

# ECONOMIC GUIDANCE FOR WATER QUALITY STANDARDS

## WORKBOOK

### 1. INTRODUCTION

As presented in the Water Quality Standards Regulation, economic factors are taken into consideration at various points in the process of setting, enforcing, or changing Water Quality Standards. This guidance is presented to assist States and applicants in understanding the economic factors that may be considered, and the types of tests that can be used to determine if a designated use cannot be attained, if a variance can be granted, or if degradation of high-quality water is warranted. In order to remove a designated use or obtain a variance, the State or discharger must demonstrate that attaining the designated use would result in substantial and widespread economic and social impacts. Likewise, if a degradation in high-quality water is proposed, it must be shown that lower water quality is necessary to accommodate important social and economic development.

This workbook provides guidance for those seeking to remove a designated use (such as might occur under a Use Attainability), or obtain a variance based on economic considerations, or to lower water quality in a high-quality water. In addition, it provides guidance to States and EPA regions responsible for reviewing requests for variances and modifications to designated uses, and for approval of antidegradation analyses. The guidance describes the types of information and analyses that should be considered by applicants and reviewers. The guidance, however, is not an exhaustive description of appropriate economic impact analyses. Additional information and tests may be necessary and/or desirable in certain circumstances.

The economic impacts considered are those that result from treatment beyond that required by technology-based regulations. Since water quality cannot be lower than that resulting from technology-based limits applied to direct and indirect point source discharges and reasonable Best Management Practices (BMP) applied to nonpoint sources, these are considered to be the baseline. All economic impact analyses of water quality standards should, therefore, address only the cost of improving the water to meet water quality standards or the cost of maintaining water quality in high-quality waters.

Although EPA is responsible for approving a State's water quality standards, the State is responsible for interpreting the circumstances of each case and determining

where there are substantial and widespread economic and social impacts, or where important social and economic development would be inappropriately precluded. Each analysis of economic impacts must demonstrate:

- that the polluting entity, whether privately or publicly owned, would face substantial financial impacts due to the costs of the necessary pollution controls (substantial impacts or would interfere with development), and
- that the affected community will bear significant adverse impacts if the entity is required to meet existing or proposed water quality standards (widespread impacts or important development).

This Workbook supplements the description contained in the *Water Quality Standards Handbook*, which should be read first as it contains many important definitions and descriptions of the regulations. Specific attention should be paid to Chapters 2 (Designation of Use) and 4 (Antidegradation), which describe the context in which this guidance is to be used. This Workbook is designed as a series of worksheets and accompanying guidance to be used when actually calculating the impacts of pollution control.

The intent of this workbook is to point States and dischargers in the right direction. It does not give definitive answers as to whether or not an entity has demonstrated substantial, widespread, or important economic and social impacts. If a State or discharger has difficulty with any part of the analysis presented in this workbook, they should consider seeking the assistance of a financial expert. In addition, State and regional EPA water quality staff should feel free to contact EPA headquarters' Economic and Statistical Analysis Branch in the Office of Water for advice and assistance.

The remaining sections of Chapter 1 provide an overview of the analysis and describe various factors and concepts that generally apply to analyzing the economic impacts of compliance with water quality standards. The following four chapters provide detailed guidance.

Throughout this Workbook, the term "financial impacts" refers to impacts on the entity or party that will pay for the pollution control, whereas the term "socioeconomic impacts" refers to changes in the social and/or economic conditions of the affected community. For public-sector entities, such as a publicly owned treatment works (POTW), substantial impacts include financial impacts on the community, taking into consideration current socioeconomic conditions. Widespread, on the other hand, refers to changes in the community's socioeconomic conditions. By contrast, for private-sector entities, substantial impacts refer to financial impacts and widespread

impacts refer to socioeconomic impacts on the surrounding community. In addition, the term "applicant" refers to whomever will actually complete the economic impact analysis, whether it be the State, an individual discharger, a consultant, or some other organization.

## **1.1 Designated Uses, Variances, and Antidegradation**

Pursuant to the Water Quality Standards Regulation (40 CFR 131), States must define statewide water quality goals by: 1) designating water uses and 2) adopting water quality criteria that protect the designated uses. When designating uses, States must consider the use and value of the waterbody for public water supplies, protection and propagation of fish, shellfish and wildlife, recreation in and on the water, agricultural, industrial, and other purposes including navigation. The designated use may or may not coincide with the existing use, but it cannot reflect lower water quality than the existing use. As described in the *Water Quality Standards Handbook*, if the designated use of a water body is also an existing use, the designated use cannot be downgraded to one that requires less stringent water quality criteria. If, however, the designated use is not an existing use the States may, under certain circumstances, remove the designated use, create new subcategories of the use, or grant a water quality standard.

