Environmental Defense Fund

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Director Shalanda Young
Office of Management and Budget
725 17th Street NW
Washington, DC 20503

Re: Comments on OMB's Proposed Guidance for Assessing Changes in Environmental and Ecosystem Services in Benefit-Cost Analysis

Environmental Defense Fund (EDF), along with the undersigned organizations, respectfully submit the following comments in response to the Office of Management and Budget's (OMB) *Request for Comment on Proposed Guidance for Assessing Changes in Environmental and Ecosystem Services in Benefit-Cost Analysis (Docket ID: OMB-2022-0016)*[1]. We appreciate that OMB is taking a major step forward in assuring future benefit-cost analyses more comprehensively evaluate environmental impacts by incorporating the value of changes in ecosystem services.

For years, our organizations have advocated for the incorporation of ecosystem service values in federal benefit-cost analyses. These goods and services provided by nature contribute to human well-being and sustainable development in a myriad of ways. Enhancing the provision of ecosystem services can create large economic benefits for society, whereas the loss of these services has historically and will continue to have severe negative impacts on social welfare. Failing to account for the value of changes in ecosystem services in regulatory impact assessments may consequently risk the selection of policy alternatives that do not maximize improvements to social welfare. The loss of ecosystem services can also result in additional infrastructure investment costs to address societal needs that were historically provided by nature. Therefore, it is not only important to estimate ecosystem service benefits provided by various policy alternatives, but also the costs associated with the loss of those services.

We are broadly supportive of the inclusion of ecosystem service values in federal benefit-cost analyses and are appreciative of OMB's efforts to provide standardized guidance to federal agencies on how to assess and value ecosystem services consistent with Circulars A-4 and A-94.

[1] OMB, Request for Comments on Proposed Guidance for Assessing Changes in Environmental and Ecosystem Services in Benefit-Cost Analysis, 88 Fed. Reg. 50912 (Aug. 8, 2023).

The incorporation and mainstreaming of these guidelines in federal benefit-cost analyses holds the potential to improve policy-making that generates greater net benefits to society for generations.

As the *Guidance for Assessing Changes in Environmental and Ecosystem Services in Benefit-Cost Analysis* is finalized over the coming months, we recommend preserving the existing core principles on how to conceptualize the measurement and inclusion of these values, but we suggest expanding the guidance on the data, methodological tools, and analytical procedures needed to conduct these analyses in practice. In the following sub-sections, we respectfully encourage the consideration of several recommendations: 1) greater emphasis on practical analytic approaches, 2) expand on the contextual factors affecting ecosystem services, 3) evaluate the distributional equity of ecosystem service benefits, and 4) acknowledge uncertainty and potential for underestimation in valuing ecosystem services.

Greater Emphasis on Practical Analytical Approaches

The proposed guidance provides an extensive conceptual review of the ways that regulation could affect natural systems, built systems, and social systems, and how those changes could in turn affect the provision of ecosystem services. This conceptual guidance reflects best practices for valuation of ecosystem services, but should be expanded to provide greater emphasis on how to conduct these analyses in practice and acknowledge the analytical challenges involved in the valuation of ecosystem services. This should include more practical, real-world examples that elucidate the complexities and steps involved in various ecosystem service valuation scenarios. These examples should be relevant and applicable to each federal agency conducting these analyses in order to highlight where difficulties may arise and how to overcome them.

As referenced throughout the guidance document, assessing the value of changes in ecosystem services often requires interdisciplinary approaches, tools, and methodologies. For example, Figure 2 provides two hypothetical pathways for how a regulatory change affecting road development could lead to changes in mortality from smoke and fire and changes in recreational access. Each step described in these causal pathways requires unique analytical approaches, likely drawing on methodological approaches from ecology, forestry, atmospheric chemistry, meteorology, epidemiology, and economics. To help address this challenge, we suggest that OMB highlight examples of previous empirical studies that demonstrate best practices and provide recommendations for commonly used modeling tools and publicly-available datasets that may support this type of analysis. For instance, it would be useful to describe the chemical transport models needed to estimate wildfire smoke dispersion and identify relative risk factors linking exposure to PM2.5 and mortality. In this specific example, there also needs to be additional guidance on how to translate a change in physical health outcomes or a change in recreational opportunities to a change in economic value, including clearer guidance on the Value of a Statistical Life and examples for conducting travel-cost and hedonic price analyses.

