MUSEUM on Main Street

Water/Ways Exhibition Script

Section 1 – Water/Ways

Front side- introduction

Water is life. It forms our world and our lives. It allows us to travel; it blocks our paths. It is crucial in determining where we live and work and what we eat and drink. It is an essential biological and natural resource that people struggle to access and control.

Water shapes human culture -- our ways of life. It is central to many rituals and ceremonies around the world. It inspires art and music.

As you explore this exhibition, consider how you would tell your own water story. What does water mean to you? What role does water play in your work, your town, your neighborhood, and your worldview?

Think about your water/ways.

Key Words:
Everywhere, oceans, ice, steam, rivers, lakes, streams, vast, precious, necessary, critical, resource

Quote:
No water, no life. No blue, no green. –Sylvia Earle, oceanographer

Credits
Water/Ways
A Museum on Main Street exhibition developed by the Smithsonian Institution Traveling Exhibition Service

Funded by the U.S. Congress

Brought to you by the [state humanities council]

[State] programming is supported by [state partners].

Inspired by an Exhibition organized by the American Museum of Natural History, New York (www.amnh.org), and the Science Museum of Minnesota, St. Paul (www.smm.org), in collaboration with Great Lakes Science Center, Cleveland; The Field Museum, Chicago; Instituto Sangari, Sao Paulo, Brazil; National Museum of Australia, Canberra; Royal Ontario Museum, Toronto, Canada; San Diego Natural History Museum; and Science Centre Singapore with PUB Singapore

Video
"Different Water Settings" component – attached to structure.

Background Image:
Jet skier on wave
Michael Dawes

Row of Images:
Underwater Diver
Greg McFall, Gray's Reef NMS, NOS, NOAA

Hands with pouring water
US Agency for International Development

Lake Erie Ice
Chief Petty Officer Nick Gould / US Coast Guard

Drinking water
Benjamin Smith, benjaminasmith.com

Rio Grande in NM – from DIY
I am New Mexico

Acoma Pueblo water collection
Library of Congress, Edward S. Curtis Collection

Mountain Stream
Michael L. Smith, US Fish and Wildlife Service

Sydney towboat/barge
University of Wisconsin-La Crosse Murphy Library

Swimming hole
Museum on Main Street

Hindu foot washing
Dennis Drenner, dennisdrennerphotographs.com

Kayaker, Blackwater National Wildlife Refuge
US Environmental Protection Agency, Eric Vance

Section 1 back side – Our World is Water
Just as we are made of water, so is our world. Water covers about 71% of the Earth's surface. There's water in the clouds above us and there's water hidden below the soil. The movement of moisture through our atmosphere determines our weather.
Water – so common, yet so strange – defines our planet.

What are water's/ways?

"Water Droplet" reflective graphics
We are water. The human body is about 60% water.

Quote: The sea is everything. It covers seven tenths of the terrestrial globe. Its breath is pure and healthy. It is an immense desert, where man is never lonely, for he feels life stirring on all sides. –Jules Verne, author

Water is intriguing
Water occurs naturally in three different physical states — liquid, solid, or gas – in the same environment. That same environment – *our environment* – is made possible because of water's ability to assume different forms. Each state of water is essential to life.

When we usually think of water, it is as the familiar liquid state. But, water as a gas is all around us as vapor, mist, and atmospheric moisture. Depending on where you live, you might see a lot of solid water – ice – throughout the winter. Or maybe just in your glass! Whether it is liquid, solid, or gas, water is critical on Earth in all of its forms.

Clouds are made up of clusters of water droplets that are constantly changing. A single cloud may only exist for an hour before its droplets evaporate into water vapor and start the condensation process once again. Once the droplets grow large enough, they will fall as rain.

Kettle Steam caption
Steam is more than just a byproduct of heating water. It plays a critical role in power generation. Modern steam turbines produce more than 80% of the world's electricity. And, naturally occurring steam from beneath the earth's surface powers geothermal energy plants.

Where is our water?
Water is among the most plentiful substances on Earth's surface. From oceans, rivers, and lakes to the rain, snow, and hail that fall each day, Earth holds a nearly unimaginable amount of liquid water: about 327 quintillion gallons.

Yet freshwater, the water we need to live, makes up only three percent of the world's water, and much of it is inaccessible.

Where do you get your water?

Where is Your Water flipbook

Flipbook pages 2-3:
Graphic: The Water Cycle
The water on Earth today is all the water we will ever have. All of it is linked in a vast cycle, from oceans to wetlands, rainwater to groundwater. And that water is in endless motion, on the planet's surface, below ground, and in the atmosphere above.

Lakes, rivers, and oceans lose water to the air through evaporation. Plants draw water from the soil and release it to the air. All of that water rises and — within days — falls back to earth as rain or snow. Eventually, it finds its way to lakes, rivers, and the sea. This process is called **the water cycle**.

Flipbook pages 4-5:

Graphic: Allocation of the **Earth's Water**

Vast oceans cover our planet. Ice sheets and glaciers cap its poles and mountain peaks, holding still more water. All life, as we know it, depends on this water. But freshwater, the water we use each day, is even more precious. Freshwater makes up only **three percent** of the world's water.

Flipbook pages 6-7:

Graphic: Allocation of the World's **Freshwater** Sources

In reality, though, much of the Earth's freshwater is inaccessible. The majority of Americans – about 86% of us – actually rely on the smallest source of water on the planet: surface water. Others supply their own water, primarily by using wells to tap into groundwater.

Flipbook pages 8-9:

Graphic: Where is Surface Water Found?

Even though surface water accounts for only 0.3% of the Earth's water, it is the water source that serves the most people. In the U.S., about two-thirds of the water used in public water systems comes from surface sources, like lakes and rivers. But, groundwater itself also contributes to the volume of rivers and lakes. The entire water system we rely on is comprised of interrelated sources – just like our own personal and cultural relationships with water.

Flipbook pages 10-11

Graphic: Ogallala Aquifer

The Ogallala Aquifer provides groundwater to millions of Americans. Depletion of the aquifer is occurring rapidly.

Groundwater hides in the tiny spaces between particles of soil and in the cracks, crevices, and pores in solid rock. The volume of groundwater is huge: from 30 to 100 times more than all of Earth's rivers, lakes, and streams combined. These underground reservoirs are called aquifers, and their water comes to the surface through natural springs or by pumping.

The water in aquifers accumulated over hundreds or even thousands of years. If that water is used up, it would take many years to recharge. Scientists estimate that it would take 6,000 years to naturally refill the expansive Ogallala Aquifer in the central U.S. if it was fully drained.

Endorheic Watersheds Splash Fact

Not all water flows inexorably to the sea. Endorheic watersheds are closed drainage areas -- like a giant bowl -- where water has no physical outlet. Eventually, water evaporates or is absorbed into the ground. The huge Great Basin stretching across much of Nevada and Utah is an endorheic basin, as is the Great Divide Basin in Wyoming and the Devils Lake Basin in North Dakota.

What's a Watershed?

The adage that someone, somewhere, is always downstream from you is actually true. Everyone lives within a watershed — the surrounding area of land in which water collects and, ultimately, drains into a water source.

19th century geologist John Wesley Powell called a watershed “that area of land … within which all living things are inextricably linked by their common water course.” He believed that watersheds were a shared interest and that governments, residents and new settlers should work together to manage resources properly.

In reality, watersheds cross property lines and political boundaries all the time, sometimes causing conflicts for neighboring jurisdictions.

What’s a Watershed?
Touchable map label
Watersheds are like big funnels where water flows down to the lowest point of elevation into a catchment, like a lake or sea. Touch the map below of the Elwha River, Washington watershed to feel how the terrain creates a basin for a river. The river rises in the state’s Olympic Mountains and flows into the Strait of Juan de Fuca.

How large can a watershed be? While the Elwha’s watershed is relatively small, think about some of the river basins in the US and all of the many smaller streams and rivers that contribute to them. Watersheds can be huge! The Mississippi River basin, along with its great tributaries, the Missouri and Ohio Rivers, gathers water from the Idaho-Montana border to western New York and empties it into the Gulf of Mexico, draining more than 40% of the 48 contiguous states.

