

SEPARATE OPINION
OF JUDGE DONOGHUE

Compensation for “pure” environmental damage — Valuation of damage to environmental goods and services — Unsupported award for the value of restoration of the wetland.

1. I submit this separate opinion in order to set out the reasons for my votes with respect to compensation for the impairment or loss of environmental goods and services (Judgment, para. 157 (1) (a)) and restoration costs (*ibid.*, para. 157 (1) (b)).

I. COMPENSATION FOR THE IMPAIRMENT OR LOSS OF
ENVIRONMENTAL GOODS AND SERVICES

2. I agree with the Court that Costa Rica is entitled to compensation for the impairment or loss of environmental goods and services, but I consider that the sum awarded by the Court exceeds the valuation that is supported by the evidence.

3. Reparation is intended to restore an applicant to the position in which it would have been if the respondent had not engaged in the wrongful conduct that caused damage to the applicant. The task before the Court at the present stage of these proceedings is limited to determining compensation for the material damage caused to Costa Rica by Nicaragua’s wrongful conduct (*Certain Activities Carried Out by Nicaragua in the Border Area (Costa Rica v. Nicaragua)* and *Construction of a Road in Costa Rica along the San Juan River (Nicaragua v. Costa Rica)*, Judgment, *I.C.J. Reports 2015 (II)*, pp. 740-741, paras. 229 (5) (a) and 229 (5) (b)). Damage to the environment can include not only damage to physical goods, such as plants and minerals, but also to the “services” that they provide to other natural resources (for example, habitat) and to society. Reparation is due for such damage, if established, even though the damaged goods and services were not being traded in a market or otherwise placed in economic use. Costa Rica is therefore entitled to seek compensation for “pure” environmental damage, which the Court calls “damage caused to the environment, in and of itself” (Judgment, para. 41).

A. The Evidence in Support of Costa Rica's Claim

4. The environmental damage of which Costa Rica complains occurred in its territory. There is no reason to depart from the general rule that the party which alleges a fact in support of its claims bears the burden of proving that fact (*Pulp Mills on the River Uruguay (Argentina v. Uruguay)*, Judgment, I.C.J. Reports 2010 (I), p. 71, para. 162; *Ahmadou Sadio Diallo (Republic of Guinea v. Democratic Republic of the Congo)*, Compensation, Judgment, I.C.J. Reports 2012 (I), p. 332, para. 15). Thus, it falls to Costa Rica to establish to the satisfaction of the Court the nature and extent of the injury that it asserts. This calls for evidence regarding the physical changes in Costa Rican territory that followed Nicaragua's unlawful activities and the environmental goods and services that allegedly were impaired or lost as a result of those changes.

5. The pleadings and reports that Costa Rica has submitted at the compensation phase of this case focus on the environmental goods and services that could, in theory, be provided by a wetland and on the methodology to be used to value those goods and services. However, Costa Rica offers little evidence to support its assertions regarding the extent of damage or the particular goods and services that it claims to have lost. When the pleadings and reports in the present phase of the proceedings are considered along with evidence submitted to the Court in earlier stages of the proceedings, however, it is possible to form some appreciation of physical changes in Costa Rica's territory that resulted from Nicaragua's activities and the effect of those activities on environmental goods and services.

6. The Report of Ramsar Advisory Mission No. 69 of 17 December 2010 (Memorial of Costa Rica (Merits), Vol. IV, pp. 83-136 (Ann. 147)), submitted by Costa Rica in an earlier stage of this case, provides some general information about the physical characteristics of the *Humedal Caribe Noreste* (hereinafter "HCN") Ramsar site in which the *caños* constructed by Nicaragua were located. It indicates that the total area of the HCN is 75,310 hectares (*ibid.*, p. 101), that the HCN is a wetland that includes lakes, flooded forests, rivers and estuarine lagoons and that the wetland is of great importance as a resting place for neotropical migratory birds and is home to several species of salamander (*ibid.*, p. 102). It states that "[l]and use is principally given over to the development of agricultural and livestock rearing activities, tourism and fishing" (*ibid.*). Although Costa Rica has at times referred to the affected area as an "untouched wetland" (CR 2013/24, p. 19, para. 13 (Ugalde)), the evidence reveals a more nuanced picture. A 2011 Report of Costa Rica's Ministry of Environment, Energy and Telecommunications (Memorial of Costa Rica (Merits), Vol. IV, p. 278 (Ann. 155)) indicates that there has been an expansion of agricultural activity in the immediate vicinity of the area deforested by Nicaragua in 2010, and Costa Rica's expert

