Social Impact Assessment and Offshore Oil and Gas in the Gulf of Mexico

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ABSTRACT

This paper discusses social impacts of offshore oil and gas development on human communities in the Gulf of Mexico. It addresses issues that arose as Minerals Management Service (MMS) followed the National Research Council's rationale in applying social impact assessment (SIA) to the Gulf's offshore petroleum industry. Gulf assessments are conducted under the National Environmental Policy Act, which involves many processes aimed at identifying, considering, and mitigating possible impacts of a federal lands action. This paper addresses only the analysis of impacts, and focuses primarily on social effects as opposed to economic or psychological ones. The first section discusses the "classic SIA model," the original boomtown model that established the underlying issues, questions, and logic that shape most energy-related socioeconomic assessments. We show that, at the core of this model, project-induced demographic change drives other project-related socioeconomic effects. The second section describes significant differences between classic model assumptions and the actual demographic consequences of the Gulf's oil industry. We show that the industry's effects have been large, long term, widely distributed, and locally variable and that they are inadequately addressed by the project-oriented classic SIA model. The third section returns to the classic model and concludes that none of its basic assumptions fits Gulf of Mexico realities and that the model is incapable of addressing situations with the magnitude, longevity, or complexity of that faced by social impact assessment in the Gulf. This discussion concludes by outlining a strategy for addressing the kinds of assessment problems faced by MMS in the Gulf Region and by many other federal agencies charged with similar responsibilities.

Introduction

The National Environmental Policy Act (NEPA) created mechanisms to identify, assess, and mitigate adverse environmental and socioeconomic consequences of government land actions. NEPA-related procedures have evolved into many types of interactions among decision makers and stakeholders, and many forms of information gathering, assessment, and reporting. We address only part of this picture: environmental impact statement (EIS) assessments of socioeconomic effects. Under socioeconomics, EISs evaluate economic, fiscal, demographic, infrastructural, and other social effects such as changes in crime rates and family structure, as well as psychological issues such as the fear of crime or changes in environmental attitudes. We consider only the former types of effects and focus on the logic of NEPA-related assessments rather than on EIS findings. We use the Gulf of Mexico offshore petroleum industry as our example. Impact assessment of offshore lease sales may entail unique problems, but it also addresses the types of general energy-related issues that first motivated NEPA. Thus, we describe here a case in point of how a particular application of NEPA procedures to an ongoing policy in a complex situation raises issues that are common across many different types of social impact assessment.

This paper discusses an "offshore petroleum industry" that is actually composed of many large and small industrial sectors, such as drilling, production, shipbuilding, fabrication, pipelaying, diving and underwater construction, seismic surveying and analysis, trucking, air transport, offshore vessel transport, catering, oil refining, natural gas transport, and petrochemicals. Each of these sectors has its own organization, regulations, dynamics, technological developments, range of labor needs, working conditions, and responses to industry cycles and transformations. As a recent study notes, "Production platforms, once in place, can continue to produce through short-term price fluctuations. Dive companies can find a niche in platform decommissioning, which is sensitive to the age of structures, not the supply and demand for oil and gas. Fabricators, depending on their size and location, may be awarded large and lengthy contracts for deepwater projects, other yards may suffer as smaller development programs are put on hold. Drillers, however, cannot drill unless the owners of leases … initiate exploration and development (E&D) programs" (McGuire and Gardner 2003:219). Current high natural gas prices are good for drillers but devastating to petrochemical businesses that rely on gas for fuel and feedstock. This paper uses such terms as "offshore industry" and "oil industry" to signify this large, diversely sectored, and variably context-responsive set of industries.

Background

The Gulf of Mexico offshore petroleum industry is huge. Since the 1950s, more than 5,500 platforms have been installed in the Gulf. Currently, there are approximately 3,800 active platforms on the federal Outer Continental Shelf (OCS), which are the source of 25% of the gas and 30% of the oil produced in the United States. These percentages are expected to rise over the next few years. There are more than 25,000 miles of pipeline on the federal OCS. Approximately 1.6 million miles of seismic lines have been taken on it. There are over 3.5 million passenger trips to and from platforms every year. In 2000, there were 162 shipbuilding and repair facilities in the Gulf and 1,155 registered oil support vessels, 86% of which were based in Louisiana. Also in that year, oil and gas extraction, pipelines, and refining employed over 65,500 people and paid $3.5 billion in wages (Louis Berger Group 2003). Since 1952, there have been over 90 federal lease sales, and there are currently over

7,000 active leases. This leasing program is the second largest revenue source for the federal treasury after the Internal Revenue Service. The treasury receives approximately $4.3 billion annually from bonuses, rents, and royalties (see Figure 1).

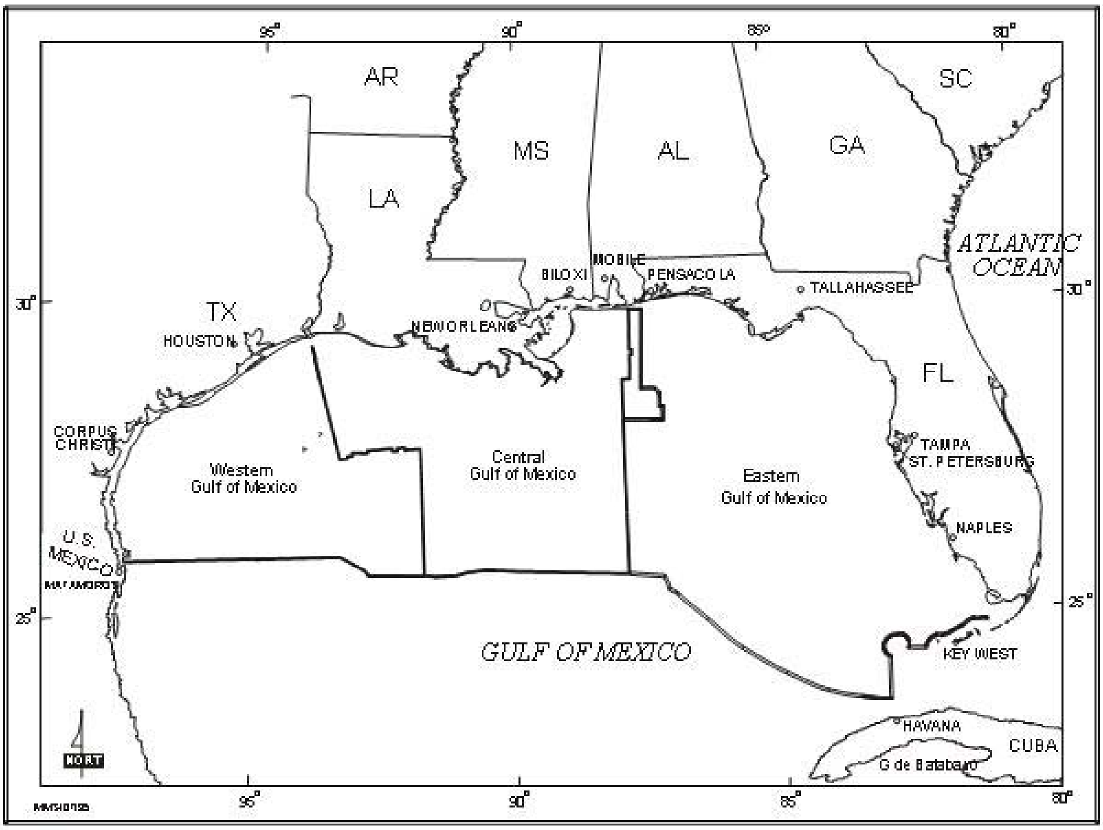

Figure 1: Gulf of Mexico Region

The Minerals Management Service (MMS) was founded in 1982, created from parts of several governmental bodies overseeing OCS activities. MMS is charged with leasing offshore petroleum reserves on the federal OCS in an environmentally safe manner. The Environmental Studies Program (ESP) was originally created under the Bureau of Land Management (BLM) to provide information and analysis in support of agency decision making and environmental assessments as mandated by NEPA. Under MMS, the ESP continues to fund a substantial quantity of research designed to improve the information on which decisions and assessments are made. Since 1982, the agency has invested over $650 million on over 900 studies on oceanography, ecology, and socioeconomics. However, under the BLM, the ESP conducted little socioeconomic research in the Gulf. The ESP, like NEPA, arose from the ferment of the 1970s energy crisis. The federal response to that crisis included proposals for massive developments of domestic energy sources, which precipitated an effort by federal resource management and science agencies to assess and mitigate the effects of those energy development proposals. NEPA defines effects as the differences between an area's baseline conditions and the conditions after project initiation. Early on, socioeconomic effects were seen as arising from four sources: (1) national and regional economic inputs; (2) physical and biological impacts of new facility sitings and new sources of pollution, including oil spills; (3) boomtown effects from new labor demand; and (4) public perceptions and fears about these proposals (Pikul and Rabin 1974; NAS 1978). Pointing to the oil industry's long history in the Gulf and its well-developed infrastructure and workforce, the BLM reasoned that regional economic impacts were certain but that any additional social impacts of offshore development would be difficult to identify by means of NEPA baseline-monitoring techniques. As a result, few socioeconomic studies were initiated in the Gulf despite the fact that virtually all U.S. offshore oil development was occurring in that region.

At first, MMS continued the narrow reading of NEPA begun under the BLM and sponsored little socioeconomic research in the Gulf. Then, in 1986, petroleum prices collapsed, sending Louisiana and Texas into recession and convincing many in MMS that the socioeconomic effects of its leasing program were important regardless of their original reading of NEPA. In the 1990s, MMS contracted with the National Research Council (NRC) to examine the adequacy of ESP support for agency decision making and assessments. The NRC was highly critical of the socioeconomic component of the Gulf's ESP, and asserted a strong rationale for conducting research in this area. It noted that the same 100-year history of industry operations in the Gulf that had been used to argue against socioeconomic research also makes the Gulf a ready-made "laboratory" for studying petroleum's social and economic effect (NRC 1992). The NRC reasoned that because the Gulf offshore industry is homegrown, long-lived, and widespread, and includes a complete range of related upstream and downstream activities, most social or economic impacts that the industry can have are likely to be present there. At the same time that the NRC was issuing its report, the MMS was holding its "Gulf of Mexico Socioeconomic Agenda Setting Workshop." The price collapse provided the impetus for the program, and the NRC provided its justification. In 1992, the workshop began to define its content (Gramling and Laska 1993; see Luton and Austin, 2003 for a discussion of these developments in the ESP).

