



Information on the Determination of the Factors R and vl in the Financial Contribution Calculation Formula

BACKGROUND

The Regulation respecting compensation for adverse effects on wetlands and bodies of water that stems from the *Act respecting the conservation of wetlands and bodies of water*, SQ 2017, c 14, was published in the September 5, 2018 issue of the *Gazette officielle du Québec* and came into effect on September 20, 2018. It proposes the following new and clear formula for calculating the financial contribution and that can be directly used by project proponents:

$$AC = (cw + vt) \times S$$

Where **AC** = the amount of the financial contribution payable as compensation for adverse effects on a wetland or body of water

cw = the cost per square metre (m²) for the creation or restoration of a wetland or body of water, calculated using the following formula: $cw = bc \times \Delta I_f \times R$, i.e., the basic cost of \$20/m² x a factor that takes into account the adverse effects on a wetland or body of water based on its initial state and the impact of the activity x a regional variation factor (R)

vl = value of the land per square metre calculated using the average value of vacant lots within the territory of the individual regional county municipality

SA = surface area in square metres of the portion of the wetland or body of water in which the activity is carried out, excluding the surface area occupied by existing works or structures

The purpose of this document is to present the methodology for determining the regional variation factor (R) for each municipality as well as the average value of vacant lots (vl) within the boundaries of a particular Regional County Municipality (RCM). These values are listed in schedule 4 of the draft regulation.

DETERMINATION OF THE REGIONAL VARIATION FACTOR (R) FOR WETLANDS AND BODIES OF WATER

Urbanisation and land artificialisation are important factors in the process of the fragmentation of natural environments and the deterioration of biodiversity. Mapping anthropic pressure is a way of anticipating the potential impacts of human activity on Québec ecosystems to the extent that it reflects their influence, based on the type of human activities that occur.

In order to map the anthropic pressure exerted throughout Québec, the Québec land use profile, prepared by the Ministère du Développement durable, de l'Environnement et de la Lutte contre les changements climatiques (MDDELCC, 2016¹) was used as a reference. The profile was drawn up using compiled information and geographical data from a number of available sources, particularly in the framework of the Government of Québec's approach to networked co-operation for sharing geographical information. The sources of land use data (MDDELCC, 2016) are shown below in schedule 1. Anthropic pressure mapping was based on municipal boundaries as found in the Système sur les découpages administratifs à l'échelle 1/20 000 (SDA 20k), which was produced by the Ministère de l'Énergie et des Ressources naturelles (MERN, 2018²).

Three principal steps took place in the mapping process:

- (1) grouping land use categories (MDDELCC, 2016) on the basis of the major types of anthropic pressure (urban, agricultural, forestry)
- (2) calculating the percentage of each land use category by municipality
- (3) allocating anthropic pressure categories based on the percentage size of each within the municipality

According to a review of the available literature, some land occupancy thresholds are significant indicators for assessing the quality of natural habitats and biodiversity. The proposed categories used to illustrate the levels of anthropic pressure and their potential impacts on ecosystems and biodiversity were drawn from available literature in this field (Clément, F. *et al.*, 2017³; Environment Canada, 2013⁴; Rompré *et al.*, 2010⁵; Groves *et al.*, 2003⁶; Roy *et al.*, 2003⁷; Wang *et al.*, 1997⁸). The percentage values are in general calculated by watershed (catchment basin). For the purposes of this simulation, they reflect the levels of observed anthropic pressure on the natural environment, on a municipal scale (Table 1).

¹ MDDELCC, 2016. *Cartographie de l'utilisation du territoire du Québec. Données de SIG [ArcMap, ESRI Canada]*, Ministère du Développement durable, de l'Environnement et de la Lutte contre les changements climatiques, Government of Québec, Québec.

² MERN, 2018. *Systèmes sur les découpages administratifs à l'échelle 1/20 000 (SDA, 20k). Données de SIG [ArcInfo ESRI Canada]*, Ministère de l'Énergie et des Ressources naturelles, Government of Québec, Québec.

³ Clément, F., Ruiz, J., Rodriguez, M.A., Blais, D. & S. Campeau, 2017. "Landscape diversity and forest edge density regulate stream water quality in agricultural catchments," *Ecological Indicators*, 72 (2017) pp. 627-639.

⁴ Environment Canada, 2013. *How Much Habitat is Enough? 3rd edition*, Environment Canada, 138 p.

⁵ Rompré, Ghyslain *et al.*, 2010. "Conservation de la biodiversité dans les paysages forestiers aménagés : utilisation des seuils critiques d'habitats," *The Forestry Chronicle*, 2010, 86(5): 572-579, <https://doi.org/10.5558/tfc86572-5>

⁶ Groves, C., M.W. Beck, J.V. Higgins & E.C. Saxxon, 2003. *Drafting a Conservation Blueprint. A practitioner's Guide to Planning for Biodiversity. The Nature Conservancy*, Island Press, 457 p.

