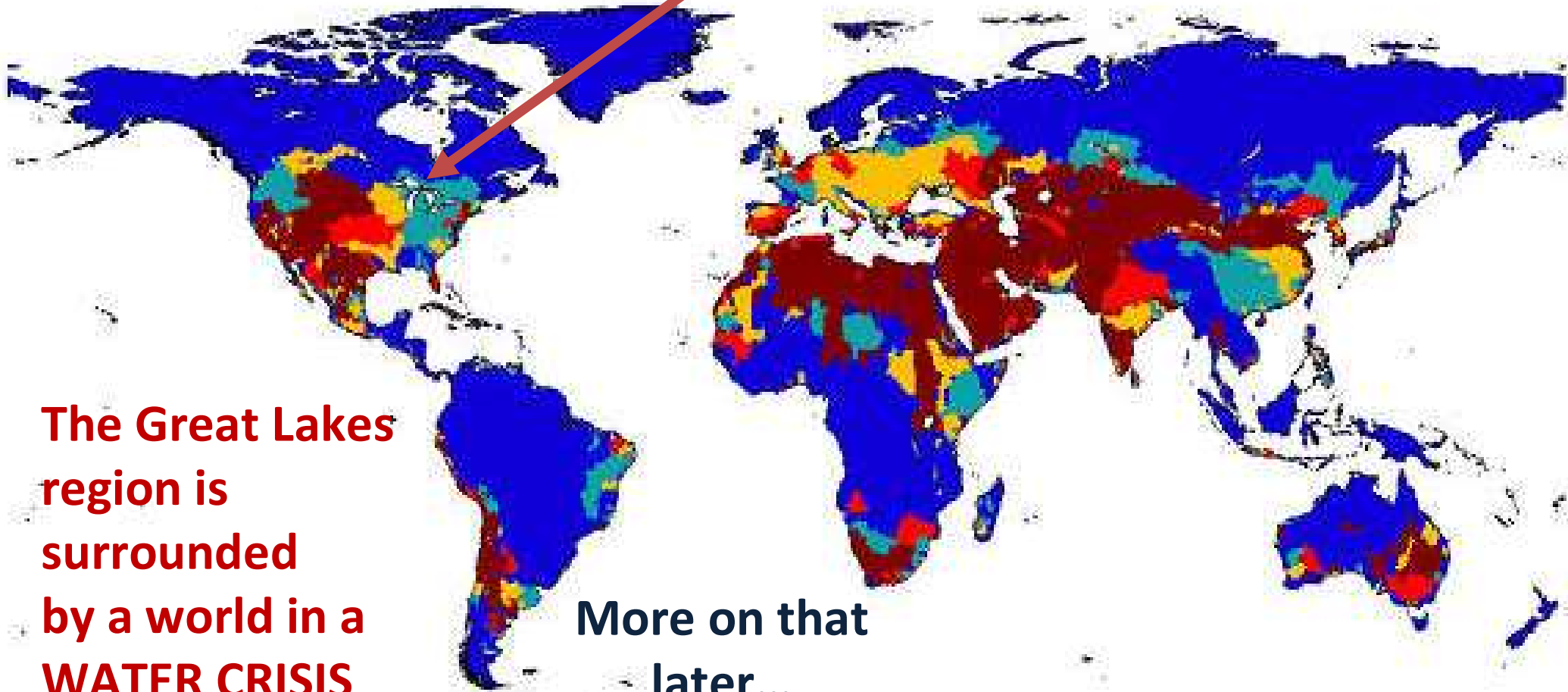
US Map





H-O-M-E-S

Why Are We So Lucky?



The Great Lakes region is surrounded by a world in a WATER CRISIS

More on that later...

World Water Council Map

Water Stress Indicator: Withdrawal-to-Availability Ratio [CR]



WATER FLOW

Where does water
go...

- From **INSIDE** buildings? and
- **OUTSIDE** from rain and snow?



