*Sociological Forum, Vol. 21, No. 3, September 2006 (© 2006)*
DOI: 10.1007/s11206-006-9026-2

# Bringing the Material Back In: Understanding the U.S. Position on Climate Change

**Dana R. Fisher**[1]

*Published online: 5 December 2006*

*This paper analyzes how natural resource interests have been translated into political outcomes in the form of American climate change policy. Incorporating data about natural resource use and national decision-making, this paper concludes that comprehending fully political decisions about global climate change in the United States requires us to recognize how land-use interests in the growth machine are translated into political outcomes. The findings of this paper suggest that, in order to understand social phenomena more fully, sociologists must recommit to studying the conjoint constitution of natural resources and social processes.*

**KEY WORDS:** environmental sociology; policy-making processes; natural resource dependence; global climate change.

## INTRODUCTION

With the birth of environmental sociology in the 1970s, scholars working in this relatively new subdiscipline encouraged sociological research that incorporated environmental factors (see especially Burch, 1971; Buttel, 1986; Catton and Dunlap, 1980; Dunlap and Catton, 1979; Humphrey and Buttel, 1982). One of the major topics of discussion in the newly formed American Sociological Association section on Environmental Sociology was the tacit understanding that sociological research should

[1] Department of Sociology, Columbia University, 324M Fayerweather Hall, Mail Code 2551, 1180 Amsterdam Avenue, New York, 10027; e-mail: drf2004@columbia.edu.

not include inquiry into natural environmental factors.[2] So consistent was this concern that, when Buttel reviewed the "New Directions in Environmental Sociology" in the *Annual Review of Sociology* in 1987, he stated that the core of the theoretical work on environmental sociology had been "self-consciously fashioned as a critique of 'mainstream' sociology" (p. 468). At the time, in fact, it was possible to find statements—including those in some of the top journals in sociology—that indicated a relatively clear disregard for the importance of ecological constraints on society (e.g., Choldin, 1978; Greenwood, 1984; Jeffery, 1976; Michelson, 1976; van den Berghe, 1978; but see Duncan, 1964; Field and Johnson, 1986; Firey, 1960; and Hawley, 1944). Manfred Stanley, in his article in the *American Sociological Review* (1968:855), for example, summarizes the tendency of social scientists to focus on the "progressive substitution of sociocultural explanations for those stressing the determinative influence of physical nature."

Sociologists working in environmental sociology, however, acknowledged the importance of incorporating environmental variables into their research. As Dunlap and Catton note in their influential piece in the *Annual Review of Sociology* (1979), "Environmental sociology involves recognition of the fact that physical environments can influence (and, in turn, be influenced by) human societies and behavior. Thus, environmental sociologists depart from the traditional sociological insistence that social facts can be explained only by other *social* facts" (p. 244, emphasis in original; see also Dunlap, 2002; Dunlap and Catton, 1983). The authors go on to recognize the "acceptance of 'environmental' variables as meaningful for sociological investigation," considering it the hallmark of environmental sociological research (1979:244; see also Dunlap, 1986).

A quarter of a century later, it has become extremely rare to see sociological research that clearly overlooks the ways that society is affected by and affects the natural environment. In addition, it has become much less rare to find environmental articles in leading sociology journals (see e.g., Buttel, 2000; Fisher and Freudenburg, 2004, 2005; Foster, 1999; Frank *et al.*, 2000a,b; Goldman and Schurman, 2000; Molotch *et al.*, 2000; York *et al.*, 2003a; York and Rosa, 2005). As this paper argues, however, even with this growth, the role of environmental factors in social affairs continues to be underrated. In fact, as recently as 2002, Buttel stated, "It remains relatively uncommon within contemporary sociological circles to devote serious attention to the natural world and the social relations that shape and are shaped by the natural world" (p. 201). The reasons behind this neglect are not likely to be the product of an overt bias or the enduring legacy of the

[2] This American Sociology Association section is now called the Section on Environment and Technology.

Durkheimean dictum. Instead, as Guterbock (1990) recognizes in his study of the effects of snow on urban density patterns, the task may simply be far more difficult than is commonly understood. He encourages the inclusion of environmental characteristics as follows: "If we omit climate—and environmental factors generally—from our sociological models, we do so at the peril of seriously misunderstanding our social world" (pp. 382–383).

Building on this challenge to sociological research, Freudenburg *et al.* (1995) present the notion of the *conjoint constitution* of natural resources and society, suggesting that "the physical characteristics do matter, but they matter in a way that depends to a large degree on the practices, perspectives, and technologies that are taken for granted in a given time and place. At the same time, the social definitions of the situation can depend . . . on the physical environment, both in its raw form and as modified by past human activity" (p. 372). Applying the notion of conjoint constitution to political decision-making, this paper examines how the environmental factors of a nation-state affect its policies.

There are many cases of sociological research that illustrate this point. Perhaps the acid test, however, would be to consider what is widely understood as an explicitly environmental issue, and one that has already been analyzed by a number of scholars, including some of the leading environmental sociologists in the world. Fortuitously, there happens to be just such a case, involving the fact that the United States is one of the only nations in the world to reject the Kyoto Protocol,[3] the international treaty that regulates greenhouse gases.[4] As I discuss in detail in the pages that follow, social scientific inquiry has focused on a variety of *social* aspects of the United States to understand its climate change policy and its position on the Kyoto Protocol (e.g., Gelbspan, 1997; Harris, 1998, 2000; Leggett, 1999; Lisowski, 2002; Lutzenhiser, 2001; McCright and Dunlap, 2000, 2003; Sprinz and Weiss, 2001; Victor, 2001). Although these accounts explain specific aspects of the policymaking process, they overlook the significant role that the country's natural resource endowment plays in affecting climate change policy. In other words, surprisingly little attention has been paid to the conjoint constitution of policymaking in the United States and the specific environmental characteristics of the country and its energy infrastructure.

[3] Although there are a number of developed, or Annex I, countries that have not ratified the Protocol, the United States is the *only* nation to reject the treaty publicly. During her closing statement at the climate change negotiations in 2001, Undersecretary of State for Global Affairs Paula Dobriansky, who became the head of the U.S. delegation in May 2001, publicly stated that the United States thinks that the Kyoto Protocol "is not sound policy" (Dobriansky, 2001).

[4] The term *greenhouse gases* refers to carbon dioxide ($CO_2$), methane ($CH_4$), nitrous oxide ($N_2O$), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride ($SF_6$).

This article, accordingly, explains the responses to the potential regulation of greenhouse gases in the United States by looking at America's natural resource endowment and how it affects decision-making. In the following section, I briefly review the accounts put forth by sociologists to understand decision making with regard to global climate change in the United States. I then review the work of scholars who have looked at the role of natural resource interests, paying particular attention to the notion of conjoint constitution and how it applies to this particular case. Following that review, I present data on the relationship between America's natural resource endowment and domestic climate change policymaking both before and after the Bush administration's decision. In that discussion, I show how dependence on a particular natural resource was translated into domestic policy. Finally, I discuss the implications of these findings for the ways that sociologists conduct research, suggesting that there is a need to recommit to incorporating environmental factors into sociological analyses so that we may understand these phenomena more fully.

## SOCIOLOGICAL PERSPECTIVES ON A SPECIFIC SOCIETY–ENVIRONMENT RELATIONSHIP

As previously noted, environmental sociologists have been calling for the meaningful inclusion of environmental factors in sociological research since the subdiscipline was born in the 1970s. While a general level of consensus has emerged among atmospheric scientists who see a link between anthropogenic emissions of greenhouse gases and an increase in the earth's propensity to retain the sun's heat (see, for example, IPCC, 2001; National Research Council, 1992, 2001), sociological research has increasingly concerned itself with understanding aspects of this environmental issue. However, much of the sociological research on global climate change continues to focus on the role of social phenomena independent from environmental factors.

### Understanding Climate Change Policy in the United States

One particularly relevant case in point is the sociological research that explores the relationship between greenhouse gas emissions and the social characteristics of nation-states (e.g., Dietz and Rosa, 1997; Roberts and Grimes, 1997; York *et al.*, 2003b; see also Fisher and Freudenburg, 2004; Roberts, 2001). Generally, this work tends to focus on the relationship between emissions and affluence, as well as other social characteristics,

analyzing how they are related to national emissions. Although the purpose of this research is to understand the variance in emission levels of different countries, it has a relatively clear policy component. York *et al.*, for example, find that population is "a key driving force of [greenhouse gas] emissions" (2003b:43). In discussing the implications of their findings, the authors caution the reader that we cannot "be entirely sanguine about institutional [or political] change" (p. 44). Similarly, in his study of global inequality and climate change, Roberts links the inequality of greenhouse gas emissions to global politics surrounding the Kyoto Protocol (2001). Although these scholars are studying an explicitly environmental issue, most of the research overlooks the potential role of environmental factors.

