

FARMLAND PRESERVATION IN THURSTON COUNTY

by

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-ABSTRACT-

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Thurston County is a metropolitan county in Western Washington on the south end of Puget Sound that possesses an agricultural economy in transition and a growing population. Ever present on the horizon is the threat of development and loss of farmland while at the same time opportunities for direct marketing are increasing. Long Term Agriculture zoning exists to protect agriculture from development, but the results of a recent farmland inventory of the county show that less than 20 percent of the farmland in Thurston County is zoned Long Term Agriculture. There is the potential that Thurston County will be establishing an ongoing purchase of development rights (PDR) program to protect farmland. The effectiveness of a PDR program hinges on the incorporation of both agricultural (soils) and non-agricultural (development potential) farmland selection criteria. A number of multi-criteria analyses were conducted using Geographic Information Systems software to determine the effectiveness of different combinations of selection criteria. As the selection criteria for farmland preservation moved away from agricultural criteria and began to incorporate more non-agricultural criteria the number of acres zoned Long Term Agriculture in the highest ranked 20,000 acres of the selection decreased. Thus, more farmland at a greater risk of development was being incorporated; increasing the overall percentage of farmland protected from development. Farmland in Thurston County has largely been protected based solely on the presence of high quality soils, leaving a significant amount of farmland unprotected. A well design PDR program in Thurston County could close the gap between protected and unprotected farmland.

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Chapter 1: Introduction

The focus of this thesis is on farmland preservation in metropolitan areas and how a purchase of development rights (PDR) program can be tailored to fit the unique needs of an individual county. Thurston County, Washington, is highlighted as a metropolitan county with an active agriculture sector that is expected to face increasing development pressure over the next twenty to thirty years.

From the 1940's through the 1970's American farmers profited to an extent never before seen as agricultural production reached new efficiencies of scale, and as new agricultural lands became available through large scale irrigation projects. These changes in the agriculture industry negatively affected Thurston County with its smaller scale producers and limited processing facilities. At the same time a period of urban expansion caused unprecedented losses of productive farmland as residential and commercial development began to expand into the adjacent prime farmlands (Mariola, 2005; Thurston County Agriculture Committee, 1978). The rate of rural land conversion to urban uses in the U.S. from 1967 to 1975 was three times the historic average. One result of this significant loss of farmland and the beginnings of the environmental movement was an effort to protect farmland from development. By 1980 a nationwide movement had begun to preserve farmland, and the national non-profit American Farmland Trust was founded to tackle the issue of farmland preservation (Mariola, 2005). Over time the farmland preservation movement has grown and changed. No longer is farmland preservation simply a means with which to

protect agricultural production. Today, issues such as resource management, environmental protection, and farm and community survival have found their way into the farmland preservation movement (Bunce, 1998).

Thurston County was on the cutting edge of farmland preservation when in 1978 it established the Agricultural Advisory Committee to assist the Board of County Commissioners and Planning Commission on agriculture related issues (Thurston County, 2002). That same year the Agricultural Advisory Committee issued a report titled “1978 Citizen’s Report: Agriculture in Thurston County.” One of the conclusions of the Committee’s report was the need for a county level purchase of development rights program to protect farmland in Thurston County (Thurston County Agriculture Committee, 1978). More than 30 years later a number of programs have been created to protect farmland in Thurston County; however, an ongoing, countywide PDR program is not one of them. Development rights were purchased on roughly 900 acres of farmland in northeastern Thurston County near the Nisqually Delta in the early 1990’s, but a countywide yearly funded program has not materialized. The potential exists for establishing an on-going PDR program in Thurston County within the next few years (Thurston County, 2009).

The thesis for this research is that given the metropolitan nature of western Washington and Thurston County (Klein & Reganold, 1997) the success of a PDR program in Thurston County depends on selection criteria that include both agricultural and non-agricultural criteria. A recent study from the state of Michigan found that as the criteria for preserving farmland shift from agricultural

criteria (soils) to non-agricultural criteria (threat from development), the priority farmland for preservation shifts from rural to metropolitan farmland (Adelaja et al., 2007). The goal of this research is to answer the question of: What does an effective PDR program look like in Thurston County? To answer this question a Geographic Information System (GIS) will be used to analyze the use of two types of criteria, agricultural and non-agricultural, within a PDR selection criteria. GIS is a computer application that uses spatial and attribute data for making decisions. GIS can facilitate data input, storage, analysis, and output of both spatial and attribute information. (Malczewski, 1999). To complete the GIS analysis agricultural and non-agricultural criteria will be standardized to a zero to one scale and given various weighting factors within ten separate analyses to determine which combination of criteria provides the most effective PDR selection criteria. The standardization of the criteria is necessary when combining a number of different criteria with different units of measure into a multi-criteria analysis (Malczewski, 1999).

There is a growing body of literature on the topics of farmland preservation and metropolitan agriculture largely spurred by the continuing growth of urban areas and the significant contribution that farms in metropolitan areas make to the U.S. agriculture industry. Sources for this thesis come from both local and national research. Locally, the South of the Sound Community Farm Land Trust (SSCFLT) has recently completed a farmland inventory of Thurston County that was very important during the conceptualization of this thesis. Nationally, the American Farmland Trust and United States Department of

Agriculture (USDA) are conducting and funding research on agriculture in metropolitan areas. A number of researchers from universities across the U.S. have also made contributions within the last few years that have greatly influenced this research (Adelaja et al., 2007; Clark et al., 2007; Esseks et al., 2008; Thompson & Prokopy, 2009).

This research is divided into a number of chapters pertaining to farmland preservation. Chapter two will follow this introductory chapter and provide an overview of agriculture in Thurston County over the last several decades using federal agriculture census information and data from the Thurston Regional Planning Council. A review of the results of a recently completed Geographic Information System (GIS) farmland inventory of Thurston County is also necessary to complete the overview. Chapter three will then discuss the various regulatory mechanisms, including zoning, current use valuation, urban growth areas, transfer of development rights (TDR), and PDR that are used to protect farmland. Chapter four provides an analysis of the strengths, weaknesses, opportunities, and threats to farmland in Thurston County. Finally, in chapters five and six, using the recently completed farmland inventory of Thurston County a number of different farmland preservation criteria will be detailed followed by a number of multi-criteria analyses that will combine different preservation criteria. The goal of analyzing different preservation criteria is to determine which criteria and combinations of criteria provide the greatest increase in the level of farmland protection in Thurston County.

Chapter 2: Agriculture in Thurston County

Thurston County is located on the southern end of Puget Sound west of the Cascades, part of the expansive Seattle-Tacoma-Olympia metropolitan area. Agriculture in metropolitan counties like King, Pierce, and Thurston Counties is generally smaller in size than in areas like eastern Washington. Though smaller in size, the agriculture can also be more intensive; producing greater profits per acre than in other parts of the state (Klein & Reganold, 1997).

Over the course of the last 70 years the amount of land in farms in Thurston County has decreased from a high of almost 180,000 acres in 1940 to a low of 56,799 acres in 1987. From 1987 to the latest federal Census of Agriculture in 2007 the amount of land in farms has increased to 80,617 acres. The amount of land used for crops reached a high in 1950 of just over 57,000 acres and also set a low value in 1987 at 22,753 acres. The amount of land used for crops has since increased to 30,029 acres in 2002, but again decreased in 2007 to 26,283 acres (Figure 1). The acres of woodland in Thurston County could be contributing to the increase in acres of land in farms; total acres of woodland increased from 16,333 acres in 1997 to 25,999 acres in the 2007 census, an increase of almost 10,000 acres. (*Census of Agriculture*, 1930 – 2007). The upswing in acres over the last ten years can be attributed to a change in how the Census of Agriculture was conducted. Beginning in 2002, and retroactively applied to 1997, the census results are statistically modified to compensate for the lack of participation by all farmers (Thurston Regional Planning Council [TRPC], 2008).

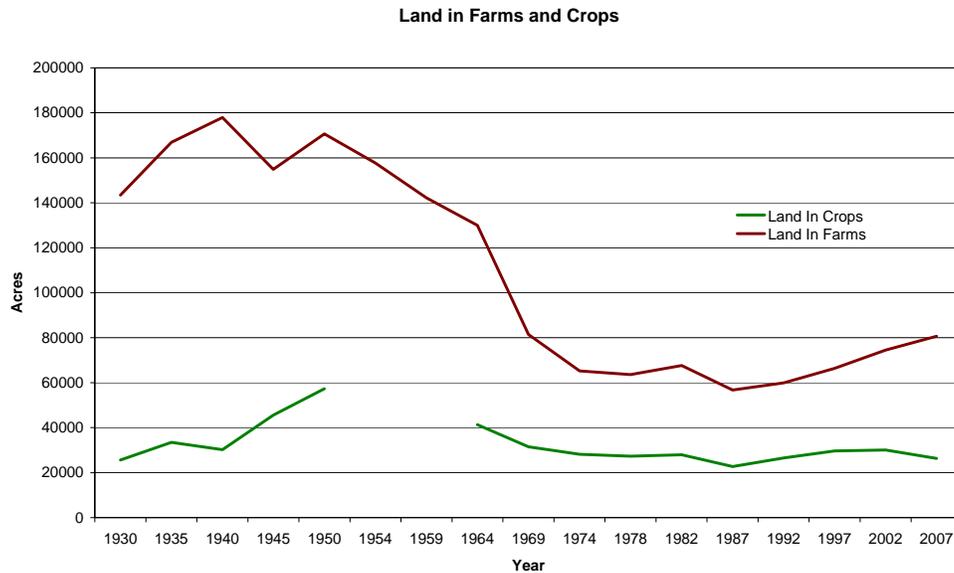


Figure 1. Acres of land in farms and land used for crops in Thurston County from 1930 to 2007.

In 2002 the Thurston Regional Planning Council released a study on the rate of urbanization and forest harvest in Thurston County from 1985 to 2000. During that 15 year time span the population of Thurston County increased by approximately 70,000, and the number of jobs increased by over 48,000. Using satellite imagery the researchers were able to detect an increase in urbanization of approximately 32,600 acres. Of this total, 57 percent (18,565 acres) was previously forested and 30 percent (9,893 acres) was previously farmland (TRPC, 2002). From 2000 to 2008 the population of Thurston County increased by almost 38,000. The population is projected to increase by an additional 127,493 by 2030 (TRPC, 2008).

Discrepancies between the federal Census of Agriculture and other measures of the changing agricultural landscape are not uncommon. The problem with these discrepancies is that Census of Agriculture data influences farmland preservation policies, so if the census shows farmland is increasing when in fact it is decreasing, policy makers will be making decisions with misleading

information. It is important for state and local governments to begin tracking farmland to better inform land use decision making (Thompson and Prokopy, 2009).

One of the goals of the recently created Washington State Office of Farmland Preservation is to create an inventory through the University of Washington College of Forest Resources of all the farmland in Washington State to identify farmland at risk of conversion to non-agricultural uses (Office of Farmland Preservation [OFP], 2009). A Thurston County non-profit, SSCFLT, has recently completed a farmland inventory of Thurston County. The farmland inventory will be used in this research to evaluate different PDR selection criteria. The SSCFLT inventory found 68,247 acres of farmland and aquaculture with three quarters of the farmland within three miles of an urban area (Figure 2).

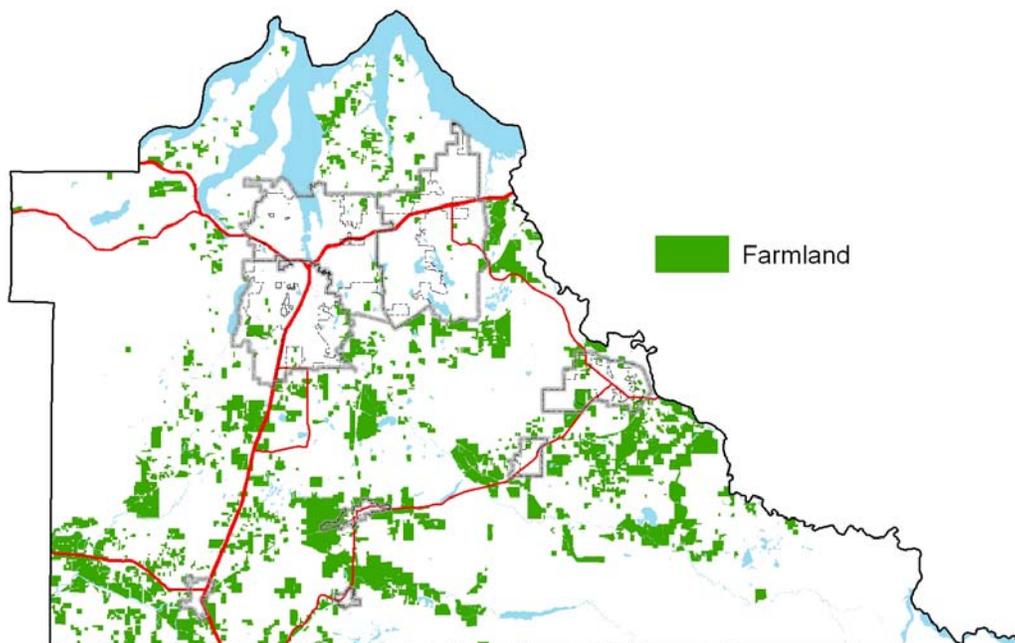


Figure 2. Distribution of farmland in Thurston County per the SSCFLT farmland inventory.

One of the first steps that need to take place in order to protect farmland is an inventory of the existing farmland and a system for monitoring it in the future (Institute for Local Self Government, 2002). Thurston County has been striving to protect farmland over the last 30 years without having accomplished one of the necessary first steps. With a complete inventory of all the farmland in the county planners can take a proactive approach and evaluate all of the farmland parcels at once (Tulloch et al., 2003). The use of Geographic Information Systems (GIS) in farmland preservation is growing as it can assist planners in identifying land for protection (Daniels et al., 1997).

Chapter 3: Farmland Preservation Strategies

Numerous strategies exist that can be used to protect farmland. Some of the more common strategies include current use valuation, agricultural zoning, large lot zoning of greater than 40 acres, agricultural districts, right to farm laws, TDR, and PDR (Lacy, 2006). A number of goals can be achieved through the use of these preservation strategies, including the prevention of sprawl, maintenance of agricultural production, support of the agriculture economy, protection of environmental services, and the provisioning of rural amenities for example farmland as rural scenery. Over time numerous strategies can be put in place to provide a greater level of protection than any one strategy could alone (U.S. Department of Agriculture [USDA], 2002). Nearly all of the aforementioned preservation strategies have been enacted in Thurston County.

Zoning

Since 1995 Thurston County has used zoning as required by the Washington State Growth Management Act of 1990, as amended, to classify lands under Long Term Agriculture. Currently there is approximately 11,887 acres zoned Long Term Agriculture in Thurston County.