(Dr. Thorne) acknowledged in oral proceedings in 2015 that 52 hectares of flooded forest in the immediate vicinity of the 2010 *caño* had been cleared for agricultural purposes over the last decade or so (CR 2015/3, pp. 34-35 (Thorne)).

7. Nicaraguan personnel constructed three *caños* in the HCN. The first *caño* was excavated in 2010; the other two (western and eastern) *caños* were dug in 2013. Costa Rica's claim for compensation relates to the 2010 *caño* and the 2013 eastern *caño* only.

8. To construct the 2010 *caño*, Nicaragua cleared 5.76 hectares of land, within which it cleared a total of 2.48 hectares of forested land, located in three sectors of 1.67 hectares, 0.33 hectares and 0.48 hectares, respectively. The Parties disagree about the number and age of the trees that Nicaragua felled. I agree with the Court (Judgment, para. 79) that the removal of trees was the most significant damage caused by the excavation of the *caños*. I therefore review here the available evidence regarding the extent of this damage (that is, the number and age of felled trees).

9. In the first of the three sectors in which trees were felled to construct the 2010 *caño*, the Ministry of Environment, Energy and Communication of Costa Rica counted 197 felled trees (Memorial of Costa Rica (Merits), Vol. IV, pp. 47-64 (Ann. 145)). Costa Rica presented evidence that 66 per cent of these trees were older than 50 years and 46 per cent of the trees were older than 100 years (Memorial of Costa Rica on Compensation, Vol. I, p. 169 (Ann. 2); see also Memorial of Costa Rica (Merits), Vol. I, p. 366 (App. 1); Vol. IV, pp. 60-64 (Ann. 145)). The evidence suggests that Nicaragua felled close to 100 additional trees in the two other sectors and that the forests in those sectors were of a similar age to those in the first sector (Memorial of Costa Rica (Merits), Vol. IV, pp. 267-268 (Ann. 155)).

10. Nicaragua cleared an additional area of 0.43 hectares in constructing the 2013 eastern *caño*. There apparently were some trees in this area, although Costa Rica provided little information about them. At the merits stage of this case, Costa Rica's expert (Dr. Thorne) testified that the 2013 eastern *caño* was located on land that is much younger than is the area of the 2010 *caño*, and that did not have mature trees (CR 2015/3, p. 42 (Thorne)). Despite the distinction between the area of the 2010 *caño* and that of the 2013 eastern *caño* that Dr. Thorne recognized, Costa Rica uses the inventory of the 2010 *caño* as the basis for the portion of its compensation claim related to the 2013 eastern *caño*.

11. Taking into account the available information, I agree with the Court that the evidence establishes that Nicaragua felled approximately 300 trees. It did so in constructing the 2010 *caño*. There is no reason to doubt the evidence provided by Costa Rica regarding the age of those trees. For this reason, it seems appropriate to proceed on the basis that

recovery of the area of 2.48 hectares felled in construction of the 2010 *caño* will require 50 years. The other areas cleared to construct the 2010 *caño* (which were not forested) and the area of 0.43 hectares cleared to construct the 2013 eastern *caño* can be expected to recover more quickly. The evidence indicates that there has already been significant regrowth of plants other than trees.

12. Costa Rica bases its claim for compensation on six heads of damage: standing timber, other raw materials, gas regulation and air quality, natural hazards mitigation, soil formation and erosion control, and habitat and nursery (biodiversity). Costa Rica claims that all of these environmental goods and services will require a recovery period of 50 years and that, taken together, they should be valued at US\$2,823,111.74 (Memorial of Costa Rica on Compensation, Vol. I, p. 149 (Ann. 1)).