This omission is even more obvious in the small but growing research on the politics of climate change in the United States (e.g., Harris, 1998, 2000; Lutzenhiser, 2001; McCright and Dunlap, 2000, 2003; Rudel, 2001; Sprinz and Weiss, 2001; Victor, 2001; but see Fisher, 2004; see also Gelbspan, 1997; and Leggett, 1999 for more popular accounts). In his attempt to explain the U.S. withdrawal from the Kyoto Protocol, for example, Lisowski applies Putnam's logic of the two-level game between international and national politics (Putnam, 1988; see also Evans and Putnam, 1993). Lisowski finds that U.S. President George W. Bush took advantage of politics inside the United States to "legitimize his hawkish approach" internationally (2002:101). Lutzenhiser also focuses on policy to explain the U.S. position on climate change. Analyzing the different proposals for potential climate change policy in the United States, the author finds that, as of summer 2001, there was "no U.S. climate policy and little debate about one" (2001:512). Although his conclusion suggests the need to look at the distribution of consumption and pollution, the author looks specifically at political and economic factors to explain what he calls "non-policy" in the United States.

Perhaps the most surprising of these sociological studies of American climate change policy is presented by McCright and Dunlap (2000, 2003). Although Dunlap is one of the leading sociologists who criticize what he calls the "extremely 'unecological' traditions and perspectives in modern social science" (1980:5; see also 1986, 2002; Dunlap and Catton, 1979, 1983), he and his colleague focus on explicitly social factors to explain American climate change policy. The authors study the role of the conservative movement and how this movement was able to challenge the science of the issue in the United States (2000, 2003; see also Boehmer-Christiansen, 1994). In their more recent investigation, they conclude that "the conservative movement and especially the conservative think tanks appear to have

successfully affected our nation's policy-making, this time with international implications" (2003:370).

Although the aspects of the debate expressed in these existing sociological studies of American climate change policy are important, they focus on specific features of the debate in isolation, without considering the role that environmental factors may be playing in national decision-making processes. As I argue in this paper, because the most well-known greenhouse gas—carbon dioxide—is emitted as a product of all fossil fuel combustion, debates surrounding the regulation of greenhouse gases in the United States are inherently related to the natural resource endowment of this country and the specific resources that fuel its energy infrastructure.

## Exploring the Relationship Between Natural Resource Endowments and Decision Making

Even though the research on global climate change does not explicitly incorporate environmental factors, a relatively unrelated literature provides a potential point of departure for exploring the effects of natural resource endowments on society (e.g., Bunker, 1985, 1992, 1996; Drucker, 1986; Elo and Beale, 1985; Flora, 1990; Freudenburg, 1992; Freudenburg and Gramling, 1994; Humphrey *et al.*, 1993; Martinez-Alier, 1995; Peluso and Fortmann, 1994; Smith, 1994; Weber, 1995). In fact, outside of discussions of climate change policy, a number of scholars have studied the role that natural resource interests—that is, social actors with an economic and/or political investment in natural resources—have played in national decision making in the United States (e.g., Heinz *et al.*, 1993; Nash, 1968; Sherrill, 1983; Vietor, 1980). In particular, these scholars focus on natural energy resources with the goal of understanding how the political interests associated with such resources affect energy policy more broadly (e.g., Chubb, 1983; Goodwin, 1981; Laumann and Knoke, 1987). Laumann and Knoke, in fact, highlight the challenges to regulating natural resources that fuel the energy infrastructure. Energy policy is "entangled with questions of regional development, environmental quality, and national security" (Laumann and Knoke, 1987:44; see also Vietor, 1980).

To understand these challenges, it is important to explore the role that land use plays in decision-making. In his work on the city as a growth machine, Molotch (1976) presents what he calls a "political economy of place." Although the focus of his study is urban areas and unemployment, the author provides a useful framework for understanding the relationship between natural resource endowments and decision-making. In particular, Molotch outlines how the "government becomes the arena in which

land-use interest groups compete for public money and attempt to mold those decisions which will determine the land-use outcomes" (p. 312). In doing so, the author explains how government decisions affect the cost of and access to raw materials in a variety of ways. At the same time, Molotch argues that land areas—be they communities or nations—should be seen as a "mosaic of competing land interests capable of strategic coalition and action" (p. 311; for an example of such a "mosaic," see Hansen, 1991).

But what determines the relationship between *particular* land interests and how they affect political decision-making? To understand the relationship between natural resource interests and the politics of climate change, we must return to the broader literature on the society–environment relationship to reconsider the role of environmental factors. This relationship is, perhaps, best presented in the notion of conjoint constitution, which, as I have noted, highlights the need to incorporate environmental factors into sociological research. Its central component is the recognition that there is a "mutual contingency" between the physical and social worlds. In the words of Freudenburg, "What have commonly been taken to be 'physical facts' are likely in many cases to have been shaped strongly by social construction processes, while at the same time, even what appear to be 'strictly social' phenomena are likely to have been shaped in important if often overlooked ways by the fact that social actions often respond to stimuli and constraints from the biophysical world" (2002:233: see also Freudenburg *et al.*, 1995).

As part of their work on conjoint constitution, Freudenburg *et al.* look at the degree to which the environment and society are interrelated by analyzing the meanings and uses of the area along the Michigan–Wisconsin border known as Iron Mountain (1995). Because of its environmental characteristics, this mountain has served multiple social purposes over time: as hunting grounds and living space to the Menominee tribe before European settlers arrived; as a source of timber for the early English-speaking residents; as a source of iron ore during the period of railroad expansion in the United States; and then, when new technology made a different type of iron ore more attractive and strip mining became the preferred means of ore extraction, the mountain became a site for regional tourism. The authors conclude that it is not merely social construction, but the "interplay of the social and the physical" that leads society to take for granted our "socially agreed-upon definitions" (1995:388). In other words, certain characteristics of the natural resources themselves contribute to the influence they wield in the policymaking arena. Combining the notion of the conjoint constitution of society and the natural environment with the ways that land-use interests in the growth machine affect decision making, this paper explains how

America's natural resource endowment, in terms of its dependence on oil and coal, affects national policymaking.

By looking at national efforts to regulate global climate change in the United States since 1997, I unpack the relationship between the natural resource endowment of the United States, as represented by certain energy interests that fuel the country's economy, to understand how geographically diffuse and labor-intensive natural resource interests have been translated into policy outcome.

## OUTLINE

The rest of this paper is broken down into three sections. First, I trace natural resource extraction and consumption throughout the United States, paying particular attention to how this reliance on indigenous natural resources affects political decision-making. Second, I present data on the ways that natural resource dependence has influenced national decision making concerning the issue of global climate change in the United States, focusing on three points in history: United States Senate Resolution 98, which passed unanimously in July 1997; the Senate vote on the Climate Stewardship Act of 2003, which took place after the Bush administration decided to reject the Kyoto Protocol; and the more recent, subnational policies in nine American states to implement emission targets. Finally, I discuss how the inclusion of environmental factors significantly adds to our understanding of this important political issue, suggesting that future sociological research must consider these factors in a meaningful way.

## Data and Methods

This paper incorporates three very different types of data: secondary quantitative data on the energy infrastructure in the United States, data that were collected through interviews with people involved in the climate change debate in the United States, and data on political parties and the voting behavior of elected representatives. The quantitative data were collected from multiple sources, as cited in the text. The qualitative data for this paper were collected during three research trips to Washington, DC. The first two trips took place in April and August 2000, during the last year of the Clinton administration. The last trip took place in May 2001, during the first year of the Bush administration. In addition, I met with a number of representatives from the United States at the negotiations concerning climate change held at the Conference of the Parties-6 (COP-6) in

the Hague in 2000, and at the Conference of the Parties-6bis (COP-6bis) in Bonn in 2001. In total, I met with more than 50 people engaged in the issue of climate change in the United States, formally interviewing 28 of them who were key players involved in determining the policy decisions regarding global warming in the United States. Building on the work of Lofland and Lofland (1995), the interviews were open-ended and semistructured. Interviewees included scientists, government officials, and representatives of industry and social movement organizations. They represent a snowball sample of those who contributed to political decisions regarding the regulation of greenhouse gases in the United States. Some of the people whom I interviewed agreed to meet under the assumption that they would not be directly named. In referring to those conversations, I cite the person's general affiliation.

