
THE NATION-STATE AND THE NATURAL ENVIRONMENT OVER THE TWENTIETH CENTURY*

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National activities to protect the natural environment are on the rise. Conventional explanations of the phenomenon emphasize domestic processes, set in motion by environmental degradation and economic affluence. We propose instead a top-down causal imagery that hinges on a global redefinition of the "nation-state" to include environmental protection as a basic state responsibility. We test our view using event-history analyses of five indicators of environmentalization: the proliferation of (1) national parks, (2) chapters of international environmental associations, (3) memberships in inter-governmental environmental organizations, (4) environmental impact assessment laws, and (5) environmental ministries in countries around the world over the twentieth century. For all five measures, the top-down global explanation proves stronger than the bottom-up domestic alternative: The global institutionalization of the principle that nation-states bear responsibility for environmental protection drives national activities to protect the environment. This is especially true in countries with dense ties to world society and prolific "receptor sites," even when controlling for domestic degradation and affluence. It appears that blueprints of nation-state environmentalization, which themselves become more universalistic over time, are drawn in world society before being diffused to and enacted by individual countries.

In the environmental realm, to a surprising extent, the blueprints for nation-state involvement are drawn in world society, from where they diffuse to individual countries. Such a top-down process may operate in other domains of national policy, but it is especially prominent in environmental protection, where laws and problems seem to flout national boundaries. We investigate the conditions under which nation-states have engaged in activities to protect the natural environment over the period 1900–1995. We expect that such activities have increased as

the principle of national environmental protection has become institutionalized in world society, particularly among nation-states tightly linked to world society and among those with "receptor sites"¹ capable of receiving and transmitting global blueprints of national environmentalism to domestic actors. In contrast to much social scientific orthodoxy, we emphasize the global embeddedness of the nation-state form.

THE PROBLEM

The twentieth century has witnessed a spectacular rise in national activities to protect the natural environment.² On age-old prob-

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¹ Receptor sites are social structures (e.g., scientific institutes) with the capacity to receive, decode, and transmit signals from world society to national actors.

² Indeed such activities began much earlier. Pollution control in England dates back to 1388

lems, such as drought and pestilence, and contemporary concerns, such as toxic waste and ozone depletion, countries around the world have mobilized. This is not to say that all environmental issues have been solved or have even been addressed; clearly, the accumulation of problems has outstripped the accumulation of solutions (Caldwell 1990). Nevertheless, nation-states have accepted a rapidly expanding portfolio of responsibilities vis-à-vis the natural environment, and some of the associated activities appear to have slowed rates of degradation (Dietz and Kalof 1992; Roberts 1996).

Figure 1 exhibits five indicators that we believe illustrate the embrace of responsibility for the natural environment by the nation-state: (1) cumulative numbers of national parks and protected areas (such as Yosemite), (2) chapters of international environmental nongovernmental associations (such as the World Wildlife Fund), (3) state memberships in intergovernmental environmental organizations (such as the International Whaling Commission), (4) environmental impact assessment laws, and (5) national environmental ministries (see Appendix A for data sources). At the same time, however, we do not mean to attribute to these indicators any exceptional significance. Faced with no established cross-national and historical data on environmental activity, we simply have collected data on every indicator available.

All five indicators in Figure 1 show exponential growth over the twentieth century: Notable increases in activity are apparent after the birth of the United Nations in 1945, and also after the creation of the United Nations Environment Programme at the Stockholm conference in 1972 (Meyer, Frank, et al. 1997). Taken together, the five indicators suggest an important reconstitution of the nation-state form: The nation-state has become environmentalized as a whole set of policies, once practically invisible in state organizations, now appears to be *de rigueur*.

(Lowenthal 1990), and game laws in the United States originated in 1769 (Andrews 1999). As early as 1942, an international observer wrote, "From 1850 on, the stream of national protective legislation rapidly widened, until by the present day all major and most minor nations have ample protective codes" (Hayden 1942:12).

In saying this, we do not assume the nation-state has become uniformly focused on environmental protection. This is clearly not the case, as examples around the world dramatically illustrate (e.g., the Three Gorges dam in China and ranchland policy in the United States). Rather our point is that a new dimension of state responsibility has emerged:

Governments are now held accountable to new standards. . . . Not only has a stable set of expectations about reciprocal state practice been established, its form has evolved over time to become more comprehensive, reflecting growing scientific understanding about the behavior of ecosystems. Debates now are no longer about whether to protect the global environment but rather how it should be protected. (Haas 1995:333-34)

Of the five indicators of national environmentalism, national parks and protected areas, such as the United States' Yellowstone and South Africa's Cape Peninsula, show the earliest and steepest rise in numbers. Such parks preserve awesome landscapes and centers of biodiversity from human exploitation. Before 1900, there were fewer than 40 national parks worldwide that fit our definition,³ and they were located mainly in the United Kingdom and its former colonies. By 1907, however, parks existed on every continent on Earth, and by 1990 the International Union for the Conservation of Nature listed nearly 7,000 national parks throughout the world. The number continues to multiply.

Also originating around the turn-of-the-last century, country chapters of international environmental nongovernmental associations, such as the International Friends of Nature (founded 1895) and International Council for Bird Preservation (founded 1922), also increased dramatically over the twentieth century. Such chapters represent citizen mobilization on environmental issues, embodying change in national politics more precisely than change in national states. Chapters undertake advocacy, education, and often direct action to protect the natural environment (Wapner 1996). According to the best available sources, country chapters of

³ We define national parks and protected areas as areas legally dedicated to protecting and maintaining biodiversity or natural resources.