Panel Images:

Background Image:
Water Droplet and ripples
Pakhnyushchy/Shutterstock.com

Our World is Water image:
Image of Earth
NASA/NOAA/GSFC/Suomi NPP/VIIRS/Norman Kuring

Water is Intriguing Images:
Vapor/Clouds
Daniel Speiss

Yellowstone National Park Scene
Neal Herbert

Iceberg, Atlantic Ocean
Dr. Roger Hewitt, NOAA NMFS SWFSC Antarctic Marine Living Resources (AMLR) Program

Steam from tea kettle
Benjamin Lehman

Water bubbles
Daniella Koontz, Koontz Photography

Old Faithful geyser, WY
Dr. David Goodrich, NOAA (ret.)

Ice cube from water glass
Simon Schoeters

Where is our water? Images
Falling rain from a thunderstorm
Iren Petrova

Pumping well water in Marshall, TX
Lee Russell, Library of Congress, Farm Security Administration – Office of War Information Photograph Collection

Waves detail
Michael Dawes

Endorheic Watersheds Splash Fact Image
Water flowing in the Great Basin drains into Utah's Great Salt Lake
D Sharon Pruitt

What's a watershed? Images:
Yosemite National Park, CA
Vlue/Shutterstock

Chesapeake Bay drainage marker, VA
Museum on Main Street

Walnut Creek Watershed marker, Erie, PA
Asbury Woods Partnership and Water Resources Education Network

Crystal Lake watershed sign, Newton, MA
Crystal Lake Conservancy, Newton, MA

Section 2 – Source

Front side- Source

Water is the source of our very lives. It is at the source of the things we encounter every day. It shapes our land, forms our communities, and inspires our culture.

Rivers, rain, ice, and oceans shape the land through erosion and constant pressure on the earth. The ebb and flow of water creates and destroys the land we inhabit. Access to water determines where, and how, we build our communities and structure our lives. Water holds a central place in the origin stories and rituals of many cultures and faiths. Water inspires our art, music, dance, and literature.

What would you lose if you did not have water?

Mississippi River Delta Photo Caption
Rivers not only carry water to the sea, but also sediment and organic materials. When a river drops enough sediment at its mouth, vegetation begins to grow, forming new land. The Mississippi River's delta at the Gulf of Mexico is the seventh largest in the world, but it is steadily losing land as water is diverted upstream into other river basins to provide flood control.

Keywords
Carve, erode, power, reverence

Carving and Claiming the Land
Water, no matter how gentle it might look on the surface, is one of the world's most powerful natural forces — one that has the ability to give shape and form to the landscape around us. The intense power of water created natural wonders like the Grand Canyon and Niagara Falls.

Storms, waves, and sea level changes alter shorelines. Rainwater, rivers, and streams slowly whittle away at the land, shrinking mountains and cutting into the landscape. Water takes away the land and builds it up elsewhere. It is the ultimate architect.

The Colorado River carved the Grand Canyon, which runs for 277 miles and is more than a mile deep in some places. Erosion from the flow of water and ice and from wind created the amazing landscape we enjoy today.

Even the lack of water can create a notable landscape!

The great falls of the Niagara River were created about 12,000 years ago. Almost four million cubic feet of water flow across the falls every minute.

Splash Fact – Glaciers
Glaciers are like rivers of ice, but they are not frozen in place. Glaciers flow, growing and retracting over time. Through its gravity-induced movement, a glacier grinds up or deposits rock and earth, smoothing the landscape beneath its tremendous weight. Glaciers made some of the natural features we know today, including Minnesota's 11,000-plus lakes, Michigan's Sleeping Bear Dunes, Niagara Falls, and the valleys and Finger Lakes of central New York.

The Ripple Effect
In an instant, water can tear down what stands, whether it was built by man or nature. During floods, when water is surging, all people can do is get out of the way. Most of the time, people accept the risk and move back as soon as they can to rebuild. But, in some situations, people choose to stay out of the way permanently, knowing that the water will always win.

[ripple 1] The 1927 Mississippi floods forced more than 600,000 people from homes and farms. Some African American evacuees, treated unfairly in refugee camps, subjected for years to the racism of Jim Crow laws, and trapped by poverty in the sharecropping system in the Mississippi Delta region, relocated to northern cities to search for greater equality and better jobs.

[ripple 2] Thousands of New Orleans residents made new homes in other states after Hurricane Katrina devastated the city in 2005. Here, evacuees from New Orleans take shelter in Houston's Astrodome stadium.

[ripple 3] Unlike many other towns along the Mississippi, Valmeyer, Illinois moved to higher ground after the great flood of 1993, about two miles east of its original location. Residents gathered for a groundbreaking ceremony for their new town.

Ripple Effect Images
1927 Mississippi River flooding
Mississippi Department of Archives and History

Hurricane Katrina evacuees
FEMA/Andrea Booher

Valmeyer, Illinois relocation
Photo by Marvin Cortner

Water Inspires Our Humanity
Water is central to humanity. We need it to survive. But how we interact with it is individual.

Water is gentle, nurturing and cleansing, while simultaneously powerful enough to shape the planet. It is no wonder that water fascinates us and is woven into so many elements of our culture. Nearly all cultures and faiths incorporate a level of reverence for water. Whether water is plentiful or scarce, it is as essential to human culture as it is to life.

What do you *think* about water? How is water important to you and your culture?

Spirituality and Water Flipbook

Cover image:
Misogi ritual in a waterfall (detail)
Lawrence Barrow, www.lawrencebarrow.com

Flipbook pages 2-3:
Images:
River *baptism* at Moon Lake, Coahoma County, MS, 1989
©Ken Light

Baptism aboard the USS John C. Stennis in the Persian Gulf, 2007
US Navy Photo by Mass Communication Specialist 3rd Class Paul J. Perkins

Born of **Water** and **Spirit**
Across the various Christian denominations, water is seen as a primal force of creation and cleansing. In the Judeo-Christian tradition, the Old Testament creation story describes the earth as nothing but darkness with the Spirit of God "hovering over the

waters." The famous story of Noah's Ark tells of God cleansing the earth with a great flood.

The Christian ritual of baptism is tied to this dual symbolism of water. Baptism means immersion or bath in Greek. An individual is submerged, fully or partially, and then lifted from blessed water, therefore symbolizing death of human sin and rebirth into a Christian life. Christians believe Jesus established the importance of baptism by saying "No one can enter the kingdom of
God without being born of water and Spirit."

Flipbook pages 4-5:

Image:
A family prepares to practice the *Tashlich* during Rosh Hashanah, NY, 2009
Douglas Palmer

Water **Cleanses the Soul**

Many traditions teach that cleansing with water, or "ablution," is important for purifying the body and renewing the spirit. Water helps to wash or carry away a believer's sins. Observances of Rosh Hashanah, the Jewish New Year, traditionally begin with the *Tashlich*. The ritual involves tossing pieces of bread into flowing water to cast away any sins from the previous year, washing the soul or spirit clean for the New Year.

In Judaism, women and men have also performed another ritual called a *mikvah* (also *mikveh*, meaning "collection"), or immersion in a pool of water. This was done mostly after funerals or any contact with the dead. Later, a traditional full *mikvah* was done primarily by women after a menstrual cycle or giving birth. Today, some Jewish men and women see the traditional *mikvah* as outdated or even sexist. However, followers are reviving and reinterpreting *mikvahs*, using them more widely and openly.

Flipbook pages 6-7:

Image:
Islamic wudu before entering the mosque
Jasminko Ibrakovic/Shutterstock.com

Washing with **Intention**

Born in the arid lands of what is today Saudi Arabia, the Islamic faith places great value upon water. Water and other natural elements are seen in Islam as life-giving gifts and signs of God in our lives. Water is also called an "ayah," which is the same significance as a "verse" in the Quran. Every living thing was created from water and heaven features it as plentiful.