Since 1992, the socioeconomic component of the Gulf's ESP has grown substantially in size and scope. Over 40 research reports have been completed. About 25 research projects are ongoing; more will begin in 2004 and in subsequent years. This paper, however, does not describe the program's growth or content. Instead, it addresses issues that arose as MMS followed the NRC rationale and applied SIA logic to the Gulf's offshore oil industry.[1] This paper is divided into four sections. The first discusses what we term the "classic SIA model," the underlying issues, questions, and logic that shape most energy-related socioeconomic assessments, including MMS's. The second uses demography to illustrate differences between the paradigm and the Gulf. What we say may not be new (e.g., Wilkinson et al. 1982; Gramling and Brabant 1986), but the Gulf provides a fresh perspective. The third section describes a larger set of problems associated with applying the classic model to the Gulf. The paper concludes with a few comments on where MMS might go from here. The ESP is a work in progress.

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[1] For information about the Gulf ESP, see: <http://www.gomr.mms.gov/homepg/regulate/environ/studiesprogram.html>. This site contains information on Gulf Region ongoing studies, completed studies from 1993 to the present, and the Annual Studies Plan. It also includes PDF files of many of the more recent study reports.

Classic SIA

SIA has evolved in many directions over the years. However, we label as "classic SIA" the model that emerged from a group of impact studies conducted in the 1970s and early 1980s that addressed large, government-sponsored projects such as coal-fired generating plants, strip mines, and hydroelectric dams, mostly in rural areas of the western United States (Murdock et al. 1984; for examples of early methodologies, cf.: Wolf 1974; McEvoy 1977; Murdock and Leistritz 1979; Finsterbusch 1980; Finsterbusch and Wolf 1981; Leistritz and Murdock 1981; and Weber and Howell 1982). While this model is often called the boomtown model, we label it classic because it was the first SIA model, the root from which later versions grew, and because it established an underlying logic, set of goals, and list of concerns that still resonate in SIAs that later emerged. Its longevity also makes it classic; for 20 years it has remained a frequently used approach and the predominate model for energy-related projects (e.g., Gilmore and Coddington 1981; Chase and Leistritz 1982; Summers and Selvik 1982; Walsh 1985; Guilford 1989; Ringholz 1989; Vanclay and Bronstein 1995; Luke et al. 2002). As such, it is the approach on which the BLM and MMS began to build their assessments of the social and economic effects of the OCS leasing program (e.g., CEQ 1974; Williams and Horn 1979; Executive Resource Associates 1984).

As is often noted, this SIA model reflects the conditions from which it emerged, most notably, concerns about boomtowns (Wilkinson et al. 1982; Albrecht 1982). As contemporaries wrote, studies of Gillette and Rock Springs, Wyoming (Kohrs 1974; Gilmore and Duff 1975; Brown 1977; Lovejoy 1977), and, later, of Forsyth and Colstrip, Montana (Blevins et al. 1974; Gold 1974), Craig, Colorado (McKeown and Lantz 1977), Page, Arizona (Ives and William 1976; Little 1977), and Fairbanks, Alaska (Dixon 1978) rejuvenated interest in boomtowns. The basic theme of this literature "is that rapid population growth associated with energy development creates social disruptions, cultural conflict, and pathological behaviors among residents of boomtowns" (Summers and Branch 1982:34-35). These community studies, and others that followed, express a deep concern for a way of life being forever altered—they ask, "Whatever happened to Fairbanks?" They raise issues about local control, about townspeople having little say regarding new forms of industry appearing "on their village green" (Summers and Selvik 1982:vii), about the rural towns becoming "dependent on extra-local decision-making organizations," about the idea that mineral exploitation introduces organizational forms that demand changes to the existing social organization, about land-use conflicts and competition for scarce water, about the benefits and uncertainties created for local businesses, about new demands on public infrastructure and services, and about taxes and fiscal policy. They raise issues about large but short-lived labor demand, about the inflow of workers not rooted in the community, and about increasing crime, alcoholism, drug abuse, mental illness, divorce, social isolation, and alienation (Summers and Branch 1982:24-25, 28-29).

Classic Equation: Jobs = People = Effects

While concern about the unique features of communities energized these early impact studies, the recognition of shared characteristics and situations shaped the SIA model. Large, managerially complex, technologically sophisticated, industrial projects designed to exploit a natural resource were constructed near small, rural, isolated, homogeneous, often declining, agriculture-based communities. Project-related decision making was external to the community and foreign to its systems of leadership or governance. Project-related technology, goods and services needs, and labor demands were well beyond the community's capacity to supply. Projects were, essentially, foreign transplants that would exist for a limited time period, divisible into three distinct phases. A short-lived construction phase with high levels of employment and heavy demands on the community and its infrastructure and leadership was followed by a longer operations phase that used fewer, more specialized workers and made lighter, more constant demands. The final phase, decommissioning, brought the project to its inevitable close.

In the classic SIA model, new project labor demand is the primary cause of positive and negative socioeconomic impacts. New jobs increase household income and expenditures, which stimulate local business activity and generate more government revenue through taxes and fees. While higher labor demand always means positive economic effects, the model's strength comes from locating these benefits in their rural context. Because these communities are small and agricultural and the projects are large, industrial, and foreign, most of the new jobs cannot be filled by the local labor force; and because these communities are far from any population centers, new jobs will not be filled by commuters already living nearby. New workers must come from elsewhere. This means that inserting large projects into rural communities will cause rapid population growth as outsiders arrive seeking work. Other factors amplify this process. Rural environs compress the new population in space because services like water, electricity, and schools are found only in towns, limiting where inmigrants might live. In addition, the short lifespan of the projects and, especially, of their construction phase compress the new population in time. These communities will experience rapid population growth because new labor is drawn from elsewhere and demand is front-loaded. For the same reasons, these communities will also face rapid population decline. Construction workers who inmigrate will outmigrate when their jobs end, although operations-phase employment may slow this decline. Again, other factors accentuate the ups and downs. Many workers arrive with families, inflating the new population's size and diversity. Since the new households stimulate local business growth, local businesses may also outrun their local labor supply, creating additional inmigration. These jobs, too, will be lost as the project-related population decreases.

An emphasis on links between rapid population change and other effects, such as the fate of local business, is a characteristic of this model that recapitulates its boomtown genesis. While demographic change concentrated in time and space would be an important impact in its own right, in the classic SIA model it is fundamental: it is the first and most germane cause of a wide range of other socioeconomic effects, and it is the point where impact theory, assessment practice, and the original boomtown concerns all meet. As one pioneer practitioner warns, "Determining demographic effects of project development is one of the most important steps in the socioeconomic assessment process because estimating demographic impacts is essential for assessing other population-related effects such as public service demands and fiscal impacts. In fact, too many planners and decisionmakers assume the magnitude of population impacts is synonymous with the magnitude of all impacts" (Leistritz 1992:212).

Consequences and Their Causes

The classic SIA model addresses several categories of impacts. Demographic effects come first, as products of new labor demand. Economic impacts come second, as products of labor demand and the demographic effects. As already noted, economic impacts amplify the demographic effects (e.g., via secondary or tertiary demand). Infrastructure and public service effects come next. These can include new demands for private and public housing, and for infrastructure and services associated with education, police, fire and emergency services, transportation, water, sewer and sanitation, health and social services, criminal justice, recreation, and libraries. In classic SIA, these effects are due primarily to demographic changes, although some interactions are seen as more complicated. For example, rapid inmigration may create housing booms that increase the tax base along with demands for roads, schools, and police protection. Conversely, the bust brings empty housing, a shrinking tax base, overbuilt schools, and lingering bonded indebtedness.

This housing example raises a fourth category, fiscal impacts. Fiscal impacts are products of project activities, labor demand, and demographic effects. On the positive side, these impacts include increased local revenues (e.g., fees and property and sales taxes). On the negative side, they include increased expenditures to meet new infrastructure and public service demands. Again, this focus on housing, public infrastructure, roads, schools, social services, and public safety parallels concerns endemic to boomtown literature, concerns that also shape classic SIA's basic instrumental goals. Both boomtown literature and the SIA model share the concern that the community and its leadership might be overwhelmed by its swelling population and burdened afterward by an overoptimistic response to it. For this reason, the goal of classic SIA is to produce assessments akin to city planning documents that can be used by affected communities and other relevant jurisdictions (e.g., school districts) to balance responses to the opportunities and difficulties of the economic boom against the realities of the inevitable bust.

The last category generally addressed is social and cultural impacts, which include such topics as the distribution of effects within the community (e.g., who benefits and who is burdened), impacts to specific populations (e.g., effects of inflation on the elderly, the alienation of youth, the isolation of trailer park life), impacts on community cohesion or identification, effects on crime and other dysfunctional behaviors (both actual rates and fear), and effects on environmental attitudes. While some effects in this category may be positive, such as the introduction of new ideas or the increase of what Summers and Branch (1984:39) call "perceived freedom" (e.g., the introduction of alternative pathways to social status), most of them are negative. Social and cultural impacts actually constitute a residual category comprising a variety of topics that share few methodological or subject-area similarities, and that are sometimes considered in an assessment and sometimes not. However, these topics do share one commonality; none fits easily into other classic SIA impact categories because each has a complex and, often, unclear or uncertain relationship to demographic change, a defining characteristic of the other impact categories.[2]

The fact that central boomtown issues, even ones that remain public concerns, are relegated to a residual category illustrates the importance of demographics in defining classic SIA's relevant questions, information, and procedures. However, it also underscores the influence that the model's boomtown origins continue to exert from within. The topic of crime is a case in point. While violent crime is a cause célèbre in boomtown literature, its validity as a contemporary impact has been argued for decades. The debate's very robustness in the face of inconclusive evidence and its marginal place in the assessment process may indicate the enduring force of boomtown concerns. More telling, though, is its habitual invocation of

[2] Environmental justice is the exception that proves the rule. It is a more narrowly defined version of the NEPA issue of who benefits and who is burdened. While the assessment of the general question of the distribution of benefits remains inconsistent, under Executive Order 12898 (59 FR 7629) federal agencies are required to identify any disproportionate, negative impacts of their activities on minority or low-income populations. Therefore, environmental justice appears regularly as a separate category of effects.