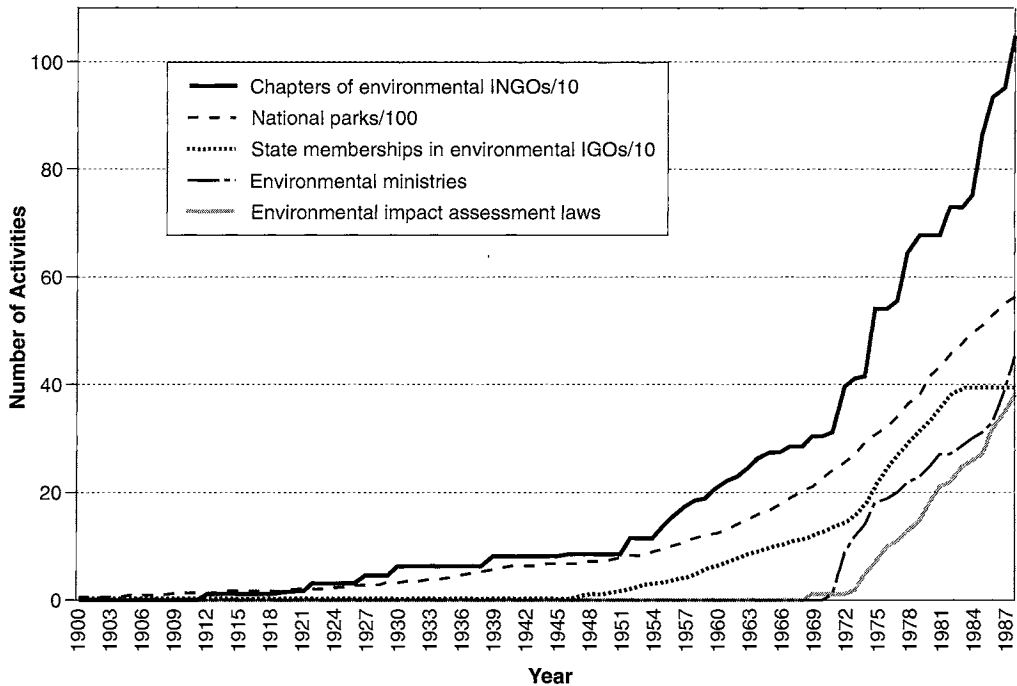


Figure 1. Cumulative Numbers of Five National Environmental Activities, 1900 to 1988

Note: INGOs are international nongovernmental organizations; IGOs are intergovernmental organizations.

international environmental nongovernmental associations were scant in 1900 (due partly to the paucity of the associations themselves), and those chapters that did exist were disproportionately in Western countries. As the century proceeded and the number of associations rose, however, country chapters diffused far and wide. By 1925, close to 25 percent of all chapters of international environmental nongovernmental associations were located outside Europe, and that proportion approximately tripled to 69 percent by 1990 (Frank et al. 1999).

The ascent of state memberships in intergovernmental environmental organizations was equally striking, but occurred later (e.g., the Asia and Pacific Plant Protection Commission was founded in 1955 and the Antarctic Mineral Resources Commission was founded in 1988). These organizations represent official state mobilization around environmental issues. They set parameters of action for the global commons (oceans, seas, rivers, the atmosphere) and increasingly establish standards of conduct within national borders (Haas and Sundgren 1993). Among

the earliest members of an intergovernmental environmental organization were the United States, Canada, Japan, and the USSR, all members of the North Pacific Fur Seal Commission, established in 1911. Now such memberships are much more broadly dispersed among nation-states. There are 58 countries on the Governing Council of the United Nations Environment Programme, the master intergovernmental environmental organization, whose broad mission it is "to provide environmental policy leadership within the world community" (UIA 1999:2177).

As Figure 1 shows, the numbers of environmental impact assessment laws grew from only 1 in 1969 to more than 50 by 1990 (Hironaka 1998). Such laws encourage decision-makers to take into account the possible effects of development investments on environmental quality and natural resource productivity (Horberry 1984). The United States, in 1969, was the first country to pass an environmental impact assessment law. Since then, the innovation has been widely adopted, becoming especially common in Europe, Asia, and the South Pacific.

Last, Figure 1 shows the proliferation of national environmental ministries. These organizations structure and routinize states' relationships to nature. At the highest level of government, environmental ministries provide official arenas for discourse and activity aimed at preserving nature. Environmental ministries are nearly always distinct from, and more recent than, natural resource ministries, as they seek to protect, rather than exploit, nature's bounty. From the time of the first ministries in 1971 to 1995, at least 109 nation-states formed national environmental ministries. Following the lead of the United Kingdom in 1971 were Japan and East Germany in 1972, Singapore and Poland in 1973, and Burkina Faso and Mauritius in 1974, among others. Nation-states embraced this new organizational form quickly and broadly, especially in the years around the two United Nations conferences on the environment—1972 and 1992.

Taken together, our five indicators illustrate a change in the "nation-state" over the twentieth century—the internalization of environmental concerns, which were once seen as outside the state's purview. All five indicators produce similar exponential curves in Figure 1: a period of introduction (longer for early innovations and shorter for later ones), followed by a period of explosive growth. The proliferation of national environmental policies by no means assures the arrest of environmental destruction. Nevertheless over the twentieth century a striking change has taken place, as the nation-state has become more and more accountable for the protection of nature (Haas 1995).

CURRENT EXPLANATIONS

By what process did virtually every country on Earth come to take some, and in many cases a great deal of, responsibility for environmental protection? Most social scientists find the answer in changing domestic factors, especially increasing degradation of the natural environment (Nanda 1983; Sprinz and Vaahoranta 1994; Thomas 1992) and rising affluence (Inglehart 1990; Lowe and Goyder 1983).⁴ In the former case, national

environmentalization is seen to be a direct, functional response to immediate problems: more despoliation (e.g., water and air pollution, overpopulation, declining biodiversity) spurs more action. In the latter case, countries undertake environmental activities because wealth is said to have satisfied basic human needs, such as food and shelter, thus shifting orientations toward quality-of-life issues, such as environmental protection and enhancement.

Neither of these standard accounts articulates well with the historical record. In centuries past, the most massively degraded areas were typically abandoned, regardless of the local society's affluence. Thus as early as 1864, Marsh wrote, "There are parts of Asia Minor, of Northern Africa, of Greece, and even of Alpine Europe, where the operation of causes set in action by man has brought the face of the earth to a desolation almost as complete as that of the moon" ([1864] 1965: 42). In that period, migration, not amelioration, was the normal response to environmental despoliation (McCormick 1989; Turner et al. 1990). More recently, neither the spectacular wealth of the oil-rich Middle East nor the pervasive natural degradation of Soviet-dominated Eastern Europe appears to have stimulated unusually high levels of environmental protection (e.g., Feshbach 1995).

Neither do the degradation and affluence explanations fit with the evidence presented in Figure 1. From the exponential rises in environmental activities, it appears that most countries have embraced environmental protection, not just the rich or despoiled (we test this proposition below).

Thus we propose an alternative explanation of environmentalization. Contrary to the view that nation-states are autonomous actors shaped by internal preferences and interests, the view so often portrayed by social scientists, we propose instead that nation-states are enactors of wider world cultural institutions. In making this argument, we build on earlier work showing the rise of global institutions for the environment (Frank 1997; Haas 1995; Meyer, Frank, et al. 1997). We investigate the impact of such global institutions on national environmental policies.

⁴ An emerging literature challenges the relationship between affluence and environmental-

ism. See Brechin and Kempton (1994, 1997) and Dunlap and Mertig (1995, 1997).

