

California's Farmland Preservation Programs, Taxes, and Furthering the Appropriate Safeguarding of Agriculture at the Urban Fringe to Reduce Greenhouse Gas Emissions*

Robert W. Wassmer, Ph.D.

Chairperson and Professor
Department of Public Policy and Administration
California State University, Sacramento
Sacramento, CA 95819-6081

(916) 278-6304

rwassme@csus.edu
www.csus.edu/indiv/w/wassmerr

September 30, 2008

*The California Department of Conservation commissioned the production of this paper. The opinions expressed here are only my own and in no way represent the opinions of the California Department of Conservation. Al Sokolow, Larelle Burkham-Greydanus, Peter Detwiler, Fielding Greaves, Brian Leahy, Scott Limpach, and Charles Tyson offered helpful comments on an earlier draft that made the final product better. Any errors that remain are my own.

1. Introduction

California has long been a leader in both its attempts to preserve land devoted to agricultural production and in its approach to funding its state and local governments. Recently it has become the leader in creating a statewide policy to reduce the amount of greenhouse gases generated within its border.

California's Williamson Act of 1965 allows the payment of lower local property taxes by farmers and ranchers for a 10-year renewable term in exchange for agreeing to keep their land in agricultural production or open space. The Open Space Subvention Act of 1972 provides for the state to partially reimburse county governments directly for the property taxes foregone under this program, and indirectly reimburse school districts. The California Farmland Conservancy Program (CFCP) of 1996 uses grant funding to protect permanently farmland in exchange for conservation easements that compensate the landowner based upon the appraised value of lost development rights and other restrictions. Started in 1998, the Williamson Act Easement Exchange Program allows the release of agricultural land from a previous Williamson Act contract if it enters into an agricultural conservation easement through the CFCP or through other state agencies that also engage in the purchase of agricultural conservation easements. Furthermore, the "Super Williamson Act" of 1998 allows agricultural property to enroll for a 20-year term in exchange for property tax payments that are 35 percent less than under the Williamson Act.

California's path down an alternative way of funding its state and local governments began with voter approval of Proposition 13 in 1978. As a result, local governments in the state dramatically reduced their reliance on property taxation and instead turned to greater revenue sharing from the state, the collection of fees, and the chasing after local sales tax revenue through

local land use decisions that favor big-box retailers and auto malls (“fiscalization of land use”). After Proposition 13, the state garnered the revenue necessary for its greater support of local government through the establishment of statewide personal income and corporate income tax rates that are higher than in most other states.

With an Executive Order (S-3-05) in 2005 from Governor Schwarzenegger declaring climate change a reality, California also became the policy leader among the states in efforts to reduce greenhouse gas emissions (GHGs). The Global Warming Solutions Act (AB 32, Nunez, 2006), passed by the California Legislature and signed into state law by Governor Schwarzenegger in 2006, requires the state to reduce its 2010 GHGs to 2000 levels; by 2020 to reduce them to 1990 levels; and by 2050 to reduce GHGs to 80 percent of 1990 levels. By early 2009, AB 32 also requires a specific plan that will achieve the required GHG emission levels through regulation, market mechanisms, and/or other actions. As noted by the Economic and Technology Advancement Advisory Committee (ETAAC, 2008, pp. 1-2) commissioned to advise the California’s Air Resources Board on the implementation of AB 32, transportation activities generate just over 40 percent of the state’s current GHGs. Thus, a reduction in automobile use is necessarily required if California desires to meet the GHG reductions required under AB 32. As described by Ewing *et al.* (2008), such a reduction in automobile use can only come about if Californians choose to live in more compact and mixed-use land use patterns that allow walking, biking, and mass transit as replacements for current automobile trips.

California’s policy choices regarding state and local revenue reliance, farmland preservation, and reducing greenhouse gas emissions are interrelated. There is concern among environmental and agricultural stakeholders that elements of the system of state and local taxation that developed in California after Proposition 13 discourages the retention of land in

agriculture, and this subsequently generates greater urban sprawl in the state. Many of these same stakeholders point to the presence of the state's three major farmland conservation programs (and other programs and multiple policies throughout different codes) as encouraging the retention of agricultural land and thus resulting in less urban sprawl in the state. The overall purpose of this paper is to examine these two claims in as unbiased a manner as academically possible and to offer an opinion on their validity. Such an opinion is necessary to offer an informed comment on the desirability of reforming the state's tax system, and/or expanding the state's system of farmland preservation, to reduce the degree of sprawl experienced in California and thus be better poised to achieve the reduction in GHGs mandated by AB 32.

The remainder of this paper contains five additional sections. Section 2 offers both a definition of urban sprawl and how the presence of sprawl contributes to the generation of GHGs. The battle to reduce sprawl occurs at the urban/rural boundaries or "urban fringe" that surround urban areas. Land use at this fringe is often agricultural and if preserved appropriately, it can effectively slow or stop the spread of sprawl. Section 2 also looks at the available information on the likely effect of sprawl reduction on the generation of fewer GHGs in California.

Section 3 continues with a review of the California state and local taxes that some observers say encourages farmland conversion to non-agricultural uses. This section also examines the likely influence of the federal estate taxes and planned changes. Described are the mechanisms by which this greater farmland conversion could or could not occur due to California's choice of state and local tax instruments and the federal estate tax. I also describe empirical evidence on the effect that these taxes have on agricultural conversion. Section 4 provides a description of California's farmland conservation programs and previous empirical

studies that have examined the effects of farmland conservation programs in California and the United States.

Section 5 concludes with a summary of the available evidence on the influence that California tax and farmland conservation policies have on the appropriate conservation of agriculture land to reduce sprawl. Where the conclusion warrants that a specific tax or farmland conservation policy is likely generating greater sprawl, I suggest potential policy solutions to reduce this effect.

2. Urban Sprawl, Farmland Preservation, and GHGs

What is Urban Sprawl?

To consider the impact that California's system of taxes and farmland preservation programs has on the conversion of agricultural land, the impact this agricultural conversion has on the generation of urban sprawl, and the subsequent greater production of greenhouse gases that comes from urban sprawl, it is first necessary to clarify what is meant by urban sprawl. I characterize urban sprawl as low-density residential and "strip-mall" commercial development that is distant from an urban area's employment centers. Such noncontiguous and non-integrated forms of development at the fringe of a urban area concerns planners and policymakers due to the dependence it creates on the automobile for personal transportation and the driving distances necessary for the typical commute to work.

Economists (see Brueckner, 2000; Mills, 1999; and Wassmer, 2008 as examples) describe the following cause and effect occurrences as the primary reasons for urban sprawl. As population rises in an urban area of a fixed land area, it becomes more difficult to locate new residential and business activity in the area's existing employment centers. Land prices increase in these employment centers and new residents increasingly decide to tradeoff a longer commute

to work for less expensive housing options at the fringe of the urban area. Even if an urban area experiences no population growth, as the real incomes of some existing residents rise, they often desire to live in larger houses and lots. The inexpensive land to build these on is more likely on the urban/rural fringe that surrounds urban areas. In addition, the “flight from blight” that occurs as residents that are more affluent seek the real and perceived lower crime rates and higher performing public schools outside of a metropolitan area’s central places also generates urban sprawl. The construction of state and federally subsidized highways, and the relatively low private cost of using an automobile to get to work, has further facilitated urban sprawl.

Economics help us better understand why a household, where the primary and even secondary wage earner works in a metropolitan area’s central place, decides to locate at the urban fringe and thus contribute to sprawl. A household makes a choice of residence by weighing the private benefits of a decentralized location (cheaper land to build a larger house with a larger lot on, perceived “better” public schools, lower crime rates, newer infrastructure, neighbors they would rather associate with, closer to public open space, etc.) against the private costs of this decentralized location (a longer and more expensive commute, greater traffic congestion in the commute, less urban amenities, etc.). If a household chooses to be a contributor to an urban area’s sprawl, it has very likely determined that the private benefits of living on the urban/rural fringe of the area are greater than the private costs. However, in making this decision it is unlikely that the household has fully considered the social costs (greater air pollution from a longer commute, greater freeway congestion, increased publicly-funded infrastructure costs, the social and economic isolation of the poor and/or racial/ethnic minorities left behind at the core of the metropolitan area, the social loss of prime agricultural land and/or open space valued at greater than its market price, etc.). The immortal words of a

Pogo comic strip from Earth Day 1971 still rings true concerning the primary cause of urban sprawl: “Yep son, we have met the enemy and he is us.” Nevertheless, as Ned Levine (1997, p. 280) points out: “What to one person is sprawl, to another is his/her home.”

Economists refer to privately ignored social costs as negative externalities. Thus, a policy prescription often given by economists to reduce sprawl is to get housing consumers (or the developers that build houses for them) to consider the external costs of choosing a decentralized location through the payment of fees/charges equivalent to these social costs. As will be discussed later, fees are widely levied on developers and owners of newly built homes in California to help cover the additional cost of infrastructure constructed for them. However, due to both the difficulty of determining the appropriate fees to charge and the strong political resistance to implement them, fringe development rarely pays fees for the social costs just described. Policy activists interested in reducing urban sprawl have instead chosen to conceptualize forms of suburbanization in which they are certain that the total private and social costs of their development are greater than the total benefits.

The Sierra Club (1998) defines urban sprawl as low-density development away from places of employment and shopping, and requiring the use of automobiles to get to these non-residential places. Continuing this theme, the *Planning Commissioners Journal* (2002) describes sprawl as dispersed development outside of compact urban and village centers along highways and in the rural countryside. Downs (1998) recognizes urban sprawl by observable traits such as unlimited outward extension of new development, low-density developments in new-growth areas, leapfrog development, and strip commercial development. Ewing (1994 and 1997) takes a very deliberate approach to conceptualizing urban sprawl. Surveying 15 academic articles on the subject, he found that the terms low-density, strip or ribbon, scattered, or leapfrog development

are most often used by urban planners to characterize sprawl. Ewing lumps these characteristics under the term “non-compact development.”

In California, where demographers at the State’s Department of Finance anticipate that population will grow from 32.5 million in 2000 to near 50 million in 2025, the question of how to accommodate a greater than 50 percent increase in population in 25 years is widely asked.¹ How environmentally and fiscally feasible will it be to live and work in a state if a majority of its population growth continues to occur at low density at the fringe of its current urban areas?

