PROTECTING GROUND WATER FOR HEALTH pdf

1: Groundwater Protection â€“ www.enganchecubano.com

Protecting ground water for health. www.enganchecubano.come water 2 Water pollution - prevention and control www.enganchecubano.com supply www.enganchecubano.com management - methods www.enganchecubano.com Health Organization.

Geological Survey reports that during , about 79 percent of all Minnesotans obtained their domestic water supplies from groundwater and nearly million gallons of groundwater were withdrawn every day. Groundwater sources of drinking water may be private private wells that serve individual homes or public serving larger numbers of individuals. Safe Drinking Water The homeowner is responsible for the safety of the drinking water from a private well. Properly constructed and maintained water wells can provide many years of trouble-free service, but wells will eventually deteriorate or become damaged, and allow surface contaminants to enter the water. The Minnesota Department of Health MDH has helpful information for homeowners about assuring that water from private wells is safe and that wells are properly sealed to protect ground water resources. Public water systems are regulated by MDH and are classified as either community or noncommunity systems. Community public water systems, such as municipalities and manufactured home parks, serve consumers in a residential setting. Noncommunity public water systems are facilities such as schools, factories, restaurants, resorts, and churches that are served by their own supply of water usually a well. Currently, there are almost 1, community water supply systems and over 7, noncommunity public water systems in Minnesota. Section staff monitor drinking water quality, perform on-site inspections of public water systems, and review plans for water system construction. For more information, read the descriptions below or see Drinking Water Protection. Sanitary Surveys A sanitary survey is an on-site review of the adequacy of the water source, facilities, equipment, operation and maintenance of a public water system for producing and distributing safe drinking water. Sanitary surveys of public water systems are conducted by MDH at a frequency of once every 18 months for community public water systems and once every three years for noncommunity public water systems. Testing for Contaminants Water from public water systems is required to be sampled and analyzed for a variety of contaminants. The number of contaminants that must be tested depends on the type of public water system. Community water systems are tested for contaminants such as bacteria, nitrate, pesticides, solvents, and metals. All noncommunity water systems are tested at least annually for the total coliform bacteria and nitrate. Noncommunity water systems that serve the same people every day such as schools and factories are also tested for contaminants such as pesticides, solvents, and metals. The Minnesota Department of Health keeps detailed information on testing requirements and test results. Evaluating Health Risks The health risks from contaminants in drinking water are evaluated by the U. Each agency makes public the health effects of the contaminants that have been found in groundwater. Each agency also makes public the concentrations or levels of concern for more than contaminants. These levels of concern are based on protecting human health and, in the case of the U. EPA, also take into account the feasibility of controlling contamination in drinking water. Under the Drinking Water Contaminants of Emerging Concern CEC program , MDH staff identify chemicals of emerging concern for evaluation and develop health-based guidance values for these chemicals when sufficient data are available. Go to Top Protecting Groundwater Programs in state and local government agencies are responsible for protecting groundwater from contamination so that drinking water supplies from water are safe for human consumption. The Minnesota Department of Health has many roles in this effort including protecting water, ensuring that drinking water from wells is tested and is safe, and recommending cleanup of contaminated sites. Other state agencies also have diverse and important roles in ensuring that the drinking water from wells is safe for human consumption. The Unit also helps public water systems in developing their Wellhead Protection Plans, which include strategies to prevent the pollution of the groundwater. For more information, see Source Water Protection. Properly Constructed and Sealed Wells The Well Management Section is responsible for developing and enforcing well drilling rules to prevent the spread of groundwater contamination. The Section is also responsible for a program for assuring that unused wells are properly sealed by licensed well contractors. The number is or Information may be forwarded to the Minnesota Pollution Control Agency for cleanup of contaminated sites such as fertilizer or fuel that can affect surface and groundwater. Contamination incidents related to agriculture also may be investigated and cleaned up by the Minnesota Department of Agriculture. Geological Survey USGS is the leading Federal agency in Minnesota that collects and interprets water-resource data and information used by resource managers, planners, and the general public. To define the availability of water for public, irrigation, and industrial supplies, the USGS monitors stream flow, lake levels, and ground-water levels at many locations and has studied numerous aquifers in Minnesota. Typically, the studies describe the effects of present and future groundwater withdrawals on the levels and quality of groundwater and streams. The results of USGS water-quality studies provide water managers with essential information needed to make ground-water management decisions throughout Minnesota. For more, see U. Monitoring Quality Three Minnesota State Agencies â€" the Departments of Agriculture and Health and the Minnesota Pollution Control Agency â€" have developed a joint plan for conducting ground water quality monitoring on a statewide basis in Minnesota. Commissioners of the three agencies signed the monitoring agreement on February 18, Since then, studies of trends of contamination have been conducted Water monitoring programs of the MDA are designed to define long-term impacts of normal pesticide use on waters within the state. The monitoring focuses on specific groundwater sources aquifers beneath the central sand plain region as being particularly vulnerable in the state and twelve counties in this area are currently being monitored see Monitoring and Assessment of Agricultural Chemicals. More recently, the MDA has extended the regional monitoring program to other areas of the state. In addition, the MDA began sampling drinking water wells across the state statewide ambient drinking water evaluation program. These expanded monitoring programs are in the February 18, water quality monitoring agreement.

