

A POTENTIAL GROSS SALES TEST FOR FARMLAND:
THE SYNTHESIS AND APPLICATION OF A
RURAL RESOURCE PLANNING TOOL

by

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Abstract

Due to recent changes in Oregon land-use regulations, agricultural resource lands within exclusive farm-use zones are being designated as high-value, important, or small-scale farmland according to their relative potential for commercial agriculture. Potential gross agricultural sales are used as a threshold in the designation of small-scale farmlands; however, the regulations are not clear on what form a test for the gross agricultural sales potential of land would take, nor are they clear on how it would be applied. The purpose of this research project was to develop a systematic procedure to estimate the annual potential gross sales of agricultural parcels. The research project had three major objectives: first, to identify data sources that are commonly available at the county level that could be used in a test of agricultural gross sales capability; second, to develop a potential gross sales procedure that would be easy to apply, parcel-specific, replicable, and defensible; and third, to apply the procedure in order to identify the strengths and weaknesses of the potential gross sales test as a land-use planning tool. The research found that the structure of assessors' rent schedules along with assessors' inventories of the type and acreage of soils within ownership parcels present the means to disaggregate county-level gross sales estimates derived from Extension data in order to estimate potential gross sales at the farm-unit scale.

Background

The effort to preserve Oregon's agricultural resource land base began in 1973 as part of its statewide comprehensive land use planning program. State law requires counties to inventory agricultural lands in their jurisdictions and to preserve them by adopting exclusive farm use zones (EFU zones) (8). Oregon law provides strict guidelines for development in EFU zones to minimize land use conflicts and to prevent the loss of agricultural land (9).

The recognition that some ownership parcels within EFU zones are generally unsuitable for agriculture led to amendments to Oregon Revised Statutes in 1983 that established criteria for the identification of these parcels and standards for the permitted uses of such lands. Similarly the recognition of variation in the level of the suitability of agricultural parcels for commercial-scale production has led, in 1993, to the revision of the criteria established in 1983.

This applied research addresses one of the technical requirements of Oregon's complex and evolving agricultural resource land preservation program in an effort to aid the work of state, county, and private agricultural resource land use planners.

Introduction

Due to recent changes in Oregon land-use regulations, agricultural resource lands within exclusive farm-use zones are being designated as high-value, important, or small-scale farmland according to their relative potential for commercial agriculture. While soil quality and parcelization patterns are the primary factors for identifying these lands, potential gross agricultural sales is used as a threshold in the designation of small-scale farmlands. The threshold requires a potential gross sales test to show that parcels designated as small-scale farmlands are not capable of producing \$20,000 or more in indicator farm products in Western Oregon, or \$10,000 in Eastern Oregon. New planning permit standards require a potential gross sales test as well. Standards for the construction of a farm dwelling on a high-value farmland parcel include a threshold of at least \$40,000 in gross annual sales from agricultural production to demonstrate that the parcel has the potential for commercial agriculture (10,11).

The regulations are not clear on what form a test for the gross agricultural sales potential of land would take, nor are they clear on how it would be applied, except in the use of indicator crops as designation criteria and the suggestion of data sources appropriate to the procedure. Small-scale rangeland designation criteria are explicitly defined in terms of animal unit months per acre (AUM) and small-scale forest tracts in cubic feet per acre. However, in the designation of small-scale farmland, the selection of indicator crops and the justification of methods to estimate the annual gross

potential of farmland for crop sales are left to local technical resource committees (10). The purpose of this research project was to develop a systematic procedure to estimate the annual potential gross sales of agricultural parcels.

Previous Research

Since 1983, when gross agricultural sales was first used as a planning permit criterion, researchers have been working to develop a procedure to estimate potential gross sales. In Holoch's Linn County, Oregon, case study in 1984, prevalent agricultural types were identified as associated with landforms and average income was determined from the U.S. Census of Agriculture (6). Harrison's 1985 analytical model expanded this approach in a Umatilla County, Oregon, study by identifying the dominant crops associated with generalized landforms in the county and grouping farms within landform classes by net income and acreage categories taken from an agricultural land use survey (5). These approaches are based on objective data but are too generalized to apply on a parcel-specific basis.

In 1991, Greenstreet estimated, by expert opinion, gross sales as a ratio of assessed farm use value per acre based on soil categories and assessor sub-zones for Deschutes County, Oregon (12). This approach is parcel-specific, but while farm use valuation was based on objective criteria the gross sales ratio was subjective and therefore lacks replicability.

A 1993 test project in Wasco County, Oregon, by Pease and White, identified indicator crops and, using soils yield and market price data, determined the largest parcel size with the poorest soils that could qualify for small-scale designation. To apply the test, ownership parcels and soils map data were digitized and parcels were examined on a case-by-case basis (14). This procedure is based on objective data and is parcel specific, but it requires detailed and time consuming cartographic analysis of each parcel to which it is applied.