WATER FLOW

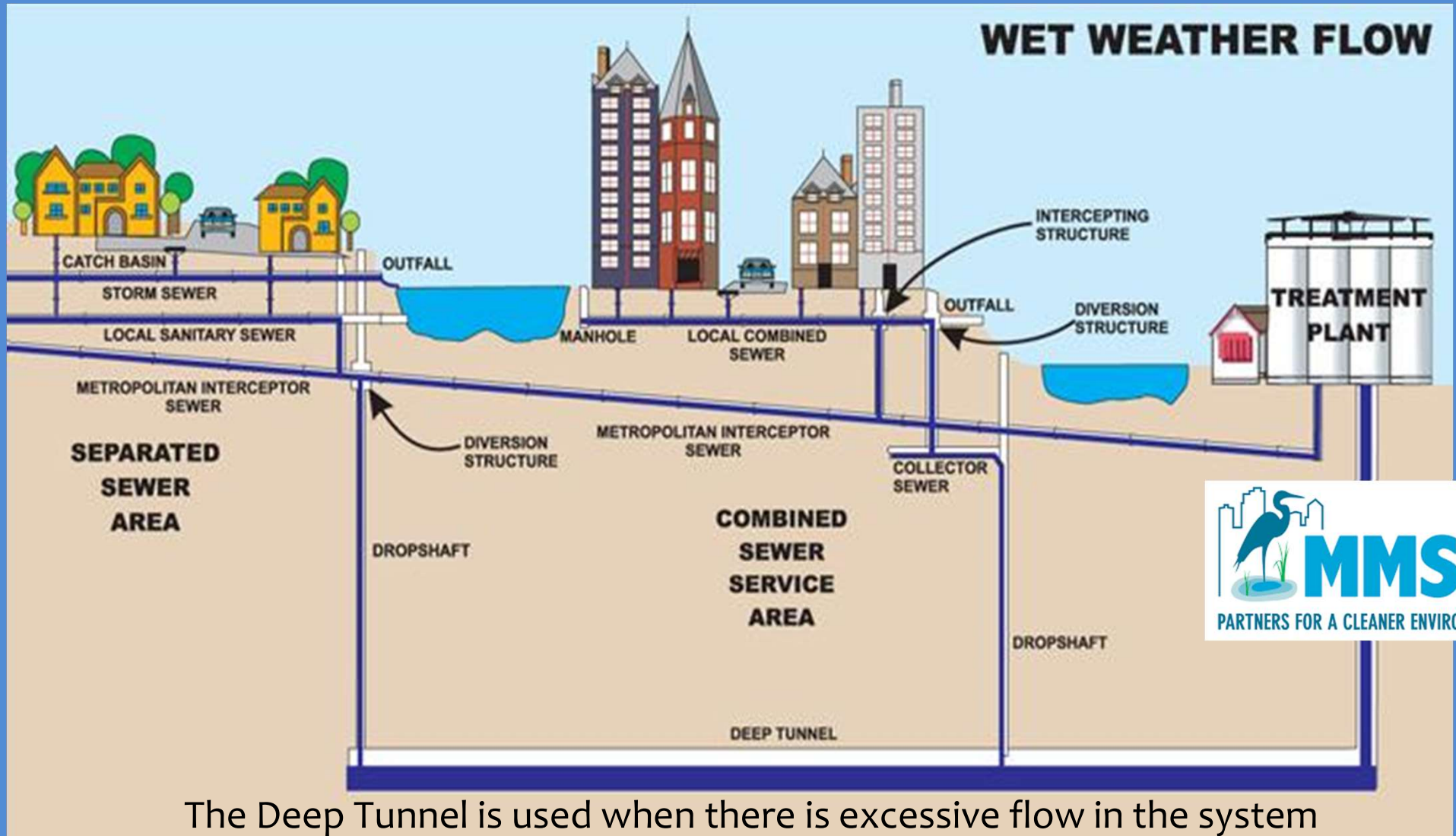
Where does water go...