Zoning as a farmland protection strategy has a number of advantages. Zoning can provide temporary protection from development until more permanent preservation strategies can be implemented (Halich, 1999). Zoning can also quickly protect a large amount of farmland thus preventing the conversion of farms to development and protecting a contiguous critical mass of agricultural

lands and production (Duke & Lynch, 2006); this is necessary to protect the agriculture industry from regional or parcel fragmentation.

Regional fragmentation occurs after farmland has been lost resulting in an insufficient market for farm support operations and facilities. Parcel fragmentation can also arise under weak zoning regulations resulting in a checkerboard or non-contiguous distribution of farmland; this creates difficulties for farmers trying to achieve an efficient scale of operation (Brabec & Smith, 2002).

A number of negatives also exist for zoning. As it is currently practiced, constitutional issues exist with zoning that hinder its ability to keep land in agriculture, and that create problems for planners when trying to implement (Duke & Lynch, 2006). The act of zoning land Long Term Agriculture is essentially taking rights away from a private property owner, raising the question of a regulatory taking. The 5th amendment of the U.S. constitution states that private property shall not be taken for public use without just compensation. Past rulings have shown that if a property owner is left without any economically viable use of their property due to zoning the property owner should be compensated (Bobrowski, 2002). In Thurston County property owners who have been under consideration for inclusion within Long Term Agriculture have made the argument that their land is not productive farmland due to rocky shallow soils. They assert that the county is removing the only viable economic use of the property, which is development (Thurston County Planning Commission, 2008a).

Another problem with zoning is the possible temporary nature of designations. In Thurston County the best protection farmland can currently receive is to be zoned Long Term Agriculture, but the reality is zoning can change as landscapes and development evolve (Duke & Lynch, 2006; Washington State Department of Community Trade and Economic Development, 2004; Halich, 1999). One of the greatest difficulties with zoning farmland under Long Term Agriculture is the restriction of development rights imposed on property owners without compensation for the loss in land value (Lopez et al., 1988). This can create a difficult political climate for those who must implement zoning (Duke & Lynch, 2006; Halich, 1999). The act of down zoning property to Long Term Agriculture in Thurston County has been met with resistance, by some residents, from concern for the loss of value without compensation (Thurston County Planning Commission, 2008a). This puts elected officials in the uncomfortable position of angering their constituents.

Besides zoning specifically for agriculture, which provides extremely low density development of 1 house per 40 to 50 acres, many areas outside urban growth areas are zoned one house per five acres to one house per 10 or 20 acres. Large lot zoning such as this allows developers to build in a scattered fashion that consumes more of the landscape than compact development (Daniels, 1999). Large lot zoning of 3 to 20 acres is not effective for preventing development and can lead to significant reductions in farmland (USDA, 2001). The rural character of suburban areas with scattered residences on large parcels can reduce the number and success of working farms as available land for farming is lost to

residential uses on large parcels (American Farmland Trust [AFT], 2006b). The size of development outside urban areas is increasing as well; in the past new housing lots were predominantly 1 – 10 acres, but since 1994 55 percent of new housing has been on lots 10 – 22 acres in size (Mariola, 2005). With zoning densities of 1 house per 5 – 10 acres in rural areas both farmland preservation and efficient development lose; the alternative is to zone land at high densities within urban areas and very low densities in rural areas to promote compact development and farmland preservation (AFT, 2006b).

The farmland zoned Long Term Agriculture in Thurston County must meet a number of criteria. The number one criterion for Long Term Agriculture is soil quality; the soils should be predominantly prime farmland soils. Land within urban growth areas are not eligible and parcels designated Long Term Agriculture should be separated from built up areas by a road, railroad, river, or other feature that provides separation. The size of parcels selected should be greater than 20 acres and must be verified to be in active agriculture. Finally, parcels selected should be part of a larger agricultural area no smaller than 320 acres or 200 acres if close to another agricultural area (Thurston County, 2003).

Current Use Valuation

The state of Maryland was the first to use a current use property tax valuation in 1956 (Lacy, 2006). The Washington State Open Space Tax Act was created in 1970 to help protect natural resources on private lands. A property owner with farmland, forestry lands, or natural areas can take part in the open space program. Property owners receive a tax deferral by having their property

assessed at its current use rather than at the potential developed value. Since 1990 the number of acres in the open space agriculture program in Thurston County reached a high of 40,991 acres in 1992, but has decreased nearly every year since to a low in 2008 of 34,774 acres. Open space agriculture represents approximately half of the total farmland recently inventoried by SSCFLT (TRPC 2008). It is unclear whether the downward trend in the current use agriculture program is due to loss of farmland or active farmers choosing not to participate in the program.

To put Thurston County's open space agriculture in perspective the top ten counties with the greatest amount of open space agriculture in Washington State all have greater than 500,000 acres enrolled, and the top four counties have over one million acres each. What Thurston County lacks in acres of farmland, it makes up for in value of the land. When the true value of the farmland in the open space tax program is factored, there is a reduction in assessed value of over \$200 million, a 91 percent reduction in value, placing Thurston County sixth in the state. This means that farmers stand to benefit from taking part in the open space agriculture program in the form of property tax savings, but at the same time farmers could also make considerable and perhaps greater gains through development (OFP, 2008). In metropolitan areas such as Thurston County the reduction in property taxes is not enough to protect farmland with the greatest development potential; the financial incentive for farmers to use their property for non-agricultural uses is fairly high (USDA, 2001). Current use valuation does

help farmers by reducing their expenses, but it is not a sufficient strategy to directly address development pressure (Lacy, 2006).

An example from Thurston County would be two farmers with 20 acres of land, both of which are within urban growth boundaries. One of the farmers is in the current use agriculture program and the other is not, and they both have zoning of rural residential one unit per five acres. Both farmers also have land and buildings totaling approximately \$450,000 in value. The farmer in the current use agriculture program pays property taxes of \$2,600 in 2009. The farmer who is not in the current use agriculture program has to pay \$4,400 in 2009 property taxes. While the \$1,800 in savings the farmer receives by taking part in the current use agriculture program is significant year to year, it pales in comparison to the half a million dollars or more the farmer could receive by marketing and selling the land for development.

Urban Growth Boundaries

The Growth Management Act of 1990 required Thurston County to establish urban growth boundaries to accommodate future urban expansion. The farmland inventory conducted by SSCFLT found that 3,124 acres of farmland are located within the urban growth areas of Thurston County. Generally farmland is not eligible for protection through a PDR program at the county level if it is located within an urban growth area or not within a designated agricultural zone.

The goal of establishing urban growth areas is to funnel urban development into growth areas and limit high density development outside of the urban growth areas. This begs the question what is the future of farmland within

urban growth areas? The Growth Management Act specifically states that, “Each urban growth area shall permit urban densities and shall include greenbelt and open space areas”. Thurston County is not precluded from protecting farmland within the urban growth areas. Farmland and the practice of agriculture could serve as open space within urban growth areas.

Right to Farm

State and local governments around the U.S. have enacted right to farm laws designed to do two things for farmers. One, to give farmers legal standing if a neighbor decides to bring a lawsuit against them for simply practicing agriculture, and, two, protection from ordinances or unreasonable controls that would inhibit their ability to farm. A right to farm law does not protect those farmers who are using poor management practices that unduly impact their neighbors. The right to farm law also helps non-farm rural residents understand the expected agricultural activities in rural areas (Farmland Information Center, 1998).

Thurston County has enacted a right to farm ordinance that protects agricultural practices that existed prior to non-agricultural uses from nuisance complaints. The agricultural practices must not pose a risk to the public well-being which includes groundwater supplies. What a right to farm law does not do, however, is restrict the ability of an individual or the government to bring a lawsuit against a farmer (Thurston County Code, 1997).

Transfer of Development Rights (TDR)

The function of a TDR program is to remove development rights from land that is to be protected and place the development rights in areas suitable for development. A TDR program operates by landowners making development rights available within a defined sending area for developers or jurisdictions to purchase or hold. The developer can then use the purchased development rights to increase development density within a defined receiving area designated for future urban growth. To date, TDR programs for farmland preservation have yet to make a lot of progress in the United States, protecting far fewer acres than PDR programs (Lacy, 2006).

In 1995 Thurston County adopted a TDR ordinance for farmland preservation. Land zoned Long Term Agriculture serves as the sending area with land owners able to transfer one development right per five acres. Two residential zones serve as the receiving areas where the developer can increase the density from five to six units per acre in one area and from 15 to 16 units per acre in the other sending area (Pruetz, 1999).

To date, 35 development rights have been issued by property owners and 14 development rights have been purchased by developers; resulting in 70 acres protected by the TDR program (Thurston County Planning Commission, 2008b). The two major problems with the Thurston County TDR program are lack of a strong incentive for farmers to sell development rights and little to no demand for higher density development in the receiving areas (Bledsoe et al., 1998). Property owners in the sending areas of Thurston County have voiced their dissatisfaction

with the TDR program because it has failed to return the value to their lands that were lost when zoned to Long Term Agriculture (Thurston County Planning Commission, 2008a). For example a property owner whose land is zoned Long Term Agriculture; has incurred a reduction in the market value of their land through the lowering of the allowable development density. Currently the only way a property owner can recoup some of their lost property value is if their development rights are transferred to an urban developer which would result in a payment to the rural property owner.

King County began using a TDR program in the year 2000 to protect open space and has since protected 137,500 acres through development right transfers. However, less than 100 acres of development rights have been transferred from farmland, the majority is forest lands (M. Murphy, personal communication, April 15, 2009). The most successful farmland TDR program in the nation, Montgomery County, Maryland, has protected 51,489 acres (Farmland Information Center [FIC], 2008). Montgomery County provides an example of the type of farmland preservation success that is possible under a TDR program (Lacy, 2006).

Purchase of Development Rights (PDR)

A PDR program provides a mechanism for government or a non-profit entity to purchase development rights from an individual property owner. The property owner retains ownership over the land, but loses all rights to any future non-farm use. The funding for PDR programs, operated by a state or county, comes from public funds. Property or sales tax would be two examples, but

funding strategies can also be more complex and creative. The amount paid to a property owner for the development right is determined by subtracting the value of the land if sold for development from the value of the land if sold for agricultural purposes. As opposed to TDR programs, PDR programs do not generally have specific sending areas to purchase rights but usually are applied within an entire county or state (Lacy, 2006). Over the course of the last 40 years 57 local PDR programs have been established in 18 states with the purpose protecting farmland. These programs have spent upwards of \$1 billion dollars to acquire the development rights to farmland (FIC, 2008). The implementation of a PDR program should be geared towards the needs and circumstances of the local community. A PDR program should also reflect the goals of elected officials, planners, and community members (AFT, 2006a).

Five counties in Washington, including King, San Juan, Skagit, Thurston (program not currently active), and Whatcom have purchased farmland development rights. King County has protected the most acres in Washington State with 13,265 acres, followed by Skagit County with 6,078 acres, San Juan County with 1,156 acres, Thurston County with 942 acres, and Whatcom County with 571 acres (FIC, 2008).

The advantages of a PDR program as a farmland preservation strategy can be summed up in three words: efficient, equitable, and permanent (Brabec & Smith, 2002). PDR programs are efficient because funds are targeted for the highest quality farms under the greatest threat of development. Farms are chosen based on predetermined selection criteria that can include a broad array of criteria

depending on the goals of the PDR program (USDA, 2001; Duke & Lynch, 2006). The equitable nature of PDR programs comes from the voluntary nature of participation by the farmer. This avoids issues with devaluing property as seen in zoning, thus avoiding any uncompensated infringement on property rights (USDA, 2001; Halich, 1999). A study conducted in 2008 of 15 metropolitan counties found that farmers favor PDR programs over zoning 64 percent to 37 percent (Esseks et al., 2008). PDR programs also keep farmland affordable. By removing the development value of a property it can be sold and purchased for just the agricultural value (Halich, 1999). With the exception of TDR programs, PDR programs are unique in their ability to protect farmland permanently (USDA, 2001).

The one consistently cited disadvantage of PDR programs is the cost (Brabec & Smith, 2002; Halich, 1999; USDA, 2001). The average cost per acre of farmland preserved in 2003 was approximately \$2,000 (Adelaja et al., 2007). If Thurston County had a goal of preserving 20,000 acres using PDR it would cost approximately \$40 million.

Another disadvantage to PDR is the voluntary nature of the program which means targeted farms may not take part. On the flip side there may be too great a demand to participate in the PDR program that outpaces the supply of funds for purchase (Halich, 1999).

Summary of Preservation Strategies

It is important to keep in mind the existing protection status of farmland and the implied allocation of property rights when planning for future farmland

preservation, particularly for the implementation of a new PDR program. If the implementation of the new program is not done correctly, stakeholder dissatisfaction could ensue thus endangering the success of the program. All preservation policies should be coordinated to eliminate inefficiencies in farmland preservation (Duke & Lynch, 2006). Because all of the farmland in Thurston County is not zoned Long Term Agriculture it could be difficult to implement a PDR program and purchase land not currently in Long Term Agriculture. It would be creating a situation where development rights were taken from some property owners and purchased from others. The maintenance of Thurston Counties TDR program could mitigate the situation and provide farmers in Long Term Agriculture with two avenues for recouping some of their lost property value.

No single preservation strategy can satisfy all the goals of farmland preservation; for farmland preservation to be fully realized the right combination of preservation tools and both governmental and non-governmental participation must be combined (Lacy, 2006). A good example of using multiple preservation tools comes from Montgomery and Calvert Counties in Maryland. Montgomery County has been extremely successful with farmland preservation through the use of TDR, having protected approximately 50,000 acres, which represents over half of all the acres protected nationally. Even with the substantial farmland protection that had been accomplished, Montgomery County realized the TDR program was not meeting all of their goals. The county has since added a PDR program to focus on parcels bordering urban areas. Calvert County created a

PDR program much like Montgomery County after also realizing its TDR program was not meeting all of its goals; Calvert County's PDR program is also geared towards farmland near urban areas (Lynch & Musser, 2001).

Chapter 4: Thurston County Agriculture: Strengths, Weaknesses, Opportunities, and Threats

This chapter is devoted to the strengths, weaknesses, opportunities, and threats to agriculture in Thurston County. Generally, the attributes discussed pertain to agriculture within a metropolitan area. That being said, some of the information presented represents national or regional trends that pertain to metropolitan agriculture as a whole; individual farms may not always conform to these trends. (Clark et al., 2007). Every effort will be made to include attributes and trends specific to Western Washington and Thurston County as they are available.

Strengths

One of the strengths of farmland protection is the low cost to tax payers when compared with low density development (USDA, 2001). A cost of community services (COCS) study provides a means of comparing costs and revenues based on current land use patterns. A review of more than 60 COCS studies showed that property taxes are insufficient to pay for the costs of residential development. Keeping farm and forest land productive results in low demands for services and lower costs to tax payers; at the same time farming and forestry provide economic and environmental benefits (AFT, 1999).