How Sprawl Contributes to GHG Emissions

Urban sprawl is low density residential development far removed from the major employment centers in an urban area. As discussed in Frumkin, Frank, and Jackson (2004), such lower density (or less compact development) forces residents on more frequent trips, limits their transportation options, and greatly increases the necessity of owning an automobile. Residents must travel outside of their neighborhood to work, and to consume office, retail, entertainment, and other service activities because there is very little mixing of the non-residential land uses with housing subdivisions.

As noted in Frumkin (2002, pp. 202-203), carbon dioxide emissions (CO₂) account for about 80 percent of the green house gases emitted in the United States. Transportation activities resulted in about one-third of all of CO₂ emissions in the country. Noteworthy is the fact that transportation activities generated as much as 60 percent of all CO₂ emissions in California (see www.smartgrowthamerica.org/documents/State_Emissions_by_Sector). As described in Ewing *et al.* (2008), a policy to reduce CO₂ emissions in California (and thus achieve the ambitious GHG reductions mandated by AB 32) must stand on a “three-legged stool.” One leg rests on

¹This paper takes this assumption as a given. An alternative approach could also look a ways to attack sprawl through policies designed to reduce California’s future population growth.

improving fuel economy, a second on reducing the carbon content of fuels, and a third on reducing vehicle miles traveled (VMT). The necessity of improvements in the first two legs of this stool are widely discussed and being encouraged through public policy. The same is not true about the third.

VMT in the United States since 1980 has risen three times faster than the country's population. Observers attribute this to the increase in urban sprawl that occurred over the same period. This has led many to conclude (for an example see Steinbach, 2007) that technological advancements in fuel efficiency and the carbon content of fuel will not be enough to meet the ambitious goals for GHG reduction set by AB 32. VMT will need to come down, and this is only possible if Californians chose more compact and mixed-use forms of residential development.

California's Economic and Technology Advancement Advisory Committee (2008, pp. 3-12), charged with coming up with a plan to reach the GHG goals laid out in AB 32, calls for the need to shift demand for VMT through greater smart growth planning:

Planning measures can shift investments in housing and transportation infrastructure in a way that would reduce GHG emissions over the long term by providing desirable and low-GHG transportation options, largely by replacing automobile trips. Partnerships between the state government and regional and local agencies are critical to achieving these goals.

Furthermore, this same report notes the possibility of revising California's current farmland preservation policy to meet the GHG reductions required by AB 32 (p. 3-14):

The current Williamson Act mechanism, used to keep farmland in agricultural use and delay housing or commercial development may not provide sufficient incentives for farmland owners to prevent urban sprawl and halt the growth of VMT. A large share of Williamson Act land in San Joaquin County is in non-renewal status, for example..

Estimates of the Contribution of Sprawl Reduction to GHG Reduction

In a review of over 50 empirical studies on the relationship between compact development and automobile use, Ewing and Cervero (2001) report the consensus finding that the built environment one lives in as the most important determinant of vehicle miles traveled (VMT). Ewing, Pendall, and Chen (2003) specifically found, after accounting for income and socio-economic differences in 83 of the United State's largest metropolitan areas, that VMT was 25 percent less in compact metropolitan areas. After reviewing previous empirical literature on the topic, Ewing *et al.* (2008) report that it is reasonable to assume that individuals in a household located in an area with twice the prevalence of density, diversity of uses, accessible destinations, and interconnected street grids end up driving about one-third less. Studies such as these are the basis for the CalTrans estimate offered in the ETAAC (2008. p. 3-12) report that a family living in a compact transit village could reduce its household's VMT by 20 to 30 percent.

Ewing *et al.* (2008) find that residence in a compact, non-sprawled neighborhood results in a 30 percent reduction in VMT. This study uses an elaborate simulation model to predict that by 2050 total transportation related CO₂ emissions could fall by seven to 10 percent from current trends if a feasible percent of future development is steered toward mixed-use and high-density neighborhoods. They point out that by shifting just 60 percent of new development to a more compact form by 2030 would be equivalent to a 28 percent increase in federal vehicle efficiency standards (or the same as the new development being sprawl and all residents in the new sprawl driving a hybrid automobile). Of course, GHG emissions fall even further if instead new development is compact and residents of it drive a hybrid and used an automobile fuel with lower carbon content (or relied more upon mass transit, walking, or biking).

The Appropriate Preservation of Agricultural Land to Reduce Sprawl

As noted by Daniels and Lapping (2005), there are two types of land preservation associated with the discouragement of urban sprawl and the encouragement of a form of compact development that most people would likely desire to live in. These include (1) the preservation of lands for parks, recreation, and green spaces within built-up areas and (2) the preservation of rural land for agriculture, to maintain valuable natural areas, and to channel development into more compact and mixed uses. If applied appropriately – and within an appropriate and necessary use of regulatory programs, general plans, consistent zoning, and subdivision ordinances – California’s state-level farmland conservation programs are potential policy instruments that could achieve both of these desirable forms of land preservation. However, appropriateness requires preserving enough farmland to constitute a greenbelt that surrounds an urban area and effectively becomes a growth boundary for it.

California’s farmland preservation programs can be a powerful policy tool in helping to defeat the state’s urban sprawl if applied in a well-coordinated and contiguous manner around the entire fringe of the state’s growing urban areas. Such a greenbelt arises if the vast majority of agricultural lands within the greenbelt enroll in current farmland preservation programs. This greenbelt can effectively become a growth boundary for an urban area if it is wide enough, and/or if other methods are used, discourage development beyond the greenbelt. Such a greenbelt would steer future development into the existing urban area. This would very likely result in the desired mixed-use and compact development that, as described, yields the lower statewide average household VMT necessary to reduce GHG emissions as required by AB 32.

Later I examine the extent to which California’s farmland preservation programs have achieved these desirable anti-sprawl goals. Before doing this, I next examine the current system

of state and local taxation in the California and explore the arguments given for it encouraging agricultural conversion and possibly greater sprawl.

3. California Taxes and Agricultural Land Conversion

Proposition 13 changed California's state and local government revenue structure into one that is different from that observed in most of the rest of the United States. The passage of this proposition placed in California's Constitution the requirement that the *ad valorem* rate of property taxation anywhere in the state not exceed one percent of a property's acquisition value. Acquisition value begins as market value in 1975, or at the time of the most recent sale that occurred after 1975, and increases annually from the time of sale at a rate that cannot exceed the higher of either two percent or the rate of inflation.

Proposition 13 resulted in a nearly 60 percent cut in the property tax revenue collected by the state's local governments. An equivalent fall in state and local spending never occurred. Instead, increasingly larger grants from the state replaced lost local property tax revenue, and local governments relying on increasingly higher fees and chasing after the point-of-sale tax revenue they keep when generated within their borders. Next, I examine arguments on how California's post-Proposition-13 revenue structure influences the amount of land converted from agriculture in the state.

Lower Reliance on Property Taxation

The higher the rate of traditional property taxation in a state, the greater the pressure put upon farmers at the boundary between rural and urban uses to remove land from agricultural uses. This pressure arises because the traditional value which property taxation falls upon is not its value in current use, but its market value in "best" use. At the urban fringe, due to residential demand for reasonably priced large homes on larger lots, the higher market value land use is

very often not in agriculture. Farmers at the urban fringe, under a traditional system of property taxation, face the additional pressure to convert their land to non-agriculture uses to obtain the higher revenue stream they are required to pay taxes on.

However, because of Proposition 13, the pressure on agriculture land conversion in California due to **only** property tax reasons is not as great in other states. The two reasons for this are acquisition based property assessment and the mandated one-percent rate of property taxation. Under acquisition-based assessment, a property's value for tax purposes increases a maximum of the lower of two percent per year or the rate of inflation, and only jumps to market value when sold. Thus a piece of agricultural property that was acquired by the present owner when agricultural production was its best use and the market price it sold for reflected this, retains its agricultural-based property tax assessment until sold. This does not occur in states where market-based assessment is the rule. In such states, assessment rises to best use by appraisal even if the farm's ownership does not change hands.

As compiled by Moody's (<http://www.nytimes.com/2007/04/10/business/11leonhardt-avgproptaxrates.html>), California's average property tax rate of 0.68 – calculated as the average percentage of a property's market value paid in property taxes in a year – is only bested at the low end by Hawaii's rate of 0.40. In comparison, there are nine states with rates above 2.00, with Texas topping the list at 2.57. California's extremely low rate of property taxation further reduces the incentive for farmland conversion in the state. Facing a lower penalty (in the form of higher property taxes) for non-conversion, there is less incentive to do it. Finally, California's Williamson Act or its "Super" variant allows farmers to lock in an agricultural assessment value or an assessment value 35 percent below it. This points to the likelihood that when considering only the influence of California's system of property taxation, it alone is much less of a direct

determinant of the amount of agricultural conversion occurring in California than in other states with a much high rate of property taxation. Though if the state were to eliminate property taxation entirely (as no other state has), it is fair to say that there would be less conversion of agricultural land at California's urban-rural boundaries.

Regarding the overall theoretical influence of local property taxation on urban sprawl, Brueckner and Kim (2003) demonstrate that the expected influence on land use in an urban area whose jurisdictions rely on property taxation to a lesser degree is indeterminate. It could be an increase in the intensity of land development (because the physical property placed on it is taxed less), a subsequent increase in population density, and a reduction in sprawl in the urban area. However, a lower rate of property taxation in a metropolitan area also results in a higher quantity of housing capital demanded by the typical resident in the metropolitan area. Holding population and improvements per acre constant, if typical lot size increases in response to the increase in demand for housing capital, population density decreases and the land required to house a fixed population increases (more sprawl). Thus, the theoretical effect of local property taxation on the size of an urban area is therefore theoretically ambiguous under general assumptions and requires an empirical investigation. Using a specific form of an individual preference function, Song and Zenou (2006) derive the theoretical effect that a lower reliance on local property taxation should result in more urban sprawl. They confirm this prediction with an appropriate empirical investigation of the size of United States' urban areas and find that a one percent decrease in the overall effective rate of property taxation in a metropolitan area is expected to increase the land area of the metropolitan area by about 0.4 percent (or more sprawl).

In comparison to property taxation in other states, California's system of property taxation relies on acquisition value assessment and a low rate of property taxation. For the

reasons just discussed, this makes it less likely to be a direct driver of farmland conversion in California than in other states with higher property taxes. However, an overall lower rate of property taxation in a state increases the amount of sprawl experienced in the state's metropolitan areas by encouraging people to purchase larger homes and lots. These homes are more likely on the urban fringe and require greater farmland conversion to produce them.

