

***APPLIED SOCIAL SCIENCE IN MMS***  
**A Framework for Decisionmaking**

*Minerals Management Service  
Environmental Studies Program*

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## **LIST OF ACRONYMS**

ANCSA	Alaska Native Claims Settlement Act, as amended in 1988
ANILCA	Alaska National Interest Lands Conservation Act
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
COOGER	California Offshore Oil and Gas Energy Resources (an MMS study)
CZM	Coastal Zone Management
DOI	Department of the Interior
EA	Environmental Assessment
EIS	Environmental Impact Statement
ESP	Environmental Studies Program
GOM	Gulf of Mexico
MMS	Minerals Management Service
NEPA	National Environmental Policy Act of 1969
NRC	National Research Council
OCS	Outer Continental Shelf
OCSLAA	Outer Continental Shelf Lands Act, as amended in 1978
U.S.C.	United States Code

## ***PURPOSE***

This document provides background for the Minerals Management Service (MMS) management and staff on the role of social science in decisionmaking for Outer Continental Shelf (OCS) oil and gas development. This document supports the national and regional studies planning process and explains to MMS constituencies how MMS uses social science in its decisionmaking.

By linking research endeavors to the Bureau's decisionmaking processes, this document addresses the following needs:

- set logical boundaries on research needs, allowing the Bureau to identify what is necessary and sufficient;
- outline a logical sequencing of studies, allowing the Bureau to better anticipate future data needs;
- better direct the limited research budget toward upcoming decisions;
- identify significant similarities among the MMS offshore regions (and sub-regional areas), allowing the results of studies to be generalized from one region to another; and
- identify significant differences among the regions, allowing for the MMS Environmental Studies Program (ESP) planning process to account for them.

Finally, this document:

- communicates the general direction of MMS social science research to interested constituents including industry, State and local governments, and environmental groups;
- incorporates recommendations made over the years by the MMS's Scientific Committee;
- responds to major recommendations made by National Research Council reviews of MMS social and economic studies (NRC, 1989; 1992; 1993);
- incorporates ideas and recommendations made at various MMS-sponsored conferences and workshops (e.g., California, 1991; Gramling and Laska, 1993; MMS Deepwater Workshop, 1997); and
- addresses the lack of social and economic data noted by Congress in the 1980's when imposing leasing moratoria.

## ***RATIONALE FOR SOCIAL SCIENCE RESEARCH***

The MMS is charged with the orderly development of offshore energy and mineral resources, with safeguarding the environment affected by this development, and with the effective collection of revenues generated from mineral leases offshore and on Federal and Indian lands throughout the country.

The Bureau's responsibilities include assessing the effects of OCS activities on natural, historical, and human resources and the appropriate monitoring and mitigating of those effects. The ESP is required by the Outer Continental Shelf Lands Act, as amended in 1978 (OCSLAA), to provide information for sound decisionmaking and management. The ESP conducts research across the spectrum of the physical, biological and socioeconomic areas of inquiry that constitute the "human environment," as defined by the OCSLAA and the National Environmental Policy Act of 1969 (NEPA).

The ESP's social science research:

- provides information essential to understanding the consequences of OCS-related activities on the populations, economies, and social and cultural systems in areas where the activities occur;
- supports MMS's planning and management processes;
- provides information essential for effective interaction with the public about such effects; and
- is required by law.

## ***SUPPORT FOR BUREAU MISSION***

The MMS uses social science data and analyses in all phases of Bureau decisionmaking, from 5-year planning, through prelease and leasing activities, exploration, development, production, and platform decommissioning. Relatively few effects occur in the human environment as a result of 5-year planning or OCS lease sales; more can result from oil exploration; and still more from oil and gas development, production, and decommissioning. For these reasons, MMS "tiers" its OCS management decisions, basing them on considerations of issues specific to the phases of leasing, exploration, development, and production. Environmental Studies Program planning reflects this tiering. The MMS conducts studies to address the data and analytical needs arising from specific phases of decisionmaking. This process is cumulative. While studies are conducted to inform lease-sale decisions, additional ones are designed to inform later management

decisions. When possible, later studies build on the information and analysis completed by earlier ones.

The possible social and economic effects of the program are among those of greatest concern to the public and to Federal, State and local government officials. Analyses of these dimensions can address frequently asked questions such as:

- How many jobs will be created as a result of OCS leasing and development activities?
- How many jobs will be created for local residents, and how many will involve new workers from outside the area?
- How many people will move to an area as a result of OCS activity?
- Will OCS development require new schools, hospitals, and other facilities to be built?
- Will the influx of new OCS-related workers change the way of life and the culture of the area in which OCS activity occurs?
- Will OCS development impact the local tax base?
- What are the likely social and economic consequences of development, and who is likely to be affected?
- How can the impacts of OCS activity be monitored, and what steps can be taken to enhance the positive impacts while mitigating the negative?
- What are the cumulative impacts of OCS development?
- How can OCS development be made more sustainable?
- How does MMS study, document, and account for the rapid changes in the oil and gas industry?
- How can MMS improve its relationships with indigenous subsistence cultures and incorporate traditional indigenous knowledge in the decisionmaking process?
- What are potential impacts on subsistence cultures?
- What are potential impacts on subsistence hunting patterns and subsistence

- cultures?
- What are the “perceptions of risk” associated with OCS oil and gas development, and how do these perceptions vary among stakeholder organizations and demographic groups?
- Can OCS oil and gas be developed without detrimental effects to the recreation and tourism industries?