Chapter One : Synthesis

Research Objectives

The research project had three major objectives: first, to identify data sources that are commonly available at the county level that could be used in a test of agricultural gross sales capability; second, to develop a potential gross sales procedure that would be easy to apply, parcel-specific, replicable, and defensible; and third, to apply the procedure in an evaluation of a county-level agricultural land-use planning program in order to identify the strengths and weaknesses of the potential gross sales test as a land-use planning tool.

Data Sources for a Farm Potential Gross Sales Test

Extension Service County Agricultural Estimates

Agricultural estimates are compiled for each county in the state of Oregon by the Oregon State University Extension Service Office of Economic Information. The county-level reports include annual data for a wide variety of crops. These data include harvested acres, unit yield, unit price, value of production, percent sold, and value of sales (2). For this study, crops with the highest average harvested acreage for a five year period were selected as indicator crops. This selection procedure quantifies the relative importance of each crop to an area's commercial agricultural enterprise in terms of acres harvested.

Average value of production was found to be more appropriate than average value of sales to estimate crop sales per acre, as sales figures do not account for agricultural production used on the farm as a part of a farming operation. It was found that adverse weather or market conditions affecting indicator crop yields can be factored out by averaging the top three of five annual value of production per acre estimates. Alternatively, the highest and lowest annual estimates could be eliminated in the averaging procedure to reduce the effects of market fluctuations (14).

Extension reports are the most comprehensive estimates of agricultural production available at the county level. An average value of crop production per acre for a county can be derived from these data. However, due to the county-wide scale of the estimate,

it is not applicable at the parcel-specific scale for testing the gross sales potential of a parcel, unless it could be adjusted to account for variation in the production capacity of the land. This requirement led to the investigation of data available from county assessors' offices for their suitability in the disaggregation of county level gross sales estimates to the farm scale.

County Department of Assessment Data

Counties in Oregon that use the income approach to assign values to farm properties for tax purposes have developed a comprehensive and parcel-specific database that reflects the soil quality and other production factors for parcels under farm-use tax deferral. The income approach to farm-use valuation requires the development of a means to determine net farm income in terms of land rent (4). The income approach for the valuation of farm-use land involves the establishment of a rent schedule for farm acreage based upon soil quality, irrigation, and spatial variation in farming conditions (3).

To establish a rent schedule, the type and acreage of soils on farm-use land are inventoried and classified according to soil capability class and/or productivity rating. In Oregon counties using the income approach, an annual rent per acre is determined for each soil class based upon annual rent surveys and review by a local Farm Board. Rent will vary for a soil class with the use of irrigation. It may vary between sub-county regions with changes in climate, elevation or other factors affecting farming conditions (3,4).

There are some factors that limit the use of assessors' inventories in the estimation of potential gross sales for county-wide planning purposes. The identification of farm units from assessors' inventory data was found to be difficult when they involve multiple tax lots, non-contiguous ownership parcels, multiple owners, and/or rental arrangements. Also, an inventory of soil type and acreage for parcels that are not assessed for farm-use may not be included in the database.

However, several factors contribute to the desirability of incorporating assessors' rent schedules as a part of a procedure to estimate farmland gross sales potential. They are linked to specific sites through soil inventories and farm-use designation. They reflect variation in farming conditions. They have a firm legal basis under state-wide Oregon Department of Revenue rules and are validated through review by local farm boards (4,10). While assessors' rents only indirectly reflect the production potential of agricultural land, the structure of the rent schedule offers an indication of the relative production potential of soil types both within and among sub-zones.

Discussion

These two data sets were used to develop a test of the gross sales potential of agricultural resource land. The limitations of each data set preclude its use alone for this purpose. Elements of each, however, can be combined in a synthesis of a potential gross sales test. The structure of assessors' rent schedules along with

assessors' inventories of the type and acreage of soils within ownership parcels present the means to disaggregate county-level gross sales estimates derived from Extension data in order to estimate potential gross sales at the farm-unit scale.

A Procedure to Estimate Potential Gross Sales for Agricultural Parcels

Selection of Indicator Crops

The first step in the development of a potential gross sales test is the selection of indicator crops important to the agricultural enterprise of the area under consideration. They are selected from the list of typical crops in a soil survey, from the list of the crops with the greatest harvested acres as reported in county Extension estimates, and/or through consultation with local agricultural experts. If the local agricultural enterprise includes a mix of irrigated and dryland crops, two such sets of indicator crops are selected. The calculations described below are performed separately for each category.