13. In respect of two of Costa Rica's categories (damage to natural hazards mitigation and to soil formation and erosion control), I agree with the Court that Costa Rica has not presented evidence establishing environmental damage (Judgment, para. 74). As to the remaining four heads of damages (standing timber, other raw materials, gas regulation and air quality and biodiversity), the Court concludes (rather summarily) that Nicaragua's activities have "significantly affected" the provision of these goods and services (*ibid.*, para. 75). I consider that the evidence that bears on this conclusion regarding the extent of damage to Costa Rica deserves closer scrutiny.

14. Costa Rica presents a summary of its assertions regarding the six heads of damage in tabular form in Table 14 of the Neotrópica Report (Memorial of Costa Rica on Compensation, Vol. I, p. 146 (Ann. 1)). According to Costa Rica, construction of the 2010 *caño* caused first-year damage to all six categories of goods and services that it values, in total, at approximately US\$100,000. Approximately one-third of this amount is based on alleged damage to soil formation and erosion control and seven per cent of the claim is based on alleged damage to natural hazards mitigation, both of which have been correctly rejected by the Court for lack of evidence.

15. Of the remaining four heads of damage, two loom large in Costa Rica's claim. Damage to standing timber accounts for approximately 20 per cent of Costa Rica's claim and damage to gas regulation and air quality is 37 per cent of Costa Rica's claim. The two remaining heads of damage (other raw materials and habitat and nursery (biodiversity)), taken together, account for only about two per cent of Costa Rica's claim.

16. There can be no doubt that the felling of trees caused significant damage to standing timber. As noted above, there is a basis in the evi-

dence to conclude that Nicaragua felled approximately 300 trees in constructing the 2010 *caño* and that the felled areas will take 50 years to recover.

17. The other significant head of damage claimed by Costa Rica is gas regulation and air quality. Under this head of damage, Costa Rica claims almost one million US dollars, as the present value of the alleged damage over 50 years (see Counter-Memorial of Nicaragua on Compensation, p. 135 (Ann. 1)). It bases this claim solely on the areas that Nicaragua deforested in constructing the two *caños*, a combined area of 2.91 hectares (Memorial of Costa Rica on Compensation, Vol. I, p. 146 (Ann. 1)). Costa Rica does not clearly define what it means by gas regulation and air quality, but the Neotrópica Report emphasizes the loss of carbon sequestration capacity.

18. Trees and other plants play an important role in carbon sequestration and deforestation can contribute to climate change. As Nicaragua points out, however, deforestation in one State leads to global damage to the capacity for carbon sequestration. Costa Rica nonetheless claims that it is entitled to compensation for the entire amount that it considers to be the value of the loss of carbon sequestration capacity.

19. Given the weight that Costa Rica attaches to its claim for damage to gas regulation and air quality services, its evidence in support of that claim should have been solid. However, Costa Rica relies primarily on a study authored by a graduate student that offers a valuation of damage far in excess of other studies noted by Costa Rica. The evidence presented by Costa Rica does not establish that Nicaragua's deforestation of an area of 2.91 hectares has had an impact on Costa Rica to the extent claimed by Costa Rica. Moreover, Costa Rica's claim that the gas regulation and air quality services provided by the affected area have been damaged at a level valued at almost one million US dollars must be considered in light of evidence that Costa Rica had allowed the clearing of land adjacent to the 2010 *caño* (see paragraph 6 above), with an area (52 hectares), which is almost twenty times the size of the area of 2.91 hectares on which Costa Rica bases its gas regulation and air quality claim. For all of these reasons, I do not find that Costa Rica has presented evidence supporting the Court's conclusion that Nicaragua's unlawful activities "significantly affected" gas regulation and air quality services. The damage to gas regulation and air quality that Nicaragua caused to Costa Rica is likely to be small.

