



Creation Season

Sixth Sunday of Easter, Year A, April 27, 2008

Water: Groundwater/wells

Information and Reflections for Homilists, Liturgists, and Clergy of the Episcopal Diocese of Minnesota

There are several Themes for this Sunday:

Lectionary themes

Resurrection as God's call to those trapped in idolatry
 Gospel theme: God will give an advocate

Revised Common Lectionary Readings:

Acts 17:22-31
 Psalm 66:7-18
 1 Peter 3:13-22
 John 14:15-21

Creation themes

Groundwater, Wells
 Bottled water is depleting natural water supplies and creating a false sense of security

Grist for sermon preparation

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The Gift of Fresh Water

Fresh water is one of God's great gifts and is, of course, essential to life. The human body is anywhere from 55% to 78% water depending on body size. To function properly, the body requires between one and seven liters of water per day to avoid dehydration; the precise amount depends on the level of activity, temperature, humidity, and other factors. Most of this is ingested through foods or beverages other than drinking straight

water. Medical literature [suggests consumption of] one liter of water per day for an average male, excluding extra requirements due to fluid loss from exercise or warm weather. [note 1]

Fresh water is available in two primary ways: as surface water in lakes, rivers and streams, and as groundwater in aquifers. Today our focus is on groundwater. Lakes rivers and streams have been covered in previous weeks, so the following general material about the value of fresh water may be redundant. But I prefer to begin by talking about the blessing God gives us in Creation, and these blessings of fresh water apply no matter where it comes from.

Ways Water Blesses and Sustains Us

The U.S. Geological Survey categories of water use show how many different ways fresh water is used

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to support human life and well-being:

Commercial water use includes fresh water for motels, hotels, restaurants, office buildings, other commercial facilities, and civilian and military institutions. Domestic water use is probably the most important daily use of water for most people.

Domestic use includes water that is used in the home every day, including water for normal household purposes, such as drinking, food preparation, bathing, washing clothes and dishes, flushing toilets, and watering lawns and gardens.

Industrial water use is a valuable resource to the nation's industries for such purposes as processing, cleaning, transportation, dilution, and cooling in manufacturing facilities. Major water-using industries include steel, chemical, paper, and petroleum refining. Industries often reuse the same water over and over for more than one purpose.

Irrigation water use is water artificially applied to farm, orchard, pasture, and horticultural crops, as well as water used to irrigate pastures, for frost and freeze protection, chemical application, crop cooling, harvesting, and for the leaching of salts from the crop root zone. Nonagricultural activities include self-supplied water to irrigate public and private golf courses, parks, nurseries, turf farms, cemeteries, and other landscape irrigation uses. The importance of irrigation to the United States is illustrated by the large amount of fresh water that is used to cultivate crops, which are consumed domestically and throughout the world. In fact, irrigation is the largest category of water use in the United States, as it is worldwide.

Livestock water use includes water for stock animals, feed lots, dairies, fish farms, and other non-farm needs. Water is needed for the production of red meat, poultry, eggs, milk, and wool, and for horses, rabbits, and pets. Livestock water use only includes fresh water.

Mining water use includes water for the extraction of naturally occurring minerals; solids, such as coal and ores; liquids, such as crude petroleum; and gases, such as natural gas. The category includes quarrying, milling (such as crushing, screening, washing, and flotation), and other operations as part of mining activity. A significant portion of the water used for mining, about 32 percent, is saline.

Public Supply water use refers to water withdrawn by public and private water suppliers, such as county and municipal water works, and delivered to users for domestic, commercial, and industrial purposes. In 1995, the majority of the nation's population, about 225 million, or 84 percent, used water delivered from public water suppliers. About 42 million people supplied their own water, with about 99 percent of that water being groundwater, usually from a local well.