A COCS study conducted in nearby Skagit County revealed that residential development produced \$131.5 million in revenues but at the same time required over \$160 million in expenditures, with a net loss to Skagit County of \$31.2 million. Farms, forests, and open space on the other hand required \$9.6 million but produced \$19 million in revenues, a net gain of \$9.3 million. For

every dollar of revenue the county receives from residential development, it costs the county \$1.25. For every dollar of agricultural revenue it costs the county only \$0.51. The low cost of services to farmland makes it in the public's interest to protect farmland rather than convert it to low density development (AFT, 1999).

Farmland in metropolitan or even metro-adjacent counties is an important component of both the state and national farm economy. Nationally in 2002 metropolitan and metropolitan adjacent counties possessed only 38 percent of the U.S. farmland, but generated 55 percent of the total farm sales. (Jackson-Smith et al., 2008). Data from 1992 indicate farmland in the metropolitan counties of western Washington have an even bigger impact than metropolitan counties nationally. In 1992 Western Washington accounted for only 5 percent of the state's farmland but generated 23 percent of the states total agricultural earnings (Klein & Reganold, 2002).

Generally it has been understood that farmer participation in new urban oriented markets has remained relatively low. Urban oriented markets include marketing products as local, natural, organic, family raised, selling direct to consumers, selling direct to institutions, or value added processing. However, a recent case study of eight metropolitan counties found that a majority of farmers use at least one urban oriented marketing strategy (Clark et al., 2007). This finding fits well with western Washington which has a longstanding tradition of urban oriented marketing strategies such as farmers markets, farmland preservation groups, community supported agriculture, and food cooperatives (Selfa, Jussaume, & Winter, 2008).

There are a number of locational strengths that will benefit farmers in Thurston County but may not benefit farmers in more rural counties. These include a larger consumer base, a more efficient transportation system, shorter distance to markets including three farmers markets in Thurston County, direct marketing opportunities, the availability of off-farm employment (Klein & Reganold, 1997), and a larger number of seasonal or part-time workers (USDA, 2001). Another strength of the proximity to consumers is vegetable production (Lopez, Adelaja, & Andrews, 1998); in Thurston County during almost the last 40 years the number of farms producing vegetables have increased from eight in 1969 to a high of 64 in 2007. Though at the same time the number of acres devoted to vegetables has decreased from 939 acres to 390 acres over the same time span (*Census of Agriculture, 1930 – 2007*). This maybe a sign of farmers switching to higher value products in the face of rising land prices and urban oriented marketing (USDA, 2001).

Weaknesses

As low density development occurs outside urban areas, it is common for hobby or lifestyle farms to develop. These can be characterized as small in size with little to no profits (Jackson-Smith, 2008). As economic enterprises hobby farms are not generally viable, and when they are no longer fun or rewarding for the property owner, development may soon follow (USDA, 2001).

As the urban population of a metropolitan county works to protect farmland through various regulatory mechanisms, a knowledge gap may exist between those entities offering assistance and the farmers receiving the assistance.

Farmers also generally feel that most farmland preservation policies will have negative impacts on their way of life (Jackson-Smith, 2008).

In Thurston County one of the big agricultural weaknesses is that thousands of acres of farmland are not currently within the zoning designation of Long Term Agriculture or participating in the current use valuation program. Both of these indicate that there is a significant amount of farmland at risk of conversion to other uses (SSCFLT, 2009).

Opportunities

The opportunities section for agriculture in Thurston County is focused towards farmland preservation. Overall, land preservation which includes farmland preservation receives extensive public support, although individuals have different opinions about why land should be preserved (Kline & Wichelns, 1998).

In Washington State those farmers using sustainable agricultural practices are more likely to support policies to protect local family farms and government restrictions on non-agricultural development (Selfa, Jussaume, & Winter, 2008). A recent Washington State study found that both farmers and consumers want to protect agricultural land; this finding transcended demographic, production, and purchasing differences for both farmers and consumers (Selfa, Jussaume, & Winter, 2008). The combination of citizen support and the current down turn in new home construction makes the climate for farmland preservation in Thurston County quite favorable (USDA, 2001).

Threats

The major threat to agriculture in a metropolitan area such as Thurston County is conversion to low density development. Farming in a metropolitan area places farmers under development pressure from individuals and families migrating from both cities and rural areas (USDA, 2001). As farmers compete with middle-class residents for land, prices increase. Conflicts with non-farm neighbors become more common, and farmers may be subject to increased regulation and enforcement of agricultural practices (Clark et al., 2007).

While farmers may begin to benefit from an increase in direct sales to metropolitan citizens, they will also be subjected to increasing labor and time demands. Farmers will also have to compete with large scale non-local organics, particularly those from California that may force them to lower their prices, thus reducing profits (Jarosz, 2008). Generally, livestock is the farm commodity most negatively affected by suburbanization (Lopez, Adelaja, & Andrews, 1988), and while vegetable production expands under suburbanization, it is also usually the last agricultural commodity to be farmed before land is converted to non-farm uses (USDA, 2001).

Thurston County is on the low end of urbanization pressure as compared to Southern California or the Northeast U.S., but farm policies implemented sooner rather than later will be more effective as urbanization can reach such a level that farm policies begin to be less effective (Larson, Findeis, & Smith, 2001). For example, areas of contiguous farmland in Thurston County could become permanently fragmented by development if not protected. Projected

levels of population growth in Thurston County over the next 20 years will affect the success of farmland preservation efforts.

Chapter 5: Criteria for Farmland Preservation

Numerous criteria exist for selecting farmland for preservation. Each criterion should reflect a specific desired trait about farmland that is to be protected. Over the last 30 years the criteria used to select farmland has tended to favor agricultural criteria; soil quality has been a primary measure. Evidence from the Northeastern U.S. and Great Lakes regions suggest that the public wants more from their PDR programs than the protection of soil quality. There is a desire to protect locally grown food, the farming culture, and water quality among other non-agricultural criteria (Duke & Aull-Hyde, 2002; Adelaja et al., 2007). The potential exists that by incorporating more non-agricultural criteria and shifting away from agricultural criteria a PDR program could select farms for preservation that would have been overlooked in a more traditional program (Kline & Wichelns, 1996).

Agricultural Criteria

Soil Quality

The most common criterion for selecting farmland for preservation is soil quality; built into soil quality is the slope of the land, drainage, and productivity or how farmable the soil is (AFT, 2006a). High quality soils are a finite resource, and as they are lost to non-farm uses, marginal land is more likely to be brought into production. This would mean farming on less productive, poorly drained, and/or steep sloped soils (Lacy, 2006). Soil quality is also a common selection criterion because the information is freely available and based on science, which yields a relatively objective means of classifying farmland (USDA, 2002).

At the same time, soil quality may not deserve such a high status in ranking criteria. With advances in farm technologies and the variety of types of agriculture that can function on moderate soils it begs the question, are soils the most important criteria? By making soil quality the highest priority successful farmers on moderate quality soils are being overlooked (AFT, 2006a).

One of the components of the SSCFLT farmland inventory was the grouping of soils in Thurston County into three classes, Tiers One, Two, and Three. Tier One soils comprise all prime soils with a land capability classification of one to three. Tier Two soils are all soils that are prime if irrigated, drained, or protected from flooding with a land capability classification of three to five. Tier Three soils are poor quality soils for agriculture with land capability classifications greater than five; these soils are generally steep, rocky, and/or very poorly drained.

The classes defined within the SSCFLT inventory can be standardized to the zero to one scale (Malczewski, 1999). To standardize the soil quality for each contiguous ownership the acreage of the Tier One soils were multiplied by 1.00, the acreage of the Tier Two soils were multiplied by 0.50, and the acreage of the Tier Three soils were multiplied by 0.00. The products for each soil type within a contiguous ownership were then added together and divided by the total contiguous ownership acreage. A contiguous ownership with a value of 1 would be 100 percent Tier One soil, and vice versa for a contiguous ownership with a value of 0.00 that would be 100 percent Tier Three soil. The majority of the

highest ranked farmland for soil quality occurs in southwestern Thurston County (Figure 3).

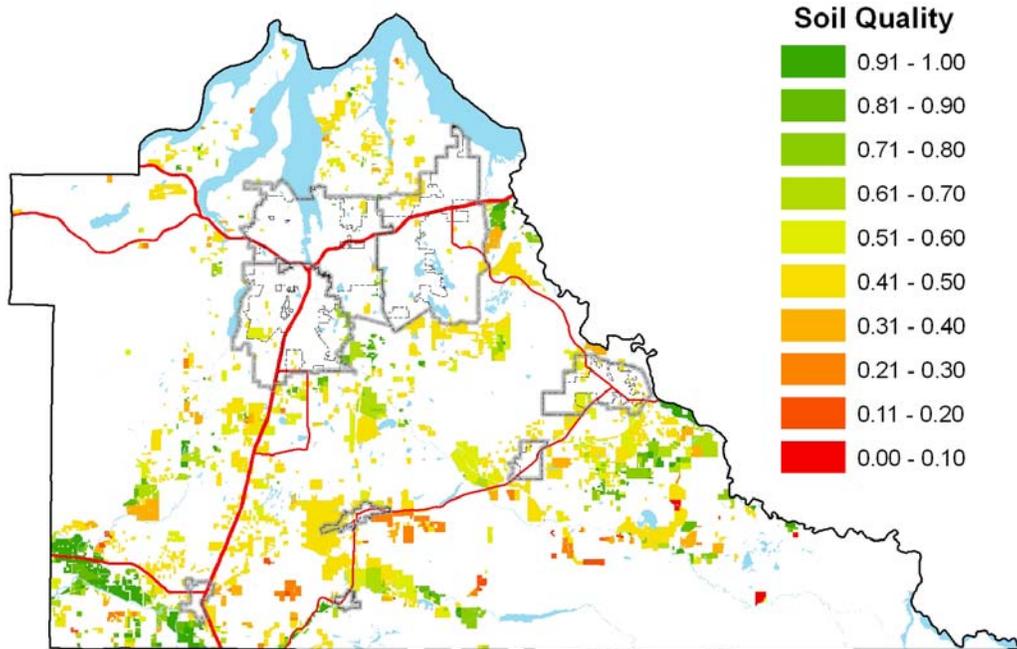


Figure 3. Map of Thurston County soil quality grouped into contiguous ownerships. An example of contiguous ownerships is provided in Figure 4.

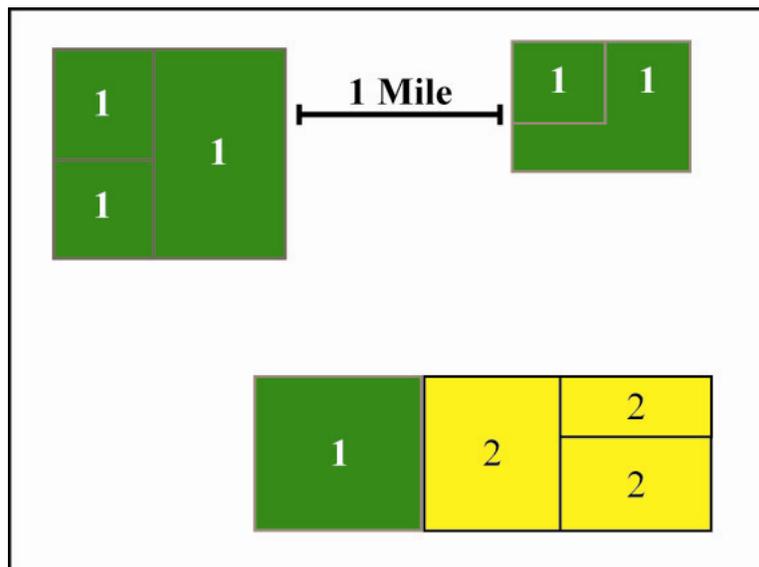


Figure 4. In the example of contiguous ownerships shown above farmer #1 would have three separate contiguous ownerships that would be evaluated separately from each other. Farmer #2 has one contiguous ownership and all parcels will be evaluated as one ownership.

Agricultural Areas

After soil quality the next most common criterion is farmland preservation contiguity (Figure 5); prioritizing farmland for preservation that is adjacent or

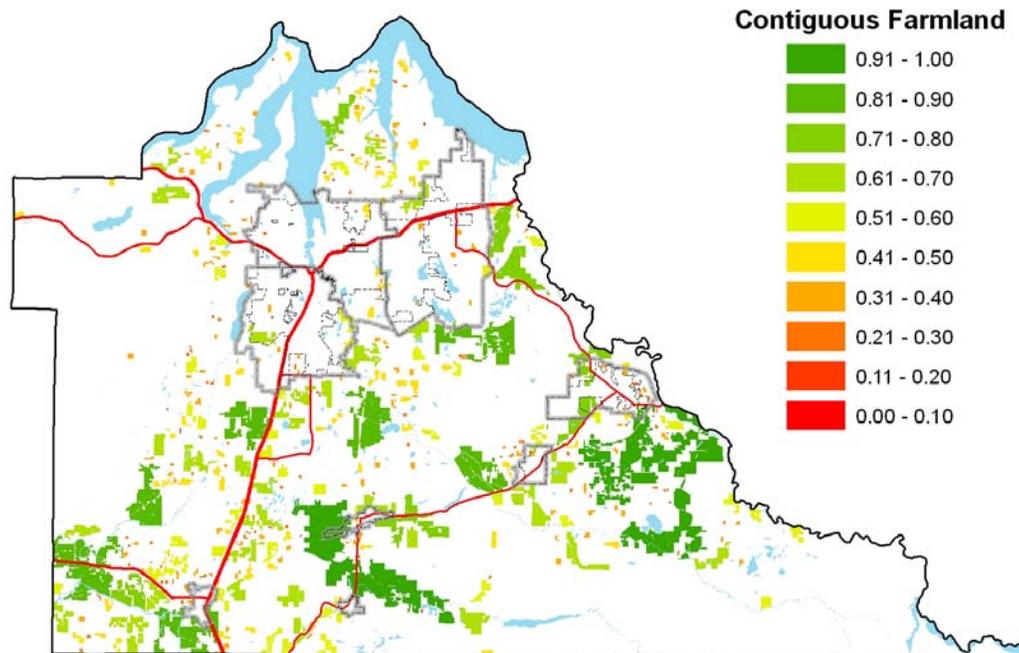


Figure 5. Map of contiguous farmland areas in Thurston County.

close to previously preserved farmland or natural areas. This is commonly referred to as protecting a critical mass of farmland that is better insulated from the effects of non-farm development (AFT, 2006a). A recent study that looked at 15 metropolitan counties in the U.S. found a majority of the parcels protected through PDR programs had a neighboring preserved farm (Esseks et al., 2008). In addition to protecting farmland adjacent to already protected farmland is the desire to protect contiguous farmland areas (AFT, 2006a).

