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A Century of Environmental Legislation

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Abstract

We find three intertwined ambitions that drove federal legislation over wildlife and biodiversity at the beginning of the 20th Century: establishment of multiple-use federal lands, the economic development of natural resources, and the maintenance of option values. We examine this federal intervention in natural resource use by analyzing roll-call votes over the past century. These votes involved decisions regarding public land that reallocated the returns to users by changing the asset's physical character or its usage rights. We suggest that long term consequences affecting current resource allocations arose from disparities between broadly dispersed benefits and locally concentrated socio-economic and geo-physical (spatial) costs. We show that a primary intent of public land management has become to preserve multiple-use option values and identify important factors in computing those option values. We do this by demonstrating how the willingness to forego current benefits for future ones depends on the community's resource endowments. These endowments are defined not only in terms of users' current wealth accumulation but also from their expected ability to extract utility from natural resources over time.

JEL Codes: N51, N52; Q28; Q23, Q24

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1. Introduction

The evolution of environmental law in the United over the past century, particularly for wildlife protection, has created a time series of political actions. These actions reflect the increasing demand for environmental goods as individuals and the nation become richer and better educated and as the opportunity costs of the natural resources required to maintain diverse ecosystems to support wildlife increase. Regional differences exist in the net benefits of these regulations, and the amenities they provide, over time. The extent to which these differences are due to socio-economic characteristics, ideology, and/or local and regional resource endowments is the focus of our empirical investigation.

As public goods, collective action is necessary or such protection is underprovided. In this paper, we analyze several votes on environmental concerns from the House of Representatives that span the last century to investigate the nature of this collective action. We ask, in a spatio-temporal framework: Do economic considerations play the expected roles in determining how a local community will respond to a request to help provide for a regional public good with disparate costs and benefits to each of the local communities? Can we characterize these economic considerations? Can we differentiate ideology from the impacts of natural resource endowments?

Approximately one century ago, the federal government initiated a process through which it has come to play a significant role in the development and enforcement of laws concerning the environment in general and wildlife in particular (Lueck 2000). A manifestation of this role has been the continuing, acrimonious debates over transformation, renewal and funding the Endangered Species Act (ESA), in which those wishing to loosen restrictions of the act allege that economic interests have been ignored; the problem has been approached as a purely scientific one. While this charge (and explanation) can be levied against other federal statutes affecting wildlife passed in the 20th century, the clamor has been most associated with the ESA. We suggest, as Brown and Shogren (1998) do, that the conflict stems from a divergence in socio-economic and geo-physical allocations of costs, which are concentrated, and benefits, which are dispersed.

The variation in net benefits at the Congressional district level, in turn, is reflected in economic terms. In particular, for public environmental or resource assets there may be concrete tradeoffs between direct use economic values and the long-term preservation of option or other passive use values. The votes from the House of Representatives on such statutes that are analyzed to determine whether economic interests played a role are:

- (1) The Organic Act of 1897 (HR 16).
- (2) The Lacey Act of 1900 (HR 6634).
- (3) The Act of 1934 (HR 2837).
- (4) The Outer Continental Shelf Lands Act of 1953 (HR 4198).

- (5) The Trinity River Dam Act of 1955 (HR 4663).
- (6) The vote of 1978 to exempt the Tellico Dam project from the prohibitions embodied in the Endangered Species Act of 1973 (Amendment to HR4388).
- (7) The Fazio Amendment of 1997 (H.AMDT 283 to HR 2203).
- (8) The vote of 2005 on the Threatened and Endangered Species Recovery Act of 2005 (HR 3824).

Several themes emerge as we qualitatively and quantitatively investigate these votes. First, what began as state level regulation to protect immediate economic returns on wildlife evolved over the twentieth century to federal regulation to maximize the long-run net benefits of land conservation. Second, the margins within which environmental decisions are made are shrinking as non-market benefits have increased for all assets from public resources. Finally, *for any single resource use*, opportunity costs have increased as the benefits from other uses have increased. These margins and opportunity costs are reflected in the burgeoning body of environmental regulations that form the constraints within which new actions that help or harm the environment may occur. Voting decisions on environmental legislation, the varying foci of congressional debates, and spatial illustration of these patterns, show both the consistent trends and the changing tradeoffs clearly. After a theoretical explanation of the century's trends and brief descriptions of each of these votes, we discuss our data, present our results, and draw our conclusions.

2. Historical Evolution of Localized Values Reflected in National Decisions

Support for the theory that legislative conflict over wildlife preservation arises in these cases from dispersed economic benefits with concentrated costs comes from biological research (Flather and Knowles 1998; Wilcove, Rothstein et al. 1998) and subsequent economic and public choice analyses (Cain and Kaiser 2003; Loomis and White 1996; Brown and Shogren 1998; Metrick and Weitzman 1998; Mehmood and Zhang 2001). A Congressional Representative's vote should reflect these tradeoffs as a function of self-interest; a representative's ideological beliefs and his community's role as electorate combine as the representative seeks to maintain his position. The public choice literature has long debated the role of interest groups and other distortions (e.g. logrolling) in capturing votes [e.g. Kalt, 1984; Levitt, 1996; Sproule-Jones, 1982; Stratmann, 1992; Jackson, 1989; Jenkins, 1999; Poole, 1993]. The outcomes indicate the need to control for ideology in analyzing any effect constituent preferences have. We use Poole and Rosenthal's excellent work capturing political ideology for this control.

Theory also suggests that environmental goods are normal goods, with positive income elasticities [Kahn, 1997; Van Liere, 1980]. As incomes and wealth have increased over the century, we expect to

see growing support for environmental goods. As wildlife and biodiversity are exhaustible resources, understanding the demand for these goods also requires understanding variances in the time rate of preference for the goods associated with preservation. We expect that as income, education and life expectancies increase, the rate of time preference should place increasing weight on future welfare and increase efforts at preservation. In addition, youth may value decisions that invest in future welfare more than the elderly.

Ideological preferences, or the appearance of them, should also influence decisions regarding preservation. A century ago the variance in political ideology seems to have been significantly greater than today. Where costs are not specific, such as those in the ESA, votes now tend to be overwhelmingly in favor of species preservation – reflecting the overall acceptance of the principle of preservation. However where potential costs are definable, as they are in most of the votes analyzed here, national controversy arises in spite of the localization of these costs. This controversy must stem in part from the expectation of similar costs being imposed on one's own constituency and will reflect the ideological beliefs of the Representative and the economic interests, and ideological beliefs, of the population who elected him.

These ideologies and economic interests should be determined in great part by the natural resources located within a community or region. Many of the heated political debates regarding the environment have hinged on the fact that limited natural resources would be reallocated from one use to another. This is particularly the case with public water and land resources that provide joint environmental and economic outputs. In their natural states, such resources will provide habitat for specific sets of wildlife species. Transformed for human purposes through dams, roads, and other feats of engineering, these habitats are also transformed, at the cost of the original species. For the most part, developed urban environments no longer face these tradeoffs, while regions that are sparsely populated may. Thus the costs of species preservation are more likely to fall on less developed regions. Availability of vital water resources is also expected to play an important role.

The eight votes presented here served to advance the debate on wildlife preservation. They highlight the increasing benefits of this preservation, as well as the increasing opportunity costs of providing it. Both the marginal benefits and marginal costs of wildlife conservation have increased over the century. This has increased the price while leaving the optimal allocation of land to wildlife uses uncertain. From 1900 forward, implementation delays of preservation actions lengthened as costs mounted.

3. Backgrounds to the Votes

While common threads develop through the eight votes, the first step is to consider each of them in isolation. The goal of this section is simply to have a working understanding of the issues involved.

3.1. *The Organic Act of 1897 (HR 16)*

In today's world, deforestation is a global concern because less CO₂ is photosynthesized into O₂, resulting in more greenhouse gas produced.¹ Deforestation, alas, is neither a new nor distant concern. In the U.S., beginning in 1849 and with some regularity for decades to follow, the annual *Report of the Commissioner of Patents* decried the long-term damage attributable to more trees being harvested than necessary. For example, in the 1849 *Report*, when wood arguably was the economy's most important input, the commissioner noted, "the waste of valuable timber in the United States, to say nothing of firewood, will hardly begin to be appreciated until our population reaches fifty million. Then the folly and shortsightedness of this age will meet with a degree of censure and reproach not pleasant to contemplate."² A quarter century later, the Secretary of the Interior's report still echoed this sentiment.

In 1871, Congress passed the first appropriation bill (\$5,000) for the "preservation of timberlands." Those lands were the reservations that grew naval timber and date from the Federal Timber Purchasers Act of 1799.³ Thanks in part to the newly formed American Forestry Association, which initially emphasized the appreciation and protection of trees, Congress in 1875 passed, "An act to protect ornamental and other trees on Government reservations and on lands purchased by the United States, and for other purposes." This forbade unauthorized cutting of (or injury to) trees on government property.

Starting with the stewardship of Carl Schurz as Secretary of the Interior in 1877, that department moved toward a more active interest in conservation issues, as Schurz advocated for such policies as the creation of forest reserves and a federal forest service.⁴ In the General Revision Act of 1891, Congress abandoned the land policy that had begun with the Land Ordinance of 1785 and, among other steps, created "forest reserves" (which we now know as national forests) by withdrawing forest covered land from the public domain.

Six months after signing this act, President Benjamin Harrison created the Yellowstone National Park Timberland Reserve. An additional 14 reserves were created before Harrison's term ended. Conspicuously absent was any administrative mechanism to help protect the reserves. The McRae bill

1 In addition, there are many other deleterious local and regional impacts.

2 Thomas Ewbank, the United States Commissioner of Patents, *Report of the Commissioner of Patents, for the Year 1849* (House of Representatives Executive Document No. 20), 2 volumes.

3 The Federal Timber Reservation Act of 1827 established a timber reserve for the exclusive use by the Navy.

4 On federal land acquisition for conservation, see Sally K. Fairfax, Lauren Gwin, Mary Ann King, Leigh Raymond and Laura A. Watt, *Buying Nature: The Limits of Land Acquisition as a Conservation Strategy, 1780-2004* (Cambridge: MIT Press, 2005), particularly chapter 3.

submitted to Congress in 1892 attempted to remedy that omission.⁵ It was designed to stop the taking of timber at no charge from reserves. The forests were to be managed to provide for watershed and timber uses, to guarantee a timber supply in perpetuity; the destruction of the forests would cease. The questions that were raised about the bill centered on whether it would lead to even more destruction. In particular, the debate concerned the management of the total reserve as opposed to that of individual trees even though the bill never addressed the conditions under which individual trees would be cut.

Opposition to the McRae bill came from two groups. The first believed that the impact would be more destruction, the opposite of what was intended. The second was those who had been taking timber from the reserves at no charge (e.g., mining companies) and would have to pay under the proposed bill. The bill was passed by the House in December 1894 when the first group was placated. The Senate took its time. The bill received little attention until one act of President Grover Cleveland elicited a quick response.

Once the National Forest Commission was appointed in 1896, the commissioners toured forests in the west. Its oral report to Cleveland recommended 13 new reserves be created in seven western states, and Cleveland did so. Protests immediately arose, especially in the western states. Legislatures sent memorials; public officials sent letters; newspapers wrote editorials condemning the president, who was denounced in Congress. The major complaint was the damage that would be done to mining and lumbering, the west's two major industries.

In February 1897, while the Sundry Civil Appropriations Bill was being discussed during Cleveland's final week as president, an amendment was proposed that would return the land in the debated reserves to the public domain. President-elect William McKinley indicated he would be willing to compromise on the reserves, but the problem was to find a way "to rescind Cleveland's order, at least temporarily, without insulting the Office of the Presidency."⁶

What is generally known as either the Organic Act or Forest Management Act of 1897, part of the Sundry Civil Appropriations Bill, was signed into law that June without Cleveland's reserves. After five years of debate, the fundamental ideas of the McRae bill were passed in a slightly modified form. The act established the purposes of the Forest Reserves as well as the criteria for new forest reserve designations -- timber production plus watershed and forest protection. Virtually all of these forests remain under national management today. It also allowed resources to be used for

5 The following discussion is largely based on Robert Bassman, "The 1897 Organic Act: A Historical Perspective," *Natural Resources Law*, vol. 7, 1974, 503-20.

6 *Ibid.*, p. 510.

recreation, lumbering, mining, and grazing.⁷ Gifford Pinchot, of the United States Department of Agriculture's Division of Forestry, was hired as a "confidential forestry agent" to investigate the management of the forest reserve. He suggested that responsibility for the reserves be moved from the Interior Department (which received the assignment under the Organic Act) and placed in the Agriculture Department so that the forest reserves and the foresters would be within one department. Such a move was seconded by the American Foresters Association and the Sierra Club, and President Roosevelt did just that when signed the Forest Transfer Act in 1905.

