Socio-Political Constraints

The term socio-political constraint refers to the way land is currently being used and to its relative availability for potential inclusion and contribution to a Natural Heritage System based on laws, conventions, and/or restrictions associated with levels of protection from international, federal, provincial, municipal and/or private institutions.

While socio-political, economic and cultural interests and values are considered in this evaluation, it is not from a formal land use planning perspective but rather as a system design concept. The design approach facilitated by the systematic conservation planning process and decision support use of MARXAN is sophisticated. It recognizes that there are overriding controlling factors that exist on the landscape influencing where conservation values may realistically be considered from in contribution to natural heritage system objectives. It would be naïve to operate under any other assumption.

Nature for Niagara's Future is working towards a set of natural heritage system objectives that link the best available science with what is currently on the ground in terms of natural heritage features and land uses. Socio-political constraints function like an existing framework within which this evaluation and conceptual system design process must work from as a point of departure. They ultimately represent "what is" on the landscape and help us to consider existing policies, legislation and land use as a guide. Targets based on the best available science may be unachievable but that context quantifies how well existing management measures are performing and contributing towards the concept of sustainability. It also helps establish where the greatest conflicts with human use issues exist, and to what degree. If we are short in attaining targets for ecological objectives, we at least know the deficiency in a measurable way and what the compromises have been to date.

The Scenario Development Team for the project met for 9 full day sessions between October of 2010 and June of 2011 to identify goals and objectives, socio-political constraints, and set targets for all of the features to be included and assessed through the NHS design process. Four and a half of these full day sessions were spent agonizing over the socio-political constraint decisions as the Scenario Development Team really struggled with the fear that this process was a land use planning exercise intent on developing new natural heritage environmental policies despite being reassured repeatedly that this was an information exercise. As a result, several socio-political constraints requested by members of the Scenario Development Team conflicted with the whole concept of identifying a conceptual reserve of green infrastructure across the landscape which created challenges for the design process. To move forward, the analysis had to perpetuate two fundamental scenarios dealing with these constraints using different modeling approaches before the group came to terms with the fact that one of these was a deviation from practical baseline considerations.

Socio-political considerations are accommodated in the NHS design process by assigning each a status or, identifying it as an underlying cost factor in MARXAN. This is done on the site or hexagon level. Therefore, how socio-political constraint inventories are summarized on planning units into cost factors or as a single constraint status is a significant mapping consideration.

Setting a status tells MARXAN how a particular area of land should be treated in terms of evaluation for potential contribution to system objectives. Constraints modeled through this parameter basically override any efficiency considerations and are a way to prescribe what is in solutions for a scenario and what is not. To be included in the design process, each constraint feature must be mapped and only one status can be assigned on the entire hexagon. In order to assign the appropriate constraint status to a hexagon, a majority overlap rule was applied where at least half of the area of the hexagon has to be occupied by the constraint feature for the hexagon to be assigned a constraint status.

There are essentially four status types:

- Included (formerly called Conserved) – these areas must always be included within the NHS solution, and are essentially locked in without an evaluation of how well they contribute to system objectives or, how much they cost.
- Preferred – these areas are seeded into the evaluation process as included however, if through evaluation MARXAN can determine a more efficient hexagon, they will not be included within the final NHS solution.
- Excluded – these areas are never included (locked out) of the output solution. They do not contribute to system objectives.
- Available – these areas are available for inclusion subject to the evaluation of how well they contribute to system objectives with cost as an underlying factor.

In order to rectify situations where a planning unit may contain at least 50% of two or more constraint status types, included status trumped all other types, while excluded trumped preferred.
Selection of planning units by MARXAN with a status of available or preferred can be further influenced through underlying cost. Cost does not refer to dollar values but to the concept that these areas are more 'expensive' in the optimization process than other areas. Cost is essentially a way to minimize the inclusion of certain areas or features in the results. It is more like steering away from certain socio-political constraint areas to the extent possible. Therefore, cost is a much less drastic approach in comparison to other status parameters as it does not sentence potential contributions to system objectives from being overlooked like an 'excluded' assignment does.

Cost became the most practical way to incorporate the majority of the socio-political constraint considerations throughout the project despite some strong opinion to exclude certain features and land uses by members of the Scenario Development Team. Cost for a hexagon was determined by summing all of the overlapping area of cost features occurring in a hexagon and offsetting that amount by the total area of natural cover found within the hexagon. As a result many of the high cost areas simply represent multiple competing human land uses and not necessarily areas with low conservation value. Additionally, it is important to note that in scenarios where much of the existing natural cover was assigned an included or excluded constraint status and/or where many targets were set to 100%, the influence of cost on the system design becomes negligible.

Overall, the hexagon status and cost settings are simply modeling parameters within MARXAN. MARXAN documentation does not unequivocally label these as socio- political constraint functions, and presents them simply as optional analytic tools. When to use either in the context of addressing socio-political constraints or any other issue is largely up to the user, who in this case was the Scenario Development

Team. There is no correct or incorrect way to use cost or constraints, although using an approach that relies heavily on only the status parameters runs the risk of becoming just another feature based approach negating the benefit of the optimization tool. Ideally socio-political constraints should represent a balance between modeling functions based on specific local circumstances that do not comprise the overall objective or problem defining the analysis.

In some Nature for Niagara's Future Scenarios, certain socio-political considerations were omitted and not given a status or identified as a cost. These are areas where setting a specific constraint was not appropriate (e.g. due to lack of representation) or not necessary (e.g. none exist in the study area). Features that had insufficient data to map their locations also could not be assigned a status. These areas are identified as data gaps for consideration in future NHS design and planning exercises. The socio-political constraints were divided into five main categories; Conservation Lands, Aggregate Lands, Agricultural Lands, Urban Lands, and Cultural Lands.

