

1 **Section 4.1 Criteria for Choosing Valuation Methods**

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3 **4.1.1 The Need for Criteria**

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5 In advocating an expanded and integrated approach to valuing the protection of  
6 ecological systems and services, the committee has urged the Agency to consider and  
7 experiment with the use of a broader set of valuation methods. This chapter provides an  
8 overview of the methods that the committee examined, which are discussed in more  
9 detail in Appendix B. The methods vary in the degree to which researchers have  
10 developed conceptual frameworks for the methods, the degree to which they have been  
11 subject to testing, and the degree to which they have been used in actual valuation  
12 studies.

13 The committee’s recommendation that EPA consider the use of an expanded set  
14 of methods is based on a presumption that any method used by the Agency would need to  
15 meet relevant scientific standards. Thus, before relying on any given method in a  
16 particular valuation process, it is imperative that the method be evaluated to determine if  
17 there is a sound scientific basis for its use in that context. Methods that are in their early  
18 stages of development and application to valuation will need to be evaluated both for  
19 their scientific merit and for their appropriateness in the given context of interest.  
20 Methods that are well-developed and have been extensively used for valuation and  
21 validated in other contexts should still be evaluated for their suitability in the specific  
22 valuation context at hand. In either case, the evaluation should be based on a common set  
23 of criteria developed specifically for this purpose. Because of limited resources and the  
24 particular expertise of the committee members and because suitability will generally be  
25 context specific, the committee has not developed a full set of criteria for evaluating  
26 methods and applied those criteria comprehensively to the methods described here  
27 (although some strengths and weaknesses of the methods are discussed in Appendix B).  
28 The committee urges EPA to develop a list of criteria and evaluate methods based on that  
29 list prior to using them for valuation. Some suggestions for criteria that EPA should  
30 consider for inclusion on the list are described briefly below (see Section 4.1.2).

31 In developing criteria for evaluating valuation methods, a distinction should be  
32 made between criteria for evaluating the suitability of a particular method as it might be

1 applied in a given context (i.e., evaluating the scientific merit and suitability of the  
2 method *itself*) and criteria for evaluating the manner in which the method is actually  
3 applied (i.e., evaluating the *implementation* of the method). For example, the question of  
4 whether a survey-based method can appropriately be used to estimate or elicit value(s) in  
5 a particular context is a different question (requiring different criteria) than the question  
6 of whether a specific survey was properly designed and executed so as to estimate or  
7 elicit the intended value(s). If not properly implemented, any method can yield results  
8 that are not useful for the intended purpose. For any individual method, criteria can be  
9 developed to ensure that the method is carefully implemented, and criteria of this type  
10 exist for many of the methods described here (give refs). The committee recommends  
11 that the Agency develop a “higher-order” list of criteria designed to evaluate the  
12 suitability of specific methods in specific contexts, assuming that if used the method  
13 would be implemented according to “best practices” as defined by applicable criteria  
14 specific to that method.

#### 16 **4.1.2 Some Suggested Criteria**

17 While not prescribing the specific criteria that EPA should use to evaluate  
18 methods before using them in a specific context, the committee offers here some  
19 suggested criteria that might be included. These are based on related discussions in the  
20 literature on criteria for evaluating valuation methods (give refs), as well as the  
21 committee’s own deliberations.

22 A primary consideration in the evaluation of a method should be the extent to  
23 which the method seeks to elicit or measure a concept of value that has a consistent and  
24 transparent theoretical foundation that is appropriate for the intended use. The committee  
25 recognizes that different valuation methods are designed to measure different concepts of  
26 value, but in order for a method to be appropriate for any valuation context it must seek  
27 to measure a concept of value that is well-defined, theoretically consistent, and relevant  
28 for the particular valuation context. For example, a method derived from a biodiversity-  
29 based theory of value would not be relevant in a context where biodiversity is not  
30 important. Similarly, legal requirements may prescribe a theory of value to be used in a  
31 particular valuation context. For example, OMB’s Circular A-4 requires use of economic

1 value where possible. Thus, the Agency should consider the theory of value underlying a  
2 particular method and its relevance when evaluating the appropriateness of using that  
3 method in a specific context.