Thermoelectric Power water use is the amount of water used in the production of electric power generated with heat. The source of the heat may be from fossil fuels, nuclear fission, or geothermal. Fossil fuel power plants typically reuse water. They generate electricity by turning a turbine using steam power. After the steam is used to turn the turbines, it is condensed back to water by cooling it. The condensed water is then routed back to the boiler, where the cycle begins again. [note 2]

Additional Resource: <http://ga.water.usgs.gov/edu/wateruse.html>

The Minnesota Episcopal Environmental Stewardship Commission (MEESC) has prepared Creation Season materials for the Season of Easter, 2008, with a focus on water. If you find the information on this reflection to be of interest, you may wish to visit the MEESC website for more information (www.env-steward.com). Members of MEESC are available to visit your congregation to assist you and them in an environmental stewardship walk.

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Ground Water and Well Water in the Bible

Perhaps the most important story about ground water in the Bible is the story of the Waters at Meribah-Numbers 20:1-11

In the dry wilderness of Sinai and Palestine, groundwater was essential. Wells for drinking and watering livestock are mentioned frequently in the Bible [note 3]:

Genesis 21.19 *Then God opened her eyes and she saw a well of water. She went, and filled the skin with water, and gave the boy a drink.*

Genesis 21.25 *When Abraham complained to Abimelech about a well of water that Abimelech's servants had seized,*

Genesis 24.11 *He made the camels kneel down outside the city by the well of water; it was toward evening, the time when women go out to draw water.*

Genesis 26.19 *But when Isaac's servants dug in the valley and found there a well of spring water,*

Genesis 26.20 *the herders of Gerar quarreled with Isaac's herders, saying, "The water is ours." So he called the well Esek, because they contended with him.*

Genesis 26.32 *That same day Isaac's servants came and told him about the well that they had dug, and said to him, "We have found water!"*

Genesis 29.3 *and when all the flocks were gathered there, the shepherds would roll the stone from the mouth of the well, and water the sheep, and put the stone back in its place on the mouth of the well.*

Genesis 29.8 *But they said, "We cannot until all the flocks are gathered together, and the stone is rolled from the mouth of the well; then we water the sheep."*

Numbers 21.16 *From there they continued to Beer; that is the well of which the LORD said to Moses, "Gather the people together, and I will give them water."*

Joshua 15.19 *She said to him, "Give me a present; since you have set me in the land of the Negeb, give me springs of water as well." So Caleb gave her the upper springs and the lower springs.*

2 Samuel 23.15 *David said longingly, "O that someone would give me water to drink from the well of Bethlehem that is by the gate!"*

2 Samuel 23.16 *Then the three warriors broke through the camp of the Philistines, drew water from the well of Bethlehem that was by the gate, and brought it to David. But he would not drink of it; he poured it out to the LORD,*

1 Chronicles 11.17 *David said longingly, "O that someone would give me water to drink from the well of Bethlehem that is by the gate!"*

1 Chronicles 11.18 *Then the Three broke through the camp of the Philistines, and drew water from the well of Bethlehem that was by the gate, and they brought it to David. But David would not drink of it; he poured it out to the LORD,*

Song of Solomon 4.15 *a garden fountain, a well of living water,
and flowing streams from Lebanon.*

John 4.11 *The woman said to him, "Sir, you have no bucket, and the well is deep. Where do you get that living water"*

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Dangers of Overuse

The greatest problem facing groundwater around the world is simply over use. People are drawing the water out faster than it can be replaced. “This ‘groundwater deficit’ has widespread social and economic impacts, with subsidence-the gradual settling or sudden sinking of the land surface-and seawater intrusion being two particularly important ones.”

Here in the United States: “Groundwater depletion has been a concern in the Southwest and High Plains for many years. It has also been observed in the Atlantic coastal plain, Gulf Coast plain, west-central Florida, the Chicago-Milwaukee area, and the Pacific Northwest. The High Plains Ogallala aquifer is being depleted eight times faster than nature can replenish it. And the water table under California’s San Joaquin Valley has dropped nearly 10 meters in some spots within the last 50 years.”

