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Public Goods Provision: Lessons from the Tellico Dam Controversy

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ABSTRACT

Although absent from the initial Endangered Species Act (ESA) of 1973, evidence of economic considerations first appeared in the 1978 amendments. The only controversial vote concerning the ESA was the one to exempt the Tellico Dam (1978). Although the dam was a local project with little expected net benefit, this article argues that broader economic considerations mattered. Working from public choice models for congressional voting decisions, a limited dependent variable regression analysis indicates the economic variables with the most explanatory power for this environmental decision are college education, poverty, the designation of critical habitat within a district, the number of endangered species in the state, dollars the state received due to earlier ESA funding, and the percentage of the district that is federal land. Comparisons with aggregated environmental votes in the same year highlight the intensity of economic considerations in the Tellico case. Our results imply that the ESA's prohibitions have worked successfully to give weight to nonquantifiable and dispersed benefits in the face of concentrated and visible costs.

INTRODUCTION

The man said that these prodigious animals had heard about the ark and were coming. Coming to get saved from the flood. And not coming in pairs, they were ALL coming: they didn't know the passengers were restricted to pairs ...and wouldn't care a nap for the regulations, anyway—

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> they would sail in that Ark or know the reason why. The man said the Ark would not hold half of them; and moreover they were coming hungry, and would eat up everything there was, including the menagerie and the family....Those powerful animals would be of inestimable value to man now, when transportation is so hard pressed and expensive, but they are all lost to him.[1]

In the early 1960s, new ideas about the quality of life emerged, including new concerns about human beings and their physical environment. The concept of species preservation ultimately became the Endangered Species Act (ESA) of 1973.[2] Congress passed legislation to address a narrowly defined, purely biological issue. By defining the issue so narrowly, Congress ignored economic considerations. Yet, the economic costs of this act and subsequent amendments (plus two predecessors and several related statutes)[3] have been extraordinary, while the benefits have eluded quantification. Listing a single species can result in thousands of jobs lost and millions of acres restricted from its most remunerative use.[4] Renewal of the act has been stalled for several years because of these economic considerations. When did the pendulum shift?

The ESA and two earlier acts passed both houses of Congress with overwhelming majorities, usually by voice votes.[5] There was one exception to this consensus behavior, the 1978 vote to exempt the Tellico Dam from the ESA. This vote highlights the public goods problem endemic to species preservation: the costs are localized, visible, and concentrated, while the benefits are uncertain and widely distributed. This vote is one of few places in wildlife law where the opportunity exists to examine the tradeoff between biodiversity and economic costs.

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1. MARK TWAIN (SAMUEL LANGHORNE CLEMENS), LETTERS FROM THE EARTH, *Letter V* (HarperPerennial, Bernard DeVoto ed., 1991) (1909).

2. 16 U.S.C. §§ 1531–1540 (1973).

3. Endangered Species Preservation Act of 1966, Pub. L. No. 89-669, 80 Stat. 926 (repealed 1973); Endangered Species Conservation Act of 1969, Pub. L. No. 91-135, 83 Stat. 275 (repealed 1973); Marine Mammal Protection Act of 1972, 16 U.S.C. §§ 1361–1407.

4. The political economy of the listing process is discussed in Amy Whritenour Ando, *Waiting to Be Protected under the Endangered Species Act: The Political Economy of Regulatory Delay*, 42 J.L. & ECON. 29 (1999). The incentive of landowners to preemptively destroy habitat is discussed in Dean Lueck & Jeffrey A. Michael, *Preemptive Habitat Destruction under the Endangered Species Act*, 46 J.L. & ECON. 27 (2003).

5. All voting in Congress is a matter of public record. "However, not all floor votes are roll call votes. There are voice votes ('aye' or 'no') and division or standing votes (where the presiding officer counts Members), and these types of votes do not indicate by name how a Member voted." U.S. Senate, *How to...find out about congressional voting, available at* http://www.senate.gov/reference/common/faq/how_to_votes.htm (last visited Nov. 17, 2003).

This article explores the question of whether economic concerns mattered in the congressional vote to exempt the Tellico Dam.

Experts, particularly Mehmood and Zhang,[6] have investigated this vote within the context of public choice. This article improves upon previous analyses in three ways. First, the data analyzed are at the congressional district level for most variables, including species and habitat, which allows closer scrutiny of district choices. Second, the multi-dimensional role of the presence of endangered species in a district is separated into four effects: listed species were in a district; critical habitat had been designated early, signifying serious threats, high benefits, and/or low costs of compliance; states could receive federal funds made available for compliance with the ESA; and disputes over endangered species often disguised disputes over land use, particularly federal lands utilized by multiple and potentially conflicting constituents. Third, this article places the Tellico vote in the context of other environmental legislation of the same year. This permits a consideration of the extent to which a representative's support for the act is based on a strict analysis of the true costs and benefits to the district of this particular enactment rather than simply demonstrating support as a generalized environmental concern. This is of particular interest because it addresses the overwhelming support for endangered species legislation within the context of imperfect information about the consequences of a prohibitive act versus a simple warm-glow argument for environmental causes.

Potential economic impacts were not discussed during the House hearings on the ESA and received little notice in the Senate hearings. The questions surrounding endangered species were perceived as strictly scientific, ones that could be answered by experts without regard to economic impact. This reason is the one customarily given for Congress's passage of the ESA with such an overwhelming majority.[7] Congress therefore addressed the problem of endangered species with a prohibitive policy that lessened the likelihood that competing interests could be balanced.[8]

One of the competing interests is the economic interest of those whose resources (especially land and water) are affected by the ESA. The act's prohibitions "take" from the owner the right to use the land in

6. Sayeed R. Mehmood & Daowei Zhang, *A Roll Call Analysis of the Endangered Species Act Amendments*, 83 AMER. J. AGRIC. ECON. 501-12 (2001).

7. Jon A. Souder, *Chasing Armadillos Down Yellow Lines: Economics in the Endangered Species Act*, 33 NAT. RESOURCES J. 1095 (1993) (arguing that Congress believed such species were what came to be called "charismatic megafauna" rather than "uncharismatic microfauna").

8. *See generally* STEVEN LEWIS YAFFEE, PROHIBITIVE POLICY: IMPLEMENTING THE FEDERAL ENDANGERED SPECIES ACT (1982).

particular ways, potentially the ways in which the market valued its marginal revenue product prior to the ESA's inception. Nevertheless, it is widely believed that the benefits of prohibition far outweigh the costs, regardless of their size. Many critics have noted that no allowance for compensation exists.[9]

The benefits of species preservation are viewed as long-run and diffused over many future generations, while those of alternative uses (*e.g.*, food production for the poor) are short-run and far easier to quantify. One benefit of preservation is ecological; the survival of the human species depends on the survival of other species. To use the conventional metaphor, there is a common fabric of life, and the loss of even a few threads could lead to a rapid unraveling, a mass extinction. While there are estimates of the value of one human life, how does one put a value on the disappearance of a species?[10]

The other benefit is economic—the potentially valuable, as-yet-unknown information otherwise irretrievably lost as a result of extinction.[11] To quote Edward Wilson,

> The surviving biosphere remains the great unknown of Earth in many respects. On the practical side, it is hard even to imagine what other species have to offer in the way of new pharmaceuticals, crops, fibers, petroleum substitutes and other products. We have only a poor grasp of the ecosystem services by which other organisms cleanse the

9. *See* Richard L. Stroup, *The Economics of Compensating Property Owners*, 15 CONTEMP. ECON. POL'Y 55 (1997).

10. *See* W. Kip Viscusi, *The Value of Risks to Life and Health*, 31 J. ECON. LITERATURE 1912 (1993); Robert Costanza et al., *The Value of the World's Ecosystem Services and Natural Capital*, 387 NATURE 253 (1997) (arguing that ecosystem services are valued at levels several times greater than world GDP); John Loomis & Douglas S. White, *Economic Benefits of Rare and Endangered Species: Summary and Meta Analysis*, 18 ECOLOGICAL ECON. 197-206 (1996) (providing an overview of value estimates of endangered species); Daniel A. Hagen et al., *Benefits of Preserving Old-Growth Forests and the Spotted Owl*, 10 CONTEMP. POL'Y ISSUES 13 (1992) (providing a prototypical contingent valuation study of willingness to pay to preserve old-growth forests and the spotted owl); Martin L. Weitzman, *The Noah's Ark Problem*, 66 ECONOMETRICA 1279 (1998); Andrew Metrick & Martin L. Weitzman, *Conflicts and Choices in Biodiversity Preservation*, 12 J. ECON. PERSP. 21 (1998) (addressing theoretical concerns in valuation of biodiversity).