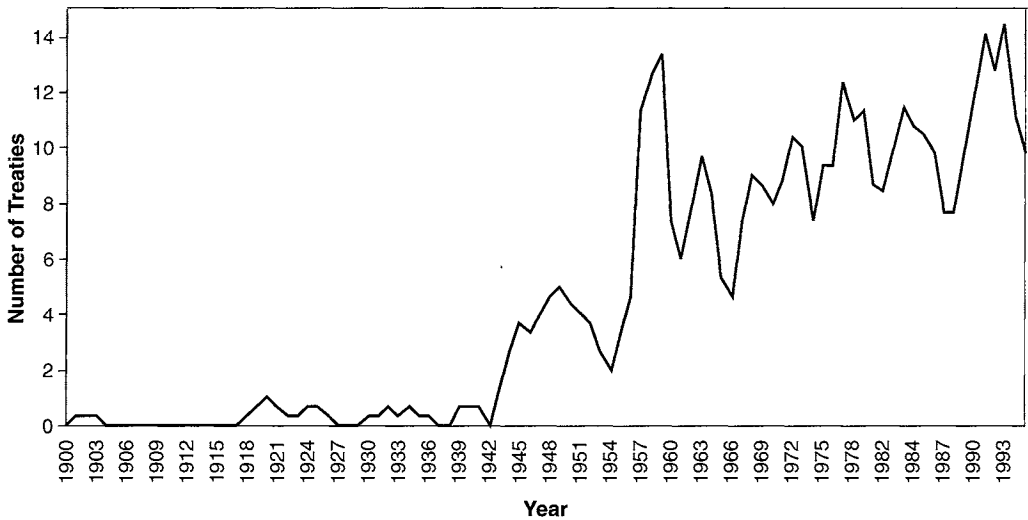


Figure 2. Annual Foundings of International Environmental Treaties, 1900 to 1995

Source: Burhenne (1997).

Note: Graph shows a three-year moving average.

THE ARGUMENT

Our argument begins from the premise that blueprints for the nation-state are drawn in world society (Meyer, Boli, et al. 1997). This means that rule-like definitions establishing what the nation-state is, what it can do, and how it can relate to other entities are organized and established globally. This has always been true to some extent, but it has become increasingly so with the proliferation of international organizations, treaties, and other forms of globalization (Anderson 1991; Robertson 1992; Ruggie 1993; Smith, Chatfield, and Pagnucco 1997).

Some global blueprints for the nation-state are more institutionalized than others. And both global blueprints and the extent to which they are institutionalized have changed over time. One such change is the elaboration and specification of environmental protection as a basic *purpose* of the nation-state. Driven first by a rising conception of nature as a life-sustaining global ecosystem and second by a general structuration of the world polity, global blueprints for national environmental protection have proliferated rapidly over the twentieth century (Frank 1997; Meyer, Frank, et al. 1997). These blueprints include the growing number of action plans produced by international environmental governmental

and nongovernmental organizations, the increasing variety of recommendations made by international policy experts, and the expanding set of guidelines issued by natural scientists (Caldwell 1990; McCormick 1989). The proliferation of protective blueprints by no means eradicates destructive ones, many of which are associated with global capitalism (O'Connor 1998; Schnaiberg and Gould 1994). Nevertheless, an elaborate and consequential global environmental regime has emerged (Levy, Keohane, and Haas 1993; Zürn 1998). To illustrate, Figure 2 shows that the average yearly number of international environmental treaties founded was less than one through 1945, but increased to around nine from 1960 onward. The rise is especially spectacular given the difficulties in coordinating nation-state interests (Young 1989). In many forms, in addition to international treaties, blueprints of nation-state environmentalism have multiplied in similar fashion.

One characteristic of nearly all global blueprints is their universalism (Boli and Thomas 1997). Produced by "unbiased experts" and "disinterested professionals"—individuals and/or organizations claiming to represent absolute truths and collective interests—world models of nation-state organization are constructed to apply universally, regardless of variations in domestic factors

(Meyer and Jepperson forthcoming).⁵ This universalism is pronounced in the environmental realm, where depictions of nature in terms of the global ecosystem have expanded greatly over time. While the emphasis on universalism sometimes means blueprints of national environmental protection contain only lowest-common-denominator elements (Wapner 1996), Figure 2 attests that a great many common denominators are to be found, some of which lead to real action by nation-states (Haas and Sundgren 1993; Zürn 1998).

Sanctioned by universalism, blueprints for the nation-state diffuse throughout world society. The driving force behind diffusion is institutionalization itself: the growing agreement that the nation-state *is by definition* responsible for the continued vitality of the natural environment, and the growing agreement that specified activities (such as designating parks and participating in international environmental bodies) fulfill that responsibility. Yet beyond broad world sociocultural processes, many more grounded mechanisms of diffusion are produced by the distillation of new cultural understandings into organizational entities (Boli and Thomas 1997). We suggest several mechanisms below.

Mechanism of Diffusion: Some Examples

National parks and protected areas have long been encouraged by international environmental nongovernmental associations, whose promotional activities include evaluating and designating suitable land areas, lobbying government officials, purchasing land (sometimes with debt-for-nature swaps), and training park rangers (Lewis 1998).⁶ Such activities are prominent at the International Union for the Conservation of Nature's World Parks Congresses, held each decade since 1962. At present, the World Wildlife

Fund is campaigning for the protection of 200 outstanding examples of the Earth's diverse habitats by the end of the year 2000. As such, international environmental nongovernmental associations provide an interface between world society and individual countries.

Second, state memberships in intergovernmental environmental organizations have been advanced by natural scientists. The universalism of science and its cultural status as truth make it relatively easy for scientists to tie national interests to the activities of intergovernmental environmental organizations (Caldwell 1990; Strang and Meyer 1993; also see Schofer 1999; Schott 1993). Haas (1989) recounts the crucial role played by scientists in convincing Algeria to participate in the Mediterranean Action Plan. Initially resistant, Algeria was spurred toward membership only after the production of scientific data documenting the degraded state of Algeria's coastline. Scientists have been equally important in paving the way for state participation in the ozone and climate-change regimes (Benedick 1991). It is clear that scientists serve as conduits between global culture and nation-states.

As a third example, international organizations from the International Union for the Conservation of Nature to the World Bank have been active in spreading environmental impact assessment laws, occasionally using strong arm tactics to do so. In the 1950s and 1960s, the idea of environmental impact assessment laws began to appear in the discourse of international associations, both governmental and nongovernmental. Shortly thereafter, environmental impact assessments began to appear as features of international treaties, and recently they have been promoted by the World Bank and the United Nations Environment Programme, both of which provide advice and guidelines on assessment implementation. Standardized templates are available in such publications as the United Nations' *Environmental Impact Assessment: Training Resource Manual* (see Hironaka 1998). By the time the United States had adopted the first legislation in 1969, the concept of environmental impact assessment laws had been discussed thoroughly in the international realm (see Figure 3).

⁵ Yearley (1996) claims that both scientists and some nation-states have significant sectarian interests in construing environmental problems as "global." While this is undoubtedly true, it is also true that the socially constructed universalism of science powerfully shapes international environmental discourse and activity.

⁶ Lindborg (1992) and Wapner (1996) show other ways environmental associations promulgate global blueprints for nation-state environmentalism.

