Policy Reversal: Evidence from Senate Voting on the Endangered Species Act*

Edward J. López
Assistant Professor
Department of Economics
University of North Texas
Denton, TX 76203-1457
elopez@unt.edu

Daniel Sutter
Associate Professor
Department of Economics
University of Oklahoma
Norman, OK 73019-2103
dsutter@ou.edu

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ABSTRACT: In 1978 Congress weakened several key provisions of the Endangered Species Act (ESA), which had been enacted only five years earlier. We analyze several potential explanations for this policy reversal including state interests, senator characteristics, and ignorance/miscalculation of the cost of species protection. We seek to explain how senators voted in both 1973 and 1978, and why many senators switched their vote from supporting ESA to weakening it. Our findings indicate that party affiliation and policymaker preferences were not important to the 1973 votes but became key variables in the 1978 model and the switching model. In addition, the endangered species variables, which capture the economic impact of the ESA on individual states, have little explanatory power over individual votes and even less on switching. Senator and state characteristics drive the 1978 and switching vote models. An influx of relatively conservative Democrats between 1973 and 1978 presents itself as the leading explanation for this policy reversal.

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1. Introduction

Congress passed the landmark Endangered Species Act in 1973 establishing species preservation as a national priority. Just five years later, after the Supreme Court halted construction of the Tellico Dam to protect the endangered snail darter, Congress amended the Act to weaken several of its key provisions. This policy reversal raises a number of interesting questions for both political economy and environmental policy.

Policy reversals are of interest to political economics because of the persistence of even inefficient policies. Consequently policy reversals might reveal as much about the determinants of political outcomes as the passage of the legislation. The amount of control that citizens exercise over their representatives remains controversial. Some scholars believe politicians must faithfully represent their constituents (or at least the best organized constituent interests) or be quickly voted out of office (Wittman 1995). Others believe that infrequent elections and widespread voter ignorance produce significant slack, which legislators can exploit to pursue their own or special interests at their constituents' expense. Policy reversals might allow a test of the tightness of electoral constraints: with tight constraints a shift in political equilibrium must be a result of a change in the relative strength of competing interest groups. Indeed, several recent papers have investigated the influence of Political Action Committee contributions on roll call voting by considering votes on the same issue over time (Bender and Lott 1996, McGarrity and Sutter 2001, Stratmann 2002). Political economists also debate the amount of information politicians and voters possess. Some scholars believe that ill-informed voters and politicians produce numerous inefficient policies. Indeed, many Congressmen claimed that they thought the Endangered Species Act (ESA) would apply only to a few dozen species of higher vertebrates and that species preservation could not stop federal construction projects. Senate voting on ESA provides an opportunity to test if politicians lacked (or ignored) readily available proxies for the cost of species protection.

The early history of the ESA also provides insights into environmental policy. Environmental protection is a public good, and thus collective action problems should plague interest groups seeking this goal, at least relative to groups seeking legislation providing excludable benefits. Consequently interest groups can attain private

advantages through legislation supposedly providing the public good of environmental protection (Maloney and McCormick 1982, Pashigian 1985). Yet despite obvious collective action problems, environmental interest groups possess considerable political clout and few new environmental policies are ever reversed. Species protection is particularly problematic since flora and fauna have no political resources and their protection requires interspecies altruism. The potential lack of a stable political equilibrium has ominous implications for environmental policy and particularly species preservation: a political cycle could produce an irreversible species extinction. Protection of endangered species and conservation of biological diversity remain topics of considerable political interest. Species preservation is a major priority for many environmental groups, who seek to extend the Act's protection to entire ecosystems, while the Republican Congress in 1995 targeted the ESA for repeal. The early political history of the ESA may hold clues for its future prospects.

In this paper, we examine Senate voting on the ESA and the 1978 Amendments to identify the determinants of this policy reversal. We discuss in Section 2 five possible explanations for policy reversal: 1) a shift of power among constituents and organized interests (shift in political equilibrium); 2) a shift of those senator-specific characteristics that determine how they vote; 3) ignorance of the details and/or actual costs of the initial legislation, on behalf of voters and/or senators; 4) an ideological shift among Senate leaders or members of the relevant oversight committees; and 5) lack of a stable equilibrium under majority rule voting. We then estimate votes in 1973 and 1978 in an empirical model that includes senator-specific, state-specific, and endangered species variables to discriminate between the first three explanations. We use several variables which measure the cost of species protection to a state including the percent of land in the state owned by the federal government and the number of species in the state listed as endangered in 1973 and 1978. These variables allow a rare test of the role of limited information in policy making.

We conduct probit estimations on the individual votes in 1973 and 1978. We also examine a senator's change of vote between 1973 and 1978—whether the senator switched the direction of his vote. Our findings indicate that state-specific constituency variables and senator-specific variables such as DW-NOMINATE

scores (Poole and Rosenthal 1997) explain senator voting. Party affiliation does not explain the 1973 vote but becomes highly significant in the 1978 vote, whereas certain of the constituent interest variables lose explanatory power in 1978 compared to 1973. We also find that when party does matter to predicting the votes, it works in the opposite direction as DW-NOMINATE: the probability of supporting ESA is *lower* for Democrats but higher for more liberal senators. This atypical result, we argue, seems to be due to the historically unusual changes occurring at this time in the Senate among party balance, regional representation, and the distribution of policy preferences within and between the parties. Finally, the endangered species variables exhibit only slight explanatory power in either of the votes, but help in surprising ways to determine whether a senator switched his vote between 1973 and 1978. Overall, the policy reversal is explained partly by changes in constituent interests but mostly by an influx of Democrats, particularly conservatives from non-southern states.

2. Potential Causes of Policy Reversals

Political economy offers several potential explanations for policy reversals like the amending of the Endangered Species Act. The explanations depend on the tightness of electoral controls on politicians, the discretion that senators possess on roll call votes, and the degree to which ignorance prevails in political decisions. Since scholars disagree on the efficiency of representative democracy, each of the following rationales could explain Congress' reversal on the ESA.

A change in the balance of constituent interests provides a first explanation for a policy reversal. If voters and organized interests combine to control politicians effectively, then a change in policy (or roll call votes) must result from a change in the balance of the political pressures. Marginal political benefits and costs determine legislator behavior in the political equilibrium view (Peltzman 1976, Becker 1983). Policy change should conform to simple comparative statics, with the weakening of the ESA a result of decreased marginal political benefits or increased marginal political costs of species protection in some combination. A change in the balance of political power could result from a change in the relative political strength of competing interests (e.g., urban residents

become more numerous or influential in a state, or constituents in a state attain a higher education level) or a change in an interest group's attitude toward species protection.

A change in the policy preferences of legislators provides a second explanation for a policy reversal. The location of the median legislator could shift because of a change in the preferences of returning members or because of a composition effect where new legislators have different preferences than the legislators they replace (Poole and Rosenthal 1997). If politicians possess considerable discretion in their activities in office then individual legislators may change their attitude toward species protection or newly entering legislators may have contrasting preferences. Senator-specific characteristics will determine roll call votes if elections do not tightly constrain legislators' behavior. Note that a change in constituent preferences may be the cause of senator turnover in the composition effect, so a lack of change in constituent interest variables is necessary to attribute policy change entirely to legislator discretion.