Like the other major world religions, Islam emphasizes water's purifying power. Before entering a mosque to pray to Allah, Muslims must perform a wudu, or a sacred ritual of washing the face, forearms, head, and feet. The washing is done in this order with *niyyat*, meaning "intention," while saying prayers for forgiveness and guidance.

Flipbook pages 8-9

Image:
Washing of the feet at a Hindu wedding
Image by Dennis Drenner, www.dennisdrennerphotographs.com

Sacred Waters
Hinduism is one of the world's oldest religions and embodies many different sects and beliefs. However, the importance of water remains central to all Hindus. Rivers are especially sacred as a source of life and able to wash away impurity. The River Ganges in India is so important in
Hinduism that it is represented by the Goddess Ganga and is believed to wash away sin.

Water plays a central role in many Hindu practices. Water immersion is a common conclusion to festivals celebrating a deity. A deity idol, historically made of clay, is submerged and dissolves in water, returning to earth. Water is equally important in other activities such as marriage ceremonies. Symbolically, when the groom arrives he receives water, sometimes with milk and honey, to cleanse his feet. Later, water is poured over hands, first of the bride's parents, falling to the groom and then the bride. This practice is akin to the idea of entrusting the bride to the groom.

Flipbook pages 10-11
Image:
A statue of Buddha is bathed on Vesak Day, a day for celebrating the life of Buddha, Lewis North Chapel, Joint Base Lewis-McChord, Washington
Photo by Ingrid Barrentine, US Army, 2011

Water and **The Right Path**
Buddhists believe we live in a cycle of birth, death, and rebirth called *samsara*. Breaking free from *samsara* means following the teachings of Buddha by losing selfish attachments and desire. Water plays a crucial role in helping Buddhists find this harmony and reach enlightenment because it symbolizes purity, renewal, and calmness.

Water is central to many festivals, prayers, and offerings. Water is often used to bath statues of the Buddha, representing cleansing and removing negativity like bad karma. Drinking water is also given as an offering at altars to Buddha showing compassion. Praying by water and in nature is also important because Buddhists believe we are all connected.

Flipbook pages 12-13
Image:
Misogi in the Kuyanotaki waterfall, near Kyoto, Japan
Lawrence Barrow, Kyoto, Japan, www.lawrencebarrow.com

Cascading Waters
Shinto is the indigenous faith of Japan that emphasizes great respect for the natural world and our ancestors. That respect extends to water, which is seen also as having cleansing power. Shinto has a multitude of gods, including a god for water. *Suijin* is the Water *Kami*, a term given to the god of water in its many forms. A water *kami* can be in rice fields, mountain springs, streams, and even irrigation canals and wells. *Suijin* is also related to everything living in the water.

As such a powerful element, water is important for Shinto cleansing rituals and prayer. Before praying at a shrine, followers clean their hands and mouth with water from a "*chozuya*," a basin filled with water. Another important ritual is the *misogi*, a complete immersion in a river, waterfall, or ocean. Mirroring the *kami* who created the universe,

Shinto followers remove worldly possessions and enter the water to cleanse their body, mind, and spirit.

Flipbook pages 14-15

Images:
Dakota people participate in a cultural heritage program at the *bdote*, 2009

Wita Tanka (known by English speakers as Pike Island) is located at the *bdote* (confluence) of the *Haha Wakpa* and *Wakpa Mnisota* (Mississippi and Minnesota Rivers)

Photos courtesy of Bdote Memory Map

Waters at the **Core**
Tangible and spiritual connections to water run throughout Native American communities. Despite their diversity, the traditions, creation stories, and histories of Native American nations show a common thread: respect for water as a sacred gift rather than as a resource to exploit. Native peoples across North America revere water in their spiritual practices.

In Dakota culture, a *bdote* represents a confluence of waters. For the Dakota people, the area where the *Haha Wakpa* (Mississippi River) and *Wakpa Mnisota* (Minnesota River) meet is **the *Bdote***, a place that for many Dakota is the very center where the world formed and the Dakota people began. Water is sacred to the Dakota because it gives life and, historically, brought people together. ***Bdote*** is not just the place where Dakota history, culture and spirituality are centered. It also became the scene of one of the greatest horrors suffered by the Dakota people. During the US-Dakota War in 1862-63, hundreds of Dakota were imprisoned and died in a camp at the ***Bdote***.

Today, the Dakota people work to retain their ties to the sacred land at ***Bdote***. They regularly hold cultural observances and provide educational programming to help people living in Minnesota's Twin Cities better understand the spiritual and cultural importance of the waters and the land.

Panel Images:

Background Image:
Havasupai Falls, AZ
Anna Morgan/Shutterstock.com

Carving and Claiming the Land images:
Desert View Point, Grand Canyon, AZ
Jorg Hackemann/Shutterstock.com

Mississippi River Delta, LA
Copyright Ron Wooten, All Rights Reserved

Cracked desert floor
William Warby

Niagara Falls, NY/Ontario Canada
Roy Tennant, freelargephotos.com

Sleeping Bear Dunes National Lakeshore, MI
National Park Service

Antelope Canyon, AZ
Museum on Main Street

Mammoth Cave, KY
National Park Service

Glaciers Splash fact image:
Sawyer Glacier, AK
Dr. Terry McTigue, NOAA, NOS, NCCOS, CCMA

Water Inspires our Humanity images:

Humanity images captions
William H. Johnson, I Baptize Thee, oil on burlap, ca. 1940
Smithsonian American Art Museum, Gift of the Harmon Foundation

In a Christian baptism, water serves to cleanse a believer and represents rebirth into a new life. William H. Johnson reflects the importance of baptism in the African American Christian community in this work.

Artist painting on a beach
tomas del amo/Shutterstock.com

Crowd at the Seashore (detail)

Misogi (detail)

George Caleb Bingham, *The Jolly Flatboatmen*, oil on canvas, 1846
Courtesy of National Gallery of Art, Washington

Howard Russell Butler, *Clearing after September Gale – Maine Coast*, oil on canvas, ca. 1924
Smithsonian American Art Museum, Bequest of Henry Ward Ranger through the National Academy of Design

Albert Bierstadt, *Among the Sierra Nevada, California,* oil on canvas, 1868
Smithsonian Art Museum, Bequest of Helen Huntington Hull, granddaughter of William Brown Dinsmore, who acquired the painting in 1873 for "The Locusts," the family estate in Dutchess County, New York

William James Glackens, *Crowd at the Seashore*, oil on canvas, ca. 1910
Metropolitan Museum of Art, Bequest of Miss Adelaide Milton de Groot (1876-1967), 1967

Section 2 back side - Home is where the water is
The availability of fresh water is a basic need for communities. In the past, people settled in places with adequate water. Today, tens of millions of Americans continue to make their homes along the water's edge.

Waterways define our boundaries. We identify our communities with names like Eastern Shore or Bay Area, making the water a natural marker and cultural touchstone of the places where we live and work. The physical and cultural identities of a community inform one another.

Consider your own hometown. Is it on or near water? Is it defined by a lack of water? Would your community be the same without water? How does the availability of water affect your decisions each day?

Quote
Out here, water is like gold. –Ed Wiltse, mayor of Ulysses, Kansas, 2006

Object case
People Make Their Homes by the Water
Our need for water not only impacts where we live, but also the items that we make and use each day. These items all reflect water's influence on American culture.
Objects: Acoma Pueblo, New Mexico pottery canteen; New England whale oil lamp; Muscatine, Iowa mussel shell buttons and button blanks; sweetgrass basket from the Gullah/Geechee tradition in South Carolina and Georgia; and Tidewater Virginia bowl with fish design

Photo caption on left
Surrounded by water, islands are perhaps the most obvious landscapes affected by water. It seems inevitable that native islanders develop deep, meaningful relationships with water. Physical separation from the mainland makes it easier to adopt – and maintain – unique customs and languages, but it does not equal cultural isolation.