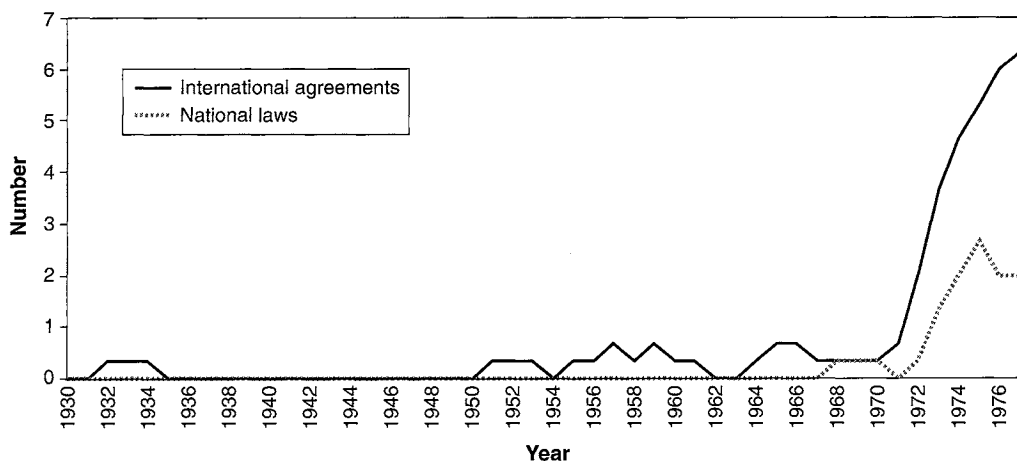


Figure 3. Environmental Impact Assessment: International Agreements and National Laws, 1930 to 1977

Sources: Ruster, Simma, and Bock (1983); Wood (1995).

Finally, it is also the case that states pressure other states to adopt forms of environmental protection. In many instances, the pressures emanate from the more powerful countries. For example, the colonizers established the first parks in Africa, sometimes against African interests (Hayden 1942). But often, alliances of the less powerful states pressure for environmental reform, as at the 1992 Rio conference on Environment and Development where the United States exhibited considerable foot-dragging in opposition to proposed reforms (McCoy and McCulley 1993). In the environmental realm, interstate pressures only rarely appear as exercises of raw power: More often views are promoted as education or enlightenment about universally agreed-upon principles and collective benefits (in which case power dynamics coalesce with the broader sociocultural processes emphasized throughout our article).

Thus, through mechanisms such as these (the workings of international environmental organizations, the advocacies of scientists, interstate pressures), global blueprints for national environmental activities diffuse to specific nation-states. The underlying forces of change are cultural, but the carriers are often organizational.

HYPOTHESES

Our main arguments are thus that blueprints for the nation-state are drawn in world soci-

ety, that such blueprints have, over time, increasingly specified environmental protection as a basic purpose of the nation-state, and that the provisions of such blueprints diffuse from world society to individual countries. These arguments stand in contrast to the prevailing orthodoxy, which emphasizes bottom-up causal processes hinging on environmental degradation and economic affluence. To test our ideas, we perform event-history analyses on the rates at which countries form national parks and protected areas, establish country chapters of international environmental nongovernmental associations, inaugurate state memberships in intergovernmental environmental organizations, pass environmental impact assessment laws, and create national environmental ministries. Our perspective generates three hypotheses.

The first hypothesis follows directly from our argument and operates at the world level, where it predicts increases in environmental protection by all kinds of countries—degraded or pristine, rich or poor. If nation-states arise from blueprints drawn in world society (e.g., those formed by resolution of the World Meteorological Organization or the United Nations Environment Programme), then increases in the extent to which those blueprints emphasize national environmental protection should generate actual increases in environmental activities in nation-states (Levy, Keohane, and Haas 1993).

Hypothesis 1: As the principle of national-level environmental protection becomes institutionalized in world society, global blueprints for nation-state environmentalism should diffuse at a faster rate.

The second hypothesis operates at the country level and predicts cross-national variation in environmental activities. If the definitions and forms of the "nation-state" originate in a world sociocultural system, then those nation-states most deeply embedded in this system should be most likely to embody its definitions and forms (Frank 1999; Meyer, Boli, et al. 1997).

Hypothesis 2: Global blueprints for nation-state environmentalism should diffuse at a faster rate to those nation-states most closely linked to world society.

The third hypothesis also operates at the country level and also predicts cross-national variation. If nation-states must learn the importance of global blueprints before enacting them, then nation-states with more prolific domestic "receptor sites" should be more likely to environmentalize than others (Finnemore 1996; Haas 1989, 1990).⁷ We conceptualize receptor sites as social structures with the capacity to receive, decode, and transmit information from the outside (here, world society) to local actors (here, nation-states) (cf. Luhmann 1989). Without external stimuli, receptor sites remain inactive. Given scientists' role as arbiters of truth in the environmental realm, the most important domestic receptor sites are undoubtedly scientific ones (from private individuals such as E.O. Wilson to state organizations such as the Oak Ridge National Laboratory) (Buttel and Taylor 1992; Caldwell 1990; Frank 1997; Haas 1989, 1990; Taylor and Buttel 1992).

Hypothesis 3: To nation-states with more developed domestic receptor sites, global

blueprints of nation-state environmentalism should diffuse at a faster rate.

Because size may be a condition for many kinds of national activities, we include a population measure in our models. We also include iron and steel production, a measure of industrial development, to address the main competing explanations of nation-state environmentalization, which emphasize country-level degradation and affluence.

METHODS AND DATA

To test our hypotheses, we employ event history analysis. Event history analysis is a statistical tool used to model events occurring at particular points in time. We employ it to discern the causal processes that hasten (or slow) the rate of specific environmental events among nation-states. This focus on rates distinguishes event history analysis from OLS regression analysis, in which the dependent variables are amounts measured on a continuous scale. Analogous to regression, event history analysis yields coefficients (and standard errors) that reflect the impact of independent variables on the *rate* of the outcome of interest. Positive coefficients identify independent variables that increase the rate of events over time; negative coefficients identify variables that decrease the rate. Standard errors allow for hypothesis tests to determine if the observed effects are the product of random variation in the data (see Tuma and Hannan 1984).

As indicated above, the five events in question are the formation of national parks and protected areas, country chapters of international environmental nongovernmental associations, state memberships in intergovernmental environmental organizations, environmental impact assessment laws, and national environmental ministries. The first three events are recurrent, such that the dependent variable is the transition rate from a count of N to $(N + 1)$. The last two events are absorbing, such that the dependent variable is the transition rate from 0 to 1. We use constant-rate models, which assume that transition rates are constant in the absence of time-varying independent variables.