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2: Onsite Sewage & Water Services â€“ Chickahominy Health District

Protecting groundwater for health Overview For health professionals, it thus is a tool for access to environmental information needed for such a process and for professionals from other sectors, it gives a point of entry for understanding health aspects of groundwater management.

However, nanotechnology may also present unintended health risks or changes to the environment. It is presumed that some of these chemicals may present new, unexpected challenges to human health, and their safety should be evaluated prior to release. These cross-cutting issues are not yet understood well enough to inform the development of systems for measuring and tracking their impact. Further exploration is warranted. The environmental health landscape will continue to evolve and may present opportunities for additional research, analysis, and monitoring. Blood Lead Levels As of , there are approximately 4 million houses or buildings that have children living in them who are potentially being exposed to lead. Nearly half a million U. Since no safe blood lead level have been identified for children, any exposure should be taken seriously. However, since lead exposure often occurs with no obvious signs or symptoms, it often remains unrecognized. References 1 World Health Organization. Preventing disease through healthy environments. Status and trends through Impact of regional climate change on human health. Climate change, air quality, and human health. Am J Prev Med. Environmental health, from global to local. Biological interactions of carbon-based nanomaterials: From coronation to degradation. Health and the Built Environment: Am J Public Health.

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3: WHO | Protecting groundwater for health:

Protecting drinking-water resources is a key barrier in preventing health effects from pathogens and toxic chemicals. Effective action builds on cooperation amongst practitioners in many fields - drinking-water supply, health, environment, land-use planning, agriculture and many more.

Lead in Wells Purpose This page is intended to provide private well owners with information about private well water in Virginia. The mission of the Division is to protect public health and ground water quality. This is best achieved by implementing an onsite wastewater and private well program based on sound scientific, engineering, and public health principles. We also strive to maintain effective communication in the onsite and private well water community, and the division is using this website as one method to keep interested parties informed on new developments, regulations, and policy decisions. In 52 counties, the number of households using private wells is increasing faster than the number of households connecting to public water supply systems. Heaviest reliance on private water supply systems is outside urban centers in rural, non-agricultural areas, where new growth occurs beyond the extent of public water or sewer lines. Of the more than one million households in Virginia using private wells, 92 percent also use septic systems. We often take for granted that our homes have safe, reliable water for use in the kitchen, laundry, bathroom, and garden. Is the water safe to drink? Water supplied by a utility or municipality is regularly tested to make sure that it meets drinking standards. Testing once a year is a good idea. Homes with a well and public supply must never connect the two systems. If you use water conditioner equipment, it should be maintained and kept in good working order. Most wells do not require chemicals for treatment but the only way to know the quality of the water is by regular testing. The soil does an effective job of naturally cleansing harmful organisms from rainwater some of which will recharge drinking water aquifers. Deep ground water is more likely to be free from organisms than water from shallow wells because of longer travel times. Untreated surface water from a lake or river almost always contains bacteria and other organisms. Some threats to groundwater include: Individual behavior can impact ground water quality and consequently, private well water. One must always dispose of hazardous materials and chemicals in an appropriate and safe manner and never on your property which could impact the drinking water aquifer. Most landfills or transfer stations accommodate the safe recycling of hazardous materials such as paint, solvents, batteries, and cleaning products. Contaminants on the ground surface and in the soil may be picked up by rainfall and through infiltration and runoff affect the quality of groundwater. All Virginians should be concerned about groundwater protection and private well owners need to be vigilant about threats to their water supply. The National Ground Water Association recommends well owners test the water: More frequently than once a year if there is a change in the taste, odor, or appearance of the well water, or if a problem occurs such as a broken well caps or a new contamination source appears. If family members or houseguests have recurrent incidents of gastrointestinal illness. If an infant is living in the home. If you wish to monitor the efficiency and performance of home water treatment equipment. Please take advantage of this information to make an informed decision about your private well water.

