

## **Appendix 2.** Weight calculation methods and metric category definitions.

### **2.1 Metric category descriptions**

#### **Water quality:**

Metrics related to a parcel's capacity to improve or protect water quality. For example, does the parcel have the capacity to mitigate nutrient or sediment runoff, or does the parcel contribute to a drinking water supply?

#### **Recreation accessibility:**

Metrics related to how easily the public can experience benefits related to this parcel. For example, if it is an easement on private land, is the easement near public hunting land, or is it within the viewshed of a scenic trail? How many people could make a day trip to the area the parcel produces benefits?

#### **Habitat/Biodiversity:**

Metrics that measure the ability or potential ability for a parcel to support species and metrics that identify the presence and/or quality of ecosystems or biodiversity.

#### **Spatial context:**

Metrics that score parcels based on the potential benefits derived from its geographic location. For example, does the parcel contribute to a complex of nearby protected areas, or does it fall in an area identified as part of a planning process (e.g. the Prairie Plan)?

#### **Size:**

Metrics that measure the absolute size of a parcel, or a relative increase in size of a complex.

#### **Risk of development:**

Metrics that prioritize parcels at high risk of development or penalize parcels at low risk.

#### **Management factors:**

Metrics that score a parcel based on the level of management required, or based on the parcel's ability to contribute to the management of an area (e.g. through access).

#### **Donation of portion:**

Metrics that consider if the landowner is willing to donate a portion of the value of the parcel.

#### **Market benefits:**

Metrics that consider the value of timber or grazing resources of a parcel.

#### **Public support:**

Metrics that measure how much support/engagement there is for an acquisition.

## 2.2 Program scoring weight calculation methodology

We placed individual metrics used in quantitative scoring systems into ten categories in order to compare the factors that are used to prioritize lands for protection. We created the ten categories to reflect common themes while still encompassing all of the metrics we reviewed. We recognize that a single metric may be relevant to multiple categories; however, to make consistent comparisons between organizations, we assigned each point of a metric to a single category only. We divided the maximum score in a given category by the overall maximum score attainable under each program to determine the weight a program placed on a category.

As an example of our scoring methodology, here is how we calculated the ‘Recreation accessibility’ score for the DNR Trout Stream Easement program. Of the 17 metrics used in the program, we identified 3 metrics that fell into the ‘User accessibility’ category because they best capture the value to the public based on how accessible the benefits are to people. The scoring criteria below are from the DNR scoring guidance.

### **Existing/potential angler use**

3 pt = based on professional judgement of factors including the stretch’s current angler use and demand for additional access.

### **Accessible**

1 pt = the proposed easement is crossed by a road or trail that would provide angler access other than from adjoining easement.

### **Recreation potential**

Points are awarded by GIS tool querying census data for total population within 50 miles.

0 pt = <10,000

1 pt = 10,001 to 20,000

3 pt = 20,001 to 50,000

4 pt = >50,000

The sum of the maximum scores for each metric is  $3+1+4 = 8$ . The maximum amount of points in the scoring system is 48. Thus, the importance weight of ‘User accessibility’ is  $8/48 = 17\%$ .

The Department of Natural Resources (DNR) Wildlife Management Areas and Aquatic Management Areas programs have slightly different scoring systems depending on where in the state the acquisition is occurring. Having different scores for different regions allows the DNR to better capture the value of certain ecosystems that may be abundant in one part of the state but rare in another, such as forests in the northeast vs. the southwest. After aggregating the metrics into metric categories for this analysis, the regional score differences largely disappeared because the changes often happened in the same category. We report the aggregated values for the ‘Transition’ region because this region includes the most metrics and is typically within one percentage point of the mean of all regions for a given category (Appendix 3.2).

Some scoring systems had rules that prevented the score of one metric from being reliably isolated. For example, using the Board of Water and Soil Resources (BWSR) Wetland Restoration scoring system, a maximum of 10 points are available for a combination of size and nearby habitat (section B in the tables below), but either metric can achieve 10 points on its own.

Without a strictly additive score, we could not break this program into categories precisely. We calculated a separate weight for each section of their scoring system based on the number of points theoretically possible and the enforced maximum for each section (Table A2.1). Using the example above, 20 points were available in the section, but only 10 can count toward the final score, thus each point in that section is weighted by 0.5. Ten of the points fell into the ‘Size’ category, and after given their section weighting, contribute 5% of the final score (Table A2.1).

**Table A2.1.** Determining weights for each section in Board of Water and Soil Resources Wetland Restoration scoring system.

	A	B	C	D	E
Theoretical maximum score	123	20	20	10	15
Enforced maximum score	50	10	20	10	10
Point weight by section (Enforced / Theoretical)	0.41	0.5	1	1	0.67

**Table A2.2.** Estimation of weights under the non-additive Board of Water and Soil Resources Wetland Restoration scoring system.

Metric Category	Theoretical Maximum Score by Section					Weighted Maximum Score by Section					Category Weight
	A	B	C	D	E	A	B	C	D	E	
Water quality					7					4.67	4.67
Recreation accessibility											0.00
Habitat/Biodiversity	83		20		2	33.74		20.00		1.33	55.07
Spatial context	10	10			6	4.07	5.00			4.00	13.07
Size	30	10				12.20	5.00				17.20
Risk of development											0.00
Management factors											0.00
Donation of portion				10					10.00		10.00
Market benefits											0.00
Public support											0.00

In addition to the section-by-section weighting, the BWSR wetlands program posed a challenge in that approximately 33% of its score is attributed to an inseparable combination of the condition and number/size of depressional wetlands. The scoring system indicated that restorable depressional wetlands were a priority, but did not indicate why. This ambiguity means that 33% of the score does not fit well into any category, but there was not sufficient evidence to subdivide it. Given the focus on the condition of the wetland we opted to place it into the habitat/biodiversity category, but arguments could be made for size, spatial context, water quality, or a combination of those categories.

Qualitative, expert opinion driven prioritization employed by many smaller and non-governmental organizations could not be evaluated with this approach, nor could the expert opinion applied in conjunction with quantitative scoring systems. This approach also did not screen for unlikely combinations of attributes when calculating weights. As such, these should be considered an approximation to detect broad trends only.