Our basic aim is to show, corresponding to the hypotheses above, three main indepen-

⁷ The idea of the "receptor site" is uncommon in the social sciences: Here, we mean it to correspond fairly directly to the common usage in biology, where it refers to an organ or structure that, upon receiving specific stimuli from its environment, generates nerve impulses conveying information about the environment.

dent-variable effects on the five dependent variables: a positive effect from the institutionalization of environmental protection in global blueprints of the nation-state; a positive effect from nation-state linkages to world society; and a positive effect from nation-state domestic receptor sites. Furthermore, we aim to show that these effects remain, holding constant country-level measures of population, affluence, and environmental degradation.

Given that little quantitative work has been done in this area, these analyses take a strong first step toward explaining nation-state environmentalization. However, the analyses reported remain exploratory: It is difficult to find indicators, covering a long period of time, that can clearly capture the independent-variable effects we propose and show that the indicators form statistically distinct clusters. We also are limited by the availability of data for control variables for many countries over the whole century. Nevertheless, we believe our analyses can go a good distance toward explaining nation-state environmentalization.

Dependent Variables

The first dependent variable records the cumulative numbers of national parks or protected areas established by a nation-state. (See Appendices A, B, and C for sources, transformations, and the exact time period used for each event-history analysis.) We restrict the analysis to parks larger than 1,000 hectares. South Africa and New Zealand were the first countries to designate national parks in the twentieth century, both in the year 1900. By 1990, approximately 136 countries had at least one park that fit our definition, with the United States having more parks than any other country. A few small and/or peripheral nation-states had no parks larger than 1,000 hectares (e.g., Luxembourg and Qatar).

The second dependent variable measures the number of country chapters of international environmental nongovernmental associations established in a nation-state. We used 10 keywords from the *Yearbook of International Organizations* (UIA 1948–1998) (e.g., natural resources, environment) to construct an initial list of such associations; we

then pared the list to include only those having nature as a primary concern and having membership data for the whole century (or since founding). Before World War I, only a dozen countries had even one chapter of an international environmental nongovernmental association. By 1988, nearly every country in the world had at least one such organization (excepting a few peripheral countries, such as Cape Verde and Togo); Canada, the United Kingdom, and the Netherlands all had 19 association chapters, only one short of the maximum possible in our data set.

Third, we record the number of intergovernmental environmental organizations to which each nation-state belongs. Such organizations are established by intergovernmental agreement, have at least three countries as members, and have environmental concerns prominent on their agendas. Most intergovernmental environmental organizations were founded after the United Nations was established and their memberships were broadly dispersed from the start. By 1989, fewer than 20 nation-states, including Bhutan and Mongolia, had no memberships in intergovernmental environmental organizations. France had the most affiliations with 12, well short of the maximum possible 20 in our data set.

Fourth, we mark the year each country first adopts legislation requiring environmental impact assessments, which demand consideration of environmental implications in large construction projects. Although the first three nation-states to adopt environmental impact assessment laws were all developed Western countries (the United States, Canada, and Australia), the next three were Colombia, Malaysia, and Thailand. Already by 1990 the innovation had spread to more than 50 countries around the world (Hironaka 1998).

Finally our fifth dependent variable records the founding years of national environmental, conservation, and ecology ministries. From the first ministry in 1971 to 1995, the number of nation-states with such ministries grew to 109; 108 of these appeared in the wake of the United Nations Environment Programme (McCormick 1989; Meyer, Frank, et al. 1997). The roster of countries with environmental ministries continues to grow, although the United States itself is

without a formal one (the director of the Environmental Protection Agency is not a Cabinet-level position).

We see these five dependent variables as *indicators* of an underlying process in which changes in the culture and organization of world society have rendered nation-states responsible for environmental protection. We expect our independent variables to have similar effects on all five indicators. Nevertheless, we keep the dependent variables separate to leave open the possibility that they are not as cohesive as we imagine.

Independent Variables

For each independent variable, we use multiple indicators to create latent-variable factors for the analysis. Given that no conventional measures of our independent variables exist, the factoring technique adds confidence that the key concepts have in fact been tapped. The indicators for the independent variables are culled from a wide variety of sources (see Appendix B for sources, transformations, and factor loadings).

Global institutionalization of national environmental protection. To capture the first independent variable, incorporation of environmental protection into the definition of the "nation-state" institutionalized in world society, we use three world-level indicators, with an average intercorrelation of .40: the staff size of the United Nations Environment Programme, founded in 1972; a dichotomous variable marking the years surrounding the two United Nations conferences on the environment, in 1972 and 1992; and the cumulative number of international environmental treaties over the century. We are trying, with these indicators, to gauge the global institutionalization of an environmentalized "nation-state." (See Appendix B for details.)

Nation-state ties to world society. To measure the extent to which countries have open conduits to world society, we employ two highly intercorrelated ($r = .73$), country-level indicators: national chapters of all kinds of international nongovernmental associations, except environmental ones; and national memberships in all kinds of intergovernmental organizations, except environmental ones. The intent is to capture a nation-state's gen-

eral embeddedness in world society, in which new national environmental protection initiatives originate.

Nation-state receptor sites. As indicators of a country's domestic capacity to receive and interpret global blueprints for national environmental protection, we use two highly correlated ($r = .95$) measures: the number of domestic ecology associations, and the number of other domestic natural science associations. Scientists, and especially ecological scientists, are recognized as authorities in the environmental realm (Buttel and Taylor 1992; Frank 1997; Taylor and Buttel 1992). In measuring science organizations, we aim to assess each country's capacity to receive environmental "signals" from world society and transmit them to domestic actors.

Control Variables

Limited by the availability of data for many countries over the whole time period, we use population size as a control variable in the main analyses and add iron and steel production as a parallel control variable in the secondary analyses. National population counts are associated with a country's ability to pursue all kinds of activities, especially environmental ones, since large populations place more pressure on natural resources. Iron and steel production, as a gauge of industrial development, simultaneously measures both national wealth and environmental degradation. Because iron and steel production is highly correlated with other indicators of affluence and degradation (e.g., GDP and air pollution, themselves unavailable for many countries over the whole century), we use this variable to test the main competing arguments.

Each of the three independent-variable factors were created separately using SPSS (1988), and factor scores were computed based on these analyses.⁸ Event-history anal-

⁸ The indicators of the main independent variables loaded onto single factors with high weights (see Appendix B for factor loadings). We could not factor analyze the nation-state-level indicators into ties and receptor-sites variables owing to high multicollinearity, but we believe the substantive and theoretical grounds for the distinction are strong. Multicollinearity does not appear to be a problem in the event-history analyses re-

yses were conducted using the RATE program (Tuma 1992).

RESULTS

Table 1 summarizes the results. For each of the five dependent variables, we report the findings from two event-history analyses, the first without and the second with the control variable for industrial development (reported in columns a and b, respectively).

Across the top row of Table 1, we see that global institutionalization of the principle that "nation-states" protect the natural environment has positive and significant effects on all five dependent variables (both with and without the control for industrial development). The rates at which parks, chapters of international environmental nongovernmental associations, memberships in intergovernmental environmental organizations, environmental impact assessment laws and national environmental ministries appear in countries *all* increase significantly as national environmental protection becomes rule-like in the culture and organization of world society. The results provide strong support for our most basic argument—that blueprints for the nation-state are drawn in world society from which they diffuse to individual countries.