The answers to such questions can:

- Provide a better understanding of how future long-term impacts will affect communities and ways of life and will allow for predictions of these impacts.
- Allow the decisionmaker to discuss the likely impacts of development in terms (e.g., jobs, income, public services, subsistence resources) familiar to the public, thereby allowing the public to examine the project in terms relevant to their own communities and lives.
- Assist the decisionmaker in identifying potential areas of concern and groups likely to both promote and oppose development before it begins.
- Provide information on the past impacts of OCS development that can be used to access new areas as potential sites for additional leasing or exploration.

Management decisions are often complicated by the separation between "scientific fact" and "people's values." Science gives no answers concerning what ought to be done. Nevertheless, the existence of good, scientific, empirical information often narrows the area of reasonable debate. Conducting social and economic studies provides a vehicle through which the MMS examines the needs and concerns of its customers and the general public. Thus, social and economic research allows MMS to be proactive, to help define parameters of public concern and, thereby, to have a more effective program of public outreach through information distribution.

## ***LEGAL MANDATE***

The MMS's major legal mandates are the OCSLAA and NEPA. An objective of both laws is to provide the information needed for balanced decisionmaking. Both direct MMS to study the human environment, and both include guidance on Bureau social and economic information needs. The OCSLAA focuses on the causal links between the physical, social, and economic effects of Bureau actions and human living conditions, whereas NEPA's guidance stresses specific effects of Bureau actions.

Section 18 of the OCSLAA, the foundation for Department of the Interior (DOI)

OCS activities, mandates that management of the OCS shall consider the...

economic, social, and environmental values of the renewable and nonrenewable resources contained in the Outer Continental Shelf, and the potential impact of oil and gas exploration on other resource values of the marine, coastal, and human environments. (43 U.S.C. 1344)

It defines the "human environment" to include ...

the physical, social, and economic components, conditions, and factors which interactively determine the state, condition, and quality of living conditions, employment, and health of those affected, directly or indirectly, by activities occurring on the Outer Continental Shelf . . . . (43 U.S.C. 1333)

The NEPA creates requirements for Federal agencies engaged in significant land actions to undertake impact assessments, including impacts on the human environment. The Council on Environmental Quality's (CEQ) Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act (40 CFR 1500-1508) state that the "human environment" is to be "interpreted comprehensively" to include "the natural and physical environment and the relationship of people with that environment" (40 CFR 1508.14). An action's "aesthetic, historic, cultural, economic, social, or health" effects must be assessed, "whether direct, indirect, or cumulative" (40 CFR 1508.8). The CEQ regulations state that when "economic or social and natural or physical environmental effects are interrelated, the environmental impact statement (EIS) will discuss all of these effects on the human environment" (40 CFR 1508.14). An EIS provides a procedure for Federal decisionmakers who must consider the positive, negative, intended, and unintended consequences of potential courses of action before they proceed.

Federally approved state Coastal Zone Management (CZM) programs of coastal states have increased the importance of social and economic information and public involvement requirements (through NEPA and the CZMA) to successful program implementation. The CZM Federal consistency process has led some states (e.g., North Carolina) to deny consistency primarily based on inadequate understanding of the social and economic impacts of OCS oil- and gas-related activities.

The Endangered Species Act of 1973 requires agencies to give special consideration to certain environmental and user-conflict issues. In the Alaska Region, the Alaska Native Claims Settlement Act as amended in 1988 (ANCSA), requires the Bureau



to give customary and traditional subsistence uses special consideration. The 1994 Environmental Justice Executive Order (12898) requires Federal actions to be taken to consider the possible disproportionate socioeconomic effects of OCS activity on minority populations and low-income populations. This mandate requires MMS to examine these effects in an EIS. Other examples of applicable laws include the Marine Mammal Protection Act, Clean Water Act, Clean Air Act, and Alaska National Interest Lands Conservation Act (ANILCA).

## ***SOCIAL SCIENCE RESEARCH COMPONENTS***

Social and economic effects can occur at all stages of OCS development, from prior to a lease sale, through exploration, development and production, to decommissioning and the cessation of activities (NRC 1992). The range of social and economic studies are categorized into eight broad components:

- issues identification,
- national economic analysis,
- region-level analysis,
- community-/individual level analysis,
- resource-use issues,
- adaptive policy studies,
- mitigation, and
- monitoring.

Table I matches the above-listed components to the data needs and sequencing of MMS's decisionmaking process. High (H), medium (M), and low (L) indicate the level of detail needed to support decisions at each stage. These levels are approximate. Sequencing is affected by such considerations as data availability, data and funding needs of other planned and ongoing studies, and planning-area-specific issues.