3.2. *The Lacey Act of 1900 (HR 6634)*

Throughout the nineteenth century, the preservation of wildlife -- a major part of the human food supply -- was a state responsibility. With the passage of the Lacey Act of 1900, the federal government began to assert itself in this area. This act, the first federal statute protecting game, prohibited the interstate shipment of illegally taken wildlife, as well as the importation of injurious species.⁸ There were at least two underlying reasons: a) the virtual extinction of the Passenger Pigeon and a number of other birds in large measure to meet the demands of the millinery and culinary trades and b) the accidental introduction of the English sparrow.⁹ The act permitted states to bar imports of animals legally killed in another state; they already had the right to prohibit exports. The Secretary of Agriculture was instructed to adopt whatever measures proved necessary for the "preservation, distribution, introduction, and restoration of game birds and other wild birds."

The issue of states' rights was an important part of the debate on the bill. Lacey noted that, under his bill, the federal authority began where state authority ended:

7 Another provision allowed "in lieu" trading of public land inside the forest reserve boundaries with other public lands outside the boundaries which led to considerable fraud and the hiring of Gifford Pinchot. All this proved to be the blueprint for forest management into the 1960s.

8 Excellent summaries of basic environmental law can be found in Bean (1983) and Yaffee (1982).

9 Lacey commented that, "If this law had been in force at the time the mistake was made in the introduction of the English sparrow we should have been spared from the pestilential existence of that 'rat of the air,' that vermin of the atmosphere." *Congressional Record*, April 30, 1900, p. 4871.

It begins when animals or birds are loaded upon the cars to be shipped to a point outside of the state. When they are thus transported... the local game wardens, endeavoring to protect the birds of your State, find themselves powerless, because the birds are not seen of men after they are once packed until they turn up in the markets of one of the cities. The State law is thus nullified.... Then the national law comes in and forbids the shipment, and in this manner the State law is supplemented.

(Congressional Record, April 30, 1900: 4873)

He went on to note that the law applies only to those birds (and animals) protected by state law, so that the decision to protect a species was still a state decision. A national game law in his opinion would have been declared unconstitutional at that time. Lest anyone doubt the right of the federal government to get involved in such matters, a treaty on the subject was negotiated with Canada in accord with the Migratory Bird Treaty Act of 1918.

The Lacey Act is still in force today, with a series of amendments over the century. The most recently approved amendments in 2008 significantly increase the number of species under regulation, so that all taxa of flora and fauna are covered, with very few exceptions. It has become a primary federal tool both in support of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) and in fighting the spread of invasive species both across state and international borders (species non-native to a region that can be expected to cause economic and/or ecological damages through establishment and spread) (USFWS, 2014). The evolution of this law over the century captures the changing societal prerogatives from use values for hunting and fishing to indirect and non-use values from preservation.

3.3. *The Everglades National Park Act of 1934 (HR 2837)*

The movement to protect a segment of the Everglades began at a relatively early date. The Swamplands Act of 1850 placed 20 million acres of land under Florida state management for drainage and reclamation. After 30 years of difficulties in starting operations, water reclamation efforts began in 1881 and initiated dramatic changes in the ecosystem in return for development and agriculture (Light & Dineen, 1994). In 1916, as south Florida was being developed, the 4,000 acre Royal Palm State Park was created as the first protected area in the Everglades (NPS, 2014). By the 1920s, efforts were underway to significantly increase the area of the national park, which today is over 1.5 million acres (NPS, 2014). In 1928, the Senate authorized an investigation into the proposed park, and the House followed suit in 1929. The report of that investigation was extremely favorable. The Everglades National Park Act of 1934 recognized the need to preserve the unique fauna and flora of the area. From the start, it was clear the state parkland would be donated to the new park. It was hoped that unnamed parties would donate the remainder of the land, that the federal government "would not expend one

dime" in property acquisition. It was stipulated that "no expenditure whatever shall be made by the Government on the development of the park for 5 years after the adoption of the bill." Indeed, the formal dedication of the park would not take place for over 13 years.

Although the Senate had passed similar bills on three different occasions, the 1934 bill represents the measure as it came to a vote in the House. Debate focused on the likelihood that federal expenditures would prove necessary and whether such expenditures were desirable in the depths of the depression.¹⁰ Opponents tried to paint an inaccurate image of "a snake swamp park on perfectly worthless land." (*Congressional Record*, 24 May 1934: 9497)¹¹ Indeed, they argued the land must be worthless:

Do you imagine Florida or any other sovereign State would come to the Federal Government and ask it to take over this great vast territory of land unless it was for the purpose of saddling the expense of maintaining the property upon the Treasury of the United States?
(*Congressional Record*, 24 May 1934: 9502)

Those in favor of the bill noted that all the country's major conservation organizations supported it. The scientific basis for preserving the land was clear to the proponents:

Here is located the only natural tropical growth in continental United States. In this section certain species of bird and animal life are staging their last stand. They are rapidly becoming extinct.
(*Congressional Record*, 24 May 1934: 9504)

Although it was not a part of the debate, it should have been clear that the Everglades would be the source of water for southern Florida.

The act defined the park in a manner that made the preservation of wilderness a primary goal:

10 "I think the time has come to call a halt to these commitments until we know when we are coming out of this depression.... This is no time to bring in a bill of this character to commit the Federal Government to large future expenditures. A fire is not going to sweep over these swamps and they will remain there intact." *Congressional Record*, 24 May 1934, p. 9504. A proponent, attempting to show that conditions were improving, appended data on the number unemployed (*Congressional Record*, 24 May 1934, p. 9511).

11 For example, there were relatively few snakes that inhabited the Everglades.

The said area ... shall be permanently reserved as a wilderness, and no development of the project or plan for the entertainment of visitors shall be undertaken which will interfere with the preservation intact of the unique flora and fauna and essential primitive natural conditions now prevailing in this area. (*Congressional Record*, 24 May 1934: 9512)

Little progress was made towards establishing the park until after World War II. A further impetus to preservation was taken in 1944, when Congress authorized the creation of a national wildlife refuge. In 1946, the Florida Legislature appropriated \$2 million for the purchase of private lands within the Everglades, and the State Federation of Women's Clubs donated Royal Palm State Park to the federal government. The formal dedication came a year later.

By 1989, a law for the expansion of the park and establishment of a visitor's center, along with provisions for the Army Corps of Engineers to investigate improvements increasing water deliveries to the park, was passed in the House by voice vote and became Pub. Law 101-229. Earlier controversies were set aside as water was increasingly becoming a problem for the park, in multiple dimensions: quality, quantity and distribution. Among the most notable consequences of these problems are:

a 93 percent drop in the population of wading birds nesting in the Everglades over the last 60 years, toxic levels of mercury found in all levels of the food chain, the die-off of sea grass in Florida Bay, and endangered species such as the wood stork and the Florida panther. (Bacher 1997)

With one million annual visitors and its critical ecological niche, the continued good health of the Everglades National Park is critical to the economic and social health of south Florida, and all concerned are involved in what is described as "an unprecedented ecosystem restoration effort." That "all" includes state, local and tribal government agencies, civic and environmental groups, business, and the federal government. The combination of water problems and their effects led to a comprehensive Everglades restoration plan being included in the Water Resources Development Act of 2000 (Pub. Law 106-541).

3.4. The Outer Continental Shelf Lands Act of 1953 (HR 4198)

The Outer Continental Shelf Act of 1953, which has been amended many times over the years since, is a clear example of spatially disparate net benefits to the states and congressional districts. The creation of well-defined federal and state property rights began the process of closing the commons and increasing the ability of governments to extract rents from offshore resources, both in the short- and long-runs. The original law does not make mention of the environment or marine wildlife. The law today, however, identifies responsibilities governing the operations and activities expected to derive from the act that explicitly include marine life:

The regulations...shall include...provisions –

(1) for the suspension or temporary prohibition of any operation or activity, including production, pursuant to any lease or permit...if there is a threat of serious, irreparable, or immediate harm or damage to life (including fish and other aquatic life), ...or to the marine, coastal, or human environment. (Pub. Law. 106-580 as amended, Sec 5)

And that

Timing and location of exploration, development, and production of oil and gas among the oil- and gas-bearing physiographic regions of the outer Continental Shelf shall be based on a consideration of ... an equitable sharing of developmental benefits and environmental risks among the various regions;... the location of such regions with respect to other uses of the sea and seabed, including fisheries,... [and] the relative environmental and predictive information for different areas of the outer Continental Shelf. (Pub. Law. 106-580, Sec 18)

The effects of the Santa Barbara Oil Spill of 1969 can be seen directly in these legal shifts and considerations, just as they are indirectly seen in much of the environmental law of the 1970s (Clark and Hemphill, 2002). Still controversial, the latest voting legislative activity on the OCS was a House vote in June, 2013, passed 256-171, on H.R. 1613, amendments to the act that expand transboundary activities.

3.5. *Trinity River Dam Act of 1955 (HR 4663)*

The debate over the Trinity River Dam Act of 1955 centered on land reclamation versus power subsidization. Using federal reclamation laws, the Trinity River (the largest tributary of the Klamath River) was to be dammed and its water diverted to the nearby Sacramento River in order to supply irrigation water to California's Central Valley project (in the Sacramento and San Joaquin River basins). The diversion's hydroelectric power potential was to be utilized for electric power needs in northern California. The Central Valley project, started in 1935 and now consisting of 20 dams and reservoirs plus 500 miles of canals, redistributes "surplus" water from the northern end to the southern part of the valley. In large part, it is an attempt to resolve the natural pattern of drought in the summer and flooding in the winter.¹²

12 The Native Americans dealt with the winter flooding by simply packing up and moving to higher ground. For the most part, European settlers created permanent housing structures.

While preliminary study on this project was underway in the early 1920s and the project itself was included in the 1931 California State Water Plan, it was not until 1942 that the federal Bureau of Reclamation began its study. By the early 1950s, when the federal government ruled the project met the requirements of the Reclamation Act, the problems were reaching a critical stage. California's unprecedented postwar growth led to a situation where actual water use in the early 1950s was three times that anticipated in the original plan. In addition, a critical drop in the water table led to a situation where, without additional irrigation water, farmers in the Central Valley would "have to go out of farm production within a few years." (*Congressional Record*, 9 June 1955: 7961)

Of the estimated \$225 million expense, roughly 70% was for the construction of power facilities and the balance was for irrigation. It was expected that within 26 years of the start of operations, the power facilities would generate an equal amount of revenues, recovering the costs. Similarly, the irrigation facilities would "pay for themselves" within 50 years. Proponents noted that the 3.31:1 benefit-to-cost ratio was one of the highest for any project brought before Congress (*Congressional Record*, 9 June 1955).

It was noted that negotiations were underway with the Pacific Gas & Electric Company to purchase falling water for power generation. The bill required a report on those negotiations within 18 months. This led many Representatives to suggest that the federal government proceed with the reclamation part of the project and wait to see if a private agency would be willing to bear the cost of constructing the power facilities:

If we in the Congress wait for the termination of that investigation, we can come in here with a bill, a partnership bill, which would permit the Government to pay for and build the irrigation and reclamation features of this bill which would amount to only about \$20 million to \$25 million and permit the Pacific Gas & Electric Co. to build the power facilities and pay rent for the falling water. (*Congressional Record*, 21 June 1955: 8883) Gas company officials requested an amendment permitting a cooperative agreement between the company and the federal government with respect to construction, but none was included in the bill (*Congressional Quarterly Annual*, 1955: 446).

Since the project's completion in 1963, the Trinity River has supplied approximately 5% of the water supply for the entire Central Valley and San Joaquin/Sacramento Bay Delta and has supplied approximately 25% of the entire Central Valley Project power supply. Reality, however, has been quite different from what the House of Representatives believed in 1955. The dam has had a deleterious effect on Coho salmon and steelhead fish populations, affecting ocean fishing from Central Oregon to Central California. Further, despite the additional water, the winter-run Chinook of the Sacramento River is still endangered. Those cultures dependent on Klamath-Trinity fish, particularly the Hoopa Valley and Yurok Tribes have declined with the damming of the river and have been active continually in trying to maintain stream flow for fisheries (Hoopa Valley Tribal Council, 2010). By 1982, Congress

was attempting to restore the Trinity River and its fisheries. This resulted in the Trinity River Basin Fish and Wildlife Management Act of 1984, passed by voice vote, with re-authorization plus amendments in 1995 that passed 412-0. These uncontroversial votes can be traced in part to the original 1955 requirements for stream flow based on maintaining fishing rights for the Hoopa Valley Tribe (Hoopa Valley Tribal Council, 2010) and in part from the balance of funding in the law, with the downstream Californian power users footing 50% of the restoration (Pub. Law 98-541).

Compounding the community's problems, under President Clinton's Northwest Forest Plan, a depressed Trinity County became one of the most timber-dependent counties. Losing thousands of acres to dam construction and inundation didn't help. Though the restoration votes ended up being passed easily, the debate over the best use of the water continues. The 113th Congress (2013-2014) introduced several bills intended to revisit the allocation of water between human and in-stream uses (www.congress.gov), particularly in light of drought conditions. We see here both human and in-stream values increasing, and continuing legislative intervention efforts.

3.6. The 1978 Tellico Dam Exemption from the Endangered Species Act (Amendment to HR4388)

The next piece of legislation we consider is the 1978 vote to exempt the Tellico Dam from the Endangered Species Act of 1973. The 1973 act divided species into "endangered" and "threatened." This division includes not only the true species, but subspecies and distinct populations as well. The "threatened" category was designed to protect species before they became endangered and to continue to protect them once they were removed from the endangered list. The taking of an endangered species anywhere within the U.S. was made a federal offense, completely eliminating what had been viewed as a right of the states.