Use of Extension Service County Reports

County-level Extension Service crop summaries are used to estimate an average value of crop production per acre (2,12). Gross sales per acre for each indicator crop is determined for the most

recent five years by dividing its value of production by its harvested acres for each year and determining the average sales per acre of the highest three of the five years for each indicator crop (or alternatively, the three middle years) to reduce variation due to adverse weather or market conditions (14,10).

The average harvested acreage for each indicator crop is similarly determined in order to weight its average gross sales per acre according to its relative importance in the area's agricultural enterprise. The percentage of the total average harvested acreage of all indicator crops is determined for each crop. The average gross sales per acre for each crop obtained above is multiplied by its percentage of total harvested acreage to obtain a weighted average gross sales per acre. The sum of these weighted gross sales averages estimates the average annual potential gross sales of crops per acre for farmland at the county scale. A mathematical representation of the procedure is given in an endnote.

Use of Assessors' Data

The county scale estimate derived from Extension reports is adjusted for the use of irrigation and spatial variation in soil quality and farming conditions by utilizing the relative structure of the assessors' farm-use rent schedule. Because the gross sales estimates represent the average potential gross sales capability of farmland, an assumption is made that rent charged for farmland at such a level of capability would equal the average rent. Thus, if the gross sales estimate is multiplied by the percentage of the average

rent represented by the rent for each soil class, the gross sales estimate will be adjusted for each soil class. This figure is termed the adjusted gross sales factor.

Assessors' inventory data is used to apply the potential gross sales test to a parcel. The acreage of each soil class in farm-use in a parcel is multiplied by the adjusted gross sales factor for that soil class. The sum of these products is the estimate of the potential of that parcel for annual gross sales of crops.

The synthesis of the potential gross sales test is complete with the last of these calculations (See endnote for its complete mathematical representation). A test of its validity follows.

Validation of the Potential Gross Sales Test

In 1991, as part of a research project to establish base-line data for exclusive farm-use zoning standards and permit decisions in Deschutes County, Oregon, the expert opinion of the county farmland appraiser was used to develop a multiplier of assessors' farm-use values to estimate gross agricultural sales (12). The results of the estimates by zone and soil category are detailed in table 1. The soil categories are based on productivity under irrigated (W) and dry (D) conditions.

Table 1. Appraiser's Estimate of Gross Sales

	SOIL CATEGORY			
	W 1,2,3	W 4,5	D 4,5	D 6,7
ZONE 1	\$588	\$384	\$178	\$10
ZONE 2	\$521	\$352	\$163	\$9
ZONE 3	\$521	\$352	\$163	\$9
ZONE 4	\$448	\$304	\$141	\$8
ZONE 5	\$480	\$320	\$148	\$8
ZONE 8	\$526	\$352	\$163	\$9

The potential gross sales test was applied to the Deschutes County assessor subzones. The results are shown in table 2.

Table 2. Potential Gross Sales Test Estimates

	SOIL CATEGORY			
	W 1,2,3	W 4,5	D 4,5	D 6,7
ZONE 1	\$553	\$354	\$168	\$8
ZONE 2	\$518	\$354	\$168	\$8
ZONE 3	\$528	\$354	\$165	\$8
ZONE 4	\$499	\$338	\$168	\$8
ZONE 5	\$531	\$353	\$168	\$8
ZONE 8	\$531	\$353	\$168	\$8

The results of a two-sample analysis of variance to test the hypothesis of equal means for the paired observations with a 95 percent confidence interval and 46 degrees of freedom shows no significant difference in means with a two-tailed p-value of .90 to reject the alternative hypothesis of unequal means.

The first set (table 1.) was derived by multiplying farmland valuation given by assessor zone and soil category by a gross sales

multiplier developed by an expert (the county farmland appraiser) with considerable experience with the agricultural enterprise and farm-use valuation of the county (12,13).

The second set (table 2) was derived by using the following indicator crops from Deschutes County Extension reports: all grains, alfalfa, and peppermint. The average potential income capability of farmland per acre was estimated at \$439. The farm-use rent percentages used to adjust the estimate for soil category and assessor zone were based on the average of the rent of all zones for all irrigated soil categories - W 1,2,3 and W 4,5 (12).

Discussion

Limitations and Strengths of the Potential Gross Sales Test

This test does not account for forest practices nor livestock production except as reflected in rents for pasture or feed crops. It also cannot be applied in counties that use the comparable sales approach to farm-use land valuation rather than the income approach, nor where Extension Service estimates are unavailable.

The strengths of the test are as follows: it uses widely available data and is therefore widely replicable; it is defensible because it uses the best available estimates of the value of crop production and a land rent adjustment factor validated by state-wide assessment rules and a local farm board review; it is parcel-specific while accounting for spatial variation in farming conditions; and it is easy to apply area-wide through data

processing of assessor's inventories. While its accuracy has been tested with good results against another method that relied upon expert judgment, it is recommended that rural resource planners consult with the local Assessor's Office and Extension Service personnel in the application of this potential gross sales test.

