

ESTIMATING THE ECONOMIC IMPACTS OF GAS EXPLORATION AND DEVELOPMENT IN MISSISSIPPI SOUND

Prepared for:

Mississippi Chapter of the Sierra Club

Gulf Islands Conservancy

24 May 2005

ECONorthwest
ECONOMICS • FINANCE • PLANNING

© ECONorthwest 2005

Executive Summary

Mississippi has proposed regulations to govern seismic and geophysical exploration related to potential gas reserves in the Mississippi Sound. It is anticipated that, if these and related activities indicate there are suitable quantities of gas, the state will entertain applications for permits to extract gas from the Sound. Exploration and production could take place as close as one mile to the barrier islands, which are units of the National Park Service.

Estimating the net economic benefits, if any, of potential gas production in the Mississippi Sound requires full consideration of the costs as well as the benefits. Estimates of gross revenues from potential gas finds are incomplete because they do not account for the costs.

Costs will arise when gas exploration and production negatively affect those with competing demands for the Sound's resources. These competing demands are widespread and include demands for the islands' wilderness, access to fisheries, non-industrialized recreational areas, and views not impeded by industrial landscapes. Gas exploration and production could reduce or destroy economic values and jobs associated with these competing demands.

The potential economic costs of gas production fall into a number of categories:

- Costs to existing tourism businesses if gas exploration causes visitors to stay away
- Costs to owners of property whose value would decline because of gas development
- Costs to local governments that must pay for the infrastructure needed to support gas development
- Costs to visitors who no longer can enjoy wilderness or non-industrialized recreation
- Costs due to the loss of scientific and educational opportunities
- Costs to recreational and commercial fishermen who lose access to fishing sites
- Costs to residents who wish to leave an unimpaired Sound to the next generation
- Costs associated with the risk of pollution or spills of drilling and production fluids

Until all these potential costs are taken into account, it cannot be said that exploration for gas in the Mississippi Sound will have any net economic benefit to Mississippi.

Care must also be taken in estimating the potential benefits from gas exploration. Estimates must be based on realistic assumptions regarding the timing and feasibility of future extractions. Otherwise, they will be misleading. There are many scenarios in which the costs of gas exploration outweigh any benefits.

Ernie Niemi prepared this report for the Mississippi Chapter of the Sierra Club and the Gulf Islands Conservancy. I am an economist with ECONorthwest, an economics consulting firm. For more than 25 years, I have studied, taught, researched, consulted, and testified at the intersection of economic and environmental issues. ECONorthwest is solely responsible for the contents of this report. For more information, please contact me:

Ernie Niemi
ECONorthwest
Suite 400, 99 West 10th Avenue, Eugene, Oregon 97401
541-687-0051 niemi@eugene.econw.com.

A. Background and Introduction

Mississippi has proposed regulations to govern seismic and geophysical exploration related to gas reserves in the Mississippi Sound. This activity is one of the first steps in exploration for gas. It is anticipated that, if exploration activities indicate suitable quantities of gas, the state will entertain applications for permits to extract gas from the Sound.