Durkheim and anomie, the concept he coined to address social phenomena appearing as a rural peasantry was being uprooted into cities that had yet to develop modern structures of social control. In the 100 years since Durkheim's *Suicide*, criminologists have developed alternative explanations of crime rates that are simpler and more directly related to what is known about crime and criminals. Anomie's charm lies not in its simplicity, or elegance, or obvious empirical might but rather in its recourse to an organic community and its breakdown, and to the disorder that must surely follow, and to our gnawing concerns about boomtowns and the worlds we have lost (Summers and Branch 1982; Wilkenson et al. 1982).

Classic SIA as Paradigm

We have labeled the boomtown model as classic SIA because it is the root from which other approaches have sprung. It also fits Thomas Kuhn's famous formulation of a paradigm. Kuhn (1970:10) describes scientific paradigms as models that organize "law, theory, application and instrumentation" into "coherent traditions of scientific research." We identify the classic SIA model as paradigmatic to underscore its importance in shaping theory, application, and technique into just such a coherent tradition. We have already discussed its role in organizing original boomtown concerns, a theory of effects, and the practices and goals of assessment all around the demographic impacts of a project's labor demand. We have also noted that the model defines assessment's salient questions, hence, the salient evidence. The hierarchy of impact categories shaped by their relationships to demography is one example; the issues surrounding criminal behavior are another. Definitions of salience push inquiry in some directions and not others. Studies focus on population-induced demand and, almost in passing, note that petroleum's big infrastructural effect in North Dakota was road wear from truck traffic (Chase and Leistritz 1982). Studies assume a causal nexus between social disruption and a fear of crime that is most evident in women, while failing to consider a sizable body of literature on the macho, male-centered culture of oil drillers (e.g., Affleck and Eakes 1976; Moen 1986). Finally, we note that, as in Kuhn's definition of paradigm, this model has shaped SIA's instrumentation. For example, the development of regional input-output (I/O) models is one of the notable achievements under classic SIA (Jones et al. 1988). These I/O models tend to be "static," that is, they assume that relationships among different economic sectors remain constant over time. This assumption fits well with a scenario in which a massive, short-lived project is inserted into a small, rural, agricultural economy. In such situations, most goods and services demanded by the project will be imported from elsewhere. However, most contemporary communities are situated in more dynamic economies. Static models are less appropriate when local labor and local enterprises will respond to new project demands.

We also raise the issue of classic SIA as paradigm to emphasize the large shadow it casts on the field of SIA at large—a wide-ranging but variable influence that is manifested, for example, in the impact categories addressed and their processional order, in an emphasis on demographic effects whatever their magnitude and significance, in the ad hoc and residual character of social and cultural effects even when these are noteworthy public concerns, in the use of fear and anomie and in the general dearth of causal explanations except those rooted in demography or subjectivity, in the focus on communities and local areas and their dynamics almost to the exclusion of larger contexts, and in the focus on projects, the early phases of projects, and construction rather than on the effects of the subject industry. However, considering this point is not our goal here. Whether one accepts or rejects such family resemblances as evidence of the classic model's wide-ranging influence on the current variants of SIA, it does still seem to dominate the assessment of natural resource extraction and energy projects, and its influence can certainly be found in assessments of the OCS leasing program. We will note several of the many examples of its influence drawn from MMS-sponsored research in the Gulf of Mexico. First, demography tends to be emphasized even when there are virtually no population effects. The Mobile, Alabama, area hosts a large urban and suburban population and complex economy, just the type of context in which many of the OCS program's socioeconomic effects occur. An excellent study of Alabama's offshore gas industry carefully reports its annual demographic impacts to the tenth of a person, even though these numbers are only artifacts of an economic projection and not related to any actual migration data, and even though the projected inmigration is inconsequential (Wade et al. 1999). Similarly, a report on the rapid growth of offshore support activity at Port Fourchon was delayed as its author searched in vain for demographic effects that he simply knew must be substantial but, in fact, were hardly there (Hughes et al. 2001). Second, analysis sometimes directly equates demographic impacts with social ones. Not heeding Leistritz's warning, a MMS study of the social costs of the 5-Year OCS Leasing Program argues that, since the program has no population effects, it has no infrastructural costs (Plater and Wade 2000). These are subtitle examples of the influence of the classic model. A spate of research funded by MMS immediately in response to the oil price collapse used the boomtown assumptions explicitly (e.g., Laska et al. 1993; Seydlitz and Laska 1994).

Demographics, Offshore Oil, and Classic SIA

The classic approach to SIA grew out of rural Americans' sudden introduction to large, new, energy projects. This approach morphed concerns about small towns and boomtowns into a systematic analysis of socioeconomic impacts. This model may be valid under conditions like those from which it arose. However, like any paradigm, the classic model is a very strong lens that throws the world into a particular focus. Our question is whether this focus is appropriate for viewing the OCS program's social and economic effects in the Gulf of Mexico. We have examined the demographic assumptions that lie at the model's heart. Next, we look at the petroleum industry's demographic effects on Louisiana, particularly from 1960 through the 1980s, to show the marked differences between Gulf realities and the model's paradigmatic assumptions. While the model assumes that affected communities go through similar patterns of in- and outmigration, from early on the demography of south Louisiana petroleum-affected communities exhibited a pattern of stability and geographic differentiation very unlike this scenario. Second, while the model assumes that this pattern will be localized in affected communities, by the end of the 1960s the Gulf oil industry's demographic consequences were sufficiently dispersed to be systemic; that is, the industry influenced population patterns across the state. Finally, while the model assumes that boomtowns are a consequence of the sudden importation of industrialized processes into nonindustrialized communities, in the late 1970s when in south Louisiana towns boomed, and in the mid-1980s when they busted, these effects occurred in highly industrialized communities with long and strong links to a regional, oil-centered economy (Gramling and Freudenburg 1990a).

Petroleum and Community Effects

The early oil industry certainly contributed to our images of boomtowns. Its Pennsylvania birth gave us the thriving town of Pithole overnight, which now exists only as memory and a roadside marker (Darrah 1972; Gramling 1996). The 1900 discovery at Spindletop and discoveries that followed were marked by a progression of boomtowns—Jennings, Beaumont, Oil City, Vivian, Smackover, and others (Franks and Lambert: 1982). Kilgore, Texas, provoked a classic piece of boomtown literature (Chambers 1933). For the first two decades, discoveries tended to follow the same general pattern. Flush production, the rush to capture oil, and cheek-to-jowl derricks generated booms and busts in nearby towns (Bertrand 1952; Franks and Lambert 1982). However, even during these decades, changes afoot were weakening the forces feeding boomtown growth. Within the industry, technological advances reduced labor demands and lengthened field life while managerial and legal changes tended to stabilize production and the workforce. Outside the industry, ongoing industrialization and specialization, growing regional populations and economies, and improving transportation systems lowered local labor demand, increased locally available labor, and created alternatives for people seeking work while the transformation of U.S. bureaucracies tended to make population movements more manageable (Stein 1964). In oral histories, early industry participants identified Kilgore as possibly the last "real boomtown" (Boatright and Owens 1982), and research on Permian Basin oil booms presents a similar view. It finds that short-lived boomtowns were the exception after World War II. Most places experienced long-term benefits, growing with the boom, then declining, but not to pre-boom levels (Olien and Olien 1982). Postwar America has had its share of booms and busts but they have been mostly in cities and suburbs and their causes and consequences are viewed as multidimensional, complex, and, for better or worse, indicative of the country's future rather than as an assault on its past. The 1970s and 1980s phenomena addressed by classic SIA were striking because they moved against the flow of this rapidly urbanizing world, because government policies brought a new kind of growth to rural communities that had been in decline for a half century or so.

The petroleum industry that began to develop in Louisiana's coastal wetlands in 1900 and that moved offshore in 1947 was subject to the same trends affecting the rest of the industry. However, its need to operate in wetlands and over water also made it different. One difference is that oil workers and their families could not live near the fields. Workers had to commute from *terra firma* to their jobs, and the time and costs involved led to a system of concentrated work schedules. Men worked 12-hour shifts for seven, fourteen, or twenty-one days straight and then had an equal number of days off. Concentrated work schedules affected the industry's demographic outcomes in two ways. First, they stabilized the residences of the workforce associated with oil exploration and development. While onshore seismic crews, drillers and pipeliners, and their families moved from field to field, in the offshore industry these workers could live in one community and be transported to the various fields. Thus, forces within the industry encouraging a more settled workforce arose earlier and more strongly in south Louisiana than in the industry in general (Austin et al. 2002). Concentrated work schedules also encouraged geographic dispersal of offshore worker residences. Since workers commuted only once every two, four, or six weeks, they could live relatively far from their point of embarkation (Aratame and Singelmann 2002; Gramling 1980a). This meant that "occupational communities" and occupational segregation found elsewhere in the industry were not as notable in south Louisiana (Affleck and Eakes 1976). Worker households were dispersed within communities, and workers could more easily participate in such "traditional" activities as trapping and fishing (Gramling 1983). This pattern of dispersed worker settlement patterns associated with the maintenance of more rural lifestyles and long commutes to work to nonurban job sites reflects a general southern pattern of industrialization that differed from the earlier northern norm because it occurred in the age of electric power and after road systems began to improve. In the south, industrialization was not synonymous with urbanization. Factories were built outside of cities, and workers settled in more rural areas such as in "ribbon" developments along connecting roads. Even by the 1940s, this pattern was "particularly pronounced" in basic industries in south Louisiana, an area where the petroleum and petrochemical industries and rural communities had already had almost a half-century of interactions (Heberle 1948:34).

