Hydrologic Function

Groundwater – Discharge
Target –Hydrologic Function

This value is related to the discharge of groundwater to the surface water system in the study area.

The purpose of setting a target on this value is to ensure that appropriate features are included in the preferred scenario in order to protect groundwater inputs to the surface water system.

In the context of our study area these are the areas that contribute to the quantity of water that is maintained in the streams, rivers and lakes. Base flow in the streams throughout the watershed is at a deficit.

Datasets

1. NPCA NAI ELC Community Series Mapping
2. NPCA Subwatersheds (Upper Twelve Mile Creek)

The community series mapping was used to identify the areas of natural cover within the Upper Twelve Mile Creek, as the only coldwater system in Niagara. The subwatershed currently enjoys 45.2% natural cover.

Discussion
The Scenario Development Team (SDT) discussed the importance of groundwater discharge as it relates to the maintenance of baseflow for the streams and rivers.

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 the links between groundwater recharge and discharge. He also explained to the team the differences between the discharge in the Fonthill Kame / Twelve Mile Creek system and other areas of the watershed. He reminded the group that the geological formation of the Fonthill Kame is unique in Niagara. And, Twelve Mile creek is the only confirmed cold water stream in the study area.

The issues around potential groundwater discharge in Niagara-on-the-Lake were discussed.

The group also discussed setting a target for the discharge only in the Twelve Mile creek watershed given its significance as the only cold water stream in the study area.

Data Gap
There is a lack of discharge data across the watershed.

Decision
Date: April 7, 2011
95% of existing natural cover in the Upper Twelve Mile Creek watershed as Baseline.

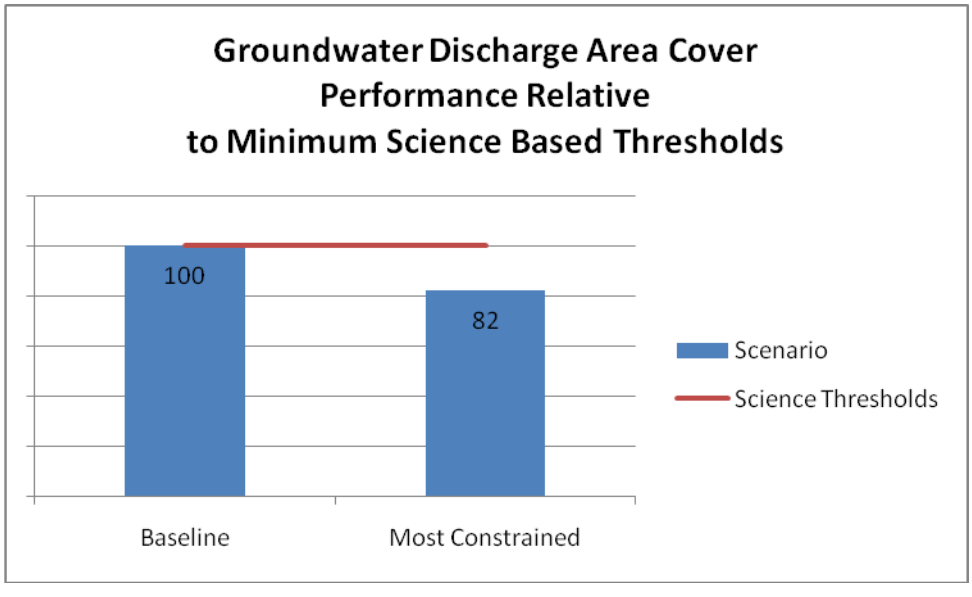
Representation in the Learning Scenarios
As it pertains to the hydrologic function, the Twelve Mile Creek watershed is of great importance given that this subwatershed is the only cold water system in the study area. The geological

formation of the Fonthill Kame is the source of the groundwater for the system. Natural cover in this area is therefore important to the maintenance of the source water. As a result of this objective, throughout the various learning scenarios substantial amounts of the natural cover in the Twelve Mile Creek watershed was frequently selected making this area in general a natural core area for the backbone to a Natural Heritage System in Niagara.

Representation in the Final Scenarios

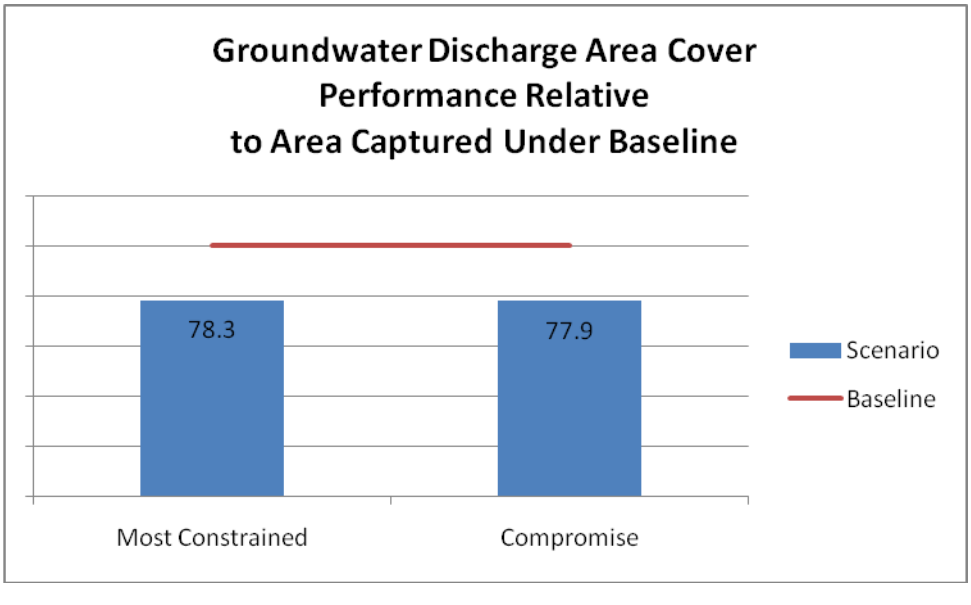
Under the Baseline Scenario, Groundwater Discharge in the Twelve Mile Creek watershed achieved 100.0% of the value targeted.

Figure 27: Groundwater Discharge Area Cover Performance Relative to Science Thresholds



Under the Most Constrained Scenario, Discharge in the Twelve Mile Creek watershed achieved only 82.0% of the value in the targets, and 78.3% of the Baseline value.

Figure 28: Groundwater Discharge Area Cover Performance Relative to Baseline Comparator



Under the Compromise Scenario, Groundwater Discharge in Twelve Mile Creek watershed achieved 77.6% of the Baseline value.

Recommendations

Refine existing groundwater discharge mapping.

Map and further identify any additional groundwater discharge locations across the watershed.