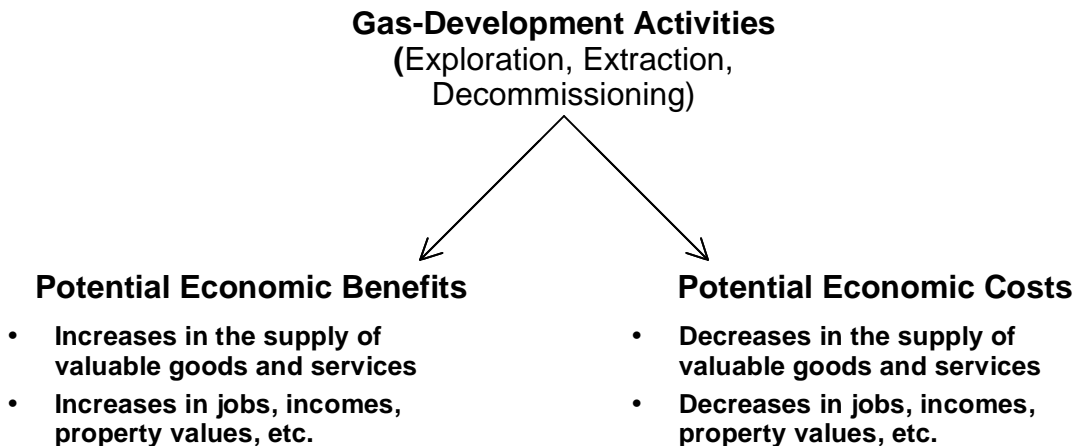
Introduction to unindustrialized areas of the Mississippi Sound of production equipment and infrastructure related to gas exploration will have important consequences for the Mississippi Coast. Some of the most important will be the economic impacts on families, firms, communities, and the state as a whole.

Mississippi statutes provide for the preparation of an economic-impact statement when regulations are promulgated. This report briefly describes issues and information the state must incorporate into its analysis, if it is to provide a comprehensive depiction of the economic impacts of gas activities.

Most important, the state must recognize that development of gas resources will generate both economic costs and economic benefits. Figure 1 emphasizes this point. Until the state has evaluated the benefits and costs thoroughly, it is impossible to determine if the benefits of exploring for and extracting gas will outweigh the costs.

Gas-development activities will affect economic values and activities that derive much of their strength from the high-quality natural resources of the Mississippi Sound. To develop a credible, thorough description of the economic impacts of gas-development activities in the Sound, the state must satisfy standards of economic analysis that are widely accepted by professional economists. At the core of these standards are three requirements: (1) give the analysis of costs the same consideration as the analysis of benefits; (2) use analytical methods that yield a reasonable estimation of the benefits of gas-development activities; and (3) fully describe the uncertainties and risks inherent in gas development. This report offers some initial guidance for meeting these standards.

Figure 1: Gas-Development Activities in the Mississippi Sound Will Generate Economic Costs as Well as Economic Benefits



B. Estimating Potential Economic Costs

Gas-development activities in the Mississippi Sound will generate economic costs whenever they impair the value of goods and services derived from the Sound and/or impede activities in other industries. In economics jargon, such costs will materialize whenever there is scarcity in the supply of natural resources available in the Sound and competing demands for the resources that would be used or affected by the gas industry. Scarcity means there are competing demands for the goods and services derived from the environment, with not enough go satisfy all the demands. Hence, if Mississippi were to allocate resources to the gas industry, by granting permits for exploration and extraction, it would concurrently reduce the supply for those with competing demands.

Substantial evidence indicates there are competing demands for the Sound's resources that would be affected by gas-development activities. Documentation of the competing demands is widespread. One broad example is a recent report, from a committee of the National Research Council, on the valuation of goods and services derived from aquatic ecosystems.¹ This report observes that there is widespread agreement among economists that the natural environment, in and of itself, has economic value. It does not have to first be converted into something else.

“Given the crucial role that ecosystems and their services play in supporting human, animal, plant, and microbial populations, there is now widespread agreement that ecosystems are ‘valuable’ and that decision-makers ranging from individuals to governments should consider the ‘value’ of these ecosystems and the services they provide to society....”

The committee's report also describes a framework, called “total economic value,” for systematically identifying all categories of value that might be affected by a change in the productivity of an aquatic ecosystem. Table 1 shows the framework's three major classifications of value and provides illustrative examples of each. The left column of the table shows some of the ways aquatic ecosystems provide value through their direct use by providing commercial and recreational fishing opportunities, for example. The middle column shows some of the ways they provide value indirectly, for example, by conserving nutrients and helping control damages from major storms. The right column shows ways aquatic ecosystems provide value even when they are not used, as when members of a fishing community place a value on maintaining an aquatic ecosystem that is part of their cultural heritage, or when people want to maintain the ecosystem in a healthy state as a legacy to the next generation.

