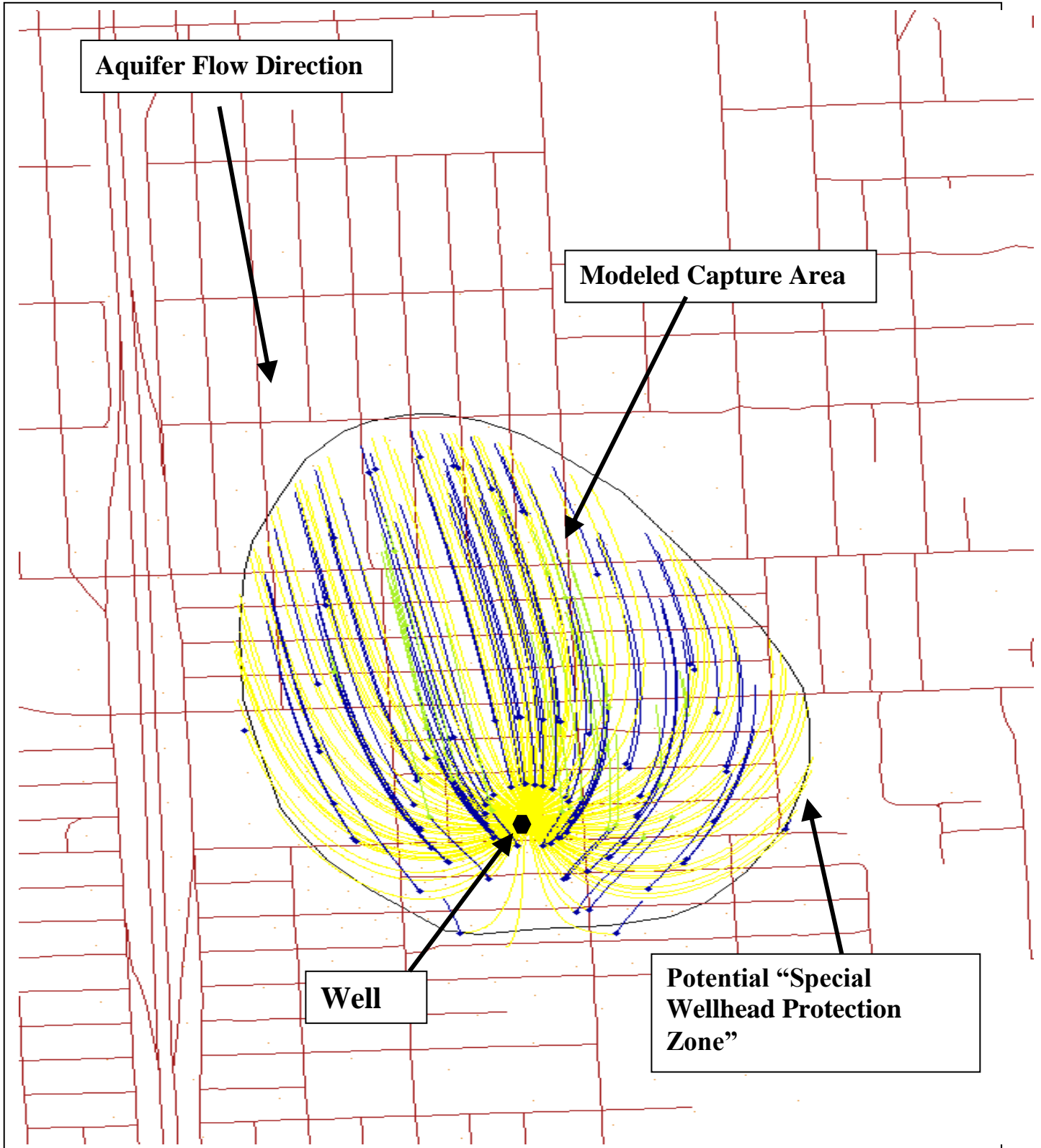


Spokane Aquifer Joint Board (SAJB) 2007 Wellhead Protection Update

SAJB approved 20 September 2007

following previous version 28 June; & drafts 12 June, 6 June, 15 May, 20 April, 2 April ; 16 Feb 2007



Purpose

To comprehensively re-evaluate previously modeled capture areas using a new set of parameters designed to a) reduce the length of modeled capture areas, and b) generally widen the capture areas, such that the overall area being considered for wellhead protection is reduced to a size that might be acceptable to land use regulators for application of protective zoning. In addition, the SAJB wishes to make clear its member's desires in terms of the activities that should be regulated in the capture areas and in terms of added protections over the Aquifer.