20. It is not difficult to imagine that the destruction of trees and other plants and changes in water flows caused damage to the remaining two heads of damage — other raw materials (which I understand to mean the

plants other than trees that Nicaragua destroyed) and to the habitat and nursery (biodiversity) of numerous species, at least in the vicinity of the areas cleared by Nicaragua. As noted above, however, Costa Rica has given little weight to these services in its own valuation, and the areas cleared by Nicaragua make up only a tiny portion of the HCN, in which other, larger areas have been cleared for agricultural purposes. In addition, the recovery period for plants other than trees is likely to be shorter than the recovery period applicable to mature trees. These considerations lead to the conclusion that the damage to habitat and nursery (biodiversity) and other raw materials is not extensive.

21. I therefore conclude that Costa Rica has provided sufficient evidence to establish that Nicaragua's wrongful conduct caused significant damage to approximately 300 trees, many of them mature, and to the environmental goods and services provided by those trees, which will require 50 years to recover fully (standing timber). The destruction of trees and smaller plants (other raw materials) also caused a limited reduction in the environmental services of carbon sequestration (gas regulation and air quality) and habitat and nursery (biodiversity).

B. Valuation

22. Valuation of damage to environmental goods and services that have not been traded in a market is a matter of approximation and extrapolation. Neither Party presents a methodology that is entirely satisfactory. However, the approaches suggested by the Parties can assist the Court in arriving at an appropriate level of compensation.

23. Nicaragua pointed to a number of flaws in Costa Rica's valuation methodology, leading me to conclude that Costa Rica's methodology provides only limited assistance to the Court. I note three illustrations of shortcomings in that methodology:

- (a) As Nicaragua points out, in calculating the value of standing timber, Costa Rica's methodology uses an annual value, as if each tree could have been harvested each year for 50 years. Nicaragua makes a convincing case that standing timber should be valued as a one-time loss of each tree.
- (b) To estimate the cost of lost gas regulation services (carbon sequestration) in the affected area, Costa Rica draws values for carbon stock and annual carbon flow from a non-peer-reviewed study by a graduate student, ignoring other studies with lower valuations. Costa Rica

applies both the value of the stock and the value of the flow over a 50-year recovery period, assigning one-year values of US\$14,955 to carbon stock and US\$27 to carbon flow (Memorial of Costa Rica on Compensation, Vol. I, p. 146 (Ann. 1); p. 158 (Ann. 1, App. 3)), respectively. As Nicaragua notes, however, even assuming that carbon flow is lost each year, the carbon stock of a tree is released into the atmosphere once, when the tree is felled (Counter-Memorial of Nicaragua on Compensation, para. 4.25). Because Costa Rica's valuation is based almost entirely on stock, with only a negligible value assigned to flow, its methodology leads to a significant inflation of the value assigned to gas regulation and air quality.

- (c) Costa Rica states that its calculations are based on a 4 per cent "discount rate", which is said to account *both* for the present value of the loss of goods and services in future years and for the rate of recovery of those services over a 50-year period. Nicaragua points out that a discount rate and a recovery rate are not one and the same, and that they are not typically combined into a single figure. Because Costa Rica's valuation methodology assumes natural recovery over a 50-year period, a recovery rate would take into account the fact that, in each successive year during the 50-year period, the impairment of goods and services decreases. A discount rate, on the other hand, takes into account the time-value of money and is used to calculate the present value of lost goods and services allocated to future years. The higher a discount rate, the lower the present value of future-year losses. Costa Rica combines both a recovery rate and a discount rate (as the term is usually used) within a single 4 per cent figure and appears to be applying a low discount rate and a low recovery rate, thus increasing the size of its claim, without explaining the basis for doing so.

24. I find more value in the approach that Nicaragua takes to the valuation of damage, at least as a starting-point. To value the environmental damage for which Costa Rica should be compensated, Nicaragua calls attention to a Costa Rican Government "Forest Conservation Certificate" programme which, according to a Costa Rican official, "was created for the purpose of remunerating the owner or holder [of land] for the environmental services generated by conserving their forest" (Reply of Costa Rica on Compensation, p. 134 (Ann. 1, App. 10)). The programme, according to this official, is

"a mechanism used by the Costa Rican Government to monetarily compensate particular forest owners for their conservation efforts,

given the fact the society at large benefits from a variety of services that impact the protection and the improvement of the environment (The Forest Law refers to these services as ‘. . . greenhouse gases mitigation (fixing, reduction, sequestration, storage and absorption) protection of water for urban, rural or hydroelectric use, protection of biodiversity for its conservation sustainable, scientific and pharmaceutical use, research and genetic improvement, protection of ecosystems and diverse forms of life and natural scenic beauty for tourism and scientific purposes.’)” (Reply of Costa Rica on Compensation, p. 134.)