The items in Table 1 illustrate the various competing demands that exist for the goods and services produced by the environment in the Mississippi Sound. These include direct-use demands, such as those of the commercial and recreation fishing industry: for an ecosystem that produces fish and shellfish without the risks of hazardous spills that accompany gas development, and for fishing grounds without the hazards of drilling rigs. There also are indirect-use demands, such as those of coastal property owners for protection from storms, without the hazards created by gas rigs, pipelines, and other infrastructure. And there are

¹ National Research Council, Committee on Assessing and Valuing the Services of Aquatic and Related Terrestrial Ecosystems. 2004. *Valuing Ecosystem Resources: Toward Better Environmental Decision-Making*. National Academies Press.

nonuse demands, such as those that exist to the extent that some Mississippians desire to leave for the next generation the Sound without gas-related infrastructure.

Table 2 expands the total-value framework offered by the committee of the National Research Council to provide a more focused listing of the potential costs that might be generated by gas-development activities. These activities would generate costs for those individuals and firms associated with direct uses of the Sound, insofar as they would diminish the quality and value of recreational, tourism, and commercial activities. The potential extent of such impacts should receive considerable scrutiny, insofar as the Sound provides the centerpiece for recreational activities along the state’s southern boundary, the tourism industry, and other industries, such as commercial fishing. Other costs could materialize insofar as gas-development activities adversely affect the Sound’s utility as a site for scientific research, and as a undeveloped control area for research on the impacts of development elsewhere. Public and private efforts to maintain and restore the Sound’s ecosystem might see the value of their investments decline and/or incur additional costs to attain non-gas management objectives for the Sound.

Pollution from gas-development activities would generate costs to the extent it diminished demand for off-site activities and properties, and for non-gas goods and services. Such costs could materialize, if, for example, gas development were to diminish the area’s attractiveness to recreationists and tourists that otherwise would be attracted to the Sound’s undeveloped character. With fewer people visiting the area, there would be lower demand for non-resource-related goods and services, and for the land and labor that produce them. Even small impacts on recreation and tourism linked to the Sound’s natural resources could have large spillover impacts on other activities. The state, itself, has

Table 1. Classification and Examples of Total Economic Values for Aquatic^a Ecosystem Services

Use Values		Nonuse Values
Direct	Indirect	Existence and Bequest Values
Commercial and recreational fishing	Nutrient retention and cycling	Cultural heritage
Aquaculture	Flood control	Resources for future generations
Transportation	Storm protection	Existence of charismatic species
Wild resources	Habitat function	Existence of wild places
Recreation	Shoreline stabilization	
Genetic material		
Scientific and educational opportunities		

Source: Adapted by ECONorthwest from National Research Council. 2004. *Valuing Ecosystem Services: Toward Better Environmental Decision-Making*.

^a Freshwater and marine.

identified the interactions between the area's natural resources and its overall tourism industry, noting that fishing and scenery "complement" the area's gaming casinos.² The gaming industry also has acknowledged this interaction, recognizing that the scenic beauty and character of the area is a key ingredient of the area's ability to attract tourists.³ More than 11 million visitors come to the area annually and spend more than \$3 billion in travel-related expenditures, with more than \$1 billion in expenditures in the gaming industry alone.⁴ If gas-development activities were to induce even a small percentage of these people to recreate elsewhere, sales throughout the area's tourism industry could decline by millions of dollars.

Reductions in recreational activities and tourism in the area probably would lower the demand for and value of properties in the area, all else equal. Further reductions might occur if gas development resulted in additional storm-related hazards.

Public agencies would experience additional costs to the extent that gas-development activities accelerate wear and tear on roads and other public facilities, and generate additional costs for police, fire, schools, and other public services. To estimate these costs, the state should consider not just the impacts on public services stemming from activities of the gas industry itself but also those stemming from the activities of firms in ancillary industries.