Ripple Effect – Reclaiming Land from Water
Over the centuries, people have reclaimed land from water, turning wetland areas into usable land. But, these former wetlands can be dangerous zones – they are sometimes highly vulnerable to flooding and can be unstable during earthquakes.

[ripple 1] Filling in marshy areas allowed Boston to grow significantly beyond the Shawmut Peninsula where the city began. Reclamation of tidal marshes doubled the size of the peninsula and supported the creation of the South End and Back Bay neighborhoods.

[ripple 2] San Francisco's Marina District was built on land claimed from tidal pools and marshland. During the 1989 Loma Prieta earthquake, the neighborhood suffered soil liquefaction that caused many buildings to collapse.

[ripple 3] Levees, canals, and pumping stations allowed parts of New Orleans to be developed out of swampland. These areas, however, are vulnerable to hurricanes and flooding.

Ripple Effect images:
Boston land reclamation map

Map reproduction courtesy of the Norman B. Leventhal Map Center at the Boston Public Library

San Francisco Marina District after 1989 earthquake
C.E. Meyer, US Geological Survey

New Orleans levee
Undated postcard

Home is where the water is captions

Hannibal, MO map showing river traffic
Bird's eye view of the city of Hannibal, 1869.
Hannibal, Missouri is one of the best-known towns on the Mississippi River, thanks to the writings of Mark Twain, whose characters were based upon people he knew while growing up there. The town owes its founding to the river. Hannibal formed as a town in 1819 and soon became a principal port for travel and trade along the river.

A waterside residential development, Oxnard, CA
Historically, Americans sought water for its critical usefulness. We're still settling at the water's edge today, but often for different reasons. Properties adjacent to water are highly desirable for recreation and scenic beauty, despite the risks of storms and flooding.

Baltimore Harbor
Like Native Americans already living in North America, European settlers established new cities and towns like Baltimore in protected harbors along the coasts or on major rivers. Water was a critical lifeline for both Native Americans and settlers, sustaining their settlements and providing access for migration, trade, and communication with others.

A Critical Resource, A Societal Asset

Water is a shared resource. It flows between communities; the water used upstream is also used downstream. But it is not always shared equally. Water's usefulness – and our unquestionable need for it – makes it a valuable commodity. Disputes over access and availability of water happen regularly, throughout the world, our country included. These disputes often lead to a difficult question for a community to answer: Who owns the water?

Americans have worked hard to find water, invest in access to it, and then hold tight to the resource. The reality, however, is that you can't stake a claim on water the way you would a mine.

Critical Resource, Societal Asset group captions

Lake Lanier, GA is formed by Buford Dam on the Chattahoochee River
Like watersheds, water decisions cross political, cultural, and economic boundaries. The "Tri-State Water Wars" began in 1989 over a proposal to reallocate water from Lake Lanier to serve the growing Atlanta area. Alabama and Florida sued Georgia and the federal government, citing the threats of economic and environmental harm from reduced flows on the Chattahoochee River. The conflict gained national attention when Georgia later challenged its border with Tennessee to access water from the Tennessee River. Competition for water can set states against states, urban areas against rural

towns, and human needs against environmental sustainability. How can communities decide which needs are most important?

Colorado River upstream
Today, due to dams and diversion of water for drinking and agriculture, the mighty Colorado River dwindles to nearly nothing before it reaches the sea.

Detroit children – water rights
Access to clean water is of critical importance to all Americans. Yet, even though water may seem plentiful to most of us, access is out of some Americans' reach due to poverty or contamination.

In 2013, to help cut financial losses, the city of Detroit disconnected water service to thousands of customers with unpaid bills. Discussions about whether or not access to water was a human right spread across the city.

Michigan National Guard members distribute water to Flint, MI residents, 2016
Michigan National Guard

In 2014, Flint's municipal water system began taking water from the Flint River instead of purchasing water from nearby Detroit. The contaminated river corroded the city's aging water pipes. Lead and other contaminants leached into drinking water. Flint returned to Detroit's water system, but the damage to the pipes left water unfit to drink. The city needed financial help to repair its infrastructure and residents faced an uncertain future filled with serious health concerns.

Volunteer Darlene Arviso uses a tanker truck to deliver water to a Navajo family
Photo by Laurel Morales, KJZZ's Fronteras: The Changing America Desk.
Copyright 2013 Maricopa County Community College District

Among the Navajo Nation, many are facing water poverty. Groundwater is deeply buried in the region and many wells are contaminated by old mining practices. Some families drive long distances to access clean water. Nonprofit organizations and concerned citizens seek to help the Navajo gain access to reliable water sources.

Natural gas drilling workers, PA
Bloomberg/Daniel Acker

Fracking protestors, PA
Marcellus Protest

Hydraulic fracturing or "fracking" is a practice that injects water and many chemicals into the earth's surface to break open rocks that contain oil and gas. In recent years, fracking has grown into a very controversial practice. Many people believe that fracking chemicals and wastes contaminate groundwater. Many others embrace the jobs and economic benefits that oil and gas extraction bring to their communities.

Panel Images:

<u>Background Image:</u>
Confluence of Potomac and Shenandoah Rivers at Harpers Ferry, WV
MarkVanDykePhotographyShutterstock.com

<u>Images above object case:</u>

Fisherman, American Samoa
National Park Service

Aleut kayaker, Priblof Islands, AK
Clark James Mishler

Home is where the water is images:
Bird's eye view of the city of Hannibal, MO 1869
Library of Congress, Geography and Map Division

A waterside residential development, Oxnard, CA
Derek Gordon/Shutterstock.com

Baltimore in 1752, engraved in 1851 by William Strickland
Maryland Historical Society

Critical Resource, Societal Asset images:
Colorado River Delta, Mexico
Pete McBride

Buford Dam, Lake Lanier, GA
US Army Corps of Engineers

Detroit children at water access protest, Detroit, MI
Detroit Water Brigade

Michigan National Guard members distribute water to Flint, MI residents, 2016
Michigan National Guard

Volunteer Darlene Arviso uses a tanker truck to deliver water to a Navajo family
Photo by Laurel Morales, KJZZ's Fronteras: The Changing America Desk, Maricopa County Community College District

Natural gas drilling workers, PA
Bloomberg/Daniel Acker

Fracking protestors, PA
Marcellus Protest

Section 3 – Flow

Flow front side

Water is a core factor in our relationships with the world around us. The ebb and flow of water both connects and divides us. Historically, access to water made it easier to travel, migrate, or trade with others. Water was the fastest pathway to other places. Today, waterways still serve as highways, moving people, cargo, and ideas.

Water is also a natural border, and makes a logical political boundary. It can also be significant as a cultural or symbolic border. For those traveling by land that same water can be a barrier. Those on land need to devise a way to cross it.

What are the ways that water forms connections and divisions in your community?

Keywords
Boundaries, connections

Photo Captions
Ice road, AK
A water source can even exist as a barrier or connector in its different physical states! Ice roads are a great example. For much of the year, they do not even exist. During the winter months, ice roads on frozen lakes allow the transportation of goods and equipment to isolated communities.

Golden Gate Bridge, CA
Waterways presented people with the challenge of finding ways to reach the other side. Sometimes, those crossings required feats of human ingenuity. The Golden Gate Bridge, completed in 1937, is an iconic structure across the narrow, treacherous strait between San Francisco Bay and the Pacific Ocean and is considered an engineering marvel.

Lake Washington Canal
Rivers, canals, and the Great Lakes served as our first highways, bringing goods from the coast to inland America and sending what was mined, made, and farmed in the heartland to the rest of the world. Water continues to provide those critical links today.

Section 2 Back side
Quote
Nothing is softer or more flexible than water, yet nothing can resist it. -Lao Tzu, philosopher and poet

Keywords
Separation, passages

Photo captions
Polynesian Voyaging Society
Historically, some islands have been cultural crossroads. In the Hawaiian Islands and on Guam, the waters of the Pacific represented a gateway to the rest of the world, not an impenetrable barrier. Islands were a place for travelers to converge and share ideas, materials, and practices.

