State Board of Examining Water Well Drilling Contractors and Pump Installation Contractors

October, 2017

Wyoming Water Well Contractor's Newsletter

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State Board of Examining Water Well Drilling Contractors and Water Well Pump Installation Contractors

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NEWS FROM THE DIRECTOR'S DESK

Last week I was very lucky to be able to spend a few days in Sheridan to assist the State Engineer's Office in providing training to real estate agents on how to determine if a water right exists for a piece of property, the importance of completion of a well and the importance of using a licensed water well contractor. This gave me the opportunity to stop by the Board of Control Office in Sheridan and visit with Dave Schroeder, Water Division II, Superintendent, Deb Reed, Secretary, and John Mumm, Lead Hydrographer. While visiting with Deb Reed, I asked if she would mind if I were to share an article she had written for the Wyoming State Engineer's Office Newsletter on Water Dowsing. This subject has been controversial for hundreds, if not thousands, of years. There is no scientific reason why dowsing should work. Yet, it apparently works well enough and reliably enough to keep the practice alive. It would be interesting to know how many people use dowsing to determine the location of a well and their rate of success. However, we'll save that discussion for another day. Have a great and prosperous October!

Water Dowsing by Deb Reed,

Board of Control, Water Division II Office

Some days it seems like our office phone number should be 1-800-wrong-number. We've gotten calls for information on everything from, "What size should a handicap bathroom be?" to "How do I report overcharges on my water bill?" The other day I got a call asking if I knew of a local water witch and I thought this might be a good topic for the newsletter.

Palms-up is the standard way to hold a dowsing stick.

Divination (sometimes referred to as Witching, Doodlebugging, or Dowsing) is an attempt to locate hidden water wells, underground streams, oil reserves, lost septic tanks and leach fields, caves, utility lines, water and gas pipes, buried metals, ores, minerals, gemstones, people, pets, or missing objects. For the sake of this article, we'll stick with water.

Water dowsers use a divining rod. The most common being a Y-shaped branch cut from a witch-hazel, willow, or peach tree, usually 12 to 24 inches in length.

A piece of grapevine or any flexible rod, branch or wire works for some.

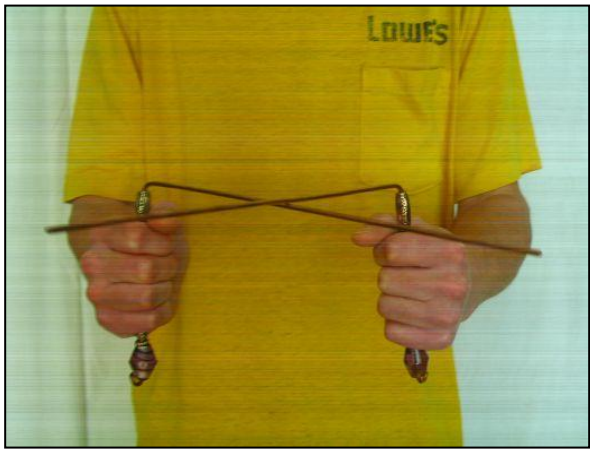
The dowser holds the Y-shaped rod with one short end of the Y in each hand and the long end of the Y pointing forward. Exercising a slight outward pull on the forks of the Y to keep the end under tension, the dowser steadily walks over the area in a grid pattern, carefully covering the entire area to be searched. When the dowser passes over or near water, the rod points down, showing the spot.

Using this method some dowsers claim that they can determine not only where the water will be found, but also its depth, as indicated by the strength of the downward pull on the tip of the Y-rod, or the speed at which it dipped when they approached the area.

Some dowsers prefer to use a simple pair of L-shaped rods. These may be made of metal, and generally have loosely fitted wooden or cardboard tube handles which allow the long arms of the rods to spin loosely when the handles are tightly gripped. Professional dowsers often prefer their L- rods to be made of brass or copper.

The dowser holds one rod in each hand, with the short part of the L held in the hand and the long part of the L pointing forward. Walking the area in a regular grid, the dowser observes the rods. If they turn to the right, the dowser walks to the right. If they turn to the left, the dowser walks to the left. When the dowser passes over or near water, the two rods cross and the dowser marks the spot. The area may be walked several times, confirming the marked spot until the dowser is satisfied that the L-rods are accurate.

Does dowsing really work? There are numerous scientific studies on dowsing with results anywhere from "astonishing" to "a little better than a good guess." I watched two people dowse for water in the same area by a spring. The rods crossed for one, but did not move for the other. It truly is up to the individual and what they believe and experience with dowsing.



