Costs Related to Elevated Nitrates in Groundwater

Reverse Osmosis

One under sink reverse osmosis unit costs between $200 and $600

Whole house purification units cost between $2,300 and $2,800

Commerciale systems are as high as $6,000

Filters must be replaced as often as every month and as infrequently as every year. Filters cost between $9 for a single filter and $180 for a system.

Under sink systems can be rented for as little as $10 per month

Source:

APEC Water – http://www.freedrinkingwater.com/parts/

Yakima Culligan – http://culliganpacific.com/yakima_wa

Well Drilling

Drilling costs begin at $40 per foot for a 6" casing and 6" pipe

$400 for seal and ecology shield

$200 for permit

Other costs may be added depending on soil conditions

An 8" casing with a 6" pipe costs $50 per foot

An 8" casing with an 8" pipe costs $60 to $65 per foot

Depth	6” casing & 6” pipe	8” casing & 8” pipe	8” casing & 8 “ pipe
50	$2,600	$3,100	$3,600
100	$4,600	$5,600	$6,600
200	$8,600	$10,600	$12,600
300	$12,600	$15,600	$18,600
400	$16,600	$20,600	$24,600
500	$20,600	$25,600	$30,000
1,000	$40,600	$50,600	$60,600
2,000	$80,600	$100,600	$120,600

Source:

Apple Valley Well Drilling

Families

Costs include: Purchase of bottled water, purchasing and maintaining reverse osmosis systems, testing well water, drilling new wells, and health related costs.

I. Consider the budget for a family of four with an annual income of $36,000 – a monthly income of $3,000. This equates to both parents working 40 hours per week for $10/hr.

Here is a hypothetical household budget:

Cost of Bottled Water at $1.20 per gallon

Calculate one gallon of water per person per day for drinking & cooking = $4.80 per day or $145 per month

Average property tax including school levies for Lower Yakima Valley cities = 6.797%

Average county property tax including fire protection and state school levy = 7.097%

Estimate an $80,000 mortgage with payments of $400 per month

Monthly Expenses

Income tax $ 0

Sales tax = 8% of non-food purchases

Social Security = 6.2% of gross income	186.00
Car payments	250.00
Car Insurance	125.00
Health Insurance	120.00
Out of Pocket Health Costs	150.00
Gasoline	200.00
Electricity	100.00
Telephone	80.00
Home Heating	200.00
Food at $30 per day	900.00
Clothing	
Car Repairs	
Home Repairs	
Church	
Computer Access	
School Supplies	
Child Care	
Bottled Water	145.00
Total	$3,322.67

This family has to find at least an extra $322.67 every month to meet their budget. Bottled water is 4.4% of their monthly income.

II. Consider the budget for a family of four with an annual income of $24,300 - the federal poverty level, a monthly income of $2,000. This equates to one parent working forty hours a week for $12.50 per hour

Monthly Expenses

Income tax	$ 0
Sales tax = 8% of non-food purchases	
Social Security = 6.2% of gross income	125.00
Rent	700.00
Health Insurance – eligible for low cost or free health insurance under ACA	
Electricity	100.00
Telephone	80.00
Home Heating	200.00
Food at $30 per day	900.00
Clothing	
Home Repairs	
Church	
Computer Access	
School Supplies	
Child Care	
Bottled Water	145.00
Total	$2,250.00

This family, without a car, must find an extra $250 per month to meet their budget. Bottled water is 6.4% of their monthly income.

Costs if 2,500 people in the Lower Yakima Valley buy bottled water due to elevated nitrates in their wells, calculated at $1.20 per person per day = $1,095,000 per year.

Sources:

Families USA (2016) Federal Poverty Guidelines. Available at http://familiesusa.org/product/federal-poverty-guidelines

Yakima County Development Association (2009) Yakima County Profile. Available at http://www.yakimacounty.us/DocumentCenter/View/1579

Yakima County – 2016 Tax Booklet at http://www.yakimacounty.us/DocumentCenter/View/9169

2015 Yakima County Community Indicators report – United Way https://www.uwcw.org/yc-life.

Tax Payers

New wells for Outlook School - $48,000

New well for the City of Mabton - $1.8 million

Since 2001 the City of Grandview has submitted 1040 water samples from their municipal wells in order to adequately monitor elevated nitrates. At a cost of $50 per sample this equates to $52,000 over a fifteen year period or about $3,500 per year. Grandview must blend water from high nitrate wells with safer water from other wells.