One part of the listing process was the designation of "critical habitat." Unfortunately, this was not defined nor was a procedure specified for determining such areas. "Critical" came to mean: that which was deemed essential for preservation. Interest group "watchdogs" were expected to complain when they perceived "a critical habitat" was endangered, and that is exactly what they did in Tennessee.

The Tellico Dam project was conceived in the late 1930s by the Tennessee Valley Authority who did not fund it until 1967. This delay signifies in large part the low expected return on the project. The dam would create a 16,000-acre reservoir over part of the Little Tennessee River, but no new energy capacity would be developed. The project's goal seemed to be to create recreational opportunities in the area thereby raising residential land values (Hargrove and Conklin 1983; Wheeler 1986). In accord with the 1960s endangered species acts, surveys of the area's endangered species were underway, but it was the critical habitat provisions that presented the greatest problem. In 1973 a biologist snorkeling in the Little Tennessee River below the construction site for the dam found a previously unknown fish,

the tiny Snail darter. Over the next two years it was determined the Snail darter had distinct biological differences from other species. Consequently, it was listed as an endangered species whose critical habitat was limited to the Little Tennessee River, a habitat that would be drastically changed by impoundment. So, although the dam was approximately 95% completed, the project was stopped by court order. Resolution of the resulting dispute was left to Congress.

Tennessee Congressmen, led by Senate minority leader Howard Baker, submitted an amendment exempting the Tellico dam. The House of Representatives, with Republicans voting largely as a block, passed HR 14104 exempting the dam from the Act in October of 1978. The Senate rejected the amendment the following June. The next day, the congressman from the Tellico district added the exemption to a Public Works Appropriation bill, which immediately passed the House. This is the vote we analyze. The Senate initially passed only the appropriation bill, but the conference bill including the exemption amendment passed in November 1979. President Carter, who opposed the Tellico Project, did not have the political will to veto the entire appropriation bill. Thus, the dam was completed and the reservoir filled. Since that time, the prohibitions of the ESA have been the subject of intense debate, both in and out of Congress. This again reflects a case where both the benefits and the costs of preservation are increasing.

3.7. *Fazio Amendment for the Animas-La Plata Dam project (H.AMDT 283 to HR 2203)*

As the Tellico Dam was being completed, the debate intensified over the Animas-La Plata project in Colorado, with a non-jeopardy opinion issued by the Fish and Wildlife Service in December 1979 indicating that the ESA would not hinder the project. Viability studies were undertaken between 1956 and 1962; construction was initially authorized in 1968 as part of the Colorado River Storage Projects Act. Financing and local complaints slowed implementation (USBR, 2003). Ute Indian tribes filed suit in 1976 asserting their right to 93,000 acre-feet of water from seven Colorado rivers in the southwestern part of the state. Their rights, under the Supreme Court's Winters Doctrine, went back to the tribes' 1868 treaty with the U.S. that established two reservations near Durango. Under the treaty signed by Chief Ouray, the Utes had agreed to become farmers. By the mid-1970s, the Utes, non-Ute farmers, ranchers, and a couple of towns all claimed the water. Negotiations for its division had begun with the authorization of the Animas-La Plata project in 1968, though construction was not funded. The roots of the project stretched back farther, at least to the Great Depression, when a dam that would move 265,000 acre-feet of water from the Animas River to the La Plata River to water a dry plateau was proposed near the headwaters of the Animas River, high in the San Juan Mountains.¹³

13 Ed Marston, "Cease-fire called on the Animas-La Plata front," *High Country News*, 11 November 1996.

The project would increase the water supply instead of forcing each of the parties to take smaller shares. Proponents advocated funding the project to settle the Ute's claims, but environmentalists and others (even the Reagan administration) opposed it. Environmentalists were concerned about the fate of streams used for recreational outputs including whitewater rafting and trout fishing. Congressmen noted that it offered more benefits to farmers than to the Utes and Navajos. An estimated \$5,800 per acre would be spent to irrigate lands to grow crops already in surplus; a subsidy would have to be paid to the farmers. The Office of Management and Budget (OMB) noted that the terms under which the federal government would finance the local share of costs were more generous than the standard for water projects. In 1985, Congress decreed that no federal funds could be spent on this project until the non-federal parties agreed to pay their share of the costs as part of an overall water-rights settlement. The parties all signed an agreement in 1986, and, in October 1988, President Reagan received a bill ratifying the agreement.¹⁴

Non-Indian proponents of the Animas-La Plata project joined with the Utes by tying the project to the 1988 Ute Indian Water Rights Settlement Act, which was ratified by the tribes, the states of Colorado and New Mexico, as well as by the U.S. Congress. The tribes agreed to drop their suits in exchange for agricultural and municipal water from the Dolores River project for the Ute Mountain Utes, a guarantee of 60,000 acre-feet of water per year water from the Animas-La Plata Project, and \$60.5 million in economic development funds. The Utes had no reason to believe that this coalition would fail to deliver; however, by the early 1990s, the project was in regulatory gridlock. At one point, there were three lawsuits against the Bureau of Reclamation by opponents of the project, and one against the Environmental Protection Agency by proponents. A court injunction forbade the Bureau from moving any dirt in an attempt to protect archaeological resources, while a Congressional directive ordered the Bureau to immediately move dirt.¹⁵

By 1997 the estimated cost of the Animas-La Plata project had risen from \$577 million to \$744 million. The project consisted of two major reservoirs, seven pumping stations, and twenty miles of pipes and canals. For all intents and purposes, it was designed to pump water 1,000 feet uphill, from one river to the other. Gov. Romer of Colorado, in conjunction with the Utes, attempted to find a compromise that would meet many of the environmental objections. Romer, a proponent of the project,

14 The non-federal parties agreed to pay \$212 million of the \$577 million cost. Stored water would also be supplied to the Navajo reservation and other parts of northwestern New Mexico. Joseph A. Davis, "Animas-La Plata Project," *Congressional Quarterly Weekly Report*, 22 October 1988, p. 3061

15 Marston (1996). The project was tied to a plan to recover the Colorado squawfish and razorback sucker downstream in the San Juan River. Both fish were endangered which brought the Endangered Species Act to bear on the project. In addition, the Clean Water Act was involved through salt, selenium, mercury and heavy-metals loading in rivers throughout the Four Corners area.

opened the November 1996 conference seeking a compromise by stating, "I take these obligations very seriously; the Southern Utes and the Ute Mountain Utes have important water rights, and that should not be disputed. The challenge for us today and beyond is to determine how we will satisfy those rights."¹⁶ Under the compromise plan, the cost decreased from \$744 million to \$290 million, \$257 million of which would come from the federal government.¹⁷ The compromise agreement, the Animas-La Plata Reconciliation Plan, would divert, at most, 57,100 acre-feet a year from the Animas River, the maximum allowed under a 1991 U.S. Fish and Wildlife Service opinion aimed at protecting endangered fish.¹⁸ Two-thirds of the diverted water was to go to the Utes, as opposed to one-third in the original project, but existing non-Indian irrigation was to be protected against senior Ute claims. This kept alive the possibility that the project could be constructed as originally designed sometime in the future.

On 25 July 1997, the House approved \$20.4 billion for energy and water development in the 1998 fiscal year. This bill ended federal support for the Tennessee Valley Authority's non-power functions such as flood control and shifted a large portion of the Energy Department's non-defense environmental cleanup expenditures to Army Corps of Engineers. The issues that surrounded the bill for three years, including the Animas-La Plata project, were discussed. An amendment was offered by opponents of the project to prohibit use of that money for land purchases or anything related to construction until such time as Congress were to authorize what remained of the proposed compromise to scale back the project. Rep. Vic Fazio (D, Cal), offered an amendment to the amendment. The Fazio amendment, which was adopted by a vote of 223-201, prohibited any of the funds in the appropriation bill from being used for construction of the Animas-La Plata Project, except for activities required to comply with the applicable provisions of current law and continuation of activities pursuant to the Colorado Ute Indian Water Rights settlement Act of 1988.¹⁹ This is considered a compromise in favor of construction interests over environmental ones. The vote on the Fazio amendment involves identical themes to the others considered here. The benefits fall to specific groups while the costs are dispersed.

16 Quoted in Marston (1996).

17 Jonathan Weisman, "Campbell Diverts Water Project Attack," *Congressional Quarterly Weekly Report*, 19 July 1997, p. 1699.

18 Becky Rumsey, "A-LP looms liter," *High Country News*, 4 August 1997. The compromise did not satisfy many of the project's opponents who argued that it remained too expensive, that it threatened elk winter range, fishing and rafting, that taxpayer money was still being used to subsidize municipal water users, and that it didn't preclude the possibility of completing the dam as originally planned. The Senate version of the appropriations bill included \$6 million for the project, which would keep it alive through 1998. Thus, debate continued over a project on which the Bureau of Reclamation had spent \$62 million, and \$8.2 million of unspent money remained in the program's accounts.

19 Jonathan Weisman, "House Energy-Water Bill Passes by Wide Margin," *Congressional Quarterly Weekly Report*, 26 July 1997, p. 1779.

3.8. The Threatened and Endangered Species Recovery Act of 2005 (HR 3824)

Efforts to weaken the Endangered Species Act's provisions have continued since its initial passage. The most recent House vote on these efforts came in 2005, when they voted 229-193 in support of the Threatened and Endangered Species Recovery Act. One of the primary actions the bill sought was to remove provisions for establishing critical habitat, which is where the concentrated costs appear. Other provisions similarly focused on costs. The Senate did not take up this bill allowing the issue to remain unresolved (LCV, 2005).

4. Analysis of the Voting Record

4.1. Qualitative Discussion of the historical record

Qualitatively, the tales presented in section 3 demonstrate a narrowing of the debate on environmental preservation from controversy over the very establishment of protection to bitter fights over very specific issues, often pitting a handful of species against a subset of economic interests. We discuss first a spatial visualization of the analysis. In Figure 1, one can see the evolution of the country's choices about environmental legislation. At the turn of the 20th century, much of the land that would remain in the public domain over the century, becoming the most likely to be set aside for biodiversity conservation, either had no vote (they were not yet states) or chose abstention. This is shown by the large number and land area of the uncolored congressional districts in the 1897 and 1900 votes. Of voting districts, the spatial balance between red (pro development) and green (pro environment) districts is relatively even at the turn of the 20th century, with the green districts somewhat dominant in the 1930s vote. One sees over time a shrinking of the congressional district size that casts the 'pro-conservation' vote; smaller districts are more urbanized where the costs of conservation are expected to be less burdensome. Option values to develop the land and natural resources matter. At the beginning of the century, however, the direct use of the timber and game resources drives the conservation actions, and so the pro-environment vote captures this desire to maintain the resource base for the uses it had at the time. This is also true in the 1930s. From the 1950s on, however, the option value of the conservation has shifted relative to other development goals for the regions.

These shifts are particularly telling when one compares Figure 1 to Figure 2. Figure 2 shows the Poole-Rosenthal measure of the ideological spread of the Congress over time. Today, the area with a conservative ideology corresponds with that more likely to cast a pro-development vote, and we have come to assume this correlation. At the turn of the 20th century, however, the relationship is reversed: conservative districts were more likely to vote for the conservation acts.

The broader intellectual debate about the desirability of federal preservation at the expense of individual or states' rights has become moot, as the passages of preservation acts with potentially high, but uncertain, costs showed. Many such extremely restrictive wildlife regulations sailed through Congress in the latter half of the century. The ESA and the several earlier, related acts all passed both Houses of Congress with overwhelming majorities, usually by voice vote.²⁰ In an earlier paper, we examined the controversy over the proposed exemption of the Tellico Dam from the ESA. We argued that it is an example of the public goods problem endemic to species preservation -- the costs are localized, visible and concentrated; the benefits are uncertain and widely distributed (Cain and Kaiser 2003). The prohibitive policy embodied in the act is consistent with, not a radical departure from, the federal government's traditional approach to wildlife law.

A tendency to attempt to push costs into the future is apparent from the beginning. Even the Lacey Act did not prove effective immediately. This was largely a result of the market profits enjoyed by hunters and the lack of enforcement officers. This failure led the federal government to pass the Weeks-McLean Act (1913) that states:

All wild geese, wild swans, brant, wild ducks, snipe, plover, woodcock, rail, wild pigeons, and all other migratory game and insectivorous birds which in their northern and southern migrations pass through or do not remain permanently the entire year within the borders of any State or Territory, shall hereafter be deemed to be within the custody and protection of the Government of the United States, and shall not be destroyed or taken contrary to regulations hereinafter provided therefor.