11. R. David Simpson et al., *Valuing Biodiversity for Use in Pharmaceutical Research*, 104 J. POL. ECON. 163 (1996). *See also* Gordon C. Rausser & Arthur A. Small, *Valuing Research Leads: Bioprospecting and the Conservation of Genetic Resources*, 108 J. POL. ECON. 173, 173-206 (2000) (discussing the potential for pharmaceutical or scientific research gain from biodiversity, which may be quite low). There is also an aesthetic benefit. *See generally* E.O. WILSON, BIOPHILIA (1984) (arguing that the sensory and intellectual stimulation we derive from other life forms is a basic human need).

> water, turn soil into a fertile living cover and manufacture the very air we breathe.[12]

Each organism contains a genetically coded blueprint that permits scientists to produce those pharmaceuticals, crops, and the like. The only way we can retain the information from, say, a seemingly insignificant fish is to protect it, to preserve it, and to prohibit alternatives that threaten it.

By 1978, there was considerable concern expressed about the act's economic impact, and the Tellico case was the "lightning rod that attracted attention to the uncompromising nature of the Act's requirements."[13] Economic interests were reflected in the 1978 amendments to the ESA, which were passed by voice vote. Were they also apparent in the October 1978 vote to exempt the Tellico Dam? The idea that Congress would initiate a prohibitive policy concerned with maximizing distant and uncertain benefits is surprising given that one expects utility-maximizing politicians to be myopic. Can the overwhelmingly favorable vote on the ESA be attributed to a lack of understanding of the act's potential economic ramifications?

The first section of this article discusses the background of the lack of economic considerations in the ESA. The second section discusses the events surrounding the battle between the Snail darter and the Tellico Dam. When the economic impact of ESA's prohibitions created a real problem and experts could not find an answer that balanced competing interests, they turned to Congress. The third section presents some conceptual issues, while the hypothesis that economics played a measurable and significant role in the exemption vote is analyzed in the fourth section. We conclude that economic interests were represented in the vote. The final section discusses the immediate aftermath of this episode, where votes on extending the ESA have been overwhelming majorities in favor of protection and prohibition. In the last decade or so, economic considerations (*e.g.*, the presence of a "Tellico-like" situation in one's own district) have stalled votes on extensions.

I. THE LEGAL UNDERPINNINGS

Following the American Revolution, the legal doctrine of state ownership of wildlife emerged.[14] By the end of the century, however, the

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12. E.O. Wilson, *Is Humanity Suicidal?*, N.Y. TIMES MAG., May 30, 1993, at 29.

13. Souder, *supra* note 7, at 1102.

14. The powers held by the English crown and Parliament devolved to the states. Excellent overviews can be found in MICHAEL J. BEAN, THE EVOLUTION OF NATIONAL WILDLIFE LAW (1983); Dean Lueck, *The Law and Politics of Federal Wildlife Preservation, in* POLITICAL ENVIRONMENTALISM (Terry L. Anderson ed., 1999); Dean Lueck, *Ownership and*

federal government began to assert itself. Dean Lueck has argued that the geographical jurisdiction of the party controlling wildlife stocks is a function of the stock's territory. Hence, the federal government became involved with migratory species whose territorial requirements crossed state lines. The drafting of the Lacey Act,[15] the Migratory Bird Act,[16] and other early federal statutes was motivated, at least in part, by what was perceived as an accelerating rate of species extinction. Both the extent of wildlife protected and the nature of the protection were narrowly defined in these laws.

The motivation for the Endangered Species Preservation Act[17] was the "broadening knowledge about endangered species, growing public concern for protecting non-game animals, pressure from administrative experts, and congressional awareness of a symbolic issue that 'no one was against....'"[18] In August 1964, the Interior Department published a "preliminary copy" of the "Redbook," the first official federal list of endangered species.[19] The 62 vertebrate species were selected solely on the basis of biological data and informal expert opinion.[20] The act authorized the Secretary of the Interior to use the land acquisition authority of existing laws to meet the act's goals; none of this was viewed as incurring any real costs.[21] The Endangered Species Conservation Act[22] extended this approach internationally.[23]

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the Regulation of Wildlife, 29 ECON. INQUIRY 249 (1991); Dean Lueck, *The Economic Nature of Wildlife Law*, 18 J. LEGAL STUD. 291 (1989); YAFFEE, *supra* note 8.

15. Lacey Act, ch. 533 § 1, 31 Stat. 187 (1900).

16. Migratory Bird Treaty Act, 16 U.S.C. § 703-712 (1918).

17. Endangered Species Preservation Act of 1966, Pub. L. No. 89-669, 80 Stat. 926, *repealed by* Endangered Species Act of 1973, 16 U.S.C. §§ 1531-1544 (1982).

18. YAFFEE, *supra* note 8, at 39. Responsibility for administering federal law currently resides in the Fish and Wildlife Service of the Interior Department and the National Marine Fisheries Service of the Commerce Department. *Id.*

19. The list is contained in Endangered and Threatened Wildlife and Plants, 50 CFR §§ 17.11-17.12 (2003).

20. The book was the work of the Committee on Rare and Endangered Wildlife Species, a group of nine biologists appointed by the Bureau of Sports Fisheries and Wildlife, U.S. Dep't of the Interior. The copy was "preliminary" because, as the committee explicitly admitted, the criteria for listing were not clearly defined. Since the Redbook listing did not signify formal federal protection, there could be no harm. The first official list in 1968 included 142 species.

21. Especially since the U.S. Department of the Interior testified that only 78 species were involved, an increase of 16 in the years since the publication of the "preliminary" copy of the Redbook.

22. Endangered Species Conservation Act of 1969, Pub. L. No. 91-135, 83 Stat. 275 (repealed in 1973).

23. The legislation directed the government to encourage other countries to join the effort to conserve wildlife. In particular, the government was to convene an "international ministerial meeting" that would lead to "a binding international convention on the conservation of endangered species." Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), Mar. 3, 1973, 27 U.S.T. 1087. As the title suggests,

President Richard Nixon, in his Environmental Message of February 1972, noted that this body of law "simply does not provide the kind of management tool needed to act early enough to save a vanishing species." Nixon proposed legislation that "would make the taking of endangered species a federal offense, and would permit protection measures to be undertaken before a species is so depleted that restoration is impossible."[24] The result was the Endangered Species Act. The act categorized species as either "endangered" or "threatened."[25] 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 act made the taking of an endangered species anywhere within the United States a federal offense.

Mann and Plummer argue that the key difference between the ESA and the earlier acts was the elimination of the word "practicable."[26] Earlier legislation encouraged other federal agencies to safeguard biodiversity "where practicable," a phrase that allowed for balancing. In practice, other agencies rarely found such action practicable. By eliminating the word, a failure to balance was replaced with wording that eliminated balancing altogether, which created a prohibitive policy. Congress evidently did not appreciate the significance of this subtle change. While the authors of the ESA did, they did not anticipate its economic implications.

Yaffee argues that the act embraced a "prohibitive policy" for three reasons. First, the issue was symbolic; no one seemed to notice that Congress essentially banned a natural process—extinction. The hearings in the House and Senate focused on such issues as states' rights, the listing process, and the rights of individuals, particularly Alaskan natives, to take a member of an endangered species.[27] Second, the endangered species problem was defined as a technical one by scientific experts rather than as one involving a tradeoff between conflicting social goals. The Act made it clear that economic considerations could not be used when listing a species nor when designating *proposed* "critical habitat," a concept that was not defined in the ESA but came to mean

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CITES is limited to trade; it does not provide a comprehensive blueprint for species preservation.