Operations in wetlands and over water also required a much larger, more complex, and industrialized support structure than was needed by the rest of the industry to build, operate, and maintain the platforms, exploratory rigs, seismic vessels, pipelaying barges, and various supply and support boats required, and it made many more demands for goods and services generally. Thus, on one hand, compared to its onshore relative, the offshore industry involves many more sectors of the economy and requires a much larger and more diverse labor force. On the other, the offshore industry served to stabilize the residences of this worker population. In classic SIA, the construction workers move from job to job creating the boom phase of projects. Offshore oil development requires much more front-loaded labor than do onshore projects. However, while this labor force may be analogous to construction workers in classic SIA, fabrication yards, shipyards, and ports are geographically fixed and their workforce lives nearby, undermining any tendencies to create boomtowns, at least as envisioned by classic SIA. This analysis also highlights a second aspect of the infrastructure needed to work offshore that, in the long run, proved to be even more significant in shaping the industry's demographic effects—its enormous size and complexity.

To summarize, even early on, oil industry operations in wetlands and over water led to a larger, more diverse, and more settled workforce in southern Louisiana than was typical for the industry at large. Also, early on, these differences led to community-level demographic consequences that differed markedly from the classic SIA boomtown scenario. The 1900 discovery at Jennings, on the heels of Spindletop, and the discoveries that followed at Vinton, Walsh, Iowa, Hackberry, and other communities, were marked by a rush to production and rapidly increasing and decreasing populations. The Jennings salt dome, however, has now been producing for over 100 years. It exemplifies the changes in technology and strategy that have led to more stability within the industry in general (see Forbes 1946). More relevant here are the changes specifically related to operating in wetlands and over water. Already by the 1920s, several larger south Louisiana towns such as Morgan City, Lafayette, and Lake Charles had become oil supply centers, providing labor, services, and fabricated equipment to oil fields over a wide territory. As this diversification occurred, their population growth became more robust and showed a diminished sensitivity to drilling activities in nearby fields. This was a process of industrial aggregation (Heberle 1948). These communities were strategically located to serve the oil industry because of their railroad connections and their access to water transport, and because they were already serving as centers for trade and manufacturing. Also, by the 1920s, several smaller but strategically located south Louisiana communities such as Golden Meadow were already serving as bedroom communities for rig workers commuting to platforms located in the area's uninhabitable wetlands (Bertrand 1952). Even before classic SIA scenario had been written, the dynamics of the south Louisiana oil industry were undermining its validity.

Petroleum and Systemic Effects

In 1947, drilling moved from near shore into the open ocean and as the offshore industry grew, so too did its needs for onshore support. Within two decades, it had transformed itself into the economic motor behind Louisiana's expanding economy (Scott 1978), so much so that, even after its downturn in the 1980s, about 3,800 contractors and vendors in 47 parishes were still providing about $4 billion in goods and services to OCS operations (Applied Technology Research Corp. 1994).

Local specialization and its demographic effects were already evident in the 1920s (Bertrand 1952). By the 1960s, the size and spread of the industry and its enormous demands for goods and services affected economic opportunities and demographic outcomes statewide. These effects appeared against the backdrop of a declining, traditional, agricultural-based, Southern economy. From the Civil War until the 1970s, Louisiana experienced net out-migration except for three decades. This means, more people left the state than moved to it except when the recessions and depressions of the 1890s, 1900s, and 1930s limited economic opportunities elsewhere. This relocation from agrarian rural areas to more industrialized urban centers disproportionately affected Louisiana's blacks, who have shown net out-migration for every post–Civil War decade except the 1870s (Maruggi and Wartenberg 1996). These differences indicate differences in opportunities. During the decade of the 1960s, as south Louisiana's oil industry began to grow, the state's pattern of outmigration began to change. There was still a steady net out-migration from rural areas and blacks continued to leave at higher rates than they entered, but the net migration rate for whites became slightly positive. Moreover, the growing presence of the oil industry and its role in making the state more economically attractive to white inmigrants are evident in the geographic distribution of the shifts. In the 1960s, 13 of Louisiana's 64 parishes experienced net in-migration and all but 2 of these were in the urbanized, industrialized, and oil-influenced southern half of the state. One exception was due to a military buildup at Fort Polk; the other was a northern urban center (Christou 1972; Maruggi and Wartenberg 1996). In Louisiana's southern half, parishes experienced net in-migration due to white flight to suburbia and to real economic growth in the New Orleans and Baton Rouge metropolitan areas and the industrial strip stretching between the two. This real economic growth was driven in large measure by growth of the oil industry and associated refining and petrochemical industries. Also telegraphing the industry's emerging regional demographic effects was the growth of the coastal parishes of St. Mary and Lafourche, which were heavily involved with supporting its offshore activities (Burford and Murzyn 1972). Thus, by the end of the 1960s, the oil industry's demographic consequences had ceased to be the kind of localized or community-centered phenomena addressed by classic SIA. Its imprint was found on the growth of cities and their suburbs, on the growth of industrialized regions, and on the general pattern of growth and decline throughout the state of Louisiana.

While the petroleum industry is known for its volatility, the 1960s began a decades-long period of a generally upward movement as the country's demand for oil and gas grew. This upward movement accelerated in the 1970s, particularly after the Arab oil embargo and U.S. policy responses to the crisis, and continued to accelerate into the 1980s (Baxter 1993; Wallace et al. 2003). During the 1970s, offshore production outpaced that of onshore (Lindstedt et al. 1991), and this powerful economic force and the myriad opportunities it was generating were strongly evidenced in the patterns of demographic change throughout the state (Scott 1981). The 1970s was the first decade since the great European immigration of the 1870s in which Louisiana experienced substantial net inmigration; 32 parishes—half of all parishes—showed net in-migration and even black out-migration slowed. This growth occurred against the backdrop of a still-declining rural Southern economy. While all areas of the state performed well, continued weakness in the northeast and along the Mississippi "indicate that agriculture and forestry based economies in the 1970's fared worse than the petroleum and manufacturing based areas" (Maruggi and Wartenberg 1996:39, 41). Also, certain national demographic trends were more in evidence than in previous decades. For example, as elsewhere in the country, suburbanization was a dominant factor in 1970s population growth. However, net in-migration was clearly related to the oil boom and the accelerated job growth that began in the early 1970s, and that accelerated after 1974 with the Arab oil embargo and the federal policy responses to it (Maruggi and Saussy 1985). The shift in Louisiana's patterns of demographic growth during this era was a product of forces affecting economics at many levels. First, this shift still should be seen against the backdrop of a declining, traditional, agriculture-based economy for it was due to increased in-migration rather than to decreased out-migration. Also, this shift should be seen in the light of the national economy, for it was pushed along by considerably slower employment growth elsewhere (Maruggi and Wartenberg 1996). Finally, it should be seen in the light of wider national and international conditions that helped deepen the country's recession and drive up the price of oil to levels that were to prove untenable (Baxter 1993).

Net in-migration continued to accelerate into the early 1980s until oil prices began to fall and, then, to drop dramatically. By 1986, the oil industry had gone bust. Again, the industry's demographic effects were felt throughout the state. In the 1980s, only 4 parishes experienced net in-migration, and these resulted from the continued trend toward suburbanization, not from economic growth. St. Tammany had the only significant amount of net in-migration, and that was due to an equally significant out-migration from New Orleans. In the 1980s, 60 parishes and all metropolitan areas experienced net out-migration. As in the preceding decade, the demographic consequences of the industry were statewide and should be seen against the backdrop of other regional and national trends. Again, the cause of net out-migration was not from an increase of people leaving Louisiana so much as from a virtual cessation of people moving into it. Again, the rate of in-migration was strongly influenced by the national economy. "The Louisiana economy again moved in the opposite direction of the national economy in the 1980's. Oil prices plummeted in 1981, triggering the oil-bust economic recession that lasted through most of the decade. In contrast, the United States enjoyed solid economic growth in nearly every year of the 1980's. Thus, the loss of the high-paying oil patch jobs that attracted workers to Louisiana in the 1970's resulted in an unprecedented out-migration of 411,099 persons in the 1980's" (Maruggi and Wartenberg 1996:11).

The industry's internal dynamics (e.g., technology intensiveness), coupled with its unique mix of economic and geopolitical issues (e.g., elasticity of demand, OPEC influence on supply), make it more volatile than many, and one might assess how its unpredictability impacts states, communities, and individuals. Clearly, the ramping up of offshore activities in the 1960s and 1970s, and their spike and dive in the 1970s and 1980s, had marked demographic outcomes that overlay and intertwined with the other demographic trends that defined these decades—the decline of rural southern agriculture and suburbanization, for example. Just as clearly, the classic SIA model sheds little light on these salient industry effects. The model simply cannot illuminate because of its narrow geographic and temporal focus, because of its emphasis on the construction phase of projects to the neglect of other activities, agents, and processes, and because it attempts to explain the effects of the offshore petroleum industry without recourse to an understanding of that industry's organization, scale, geography, and rhythms.

In the heady days of the late 1970s and early 1980s, times were flush and the national news was quick to identify south Louisiana boomtowns with their flocks of jobseekers living in labor camps and cars. Then, during the traumatic mid-1980s oil crash, the same media reported on people fleeing, failed businesses, and repossessed houses (e.g., Trillin 1979;

Schweid 1989).[3] Classic SIA arose from the empirical grounding of case studies of project-induced boomtowns. Below, we examine Louisiana's reported oil boomtowns, focusing on Morgan City as the most notorious example, to show that these events differ sharply from the SIA model and are best explained as local manifestations of larger, industrywide changes.

Louisiana Boomtowns circa 1980

The offshore industry is large, complex, and unevenly distributed among communities. As we have seen, this differentiation was evident by the 1920s. Oil-involved towns were becoming supply bases, equipment fabricators, bedroom communities, refining centers, banking and service centers, or combinations of these. By the 1960s, the oil industry had also grown sufficiently large to have demographic consequences across the state. These two trends are obviously related. First, as the oil industry grew, so too did its role in the state and regional economy. Also, as its economic role grew, so too did the importance of its uneven distribution in shaping its local-level social and economic effects. This issue of distribution involves both quantity and mix. With regard to quantity, when offshore exploration increases, all involved communities should experience increases in local business activities, but communities with many oil-related businesses should benefit more than those with few. However, the local mix of oil-involved businesses is also important in shaping benefits because the offshore industry is composed of many different types of businesses, each of which responds differently to any given change. Therefore, if offshore exploration increases significantly, communities that host a mix that is heavily involved in new platform fabrication should benefit more than those with a mix primarily related to production or refining. The opposite is also true. Should offshore exploration decline, communities most involved with exploration and development should suffer most.