From there, the Lacey Act and subsequent trade restrictions worked to alleviate the open-access public resource stresses on game and wildlife stocks. Weeks-McLean was soon replaced by the Migratory Bird Treaty Act (1918). The constitutional right of the federal government to make treaties and to enact laws consonant with those treaties was brought to the service of wildlife. The treaty was negotiated with Great Britain acting on behalf of Canada and was later expanded to include Mexico and Japan, see Foster (1978). The Lacey Act was expanded to prohibit foreign commerce in illegally taken wildlife in 1935. The Endangered Species Conservation Act of 1969 amended the Lacey Act to extend its prohibition to reptiles, mollusks, amphibians, and crustaceans. It also amended the Black Bass Act (1926) to prohibit interstate and foreign commerce in illegally taken fish. Both the Black Bass and Lacey Acts were repealed in 1981 and replaced with the Lacey Act Amendments of 1981, which restored protection for migratory birds, removed from the Act in 1969, and initiated protection for

20 Among these acts is The Endangered Species Preservation Act (1966) under which the Department of the Interior was charged with developing a program for the "conserving, protecting, restoring and propagating selected species" of mammals, birds, and fish. The Endangered Species Conservation Act (1969) extended the principle internationally.

plants. Though the initial implementation was delayed, the long run goals of preservation for direct economic use continue to evolve into more general preservation goals, encompassing invertebrates and other less commercially attractive species.

Formation of the Everglades National Park also experienced significant delays after its 1934 passage; President Truman did not formally dedicate the park until 6 December 1947. By 1997, however, the park whose land had been deemed so worthless had been named an International Biosphere Reserve, World Heritage Site, and Wetland of International Importance. It is the only national park in the northern hemisphere so honored.

The Trinity River Dam vote resulted in power production and development over wildlife preservation. Completion was delayed until the mid-sixties, and its example shows the escalation of expected costs that could come from other, similar projects in the future. According to a 9 May 1997 posting on the internet by Tom Stokely, a Senior Planner managing the Natural Resources Division of the Trinity County Planning Department, the cost overruns had amounted to over \$60 million. Fisheries have been significantly impacted. Coho salmon were officially listed as threatened in April 1997, while steelhead, after much study, avoided a listing in Klamath Mountains province in April 2001 though neighboring Central Valley lists steelhead as threatened (Service 2002). Notes Stokely, "The Trinity County Board of Supervisors supported the dams in 1955 because back then, 'people believed their government', and they were promised many things, most of which were untrue. Times have changed here, and Trinity County was the only California county which supported Ross Perot for president in the 1992 election." See also Herndon, Inokuchi et al. (1997).

Like the Trinity River Dam, the completion of both the Tellico Dam and the Animas-La Plata Project would make significant changes to the existing landscape and its uses. The Tellico Dam eliminated Cherokee cultural sites and about 600 family farms on prime agricultural land. It also changed the ecology of a wild river to that of a regulated reservoir. Though after the fact, the Snail darter was found living in several other locations, at the time it appeared that an endangered species would lose all of its critical habitat. In the 1930s, these matters would have been of little concern. Three decades later, with government regulation on just such issues, the dam became extremely controversial. Among other concerns, there was a notable controversy over whether there were any real economic benefits to be gained from the Tellico Dam; the original benefit-cost study was proven to have significantly overestimated benefits. Early recalculations, available in 1979, projected that, at best, the dam would break even rather than realize the 7-to-1 benefit-cost ratio claimed by the TVA. As noted, the dam contemplated as part of the Animas-La Plata project would water a dry plateau. This project also experienced significant delays from inception in 1956, authorization in 1968, through to the first pumping of water in 2009. Since the project has only just begun, its effect on the population of trout and other fauna remains speculative.

4.2. Quantitative Analysis of Decision-making: Data and Issues

Congressional battles over public environmental resources in general grew more heated over the century, perhaps peaking in the 1970s. Using coding of the first 100 Congresses from Poole and Rosenthal (1997) for consistency, roll call votes regarding public land and resource use increased; public works became relatively less controversial, while fish and wildlife became more so. During the 56th Congress (1899-1901), just 4 of the 149 issues resulting in a roll-call vote could be classified as government management of fish and wildlife or public works, and only one addressed fish and wildlife, the Lacey Act. In the 73rd Congress (1933-34), there were two roll call votes regarding the establishment of the Everglades National Park, none pertaining to fish and wildlife, and an additional 13 pertained to government management of public works from a total of 143 roll-call votes. Members of the 84th Congress (1955-56) called for 149 votes, 19 covered government management of fish and wildlife, pollution and environmental protection, or public works. By the 95th Congress (1977-1978), demands for roll call votes had escalated; 1540 roll call votes occurred. Of these, 123 covered government management of fish and wildlife (16), pollution (30), public lands (12), parks and conservation (40), and public works (25). For the first time, public works were less controversial than provision of environmental and natural resources. The 105th Congress (1997-8) had 1187 roll call votes, of which 72 are classified as environmental votes. This is a similar ratio as for the 95th Congress, but, perhaps, there has been a decline in overall controversy on environmental issues. (Crespin & Rohde, 2007).

We have assumed that each Representative's utility is maximized through reelection, so she, in turn, will wish to maximize the utility of her overall district, subject to minimizing any impact that would alienate enough voters to prevent reelection. Thus, the probability that a politician will vote a particular way on an issue is a function of the probability that the median voter perceives the benefit-cost ratio as consistent with the Representative's vote. This model is particularly useful for analyzing environmental votes because the benefits and costs of taking actions that preserve or improve current natural states typically are unevenly dispersed. Benefits accrue in small amounts to almost everyone, but the value of these benefits is largely subjective (e.g., existence values) or uncertain (option values). However, the costs are generally borne by substantially fewer individuals who live in concentrated areas, say, a Congressional district. From this perspective, several demographic, ecological, economic and political variables within a Congressional district should influence the probability that a Representative voted in a particular way.

One problem for our analysis is that there are few economic common denominators across Census years. As will be discussed, while our underlying conceptual model doesn't change, the variables we are forced to use to represent the different effects do. Table 1 summarizes these variables across the votes.

In our analysis, it is expected that political ideology will affect decision-making. We rely on Poole and Rosenthal's work quantifying the ideological dimension of politicians through their voting records to

measure the effect of this ideology. They analyze all Congressional roll call votes and account for, in two dimensions, significant patterns in roll call voting by members of Congress. The first dimension captures the member's location on the liberal-conservative scale while the second is more issues based in regional differences (e.g. slavery, bimetallism, and civil rights). (Poole and Rosenthal, 2014). Using their first dimension coordinate, we have a variable that indicates each Representative's position in the liberal-conservative spectrum or their stance on government intervention in the economy (Poole and Rosenthal 1997).

How constituents respond to legislation depends on a community's income and education levels in diverse ways. The effects of the two are difficult to separate; when education levels rise, income levels follow. We consider high income, high education to be one end of a dual spectrum, low income, low education to be the other. Higher levels of both are expected to be welfare improving for the community. The higher one's income, the easier it should be to avoid the ill effects of any cost environmental legislation might impose. The higher one's education, *ceteris paribus*, the more one should be more aware of the scientific and economic arguments in favor of the environment. Simultaneously, the lower the income level of the district's population, the higher the potential costs of the legislation, and the lower the probability that one would support it.

Areas in which environmental legislation is likely to be especially costly are areas in which primary industries (agriculture, forestry, fisheries, and mining) are heavily represented. In general, these are areas that have a low population density and lots of land. As Congressional districts are organized to include (theoretically) equal populations, land area and population density will have opposite effects on the probability of voting for environmental concerns. To accentuate the differences between rural and urban districts, we concentrate on the percent of the urban population in or the population density of a district (as available), and therefore potential for expansion into underutilized land resources.

The variation in population density measures the impacts of benefits and costs on city dwellers, who have lower expected costs because the area is developed and its industries generally rely much less on natural resources. The most densely populated districts, with 100% urban population, should have virtually no expected costs associated with the acts analyzed here. Those districts with the lowest population densities are those where the costs are expected to be greatest.

Another important measure of perceived costs is the average age of a district's population.²¹ For retired individuals, both the costs and the benefits of environmental legislation might be lower than for other age groups. Unless motivated by the bequest motive, there would be a shorter horizon for the accrual of

21 The influence of senior citizen groups in states like Florida and Arizona is convincing evidence that local politics can be affected by specific demographic groups.

benefits. They might not agree as strongly with the consequences of an act that would increase their taxes. However, by the same reasoning, they would be unlikely to come up against any direct costs from future implications of the act. Moving down the age scale, from the retirees through the established, older portion of the workforce to the new voters just out of school, both potential benefits and costs should rise. The evidence for whether these higher benefits outweigh the costs or vice-versa is mixed, but the general finding appears to be that age is negatively correlated with environmental concern (Van Liere and Dunlap 1980; McLeod, Woirhaye et al. 1999).

The data for the empirical analysis of each of these votes comes from several sources. Voting and ideology data comes from Poole and Rosenthal's web portal www.voteview.com. GIS shapefiles for the congressional districts are from digitization of Martis (1982) as done by Lewis et al (2013). For education, income, age, urbanization levels and government employment census data, Scott Adler's Congressional District data was used for the 83rd through the 105th Congresses (Adler, 2014). The National Historical GIS database was used for the 109th district (www.nhgis.org). For the 55th and 56th Congresses, county level data from the nearest census year was taken from the modifications made by Joseph Ferrie of ICPSR data. This data was aggregated to the level of Congressional Districts using a file developed for Lee Alston at the University of Illinois, Champaign-Urbana.²² When a county contained more than one Congressional District, that county's data was apportioned into the district according to the share of the county's population in that district.

We use GIS to determine, for each district in each relevant congress, the percentages of the district that are 'water' rather than land, the percentages of the district that are designated as current federal lands, and the percentages of land that have formally assigned critical habitat for Endangered Species. We provide a brief discussion of this visual evidence in the Appendix.

4.3. *Quantitative methodology and results*

4.3.1. *Discrete choice model*

We use discrete choice models to estimate the effects of these ideological, economic, and geophysical properties on congressional voting and the shaping of our wildlife resource history. In each of the analyses, the dependent variable is a choice describing a Representative's vote. The data are organized so that directional effects have the same meaning, describing whether a Congressman or woman voted in favor of the environment, not necessarily for the measure. Abstentions are also investigated; especially at the beginning of the century, they account for a large percentage of the votes. It is unclear whether the abstentions really reflect an intermediate position, so we do not use an ordered regression

22 We gratefully acknowledge the contributions of both Joe Ferrie and Lee Alston.

model. We include this as a ‘choice’ that may reflect commitment to the issues and/or position as a congressman. We consider abstentions in a multinomial logit specification, as well as dropping them to use a simple for-against logistic specification. Therefore, we lose information about the abstentions, but we do not otherwise introduce error. We do not treat abstentions as either implicit ‘yes’ or ‘no’ votes as the literature indicates this may introduce unwanted biases (Fenichel et al, 2009). We find that the results of the multinomial logit treating abstentions as their own choice and those of the simple logit with abstentions dropped are sufficiently similar to report only the results of the simple logit here.²³

The results of all estimations are reported in the Appendix as odds ratios, with the base level being the vote that does not favor the environment. Thus coefficients greater than 1 indicate that the higher the value of the independent variable, the higher the odds of a congressman voting in favor of the environmental option.

The importance of ideology and its connections to economic conditions mean that we wish to investigate closely the differences between models using just ideology to explain voting behavior and models that include economic and geophysical resources. Thus column 1 of the individual results tables (Tables A1-A8) show the full specification, while column 2 shows the regression with only the economic and geophysical (district endowment) variables and column 3 shows the results using political ideology as the only explanatory factor. Ideology proves to be a statistically-significant variable in each regression, often with the greatest single impact on the vote. However, economic variables enhance the overall result in every case. Specification testing illustrates that using ideology alone versus using economic and geophysical variables alone does not result in different levels of explanatory power for the overall model, while the combination of economic, geophysical, and ideological concerns provides significantly more explanatory power in each case as compared to either less restricted model. We report the individual voting results in the Appendix; we summarize across the century here.

4.3.2. *Synthesis of voting results*

Table 2 summarizes the overall results for comparison. Variables with a statistically significant and large directional effect under all model specifications are indicated by +++ or ---. Significant effects that have relatively small magnitudes are indicated by + or -. Insignificant effects are indicated by 0. In some cases, alternate specifications indicate a positive or negative significant effect, indicated by 0+ or 0- respectively. Variables that could not be included due to missing information are indicated by NI.

23 The full MNL results are available upon request to the authors.

As is clear from the table, ideology consistently is an important factor, but there is a decided shift from a conservative ideology that strongly supports wildlife legislation to one that strongly opposes it. This corresponds to a shift in perception from conservation for use values across time (primarily solving the tragedy of the commons problem) to conservation for intrinsic or other non-use values.

The importance of higher levels of education is inconsistent over time. Pro-environmental votes that seem to be about preserving use values are more favored by district's with higher education levels. Higher levels of income, on the other hand, have almost no effect over the entire time period, with some weak support for higher income districts preferring the environmental vote in the 19th century. The hypothesis that higher income affords more environmental quality as an affordable luxury may be too simple; higher levels of education may actually desire more opportunities for development in order to capture greater returns to education in the form of higher incomes rather than environmental quality.

Districts with older populations reflect opposite impacts to higher education; there are higher likelihoods of environmental voting in such districts when non-use values seem more prominent. Government employment has either no or a strongly negative effect on pro-environment votes. This is an interesting and somewhat disheartening result; areas with higher public sector employment appear less invested in other public goods and more in public economic development.