## NATURAL RESOURCE DEPENDENCE AND THE AMERICAN ENERGY INFRASTRUCTURE

As a first step in understanding the connection between natural resource endowment and political decision-making in the United States, we examine the specific characteristics of the energy infrastructure in the United States. David Gardiner, the Deputy Chairman of the White House Climate Change Task Force during the Clinton administration, introduced the overall relationship between the energy infrastructure and climate change regulation when he spoke about the difficulty of climate change policymaking in the United States in 2000:

> I think, in the end, there's a large group of economic interests who are happy with the way things are today and would be perfectly happy if the world did not change. And in the end, if we're going to deal with climate change, we must change the way in which we produce and use energy, and there are powerful economic interests who . . . prefer the status quo and oppose change. . . . Underneath it all, what's really going on here is the debate about that set of politics, and we believe we have to change: We believe that the future is in clean energy and not dirty energy (Gardiner, interview with author, 2000).

Such a shift from dirty to clean energy, however, would have a significant effect on the energy infrastructure of the United States. One aspect of that infrastructure is its sheer size: the United States is the largest energy producer, consumer, and net importer in the world (Energy Information Administration, 2002), but another aspect of the energy infrastructure is its specific character. In the words of William L. Fang, deputy general counsel of the Edison Electric Institute, which represents the companies that

**Table I.** Total Energy Production/Consumption by Source in the United States 2000 (Quadrillion Btu)

| Energy source | United States |
|---|---|
| Coal | |
| Production | 22.623 |
| Consumption | 22.580 |
| Percentage of overall energy consumption | 22.8% |
| Oil | |
| Production | 12.358 |
| Consumption | 38.404 |
| Percentage of overall energy consumption | 38.8% |
| Natural gas | |
| Production | 22.233 |
| Consumption | 23.953 |
| Percentage of overall energy consumption | 24.2% |
| Nuclear power | |
| Production | 7.862 |
| Consumption | 7.862 |
| Percentage of overall energy consumption | 7.9% |
| Renewable energy | |
| Production | 6.158 |
| Consumption | 6.158 |
| Percentage of overall energy consumption | 6.2% |
| Percentage from indigenous sources | 72% |

*Note*. Source: Energy Information Administration, 2002.

produce 70% of all electricity in the United States,[5] "In the U.S., you've got plentiful forms that can be cheaply transported, and that's why renewables haven't come in very much in our industry or anywhere else. So I think those help account for some of the . . . policy responses to those kinds of situations" (Fang, interview with author, 2000).Table I, which presents overall energy production and consumption, shows the distribution of indigenous energy supply and energy consumption in the United States in 2000. It is important to note the specific fuel sources being produced in this country: the United States produces high levels of coal, natural gas, and, to a lesser extent, crude oil.

As Table I also shows, 38.8% of U.S. energy consumption is oil. Indigenous American oil, along with the open spaces within the United States, have contributed to the United States becoming the most automobile-dependent country in the world. Dependence on motor-vehicle travel, in fact, has been found to be one of the best predictors of carbon dioxide emissions in the developed world (Fisher and Freudenburg, 2004, 2005). Although U.S. dependence on oil plays a significant role in explaining carbon dioxide emissions, I contend that understanding policy outcomes regarding

[5] Statement on the website of the Edison Electric Institute: Available at: www.eei.org/resources/eei/ (accessed October 2, 2003).

climate change involves focusing on land use in the form of natural resource extraction.

Although the United States consumes significant amounts of oil and natural gas, it produces only about 55% of those fuels. In contrast, the United States produces more coal than it consumes. This point is particularly significant given the variation in the carbon dioxide emissions from the consumption of the different types of fossil fuels: "Coal releases more $CO_2$ per unit of generated energy than does oil, and oil more than natural gas" (International Energy Agency, 2000a:20). As the *New York Times* reported in July 2001, more specifically, "American coal-powered plants pump 2.3 billion tons of $CO_2$ into the air each year—twice as much as the amount emitted by cars" (Goodell, 2001:6). Hugh Pitcher, Staff Scientist of the Global Climate Change Group at the Pacific Northwest National Laboratory, discusses the implications of this difference: "You could roughly meet the Kyoto [Protocol] targets for the United States if you shut down every coal-fired electricity generating plant and replaced it with a combined cycle gas turbine" (Pitcher, interview with author, 2000). This statement highlights the fact that it is not just *overall* energy consumption and production that is important to understanding the American responses to the issue of global warming; the natural resource interests that will be most affected by the regulation of carbon dioxide emissions are also important.

As Pitcher's observation suggests, more important than the overall levels of energy consumption may be the fact that 22.8% of the energy consumed in the United States is produced by burning coal (Energy Information Administration, 2002). Perhaps even more important than the overall consumption of coal is the fact that the United States has the largest coal reserves in the world. The significance of this point is stressed by Kert Davies, the Science Policy Director of one of the leading environmental groups working on climate change, Ozone Action, which was absorbed by Greenpeace in 2001: "Who will get hit [by the regulation of greenhouse gases in the United States] is coal, not so much oil. . . . If you're a power plant or a power company, you're in deep trouble, because they're the ones who really have to move" (Davies, interview with author, 2000). As previously stated, in contrast to oil, natural gas, and nuclear power, the United States produces *more* coal than it consumes. Therefore, any regulation of carbon dioxide will not only affect electricity companies, it will also affect the companies that extract the coal and the workers who do the mining. Both Davies and Pitcher speak of electricity production when they speak about coal consumption in America. Table II, which provides a list of the fuel share in electricity generation in the United States, shows that 52.3% of all U.S. electricity in 1998 was generated from coal.

**Table II.** Fuel Share (in %) in Electricity Generation in the United States, 1998

| Country | Coal | Oil | Gas | Nuclear | Hydroelectric | Other |
|---|---|---|---|---|---|---|
| United States | 52.3 | 3.8 | 14.6 | 18.6 | 8.4 | 2.2 |

*Note*. Source: International Energy Agency, 2000b.

Given the high level of carbon emissions from coal, why does the United States continue to consume so much? In the view of William Fang, deputy general counsel of the Edison Electric Institute, the abundance of indigenous coal makes a shift difficult. If the country were to switch to another fuel source, "tremendous amounts of natural gas would be needed, and the price, supply, the delivery of gas, those are all huge questions" (Fang, interview with author, 2000). Fang, a lobbyist for the electricity industry, claims that an energy transition in the United States away from coal would be very expensive, if it were possible at all. Such a transition, in addition to being expensive, would affect the regions of the United States that extract coal. Not only does the United States produce high levels of coal as a whole, but coal extraction is geographically diffuse across the United States. In contrast to the U.S. oil reserves, which, according to the Energy Information Administration (2003), are "concentrated overwhelmingly (more than 80%) in four states—Texas (24%, including reserves in the Gulf of Mexico), Alaska (22%), Louisiana (20%, including reserves in the Gulf of Mexico), and California (19%, including Federal Offshore reserves)"—coal has been mined around the country for decades (e.g., Vietor, 1980). In 2000, coal extraction took place in 26 of the 50 states: 13 states are major coal-producing states, extracting more than 25 million short tons of coal a year; and 13 states produce less, extracting less than 25 million short tons in 2000 (Energy Information Administration, 2000). These states comprise what Leggett has called the "problematic heartland of coal" in the United States (1999: 249). Figure 1 presents a map of coal-producing states in the United States.

In addition to their differences in geographical distribution, oil and coal extraction involve very different levels of labor intensity. Oil extraction has become increasingly mechanized and does not require a significant labor force. In contrast, coal mining has been one of the most labor-intensive of the extractive industries (for a social history of coal usage, see Freese, 2003). There are significant differences in the labor intensity associated with the type of coal being mined,[6] and the United Mine Workers—the national union for all American miners—is still very strong and plays a significant

[6] For a full discussion, see the "Market Trends—Coal" page of the Annual Energy Outlook on the website of the Energy Information Administration: Available at: www.eia.doe.gov/oiaf/archive/aeo98/coal_pr.html (accessed March 24, 2004).

