



## Analysis

# Can urban areas help sustain the preservation of open space? Evidence from statewide referenda<sup>☆</sup>



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## ABSTRACT

Statewide referenda for land conservation are likely to entail a disparity between people who vote on the referenda and those who live in proximity to conserved areas, which may lead to a lower probability of passage than a more local referendum. This paper examines trends in voting preferences on statewide land conservation referenda in Rhode Island using precinct-level voting data. We identify two similar referenda in 2004 and 2012 and estimate a first difference spatial regression model that seeks to understand the determinants of changes in support over time. Controlling for socioeconomic characteristics and political ideology, we find that referenda support is growing in densely populated communities relative to sparse ones, and there is a multiplicative effect of rapidly growing dense areas. This implies urban areas are becoming critical supporters for the preservation of farm, forest and open space lands, despite being non-proximate to lands at risk of development.

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## 1. Introduction

The last century of population movement in the United States is generally characterized as first moving from rural to urban areas and then moving from urban to suburban areas – the latter generating urban sprawl. Sprawl development has serious negative economic, societal and environmental impacts, including increased congestion, pollution, and decreased access to farmland, forests and open space (Burchell et al., 2002). Society has begun to take action to combat sprawl and protect open space access through private initiatives as well as policies at all levels of government. One increasingly popular way to preserve open space is public referenda. These referenda typically raise funds through bonds or increased property taxes that can be used for acquisition of property or development rights. Nationwide, the number of referenda per year has increased from just 26 in 1988 to a peak of 215 in 2004, with over 75% of

them passing (Trust for Public Land, 2013). In fact, by 2004 more money was allocated to land conservation through referenda than federal spending (Nelson et al., 2007).<sup>1</sup>

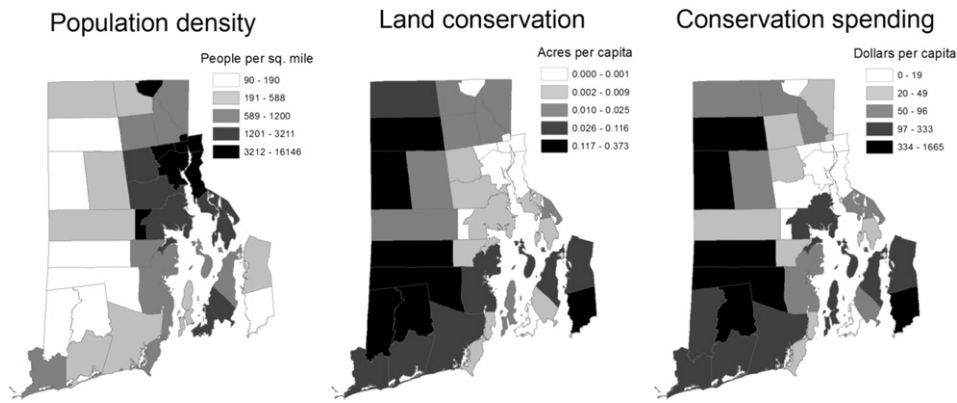
Intuition would suggest that a likely factor in determining support for land conservation referenda is the distribution of costs of sprawl and benefits of conserved open space. Indeed, prior research has shown that proximity is a key factor. Geoghegan et al. (1997) and Irwin (2002) find that property values increase with the proportion of open space within a given radius of a property. Tyrväinen and Miettinen (2000) find that property values decrease with increasing

<sup>1</sup> Open space conservation referenda can take on a number of forms. They vary by the type of land being conserved, ranging from farmland, forestland and wetlands to recreational spaces such as public parks and marinas. They also vary by type of legislation. Some measures are for land acquisition. Others are to continue protection of existing land, while many (including most of the measures in Rhode Island) set up funds to finance future conservation measures. The methods of finance include bonds, increased property and sales taxes, lottery funds, and royalties from resource extraction. In Rhode Island, state level referenda almost exclusively use bonds. The referenda are held at a variety of jurisdictional levels, ranging from the state level, as studied in this paper, all the way down to the municipal level. According to [landvote.org](http://landvote.org), 2394 measures have been put on the ballot across the country, resulting in approved funding of over \$58 billion for land conservation since 1988. Between 1992 and 2001, the federal government spent 22.6 billion dollars on land conservation (Lerner et al., 2007) versus 21 billion dollars (Trust for Public Land, 2013) from open space referenda.