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4: Private Well Water Information â€“ Environmental Health

However, bills that would protect groundwater still have to pass through the legislature. Right now the legislature is a huge roadblock that prevents the MDA from protecting groundwater and drinking water sources.

It is illegal in Idaho to cause or allow the release of a contaminant anything that does not occur naturally or naturally occurs only in very small quantities into the environment in a manner that it: Causes a ground water quality standard to be exceeded Injures a beneficial use of ground water Is not in accordance with a permit, consent order, or applicable best management practice, best available method, or best practical method One potential source of contamination of ground water is land application of treated wastewater spent or used water from a home, community, farm, or industry. To ensure ground water is protected, DEQ requires anyone wishing to land-apply treated wastewater to obtain a wastewater reuse permit. Septic systems can also contaminate ground water. This evaluation helps predict whether effluent from the treatment system will be diluted enough to prevent ground water contamination. Fortunately, preventing ground water contamination does not have to be. Properly dispose of hazardous materials. Most community wastewater treatment plants are not designed to treat hazardous substances. Thus, they can eventually be discharged into bodies of surface water and cause contamination. Landfills are generally not equipped to handle hazardous materials either. Once in the ground, these harmful substances can eventually contaminate the ground water. Dumping hazardous materials on the ground, where they can leach down into ground water or be carried by runoff from rainstorms into nearby surface waters, is harmful, too. The best alternative is to limit your use of products with hazardous materials as much as possible. Even better yet, use nonhazardous products instead. Some communities host hazardous waste disposal events or have hazardous waste disposal facilities. Take advantage of these options if available. Carefully use pesticides and fertilizers. Many pesticides and fertilizers contain hazardous chemicals that can travel through the soil and contaminate ground water. If you must use them, do so in moderation. Maintain your septic system. Your septic system discharges into a drainage field where the effluent undergoes some decomposition in the soil as it works its way down to the ground water. Have your system inspected and pumped out frequently to avoid allowing solid material to leave the tank and enter the drainage field. Also be cautious about what you put in your system. Some substances, like coffee grounds, cigarette butts, and sanitary items, do not break down easily in septic systems, and chemicals like paints, solvents, oil and pesticides will go from your septic system into the ground water.

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5: Protecting groundwater protects public health, the environment | Indiana Geological & Water Survey

Protecting Groundwater for Health Managing the Quality of Drinking-water Sources Edited by Oliver Schmoll, Guy Howard, John Chilton and Ingrid Chorus.