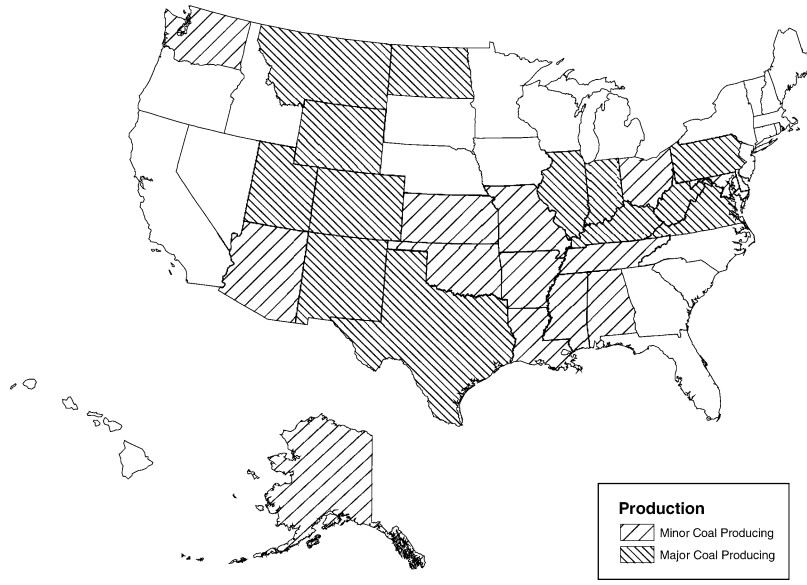


**Fig. 1.** Coal production in the United States by State (2000).

role in the national policy arena. In 2004, in fact, the union ranked as one of the 30 largest labor unions in the United States.[7]

Because coal extraction is so labor-intensive, the political influence of coal mining is further heightened by what Freudenburg and Gramling call the "social multiplier effect," according to which "social interaction patterns can exert powerful influences on individuals' attitudes" (2004:205; see also 1994). In other words, even though coal mining only employed an estimated 2.1% of the labor force in West Virginia in 2004,[8] because far more people in the state have friends, family, and neighbors who work in the industry, the influence of this particular natural resource is significantly larger than the number of people actually working in the mines. As a result of the labor-intensity of coal mining and its social multiplier effect, public opinion tends to support the industry in areas where coal extraction takes place (for full discussions of how public opinion affects public policy, see Burstein, 1998; Burstein and Linton, 2002; see also O'Connor *et al.*, 2002). In short, these different characteristics of America's natural resource endowment

[7] See www.infoplease.com/ipa/0/1/0/4/6/3/A0104634.html (accessed April 1, 2004).

[8] These numbers are based on estimates provided by the U.S. Energy Information Administration: Available at: www.eia.doe.gov/cneaf/coal/page/acr/table18.html (accessed April 25, 2006) and the U.S. Census Bureau: factfinder.census.gov/servlet/QTTable?_bm=n&_lang=en&qr_name=DEC_2000_SF3_U_DP3&ds_name=DEC_2000_SF3_U&geo_id=04000US54 (accessed on April 25, 2006).

are very significant and affect how the political interests associated with these resources get translated into policy outcomes. As I discuss in more detail in the following sections, the geographical distribution of coal, along with the labor required for its extraction, affects the proclivities of states' elected officials, as well as those of President Bush, who comes from the only state in the nation that extracts both significant amounts of coal *and* oil.

## NATURAL RESOURCE DEPENDENCE AND DOMESTIC POLICY-MAKING

The importance of coal as an energy source and as an economic good, when seen from the perspective of a coal-producing state, was stressed during a conversation in 2000 with the Legislative Assistant and Counsel to Senator Michael Enzi, a Republican senator from Wyoming—a state that happened to be responsible for 31% of U.S. coal extraction in 2000. "We also have . . . strong concerns and interests in coal. . . . Part of the things that the Kyoto Protocol would do would be to take out our ability to produce and utilize that coal. That would be the end of the state economy. . . . Those elements fund a lot of the state, and we actually have seen many big benefits that have come from that" (Scholes, interview with author, 2000).

More broadly, with coal being extracted from 26 states of the United States, 52 of the 100 U.S. senators come from states in which coal production contributes to the state economy and coal extraction employs many people in the labor force. In addition, even more states fuel their electricity plants with cheap and indigenous U.S. coal. In other words, although the Deputy Director of the White House Climate Change Task Force during the Clinton administration was indeed correct when he stated that we "must change the way in which we produce and use energy" in order to address the issue of global warming (Gardiner, interview with author, 2000), the lack of support for a change in the U.S. energy infrastructure is widespread. A move away from coal as the economy's main source of electricity would affect not only the owners of a few wealthy companies; it would also affect those working to extract the resource, as well as more than half of the electricity consumers in the United States. In addition, given the vast quantities of coal that are shipped to power plants on American railways (Vietor, 1980:4), an energy transition in the United States would likely affect the transportation sector as well. In other words, the specifics of the energy infrastructure in the United States, particularly given the geographical distribution and labor-intensity of U.S. coal extraction, have a significant effect on national policy outcomes. This natural resource dependence in the United States is very important and, I contend, contributes significantly to

political debates that have led to the lack of a national climate change policy in the United States.

Throughout its 8-year-term, the Clinton administration actively negotiated for the Kyoto Protocol and supported strong climate change policymaking in the United States. Consistent with the claims of scholars who study the relationship between political interests and political outcomes (e.g., Laumann and Knoke, 1987), the Clinton administration, which was very sensitive to environmental interests, supported climate change regulation in the United States. The Congress, in contrast, which includes representatives from the 26 coal-extracting states and experienced significant pressure from natural resource interests, had a very different position than that of the administration.

## The Byrd–Hagel Resolution

Perhaps the most well-known national policy regarding climate change in the United States is Senate Resolution 98, or what has come to be known as the Byrd–Hagel Resolution. On July 25, 1997, more than 4 months prior to the climate change negotiations in Kyoto, Japan—where the Kyoto Protocol would be drafted—the U.S. Senate unanimously voted to pass the Byrd–Hagel Resolution. The resolution stated that "the United States should not be a signatory to any protocol . . . at negotiations in December 1997, or thereafter" (U.S. Senate, 1997a). It made clear the Senate's position against legally binding emission-reduction targets before the administration sent its negotiating team to Kyoto in December.

The leading sponsors of the resolution were freshman Republican Senator Chuck Hagel from Nebraska and Democratic Senator Robert Byrd from West Virginia. As a Senior Staff Member of the Senate Energy and Natural Resources Committee noted, Hagel was hand-picked to stop the regulation of greenhouse gases by the Global Climate Coalition, an industry-sponsored, nonprofit organization that lobbied on behalf of automobile and energy interests. In the staff member's own words, "The Republicans were looking for somebody to take the lead on climate change and the campaign against [the] Kyoto [Protocol]. . . . I was at his very first fund-raiser when they announced he was their lead guy on climate change" (Senior Staff, interview with author, 2001).

Senator Byrd, in contrast, was one of the most senior Democrats in the Senate. Even though he recognized the importance of the issue of climate change (e.g., U.S. Senate, 1997b), the senator hailed from the coal-extracting state of West Virginia. In 2000, for example, West Virginia was responsible for 14% of all U.S. coal production (Energy Information

Administration, 2000). Some political insiders recall that Byrd himself recruited most of the support for the resolution. In the words of Rafe Pomerance, one of the U.S. negotiators from the State Department at the time, "Byrd went and lined everybody up ... [he] walked around with the Resolution [asking senators to] sign his Resolution" (Pomerance, interview with author, 2000). Senators representing states with energy interests as well as Democrats in the Senate were both observed signing on to the resolution due to Byrd's personal involvement with it.

On July 25, 1997, the resolution passed unanimously in the Senate with a vote of 95:0. Perhaps, the most reasonable interpretation of its success is that different members of the Senate supported it for altogether different reasons. Some senators probably supported it because Byrd—a Senior Democrat in the Senate—asked for their assistance. Others, however, strongly believed in the resolution's message—that a treaty based on preexisting international agreements about the rules of the climate change treaty under negotiation would be harmful to their political interests. Although, in many cases, Congressional resolutions are nonbinding, frequently being nothing but "acts of friendship or rewards or whatever" (Pomerance, interview with author, 2001), Senate Resolution 98 may not be such a benign policy recommendation.