Contiguous farmland in Thurston County was identified by buffering the parcels within the farmland inventory by a distance of 75 feet to eliminate gaps between parcels due to roads (Tulloch et al., 2003). Close to 400 separate

agricultural areas were created using the buffer feature ranging in size from 9,393 acres to just over 2 acres. There are 11 contiguous farmland areas in Thurston County greater than 1,000 acres in size.

Given the skewed distribution of the size of agricultural areas with only a handful of the total areas being greater than 1,000 acres a straight linear transformation to the zero to one scale would be inappropriate. For that reason a value curve was used to standardize the agricultural areas. Using the midvalue method first, the maximum and minimum agricultural areas were assigned the values of 1.0 and 0.0. The midvalue point between the maximum and minimum received a value of 0.5. Then the midvalue was established between 1.0 and 0.5 (0.75), and 0.0 and 0.5 (0.25). The setting of midvalues continued until the data had been divided into sixteenths. Using Microsoft Excel a logarithmic curve was determined from a scatter plot of the values with the values zero to one on the y-axis and the acreage of the agricultural areas on the x-axis. This equation was applied to all of the agricultural areas, but the resulting data did not perfectly fit the zero to one scale as was hoped. Therefore, a linear transformation was used by dividing all the derived values by the maximum value of 1.23 to shift the data to a zero to one scale (Malczewski, 1999).

Quality of Agricultural Operation

Another useful criterion to include in farmland preservation is the quality of the agricultural operation itself. Does the farm possess a soil or water conservation plan? How long has the farm been in the family, and will it be so in the future? What is the diversity of products produced by the farm? What

investments have been made in capital improvements? What is the condition of the farm? Last, what amount of the family income comes from the farm? The answers to these questions, while more qualitative in nature than other criteria, are important to define continuing viability of the agricultural operation (AFT, 2006a).

Three criteria can be used to help determine the quality of the agricultural operation. The first criterion is to identify those farms enrolled in the current use valuation program for agriculture (Figure 6). To be admitted to the

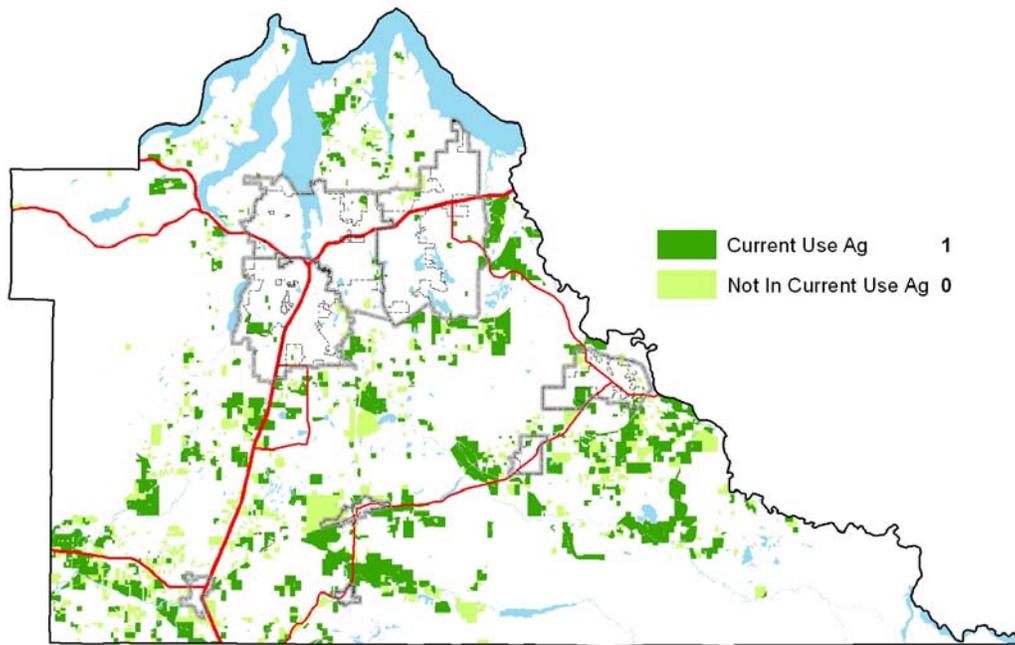


Figure 6. Map of farmland ownerships with a portion or all of their land enrolled in the current use valuation program.

Thurston County current use program an applicant must show proof of farming activity and proof of farm income for three of the previous five years. Using this criterion helps to highlight those farms actively involved in agriculture, and it encourages those farmers who wish to take part in the PDR program to join the current use agriculture program. The only drawback is that farmers intent on

selling their land are potentially less likely to be enrolled in the current use program.

A second agricultural quality criterion comes from the farmland inventory conducted by SSCFLT that collected information on farms with which the Thurston Conservation District has worked. While the data do not indicate the exact services provided to the landowner the conservation district primarily provides assistance with land and water conservation measures to reduce the impact of agricultural operations. Identifying those farmers who have worked with the Conservation District provides a source to identify the quality of agricultural operations (Figure 7).

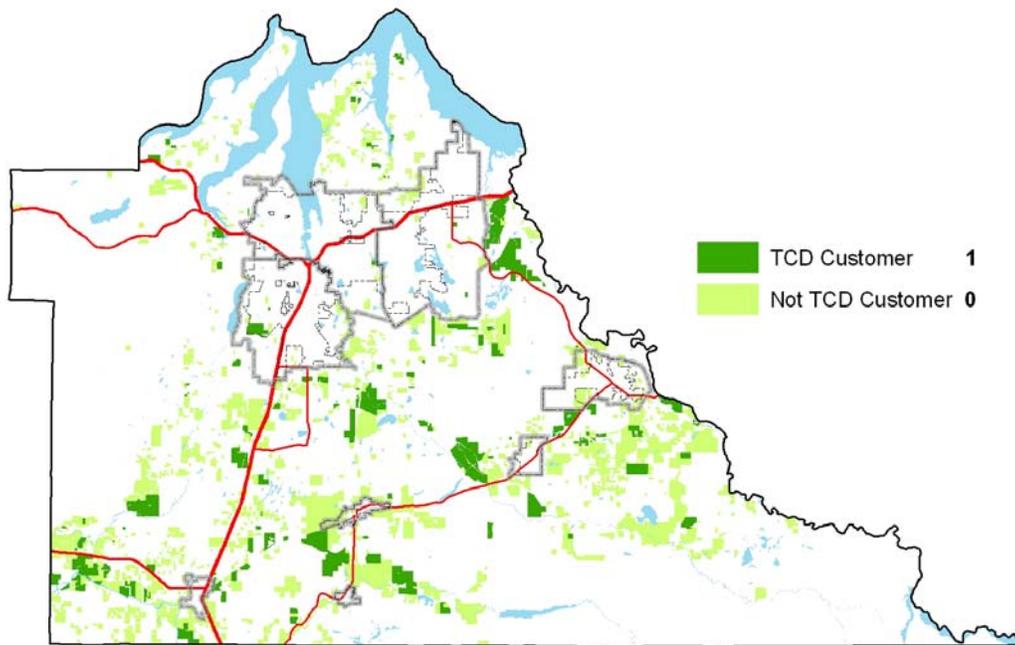


Figure 7. Map of ownerships where the Thurston Conservation District has provided services.

The final criterion for defining the quality of an agricultural operation is organic certification (Figure 8). Only a handful of farms in Thurston County have

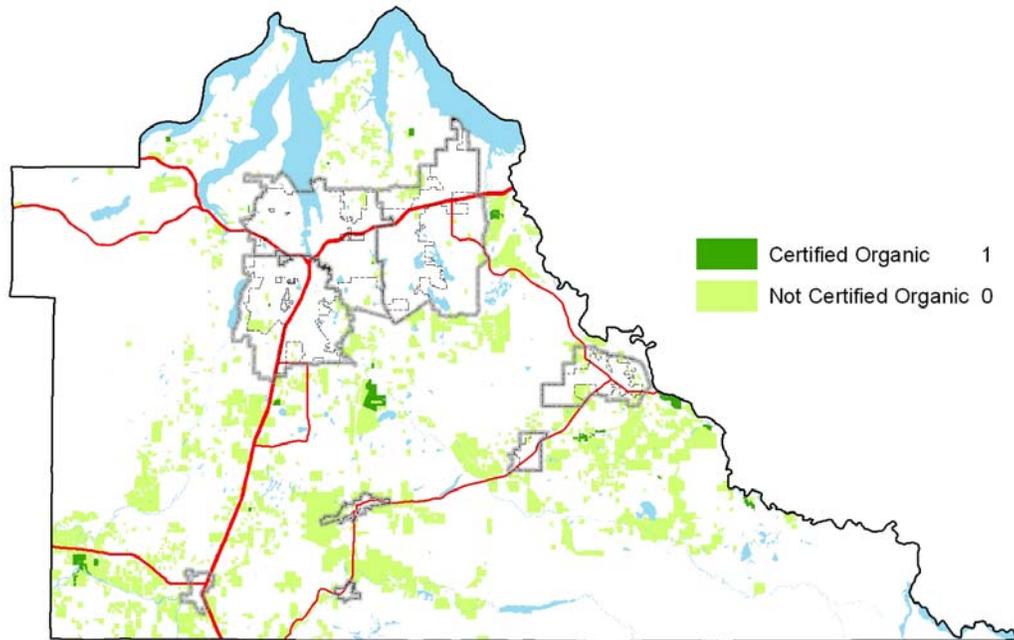


Figure 8. Farmland ownerships that have been certified organic.

been certified organic, but their certification indicates a commitment to long-term farming and environmentally friendly farming practices. Nationally, sales of certified organic products have increased 20 – 25 percent every year since 1990, but at the same time farmers incur significant costs in converting to organic agriculture (Lotter, 2003). By placing an organic certification criterion in the PDR selection criteria, Thurston County would be rewarding those farmers who have committed to organic agriculture.

Each of the agricultural operation quality criteria defined above represent deterministic variables. All three of the criteria are binary yes or no variables; each contiguous ownership receives a one or zero (Malczewski, 1999). Not a lot of middle ground exists for any of the three criteria; for example, a farmer has enrolled in the current use valuation program or he/she has not.

Agricultural Zoning

PDR programs can also prioritize farms for preservation that are within a defined agricultural district or zoning. There are two reasons for a county to do this. The first is to capitalize upon local government, such as a municipality, that has zoned land for agriculture. It is common in some states for municipalities to create the zoning as opposed to counties, but counties are usually better equipped to operate a PDR program. The second reason is to focus the PDR program on defined existing agricultural areas (AFT, 2006a). Neither of these reasons really applies to protecting farmland in Thurston County. First, the municipalities within Thurston County do not zone land for agriculture; the county is in charge of zoning land for agriculture within the unincorporated portions of the county. This concept applies more to areas with a strong home rule system of government where local municipalities have the power to zone land as opposed to the counties; Pennsylvania is an example of a state where this would apply. Within counties in Pennsylvania there is no unincorporated land, everything is within a municipality. The other reason why focusing on already defined agricultural areas does not work for Thurston County is that Long Term Agriculture zoning protects less than a fifth of the recently inventoried farmland in the county (Figure 9) (SSCFLT, 2009).

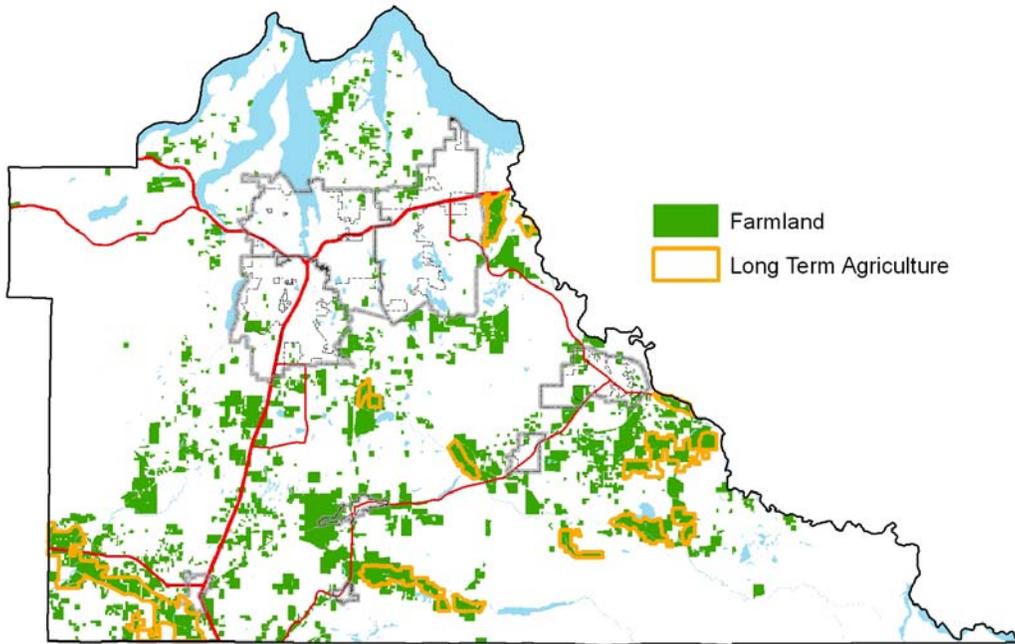


Figure 9. Map of farmland zoned Long Term Agriculture in Thurston County.