This method offers, at the very least, a relative indication of the gross sales potential of agricultural parcels. The formula, coupled with assessor data and cadastral maps digitized to the parcel scale in a Geographic Information System, would make a powerful mapping tool for the identification and designation of agricultural resource lands as well as for zoning permit decisions.

Chapter Two : Application

The potential gross sales test was applied as a monitoring tool for reviewing the conformity of new dwelling permit approvals to exclusive farm-use zone planning permit standards. The review was conducted for the period of 1983 to 1992 in Benton County, Oregon. A total of one hundred and three permits to build new dwellings were monitored in terms of agricultural gross sales potential. Total acreage of the parcels affected and their spatial distribution were also considered in the study. Seventy-eight of the permits were approved for the construction of farm-related dwellings. Twenty-five were approved for non-farm dwellings.

Assumptions made in the course of this study include the following:

- Contiguous ownership tracts were used as proxies for farm units (12).
- All calculations of gross sales potential used 1993 dollars and the 1993 rent schedule for Benton County farm-use land.

Methods

Assessor's inventory data for all parcels located within Benton County's Exclusive Farm-use Zones were obtained from Benton County Computing Services in 'comma-quote delimited' ASCII format. The data for each parcel included its property identification number, name of the owner, total acreage, and acreage by land-use designation and soil class. A total of 2632 records were included in the database. The data were imported into an electronic spreadsheet program, 'parsed' into a relational data-base, and sorted by property identification number.

A list of parcels approved for new farm-related and non-farm dwelling permits for the period of 1983 to 1992 was obtained from the OSU Department of Geosciences and the Benton County Development Department (1). The property identification number of these parcels were compared to property identification numbers in the assessor's inventory. All matching numbers were marked before sorting the data by the name of parcel owners. All parcels with matching names to marked records were labeled as farm-related or

non-farm according to the type of dwelling permit. All other records were deleted from the database.

All records with matching names were checked for contiguity by consulting the cadastral maps of the Benton County Department of Assessment. All records not contiguous with a parcel approved for a dwelling permit were deleted from the database.

This process resulted in a database of 277 records for parcels representing the proxies of farm-units for 103 properties approved for new dwelling permits in Benton County Exclusive Farm-use zones in the period 1983 to 1992. The potential gross sales test was formulated for Benton County and applied to each property through electronic data processing.

Findings

The Potential Gross Sales Test for Benton County

The indicator crops for the potential gross sales test for Benton County were selected from the list of typical crops found in the Soil Survey of the Benton County Area, Oregon (7). The irrigated indicator crops selected were beans, sweetcorn, peppermint, and alfalfa. Dryland indicator crops were wheat, bentgrass, and barley. The county-level average potential gross sales per acre estimate for irrigated land was calculated to be \$951, for dryland \$396.

The 1993 assessor's rent schedule for farm-use valuation in Benton County is shown in table 3 (4). There are three irrigated land soil classes, eight dryland soil classes, and two sub-county zones present in the schedule.

Table 3. 1993 BENTON COUNTY FARM-USE VALUATION RENT SCHEDULE

IRRIGATION	SOIL CLASS	MAIN VALLEY	FINGER VALLEYS
IRRIGATED	I	\$84.89	\$63.67
	II	\$78.44	\$58.83
	III	\$62.40	\$46.80
DRY	I	\$62.40	\$46.80
	II	\$57.60	\$45.36
	III	\$45.80	\$34.35
	IV	\$28.80	\$21.60
	V	\$9.60	\$7.20
	VI	\$4.80	\$3.60
	VII	\$4.80	\$3.60
	VIII	\$2.08	\$1.56

In determining the rent schedule percentages to be used in the adjustment of the county-level gross sales per acre estimate, it was found that the rent schedule for the 'finger valleys' of Benton County reflects a percentage of the rent for the main Willamette Valley based on a shorter growing season (3). Because land with soil classes V through VIII have low potential for commercial agriculture and are assessed based on a percentage of the rent for class IV soils, they should not be used to determine the average rent (3). Accordingly, the percentages used in the adjustment calculations were based on average rents in the main valley. For irrigated land, the average rent in the main valley for soil classes I

through III were used, and for dryland, classes I through IV. The rent schedule percentages used in the adjustment of the county-level annual gross sales per acre estimate for Benton County are shown in table 4.