24. *Quoted in* BEAN, *supra* note 14, at 329; YAFFEE, *supra* note 8, at 49.

25. In the Marine Mammal Protection Act (16 U.S.C. §§ 1361–1407 (1972)), special protection was available once a species was considered "depleted," but not yet "endangered." This division was limited to animals in 1973; it was extended to plants in the 1978 amendments. The compromise with the fur industry requiring that species be "threatened with worldwide extinction" was dropped.

26. CHARLES C. MANN & MARK L. PLUMMER, NOAH'S CHOICE: THE FUTURE OF ENDANGERED SPECIES 158-60 (1995).

27. Souder, *supra* note 7, at 1101.

"essential for preservation."[28] There was no attempt to make even a rudimentary cost-benefit calculation, although the possible effects on future economic development were mentioned during Senate hearings. Finally, it was not clear whose interest would be harmed before the fact as "Congress defined the law prohibitively because no one told them not to."[29] The bill passed the Senate 92 to 0 on July 24 and the House 390 to 12 on September 18. Shortly after the Act was passed, concerns arose and Congress began to consider the cost of species preservation. One set of concerns was economic. Amendments passed in 1978 inserted economic considerations in two places to provide balance. One place was during the phase when critical habitat was *determined*. The other was the creation of the Endangered Species Committee (also known as "the God Committee") in which a super-majority could exempt a project from the prohibitions of the ESA.[30]

Interest group "watchdogs" were expected to complain when they perceived that "a critical habitat" was endangered, which is exactly what they did in Tennessee. As Yaffee has documented persuasively, "There is in fact enormous amounts of uncertainty and latitude involved in these seemingly technical decisions. Choice and judgment are pervasive."[31]

II. THE TELLICO DAM CONTROVERSY

The ESA held species preservation to be an important American "value," one that had a monetary value of infinity. The law was specific—any and all actions that brought harm to a threatened or endangered species (broadly defined to include habitat) were prohibited. Any action, no matter how profitable to an individual, a firm, or even society, could be stopped. Or could it?

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28. In practice, this could include all or just a portion of the existing habitat.

29. YAFFEE, *supra* note 8, at 47. Congressional hearings revealed little opposition. In fact, there was no testimony from anyone who could be considered as having a direct economic interest.

30. Another concern reflected the broad interpretation given to the word "species." Until the 1960s, scientists estimated the total number of species at approximately 3 million. Advances in both taxonomy and statistics over the next two decades caused that estimate to be raised to 10 million. This explosion suggests the possibility that many more species, especially "minor" ones, were endangered than originally believed. The explosion forced the staff of the Fish and Wildlife Service's Office of Endangered Species to establish some priorities in selecting species for review. YAFFEE, *supra* note 8, at 18.

31. *Id.* at ix. *See also* Ando, *supra* note 4.

The Tellico Dam project provided an almost immediate test of the ESA and its prohibitive policy.[32] The dam was conceived in the late 1930s, but the Tennessee Valley Authority (TVA) did not fund it until 1967.[33] The project was controversial from the outset. It 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 higher residential land values and recreational opportunities, including a new community of 50,000. In the process, it would eliminate Tanasi, capitol of the Cherokee nation, other cultural sites, and about 600 family farms on prime agricultural land. It would also change the ecology of a wild river with superb trout fishing to that of a regulated reservoir.

In 1969, Congress passed the National Environmental Policy Act (NEPA)[34] mandating that an Environmental Impact Statement (EIS) must be filed when a proposed action would likely affect the environment. The TVA tried to avoid filing an EIS and was sued successfully in 1971 as a result. Cherokee leaders, who originally opposed the dam, agreed to the resumption of construction when the EIS included promises of archeological surveillance and a Cherokee cultural center. These negotiations delayed the resumption of construction until 1973.

This delay proved just long enough for the dam to face another legal innovation—the ESA. In accordance with the 1960s acts, surveys of the area's endangered species were underway, but the provision for the preservation of critical habitat in the 1973 act presented a new problem. In 1973, a biologist opposed to the dam found a previously unknown (and therefore rare) fish, the Snail darter, a member of the perch family, while snorkeling in the Little Tennessee River below the dam. Over the next two years scientists determined that 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.[35] So, although the dam was nearly complete, a court order halted the project.

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32. *See generally* TVA: FIFTY YEARS OF GRASS-ROOTS BUREAUCRACY (Paul K. Conkin & Erwin C. Hargrove eds., 1983); WILLIAM BRUCE WHEELER, TVA AND THE TELLICO DAM, 1936–1979 (1986).

33. Congress authorized funds in 1942, but the War Production Board took them within four months. The dam was reauthorized in 1966. MANN & PLUMMER, *supra* note 26, at 164.

34. National Environmental Policy Act of 1969, 42 USC §§ 4321-4370f.

35. In an attempt to comply with the ESA and complete the dam, specimens were successfully transplanted from the Little Tennessee River to form a new population in a nearby river. After the fact, the Snail darter was found living in several other locations.

The TVA argued that the project should be exempt from the 1973 requirements because it had begun construction before Congress passed the law. The courts, by denying the TVA the right to complete the dam, essentially chose to leave this decision to Congress. In early 1978, at the urging of Senate minority leader Howard Baker of Tennessee, Congress created the "God Committee" in response to the Tellico situation.[36] After reviewing the facts, this committee unanimously rejected the TVA's request for an exemption in January 1979.[37] The TVA's only remaining recourse was Congress.

Tennessee Congressman Duncan, with the assistance of Senator Baker, had 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 (231 to 57: R 99 to 30, D 132 to 127)[38] in October of 1978. The Senate waited on the decision of the God Committee, then rejected the amendment (43 to 52: R 23 to 17, D 20 to 35)[39] the following June. The next day, the congressman from the Tellico district added the exemption to a Public Works Appropriation bill that immediately passed the House. 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.

Beneath the political machinations, there was a clear reality—the "devastatingly absolute" strictness of the ESA had been, and could be, circumvented for economic reasons. When the issues were broad and nonspecific, congressional votes for the protection of species were overwhelmingly in favor of protection. When the issue became specific, when a small fish with little market or recreational value stopped a federal project involving many millions of dollars, congressmen became much more sensitive to economic concerns. Who was to say that a Snail darter would not turn up in one's own district?

III. THEORETICAL CONSIDERATIONS

Before addressing whether economic concerns impacted the vote to exempt the Tellico Dam, the question of how representatives vote must be addressed in order to determine if some aspects of the Tellico vote can be explained by political machinations.

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36. Souder, *supra* note 7, at 1104.
37. MANN & PLUMMER, *supra* note 26, at 171.
38. Vote 813, 34 CONG. Q. ALMANAC 230-H (1978).
39. S1143, Endangered Species Act, Vote 128, 35 CONG. Q. ALMANAC 23-S (1979).

A. The Tellico Vote and Some Political Considerations

The Tellico Dam project has the qualities of a typical public works project; the direct benefits accrue to a limited, localized minority while the costs are dispersed. One expects log-rolling, or vote trading, in such a situation.[40] Further, there is an ideological dimension to this vote that involves voters' attitudes toward the tradeoff between economic growth and endangered species and their attitudes toward the TVA (or public works projects in general). With Senator Baker as Senate minority leader, Republican votes were going to be affected by his position.