Since many MMS management decisions are NEPA-related, research that supports Bureau decisionmaking reflects the NEPA-defined processes of scoping, assessment, and response analyses. Scoping includes activities to identify factors of significance to persons interacting with MMS management activities. Assessment refers to all analyses required to examine the effects and implications of key socioeconomic conditions and change affecting or being affected by MMS activities. Response analyses focuses on MMS's ability to study decision-related issues as they arise--usually outside of the normal long-term planning process. Response analyses also provides for issue identification leading to the development of mitigation and the associated evaluation of the effectiveness of this mitigation. Table II relates the eight ESP components to these NEPA-defined processes.

**Table I**  
**Social Science Data Needs for OCS Decision Points**

Components/ Decision Points	Issue Identification	National Economic Analysis	Regional- Level Analysis	Community-/ Individual-Level Analysis	Resource Use Issues	Mitigation	Monitoring
5-Year Program	L	H	H		H	H	
Call/ Area Identification	L					H	
Scoping	H			H	H	H	
Draft EIS	H		H	M	H	H	
Decision on Content of Final EIS	H		H	M	H	H	
Final EIS	L		H	M	H	H	
Final Notice of Sale/Lease Sale			M	L	H	H	
Exploration	H		M	H	H	H	L
Development	H	L	M	H	H	H	H
Production	H		M	H	H	H	H
Decommissioning	H		M	H	H	H	M

H - high level of detail

M - medium level of detail

L - low level of detail

**Table II**  
**NEPA Processes & Program Components**

NEPA	Components
Scoping	Issues Identification
Assessment Analyses	National Economic Analysis Regional-Level Analysis Community-/Individual-Level Analysis Resource-Use Issues
Response Analyses	Adaptive Policy Studies Mitigation Monitoring

The following sections define the social science research components, provide an explanation of their application to MMS, and present examples.

## ***Issues Identification***

Issues identification studies can be conducted for a region, planning area, or community. This component includes the identification of the various stakeholders, their issues and concerns towards the environment, and risk analysis. These studies explore the similarities among and differences between issues and concerns held by stakeholders. They can address specific developmental projects or broader questions such as changes in attitude, perceptions, or environmental risk over time.

In addition to identifying constituents, their issues and concerns, and risks, these studies identify opportunities for public involvement, areas of potential conflict and resolution, and significant issues for further research. Research in these areas can be designed to achieve early public involvement and to increase effective communication. Study results provide information for programmatic, sale-specific, and project-specific decisions.

Included in the issue identification component is the field of risk analysis. According to the NRC (1993:26), risk is a central social science concept running through a variety of environmental problems and challenges. Risk analysis is a structured way to approach problems rooted both in real and perceived risks, and provides management with an effective tool for problem resolution.

For MMS to effectively incorporate public perceptions of environmental risk in decisionmaking, it must understand attitudes towards the environment. Environmental attitudes have been conceptualized and operationalized in different ways—from a worldview, to localistic concern, to an overt behavioral component. This complex concept has evolved through many historical phases, retaining elements of past conceptualizations while adding new facets as the social-historical context changes, often transforming into a sense of pro-environmental attitudes and into a level of commitment to defend the environment. These permeations of environmental attitudes differ in the various OCS planning areas due to differences in the region's social and historical context.

In MMS, the ESP plays only a limited role in the NEPA scoping process; nevertheless, issues-identification studies exist in all regions. In the Alaska Region for example, an analysis of public hearing comments *A Description of the Socioeconomics of the North Slope Borough, Appendix: Transcripts of Selected Inupiat Interviews*, was used to categorize and define major scoping issues for offshore Alaska. The Gulf of Mexico (GOM) Region conducted a *Socioeconomic Research Agenda Workshop* that brought social scientists together to identify the region's data needs and approaches to address them. *The Coastal North Carolina*

*Socioeconomic Study* identified issues in order to measure how people perceive threats to their environment. In the Pacific Region, *Trends in Public Opinion of Offshore Oil Development in California* identified changes in attitudes toward offshore oil development over time. In the GOM Region, three studies with similar titles but different methodologies identified stakeholder groups and their issues for each planning are: *The Socioeconomic and Environmental Issues Analysis of Oil and Gas Activities in the OCS of the Eastern GOM*, ...*the Central GOM*, and ...*the Western GOM*.

## **National Economic Analysis**

The MMS conducts a national economic analysis for each 5-year leasing program. The MMS calculates the net benefits of the program alternatives in a national cost-benefit analysis framework. The models used to calculate these components include the *Net Economic Value Model*, which estimates the net benefits to industry plus transfers to the Government; the *General Purpose Environmental Cost Model* (1991 and 1999), which estimates the supply side social and economic costs; and the *Market Simulation Model*, which assesses demand side benefits. Each of these models is reviewed and updated for each 5-year program, and the ESP provides some support for this process.