Adverse impacts on the Sound's ecosystem should be seen as economic costs. These costs may materialize as reductions in the ecosystem's biological productivity, undesirable changes in its biological and physical characteristics, and/or reductions in its ability to provide wilderness and other services. There is presently no oil and gas activity in Mississippi state waters, and no exploration or production facilities visible from the mainland or any of the barrier islands.⁵ The barrier islands are approximately 10 miles offshore, and are units of the Gulf Islands National Seashore, part of the National Park System. Horn and Petit Bois Islands are managed as wilderness. The wilderness islands are heavily used especially on weekends, and gross visitation for Horn and Petit Bois Islands in 2000 was around 50,000. The barrier islands have a one mile buffer zone controlled by the National Park Service, but drilling rigs or production platforms readily visible and audible from the park could be set up just outside this boundary.

² Mississippi's official website for tourism says of the area that it is an "excellent bargain, with plenty of entertainment, historic sites, fishing and scenery to complement the gaming scene."
<http://www.visitmississippi.org/coastal/index.asp> (accessed May 24, 2005)

³ "The Mississippi Gulf Coast has the beauty and character to be the next must-see destination in the Southeast United States." Barry Shier, Mirage Resorts, quoted in Harrison County Development Commission. 2003. *Gulf Coast Economy: Mississippi's Gulf Coast Soars to Economic Prosperity*.

⁴ Harrison County Development Commission. 2003. *Gulf Coast Economy: Mississippi's Gulf Coast Soars to Economic Prosperity*. Data for 2001.

⁵ Under good visibility conditions some distant facilities in Alabama waters may be visible from Horn or Petit Bois islands.

Table 2. Potential Economic Costs of Exploring for and Extracting Gas from Mississippi Sound

Type of Cost	Description
Direct uses of the Sound	Exploration, extraction, and decommissioning activities may diminish the quality and value of recreational, tourism, and commercial activities in Mississippi Sound. They also may diminish the Sound's value as a site for scientific research and as an undeveloped control area for research on the impacts of development elsewhere. They also may degrade the productivity of public and private investments in the Sound's ecosystem and in ecosystem-related infrastructure. They may increase the costs of attaining non-gas management objectives for the Sound.
Indirect uses of the Sound	Air, water, noise, and visual pollution may reduce the demand for off-site recreational activities, residential properties, and commercial goods and services. Exploration, extraction, and decommissioning activities, plus related infrastructure may diminish the ecosystem's ability to buffer the impacts of storms, and to accommodate waste products from other activities.
Property values	Negative impacts on direct and indirect uses of the Sound probably would lower the values of residential and commercial properties associated with these uses. For example, the activities and infrastructure associated with exploration and extraction probably would have a negative impact on residential and commercial properties whose values currently are linked to the undeveloped character of the Sound.
Public services	Exploration, extraction, and decommissioning activities will accelerate wear and tear on roads and other public facilities. The immigration of oil/gas workers and their families will generate additional costs for police, fire, school and other public services.
Ancillary activities	Exploration, extraction, and decommissioning activities will stimulate other, ancillary activities that will have their own economic costs.
The Sound's ecosystem	Exploration, extraction, and decommissioning activities, plus air, water, noise and light pollution may have negative effects on the biological and physical components of the Sound. These effects may appear within the Sound or outside it, insofar as water, nutrients, and species circulate through the Sound as part of a larger ecosystem.
Quality of life	Exploration, extraction, and decommissioning activities, plus air, water, noise and light pollution may have negative effects on the quality of life for some residents in communities adjacent to the Sound. If the effect is great enough, some residents may locate elsewhere.
Wilderness values	Exploration, extraction, and decommissioning activities would diminish the value of wilderness and other undeveloped areas in the Sound.
Risk	Exploration, extraction, and decommissioning activities may generate risk of serious, even catastrophic accidents, such as hazardous-material spills, explosions, boating accidents, and hurricane-related damages. They also may alter the composition and function of the ecosystem, by altering water quality, species composition, etc. To the extent these risks are not borne by the industry, then they will be borne by others, including local communities.
Option values	Exploration, extraction, and decommissioning activities may close the door on the Sound's future ability to satisfy economically valuable demands for goods and services.
Legacy values	Exploration, extraction, and decommissioning activities, plus air, water, noise and light pollution may impose costs on those who desire to leave, as a legacy to future generations, the Sound in its current condition, without gas development.