Aquifer Protection

SAJB water purveyors are of one mind in terms of aquifer protection - IT IS ESSENTIAL and, here should only be strengthened - not reduced. Wellhead protection is a subset of aquifer protection. It is not the purpose of this current effort to reduce existing wellhead protection or to reduce existing aquifer protection.

Terminology

State law required purveyors to technically define wellhead protection areas. Purveyors across the State had varying requirements depending on local conditions and Department of Health concerns. In many cases the capture areas for 6 month, 1, 5, and 10 year time of travel were required to be done. There was also at least an option for defining "special wellhead protection areas" in addition to the fixed time of travel zones. Technically defined areas coming from this 2007 update should be considered as "Special Wellhead Protection Areas" no matter the time of travel.

None of the technically defined areas have standing in terms of land-use regulation until the local land-use regulators (Cities, and Counties) adopt such zones and define the applicable conditions. Locally Spokane County has adopted some zones and applied conditions through the CARA regulations. The current County regulations are considered by the SAJB to be more aquifer protection in nature than wellhead protection.

In this document the term "Special Wellhead Protection Zone" is used to refer to anticipated regulated zones that are based on the technically defined Special Wellhead Protection Areas. It is understood that the Special Wellhead Protection Zones may differ from the Special Wellhead Protection Areas in a number of respects. For example a zone might follow parcel boundaries, and might encompass more than a single wellhead area.

Wellhead Protection Area Modeling

The changes in capture area length and width reduce capture area uncertainty arising from varying pumping rates, and model accuracy and precision limits. These changes in area size arise from the following changes in model inputs:

- 1) The base model was adjusted such that average pumping rates were input for all purveyor wells with the exception of Spokane Industrial Park who indicated that their maximum pumping rate should be used.
- 2) Each well's capture area was then separately modeled using the same average pumping rate base model, but after changing the particular well's pumping rate to the actual maximum pumping rate and/or the water right instantaneous maximum pumping rate, all as specified by the purveyor.
- 3) Before the model was used to map each capture area, the model was set to recalculate groundwater elevations with the new pumping rate for the well. This recalculation was done in a consistent

manner for all the wells by specifying that the model calculations be done until the changes in head were no greater than .0001 feet.

4) The capture area delineation was run with an assumed porosity of 0.20.

5) The modeled time, varied at each well to match the purveyors provided importance factor, limited the length of the capture areas. The purveyors agreed to a limit of no more than two years time of travel and no less than a radius of 500 feet in determining their importance factors for each well.

6) At least five “starting” depths evenly located down the full depth of the aquifer at the well were used. At each “starting” depth the model traced at least 20 particles up-gradient ending at the point the importance factor derived time was reached.

The current model is a Microfem model (Dr. C.J. Hemker, Amsterdam, The Netherlands; microfem.com) originally used by CH2M-Hill for the City of Spokane and the Spokane Aquifer Joint Board and was modified by Lloyd Brewer who changed the model from a horizontal base NAD 1927 to NAD 1983 making model outputs compatible with current City and County GIS base maps.

As the current model does not extend into Idaho, the capture areas that would extend into Idaho are to be hand drawn using available technical information such that the capture area is mapped as best practically can be done.

Future Modeling

SAJB members are aware of some potential deficiencies in the current aquifer model being used for the capture zone delineation. In particular: 1) a more recent County model indicated greater flows moving through the Trinity Trough; 2) more study has been done on the partially confined lower unit (Hillyard/Little Spokane) aquifer during the Bi-State Aquifer Study; and 3) updated information is expected as well on aquifer thickness. It is expected the Bi-State Aquifer Model will either be able to be used in making the delineations to be regulated or that the existing Microfem model will be updated with data from the Bi-State Aquifer Study, and the delineations then performed. In the long run a model with associated input and output files needs to be recognized and maintained for regional wellhead protection delineation work. In addition the modeling protocols need to be defined and standardized.

Future Wells

The SAJB has provided special wellhead protection capture areas for a couple of anticipated future wells. It is to be understood that all future well sites have not been identified, and it is expected that future well capture areas will be determined and added for protection as they are developed. It is understood by the purveyors that the legal protections these zones provide may take some time to implement for new wells. The SAJB intent is that this implementation time be kept as short as possible.

Zoning

Relatively high risk business activities have been identified with intent that such business activities would not be allowed in special wellhead protection zones unless the proponent gains approval via one of the following two methods:

1) The business proponent obtains a sign-off from the purveyor(s) whose special wellhead protection zone(s) would be developed in, obtains a sign-off from the Land Use Regulator(s) whose regulatory limits the development would lay within, and finally obtains sign-off from Washington State Department of Health or its designee.