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**Fig. 1.** Spatial distribution of population and conservation effort Notes: Population data come from the 2000 Decennial Census. Conservation acres and spending data are from the Land Acquisition Database from the Rhode Island Department of Environmental Management. All data are plotted at the municipal level.

distance from forested areas.<sup>2</sup> For the cost of sprawl, the literature is also consistent in showing that most costs are born at the local rather than in the broader region. For example [Bruekner \(2000\)](#) and [Deal and Schunk \(2004\)](#) note that infrastructure costs appear to be born at the municipal level. These results suggest that urban communities may be less impacted by urban sprawl and less willing to support and pay for conservation.

Given the localized accrual of benefits and costs of land use change to areas on the urban-rural fringe, an open question is why are state-level referenda so popular? Why not just let communities in the urban-rural fringe hold municipal referenda and address the problem? Not only are state-level referenda common, but they typically pass, often with over 70% approval. So the question becomes can urban areas, which contain a majority of voters, help sustain non-proximate open space?

This paper examines which community characteristics lead to support of statewide conservation referenda. Our focus in this paper is Rhode Island, which despite its diminutive size is an excellent location to study. Rhode Island is the second most population dense state in the US ([Wikipedia contributors, 2016](#)) and has recently experienced tremendous land use change with 30% of undeveloped land being developed between 1995 and 2005 ([Rhode Island Statewide Planning Program, 2006](#)). In addition, Rhode Island is exceptional in its use of statewide conservation referenda – seven have been voted on since 2000, more than nearly all states.

Within this context, we are particularly interested in urban areas, which are unlikely to receive much proximate benefit from conservation, but hold a tremendous voting power and tax base that may be tapped to achieve environmental, economic and societal benefits in other communities. [Fig. 1](#) illustrates this puzzle for Rhode Island. The first map shows population density, and the second two maps show conservation spending and acres preserved for years 2000–2015 by funds raised through state level referenda. Together, the maps show an almost inverse relationship between population density and direct benefits from the conservation referenda. On one hand, the lack of conservation in urban areas makes sense given the scarcity of undeveloped land and its cost. But on the other hand, it raises the question of why urbanites would choose to vote in favor of such conservation referenda. One possible explanation is that these are the people that understand

scarcity of open space and have a larger willingness to pay for conservation of the land that is left.

The purpose of this paper is to examine trends in voting preferences on statewide land conservation referenda in Rhode Island and to understand if dense and fast growing areas can help sustain open space. Because Rhode Island is so active with statewide referenda, we were able to find two referenda, 2004 and 2012, that are similar in their priority on land conservation and secondary funding focuses. We collected precinct-level votes and develop a methodology to match precincts to census tracts. By aggregating voting data to geographically consistent tract boundaries and focusing on two similar referenda, we effectively create a panel data set offering repeat voting observations at the tract level. We estimate a first difference specification with the change in percentage of votes in favor of the referenda as the dependent variable and the key independent variables being population density, population growth and their interaction. Our analysis also models spatial dependence with a spatial lag and spatial error and includes several socioeconomic controls.

The main findings suggest that densely populated communities have increased support for state-level referenda relative to sparsely populated communities in recent years. Further, when dense areas are growing in population, these areas are even more likely to support the measure. This indicates that state level land conservation referenda may be a valuable way to engage urban voters (and their taxes) in the process of land conservation. In addition to the main findings, our results show that areas with an increasing proportion of Democratic voters increase support of referenda. Further, we find evidence of mean reversion in voting patterns, which we interpret as evidence of voters not sorting into neighborhoods based on referenda support.

Voting has long been seen as a source of revealed preferences. Surprisingly, however, [McConnell and Walls' \(2005\)](#) exhaustive review of the literature on the valuation of open space included only one paragraph and one citation on voting. It has only been in recent years with increasing data availability and GIS tools that research using voting outcomes has become more prevalent. There are essentially two main strands in this literature. The first examines municipalities or counties that hold their own referenda and seeks to model support as a function of population, location and referenda characteristics (e.g., [Kotchen and Powers, 2006](#); [Nelson et al., 2007](#); [Banzhaf et al., 2010](#), [Heintzelman et al., 2013](#)). The second strand uses statewide referenda, partitions the state into areas with known voting outcomes, and examines which population and location characteristics drive support. The seminal work of [Deacon and Shapiro \(1975\)](#) examined two statewide initiatives in California, one that dealt with coastal land conservation, using voting observations at the city level. Similarly, [Kline and Wichelns \(1994\)](#) studied four statewide referenda in Rhode Island using town

<sup>2</sup> While these papers find houses capitalize open space on a local scale, it is possible or even likely that benefits extend beyond a small radius, which could provide motivation for voters not living in proximity to open space to vote in favor of a statewide referendum. However, even if benefits extend to all areas of a state, we would still expect proximate voters to benefit relatively more and thus to vote yes more often than non-proximate voters, all else equal.

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