Throughout the proposed documentation, there should also be greater acknowledgment of the analytical challenges involved in the biophysical modeling that often underlies ecosystem service valuation. For example, on page 26, it is suggested that *"monetizing ecosystem services may be as simple as adding an additional parameter to other equations or calculations. For example, an agency may already be using a flood risk model to estimate property damages, but that model may not capture the way that natural vegetation affects flood risk. Altering a single parameter in the existing flood model to reflect natural vegetation could represent the ecosystem service-change pathway and provide an efficient way to monetize the service."* While this may seem straightforward in principle, this simple act of "adding an additional parameter" to a flood model may require considerable time, expertise, and computational resources. In our view, the agencies responsible for conducting these specific types of analyses (i.e., FEMA, USACE, and NOAA) are not incorporating ecosystem service values in their benefit-cost analyses in part because it is practically quite challenging. OMB could help to address this gap by including references to past studies that have done this well and identifying hydrologic and hydraulic models that are well suited to incorporating the effects of natural vegetation. Furthermore, similar to how Circular A-4 and A-94 provide specific values for the recommended discount rate and equity weights, the guidance document could provide specific references to recommended parameter values for representing the effects of land use and land cover types within these models.

We also suggest highlighting the potential tradeoffs between analytical rigor, feasibility, and generalizability in conducting ecosystem service analyses. At present, the guidance document offers conceptual recommendations for best practices in designing these assessments. However, it should be recognized that due to lack of available data, modeling capacity, and other practical challenges, it may not always be possible to follow these best practices. To this end, we suggest acknowledging that when following best practices is not possible, there are always second-best and third-best alternative approaches. This type of guidance is described for non-market valuation – i.e., revealed preference methods are preferable to stated preference, etc. – and could also be described for other aspects of ecosystem service modeling process. For example, a locally-developed 2-dimentional hydraulic model that estimates changes in flood damage associated with changes in wetlands (see page 26; e.g., 2D HEC-RAS models) is preferable to geographically-agnostic, averaged estimates of the value of wetland loss (see page 28; e.g., Taylor and Druckenmiller 2022); however, in the absence of that hydraulic model, using generalizable per acre estimates of the value of wetlands is better than nothing.

Expand on the Contextual Factors Affecting Ecosystem Services

We recommend further emphasizing how the types of goods and services provided by various ecosystems depend on the configuration of the landscape and surrounding land use. For example, the value of flood mitigation services provided by wetlands will likely be greater for those located directly upstream of urban development. However, wetlands located in less urban landscapes may provide greater cultural and recreational benefits or benefits to communities further downstream. Generalizable average estimates of the dollar value per acre of wetlands rarely account for this

spatially heterogeneity in the benefits provided by wetlands and may therefore significantly under- or over-estimate their value in a given context. Instead, it is critical that the value of ecosystem services account for contextual factors, such as beneficiary demand for services, watershed topography, built infrastructure, and local climate. Given the high degree of spatial variation in the value of many ecosystem services, the updated guidance should emphasize the importance of spatial analysis in ecosystem service valuation and offer guidance on handling spatial data.

Servicesheds are useful conceptual and analytical tools for understanding the spatial-dependance of ecosystem services, but more detailed guidance is needed on how to delineate these areas. For some ecosystem services, particularly hydrologically-based services, a serviceshed can be clearly delineated based on physical outcomes (e.g., rainfall drainage); for other services, servicesheds may not be as easily spatially delineated. Given this variation across ecosystem services, a more detailed definition of servicesheds and examples for different provisioning, regulating, and cultural ecosystem services would help agencies apply this concept more consistently. We recommend that OMB clarify this concept further and provide more nuanced guidance on how to define and determine the extent of relevant "servicesheds" for various ecosystem services.

Evaluate Distributional Equity of Ecosystem Service Benefits

As is clearly stated in the proposed updates to Circulars A-4 and A-94, analysis of the distribution of benefits and costs allows for more effective consideration of regulatory alternatives. This guidance is particularly important for evaluating policies that affect the provision of ecosystem services, as research has shown that ecosystem service benefits are often unevenly distributed among socioeconomic and demographic groups and among rural and urban communities[2]. In general, non-white and lower-income populations disproportionately bear the burden of declines in ecosystem service benefits. These disparities, and any polices designed to rectify them, must therefore be evaluated in the context of the historical, political, and economic forces that have reinforced environmental privilege and perpetuated class and race-based injustice. As OMB simultaneously improves its guidance on distributional analysis and ecosystem service valuation in federal benefit-cost analyses, it is critical to consider not only the benefits and costs of changes in the provision ecosystem services, but also to whom those benefits and costs are accruing. These improvements to benefit-cost analysis have the potential to increase both the efficiency and equity of federal regulations and investments.