In fact, the Byrd–Hagel Resolution still stands today as a reminder that the U.S. Senate did not support the rules for the Kyoto Protocol that was to be drafted in Japan later that year. When President George W. Bush decided to change his administration's position on the regulation of carbon dioxide, he announced it in a letter to one of the original sponsors of Senate Resolution 98: Senator Hagel—the senator who was reportedly handpicked by the Global Climate Coalition to stop the regulation of greenhouse gases. Even though the resolution still represents the political interests of many of the senators who signed it, many agree that, had there been another vote on the resolution in 2001, it would not have been unanimous. In the words of the staff member of a leading senator on global climate change, the resolution "could never be done again" (Legislative Assistant, interview with author, 2001). Whether or not the resolution itself maintained the same level of support that it had in 1997, consensus in the Senate has continued to follow the opinions put forth by industrial lobbyists, such as Edward Yawn, the Director of Government Relations of the Edison Electric Institute, the association of U.S. shareholder-owned electric companies:[9] "[Senate Resolution 98] is a key indicator of where the Senate is on the [Kyoto] Protocol"

[9] Adapted from the website of the Edison Electric Institute: Available at: http://www.eei.org/resources/eei/.

and on policies regarding global climate change (Yawn, interview with author, 2000).

## The Climate Stewardship Act of 2003

Although issues surrounding the passage of the Byrd–Hagel Resolution suggest a connection between natural resource dependence in the United States and legislative political outcomes, the fact that the bill passed unanimously—even with the explanations given above—does not provide ample evidence for this claim. More than 2 years after the Bush administration pulled out of the negotiations for the Kyoto Protocol, however, debates about the regulation of greenhouse gases reemerged in the Senate, and these debates clarify the role that natural resource dependence plays in domestic policy outcomes.

When Senators McCain and Lieberman pushed for a vote on their proposed Climate Stewardship Act in summer 2003, debates about the issue of climate change erupted on Capitol Hill once again. Even though the act did not address the Kyoto Protocol directly, on July 28, Senator Inhofe—a Republican Senator from the coal-producing state of Oklahoma and the Chairman of the Senate Environment and Public Works Committee—gave a 2-hour speech on the floor of the Senate regarding the science of climate change and the political viability of the ratification of the Kyoto Protocol:

> 95 Senators—both Democrats and Republicans—who, according to Byrd–Hagel, presumably oppose ratification if the [Kyoto] treaty came up on the Senate floor. . . . You have Senators who are of the liberal persuasion—fine people but certainly [of] a different philosophy than mine . . . who are really sincerely talking in favor of this Kyoto Treaty, but they cast their vote against it. They said: We don't want to ratify this treaty, and we are not going to ratify this treaty (U.S. Senate, 2003a:S10015-S100156).

When Senators McCain and Lieberman tried to reopen discussion in the Senate about the domestic regulation of greenhouse gases through the Climate Stewardship Act, the high-ranking chairman invoked the unanimous vote on the Byrd–Hagel Resolution, redirecting the debate to the topic of the Kyoto Protocol, stating that discussions were a waste of time.

Even with such opposition, however, a revised version of the Climate Stewardship Act came up for a vote in the Senate in October 2003. The Union of Concerned Scientists summarized the bill as follows: "The current version of the CSA [Climate Stewardship Act] calls for a reduction in emissions of heat-trapping gases to 2000 levels by the year 2010. The bill creates a market-based system of tradable allowances to achieve this reduction. . . . The CSA would also set up a program of scientific research on abrupt

climate change" (for the full text of the act, see U.S. Senate, 2003b).[10] The bill was defeated in a vote on October 30, 2003. In contrast to the unanimous vote on the Byrd–Hagel Resolution in 1997, however, the vote on the Climate Stewardship Act was much closer: the measure was defeated by 12 votes. An examination of the relationship between the 55 senators who voted against the act and resource dependence throughout the United States provides more data to support the overall hypothesis of this paper: to understand American climate change policy, we must recognize the role that natural resource dependence plays in domestic policymaking.

Natural resource dependence was operationalized by each state's extraction of coal and oil: states that did not extract either resource were coded with a 0; states that extracted less than 25 million short tons of coal in 2000 were identified as lesser coal-producing states and coded with a 1; and states that extracted more than 25 million short tons of coal in 2000 were identified as major coal-producing states and coded with a 2 (Energy Information Administration, 2000). In addition, the four states that extracted the majority of the oil in the United States in 2003 were coded with a 1 (Energy Information Administration, 2003).[11] Total natural resource extraction for each state was calculated by summing their levels of coal and oil extraction. The values for each state ranged from 0 to 3, with only one state—Texas—scoring a 3 because it extracts significant levels of both coal and oil. Fourteen states scored a 2 because they are either major coal-producing states or minor coal-producing states that *also* extract oil; 12 states scored a 1 for extracting less than 25 million short tons of coal a year *or* extracting oil; and 23 states scored a 0 for extracting neither coal nor oil.

Next, these levels of natural resource dependence were compared to the senators who opposed the Climate Stewardship Act.[12] The relationship between natural resource extraction and opposition to the act is very significant ($r = .645$) suggesting that senators from resource-dependent states were significantly more likely to vote against the bill than those from nonextracting states. Moreover, coal-dependent states, as reported by the United States Energy Information Administration, were just as strongly associated

[10] See also the "Global Warming" page on the website of the Union of Concerned Scientists: Available at: www.ucsusa.org/glboal_environment/global_warming/page.cfm?pageID = 1237 (accessed April 1, 2004).

[11] By adopting this coding scheme, I consider the extraction of oil and coal to be threshold variables. For the 26 states that extract coal, I utilize the distinction made by the United States Energy Information Administration to determine the boundary between major and minor coal-producing states (Energy Information Administration, 2000).

[12] Because the Climate Stewardship Act aimed to regulate greenhouse gases, I look here at whether Senators from resource-dependent states voted *against* it. It is important to note that only 98 of the 100 U.S. Senators voted on the Climate Stewardship Act. Two Senators—Senator Nelson (D) from Nebraska and Senator Edwards (D) from North Carolina—abstained from the vote.

**Table III.** Coal Dependence/Opposition to the Climate Stewardship Act of 2003, Cross-Tabulation ($N = 50$)

| | Coal dependence | | | |
|---|---|---|---|---|
| Opposition to the Climate Stewardship Act per state | No coal | Minor coal ( < 25 million short tons) | Major coal ( ≥ 25 million short tons) | Total |
| 0 senators | 13 | 1 | 0 | 14 |
| 1 senator | 9[a] | 1 | 3 | 13 |
| 2 senators | 2 | 11 | 10 | 23 |
| Total | 24 | 13 | 13 | 50 |

[a]Two of the nine states in this category had one senator that abstained from the vote on the Climate Stewardship Act.

with those senators who voted against the Climate Stewardship Act ($r = .657$). In other words, senators from states that extract coal—which is a geographically diffuse and labor-intensive process—were significantly more likely to oppose the act.

The relationship between coal-dependent states and opposition to the Climate Stewardship Act becomes even clearer by looking at a cross-tabulation of the relationship between the levels of coal dependence, as measured by coal extraction, and opposition to the act. Table III presents the cross-tabulation. None of the 14 senators who supported the act came from states with significant coal dependence; 13 of these states produced no coal, and one extracted less than 25 million short tons of coal in 2000. Conversely, in states where significant coal extraction was taking place, at least one senator opposed the act. Using a Pearson chi-square test of opposition to the bill, I test the null hypothesis that voting on the bill was the same for states, regardless of their coal endowment. The results are statistically significant, and the null hypothesis is rejected ($\chi^2 = 27.87$, $df = 2$, $p < .000$). In short, these findings present a clear relationship between coal dependence and opposition to domestic climate change regulation.

It is also worth noting the strong relationship between Republican representation in the Senate and opposition to the bill ($\chi^2 = 31.946$, $df = 4$, $p < .000$). In order to test how coal dependence and the party affiliation of the senators affects the votes against this bill, Table IV presents the results of two logistic regressions of individual senators' votes against the Climate Stewardship Act. Model 1 confirms that coal extraction significantly affects the voting behavior of senators. In Model 2, which includes coal extraction as well as party affiliation, both of the variables are very significant predictors of the outcome of the vote. In other words, rather than making the relationship between coal extraction and the vote on the Climate Stewardship Act spurious by including the party affiliation of the senators, we find

**Table IV.** Logistic Regression Coefficients Predicting Votes Against the Climate Stewardship Act of 2003, Coefficient (SE), $N = 100$

| Independent variable | Model 1 | Model 2 |
|---|---|---|
| Coal extraction | 2.421** (.501) | 2.221** (.557) |
| Republicans in the Senate | | 3.158** (.680) |
| Constant | − .819 ** (.310) | − 2.156** (.519) |
| − 2 log-likelihood | 91.245 | 62.692 |

*Significant at the.05 level, ** Significant at the .01 level.

that coal extraction continues to play a very significant role in the vote on this national climate policy.