Higher Reliance on Local Sales Taxation

Sales taxation can play a role in the rate of farmland conversion in a state, not based upon the overall rate of taxation, but upon the subdivision of the receipts of the tax between the state and the local jurisdiction where a taxable sales tax transaction occurs. In California, the municipality or unincorporated portion of a county in which retail sales are generated gets to keep at least one percent of their value as pure discretionary revenue. In the revenue-constrained environment that California's local governments now find themselves, it is attractive to seek this revenue stream.

Economic theory predicts that a retail firm chooses a location in a metropolitan area based upon the location of its customers, transportation costs, other retailers, and degree of economies of scale in retail production. In an urban area with dominant central places, these factors push retailers that exhibit high and even moderate-scale economies in production to locate primarily in the central places. However, between 1950 and 1990, the percentage of the United States metropolitan population living in these central places fell from 64 to 38 percent. A reflection of this decline is more retail activity moving to the urban fringe because larger percentages of metropolitan residents chose to live there, and falling automobile transportation costs reduced even the ties of central place residents to a central place shopping location.

Greater sprawl also reflects the result of citizen desires to form and fund more homogenous communities. To fund such communities, new communities use land use controls

and subsidies to attract residents and businesses that offer a net fiscal gain. Retail activity that, in most instances, requires relatively few local-government services and generates relatively little environmental damage offers a good choice of self-generated funding for local treasuries. If suburban communities actively seek retail activity for the purpose of the fiscal gain it generates, then their actions may be a factor in the generation of further sprawl. The concept does not mean that the choices made in the raising of local government revenue can induce more or less retail activity in an urban area, but such choices may induce changes in where the fixed amount of urban area retail locates. A smaller percentage of the overall retail activity in an urban area necessary to support a given population is going to existing central places and more is going to new communities forming at the urban fringe.

Misczynski (1986) coined the term “fiscalization of land use” to describe what he increasingly expected to happen after California’s post-Proposition 13 abandonment of property taxation as a discretionary source of local revenue. Innes and Booher (1999) continue with Misczynski’s theme and point to the complex and fragmented system of local finance in California, with its heavy reliance on sales taxation as a source of local discretionary revenue, as the single most important factor driving local land-use decisions in the state. Atkinson and Oleson (1996) believe the automobile to be the major culprit of sprawl, but maintain that this would not have been possible without complimentary local finance policies. Though in a monograph-length study of sales taxation in California, Lewis and Barbour (1999, p. 126) conclude that local sales-tax reliance motives local land-use decisions in the state, “...although [such reliance is] unlikely to systematically alter broad patterns of retail development.” They argue that retailers primarily base location on economic factors that are not subject to much control by local government.

Some databased evidence exists for the theory that if local governments in a metropolitan area rely largely on sales taxes collected within their borders for revenue, the area is likely to exhibit greater urban sprawl. After surveying land use officials in 471 California cities on what causes them to desire new and redevelopment projects, Lewis (2001) found that “new sales tax revenues generated” ranked first for new development and was tied for first with “city council support for the project” for redevelopment projects. In support of the argument just presented, non-central city officials were more likely to rank sales tax revenue higher than their central city colleagues were. Wassmer (2002) also finds a positive relationship between big-box retail sales at the fringe of urban areas in the western United States and the fraction of statewide own-source municipal revenue gained from sales taxation. For every 10 percent increase in local sales tax reliance in a western urban area, the dollar value of retail sales occurring in non-central places in the urban area (a proxy for greater sprawl) rose by 2.4 percent.

Higher Reliance on Local Fees

Following Proposition 13, local governments in California have sought new sources of revenue. This is especially the case in providing services and infrastructure to new residential development where it is unlikely that the one percent rate of property taxation on the market value of new development covers the annual cost of provision. To cover these costs, local governments in the state have increasingly turned to development exactions. Exactions require the payment of fees by a developer before they can proceed, and/or the developer’s donation of land for public uses, infrastructure construction, and the provision of public services. As noted in Dresch and Sheffrin (1997), California leads the nation in imposing exactions on new housing. Bluffstone *et al.* (2008) finds a current average per-house development fee of just over \$15,000 in California’s Inland Empire. In their earlier analysis, Dresch and Sheffrin report a 1992 to

1996 range of \$20,000 to \$30,000 (in current dollars) per-house development fees in the Bay Area's Contra Costa County.

Whether the imposition of these greater exactions in California results in the generation of more or less urban sprawl in the state (and subsequently less or more farmland conversion) depends on the response to two questions. (1) Who ultimately pays for these exactions? (2) Are imposed exactions on new development likely to be greater at the urban fringe or urban core?

In an economic analysis, a development fee is no different from a tax on new development. Either the landowner receives a lower price for their land when purchased by a developer, the developer receives a lower return on investment from the new development, the buyer of the new development pays a higher price for it, or a combination of all or some of these occur after a fee is levied. All of these occurrences discourage new development. The imposition of greater fees can make the (agricultural) landowner less likely to convert the current land use to new development, less likely for the developer to undertake it, and/or less likely for the consumer to purchase it. Crucial to the assessment of the final impact of development fees on urban sprawl is whether they are likely to be larger for new development at the fringe or core of an urban area. Where they are higher is where the greater discouragement of development will occur. If exactions for a new home are expected to be higher for a new home at the fringe of an urban area because the marginal cost of providing services are greater there than at the urban core, then California's greater reliance on fees after Proposition 13 has likely resulted in greater farmland conservation and less sprawl.

The California Department of Housing and Community Development (2001) offers empirical evidence on whether a home built in an established central place in California is likely to pay more or less in development fees than one built on the urban fringe. In this study, two

statistical studies using 1999 fee data collected from 89 cities in California look at the factors that make it more likely for a new house to pay different types of fees, and the factors that drive the magnitude of per-home fees paid in different categories. The study reports that a city is more likely to charge a school construction based fee and a capital outlay based fee the greater the 1990 to 1997 percentage growth in population experienced in the city. Additionally, the magnitude of the per-home subdivision fees in total, for capital outlay, for school construction, and for transportation and parks is expected to be greater the larger the 1990 to 1997 percentage growth in homes in the city. Since both of these percentage growth rates are greater in cities at the fringe of California's urban areas, the evidence points to fringe cities being more likely to use fees. In another regression analysis, this Housing and Community Development study found that for every 100 percent increase in a city's housing supply rate, the ratio of fees charged to the market price of the home increased by 57 percent. Fee-price ratios were highest in fringe jurisdictions with higher volumes of housing construction activity. Thus, it is reasonable to conclude that California's post-Proposition 13 shifts to greater fee reliance has likely resulted in less sprawl occurring than would have occurred without it.

Higher Reliance on State Personal Income and Corporate Income Tax

As described in Keating (2008), California currently has the highest state marginal income tax rate levied on individuals in the country. In 2007, it stood at 10.3 percent, of which 9.3 percent applies for any taxable individual income greater than \$40,346 and an additional one percent applies for taxable individual income earned after one million dollars. This compares to 9 states (including Nevada) that levy no personal income tax, and 19 other states whose highest marginal income tax bracket is less than six percent. Regarding the corporate income tax, California's top corporate income tax rate (applied equally to all taxable corporate income) is 8.84 percent. This

top rate is the eighth highest among all the states. Since approximately 90 percent of the state's farmers pay personal income taxes and not corporate income taxes, but corporate farms earn 53 percent of all California's farm income, both of these forms of income taxation are relevant to consider in their potential impact on farmland preservation (see Rand California Business and Economic Statistics, <http://ca.rand.org/stats/economics/farmincome.html>).

Two issues immediately arise concerning income taxes and farmland preservation. The first being the higher the rate of income taxation, the lower the after-tax return that a landowner receives from farming, and the more likely they are to leave farming by selling all or portion of their agricultural land to a developer. Second, the higher the rate of income taxation, the greater the benefits a farmer receives from enrolling in one of California's farmland preservation programs, the more likely they are to do it, and their land will subsequently not be converted from agricultural use. Thus, California's relatively high rates of personal and corporate income tax exert differential effects on farmland preservation.

California's high rate of state income tax makes it less likely for a farmer to enroll in the Williamson Act. Why, because the burden of property taxation is less due to their increased value as a deduction toward high state income tax payments. At a six percent rate of income taxation, the farmer pays 94 percent of all deductible property taxes. While at a nine percent rate of property taxation the farmers pays only 91 percent of all deductible property taxes. Alternatively, the same higher rate of state income taxation makes it more lucrative for a farmer to donate a portion of their land to satisfy requirements of the California Farmland Conservancy Program because the value of the charitable tax deduction is worth more when facing a higher rate of marginal income taxation. A search of the literature revealed no empirical studies that would allow a quantification of the impact of a higher rate of income taxation on enrollment in a

use value property tax program like the Williamson Act or in a farmland conservation program like the CFCP.

Presence of Federal Estate (Death) Tax

An estate (or death) tax is levied upon the value of all property owned by a decedent at the time of their death or half of a couple's interest in community property; less the value of deductions allowed for debts, charitable bequests, and spousal bequests. Through 2004, the State of California imposed an estate tax separate from the federal government. Now a resident of California only pays the federal estate tax. As detailed in Buckley (2005), a decedent's heirs are only required to file a federal estate tax return if the gross (value less allowed deductions) amount of the estate exceeds \$2 million. The federal tax rates applied to an estate are progressive and in 2008, the top rate was 45 percent. In 2009, the exemption rises to \$3.5 million. In 2010, the federal estate tax ends for one year and will return in 2011 with a lower exemption of \$1.3 million and a higher top tax rate of 60 percent. Many never expect the planned 2011 implementation to occur. Instead, the post-2011 federal estate tax situation is likely to remain in hiatus (as supported by a majority of Republicans) or an alternate structure imposed (as supported by a majority of Democrats).

Along with the California specific taxes described earlier, the influence of federal estate taxation on farmland preservation in California is widely discussed among stakeholders in the state's agricultural community. In an editorial written by the President of the California Farm Bureau Federation, Pauli (2005) summarizes the feelings of many in the farm community regarding the federal death tax. California is the nation's number one agricultural producer and its farmers produce on some of the highest land values in the country. In addition, the assets of a farm (land, machinery, equipment, and buildings) are less liquid than for other business owners.