This interplay between offshore exploration and development and the local industry mix highlights the differences between the role of labor demand and demographic change in classic SIA and their actual relationship in the Gulf. In both, early project phases generate high levels of blue-collar labor demand in the Gulf, perhaps more so since labor-intensive activities associated with drilling and fabrication form large sectors of offshore industry employment and are in highest demand during exploration and development. As a general rule, blue-collar labor is more sensitive to industrial fluctuations than is white-collar, that is, auto workers are laid off during model changes while engineers are not, just as, in classic SIA, tenure is short for construction workers and long for production workers. This is also true for the offshore industry; its large blue-collar workforce is concentrated in such activities as fabrication and drilling, all of which are in high demand during exploration and development but not during production. Exploration- and development-related jobs are particularly sensitive to offshore ups and downs because, compared to production, the costs of these activities are higher and more discretionary, and their returns less immediate and predictable. In classic SIA, the workforce is external to the impacted community and project phases are discontinuous, hence these phases are expressed as the comings and goings of workers. In the Gulf, discontinuous phases also employ an enormous blue-collar workforce.

[3] The issue of boomtowns lays dormant in coastal Louisiana during the growth of the 1960s and into the 1970s. As offshore activity accelerated in the late 1970s, academics began to debate the usefulness of the classic SIA model in the Gulf. Gramling and Brabant (1986) argued that the local evolution of the offshore industry gave communities time to adjust and that concentrated work schedules and long commutes to work also mitigated demographic effects (cf. Gale 1986 for a rejoinder). Although published later, this academic exchange occurred prior to the bust. In the bust's immediate aftermath, many assessments of oil's community-level socioeconomic impacts drew on this model (e.g., Brabant 1994; Freudenburg 1992; Gramling 1992; Laska et al. eds. 1993; Seydlitz et al. 1993, 1995).

However, unlike in classic SIA, this workforce is already resident in the affected communities. Moreover, while offshore projects are discontinuous, they do not produce discontinuities in local labor demand onshore for two basic reasons. First, oil-involved communities serve multiple projects in various phases in multiple fields of varying maturity. Thus, communities experience the labor demands of various projects and project phases as a blend. Second, the separation of labor into phases is anything but clear-cut. Fabrication and drilling are strongly associated with exploration and development, but fabricated ships support production platforms and need refitting, and exploration and maintenance drilling occurs on production platforms and most workers are welders, crane operators, crewmen, or are in other non-phase-specific jobs. South Louisiana has a higher percentage of jobs in mining, transportation, and fabrication than the U.S. average (Manuel 1980; 1997), but the workers look like workers anywhere: most live at home, commute to work, and work onshore. For communities, their residents, and the local mix of businesses, the demands from exploration and development are experienced as part of the general demands of the offshore industry for goods and services and not as identifiable phases. Under most conditions, changes in the level of these activities are experienced as normal ups and downs in the local demand for goods and services. As in many U.S. industries, in good times, jobs segue into the next; in bad times, workers may be laid off for a while.

Morgan City, in St. Mary Parish, like other south Louisiana boomtowns of the 1980s, is an example of the interplay between local industry mix and offshore exploration and development under extreme conditions. Morgan City, particularly, was a lightning rod for these dynamics because of its concentration of the most blue-collar, labor-intensive, and activity-sensitive businesses in the industry (Gramling and Freudenburg 1990b; Manual 1995). This evolution began as a lumber town with transportation advantages. Morgan City emerged in the 1850s as a residential and commercial area because of its railroad connections to New Orleans and steamer service to Galveston (Broussard 1977). Its first boom came when the northern investor Charles Morgan built a port and dredged a channel to the ocean to avoid the unionized facilities in New Orleans. By the early 1900s, it was already an important inland port hosting commercial fishing and shipbuilding industries (Baughman 1968). This pattern of aggregation typifies industrial growth in rural Louisiana; new industries were attracted to established ones because of shared transportation, infrastructure, and labor needs (Heberle 1948). In Morgan City, oil was a part of this aggregation. The town caught oil fever in 1901 even before a well was produced in the state (Broussard 1977), but it became an operations center for the coastal wetlands because it was a port and transportation hub with a shipbuilding industry, a blue-collar labor force, and access to the oil fields (Gramling 1984a; Davis 1990). Later events reinforced these advantages. The 1905 development of the Intracoastal Waterway extended the port's inland reach (Franz and Durio 1977). The 1935 discovery of the Jeanerette field put Morgan City in the center of the state's top petroleum-producing parish. A 1930s offshore shrimping boom also added to the port's transportation and shipbuilding capacities. World War II brought more shipbuilding and another boom, further solidifying the town's identity as an oil and fabrication center. Then, in 1947, Kerr-McGee completed a well on nearby Ship Shoal, often considered the first successful offshore well. At that moment, Morgan City already was a supply base and fabrication center and was poised to meet the emerging demands of the offshore industry and to grow as that industry grew.

Morgan City's 150-year life as a port and industrial center includes several periods of rapid growth and three with reported housing shortages. These shortages all occurred in a wider social context that made the problem look similar to ones in other places. In the early 1900s, its bustling port attracted a "floating population" of Norwegians, Swedes, Poles, Greeks, Italians, Portuguese, and Filipinos (Baughman 1968). A wave of European immigration in the 1900s put similar but larger foreign populations in such southern port cities as New Orleans and Galveston (Maruggi and Wartenberg 1996; Donato 2003). During WWII, its shipbuilding industry attracted Depression-displaced people seeking war-related marine construction work (Broussard 1977). The war began a demographic revolution as sharecroppers fled rural depression for the rapidly industrializing cities (Daniel 1990). Morgan City's 1980s boomtown experience follows a similar path. As noted, Morgan City was positioned to benefit from the development of the offshore industry. Increased jobs in the area "brought a rapidly growing population and increased permanent settlement particularly during the 1950s and 1960s. Entire communities such as Bayou Vista sprang into being" (Gramling 1984:134). By the mid 1970s, Morgan City lay at the center of an enormous collection of industry-related enterprises. Traveling east from the town was "a seemingly never-ending galaxy of industries, including the sprawling McDermott and Avondale Shipyards, which employee literally thousands of men and women from throughout St. Mary, and even as far as St. Martin Parish." For miles there was "an immense diversity of industries: shipyards, oil field helicopter operations, supply houses, and a plethora of other businesses all catering to the needs of the gargantuan oil companies" (Broussard 1977). Thus, Morgan City grew rapidly throughout the 1950s, 1960s, and 1970s as part of a much larger offshore-oriented industrial expansion, but, despite its concentration of development-stimulated businesses, at no time during this economic boom did it, or similar communities, become boomtowns. Gramling (1983) examines this period and finds that Morgan City did not because the local evolution of the offshore industry and the pace of population growth gave the community time to adjust (see also Gramling and Brabant 1986). While he found that offshore growth kept Morgan City's property values and rents relatively high from the 1940s into the 1980s, any housing shortage in the immediate environs of Morgan City was due to land availability problems because of the surrounding wetlands and competition from agriculture, and it was mitigated by longer commutes to work. He also argues that, during the 1960s and 1970s, the industry's high wages allowed south Louisianans to achieve a middle-class lifestyle (Gramling 1980b, 1984; Manuel 1997).

Despite three decades of sometimes rapid growth of the industry, the surrounding parishes, and the town, Morgan City achieved its supposed boom- and bust-town status only within the first few years of the 1980s, and, again, this status reflected current events elsewhere. The "boom" came after the Arab embargo, the superheated oil industry, a credit crunch from the savings-and-loan collapse, and a deep recession devastating much of the rest of the country's industries, and after newspaper hype about plentiful jobs and easy wealth in the oil patch sent recession-displaced workers from across the country flocking southward, sometimes with their families and sometimes alone and with just what their cars could carry. Many of the earlier arrivals did find jobs, but insufficient work for all placed great burdens on shelters, soup kitchens, and local helping institutions in general (Brabant 1993). But even these problems may have been somewhat overstated, described as they were in the immediate aftermath of the oil-price crash and in the light of the boomtown model. For example, the presence of camps for offshore oil-related support workers was used as evidence of a boomtown housing shortage in the 1980s (Brabant 1993). However, while a housing shortage may have existed and the labor camps no doubt grew larger as the industry boomed, these camps exist in good times and bad for they serve day-labor recruited for the lowest paid types of oil-related work. They are analogous to migrant labor housing, not indicators of local housing availability (Higgins 1999).[4] Then, world oil prices began to fall precipitously and, for a time, exploration and development virtually ceased. The oil crash devastated the economies of Oklahoma, Texas, and Louisiana, but communities like Morgan City were most hurt. By the mid-1980s, businesses were closing, workers were loosing jobs or taking pay cuts, and people were leaving, mostly newer arrivals but also locally born residents, and what once had been viewed as a vehicle carrying blue-collar workers into the middle class was now a community's "overadaption" to an inherently cyclic extractive economy (Gramling and Freudenburg 1990b).

Morgan City is no more a classic boomtown than is Flint, Michigan, which suffered through plant closures when the regionally dominant automobile industry reorganized in the face of Japanese competition. The 1980s oil-price crash came at the end of a decades-long expansion of a massive industry that extended from Texas to Alabama, after OPEC actions had heated that expansion to a boiling point, and after a growing recession elsewhere in the country set droves of laid-off workers south to find work. These events were not the result of the completion of a project or a group of projects, or of happenings in Morgan City but rather occurred because the town lay at the heart of a regionally dominant industry suffering a regionwide economic depression that rolled through Louisiana, Texas, and Oklahoma as oil prices collapsed and exploration almost stopped. Actually, the 1980s oil price bust inverts the causal relationships postulated by the classic SIA. Effects occurred because the industry labor demand was long term and widespread and was not compressed in time and within one or a few communities. Out-migration occurred as oil's downturn brought down other sectors of the economy; out-migration was not the cause of this downturn. Similarly, social services were overloaded because of a shrinking state tax base, not because of local demand. Causes were manifestations of larger-scale processes and of exceptional combinations of oil- and non-oil-related factors, such as an unusual concentration of fabrication jobs, an offshore overheated by an OPEC embargo, an economic recession elsewhere sending workers south seeking jobs, and city growth limited by wetlands.