Miscalculation of the costs of species protection by senators or constituents is a third possible explanation for this policy reversal. Miscalculation could take one of several forms. Public policies generate nonexcludable benefits, leading to the well-known problem of rational ignorance. Some public choice scholars argue that pervasive public goods outcomes produce a citizenry with little knowledge concerning politics or the effects of policies. Citizens may thus know little about the specifics of legislation and thus support policies which turn out not to be in their personal interest. Rational ignorance is consistent with politicians' public statements about the unexpected consequences of ESA. Due to rational ignorance, Congress might have mistakenly passed an ESA in 1973 which inefficiently did not allow any balancing of the costs and benefits of protecting specific species.[1] Miscalculation could also result from an efficient consideration of the cost of information. Acquisition of detailed information about the total cost of species preservation, as well as the state-by-state breakdown of these costs, is costly to politicians and constituents. Senators might have efficiently acquired information and then estimated the costs and benefits of species preservation in 1973, and then reversed their positions in 1978 based on the realized

[1] The initial ESA explicitly allowed only scientific criteria when listing species and habitats. It therefore disallowed economic criteria.

costs. Thus miscalculation in the passage of the ESA in 1973 may or may not have been inefficient ex ante. Although descriptive accounts of legislator behavior emphasize the cost of becoming informed on very many of the pieces of legislation voted on by Congress, academic studies of roll call votes rarely consider the possibility of mistakes, due likely to the difficulty of falsifying explanations for policy based on mistakes. In addition legislators might wish to claim ignorance as a cover for a less popular interest group motive for a roll call vote. The endangered species variables described in the next section allow falsifiable predictions regarding the miscalculation hypothesis.

An ideological shift among legislative leaders with agenda control is a fourth possible explanation for policy reversal. Committees possess de facto property rights over issues, and the institutional structure of Congress helps determine policy outcomes (Shepsle 1979, Shepsle and Weingast 1981). In this view a change in the leadership in either chamber or a change in the membership on the relevant oversight committees could produce a policy reversal. Weingast and Moran (1984), for instance, argue that a change in oversight committee membership produced a change in Federal Trade Commission regulatory policy in the late 1970s. A change in policy preferences among committee members may similarly have caused the reversal on ESA. We examine this possibility with a non-parametric comparison of DW-NOMINATE scores between 1973 and 1978.

Finally, policy reversals could be the result of the nonexistence of a stable equilibrium under majority voting. The conditions for the existence equilibrium are very strict (Mueller 1989, Moser 2000) and seem unlikely to be met in the world. The nonexistence of equilibrium creates the potential for policy cycles. Although politics seems to exhibit more stability than the cycling prediction suggests (Tullock 1981, Moser 2000), policy reversal on ESA could be one example of such cycling. Because of the difficulty of measuring preferences on a specific issue, policy cycles are difficult to observe in the political world (Stratmann 1996). The irreversibility of species extinction raises the significance of potential cycles in on this issue.

Political economists continue to debate the amount of discretion elected officials possess and the prevalence of rational ignorance. Given the lack of consensus on these questions, we consider each of the

above hypotheses as plausible explanations for weakening the ESA. We hope to discriminate empirically between these explanations by examining the determinants of Senate votes on ESA in 1973 and 1978, including an examination of vote-switching behavior.

3. Dependent Variables: The Votes Considered

The final votes on the Endangered Species Act and the 1978 Amendments were nearly unanimous in both the House and Senate. The House passed the ESA in 1973 by a vote of 355-4 while the Senate approved the Act 92-0. The final votes on the 1978 amendments were 384-12 in the House and 94-3 in the Senate. The lack of variance precludes econometric analysis of the final floor votes in the House or Senate.

The Senate, however, voted on several amendments to each bill prior to final floor voting. The votes on these amendments were more balanced, and so are amenable to econometric estimation. We seek to identify the determinants of support for species preservation in 1973 and 1978 and thus the cause of the policy reversal.[2] The 1973 vote is roll call vote #312 (henceforth "V312") to authorize the federal government to enforce endangered species protection in states that provided inadequate enforcement. The proposal was sponsored by Senator Stevens (R, Alaska) and accepted 60-33. A vote in favor of the Stevens amendment indicates greater support for species protection. We employ the following 1978 votes:

Roll Call Vote #216 ("V216"): To allow heads of federal agencies to exempt projects from the Act, as well as construction projects under way or under contract in 1973. Sponsor: Stennis (D, Mississippi). Rejected 76-22.

Roll Call Vote #217 ("V217"): To protect endangered species only when "consistent with the welfare and national goals of the people of the United States." Sponsor: Scott (R, Virginia). Rejected 86-10.

Roll Call Vote #218 ("V218"): To limit protection of the act to species of "substantial benefit to mankind."

[2] The House voted 231-157 in 1978 to exempt the Tellico Dam from the ESA. The Senate did not approve this exemption, which was dropped by the conference committee.

Sponsor: Scott (R, Virginia). Rejected 87-2.

Roll Call Vote #219 ("V219"): To limit eligibility for exemptions from the Act to projects for which "a substantial and irretrievable commitment of resources" were made before the species was found in the given location. Sponsor: Nelson (D, Wisconsin). Rejected 70-25.

Roll Call Vote #220 ("V220"): To require only four votes instead of five from the Endangered Species Committee to approve an exemption from the Act. Sponsor: Scott (R, Virginia). Rejected 69-23.

All the 1978 votes except V219 would have weakened the ESA further than the approved amendments actually did. Even so, the 1978 Amendments did not weaken the ESA as greatly as some feared at the time, which questions our interpretation of this as an instance of policy reversal. Appeals to the Endangered Species Committee, for instance, have been rare, and although the number of species listings fell after 1978, this was reversed in the mid 1980s. Yet the perceived ex ante potential for these amendments to reduce species protection is unmistakable. Further, environmental groups strongly opposed the 1978 amendments (Yaffee 1982), which helps emphasize the direction of change.

Although we focus on these preliminary votes, the near unanimous reversal by both the House and Senate on the final ESA votes merits discussion. Seemingly this is evidence against turnover of members leading to the policy change, since virtually all returning members voted first to enact ESA then to reverse it. And a change in the balance of interest groups strength would need to be national in breadth to affect this many Senators' votes. Yet it would be a mistake to infer too much from the final votes. As Holcombe (1986) demonstrates, unanimous consent under a simple majority decision rule does not have the same implications about underlying consensus as unanimous consent with voluntary participation. Once it was clear the ESA and the amendments had sufficient support to pass, the cost to Senators of voting for the Act or the amendments falls dramatically. The final votes might easily overstate the change in support for species protection.

4. Independent Variables

We use three types of independent variables in this study, senator-specific variables, state-specific variables, and endangered species variables. The groups correspond to the first three potential explanations for policy reversal discussed in Section 2. If a change in constituent interests explains endangered species policy reversal, these variables should be significant in explaining the 1973 and 1978 votes, and either changes in the signs of these variables or changes in the values of these variables should explain vote switches. We test for the joint significance of each group of variables in our analysis. We can strongly reject an explanation if its variables are consistently jointly insignificant. Below we describe the variables in each category and our expectations of their influence on ESA roll call voting. Table 1 provides summary statistics for all the variables used in this study. Note that we have observations in both 1973 and 1978 for all variables except where noted.

Senator-specific Variables:

DEMOCRAT: A binary variable that equals one if a senator is a member of the Democratic Party. Democrats are generally stronger supporters of environmental protection.

DW-NOMINATE: The senator's policy position along a single liberal-conservative dimension, as revealed through his entire past voting record (Poole and Rosenthal 1997). These scores are spatial parameter estimates of the senator's ideal point on a -1 (extremely liberal) to 1 (extremely conservative) policy space. Political scientists refer to these estimates as a measure of senator-specific ideology. While it is not plausible that a senator's past voting record is determined solely by his ideological preferences, we will follow the use of this shorthand terminology, recognizing that NOMINATE scores are closer to the notion of revealed preferences than to preferences per se.[3]

TENURE: Number of years the senator had served consecutively in the Senate. This variable controls for the

[3] Since ESA is an environmental issue, we could instead use an index of a senator's vote record on environmental issues only. So-called watchdog interest groups commonly track congressional voting on their key issues. For example, the League of Conservation Voters calculates an index that places legislators on a 0 (extreme anti-environmental) to 100 (extreme pro-environmental) space. Since senators presumably employed the same voting calculus on both ESA and the

effects of seniority in the senate and demonstrated ability to win election to the senate.