Since the estate value of a California farmer is often beyond the exemption allowed, and with non-liquid assets, heirs may be more likely to sell the family farm to a developer to pay the federal estate tax. The presence of the federal death tax therefore acts as a significant factor in the conversion of agricultural land in the state. Pauli's argument is legitimate providing that upon death a significant percentage of California's family farmers are subject to the estate tax and pay amounts that are significant enough to require the liquidation of a farm. Nonetheless, an additional cause and effect argument made by the Friends of the Earth (2001) is that the presence of a federal estate tax acts to encourage more of California's farmers to participate in its Farmland Conservancy Program through a charitable donation of their own land. Subtracted off the top of the decedent's estate, the market value of such a donation is can help put them under the exemption level for paying the estate tax. I next offer some empirical evidence on the role that the estate tax plays in the conversion of farmland.

Burman *et al.* (2005) uses 2003 filing data from the federal estate tax and reports that about 66,000 returns were filed nationwide that year, but less than half of these resulted in taxable estate income. The result being that less than 1.5 percent of all 2003 decedents in the United States owed an estate tax. Over 99 percent of these returns consisted of individuals who earned income greater than 90 percent of all others in the country. Small farms and businesses (defined as valued at less than \$5 million) made up less than two percent of all taxable estate returns (or about 660 in number) and only a half percent of estate tax liability. Given the increase in the exemption scheduled for 2009, Buckley (2005, p. 839) estimates that this number will fall to less than 300 small farm and business owing any estate taxes in that year. These are not large numbers and hence do not make a strong case for a huge influence of the federal estate tax on California farmland conversion. Burhman *et al.* (2005, p. 379) also points out that family-

owned farms and closely held business subject to an estate tax now receive especially generous treatments that allows them to make interest free tax payments on an estate tax balance for as long as 14 years. As described in Daniels and Bowers (1997, Chapter 12), adequate estate planning greatly increases the likelihood that a family farm can remain as such.

Understanding this, perhaps it is not a surprise that Professor Harl, an Iowa State University estate tax expert is quoted as saying he has heard many horror stories about people having to sell farms to pay estate taxes but has "...not been able to find a single case where estate taxes caused the sale of a family farm" (Johnston, 2000). As noted in a press release by the American Farm Bureau Federation (2007), there exists anecdotal evidence of families selling off a portion of their farm after the owner's death, but even here, there is no example offered of complete liquidation of a farm to pay the federal estate tax. Even if such an example is found, without the use of advanced statistical techniques (as later described in the Brunetti, 2006 study) it would be hard to directly attribute the cause of liquidation to the death tax alone. Heirs may have just decided to get out of farming for other reasons after the principal operator of the farm passed away.

As further analyzed in Buckley (2005), the 2011 total repeal of the federal estate tax will very likely create more losers than winners among farmers. This is because the cost basis of assets passed on by a decedent to their heirs is now "stepped-up" to the market value of the property at death and this eliminates any separate capital gains tax levied the heirs. The planned repeal of the estate tax in 2011 removes this step-up rule and according to Buckley's analysis (p. 838) the number of farming families facing overall tax increases from this change will increase. He suggests not a repeal of the tax, but leaving intact the exemption and rate structure scheduled for 2009.

Brunetti (2006) offers the only found empirical analysis of the influence of the estate tax on the ongoing viability of family businesses. Using San Francisco probate court data from 1979 to 1982 from 312 estates that included a family farm or small business, he uses advanced statistical methods to examine the combined influence of then California and federal estate tax on the likelihood that the business sold after the owner's death. After controlling for differences in financial and owner characteristics of these businesses, he found that the greater the amount of estate tax paid, then the greater probability of selling the business after death. For every one percent increase in tax paid, the probability of sale went up by nearly the same one percent. Noted by the author are important caveats to this finding. First, a measure of the liquidity of the business exerts no influence on its sale. This is suspect since lack of liquidity is likely the mechanism that causes the estate tax to force a business sale. Second, since data drawn only from probate sales, the decedent may have not adequately planned for disposition of his estate and the finding may only apply in such a case. Finally, not adequately controlled for are all factors (besides estate taxes) that could have caused differences between selling a business and not. Because of this, Brunetti cautions that his result of a positive relationship between degree of estate taxation and business liquidation is preliminary until confirmed through improved upon research.

4. California's Farmland Preservation Programs and Sprawl

The previous section examined the influences that California's system of state and local taxation and federal estate taxation have on the direct generation of urban sprawl, indirect generation of urban sprawl through the discouragement of farmland preservation. As will be discussed later, just because a specific tax instrument encourages (or discourages) the preservation of California's farmland does not mean that it necessarily results in a reduction (an increase) in

urban sprawl and a subsequent reduction in green house gas emissions. A farm preserved in a rural area that is beyond the automobile commuting distance to an urban employment center does little to reduce the sprawl that flows from urban areas.

This section provides an examination of the three main farmland preservation policies in California and asks the same questions directed at taxation in the previous section. What is the structure and intent of these programs, and how well do they work at not only preserving agricultural production in California, but also at saving farms in a manner that reduces urban sprawl and the greater greenhouse gas emissions that can arise from it?

Williamson Act

According to Daniels and Bowers (1997), the statewide movement to encourage the preservation of family farms by allowing farmers to owe property taxes on the use value of their land instead of the development value began during the late 1950s. California's program began in 1965 with the Williamson Act. By the early 1970s, every state had instituted some form of a program that allows farmers, under agreed upon restrictions, to pay lower than normal property taxes.

California's program includes a "restrictive agreement." Agricultural land (and some grazing land) receives preferential property tax treatment after the farm owner signs a legally binding agreement to maintain the land as a farm for 10 years (with annual renewal). A penalty of 12.5 percent of the land's market value occurs if conversion happens before the contract expires (Institute for Local Government, 2002, p. 67). Similar programs exist in New Hampshire, Pennsylvania, and Vermont.

California's Williamson Act is a state policy, voluntarily administered by its city and county governments. If a local government desires the possibility for its farmers to enter into a Williamson Act contract, it first must set up rules regarding the establishment of agricultural

preserves within its boundaries. Some local leeway exists for determining the extent that nonagricultural uses can qualify, but a designated preserve must be at least 100 acres. The minimum parcel sizes for prime and non-prime agricultural land within a preserve is respectively 10 and 40 acres. A local government's planning department must also describe the consistency of a proposed agricultural preserve with its general plan, and subject the proposal to a public hearing before approval. As described above, the local government may then offer Williamson contracts to privately owned parcels seeking them within established agricultural preserves.

In 2007, about 17 million of California's 27 million acres of acres used to agricultural purposes were subject to preferential tax treatment due to the Williamson Act. Since 1972, the State of California has partially reimbursed its local governments for the property tax revenue lost due to Williamson contracts. In 2005, these intergovernmental transfers amounted to nearly \$39 million dollars (California Department of Conservation, 2006, p. 18). A 1997 State Board of Equalization study found that in the 27 counties where Williamson contracts were most prevalent, potential property tax revenue lost by counties was \$27 million. Counties received over 90 percent of this lost local revenue back in the form of state funded subvention payments (Governor's Office of Planning and Research, 2003, p. 4). However, these subvention payments have recently come under attack. The Legislative Analyst's Office (2008) recommended the enactment of laws that prevents the State of California from renewing or entering into new Williamson Act Contracts. They base this recommendation on their assessment that the act is not "cost-effective." In their words: "In many cases, it may subsidize landowners for behavior they would have taken regardless" (p. 1).

If a farm currently under a Williamson contract wishes to end its commitment without penalty, it must undertake a nine-year process in which the assessed value each year increases by

formula to its market value. Kovacs (2008) has recently examined the pattern of Williamson contract non-renewals in California and notes a steady statewide increase in yearly initiations of acres of farmland put up for non-renewal between 2001 and 2007. He attributes this to the housing market boom over most of this period that fueled subdivision developer demand at the urban fringes, especially in the San Joaquin Valley, South Coast, and the Desert regions.

Responding to criticism that the offerings of the Williamson Act did not do enough to encourage farmland preservation in California, Senate Bill 1182 (or the “Super Williamson Act”) added a Farmland Security Zone (FSZ) provision. An FSZ originally fell within an existing agricultural preserve at the request of landowners to the appropriate local government, but in 2000, a new FSZ could exist outside of an earlier created agricultural preserve. A farmland security zone must contain one or more of the following: prime agricultural land, farmland of statewide significance, unique farmland, and/or farmland of local importance. A farmer who finds his land in a FSZ may enroll in a Super Williamson contract that allows a 35 percent reduction in property tax payments below the already reduced Williamson Act amount. The cost to the farmer of obtaining this benefit is a 20-year commitment to maintain the land in agricultural production, required state approval of a cancellation of this commitment, and a higher penalty for cancellation that is 25 percent of the land’s market value. The public benefit of agricultural land enrolled in this program is the increased likelihood it remains in agriculture production for 20 or more years without reverting to the establishment of a permanent farm easement, that can create long-term lock-in problems. In 2005, there was about 818,000 acres of prime California farmland enrolled in Super Williamson contracts. This represents only five percent of the total farmland enrolled in any Williamson Act program. I now turn to an assessment of how well the traditional and “Super” variants of the Williamson Act work to

preserve agricultural production in California and for the specific purpose of this paper, to saving farms in a manner that reduces urban sprawl.

If we measure, the success of the Williamson Act by farmland participation alone, it is triumphant. Over two-thirds of all California acres in agricultural production are currently under a Williamson contract. However, the vast majority of this land has only committed to 10 years or less in agricultural production. Only five percent of the acres under Williamson contract fall under the longer 20-year commitment allowed in a FSZ. Also noteworthy is acres of new enrollment since 2003 have continually fallen behind the cumulative non-renewal of existing acres covered under Williamson contracts (Kovacs, 2008, p. 5).

The protection of California's farmland through the Williamson Acts is occurring within the shorter window than existing policy allows for. Protection over time is falling, especially in regions of the state experiencing greater increases in population and the urban sprawl it can generate. The low enrollment in the Super Williamson contracts indicates that the vast majority of California's farmers have evaluated the expected cost of putting their property in a FSZ as being higher than the expected benefit. This is perhaps not a surprise given the 20-year commitment that such contract requires, the potential for high-market value non-agricultural development on much of these lands, and the steep penalties faced for violation of the 20-year commitment.

Figure 1 offers a map of California in which the state's urban areas (defined as an accumulation of Census blocks in which the population density in each is at least 1,000 people per square mile) are represented in black. Population density varies within these urbanized areas, with higher densities usually occurring in an urban area's employment/shopping/residential hubs and falling as you move away from these hubs of compact development to the urban/rural fringe

that surround an urban area. In Figure 1, light gray represents land under a Williamson Act contract of either type. Though the scale is large, it is telling to look at this map of California and notice that a ring of white frames most of the state's urban areas (denoted in black). White rings represent land that is neither urban nor protected by Williamson Act contracts. These white rings are a visual representation of the urban/rural fringe discussed earlier. This is where sprawl is occurring and/or will occur in the upcoming decades.