Demography Modeled; the Gulf Summarized

The demographic consequences of Louisiana's petroleum industry contradict the core assumptions of the classic SIA model—that new project labor demand causes demographic change that causes other project-related socioeconomic effects. The 100 years of experience with oil operations in coastal wetlands and the 50 years of experience with offshore operations mean that the ongoing development and operation of existing offshore projects, the initiation of new ones, and a labor force poised to meet the demands of both are part of the baseline conditions of Gulf communities. Oil-involved communities do not experience the industry as a project with discrete phases but rather as a continuation of business, and social and economic effects occur from changes in the magnitude and mix of this commercial continuity.

Morgan City during the crash is an extreme example of an extreme event. All Louisiana suffered, south Louisiana suffered most, but Morgan City's concentration of exploration- and development-oriented industries was unusual even for the oil patch. During the bust, nearby Abbeville performed better despite its similar dependence on offshore work, due in part to a

[4] The current trend in the oil-related, labor-intensive fabrication industry toward the importation of guest workers from Mexico and the Caribbean must be viewed similarly. While it was first stimulated by the mini-boom of the 1990s, it is akin to similar trends in the meat packing and nursery industries and is driven by economic considerations other than a simple lack of local labor (Donato 2003).

greater proportion of this work being in the less-volatile production side of the industry. Similarly, New Iberia's better performance and quicker recovery were helped by its more white-collar mix of oil-related industries and by its role as a bedroom community for Lafayette (Tolbert 1995; Tolbert and Beggs 2003). While the bust affected all communities, significant differences in community-level effects were generated by differences in the local configurations of oil-related businesses—by each community's oil industry mix.

The crash was a historic upheaval, but a relationship among the industry, its local industrial mix, and its social and economic effects holds true generally. Simply stated, a change in the offshore oil industry affects its varied sectors differently. A change in the offshore industry is expressed in each involved community through changes in the local, oil-involved businesses. A change in the offshore industry affects each community differently because each hosts a different mix of oil-related businesses. One caveat must be made; the local conditions that amplify and mitigate these effects also differ among communities. As a contemporary example of this process, the ongoing restructuring of the oil industry is concentrating white-collar jobs in Houston. This advantages Houston and disadvantages New Orleans regardless of industry ups and downs or of its overall white-collar employment levels, and its demographic impacts are felt more in the New Orleans middle-class suburb of Mandeville than in blue-collar Morgan City, regardless of the latter's greater dependence on the offshore industry. To conclude, as the industry grew into a driver of the state's economy, the local specialization that had already appeared by the 1920s developed into a template by which the larger industry wrote its effects on involved communities. In principle, any change to the industry should have locally differing effects. Oil-involved communities may be tied to the industry's fate, but each is tied to it in a very specific way.

The classic SIA model begins in the community with the normal operations of a new project that will generate a certain magnitude and pattern of demographic effects. Gulf realities begin outside of the community. By turning this process around and linking community-level outcomes to larger industry changes, these realities seriously complicate the assessment of demographic effects. Below, we use two figures to outline these differences. The first compares and contrasts classic SIA and the Gulf; the second focuses on the Gulf's complications.

Figure 2

Generic Model

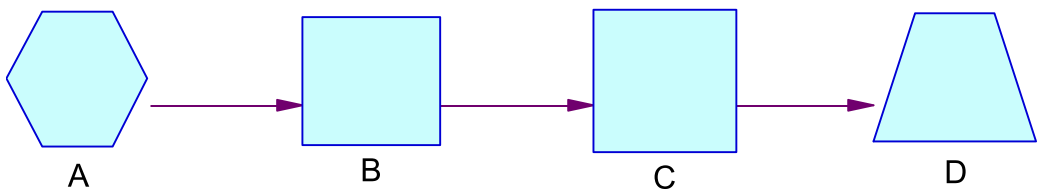
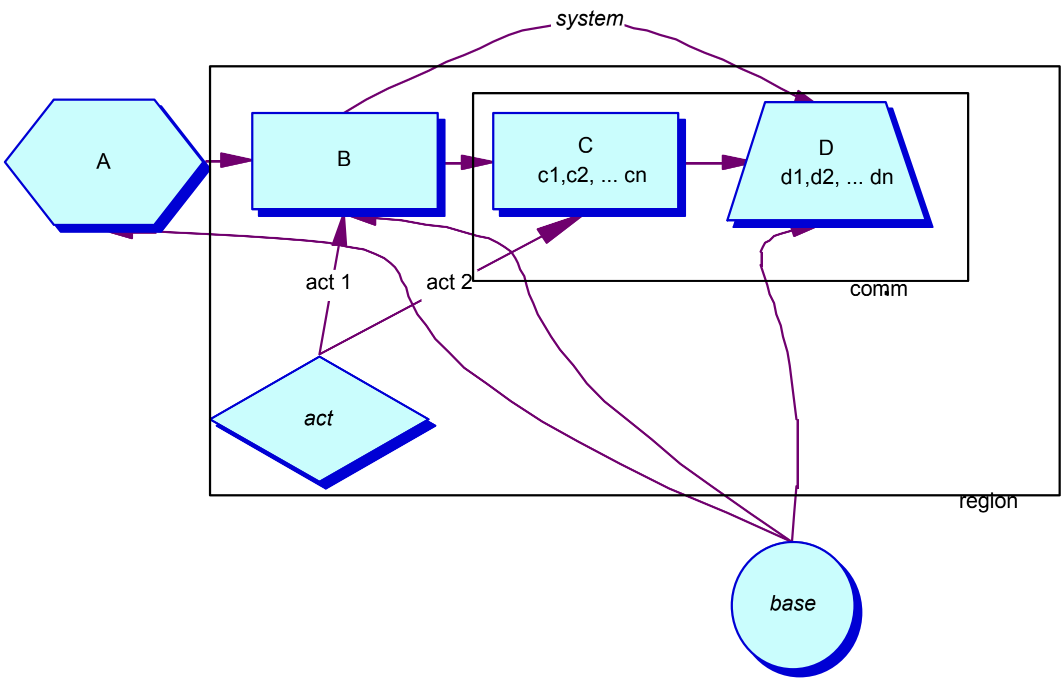


Figure 2 represents both models. Under classic SIA, a new project (A) creates new labor demand (B), which in turn generates demographic effects (C). These demographic effects lead to other socioeconomic effects within a community (D). In the Gulf, demography lacks this determining role. Instead, oil industry trends and events (A) impact Gulf oil activities (B), which impact the local oil industry mix (C), which leads to other socioeconomic effects within a community (D). Demographic effects are included in D, and, unlike with classic SIA, relationships among A, labor demand, and demographics are not specified.

In both models, a change at A generates effects at B, C, and D, and a larger change at A means a larger effect at D. The hexagram (A) represents the initiating cause. In SIA, this is a NEPA-related event such as a new generating plant. In the Gulf, A represents trends and events affecting the industry, including NEPA-related actions. Thus, A is more narrowly specified, easier understood, and more tied to government actions in classic SIA than in the Gulf. In both models, the B-C interface is the point where economic inputs become socioeconomic effects. In SIA, labor demand (B) translates into population change (C). In the Gulf, changes in industry organization, strategies, technologies, and demand (B) translate into changes in local business practices, including hiring and firing (C). Again, the B-C interface is narrower for classic SIA than for the Gulf.

In this schematic, the "community in general" (D) is designated by a trapezoid to emphasize the role of existing conditions at D in shaping the effects of A. For example, in classic SIA, a large labor force at D limits the effect of A by reducing inmigration at C. Similarly, in the Gulf, a high percentage of non-oil-related businesses at D reduces local industry impacts (C). Both models assume that conditions at D are products of past and current social and economic trends. In some Gulf communities, for example, the sugar industry buffers petroleum's fluctuations and continuing federal sugar supports make future buffering likely. Both models call these conditions at D the "baseline," recognize opportunity costs (e.g., existing sugar lands limiting available residential sites), but view baseline conditions as exogenous variables.

Figure 3
Gulf Model



While the models share similarities, Figure 3 emphasizes differences in scale, timeframes, and causal complexity that render classic SIA inappropriate for the Gulf. Classic SIA is designed to address a project in a community (or a few projects in several communities). This entire model resides in the community. In the Gulf, assessed effects originate outside the community and cannot be explained by community-level conditions. In the Gulf model (Figure 3), A is the geographically unspecified petroleum industry at large; its effects on the Gulf's petroleum industry (B) can originate anywhere. In this schematic, B lies within the line labeled "region," which includes parts or all of Texas, Louisiana, Mississippi, Alabama, and Florida. In this model, only C and D reside in the community. In Figure 3, the line "comm" designates one or several jurisdictions, towns, or parishes.

The Gulf's geographical spread raises difficult issues for data acquisition and analysis but even more intractable ones regarding causation. In classic SIA, specifying relationships within its causal structure is straightforward. Labor demand of planned project A minus available labor in community D equals unmet labor demand B, and labor demand B times average laborer household size equals inmigration C. In the Gulf, a change in OPEC production at A will affect industry behavior at B and C, which can have demographic effects at D. However, the Gulf model only identifies these casual links since specifying them is neither straightforward nor certain. This problem intensifies as one moves toward D. The five-state Gulf Region includes hundreds of counties, parishes, communities, and relevant jurisdictions (e.g., school districts). In Figure 3, multiple industry mixes are designated as *c1, c2, … cn* and multiple communities as *d1, d2, … dn*. Even if the affect of A at B can be estimated, the problem of distributing this value among the numerous communities (*d1, d2, … dn*) remains.