Higher numbers of Threatened and Endangered Species lower the probability of pro-environmental votes, while higher fractions of critical habitat raise them. This most likely reflects preference disparities through timing; earlier critical habitat designations require local interest and investment, whereas species that do not have much designated habitat may be involved in land-use disputes and other delays that reflect a lack of desire for environmental protection. Dams have surprisingly little impact.

5. Discussion and Conclusions

How well does our model perform? Table 3 examines the goodness of fit of our variables across time in explaining the voting. It shows the percentage of accurate predictions for the full specification (I), the economic model alone (II), and the ideological model alone (III). The predicted votes are calculated for the individual observations from the estimated parameters, and then compared to the actual vote to generate the percentages. In the table we also investigate correct positive (pro-environment) and negative (pro-development) predictions separately. In all three cases, the full specification achieves the highest percent of total, negative and positive correct predictions. The model fits the end periods better than the middle decades, but the lowest success rate is still 71% correct predictions. When the ideology and economic models are compared, they predict very similar percentages of the votes in the middle years, with a little greater difference at either end of the timeline. The Lacey Act vote (1900) is the only case

where the economic model alone does significantly better than the ideology model alone, with 80% vs. 69% correctly predicted.

Interestingly, the failures in predictions seem to be generally one-sided rather than well distributed. In the case of the full specification model, in the Lacey Act and Everglades Park Act, the positive corrections are much more accurate, while the Organic Act is very well predicted for both (94.6% accurate for negative and 95.6 for positive). This switches in the 1950s and 1978 votes, where negative predictions are much more accurate. In the 1997 and 2005 vote, they are balanced.

The economic model follows a similar pattern, though the Organic Act now also predicts positive votes much more successfully, and in the 2005 vote they are again more accurate for positive predictions, as with the earlier votes. With ideology alone, the pattern is reversed. The two earliest votes are much more accurate in negative (pro-development) predictions, while the 1930s, 1950s, and 1970 vote are much more accurate in positive (pro-environment) predictions, and the final two votes are once again more accurate for negative predictions. This highlights that ideology and economic considerations have complementary explanatory power even though the coefficients on the ideology variable often seem overwhelmingly high. The differences may also highlight conditions under which ideology and economics are at odds in determining public goods provision, as well as the temporal swings, not just in ideology (as shown in Figure 2), but in the interrelation of ideology and economics. Economics does a poorer job of predicting pro-environmental voting in the middle of the century, while it does a better job at either end of the time frame. This adds yet another dimension to the commonalities in economic conditions at the end of the 19th and beginning of the 21st centuries – public goods provision is looked at more similarly than it was mid-century. Not only that, the economic and ideological variables we identify as expected influences on political decisions regarding public goods provision are more likely to do so at either end of the timeline rather than in mid-20th century.

We have analyzed eight votes that span just over a century of environmental legislation. Seven of these have a focus on wildlife or species habitat issues; the Offshore Continental Shelf Act vote is included as a mid-century calibrator for general environmental sentiment. We had hoped to use identically-defined variables in all of our regressions, but that proved impossible.

Hence, we have five snapshots taken at roughly twenty-year intervals. In all five, ideology is an important variable, as one might expect. In all five, most of the economic and geophysical variables have the expected sign. The inclusion of spatial variables refines and increases our understanding of regional impacts.

As Table 3 shows, economic considerations add explanatory power. Ideology is important, but likely endogenous. Conservation is not an inherently ‘liberal’ issue. Across the century, there is an evolution from conservation for ‘direct use’ to conservation for indirect and passive use values.

With the Lacey Act, the politics of states' rights have what perhaps is their most significant impact, while the Everglades in 1934 benefit from forward-thinking, younger districts and poorer citizens who want environmental quality, but need the federal government to subsidize it. The Everglades vote also serves urban environments that won't lose potential revenue-generating lands, but will gain environmental benefits. Manufacturing wages may still be threatened by this last possibility, as would be the potential costs that could be imposed through higher taxes as the federal government expands its role in land and resource management.

The three dam votes differ substantially from each other as projected economic issues dominate the 1955 Trinity Dam project, but environmental costs and benefits dominate the Tellico vote 20 years later, and the final 1997 vote hinges on regional preferences and an urban-rural split.

At the turn of the 20th Century, we see the Organic Act creating the first forest reserves – when logging interests had significant power; and the Lacey Act protecting migratory bird populations – species mostly used for hunting and commercial purposes. The desire to preserve options for resource extraction seems to explain votes against the environment, as higher densities of Threatened-and-Endangered-Species-To-Be meant that the district were significantly less likely to vote for the act. There is an indication that the interests of the less educated, poorer folks, likely to be more dependent on the preservation of such resources, were considered. Much of the country, particularly the western lands where much of the conservation would occur, did not participate in voting, and most of the votes cast for the environment were cast by conservatives, reinforcing the idea that conservation was intended for later consumptive use of the resources.

The 1930s saw the development phase of many projects that affected habitat, including dam proposals like the Tellico dam and the Everglades Park. Many of the dams were delayed in construction, as was the formation of the park. These delays stem from the controversial levels of net gains expected. Thus decisions that gained congressional support needed 'ground truthing' before implementation. The longer the delay, the more significant the problems with local threatened and endangered species seem to be, or the greater the direct wildlife and public good conflicts with development interests. This is true for both the Everglades and the dam projects – the delays in park formation and expenditures worsen the environmental conditions and increase the need for restoration while the delays in the dams increase the benefits of the downstream resources that would be affected by the dams and increase the consequences of degradation.

Conflicts between conservation and the current use (depletion) of a resource that need to be resolved at the federal level, even when they are seemingly localized projects, are complicated by economic expectations and spatially distributed resources. In particular, evolution in the disparate interests of youth versus age can be seen in these results, where youth seems to take a longer run view starting in the 1930s, while earlier they may have been more interested in resource extraction to make their way in

the changing American landscape. High income-education interests seem to also switch in the early middle part of the century, from direct resource use to broader conservation. There is, however, little direct support for conservation as a luxury good.

At the same time, an east-west divide seems to be growing, one that is underlain by disparate resource endowments and ownership of common resources. The more of a district that is federal land, the generally lower is the vote probability for the environment, with the exception of the Everglades creation. The relationship to actual critical habitat and threatened and endangered species is more mixed. The generally positive impact of critical habitat again suggests that temporal considerations offer useful insights into conservation – areas that have critical habitat designations have overcome the hurdles that might be used to delay conservation efforts and increase costs in more pro-development areas.

Overall, local concerns do appear to outweigh considerations of global benefits when Congressmen go to cast their votes. This finding strengthens the claims of the government for the need for federal intervention in wildlife law that began, officially, with the Lacey Act.

Table 1: Summary of Roll Call Votes Analyzed

	Organic Act (1897)	Lacey Act (1900)	Everglades National Park Act (1934)	OCS (1953)	Trinity Dam Act (1955)	Tellico Dam Exemption	Animas-La Plata Amendment (1997)	ESA (2005)
Date	3/19/1897	4/30/1900	5/24/1934	4/1/53	6/21/55	10/14/1978	7/25/1997	9/29/2005
Yea's	158	142	222	285	230	231	223	229
Nay's	74	27	145	108	153	157	201	193
Other	116	183	64	42	52	42	10	11
Party Line? ²⁴	Yes	No	Yes	Partial	Partial	No	Partial	Yes
Special Issue Codes	Gov't mgmt.; parks and conservat'n	Gov't mgmt; fish and wildlife	Gov't mgmt; parks and conservatn	Gov't mgmt.	Gov't mgmt; public works	Gov't mgmt; fish and wildlife	Uncoded	
Data Used for:								
Political Ideology	Dim1, 55 th house	Dim1, 56 th house	Dim1, 73 th house	Dim1, 83 rd house	Dim1, 84 th house	Dim1, 95 th house	Dim1, 105 th house	Dim1, 109 th house
Income	Average wage manuf.	Annual wage manuf.	Annual wage manuf.	Median Income	Median Income	Per capita Income	Per Capita Income	Per Capita Income
Education	Literacy rate, over 21 yrs of age (male)	Literacy rate, over 21 yrs of age (male)	Literacy rate, over 21 yrs of age (male)	Percent attended 4 yrs college	Percent attended 4 yrs of college	Percent attended 4 yrs of college	Percent attended 4 yrs of college	Percent attended 4 yrs of college
Age	Percent of population 5-20 yrs	Percent of population 5-20 yrs	% popn 7-20 yrs	% popn 7-20 yrs	Percent Population over 20	Median age	% Popn under 18 yrs	Percent Popn under 20
Popn Density	Yes	Yes	Pct Urban	Pct Urban	Pct Urban	Pct Urban	Population Density	Population Density
Federal Land (%)	Yes	Yes	Yes	Yes	Yes	Yes	Yes.	Yes
TE Species	1967 count	1967 count	1967 count	1967 count	1967 count	1978 count	1997 count	2005 count
Critical Habitat (%)	1967 designation	1967 designation	1967 designation	1967 designat'n	1967 designation	1978 designation	1997 designation	2005 designation
Water (%)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Other				% Govt Emp	% Govt Emp	TES money	% Gov't Emp	% Gov't Emp

24 Party Line Vote Interpretation. Yes: At least 65% of Democrats voted opposite to 65% of Republicans. No: Less than 50% of Democrats voted opposite to 50% of Republicans. Partial: Between 50%-65% of Democrats voted opposite to 50%-65% of Republicans.

Table 2: Comparison Across Time, Factors in Environmental Voting

	1897	1900	1934	1953	1955	1978	1997	2005
Conservative Ideology	+++	+++	---	---	+++	---	---	---
More Education	0-	+	---	---	++	0++	0	0
Higher Income	++	0*	0*	0	0	0*	0*	0*
Higher Age	+	0-	0-	+++	0	---	0	0+++
Higher Urbanization	Ni	ni	0	0+++	0---	0--	0	ni
More Govt Emp.	Ni	ni	ni	Ni	---	---	0	0
More Water	0-	0	0	+++	0	++	0	0++
More Federal Land	0	0	0+	0	--	--	0	0
More # TES	ni	ni	0	Ni	0	0	0--	0-
More Critical Habitat	++	0-	0	0	0-	0++	0+	0+
More Dams	0**	0	0	0	0	0	0	---
Special Issue Codes	Govt mgmt; P/C	Govt mgmt F/W	Govt mgmt P/C	Govt mgmt	Govt mgmt PW	Govt mgmt F/W	U	U

Code:

0 = no effect. 0*, 0**, 0*** indicates no effect on probability with statistical significance.

+ indicates pro-environment vote more likely; - less likely, 90% significance

++ indicates pro-environment more likely; -- less likely, 95% significance

+++ indicates pro-environment more likely, --- less likely, 99% significance

0+ and 0- indicate weak support (+) or not(-) for environmental vote (in either economic or full model only)

Table 3: Comparison across time, goodness of fit

Year	Percent correct predictions			Correct negative predictions			Correct positive predictions		
	I.	II.	III.	I.	II.	III.	I.	II.	III.
1897	95.3	79.3	94	94.6	54.1	98.6	95.6	91.1	91.8
1900	92.3	80	68.8	66.7	7.4	100	97.2	93.7	62.9
1934	76.9	67.5	75.6	59.2	58.6	55.3	88.6	73.4	89.1
1953	83.1	77.2	76.6	92.2	95.8	73.3	59.3	28.7	85.1
1955	74.2	65.5	68.4	79.4	82.5	60.9	66.4	40.1	79.7
1978	81.2	70.6	70.4	86.1	82.7	59.3	73.9	52.9	86.6
1997	71.3	66.6	66.8	70.9	68.6	71.3	71.8	64.4	61.9
2005	91.5	67	83.5	92.6	73.6	84.4	90.2	59.1	82.3

Full model specification.