Figure 1

Insert Here

Placing the farmland around California's urban areas into one of the forms of Williamson Act contracts would slow urban sprawl in the state.² If land at the urban fringe designated farmland security zones, sprawl would slow for at least 20 years. If land at the fringe consisted of agricultural preserves, population growth in an urban area could be contained within an agriculturally imposed growth boundary for at least 10 years. A slowing of sprawl will help achieve the mandated AB 32 policy goal of reducing green house gas emissions in the state.

Seen from Figure 1 is California's current lack of using either of the two forms of the Williamson Act to surround its urban areas with a boundary for stopping growth. The best examples of where this is close to occurring is in the Central Valley counties of Yolo, San Joaquin, Stanislaus, Madera, Fresno, Kings, and Tulare. Nevertheless, even in these counties where agricultural land under Williamson contract (designated in gray) surrounds urban areas (designated in black), there is a very telling band of white between the black and gray. Also revealing is the fact there is very little to no use of Super Williamson contracts around these rapidly growing Central Valley urban areas, or for that matter, around any of California's urban

² To make this truly effective at controlling sprawl, the adoption of further regional-based land use planning and appropriate zoning is necessary. I discuss this later in the paper.

areas. The vast majority of FSZs in California are in Kings, Kern, and Glen counties. With the exception of the Willows urban area in Glenn County and Corcoran urban area in Kings County, farmland security zones are not adjacent to the state's urban areas. Even in these two urban areas, they are only used to any extent on one side of the urban area.

The use of Williamson Act contracts in the California is extensive, but they are fulfilling far less than their full potential at preserving farmland at the urban fringe for the purpose of slowing sprawl and working to curb future GHG emissions. Where a growth boundary in the form of farmland under Williamson Act contracts surrounds an urban area, it is largely in place for no more than 10 years and there is a ring of unprotected property at the urban fringe waiting to accept sprawling development. Since protected farmland is only under Williamson contract for 10 years or less, farmers at these existing growth boundaries rescind their commitment when this ring of unprotected land fills with sprawl. In essence, no long-term urban growth boundaries have been established around California's urban areas through Williamson Act contracts.

To examine this depiction in further detail, Figure 2 offers a similar map for the Sacramento Region. I define this area by Sacramento, Yolo, Sutter, Placer, and El Dorado Counties. The primary urban area within this region extends from the City of Sacramento north and south along interstate highways five and 99, and east along interstates 50 and 80. West of the City of Sacramento, the urban area jumps the Sacramento River into the City of West Sacramento, but a flood plain and farmland protected by 10 year Williamson contracts offers a buffer between the primary urban development in the Sacramento Area, and the Davis and Woodland urban areas in Yolo County. Important to note is that the County of Sacramento maintains an urban service boundary in its southeast corner that effectively curtails non-agricultural development there without the need for farmland to enter into Williamson contracts.

Figure 2

Insert Here

In Figure 2, the Sacramento Region offers a prime example of how the current implementation of the Williamson Act is not working as effectively as it could to slow the area's continuing urban sprawl. First, there are very few Super Williamson contracts used. In the counties of Sacramento, Placer, and Sutter, no FSZs exist. In the counties of El Dorado and Yolo, only 185 and 159 acres were respectively under Super Williamson Act contracts in 2008. The reason for the high use of farmland preservation in the western area of the Sacramento Region is Yolo County's explicit planning desire to steer the limited residential development it allows to within the city limits of Davis and Woodland. This creates a form of compact development in these two cities, but even here, there is the telling ring of white around the two large black-designated urban areas in Yolo County.

Traditional Williamson contracts only exist haphazardly in the northern portion of the Sacramento Region. As such, this portion of the metropolitan area has seen its share of sprawling development over the last two decades. But the real occurrence of sprawl in the Sacramento Region has occurred along the northeast Interstate 80 corridor extending to Auburn City, and the southeast Interstate 50 corridor extending to Folsom City and beyond to Placerville City. As Figure 2 shows, the nearly non-existent practice of preserving farmland through Williamson Act contracts has facilitated this sprawl.

In the conclusion to this paper I discuss potential policy alternatives to consider that would strengthen California's Williamson Act in a manner that would render it more effective in controlling the state's sprawl and subsequent emissions of GHGs. Before doing this, I offer

descriptions of two other California programs designed to preserve the state's farmland. Again, I assess their effectiveness at doing this and reducing sprawl.

Farmland Conservation Program

In 1996, the California Farmland Conservancy Program (CFCP) began to offer state assistance, with local government collaboration, in the permanent conservation of economically viable farmland. The CFCP manages state provided dollars and private grant funds to purchase agricultural conservation easements, held and monitored by land trusts or transferred to local governments. As described in Daniels and Bowers (1997, Chapter 11), a land trust is a private, non-profit organization that exists to acquire farmland, natural areas, and open space. Daniels and Lapping (2005) describe conservation easements as restricting land in perpetuity from residential, commercial, industrial, or institutional uses, but allowing a farmer to make ongoing agricultural management decisions. A trust acquires such an easement from a private landowner in exchange for usually both a cash payment and the income/estate tax benefits available through the donation of a portion of the value of land to the non-profit trust. The benefit of this technique is the guaranteed long-term protection of farmland. However, the cost of achieving this can be large and includes the likelihood of paying a high price to purchase permanent development rights and the likely gaps of unpreserved land from holdout farmers who do not wish to remove forever the potentially lucrative option of future development.

Prior to 2000, CFCP grants were minimal and only funded by yearly appropriations from the state's General, Soil Conservation, and Environmental License Funds. Using an allocated \$25 million in bond funds from the passage of Proposition 12 in 2000, the CFCP has since helped fund 39 individual conservation easements on close to 11,000 acres of farmland (California Department of Conservation, 2006, p. 2). In addition, California voters approved

Proposition 40 in 2002 that allocated an additional \$45 million in funds to help support the further establishment of conservation easements in the state.

The scale of California farmland subject to conservation easements is miniscule in comparison to the state's 17 million acres of agricultural land currently under Williamson contracts. An obvious budgetary reason for the limited use of the farmland policy tool is the direct and large expenditure that the permanent acquisition of development rights entails. Even California's Department of Conservation (2006, p. 4) concludes that agricultural conservation easements are not well suited to the preservation of urban fringe farmland for the **sole** purpose of directing growth back to the urban core. The high level of land speculation occurring at the urban fringe discourages most farmers from making a permanent commitment to agriculture. Instead, agricultural conservation easements work to guarantee the perpetual conservation of prime farmland in rural regions far from where urban development should never occur. Here, farmers are much more likely to agree to not developing their land for the far less than infinite commitment of 10 or 20 years as required under a Williamson contract, and the cost to securing this agreement is more obtainable. Nevertheless, as emphasized in Daniel and Lapping (2005), if used appropriately, both Williamson type property tax forgiveness programs and conservation easements can offer an effective combination of policy tools to steer development from the urban fringe. An examination of the 39 CFCP grants offered through Proposition 12 show only a few attempts to preserve farmland in a manner that creates a growth boundary around any of California's urban areas. These have only been attempts and in no case has the CFCP created a complete growth boundary.

Easement Exchange Program

Beginning in 1998, legislation went into effect that allows the cancellation of a Williamson Act contract without the payment of the specified penalties of monetary penalties to California's General Fund if the landowner/local government arranges a conservation easement on other farmland in the jurisdiction. The stated goal of this program is the allowance of potential cancellation fees to work to preserve local agriculture. Requirements for this to happen are that the value of the new easement must be equal or greater in value than the possible cancellation fee paid, and the acreage of the new easement must be equal or greater than the acreage of Williamson contracted land cancelled. The easement exchange process is voluntary and begins with a Williamson Act contract holder submitting a proposal to a locality that must approve it and then pass it on for Department of Conservation approval.

California farmland under Williamson contract at the urban fringe is eligible if the termination of the contract does not result in "discontinuous" patterns of development (California Government Code Section 51256(a)). It is crucial as to how the Department of Conservation interprets this term in determining whether this exchange program contributes to the further generation of urban sprawl. Farmers most likely interested in facilitating an exchange hold land at the urban fringe. Development pressures there have driven up the market price of land such that the return from selling before the Williamson contract expires exceeds the return from farming even with property tax forgiveness. Furthermore, the conservation easement purchased with the equivalent penalty funds of 12.5 or 25 percent of the market value of this fringe land is farther from development pressure than the converted farmland. Thus, the presence of this exchange program very likely facilitates the break down of boundaries that have arisen around the urban fringe areas designated in white in Figures 1 and 2. Between 2000 and 2005 only 435 acres of farmland in Riverside County took advantage of the Easement Exchange Program. At

present, its existence is exerting no effect on the generation of urban sprawl in California, but it would be wise to monitor its use in the future.

5. Conclusion and Suggested Policy Changes

Planners and academics, together with land preservationists, need to present more studies on how the acquisition of land and conservation easements can help to clarify where developments should or should not go, and how land preservation can help to achieve the smart growth goals of cutting sprawl and reviving cities and suburbs (Daniels and Lapping, 2005, p. 324)

With AB 32, California set itself on a track to reduce green house gas emissions in the state in 2050 to 80 percent or less of that emitted in 1990. This must be considered a highly ambitious goal given the growth anticipated in both the state's population and vehicle miles traveled (VMT) by the typical Californian. Since over 40 percent of California's current GHG emissions are generated in transportation activities, the achievement of this goal will only come about if public policy tackles all three of the elements that make the automobile currently such a large contributor to climate change: (1) the high carbon content of automobile fuel, (2) the low fuel efficiency of automobiles, and (3) the large VMT generated by the typical automobile owner in the state. As shown in Ewing *et al.* (2008), VMT can only decrease by the necessitated amount if Californians make future land use decisions that results in more compact and mixed-use development patterns.

With the goal of offering advice to state policymakers on how to reduce sprawl in order to reduce VMT and GHG emissions, this paper has looked at how California's current system of funding its state and local governments, the federal estate tax, and the state's farmland conservation programs influence the compactness of urban land use choices made in the state. I conclude the paper with a summary of the earlier reported upon evidence. This evidence is the basis of politically feasible policy suggestions that would likely reduce the positive influence that

these factors have had on the generation of sprawl. Finally, I provide suggestions on needed further work that would empirically verify the relationship between the presence of Williamson Act contracts and reduced sprawl, and a more detailed examination of other states' practices regarding the use of farmland protection programs to curtail is sprawl.