TABLE 4. BENTON COUNTY RENT SCHEDULE ADJUSTMENT PERCENTAGES

IRRIGATION	SOIL CLASS	MAIN VALLEY	FINGER VALLEYS
IRRIGATED	I	113%	85%
	II	104%	78%
	III	83%	62%
DRY	I	128%	93%
	II	118%	93%
	III	94%	71%
	IV	59%	44%
	V	20%	15%
	VI	10%	7%
	VII	10%	7%
	VIII	4%	3%

The adjusted gross sales factor estimates for Benton County by soil class, irrigation, and sub-county growing area are shown in table 5. They were derived by adjusting the county-level estimate from OSU Extension Service Reports (2) with percentages from the structure of the Benton County Department of Assessment rent schedule for farm-use land valuation (4).

TABLE 5. BENTON COUNTY ADJUSTED GROSS SALES FACTORS

IRRIGATION	SOIL CLASS	MAIN VALLEY	FINGER VALLEYS
IRRIGATED	I	\$1,073	\$805
	II	\$991	\$744
	III	\$789	\$591
DRY	I	\$507	\$369
	II	\$468	\$369
	III	\$372	\$279
	IV	\$234	\$176
	V	\$78	\$59
	VI	\$39	\$29
	VII	\$39	\$29
	VIII	\$17	\$13

Monitoring the Conformity of 1983-1992 Exclusive Farm-Use Zone Dwelling Permit Approvals to Planning Permit Standards

Definitions and assumptions made in order to monitor the conformity of EFU zone dwelling permit approvals to planning permit standards include the following:

- Commercial farms were defined as parcels with a gross annual sales potential from agricultural production of at least \$40,000 (7).
- Farm-related dwelling permits were rated class 'A' (valid) only if sited on commercial farms.
- Class 'B' was defined as farm-related dwelling permits sited on parcels with a potential gross sales between \$20,000 and \$40,000.

- Class 'C' was defined as farm-related dwelling permits sited on parcels with an estimated potential gross sales of \$20,000 or less but sized greater than 20 acres.
- Class 'D' was defined as parcels with potential gross sales of \$20,000 or less and consisting of 20 or less total contiguous acres (6).
- Non-farm dwelling permits were considered valid only if sited on class 'D' parcels.
- New dwelling permits on state-owned parcels were considered to be exceptions to planning permit standards.

Farm-Related Dwelling Permits

There were a total of 78 farm-related dwelling permits in the evaluation. Contiguous ownership parcels associated with these permits ranged in total acreage from 7 to 967 acres. The average size of the parcels was 87 acres, the median 50 acres. The potential gross sales estimates for these parcels ranged from \$0 to \$217,343. Average potential gross sales for parcels granted farm-related dwelling permits was found to be \$31,284. The median was \$15,937.

Nineteen permits sited on parcels 20 acres or smaller and with a potential gross sales estimate less than \$20,000 were in class 'D'. This represents 24% of the farm-related permits in the sample. The average size of these parcels was 16 acres. The average potential gross sales estimate for this class was found to be \$6224, the median \$4960, and the range from \$0 to \$18,327.

Twenty-five permits sited on parcels larger than 20 acres in size and with a potential gross sales estimate of \$20,000 or less were in class 'C'. This represents 32% of the farm-related permits in the sample. The average size of these parcels was 54 acres ranging from 21 to 171 acres. The average potential gross sales estimate for class 'C' parcels was found to be \$11,558, the median \$5812, and the range from \$0 to \$19,613.

Fourteen permits sited on parcels with a potential gross sales estimate between \$20,000 and \$40,000 were rated class 'B' in the evaluation. This represents 18% of the farm-related permits in the sample. The average size of these parcels was 72 acres ranging from 26 to 140 acres. The average potential gross sales estimate for class 'B' parcels was found to be \$24,847, the median \$24,507, and the range from \$22,327 to \$27,003.

Eighteen permits sited on parcels with a potential gross sales estimate greater than \$40,000 were rated class 'A'. This represents 23% of the farm-related permits in the sample. The average size of these parcels was 225 acres ranging from 89 to 967 acres. The median size was 158 acres. The average potential gross sales estimate for the class 'A' parcels was found to be \$93,615, the median \$87,098, and the range from \$48,701 to \$223,944.

Two farm-related dwelling permits were for state-owned land and were considered to be exceptions to planning permit standards.

Non-Farm Related Dwelling Permits

Under state administrative rules, the construction of new non-farm dwellings in exclusive farm-use zones can be permitted only on parcels not suitable for agricultural production (9,10).

For the twenty-five non-farm permits, contiguous ownership parcels ranged in total acreage from 1 to 294 acres. The average size of the parcels was 33 acres, the median 5 acres. The potential gross sales estimates for these parcels ranged from \$0 to \$51,818. Average potential gross sales for parcels granted non-farm dwelling permits was found to be \$3545. The median was \$0. Only five of the parcels were found to have potential gross sales over \$0.