Cuban Refugees Arriving in US
Water is also a gateway to freedom or for migration. Many enslaved Africans brought into captivity via the Middle Passage across the Atlantic later escaped slavery using water, traveling north by sea or along rivers and streams for concealment. In a 20th century example, thousands of migrants from Cuba participated in a boatlift from the island to Florida, seeking asylum in the US.

Rio Grande Mexico-Texas Gathering

America's international boundaries are approximately half water. The Rio Grande, St. Lawrence River and the Great Lakes make up over 3600 miles of our 7458 miles of international border.

Communities do not let those water-based boundaries keep them apart. Bridges and ferries connect border towns and countries together. The Rio Grande separates Lajitas, Texas and Paso Lajitas, Mexico. But in 2014, local residents held hands to create a human bridge across the river to unite their towns.

Mississippi River at Gateway Arch, St. Louis
In American culture, the Mississippi River is viewed as the divide between the east and west while the Ohio River divides the north and south.

The Gateway Arch in St. Louis symbolizes the city's role as a gateway – physically and culturally – to the American west during the 19th century.

Panel Images:

Rippling water background image:
Rippling water
Gordon/Shutterstock.com

Front side images:
Ice Road, AK
Stephen Nowers, Courtesy Cruz Companies

Golden Gate Bridge, CA
The Jon B. Lovelace Collection of California Photographs in Carol M. Highsmith's America Project, Library of Congress, Prints and Photographs Division

River Steamboat, FL, 1902
Library of Congress

Port of Los Angeles
Photo Courtesy of Port of Los Angeles

Lake Washington Canal, Seattle, WA
US Army Corps of Engineers

Back side images:
Traditional Polynesian Ships, HI
© 2014 Polynesian Voyaging Society and ʻŌiwi TV. Photographer: Kaipo Kīaha

"Arrival of Fifteen from Norfolk, VA" from *The Underground Railroad: A Record of Facts, Authentic Narratives and Letters* by William Still
Boston Public Library (Rare Books Department)

Americans and Mexicans join hands across the Rio Grande, 2014
Lorne Matalon

Cuban migrants arrive in Key West, FL, 1980
US Coast Guard

Gateway Arch, St. Louis, MO
Matt Kozlowski

Section 4 – Quench

Front Side – Harnessing the Power of Water

Humans not only drink water—we put it to work. We search for ways to control water and the energy it possesses. According to the US Geological Survey, Americans withdrew 355 billion gallons of water for use **each day** in 2010. Massive dams don't just corral our drinking water. They can also generate power. Miles upon miles of canals and irrigation ditches water our crops. We use water to make goods like paper and computer chips, to keep lawns green, and for cooking and cleaning.

Whether we use it for drinking, manufacturing, or transportation, access to water is critical to our economy. But there needs to be a balance. In some areas agriculture and industry are depleting water sources. Furthermore, poor environmental practices have led to pollution and contamination of water supplies and waterways in some communities.

What are the ways you and your community put water to work?

Background image caption
The Theodore Roosevelt Dam was built in 1911 on the Salt River to store the river's water for agricultural use. Its reservoir is 22 miles long and about 2 miles wide.

Key Words
Control, wash, drink, grow, need, balance

At Home
You've probably had a glass of water to drink today, taken a shower, or washed some dishes. We use water in our homes every day. For most Americans, water is so easy to get and use that we don't even think about it.

In 2010, about 12% of freshwater withdrawals in the US went into the public water supply and about 57% of that was delivered to homes. According to the US Environmental Protection Agency, 71% of interior domestic water is used in bathrooms. Additionally, people use water to cook, clean, water plants, and many other uses.

Did You Know?
Up to 14% of the water used in an average home is actually lost in leaks. Check those faucets and pipes!

Newer water-saving showerheads use about 2 gallons of water per minute, while older fixtures can use up to 5 gallons per minute. The average bath requires about 36 gallons of water. For most Americans, a short shower in an updated bathroom can equal significant water savings.

Americans use about 80-100 gallons of water per day, mostly for health and hygiene. How does your use measure up?

Flushing Toilet Image
Older toilets use up to 5 gallons of water in a single flush. Today, federal standards allow only 1.6 gallons per flush. The average toilet is flushed five times each day. How much water could you save with a newer toilet?

How Much Water? Interactive
Many of the products we use every day require significant amounts of water to produce. Check out the number of gallons of water needed to grow or produce some of the items you use.

1 apple
18 gallons of water

1 pound of beef
1,799 gallons of water

1 pound of chicken
468 gallons of water

1 pound of chocolate
3,170 gallons of water

1 ream of paper
1,321 gallons of water

1 pound of rice
449 gallons of water

1 pair of jeans
2,000 gallons of water

1 gallon of coffee
880 gallons of water

1 pound of cheese
600 gallons of water

1 cotton t-shirt
713 gallons of water

1 smartphone
240 gallons of water

1 small pizza
333 gallons of water

1 gallon of milk
1,056 gallons of water

1 car with 4 tires
39,090 gallons of water

½ pound of leather
1,096 gallons of water

1 gallon of tea
128 gallons of water

In Agriculture
Agriculture, and its often heavy use of irrigation, is one of the largest consumers of freshwater in the United States. In 2010, the US Geological Survey reported that irrigation accounted for about 38% of freshwater withdrawals. Only about 50% of the water used for irrigation is reusable. Much water is lost to evaporation and water leaks.

Group caption for all agriculture panel images
It's easy to remember that water is used for irrigating crops, but it is also needed for livestock. Furthermore, water is needed for the crops that are fed to the livestock. Then, we need additional water to clean and process the foods that we eat. The cumulative effect is staggering.

In Power and Industry
Much of our water goes into making and powering the machines and tools we use each day. Manufacturing plants can be significant consumers of water. Many goods require large amounts of water to produce. But, in 2010, thermoelectric generation plants used more than 40% of fresh water in the US. That's even more than the amount used for irrigation. Most of this water was used to drive steam-powered turbines to create electricity.

Captions for Power and Industry images
We also use water to generate power in numerous ways. Hydroelectric power plants use water directly and do not burn fossil fuels, but impact the landscape by flooding upstream areas and reducing water availability downstream. Nuclear energy plants use water for cooling; geothermal energy id derived from heated water beneath the Earth's surface; and underwater turbines use the energy of water currents to make power.

Using water to power machinery led many companies to establish their plants and mills along waterways. In 1891, the Columbia Canal in Columbia, SC, a shipping canal along the Broad River was extended to allow the construction of a hydroelectric powerhouse. The power from the canal was used for the massive Columbia Mills Building built behind the powerhouse. Completed in 1893, the mill was one of the first to be fully powered by electricity.

"Water and Work" flipbook

Flipbook pg. 2-3

Image:
New Jersey farmers grew cranberries starting in the 1830s. The state is now the third largest producer in America.

US Department of Agriculture photo by Keith Weller

A **Floating** Heritage
Every cranberry farmer is growing a piece of American heritage. Native Americans used cranberries for food, medicine, and dye for clothing. By the early 1800s, farms were expanding in Massachusetts and the fruit was being shipped to large cities like Boston. Today, it is one of only three native fruits grown commercially. Massachusetts remains a top producer, second only to Wisconsin.

Water is crucial to this crop. Cranberries grow on low-laying vines in “bogs” - beds of clay, gravel, acidic peat, sand, and a reliable supply of fresh water. The vines need an inch of water a week to grow. At harvest time, farmers flood bogs with a foot or more of water.

Flipbook pg. 4-5

Image:
Dockhands, or longshore workers, move cargo in New Orleans, Louisiana
University of Wisconsin La Crosse, Murphy Library, Special Collections. Neg. 17152.

Moving the World
Ports have been crucial to the development of America, especially in southern Louisiana. Since the founding of New Orleans in 1718, people have been working hard shipping and receiving goods from its ports. Today, the Ports of South Louisiana, New Orleans, and Greater Baton Rouge all rank in the top ten US ports by cargo tonnage traded.