Risk-related costs may materialize in any number of ways. Gas-development activities, as well as those of ancillary firms and industries, may generate risk to people and property from accidents, such as hazardous-material spills, explosions, boating accidents. They also may generate risk to the composition and function of the ecosystem, by altering water quality, species composition, etc. Risks stemming from gas development activities, as well as from ancillary activities, will be magnified to the extent they interact with other risks, such as major storms.

Some of the economic costs of gas development may manifest themselves by diminishing the quality-of-life residents and visitors enjoy from being in the area, and thereby inducing some households to locate elsewhere. Growing evidence indicates that changes in quality of life can have a substantial impact on the economic growth of communities and states.⁶ A shift in location decisions away from the area could alter the structure of the area's economy both by reducing the supply of workers and by removing the consumers' spending power of households that locate elsewhere.

The final two categories of potential costs shown in Table 2 refer to nonuse values that might be diminished by gas-development activities. To estimate option-value costs the state should determine the value of keeping its options open by not allowing gas development to preclude future activities in the Sound. To estimate legacy-value costs, it should determine if gas development would reduce existence and bequest values associated with the Sound. Existence values of interest to the state would exist when Mississippians place a value on maintaining the undeveloped character of the Sound, even though they have no intention of visiting the Sound. Bequest values rise out of this generation's desire to pass to future generations a Sound without gas development. The potential for nonuse costs seems substantial, given that there is presently no oil and gas activity in Mississippi state waters and the barrier islands are part of the Gulf Islands National Seashore.

C. Estimating Potential Economic Benefits

News reports dealing with potential gas production in the Mississippi Sound have stated that revenues may be in the tens or hundreds of millions of dollars per year. Such gross estimates, however, do not represent a full assessment of the *net* benefits that might be realized from gas development.

Economists typically separate the economic benefits of energy development into two categories: increases in the supply of goods and services and increases in jobs and other, related variables, such as incomes and tax revenues. The two categories of potential benefits are distinct and should be described separately. They should not be added to calculate a single, combined estimate of the benefits of gas-development activities.⁷

⁶ See, for example, Partridge, M. and D. Rickman. 2003. "The Waxing and Waning of Regional Economies: the Chicken-Egg Question of Jobs Versus People." *Journal of Urban Economics* 53: 76-97

⁷ As I explain below, the two categories of benefits measure different things. The economic importance of an increase in goods and services is measured in terms of value, i.e., society's willingness to pay for the increase. The economic importance of an increase in jobs is measured in terms of the net increase in the number of jobs and the net increase in wages paid, neither of which measures the value of (society's willingness to pay for) the

Potential increases in goods and services. The primary benefit from exploring for and developing gas resources is the expected increase in the supply of the gas, itself. Additional benefits might include increases in knowledge and skills acquired from the activities, but they are likely to be small relative to the potential value of the gas resources, if any are found.⁸

A common error found in economic-impact studies of gas exploration occurs when they use point-estimates to express the quantity and value of gas resources. Neither geologic science nor economics is sufficiently robust to know either variable with pinpoint certainty. Both are more accurately expressed as a probabilistic range, reflecting different levels of confidence. If gas resources were to be located, both their quantity and value should reflect the feasibility of extracting them. Gas that cannot feasibly be extracted under current and expected economic conditions has no current economic value.