One of the non-farm dwelling permits was sited on a class 'A' parcel 294 acres in size with a potential gross sales estimate of \$51,818. One, rated class 'B' was 86 acres in size and estimated to have the potential for \$31,730 in gross sales.

Four of the cases were rated class 'C' as the parcels were larger than 20 acres, ranging from 35 to 79 acres. Only one showed any gross sales potential, at \$2552.

Eighteen non-farm permits were sited on class 'D' (valid) parcels. This represents 72% of the cases. They ranged in size from 1 to 10 acres. Only two showed any gross sales potential, at \$708 and \$1860.






One non-farm permit was considered to be an exception to planning permit standards as it was sited on a contiguous ownership parcel with tax exempt status.




Spatial Distribution of the 1983-1992 Exclusive Farm-Use Zone Dwelling Permit Sites

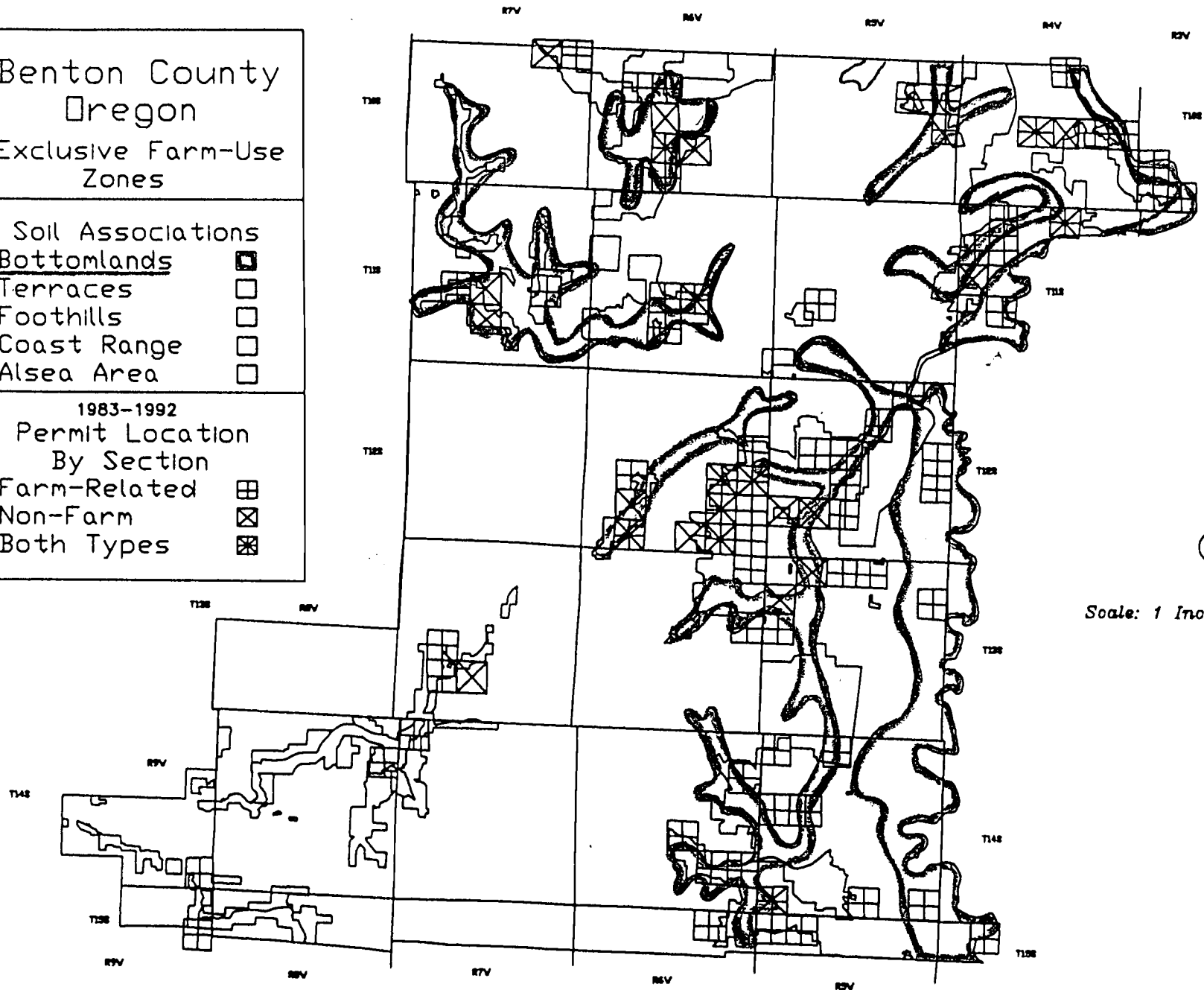
The spatial distribution of the dwelling permit sites was mapped at the section scale as shown in figures 1-a through 1-e, which also show Benton County's exclusive farm-use zones and the soil/landform associations present within the zones. The soil/landform polygons were digitized from the General Soil Map found in the Soil Survey of Benton County Area, Oregon (7). This map shows the location of the soils of the county's bottomlands, Willamette Valley terraces, foothills, and coast range. The southwestern portion of the county, or the Alsea area is not included in the General Soil Map.