It takes hundreds of people every day to make a port work smoothly. Longshore workers, ship pilots, crane operators, security, and more are vital to importing and exporting goods that our society and the world demands at over 360 commercial ports nationwide.

Flipbook pg. 6-7

Image:
Dip-net fishing at Celilo Falls, circa 1956-57. Today this area is Lake Celilo along the Oregon and Washington state border.
US Army Corps of Engineers

A Tradition Destroyed
Along nine miles of the Columbia River in Oregon and Washington, Columbia River Plateau tribes gathered to fish for thousands of years. The narrow waterway created by the river’s Celilo Falls made a perfect spot for subsistence salmon fishing. Generations upon generations of Warm Springs, Yakama, Umatilla, and Nez Perce tribal members learned how to fish with traditional dip-nets and platforms at the falls. Salmon were vital to their lives – physically, culturally, and spiritually.

Non-Native settlement and commercial activity changed everything. Tribes faced increased competition and restricted access, while a railroad and canal altered the

landscape. In 1957, when the Army Corps of Engineers finished the Dalles Dam, the dam's reservoir completely flooded the falls and Celilo Village.

Flipbook pg. 8-9

Image:
Lobsterman in Maine
Photography by Cynthia Farr-Weinfeld, www.cfwphotography.com

Catch a Piece of History

Lobstering is an important business in the New England states along the Gulf of Maine, but Maine's lobster industry is perhaps best known. Lobsters have long been important to the economy and diet of Mainers. In colonial days, lobsters were so numerous they were caught along the shoreline and considered food for the poor. Native Americans used lobster to fertilize crops. But by the 1850s, Maine lobster was in demand in the big Eastern cities and canneries boomed.

Today, Maine is the largest lobster producer in the United States bringing in over $1 billion a year. Although times have changed, harvesters still catch lobsters by hand in traps. Lobstering families still pass down these skills over generations, remain in tight-knit communities, and hold festivals.

Flipbook pg. 10-11

Image:
Gusty Chocknok, skipper of the F/V Helen Marg from Togiak Bay on a salmon gillnetter in Bristol Bay, Alaska
National Oceanic and Atmospheric Administration/Department of Commerce, photo by Karen Ducey, NMFS

Surrounded by Seas

In Alaska, fishing is simply part of life. The majority of residents know how to fish for subsistence, recreation, or for commercial sale. Surrounded by the Arctic Ocean, Pacific Ocean, and the Bering Sea, Alaska has over 30,000 miles of coastline, over 12,000 rivers, and three million lakes. The seafood industry provides over 78,000 Alaskan jobs.

Salmon is one of its most famous industries. Whether wild-caught or from hatcheries, Alaska salmon is highly valued worldwide, and provides more jobs than other fisheries. At their peak in the 1940s, commercial salmon fisheries caught over 100 million annually. Today hatcheries also put salmon back into the supply. In 2010 alone, hatcheries supplied over 77 million salmon to the waters. Every year, Bristol Bay sockeye salmon contributes over $5.8 billion to the economy.

Flipbook pg. 12-13

Image:
Repairing a US Navy anchor at Naval Station Bremerton, Washington, 2002. This anchor was made at the Norfolk Naval Shipyard.
Photo by Chief Photographers Mate, Daniel E. Smith, US Navy

Sea-Worthy Heritage

The hands that craft and repair boats help make our coastlines and rivers thrive as lifelines of travel and commerce. Thousands of people are employed in private and

federal shipyards. The Atlantic and Gulf Coasts boast more major shipyards than anywhere else in America.

Virginia employs more shipyard workers than any other state, and is home to the oldest and largest shipyard, the Norfolk Naval Shipyard, built in 1767. The first dry dock was built there in 1833 and is still in use today. Workers and families in the state's Hampton Roads region showcase their proud shipbuilding heritage at the annual Norfolk Harborfest.

Panel Images:

Background image:
Theodore Roosevelt Dam, AZ
US Department of the Interior/Bureau of Reclamation

At Home Images:
Leaky faucet
John Krzesinski

Showerhead
Museum on Main Street

Drinking water
Benjamin Smith, www.benjaminasmith.com

Washing vegetables
Laurie Hulsey

Hand washing
Courtesy of California Department of Water Resources, Photograph by John Chacon

Flushing toilet
Museum on Main Street

In Agriculture Images:
Irrigation equipment
US Department of Agriculture by Lance Cheung

Vegetable stand, Washington, DC
US Department of Agriculture

Cows at water trough, CA
US Department of Agriculture

Washing harvested squash, Mechanicsville, VA
US Department of Agriculture by Lance Cheung

Irrigating fields
muratart/Shutterstock.com

Diverting water into an irrigation canal
US Department of Agriculture by Bob Nichols

Irrigated landscape near Ririe dam, ID
Sam Beebe

In Power and Industry Images:
John Cable Mill, TN
Library of Congress, Edouard E. Exline

Shrimp processing plant, MS
Museum on Main Street

Hoover Dam power station, NV
Blue Legacy International

Geothermal energy plant, OR
US Geothermal Inc. – Neal Hot Springs

Underwater turbine installation, NY
Verdant Power, Inc.

Columbia Canal Powerhouse, Columbia, SC
Library of Congress

Section 4 – Backside
Finding Comfort and Purpose in Water
The scent of a rain shower. The sound of rain on a rooftop. A cool swim on a hot day. Majestic waves crashing on the shore. Water appeals to all our senses.

Our relationship with water is both personal and communal. We look to water to provide peace and solitude in the midst of our hectic daily lives. We see natural beauty along riverbanks and we pause to admire sunrise and sunset at the water's edge. Yet water also has a way of bringing us together. We gather at the shore of the ocean, a lake, or a river to swim, fish, kayak, or boat.

We carry in our heads and our hearts notions about what our water means to us. What are your personal water/ways?

Keywords
Knowledge, Understanding, Wisdom, Font, Quest, Appreciation, Respect, Communal, Leisure, Relaxation, Peace

Object Case – Travel and Recreation
Water and Our Great Escapes
Beaches, lakes, and rivers are among Americans' favorite vacation spots. We take our swim and fishing gear and our cameras on our trips, find fun and good food, and come home with great souvenirs, treasured photos, and fond memories.
Objects: Viewmaster with travel reels; crab crackers; souvenir postcards; snorkel and mask; vacation photos; and fishing lures

Recreation Images Caption
Whether we are splashing in the surf at a beach, sawing through ice for fishing or hanging out beside a pool, water provides the setting for fun, fitness, and recreation for millions of Americans.

Culture and Heritage at the Water's Edge
Local tradition bearers in communities from diverse cultures across the United States work closely to preserve customs tied to the water. By collecting stories and continuing community festivals, Americans everywhere are embracing and expanding upon those water traditions.

Cultural Heritage Image Captions
Texas Cavaliers River Parade

The Texas Cavaliers River Parade is an annual festival that began in 1941 with a parade of decorated boats on the San Antonio River. Today, the festival raises funds for local children's charities.

City of Lakes Loppet Festival, Minneapolis, MN

Each February the City of Lakes Loppet Festival in Minneapolis celebrates the winter environment and landscape. Artists come together to create ice monuments like the Loppet Luminary and festival participants cross-country ski across frozen lakes.

US Navy personnel in Dragon boat race, Okinawa

Americans across the country (and around the world) hold dragon boat festivals to celebrate Asian American culture. These festivals feature traditional Chinese dragon boat races and often offer programs on Asian arts, music, food and dance.

Parade float at Columbus Day Blessing of the Fishing Fleet, San Francisco

From California to Mississippi to Maine, coastal communities across the country celebrate their local fishing and shipping heritage with blessings of their local fleets and parades of ships. Virginia's Norfolk Harborfest is the longest-running free maritime festival in the US. The festival celebrates the heritage of the Hampton Roads area with tall ships, music, and fireworks. The Chesapeake Bay community in Chestertown, Maryland celebrates tall ships with its annual Downrigging Festival.