“Large-scale groundwater withdrawal can lead to a consolidation of aquifers, causing land subsidence. This in turn causes widespread damage to urban center-undermining buildings and rupturing roadways, water lines, sewer systems, and other infrastructure. It also jeopardizes sunken areas with flooding and even permanent inundation.”

“When groundwater extraction in [costal aquifers] reaches a certain point, seawater can be pulled into freshwater aquifers. The resulting contaminated groundwater is virtually unusable. To many fast-urbanizing areas that depend largely on groundwater for drinking and agriculture, the saline water not only degrades their soil, it poses serious threats to their drinking water supply.” [note 4]

Threat of Contamination

Next to overuse, the biggest threat to groundwater is contamination by fertilizers, pesticides, feedlot effluent, and industrial pollutants. Unfortunately, contaminated groundwater is very difficult and expensive to clean up. Solutions can be found after groundwater has been contaminated but this isn’t always easy. The best thing to do is adopt pollution prevention and conservation practices in order to protect important groundwater supplies from being contaminated or depleted in the first place.

Sources of pollution and its dangers are discussed at: <http://www.groundwater.org/gi/contaminationconcerns.html>

Problems with Bottled Water

A smaller but fast growing problem is the sharp increase in use of bottled water. As in so many things, “the Unites States is the world’s largest consumer of bottled water, with Americans drinking 28.7 billion liters in 2005.”

“The difference in cost between bottled and tap water is staggering: the bottled version costs from 240 to more than 10,000 times as much. The Pacific Institute found that bottled water sold in most industrial countries costs \$500 to \$1,000 per cubic meter, compared with 50 cents per cubic meter for California’s high-quality tap water.”

“Social injustice remains a big concern in terms of bottled water consumption. People who desperately need a better supply of drinking water are usually not able to afford the bottled version.”

“The environmental impacts of bottled water also need to be considered. Excessive withdrawal of natu-

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ral mineral water or spring water to produce bottled water has threatened local streams and groundwater aquifers. And producing, bottling, packaging, storing, and shipping bottled water uses significant amounts of energy. In addition, millions of tons of oil derived plastics are used to make the water bottles.” [note 5]

What Individuals and Congregations Can Do

Reduce water consumption. Most municipal water supplies come either from wells, or a combination of wells and surface water. Therefore, anything that reduces your water consumption, reduces demand for groundwater. You will find a multitude of ideas for conserving water at home and in the parish at these sites:

<http://www.groundwater.org/ta/ta.html>

Preserving water outdoors: <http://www.wateruseitwisely.com/outdoor/index.shtml>

A family water use audit: <http://www.wateruseitwisely.com/familywater/index.shtml>

Protect groundwater from contamination. Use low phosphate detergents. By now most of the consumer brands are low phosphate, but not all. If you change the oil in your car, lawn mower or snow blower, make sure you capture all the used oil and dispose of it properly. Used motor oil is one of the most common non-point source contaminants. Auto parts stores and repair shops can take your used oil.

Use fertilizers and pesticides sparingly if at all. Apply when you’re sure they’ll stay where needed and won’t wash into the crick or storm drain. If you have a septic system, make sure it is working properly and not leaking except into the septic field.

Recharge the aquifer. Rainwater that soaks into the ground rather than running off recharges the aquifer below. Every little bit helps. Try to limit runoff from impermeable surfaces like roofs and driveways and keep as much permeable surface as possible.

Lawns and gardens are naturally permeable and allow rainwater to soak into the earth. Permeable surfaces are available for walkway, patios, and even driveways. Be sure you check these out if you are adding or replacing hard surfaces on your property. Capture runoff from impermeable surfaces and channel it onto the lawn or into a rain garden.