4         Given that a method seeks to elicit or measure a well-defined concept of value,  
5 another over-arching criterion for evaluation is validity, i.e., how well the method  
6 measures, estimates or elicits the true value (Gregory, et al. 1993; Freeman, 2003;  
7 Fischhoff 1997). Ideally, a method should measure only what it is supposed to measure.  
8 Unfortunately, since true values are typically unobservable, other criteria must be used to  
9 assess the extent to which the method is likely to yield a measure, or at least an unbiased  
10 estimate, of the true value. Examples of criteria that provide information about the  
11 validity of a method include:

- 12         ○ Does the method provide estimates that capture the critical features of the relevant  
13         population's values, including how deeply they are held? To the extent that an  
14         Agency action has multiple consequences -- for example, both ecological and  
15         human health effects -- a method that captures information about values  
16         associated with both types of effects will provide a more comprehensive measure  
17         of the value of those changes. Similarly, a method that captures multiple sources  
18         of value will be more comprehensive than one that focuses on a single source of  
19         value, such as biodiversity.
- 20         ○ Is the method designed to measure value directly, or does it instead seek to  
21         measure a proxy for value or assess value using a constructed scale? *Ceteris*  
22         *paribus*, methods that seek to estimate or elicit values directly can be expected to  
23         have greater validity than those that seek to measure something that is simply  
24         correlated with value (i.e., a proxy for value) or that use a constructed scale for  
25         expressing values.
- 26         ○ Does the method impose demands on respondents that limit their ability to  
27         articulate values in a meaningful way? For example, does the method impose  
28         unrealistic cognitive demands on individuals expressing values? Does it allow  
29         those individuals to engage in the process that they would normally undertake to  
30         identify or formulate and then articulate their values?

- 1       ○ Does the method yield value estimates for individuals that those individuals  
2       would, if asked, consent to have used in the proposed way? Fischhoff (2000)  
3       suggests that this form of implied informed consent can help to ensure the quality  
4       of valuation data generated by a given method and to avoid inappropriate use of  
5       the resulting value estimates, by ensuring that individuals would “stand behind  
6       researchers’ interpretation of their responses” (p. 1439).
- 7       ○ Does the method ensure that measured or elicited values reflect relevant scientific  
8       information? A basic premise of the valuation approach proposed by the  
9       committee is that valuation seeks to elicit or measure values that individuals  
10      would hold if well-informed about the relevant science. This does not require that  
11      all individuals expressing values know as much as scientific experts in the field,  
12      but rather that they understand as much of the science as necessary to make  
13      informed judgments. For example, they must be aware of the magnitude of the  
14      changes in ecosystem services or characteristics that would result from the  
15      ecological changes being valued.
- 16      ○ Does the method yield value estimates that are responsive to changes in variables  
17      that the relevant theory suggests should be predictors of value, and invariant to  
18      changes in variables that are irrelevant to the determination of value? For  
19      example, under an economic theory of value, an increase in the quantity of the  
20      good being valued should result in an increase in the magnitude of expressed  
21      values. This form of validity has been termed “construct” validity (Freeman,  
22      2003; Fischhoff, 1997).
- 23      ○ Can value estimates generated by the method be replicated if the valuation were  
24      conducted by other researchers, at a different point in time, or in different settings  
25      that in theory should produce similar value estimates? The expressions of value  
26      should be stable in the sense that they should not change upon further reflection  
27      (Fischhoff, 1997) and are not unduly influenced by specific researcher or group  
28      characteristics (in the case of methods that involve group processes).

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30       A basic premise of the CVPESS valuation approach is that it seeks to measure the  
31      values held by the public. Thus, another criterion for evaluating a method is whether the

1 values that it measures are representative of the values held by the relevant population.  
2 Even if a method provides a valid estimate of an individual’s values, it will not generate  
3 valid information about the values of the public if the estimated values are not  
4 representative of the values held by the broader population.

5           Methods can also be evaluated on the extent to which the resulting value  
6 estimates can be transparently communicated in a useful format to those who will use the  
7 value information. Decision makers and the public should be able to understand how the  
8 value measures relate to and inform the decision that needs to be made.

9           Finally, given the Agency’s time and resource constraints, methods should also be  
10 evaluated based on the cost of implementation, including the required personnel,  
11 monetary resources, and expertise. For example, *ceteris paribus*, methods that rely on  
12 readily available secondary data will be less costly to use than those that require  
13 extensive primary data collection or deliberative interactions.

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