Due to the irregular nature of the soil/landform association polygons, a more detailed investigation of the location of the dwelling permit sites was conducted by consulting the cadastral maps of the Benton County Department of Assessment. Each permit site was classified according to soil/landform association in order to discern the spatial distribution of the permit sites according to their relative conformity to planning permit standards.

Benton County
Oregon
Exclusive Farm-Use
Zones

Soil Associations
Bottomlands 
 Terraces 
 Foothills 
 Coast Range 
 Alsea Area 

1983-1992
 Permit Location
 By Section
 Farm-Related 
 Non-Farm 
 Both Types 



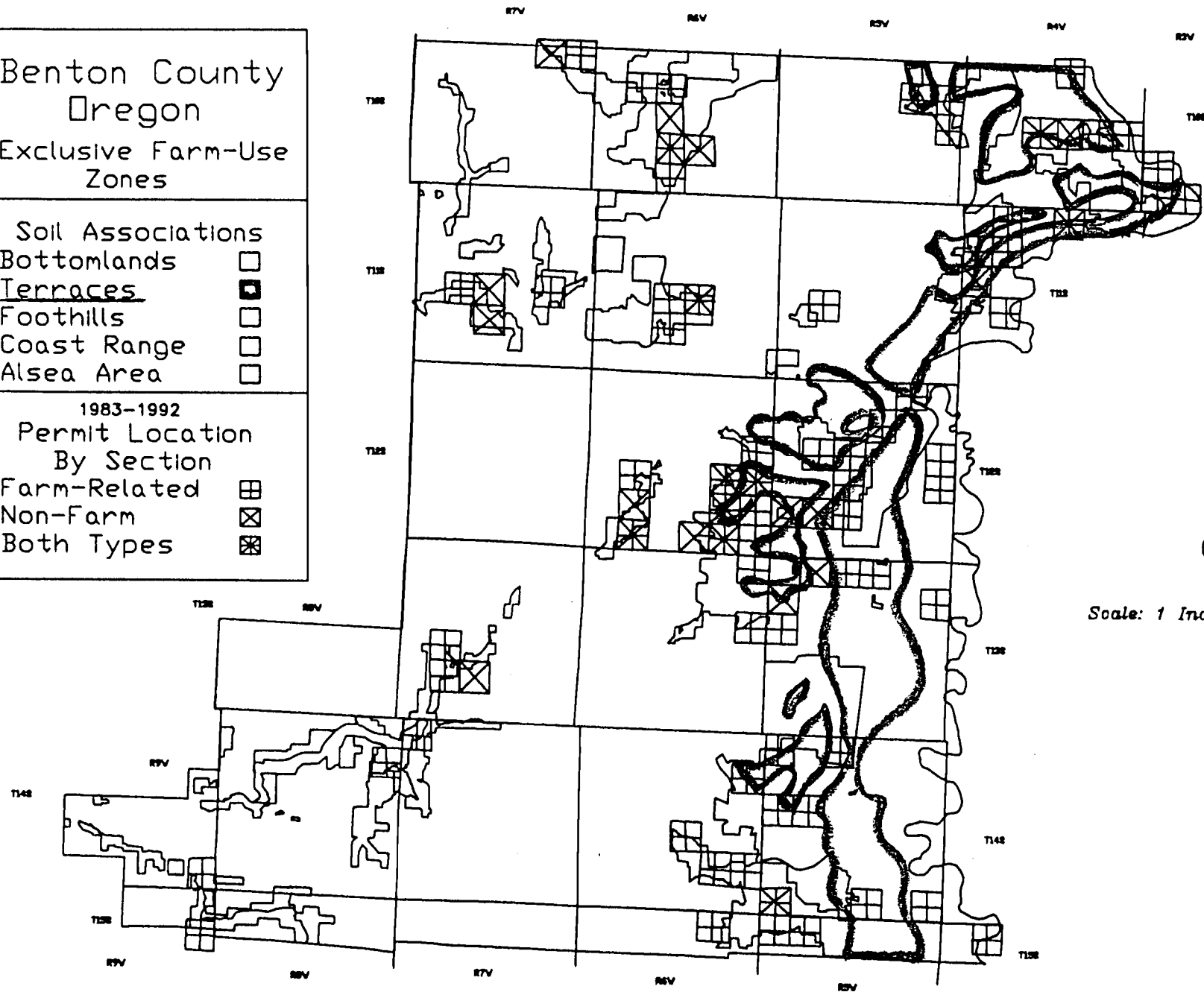
Scale: 1 Inch = 4.73 Miles

By Patrick J. Chinton 1993
 Sources: Benton County Survey Office;
 Benton County Development Office;
 Soil Survey of the Benton County, Or. Area