Non-Agricultural Criteria

Development Potential

PDR programs that use development potential, or threat, as a selection criterion rank farmland based on how developable the land is. By using development potential as a criterion, farmland under the greatest threat from development can be targeted for preservation ahead of less developable parcels (AFT, 2006a). In Thurston County the easiest way to determine the development potential of farmland is to look at its zoning (Figure 10). The zoning of farmland

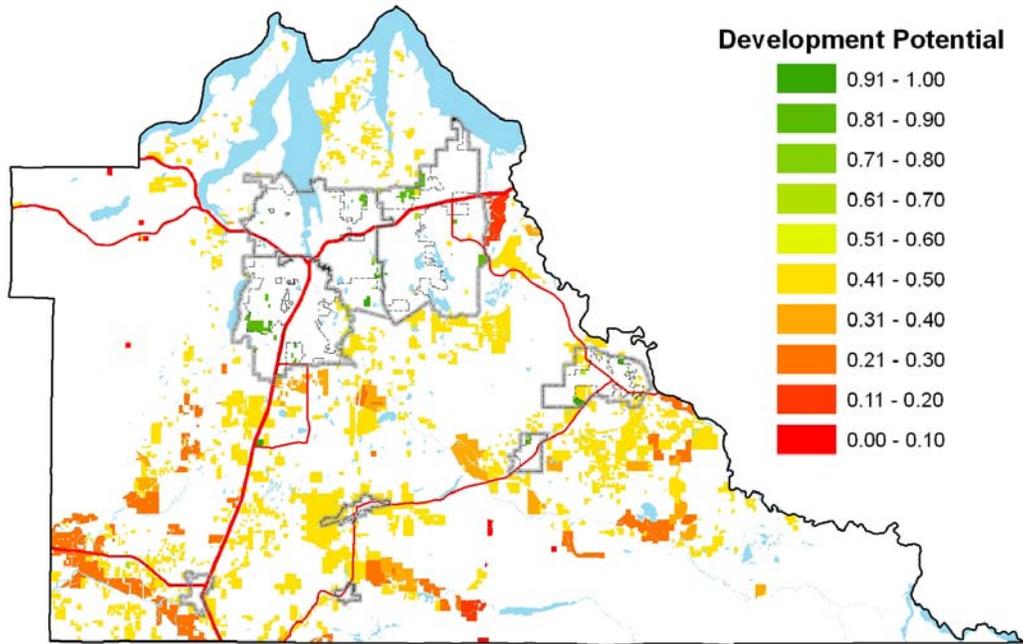


Figure 10. Development potential of farmland ownerships in Thurston County.

in Thurston County falls into 44 different zoning designations, ranging from Long Term Agriculture and rural 1/20 to urban reserve 1/5 and residential zones with high housing densities (Table 1.)

| | | |
|--|--|---|
| Lake | Low Density Residential | Master Planned Community |
| Long Term Forestry | Planned Industrial Park | Moderate Density Residential |
| Nisqually Agriculture | Professional Office/Residential | Central Business District |
| Long Term Agriculture | Rural Commercial | Heavy Commercial |
| Rural 1/20 | Residential LAMIRD 2/1 | Light Industrial |
| Rural 1/10 | Medium Density Residential 4/1 | Commercial |
| Agriculture | Single Family Residential 4/1 | Highway Commercial |
| Open Space | Low Density Residential 0-4 | Large Lot Commercial |
| Urban Reserve 1/5 | Residential Sensitive Resource 2-4 | Rural Resource Industrial |
| McAllister Geologically Sensitive Area | Low Density Residential 3-6 | Mixed Residential 7-13 |
| Rural Residential 1/5 | Residential | Multifamily Medium Density Residential 9-15 |
| Rural Residential Resource 1/5 | Single Family Low Density Residential 4-7 | Arterial Commercial |
| Residential LAMIRD ½ | Residential 4-8 | Mixed Residential 10-18 |
| Open Space Institutional | Single Family Medium Density Residential 6-9 | Residential Multifamily 18 |
| Residential LAMIRD 1/1 | Medium Density Residential 6-9 | |

Table 1. Zoning designations of farmland in Thurston County.

Zoning for all parcels within the farmland inventory were identified, and the 44 different zoning designations were assigned values by dividing the number of units allowed per acre. For example zoning of urban reserve one unit per five acres received a value of 5. For zoning designations with a range of allowable development densities, the maximum value was used to derive the value. The midvalue method used for soil quality was again used to derive a logarithmic value curve to standardize all of the zoning designations to a zero to one scale (Malczewski, 1999). The value curve generated values from -0.16 to 0.79. Because of the poor fit to the zero to one scale all scores were increased by placing the high score of 0.79 at 1 and increasing all other scores accordingly.

Multi-parcel ownerships are commonly made up of differently zoned parcels. To aggregate the development potential for the entire contiguous ownership the acreage of each parcel was multiplied by the development potential value, summed for each contiguous ownership, and divided by the total acreage of the contiguous ownership as shown in Figure 10.

Ownership Size

Another common non-agricultural PDR criterion is the size of the parcel. Most programs focus on parcels over a certain size to maximize farmland preservation (AFT, 2006a). Since most farmers own multiple parcels making up larger ownerships, the level of analysis for this research is not the parcel, but rather the size of contiguous parcels under the same ownership.

Contiguous ownerships range from just over an acre to over 1,000 acres with an average size of approximately 42 acres. Only 16 of the almost 1,600

ownerships identified were larger than 500 acres. For that reason ownership size was standardized to the scale of 0 to 1 using the midvalue method defined in soil quality (Figure 11) (Malczewski, 1999). As was the case with the other criteria standardized using the midvalue method, the resulting logarithmic equation and values for ownership size did not conform to the zero to one scale. Like soil quality a linear transformation of the resulting values was used by dividing all values by the maximum value of 1.277.

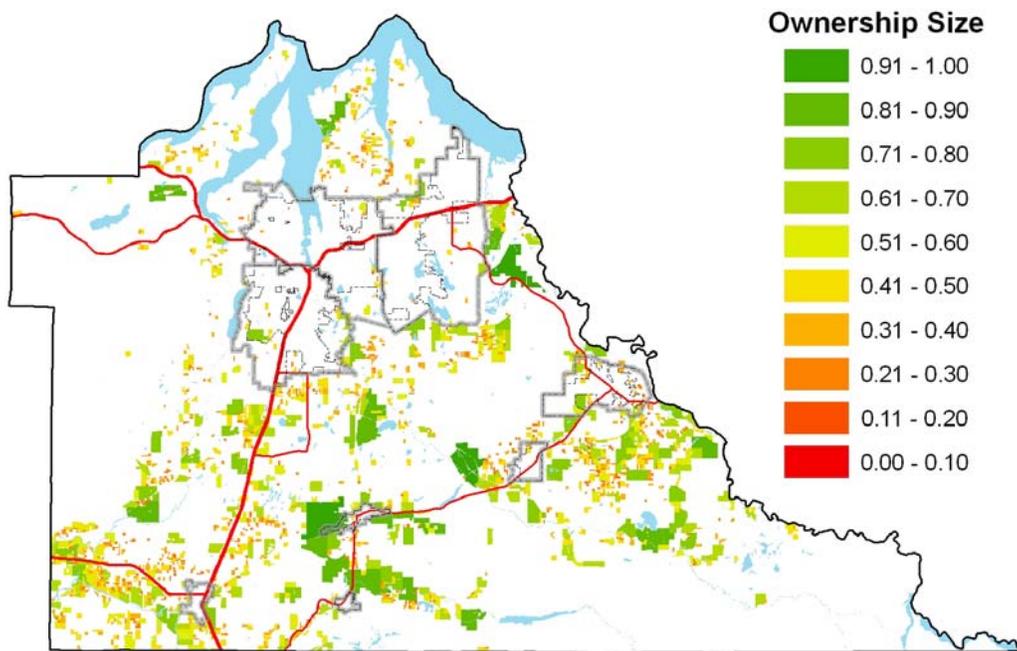


Figure 11. Farmland ownership size in Thurston County.

Cost

The acquisition of development rights is expensive, so it is no surprise that it plays a role in most PDR selection criteria. In some PDR programs the selection of farmland for preservation is based solely on the cost of the development rights. The price of each acquisition can determine its rank, but it is also important to ascertain if the owner is donating any of the value or if matching funds are being provided by another entity (AFT, 2006a). There are significant

tax advantages for property owners to donate some or all of the easement value, not only for federal income taxes but also for their heirs when dealing with estate taxes (Small, 2000).

The cost of development rights for a particular property is usually defined through an appraisal after the farmland has already been targeted for preservation. Therefore, it is difficult to gauge the cost of the development rights for each individually owned piece of farmland in Thurston County. This criterion will not be included in the multi-criteria analysis.

Natural Resource Value

When a county decides to preserve farmland through PDR, an opportunity exists to protect not just the farmland but the associated habitat, wetlands, watersheds, and scenic views that each prospective piece of farmland might possess (AFT, 2006a). The Washington Department of Fish and Wildlife provided the SSCFLT with a Local Habitat Assessment (LHA) for Thurston County. The LHA is a GIS raster or surface model that combines an ecoregional assessment, road density, and land conversion data to determine the value of wildlife habitat on a range of 0 to 10 for the entire county. The LHA values for the farmland in the SSCFLT inventory range from two to almost nine. To standardize the LHA values to the zero to one scale a linear transformation was used by dividing each contiguous ownership by the maximum LHA value for farmland (Figure 12) (Malczewski, 1999).

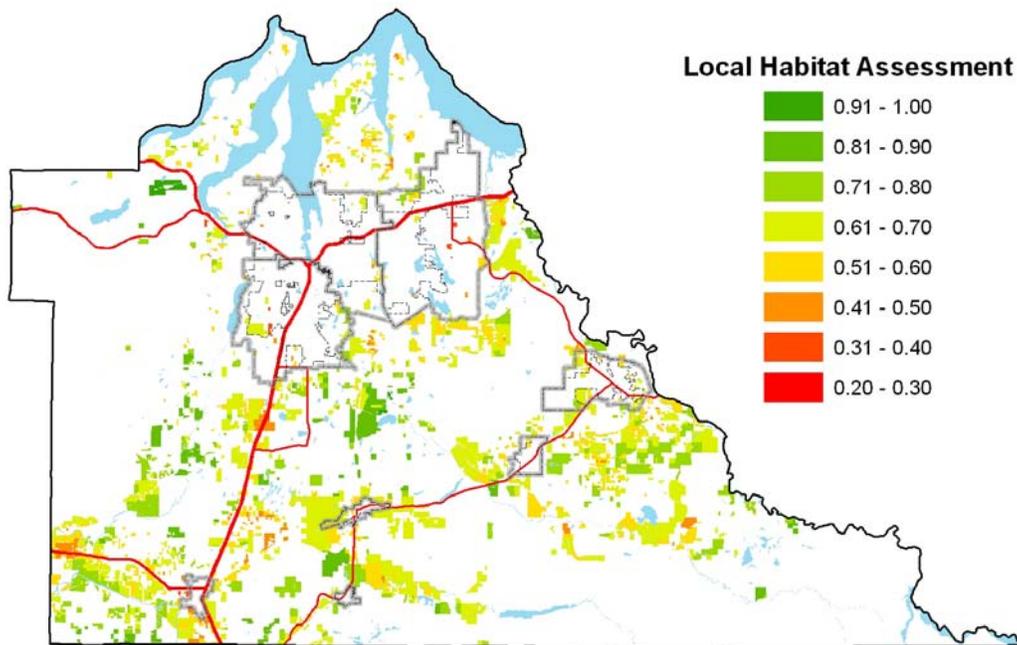


Figure 12. LHA of Thurston County farmland.

Critical Aquifer Recharge Areas

Critical aquifer recharge areas (CARA) are one of the critical areas identified in the Washington State Growth Management Act of 1990 that Thurston County is required to protect. Farmland that is located within the highest rated aquifer recharge areas must comply with best management practices for agriculture (Thurston County Planning Commission, 2006). Purchasing development rights on farmland within the most critical aquifer recharge areas could help protect groundwater resources given the existence of best management practices (Figure 13).

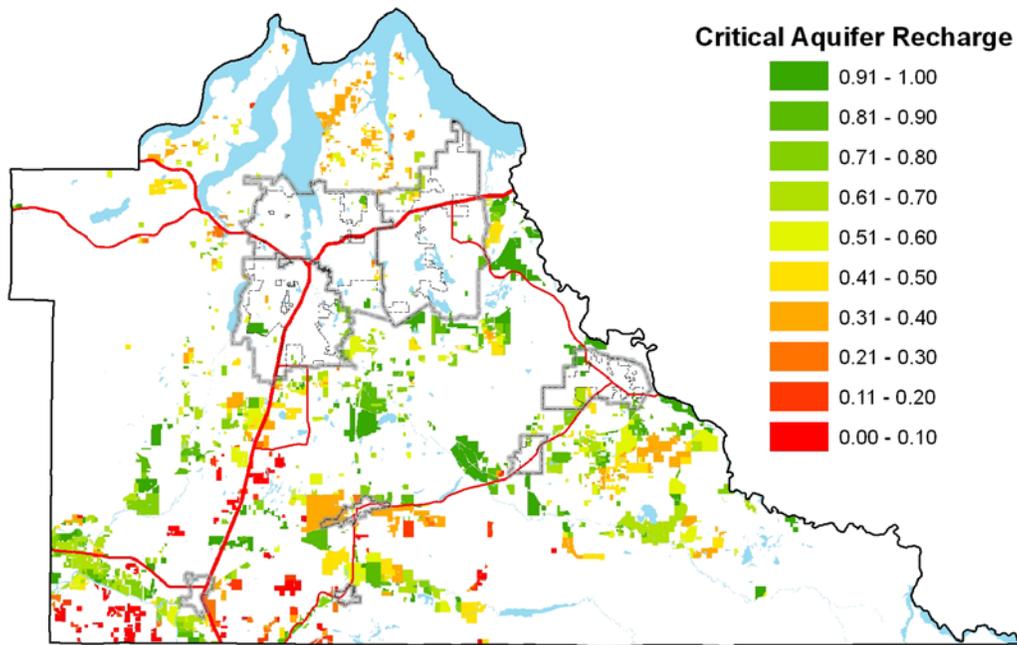


Figure 13. Thurston County farmland critical aquifer recharge values.

Standardizing the aquifer recharge for each contiguous ownership to the zero to one scale involved first calculating the acreage of four possible levels of aquifer recharge for each ownership. The levels of aquifer recharge are low, moderate, high, and extreme. The acreage of the extreme areas was multiplied by 1, the acreage of high areas was multiplied by 0.75, the acreage of moderate areas was multiplied by 0.5, and the acreage of low areas was multiplied by 0.25. The products for the existing levels of aquifer recharge within each contiguous ownership were then added together and divided by the total contiguous ownership acreage. This standardization is the same used to define soil quality (Malczewski, 1999).

Proximity to Urban Areas

This criterion is a measure of an ownership's proximity to existing or planned urban areas or the proximity to public water or sewer. If used in the selection criteria of a PDR program, it either drives the selection of farmland

towards or away from development. Some PDR programs view proximity to development as a negative, while other programs view it as a positive. Generally, farmland farther from development will be more affordable while farmland closer to development will be more expensive. The argument for protecting land adjacent to urban areas is that it provides a buffer against development (AFT, 2006a). While this type of preservation may help control urban expansion, it is not likely to contribute significantly to the total number of acres preserved (Lynch & Lovell, 2003). However, this may not be true for Thurston County since by not protecting farmland near urban areas a significant number of acres may actually be lost to non-agricultural uses (Figure 14).

