

## July 7, 2004 Comprehensive Plan Land Use Element Aquifer Recharge Areas

Chapter 1, Overview – Major Issues – Page 58 (This is also where the map is located)

### **Aquifer Recharge Areas**

~~The natural history of Island County, from the region's volcanic origins to its repeated glacial advances and retreats punctuated by massive post-glacial flooding, has left a geologic hodgepodge of sands, gravels, fine silts and sediments; cemented till ("hardpan"); clays; and metamorphic rock formations. Many of these formations bear accessible groundwater and can supply groundwater for the County's domestic, agricultural, recreational, and commercial/industrial needs. Island County's groundwater system is highly complex. Its aquifers are made up of multiple layers of unconsolidated sands and gravels capable of supplying water for human use. Mixed between these aquifers are layers of silt, clay and cemented till known as hardpan that pass water more slowly (aquitards). From place to place in Island County, aquifers and aquitards vary in thickness and depth below the surface making water resource availability assessments extremely difficult.~~

Due to the chaotic deposition of the county's water-bearing formations, region-wide studies have not been able to accurately quantify available groundwater supplies. As more wells are drilled, information on local conditions improves; but county-wide, there is little predictability as to depth, quantity, and quality of groundwater. Gross water balance estimates suggest that in some areas ample groundwater exists, while in others there is imminent threat of exhausting "fresh" groundwater supplies. High chloride levels ~~and low water level elevations in groundwater, groundwater~~ often ~~indicating indicate~~ ~~sea water seawater~~ intrusion, ~~plague~~ ~~ings~~ many water systems along shoreline areas and even in some inland areas. Virtually impermeable layers of clay and hardpan (essentially worthless for groundwater extraction) can serve as protective barriers to vertical movement ~~of surface contaminants~~. Groundwater contamination from surface activities is not widespread in Island County. ~~However however~~, some areas of elevated nitrates have been ~~investigated recently identified~~.

~~Most of~~ Approximately 72% of Island County residents depends on groundwater as a drinking water source. Exceptions include the City of Oak Harbor, the Whidbey Island Naval Air Station, and an outlying community near Deception Pass, which relies on Skagit River water piped to the City via the Anacortes treatment plant.

Rainfall infiltration into aquifers is the only source of renewing the county's groundwater supplies. There is no evidence of any naturally occurring underground hydraulic connection to mainland sources of groundwater. Continued infiltration of fresh water is necessary to exclude intruding seawater from moving inland. Development is generally associated with an increase in impervious surfaces and may affect the recharge potential by clearing, grading, and removing vegetation. These impacts ultimately reduce the area available for rainwater infiltration and may cause rainfall to run off faster. Thus, less water reaches the aquifers for storage, and greater

intrusion of seawater may result. Clustering and preservation of large open spaces can promote infiltration.

In February 1997, the Board of Commissioners contracted with the USGS to cooperate in a Water Recharge Study in Island County. The objectives of the study were to estimate the total amount and aerial distribution of recharge entering the groundwater system on Whidbey and Camano Islands and identify potential areas for using runoff to artificially recharge the groundwater system. The study complimented earlier USGS studies in Island County completed in the mid 1980s.

Through recent efforts of the county's Water Resource Advisory Committee, data derived in the USGS study has been used to delineate critical aquifer recharge areas based upon high, medium and low susceptibility (Map X). This delineation provides General areas of low, medium, and high recharge potential have been mapped based on surficial geology county wide (Map I). While providing useful and valuable information for water resource planning efforts aimed at reducing risks of contamination due to human activity in susceptible recharge areas. about recharge potential over wide areas, the mapping scale and complexity of the underlying geology make it impractical to apply the information to site-specific land uses.

Rainfall infiltration from the surface to water-bearing layers is the only source for renewing the county's groundwater supplies. There is no evidence of any naturally-occurring underground hydraulic connection to mainland sources of groundwater. Continued infiltration of fresh water can exclude intruding sea water from subsurface water-bearing layers, literally keeping the sea water at bay. Growth and development typically have been accompanied by an increase in impervious surfaces, loss of wetlands and other natural water retention areas, and removal of vegetative cover. These impacts reduce the area available for rainwater infiltration, causing rainfall to run-off faster. Thus, less water reaches the aquifers for storage, and greater intrusion of sea water can result. Clustering and preservation of large open spaces can promote infiltration.

#### **Groundwater Recharge Study**

In February 1997, the Board of Commissioners contracted with the USGS to cooperate in a Water Recharge Study in Island County. The objectives of the study are:

1. Estimate the total amount and aerial distribution of recharge entering the groundwater system on each Whidbey and Camano Islands.
2. Identify potential areas for using runoff to artificially recharge the groundwater system.

This study will compliment earlier USGS studies in Island County completed in the mid 1980s.

## **Aquifer Recharge Areas**

### **Definition:**

Critical Aquifer Recharge Areas are those areas ~~that have been designated as:~~  
~~A. A Sole Source Aquifer under the Federal Safe Drinking Water Act; or~~  
~~Ground Water Management Areas per Chapters 90.44, 90.48, and 90.54 RCW, and~~  
~~Chapters 173-100 and 173-200 WAC, that possess geologic and hydrogeologic~~  
~~characteristics that limit the protection of surface contaminants from entering~~  
~~groundwater systems. Critical aquifer recharge areas also include areas where an~~  
~~aquifer that is a source of drinking water is vulnerable to contamination that would~~  
~~affect the potability of the water.~~

~~B.~~

### **Designation Criteria:**

~~All of Island County. Low, medium and high susceptibility.~~

Chapter 4, Goals and Policies – General Land Use Policies – Page 138

## **Aquifer Recharge Areas**

Goals and policies for aquifer recharge areas may be found in the Water Resources Element of the Comprehensive Plan.