25. Thus, this programme is designed to compensate landowners who preserve land that provides an array of environmental services to Costa Rican society, including certain of the environmental services that are at issue in the present case (greenhouse gas mitigation and the protection of biodiversity and ecosystems). Because the programme assigns an overall value to all environmental services provided by the forested area, its use as a valuation methodology does not require separate valuation of each environmental service for which Costa Rica seeks compensation.

26. Using the highest level of compensation that Costa Rica has paid under this programme, adjusted to 2017 US dollars (US\$309 per hectare per year), and based on a recovery period of 30 years, Nicaragua (using a 4 per cent discount rate) assigns a maximum present value of just under US\$35,000 to the environmental damage caused by its activities. (It is appropriate that Nicaragua does not further reduce the amount of compensation to take into account the rate of recovery, given that the programme would appear to apply regardless of the extent of recovery in a given year.)

27. The programme invoked by Nicaragua is, at best, an approximation of the value of the environmental services that the affected area provided to the State of Costa Rica and its population, which were damaged by Nicaragua’s conduct. In two respects, Nicaragua’s methodology may undervalue the services damaged by Nicaragua. First, Nicaragua bases its valuation on annual payments until the damaged area recovers. Its maximum valuation of US\$35,000 is based on a 30-year recovery period. However, the services provided by the mature forests on the 2.48 hectares of land that Nicaragua deforested will be impaired during a 50-year recovery period. The compensation suggested by Nicaragua should therefore be increased to take into account the present value of annual payments in respect of these 2.48 hectares throughout a 50-year recovery period (i.e. by adding to the above-mentioned US\$35,000 the present value of payments in years 31-50 for 2.48 hectares at US\$309 per hectare (using Nicaragua’s 4 per cent discount rate)). Secondly, Costa Rica has pointed out that the programme cited by Nicaragua does not apply to

government-owned land and that the programme is not specific to wetlands. It may be that the environmental services provided by 6.19 hectares of land in a protected wetland should be assigned a value that exceeds the maximum rate that Costa Rica has previously paid in this programme. Taken together, these considerations call for an increase in the valuation of environmental services based on Costa Rica's programme, perhaps in the range of five to ten thousand US dollars.

28. There is an additional reason why the programme invoked by Nicaragua does not appear to capture all of the environmental damage caused by Nicaragua to Costa Rica. As described by the above-cited Costa Rican official, this programme compensates landowners for the value to Costa Rican society of environmental services. The programme applies to land on which there has been no timber harvest during the preceding two years (Reply of Costa Rica on Compensation, p. 134 (Ann. 1, App. 10)). Thus, the rate of compensation does not appear to take into account the value of standing timber, which may or may not be found on the land in each year of payment. If the Forest Conservation Certificate programme is used to value the environmental damage to Costa Rica, it must be supplemented by another methodology that assigns a value to the 300 felled trees as standing timber.

29. Costa Rica's methodology for valuing standing timber makes use of the market value for timber. This is a reasonable proxy for their value, despite the fact that the felled trees were not being grown for timber. As noted in the Neotrópica Report, the felled trees were part of Costa Rica's "national reserves" (Memorial of Costa Rica on Compensation, Vol. I, p. 128 (Ann. 1)), which could have been harvested and sold as timber.

