Hydrologic Function

Groundwater – Moderate Importance for Recharge
Target –Hydrologic Function

This value is related to the Recharge of Groundwater - Moderate Importance in the study area outside of the Fonthill Kame.

The purpose of setting a target on this value is to ensure that appropriate features are included in the preferred scenario in order to regulate the quality and quantity of groundwater to maintain healthy watersheds.

In context to our study area, the areas of moderate importance (21 % of the watershed) are determined based on the geology and soils and are distributed throughout the watershed.

Datasets

1. NPCA NAI ELC Community Series Mapping
2. NPCA Significant Groundwater Recharge Areas

Significant Groundwater Recharge Areas (SGRAs) are a vulnerable area delineated for the Source Water Protection Assessment Report (Chapters 3 and 4 - NPCA, 2010). SGRAs are identified for priority protection of groundwater quantity under the Provincial Policy Statement (MMAH, 2005). The SGRAs are classified as “significant” when they supply more water to an aquifer than the surrounding area. SGRAs were identified where groundwater is recharged by a factor of 1.15 or more the average recharge rate for the whole watershed (average recharge rate for NPCA is 46 mm/year). This method is recommended where recharge rates are fairly homogenous such as is generally the case for NPCA. This data forms part of the local Niagara Assessment Report Database (ARDB). These areas outside the Fonthill Kame were given moderate importance because of their natural recharge rates are fairly low in comparison.

The Niagara Watershed identifies 20.6% of its land base as high importance groundwater recharge area of which 31.3% is currently natural area.

Discussion

The Scenario Development Team (SDT) discussed the importance of groundwater recharge distributed throughout the watershed. Jayme Campbell, Hydrogeologist/Engineer with the Niagara Peninsula Conservation Authority provided expert support for this value as he presented the data from the Source Water Protection – Assessment Report.

J. Campbell clearly defined for the team the differences between the High Importance area of the Fonthill Kame and the other Moderate Importance areas throughout the watershed.

The team discussed at length the difference between various forms of natural cover and non-natural cover. Members of the SDT expressed concern over the fact that the type of cover natural or non-natural should not impact recharge especially since the current development standards state that there should be “no net loss to infiltration”.

Data Gap

From SGRA, 2009 NPCA and AquaResource Inc., these factor with soil and topography to distribute modeled recharge values.

Table 10: Cover Infiltration Values (MOE, 2003)

Description of Area	Infiltration Factor Value
Urban Lawns/Shallow Rooted Crops (spinach,beans,carrots)	0.05
Moderately Rooted Crops (corn and cereal grains)	0.1
Pasture and Shrubs	0.15
Mature Forests	0.2

SOLRIS Land cover infiltration values

Land Cover	Infiltration Value	Land Cover	Infiltration Value
Annual Crop	0.1	Mixed Agriculture	0.15
Bog	0.15	Mixed Crop	0.15
Built Up Impervious	0	Mixed Forest	0.2
Built Up Pervious	0.05	Monoculture	0.1
Coniferous Forest	0.2	Orchards	0.15
Deciduous Forest	0.2	Perennial Crop	0.15
Extraction- Rock (Sand and Gravel)	0 (0.2)	Plantations	0.2
Forest	0.2	Rural Land Use	0.15
Hedge Rows	0.2	Swamp	0.15
Idle Land	0.15	Transportation	0
Marsh	0.15	Vineyards	0.15