AGE: The senator's age in years at the time of the vote. Environmental protection became an important political issue in the early 1970s, so senators of different age cohorts may have different environmental policy preferences. They may also have different time horizons.

Constituent Interest (State-Specific) Variables:

ENVIROS: Membership in the six largest environmental groups as a percentage of voting age population, as provided by Kalt and Zupan (1984).[4] Larger environmental group membership should produce stronger support for species protection. Data are for 1978 only.

METRO: Percent of a state's population living in metropolitan areas. Urban residents tend to have a greater demand for environmental protection and also tend to bear a smaller portion of the cost of species protection since most listed species' critical habitats lie in more rural areas.

COLLEGE: Percent of a state's population with a college degree. Increased education is expected to lead to greater support for endangered species protection.

INCOME: Per capita income in the state, measured in thousands of nominal dollars. Environmental protection is generally considered a superior good.

UNEMPLOYMENT: The state's unemployment rate. Since species protection can have an adverse effect on economic activity, a higher unemployment rate is predicted to lead to less support for species protection. On the other hand, since employment fluctuations are temporary while species extinction is permanent, a zero coefficient would be consistent with a long term view of preservation.

?UMEMP: The change in a state's unemployment rate from the previous year. A rising unemployment rate might make voters less willing to sacrifice economic activity to protect species.

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issues that inform LCV scores, we use the broader NOMINATE scores in order to avoid potential endogeneity bias with the dependent variable (cf. Jackson and Kingdon 1992).

[4] The authors thank Mark Zupan for providing the data set from Kalt and Zupan (1984). The six environmental groups are Sierra Club, National Audubon Society, Environmental Defense Fund, Friends of the Earth, National Wildlife Federation, and Wilderness Society.

Cost of Species Protection Variables:

FEDERAL LAND: Percentage of land in a state owned by the federal government. Since the ESA applies in the first instance to federal actions, this variable measures the potential cost to a state of species protection. Support for species protection should be lower in states with more federal land.

LIST73: Number of species indigenous to the state listed as endangered or threatened through 1973. The sign on this variable may depend on how a state values the tradeoff between species protection and its economic cost. The cost of species protection will be higher in states with more listed species, producing less support for species protection. However, if states with more endangered species view them as resources worthy of protection, they could demand greater species protection. Data are for 1973 only.

NEWLIST: The number of species in a state added to the endangered and threatened list between the passage of the ESA and the 1978 Amendments. More new listings may alter the how a state values the tradeoff between species protection and its economic cost. Data are for 1978 only.

PROJECT: A binary variable which equals 1 if the state had a major federal project disrupted to protect the habitat of an endangered species. The cost of species protection is higher for these states (or at least public perception of the potential costs of species protection), and so senators from these states should be more likely to oppose species protection in 1978. This variable is constructed using the list contained in Harrington (1981). The states with affected projects are Colorado, Maine, Mississippi, Missouri, Nebraska, Nevada, Tennessee and Utah. Data are for 1978 only.

Most empirical roll call studies rarely entertain the hypothesis that ignorance or miscalculation helps determine the vote outcome. Presumably this is due to the data not being amenable to measuring ignorance/miscalculation. Senate voting on the ESA presents a different opportunity in this regard. The endangered species variables allow us to test whether constituents and/or senators miscalculated or ignored

the cost of species protection. FEDERAL LAND and LIST73 are proxies of the net cost of species protection by state which should have been readily available to constituents and legislators for use in the 1973 debate on the ESA. The miscalculation hypothesis would gain some support if these variables have low predictive power in the 1973 vote but strong predictive power in the 1978 votes. The variables NEWLIST and PROJECT proxy cost "surprises" which senators and constituents could use in updating their valuation of the trade-off regarding species protection. To the extent that these variables have predictive power over the 1978 votes, constituents and/or senators may have been unable to accurately predict the costs of the ESA. Any reversal of support for species protection based on NEWLIST or PROJECT could represent a rational updating of net cost estimates, not necessarily an initial miscalculation of cost.[5]

The weakening of the ESA immediately after the Tellico Dam case provides some surface support for the miscalculation hypothesis. If legislators in 1973 thought the ESA would apply only to a handful of species and preservation could not trump economic development, they should have been willing to amend the Act as soon as they learned of their error. Senators in 1973 might have thought a vote for the ESA was a largely symbolic gesture to signal to their constituents their commitment to protect the environment. Upon realization of having passed legislation precluding any balancing of costs and benefits, Congress quickly corrected their mistake. This reading of events, however, ignores the substantial flexibility which exists in the implementation of the act. In practice economic cost is considered in the listing of species, designation of critical habitat, and the issuance of jeopardy rulings (Yaffee 1982). Consultation with the U.S. Fish and Wildlife Service (USFWS) typically leads to modification of projects to allow some protection of habitat (Rhodes and Wilson 1995). Few projects are ever prevented from proceeding; in only 54 of 96,832 formal or informal consultations between 1987 and 1992 did the USFWS totally block a project (Ehrlich and Ehrlich 1996, pp.117-8). The ESA only really requires consultation with the USFWS and thus considers the cost of species protection. Thus we must require more concrete evidence of miscalculation.

[5] Arguably with sufficient research the eventual cost of species protection might have been anticipated in 1973, but the cost of making this determination could have exceeded the expected benefit.

Note that both the number of species listed in 1973 and the number of new listings between 1973 and 1978 exhibit considerable variation across states. In 1973 Hawaii had 28 listed species while Connecticut, Massachusetts and Rhode Island had none. Likewise, the number of new listings ranged from zero in many states to 25 in Tennessee. Finally, with a correlation coefficient of .168, there is not a strong linear dependence between LIST73 and NEWLIST. This means that states with many (few) listed species in 1973 did not necessarily have many (few) new species added to the list.

5. Estimations of the 1973 and 1978 Votes

We first estimate the individual votes using probit maximum likelihood. We then construct a multiple category dependent variable that captures the senator's overall voting in 1978, and estimate this using multinomial logit. Finally, we again use m-logit to examine vote-switching behavior between the 1973 vote and one of the votes from 1978 (the vote that we will argue is the most informative one).

5.1: Estimation of the 1973 Vote

Table 2 presents the results from two probit estimations on the 1973 vote (V312). In the column of independent variables, the senator-specific variables are listed first, then the state-specific variables are listed, followed by the importance-of-ESA variables at the bottom. Among the senator variables, ideology (DW-NOMINATE) and TENURE are statistically significant determinants of the vote. DW-NOMINATE has an unexpected sign – more conservative senators were more likely to vote for Federal enforcement of the ESA. Also of note, party affiliation (DEMOCRAT) does not have any explanatory power over this vote; in both magnitude and statistical significance, the effect of this variable is estimated to be close to zero. AGE and TENURE carry opposite signs as they often do in models of congressional voting: AGE may affect the legislator's time horizon whereas TENURE is generally understood to measure political capital. As for constituent variables, ENVIROS, UNEMPLOYMENT, METRO and COLLEGE are statistically significant. Senators from states with more

environmental group members and more urban populations were surprisingly less likely to vote in favor of species preservation. Senators from states with higher unemployment rates (but not rising unemployment rates) and a higher percentage of college graduates were also more likely to vote for species protection. As for the endangered species variables, FEDERAL LAND is a positive and significant determinant of voting while LIST73 is statistically insignificant. Note that the sign on FEDERAL LAND is the reverse of that predicted because states with more Federal land should bear a higher cost of species protection, ceteris paribus.[6]

5.2: Estimation of the 1978 Votes

Tables 3 and 4 report the results estimating the two votes in 1978 that were not lopsided—V216 (the Stennis amendment) and V219 (the Nelson amendment). Recall that V216 proposed to weaken ESA, while V219 proposed to strengthen ESA. For this and other reasons, we will argue that these two votes are the most informative of the five 1978 votes considered, and that V216 is the more informative of the two. In these estimations, we begin with the base model from above and add the variables NEWLIST and PROJECT to ascertain whether these "surprises" impacted the way senators voted in 1978.