The MMS conducts economic analyses of policy issues to investigate ways to improve the OCS program's performance and to estimate its benefits and costs to the Nation. For example, the Bureau examines questions concerning the effects of royalty reduction and revenue sharing to the program and the States. Most MMS national economic analysis is done in-house, using standard methodologies, and again the ESP provides strategic support. The most recent example is the ongoing study, *Estimating the Environmental Costs of OCS Oil and Gas Development and Marine Oil Spills: A General Purpose Model: Model Methodology, Documentation and Sample Outputs*, which will refine economic multipliers for the OCS oil and gas industry for both 5-year and GOM Region projection models.

## **Regional-Level Analysis**

This component provides information and analysis at the regional and sub-regional level. An intra-regional hierarchy might include multi-county or parish, sub-State, State, and multi-State areas. These study efforts include the gathering and analysis of baseline information, modeling, and cumulative effect research.

Baseline studies describe areas before OCS activity and serve as the base against which impacts are evaluated. To do this, they also examine basic social and economic trends within regions and sub-regions and analyze causal relationships between stages of OCS activities and their effects. Finally, baseline studies provide

information and analysis needed for modeling. Because the oil industry has been part of the regional economies for many years, baseline analyses may yield information about the short- and long-term consequences of industry activities and insights into the causes and mitigation of these consequences.

Regional and subregional modeling efforts develop and test models based on historic data. They use quantitative data to project future conditions with and without program- or project-specific development. They provide a way to test developmental alternatives and specific mitigation.

Typically, these are economic-demographic projection models that use outputs from economic analyses based on export-base or econometric projection methods. They combine these results with analysis of the local available labor force and the number of new jobs projected. These models then estimate employment-related immigration. Service demands and fiscal impacts are projected on the basis of population-based rates of change. Analyses are generally done separately for multiple project phases including preleasing, leasing, development, and postdevelopment phases. Such models are often user-interactive, allowing users to expeditiously examine multiple scenarios of development. Thus, they are particularly useful for the regional assessment phase of MMS activities.

The 1995 NRC symposium in the GOM Region defined cumulative impacts as:

... those that result from the interactions of many incremental activities, each of which may have an insignificant effect when viewed alone, but which become cumulatively significant when seen in the aggregate.  
(Dickert and Tuttle 1995:39)

This symposium noted that the assessment of cumulative impacts takes two forms, one common to science and one common to sociopolitical and legal circles. The former identifies causal links between actions and effects and requires the long-term measuring and monitoring of effects. The latter emphasizes processes of decisionmaking such as the evaluation of a project's contribution to cumulative impacts found in an EIS. The assessment requires a "scoping" process in which the values and concerns of interested parties are identified and addressed. Cumulative impacts are poorly understood and rarely documented. Even though knowledge of them is limited, analysis of them is required under the NEPA process.

Information gathered pertains to:

- regional economics (industry activity, employment, income),
- demography (age, gender, race or ethnicity, family structure, education levels, migration),

- services (public safety, medical, schools and education, water and sewer, social and human services, health, housing, community recreation), and
- fiscal resources.

This information may be analyzed from one or a combination of geographic, social, economic, and political perspectives and this analysis typically has an historic element, measuring change over time.

This component supports specific analyses in EIS's, environmental assessments (EA's), and categorical exclusion reviews. This component also provides information and analysis used in the MMS 5-year planning process. It identifies specific impact producing factors (i.e., links between exploratory drilling, migration, community size and structure, delivery of public services, and infrastructure requirements). Detailed studies provide data unavailable from secondary and other existing sources. Studies also define impacts by type, range, scope, severity, and relationship to developmental stage and direction for possible mitigative approaches.

The majority of MMS's social science research takes a broad geographical perspective, focusing on groups of communities, counties, boroughs or parishes, States, or groups of States. This approach is taken for several reasons. First, since many leasing and management decisions are made at a regional or planing area level, they reflect the structure and data needs of MMS decisionmaking. Second, many individuals within a study area have strong cultural, social, and economic identifications that are not community-based, and many stakeholder groups are national or regional rather than local. Finally, many of the OCS program's positive and negative consequences occur at the regional level. This focus is analogous to the growing move toward an ecosystem management approach throughout the DOI.

The first large-scale GOM Region socioeconomic studies were regional-level projects supporting modeling. These include:

- *Indicators of the Direct Economic Impacts Due to Oil and Gas Development in the GOM* (1986) and
- *Analysis of Indicators for Socioeconomic Impacts Due to OCS Oil and Gas Development in the GOM* (1987).

New modeling efforts were procured to support the Bureau's decision to use IMPLAN-based I/O models, including:

- *Deepwater: Workshop for Modeling Demographics and Socioeconomic Change in Local Coastal Areas in the GOMR,*
- *Deepwater: An Analysis of the Socioeconomic Effects of OCS Activities on Ports and Surrounding Areas in the GOMR, and*
- *Cost Profiles and Cost Functions.*
- *Update of Oil Industry Labor Factors for the Alaska Manpower Model,*
- *Rural Alaska Model*

These new modeling efforts occurred at a time when regional-level baseline studies were focusing more on past consequences of OCS oil and gas development and the causes of those effects. In the GOM Region, examples include:

- *Oil in the Gulf: Past Development, Future Prospects (1995);*
- *The Coastal Division of Industrial Labor Over Time and Space; and*
- *Assessment of the Historical, Social and Economic Impacts of OCS Development on the Gulf of Mexico Communities* (a baseline analysis addressing demographic, social, economic, service, and fiscal impacts of the OCS oil and gas industry along the GOM).