Costs for the Lower Yakima Valley GWMA $2.3 million

Costs for the WA State Dairy Nutrient Management Program $0.6 million annually

Statewide training for dairies on how to safely apply manures to crops $575,000 in 2016-2017.

South Yakima Conservation District $240,000 annually for dairy nutrient management

SYCD Grants to individual dairies for technological updates $60,000 per year

Ongoing research to assess the health effects from elevated levels of nitrate in drinking water. For example, *Dose-Response of Nitrate and Other Methemoglobin Inducers on*

Methemoglobin Levels of Infants, a 2009 study conducted in south central Washington at a cost of $594,000

Tax payer contribution to dairy digester construction

Tax payer contribution to construction of natural gas pipeline for dairies in Yakima County $1.5 million

GWMA proposed funding for farmer education regarding nitrate leaching to groundwater - Irrigated Ag Work Group, February 21, 2017

Funding to continue groundwater testing after the GWMA project ends in 2017 – Estimated at roughly $300,000 per year during Data Work Group meeting on February 22, 2017

Costs for the EPA study

Indirect costs to tax payers:

Providing safe drinking water for impacted residents – For example $350,000 for the Yakima Nitrate Treatment Pilot Program

NRCS loans and grants

USDA dairy program payments approximately $1.3 million per year for Yakima County

Ongoing research at approximately $500,000 for each study

Sources:

City of Mabton at http://www.cityofmabton.com/economicdevelopment.html

Environmental Working Group Farm Subsidies data base at https://farm.ewg.org/regionsummary.php?fips=53000&regionname=Washington

WA State Dept. of Health – Office of Drinking Water at https://fortress.wa.gov/doh/eh/portal/odw/si/ListWaterQuality.aspx

WA State Dept. of Health Dose-Response of Nitrate and Other Methemoglobin Inducers on Methemoglobin Levels of Infants at https://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/display.highlight/abstract/5379/report/F

WSDA – Implementation of Nutrient Management Training Program for Farmers, Report to the Legislature at

http://app.leg.wa.gov/ReportsToTheLegislature/Home/GetPDF?fileName=533-DNMPReportToLegJune2016_e9a85fda-7303-4899-a2fb-c30aea1728df.pdf

GWAC Participation

Bureaucracy:

WA State salaries for staff who participate in the GWMA range from $55,000 to $96,000 per year, or $3,500 per month to $8,000 per month, or $175 per day to $400 per day

The average salary for WA State employees who participate in the GWMA is $73,600 or around $6,000 per month, or $300 per day or $37.50 per hour

Costs for a Meeting of the GWAC

Bureaucracy from out of town – approximately 4 people at a full day's pay	$1,200
Local bureaucracy – approximately 9 people at half a day's pay	1,350
Mileage for two cars from Olympia to Sunnyside @ $.54/mi times 380 miles	410
Two meals for 4 people at $15 per meal	120
Citizens and local advocacy groups – approximately 14 at a half day's pay	2,100
Total per meeting	$5,180
Six meetings per year	$31,080

Work Group Meetings

Cost per local participant – half a day = $150

Cost per out of town participant – one day = $300

Mileage for out of town participant = $205

Meals for out of town participant = $30

There are six active work groups with average attendance of five local people and one out of town member

Local participants	$750
Out of town participant	300
Mileage	205
Meals	30
Total per meeting	$1,285
Six groups with an average of 10 meetings per year	$77,100

Time spent by citizens and bureaucrats studying the data – 10 hours per month x 23 GWAC members @ $37.50 per hour = $8,625 per month

Twelve months per year x $8,625	$103,500

Total unbudgeted costs for the GWMA per year	$211,680

Growers & Producers

Costs for Soil Testing – Moisture, Nitrate-N, Ammonium – N, TKN at $40.60 per sample.