In Table 3, the most apparent difference from the 1973 vote is the strong explanatory power of party affiliation and its sign. The coefficient estimate on DEMOCRAT is *positive* and strongly significant, indicating that Democrats were more likely to vote to weaken the ESA, contrary to the norm in environmental legislation. DW-NOMINATE is also positive and significant, indicating that more conservative senators were more likely to vote to weaken ESA. A senator's AGE is also significant. The significant constituent interest variables are ENVIROS and METRO. Senators from states with more environmental group members and more urbanized populations were more likely to support species preservation, which is consistent with our expectations but contrary to the pattern observed in 1973. The other constituent interest variables are not significant. Finally only FEDERAL LAND was significant among the endangered species variables; senators from states with more Federal land were more likely

[6] We also estimated this equation using LCV scores rather than DW-NOMINATE. The results for each of the independent variables are the same except for LIST73, which becomes statistically significant with an increase of its

to vote to weaken the ESA. Neither of the "surprise" variables (NEWLIST or PROJECT) is statistically significant.[7]

In general senator-specific and constituent interest variables explain this vote. Only one of the endangered species variables is significant, FEDERAL LAND, and is consistent with economic voting on the ESA – states bearing a larger share of the costs should be less supportive of the ESA. By contrast, FEDERAL LAND had the opposite effect in 1973. We find some support then for miscalculation of the costs of species protection in the "wrong sign" for this variable in 1973 and its significance in the expected direction in 1978; senators seemed to take closer account of the state-by-state economic costs of ESA when reversing the policy. The insignificance of PROJECT and NEWLIST provide no support that updating of the estimate of the costs of species protection using new information lead to the policy reversal on the ESA.

Table 4 reports results from the analysis of V219, which proposed to strengthen ESA relative to the changes that were actually adopted in 1978.[8] A senator's ideology and party affiliation dominate the model—but again DEMOCRAT works opposite the normal direction. No other variable is statistically significant. Evidently the coalitions of support and opposition regarding ESA had formed along partisan lines sometime between 1973 and 1978. Our data cannot inform whether legislators simply followed party lines in 1978 or if the debate and proposals for reform of ESA came into line with the party split—but one or some combination of these evidently occurred. Note that the signs on coefficient estimates in Table 4 are all opposite the signs in Table 3, which is expected because the amendments propose opposite effects. This speaks to consistency in voting on the set of 1978 votes, which helps validate the dependent variable that we use to jointly estimate the 1978 votes.

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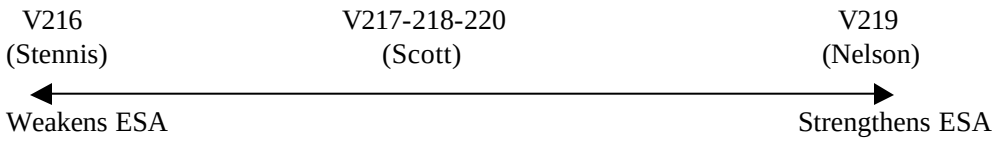
robust t-statistic from 1.09 in Model 1 to 1.62. In the results that follow, we also substitute LCV scores for DW-NOMINATE scores, and the differences are typically minor.

[7] It is possible that the effect of new listings is non-linear and/or non-monotonic. We constructed some variations on NEWLIST to investigate. First, fully half the states had zero new listings so we defined NEWLIST2 as a binary variable equal to 1 if a state had any new listings. We also found that 38 states had between 1 and 5 new listings, whereas 12 states had between 7 and 28, so we defined another variation NEWLIST3 as {0,1,2} for {0,1-5,7-28} new listings. Finally, we defined dummy variables NEWD2=1 for states with 1-5 new listings, and NEWD3=1 for states with 7-28. In alternative specifications using these variations on NEWLIST, none of the variations were statistically significant on V216 (although the nominal signs on NEWD2 and NEWD3 were negative and positive, respectively). In later estimations, we tried these same variations on NEWLIST, but in no instance did they perform sufficiently differently to warrant separate presentation of findings.

5.3: Joint Estimation of 1978 Votes:

We now construct a multi-category dependent variable that represents senators' voting on all five of the 1978 amendments as a group. Our interest here is to incorporate voting on the Scott amendments even though individual probit estimations on these votes are not feasible. Moreover, when viewing the five amendments together one discovers that senators voted in well-defined patterns, and the empirical determinants of these patterns offer insight into reversal on ESA. First, consider the patterns of voting to be explained—the dependent variable. Among the five amendments, V219 proposed to strengthen the ESA relative to the amendment that was ultimately passed. V216, by listing exemption criteria that were specific and easy to meet, would have weakened the ESA considerably further than the adopted amendments. Based on these considerations, we propose the following arrangement of the votes on a single dimension:



If this grouping is correct, then assuming sincere voting we should expect consistency in voting on the three Scott amendments (a positive correlation) and inconsistency between the Stennis and Nelson amendments (a negative correlation). The correlation coefficients of the roll call votes confirm these relationships: the Nelson amendment is negatively correlated (-.3375) with the Stennis amendment, and the three Scott amendments are all positively correlated (in excess of +.50). Senators tended to fall into three categories of vote patterns on these five votes:

i. 25 senators voted 'nay' on Stennis and 'yea' on Nelson, and *none* of these voted 'yea' on *any* of the Scott amendments. *These 25 voted strongly against making exemptions easier—against weakening ESA.*

ii. 46 senators voted 'nay' on both Stennis and Nelson. This might suggest their taking a

[8] We had to drop PROJECT from the equation because every senator from states with PROJECT=1 voted against V219.

moderate position if they voted 'yea' on the others. But a full 38 of these voted 'nay' on all three of the other Scott amendments, another 3 voted 'nay' on two and abstained on the other, and the remaining 5 voted 'yea' only on the procedural one (V220). *These 46 senators voted for the level of difficulty in exemptions contained in the final amendments.*

iii. 22 senators who voted on both V216 and V219 voted 'yea' on Stennis and 'nay' on Nelson. While support among these senators for the Scott amendments was mixed (9, 2 and 16 of these 22 voted for V217, V218, and V220 respectively), *these 22 senators voted strongly for making exemptions easier—for weakening ESA.*

This suggests a trichotomous grouping of senators with the above categories {i, ii, iii} being coded {0, 1, 2). We call this variable VEXEMPT. Since there is no definitive reason to believe these categories are ordinal, the appropriate estimator is multinomial logit. The m-logit procedure calculates a set of coefficient estimates for each category of the dependent variable, with estimates in the selected base category set to zero. We set VEXEMPT=1 as the base category in our estimation.