30. The Neotrópica Report assigns a value of US\$19,558.64 and 1,970.35 to the first-year standing timber losses for, respectively, the 2010 and 2013 eastern *caños* (*ibid.*, p. 146). As it does for all of the environmental services for which Costa Rica seeks compensation, Neotrópica then applies the first-year loss value over a 50-year recovery period, using a 4 per cent "discount rate", to reach a total loss for each environmental service over that 50-year period (Memorial of Costa Rica on Compensation, Vol. I, para. 3.18; pp. 134-147 (Ann. 1); pp. 167-171 (Ann. 2); Reply of Costa Rica on Compensation, pp. 67-69 (Ann. 1)). Using Neotrópica's methodology, Costa Rica's total claimed compensation for standing timber is approximately US\$462,490 (see Counter-Memorial of Nicaragua on Compensation, p. 135 (Ann. 1)). However, as noted above, I find persuasive Nicaragua's criticisms of the methodology that Costa Rica uses to arrive at this value, which appears to be premised on the assumption that

each tree is harvested each year for 50 years. Relying on its own experts, who have recalculated the value of the standing timber by changing only this one element of Costa Rica's methodology (and, *arguendo*, accepting all other elements), Nicaragua concludes that the lost standing timber should be assigned a value of approximately US\$30,000.

31. Starting from the present value of the lost or impaired environmental services that Nicaragua calculates based on the Costa Rican Forest Certificate programme (US\$35,000), adjusted to take into account (i) a 50-year recovery period for the deforested area of 2.48 hectares of mature forest and (ii) the fact that the damaged area was in a protected wetland, I conclude that the lost or impaired environmental services (including gas regulation and air quality, habitat and nursery (biodiversity) and other raw materials) should be assigned a present value of approximately US\$40,000 to US\$45,000. This valuation should be supplemented by a value for lost timber of approximately US\$30,000. In total, it appears that the present value of the environmental goods and services damaged by Nicaragua's unlawful conduct is in the range of US\$70,000 to US\$75,000.

32. I agree with the Court that valuation of "pure" environmental damage is inevitably an approximation based on just and reasonable inferences. In the present case, however, the alleged damage is to a small area about which the Court has made extensive inquiries over a period of years. In such circumstances, a survey of the evidence regarding the extent of damage to environmental goods and services would assist the Court in ensuring both that the compensation that it awards provides reparation to the applicant and that it does not impose punitive or exemplary damages on the respondent. I consider that the reasoning in the Judgment does not provide a sufficient justification of the level of compensation set by the Court. I have voted in favour of the amount set by the Court, but have done so with some misgivings.

II. COSTA RICA'S CLAIM FOR THE VALUE OF RESTORATION OF THE WETLAND

33. I have voted against paragraph 157 (1) (b) awarding US\$2,708.39 to Costa Rica for the "value for restoration of the wetland" (Memorial of Costa Rica on Compensation, p. 147 (Ann. 1; Report from Fundación Neotrópica)). Although the amount of compensation awarded in para-

graph 157 (1) (b) is a miniscule part of Costa Rica’s total claim, I consider that Costa Rica has not met its burden to prove the facts on which it bases this element of its claim, and thus that the Court should have rejected it.

34. As the Court observes (Judgment, para. 43), “active restoration measures” may be warranted when natural recovery does not suffice to restore the damaged environment to its prior condition. It was open to Costa Rica to pursue such active measures (for example, the replanting of trees) and to seek compensation for the cost of those measures.

35. In the Counter-Memorial on Compensation, Nicaragua addressed Costa Rica’s claim for restoration (both the claim for “restoration of the wetland” and a claim for soil replacement). Nicaragua pointed out that “there is no indication in the Memorial that Costa Rica has any intention to carry out further restoration work” and that none of the four reports that are cited by Fundación Neotrópica recommended restoration measures beyond the construction of the dyke in 2017 (Counter-Memorial of Nicaragua on Compensation, para. 4.35; Rejoinder of Nicaragua on Compensation, para. 2.3). Costa Rica could have countered these assertions in its Reply on Compensation, but did not do so. In the absence of evidence that Costa Rica intends to pursue active “restoration of the wetland” measures, I consider that the compensation to Costa Rica for environmental damage should have been limited to compensation for the value of environmental goods and services impaired or lost as a consequence of Nicaragua’s unlawful activities.

(Signed) Joan E. DONOGHUE.