The effects of country ties to world society are also positive and significant across all five dependent variables, again regardless of the control for iron and steel production. More sociocultural ties to world society means greater likelihood of national implementation for every kind of environmental protection on which we have data. Unequivocally, the findings support the notion that deeply embedded countries are more likely to be constituted along the lines of globally institutionalized blueprints.

Finally, Table 1 shows that the presence of receptor sites has positive and significant effects across all five measures of nation-state environmentalization. Only in the second analysis of environmental ministries with industrial development controlled (column 5b) does the effect become nonsignificant, and even then it remains strongly positive. It appears that nation-states with prolific receptor

sites enact global blueprints for environmental protection at higher rates than do other countries.

Each of these effects remain even with population controlled. More populated countries do seem more likely to undertake some kinds of environmentally protective activities than less populated ones. Parks, environmental association chapters, and impact assessment laws are all significantly more likely to be founded in countries with large populations (for the other two dependent variables, the coefficient for population is nonsignificant and negative). The positive effect may show only that larger countries have higher organizational capacity for such activities as park formation than smaller countries, but it may reflect population pressures as well. Clearly, other things being equal, higher populations place a greater burden on natural resources, increasing a country's incentives to manage and protect its remaining resources effectively (Ehrlich 1968; Stern, Young, Druckman 1992).

Industrial development has positive and significant effects only on the formation of parks and the passage of environmental impact assessment legislation. Of the five dependent variables, these are the two that most obviously require financial resources for their implementation. The effects of this combined measure of degradation and affluence measure are otherwise limited.⁹

⁹ To check these results, we tried more precise but time-limited indicators of affluence and degradation (results available on request). First we considered the effect of gross domestic product per capita on environmental ministries 1970–1995 (the first ministry appeared in 1971, after our GDP data begin). GDP has a nonsignificant negative effect, while our main variables have positive effects (significant effects for global institutionalization and nation-state ties). Analogously, Dunlap and Mertig (1995) find a generally negative relationship between national affluence and citizen concern for environmental quality. Although limited by the availability of data, we then log-regressed three measures of degradation (threatened bird species as a proportion of total bird species in 1990, proportion of forests lost 1990–1995, and industrial carbon dioxide emissions in 1990) on environmental ministry in 1995. None had a significant effect. Thus, the *social perception* of environmental degradation

ported in Table 1; standard errors show no signs of instability.

Table 1. Maximum Likelihood Estimates of the Hazard Rate at Which Five Indicators of Environmental Activity Occur in Nation-States, 1900 to 1995

Independent Variable	(1)		(2)		(3)		(4)		(5)	
	National Parks ^a		Chapters of Environmental INGOs		State Memberships in Environmental IGOs		Environmental Impact Assessment Legislation		Environmental Ministry	
	A	B	A	B	A	B	A	B	A	B
Global institutionalization of national environmental protection	.35** (.02)	.38** (.02)	.71** (.05)	.71** (.05)	.88** (.08)	.88** (.08)	.91** (.30)	.94** (.30)	1.19** (.19)	1.20** (.19)
Nation-state ties to world society	.50** (.04)	.35** (.04)	.71** (.09)	.73** (.09)	.68** (.13)	.67** (.13)	1.11* (.55)	.88* (.54)	.51* (.28)	.45* (.27)
Nation-state receptor sites	.40** (.02)	.28** (.02)	.06* (.03)	.07* (.03)	.10* (.05)	.10* (.05)	.26* (.14)	.23* (.14)	.18* (.10)	.12 (.11)
Population size	.49** (.01)	.48** (.01)	.09** (.02)	.08** (.02)	-.03 (.04)	-.03 (.04)	.29** (.11)	.31** (.10)	-.11 (.07)	-.09 (.07)
Industrial development	—	.11** (.01)	—	-.16 (.15)	—	.05 (.18)	—	.91* (.46)	—	.76 (.60)
Constant	-9.02** (.16)	-9.08** (.16)	-3.93** (.36)	-3.86** (.36)	-2.83** (.57)	-2.87** (.58)	-10.8** (1.7)	-11.1** (1.74)	-3.55** (.99)	-3.77** (1.01)
Improvement over Model A	—	153.14**	—	1.29	—	.07	—	2.71*	—	1.43
Chi-squared	7,748.93**		910.89**		390.03**		63.65**		52.32**	
Number of events	4,330		1,027		395		47		101	

Note: Numbers in parentheses are standard errors. INGOs are international nongovernmental organizations; IGOs are intergovernmental organizations. See appendices B and C for variable definitions.

^a In the parks analyses, we exclude countries smaller than 10,000 square kilometers.

* $p < .05$ ** $p < .01$ (one-tailed tests)

For all three of our main independent variables, the effects are strikingly consistent. Without exception, the predicted relationships appear, and their magnitudes change little with the addition of iron and steel production as a control. Furthermore, buttressing our larger perspective, it is the world-level effect from global institutionalization that is the strongest predictor of national environmental activity across the board. Altogether, the results shown in Table 1 suggest that the seeds of national environmentalization are dispersed from a global warehouse. As the global seed supply rises, national activities also rise. The cross-national variation that remains is due to differences in links to the world supply source (embeddedness) and differences in domestic capacities to germinate the global seeds (receptor sites).

Overall, the evidence suggests the importance of conceiving of the "nation-state" as emanating from the world social system at large. Thus when it comes to the natural environment, important aspects of the nation-state form appear to be constituted externally, in the global society, and our results show the impact of the global environmental regime on internal national policies.

Questions of Interpretation

The evidence in Table 1 speaks clearly, but we thought it important to verify our findings along several dimensions. First we checked for change in the processes promoting nation-state environmentalization after 1972. In that watershed year the United Nations Conference on the Human Environment convened, the United Nations Environment Programme originated, and several important international environmental treaties were founded (Caldwell 1990; McCormick 1989). But in split analyses of the dependent variables that can be measured before 1972 (parks, environmental association chapters, and intergovernmental organization memberships), our three main independent variables show positive and significant effects both

before and after 1972. The global processes driving nation-state environmentalization may have intensified over time, but they do not change fundamentally.

Second we sought to verify our interpretation of the receptor sites effect. The same organizations we call domestic receptor sites (and place at the interface of world society and the nation-state), others conceive as social movement organizations (and place at the interface of mobilized citizens and governments). We question the latter interpretation's applicability in a cross-national context, since mass environmental movements exist in so few countries. Nevertheless, we investigated the effect of the number of receptor sites for a restricted set of countries—those with too few ecology and natural sciences associations to generate strong social movement pressures. Even among these select nation-states, the receptor-site variable retained significant effects on all five dependent variables. Thus, our original interpretation appears to hold. While ecology and natural science organizations undoubtedly function as social movements in some (mostly liberal Western) countries, the more general mechanism by which they influence national-level environmentalization is as receptor sites for global blueprints (for an example of the latter process, see Barbosa 1996).