In sum, these results provide additional support for the claim that political outcomes are the product of the interaction between the society and the natural environment. In other words, state dependence on coal extraction, along with the political party affiliation of the elected official, contributes to his or her voting behavior on policies related to global climate change. These findings are consistent with Freudenburg and Gramling's work on the "social multiplier effect" of oil extraction (1994, 2004). Since coal extraction is significantly more labor-intensive than oil extraction, states that extract high levels of coal would be likely to have a significant social multiplier effect. Such an effect translates into the voting behavior of individuals as well as the political positions of the people whom citizens elect to represent them.

## Subnational Policies to Regulate Climate Change

With the continued failure of bills to regulate greenhouse gas emissions at the national level and the Bush administration's continued emphasis on increasing natural resource extraction in the United States,[13] states have begun to regulate their perceived contribution to climate change at the subnational level. As of March 2006, 28 states had implemented plans to address climate change. These different plans, however, have been called a "patchwork quilt" of policies by the Pew Center on Global Climate Change because levels of commitment and enforcement vary greatly from plan to plan (Pew Center on Global Climate Change, 2006:1).

Although they run the gamut, 9 of the 28 states implemented statewide emission targets to reduce greenhouse gas emissions by March 2006:

[13] Although President Bush stated his commitment to addressing what he called America's "oil addiction" by increasing energy efficiency and investing in alternative energy technology during his 2006 State of the Union address (Bush, 2006), national funding for such programs has been significantly reduced during the Bush administration's tenure in the White House (see, e.g., Lavelle, 2006).

**Table V.** Coal Dependence/Climate Action Plans With Emissions Targets, Cross-Tabulation, March 2006 ($N = 50$)

| | Coal dependence | | | |
|---|---|---|---|---|
| States with climate action plans with emissions targets | No coal | Minor coal ( < 25 million short tons) | Major coal ( ≥ 25 million short tons) | Total |
| Yes | 7 | 2 | 0 | 9 |
| No | 18 | 14 | 9 | 41 |
| Total | 25 | 16 | 9 | 50 |

California, New Mexico, New Jersey, Maine, Massachusetts, Connecticut, New York, Washington, and Oregon. In order to assess the relationship between coal dependence and such subnational policies, I focus on those few states that have implemented emissions targets. Looking at a cross-tabulation of the coal dependence of states and those that have implemented climate action plans with emission targets, the role of this natural resource becomes even clearer. Table V presents the cross-tabulation. Note that none of the major coal-producing states (more than 25 million short tons a year) have implemented a climate action plan that includes actual emission targets, and only two of the minor coal extractors have implemented such policies. In fact, seven of the nine states that have implemented these policies extract no coal whatsoever.

Although there are only nine such state-level policies to date, analyzing this small number of cases also indicates the enduring role that coal extraction plays in climate change policy in the United States, even at the subnational level. Using a Pearson chi-square test of states with climate action plans that include emission targets, I tested the null hypothesis that states implemented such plans regardless of their coal endowment. The results are not quite statistically significant ($\chi^2 = 3.997, df = 2, p < .136$). In contrast to the vote on the Climate Stewardship Act in 2003, however, there is no relationship between political party affiliation and those states that have implemented climate action plans with emission targets ($\chi^2 = 0.595, df = 1, p < .441$)[14].

## DISCUSSION AND CONCLUSION

Although we must interpret cautiously the analysis of the limited number of states that have implemented emission-reduction targets, the overall results support the notion that natural resource dependence in the form of coal extraction affects political decision making in the United States. In short, the results of the analysis of the Byrd–Hagel Resolution, the Climate

[14] In this analysis, I include the party affiliation of each state's governor, as the executive of each state is responsible for implementing such climate action plans.

Stewardship Act of 2003, and the more recent state-level policies to regulate greenhouse gas emissions suggest that including aspects of America's natural resource endowment helps to explain more fully climate change policy in the United States. In other words, this research provides evidence that natural resource interests are translated into political outcome through the growth machine (Molotch, 1976). Resource dependence in the United States plays a significant role in domestic decision making, particularly with regard to issues such as global climate change, where regulation will have an effect on natural resource extraction and use. Presenting data that span 10 years of domestic policy and two very different administrations, I have shown that it is the resource dependence of the nation-state and not partisan politics that determines domestic decision-making with regard to global climate change.[15] In fact, when including political party along with coal extraction in the analysis of the Climate Stewardship Act of 2003, dependence on coal continued to play a significant role in explaining the voting behavior of senators. In the analysis of the more recent subnational policies, political party plays no role in explaining which states have implemented greenhouse-gas emission targets.

Although other social scientific research has focused on important aspects of this issue in the United States, I contend that the lack of a national climate change policy in the United States is the product of the conjoint constitution of the natural resources that fuel the country's energy infrastructure and domestic policymaking. In other words, the issue of global warming has become what Lutzenhiser (2001) calls a "non-policy" *because* natural resource dependence has affected national policymaking. Like the multiple social uses of Iron Mountain explained by Frendenburg *et al.* (1995), it is the social uses of coal that give it economic and political value. If, for example, alternative fuel technology were perfected, and coal were no longer seen as the cheapest indigenous energy source in the United States, it is likely that the strong relationship between coal and decision making would no longer hold. Additionally, if clean coal technology was workable, so that coal could be burned without emitting any greenhouse gases, the voting behavior of senators from coal-dependent states would likely change.

Until such technological innovation occurs, however, we must recognize the ways that environmental constraints and opportunities are translated into political interests that have a lasting effect on decision making. In other words, how society uses natural resources such as coal contributes to the influence that such natural resource interests can wield in the policy-

[15] It is also important to note that having a president who comes from the most natural resource-dependent state in the entire country certainly makes this type of relationship more visible.

making arena. As Freudenburg *et al.* stress, "While it is possible to separate the physical from the social in terms of analytical convenience, it is important to recognize that the social is inherent in what is usually seen as the physical, just as the physical is often integral to what is perceived as the social" (1995:386).

In 2002, when Dunlap looked back on the formation of environmental sociology as a sociological subdiscipline, he realized that "mainstream sociology had developed a set of traditions and taken-for-granted assumptions that led our discipline to ignore the biophysical environment. ... In my mind, a 'real' environmental sociology would involve examination of environmental variables (especially as causes or effects) in relation to social variables" (2002:330–331). Even with appeals by many of the leading environmental sociologists in the world, however, sociologists who study the politics of environmental issues—including Dunlap himself—have overlooked the role that environmental factors such as natural resources play in social processes. By considering the conjoint constitution of natural resources and political decision making in this paper, we are able to understand better both America's position on climate change policies and, more generally, American society.

Thus, future research must continue to explore the conjoint constitution of natural resources and their social uses. More specifically, research should explore the relationship between natural resource dependence and domestic policymaking, focusing particularly on the effects of geographically diffuse and labor-intensive interests on political outcomes. These findings suggest that countries with similar energy endowments and resource dependencies—no matter what their ideological position on the issue of global warming—will adopt similar policies. Australia, the other very coal-dependent state that would be regulated by the Kyoto Protocol,[16] for example, did not ratify it. Research is needed to see if there is a similar relationship between Australia's natural resource endowment and its national climate change policy.

In addition, the findings of this paper suggest that future research should focus explicitly on the complex relationship between political representation and natural resource dependence. Although it is clear that geographically diffuse and labor-intensive resource dependence can affect the voting behavior of elected officials, further research must explore the natural resource growth machine and how it translates into political representation. By moving forward in these directions, sociologists will be able to answer important questions about the political implications of the relationship between society and the natural environment.

[16] The Protocol includes legally binding carbon dioxide emission reductions for developed—or Annex I—countries only.

## ACKNOWLEDGMENTS

I would like to thank William R. Freudenburg, Lewis Friedland, Aaron Gullickson, Charles Tilly, the Contentious Politics Workshop at Columbia University, and the anonymous reviewers at *Sociological Forum* for providing comments and suggestions on earlier drafts of this article. I would also like to thank Nicole Kaufman for her research assistance and Doug Miller for providing assistance in creating Fig. 1.