Table 5 presents the results. The top portion presents estimates for VEXEMPT = 1 and the bottom portion results for VEXEMPT=2. The m-logit coefficient estimates are not of direct interpretive value, but can be converted to estimates of each independent variable's marginal effect: within each category, the effect of the independent variable on the probability that the dependent variable takes that category relative to the probability that it takes the base category. In other words, Table 5 reports the estimated probability ratios, which are bounded below by zero. A negative (positive) beta is associated with a probability ratio less (greater) than unity, and greater deviation from unity indicates a stronger marginal effect.[9] Recall that VEXEMPT takes values {0,1,2} to represent a senator who voted {strongly against, neutral, strongly for} making exemptions easier. Therefore, we expect the relative probability estimates for categories 0 and 2 to be on opposing sides of unity. In Table 5, it can be seen that this expectation is typically upheld, though not for every independent variable. Consider party affiliation. In the top

[9] The signs on the beta estimates are preserved in the signs on reported t-statistics.

panel for Model 1 being a Democrat *reduces* the probability of voting strongly against weakening ESA, relative to the probability of voting neutral, by an estimated factor of 10 (or 1/.099). In the bottom panel of Model 1 being a Democrat *increases* the probability of voting strongly in favor of weakening ESA, relative to voting neutrally, by a factor of 38.54. The m-logit estimates confirm that ideology and party work in opposite directions, contrary to the usual case. The relative probability estimate on DW-NOMINATE is close to zero in Category 0 but quite large in Category 2, and both are significant with 99% confidence. Thus conservative senators are far more likely to vote neutrally than to vote against weakening ESA, and far more likely still to vote to weaken ESA than to vote neutrally. As for constituent variables, COLLEGE increases the probability of voting against a weaker ESA, while ENVIROS reduces the probability of voting for a weaker ESA—both relative to voting the status quo. Interestingly, none of the ESA variables is statistically significant, nor are their effects unambiguous on the 95% confidence interval (they all straddle unity). With the new formulation of the dependent variable—essentially a simultaneous estimation of the 1978 votes—party and ideology still dominate the explanatory power, with some constituent interest variables playing explanatory roles as well.

6. Analysis of Vote Switching

Comparison of the votes of individual senators reveals that many who voted on V312 in 1973 switched their support for the ESA in 1978. We now turn to analyze the empirical determinants of which senators switched their votes as opposed to those who maintained their support or opposition to the ESA. We define a dependent variable that measures whether a state's senator switched support for the ESA and then present m-logit estimation of this dependent variable.

Two modeling problems arise in this analysis. The first concerns selecting the sample. Thirty three senators left office in the five years between 1973 and 1978. Analysis of vote switching could observe only those *senators* who cast votes in both roll calls or observe all *states* whose senators voted in both years even if they replaced their senators. The appropriate sample depends on the underlying question of whether the *member* or

the *district* is the appropriate unit of choice. To the extent that senators are good agents of their constituents' interests, then the senate seat is the appropriate unit. But insofar as members can shirk or pursue their own preferences in office, then the returning member is the appropriate unit of observation. Our data do not allow a sure test of this, and since the evidence on shirking suggests that the agency problem is not too severe (Bender and Lott 1996), we use the seat as our unit of observation. We control for turnover with a binary variable RETURNER, which is set to 1 if the same senator held the seat in 1978 as in 1973.

The second modeling issue is a potential selection problem related to missing voting data. Of the 100 senate seats in our sample, nine failed to cast a vote on either V312 or V216. To see why there is a potential selection problem, let the dependent variable VSWITCH categorize senators according to whether they maintained opposition/support or switched their vote. To this end, VSWITCH takes the following categories:

0 if senator voted *against* ESA in 1973 and then *for* ESA in 1978;

1 if senator voted *for* ESA in *both* years; and

2 if senator voted *for* ESA in 1973 and then *against* ESA in 1978.

To explain the overall policy reversal on ESA, we are most interested in the determinants of falling into Category 2. Considering the 91 seats for which senators cast votes on both V312 and V216, the count in each category {0,1,2} is {32, 39, 19}.[10] Nine senators failed to cast a vote on either V312 or V216. Ignoring the problem and simply estimating the m-logit with these 90 observations is problematic since the decision not to vote is related to the alternatives being voted on.[11] In other words, these nine observations are important alternatives to the three categories above. Another solution is to combine these nine into a fourth category, which has the econometric advantage of being more consistent with the Independence of Irrelevant Alternatives assumption underlying the m-logit. These nine senators, however, would not have voted all alike and thus politically do not "belong" in the same

[10] Notice that the sum of these three categories is only 90. One senator voted against ESA in 1973 and also in 1978, which is not enough observations to add a fourth category. We ignore this one senator in estimating VSWITCH.

[11] Note that there was missing voting data regarding our earlier estimation on VEXEMPT as well, and the model includes only 93 observations as a result. As an informal test, we checked the results reported in Table 6 against the same model run on four categories, after placing the remaining seven into a fourth category. The estimates for Category 0 and 2 stayed statistically the same, and no variables except DEMOCRAT were significant in the fourth category. The stability of the estimates after adding this fourth category implies that excluding these seven observations was not biasing our

category. A third approach is to make out-of-sample predictions of how these senators would have voted on V312 and V216 using the probit models in Tables 2 and 3. The nine senators are then individually assigned to one of the above three categories based on these predictions, and the estimation could use the entire sample.

We employ the third approach. After making out-of-sample predictions on V312 and V216, the count in each category {0,1,2} of VSWITCH is {32, 46, 21}. Hence, a state's senator switched votes 53 times and maintained position 46 times. Table 6 reports estimation of an m-logit model of VSWITCH with the base category set to VSWITCH=0. The top panel in Table 6 contains estimates for switching one's vote relative to the probability of voting for ESA in both years, while the bottom panel reports the estimates of the probability of opposing ESA in both years relative to the probability of supporting ESA in both years.

The pattern in these results sheds important light on why Congress reversed direction on the ESA. First, consider the endangered species variables. If miscalculation drove the policy reversal on the ESA, these variables should be statistically significant determinants of Category 2 (for-then-against ESA). Yet none of the species variables is statistically significant in this category. Only in Category 0 (against-then-for ESA) do we see that LIST73 increases, and NEWLIST decreases, the probability of switching from against to for (relative to for-then-for ESA). This makes sense if listings as of 1973 were seen as a cost of ESA while new listings between 1973 and 1978 were seen as resources in need of protection. PROJECT is not close to being an important variable in this model. FEDERAL LAND tends to decrease the relative probability of voting for-then-against, but with a t-statistic of –1.07 its sign in Category 2 is negative with only 75% confidence. As with our earlier probit results, we find no evidence that the cost of species protection or cost "surprise" variables led senators to switch their position on ESA. If the Act was inefficient then senators evidently took account of this in their initial voting decisions.

Next, consider the state-specific constituency variables. Here too we see only a minor role among these variables in Category 2. A rising unemployment rate (in Model 1) and an increasingly college-educated populace

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results. These results are available from the authors on request.

(in Model 2) both increase the relative probability of switching from for to against ESA. As with the endangered species variables, the constituency variables exert most of their influence in Category 0. ENVIROS, for example, increases the relative probability of voting against-then-for, but is insignificant in Category 2. Similarly, METRO is positive and significant in Category 0 but insignificant in Category 2. The remaining constituent variables are insignificant in both categories. Based on these results, it appears that a shift in the balance of constituent interests played a small role in reversing direction on the ESA.

Finally, consider the senator-specific variables. Party affiliation is unimportant in Category 0, indicating that being a Democrat did not affect the relative probability of voting against-then-for. But in Category 2, DEMOCRAT is large in magnitude and statistical significance. Combined with the increase in the size of the Democratic majority between 1973 and 1978 (from 56 to 61 seats), this variable appears to have been central to the overall reversal on ESA. But why would party work opposite ideology? Examining DW-NOMINATE, more conservative senators were also more likely to reverse position from supporting ESA to opposing it. Although there was a slight liberal drift of the overall chamber from a mean of -.077 in 1973 to -.103 in 1978, other changes occurring in the Senate during this period help explain the contribution of this variable to reversal on ESA. First, Republicans lost five seats while shifting to the left and becoming higher in variance.[12] Democrats gained five seats and shifted to the right.[13] They also effectively replaced two southern liberals with two non-southern conservatives.[14] Thus, the Democratic shift to the right was greater in magnitude than the Republican shift to the left and, as a result, there were more Democrats in 1978, who were more conservative, and who were more likely to switch their vote from supporting ESA to opposing the Act.