The Scenario Development Team only ran one preliminary academic scenario without the socio-political constraints to get a sense of the effect they have on the character of the spatial results. Most of the Learning Scenarios for this project's analysis were modeled with either identical or variations of the initial socio-political constraint decisions leaving little contrast. Consequently, certain features dominate the spatial configuration of most learning scenario solutions in this project (i.e. provincially significant wetlands).

Conservation Lands

For the purpose of this project, Conservation Lands were defined as areas that have already been set aside for conservation purposes through existing policies, legislation or landowner objectives. They are all expected, with some likelihood, to persist into the future in their natural state and therefore have been considered for direct inclusion in the natural heritage system. Not all of the conservation land types identified were given an included (conserved) status. For example, this was not done when it was determined that the level of protection afforded was weak or short term.

Lengthy discussions took place in relation to setting constraints for values related to properties that were owned outright versus those that were held under easement. It was decided in the end to not lock in the easement properties since they were possibly acquired for a purpose other than conservation and their long term status was largely unknown. There was also a contingency made for those properties that are owned by conservation organizations but that are owned for the purpose of agriculture.

Designations such as Important Bird Area and Migratory Bird Area were not considered constraint worthy since they have no formal protection.

An effort was made to acknowledge previous attempts at a natural heritage system for the watershed by Land Care Niagara and Carolinian Canada Coalition. The preferred scenario will be compared to these other exercises. This will give us an idea of whether we are in line with them and will provide those organizations with potentially valuable information such as the quantification of what their systems contain relative to the features and objectives identified under this analysis.

A data gap was identified for Municipal Parks and Open Spaces since they are not consistently and comprehensively mapped throughout the watershed.

The decisions made regarding constraints for values associated with Conservation Lands are found in the table in section 4.

Aggregate Lands

For the purpose of this project, aggregate lands referred to licensed sites for pits and quarries and unlicensed sites that have been classified and mapped as significant deposits.

We considered the socio-political aspect of these sites in relation to this project since there is a good likelihood that extraction will take place in the near future that will result in the removal of natural heritage features that might otherwise contribute to natural heritage system targets.

With respect to Unlicensed Sites, aggregate representatives on the Scenario Development team had hoped to provide mapping that showed the aggregate areas available for extraction after operational constraints were applied, however, they were unable to do so within the timeframe for this project.

The decisions made regarding constraints for values associated with Aggregate Lands are found in the table in section 4.

Agricultural Lands

For the purpose of this project, a conscious decision was made by the Scenario Development Team to use agricultural capable soils as a surrogate for identifying agricultural lands regardless of the current land use.

Given the importance of agriculture in the watershed study area, and the position of the local agricultural community, it was critical to the process that we run a baseline scenario which excluded all agricultural capable soils from the natural heritage system.

The agricultural community was very concerned throughout the process that the outcomes of this project would explicitly be used to develop land use policy. The Scenario Development Team had lengthy discussions about how to best minimize the amount of agricultural land selected for inclusion within the final project outputs.

By virtue of the base data (NAI), and the tool employed (MARXAN), a number of limitations were built into the process to steer the model away from any agriculturally capable lands. In addition, lands currently under agricultural use did not contribute to any targets under any of the scenario runs.

While there are emerging inventories such as Agricultural Resource Inventory (ARI from OMAFRA), or Agricultural Land Evaluation and Area Review (LEAR) mapping that represent the best sources of information related to existing or potential agricultural lands, they are not currently available for the watershed. As the next best alternative, the agricultural representatives on the SDT recommended the

use of county soils mapping and climate data recognizing that this information significantly overestimates the lands capable of supporting agricultural uses.

The decisions made regarding constraints for values associated with Agricultural Lands are found in the table in section 4.

Urban Lands

For the purpose of this project, urban lands were defined as those areas laid out in the provincial growth plan and regional policy.

Given the expected population growth of the watershed study area, and the position of the local development community, it was determined that a baseline scenario would be run that excluded the built up urban area from the natural heritage system.

The representative of the development community expressed serious concerns throughout the process about the impacts of the outcomes on the supply of available development land. There were lengthy discussions about land use policy and the fear that this process will somehow lead to more restrictive planning regulations. A number of scenarios were run to try to alleviate these concerns including full exclusion, and prescription of constraints within the urban boundary.

Municipalities within the watershed are at varying stages of Official Plan review and data collection for the purpose of updates to the plans. Consolidation of all area municipality Official Plan information remains a data gap for future consideration.

The decisions made regarding constraints for values associated with Urban Lands are found in the table in section 4.

Cultural Lands

For the purpose of this project, it was felt that the socio-political aspect of lands that are managed for their cultural heritage should be considered. There is often a direct link between the cultural heritage of a site and its associated natural heritage.

There was a distinction made between those sites that were owned outright and the ones that are held under easement. It was felt by the group that the sites that are owned offer longer term protection and therefore warranted inclusion in the natural heritage system.

There was also an emphasis made on those sites that are managed for their natural heritage features as laid out in their management plans. This illustrated for the group a greater commitment to longer term protection for the natural features and therefore justified their inclusion in the natural heritage system.

An effort will be made at the end of the process to look at what percentage of the final scenario is comprised of publicly-owned lands. Although the group did not believe that public lands should always be included in the natural heritage system solely based on their ownership status, a distinction was

made between public and private ownership as the group felt that it can be argued that public ownership offers a higher level of long term protection.

The decisions made regarding constraints for values associated with Cultural Lands are found in the table in section 4.