This localized degradation negatively impacts water quality and potentially threatens domestic water supplies, aquaculture, agriculture, mining, industrial, and other ground water beneficial uses. Nitrate is one of the contaminants responsible for this degradation and is one of the most widespread ground water contaminants in Idaho. Nitrate is a form of nitrogen, an element whose compounds are vital components of foods and fertilizers. It is an essential nutrient for plant growth. Nitrate comes from a variety of sources, such as plants and other organic matter that return nitrate to the soil as they decompose. Septic sewer systems, waste from animal feedlots, and nitrogen-based fertilizers also discharge nitrates to the environment. Nitrate that is not used by plants can build up in and move through the soil. Precipitation, irrigation, and sandy soils allow nitrate to move around and find its way into surface water and ground water. While nitrate is just one of the potential ground water contaminants in Idaho, more is known about nitrate in ground water in Idaho than other contaminants. In addition, the presence of nitrate is a good indicator of other potential water quality problems. Why is Nitrate in Ground Water a Concern? High levels of nitrate in drinking water are associated with adverse health effects. Health Effects of Nitrate People can be exposed to nitrate through food and water. In most populations, short-term exposure to even fairly large amounts of nitrate produces no immediate health effects. However, sensitive populations babies, people in poor health, and the elderly can be susceptible to problems from short-term nitrate exposure. Infants younger than six months of age are especially sensitive to nitrate poisoning, which may result in serious illness or death. Livestock, such as cattle and sheep, also can be poisoned by high levels of nitrate in their water. Testing For Nitrate Public water systems are required to sample for various contaminants, including nitrate, on a regular basis. The contact information for your local water system should appear on your water bill, or you can contact your DEQ regional office for that information. Nitrate sampling is not required for domestic or stock wells. However, DEQ recommends that owners test their wells for nitrate on a regular basis. To find out if your domestic or stock well water contains nitrate, have it tested by a laboratory certified for nitrate testing. Read more about recommended tests for private wells. It is particularly important to test for nitrate if you live in a nitrate priority area. What if Nitrate is Found in My Water? Pregnant women, nursing mothers, and other sensitive populations should also avoid drinking the water. Instead, use water from a source that has been tested and shown to be low in nitrate. Commercially bottled water is required to meet the nitrate standard. Do not boil high-nitrate water to treat it. Boiling actually concentrates the nitrate as the water evaporates away. Water softeners and filters also do not reduce nitrate contamination. Home water treatment units are not recommended for treating high-nitrate water that will be given to infants or other sensitive populations as there is no way to know when the treatment system may fail. This list focuses on nitrate and ranks the top 34 nitrate-degraded areas referred to as nitrate priority areas in the state based on the severity of the degradation; the rank of "1" indicates the most severely impacted area in the state. List of Top 34 Nitrate-Degraded Areas in Idaho The data used to rank the priority of the areas are updated on a continual basis. DEQ uses a specific nitrate priority ranking process as the basis for the ranking. Areas are ranked based on criteria such as population, existing water quality, water quality trends, and other factors. The process also takes into account impacts on beneficial uses other than water supply. Public water system well locations are not displayed for security reasons. Capture zones delineated for source water assessments are an optional layer that may be turned on when zooming into an area on the map. Interactive Mapping Application If you own a well and live in one of the nitrate priority areas, it is particularly important to test your well water on a regular basis. If your well is not in a nitrate priority area, this does not rule out the potential for nitrate contamination, so testing your well water is still recommended.

6: Protecting groundwater protects public health, the environment | Groundwater Protection Council

Protecting drinking-water resources is a key barrier in preventing health effects from pathogens and toxic chemicals. Effective action builds on cooperation amongst practitioners in many fields - drinking-water supply, health environment, land-use planning, agriculture and many more.