Economic model only

Political Dimension model only

Figure 1: Voting patterns for environment and conservation over time

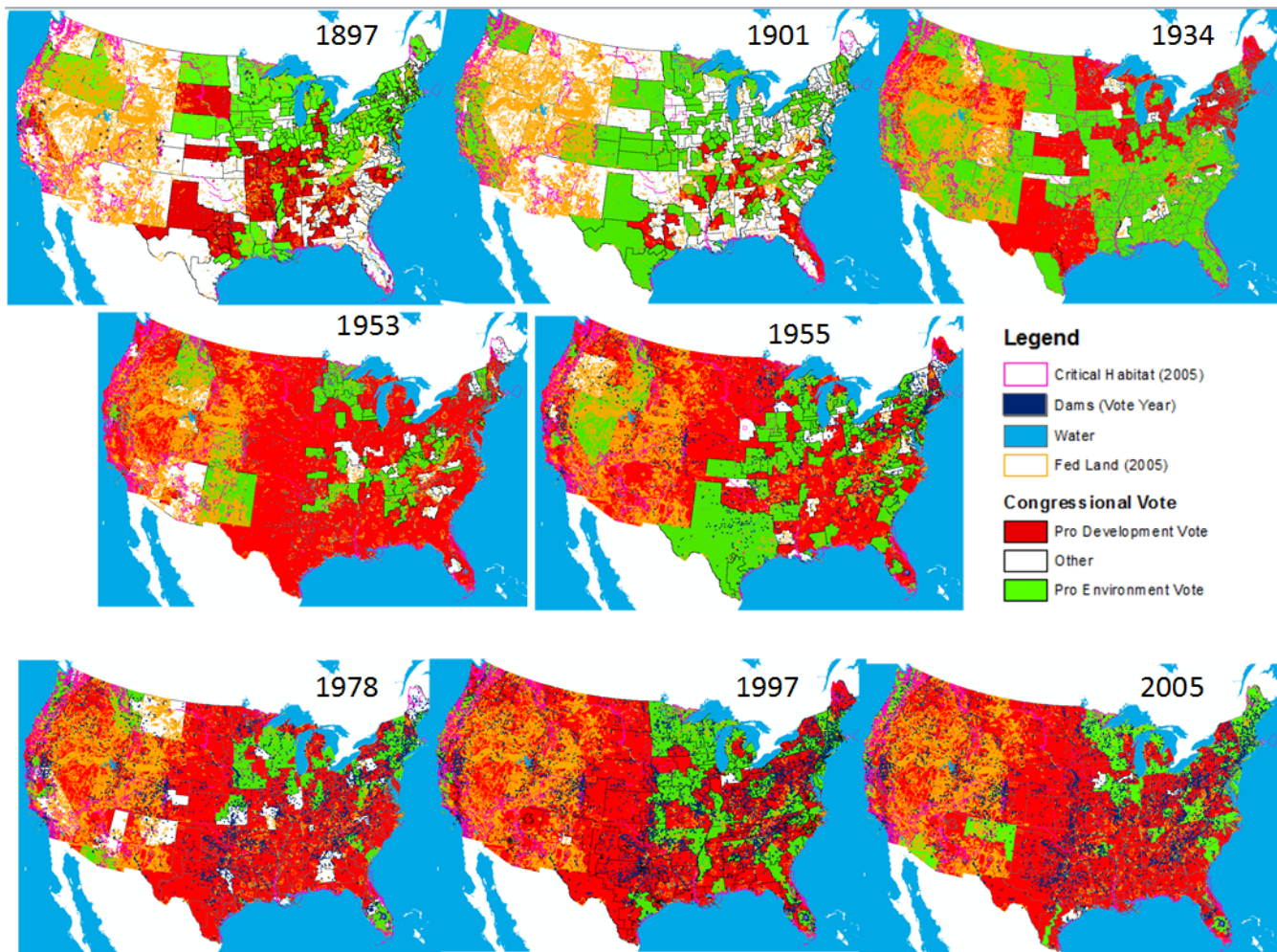
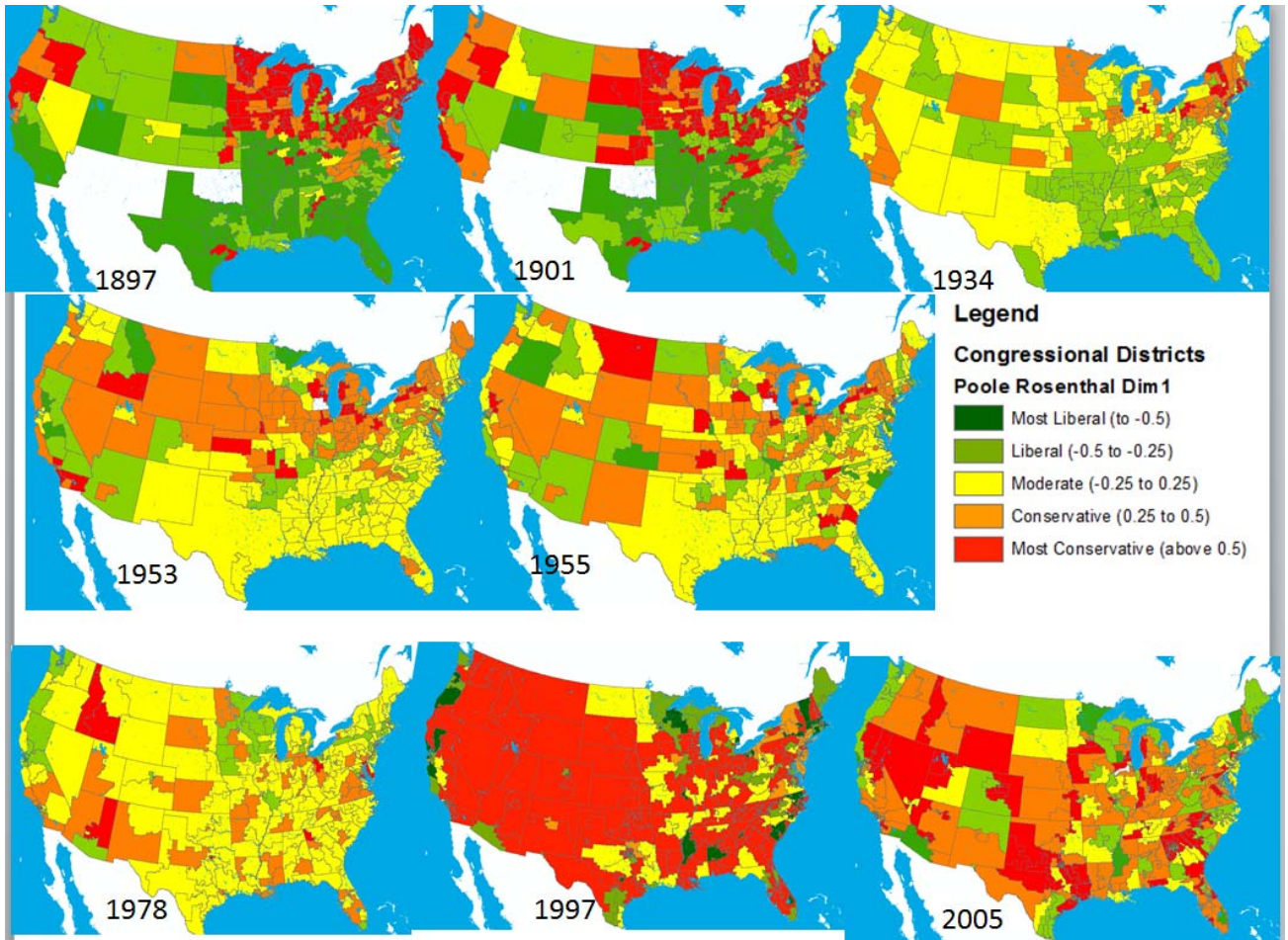


Figure 2: Ideology of the U.S. Congress House of Representatives over time.



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Appendix: Individual Vote results

There are three parts to the discussion of each vote: a verbal description of the key results, a table showing the estimated probabilities, and a figure highlighting key factors. A discussion of the variables used in the analysis is presented in the text. Since ideology is important in each regression, the discussion of that variable here will be minimal. The pro-environmental vote was “yea” for the first four acts and “nay” for the second four.

The figures illustrate the voting records, critical habitat designations over time and current federal lands.²⁵ For all votes prior to 1967, we use critical habitat as of 1967, as that is when the first listings occurred; we assume that areas which were identified as a result of the 1967 endangered species law were long known as housing valuable species that a majority found worthwhile to preserve (perhaps due to low costs). For all votes prior to this date, we use the designation for the closest year to the vote. We use current federal lands rather than federal land at the time of the vote due to a lack of spatial information. There would have been larger areas of federal land in the earliest votes, but these will also be in states with few Representatives; the vote analysis should not suffer significantly. We also used GIS to calculate the number of endangered species (presently). This captures habitat and the evolution of these areas over time to the present. Finally, we calculate the number of dams built within a 5 km radius by the time of the vote.²⁶

25 As of April 1, 2011, critical habitat has been designated for 604 of the 1,372 U.S. species, subspecies, and distinct vertebrate populations listed as threatened or endangered. (USFWS, 2014b)

26 Other spatial variables were investigated, but are generally highly correlated with, and less precise than, those we chose to use here. These include the percent of forested land and lands that by 2011 were involved in a conservation easement agreement. Because these variables are also highly correlated with regional considerations, while we tried various regional controls in alternative analysis scenarios, we found the more specific geophysical properties to be more informative. Note in particular however that many of these variables are highly correlated with being a more Western district.

Organic Act of 1897

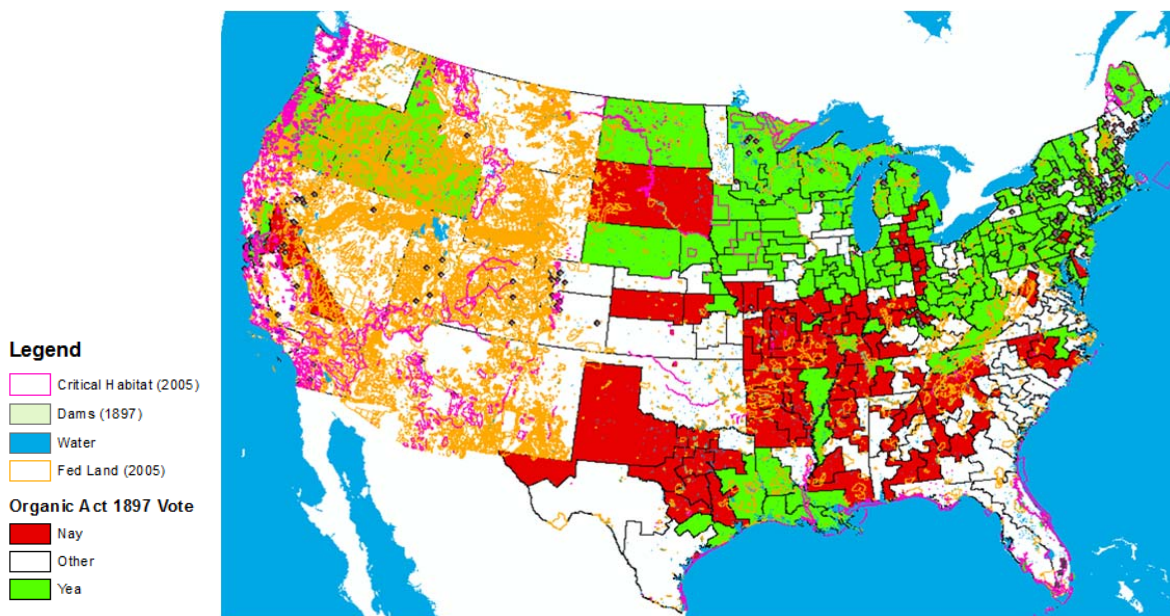
All but one Democrat who voted opposed the Organic Act, and all but 10 Republicans voted for the act. Those not voting were split rather evenly between the two parties. Third parties, consisting of 26 votes, for the most part did not vote (16 of 26), with those that did evenly split between yea and nay. As Table A1 shows, the more conservative the district's Representative, the more likely she was to vote for the act. Still, both the higher the percentage of the population that was illiterate and the higher average wages in the district increased the likelihood of voting for the act. We suggest the percent illiterate vote reflects the desire and expectation of community use of these forested lands. The half-century before had seen the rapid extraction of the forests of the upper mid-west (MI, MN, WI), and the growth of concentrated industrial activity in forestry (Weyerhaeuser), so that preservation might be considered to benefit the poorer and less educated more than others. Further, the larger the percentage of young people, the less likely the Representative voted for the environmental act. Youth may have seen the conservation as costly at their expense, restricting their access to resources. When economic variables are considered on their own, the amount of water in the district had a very positive impact on the likelihood of voting for the environment, as did the presence of future critical habitat. Most of the places critical habitat would be established did not vote, but this result only reflects the response of a small number of districts (visible in Figure A1) where ecological changes may have already been affecting resource-extraction-dependent benefits.

Table A1: Results for Organic Act of 1897

Variable	Simple Logit		
	Odds ratios (to pro-development vote)		
	Full specification	Economic Variables	Dim1 only
Conservative Ideology	1999.64 0		260.08 0
Education	1.14	1.02	
Illiterate>21	0.009	0.71	
Income avg wage	1.01 0.02	1.01 0.02	
Age	0.87	0.88	
5-20	0.06	0.06	
Water	4025.48 0.3	1.19*10 ⁷ 0.07	
Federal Land	0.14	0.3	
	0.62	0.63	
Critical Habitat	1.48*10 ¹⁷ 0.09	4.53*10 ⁸ 0.05	
Dams	1	1	
	0.03	0.1	
N. Obs	232	232	232
Wald χ^2 (p-value)	118.95 0	36.19 0	39.59 0

Notes: Robust standard errors, clustered on the 38 states. P-values below estimates. Government Employment and Urbanization excluded due to lack of data. Number of Threatened and Endangered Species dropped due to collinearity.