Chumash Paddlers

Tomols, the oldest example of an ocean-going watercraft in North America, were used for hunting, fishing, and trading. They were built from redwood trees that Chumash builders found along the coast.

Panel Images:

Background image:
Kayaker on mountain lake
Okhrimenko Vasyl/Shutterstock.com

Recreation Images:
Newport Beach, CA

The Jon B. Lovelace Collection of California Photographs in Carol M. Highsmith's America Project, Library of Congress, Prints and Photographs Division.

Virginia Beach, VA
Photo by Captain Albert E. Theberge, NOAA Corps, ret.

President Franklin D. Roosevelt exercises at Warm Springs, GA
Franklin D. Roosevelt Presidential Library and Museum

Surfing the Banzai Pipeline, HI
US Air Force photo/Staff Sgt. Christopher Meares

Ice fishing, Echo Lake, MT
Scott Hollinger

US Junior Women's Double-handed Sailing Championship, San Francisco Bay, CA
By Roxanne Fairbairn, via Wikimedia Commons

Fishing on Chattahoochee River, GA
Steve Harwood

Rafting, Hood, River, OR
US Army/Photo by Sgt. 1st Class Raymond Piper

Cultural Heritage images:
Chamorro fisherman, Guam
Ryan Harvey

Water Carnival Poster, NY
Library of Congress, Charlies Verschuuren

Decorated boats at 2015 Blessing of the Shrimp Fleet, Biloxi, MS
Museum on Main Street

Downrigging Festival, Chestertown, MD
Photo courtesy of Kbmoore.com

Norfolk Harborfest
Norfolk Festevents, LTD

Chumash tomol paddlers, Santa Cruz Island, CA
Robert Schwemmer, CINMS, NOS, National Oceanic and Atmospheric Administration

Texas Cavaliers River Parade float
The Lyda Hill Texas Collection of Photographs in Carol M. Highsmith's America Project, Library of Congress, Prints and Photographs Division

City of Lakes Loppet Festival, Minneapolis, MN

Tony Webster

US Navy personnel participate in dragon boat races, Okinawa, Japan, 2007
US Navy photo by Mass Communication Specialist 1st Class Carmichael Yepez

Parade float at Columbus Day Blessing of the Fishing Fleet, San Francisco, CA
Ken Light for American Folklife Center, Library of Congress

Section 5- Water is Eternal

Front Side – Water Threats

Water is Eternal?

Water is a finite resource. Our environment does not create water – it recycles it.

We must take steps to ensure the quality and reliability of our current water sources. We need to find ways to recycle water and make untapped water sources useful. Even though we have the recipe – two parts hydrogen, one part oxygen – we cannot safely make our own water.

Population growth is altering access to water supplies. Scientists continue to study how climate changes could affect water supplies in the future. Americans are making great strides in cleaning up water supplies, but pollution remains a problem.

Think beyond your faucet – what is the source for your drinking water? Are there any issues that could impact your access that water? What are some of the threats to water/ways in your area?

Keywords

water use vs. water access, vulnerable, renewable

Pollution and Runoff

Have you ever dumped something into a drain without thinking twice where it might end up? How do we make sure there is enough healthy water, not just for ourselves, but also for everything on the planet?

Think about how our water cycle works: What we discard will eventually be in someone else's water. The water we use for drinking and washing comes through our taps from the world around us. And we also send chemicals like medications, soaps and detergents, dirt, and even skin cells down the drain. After treatment, it ultimately returns to the environment. That waste makes its way into rivers and ground water. What we eat, what we drink, what we put on our hair and skin, what we wash out in the sink — if it's on us or in us, it ends up back in the watershed.

Pollution and Runoff group caption

A 2008-2009 US Environmental Protection Agency assessment of the health of American rivers and streams revealed that 55% of our waterways were suffering from pollution and considered to be in poor condition.

Flip Book "Before & After"

Flipbook pg. 2-3

Building New Land
Rivers build new land in their deltas by depositing sediments gathered from upstream. In Louisiana, the flow of water through the Atchafalaya River and the Wax Lake Outlet is leading to the creation of new deltas. While the Mississippi River delta to the east is losing land to erosion, the Atchafalaya and Wax Lake deltas are creating an additional square mile of land each year.

Image:
Satellite views of deltas in November 1984 and October 2014
NASA Earth Observatory images by Jesse Allen, using Landsat data from the US Geological Survey

Flipbook pg. 4-5

Drought's Impact
A severe drought brought on by several years of reduced snowpack in the Rocky Mountains where the Missouri River rises led to significantly reduced flows in the early 2000s. On Lake Oahe, a major reservoir on the Missouri in North and South Dakota, lake levels retreated so
much that boat ramps were left dry more than a mile away from water.

Image:
Satellite views of Lake Oahe in May 2000 and April 2004
NASA/GSFC/METI/Japan Space

Flipbook pg. 6-7

Stresses on an Important Lake
Lake Mead, on the Nevada/Arizona border, is formed by the iconic Hoover Dam on the Colorado River. Millions of people in three states and parts of Mexico rely on the lake for drinking water and electricity. But, with years of drought limiting snowpack and streamflows in the American West and rapid population growth in nearby Las Vegas, the lake is under extreme stress. In 2010, the lake's level was at only 38% of its capacity.

Image:
Satellite views of Lake Mead in 1982 and 2010. Note the increase in the size of the urban area of Las Vegas near the lake's western edge.
Images taken by the Thematic Mapper sensor onboard Landsat 5.
Source: US Geological Survey (USGS) Landsat Missions Gallery, "Lake Mead, Nevada," US Department of the Interior / USGS

Flipbook pg. 8-9

A Lake at the Brink
California's Owens Lake is largely dry today. Until the early 20th century, the salt lake was an important stop for millions of migrating birds. But in 1913, water from the Owens River, which feeds the lake, began to be diverted to serve the city of Los Angeles. By the

end of the 20th century, the nearly dry lake became a source for dust storms. In recent years, some water flow from the river was restored to the lake to keep dust levels down and to create shallow wetlands that aid the ecosystem. There are no plans to return the lake to its original size or depth, but it remains an important stop for birds.

Image:
Satellite views of Owens Lake in 1985 and 2010 with restored wetlands
Images taken by the Thematic Mapper sensor onboard Landsat 5.
Source: USGS Landsat Missions Gallery, "Owens Lake Restoration," US Department of the Interior/US Geological Survey

Flipbook pg. 10-11

Returning Water to the Florida Everglades
For decades, the vast Florida Everglades was considered useless swampland. In reality, it is a huge watershed that drains much of the state of Florida. In the late 19th and early 20th centuries, areas of the Everglades were drained and became agricultural land. The dikes that were built restricted natural water flow through the region, causing damage to the environment and actually making parts of south Florida more prone to flooding. In the 21st century, the Everglades are slowly making a comeback. In 2000, the US Congress authorized a major restoration project. Scientists note that the Everglades can never be completely restored, but work is underway to bring some of the region's natural wonder back.

Image:
Composite satellite images taken in 1986-87 and 2010-11
Images taken by the Thematic Mapper sensor onboard Landsat 5.
Source: US Geological Survey (USGS) Landsat Missions Gallery, "Monitoring the Everglades," US Department of the Interior / USGS and NASA

Muir Glacier Caption
Muir Glacier used to fill Muir Inlet in Alaska's Glacier Bay National Park. The 1941 image below shows ice filling the inlet and a tributary, Riggs Glacier, in the background. By 2004, Muir Glacier retreated more than four miles, leaving the inlet open. Riggs Glacier has also retreated significantly during the period.

Climate Change
Increased global temperatures have a significant impact on the water cycle. Climate change isn't just about heat – some places will be colder, some hotter. But the overall changes in the climate will lead to new weather patterns and environmental impacts. Scientists predict rises in sea level, rises in sea surface temperatures, and significant loss of glaciers and ice sheets through melting.

Some areas may see more major storms and increased rainfall. Conversely, other areas will see prolonged droughts. As the sea level rises, entire coastal communities will face potential flooding, and eventually, complete displacement.