However, this has implications for control of public health risks as the management and maintenance of smaller supplies is often weaker than for larger, utility operated supplies Bartram, In rural areas of the USA, 96 per cent of domestic water comes from groundwater. In the United Kingdom, although the national average for groundwater usage is 28 per cent, the southern counties of England depend more heavily on groundwater than the northern counties, Wales and Scotland. In Africa and Asia, most of the largest cities use surface water, but many millions of people in rural areas and low-income peri-urban communities are dependent on groundwater. These populations are most vulnerable to waterborne disease. Pedley and Howard estimate that as much as 80 per cent of the drinking-water used by these communities is abstracted from groundwater sources. Where it is available, groundwater frequently has important advantages over surface water. It may be conveniently available close to where it is required, can be developed at comparatively low cost and in stages to keep pace with rising demand. Although small, simple surface water supplies can be achieved relatively cheaply and pumping groundwater from deep aquifers may create significant operating costs, overall the capital costs associated with groundwater development are usually lower than with large-scale surface water supplies. For the latter, large, short-term capital investments in storage reservoirs often produce large, step-wise increments in water availability and temporary excess capacity that is gradually overtaken by the continuing rising demand for water. An additional disadvantage in some circumstances is that surface water reservoirs may have multiple, sometimes conflicting functions â€" water supply, flood control, irrigation, hydroelectric power and recreation â€" and cannot always be operated for the optimum benefit of water supply. Furthermore, aquifers are often well protected by layers of soil and sediment, which effectively filter rainwater as it percolates though them, thus removing particles, pathogenic microorganisms and many chemical constituents. Therefore it is generally assumed to be a relatively safe drinking-water source. This highlights a key issue in the use of aquifers as drinking-water source, showing that particular attention is needed to ascertain whether the general assumption of groundwater being safe to drink is valid in individual settings. As discussed below, understanding the source-pathway-receptor relationship in any particular setting is critical to determine whether pollution will occur. Over-exploitation therefore readily occurs, bringing with it additional quality concerns. Nevertheless, it is readily contaminated and outbreaks of disease from contaminated groundwater sources are reported from countries at all levels of economic development. Some groundwaters naturally contain constituents of health concern: However, understanding the impact of groundwater on public health is often difficult and the interpretation of health data complex. This is made more difficult as many water supplies that use groundwater are small and outbreaks or background levels of disease are unlikely to be detected, especially in countries with limited health surveillance. Furthermore, in outbreaks of infectious disease, it is often not possible to identify the cause of the outbreak and many risk factors are typically involved. Throughout the world, there is evidence of contaminated groundwater leading to outbreaks of disease and contributing to background endemic disease in situations where groundwater sources used for drinking have become contaminated. However, diarrhoeal disease transmission is also commonly due to poor excreta disposal practices and the improvement of sanitation is a key intervention to reduce disease transmission Esrey et al. Furthermore, water that is of good quality at its source may be re-contaminated during withdrawal, transport and household storage. This may then require subsequent treatment and safe storage of water in the home Sobsey, Ensuring that water sources are microbially safe is important to reduce health burdens. However, a balance in investment must be maintained to ensure that other interventions, also important in reducing disease, are implemented. Diverting resources away from excreta disposal, improved hygiene practices in order to achieve very good quality water in sources may be counter-productive Esrey, Balancing investment decisions for public health gain from water supply and sanitation investment is complex and does not simply reflect current knowledge or lack of regarding health benefits, but also the demands and priorities of the population Briscoe, Groundwater is generally of good microbial quality, but may become rapidly contaminated if protective measures at the point of abstraction are not implemented and well maintained. Further problems are caused by the creation of pathways that shortcircuit the protective measures and natural layers offering greatest attenuation, for instance abandoned wells and leaking sewers. Pollution may also occur in areas of recharge, with persistent and mobile pollutants representing the principal risks. The control of the microbial quality of drinking-water should be the first priority in all countries, given the immediate and potentially devastating consequences of waterborne infectious disease WHO, b. However, in some settings the control of chemical quality of groundwater may also be a priority, particularly in response to locally important natural constituents such as fluoride and arsenic. Furthermore, hazardous industrial chemicals and pesticides which can accumulate over time may potentially render a source unusable. The scale, impact and the often lack of feasible clean-up technologies for some chemical contamination in groundwater means that they should receive require priority for preventative and remedial strategies. It is often a lower cost option than surface water as the treatment requirements are typically much lower. In many countries, groundwater is also more widely available for use in drinking-water supply. This may provide significant advantages to communities in obtaining affordable water supplies, which may have benefits in terms of promoting greater volumes of water used for hygiene and other purposes. The natural quality of groundwater also makes its use valued in industry, and it may provide environmental benefits through recharge of streams and rivers or for the growth of vegetation. These other benefits reinforce the need for its protection. The actions taken to protect and conserve groundwater will also create costs to society, through lost opportunity costs for productive uses of land and increased production costs caused by pollution containment and treatment requirements. When developing protection plans and strategies, the cost of implementing such measures should be taken into consideration, as well as the cost of not protecting groundwater, in order for balanced decisions to be made. These units are appropriate both for assessing pollution potential and for developing management approaches for protection and remediation. Excessive groundwater abstraction in relation to recharge will lead to depletion of the resource and competition between uses, e. Strong hydraulic gradients ensuing from abstraction can induce the formation of preferential flow paths, reducing the efficacy of attenuation processes, and thus lead to elevated concentrations of contaminants in groundwater. Furthermore, changes in groundwater levels induced by abstraction may change conditions in the subsurface environment substantially, e. Groundwater quantity issues may have substantial impacts on human health. Lack of a safe water supply affects disease incidence for instance by restricting options for personal and household hygiene. Competing