Figure A1: The Organic Act Vote, 1897



Lacey Act of 1900

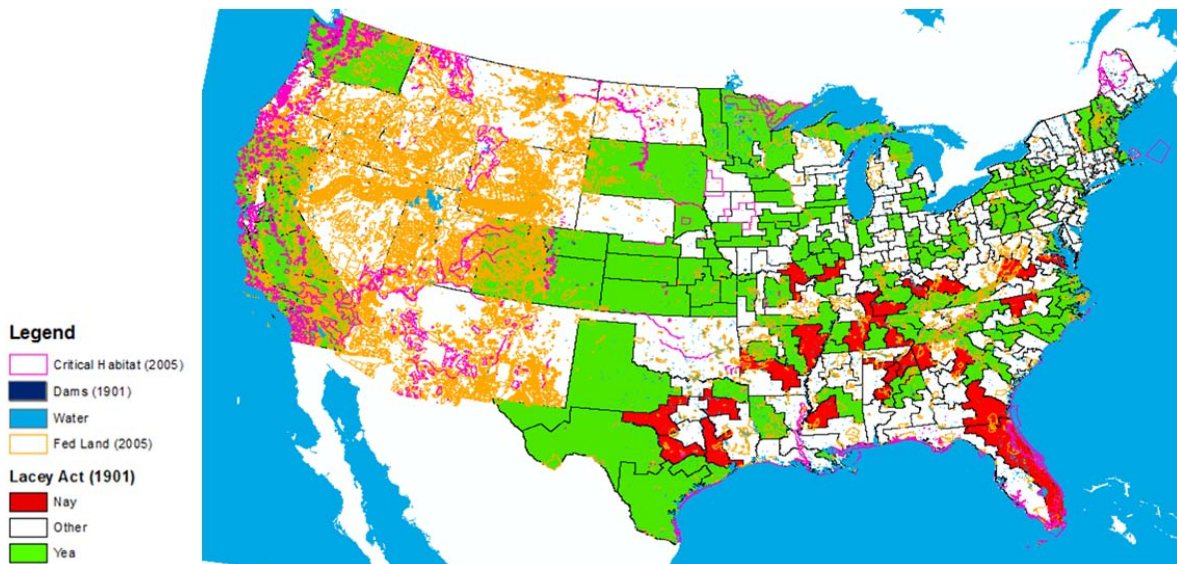
Every Congressional Republican casting a vote was in favor of the Lacey Act. The vote of Congressional Democrats was mixed; several voted for the measure. The results are shown in Table A2. The coefficients on DIM1 indicate that more conservative interests strongly favored this act, as was true of the Organic Act. Figure A2 illustrates the vote spatially. In the full specification, the greater the fraction of land devoted to what would be identified as critical habitat almost a century later significantly reduces the likelihood of voting for the act. This indicates a certain persistence in the conflict between resource conservation and resource use had already begun to take shape, possibly for identified species or habitat types. Greater illiteracy decreases the environmental vote, as does a more youthful district. We interpret this as a desire not to limit the ability to use the resources, either in the present (as correlated with Western districts) or the future (as younger). A long run ability to conserve that may come with higher incomes does not appear to have been present and accentuates the interplay between affording conservation and the availability of resource consumption.

Table A2: Results for Lacey Act of 1900

Variable	Simple Logit Odds ratios (to pro-development vote)		
	Full specification	Economic Variables	Dim1 only
Conservative Ideology	838286.50		5.920
Education illiterate>21	0.930	0.970	
Income avg. wage	0.070	0.030	
Age 5-20	10	10	
Water	0.70	0.050	
Federal Land	1.310	0.990	
	00	0.890	
	0.160	0.680	
	0.360	0.880	
Critical Habitat	0.060	0.10	
	0.30	0.40	
Dams	5.21×10^{-14}	0.002	
	0.060	0.310	
	1.440	1.210	
	0.220	0.410	
N. Obs	170	170	170
Wald χ^2 (p-value)	41.250	43.070	26.670
	0	0	0

Notes: Robust standard errors, clustered on the 37 states. P-values below estimates. Government Employment and Urbanization excluded due to lack of data. Number of Threatened and Endangered Species dropped due to collinearity.

Figure A2: The Lacey Act Vote, 1900



Everglades National Park Act, 1934

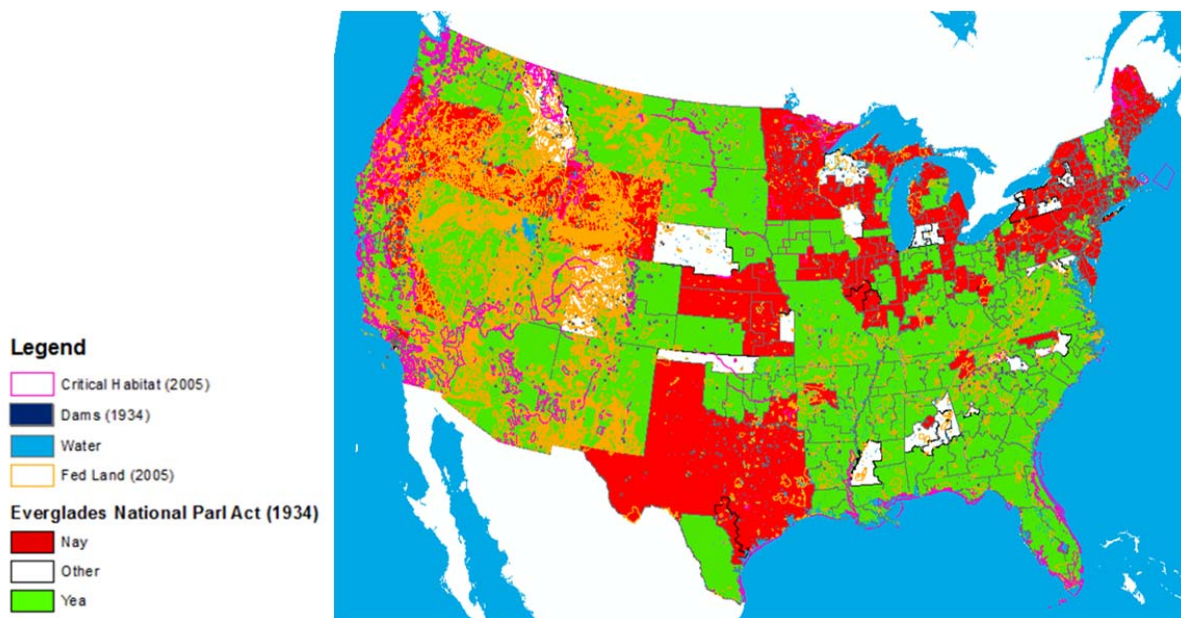
Table A3 reports the results for the Everglades National Park Act. As the table indicates, political ideology is an important variable. Here, however, the direction of effect is reversed. Inasmuch as conservatives have higher DIM1 values, the small coefficient indicates liberals were more likely to vote for the measure. Most of the nation falls in the moderately liberal category, with the Mid Atlantic and parts of the Great Lakes, Midwest and West appearing more conservative; Congress is at its most ideologically cohesive in these years. The inclusion of economic variables improves the estimation. The greater the percent illiterate, the more likely the district was to vote for the act. This is contrary to our belief that increased education should increase the demand for environmental goods. Income levels do not have a significant effect. Youth now appears to weakly prefer the environmental vote; urbanization has no effect. However, higher percentages of federal land and critical habitat both increase the probability of voting for the act, although neither is statistically significant. Figure A3 shows the spatial distribution of votes. The 1934 House had many at large districts for which state level data is used. This may account for some of the lack of precision.

Table A3: Results for Everglades National Park Creation, 1934

Simple Logit			
Odds ratios (to pro-development vote)			
	Full specification	Economic Variables	Dim1 only
Variable			
Conservative Ideology	0.03		0.01
	0		0
Education	1.19	1.24	
illiterate>10	0.006	0.001	
Income	1	1	
ann. Wage	0.2	0.054	
Age	1	1.03	
7-20	0.71	0.095	
Urbanization	1	1	
pct. Urb.	0.43	0.9	
Water	0.39	0.37	
	0.54	0.49	
Federal Land	2.94	4.85	
	0.3	0.1	
# TES	1.63	1.37	
	0.67	0.52	
Critical Habitat	12.13	16.08	
	0.57	0.43	
Dams	0.99	0.98	
	0.48	0.11	
N. Obs	381	381	381
Wald χ^2	74.27	59.09	53.51
(p-value)	0	0	0

Notes: Robust standard errors, clustered on the 48 states. P-values below estimates. Government Employment excluded due to lack of data.

Figure A3: The Everglades Park Vote, 1934



Outer Continental Shelf Act of 1953

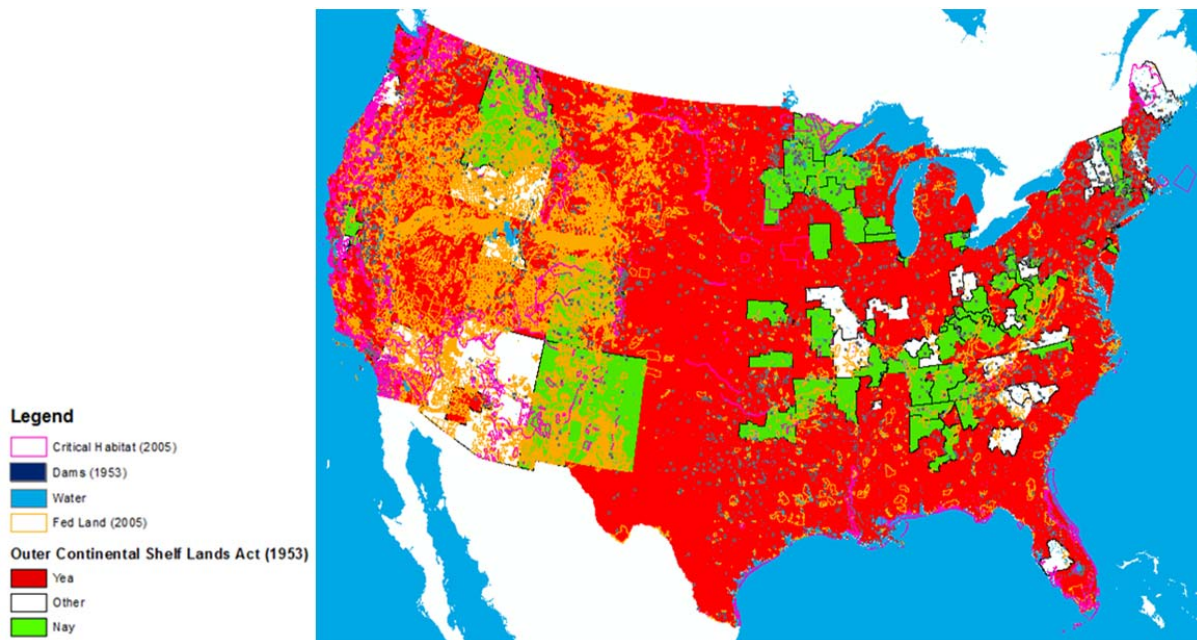
The results of the analysis for the creation of the Outer Continental Shelf Act are in Table A4, with spatial visualization in Figure A4. Conservatives vote overwhelmingly in favor of the act at the expense of environmental considerations. Additionally, the young and the educated also favor passage of the act; we see evidence that the theory that these factors should promote conservation may be weaker than the theory that educated youth are interested in economic development. Furthermore, federal lands and critical habitat do not matter, which we expect since this vote does not directly address such resources and is rather a more broadly based question about conservation for our analysis here. In the multinomial logit regression, there is weak support for the notion that a district with more critical habitat will have a representative more likely not to cast a vote; this again may be a regional conflation. This lack of significance in the OCS vote strengthens the credibility of the connection between federal lands, critical habitat, and the wildlife votes, as it is less likely that there is a missing common explanation.

Table A4: Results for Outer Continental Shelf Act, 1953

Variable	Simple Logit Odds ratios (to pro-development vote)		
	Full specification	Economic Variables	Dim1 only
Conservative Ideology	0.006		0.011
Education (pct college)	2.93*10 ⁻¹⁷	9.20*10 ⁻²⁷	0
Income (median inc)	1	1	
Age (5-20)	0.007	0.01	
Urbanization (% urban)	0.7	23.66	
Water	3.56	9.44	
Federal Land	0.36	1.26	
Critical Habitat	0.09	0.16	
Dams	1.01	1	
N. Obs	391	391	391
Wald χ^2 (p-value)	140.93	59.9	75.14
	0	0	0

Notes: Robust standard errors, clustered on the 48 states. P-values below estimates. Government Employment excluded due to lack of data. Number of Threatened and Endangered Species dropped due to collinearity.