You will find many more ideas at: <http://www.raingardens.org>

Educational Activities

- ☐ Tell the story of Moses and the Waters of Meribah. Numbers 20:1-11
- ☐ Discuss the many ways fresh water benefits us. See Categories of Water use above.
- ☐ Bring in a pitcher type home water filter. Pass some dirty water through it. Talk about how soil and rock provide natural filtering of dirty water, so that groundwater is usually clear and safe to drink. The ground under us is not a solid as it seems. It contains within it vast quantities of water called aquifers. The ground acts as a huge storage area for fresh water.
- ☐ Fill a clear disposable container with sand, gravel, or glass beads. Then add water but not quite to the level of the sand. Ask: How could the water be retrieved for use? Explore different options.
 - Dig a hole and use a ladle or spoon.
 - Dig a narrow hole and use the pump or syringe.
 - Other ideas?
 - Poke a hole in the side below the waterline (place in a pan or something first).

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- Put dry soil into a clear container, pour in water to see how it soaks into the soil.
- Bring a pump, (a big cooking syringe could be used). Pump water up from a lower to a higher location. Talk about the work involved. Remember that many people still have to do it with buckets. Haul gallon jugs of water from the basement to an upper level to fill one of the large coffee pots. Imagine five gallon jugs and carrying a mile or more. Talk about projects to build wells in poor areas. Good material for this is found at <http://thewaterproject.org/>
- Show how water runs off or is captured by different surfaces. Set up a hard surface with a slight slope in a large dishpan or baking pan. Using a sprinkling can or kids' fingers, sprinkle water and watch what happens. Now put one layer of cloth over the surface and repeat. Put several layers or a very thick layer of cloth and repeat. Discuss the children's observations. Relate these to real world conditions: Hard surfaces are parking lots, roofs and roads, also hard packed dirt and rock. Thin layer is like a thin groundcover over rock or clay. Cultivated land is often like this. It has some holding capacity, but not that much. Runoff is still a big problem. Thick layer is like natural grassland or forest.

Reference material

The following bibliography was created from searches using Pro-Quest through the Hennepin County Library system, from my home. Using the exact titles, you may be able to find these articles directly with Google.

All the articles are available in full text online. There is no charge to you for accessing these resources. The library system subscribes to the database.

In order to access them, however, you must log in through Hennepin County Libraries website. Under research tools find Pro-Quest and click it. At that point you will be prompted for your library card number. Enter that and you're in. The process is easy and very much worth learning. It allows you to get good information without all the other junk that comes up on general internet searches.

Dakota County Libraries do not appear to have Pro-Quest, but they have EBSCO Academic Search Premier, which is very similar.

Greater Minnesota folk, I don't know how it will work in your area, but it should be possible. If nothing else, most library systems in the state have sharing agreements and you can probably get a code for Hennepin County.

For further study

David Olinger and Chuck Plunkett Denver Post Staff Writers LAST OF FOUR PARTS "LIQUID ASSETS | Turning water into gold Law makes, breaks men A 2003 state Supreme Court decision effectively transfers wealth, reversing winners and losers by honoring the oldest water claims :[Final Edition]." Denver Post, November 23, 2005, <http://www.proquest.com/> (accessed January 19, 2008).

Eloise Kendy "The false promise of sustainable pumping rates." Ground Water 41, no. 1 (January 1, 2003): 2-4. <http://www.proquest.com/> (accessed January 19, 2008).

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End Notes:

- 1- Wikipedia contributors, "Water," Wikipedia, The Free Encyclopedia, <http://en.wikipedia.org/w/index.php?title=Water&oldid=185150524> (accessed January 21, 2008)
- 2- Categories of Water use: <http://www.waterencyclopedia.com/Tw-Z/Uses-of-Water.html>
- 3- NRSV excerpts: New Revised Standard Version Bible, copyright 1989 by the Division of Christian Education of the National Council of the Church of Christ in the USA, and used by permission.
- 4- "Groundwater Overdraft Problem Persists," *Vital Signs* 2006-2007 p. 104-105 (We have asked for permission to post this entire article on our site or get a free link to it, but permission is not yet received.)
- 5- *Vital Signs* 2007-2008 p. 102-103. (We have asked for permission to post this article on our site or get a free link to it, but permission is not yet received.)

To contact MEESC, visit their website (www.env-steward.com/info/members.htm), call the Rev Tom Harries (contact information in the *Diocesan Journal*), or send a note to:

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