Notably, the variable RETURNER is not significant in either category, indicating that the nexus of state and senator characteristics mattered more to VSWITCH than did the identity of the senator voting. This suggests

[12] Summary statistics for Republicans {year, mean, standard deviation, minimum, maximum, number of observations}: {1973, .198, .282, -.411, .659, 44}, {1978, .176, .303, -.481, .681, 39}.

[13] Summary statistics for Democrats {year, mean, standard deviation, minimum, maximum, number of observations}: {1973, -.294, .233, -717, .243, 56}; {1978, -.281, .238, -.717, .496, 61}.

[14] Summary statistics for Southern Democrats: {year, mean, standard deviation, minimum, maximum, number of observations}: {1973, -.001, .186, -.429, .243, 15}; {1978, -.059, .156, -.281, .286, 18}. Non-southern Democrats: {1973, -.40, .137, -.717, .127, 41}; {1978, -.374, .203, -.717, .496, 43}.

that agency slack was fairly tight on this issue—that senators tended to vote the way constituents wanted them to.

Tests of joint significance bolster our overall interpretation. Removing one set of variables (senator, state, and ESA) at a time from Model 1 in Table 6, we compared the three restricted models. As can be seen in Table 6, the log likelihood in the unrestricted model is –50.93. The log likelihood values and associated likelihood ratio test statistics for each of the restricted models are as follows:

	Log-likelihood	^{2}-test	Significant with
Senator-specific variables (4 d.f.)	-74.03	46.2	> 99%
Constituency variables (5 d.f.)	-67.35	16.42	> 99%
Endangered species variables (4 d.f.)	-56.74	11.62	> 97.5%

Thus, we reject the null hypothesis that any of our three sets of variables does not belong in the model. Although all three groups of variables pass the minimum test of joint significance, the endangered species variables contribute the least to the likelihood function while senator-specific variables contribute the most.

7. Nonparametric Analysis

We now consider evidence on the agenda control and cycling explanations for policy reversal on the ESA. The committee structure of the Senate as a whole was modified in 1977 and the committee with jurisdiction over endangered species changed from the Commerce Committee in 1973 to Environment and Public Works in 1978. This would seem to be an ideal scenario for the explanation that a change in the preferences of members with agenda control caused the policy reversal. However, the membership on these two committees overlapped considerably, and their measurable policy preferences were similar. Table 7 compares the 1973 and 1978 distribution of DW-NOMINATE scores for the Senate and the committees that reported the bills on the ESA. In 1973 the reporting committee was Commerce; however, in 1978 the reporting committee was Environment and Public Works. Note that since we have the population mean, we do not need to conduct tests for statistical significance. Looking at the Senate overall, there was a slight liberal shift between 1973 and 1978, but the

distribution also becomes slightly more skewed to the conservative side. Looking at Commerce, there is a very slight conservative shift of mean, but a fairly sizeable increase in the conservative skew. The max score increases from .425 to .609.[15] Looking at the Environment committee, the mean increases by almost 1/3 of the standard deviation, and again there is a negligible increase in the conservative skew. The most relevant comparison is between the reporting committees in the respective years—Commerce in 1973 and Environment in 1978. You can see that there is virtually no change in the mean. In fact, these distributions are almost identical. From these comparisons it appears that there was no dramatic (or even substantive) shift of policy preference, either in the Senate as a whole or on the relevant committees.

Vote cycles are difficult to rule out in a multi-dimensional policy space, but on a single dimension require only non-single peaked preferences in voting. We have no way to discern if endangered species policy is being considered in isolation or jointly with other (likely environmental) policy issues. Consequently we consider only whether species preservation policies are single peaked. We conceive of the dimension as follows. Three different levels of legal protection for endangered species prevailed during the 1970s: the pre-ESA level of protection, the original ESA's protection, and the amended ESA's protection. Arranging these outcomes on a single dimension produces the following numbering scheme: (1) pre-ESA protection, (2) amended ESA, and (3) original ESA. The 1973 final vote pitted (1) against (3) while the 1978 final vote paired (3) against (2). We assume transitive preferences and sincere voting by all Senators in each vote. The two final votes produce four possible vote combinations, which we consider in order.

a. Yes in 1973 and Yes in 1978. A senator voting in this manner reveals a preference ordering of (2) > (3) > (1), which is definitely single-peaked preference ranking. 41 senators voted this way, 26 of them Democrats.

b. Yes in 1973 and No in 1978. Preference orderings consistent with these votes are (3) > (2) > (1) and (3) > (1) > (2), so this case is ambiguous. A senator voting in this fashion values strong protection of

[15] Barry Goldwater joined the committee prior to 1978. The next highest score on the committee is .308, so Goldwater appears to have been an outlier on this committee.

endangered species, but may exhibit multi-peaked preferences. 21 senators voted this way10 of them Democrats.

c. No in 1973 and Yes in 1978. A senator voting in this manner has either (1) > (2) > (3) or (2) > (1) > (3), both of which are single-peaked. 32 senators voted this way, 21 of them Democrats.

d. No in 1973 and No in 1978. A senator voting in this manner has the multi-peaked preference order (1) > (3) > (2). 1 Democratic senator voted this way.

The analysis is incomplete because we do not have a head-to-head vote between options (1) and (2). Herein lies the ambiguity in classifying senators who voted in combination (b). These 21 senators potentially have multiple-peaked preferences. With this potential, there is then the potential for a vote cycle. But a senator who voted in this fashion is displaying strong support for species protection. To presume that a senator who looks like a strong supporter of environmental protection would prefer no federal species protection to partial protection without direct evidence seems dubious. Moreover, ESA has not come up for reform in Congress, despite the strong preference for its repeal among House Republican leaders after the 1994 elections. The policy reversal on endangered species protection yields little evidence of cycling.

8. Conclusion

In this paper we have we have discussed several potential explanations for Congress' reversal on species protection. Our empirical analysis offers some important insights regarding these potential explanations. First, we have found that senators are responsive to constituent interests: environmental variables such as ENVIROS, economic variables such as unemployment, and demographic variables such as COLLEGE, are good predictors of the way senators voted. Second, the senator's party and ideology (as measured by DW-NOMINATE scores) were relatively unimportant in the 1973 votes but these two variables dominated most of the explanatory power in the 1978 votes. In general, it seems apparent that the coalitions regarding species protection were well-formed by 1978, and that these coalitions tended to follow party lines. It is also possible that ESA had become a

sufficiently ideological issue—identifying a senator as conservative or liberal—that the senators almost had to vote party lines or consistently with their overall voting reputation in 1978. Perhaps our most surprising result is that party and ideology, when they are statistically significant, work fairly strongly in opposite directions. We have not advanced any theory for this, but closely comparing party balance, regional representation, and the distribution of policy preferences against their historical values, we come to view this an unusual time in the Senate. Perhaps this unusualness mitigates how surprised we should be to see party and ideology opposing each other. Finally, we have found much to explain in senators' vote-switching behavior. In 21 cases a state's senator switched from voting for ESA in 1973 to voting to weaken ESA in 1978. In our empirical analysis, it appears that vote-switching is not sensitive to the importance-of-ESA variables, but is driven instead by the senator-specific variables and, to a smaller degree, the constituent variables. By the interpretation of our ESA variables, therefore, this policy reversal does not appear to be caused by ignorance/miscalculation of the costs of ESA by constituents and/or senators. Furthermore, by our nonparametric analysis we do not find that a shift of agenda-controllers' preferences or a cycling problem caused the reversal either. Instead, our results suggest that a shift of policymakers' preferences in general is a better explanation. In particular, an influx of more conservative democrats appears to have tipped the scales toward considerably weakening ESA. If the influx was due to changes in constituent preferences, our story is consistent with a "composition effect" (Poole and Rosenthal 1997), by which newly entering members are the key to a change in equilibrium policy. Indeed, the variable RETURNER does not exert explanatory power in the vote-switching model, supporting the view that there was little slack in voting on ESA. In this case, models of rational political equilibrium (Peltzman 1976, Becker 1983) would explain this policy reversal more so than models of ignorance/miscalculation.