Several regional-level baseline studies have used historic time-series data to examine issues such as population change:

- *Economic and Demographic Systems of the North Slope Borough: Beaufort Sea Lease Sale 97 and Chukchi Sea Lease Sale 109;*
- *Alaska Statewide and Regional Economic and Demographic Systems: Effects of OCS Exploration and Development, 1986;*
- *Socioeconomic Baseline of the Gulf of Mexico, Phase I; and*
- *Economic and Demographic Profile of San Luis Obispo County, California.*
- *Alaska Statewide and Regional Economic Systems: Effects of OCS Exploration and Development, 1990.*

- *Social Indicators Study of Alaskan Coastal Villages Volumes I-VI*
- *An Investigation of the Sociocultural Consequences of Outer Continental Shelf Development in Alaska Volumes I-VI*

The oil industry has gone through economic fluctuations sometimes referred to as “booms” and “busts”. Examples of regional-level analysis examining this issue include:

- *Economic and Social Effects of the Oil and Gas Industry in Alaska 1975 to 1995, Volimes 1 and 2* [NSL AK-96-06];
- *Impacts of Oil Exploration and Production on the Social Institutions of Coastal Louisiana* (1993); and
- *Social and Economic Impacts of Petroleum “Boom and Bust”Cycles* (1994).

Examination of impacts to public service delivery and infrastructure has been a major component of regional-level research. Examples include:

- *California Offshore Oil and Gas Energy: A Joint Study of the Development Scenarios and Onshore Constraints in the Tri-county Area of San Luis Obispo, Santa Barbara, and Ventura Consolidated Public Proposal* (COOGER 1993-2000);
- *Navarin Basin Transportation Impact Analysis*;
- *Analysis of Aleut Institutional Response and Change: 1980-1985*;
- *Northern Institutional Profiles Analysis--Beaufort Sea*; and
- *Deep Water: OCS Related Infrastructure in the Gulf of Mexico*.

### ***Community/Individual-Level Analysis***

This research focuses on communities, groups, families, and individuals. Studies of this sort include the gathering and analysis of baseline information, community case studies, and case studies of causal relationships at the community, group, family and individual levels.

Data collected at the community and individual levels are useful to baseline descriptions because they provide information on geographical areas and groups



most likely to be affected by an action. Also, by identifying and assessing causal relationships, studies at this level help support the projection of baseline trends and likely outcomes of proposed actions. Finally, baseline studies provide information and analysis needed for mitigation and monitoring.

Methods commonly include:

- literature reviews,
- statistical analysis of existing data such as the U.S. Census,
- OMB-approved surveys, community studies, and
- ethnographic observations.

Often MMS employs mixed methodologies. For example, literature reviews and ethnographic methods are used to assess and validate more formal approaches such as structured survey results. Analysis usually looks at change over time even when the goal is to develop a baseline.

The community-/individual-level component supports management decisions at the sale-specific and operational levels and mirrors that of the regional-level analysis. It supports specific analyses in EIS's and EA's. It examines specific impact producing factors (i.e., the relationship of the persistence of local communities and institutions to OCS labor scheduling or to changes in household structure, the relationship of economic cycles to family economic strategies or socially dysfunctional behaviors). Community studies also provide baseline "snapshots-in-time" that provide important details for populations most likely to be affected by the program. Detailed studies provide data not available from secondary or other existing sources. Studies also provide definition of impacts by type, range, scope, severity, and relationship to developmental stage and direction for possible mitigative approaches.

Community case studies describe the population and its characteristics, the economy, fiscal resources, social service delivery systems, social institutions, and social issues within a community or sub-community. These studies focus on specific issues relevant to the OCS program such as the effects of economic booms and busts or the role of OCS-related employment in maintaining/modifying particular social institutions. Case studies are also directed at issues or social institutions of particular relevance to MMS's programs.

For example, MMS has conducted a study of the residence of oil and gas workers in selected companies active in the GOM Region (Centaur, 1986). This information helped MMS determine where employment effects of OCS activities were likely to occur. Many relevant issues are best researched at the level of individuals, families, or social groups. Examples include:

- effects of the oil and gas employment on commuting and migration;
- effects of oil- and gas-related employment on individual jobs;
- effects of work scheduling on families and social institutions; and
- effects of booms and busts on socially dysfunctional behavior.

For example, a Gulf of Mexico study titled *Social and Economic Impacts of OCS Deep Water Activity on Families and Individuals* addresses such topics as:

- community structure and cohesion;
- distribution of benefits and costs within a community and sub-community;
- social disorganization;
- social and individual effects of economic booms and downturns; and
- analysis of OCS-related work scheduling and impacts on family roles.

In the Pacific Region, *Petroleum Extraction Industry in Tri- County Area, California: Socio-Economic, and Historic Considerations* investigated the decline in oil production in the tri-counties. This study maintains that, although oil activity has been a steady part of the local economies from 1950 to the present and projected through 2015, the region would have been equally as well off economically (as measured by average individual income) had there been no such activity. This study found no statistically significant pattern of positive impacts of the oil and gas industry's presence on the overall scale of economic activity.