Values are typically measured by society's willingness to pay for goods or services, although in some situations they may be measured by a related concept, society's willingness to accept compensation to relinquish goods and services.⁹ The application of willingness-to-pay as the foundation for comparing the benefits and costs of an activity or enterprise is a widely recognized, analytical standard.

Potential increases in jobs and related variables. This category of potential benefits embraces changes in the structure of the economy that society generally considers to be positive: increases in jobs, incomes, property values, etc. It is important to recognize, however, that these increases, if any, stemming from gas-development activities would not occur in an economic vacuum. Any initial increases in jobs, etc. directly associated with the gas industry would have ripple effects throughout the local and statewide economies. These ripple effects, however, would be shaped by the dynamic nature of these economies.

Some of the ripple effects would multiply the initial benefits. The so-called multiplier effect would materialize as new jobs in the gas industry stimulate the generation of new jobs in

net, new jobs. When a worker has a job, she trades her time and efforts for wages and other compensation. Thus, in the cost-benefit framework, economists typically see jobs as costs, i.e., the consumption of workers' labor services, not as a benefit.

⁸ Gas exploration and development can increase the value of some goods and services without increasing their supply. For example, increased demand for boat-docking space may increase the price but not the supply of existing space. Such pecuniary effects should be distinguished from actual increases in the supply of goods and services resulting from exploration and development activities.

⁹ Consider this expression of these concepts:

"MEASURING THE BENEFITS OF IMPROVEMENTS TO ECOLOGICAL RESOURCES – THE CONCEPT OF WILLINGNESS-TO-PAY"

"The economic value of a good is determined by the maximum amount of something else (usually money) that an individual is willing to pay to obtain the good. This measure of economic value is called "willingness-to-pay" (WTP). For an environmental improvement, WTP is the amount an individual is willing to pay to obtain the improvement. An alternative measure, "willingness-to-accept" (WTA) is defined as the minimum amount of money an individual is willing to receive in compensation to forgo a benefit, such as an environmental improvement, they would otherwise receive." [U.S. Environmental Protection Agency. 2002. *A Framework for the Economic Assessment of Ecological Benefits*. February 1, p. 89.]

other industries. Some of these additional jobs would materialize as the gas industry buys additional goods and services from vendors and as these firms, in turn, buy additional goods and services from other firms. Other additional jobs would materialize as the workers in these new jobs, and their families, buy consumer goods and services.

Other ripple effects, however, would have the opposite effect. Some of the new jobs generated by gas-development activities probably would be filled by local workers who are already employed. As each of these workers takes a new, gas-related job, she would leave behind a vacancy. If the vacancy is immediately and easily filled by someone who otherwise would be unemployed, then the overall number of employed workers would equal the number of new, gas-related jobs. But, if the vacancy cannot be filled easily—or, if it cannot be filled at all—then the net, overall increase would be less than the number of new, gas-related, new jobs.

The overall impact on jobs also will be affected by the extent to which gas-related jobs attract workers from outside the region. Several studies have found that, when an industry generates new jobs in an area, many, if not most, of the jobs are filled by immigrants from other areas.¹⁰ The rate of immigration may even exceed the number of new jobs, so that the local unemployment rate increases.¹¹

In sum, some of these ripple effects offset others. Consequently, the overall effect of gas-development activities on employment, especially for local workers, is likely to be less than one would expect from considering only the positive ripple effects. In economics jargon, the actual multiplier (the ratio of total increase in jobs to the number of new jobs in the gas industry) probably will be less than the multiplier indicated by models that focus solely on the positive ripple effects. The most commonly used model of this type is known as the input-output model.¹² If Mississippi were to use an input-output model to estimate the benefits of gas-development activities, it almost certainly would over-estimate them.