Summary of Available Evidence

Lower reliance on property taxation: The overall influence of California's lower rate of property taxation on the compactness of land development in its urban areas is theoretically indeterminate. One empirical study shows that the overall influence leans toward the generation of greater sprawl. However, a lower rate of property taxation puts less pressure on owners of agriculture land at the urban fringe to develop farmland and thus the state's lower rate of property taxation works to encourage less sprawl. *Given California's low rate of property taxation and the high rate at which its farmland enjoys additional Williamson Act property tax concessions, it is reasonable to conclude that relative to other states with much higher rates of property taxation, property taxation in California exerts little direct influence on the further generation of the state's urban sprawl.*

Higher reliance on local sales taxation: Localities in California retain at least one percent of the value of all taxable retail sales generated within their boundaries. *Since jurisdictions at the urban fringe are more likely to seek this discretionary revenue, California's higher reliance on local sales taxation very likely encourages the fiscalization of land use choices toward higher-value retail at the urban fringe and this results in the generation of greater sprawl.*

Higher reliance on local fees: California leads the nation in imposing exaction fees on the construction of new housing. The fees charged in jurisdictions at the fringe of the state's urban areas are on average greater because the marginal cost to provide public services to a new

home is greater there. *California's shift to greater fees has resulted in less sprawl in the state because higher fees at the urban fringe drive up the final cost of a home and/or reduce the return on developers or landowners where they are built, and thus less homes are built in the urban fringe.*

Higher reliance on state personal and corporate income taxes: The marginal personal and corporate income tax rates levied by the State of California are some of the highest in the country. The expected influence of this on the generation of sprawl through farmland conversion is uncertain because the higher rates makes it less likely for a farmer to seek a property tax reduction through a farmland preservation commitment, and more likely to seek the tax write-off if farmland is donated to a trust to create a conservation easement. *A search through the literature revealed no empirical studies that would quantify whether California's higher state income tax rates are responsible for the generation of more or less sprawl.*

Presence of Federal Estate Tax: A death tax can act as a significant deterrent to a family farmer's heirs remaining in the business if: (1) a significant percentage of them are subject to the tax and (2) the payment level of the tax leaves them little choice but to liquidate the farm. Empirical evidence cited earlier shows that this is very likely not the case on both accounts. In fact, the threat of paying an estate tax can actually encourage the greater participation of family farmers in moving to perpetual easements after the owner's death due to the generous deduction they generate toward reducing taxable estate income. Evidence was also offered that the current proposed repeal of this tax in 2011 will hurt more of California's family farmers through regular income tax implications than it helps through reduced estate taxes owed. *The furor over the estate tax as a major cause of the loss of California's family farms is largely political and likely driven by a larger anti-tax/anti-government agenda.*

Williamson Act and Farmland Security Zones: Given the fact that nearly two-thirds of all California's acres in agricultural production are under a Williamson contract, by participation alone the program is a success. However, a geographic representation of the use of these farmland preservation programs shows that it rarely provides an effective growth boundary around any of the state's urban areas. *The current use of Williamson contracts are not fulfilling their full potential as a policy instrument in the fight to slow the state's sprawl and to help achieve the reduction in GHGs mandated by AB 32 .*

Farmland Conservation Program: California farmland subject to conservation easements is miniscule in comparison to the millions of acres currently enrolled in Williamson contracts. *For this reason, and the observation that there has been little effort in the use of CFCP grants to assist in the generation of a fixed agricultural buffer around any urban area in California, it must be concluded that this program has not achieved the potential they have for effectively slowing the spread of sprawl in the state.*

Easement Exchange Program: This program potentially allows a farmer at the fringe of an urban area to get out of their Williamson commitment to agriculture production if they can find another plot of agricultural land willing to commit to entering into a perpetual easement. *However, the perpetually preserved farmland is farther from the urban fringe than the previous agricultural land lost to development. For this reason, the easement exchange program offers the potential of actually facilitating greater sprawl. However, the nearly non-existent use of its application in California makes this currently unlikely.*

Potential Policy Changes to Consider

I now offer a set of brief policy suggestions to consider regarding current California policy instruments and conservation of urban fringe farmland. My policy suggestions are based on both

the causal relationships described earlier and my own assessment of the political likelihood of achieving them.

Beginning with the low rate of local property taxation and high rates of state income taxation in California, I suggest that no action occur to alter these forms of California revenue instruments for the purpose of farmland conservation at the urban fringe. I can cite two reasons for this opinion. First, the theoretical effect they can have on farmland conversion that generates sprawl is ambiguous. Also important is the reality of insufficient political support for altering these taxes. The system of California property taxation established after Proposition 13 is often referred to as the “third rail of California policy,” meaning anyone who dares touches it, dies a quick political death. Democrats would perhaps like to see even higher rates of income taxation in the state to cure the state’s current budget woes. While even in the face of a massive budget deficit, all Republicans in California’s Legislature have taken no new tax pledges and may even support a cut in these rates.

Regarding the federal estate tax, I conclude that the available empirical evidence does not support the heated rhetoric regarding its importance to driving the California family farm into the hands of subdivision developers. Reasonable reforms to the structure of this tax have already occurred. With some estate planning, a family farm in California can very likely remain as such if that is the heirs’ desire. What should concern California’s agricultural stakeholders is the planned repeal of the federal estate tax in 2011. Subsequent changes from it could actually raise the overall tax burden imposed upon heirs to a family farm. I suggest efforts to lobby for the continuation of the federal estate tax exemption and rate structure now scheduled to be in place for only 2009.

Two local fiscal variables that very likely exert an influence on the degree of farmland conservation going on in California are its local government's reliance on development fees and locally generated sales tax revenue. The increased reliance on both have exerted opposite influences on farmland preservation at the fringe of California's urban areas. The more prevalent use of higher fees by fringe jurisdictions increased farmland conservation in these areas because they serve to decrease the profitability or increase the price of homes developed there. While fringe jurisdictions chasing after local sales tax revenue has increased the likelihood of locating auto malls, big-box retailers, and regional shopping malls at the urban fringe and not in California's current central places. The two policy courses I suggest are thus the greater use of fees for fringe development and reduced incentives for fringe jurisdiction to fiscalize their land use decisions.

Economic theory offers a justification for charging even greater development fees at the urban fringe if such developments impose social costs that nobody is directly paying for, and hence considering when the development is proposed and built. There is a large volume of literature (for an overview see Burchell *et al.*, 1998) on the existence of these external social costs of sprawl (air pollution, traffic congestion, etc.) and thus higher fees could be theoretically justified. The problem in doing so stems from a current lack of political will at the state level to require that local governments levy these higher fees and even the questionable legality of their use in California. Remember the suggested increase in fees is not for the direct higher costs of a new development to a jurisdiction (which fringe jurisdictions have already demonstrated they are willing to charge), but for social costs that affect the entire metropolitan area and beyond. In the case of greater GHG emissions through the higher VMT that results from fringe development, these higher social costs are currently born by the entire world through climate change.

Local governments at the urban fringe strongly resist the levying of these additional fees because they would place a direct hit on the affected jurisdiction's landowners and developers in the form of lower returns, and/or a hit on new homeowners in the form of higher prices. Currently a movement exists for the development approval process under California's Environmental Quality Act (CEQA) accounting for the affect of GHGs produced from new development on global climate change (Latham and Watkins, 2008). If successful, such a CEQA change would impose greater mitigation costs upon fringe developers, or force fringe communities to implement greater mitigation fees. Either way, the result is the equivalent of an increase in fees paid at the urban fringe. The support of this CEQA policy change seems like the most politically expedient way to seek the desired policy change of greater fees at the urban fringe, less development there, and greater farmland conservation there.

The discretionary revenue sought by an urban fringe jurisdiction, that receives too little property tax revenue from its non-compact and single-use subdivision development, results in zoning for high revenue-generating retail activities that requires large patches of existing farmland to assemble. The policy course necessary to reduce this "fiscalization od land use" drive is to decrease the fiscal benefits expected from such land use choices. Assemblyman Steinberg realized this in 2002 and authored California Assembly Bill (AB) 680 that would have created a more rational and equitable distribution of the site-based local sales tax revenue collected throughout the Sacramento Area. In addition, AB 32 had provisions to reward compact growth projects undertaken in the area and to encourage local planning aligned with regional goals (PolicyLink, 2002). Steinberg's bill passed the Assembly, but died in the Senate when the California League of Cities and California Association of Counties both raised strong objections to the curtailment of local revenue choices that it entailed. Organizations that represent

California's local governments viewed the sales tax redistribution portion of AB 680 as a zero-sum gain. Some central-place jurisdictions would win additional revenue from it, but only because of the losses experienced by others. Until the perception of a local sales tax reform proposal is a win-win for all, I do not recommend the further pursuit of this policy course.

To understand my policy suggestions in regard to the use of current farmland preservation instruments, I first must offer my vision of the "ideal planning environment" that would allow for compact and mixed use development to occur in California's current urban areas and simultaneously protect as much of the prime farmland that surrounds these urban areas as possible. The ideal planning environment starts with a region-wide planning group consisting of all cities and counties economically and environmentally connected together in the desired future footprint of the region. Based upon the expected population growth in the such designated region over the next 10, 20, and even 50 years, this planning group would need to reach a consensus on where this growth should occur to best achieve the compact and mixed use developments that are necessary to achieve the region's share of reduction in GHGs specified in AB 32. In the short term, much of the population growth could be steered back into the existing urban areas within the region in the form of infill development. If long-term population growth is great enough, new land at the fringe of the urban areas within the region needs to be urbanized. A desire to preserve the greatest amount of prime farmland that abuts the urban area should drive the choice of this necessary expansion of an urban footprint. Through this consensus-based "ideal" form of regional planning, needed future development can be steered to not so prime farmland at an urban area's fringe.

The difficulty with a California region achieving the just described ideal planning environment for creating compact and mixed-use urban growth that preserves the most prime

farmland, is that there is no metropolitan-wide organization that can bring an urban area's cities and counties together to make binding regional land use decisions. Currently, the closest things are the 18 Council of Governments (COGs) formed in California's large regions to facilitate the orderly distribution of federal transportation funds. Among these COGs, the Sacramento Area Council of Governments (SACOG) has garnered national attention in the creating the beginnings of the ideal set up just described (Campoy, 2008). Labeled the "Blueprint Project," representatives from the area's local governments, with the assistance of input from citizens, developers, and the agricultural community, reached a consensus on where they would like to see future development occur. The consensus was also that future development be at a higher rate of density and mixed use than was originally projected. Though the implementation of the preferred development plan is voluntary, local officials in the Sacramento Area now have a region-wide blueprint to help guide their own land use decisions by.