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Table 1
Summary Statistics

	1973 Sub-sample					1978 Sub-sample				
	N	Mean	Std. Dev.	Min	Max	N	Mean	Std. Dev.	Min	Max
Senator-Specific Variables										
DEMOCRAT[b]	100	.56	.498	0	1	100	.61	.49	0	1
DW-NOMINATE[e]	100	-.077	.353	-.72	.66	100	-.103	.347	-.717	.681
TENURE[c]	100	10.86	8.41	1	33	100	10.79	8.63	0	36
AGE[c]	100	56.5	10.61	31	81	100	56.07	10.33	36	81
State-Specific Variables										
ENVIROS[a]	100	.68	.33	.13	1.73	100	.68	.33	.13	1.73
METRO[a]	100	57.7	25.5	0.0	93.3	100	58.8	24.3	0.0	92.4
COLLEGE[a]	100	10.6	2.2	6.6	14.9	100	19.0	4.1	11.8	29.4
INCOME[e]	100	4675	641	3448	5889	100	7560	986	5736	10851
UNEMPLOYMENT[a]	100	4.6	1.5	2.0	10.4	100	5.7	1.5	2.9	11.2
ΔUNEMP[a]	100	-.60	.50	-2.4	.20	100	-.90	.90	-2.6	1.8
Importance-of-ESA Variables										
FEDLAND[a]	100	16.0	23.2	3.0	96.7	100	16.7	23.5	4.0	98.5
LIST73[e]	100	3.42	5.37	0	28	--	--	--	--	--
PROJECT[b]	--	--	--	--	--	100	.14	.349	0	1
NEWLIST[e]	--	--	--	--	--	100	2.46	4.78	0	25
Dependent Variables (Votes)										
V312[b]	93	.645	.481	0	1	--	--	--	--	--
V216[b]	--	--	--	--	--	98	.225	.419	0	1
V217[b]	--	--	--	--	--	96	.104	.307	0	1
V218[b]	--	--	--	--	--	89	.022	.149	0	1
V219[b]	--	--	--	--	--	95	.263	.443	0	1
V220[b]	--	--	--	--	--	92	.250	.435	0	1
VEXEMPT[e]	--	--	--	--	--	93	.967	.714	0	2
VSWITCH[e]	--	--	--	--	--	93	1.69	1.01	0	3

Notes:

[a] Indicates variable is measured in whole percent units.

[b] Indicates variable is binary.

[c] Indicates variable is measured in years.

[e] Please see explanation in Section 4 of the paper.

Table 2
Probit Estimation of 1973 Vote
Dependent Variable=1 Indicates a Vote For Stronger Species Protection

Independent Variable	Model 1	Model 2
DEMOCRAT✦	-.107	.008
	(.194)	(.187)
AGE	-.009	-.006
	(.009)	(.008)
TENURE	.018*	.009
	(.010)	(.009)
DW-NOMINATE	.497*	.478*
	(.303)	(.289)
ENVIROS	-.683**	-.947**
	(.302)	(.312)
UNEMPLOYMENT	-.048**	—
	(.038)	
ΔUNEMPLOYMENT	—	-.170
		(.096)
METRO	-.009***	-.012***
	(.003)	(.003)
COLLEGE	.085**	.109**
	(.039)	(.042)
INCOME	-.057	.053
	(.143)	(.138)
FEDERAL LAND	.008**	.007**
	(.004)	(.003)
LIST73	-.013	-.012
	(.010)	(.010)
Log Likelihood	-37.31	-37.03
^{2} (11)	40.50	39.27
Prob > ^{2}	0.0002	0.0001
Pseudo R^2	0.3831	0.3878
N	93	93

Notes:
Marginal probability estimates (change in probability of voting yea for a continuous increase in the independent variable) appear on the line with the variable name. These are transformed, for ease of interpretation, from the associated probit coefficient estimates.
✦ In the case of discrete variables, the marginal probability is for a change from 0 to 1.
Robust standard errors and are reported in parentheses.
*** Significant with 99% confidence. ** Significant with 95% confidence. * Significant with 90% confidence.

Table 3
Probit Estimation of 1978 Vote 216 (Stennis Amendment)
Dependent Variable=1 Indicates a Vote to Weaken ESA (make exemptions easier)

Independent Variable	Model 1	Model 2
DEMOCRAT ⅄	.304***	.241***
	(.107)	(.112)
AGE	.008**	.007**
	(.004)	(.003)
TENURE	-.002	-.0008
	(.004)	(.003)
DW-NOMINATE	.621***	.519***
	(.174)	(.184)
ENVIROS	-.400***	-.316***
	(.173)	(.154)
UNEMPLOYMENT	-.003	—
	(.017)	
ΔUNEMPLOYMENT	—	.047
		(.031)
METRO	-.002*	-.0008
	(.001)	(.0009)
COLLEGE	.011	.012
	(.009)	(.010)
INCOME	.057	.020
	(.047)	(.042)
FEDERAL LAND	.0029*	.0021*
	(.0017)	(.0015)
LIST73	-.007	-.004
	(.006)	(.005)
NEWLIST	.0004	-.002
	(.0043)	(.004)
PROJECT ⅄	.033	.038
	(.105)	(.111)
Log Likelihood	-23.20	-22.29
^{2} (13)	45.64	52.85
Prob > ^{2}	0.000	0.000
Pseudo R^2	0.555	0.576
N	98	98

Notes:
Marginal probability estimates (change in probability of voting yea for a continuous increase in the independent variable) appear on the line with the variable name. These are transformed, for ease of interpretation, from the associated probit coefficient estimates.
⅄ In the case of discrete variables, the marginal probability is for a change from 0 to 1.
Robust standard errors and are reported in parentheses.
*** Significant with 99% confidence. ** Significant with 95% confidence. * Significant with 90% confidence

Table 4
Probit Estimation of 1978 Vote 219 (Nelson Amendment)
Dependent Variable=1 Indicates a Vote to Strengthen ESA (make exemptions harder)

Independent Variable	Model 1	Model 2
DEMOCRAT⅄	-.289*	-.281**
	(.174)	(.169)
AGE	-.003	-.003
	(.005)	(.004)
TENURE	-.0037	-.003
	(.006)	(.005)
DW-NOMINATE	-.732***	-.736 ***
	(.231)	(.224)
ENVIROS	-.104	-.148
	(.161)	(.180)
UNEMPLOYMENT	-.015	—
	(.026)	
ΔUNEMPLOYMENT	—	-.041
		(.057)
METRO	.0006	.0001
	(.0019)	(.002)
COLLEGE	.014	.011
	(.014)	(.014)
INCOME	-.044	-.078
	(.058)	(.064)
FEDERAL LAND	-.005	-.004
	(.003)	(.003)
LIST73	-.0015	-.0005
	(.007)	(.007)
NEWLIST	-.013	-.012
	(.013)	(.014)
PROJECT	—	—
Log Likelihood	-31.54	-31.42
^{2} (11)	36.58	38.08
Prob > ^{2}	0.0003	0.0001
Pseudo R^2	0.423	0.426
N	95	95