Evidence about the size of the errors that can materialize from using an input-output model comes from a recent study conducted in the Atlanta metropolitan area.¹³ This study compared the multipliers derived from input-output models and the actual ripple effects occasioned when industries created major new employment centers or expanded existing ones. Many economic-impact studies assume that the multiplier applicable to jobs created by new industrial plants is between 2 and 5, so that, if a new industrial plant would create 100 new jobs, the total number of new jobs materializing in the vicinity would be between 200 and 500. Edmiston (2004) found instead that, if a new plant created 100 new jobs, the total increase in new jobs in the vicinity was fewer than 30. The author observed that these results may reflect the negative impacts new plants have on existing firms: new industrial plants often squeeze out other firms by increasing the costs of doing business in the area.

¹⁰ Bartik, Timothy J. 1993. "Who Benefits from Local Job Growth: Migrants or the Original Residents." *Regional Studies* 27 (4): 297.

¹¹ Yeo, J.H. and D.W. Holland. 2004. "Economic Growth in Washington: An Examination of Migration Response and a Test of Model Accuracy." *International Regional Science Review*, Vol. 27, No. 2, 205-237 27 (2): 205-237.

¹² The most commonly used input-output model is known as IMPLAN.

¹³ Edmiston, K.D. 2004. "The Net Effects of Large Plant Locations and Expansions on County Employment." *Journal of Regional Science* 44 (2): 289-319.

This information illustrates the exaggeration that might occur if Mississippi were to estimate the economic impacts of gas-development activities on jobs and related variables using a model that fails to account fully for the full suite of ripple effects on the local and statewide economies. The *net*, positive impacts of gas development are likely to be less than, and perhaps much less than, the *gross* impacts. The *net*, positive impacts for local workers are likely to be even smaller.

D. Additional Analytical Guidance

Earlier, I referred to a report by a committee of the National Research Council and its conclusion that the natural environment has economic value and activities that degrade the environment generate economic costs. The committee is not alone in making this point. For example, a highly regarded summary of the economics literature on environmental and natural-resource issues observes that the benefits from modifying the environment are inextricably linked to costs:

"If society wishes to make the most (in terms of individuals' well-being) of its endowment of all resources, it should compare the values of what its members receive from any environmental change or use of a resource (that is, the benefits) with the values of what its members give up by taking resources and factor inputs from other uses (that is, the costs). A society that is concerned with the economic well-being of its citizens should make changes in environmental and resource allocations only if what is gained by the change is worth more in terms of individuals' welfare than what is given up by diverting resources and inputs from other uses."¹⁴

The Environmental Protection Agency recently prepared an extensively peer-reviewed document that offers guidance for conducting economic-impact analyses of environmental regulations.¹⁵ It makes this point:

"For most practical applications, therefore, a complete economic impacts analysis comprises a benefit-cost analysis, an economic impacts analysis [which examines the gainers and losers], and an equity assessment [which examines particular sub-groups, especially those considered to be disadvantaged]. Benefit-cost analysis evaluates the favorable effects of policy actions and the associated opportunity costs of those actions. The favorable effects are defined as benefits and the opportunities foregone define economic costs."

These and similar statements from throughout the economics literature establish a widely recognized professional standard regarding what is acceptable practice when preparing an environmental economic-impact statement: to provide a complete and unbiased description of the economic impacts of a change in the environment, an economic-impact analysis must consider both the benefits and the costs. Economic-impact studies violating the standard,

¹⁴ Freeman, A.M., III. 2003. *The Measurement of Environmental and Resource Values: Theory and Methods*, Second Edition. Washington, D.C.: Resources for the Future. pp. 7-8.

¹⁵ U.S. Environmental Protection Agency. 2000. *Guidelines for Preparing Economic Analyses*. September. p. 20. See also, U.S. Environmental Protection Agency. 1998. *Guidelines for Ecological Risk Assessment*. EPA/630/R-95/002F, Federal Register 63(93):26846-26924. May 14; U.S. Environmental Protection Agency. 2002. *A Framework for the Economic Assessment of Ecological Benefits*. February 1; and U.S. Water Resources Council. 1983. *Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies*. March 10.

however, mark themselves as deviations from widely-accepted practices of professional economists.