Figure A4: The Outer Continental Shelf Act, 1953



Trinity River Dam Act of 1955

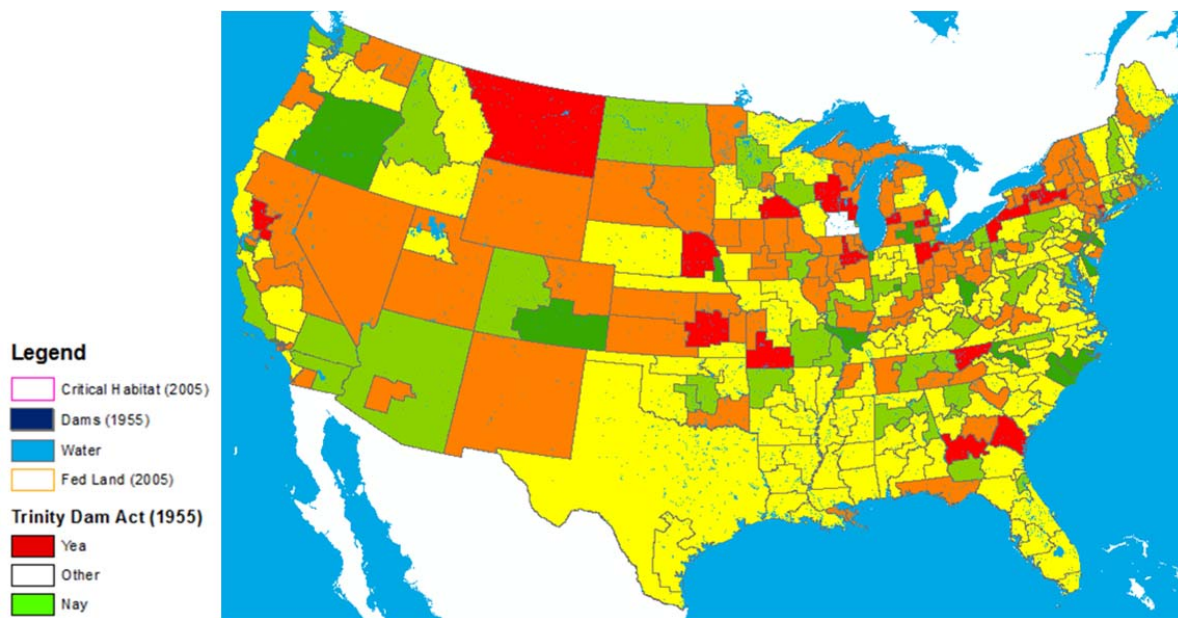
Table A5 describes the results on the Trinity River Dam Act. The vote is spatially illustrated in Figure A5. The dependent variable reflects a vote against the act, for the environmental preservation of the river and its fish. The percent of the population employed by the government, the percentage of federal land, and the prevalence of critical habitat all decrease the likelihood of voting in favor of environmental conservation. On the other hand, education has a strongly positive influence on demand for the environment. Here, as the costs become clearer and more localized, we see economic information supplementing decisions. There is direct conflict over resource uses; districts anticipating such conflict want to be able to develop (e.g. build dams), though the actual number of dams present is of little importance. Given that much of the basic research on this measure was performed by government employees, districts with more government employees perhaps were more persuaded by the research results to support the dam. Or, since such districts were more dependent on this type of legislation, they adopted "a little for you, then a little for me" mentality. In any event, this is a significant, negative effect.

Table A5: Results for Trinity Dam Act, 1955

Simple Logit			
Odds ratios (to pro-development vote)			
Variable	Full specification	Economic Variables	Dim1 only
Conservative Ideology	36.8		13.7
Education			0
% college	3.93*10 ¹¹	5.42*10 ¹⁹	
Income median inc	1	1	
Age	0.441	0.3	
5-20	6.68	2.65	
Urbanization % urban	0.35	0.6	
Govt Emp.	1.15	0.08	
% gov emp	0.9	0.002	
Water	2.14*10 ⁻¹⁴	4.93*10 ⁻¹⁵	
Federal Land	0.04	0.003	
# TES	3.44	0.63	
Critical Habitat	0.25	0.67	
Dams	0.06	0.09	
	0.02	0.04	
	0.44	0.44	
	0.4	0.37	
	0.007	0.019	
	0.07	0.16	
	0.99	0.99	
	0.43	0.52	
N. Obs	380	380	380
Wald χ^2 (p-value)	105.61	66.6	22.16
	0	0	0

Notes: Robust standard errors, clustered on 48 states. P-values below estimates.

Figure A5: The Trinity River Dam Vote, 1955



Tellico Dam Exemption, 1978

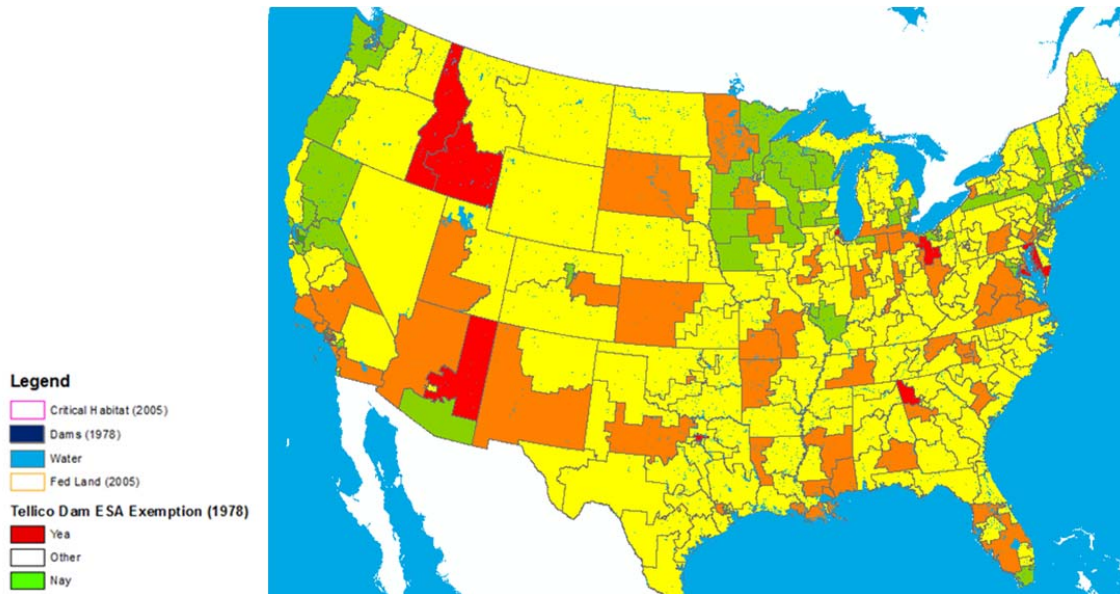
In the Tellico Dam exemption vote, the trend toward economic and spatial variables enhancing the political dimensions continues. Table A6 describes these results, and the vote is spatially illustrated in Figure A6. While conservatives voted in favor of the exemption over the environment, the addition of the same general economic variables improves the model, with several significant factors. Higher levels of education lead to higher probabilities of support for defeating the amendment and upholding the Endangered Species Act, but higher income has no effect. Contrary to our expectation, a more urban population reduces the probability of voting for the environment, though the magnitude is small. The acres of designated critical habitat, imposing restrictions on land use in a district, have a strong positive effect on the vote supporting the environment. Since delays in establishing critical habitat is one of the ways to reduce the costs of complying with the ESA, districts with designations only seven years after the passage of the act are expected to have higher local demand for environmental goods. Alternatively, such areas may have lower costs than areas that remain in limbo. This is supported by the strong negative coefficient on federal lands, which, as likely targets for additional listings and restrictions, may show the inclination to maintain more options for the land use. Again, government employment has a strong negative effect on the probability of voting in favor of the environment. The fraction of the district that is water strongly increases the pro-environmental probability, but the number of dams again has no impact.

Table A6: Results for Tellico Dam Vote, 1978

Simple Logit			
Odds ratios (to pro-development vote)			
	Full specification	Economic Variables	Dim1 only
Variable			
Conservative Ideology	0.0005		0.0098
Education	1.29	1.14	
% college	0.018	0.24	
Income per cap. Inc.	1	1	
Age	0.047	0.67	
% over 65	0.86	0.9	
Urbanization	0.01	0.003	
	0.97	1	
	0.003	0.87	
Govt Emp.	1.78×10^{-10}	1.33×10^{-7}	
% gov. emp.	0.014	0.014	
Water	126.03	87.9	
	0.04	0.004	
Federal Land	0.017	0.014	
	0.011	0.02	
# TES	1.68	0.98	
	0.34	0.96	
Critical Habitat	12.4	196.49	
	0.43	0.027	
Dams	1	1.003	
	0.68	0.714	
N. Obs	388	388	388
Wald χ^2 (p-value)	189.8	52.8	43.5
	0	0	0

Notes: Robust standard errors, clustered on 50 states. P-values below estimates.

Figure A6: The Tellico Dam Vote, 1978



Animas-La Plata Project, 1997

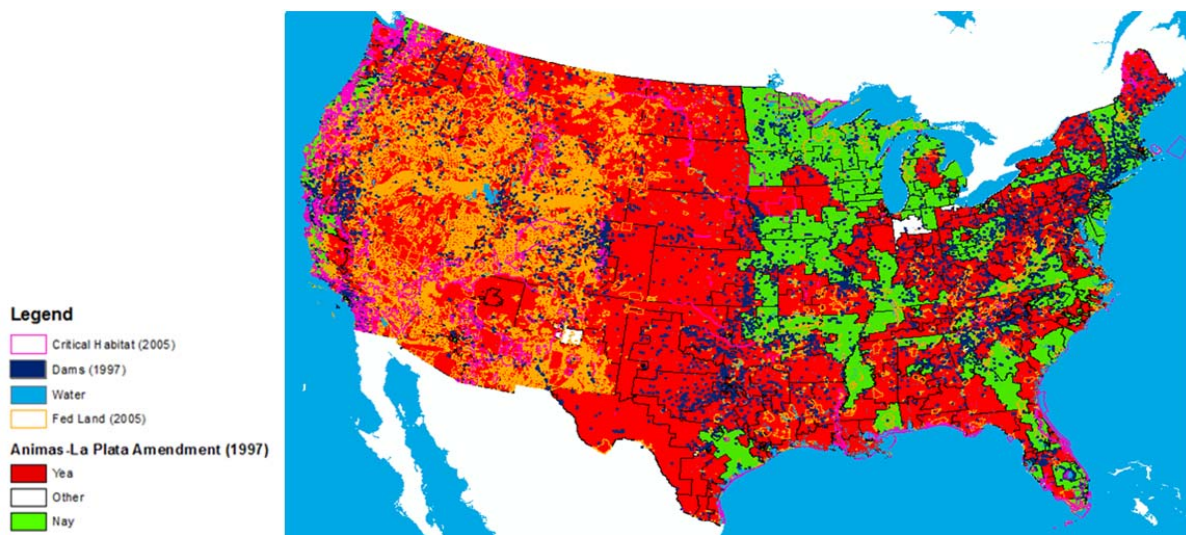
In the case of the Animas-La Plata dam, liberals voted much more for the environment. Results are shown in Table A7 and the vote is spatially illustrated in Figure A7. While economic variables improve the fit of the model, multi-collinearity is suspected as most coefficients are not significant. The effect of government employment is less clear, with no significant effect. With more threatened and endangered species, there is weak support for development over environmental protection, whereas with greater critical habitat, there is weak support for environmental protection over the dam development. This fits with the Tellico Dam exemption; assigning critical habitat may be easier in locations that favor preservation.

Table A7: Results for Animas La Plata Dam, 1997

		Simple Logit		
		Odds ratios (to pro-development vote)		
		Full	Economic	Dim1
		specification	Variables	only
Variable				
Conservative Ideology		0.190		0.210
Education		0.97	0.97	
% college		0.41	0.3	
Income per cap income		10.046	10.18	
Age		0.97	0.96	
% under 20		0.3	0.11	
Urbanization		0.84	2.61	
% urban		0.8	0.12	
Govt Emp.		0.13	18.09	
% govt emp		0.76	0.65	
Water		1.34	3.88	
		0.86	0.39	
Federal Land		0.62	0.33	
		0.62	0.17	
# TES		0.72	0.65	
		0.16	0.03	
Critical Habitat		1.66	8.85	
		0.72	0.1	
Dams		0.99	0.99	
		0.21	0.12	
N. Obs		425	425	425
Wald (p-value)	χ^2	117.950	490	50.190

Notes: Robust standard errors, clustered on 49 states. P-values below estimates.

Figure A7: The Animas-La Plata Vote, 1997



Endangered Species Act Reauthorization 2005

The 2005 Congress was highly ideologically split, with conservatives covering much of the physical space of the land, if not the population. Results are shown in Table A8 and visualized in Figure A8. Liberals are overwhelmingly more likely to vote for the environment (against the bill). Education and income have little impact. Youth has a slightly pro-development leaning, as do higher percentages of government employment. As with the Animas-La Plata vote, the number of threatened and endangered species has a negative effect on the probability of voting in favor of the environment, while the fraction of critical habitat has a positive one. The number of dams in a district has a very small significant negative impact on voting for the environment.

Table A8: Results for ESA Re-Authorization Bill, 2005

Simple Logit			
Odds ratios (to pro-development vote)			
	Full specification	Economic Variables	Dim1 only
Variable			
Conservative Ideology	0.0003		0.0053
Education	0		0
	0.97	1.03	
	0.8	0.75	
Income per cap income	1	1	
	0.001	0.75	
Age	0.89	0.98	
% under 20	0.002	0.27	
Govt Emp.	0.87	1	
% govt emp.	0.016	0.69	
Water	0.71	45.65	
	0.8	0.014	
Federal Land	0.8	0.55	
	0.8	0.38	
# TES	0.69	0.73	
	0.07	0.13	
Critical Habitat	1.96	21.99	
	0.77	0.11	
Dams	0.98	0.98	
	0.02	0	
N. Obs	424	424	424
Wald χ^2	136.3	66.4	180.16
(p-value)	0	0	0

Notes: Robust standard errors, clustered on 50 states. Urbanization not included due to data quality. P-values below estimates.

Figure A8: The ESA Reauthorization Vote, 2005