FROM **INSIDE** OUR HOMES,
SCHOOLS & BUSINESSES?

WHERE DOES **INSIDE** WATER GO?

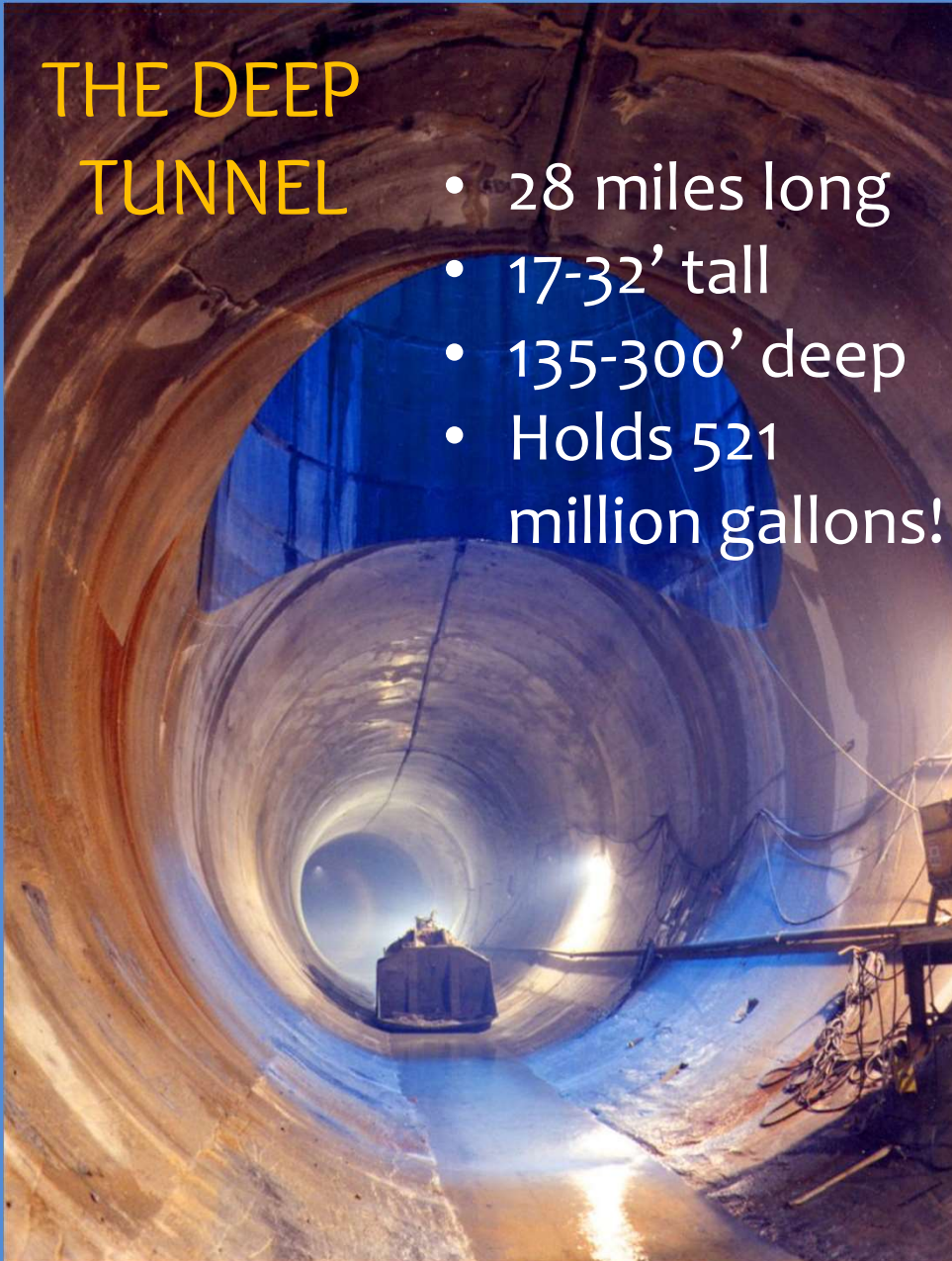
Out through pipes under the ground and streets to the treatment plant



WHERE DOES **INSIDE** WATER GO?