1. Log-rolling

Although log-rolling is often present in a public works bill for water projects, the likelihood of its presence in the vote on this amendment was small because the beneficiaries of the dam were a few Tennesseans. While Tennessee's congressmen might have been more than willing to trade votes, there is no evidence of log-rolling in the *Congressional Record* or elsewhere in the literature.[41] If vote trading had been used to attain this majority, many unnecessary trades would have occurred as the measure passed by a substantial majority in the House and failed in the Senate. Consequently, while it might have occurred, log-rolling was not considered a significant factor in the House vote.[42]

2. Ideology

In many ways, the Tellico Dam vote was a test of the increasing powers granted to wildlife protection over the century as each of the acts mentioned in the first section passed with substantial majorities. Few congressmen wanted to go on record saying they were against actions that might prevent the extinction of an endangered species. The Tellico vote was the first congressional test of the adopted prohibitive policy and the ESA was altered by it. The insistence that economic criteria be set aside in determining the future of an endangered species (and its habitat) failed to accommodate the case of a relatively obscure species directly in

40. Thomas Stratmann, *The Effects of Logrolling on Congressional Voting*, 82 AM. ECON. REV. 1162 n.5 (1992).

41. See generally DOUGLAS A. IRWIN & RANDALL S. KROSZNER, *Log-Rolling and Economic Interests in the Passage of the Smoot-Hawley Tariff* 45 CARNEGIE-ROCHESTER CONF. SERIES ON PUB. POL'Y 173-200 (1996) for a statistical documentation of log-rolling by comparing Senate voting patterns as a means to predict voting on related amendments, using controversial 1930 legislation as an example and discussing contemporary studies related statistically. There is no mention of vote trading anywhere in the literature and no obvious alternative vote to use to test for the presence of trading.

42. It is possible that votes were traded in the Senate vote that finally passed the exemption in July 1979.

conflict with an expensive federal project. While the ESA required that any decision regarding the listing of species and their critical habitat ignore economic concerns and focus exclusively on the best scientific evidence available, Congress faced no such constraint in this vote.

Thus, a second layer of ideological thinking emerges that weighs the act's uncertain benefits and costs against those of the dam. Levitt, who studied Senate votes, suggests that a Senator's own ideology is the primary determinant of roll-call voting patterns and voter preferences play a less significant role.[43] One of the assumptions of Levitt's work, however, is that "state voter preferences are assumed to be reasonably proxied by the roll-call voting patterns of a state's House delegation." Members of the House might be more likely to vote in a manner reflecting the preferences of voters in their district because they represent smaller, potentially less diverse constituencies. Their ideology has been shaped by the same influences as the voters in their district.

Since the ideological question of the role of the government in preserving endangered species had been answered several times before the Tellico Dam controversy, with virtually every voter choosing preservation, the vote on this exemption should represent the weighing of the costs of federal preservation versus its benefits.

3. Party politics

Senator Baker issued a directive that Republicans should vote in favor of the exemption, and most did. The Republican vote in the House was 99 to 30 in favor. Democrats, however, were split almost down the middle, with a vote of 132 to 127 in favor.[44] Political affiliation was clearly a more important aspect of the vote for Republican congressmen. Research on general political trends of party and ideology toward environmental issues support the hypothesis that liberals are more concerned about environmental quality than conservatives. While both weigh heavily, this ideological split appears stronger than the corresponding party split.[45] Hence, we began to analyze the Tellico vote by controlling for ideology.

Poole and Rosenthal explain the underlying patterns in congressional roll-call votes with two D-NOMINATE dimensions.[46] They assign

43. Voter preferences accounted for only one-fourth of the weight in Senators' utility functions.

44. *See* Vote 813, *supra* note 38.

45. Kent D. van Liere & Riley E. Dunlap, *The Social Bases of Environmental Concern: A Review of Hypotheses, Explanations, and Empirical Evidence*, 44 PUB. OPINION Q. 181, 187 (1980).

46. *See* Keith T. Poole & Howard Rosenthal, *Congress and Railroad Regulation: 1874 to 1887*, *in* THE REGULATED ECONOMY: A HISTORICAL APPROACH TO POLITICAL ECONOMY 81-

"a coordinate pair representing the legislator's position in a two-dimensional Euclidean space" to each legislator who ever served in Congress.[47] The first dimension is generally aligned with political ideology, often (though not always) translatable as political party. The second dimension varies across time.[48] For the 1970s, the second dimension appears to be related to a district's relative poverty. Their work provides us with a tool through which we might gauge how big a role ideology played in the vote. Although party politics are clearly an important factor, there had to have been something strong enough to convince 30 Republicans to vote against the wishes of Senator Baker and 152 Democrats to vote against the wishes of President Carter, who opposed the exemption.

B. What Economic Influences Might Affect a Congressman's Vote?

It is often assumed that a Representative's utility is maximized through reelection, which requires that they maximize the utility of a majority of their constituents. Thus, the vote on the Tellico Dam exemption should reflect a district's priorities regarding the economic tradeoffs between endangered species preservation and potential economic growth.

In the Tellico case, the benefits of maintaining the Snail darter's habitat accrue in small amounts to almost everyone, but their value is largely subjective (existence values) or uncertain (option values).[49] These attributes provide considerable economic rationale for a prohibitive conservation policy. Where costs are not specific, such as those in the ESA itself, votes tend to be overwhelmingly in favor of species preservation. Where potential costs are definable, as in the Tellico case, the situation becomes controversial nationally, even though, in the case

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120 (Claudia Goldin & Gary D. Libecap eds., 1994) [hereinafter Poole & Rosenthal, *Congress and Railroad Regulation*]; Keith T. Poole & Howard Rosenthal, *The Enduring Nineteenth-Century Battle for Economic Regulation: The Interstate Commerce Commission Act Revisited*, 36 J.L. & ECON. 837 (1993); Keith T. Poole & Howard Rosenthal, *Patterns of Congressional Voting*, 35 AM. J. POL. SCI. 228 (1991); Keith T. Poole & Howard Rosenthal, *A Spatial Model for Roll Call Analysis*, 29 AM. J. POL. SCI. 357 (1985).

47. Poole & Rosenthal, *Congress and Railroad Regulation*, *supra* note 46.

48. *Id.* For example, Poole and Rosenthal discuss the split in the late 1800s as one between agrarian and urban interests. *Id.*

49. Existence values are what one holds for a good or amenity that may never be used. In this case, the existence value of an individual for the Snail darter is simply the utility an individual gets from knowing the species continues to exist. Option values are what one holds for a good or amenity based on its potential future value. In this case, the value one might hold for the Snail darter is the hope it contains some future market (or other) value such as in pharmaceuticals or as a biological necessity for the maintenance of a valued ecosystem.

of the Snail darter, the direct costs of the decision were localized to Tennessee.[50] This case put dollars and species together in such a way that the subjective probability of a similar, expensive case in one's own neighborhood increased significantly.

From this perspective, when Representatives were forced to choose between the preservation of a single, non-charismatic endangered species and localized federal spending, several demographic, ecological, economic, and political variables within a congressional district should have influenced the way a Representative voted.

Van Liere and Dunlap[51] review the hypotheses and empirical evidence on the factors influencing environmental concerns in the 1970s. Based on this review, we identified several economic, demographic, and environmental variables, in addition to the political dimension discussed above, that should impact a congressman's vote. Since the vote would set a precedent, the variables should reflect a district's expectations of the net benefits from maintaining or discarding the prohibitive nature of the policy. The economic expectations are hypothesized to center on education and income levels, age, and financial and management interactions with the government.

1. The income-education dimension in species protection

How legislation affects the general welfare of a district's constituents depends upon 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 and high education (COLLEGE) to be on one end of the spectrum, while low income and low education (BELOWY) are on the other. Higher levels of both are expected to improve the welfare of the community. The higher one's income, the easier it should be to avoid the ill effects of any cost the ESA might impose, and the higher one's education, the more one should be aware of the scientific and economic arguments in favor of species preservation.

Simultaneously, the lower the income level of the district's population, the higher the potential costs of the ESA and the lower the probability that one would support it. There are several important

50. There is a notable controversy over whether there were any real economic benefits to be gained from the Tellico Dam. Among other things, 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. *See generally* U.S. Government Accounting Office, Comptroller General of the United States, *The Tennessee Valley Authority's Tellico Dam Project—Costs, Alternatives, and Benefits: Report to the Congress* (1977).

51. van Liere & Dunlap, *supra* note 45.

income effects. First, if poverty in a district is high, any federal project brings welcome government dollars into the local economy regardless of environmental impacts. Those dollars carry the hope for long-term revival. TVA's Tellico Dam was in such a district and carried such hopes. Second, poorer individuals or districts have a much higher discount rate on the future. When one is below the poverty line, one cannot afford to look very far into the future for possible benefits, especially when the bill for endangered species is due today.