## REFERENCES

**Boehmer-Christiansen, Sonja**
1994 "Global climate protection policy: The limits of scientific advice." Global Environmental Change 4:140–159.

**Bunker, Stephen G.**
1985 Underdeveloping the Amazon. Urbana: University of Illinois Press.

**Bunker, Stephen G.**
1992 "Natural resource extraction and power differentials in a global economy." In S. Oritz and S. Lees (eds.), Understanding Economic Process: 61–84. Lanham, MD: University Press of America.

**Bunker, Stephen G.**
1996 "Raw material and the global economy: Oversights and distortions in industrial ecology." Society and Natural Resources 9:419–429.

**Burch, William R.**
1971 Daydreams and Nightmares: A Sociological Essay on the American Environment. New York: Harper & Row.

**Burstein, Paul**
1998 "Bringing the public back in: Should sociologists consider the impact of public opinion on public policy?" Social Forces 77:27–62.

**Burstein, Paul, and April Linton**
2002 "The impact of political parties, interest groups, and social movement organizations on public policy: Some recent evidence and theoretical concerns." Social Forces 81:381–408.

**Bush, George W.**
2006 State of the Union Address By the President. January 31, 2006. Available at: www.whitehouse.gov/ stateoftheunion/ 2006/index.html (Accessed April 20, 2006).

**Buttel, Frederick H.**
1986 "Sociology and the environment: The winding road toward human ecology." International Social Science Journal 109:337–356.

**Buttel, Frederick H.**
1987 "New directions in environmental sociology." Annual Review of Sociology 13:465–488.

**Buttel, Frederick H.**
2000 "World society, the nation-state, and environmental protection." American Sociological Review 65(1):117–121.

**Buttel, Frederick H.**
2002 "Environmental sociology and the sociology of natural resources: Institutional histories and intellectual legacies." Society and Natural Resources 15:205–211.

**Catton, William R. Jr., and Riley E. Dunlap**
1980 "A new ecological paradigm for post-exuberant sociology." American Behavioral Scientist 24:15–47.

**Choldin, H. M.**
1978 "Social life and the physical environment." In D. Street (ed.), Handbook of Contemporary Urban Life: 352–384. San Francisco: Jossey-Bass.

**Chubb, John E.**
1983 Interest groups and the bureaucracy: The politics of energy. Stanford, CA: Stanford University Press.

**Dietz, Thomas, and Eugene A. Rosa**
1997 "Effects of population and affluence on CO2 emissions." Proceedings of the National Academy of Science 94:175–179.

**Dobriansky, Paula J.**
2001 "Closing statement to the seventh session of the conference

of parties (COP-7).” Marrakech, Morocco. Available online at: www.state.gov/g/oes/rls/rm/6050.htm (Accessed February 18, 2006).

**Drucker, Peter F.**
1986 “The changed world economy.” Foreign Affairs 64:768–791.

**Duncan, Otis Dudley**
1964 “Social organization and the ecosystem.” In R. E. L. Faris (ed.), Handbook of Modern Sociology: 36–82. Chicago: Rand McNally.

**Dunlap, Riley E.**
1980 “Paradigmatic change in social science: From human exemptions to an ecological paradigm.” American Behavioral Scientist 24:5–14.

**Dunlap, Riley E.**
1986 “Environment, ecology, and agriculture revisited: Ancestor worship and the dangers of disciplinary myopia.” Rural Sociologist 6(4):304–314.

**Dunlap, Riley E.**
2002 “Paradigms, theories, and environmental sociology.” In R. Dunlap, F. H. Buttel, P. Dickens, and A. Gijswijt (eds.), Sociological Theory and the Environment: Classical Foundations, Contemporary Insights: 329–350. Lanham, MD: Rowman & Littlefield.

**Dunlap, Riley E., and William R. Catton**
1979 “Environmental sociology.” Annual Review of Sociology 5:243–273.

**Dunlap, Riley E., and William R. Catton**
1983 “What environmental sociologists have in common (whether concerned with ‘built’ or ‘natural’ environments).” Sociological Inquiry 53:113–135.

**Elo, Irma T., and Calvin L. Beale**
1985 Natural Resources and Rural Poverty: An Overview. Washington, DC: Resources for the Future.

**Energy Information Administration (EIA)**
2000 “Coal production and number of mines by state and mine type, 2000.” Washington, DC: Energy Information Administration. Available at: www.eia.doe.gov/cneaf/coal/cia/html/tb103p01p1.html (Accessed April 1, 2004).

**Energy Information Administration (EIA)**
2002 Annual Energy Review 2002. Available at: www.eia.doe.gov/emeu/aer/overview .html (Accessed April 1, 2004).

**Energy Information Administration (EIA)**
2003 “United States of America—Energy Report.” Washington, DC: Energy Information Administration. Available at: www.eia.doe.gov/emeu/cabs/usa.html #oil (Accessed April 1, 2004).

**Evans, Peter B., Harold Karan Jacobson, and Robert D. Putnam**
1993 Double-Edged Diplomacy: International Bargaining and Domestic Politics. Berkeley and Los Angeles: University of California Press.

**Field, Donald R., and Darryll R. Johnson**
1986 “Rural communities and natural resources: A classical interest.” Rural Sociologist 6(2):187–196.

**Firey, Walter** 1960 Man, Mind and Land: A Theory of Resource Use. Westport, CT: Greenwood.

**Fisher, Dana R.**
2004 National Governance and the Global Climate Change Regime. Lanham, MD: Rowman & Littlefield.

**Fisher, Dana R., and William R. Freudenburg**
2004 “Postindustrialization and environmental quality: An empirical analysis of the environmental state.” Social Forces 83:157–188.

**Fisher, Dana R., and William R. Freudenburg**
2005 “Rejoinder. Ecological efficiency, disproportionality, and methodological precision: On the importance of linking methods to theory.” Social Forces On-Line Rejoinders. Available at: https://socialforces.unc.edu/epub/rejoinders (Accessed April 17, 2006).

**Flora, Corneilia**
1990 “Rural peoples in a global economy.” Rural Sociology 55:157–177.

**Foster, John Bellamy**
1999 “Marx’s theory of metabolic rift: Classical foundations for environmental sociology.” American Journal of Sociology 105(2):366–405.

**Frank, David John, Ann Hironaka, and Evan Schofer**
2000A “The nation-state and the natural environment over the twentieth century.” American Sociological Review 65(1):96–117.