Now Senator Steinberg, who represents the Sacramento Area and was the earlier architect of AB 680, wants the state to encourage the remaining 17 COGs in California to take a similar consensus approach to region wide land use. He has authored Senate Bill (SB) 375 that would require such a process. Under SB 375, the process must demonstrate how the resulting plan yields measurable green house gas reductions that are in line with those mandated statewide under AB 32 (Planning Report, 2007). SB 375 offers carrots in the form of state funded incentives for regions that achieve this. My strong policy suggestion is that those interested in the preservation of farmland in California's urban fringes needs to do everything possible to see that SB 375 ultimately becomes law. In addition, SB 732 also authored by Senator Steinberg in 2007-2008 legislative session, creates the Sustainable Communities Council to coordinate the activities of various state agencies that aim to improve air and water quality, natural resource

protection, affordable housing, and transportation. Both SB 375 and 732 are truly the beginnings of a public policy course that leads to the ideal set up described earlier.

Once a region reaches a consensus on a course of future development that helps to satisfy statewide goals regarding GHG reductions, the next policy concern that emerges is how to achieve it. This is where the existing tools of farmland preservation, used in coordination with appropriate local general plans, farmland zoning, and subdivision ordinances, be put to use that is more effective. If all the projected development for a metropolitan area over the next 10 years is expected to be accommodated through higher infill development in existing urban areas, then the relevant local communities in the area (most likely the unincorporated portions of counties at the region's fringe) should coordinate a ring of agricultural preserves that surround existing urban areas in the region. All private farms in these preserves need to be strongly encouraged to take on a traditional Williamson contract. Since it is a landowner's choice to enter into a Williamson contract, stronger encouragement could come through appropriate forms of local zoning, and perhaps additional forms of farmland protection (transferable development rights, formal growth boundaries, etc.) that would heighten the attraction of farmers to enroll in Williamson Act contracts. An appropriately established ring of agricultural preserves would leave no land unprotected (as shown in Figures 1 and 2 with white bands) between current and desired future land in urban use and protected farmland.

If infill development accommodates projected development over the next 20 years or more in an urban area, then this ring of preserved agricultural land around an urban areas should be Farmland Security Zones. Again, private farms in these FSZs need to be better encouraged to take on a Super Williamson Contract. If there is a part of the current urban fringe in an urban

area that will need to develop in 10 to 20 years from now, then this land should only be under traditional Williamson contracts and the land beyond that under Super Williamson contracts.

Under this suggested policy course, Williamson contracts set growth boundaries around California's urban areas that work to steer development back to its central places in urban area to achieve more of the mixed-use and compact development necessary to satisfy AB 32. A permanent easement within a current or projected future urban area should only receive the support of the California Farmland Conservancy Program (CFCP) if used specifically to establish a permanent stopping point for urban development because of its encroachment on prime agricultural land. The same for setting up the criteria the Department of Conservation should use for the future approval of an easement exchange.

References

- American Farm Bureau (2007), "Congress Urged to Remedy Federal Death Tax Now," November 15, Washington, D.C.: Author, available at: <http://www.idahofb.org/archivej/htmArchive/showPage.aspx?page=15452.htm&id=15452> .
- American Farmland Trust (2007), *Paving Paradise: A New Perspective on California Farmland Conversion*, Washington, D.C.: author, available at <http://www.farmland.org/programs/states/ca/Feature%20Stories/PavingParadise.asp> .
- Atkinson, Glen and Ted Oelson (1996), "Urban Sprawl as a Path Dependent Process," *Journal of Economic Issues*, 30(2), 607-09.
- Bluffstone, Randy, Matt Braman, Linda Fernandez, Tom Scott And Pei-Yi Lee (2008), "Housing, Sprawl, and the Use Of Development Impact Fees: The Case Of The Inland Empire," *Contemporary Economic Policy* 26, 433-447.
- Brueckner, Jan K. (2000), "Urban Sprawl: Diagnosis and Remedies," *International Regional Science Review* 23, 16-171.
- Brueckner, Jan. K and D.A. Fansler, "The Economics of Urban Sprawl: Theory and Evidence on the Spatial Sizes of Cities," *Review of Economics and Statistics* 65, 479-482.
- Brunetti, Micheal J. (2006), "The Estate Tax and the Demise of the Family Business," *Journal of Public Economics*, 1975-1993.

Buckley, John (2005), "Estate Tax Repeal: More Losers than Winners," *Tax Notes*, February 14.

Burchell, Robert, Naveed Shad, David Listokin, Hilary Philips, Anthony Downs, Samuel Seskin, Judy Davis, Terry Moore, David Helton, and Michele Gall (1998), *The Costs of Sprawl—Revisited*, Transportation Research Board, Washington, D.C.: National Academy Press, available at http://onlinepubs.trb.org/Onlinepubs/tcrp/tcrp_rpt_39-a.pdf.

Burhman, Leonard E., William G. Gale, and Jeffrey Rohaly (2005), "Options for Reforming the Estate Tax," *State Tax Notes*, April 18, 379-385.

California Department of Conservation (2006a), *The California Land Conservation (Williamson) Act: 2006 Status Report*, Sacramento, CA: Author, available at http://www.consrv.ca.gov/dlrp/lca/stats_reports/Pages/2006%20williamson%20act%20status%20report.aspx.

California Department of Conservation (2006b), *California Farmland Conservancy Program Proposition 12 Bond Fund Report*, Sacramento, CA: Author, available at <http://www.conservation.ca.gov/dlrp/cfcp/docs/Documents/CFCP%20Prop%2012%20Bond%20Fund%20Report%20-%20print%20quality.pdf>.

California Department of Housing and Community Development (2001), *Pay to Play: Residential Development Fees in California Cities and Counties, 1999*; Sacramento, CA: Author, available at http://www.hcd.ca.gov/hpd/pay2play/fee_rpt.pdf.

Campoy, Ana (2008), "With Gas Over \$4, Cities Explore Whether It's Smart to Be Dense: Sacramento's 'Blueprint' for Growth Draws National Attention," *Wall Street Journal*, p. A1, available at http://online.wsj.com/article/SB121538754733231043.html?mod=hps_us_pageone.

Daniels, Tom and Deborah Bowers (1997), *Holding Our Ground: Protecting America's Farms and Farmland*, Washington, D.C.: Island Press.

Daniels, Tom and Mark Lapping (2005), "Land Preservation: An Essential Ingredient in Smart Growth," *Journal of Planning Literature* 19, 316-329.

Downs, Anthony (1998), "How America's Cities are Growing: The Big Picture," *The Brookings Review*.

Dresch, Marla and Steven Sheffrin (1997). *Who Pays for Development Fees and Exactions?* San Francisco, CA: Public Policy Institute of California, available at <http://www.ppic.org/main/publication.asp?i=106>.

Economic and Technology Advancement Advisory Committee (2008), *Technologies and Policies to Consider for Reducing Greenhouse Gas Emissions in California*, Sacramento, CA: California Air Resources Board, available at: <http://www.arb.ca.gov/cc/etaac/ETAACFinalReport2-11-08.pdf>.

Ewing, Reid (1997), "Is Los Angeles-Style Sprawl Desirable?" *American Planning Association Journal* 63, 107-126.

Ewing, Reid (1994), "Characteristics, Causes, and Effects of Sprawl: A Literature Review," *Environmental and Urban Issues*, 1-15.

Ewing, Reid and Robert Cervero (2001), "Travel and the Built Environment: A Synthesis," *Transportation Research Record*, 87-114.

Ewing, Reid, Rolf Pendall, and Don Chen (2003), "Measuring Sprawl and its Impact," Washington, D.C.: Smart Growth America.

Ewing, Reid, Keith Bartholmew, Steve Winkleman, Jerry Walters, and Don Chen (2008), *Growing Cooler: The Evidence on Urban Development and Climate Change*, Washington, D.C.: Urban Land Institute.

Friends of the Earth (2001), "Estate Tax = Conservation of Real Estate," Washington, D.C.: Author, available at <http://www.foe.org/policy/51e4e.pdf> .

Frumkin, Howard (2002), "Urban Sprawl and Public Health," *Public Health Reports* 117, 201-217.

Frumkin, Howard, Lawrence Frank, and Richard Jackson (2004), *Urban Sprawl and Public Health: Designing, Planning, and Building for Healthy Communities*, Washington, D.C.: Island Press.

Governor's Office of Planning and Research (2003), *California Land Conservation (Williamson) Act Technical Advisory Document*, Sacramento, CA: Author, available at http://www.assembly.ca.gov/ruralcaucus/documents/Williamson_Act_Fact_Sheet-FINAL_10-30-03%20.doc .

Innes, Judith E. and David E. Booher (1999), "Metropolitan Development as a Complex System: A New Approach to Sustainability," *Economic Development Quarterly*, 13(2), 141-56.

Institute for Local Self Government (2002), *Farmland Protection Action Guide: 24 Strategies for California*, Sacramento, CA: Author, available at <http://water.lgc.org/resource-tools/Farmland%20Protection%20Action%20Guide.pdf> .

Johnston, David (2000), "Despite Benefits, Democrats' Estate Tax Plan Gets Little Notice," *New York Times*, July 13, available at http://www.agecon.ucdavis.edu/extension/update/articles/v11n5_2.pdf
<http://query.nytimes.com/gst/fullpage.html?res=9C06E4DF1F38F930A25754C0A9669C8B63&sec=&spon=&pagewanted=all> .

Keating, Raymond J. (2008), *Business Tax Index 2008: Best to Worst State Tax Systems for*

Entrepreneurship and Small Business, Oakton, VA: Small Business and Entrepreneurship Council, available at <http://www.sbecouncil.org/uploads/BusinessTaxIndex2008.pdf> .

Kovacs, Kent (2008), *Farmland Conversion in California: Evidence from the Williamson Act Program*, University of California: Giannini Foundation of Agricultural Economics, available at http://www.agecon.ucdavis.edu/extension/update/articles/v11n5_2.pdf .

Latham and Watkins (2008), *CEQA and Climate Change: One Year after AB 32*, Client Alert, available at <http://www.lw.com/Resources.aspx?page=ClientAlertDetail&publication=2051> .