THE DEEP TUNNEL

- 28 miles long
- 17-32' tall
- 135-300' deep
- Holds 521 million gallons!



Created in the 1980's to manage large rain events.

Since 1994, they've captured and cleaned 98.4% of stormwater & wastewater that entered the regional sewer system.



TREATMENT

Milwaukee Metropolitan Sewerage District Jones Island Treatment Plant



WATER FLOW

Where does **outside** water go?



HAIL STORM
RANDOM LAKE

FROM **OUTSIDE**: RAIN SNOW HAIL

WHERE DOES RAIN & SNOW MELT GO?

Storm
Drain

Stormwater

Rain washes everything off the land: litter, dog poo, cigarette butts, chemicals, fertilizer, pesticides and soil.

**INTO STREETS,
STORM DRAINS &
DIRECTLY INTO A
RIVER OR LAKE!**



What's the #1 cause of **POLLUTION** to our rivers and Lake Michigan?

Atwater Beach



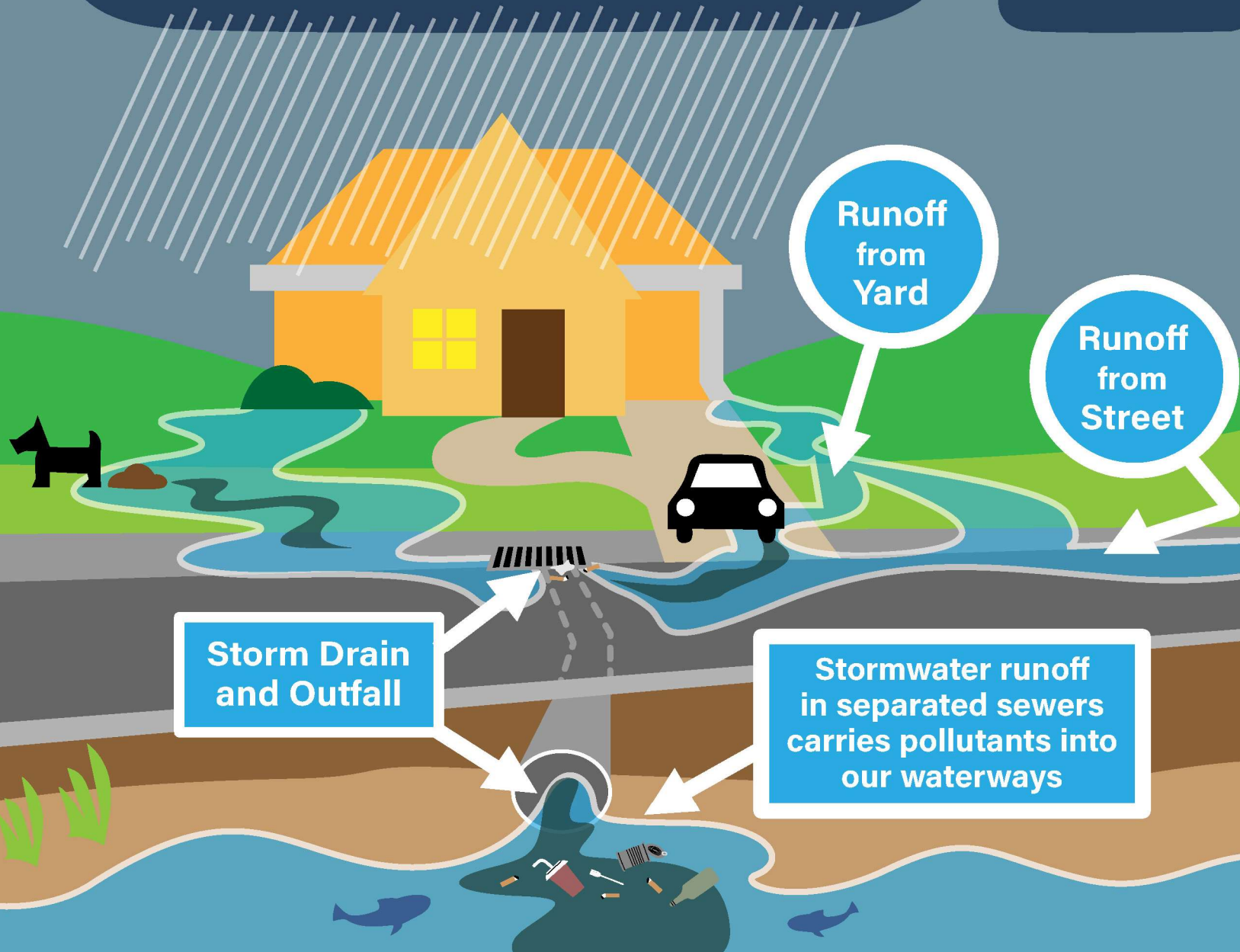
Stormwater Runoff Pollutes



SHOREWOOD
WATERS PROJECT

RUNOFF PICKS UP:

- Pet Waste
- Litter
- Fertilizer
- Pesticides
- Detergents
- Motor oil
- Chemicals



STORMWATER RUNOFF!



OH NO!!!

We can fix this!
Keeping the land clean
helps keep the water clean!

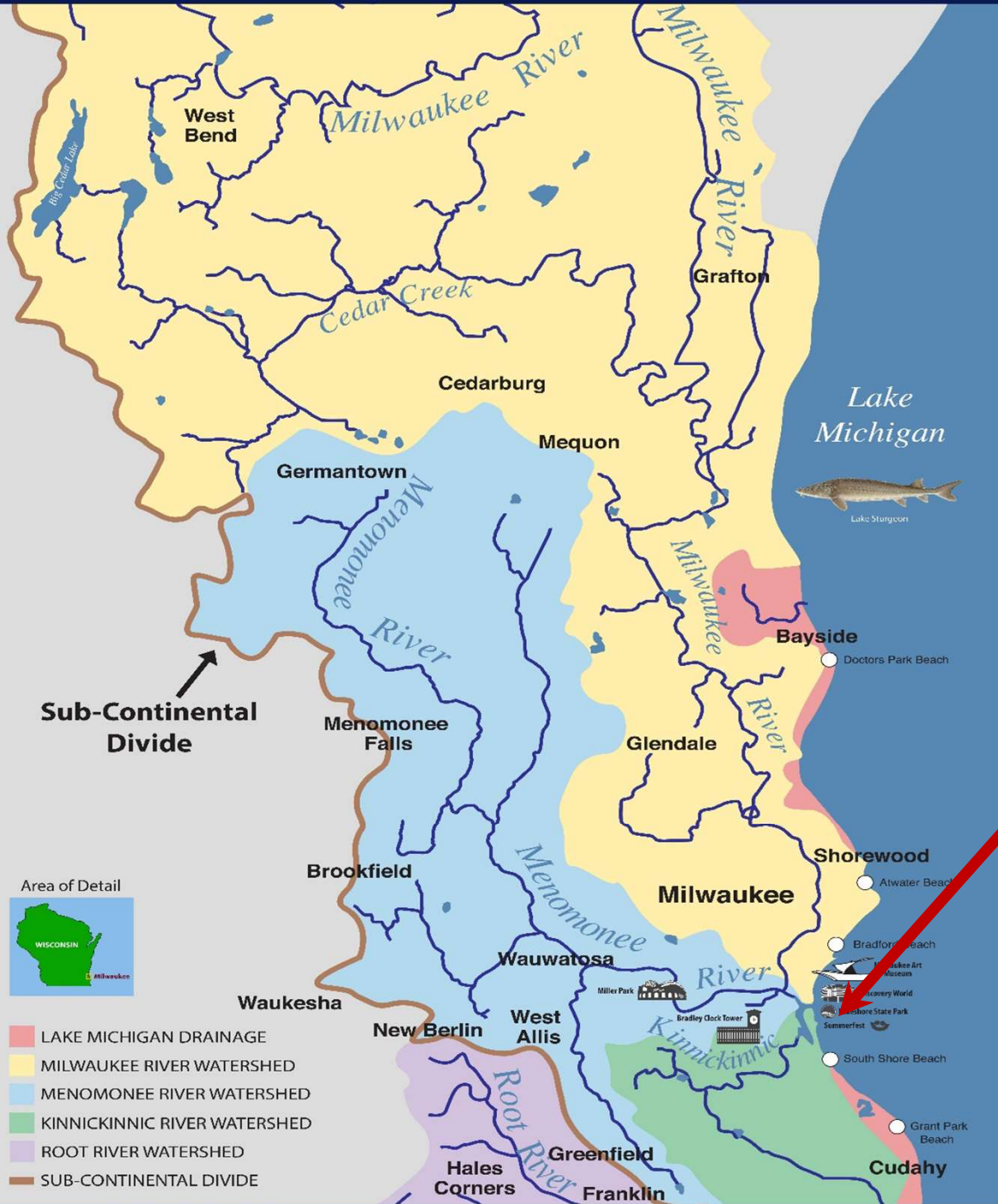
WHERE DOES WATER GO?