Acknowledge Uncertainty and Potential for Underestimation in Valuing Ecosystem Services

The estimated value of ecosystem services is often uncertain and may be sensitive to a range of inputs and methodological approaches. The extent of uncertainty can be driven by uncertainty in parameter values, datasets, and model functional form. Moreover, estimates derived from non-

[2] Gourevitch, J. D. *et al.* Projected losses of ecosystem services in the US disproportionately affect non-white and lower-income populations. *Nature Communications* **12**, 1-9 (2021).

market valuation approaches may be particularly prone to high uncertainty, as these outputs may be difficult to validate with observed data. To navigate these challenges, federal agencies would benefit from OMB offering simple methodologies that can be used to quantify uncertainty, such as using sensitivity analyses and Monte Carlo simulations. Such strategies will ensure a more grounded, transparent, and comprehensive approach to policymaking and ecosystem service valuation.

In assessing uncertainty in ecosystem service values, it is important to recognize the potential for underestimation of benefits and costs. For some types of ecosystem services, non-market valuation methodologies may be subject to biases that systematically underestimate the value of ecosystem service benefits, leading to flawed benefit-cost analyses. For instance, one recent review estimates the median benefit-cost ratio of policies designed to decrease water pollution is 0.37[3]. One conclusion from this study could be that the costs of improving water quality truly outweigh the benefits, and therefore these policies are unjustified. An alternative conclusion could be that deficiencies in integrated assessment modeling and econometric approaches, combined with the omission of certain benefits, may generate incomplete analyses and lead to flawed decision-making. This raises the question: if policies designed to enhance the provision of ecosystem services yield a benefit-cost ratio of less than one, are those policies inefficient, or are the methods of calculating benefits and costs flawed? We recommend that the draft guidance provide greater insight on this issue, and acknowledge the potential for downward bias, particularly for non-market valuation methods.

Double-counting of ecosystem service values is also an important pitfall to avoid. As ecosystem service values can represent multiple ecosystem processes, multiple types of benefits, and multiple groups of beneficiaries, it is important to recognize the nuances of double-counting. For example, in some cases, summing hedonic- and travel cost-based values may double-count some portion of the value of recreational services if the beneficiaries are the same. However, in other cases, the hedonic pricing approach and travel cost approach may appropriately capture different beneficiaries' values, as travelers and home buyers may value the same service differently. In this case, summing the hedonic and travel cost values would not constitute double-counting. Given these complexities in evaluating the potential for double-counting, we recommend including a section in the guidance document that describes common double-counting pitfalls and best-practices to avoid them.

Another component of uncertainty in the valuation of changes in ecosystem services stems from the development of an analytical baseline. As is discussed in Circular A-4, the baseline is not a description of the status quo, but rather a forecast of the way the world would look absent the regulatory action being assessed. Identifying a realistic baseline in the context of ecosystem service provision can be particularly challenging, as global environmental and demographic

[3] Keiser, D. A., Kling, C. L. & Shapiro, J. S. The low but uncertain measured benefits of US water quality policy. *Proceedings of the National Academy of Sciences* **116**, 5262-5269 (2019).

changes are constantly changing the supply of and demand for ecosystem services. Absent of the policy or regulatory action being considered, a reasonable baseline must account for dynamic shifts in climate, ecological and physical processes, landscape configuration, and biodiversity loss that are predicted to occur over the coming decades. Likewise, changes in population distribution, demographics, and socioeconomics will inevitably alter the value of ecosystem services, even if supply remains constant. Accounting for these temporal dynamics affecting ecosystem service baselines will be increasingly challenging as the time horizon of analysis increases; however, failing to do so will result in misvaluing changes in ecosystem services.

Conclusion

We are strongly supportive of the inclusion of ecosystem service values in federal benefit-cost analyses. In our view, this draft guidance on how to assess changes in ecosystem service benefits is a critically important step towards operationalizing and mainstreaming these values in federal decision-making processes. We broadly recommend preserving the core principles for how to conceptualize the valuation of ecosystem services as currently described in the draft guidance, and recommend providing additional detail on the data, methodological tools, and analytical procedures needed to conduct these analyses in practice. Lastly, we recommend OMB prioritize the implementation of this guidance into standard operating procedures into federal agencies whose decisions could have the most significant detrimental impact on ecosystem services, including the U.S. Army Corps of Engineers, the Department of Transportation and the Department of Energy.

We thank OMB for its consideration of these comments and welcome the opportunity to further discuss these comments. Please reach out to Jesse Gourevitch at jgourevitch@edf.org.

Sincerely,

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