Third, we tried some alternative indicators for the independent variables in Table 1:

As measures of *natural-resource pressures*, in place of iron and steel production we used the percentage of the population living in urban areas and logged population density (Banks 1990). In no case was the effect of urbanization significant. In only one case was the effect of population density significant, and then it was negative and thus contrary to orthodox expectations: high population densities slow the rate of park formation, as humans compete with nature for land. According to these indicators, degradation does not appear to drive environmentalization directly.

As a measure of *state openness to global innovation*, in place of receptor sites we tried democracy (Gurr 1990). According to the chi-square statistics, democracy's effect was stronger than that of receptor sites for two of

may motivate environmental policies more than degradation itself (Luhmann 1989; Taylor and Buttel 1992).

the five dependent variables—environmental ministries and impact assessment laws, the most recent of the five innovations. In the other three cases, the receptor sites variable was stronger. Democracy proved to be a reasonable, but slightly less direct, measure of a country's openness to global environmental blueprints.

As a measure of *nation-state embeddedness*, instead of sociocultural ties to world society we used imports plus exports as a proportion of gross domestic product as a measure of economic ties to the world system (Summers and Heston 1991). In only one case was this economic linkages variable significant, and then negatively so (as ecological Marxists might predict; see O'Connor 1998): Dense trade linkages slowed the rate of park formation, suggesting economic pressures to retain unfettered access to natural resources (cf. Frank 1999).

Through all these alternative measures, our basic findings held. Nation-states are more likely to adopt environmentally protective policies as such activities become institutionalized in global blueprints for the nation-state, especially among countries deeply embedded in world society and among those with prolific domestic receptor sites.

THE CHANGING NATURE OF ENVIRONMENTAL PROTECTION

Thus far we have emphasized the relationship between the global institutionalization of the principle that nation-states should protect the natural environment and the rise of national activities to do so. We now call attention to a complementary effect. Global institutionalization involves not only a change in the "nation-state" but also a change in the meaning of "environmental protection." Increasingly, environmental protection has come to mean the preservation of the global ecosystem rather than the conservation of local natural resources (Dunlap and Mertig 1992; Frank 1997). Analytically, this shift involves rationalization, scientization, and globalization.

First off, models of environmental protection become more highly rationalized with institutionalization in world society (Meyer 1994; Weber [1968] 1978). In rationalization, entities and activities acquire practical, mundane purposes; their existential justifica-

tion shifts from sacred fiat to means-ends chains. As it is becoming a standard feature of the "nation-state" over the century, "environmental protection" simultaneously gains a vastly expanded purpose: to sustain life on Earth (Pepper 1984). Every aspect of nature is reformed into an element vital for human survival.

Second, world models of environmental protection become more scientized with global institutionalization. In scientization, entities and activities come to be understood in terms of general, physical laws, under the authority of scientists and professionals (Schofer 1999; Schott 1993). At the level of culture, this entails the demystification of motive forces and the discovery of automatic control systems, which are stitched into the routine and regular workings of physical bodies and relationships. Organizationally, extensive machineries, both literal and figurative, arise to observe and expose the general laws. As national activities to protect the environment become increasingly rule-like, environmental protection is transformed from an enchanted and unpredictable process (e.g., one requiring sacrifice or heavenly supplication) to one requiring deference to biogeochemical rules (compare Hultkrantz 1961 and Thomas 1983 with Stern et al. 1992).

Third, models of environmental protection become more global with institutionalization in world society. In globalization, entities and activities are stripped of autonomy and lose their idiosyncratic connections to local settings. Organisms become embedded in cybernetic systems and become instances of abstract, universal categories (Haraway 1989).¹⁰ Thus with the institutionalization of national environmental protection, protective activities are increasingly seen to affect a worldwide whole—the entire Earth and its atmosphere (Taylor and Buttel 1992).

Altogether, rationalization, scientization, and globalization reflect a new definition of "environmental protection" in world society—an environmental protection with vastly expanded universal value and importance. Concomitant with the institutionalization of environmental protection in global blueprints for the nation-state, nature becomes increas-

¹⁰ It was Thoreau who first noted that the waters of the Ganges flow in Walden Pond.

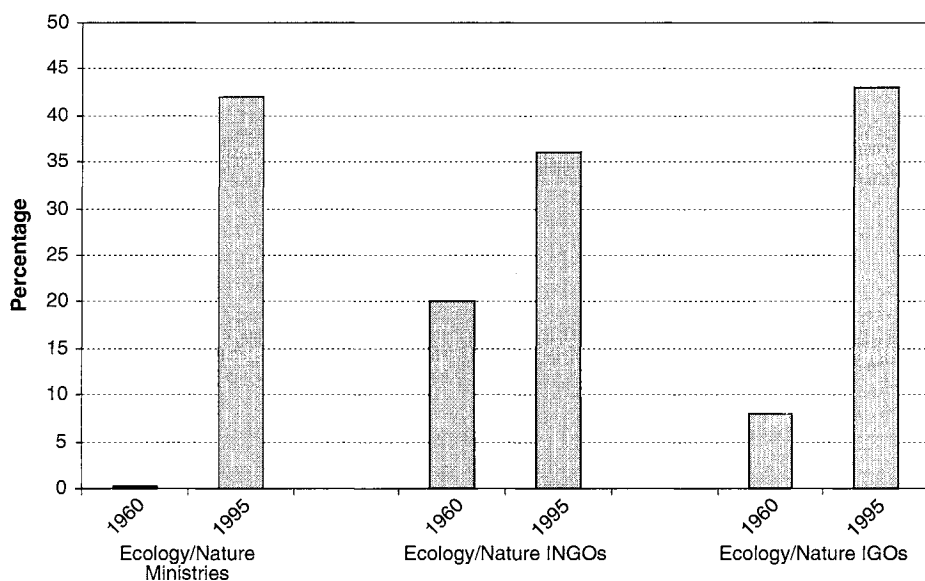


Figure 4. Changing "Nature": The Percentage of Nature Ministries, INGO Chapters, and IGO Memberships Addressing Ecosystem Preservation, at Two Points in Time

Note: INGOs are international nongovernmental organizations; IGOs are intergovernmental organizations.

ingly synonymous with the global ecosystem, without which *Homo sapiens* cannot survive.