Not Enough Water
Water use has grown twice as fast as the world's population over the last century. In the United States, population increases in the desert Southwest put incredible pressure on this arid area's scarce water supplies. But even places with sufficient rainfall often find that freshwater resources are spread too thin.

Water scarcity is more than just an issue of too little rain — sometimes it is a problem of politics, infrastructure, and overuse.

People who live where water is scarce develop many ways of adapting their water use. Some catch and keep what little rain falls to reuse for gardening, others drill wells, and some who can afford it even extract salt from seawater.

Maintaining non-native plants within an environment can have a high water cost, so a golf course in a desert might at first glance seem wasteful. But many golf courses in the desert Southwest are innovators in dealing with the scarcity of local water and are known for their efficient water use.

Caption for water shortage map
It is clear that there are numerous threats to our water resources: in 2014, the US Government Accountability Office reported that 40 states expected to experience water shortages by 2024.

Caption for Desalination plant image
Desalination plants remove salt from seawater to make it drinkable and have helped make water more accessible in some arid regions around the world. These facilities are rare in the US due to their cost, high power requirements, and concerns about environmental damage. But a new plant opened in Carlsbad, California in 2015 that can produce up to 50 million gallons of drinking water each day.

Quote
Water and air, the two essential fluids on which all life depends, have become global garbage cans. -Jacques Cousteau

Panel Images:

Background Image:
Drought-stricken lake, CA
Sheila Fitzgerald/Shutterstock.com

Pollution and Runoff Images:
A woman holds a jar of polluted water from her well, Steubenville, OH, 1973
US Environmental Protection Agency

Garbage on beach, MS
Museum on Main Street

Garbage in Raritan River, NJ
'Ducks and Debris' by Sandra Shapiro

Contamination warning on beach, Santa Monica Bay, CA

Michael Dorausch

Algae in a waterway
US Environmental Protection Agency, photo by Eric Vance

A pipe empties urban runoff on a California beach
Monterey Bay National Marine Sanctuary, National Oceanic and Atmospheric Administration

Climate Change images:

Pond depleted due to drought, CA
US Department of Agriculture by Cynthia Mendoza

Broken sea ice
Patrick Kelley, US Coast Guard

Flooding after Hurricane Katrina
National Oceanic and Atmospheric Administration/Department of Commerce, Lieut. Commander Mark Moran, NOAA Corps, NMAO/AOC

Hurricane Irene
NASA

Muir Glacier (in foreground) and Riggs Glacier (at rear), 1941
W.O. field, #41-64, courtesy of the National Snow and Ice Data Center and Glacier Bay National Park and Preserve Archive

Remains of Muir Glacier and Riggs Glacier, 2004
US Geological Survey photograph by Bruce F. Molnia

Not Enough Water images:

Golf course near Las Vegas, NV
Ryan Taylor (London, UK)

Hopi farmers use collected rainwater, AZ
Yale Collection of Western Americana, Beinecke Rare Book Manuscript Library

Drought notice, Sacramento, CA
Kevin Cortopassi

Collecting rainwater for household garden
Barb Howe

Desalination plant, Carlsbad, CA
Kleinfelder, Inc.

2014-2024 anticipated water shortage map
Developed from 2014 data from US Government Accountability Office

Section 5 Back side – It's Our Water
Americans have learned over the past century that our access to clean, usable water is far from guaranteed. No new water is being created – we have to protect the water we have and use it wisely.

While some water challenges are seemingly insurmountable, people are great problem solvers. There are many easy, positive changes we can make right where we live. It is possible – and necessary – to renew, refresh, and reuse water.

Quote
Anyone who can solve the problems of water will be worthy of two Nobel prizes – one for peace and one for science. -President John F. Kennedy

Overcoming Pollution at the Local Level
In 1995, Texas declared fish from Lake Como, a small lake near Fort Worth, off-limits. Runoff from nearby neighborhoods raised the amounts of pesticides – including PCBs, DDT, and chlordane – in the lake's fish to unacceptable levels.

Fort Worth's Environmental Management Department began a campaign to teach residents how to safely dispose of hazardous waste. The department also held festivals and lake cleanup events. They even played public service announcements about storm water pollution in local movie theaters.

Their efforts were a success. In 2008, testing revealed that the pesticide levels in Lake Como's fish had dropped dramatically, and the lake was reopened for fishing.

How are people working to restore your local water resources?

Citizen Action Case
Waste in the Waters
Tons of trash—from food wrappers to cars—are discarded along American waterways. Plastics, like water and prescription bottles, are among the most common. Many communities hold water cleanup events where volunteers clear garbage from beaches and riverbanks.

Teaching Stewardship
Schools all over the country are making water a part of local curriculum through hands-on programs that help students learn about water resources and how to manage them.

Nationally, the Smithsonian offers a series of programs that provide students with information on the science behind water. This encourages them to think about the role water plays in their lives, and to consider steps they can take to improve water quality in their communities. Another national program, Hands on the Land, links several federal agencies with a nonprofit organization to engage students in monitoring water resources and wildlife habitats on public lands.

How do students in your community learn more about water?

Spurred to Action
Cleveland's section of the Cuyahoga River was once considered one of the most polluted rivers in the country, and with good reason. Floating debris and oils on the

river's surface caught fire 13 times from 1868 to 1969. After *Time* magazine covered the 1969 fire, Cleveland mayor Carl Stokes and his brother, US Representative Louis Stokes, joined concerned citizens across the country calling for enhancement of environmental protection regulations. President Richard Nixon took action and created the US Environmental Protection Agency (EPA) in 1970.

The agency began by consolidating existing federal environmental regulations. In 1972, Congress passed the Clean Water Act, giving the EPA authority to enforce pollution control programs and provide funding for water monitoring and restoration efforts.

Since the early 1970s, Cleveland residents have rehabilitated the river and reclaimed it as an important part of the community.

What's Next? Research your Water/Ways

Water is one of the most valuable resources on the planet. Our history and our culture bear witness to the importance of water. Just as water nourishes us physically, it also builds us up spiritually. Without enough water, our health suffers and our economy and political structures would falter. It's clear that water has a significant impact on our ways of life.

What are your water/ways?
#mywaterstory

Panel Images:

Background image:
Flowing river
everst/Shutterstock.com

Overcoming Pollution images:
US Army Corps of Engineers personnel install pipes to control storm runoff
US Army Corps of Engineers

Water cleanup
US Environmental Protection Agency by Shannon Bond

Water sampling
US Environmental Protection Agency

Water analysis
US Environmental Protection Agency photo by Eric Vance

Teaching Stewardship images:
As part of an education program, Crystal Sandoval, Nnamdi Anomnachi, Kofi Henderson, Mike Brown, and Tony Thomas explore the Potomac River on the Chesapeake Bay Foundation's *Susquehanna*
Susana Raab, Anacostia Community Museum

Students collect water samples for analysis
Gary Peeples/Asheville Field office/US Fish and Wildlife Service

Students examine insects in ice cubes
US Environmental Protection Agency by Toni Castro

Students measure water turbidity
Bureau of Land Management, Upper Missouri River Breaks National Monument Interpretive Center, Fort Benton, MT

Hands on the Land program students identify organisms in water samples
Bureau of Land Management, Upper Missouri River Breaks National Monument Interpretive Center, Fort Benton, MT

Spurred Action images:

Polluted water emptied into the Cuyahoga, 1973
US Environmental Protection Agency, Frank J. Aleksandrowicz

Sewage floating on the river, 1973
Frank J. Aleksandrowicz, National Archives, via Wikimedia Commons

Abandoned cars dumped on the banks of the Cuyahoga near Cleveland
National Archives

Restored Cuyahoga River, 2015
Photo by GreenCity BlueLake

What's Next? Images:

Hands in flowing water
US Agency for International Development

Diving into pool
Photo by Brooklyn Morgan

Child on beach
US Environmental Protection Agency

Father and son fishing
US Environmental Protection Agency photo by Eric Vance