Costs for Nitrate Testing					
Lab Tests				$40.60	each sample
Labor, equipment, transportation				$50.00	
Total				$90.60	per sample
Sampling once a year					

Acreage		Every 40 acres		Every 80 acres	
40		$ 90.60		$ 45.30	
80		$ 181.20		$ 90.60	
120		$ 271.80		$ 135.90	
160		$ 362.40		$ 181.20	
200		$ 453.00		$ 226.50	
240		$ 543.60		$ 271.80	
280		$ 634.20		$ 317.10	
320		$ 724.80		$ 362.40	
360		$ 815.40		$ 407.70	
400		$ 906.00		$ 453.00	
440		$ 996.60		$ 498.30	
480		$ 1,087.20		$ 543.60	
520		$ 1,177.80		$ 588.90	
560		$ 1,268.40		$ 634.20	
600		$ 1,359.00		$ 679.50	
640		$ 1,449.60		$ 724.80	
680		$ 1,540.20		$ 770.10	
720		$ 1,630.80		$ 815.40	
760		$ 1,721.40		$ 860.70	
800		$ 1,812.00		$ 906.00	
Sampling Twice a Year					
Acreage		Every 40 acres		Every 80 acres	
40		$ 181.20		$ 90.60	
80		$ 362.40		$ 181.20	
120		$ 543.60		$ 271.80	
160		$ 724.80		$ 362.40	
200		$ 906.00		$ 453.00	
240		$ 1,087.20		$ 543.60	
280		$ 1,268.40		$ 634.20	
320		$ 1,449.60		$ 724.80	
360		$ 1,630.80		$ 815.40	
400		$ 1,812.00		$ 906.00	
440		$ 1,993.20		$ 996.60	
480		$ 2,174.40		$ 1,087.20	

520		$ 2,355.60		$ 1,177.80	
560		$ 2,536.80		$ 1,268.40	
600		$ 2,718.00		$ 1,359.00	
640		$ 2,899.20		$ 1,449.60	
680		$ 3,080.40		$ 1,540.20	
720		$ 3,261.60		$ 1,630.80	
760		$ 3,442.80		$ 1,721.40	
800		$ 3,624.00		$ 1,812.00	

There are about 94,000 irrigated acres in the Lower Yakima Valley. This equates to 1,175 80 acre fields. **At a cost of $90.60 per field this equates to $ 101,925 per year for once a year testing and $ 203,850 for twice a year testing**. Costs are higher if growers test for phosphorous, potassium and other minerals.

Moisture Sensors cost approximately $1,500 each.

Computer software ranges from?

Record keeping?

Time spent learning to use technology?

Costs for lining manure lagoons?

Costs for manure solids separation equipment?

Costs for hiring an agronomist at ___ per hour?

Health

Abstract: Human alteration of the nitrogen cycle has resulted in steadily accumulating nitrate in our water resources. The U.S. maximum contaminant level and World Health Organization guidelines for nitrate in drinking water were promulgated to protect infants from developing methemoglobinemia, an acute condition. Some scientists have recently suggested that the regulatory limit for nitrate is overly conservative; however, they have not thoroughly considered chronic health outcomes. In August 2004, a symposium on drinking-water nitrate and health was held at the International Society for Environmental Epidemiology meeting to evaluate nitrate exposures and associated health effects in relation to the current regulatory limit. The contribution of drinking water nitrate toward

endogenous formation of N-nitroso compounds was evaluated with a focus toward identifying subpopulations with increased rates of nitrosation. Adverse health effects may be the result of a complex interaction of the amount of nitrate ingested, the concomitant ingestion of nitrosation cofactors and precursors, and specific medical conditions that increase nitrosation.

Workshop participants concluded that **more experimental studies are needed** and that a particularly fruitful approach may be to conduct epidemiologic studies among susceptible subgroups with increased endogenous nitrosation. **The few epidemiologic studies that have evaluated intake of nitrosation precursors and/or nitrosation inhibitors have observed elevated risks for colon cancer and neural tube defects associated with drinking-water nitrate concentrations below the regulatory limit. The role of drinking-water nitrate exposure as a risk factor for specific cancers, reproductive outcomes, and other chronic health effects must be studied more thoroughly before changes to the regulatory level for nitrate in drinking water can be considered.**

Ward, M. H., DeKok, T. M., Levallois, P., Brender, J., Gulis, G., Nolan, B. T., & VanDerslice, J. (2005). Workgroup report: Drinking-water nitrate and health-recent findings and research needs. *Environmental health perspectives*, 1607-1614.
https://www.researchgate.net/profile/Jean_Brender2/publication/7502872_Drinking_Water_Nitrate_and_Health_-_Recent_Findings_and_Research_Needs/links/00b7d51acaa782b661000000.pdf

Costs for Nitrogen Loading Assessment

WA Dept. of Health Peer Review – About two weeks of staff time

WA Dept. of Ecology –

WA State Dept. of Agriculture –

Yakima County -

Litigation

Millions of dollars

Revised: February 23, 2017