**Supplementary material**

Title: **Brazil's Iguaçu National Park: Economic risks of proposed road construction and downgrading**

**ICMS-e transfer calculations, as established in IAP Ordinance 263/98 and other standards.**

1. *Basic Biodiversity Conservation Coefficient (CCB)*

This is the ratio between the surface of the conservation unit contained within the territory of a given municipality (*Auc*), by the total surface of the respective municipality (Am), maintaining a unit of measurement, corrected by a Conservation Factor (*Fc* - Annex III of IAP Ordinance 263/98), defined according to the Management Category.

$$CCB=\frac{Auc}{Am}∙Fc$$

1. *Biodiversity Conservation Coefficient by Interface (CCBI)*

This is the weighting of the CCB that is subject to change depending on the quality level of the conservation unit (or part) incident on the municipal territory, determined by the variation in conservation quality scores based on the annual application of an evaluation table o (*ΔQua*) and weighted by a weight (P) equivalent to the conservation unit’s management hierarchy (municipal, state and federal) (parameters defined in Annex III of IAP Ordinance 126/96 ).

$$CCBI=\left[CCB+\left(CCB∙∆Qua\right)\right]∙P$$

1. *Environmental Index by Biodiversity (AI)*

This is the ratio between the sum of the CCBI of all conservation units in the municipality (CCBM), by the sum of the CCBI calculated for all municipalities in the State (CCBE), converted to percentages and corrected by 1/2, to correspond to fifty percent of the total resources to be passed on to the municipalities.

$$IA=0.5∙\frac{CCBM}{CCBE}∙100\%$$

1. *ICMS-e transfer*

This is the IA multiplied by the value of the ICMS-e in reais (R$) in a given year.

$$ICMSe=\frac{IA\left(\%\right)∙repasse\left(R\$\right)}{100\%}$$

 *Note:* to obtain the transfer of ICMS-e providing only one conservation unit, it is enough to consider only the conservation unit interest in the municipality in the calculation of the IA instead of the sum of all conservation units.

**Example of ICMS-e calculation.**

 Considering, as an example, the Iguaçu National Park in the municipality of Céu Azul in the year 2021, we have the following parameters:

i) Area of Iguaçu National Park within the municipality of Céu Azul (*Auc*) = 85,366.03

ii) Municipality area (*Am*) = 117,659.78

iii) Conservation factor (Fc) = 0.35 (reference values for National Parks created before the emancipation of the municipality – according to Annex III of IAP Ordinance 263/98)

iv) Variation in the conservation quality of the conservation unit (*Qua*) = 0.31

v) Weight equivalent to the conservation unit’s management hierarchy (*P*) = 1 (for federal conservation units)

 vi) Sum of the Conservation Coefficient per Interphase for the entire state (*CCBE*) = 9.430

 v) ICMS-e transfer = R$ 477,985,067.96

 $CCB=\frac{85366,03}{117659.78}∙0.35$ = 0.254

$CCBI=\left[0.254+\left(0.254∙0.31\right)\right]∙1=0.333$

$IA=0.5∙\frac{0.333}{9.430406559}∙100\%$ = 0.176980704

 $ICMSe=\frac{1.763746∙R\$477,985,067.96}{100\%}$ = R$ 8,439,139.00

Thus, the value transferred from ICMS-e referring to the ParNa Iguaçu to the municipality of Céu Azul in the year 2022 was R$ 8,439,139.00.