Timeframes also raise difficult issues. In classic SIA, A is a project. Most project lifespans and their effects are relatively short-lived and their duration is reasonably known; indeed, an important characteristic of demographic effects is their temporal compression. In classic SIA, only the affected community (D) has a long lifespan, which means that it is complicated by ongoing trends and conditions of a relevant baseline. In the Gulf, timeframes are generally long with indeterminate beginnings and endings. Often, A represents events like the Oil Embargo or trends like the emergence of 3D seismic mapping whose outcomes have unknown lifespans. The lease sales MMS assesses are serial events in an areawide leasing policy that has helped shape Louisiana's oil industry for decades (Priest 2003). In the Gulf, long lifespans give both the worldwide and Gulf oil industries (A and B) the complications of relevant baselines. Figure 3 represents this with circle "base" and causal arrows pointing from it to A, B, and D. The model assumes that current conditions at C are products of conditions at B as mitigated by D.

Long, complex baselines add difficulties to specifying the components of the model. For example, B in classic SIA is labor demand, often estimated from a project plan. In the Gulf, only one element of B is a labor demand and this is composed of the demands of many and varied sectors of the oil industry, each with its own dynamics and interactions within and outside the oil patch. These baselines also add difficulties to the assessment of relationships among model components. In classic SIA, the relationship between the project (A) and labor demand (B) is known and stable. Such is not the case in the Gulf where industry activities off Brazil or Africa can affect their participation at lease sales and activities on leaseholds. Finally, these long, complex baselines make it difficult to distinguish petroleum-generated effects from such historical trends as population shifts related to suburbanization.

Differences in sale and timeframes raise significant issues concerning causation. The starting point of the classic SIA model relates directly to the government action requiring a NEPA analysis (A). In the Gulf, the most significant causes of offshore oil's community-level effects are events and trends affecting the industry itself (A). Figure 3 designates the government action requiring an analysis (e.g., a lease sale) with the parallelogram labeled "act." It lies within the region but to the side of the A-D causal chain because it can add to or mitigate oil's effects at B and C but is not their primary cause since local-level effects of the

OCS program occur as part of other trends and conditions. In Figure 3, arrow *act 1* designates region-level lease sale effects. MMS projects a lease sale's future employment effects based on oil prices and past industry behavior and uses this projection to assess demographic effects at B. Arrow *act 2* designates local-level lease sale effects. Since project sizes and locations are known from company submissions of development plans, these cannot be projected at the time of the lease sale.

In both models, effects of A on D move through B and C. However, the Gulf oil industry is sufficiently large and systemic to affect Louisiana communities independently of their direct involvement in it (Brabant 1994). Figure 3 represents this situation with a second causal arrow labeled "system" pointing from B to D. The system effects would be a portion of the share, in a shift/share type demographic projection.

Two differences are not shown by Figure 3. Classic SIA identifies demographic effects (C) as the main driver for other socioeconomic effects (D) and describes causal relationships between them. The Gulf model puts demographic effects with other socioeconomic effects in D and does not specify causal relationships between demography and other socioeconomic effects. Second, while both models assume a larger A generates larger effects at B, C, and D, this relationship is ambiguous in the Gulf model because of the local variation in industry mix (*c1, c2, ... cn*) and community outcomes (*d1, d2, ... dn*). The sum of *c1, c2, ... cn* equals C and the sum of *d1, d2, ... dn* equals D. The concentration of white-collar employment in Houston may mean little to the Gulf industry (B), and little to Morgan City (*d1*), but be significant to the commuting suburb of Mandeville, Louisiana (*d2*).

Classic SIA versus the Gulf of Mexico

In a sense, the early BLM planners were not far off when, based on their narrow reading of NEPA, they eschewed consideration of most socioeconomic effects in the Gulf. They were working with a model that focused on community-level effects of a government action and that assumed demographic effects significantly determined other socioeconomic effects. Examples of offshore oil's social or economic effects that can be incontrovertibly tied to a specific lease sale are rare indeed. When MMS accepted the NRC call to consider the Gulf as a "natural laboratory" for the study of the industry's socioeconomic effects, it had to adopt a more eclectic approach to understanding the offshore industry, one that assumes that its effects are interwoven with other local, regional, and national trends in a "dynamic baseline" (Smith 2000). As an unanticipated consequence of adopting this approach, MMS began to confront difficulties in applying SIA analysis to Gulf impact assessment at the lease-sale level. These challenges are outlined below.

Challenge of Defining the Affected Area

The first task in socioeconomic assessment is to define the affected area. This task raises the question of scale; the area must be large enough to include the significant impacts yet small enough not to dilute them. The Gulf Region is vast, covering Texas, Louisiana, Mississippi, Alabama, and parts of Florida, and MMS assesses the economic and employment effects of the program on stakeholder states. Assessing these effects is difficult enough since they are shaped by each state's fiscal and tax policies, the distribution of other industries, and the industry's own purchasing and hiring patterns (Plater et al. 2000; Luke et al. 2002; Hughes et al. 2001; Dismukes 2003). Also, within these states is a smaller but still vast area of concern composed of 56 coastal zone counties and parishes that include the extremes of social, economic, cultural, and institutional variation. The task of providing a detailed assessment of industry effects across this area would be enormous, but added to this burden is yet another level of difficulties. Social and infrastructural effects are often defined by specific local conditions—the unused capacity of a certain school district, the growing demands on a particular water system, or the condition of a specific road connecting a port and highway (Keithley 2001). Combining and separating each parish and county are literally hundreds of cities, towns, school districts, port authorities, levee boards, special tax regions, and other tax jurisdictions.

Defining the boundaries of states and coastal zone counties and communities is simple enough, but the task of identifying and describing the salient variation within such wide-ranging "affected areas" is daunting, especially as more and more local areas are added to the mix. This problem is magnified by the next two challenges discussed, that of identifying the offshore oil industry, a problem that also rapidly escalates at more local levels, and the challenge of "localizing" socioeconomic effects, of tying effects that occur locally (such as traffic or demands for social services) to actual places.

Challenge of the Baseline

Under NEPA, the difference between an area with and without the proposed action is the proposal's effects. The area sans proposal is the "baseline." However, since the industry has operated in the Gulf for decades, there is no "unaffected environment," hence no baseline as originally envisioned by NEPA. While, as noted above, this has led some to conclude that the program has no socioeconomic effects to be addressed, it has led others to ascribe all problems faced by oil-involved Gulf communities to the industry. This tendency is evident in much of the research MMS funded in its immediate response to the 1980s oil price bust, leading one frustrated oil executive to observe that even if southern Louisiana had never had oil, it would not have remained an untouched Acadiana of happy fisher folk and trappers (Porter 1992).

The task of separating the effects of oil from other regional influences and from larger national and worldwide trends is neither easy nor certain. Past effects of oil and gas development on communities, families, and individuals are bound up in other "baseline" trends.[5] Many social forces impinge on communities, families, and individuals such as mass communication, changes in education, and increasing community heterogeneity, to name a few. Often, even in oil-involved areas, the industry is just one of many causes of a particular effect (Wallace et al. 2001). Identifying oil's share of socioeconomic impacts is made more difficult because most of these impacts are not unique to that industry. Even the effects of concentrated work schedules are found in other industries (Shrimpton and Storey 2001).

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[5] For example, consider the always-sensitive issue of race and racism. To show racial discrimination in the oil industry in the 1920s, 1940s, or 1960s is not to prove an effect; rather, the demonstration supports the unsurprising conclusion that this industry often reflects the imperfections of the society of which it is a part. An "effect" would be a change in racial outcomes. There is some evidence from the 1940s (Jones and Parenton 1951; Brasseaux et al. 1994) and the 1990s (Tobin 2001) that job creation by the petroleum industry opened up opportunities for African Americans and other minorities in south Louisiana that did not exist in other rural areas of the state. While this positive effect is likely and is predicted by labor-queuing theory, could it be proven in the mishmash of history?

Challenge of Identifying the Offshore Oil Industry

SIA addresses the effects of an offshore petroleum industry that lacks clear boundaries. As noted earlier, the petroleum industry is really composed of many types of enterprises that are involved in the processes of finding, extracting, refining, and bringing petroleum-based products to market. Basic activities like drilling a well are generally undertaken by a number of firms and individuals interacting through contracts and subcontracts. Then, a myriad of firms and individuals are involved less directly in such activities as legal or insurance work, trucking materials, providing food, and constructing roads, fences, and outbuildings. Even in onshore areas where the oil industry is relatively small and where only some of its sectors are present, as in North Dakota, the numbers of enterprises required and the variability in their sizes, organization, and interactions make projecting the effects of onshore oil development extremely difficult (Chase and Leistritz 1982).

This challenge is immeasurably greater in the Gulf; first, because the full spectrum of enterprises involved in finding, extracting, and bringing petroleum-based products to market; second, because the support and transportation requirements for offshore operations add substantially to the complexities and variabilities of the oil industry and, particularly, to the upstream support of the industry (Manuel 1983; Gramling and Brabant 1984); third, because, however defined, the size and complexity of this industry are enormous; and, last, because, however defined, the industry's distribution across the Gulf is uneven. The challenge is manifested in many ways. For example, each industry has its own structure, economic dynamics, technologies, infrastructural requirements, labor organization and demands, community, and place in the U.S. economy, and for each industry, these attributes are changing over time. The fabrication, pipe-laying, drilling, diving, trucking, and supply boat industries all face different demands from the industry move to deep water, and they also face different demands and opportunities onshore (Austin and McGuire 2000; Wallace et al. 2001). In the Gulf, many petroleum-involved industries are sufficiently large that changes to them affect regional economic activity, the industry's volatility, and geographic distribution, employment levels, workforce structure, the locus of decision making, and other factors important to socioeconomic assessments. Identifying the petroleum-related industry is made more difficult because much of it consists of economic sectors that are only partially involved. In most states, the portion of catering that is oil related may not be a significant issue. In Louisiana it is, but it is still just as difficult to identify from the economic census. Questions such as this, or how to evaluate banking services, are particularly important since their relationships to the petroleum industry vary from place to place. In Louisiana, communities heavily involved in offshore oil with a mix of involved industries noticeably affected socioeconomic outcomes during the 1980s price bust (Tobin 2001; Tolbert 1995).