Van Liere and Dunlap summarize the period's findings on the role education and income play in determining levels of environmental concern. Their analysis shows strong support for a correlation between higher levels of education and higher levels of environmental concern. With respect to income, they find a mixed bag of results. Though higher income is generally hypothesized to result in higher levels of environmental concern, the evidence from several studies is inconclusive.[52] The hypothesis in this study is that, through higher expected costs of the prohibition in lower income districts and through the purported luxury-good nature of species preservation, lower income levels will favor exempting the dam.

2. Varying levels of local industrial development and economic growth

The ESA particularly affects two types of industry. The first are primary sector industries associated with the use of natural resources (agriculture, forestry, fisheries, and mining).[53] The second includes industries that rely on development or expansion that converts land use away from a "natural" state.[54] A district whose population is dependent on either of these types would be less willing to uphold the prohibitive nature of the ESA, since the potential costs are more specific and a large portion of the constituents could suffer negative economic consequences. Again, van Liere and Dunlap find generalized support for this rural-urban split on environmental concern.

Areas in which these industries are heavily represented are, in general, areas that have a low population density and a lot of land. Because congressional districts are organized to include equal

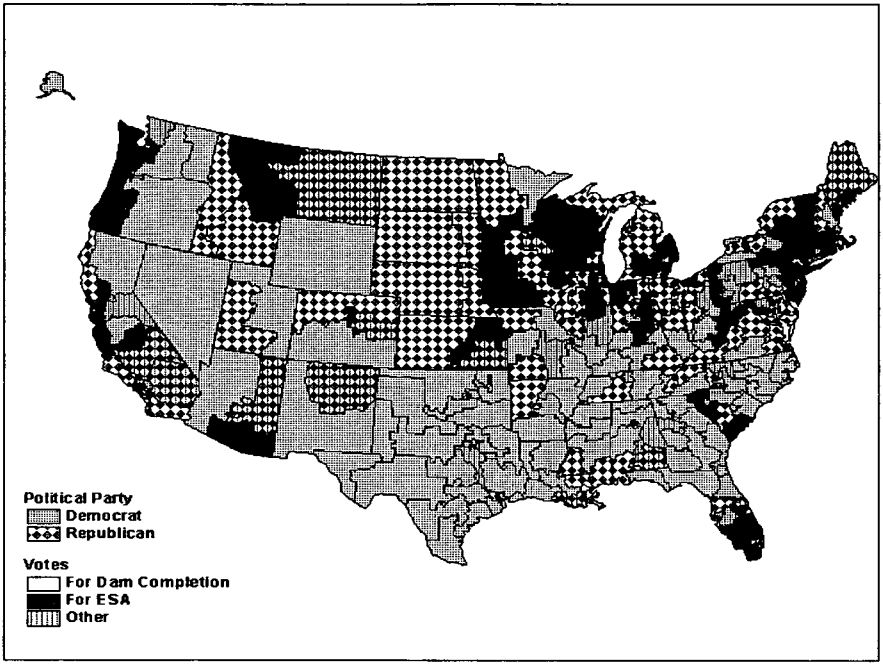
52. *Id.*

53. *See, e.g.*, Gardner M. Brown & Jason F. Shogren, *Economics of the Endangered Species Act*, 12 J. ECON. PERSPS. 3, 13-14, (1998); Clair A. Montgomery et al., *The Marginal Cost of Species Preservation: The Northern Spotted Owl*, 26 J. ENVTL. ECON. & MGMT. 111 (1994); Dean Kleckner, Statement of the American Farm Bureau Federation to the Endangered Species Task Force of the House Resources Committee on Reauthorization of the Endangered Species Act (May 18, 1995).

54. Donald M. McLeod et al., *Factors Influencing Support for Rural Land Use Control: A Case Study*, 44 AGRIC. & RESOURCE ECON. REV. 44 (1999).

populations, land area and population density will have opposite effects on the probability of voting for the exemption. A GIS mapping of the 1978 congressional districts (Figure 1) depicts the districts' political parties overlaid with their votes on the Tellico project.[55] We have elected to use population density (Popn Density) in the empirical work.[56] While the figure leads one to expect an effect, it also documents that several of the largest districts (*e.g.*, Eastern Montana, Interior California, Northern Maine) did not vote on this matter.

FIGURE 1: 1978 CONGRESSIONAL VOTE ON THE TELLICO DAM EXEMPTION FROM ESA



High population densities are associated with urban areas. City dwellers have lower expected costs because the area is developed and its industries generally do not rely on natural resources. The most densely populated districts, with 100 percent urban population, should have virtually no expected costs associated with the ESA; their benefits derive largely from existence values since it is unlikely there are opportunities to enjoy the presence of these species in the immediate vicinity.

55. This map would not have been possible without the help of Wendy Hunter, class of 2003, and Tom Crawford, Assistant Professor, Environmental Studies, Gettysburg College, Gettysburg, Pa.

56. The reason is simply that the product of population density and land area is population, and, theoretically, population is constant across districts.

Districts that are mostly urban, but include some rural land, may derive greater direct benefits from the presence of endangered species (though the costs would still be negligible).[57] Existence values may be higher as well, since the choice to live in a more rural setting may reflect higher values for nature, or a "not in my back yard" attitude. These districts would tend to favor the Snail darter perhaps even more than in a denser urban area. Districts with the lowest population densities are often farming communities where the ESA would be expected to have a negative impact and farmers would probably vote for the exemption out of fear of their own future costs under the act. In the same vein, districts within concentrated regions that face specific economic conditions (like the open, public land dominated Western states or depressed Southern states) might be expected to fear the prohibitive nature of the act more than others (or care less about environmental concerns). Therefore, one expects the coefficient on Popn Density to be positive.

3. Federal land

The predominance of federal lands in a district is expected to significantly impact a congressman's decision in this case. First, federal lands are the most straightforward to use for species protection, so these lands are the most likely to be directly affected by the ESA. Second, the Tellico project was taking place on land acquired by the TVA. Finally, federal lands should be managed for benefits at the national level but often are primarily used for local interests. In this case that pits such local uses against national ones, the outcome should reveal the importance of local considerations. We expect to find that, if local concerns outweigh federal ones, the larger the percentage of public land (FedLand), the less likely the district voted to uphold the ESA, and vice versa.

4. Expectations of age-dependent net benefits from endangered species

We hypothesize that a younger constituency will be less willing to accept the dam's exemption. Van Liere and Dunlap demonstrate that there is strong empirical support for such a negative relationship.[58] The exemption would be seen by younger generations both as degrading

57. The percentage of urban dwellers, a census statistic that might have shed some light on this issue, was not included as an exogenous variable because it is highly correlated with the income and education variables, as well as with the population density. Some useful insight can still be gleaned from the percent urban. The mean of this statistic is 75 percent, which highlights the facts that (a) most congressional districts include at least one large urbanized area and (b) the population density and land area variables are distributed unevenly across congressional districts.

58. van Liere & Dunlap, *supra* note 45.

environmental quality and as something desired by the establishment. Additionally, for retirees, there is a shorter horizon for the accrual of benefits. Unless they are motivated by a bequest motive, one expects them to consider the benefits smaller than longer-lived age groups. They might perceive activities such as preservation as increasing their taxes. On the other hand, they are likely to minimize the impact of future costs. For the youngest voters, the potential benefits and likelihood of future costs are increased. This economic concern could dampen the expected positive relationship between age and the probability of a district favoring exemption. Thus, the average age of its population (Median Age) is expected to be an important factor in shaping the district's preferences.

5. Local environmental conditions and their associated net benefits

The potential for costly run-ins with the ESA increases with the number of resident endangered species (Species), but so do local awareness about endangered species and the ability to enjoy their presence. Both benefits and costs are likely to be higher than in other portions of the country. Thus, though it is certainly an important local aspect, there is no determinate effect on welfare a priori based simply on the number of endangered species living in the state according to the Fish and Wildlife Service's 1978 list.[59] One must consider the costs of maintaining the district's fauna as well. Are the costs that support a specie's preservation low, as they often can be when plants or other highly localized species are the ones under consideration, or deflected, as they might be through federal (or other) grants for conservation?