Notes:
Marginal probability estimates (change in probability of voting yea for a continuous increase in the independent variable) appear on the line with the variable name. These are transformed, for ease of interpretation, from the associated probit coefficient estimates.
⅄ In the case of discrete variables, the marginal probability is for a change from 0 to 1.
Robust standard errors and are reported in parentheses.
*** Significant with 99% confidence. ** Significant with 95% confidence. * Significant with 90% confidence

Table 5

Multinomial Logit Estimation of 1978 Votes

Dependent Variable VEXEMPT={0,1,2} Indicates Voting {Against, Neutral, For} Weakening ESA (making exemptions easier)

	Relative Prob. Est.	**Robust t-statistic**	**95% CI**	
VEXEMPT=0 (N=25)				
DEMOCRAT	0.099 **	-1.71	0.007	1.41
AGE	0.980	-0.34	0.878	1.09
TENURE	0.982	-0.25	0.852	1.13
DWNOM	0.00024***	-3.03	$1.12e^{-06}$	0.052
ENVIROS	0.648	-0.22	0.014	29.47
UNEMPLOYMENT	1.378	0.89	0.677	2.80
ΔUNEMPLOYMENT	--	--	--	--
METRO	1.01	0.65	0.965	1.07
COLLEGE	1.38 *	1.78	0.967	1.97
INCOME	0.484	-0.80	0.082	2.85
FEDERAL LAND	0.945	-1.52	0.880	1.01
LIST73	1.003	-0.029	0.780	1.29
NEWLIST	0.832	-0.83	0.541	1.28
PROJECT	0.00	0.00	0.00	--
VEXEMPT=2 (N=22)				
DEMOCRAT	38.54 **	2.14	1.36	1092
AGE	1.13 *	1.91	0.996	1.29
TENURE	0.977	-.033	0.853	1.12
DWNOM	995 ***	2.67	6.33	156470
ENVIROS	0.0004 *	-1.91	$1.62e^{-07}$	1.27
UNEMPLOYMENT	1.063	0.18	0.550	2.05
ΔUNEMPLOYMENT	--	--	--	--
METRO	0.970	-1.15	0.921	1.02
COLLEGE	1.19	1.05	0.858	1.67
INCOME	3.16	1.20	0.482	20.74
FEDERAL LAND	1.05	1.27	0.973	1.13
LIST73	0.944	-0.49	0.751	1.19
NEWLIST	0.979	-0.27	0.818	1.17
PROJECT	2.32	0.41	0.043	125.7
Log Likelihood	-47.63		^{2} (26)	98.62
Pseudo R^2	.509			

Dependent variable VEXEMPT=1 (N=46) is the base (comparison) category.

Reported point estimates are probability ratios of falling in the category relative to the base category. These are transformed, for ease of interpretation, from the associated m-logit coefficient estimates. *** Significant with 99% confidence. ** Significant with 95% confidence * Significant with 90% confidence.

Table 6
Multinomial Logit Estimation of Vote Switching from 1973 to 1978

Dependent Variable VSWITCH={0,1,2} for {Against then For, For then For, For then Against} Species Protection

Model 1: All variables but LIST73 are in 1978 values. **Model 2:** Variables in *ITALICS* are 1978-1973 values.

	Relative Prob. Est.	**Robust t-statistic**	**95% CI**			**Relative Prob. Est.**	**Robust t-statistic**	**95% CI**	
VSWITCH = 0 (N=32)									
DEMOCRAT	0.511	-0.58	0.052	5.01	DEMOCRAT	.241	-1.52	.038	1.52
AGE	1.17**	2.09	1.00	1.23	AGE	1.11**	2.29	1.02	1.21
TENURE	0.852*	-1.84	0.719	1.00	TENURE	.927	-1.09	.812	1.06
DWNOM	0.029*	-1.73	0.0006	1.56	DWNOM	.009***	-2.62	.0003	.309
ENVIROS	1010***	2.81	8.10	126033	ENVIROS	15.41*	1.87	.880	269
ΔUNEMPLOYMENT	1.12	0.23	0.414	3.05	*UNEMPLOYMENT*	1.47	1.37	.843	2.58
METRO	1.09***	2.69	1.02	1.15	*METRO*	.958	-0.47	.805	1.14
COLLEGE	0.591***	-2.88	0.413	0.845	*COLLEGE*	.635**	-2.04	.411	.982
INCOME	0.586	-.069	0.129	2.64	*INCOME*	.999	-0.21	.998	1.00
FEDERAL LAND	0.975	-1.07	0.933	1.02	*FEDERAL LAND*	.771	-0.91	.440	1.35
LIST73	1.19**	1.98	1.00	1.43	LIST73	1.12	1.55	.969	1.30
NEWLIST	0.699*	-1.64	0.455	1.07	NEWLIST	.821	0.27	.581	1.16
PROJECT	0.927	-0.068	0.105	8.19	PROJECT	.972	0.98	.141	6.71
RETURNER	5.20	1.47	0.578	46.83	RETURNER	1.64	0.59	.277	9.64
VSWITCH = 2 (N=21)									
DEMOCRAT	43.64**	2.14	1.37	1388	*DEMOCRAT*	62.8**	2.35	1.99	1979
AGE	1.20**	2.43	1.03	1.39	*AGE*	1.19**	2.10	1.01	1.41
TENURE	0.976	-0.29	0.833	1.14	*TENURE*	0.948	-0.589	0.795	1.13
DWNOM	3186***	3.02	17.14	591995	*DWNOM*	9977***	2.96	22.74	4377759
ENVIROS	0.004	-1.35	$1.08e^{-06}$	12.19	ENVIROS	0.006	-1.19	$1.16e^{-06}$	27.42
ΔUNEMPLOYMENT	3.08*	1.64	0.802	11.82	*UNEMPLOYMENT*	1.22	0.34	0.376	3.99
METRO	1.00	0.09	0.950	1.05	*METRO*	1.13	1.12	0.911	1.40
COLLEGE	1.15	0.79	0.806	1.66	*COLLEGE*	1.99*	1.67	0.888	4.45
INCOME	1.55	0.44	0.212	11.4	*INCOME*	1.00	1.49	0.999	1.00
FEDERAL LAND	1.04	1.25	0.975	1.11	*FEDERAL LAND*	0.321	-1.11	0.043	2.38
LIST73	0.904	-0.87	0.722	1.13	LIST73	0.768	-1.36	0.527	1.12
NEWLIST	0.917	-0.81	0.744	1.13	NEWLIST	1.02	0.17	0.801	1.30
PROJECT	1.904	0.26	0.013	268	PROJECT	0.392	-0.47	0.008	19.36
RETURNER	0.258	-0.98	0.017	3.85	RETURNER	0.376	-0.65	0.019	7.11
Log Likelihood	-50.93		^{2} (28)	106.5	Log Likelihood	-57.99		^{2} (28)	91.93
Pseudo R^2	.510				Pseudo R^2	.442			

Dependent variable VSWITCH = 1 (N=46) is the base (comparison) category.

Reported point estimates are probability ratios of falling in the category relative to the base category. These are transformed, for ease of interpretation, from the associated m-logit coefficient estimates. *** Significant with 99% confidence. ** Significant with 95% confidence * Significant with 90% confidence.

Table 7
Comparison of Distribution of DW-NOMINATE Scores
Senate Overall and Relevant Committees

Body		1973	1978
Senate	*N*	99	97
	Mean	-.079	-.098
	Std. Dev.	.355	.351
	Skew	.352	.455
	Min	-.717	-.717
	Max	.659	.681
Commerce Committee	*N*	16	18
	Mean	-.129	-.071
	Std. Dev.	.285	.287
	Skew	.299	.575
	Min	-.578	-.529
	Max	.425	.609
Environment and Public	*N*	15	13
Works Committee	*Mean*	-.048	-.142
	Std. Dev.	.383	.289
	Skew	.414	.753
	Min	-.629	-.582
	Max	.651	.530