Before a designated use is removed a State or a discharger must conduct and submit a use attainability analysis to EPA. Briefly, a use attainability analysis is an assessment of the physical, chemical, biological and, if necessary, economic factors affecting the attainment of a use. If the analysis shows that, based on any one of these factors, conditions exist which make the use unsuitable or impossible to achieve, then the State may remove the designated use.

In many cases, a designated but unattained use for a stream segment need not be removed. Instead, individual dischargers may be granted variances from the water quality standards for a limited time with the expectation that they will be able to comply with water quality standards by the time their variance expires. A variance is preferable to a removal of a designated use since other dischargers, who are capable of meeting the standards, must comply with the standards through their permits. In cases where a discharger can meet water quality based permit limits for some parameters, a variance would not be granted for those parameters. The variance procedure is designed to encourage compliance with the Clean Water Act within a reasonable timeframe.

States are also required to adopt an antidegradation policy to protect existing uses, high-quality waters, and water quality in waters that are considered to be outstanding national resources. The antidegradation policy allows States to lower water quality in

higher-quality waters only if it is necessary to accommodate important economic or social development. The use of the term "important" communicates a general sense of the level of economic and social development. This provision is intended to permit degradation of high-quality water bodies in only a few extraordinary cases where the benefits of the economic or social development unquestionably outweigh the costs of lowering water quality. Under no circumstances, however, may water quality fall below that required to protect existing or designated uses.

For each of the circumstances described above, the Water Quality Standards Regulation allows the applicant to take economic considerations into account. When applying for a change in a designated use or for a variance, the applicant must demonstrate that meeting water quality standards will cause substantial and widespread economic and social impacts. The antidegradation provision requires that the applicant demonstrate that important economic or social development would be prevented unless lower water quality is allowed. In all three cases, the same general tests of impacts are used.

## **1.2 Pollution Sources**

The choice of methods used to evaluate the economic impacts of meeting water quality standards depend, in part, on whether pollution control is the responsibility of a privately or a publicly owned entity. Since the polluting entity or party may not be the one to pay for reductions, the analyses focus on the party that pays for pollution control. Some of the more common privately owned entities include, but are not limited to: manufacturing facilities, agricultural operations, shopping centers and other commercial development, residential developments, and recreational developments. Publicly owned entities include: publicly owned sewage treatment works, roads, and other municipal infrastructure.

In an economic impact analysis, the distinction between private-sector and public-sector entities is important as it determines not only who will pay for the necessary pollution control, but also the types of funding mechanisms available. For example, in the case of a privately-owned entity, the facility can raise the money through loans and equity funds but may try to pass some or all of the cost on to the consumer in the form of higher prices. In the case of a publicly-owned entity, the community can float bonds to pay for the capital costs, with the cost of the bonds and operating expenses covered by user fees and/or tax revenues. The different impact measures are addressed in two separate chapters. Chapter Two provides guidance on public-sector entities and Chapter Three provides guidance on private-sector entities.

Whether publicly or privately owned, polluting entities can be point (direct discharge) or nonpoint (runoff and erosion) sources of pollution. Attainment of water

quality standards is not limited to controls placed on point sources. Water quality standards are applicable to nonpoint sources of pollution despite the fact that there may be no direct implementation mechanisms for nonpoint sources. Although pollution control approaches used by nonpoint sources may differ substantially from approaches typically employed by point sources, analysis of the ensuing economic impacts still depends upon whether the entity providing the pollution control is privately or publicly owned.

### **1.3 Substantial Impacts**

A financial analysis of the discharger should be conducted to determine if the capital and the operating and maintenance costs of pollution control will have a substantial impact. This analysis is typically performed by the discharger and reviewed by the State, although there may be cases where the State or some other group completes the analysis on behalf of the discharger. The first step is to estimate the capital and the operation and maintenance costs of the necessary pollution control (see Figure 1-1). The second step is to determine how the entity will finance the necessary reductions. If the entity is publicly-owned (e.g. a municipal sewage treatment plant), the households in the community will bear the cost either through an increase in user fees, an increase in taxes or a combination of both. The burden to households resulting from total annual pollution control costs must be estimated. In addition, the financial impact analysis must consider the community's ability to obtain financing and the general economic health of the community.

If the entity is privately-owned (e.g. a manufacturing facility), the analysis should consider factors such as the entity's ability to secure financing and the degree to which it will be able to pass the cost of pollution control on to its customers in the form of higher prices. The financial impact analysis of private-sector entities employs a variety of financial ratios and tests. Some of these ratios and tests include benchmark values to help in the analysis.