Immediately after Congress passed the ESA in 1973, the federal government provided grants to states based on their compliance with the law (ES Money).[60] Some states realized millions of dollars in federal government expenditures to help establish an endangered species preservation bureaucracy. Total expenditures between 1973 and 1979 range from zero dollars in 28 states to between 1 million and 5 million dollars in three states (California, Colorado, and New York).[61] One would expect a congressional vote to reflect such financial support not only because of the direct fiscal stimulus, but also because the alacrity with which some state governments brought themselves into compliance reflects local support for the act.[62]

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59. This is not reported by congressional district.

60. U.S. Dep't of the Interior, Fish & Wildlife Serv., 4 ENDANGERED SPECIES TECHNICAL BULL. 3-5 (Dec. 1979) [hereinafter ES TECHNICAL BULL.].

61. *Id.*

62. Put crudely, for those with a taste for "pork," federal funds to protect endangered species were a substitute for federal funds to build a dam.

Among the districts that could be expected to support the act are those in which critical habitat designations had been made. By 1980, critical habitats had been designated for several species (Hab1980).[63] Districts with multiple habitat designations acted quickly to preserve species and to accept the potentially high costs of this preservation locally. Such districts, those with a high value for HAB1980, are expected to favor upholding the ESA.

C. Generalized Environmental Concerns: The League of Conservation Voters (LCV)

The Tellico Dam vote was one of 30 votes included in the 1978 League of Conservation Voters' scorecard of congressmen's environmental records. This assessment presents an opportunity to weigh differences between the specifics of the Tellico vote and other environmental votes that year. If their economic effects are stronger in the Tellico vote, there is further evidence that economic concerns weighed heavily in the Tellico vote.[64] As the potential costs of the ESA became as clearly visible as they did in the Tellico case, a precedent would be set for the political ability and desire to provide public goods in cases where the economic benefits are dispersed and the costs are more localized and immediate. If more self-interested activity is shown through comparison with the LCV Scorecard, then the true difficulty of balancing economic costs and benefits from environmental protection is underscored by the fact that a prohibitionary law, passed with virtually unanimous support, was bypassed for local, not national or global, interests. If, however, the Tellico vote is affected in basically the same fashion as the other 1978 environmental votes, it is more likely that the global (national) costs of the prohibition outweighed the benefits and the exception was justified given the existing set of national preferences for public goods like species diversity.

63. Critical habitats are listed in the Federal Register 1967–1980. Individual dates of entry for listings through 1979 are available in ES TECHNICAL BULL., *supra* note 60, at 10-11.

64. This assumes the model we use to test the Tellico vote can be applied to other environmental votes. If the economic variables appear important for those votes as well, and if they are stronger in the Tellico vote, then we believe there is additional evidence in favor of economic effects in the Tellico vote.

IV. ANALYSIS

A. Limited Dependent Variable Results

The October 1978 vote to exempt the Tellico Dam was analyzed to ascertain whether the Representatives' votes reflected the economic interests of their districts. This vote was taken a few months after the amendments that included the first economic considerations passed easily.

The source of the congressional district level data is the 1970 *Census of Population*.[65] ESA compliance funds are taken from the *Endangered Species Bulletin* for 1979;[66] the *Federal Register* provides the information on listed species;[67] and federal lands data is compiled from ESRI's ArcUSA database and a digitized map of the 1978 congressional districts.[68]

The dependent variable is a 0–1 choice representing a representative's vote. A "1" indicates that the representative voted against the exemption (*i.e.*, for maintaining the ESA). Abstentions or failure to cast a vote resulted in exclusion from the sample, leaving a total of 388 observations.

1. Party or ideology?

Empirical analyses of congressional votes often discover that a large portion of the vote can be explained by a variable reflecting political ideology. We first ran a logit regression[69] of the Tellico vote against the representative's political party (PARTY) and environmental and economic variables. We then ran a second logit regression using the Poole-Rosenthal D-NOMINATE data, to see whether political ideology explains the results better than political party. In both regressions, variants of the specification were tested to see how much the economic variables contributed to the explanation of the voting probabilities as a whole. As will be discussed, while party and ideology have large marginal coefficients and clearly influenced the outcomes, the economic variables are also an important part of the story. The results are shown in Table 1.

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65. The 1980 Census was not used because the data was reported using the updated 1980 districts, which differ from the districts as they stood at the time of the vote.

66. ES TECHNICAL BULL., *supra* note 60.

67. *See supra* note 63.

68. ArcUSA 1:2M, State and Country Statistical Attribute Layers (Environmental Systems Research Institute, CD-ROM, ed. 1, rel. June 1, 1992).

69. A logit regression uses properties of the logistic probability distribution function to analyze discrete choice data (coded 0-1), such as a "yea" or "nay" vote, as a function of independent explanatory variables.

TABLE 1: LOGIT REGRESSIONS ON TELLICO DAM VOTE

Variable	I (Party)		II (Dim1)		
	Logit Coef. (Std Err)	Marg. Effect (Std Err)	Logit Coef. (Std Err)	Marg. Effect (Std Err)	Mean of Variable
Constant	3.12**	0.707**	1.31	0.277	
	(1.38)	(0.313)	(1.67)	(0.353)	
Party	-1.92**	-.434**			0.33
	(0.31)	(0.069)			
Dim1			-7.06**	-1.49**	-0.06
			(0.831)	(0.170)	
College	0.139**	0.031**	0.173**	0.037*	5.73
	(0.069)	(0.014)	(0.071)	(0.015)	
BelowY	-0.137**	-0.031**	-0.110**	-0.023**	13.27
	(0.029)	(0.006)	(0.034)	(0.011)	
FedLand	-0.018**	-0.004**	-0.022**	-0.005**	8.32
	(0.008)	(0.002)	(0.010)	(0.002)	
Popn	$3*10^{-5}$	$7*10^{-6}$	$-2*10^{-5}$	$4*10^{-6}$	2978
Density	$2*10^{-5}$	$4*10^{-6}$	$2*10^{-5}$	$4*10^{-6}$	
Median	-0.067	-0.015	-0.065	-0.014	28.56
Age	(0.045)	(0.010)	(0.052)	(0.011)	
ESMoney*	0.069**	0.016**	0.045**	0.010**	7.53
10^5	(0.019)	(0.004)	(0.021)	(0.005)	
Species	-0.053**	-0.012**	-0.050**	-0.010*	18.2
	(0.015)	(0.003)	(0.024)	(0.006)	
Hab1980	0.267**	0.060**	0.327**	0.069**	1.21
	(0.081)	(0.018)	(0.094)	(0.020)	
N. obs.	388	388	388	388	388
Percent correct predicted outcome:					
	78%		83%		
χ-squared (2*(LogL-LogL(R)):					
	154		230		

** statistically significant at the 95% level or above

* statistically significant at the 90% level or above

Our analysis sets Republicans equal to one. Since Republicans generally voted for the exemption, the coefficient on Party is expected to be negative. It is; the marginal effect (evaluated at the mean) is –0.434 (see Table 1, column 2).[70] The regression of Vote against Party alone correctly predicts 231 of the 388 cases. The vote regressed against economic and environmental variables alone increases the number of correct predictions to 279 (results not shown). The regression of Party and all the other variables results in 302 correct predictions. We conclude that economic considerations were an important factor in the Tellico vote.

Substituting Dim1, in which party is one consideration, for Party in the first regression leads to 298 correct predictions of 388 votes. Substituting Dim1 for Party in the regression with all the other variables increases the number of correct predictions to 322.[71] The chi-squared statistics for all the regressions are statistically significant, but the Dim1 equations have greater statistical explanatory power. The Dim1 regression (third and fourth columns of Table 1) results in a significantly larger marginal effect (-1.44). For these reasons, we conclude that Dim1, Poole-Rosenthal's measure of ideology, is preferred to Party.