CPC Requirements

All license holders renewing their license are required to have completed eighteen (18) CPC Units. Nine (9) CPC Units directly pertaining to their license.

TEST YOUR KNOWLEDGE *answers on Page 3*

1. It is unlawful for any person to construct, alter or rehabilitate a water well or install pumping equipment in a water well without a license unless the activity is exempted from the licensing requirements? True or False?
2. Pitless adapters DO NOT have to be water tight or prevent contamination of the ground water resources and any potable water. True or False?
3. According to the current Wyoming State Engineer's Office Water Well Minimum Construction Standards, all wells are required to have an annular space of at least _____inch(es) to a depth of at least _____feet.
4. Public Water Supply wells that penetrate more than one aquifer must be sealed off between aquifers. Which of the following is NOT an acceptable sealing material? (A) Cement (B) Cement grout (C) Bentonite (D) Native Soil

Calendar of Upcoming Events:

WWWA Board Meeting	**Casper, WY**	**October 13, 2017**
WWQ & PCA 47th Annual Conference	Casper, WY	October 23, 2017
2017 Groundwater Foundation, National Conference	Boise, ID	October 24-26, 2017
NGWA Summit	Nashville, TN	December 4-7, 2017
NGWA Groundwater Week	Nashville, TN	December 5-7, 2017
WWCB Board Meeting	**Casper, WY**	**January 24, 2018**
WWWA 2018 Convention	**Casper, WY**	**January 24-26, 2018**
AGWT Educational Videos and Books	Website	WWW.AGWT.org
ISWD International School of Well Drilling Online Courses	Website	welldrillingschool.com
NGWA Introduction to Groundwater Resources (#1012)	Website	Online self-paced course
NGWA Selection and Operation of Meters for Safe and Successful Electrical Troubleshooting for Water Well Pump Systems (#7132-1)	Website	Online self-paced course
TLC Technical Learning College	Website	Self-paced courses

WWWA – Wyoming Water Well Association

NDA – National Drilling Association

NGWA – National Ground Water Association

NWDA – Nebraska Well Drillers Association

CWWCA – Colorado Water Well Contractors Association

WARWS – Wyoming Association of Rural Water Systems

WWA- Wyoming Water Association

WWQ & PCA – Wyoming Water Quality & Pollution Control Association

WWWCB – Wyoming Water Well Contractors Licensing Board

BIDP – Baroid Industrial Drilling Products

AGWT – American Ground Water Trust

SEDC – Shallow Exploration Drillers Clinic

ISWD – International School of Well Drilling
www.welldrillingschool.com

CPS - CPS Distributors

Goulds - Goulds Water Technology Factory School WebEx Training

Technical Learning College
www.abctlc.com

For continuing education opportunities please refer to each respective association's website for additional information.

Answers to Test Your Knowledge from page 2

1. True
2. False
3. 2, 20
4. (D) Native Soil

Groundwater Use for American Agribusiness

07-27-2016

U.S. Agricultural Irrigation with Groundwater Summary

Groundwater withdrawals (mgd).....49,500[1]
Percentage of total groundwater.....65.1%[2]
Percentage of total irrigation.....43%[3]
Estimated value of installed well/pump infrastructure.....$7.6 billion[4]
Farms using groundwater.....121,000[5]
Number of irrigation wells used.....476,000[6]
(mgd = million gallons per day)

Major U.S. Crops by Acres Irrigated by Groundwater[7, 8]

Corn for grain or seed

Number of U.S. farms using groundwater for this crop[9].....31,048
Number of U.S. acres irrigated for this crop using groundwater[10].....11,932,951
Average 2013 U.S. yield per acre[11].....158.1 bushels
Average 2013 U.S. price per crop output unit.....$4.50 per bushel
Potential estimated economic value of this crop: groundwater proportion (marketing year 2013—U.S. dollars)[12].....$8,489,697,989
Typical global average of U.S. gallons of water necessary to produce 1 pound.....108.07[13, 14]
Total estimated water used annually in the U.S. to grow this proportionate value of crop if groundwater was the only water source.....11,417,655,216,972 gallons
(11.42 trillion gallons per year)

Soybeans for beans

Number of U.S. farms using groundwater for this crop[9].....20,080
Number of U.S. acres irrigated for this crop using groundwater[10].....6,858,900
Average 2013 U.S. yield per acre[11].....44.0 bushels
Average 2013 U.S. price per crop output unit.....$12.70 per bushel
Potential estimated economic value of this crop: groundwater proportion (marketing year 2013—U.S. dollars)[12].....$3,832,753,320
Typical global average of U.S. gallons of water necessary to produce 1 pound.....216.14[13]
Total estimated water used annually in the U.S. to grow this proportionate value of crop if groundwater was the only water source.....3,913,772,292,936 gallons
(3.91 trillion gallons per year)