**Frank, David John, Ann Hironaka, and Evan Schofer**
200B "Environmentalism as a global institution: Reply to Buttel." American Sociological Review 65(1):122–127.
**Freese, Barbara**
2003 Coal: A Human History. Cambridge, MA: Perseus.
**Freudenburg, William R.**
1992 "Addictive economies: Extractive industries and vulnerable localities in a changing world economy." Rural Sociology 57:305–332.
**Freudenburg, William R.**
2002 "Navel warfare? The best of minds, the worst of minds, and the dangers of misplaced concreteness." Society and Natural Resources 15:229-237.
**Freudenburg, William R., Scott Frickel, and Robert Gramling**
1995 "Beyond the nature society divide: Learning to think about a mountain." Sociological Forum 10:361–392.
**Freudenburg, William R., and Robert Gramling**
1994 Oil in Troubled Waters: Perception, Politics, and the Battle over Offshore Drilling. Albany: State University of New York Press.
**Freudenburg, William R., and Robert Gramling**
2004 "Public reaction to offshore oil." In Cutler J. Cleaveland (ed.), Encyclopedia of Energy: 195–206. Amsterdam: Elsevier.
**Gelbspan, Ross** 1997 The Heat Is On. Reading, MA: Addison-Wesley.
**Goldman, M., and R. A. Schurman**
2000 "Closing the 'great divide': New social theory on society and nature." Annual Review of Sociology 26:563–584.
**Goodell, Jeff**
2001 "How coal got its glow back." Conference News Daily, reprinted from the New York Times. July 23:6–9.
**Goodwin, Craufurd D. W.**
1981 Energy Policy in Perspective: Today's Problems, Yesterday's Solutions. Washington, DC: Brookings Institution.
**Greenwood, D. J.**
1984 The Taming of Evolution: The Persistence of Nonevolutionary Views in the Study of Humans. Ithaca, NY: Cornell University Press.
**Guterbock, T. M.**
1990 "The effect of snow on urban density patterns in the United-States." Environment and Behavior 22:358–386.
**Hansen, John Mark**
1991 Gaining Access: Congress and the Farm Lobby, 1919–1981. Chicago: University of Chicago Press.
**Harris, Paul G.**
1998 "Understanding America's climate change policy: Realpolitik, pluralism, and ethical norms." OCEES Research Paper No. 15. Oxford: Mansfield College.
**Harris, Paul G.**
2000 Climate Change and American Foreign Policy. New York: St. Martin's Press.
**Hawley, Amos H.**
1944 "Ecology and human ecology." Social Forces 22:398–405.
**Heinz, John P., Edward O. Laumann, Robert L. Nelson, and Robert H. Salisbury**
1993 The Hollow Core: Private Interests in National Policy Making. Cambridge, MA: Harvard University Press.
**Humphrey, Craig R., G. Berardi, M. S. Carroll, S. Fairfax, L. Fortmann, C. Geisler, T. G. Johnson, J. Kusel, R. G. Lee, S. Macinko, N. L. Peluso, M. D. Schulman, and P. C. West**
1993 "Theories in the study of natural-resource-dependent communities and persistent rural poverty." In The Rural Sociological Society's Taskforce on Persistent Rural Poverty (eds.), Persistent Poverty in Rural America: 136–172. Boulder, CO: Westview.
**Humphrey, Craig R., and Frederick H. Buttel**
1982 Environment, Energy, and Society: Belmont, CA: Wadsworth.
**Intergovernmental Panel on Climate Change (IPCC)**
2001 The Third Assessment Report of the Intergovernmental Panel on Climate Change: Cambridge, MA: Cambridge University Press.
**International Energy Agency (IEA)**
2000a CO2 Emissions From Fuel Combustion: 1971–1998. Paris: OECD.
**International Energy Agency (IEA)**
2000b Energy Statistics of OECD Countries: 1997–1998. Paris: OECD.

**Jeffery, C. R.**
1976 "Criminal behavior and physical-environment- perspective." American Behavioral Scientist 20:149–174.
**Laumann, Edward O., and David Knoke**
1987 The Organizational State: Social Change in National Policy Domains. Madison, WI: University of Wisconsin Press.
**Lavelle, Marianne**
2006 "A lack of energy: A Bush visit doesn't change the fact that spending on alternative fuels is down." U.S. News and World Report, March 6.
**Leggett, Jeremy**
1999 The Carbon War. London: Penguin.
**Lisowski, Michael**
2002 "Playing the two-level game: U.S. President Bush's decision to repudiate the Kyoto Protocol." Environmental Politics 11(4):101–119.
**Lofland, John, and Lyn H. Lofland**
1995 Analyzing social settings: A guide to qualitative observation and analysis. Belmont, CA: Wadsworth.
**Lutzenhiser, Loren**
2001 "The contours of U.S. climate non-policy." Society and Natural Resources 14(6):511–524.
**Martinez-Alier, J.**
1995 "Political ecology, distributional conflicts, and economic incommensurability." New Left Review 211: 70–88.
**McCright, Aaron M., and Riley E. Dunlap**
2000 "Challenging global warming as a social problem: An analysis of the conservative movement's counter-claims." Social Problems 47:499–522.
**McCright, Aaron M., and Riley E. Dunlap**
2003 "Defeating Kyoto: The conservative movement's impact on U.S. climate change policy." Social Problems 50:348–373.
**Michelson, W. H.**
1976 Man and His Urban Environment. Reading, MA: Addison-Wesley.
**Molotch, Harvey**
1976 "The city as a growth machine: Toward a political economy of place." American Journal of Sociology 82: 309–332.
**Molotch, Harvey, William Freudenburg, and K. E. Paulsen**
2000 "History repeats itself, but how? City character, urban tradition, and the accomplishment of place." American Sociological Review 65:791–823.
**Nash, Gerald D.**
1968 United States Oil Policy, 1890–1964; Business and Government in Twentieth-Century America. Pittsburgh, PA: University of Pittsburgh Press.
**National Research Council, Committee on the Human Dimensions of Global Change**
1992 Global Environmental Change: Understanding the Human Dimensions. Washington, DC: National Academy Press.
**National Research Council, Committee on the Science of Climate Change.**
2001 Climate Change Science: An Analysis of Some Key Questions. Washington, DC: National Academy Press.
**O'Connor, R. E., R. J. Bord, B. Yarnal, and N. Wiefek**
2002 "Who wants to reduce greenhouse gas emissions?" Social Science Quarterly 83:1–17.
**Peluso, Nancy Lee, Craig R. Humphrey, and Louise P. Fortmann**
1994 "The rock, the beach and the tidal pool: People and poverty in natural resource-dependent areas." Society and Natural Resources 7:23–38.
**Pew Center on Global Climate Change**
2006 "Learning from state action on climate change." Pew Center on Global Climate Change, Washington, DC. Available at: www.pewclimate.org/docUploads/UpdatePewStatesBriefMarch2006%2Epdf (Accessed April 22, 2006).
**Putnam, Robert D.**
1988 "Diplomacy and domestic politics: The logic of two-level games." International Organization 42:427–460.
**Roberts, Cecil E.**
1999 "Statement of Cecil E. Roberts, President of the United Mine Workers of America Before the United States Senate Committee on Energy and Natural Resources on the Economic Impacts of the Kyoto Protocol." March 25, 1999. Available at: www.umwa.org/legaction/globalwarming/statement.shtml (Accessed April 1, 2004).

**Roberts, J. Timmons**
2001 "Global inequality and climate change." Society and Natural Resources 14:500–510.
**Roberts, J. Timmons, and Peter E. Grimes**
1997 "Carbon intensity and economic development 1962–1991." World Development. 25(2):191–198.
**Rudel, Tom K.**
2001 "Introduction to controlling climate change: Sociological perspectives." Society and Natural Resources 14:489.
**Sherrill, Robert**
1983 The Oil Follies of 1970–1980: How the Petroleum Industry Stole the Show (and Much More Besides). Garden City, NY: Anchor/Doubleday.
**Smith, David A.**
1994 "Uneven development and the environment: Toward a world-system perspective." Humboldt Journal of Social Relations 20:1.
**Sprinz, Detlef F., and Martin Weiss**
2001 "Domestic politics and global climate policy." In U. Luterbacher and D. F. Sprinz (eds.), International Relations and Global Climate Change: 67–94. Cambridge, MA: MIT Press.
**Stanley, Manfred**
1968 "Nature, culture and scarcity—Foreword to a theoretical synthesis." American Sociological Review 33:855–870.
**U.S. Senate**
1997a "Senate Resolution 98." Congressional Record, June 12, 1997: Report Number 105-54.
**U.S. Senate**
1997b "Proceedings and Debates of the 105th Congress." Congressional Record, July 25:S8118.
**U.S. Senate**
2003a "Science of climate change." Congressional Record, July 28:S10015-S10016.
**U.S. Senate**
2003b "The Climate Stewardship Act of 2003." Congressional Record, October 30, 2003:S13572–S13600.
**Van Den Berghe, Pierre L.**
1978 "Bridging the paradigms." Society, September 15/October:42–49.
**Victor, David**
2001 The Collapse of the Kyoto Protocol and the Struggles to Slow Global Warming. Princeton, NJ: Princeton University Press.
**Vietor, Richard H. K.**
1980 Environmental Politics and the Coal Coalition. College Station: Texas A&M University Press.
**Weber, Bruce**
1995 "Extractive industries and rural–urban economic interdependence." In Emery N. Castle (ed.), The Changing American Countryside: Rural People and Places:155–179. Lawrence: University Press of Kansas.
**York, Richard, and Eugene A. Rosa**
2005 "Societal processes and carbon dioxide ($CO_2$) emissions: Comment on 'Post industrialization and environmental quality: An empirical analysis of the environmental state.'" Social Forces On-Line Rejoinders. Available at: https://socialforces.unc.edu/epub/rejoinders (Accessed April 17, 2006).
**York, Richard, Eugene A. Rosa, and Thomas Dietz**
2003a "A rift in modernity? Assessing the anthropogenic sources of global climate change with the STIRPAT model." International Journal of Sociology and Social Policy 23:31–51.
**York, Richard, Eugene A. Rosa, and Thomas Dietz**
2003b "Footprints on the earth: The environmental consequences of modernity." American Sociological Review 68:279–300.