WATERSHEDS & MILWAUKEE'S WATERS

**3D Model
Demo**



MILWAUKEE'S WATERS



After the rain,
stormwater
flows into our
3 rivers that
come together
here:

and flow into
Lake
Michigan...

3 RIVERS FLOW INTO THE LAKE



Jones Island

Summerfest

Stormwater

WATERSHED DEMO



Milwaukee's Water History

From the first
Native Americans
to us...



Different Native American tribes were the first people to live in this area along the waterways.

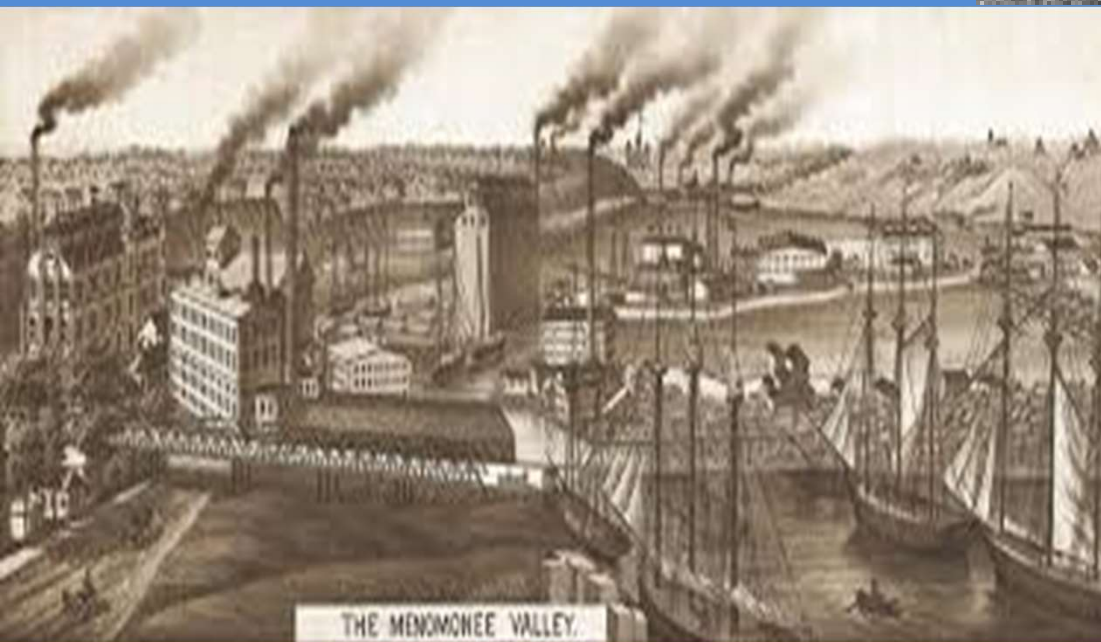
Milwaukee's rivers and Lake Michigan were highways of water for Native American tribes to hunt, fish and move.