Another example of group and individual analyses in the Pacific Region, *Social and Economic Adaptions by Fish Harvesters in the Santa Barbara Channel-Santa Maria Basin Area, California* (Utah State), uses surveys approved by the Office of Management and Budget to evaluate individual and group adaptions to changes in fisheries due to market demands, legal requirements, and space-use conflicts due to offshore oil and gas operations.

Focusing on natural gas, a recent research effort titled, *Historical and Socioeconomic Assessment of Oil and Gas Industry in Coastal Alabama*, defined the role natural gas production has had on the Alabama economy with consideration given to past and forecast production. This research shows that the cost functions in Alabama are quite different from other coastal States in the GOM Region. The study suggests that MMS should take more localistic approaches when modeling economic impacts from OCS activity. The findings of this study are now being used throughout the economic and leasing divisions of MMS.

The GOM Region is also focusing on inventories of roads, water, waste disposal, public education, available medical and health facilities for supporting oil and gas

development, particularly that in deepwater. *Benefits and Burdens of OCS Activities on Selected Communities and Local Public Institutions* is a study that deals with these effects, whereas *An Analysis of the Socioeconomic Effects of OCS-Activities on Ports and Surrounding Areas in the Gulf of Mexico Region* identifies available port facilities that directly or indirectly support oil and gas production.

*A Socioeconomic Analysis of Port Expansion at Port Fourchon* has found that infrastructure may be one of the more significant social issues related to oil and gas activity in the GOM Region. The conditions of roads and fresh water facilities are heavily impacted with in-migration and enhanced usage. Port Fourchon, Louisiana, has experienced a rapid growth in OCS-related activities and has recently handled as much tonnage as the port facilities in New Orleans. While this upswing has brought needed jobs to the area, it has also stressed the existing infrastructure, particularly State Route 1, Port Fourchon's only highway connection.

### ***Resource-Use Issues***

Resource-use issues arise from the conflicts between potential offshore activities and existing uses. These conflicts shape both the Bureau's NEPA documents and decision processes. Both the OCSLAA and NEPA stress the identification and resolution of resource-use issues and encourage analysis in terms of opportunity costs of development. Resource-use issues often prove to be some of the most contentious faced by the Bureau and sometimes have contributed to establishment of congressional moratoria in offshore regions. Existing resource uses include:

- commercial fisheries,
- subsistence activities,
- tourism and recreation, and
- military operations.

Analysis of resource-use issues supports management decisions at the site-specific and operational levels by providing data for modeling efforts and development of mitigation.

**Commercial fisheries** have been an important issue in all OCS regions. Effects of OCS activities on fisheries can be harmful or beneficial (area preemption and gear loss or habitat alteration); continuous or periodic (alterations in populations); and can be felt on a local as well as a national level (cleanup costs or seafood prices). One way to consider the potential consequences of offshore activities on fisheries is by the distribution of costs and benefits among different segments of the community and the society at large.

In the Alaska Region, possible conflicts between OCS activities and **subsistence**

**activities** and commercial fisheries are major concerns and have often been addressed through community studies (see above). Subsistence uses continue to be the primary social issue for the Alaska Region because of the priority usage awarded by ANCSA and ANILCA. Subsistence activities provide a sense of identity and are important socially, culturally, and economically. Similarities may exist in the types of resources used by local residents; however, there are considerable differences and variations among the communities using the resources. *Subsistence Economics and North Slope Oil Development* analyzes quantitative data sets on subsistence harvest production, harvest distribution, and employment by households in Kaktovik and Nuiqsut. Findings of the statistical analysis have been augmented and interpreted by additional qualitative information collected through key respondent interviews of hunters in Kaktovik and Nuiqsut. Along the same lines, issues specifically addressing conflicts of OCS activities with subsistence activities were studied in *Social Indicators Study of Alaskan Coastal Villages*. It is also important to focus on the similarities and differences in the knowledge base of the cultures who depend on traditional practices to survive. *Collection of Traditional Knowledge of the Alaskan North Slope* collected and organized "traditional knowledge" information associated with the North Slope of Alaska. The study created a database, which encompasses oral histories, taped interviews, written transcripts, published sources, and textual and video records.

**Tourism and recreation** activities (beaches, boating, fishing, camping, scenic attractions etc.) are also important resource-use issues common to all OCS regions. In parts of the GOM and Pacific Regions, rigs as habitats (artificial reefs) are positive resource-use issues, whereas the major resource conflict has been perceived threats to tourism and quality of life. When natural resources are combined with a favorable climate or location, the result is development of an extensive public and private infrastructure to support tourists attracted to the area. These recreation or leisure opportunities create expenditures along with direct, indirect, and induced economic impacts.