demands for groundwater, often for irrigation and sometimes for industry, may lead to shortage of groundwater for domestic use. In such situations it is important to ensure allocation of sufficient groundwater reserves for potable and domestic use and health authorities often play an important role in this. This monograph largely focuses on water quality issues, as these are of direct relevance to the provision of safe drinking-water. Quantity issues are therefore addressed in the context of their impact on groundwater quality. This text is concerned with groundwater as a source of drinking-water supply. However, in many locations other uses, for example irrigation, account for the largest fraction of groundwater abstraction, and inter-sectoral collaboration may be needed to develop effective groundwater allocation schemes. The contribution of groundwater to the global incidence of waterborne disease cannot be assessed easily, as there are many competing transmission routes; confounding from socioeconomic and behavioural factors is typically high; definitions of outcome vary; and, exposure-risk relationships are often unclear Esrey et al. Many waterborne disease outbreaks could have been prevented by good understanding and management of groundwaters for health. Pathogen contamination has often been associated with simple deficiencies in sanitation but also with inadequate understanding of the processes of attenuation of disease agents in the subsurface. The most comprehensive reports of waterborne disease outbreaks come from two countries, the USA and the United Kingdom, and some indications of the role of groundwater in the infectious diarrhoeal disease burden can be estimated in these countries Craun, ; Hunter, ; Payment and Hunter, ; Craun et al. A further eight were reported in non-community supplies, which serve facilities such as schools, factories and restaurants. A detailed analysis of the incidence of waterborne disease in the USA was published in the mids by Craun , which is still relevant. In his summary of data from the period between and , Craun reports that untreated or inadequately treated groundwater was responsible for 51 per cent of all waterborne disease outbreaks and 40 per cent of all waterborne illness. A recent analysis of public health data in the USA showed little change to the epidemiology of disease outbreaks Craun et al. Between and , 58 per cent of all waterborne outbreaks were caused by contaminated groundwater systems, although this is in part is due to the higher number of water supplies using groundwater than those using surface water. In general it appears that waterborne outbreaks in the USA decreased after , with the introduction of more stringent monitoring and treatment requirements. They note that outbreaks were reported linked to drinking-water supplies during this period, the majority being linked to community year-round public service water supplies. The aetiology was either known or suspected in 89 per cent of the outbreaks and zoonotic agents caused outbreaks in community systems representing 38 per cent of outbreaks associated with these systems and 56 per cent of those where aetiology was identified. The data show that the majority of illnesses and deaths were caused by zoonotic agents in the reported waterborne outbreaks. The zoonotic agents of greatest importance were Giardia, Campylobacter, Cryptosporidium, Salmonella, and E. The majority of outbreaks caused by zoonotic bacteria 71 per cent and Cryptosporidium 53 per cent were reported in groundwater supplies. The use of contaminated, untreated or poorly treated groundwater was responsible for 49 per cent of outbreaks caused by Campylobacter, Salmonella, E. Groundwater that was contaminated, untreated or poorly treated contributed 18 per cent of all outbreaks caused by Giardia and Cryptosporidium. Laboratory investigations confirmed that adenovirus, Norwalk-like virus and group A and C rotaviruses were the principal causative agents. The source of the outbreak was thought to be a groundwater well situated on the embankment of a river polluted by sewage discharges. In an outbreak of acute gastrointestinal illness at Richmond Heights in Florida, USA was traced to a supply well that was continuously contaminated with sewage from a nearby septic tank Weissman et al. The main aetiological agent was thought to be Shigella sonnei. During the outbreak approximately cases were recorded from a population of Outbreaks of cryptosporidiosis have also been linked to groundwater sources, despite being usually regarded as a surface water problem. A large outbreak of cryptosporidiosis occurred in in Brush Creek, Texas, USA from the use of untreated groundwater drawn from the Edwards Plateau karst aquifer Bergmire-Sweat et al. There were 89 stool-confirmed cases and the estimated number of cases was between and This outbreak was associated with the consumption of water drawn from deep wells of over 30 m located more than m from Brush Creek. In , epidemiological investigations traced an outbreak of cryptosporidiosis in the United Kingdom to water abstracted from a deep chalk borehole. Three hundred and forty five confirmed cases were recorded by the investigation team, who claimed this to be the largest outbreak linked to groundwater to have been reported Willcocks et al. This incident has particular significance because the water used in the supply was drawn from a deep borehole and was filtered before distribution. In the outbreak of E. H7 and Campylobacter in Walkerton, Ontario in Canada in , the original source of pathogens appears to have derived from contaminated surface water entering into a surface water body directly linked to an abstraction borehole Health Canada, Although the series of events leading to the Groundwater and public health 11 outbreak indicate a failure in subsequent treatment and management of water quality, better protection of groundwater would have reduced the potential for such an outbreak. An outbreak of E. A total of people reported having diarrhoea after attending the fair and stool cultures from people yielded E. This outbreak resulted in hospitalization of 65 people, 11 children developed haemolytic syndrome and two people died. In developing countries evidence of the role of groundwater in causing disease outbreaks is more limited, although there have been numerous studies into the impact of drinking-water, sanitation and hygiene on diarrhoeal disease. In part the limited data on groundwater related outbreaks reflects the often limited capacity of local health surveillance systems to identify causal factors and because it is common that several factors may be implicated in the spread of disease. However, the limited data on outbreaks specifically linked to groundwater may also reflect that improved groundwater sources are generally of relatively good quality. Diarrhoeal disease related directly to drinking-water is most likely to result from consumption of poorly protected or unimproved groundwater sources, untreated or poorly treated surface water, contamination of distribution systems and recontamination of water during transport. Pokhrel and Viraraghavan in a review of diarrhoeal disease in Nepal in relation to water and sanitation, cite examples from South Asia where contamination of groundwater supplies has led to outbreaks of disease. A study of local populations in Kanpur, India recorded an overall incidence rate of waterborne disease of The communities in the study areas took water from shallow groundwater sources, analysis of which revealed that over 70 per cent of the wells were contaminated. Of the cases of waterborne disease investigated, the greatest proportion was of gastroenteritis, followed by dysentery. In addition to outbreaks, there is some evidence of contaminated groundwater contributing to background levels of endemic diarrhoeal disease.