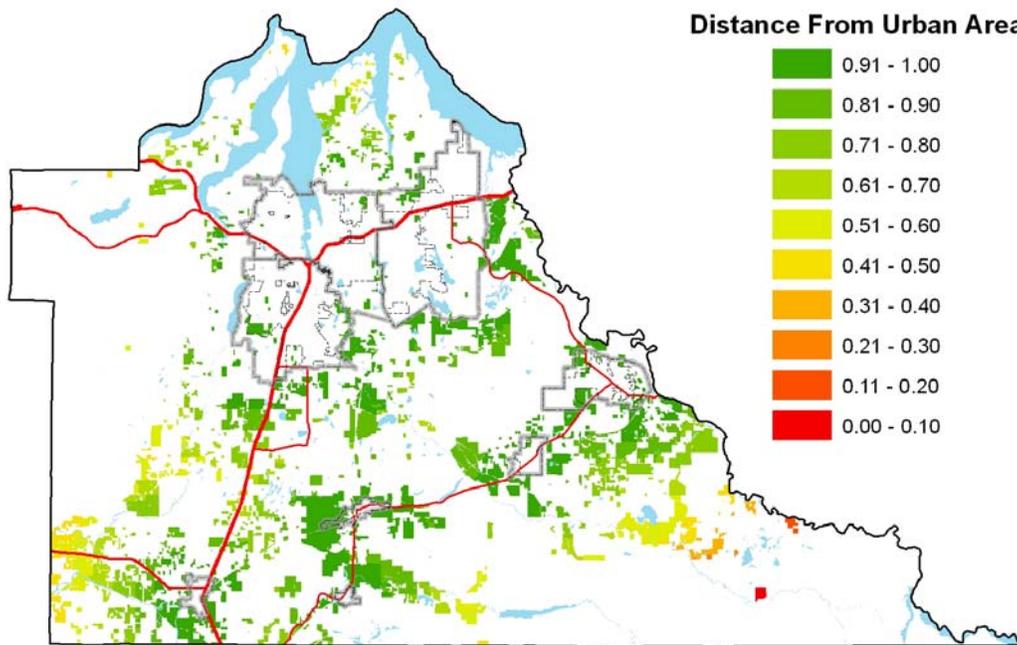


Figure 14. Distance of farmland in Thurston County from urban areas.

The distribution of farmland distances from urban areas is from approximately 0 to 10 miles. Therefore a linear transformation was used to standardize the distances from urban areas to the zero to one scale (Malczewski, 1999). This was accomplished by dividing the distance of each contiguous

ownership by the maximum distance. In this analysis farmland in close proximity to urban areas is looked at as a positive, so all of the resulting scores were inverted on the zero to one scale.

In Figure 14 nearly all of the farmland within one mile of the urban areas has a value of 0.91 – 1.00 and is colored dark green. A total of approximately 26,280 acres or about 40 percent of the inventoried farmland in Thurston County is within one mile of the urban areas.

Direct Marketing / Value Added Processing

If you were to ask someone to name a farm in Thurston County chances are they would name a farm that is directly marketing their products to consumers. This would be in the form of a farm stand on their property, a stand at one of the local farmers markets, a u-pick operation where consumers pick their own fruits or vegetables, or through a farm share in a community supported agriculture (CSA) program. These iconic farms of local production are potentially creating a strong local connection to agriculture that might not otherwise be present in the largely urban citizenry of Thurston County. By selecting for farms that market directly to consumers (Figure 15) we can reward those farmers who are actively working to make local agriculture a reality.

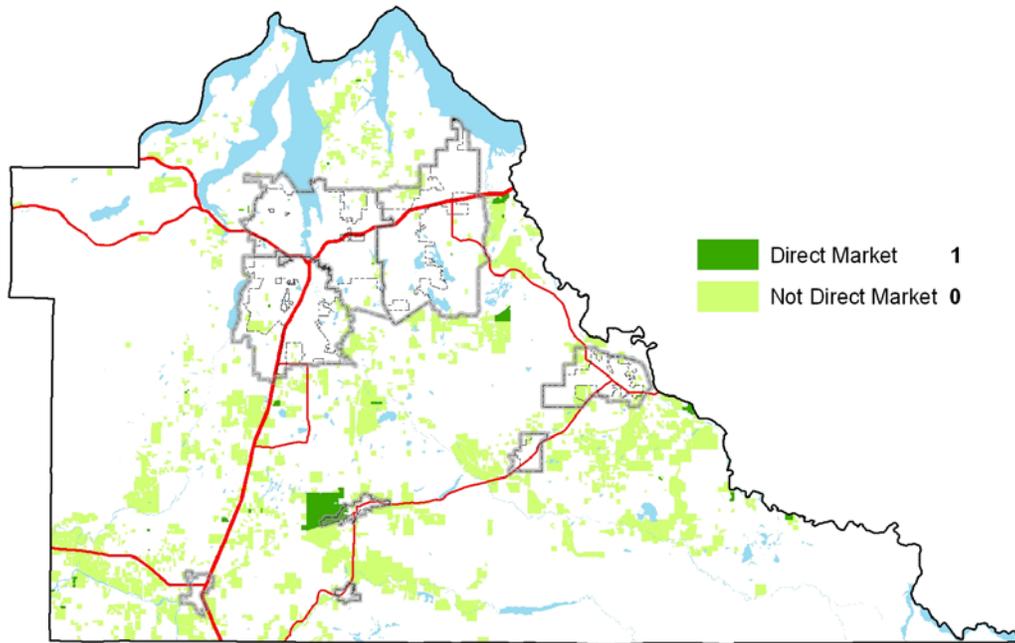


Figure 15. Farms in Thurston County that market products directly to consumers.

PDR Criteria From Around Puget Sound

Four counties in Washington have active PDR programs. King County formed one of the earliest PDR programs in the U.S. in 1979. 95 percent of the 13,000 acres of development rights acquired by King County were completed by 1985. Development rights have been acquired only sporadically since then. A quantitative process for selecting farms for the PDR program does not exist. Instead, the county gives priority to development rights for farmland that can be acquired below the appraised value. These lands must also be in active agriculture, under threat from development, and within contiguous agricultural areas (AFT, 2003).

The Skagit County PDR program has only been around since 1997, but has protected 2,500 acres through 39 transactions. A ranking system is used to award points based on the quality of the farmland, development threat, aesthetic and environmental values. Skagit County does not use an appraisal process to

determine development right values, but instead uses a separate ranking system based on comparable farmland values to establish prices. To be eligible for development rights acquisition, farmland must be located within either agricultural or natural resource zoning, which both have development densities of one unit per 40 acres (AFT, 2003).

The goals of the Whatcom County PDR program created in 2001 are to provide a buffer from development for agricultural areas and protect large areas of farmland. There are twelve target areas zoned either agriculture or rural where development rights for farmland preservation can be acquired. Whatcom County uses detailed PDR criteria with up to 120 possible points. Some highlights of the ranking criteria include preference given to bargain sales, farmland under threat of conversion, and farmland adjacent to urban areas and/or fronting a high traffic road (Whatcom County, 2006).

Though it may be the smallest county in Washington, San Juan County still created a PDR program in 1990, protecting over 1,000 acres of farmland since then. The county does not have an exact method for selecting farms for preservation. Each year the staff selects farmland for potential preservation and citizens can also apply; then public hearings are held to allow citizens to comment on specific acquisitions. The five criteria the county considers when selecting farmland for preservation are: quality of the farmland, level of threat from non-agricultural uses, current level of protection, effective use of public funds, and public opinion. The public actually gets to weigh in during public meetings on their preferences for the protection of specific farmland properties (AFT, 2003).

Selection Criteria Summary

A range of options exist for potential criterion to make up PDR selection criteria. Some of the criteria are shared by nearly all PDR selection criteria, and other criteria are used less frequently. Using PDR selection criteria that are the same as another county or state just because it worked for them may not be wise (USDA, 2002). What has worked in King County worked because of the unique features of King County; the same can be said of Skagit, Whatcom, and San Juan. Thurston County will have to create its own unique selection criteria.

What can be gleaned from the PDR examples of other counties is the incorporation of both agricultural and non-agricultural criteria. Threat from development, adjacency to urban areas, and environmental values are present in some or all of the active PDR programs in Western Washington. Other non-agricultural criteria such as cost and public input cannot be evaluated within this thesis but should be part of the selection criteria if Thurston County decides to create a PDR program.

By incorporating both agricultural and non-agricultural criteria the resulting PDR program can better respond to both farmer and non-farmer goals. While the protection of high quality soils is important, the fact that we live in a growing metropolitan area where a majority of the agricultural land is not zoned for agriculture demands the inclusion of criteria that reflect the threat from non-farm uses at the ownership level. We know the population of Thurston County is going to increase over the next twenty years, but where are these new residents going to go and is there farmland at risk of conversion in these areas? By

including agricultural and non-agricultural criteria such as quality of agricultural operation, development potential, and distance from urban areas, quality farmland under threat from future development will have the potential to gain the protection it needs. It makes little sense to protect farmland through a PDR program that is not under imminent threat from future development.

Chapter 6: Multi-Criteria Analysis

A good measure of success of a farmland preservation program is how effectively it protects the existing farmland in the county (AFT, 2006c). By using the latest federal Census of Agriculture or an existing farmland inventory, as will be the case in this research, a measure of the percentage of farmland preserved can be calculated.

About 15 percent of the inventoried farmland in Thurston County is protected by the zoning of Long Term Agriculture. The goal of selecting and weighting multiple criteria is to increase the percentage of farmland protected. For the sake of this analysis we will assume that a PDR program in Thurston County will only protect 20,000 acres. This amount was chosen because it represents more acres than have been protected by any other county in the state of Washington, and it would place Thurston County among some of the most successful PDR programs in the nation in terms of acres protected. At a value of \$2,000 per acre the total cost of purchasing 20,000 acres worth of development rights comes to \$40 million. The highest ranked 20,000 acres of each multi-criteria analysis will be used to determine which combination of criteria provides the greatest increase to the percentage of inventoried farmland that is preserved beyond that protected by Long Term Agriculture zoning.

A simple additive weighting (SAW) method will be used to conduct the multi-criteria analysis. The SAW method is frequently used in spatial multi-criteria problems (Malczewski, 1999). A decision maker, in this case Thurston County, assigns weights to each criterion, multiplies the standardized criterion

value by its weight value, and sums the products of the criterion. Because each of the criteria has already been standardized, the next step is to define a number of analyses with different weights.

There will be ten analyses with different weights assigned to selection criterion (Table 2). The analyses range from number one with strictly agricultural

| ANALYSIS | AGRICULTURAL CRITERIA | | | | | NON-AGRICULTURAL CRITERIA | | | | | |
|----------|-----------------------|-------------------|-------------------------|--------------|---------|---------------------------|----------------|------|------|-------------------|---------------|
| | Soil Quality | Agricultural Area | Current Use Agriculture | TCD Customer | Organic | Development Threat | Ownership Size | LHA | CARA | Distance From UGA | Direct Market |
| 1 | 0.8 | 0.1 | ---- | ---- | ---- | ---- | 0.1 | ---- | ---- | ---- | ---- |
| 2 | 0.75 | 0.1 | ---- | ---- | ---- | ---- | 0.1 | ---- | ---- | 0.05 | ---- |
| 3 | 0.7 | 0.1 | ---- | ---- | ---- | 0.1 | 0.1 | ---- | ---- | ---- | ---- |
| 4 | 0.65 | 0.15 | X | ---- | ---- | 0.1 | 0.1 | ---- | ---- | ---- | ---- |
| 5 | 0.5 | 0.1 | ---- | ---- | ---- | 0.2 | 0.1 | ---- | ---- | 0.1 | ---- |
| 6 | 0.4 | 0.2 | ---- | ---- | 0.1 | 0.1 | ---- | ---- | 0.2 | ---- | ---- |
| 7 | 0.3 | 0.2 | 0.1 | 0.1 | ---- | 0.1 | 0.1 | ---- | ---- | 0.1 | ---- |
| 8 | 0.2 | 0.2 | 0.1 | ---- | ---- | 0.2 | ---- | 0.1 | ---- | 0.1 | 0.1 |
| 9 | 0.1 | | 0.15 | 0.1 | ---- | 0.3 | ---- | ---- | 0.1 | 0.15 | 0.1 |
| 10 | ---- | 0.1 | 0.15 | ---- | ---- | ---- | 0.1 | | 0.25 | 0.4 | ---- |

Table 2. Criterion weights for ten analysis of PDR selection criteria. Including both agricultural and non-agricultural criterion. An “X” indicates a limiting factor, in this case, only those ownerships with some or all of their farmland in the current use agriculture program are eligible.

criteria, to number ten with a mix of agricultural and non-agricultural criteria.

The ten analyses were designed to gradually decrease the influence of agricultural criteria, particularly soil quality. At the same time while the influence of agricultural criteria is decreasing various combinations of non-agricultural criteria are being incorporated. The amount of farmland zoned Long Term Agriculture will be calculated for each analysis to determine the effect of decreasing the influence of agricultural criteria on the PDR outcome.

Results of Multi-Criteria Analysis

As the Analysis progressed from 1 to 10 the number of acres of Long Term Agriculture gradually decreased (Table 3). The lowest acreages of

| RESULTS | | | | | |
|----------|---------------|-----------|-------------------|-------|------|
| ANALYSIS | Top 20K Acres | LTA Acres | Unprotected Acres | % LTA | Rank |
| 1 | 20,190 | 7,779 | 12,411 | 38.5% | 8 |
| 2 | 20,022 | 7,779 | 12,243 | 38.9% | 9 |
| 3 | 20,012 | 7,779 | 12,233 | 38.9% | 10 |
| 4 | 20,098 | 6,685 | 13,413 | 33.3% | 6 |
| 5 | 20,645 | 6,721 | 13,925 | 32.6% | 5 |
| 6 | 20,074 | 6,984 | 13,090 | 34.8% | 7 |
| 7 | 20,009 | 6,106 | 13,903 | 30.5% | 4 |
| 8 | 19,999 | 5,439 | 14,559 | 27.2% | 3 |
| 9 | 20,235 | 3,253 | 16,982 | 16.1% | 1 |
| 10 | 20,357 | 3,307 | 17,049 | 16.2% | 2 |

Table 3. Results of PDR multi-criteria analysis.

Long Term Agriculture within the highest ranked 20,000 acres occurred in Analysis 9 and 10. Analysis 9 included soil quality within the selection criteria but the weight applied was 0.10. Analysis 10 did not include soil quality in the selection criteria. Both Analyses 9 and 10 had more than 50 percent of the available weight dedicated to non-agricultural criteria. Maps of the results of all ten analyses are available in the Appendix.