Overall responsibility for offshore **military activities** (flight and submarine training, missile firing, live-ammunition exercises etc.) lies with the Assistant Secretary of Defense. Through many years of joint cooperation between DOI and the Department of Defense, lease stipulations have been developed to accommodate joint uses of OCS areas that DOI determines to have mineral potential. These stipulations require close cooperation between oil and gas operators and military authorities.

As suggested, resource-use issues exist in all regions and are often gathered through regional- and community-level studies, more specialized examples include:

- *Economic Effects on Aquaculture Leases of Offshore Development*, which examined commercial fisheries conflicts with OCS activities;

- *Impacts of Oil and Gas Development on Recreation and Tourism off the Florida Straits*, which identified and analyzed recreation and tourism activities in the Florida Keys that might be affected by proposed OCS development activities (i.e., a regional economic impact model that evaluated relationships between recreation and tourism and OCS-related economic activity on the south Florida economy);
- *Economic Impacts of Fishing and Diving Associated with Offshore Oil and Gas Structures*, which examined the positive economic effects of GOM platforms as fish habitats; and
- *Bluewater Fishing and Deepwater OCS Activity: Interactions Between Fishing and Petroleum Industries in Deepwater of the GOM*, which explored possible user conflicts.

### ***Adaptive Policy Studies***

The MMS faces continual changes in technology, legal mandates, and public attitudes. The dynamic nature of the offshore programs requires flexibility if MMS is to effectively address unforeseen issues. Adaptive policy studies in social sciences fulfill this role.

Since this component includes a wide range of studies that cross all decision points, they cannot be characterized by a particular set of questions addressed or methodologies used. Rather, they are characterized by narrowly focused research that provides managers with specific information.

For example, to assess the effects of mercury associated with offshore gold mining in Norton Basin, the Alaska Region conducted two studies:

- *Concentrations of Metals in Norton Sound Seawater Samples and Human Hair Samples, 1989*, and
- *Segmental Analysis of Mercury in Hair in 80 Women of Nome, Alaska*.

The effects of mercury was a major issue identified in the scoping process and was analyzed in the EIS for a proposed marine minerals effort. The information obtained through these studies supported this analysis.

The 1980's downturn of the oil industry in the GOM Region led to a trend from rig operators who were highly integrated major corporations towards small, nonintegrated independent corporations. The MMS needed to understand the safety and fiscal implications, if any, of this change. The ESP procured several

studies that examined these changes and management issues surrounding them:

- *Characteristics and Possible Impacts of Restructured OCS Oil and Gas Industry in the Gulf of Mexico, 1995*, established that there was indeed a trend towards smaller, independents;
- *The Environmental and Safety Risks of Increasing Activity by Independents on the Federal Outer Continental Shelf (OCS)* analyzed data collected by MMS inspectors to determine if there were differences in safety procedures of majors and independents operating in the GOM OCS;
- *Forecasting the Number of Offshore Platforms on the Gulf of Mexico OCS to the year 2023* looks at the long-term decline in the numbers of the platforms operating in the Gulf.

*California Offshore Oil and Gas Energy: A Joint Study of the Development Scenarios and Onshore Constraints in the Tri-county Areas of San Luis Obispo, Santa Barbara, and Ventura* (COOGER) is an example of MMS addressing issues raised by local and State governments in areas that MMS has not generally studied. This study grew out of MMS efforts to work with the counties of San Luis Obispo, Santa Barbara, and Ventura in the Tri-County Forum. A major concern expressed by the counties, the State of California, and other interested parties was the potential impact of undeveloped Federal leases in the Tri-County area. The MMS, working with local and State governments and the oil and gas industry, developed COOGER as a way to evaluate the potential impacts of developing the existing leased, but undeveloped, Federal and State offshore oil and gas tracts. The statement of work for the study was co-authored by MMS, representatives from the three study area counties, three California State agencies, and the oil and gas industry. Public workshops were held to finalize the scope of the study after award, and public participation took place at every stage of the study. Another unique aspect of this study is the MMS (1/3) and oil and gas industry (2/3) cost sharing for the study.

Attitudes towards oil and gas development in the Pacific Region seem to include "NIMBY" (Not In My BackYard) responses, which have been conventionally characterized by limited information, localized attitudes, high concern for project risk, distrust of project sponsors and highly emotional responses to conflict. However, the study entitled *How Political Activists See Offshore Oil Development: An In-depth Investigation of Attitudes on Energy Development*, which was completed in 1998, maintained that the above characteristics are only partially true. Neither opponents nor supporters of OCS development have limited information, both have localized attitudes, neither trusts the other, neither are extremely emotional, and the real difference lies in the perception of risk. Where

opponents to development see huge risks, supporters perceive little risk. Therefore, the NIMBY label may tell us little other than that a political dispute exists and that the key element of the dispute is about the risks associated with the proposal.

The MMS was a co-sponsor for the *1996 International Workshop on Human Factors in Offshore Operations*. Between 75 and 90 percent of offshore accidents and injuries can be attributed to human error. The workshop was designed to define the human and organizational factors applied to reduce accidents and to identify issues that influence the utilization of these factors.