Milwaukee's Water History

Mid 1700's:

Non-native people
arrived – mostly
Europeans



Late 1800's:

The Menomonee Valley
wetlands were drained and
replaced with factories
and toxic waste.

WATER USES: Manufacturing

Late 1800's to Today

BEER, BRATS & BIKES!

Milwaukee is famous for these!



Milwaukee's Water History

Over 150 years of
dirty rivers &
beaches

1850's to 1990's



TODAY: OUR WATERS ARE CLEANER!



**BEAVERS ARE
BACK!**

- Fish and other wildlife are returning
- Garbage is reduced
- Lots of canoeing & kayaking!
- Milwaukee River swimming races. Started in 2018 – the 1st in over 80 years!



OUR WATERS ARE CLEANER!

Thanks to
hundreds of
individuals and
dozens of
organizations...



WHY CARE #1?

The source of our drinking water!



Milwaukee Water Works

They pull water from Lake Michigan, clean it and send it to everyone.

Milwaukee
Water Works



Ozone(O₃) used to clean the water. Why?

A tiny bug called Cryptosporidium - 1993



WHY CARE #2?

There's toxic water near us!

Contaminated Groundwater



RADIUM

WHY CARE #3?

Lakes & ponds have toxic algae blooms in summer!



CYANOBACTERIA IN BLUE GREEN ALGAE

WHY CARE #4?