The spatial change in farmland selected for preservation is best viewed by looking at the difference between Analysis 1 and 10 (Figure 16). The farmland ownerships that received a higher score in Analysis 10 than in Analysis 1 are red and farmland that received a lower score are blue. A majority of the decrease in scores occurs in southwest Thurston County. There is a marked change in priority

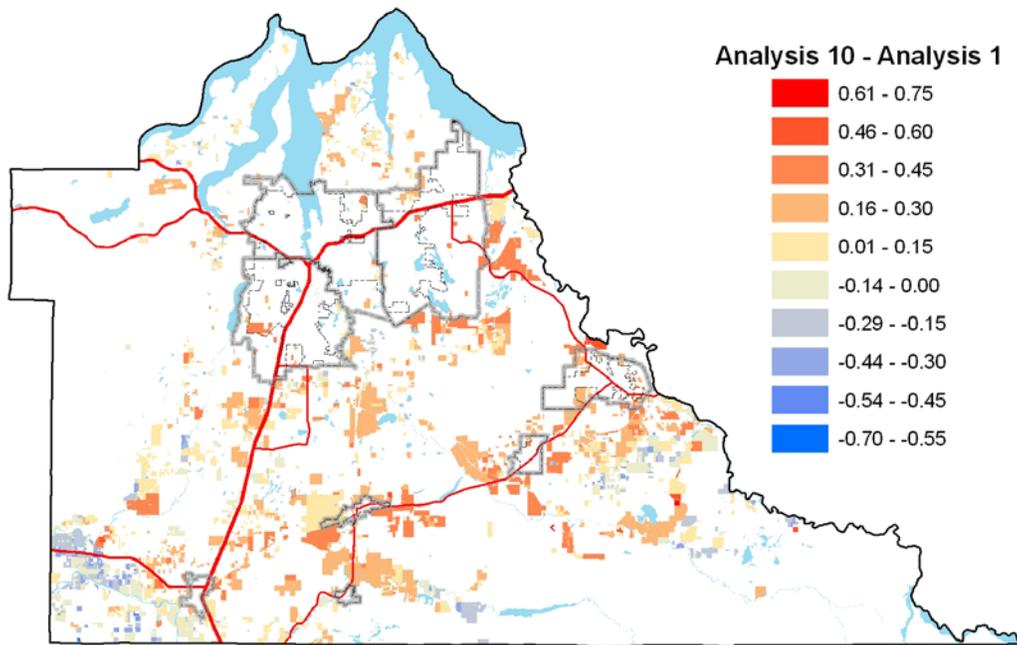


Figure 16. Map of the difference between farmland scores from Analysis 1 and 10.

farmland for preservation when Analysis 1 and 10 are compared. Also, a number of ownerships experience very little change from Analysis 1 to 10. This farmland has high quality soils that are also in close proximity to urban growth areas and have a wide range of development potential; from Long Term Agriculture to one residence per five acres.

Chapter 7: Conclusions

Given the small net gain to the overall level of farmland protection when development rights are purchased from a Long Term Agriculture property versus a highly developable property, the hypothesis that a more effective PDR program is one that incorporates both agricultural and non-agricultural criteria appears to be true. Thurston County has protected a fair amount of farmland through zoning land Long Term Agriculture, but their focus has been largely soil quality based. By expanding the criteria for purchasing development rights into non-agricultural criteria a more diverse assemblage of farmland can be protected.

Two things should be kept in mind when considering the implications of this conclusion. First, only farmers who are willing to take part in a PDR program that includes selling their development rights for no more than the appraised fair market value will do so. The county can only make the opportunity available to those farmers who wish to use it. If a farmer does not want to take part in the program, they do not have to participate.

Second, there are two important criteria that are not included in this analysis. The first is the cost of purchase of development rights. The money to be used to purchase development rights is public money, and to that end needs to be used responsibly. If PDR selection criteria are weighted towards farmland under threat of development, the cost of the program will increase and in the end fewer acres will be protect by PDR. On the other hand if the program is focused towards farmland in Long Term Agriculture that is under little to no threat from development, the cost of the PDR program will decrease and in the end more

acres will be protected by PDR. However, in the latter example by protecting land already zoned Long Term Agriculture the county would be effectively taking farmland that is currently 90% protected and making it 100% protected, as opposed to protecting land that is more expensive and only 5% to 15% protected (USDA, 2001).

Since 2006 the state of Washington has purchased easements and fee acquisitions on approximately 50,000 acres of farmland. Of those 50,000 acres nearly 14,000 acres representing 124 projects have been west of the Cascades. Washington State spent an average of just over \$7,000 dollars per acre on those 124 projects (*State Agency Land Acquisitions*, 2009). This is well over the national average of \$2,000 per acre cited earlier. It remains to be seen where the cost of purchasing development rights in Thurston County falls in the \$2,000 to \$7,000 range.

The second PDR selection criterion that is not included in this analysis is the voice of the people. The creation and operation of a PDR program is a public choice issue. It is up to the citizens of Thurston County to shape this program and make it work by expressing their opinions to the decision makers; planners and elected officials (Adelaja et al., 2007). An effective PDR program in Thurston County stands to protect thousands of acres of farmland, thus preserving agriculture in Thurston County for generations to come. The citizens need to voice their desire for a PDR program with the understanding it will potentially take a tax increase to fund. Elected officials need to withstand the potential pressure from those individuals or groups who stand to profit from the

development of rural Thurston County. It is not just farmland that is at stake, it is a way of life and the key to a more sustainable Thurston County.

The urban nature of agriculture in Thurston County can not be ignored, the converse needs to happen. We need to be embracing agriculture, not treating it like an adjacent temporary use destined for development. If we can preserve the land farmers will preserve the act of farming. The impermanence syndrome that supposedly befalls farmers in the face of development is largely unproven; in fact, there is evidence from the Midwest of farmers expanding production in metropolitan areas (Sharp & Smith, 2004). In Thurston County a farmer with 20 acres of land zoned one residence per five acres adjacent to or within an urban growth area only feels impermanence because they know how much money they stand to make when their property is developed.

It is a failure of zoning for the public good when one farmer loses the development value of their farmland and another gets to cash in on the development value. We need to be protecting all of our farmland with very low development densities, and we need to be compensating all farmers for the loss of development value. The time has passed when we can sit back and wait for the new five year agriculture census to see how agriculture in Thurston County has changed. We have an opportunity to be proactive and responsible in how we protect agriculture. Every year that goes by that we do not act is a year wasted. Over time farmland will be lost and the cost of acting to protect farmland will only increase.

In the face of the potential loss of farmland in Thurston County a number of groups are working both locally and statewide to preserve farmland. Locally the South of the Sound Community Farm Land Trust is actively seeking to purchase farmland, and the Thurston County Agriculture Advisory Committee will soon release their Working Lands Plan with the goal of increasing the role of Thurston County in farmland preservation. At the state level, the American Farmland Trust is actively involved in farmland preservation policy and research, and the Washington State Office of Farmland Preservation is actively preserving farmland and has just begun a farmland inventory for the entire state of Washington. The leadership of these groups and others like them will be necessary for Thurston County to successfully preserve farmland and the practice of agriculture for generations to come.

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Appendix

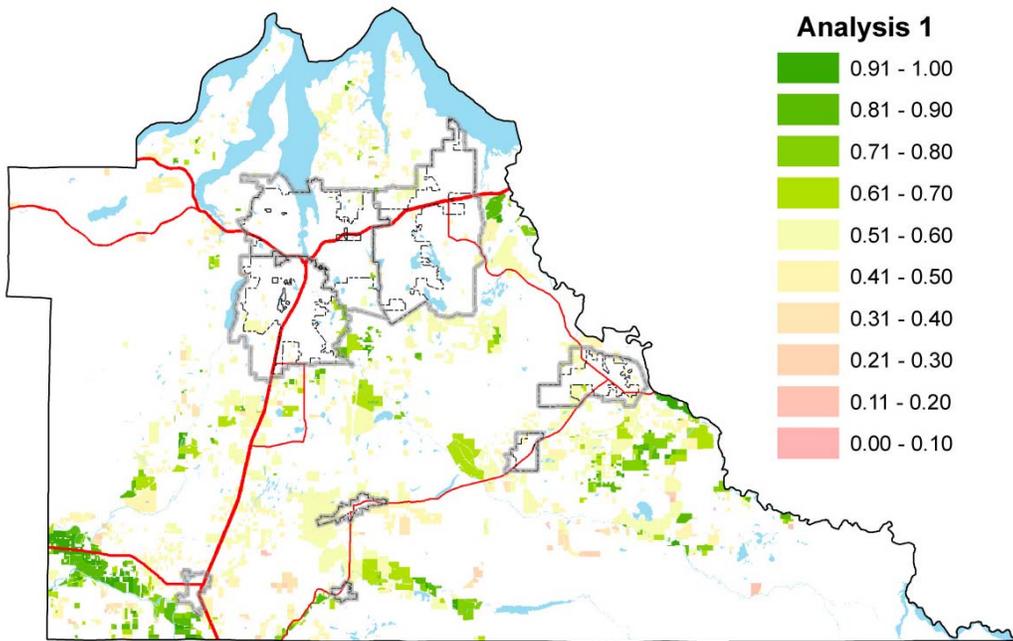


Figure 17. Results of Analysis 1 with criteria weighting of: soil quality 0.80, ownership size 0.10, & farm area 0.10.

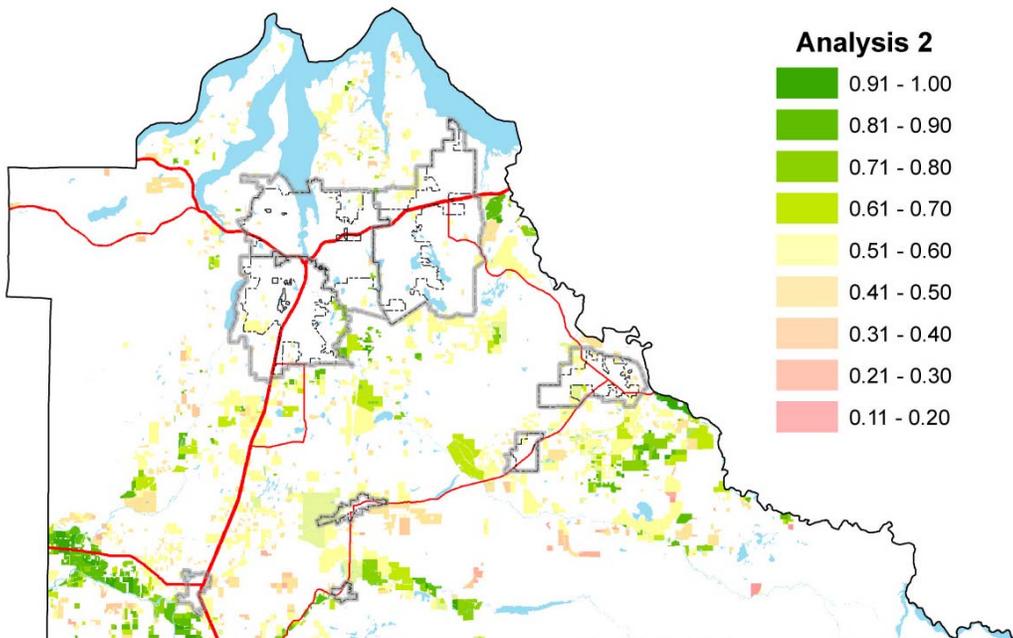


Figure 18. Results of Analysis 2 with criteria weighting of: soil quality 0.75, ownership size 0.10, farm area 0.10, & distance from urban areas 0.05.

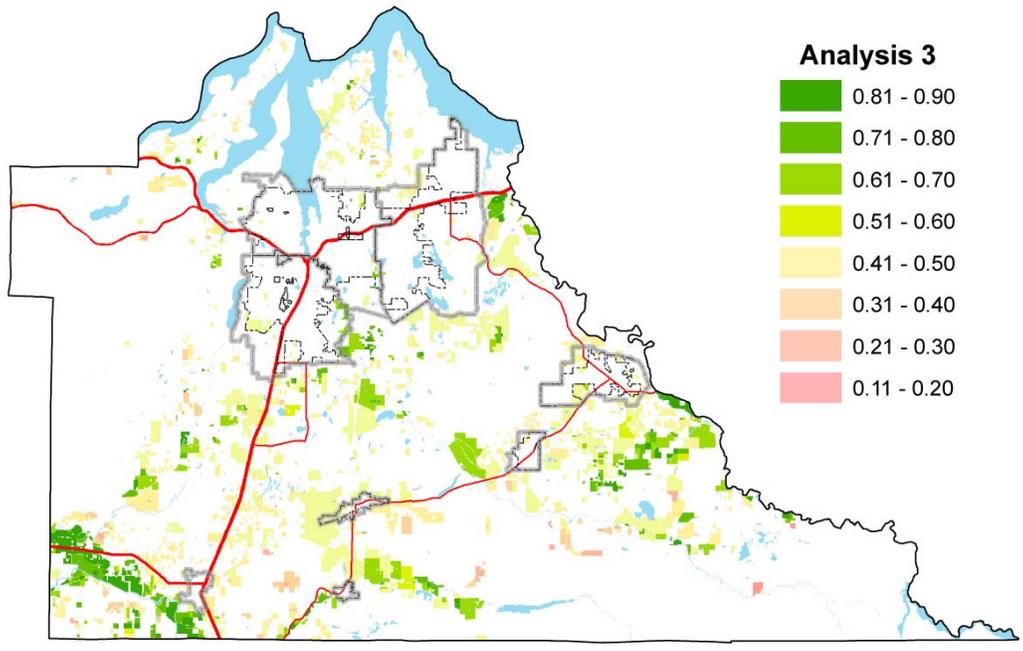


Figure 19. Results of Analysis 3 with criteria weighting of: soil quality 0.70, ownership size 0.10, farm area 0.10, & development threat 0.10.

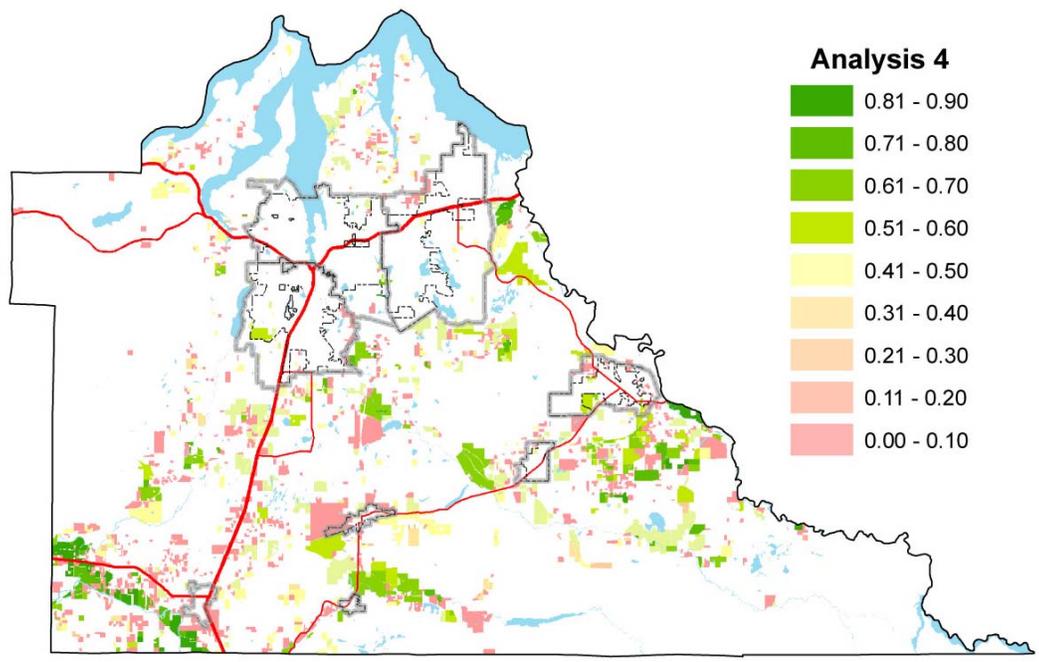


Figure 20. Results of Analysis 4 with criteria weighting of: soil quality 0.65, ownership size 0.10, farm area 0.15, development threat 0.10, & limited by current use agriculture.