The regression with both Dim1 and Dim2 results in only 305 correct predictions as compared to 320 when the economic and environmental variables are combined with Dim1. A regression (unreported here) of the economic and eco-regional variables on Dim2 reveals that Dim2 is related almost exclusively to the variables associated with income and education. A higher Dim2 indicates a poorer area, while a lower Dim2 indicates a higher percentage of college educated. It would appear that Dim2 for this time period reflects poverty conditions in a district. Thus, Dim2 ignores the information contained in the other economic variables. For these reasons, we conclude that the specification including all the economic and environmental variables is preferred to the one with Dim2.

2. Income and education

In order to highlight the spectrum's extremes and the implications for costs and benefits, the two variables used in our analysis are the

70. Similarly, for the equations using Dim1, the conservative element of the Congress has a higher dimension coordinate, and thus we expect a negative coefficient. The correlation coefficient for Dim1 and Party is 0.70.

71. Running these regressions as linear probability model (ordinary least square) regressions, the adjusted R-squareds are 0.059 (party alone), 0.216 (economic variables alone), and 0.307(party and economic variables). *See* Thomas. W. Gilligan et al., *Regulation and the Theory of Legislative Choice: The Interstate Commerce Act of 1887*, 32 J.L. & ECON. 35, 35-61 (1989); Poole & Rosenthal, *Congress and Railroad Regulation*, *supra* note 46.

percentage of college-educated individuals (College), representing the high end of the spectrum, and the percentage of persons below the poverty line (BelowY), representing the low end. The marginal effect of College in the regressions including Dim1 is similar to that in the regression including Party (0.037 versus. 0.031 respectively). The coefficient is statistically significantly different from zero in all regressions. This difference indicates that the more educated the district's population, the more likely their representative voted to preserve the Snail darter. The marginal effects of BelowY in the two regressions are also similar (–0.023 for Dim1 and –0.031 for Party). The coefficient is negative and statistically significantly different from zero in all regressions. This effect confirms the expectation that poorer communities favored the dam; they chose not to risk potential present benefits for even more uncertain future benefits.[72]

3. Industry and economic growth

The results provide little support for the hypothesis that areas open for extensive growth will support the exemption and heavily urbanized areas will not. The marginal effects for Popn Density are small and insignificant.[73] It is interesting to note that in the states that border Tennessee, the only votes opposing the exemption came from urban districts in Atlanta and St. Louis.[74] Though the econometric results find almost no relationship between population density and a representative's decision, visual inspection of Figure 1 suggests that the absence of votes from congressmen representing several large districts may have influenced our results.

72. Many other variables are available, such as the actual per capita income levels, the average number of school years, and the percentage of individuals without an eighth grade education, but, as noted, income and education variables are highly correlated. College education and poverty status provide the most intuitively interpretable results and serve to delineate the two different effects of education (higher levels increase the perception of future benefits) and income (higher levels decrease the impact of present costs).

73. If only Democrats' votes are considered, population density is significant at the 90 percent confidence level, though the marginal effect is still very small. If only economic variables are used, then population density is significant at the 95 percent level, and slightly larger (0.00001). The relationship between ideology and population density is explored visually; Figure 1 shows political party overlaid on districts, where smaller districts do appear to vote more frequently for upholding the ESA.

74. States bordering Tennessee are Alabama, Arkansas, Georgia, Kentucky, Missouri, Mississippi, North Carolina, and Virginia. Of the 69 votes from these states (21 R., 48 D., including Tennessee), the vote was 60 to 4 in favor of the exemption.

4. Federal land

The percentage of the district held as federal land has a negative, significant effect on the probability that a district voted to uphold the act. These areas may see conflict between federal and local goals and fear that federal lands in their area will be used for preservation purposes over local development purposes.

5. Age effects

The effect of Median Age in the Dim1 regression involving the full House is negative and not statistically significantly different from zero. The effect is also negative and insignificant in the other regressions. There is no clear-cut relationship between age and the perceived benefit-cost ratio for a district.

6. Species and federal funds

Species has a negative, statistically significant effect (–0.010) in the regression involving Dim1 and the full House (–0.012). Presumably, this means that the greater the likelihood that endangered species lived in a state, the more likely a congressional district favored the awarding of exemptions. This result supports the conclusion that expected localized costs outweigh any local benefits that might accrue from this public good.

ES Money has a positive, statistically significant effect (0.010) in the Dim1 regression, which reflects both a local desire for preservation in its own right as well as increased local expenditures funded by federal dollars. Support for the exemption came from states that were not yet in compliance or had garnered limited dollars. These are likely regions where the state dragged its feet on compliance because the perceived benefit-cost ratio was low.

The number of species with critical habitat designations in a district (Hab1980), however, increases the probability that a district voted to uphold the ESA (marginal effect of 0.069 for Dim1). Since these designations include setting aside land for the purpose of species' preservation, the significant, positive relationship signals that districts that moved quickly to establish habitat had local interests in line with the preservation of habitat.

B. Comparison of the Tellico Vote to Other Congressional Environmental Votes

A set of ordinary least squares regressions was performed using each congressman's score on the 1978 League of Conservation Voters (LCV) Environmental Scorecard (adjusted to remove the Tellico vote) as

the dependent variable.[75] This helps to place the Tellico vote in the context of other 1978 congressional votes involving environmental decisions. Differences between the two regressions reflect the specificity with which these variables are integrated into the Tellico vote. It should be noted at the outset that the estimated marginal effects of all the economic variables, and the constant, are greater for the Tellico regressions than for the LCV regressions.

Table 2 summarizes the marginal effects for the Tellico regressions and the LCV regressions for the two cases, using Dim1 to account for political elements. One should recognize two points in Table 2. First, in general, the marginal effects from the logit regressions on the Tellico vote (Col. I–III) are generally greater than the estimated effects from the OLS regressions on the LCV scorecard. Second, variables are statistically significant across regressions, with the exception of Federal ES Dollars and the designation of critical habitat in a district, which are significant for the Tellico Dam vote but not for the LCV score. However, the number of endangered species in a state is significant and negative in both cases indicating that districts in states with higher numbers of endangered species voted against upholding the act and against environmental causes in general. Furthermore, the concerns raised with federal funds for species protection and the designation of critical habitat did not have carryover implications for overall district concerns about the environment. This result is somewhat surprising, as one might have expected higher critical habitat levels to reflect an overall willingness to support the environment as well. However, the percentage of federal land remains a significant and negative indicator of LCV score, and perhaps this captures the relevant concerns.

75. The Scorecard takes the percentage of "environmentally correct" votes out of all votes cast by a representative, making a deduction for unexcused absences. There were 30 votes in 1978. The Tellico vote was purged, and the Scorecard recalculated.

TABLE 2: COMPARATIVE EFFECTS: TELLICO VOTE AND LCV SCORECARD

	Dependent Variable: Vote Estimation method: Logit	Dependent Variable: LCV Score Estimation method: OLS
Variable	Marg. Effect (Std Err)	OLS Coef. (Std Err)
Constant	0.277	0.518**
	(0.353)	(0.059)
Dim1	-1.49**	-0.742**
	(0.170)	(0.027)
College	0.037**	0.011**
	(0.015)	(0.003)
BelowY	-0.023**	-0.006**
	(0.011)	(0.001)
FedLand	-0.005**	-0.001**
	(0.002)	(0.0005)
Popn Density	$-4*10^{-6}$	$-1*10^{-6}$
	$(4*10^{-6})$	$(7*10^{-7})$
Median Age	-0.014	-0.0002
	(0.011)	(0.002)
ESMoney * 10^5	0.010**	0.015
	(0.005)	(0.010)
Species	-0.010*	-0.0025**
	(0.006)	(0.0007)
Hab1980	0.069**	0.004
	(0.020)	(0.004)
N. Obs.	388	388
Percent correct predicted outcome	83%	
R-sqrd, adj		0.72
χ-sqrd	230	

** statistically significant at the 95% level or above

* statistically significant at the 90% level or above

Table 3 reports the ratio of the marginal effects between the Tellico and LCV regressions. The table shows the ratio of the marginal effects of explanatory variables on the Tellico vote to those on the LCV score. Political ideology has roughly twice the marginal effect on the Tellico vote than on the LCV scorecard (2.01) when using the Poole-Rosenthal Dim1 variable. This result is consistent with the fact that Republicans had a direct mandate to vote for the exemption. However, the role of the economic variables also appears to be higher for the Tellico vote than for the LCV average. The marginal effect of College was

3.36 times greater in the Tellico vote, while BelowY was 3.83 times greater. This emphasizes the tradeoff between the instant dollars that would come in from a federally funded project versus the long run, less tangible benefits derived from the increased probability of existence for a single species. Higher levels of education do appear to create a lower discount rate on future benefits, either from the increase in scientific awareness or from higher income levels, for both the Tellico case and for environmental votes in general.