⁷ Roy, A.H., Rosemond, A.D., Paul, M. I., D.S. & Wallace, J.B., 2003. "Stream macroinvertebrate response to catchment urbanization" (Georgia, USA), *Freshwater Biology*, 48 (2): pp. 329-346

⁸ Wang, L., Lyons, J., Kanehl, P. & Gatti, R., 1997. "Influence of Watershed Land Use on Habitat Quality and Biotic Integrity in Wisconsin Streams," *Fisheries*, 22(6): pp. 6-12.

Tableau 1 – Description of categories used to determine the levels of anthropic pressure

Category	Meaning
< 30% developed	Municipality having less than 30% in agricultural area or where total clear-cutting took place
From 30% to 50% developed	Municipality having between 30 and 50% in agricultural area or where total clear-cutting took place
> 50% developed	Municipality having more than 50% in agricultural area or where total clear-cutting took place
10% to 20% urban	Municipality where urbanization covers between 10 and 20% of its area
> 20% urban	Municipality where urbanization covers more than 20% of its area

The following steps and rules were applied on the basis of Table 1 in order to allocate a regional variation factor (R) for each municipality to which the draft regulation applies (refer to section 1 of the draft regulation).

- Step 1 – Municipalities that meet the “< 30% developed” classification criteria were allocated a value of R = 0.3 for wetlands and 0.8 for bodies of water.
- Step 2 – Among the remaining municipalities that do not fall within the “< 30% developed” classification, those that meet the “from 30% to 50% developed” criteria were allocated a value of R = 1 for both wetlands and bodies of water.
- Step 3 – All remaining municipalities were classified as “> 50% developed” and were allocated a value of R = 1.2 for wetlands and 1.4 for bodies of water.
- Step 4 – Notwithstanding the values allocated in steps 1 to 3, all municipalities that meet the “10% to 20% urban” were allocated a value of R = 1.6 for both wetlands and bodies of water.
- Step 5 – Notwithstanding the values allocated in steps 1 to 3, all municipalities that meet the “> 20% urban” were allocated a value of R = 2 for both wetlands and bodies of water.

Standardization was also found to be necessary, especially when taking the regional context of selected small municipalities into account.

DETERMINATION OF THE VALUE OF THE LAND (vl)

The financial compensation formula is, in particular, meant to allow RCM purchase of lands requiring restoration work or the creation of wetlands and/or bodies of water. The average value of vacant lots is used in order to take better account of future land purchase.

The value of the land per square metre (vl) is calculated on the basis of the average value of vacant land within the particular RCM or entity in lieu thereof, as determined in schedule IV of the draft regulation on compensation for adverse effects on wetlands and/or bodies of water or, for lands in the domain of the State, at \$0.8307 per square metre.

For municipalities that are grouped together into RCMs, the value of vacant lots within the RCM boundaries was determined by the MDDELCC on the basis of data from summary municipal property tax rolls provided by the Ministère des Affaires municipales et de l'Occupation du territoire (MAMOT). More precisely, it was set on the basis of the taxable land values and on non-taxable land values shown in the "Inventaire par utilisation," in the "91–vacant lot" category. Figures shown in schedule IV correspond to the average value of vacant lots (the total of taxable and non-taxable property) per RCM divided by the total area of vacant lots within the RCM, all taken from the 2018 standardized value taxation year rolls.

In some cases, it was not feasible to use RCM data and as such, for 16 municipalities on the Island of Montréal, the land value (vt) used is the value for the entire island. For other municipalities that are not grouped in an RCM, vt was calculated on the basis of data from the individual municipality only.

Schedule 1 - List of land use data sources (MDDELCC, 2016)

Data	Source
Data base of declared lands and agricultural production	La Financière agricole du Québec
Complementary data from photographic interpretation, specific projects or land compilation (golf courses, orchards, vineyards, ski slopes, mines and developed areas)	Ministère du Développement durable, de l'Environnement et de la Lutte contre les changements climatiques (MDDELCC)
Cadre de référence hydrologique du Québec (hydrological reference framework)	MDDELCC
National Hydro Network	Natural Resources Canada
Sites d'extraction de substances minérales de surface (sites SMS) (open mines)	Ministère de l'Énergie et des Ressources naturelles (MERN)
Mines and mining projects	MERN
Highway and rail networks	Québec addresses (MERN)
Annual Crop Inventory	Agriculture and Agri-Food Canada (AAC)
Système d'information écoforestière (eco-forestry inventory system)	Ministère des Forêts, de la Faune et des Parcs (MFFP)
Cartographie écologique de la végétation du Nord québécois (ecological map of northern Québec vegetation)	MFFP
Programme d'inventaire écoforestier nordique (northern Québec eco-forestry inventory program)	MFFP
Lignes de transport d'énergie et réservoirs d'hydroélectricité (power lines and hydroelectric reservoirs)	Hydro-Québec
Aires désignées, Base de données topographiques du Québec (designated areas, Québec topographic data base)	MERN
Industrial and commercial zones, National Topographic Data Base	Natural Resources Canada
Cartographie des exploitations de tourbe horticole du Québec (maps of Québec horticultural peat farms)	MDDELCC
Cartographie des exploitations de canneberges du Québec (maps of Québec cranberry farms)	MDDELCC