## ***Mitigation***

Mitigation may be defined as specific actions taken to minimize, avoid, or compensate for negative impacts on resources that would be affected by a proposed project. It includes identification, projection, and evaluation of effects that could be associated with a proposed action. The aim of mitigation is to bring estimated impacts within an acceptable range. In selected cases, this may mean compensating States for resources that cannot be saved.

These measures can be specifically and selectively applied at policy, program, and project levels. Policy adjustment can alter the mix and balance of planning goals and objectives in accordance with public preferences. Program alterations can similarly revise planning guidelines and design specifications. Project modifications can tailor operating procedures and activities to suit local conditions.

Stipulations are another example of mitigation. The Bureau's stipulations may cover a range of categories including:

- fisheries,
- geologic hazards,
- safety and technology,
- air quality, marine biology,
- military,
- cultural resources, and
- subsistence.

Environmental studies have played an indirect role in mitigation. The primary research contributions to mitigation research are problem identification, information collection, and analysis allowing evaluation of proposed measures.

Examples of regional mitigation studies are:

- *Mitigation of Sea Floor Conflicts Between Oil and Gas Pipelines and Commercial Trawl Fisheries on the California OCS* (Pacific Region)
- *Mitigating the Impact of Offshore Oil Development* (Pacific Region)
- *Marine Mining Technologies and Mitigation Techniques*, a detailed analysis with respect to the mining of specific offshore mineral commodities (GOM Region)
- *Identification and Assessment of Impacts Associated with the Construction and Operations of Submarine Pipelines on the Mid-Atlantic Outer Continental Shelf* (Brosius 1983), which identified suitable areas for pipeline construction based on environmental and socioeconomic features of the mid-Atlantic, characterized potential impacts, and recommended mitigating measures and special practices to minimize impacts as well as areas that should be avoided.

## ***Monitoring***

Monitoring measures ongoing development-related social, cultural, and economic impacts. It provides a basis for comparing the predictions of effects with their occurrence. As part of assessment, impact variables are identified and analyzed.

Social science impact monitoring categories include proposed actions, the human environment, and responses.

- **Proposed action monitoring** follows trends in technology development, tracks project development (including institutional and managerial factors), and identifies indirect socioeconomic effects through environmental and ecological systems.
- **Human environment monitoring** compares actual with projected changes in social conditions and systems and employs quality-of-life indices.
- **Response monitoring** includes:
  - measuring social concerns generic to the state of society and specific to the proposed action (issues tracking);
  - gauging the relative effectiveness of established mitigation measures; and
  - systematic testing of impact hypotheses formulated for use in policy analysis and impact management.



Minerals Management Service environmental documents analyze and propose mitigation measures as options. Selected measures may be stipulated as conditions of leases, permits, contracts, and the final design of projects. Monitoring can be used to ensure commitment to stipulations as part of the decision to proceed with the project. Monitoring supports management decisions at the operational level. It assists in developing effective mitigation, supports local/regional planning efforts, and provides data for refinement of modeling efforts.

In the Alaska Region, the *Social Indicators Study of Alaskan Coastal Villages*, an extensive monitoring program, determined and evaluated key factors within communities affected by the Exxon Valdez oil spill. These key factors are crucial to future monitoring of the potential effects caused by OCS-related activities. This study also provided useful baseline information.

In the Pacific Region, social science impact monitoring has traditionally been done by the counties permitting facilities within their jurisdictions. Typically, impact monitoring is funded as part of the operating permit and may be conducted by the industry, an outside contractor, or the counties themselves.

In the Gulf of Mexico Region, a study titled *Assessing and Monitoring Industry Labor Needs* addresses the direct effects of deepwater development on State and regional economies. Since these effects are driven by industry employment and purchasing, they allow MMS to make more detailed and accurate projections and economic forecasts, and to address issues of State and local benefits of deepwater development and/or exploration.

## ***SUMMARY AND CONCLUSIONS***

In recent years the MMS has given increased emphasis to socioeconomic research. For example, in response to the deepwater driven growth industry in the GOM and as a result of the 1997 workshop on issues surrounding deepwater oil and gas development, the MMS has initiated several studies to address the socioeconomic implications of deepwater development.

In addition, 1999 marked the first *MMS National Social and Economic Planning Conference* to identify various research linkages among regions and studies and to explore their long-term and methodological similarities and differences. This conference provided the technical experts needed for a state-of-the-art review of social and economic studies assessment as it relates to OCS oil and gas activities. This conference was a complement to MMS's existing national and regional level decisionmaking processes.

This document outlined why MMS conducts social science research. The document discussed the range of social and economic research supported and used in the Bureau as a framework for evaluating both national and regional social science research needs. As stated, the MMS uses social science data and analysis throughout the various phases of decisionmaking: 5-year planning, prelease and leasing activities, exploration, development, production, and decommissioning of offshore platforms. The MMS designs studies to address the data and analytical needs arising from these specific phases in order to aid in the decisionmaking process.

The social and economic impacts of energy development are very important to MMS. Researchers have confirmed that many of these impacts are often the first felt and the most strongly experienced. In addition, MMS is also discovering that social and economic regimes may require a longer timeframe to recover, unlike the biological and physical environments, which tend to recover relatively quickly.

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