Legislative Analyst's Office (2008), *Analysis of the 2008-09 Budget Bill: General Government Tax Relief (9100)*, Sacramento, CA: Author, available at http://www.lao.ca.gov/analysis_2008/general_govt/gen_anl08020.aspx .

Levine, Ned (1997), [Letter], *American Planning Association Journal* 63, 279-282.

Lewis, Paul (2001), "Retail Politics: Local Sales Taxes and the Fiscalization of Land Use," *Economic Development Quarterly* 15, 21–35.

Lewis, Paul and Elisa Barbour (1999). *California Cities and the Local Sales Tax*, San Francisco, CA: Public Policy Institute of California, available at: <http://www.ppic.org/publications/PPIC121/PPIC121.pdf/index.html> .

Mills, Edwin S. (1999), "The Brawl over So-Called Sprawl," *Illinois Real Estate Letter*, summer, 1-7.

Miszczynski, Dean J. (1986), "The Fiscalization of Land Use," in *California Policy Choices*, edited by John J. Kirilin and Donald R. Winkler, Sacramento, CA: School of Public Administration, University of Southern California.

Pauli, Bill (2005), "Repeal the Estate Tax," *Hollister Free Lance Newspaper*, September 6, available at <http://www.hollisterfreelance.com/opinion/167642-repeal-the-estate-tax> .

Planning Report (2007), *SB 375 Connects Land Use and AB 32 Implementation*, July, Sacramento, CA: author, available at http://www.planningreport.com/tpr/?module=displaystory&story_id=1257&format=html .

PolicyLink (2002), *Building A Healthier Sacramento Region: An Analysis of Assembly Bill 680*, Oakland, CA: Author, available at <http://www.policylink.org/pdfs/AB%20680.pdf> .

Planning Commissioners Journal (2002), *Sprawl Guide*, available at www.plannersweb.com/sprawl/define.html .

Steinbach, Tom (2007), "Technology Alone Won't Tame Climate-Change Juggernaut," *San Francisco Chronicle*, October 21, p. F1.

Wassmer, Robert W. (2008), "Causes of Urban Sprawl in the United States: Auto Reliance as Compared to Natural Evolution, Flight from Blight, and Local Revenue Reliance," *Journal of Policy Analysis and Management* 27, 536-555.

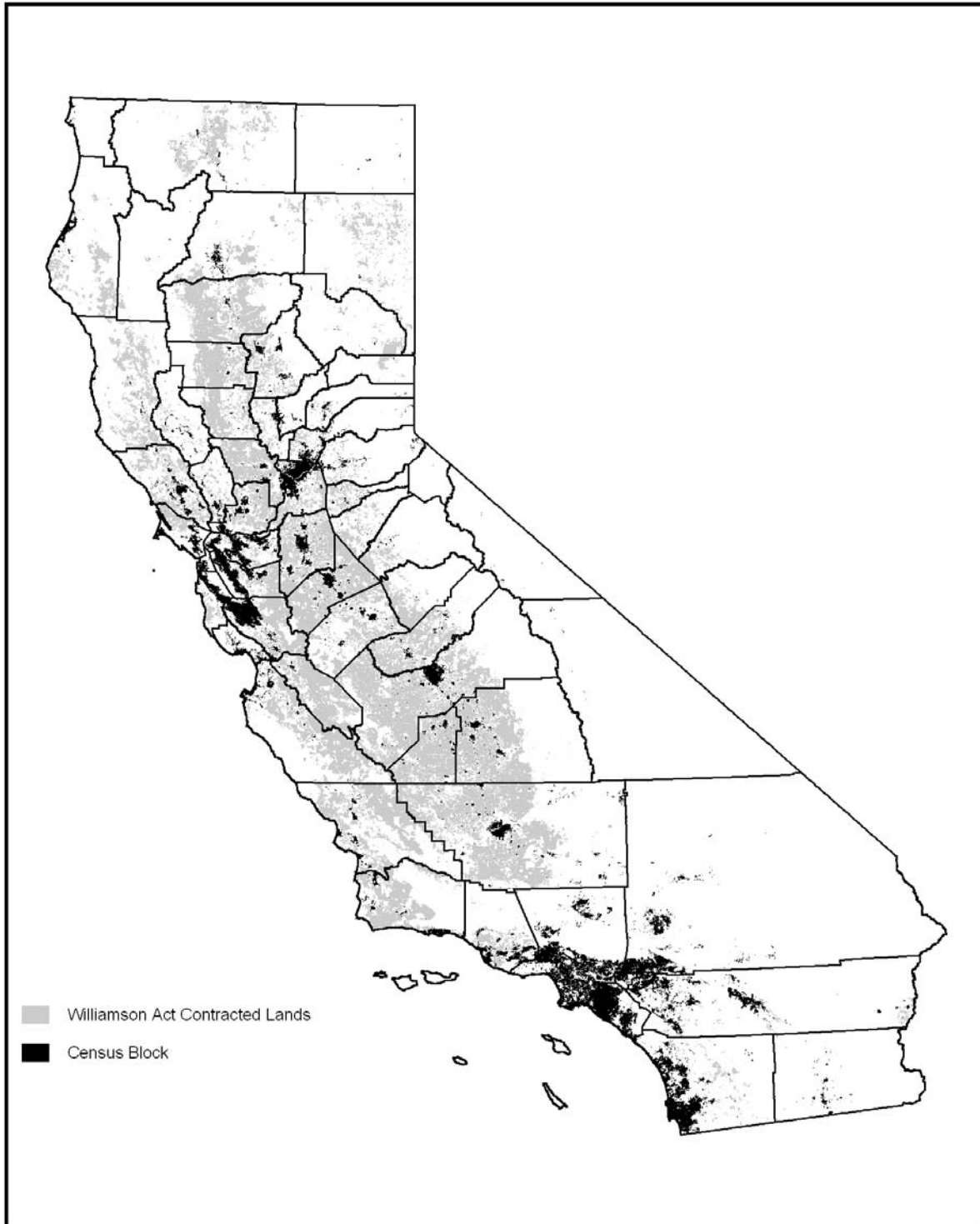
Wassmer, Robert W. (2002), "Fiscalization of Land Use, Urban Growth Boundaries, and Non-Central Retail Sprawl in the Western U.S.," *Urban Studies* 39, 1307-1327.

Sierra Club (1998), *The Dark Side of Sprawl*, Washington, D.C.: Author.

Song, Yan and Yves Zenou (2006), "Property Tax and Urban Sprawl: Theory and Implications for US Cities," *Journal of Urban Economics* 3, 519-534.



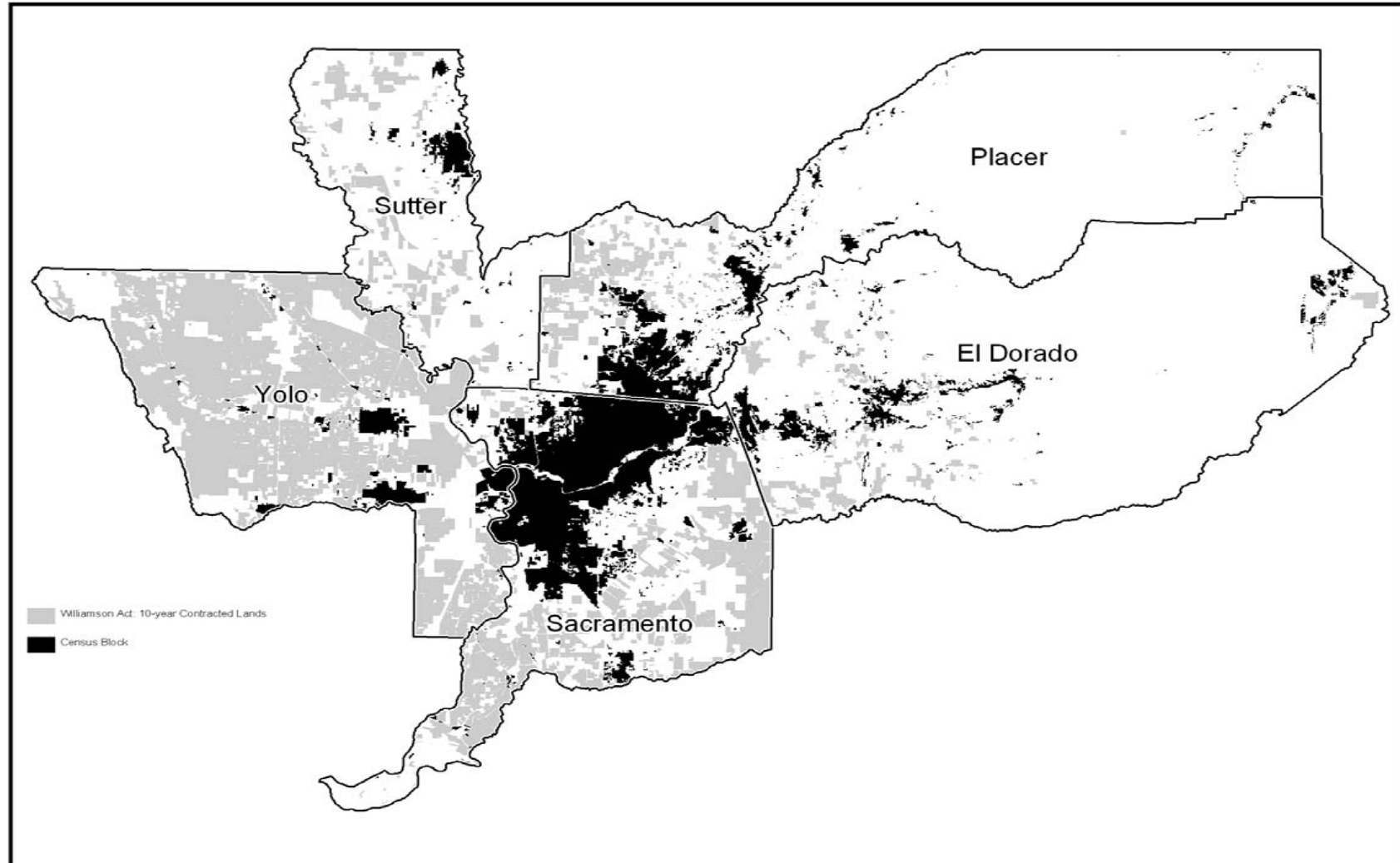
Figure 1



GIS map created by James Nordstrom at California Department of Conservation.



Figure 2



GIS map created by James Nordstrom at California Department of Conservation.