Demonstration of substantial financial impacts is not sufficient reason to modify a use or grant a variance from water quality standards. Rather, the applicant must also demonstrate that compliance would create widespread socioeconomic impacts on the affected community.

### **1.4 Widespread Impacts**

States and dischargers will need to consider the possibility that financial impacts could cause far reaching and serious impacts to the community. An important factor in determining the magnitude of these impacts is defining the geographical area

affected. The affected area might be a town, city, region, county or some combination of these geographical units.

Equally important are the *types* of impacts that might occur. There are no economic ratios or tests per se to evaluate socioeconomic impacts. Instead, the relative magnitude of a group of indicators should be taken into account. For public-sector entities, the applicant will need to estimate the change in socioeconomic conditions that would occur as a result of compliance. Of particular importance are changes in factors such as median household income, unemployment, and overall net debt as a percent of full market value of taxable property. For private-sector entities, the assessment of widespread impacts should consider many of the same socioeconomic conditions. The analysis should also consider the effect of decreased tax revenues if the private-sector entity were to go out of business, income losses to the community if workers lose their jobs, and indirect effects on other businesses.

In some instances, several entities potentially may suffer substantial impacts. For example, this situation can arise where several facilities are discharging to a stream segment that is being considered for a change in designated use. While a separate financial analysis should be performed for each facility, the impacts on all the facilities should be considered jointly in the analysis of widespread impacts.

## **1.5 Antidegradation**

As with removing a use or granting a variance, economic impacts are considered as part of an antidegradation review. While the terminology is different, the tests are basically the same. In the first case (discussed in Chapters 2, 3, and 4), a finding of substantial and widespread economic impacts can be the basis for granting a variance or changing a designated use. In the case of antidegradation, the analysis must show that maintaining "high-quality waters" will preclude important economic and social development. As such, the two cases can be thought of as two sides of the same coin. Variances and downgrades refer to situations where additional treatment to meet standards may result in declining economic and social conditions, while antidegradation refers to situations where lowering water quality may result in improved social and economic conditions.

When performing an antidegradation analysis, the first question is whether the costs of the pollution controls needed to maintain the high-quality water will interfere with the development. If not, then lower water quality is not "necessary" for the development to take place. If, on the other hand, the costs will interfere with the development and lower water quality is "necessary" for the development to take place, then the analysis must show that the development would be an important economic

and social development. These two steps rely on the same test as the determination of substantial and widespread economic and social impacts.

## **1.6 Organization of the Rest of the Workbook**

The remainder of this Workbook addresses the measurement of economic impacts. In Chapter 2, guidance is presented to assist applicants in evaluating financial impacts on public-sector entities. Chapter 3 presents guidance on evaluating financial impacts on private-sector entities. Chapter 4 provides a discussion of how to assess whether impacts are widespread as well as substantial. This discussion includes both public-sector and private-sector entities. Chapter 5 applies the concepts developed in Chapters 2, 3, and 4 to antidegradation.

Worksheets are included in each chapter that will assist the reader in calculating potential impacts. Chapters 2 and 3 include worksheets for: 1) estimation of annualized costs of pollution control, and 2) evaluation of the financial burden of pollution control. Chapter 4 includes worksheets that can be used in the evaluation of whether the impacts on the entity(ies) will result in widespread economic and social impacts. Chapter 5 includes worksheets for determining if important social and economic development might be lost.

In addition to presenting step by step guidance on how to estimate impacts, several of the worksheets provide benchmark comparisons that allow an assessment of the magnitude and relative importance of potential impacts. These worksheets, however, should not be used in isolation. Discussion of key sources of information, important entity and community attributes, and interpretation of results are found only in the accompanying text. Applicants, and State Water Quality staff charged with reviewing the application, should be sure to read all text accompanying the worksheets. While Chapter 2 addresses public-sector treatment requirements, if a substantial portion of the costs of a public facility is borne by a private entity (such as a manufacturing facility that pays substantial user charge fees to a POTW), both Chapters 2 and 3 should be referred to.

In all cases, the determination of economic and social impacts must be made on a case by case basis. This determination, therefore, requires the application of good judgement as well as use of the guidance provided in this workbook. Additional information and tests may be required in order to measure the size and extent of the impacts. Applicants should be aware that they will be required to supply documentation to substantiate their claim of substantial and widespread economic and social impacts. In addition to background data, however, this documentation should include a brief written description of why the applicant believes economic and social impacts will occur.