OR

2) The business proponent goes through a public hearing examiner process and gains approval for the development with or without mitigation.

Relatively High Risk Business Activities

These activities are as previously defined by the old Policy Coordinating Committee except as highlighted below, having been reviewed more recently by the SAJB and the Aquifer Protection Council. Relatively high-risk land use activities include but are not limited to:

Animal Feedlots

Bio-Research Facilities

Chemical/Agricultural Chemical Warehousing
Composite (“fiberglass”) Products Manufacturing
Dry Cleaning (performed on location)
Electronics Manufacturing
Electroplating
Engine & Vehicle Repair/Service/Salvage

Furniture Stripping

Junk Yards

Metal Fabrication

Mining/Sand & Gravel Extraction

Oil & Gas Drilling

Paint Manufacturing and Wholesale Storage
Petroleum Bulk Storage & Transmission

Photo Processing

Printing and Lithography

Solid Waste Handling & Recycling Facilities

Vehicle Washing

Wastewater Bulk Storage, Treatment & Pumping Facilities

Wood Treatment Facilities

Grandfathering

The SAJB agrees that relatively high risk business activities currently occurring in special wellhead protection areas will not be subject to the new zoning requirement, until and unless, a business plans to re-develop or upgrade its facilities to such a degree that new building regulations apply.

Stormwater

Water purveyors want no direct injection of untreated stormwater in special wellhead protection zones. In addition they want no more treated stormwater injection in the special protection zone than stormwater runoff generated within that zone. Stormwater injection and injection wells should be located as far as practical from wellheads.

Stormwater disposal facilities over the Aquifer, but **not** in special wellhead protection zones, that are designed to handle greater volumes than would be modeled coming from a wellhead protection area should be required to be modeled using the same aquifer model used for wellhead protection capture zone delineation. No significant change in well capture areas should be demonstrated, the recharge should be more than a two year time of travel from all drinking water wells, and no more than 10% of any well’s modeled production should come from this type of recharge.

Wastewater

-Sewage

Properly designed, constructed, and functioning wastewater collection systems (nominally, 8-inch diameter pipes) should be encouraged within wellhead protection zones in so far as septic systems are eliminated and wastewater is conveyed away from the zones to treatment facilities. Additional wastewater conveyance systems should be avoided in special wellhead protection zones whenever an alternative route is feasible. Undersized systems and systems of questionable integrity should be upgraded and/or removed from the special wellhead protection zones within 5 years of such a determination. Wastewater force mains should be constructed outside special wellhead protection zones wherever practical. If a portion of a force main system must be located within a zone, that portion must be constructed of ductile iron pipe. Wastewater transmission mains (12-inch diameter pipe and larger) should not be located in special wellhead protection zones whenever an alternate route is feasible. If a portion of a transmission main system must be located within a zone it must be placed as far from the wellhead as possible and that portion must be constructed of either ductile iron or reinforced concrete with gasketed and sealed joints.

-Septage

Septic systems can be permitted in special wellhead protection zones, but only if in compliance with the most recent health district requirements, and only when in densities of no greater than one single family residence system in five acres. Should a water purveyor document diminished water quality due to septic systems, the appropriate land-use regulator, County, and the Spokane Regional Health District should cooperatively work to eliminate the septic system(s) from the wellhead protection zone.

Reclaimed Water

-Reuse

Washington State Class A reclaimed wastewater can be used in special wellhead protection areas for otherwise acceptable commercial/industrial activities and can be used for outdoor irrigation where the rate of application does not exceed the normal plant uptake rate less available precipitation. The use of reclaimed wastewater, if of a lower classification than Class A in a special wellhead protection zone, should be treated as a relatively high risk activity and not permitted without a public hearing to decide appropriate controls and conditions.

-Recharge

Surface percolation and/or direct injection of Washington Class A reclaimed water into the groundwater and/or into the ground below the ground surface for recharge can occur in special wellhead protection areas if such injected water is no closer to drinking water wells than one year time of travel. Surface percolation of reclaimed wastewater into the Spokane Rathdrum Prairie Aquifer should be the preferred type of reclaimed wastewater recharge permitted and then only permitted if the reclaimed water is class A. Recharge projects should be required to be modeled using the same aquifer model used for wellhead protection capture zone delineation. No significant change in well capture areas should be demonstrated, the recharge should be more than a one year time of travel from drinking water wells, and no more than 10% of any well's modeled production should come from this type of recharge.