Federal lands (FedLand) and numbers of species (Species) (with ratios of 5 and 4 respectively) are also significantly more important in the Tellico vote than in the votes concerning environmental legislation in general. While this result for Species is expected, the result for FedLand highlights the important role that the Endangered Species Act plays in allocating land use, particularly on federal land. As discussed, critical habitat (Hab1980) and Endangered Species funding (ESMoney) are not significant for the LCV score and, thus, have a more clear-cut influence on the Tellico vote.

TABLE 3: COMPARISON OF SIGNIFICANT ECONOMIC VARIABLES IN TELLICO VOTE TO LCV SCORECARD VOTES

Variable	Ratio of Vote -- DIM1/LCV
Dim1	2.01**
College	3.36**
Belowy	3.83**
Fedland	5.0**
Species	4.0**
N. Obs.	388
** indicates that ratio is significantly different than 1 at the 95% confidence level ESmoney and Hab1980 not significant for LCV score. Median Age, Popn Density not significant for either.	

In short, economics mattered, and it mattered relatively more in the Tellico vote than in the other votes included in the LCV scorecard.

V. CONCLUSIONS AND EXTENSIONS

This analysis suggests that economic interests played a role in the vote on the Tellico Dam exemption and that some economic balancing entered into decisions concerning endangered species implicitly, even if the law did not require it explicitly. In the 1990s, the inability of Congress to reach consensus over a way to explicitly articulate important economic dimensions would stymie further revisions of the ESA. Representatives voted on the Tellico Dam

exemption according to their expectations for future interactions with the ESA. This analysis has demonstrated that the higher the expectation that a district would encounter a problem with an endangered species, the higher the probability that a representative voted for options that were expected to maximize local net benefits rather than global net benefits. The apparent prohibitiveness of the ESA, which should have enforced global benefits over local concerns, was circumvented for economic reasons. These economic concerns are similar to those in the ESA amendments passed a month earlier. These concerns were slowly integrated into the ESA as reauthorizations occurred over the first two decades and have come to play an even larger role as reauthorizations have stalled in the last decade.

In 1982, after months of negotiations with industry representatives, state wildlife managers, and environmentalists, a "streamlined" ESA was reauthorized by voice vote in both Houses.[76] Loggers, miners, and electric utilities argued that existing law delayed or blocked private and public projects, a legacy of the Tellico controversy. Although the Reagan administration suggested that potential economic costs be included among the factors considered for listing a species, the listing criteria remained exclusively biological.[77] The industries whose projects required federal permits complained that existing law did not allow them to learn in a timely fashion whether the project would imperil an endangered species or its critical habitat.

The timber industry, in particular, has used the provisions in the 1982 revision to continue harvesting in endangered species' habitat. The relevant provisions allow a regional authority, firm, or individual to receive a permit for "incidental takings" of endangered species, if they have created and implemented an approved Habitat Conservation Plan (HCP).[78] Due to their costly nature, there were few HCPs prior to 1991. The decision of the God Committee not to allow an exemption for the Northern spotted owl (as well as the early success achieved with HCPs with Southern timber firms for the Red-cockaded woodpecker) put a

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76. Martha Angle, *Smooth Sailing Ahead: House, Senate Panels Approve Bills on Endangered Species*, 40 CONG. Q. WEEKLY, 1107, n.20 (May 15, 1982). (Some version of the word "streamline" appears in almost every report on this legislation, especially with respect to the provisions prohibiting trade and protecting habitats. "Streamlined" is contrasted to "did not significantly relax." *See, e.g.*, 38 CONG. Q. ALMANAC 435 (1982).

77. Interior Secretary James Watt requested only a one-year reauthorization; the Secretaries of Commerce and State favored a two-year extension, and the bill was originally written as such. The House Fisheries and Wildlife Conservation Subcommittee adopted a three-year extension, which passed. Environmentalists took Watt's stance as an attempt to avoid conflict during off-year elections and as an intention to introduce a "significantly relaxed" version of the Act following the election.

78. Endangered Species Act, 16 U.S.C. §§ 1531-1540, 10(a)(1)(b) (1973).

focus on HCPs as a potentially inexpensive way to deal with the prohibitive requirements of the ESA.

There are presently several hundred HCPs on the books or in the works between individual firms and the Fish and Wildlife Service. Proactive efforts are even beginning to surface, generally in order to reduce uncertainty about potential future listings. Since there are significant economic costs, firms are using HCPs to support their economic interests. There is no reason why the HCP alternative cannot be extended to other large landholders (*e.g.*, ranchers). Using authority granted in the 1982 revision, the Secretary of the Interior exempted many small landholders in the 1990s, thereby mitigating their potential costs. In March 1997, the U.S. Supreme Court ruled that property owners had legal standing to bring suits against the federal government for "failing to consider the economic effect or scientific necessity of protecting endangered or threatened species."[79] Stroup's suggestion that compensation be paid is yet another possibility for introducing balancing.[80]

The likelihood of successfully revamping the ESA to directly include economic costs dwindles with each additional level of evidence on both sides of the argument. The millions of dollars foregone in timber values from the Northern spotted owl and other birds juxtaposed with the increasing awareness and value for ecosystem protection in addition to species protection insures that any revamping of the ESA will have to be a compromise. Unfortunately, the two camps are entrenched in their positions regarding the costs of the ESA to themselves and society.

Balancing provisions were removed from the ESA, but Congress has demonstrated that it will consider the necessary tradeoffs when warranted. The issues raised by this paper imply that, with the addition of the God Committee, HCPs, exemptions, and legal standing for property owners (with the possibility of compensation), the ESA can work successfully to give weight to non-quantifiable and dispersed economic and social benefits in the face of concentrated and visible economic costs.

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79. Reynolds Holding & Alex Barnum, *Door Open for Species Act Suits: Ranchers, Farmers Can Claim Economic Loss, High Court Says*, S.F. CHRONICLE, Mar. 20, 1997, at A1 (regarding outcome of *Bennett v. Spear*, 520 U.S. 154 (1997)), *available at* http://www.sfgate.com/cgibin/article.cgi?file=/chronicle/archive/1997/03/20/MN74759.DTL (last visited Nov. 17, 2003).

80. Stroup, *supra* note 9.

APPENDIX TABLE: VARIABLES, DEFINITIONS, SAMPLE MEANS

Variable	Source	Form	Sample Mean (388 obs.)
College	1970 Census	Percent	5.73
Below Poverty Line (BelowY)	1970 Census	Percent	13.27
Federal Land (FedLand)	1978 Congressional District Map, ESRI ArcUSA database (USGS DLG, 1980)	Percent	8.32
Population Density (PopnDensity)	1970 Census	Census measure divided by 1000 for scale	2.978
Median Age	1970 Census	Years	28.56
Federal ESA dollars for species (ESMoney)	ESA Bulletin	10,000's of Dollars, for state	7.533
Endangered Species (Species)	Federal Register, 1978	Count for state	18.3
Critical Habitat Designations (Hab1980)	Federal Register Listings to 1979, 1978 Congressional District Map	Count for district	1.21
Party	Congressional Quarterly, 1978	Dummy Variable, Republican = 1	0.33
Vote	Congressional Quarterly, 1978	October, 1978 House Vote on Tellico Dam Amendment	0.32
LCV	League of Conservation Voters 1978, 1979 reports	LCV score (scaled to 0-1); LCV score ranks congressmen by votes on environment	0.503
Dim1	Poole & Rosenthal NOMINATE data online at http://voteview.gsia.cmu.edu/	Ranked indicator of political ideology	-0.06