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7: Environmental Health | Healthy People

Protecting groundwater protects public health, the environment An Artesian Well found in Allen County. The Indiana Geological Survey encourages the public to protect public health and the health of the environment by protecting groundwater on Protect Your Groundwater Day.

Please see DPOR regulations for more information. These sewage systems allow increased usability of valuable land resources while protecting ground water and public health, but incorporate complex designs that require routine maintenance to ensure they are functioning properly. They are also required to submit a copy of the Operations and Maintenance Manual provided by their designer to the local health department. AOSS that were installed prior to April 7, are subject to the performance standards in place at the time they were installed. The main requirements are that the owner maintains a relationship with a licensed Operator, has at least one service visit per year, and keeps a copy of the Operator maintenance log and AOSS manual. On December 7, , the Alternative Onsite Sewage System Regulations became effective and contain the performance requirements and horizontal setbacks that are necessary to protect public health for alternative onsite sewage systems AOSSs. The regulations also contain owner and operator responsibilities for operating and maintaining AOSSs. AOSS technologies that are newer and have not established performance histories that would grant them general approval status are required to have more maintenance visits with many additional samples taken. It is important for owners of AOSS to understand that it is ultimately their responsibility to ensure that their systems are functioning properly and meeting performance standards. Owners may accomplish this by maintaining a relationship with a licensed Operator and learning more about how their system works, what the limitations are, and how simple changes in habit or routine can affect system function. Information regarding Operator licensure can be found at the Department of Professional Occupation Regulation at For more information on these requirements, please click here. For more information on AOSS operation and maintenance, please contact an Environmental Health Specialist at your local health department. VDH has regulations in place to ensure septic systems are state adequate. Construction permits for a combined well and sewage disposal systems are valid for 18 months. Well-only permits are valid for 54 months. Beginning July 1, , the Virginia Department of Health VHD increased fees charged for certification letters and septic and well permits. In addition, VDH wanted its fees to be more in line with the actual cost s of providing the specific service s. The revised VDH fee schedule is less than or comparable to fees charged by neighboring states. Counties, who have adopted the Bay Act, require every septic tank located in the Chesapeake Bay Preservation Area CBPA , including the majority of the Chickahominy District, be pumped out or inspected every five years. Regular pumping out of your septic tank will not only increase the life of your system, it will also help protect the environment. For more information on the septic tank pump-out program please contact your local county agency.

8: Groundwater: Background: Minnesota Department of Health

Protecting ground water and public health There are a number of pressures contributing to the degradation of water quality of ground waters, creeks, streams and their associated ecosystems. A primary source of contamination is wastewater pollution from septic tanks.