A reflection of this overall process can be found in three of the dependent variables. In Figure 4, we show the percentages of all national nature activities that seek ecosystem preservation (as opposed to resource conservation) at two points in time: 1960 and around 1990. We show ecosystem-oriented nature ministries, ecosystem-oriented chapters of international nature associations, and ecosystem-oriented memberships in intergovernmental nature organizations.¹¹

We see a marked change for all three variables over time. The percentage of ecosystem-oriented nature ministries rises from 0 to 42 percent, and the percentages of ecosys-

tem-oriented association chapters and intergovernmental organization memberships rise from 20 to 36 and from 8 to 43 percents, respectively. A shift is clearly in evidence: The activities of nation-states vis-à-vis nature have shifted toward the preservation of the global ecosystem.

These results, together with the preceding evidence, suggest twin aspects of the global institutionalization of national environmental protection: the environmentalization of the nation-state and a concomitant universalization of environmental protection, as "nature" becomes more rationalized, scientized, and globalized. The top-down processes that characterize change in the environmental realm may be less prominent in more particularistic realms (e.g., in military policy).

CONCLUSION

National activities to protect the natural environment have proliferated spectacularly over the twentieth century. Each of our five indicators of the process shows exponential growth. We show that such activities have increased not just in response to domestic degradation and affluence but also in response to a global redefinition of the respon-

¹¹ Ecosystem-oriented activities aim to integrate human society with the life-sustaining physical universe, such that natural processes proceed unhindered. Resource-oriented activities accept the intervention of human society in nature, but seek to regulate the exploitation of nature's bounty for long-term market interests. Conceptually, there is a continuum between the two models; in practice, the distinction is often sharp (e.g., tropical timber v. rainforests). Frank (1997) and Haas and Sundgren (1993) show related shifts in international environmental treaties.

sibilities of the nation-state. As the principle of national environmental protection has become institutionalized in world society, national activities to protect the environment have increased, particularly among those nation-states strongly tied to world society and those with receptor sites capable of transmitting emerging blueprints to domestic actors. In concrete terms, we see global social forces at work when national parks appear in Nepal, when a chapter of the International Council for Bird Preservation opens in The Gambia, when Mexico joins the International Whaling Commission, when environmental impact assessments begin in Kuwait, and when Romania founds an environmental ministry. With these activities, nation-states embody global institutional forms, which themselves have become more universalistic over time.

We intend our emphasis on world social and cultural processes to counter views of national environmental policies as arising mainly in response to domestic factors, and we believe the evidence supports our view. But we do not suppose that domestic factors—affluence, degradation (Walsh 1981), public opinion (Dunlap 1995; Kempton 1993), media coverage (Mazur 1998)—are unimportant to environmental policy formation in particular cases or in the short term; only that they recede from causal salience over many cases and over the whole century. We emphasize large-scale structural processes, in which “domestic factors” appear more as mechanisms of change rather than independent causal forces. Likewise we do not suppose that world sociocultural forces work in isolation from world economic and political forces, merely that the latter typically operate within parameters established by social reality, including definitions of the “nation-state” and “environmental protection.”

If nation-states environmentalize in response to global institutionalization, then what forces drive the latter? The global institutionalization of the principle that nation-states bear responsibility for environmental protection follows the general structuration of the world polity and the rise of universalistic depictions of a global ecosystem. With their discoveries of the workings of a life-sustaining natural environment, scientists dramatically raise the stakes of environmen-

tal protection, and they do so in a world polity in which nation-states are the main legitimated actors. Thus emerges the principle that nation-states should protect the natural environment, setting in motion the processes on which we have focused here.

All this does not mean the environmental crisis is over. Problems still accumulate faster than solutions, and solutions still yield only partial successes. Nevertheless a positive change is strikingly evident. The lead actors on the global stage—nation-states—have come to bear greatly increased responsibility for environmental protection over the twentieth century. We see the transformation as resulting from global-institutional processes, which may be especially strong in the environmental realm due to its universalism.

In recent decades, social scientists typically have emphasized the ways nation-states are constructed from the bottom up, and there are many compelling examples of that occurring. Here we have illustrated a different kind of process, in which nation-states are constructed from the top down. We see blueprints for the nation-state being drawn in world society, and we see the institutionalization of these blueprints as establishing rule-like principles of what nation-states *are*, and what by definition they *do*.

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Appendix A. Dependent Variables: Definitions, Data Sources, and Periods of Analysis

Dependent Variables	Definition	Data Source(s)	Period of Analysis
National parks and protected areas	Annual cumulative numbers of parks per nation-state	IUCN (1990)	1900–1990
Country chapters of international environmental nongovernmental associations	Annual numbers of chapters per nation-state	Fried (1905–1911); League of Nations (1921, 1938); UIA (1948–1990)	1900–1988
Nation-state memberships in intergovernmental environmental organizations	Annual numbers of memberships per nation-state	Fried (1905–1911); League of Nations (1921, 1938); UIA (1948–1990)	1900–1984
Environmental impact assessment laws	Year of founding	Wood (1995)	1966–1992
National environmental ministries	Year of founding	Europa Year Book (1970–1995)	1970–1995

Appendix B. Independent Variables: Definitions, Transformations, Data Sources, and Factor Loadings

Latent Independent Variable	Definition	Transformation	Data Source	Factor Loading
Global institutionalization of national environmental protection	UNEP staff size	Equals 0 before UNEP founding (1972); thereafter is logged	UNEP (1982–1993)	.87
	Years around 1972 and 1992 UN environment conferences	Equals 1 for the years 1970–1974 and 1990–1994; otherwise 0		.63
	Cumulative international environmental treaties	Excluded treaties that led to environmental intergovernmental organizations; logged	Burhenne (1997)	.90
Nation-state ties to world society	Memberships in all except environmental INGOs	1 added to all cases to eliminate zeros; logged and interpolated	UIA (1948–1990)	.97
	Memberships in all except environmental IGOs	1 added to all cases to eliminate zeros; logged and interpolated	UIA (1948–1990)	.97
Nation-state receptor sites	Annual numbers of domestic ecology organizations	1 added to all cases to eliminate zeros; logged	Zils (1998)	.91
	Annual numbers of domestic natural science organizations	1 added 1 to all cases to eliminate zeros; logged	Zils (1998)	.91

Note: INGOs are international nongovernmental organizations; IGOs are intergovernmental organizations.

Appendix C. Control Variables: Definitions, Transformations, and Data Sources

Control Variable	Definition	Transformation	Data Source
Population size	Annual population, in 1,000s	Logged	WRI (1998)
Iron and steel production	Annual production, in 1,000 metric tons	Logged and divided by the population size (in 1,000s)	Singer and Small (1990)
Gross domestic product per capita	Annual GDP per capita in current U.S. dollars	Logged	WRI (1998)
Population density	Annual persons per square kilometer	Logged; removed outlier (Maca) from the analysis	WRI (1998)
Threatened/known bird species	In 1990	Logged	WRI (1998)
Deforestation	Forest loss, percent change, 1990–1995	Removed outlier Cape Verde from the analysis	WRI (1998)
Industrial CO ₂ emissions	1990, in 1,000 metric tons	Logged	WRI (1998)

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