[1] U.S. Geological Survey, October 2009 report on estimated 2005 water use.
[2] *Ibid.*
[3] *Ibid.*
[4] This is an estimated number calculated by multiplying the number of existing irrigation wells by $16,000, the median U.S. dollar value of typical final costs to the customer in 2015. The value was calculated by responses from U.S. water well contractors to a *Water Well Journal* survey conducted by Industry Insights, Inc. in 2016. Both installed and new irrigation wells vary in final cost—some being less than the median, some being more. Our valuation is only an estimate.
[5] 2013 *Farm & Ranch Irrigation Survey*. U.S. Department of Agriculture and U.S. Bureau of Census, Census of Agriculture. Found at: https://www.agcensus.usda.gov/Publications/2012/Online_Resources/Farm_and_Ranch_Irrigation_Survey/.
[6] *Ibid.*
[7] Selected crops only. Other crops are also groundwater irrigated, at least in part.
[8] 2013 *Farm & Ranch Irrigation Survey*. U.S. Department of Agriculture and U.S. Bureau of Census, Census of Agriculture. Found at: https://www.agcensus.usda.gov/Publications/2012/Online_Resources/Farm_and_Ranch_Irrigation_Survey/.
[9] *Ibid.*
[10] *Ibid.*
[11] Crop Production: 2015 Summary [2013 data], January 2016. U.S. Department of Agriculture, National Agricultural Statistics Service. ISSN 1057-7823.
[12] Crop Values: 2013 Summary, February 2014. U.S. Department of Agriculture, National Agricultural Statistics Service. ISSN 1949-0372.
[13] http://www.waterfootprint.org/?page=files/productgallery&product (retrieved August 31, 2010).
[14] Calculated by converting liters to U.S. gallons, converting 1 kilogram to 2.2 pounds, dividing gallons by 2.2.
[15] http://www.caes.uga.edu/departments/bae/extension/handbook/documents/Density%20of%20Agricultural%20Products.pdf.
[16] https://www.unc.edu/~rowlett/units/scales/bushels.html.

Groundwater Use for American Agribusiness

Wheat for grain and seed

Number of U.S. farms using groundwater for this crop[9] 8,296
Number of U.S. acres irrigated for this crop using groundwater[10] 2,176,732
Average 2013 U.S. yield per acre[11] ..... 47.1 bushels
Average 2013 U.S. price per crop output unit ..... $6.80 per bushel
Potential estimated economic value of this crop: groundwater proportion (marketing year 2013—U.S. dollars)[12] $697,163,725
Typical global average of U.S. gallons of water necessary to produce 1 pound ..... 162.11[13]
Total estimated water used annually in the U.S. to grow this proportionate value of crop if groundwater was the only water source ..... 997,235,295,072 gallons
(0.997 trillion gallons per year)

All cotton

Number of U.S. farms using groundwater for this crop[9] 5,856
Number of U.S. acres irrigated for this crop using groundwater[10] 2,558,510
Average 2013 U.S. yield per acre[11] ..... 25.6 bushels
Average 2013 U.S. price per crop output unit ..... $0.821 per pound
Potential estimated economic value of this crop: groundwater proportion (marketing year 2013—U.S. dollars)[12] $1,724,540,639
Typical global average of U.S. gallons of water necessary to produce 1 pound ..... 324.21[13]
Total estimated water used annually in the U.S. to grow this proportionate value of crop if groundwater was the only water source ..... 679,521,916,600 gallons
(0.68 trillion gallons per year)

Rice

Number of U.S. farms using groundwater for this crop[9] 3,529
Number of U.S. acres irrigated for this crop using groundwater[10] 1,843,682
Average 2013 U.S. yield per acre[11] ..... 170.97 bushels
Average 2013 U.S. price per crop output unit ..... $0.16 per pound
Potential estimated economic value of this crop: groundwater proportion (marketing year 2013—U.S. dollars)[12] $2,312,202,157
Typical global average of U.S. gallons of water necessary to produce 1 pound (avoirdupois) ..... 360.24[13]
Total estimated water used annually in the U.S. to grow this proportionate value of crop if groundwater was the only water source ..... 5,109,876,161,513 gallons
(5.1 trillion gallons per year)

	Pounds per bushel[15, 16]
Corn	56
Soybeans	60
Wheat	60
Cotton	32
Rice	45

NGWA

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