Thanks to rain, snow and the force of gravity, our Earth accumulates groundwater, a precious underground resource that helps satisfy our requirements for fresh water. Groundwater originates from rain and melted snow, which trickle down through soils, sediment and bedrock into water-saturated subsurface zones known as aquifers. According to the Centers for Disease Control and Prevention CDC , groundwater supplies roughly one-third of our freshwater, providing water to nearly 90 million people. In addition, another 13 million US homes access groundwater through private wells. According to the California Department of Conservation, the US uses some 80 billion gallons of groundwater per day for public supply, irrigation, livestock, manufacturing, mining, thermoelectric power and more. Protecting Groundwater Not surprisingly, groundwater can become contaminated with man-made and naturally occurring contaminants. For example, contaminants may enter groundwater by seeping into the subsurface from the ground level or by migrating into an aquifer from an underground source, such as a leaking septic system or gasoline storage tank. How do we protect our groundwater from contaminants? The US Congress, in an effort to protect drinking water from biological, chemical and physical contaminants, passed the Safe Drinking Water Act In , EPA issued the Groundwater Rule under the Act to further protect groundwater from disease-causing viruses and bacteria. The Groundwater Rule requires regular sanitary surveys of groundwater systems for the purpose of identifying and correcting deficiencies. But, you and I have an important role to play too, as we go about our daily lives. Consumer Tips for Protecting Groundwater: Because of the sheer number of septic tanks in the US, they can be a formidable source of groundwater contaminants, including bacteria, nitrates, viruses, synthetic detergents, household chemicals, and chlorides, if not appropriately maintained, notes EPA. Never discharge hazardous substances into the household plumbing served by a septic tank system. Store, handle and dispose of hazardous substances2 properly. Store hazardous household substances in secure, original containers. If necessary, mix these substances over level concrete or asphalt where spills can be cleaned up or absorbed. Do not dispose of hazardous household wastes by pouring on the ground, down the drain, toilet, gutter, sewer, abandoned well or into water bodies. Use plant foods, fertilizers, herbicides, and pesticides responsibly. Overuse or inappropriate use of these substances can contaminate groundwater. University extension services offer free guidance on gardening responsibly. Decommission abandoned wells on your property. According to the Pennsylvania Department of Environmental Protection , proper well abandonment eliminates a pathway for migration of contamination, among other objectives. A qualified water well contractor can decommission abandoned wells safely.

9: Basic Information about Lead in Drinking Water | Ground Water and Drinking Water | US EPA

Protecting groundwater sources of drinking water entails a long-term investment in sound land use planning and management. This kind of work will rarely be urgent for local water resource professionals.

ShareCompartir Vector schematic representation of the water cycle in nature Protect Your Groundwater Day is an annual observance sponsored by the National Ground Water Association This day brings attention to the importance of protecting ground water as a valuable resource. The observance also stresses the need for simple ways everyone can act to protect groundwater, and why we all have a stake in maintaining its quality and quantity. You turn on the tap and there it isâ€"water. At least that is the case in most of the United States. But do you know where your water comes from? Ground water is water that is located below the surface of the earth in spaces between rock and soil. Ground water supplies water to wells and springs and is a substantial source of water used in the United States. Thirty percent of all available freshwater comes from ground water, 1 which supplies a significant amount of water to community water systems and private wells. EPA regulations protect public drinking water systems, but they do not apply to privately owned wells. Therefore, owners of private wells are responsible for ensuring that their water is safe from contaminants. To learn more about safe well water, see Testing Wells. Tracking Groundwater in Maine In Maine, more than half of all homes rely on private wells for drinking water. Many wells have levels of arsenic, uranium, or other chemicals that can cause serious health effects such as cancer or low birth weight. These contaminants can only be detected through laboratory testing. Private well owners are responsible for testing their own water and correcting any problems. Now, for the first time, the Maine Tracking Program website is displaying town-level measures for six potentially hazardous substances. Users can view data from more than 11, well water tests and see the percentage of homes that have tested their wells. In addition, the site can also be used to create reports. While everyone who gets drinking water from a private well should regularly test the water, these data highlight areas where residents may be at higher risk for exposure to harmful chemicals. A tracking program partner, the Healthy Community Coalition, uses the tracking data to identify areas where they will target well water safety interventions. They organize events in high-risk, rural areas of Maine and send a mobile health unit to the locations to educate residents about well water safety and give out free well water test kits. They are also using the tracking data to identify and select high-risk communities where they will work to increase rates of testing through community events and local media. Visit our website to learn more about how we are Promoting Clean Water for Health in communities in the US and internationally. The Environmental Health Services website provides a list of educational resources for local and state environmental health practitioners on groundwater protection and on addressing threats to health from private wells, drinking water supply, emergency water supply , and more.

PROTECTING GROUND WATER FOR HEALTH pdf

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