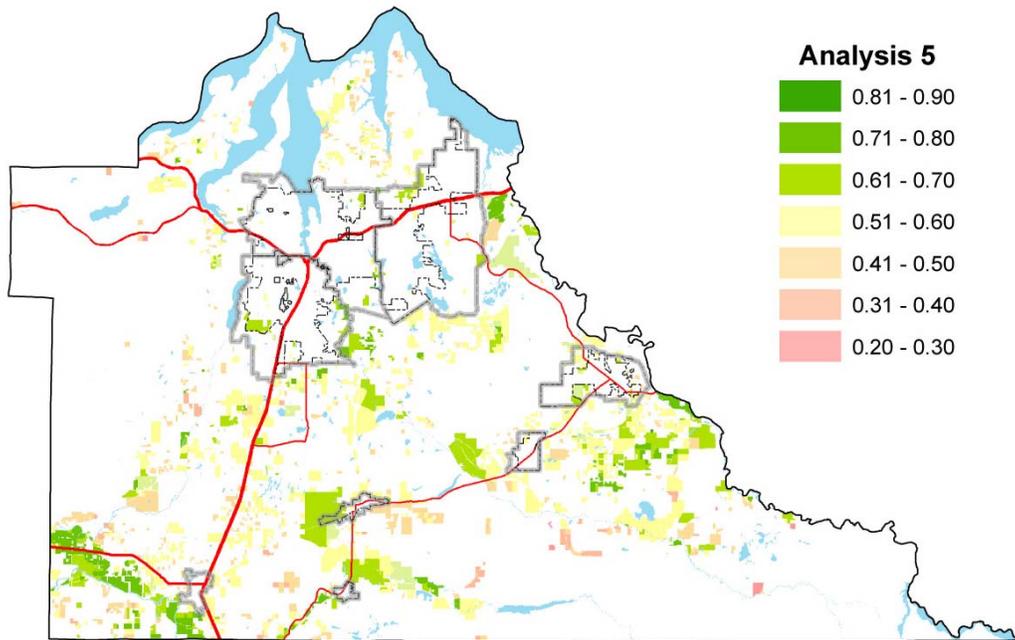


Figure 21. Results of Analysis 5 with criteria weighting of: soil quality 0.50, ownership size 0.10, farm area 0.10, development threat 0.20, & distance from urban areas 0.10.

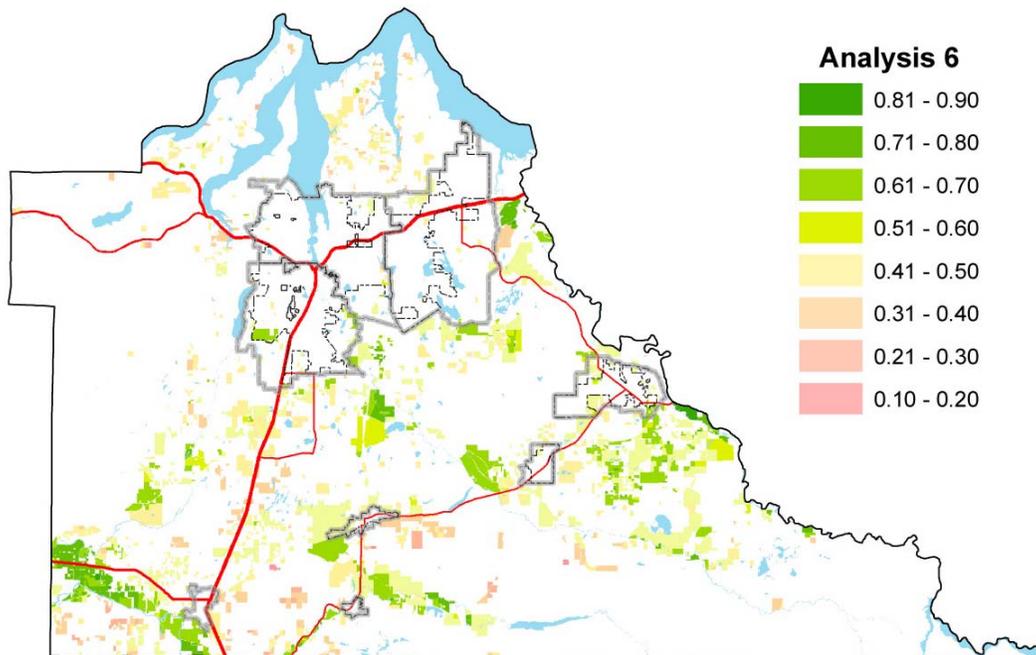


Figure 22. Results of Analysis 6 with criteria weighting of: soil quality 0.40, farm area 0.20, critical aquifer recharge areas 0.20, development threat 0.10, & certified organic 0.10.

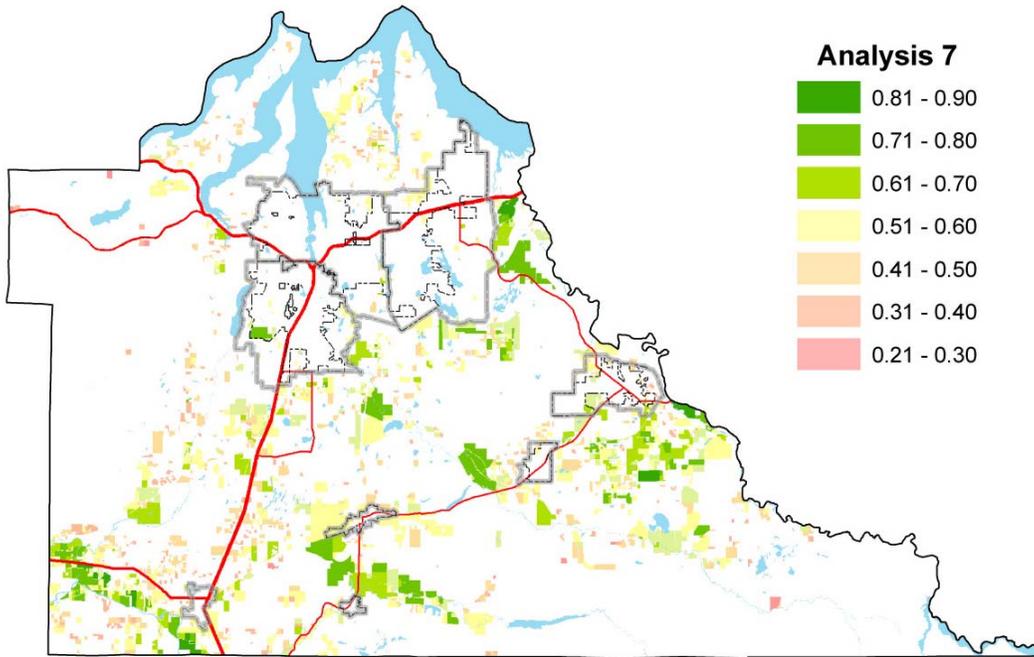


Figure 23. Results of Analysis 7 with criteria weighting of: soil quality 0.30, farm area 0.20, ownerships size 0.10, development threat 0.10, current use agriculture 0.10, distance from urban areas 0.10 & conservation district customer 0.10.

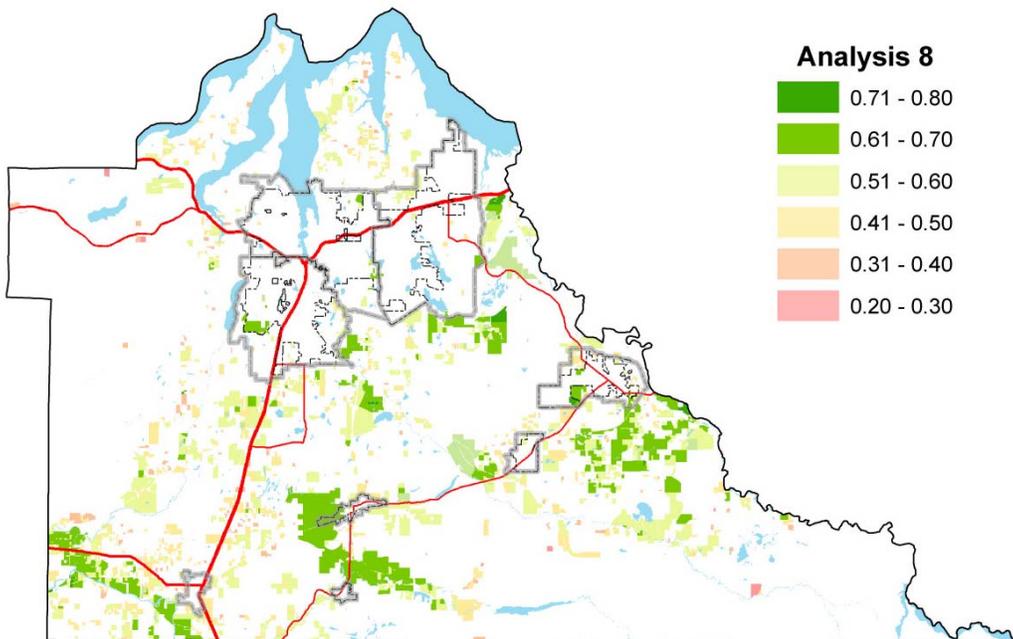


Figure 24. Results of Analysis 8 with criteria weighting of: soil quality 0.20, farm area 0.20, development threat 0.20, current use agriculture 0.10, distance from urban areas 0.10, local habitat assessment 0.10, & direct market 0.10.

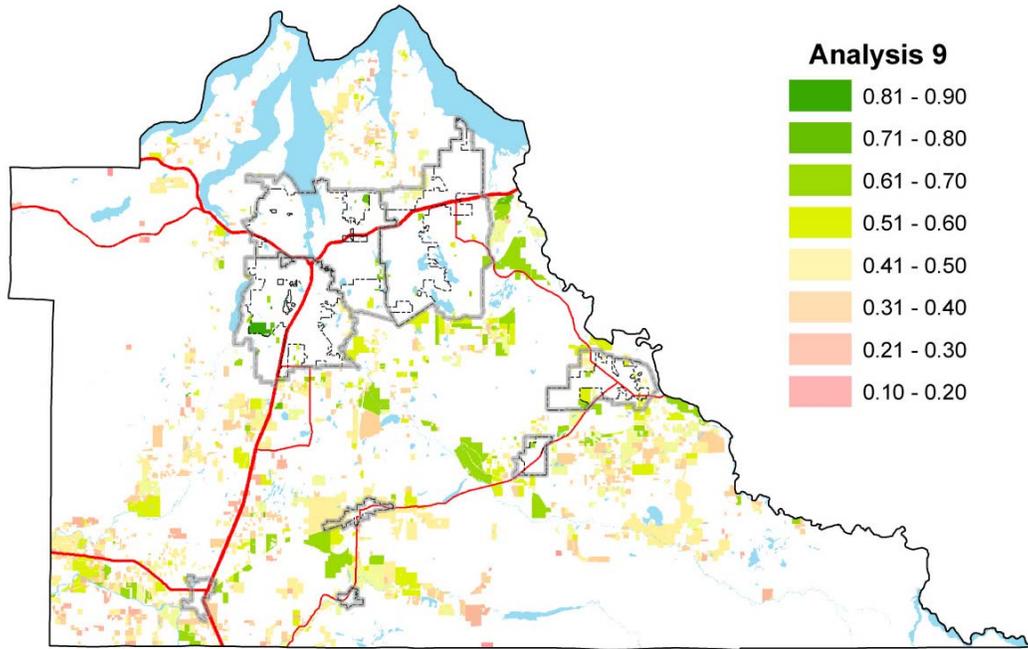


Figure 25. Results of Analysis 9 with criteria weighting of: development threat 0.30, distance from urban areas 0.15, current use agriculture 0.15, soil quality 0.10, conservation district customer 0.10, critical aquifer recharge areas 0.10, & direct market 0.10.

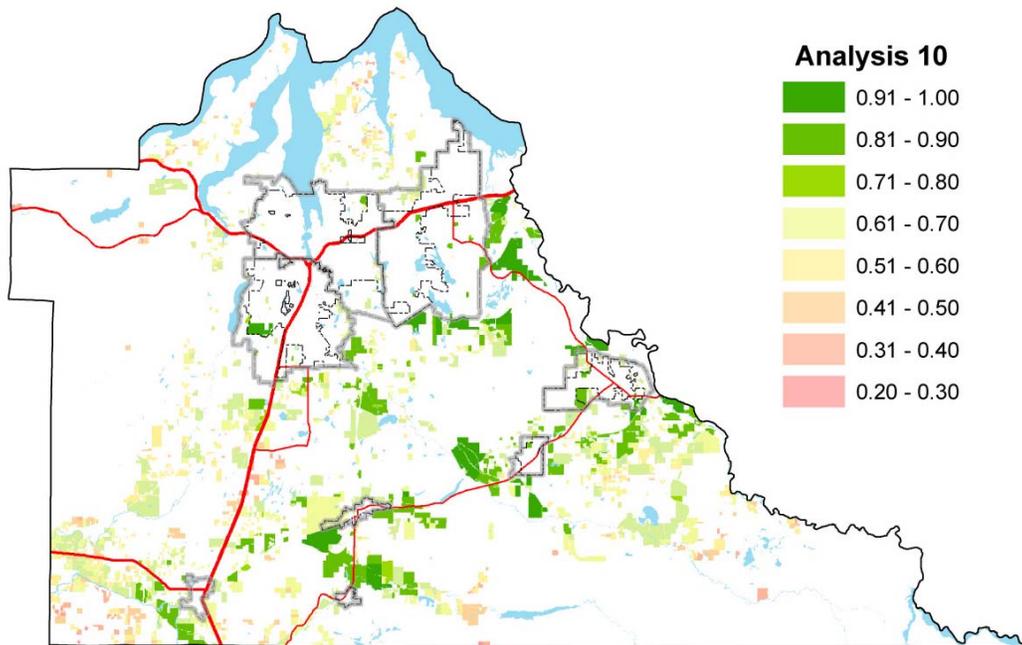


Figure 26. Results of Analysis 10 with criteria weighting of: distance from urban areas 0.4, critical aquifer recharge areas 0.25, current use agriculture 0.15, ownership size 0.10, & farm area 0.10.