Look what happened to the **Aral Sea!**

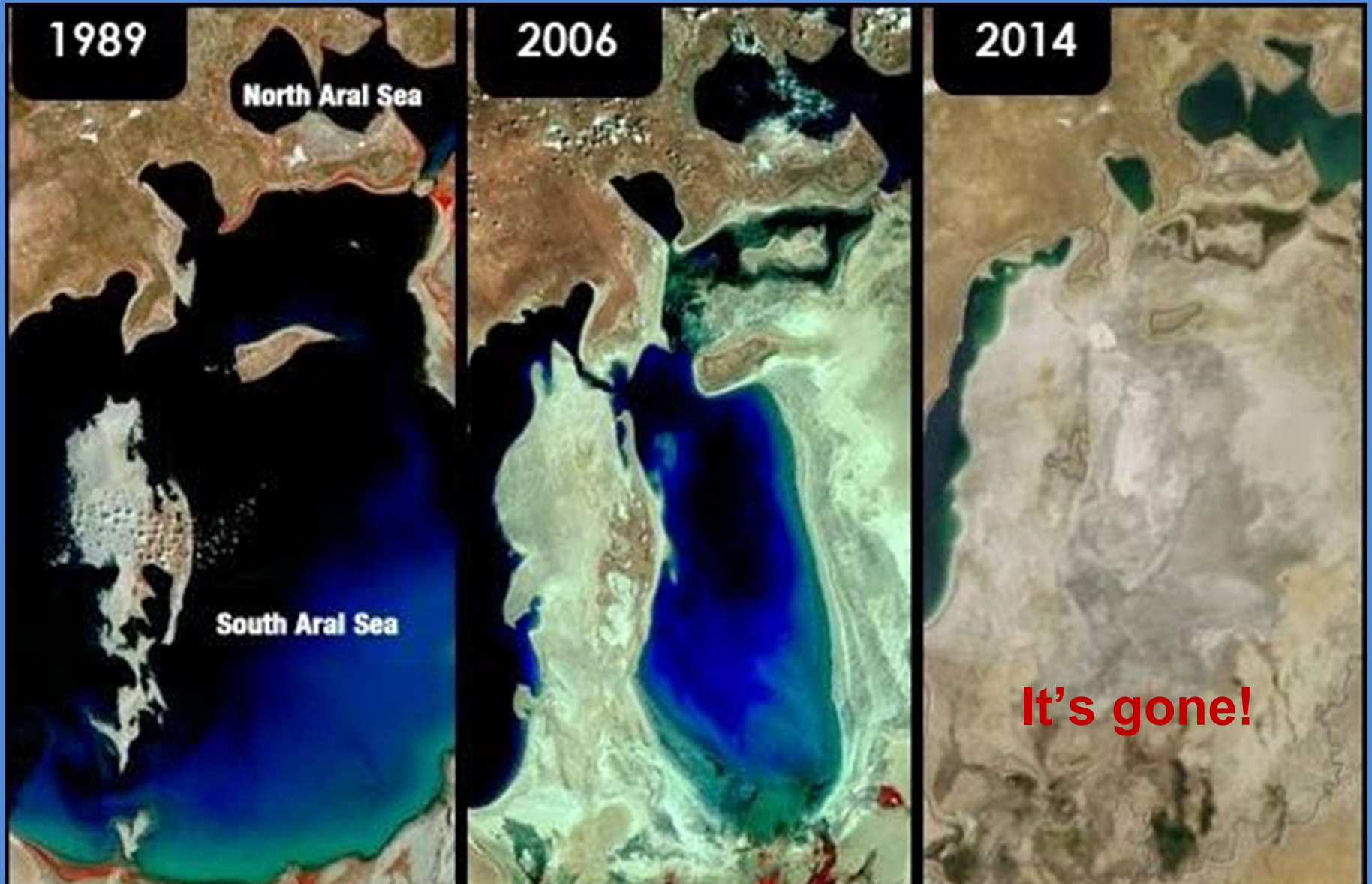
A lake
larger than
Lake
Michigan
GONE!



The world's
4th largest
freshwater
lake.

WHY CARE #4?

The Aral Sea Disappears!



The Aral Sea Today!

A desert – it lost nearly 90% of its water!



Now toxic dust blows across to surrounding villages

WHY CARE #5?

Water Restrictions



Why? Little water,
droughts and too
many people!

Thousands of cities
worldwide have
restrictions –
some cities are close
to running out of
water!

WHY CARE #6?

There's a World Water Crisis!

844 M
people don't
have clean
water

1-3 M
people die of
water related
issues each
year

2.3 B
people live
without a
toilet

200 M
hours women &
girls spend daily
finding water

They walk up to
4 miles each day too!

**Would
you
drink
this
water?**



SOLUTIONS

1. Never dump anything in storm drains

2. Keep the land clean



PICK-UP DOG POO!

POO FACTS

- ❖ Contains things that can make people sick!
- ❖ Gets in stormwater & pollutes our waters
- ❖ 89 million dogs in the US =

Over **32.5 billion pounds** of poo per year!

365 days x 1 pound/day x 89 million dogs = 32.5 billion pounds per year!



SOLUTIONS: GREEN INFRASTRUCTURE

KEEP WATER WHERE IT FALLS!

- ❖ Rain Barrels
- ❖ Rain Gardens
- ❖ Green Roofs
- ❖ Porous Pavers
- ❖ Native Landscaping
- ❖ Stormwater Trees
- ❖ Bioswales



SOLUTIONS: YOU!



... and your creative minds to
find more solutions

SOLUTIONS: BE A WATER GUARDIAN



**Yes, we have lots of freshwater, but
we need to protect our waterways!**

WE'RE SO LUCKY!

UW MILWAUKEE'S

School of Freshwater Sciences



**Only school like it in the world!
Creating the next Water Generation!**

WE'RE SO LUCKY!



This is your home!

KEEP IT CLEAN!