Decision
Date: April 7, 2011

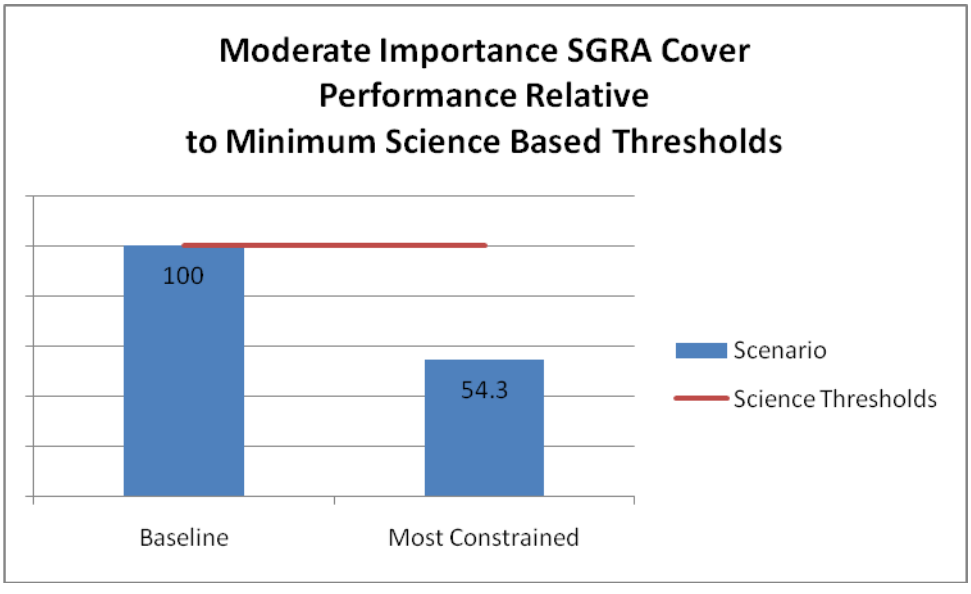
Moderate Importance Area: 90% of existing natural cover as Baseline, 50% of existing natural cover as a What-if Scenario, if the 50% is reached.

Representation in the Learning Scenarios
As it pertains to the hydrologic function, groundwater recharge is of great importance as the geological formations provide the source of the groundwater for the several surface water systems and drinking water wells. Natural cover in this area is therefore important to the maintenance of the source water.

Because of the vulnerability of groundwater to contamination in these areas, a target was set of 90% of the existing natural cover. By not setting the target to 100%, the model could then make choices about what to include given the contributions of certain features.

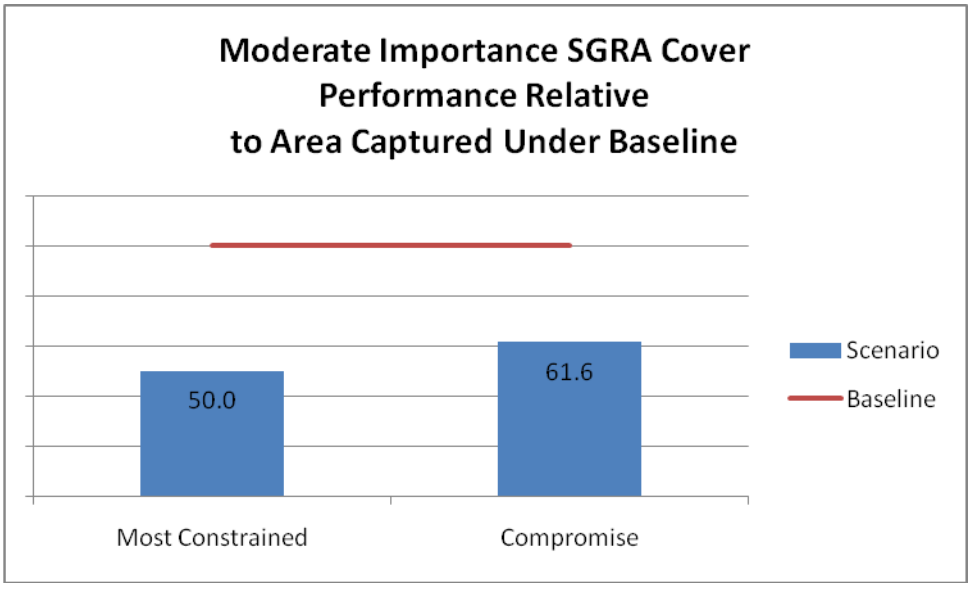
Representation in the Final Scenarios
Under the Baseline Scenario, Groundwater Recharge, in the Moderate Importance areas achieved 100.0% of the value in the target.

Figure 37: Groundwater Recharge – Moderate Importance Cover Performance Relative to Science Thresholds



Under the Most Constrained Scenario, Groundwater Recharge, in the Moderate Importance areas achieved 54.3% of the value in the target, and 50.0% of the Baseline value. The shortfalls are due to the social political constraint exclusions in this scenario.

Figure 38: Groundwater Recharge – Moderate Importance Cover Performance Relative to Baseline Comparator



Under the Compromise Scenario, Groundwater Recharge, in the Moderate Importance areas achieved 61.6% of the Baseline value. The shortfall is largely due to meadow communities not being able to contribute as cover in this scenario.

Recommendations

Update mapping of rate of recharge in relation to type of cover (natural or non-natural).