Challenge of Addressing Local Effects

MMS must assess socioeconomic effects for a set of lease sales. However, its sale and multi-sale EISs do not address the act of leasing; rather, they analyze the potential effects of future industry actions that may result from the sale. Actions resulting from the sale are defined as future industry activity on a block leased during that sale. This definition itself can only be partially true. Lease sales only create opportunities for petroleum industry actions. However, the actions themselves are undertaken based on the economic and business considerations of enterprises, considerations that change. Lease sales serve to maintain or to expand the arena in which these business decisions can be made; this arena of older and newer leaseholds geographically constrains activities but does not determine what kinds of actions the industry will take or where these actions will take place. To estimate the potential effects of a lease sale, MMS develops a scenario of the estimated number of wells and platforms that will occur on the leased blocks, However, under these conditions, the sale-level scenarios and projections that MMS develops are necessarily general and impossible to contextualize within the socioeconomic variation of the Gulf. Based on past industry activity, MMS projects economic and demographic impacts for multi-county "subareas" because it has no basis for projecting sale effects at county or community levels. However, many social and infrastructural effects are often shaped even more by specific local conditions—the unused capacity of a certain school district, the growing demands on a particular water system, or the condition of a specific road connecting a port and highway. Thus, MMS faces the question of how to relate the multi-county projects necessitated by sale-level assessments to a consideration of local-level types of effects. Just as the baseline challenge implies that onshore effects cannot be linked to specific sales, this challenge questions the possibility of linking effects of a sale to specific onshore locations.

Challenge of Addressing Cumulative Effects

The challenge of cumulative effects relates to the baseline challenge. From an assessment perspective, since the industry is already in place, a lease sale's primary socioeconomic effect is to keep the industry operating and maintain the status quo. The state of Louisiana has repeatedly complained that sale-level assessments do not adequately address the cumulative effects of the OCS program on the state. While the baseline challenge addressed the problem of separating oil's effects from other regional influences and from broader national and worldwide trends, the state of Louisiana raises the issue of how sale-level effects should be assessed when many of the industry's past (or cumulative) effects have established limiting conditions for new ones. For example, drawing on our earlier discussion of demography, one of the reasons boomtowns are unlikely in the Gulf is that the local labor force has already been shaped by the industry, but, as the state of Louisiana notes, this does not really mean that there are no current effects from the program.

Classic Model Revisited

This list of five challenges was developed piecemeal during an attempt to apply classic SIA, not to critique it. These challenges are sets of interrelated problems that loosely cover the entirety of assessments, from defining the study area through considering cumulative effects. We have discussed at length the problem of the paradigm's demographic heart. Here, we briefly describe the wide range of other significant differences between the classic paradigm and the Gulf (see Table 1 for a summary)
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Classic SIA assesses the effects of a project while the MMS Gulf Region is legally required to assess the effects of the program. This allows classic SIA to begin with real values for questions of location, size, and labor force demands while MMS assessments cannot. While MMS develops scenarios to estimate the sale of industry activity, these estimates are many times removed from the planning of any actual project. For the same reason, while classic SIA begins by locating a project in a community, MMS has no basis for locating sale-level effects in any particular community.

While classic SIA addresses projects in one or several communities, the MMS Gulf Region addresses a program in five states. While classic SIA addresses project effects in small, rural, isolated places, the MMS Gulf Region addresses program effects that occur primarily in urban settings and in already industrialized rural settings long connected both to the industry and urban centers.

Table 1: Differences between the SIA paradigm and Gulf realities

SIA	***GOMR***
Assesses a project	Assesses a program
Project simple and key variables specific to plan and geography	Industry complex and key variables hypothetical and general
Assessment area = the community	Assessment area = 5 states
Community small, rural & isolated	Affected areas include urban and/or industrialized
Processes related to industrialization	Processes related to regional development
Project new to area	Program (and industry) developed in area
Project timeframe discontinuous	Program timeframe ongoing
Time compression highlights effects	Timelines not compressed
Timeframe segmented	Timeframe segments all ongoing & overlapping
Effects vary by project phase	Effects vary by industry mix and activity level
Effects concentrated in construction	Effects of segments indistinct
Project imposed from without	Program (industry) evolved in area
Project organization unfamiliar	Industry tied to local entrepreneurship
Project technology unfamiliar	Project technology locally developed
Project scale massive & unfamiliar	Project scale typical and familiar
Labor demand greater than supply	Local labor supply matched to industry
Labor demand compressed in time	Labor demand continuous
“Boom and bust” concerns	Market fluctuation concerns
Cumulative effects = other projects	Cumulative effects = ongoing program
Effects decision driven	Effects economically driven
Assessment rationalistic	Assessment probabilistic
Outcomes more “predictable”	Outcomes less “predictable”
EIS stresses planning	EIS stresses documentation

The enormous contrast in size, complexity, and content of the study area between classic SIA and the one actually addressed by the MMS Gulf Region is mirrored in contrasts between the project effects addressed by classic SIA and the industry effects faced by the Gulf. SIA projects are new and foreign to its impact area; the oil industry and its projects are not new or foreign to the Gulf. All things end; oil production in the Gulf OCS will someday cease even if it were not a nonrenewable resource. However, in the context of assessment, the newness and foreignness of the projects in classic SIA mean they have a discontinuous lifespan, a planned beginning and a foreseeable end, while the Gulf industry that MMS must assess does not. Essentially, MMS is assessing the effects of an ongoing program, a slice of life that began decades before and that will continue decades more. In classic SIA, the limited lifespan of a project heightens its effects by compressing them in time. The effects of the Gulf oil industry are not compressed in time.

Classic SIA divides this compressed time into project phases, commonly construction, operations, and decommissioning. Obviously, each offshore project has its exploration, development, production, and removal phase. Indeed, MMS uses these phases when making its economic projections. However, onshore, in such oil-involved communities as Morgan City, Lafayette, or New Orleans, the effects of one project blend into the next, and project phases are indistinguishable. Community experiences vary because their economic articulation with the industry varies, because they are more or less dependent on fabrication, or refining, or providing legal support, and because the industry's cyclic nature, its technological advances, and its reorganizations affect each of these activities differently in both the short and long run. Finally, even though classic SIA addresses large-scale energy projects, the compression and segmentation of time lead it to focus on the construction phase and construction trades. In the Gulf, fabrication is just one piece of an entire industry that must be assessed.

Not only do the impact area and agent differ, so too do the relationships between the two. In classic SIA, a project is imposed from without; project organization and technology are unfamiliar. This raises issues about the ability of local governance and governing elites to respond. More important to the model, however, project labor demand is greater than the local supply. This, along with compression in time, creates the boom and bust. In the Gulf, the offshore industry developed in the area. Its organization and technology are familiar, and, more important, the local labor force developed and was shaped by the developing oil industry. New projects do not lead to unusual labor demands or to the booms and busts envisioned by classic SIA. As described above, the industry is cyclic and its ups and downs affect communities, but project demand, or even multiple projects associated with a lease sale, does not produce boomtowns.

In classic SIA, effects are decision driven, that is, the decision to allow a project leads directly to the effects to be analyzed. This makes the assessment process rationalistic or deductive. Other socioeconomic effects flow from, and are deduced from, the projects' predicted labor demand. In the Gulf, the assessment process must be more empirical and inductive. Industry activity comes not from the government's decision to hold a sale but rather from such economic factors as oil price. For this reason, assessment must remain probabilistic rather than deductive. Outcomes are less predictable because the forces that drive activity are exogenous to the kinds of economic projection models that are used.

Conclusions

The boomtown SIA methods discussed here were formulated to measure impacts: (1) in small and easily definable areas (e.g., communities, counties); (2) from single, often one-dimensional causes (e.g., a generating plant); (3) of developments of relatively short duration (e.g., several years); (4) where the impacting agent is externally imposed (i.e., no evolutions of existing enterprises); and, (5) where the impacting agent overwhelms the community's institutional structures, infrastructural capacities, and labor force.

Oil development in the Gulf falls on the opposite end of the continuum on each of these qualities. Oil development has occurred in every Gulf state and has occurred over more than a century. It has evolved in concert with many other social, political, economic, and technological changes in the region, the country, and the world, the consequences of which dwarf, mask, inspire, add to, and mitigate the more obviously oil-related effects in the Gulf. The petroleum industry has evolved in response to the invention of the automobile, two world wars, the interstate highway system, international oil consortia, and international political relationships, to name a few significant influences. Unlike energy boomtown impact scenarios in which impacts are abrupt and of fixed duration, the Gulf oil and gas industry has grown to an enormous size, its influence has reach across the seas, and its end is not in sight. Thus, no closure or final tally of impacts is possible.

Moreover, the industry is an extremely complex one that includes “major” and “minor” oil companies, platform and pipeline construction firms, port authorities, vessel and helicopter operators, high-technology instrument design and fabrication companies, seismic survey companies, GIS mapping firms, diving companies, trucking companies, caterers, waste disposal companies, and myriad other types of firms. It includes some of world's largest companies as well as single-person enterprises, high-paid workers and low-wage ones. While oil “development” may be the precipitating cause, the agents of social and economic effects are now numerous, varied, and diversified and include federal, state, and local governments. For example, state royalty revenue and statewide revenue-sharing policies ensure a distribution of benefits disproportionate to burdens. The course of change has been anything but unilinear and its pace may be accelerating.

What is clear from even this superficial examination of the effects of OCS activities is that a traditional NEPA-style analysis is woefully inadequate to address their scale, complexity, and duration. It is also evident that the traditional boomtown SIA paradigm does not, and cannot, provide the conceptual framework or methodological tools needed to accomplish this task. We have described some of the reasons why the MMS ESP has pursued, and will continue to pursue, a more realistic and robust approach to measuring and evaluating changes associated with its lease sale activities in the region. For now, at least, our approach will not champion a particular model. Rather, it will take an eclectic track. It will view SIA as a set of topics or issues that should be assessed. This set of topics will come from NEPA scoping and other agency information-gathering efforts, and from existing SIA literature. For each of these topics, the mechanisms by which it is affected by the industry, the degree to which it is affected, and how these effects relate to other industry effects will be empirical questions. Internal consistency will derive from the goal of SIA—the assessment of industry effects for each topic. Scientific consistency will come from the logic and findings of the academic fields relevant to the topic or issue being analyzed—from the field of criminology when looking at crime, for example. As projects increase in complexity, scale, and duration, we expect other agencies will increasingly rely on similar approaches in responding to their legal and practical obligations. To the extent this plan reflects a shift away from the traditional SIA paradigm, we believe is it is well founded and long overdue.

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