Benton County
 Oregon
 Exclusive Farm-Use
 Zones

- Soil Associations
- Bottomlands
 - Terraces
 - Foothills
 - Coast Range
 - Alsea Area

- 1983-1992
 Permit Location
 By Section
- Farm-Related
 - Non-Farm
 - Both Types



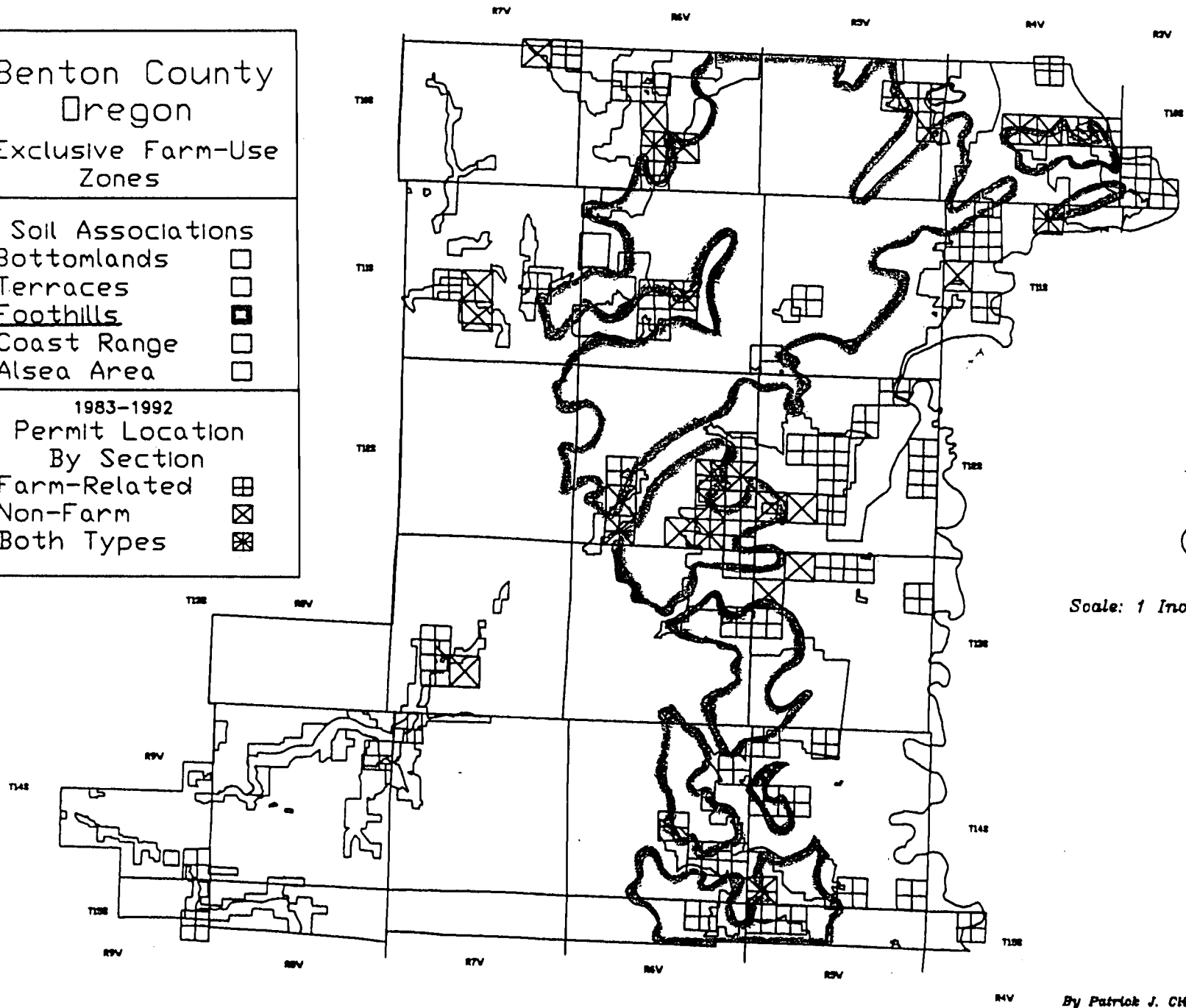
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Benton County
Oregon
Exclusive Farm-Use
Zones

Soil Associations
 Bottomlands
 Terraces
Foothills
 Coast Range
 Alsea Area

1983-1992
 Permit Location
 By Section
 Farm-Related
 Non-Farm
 Both Types



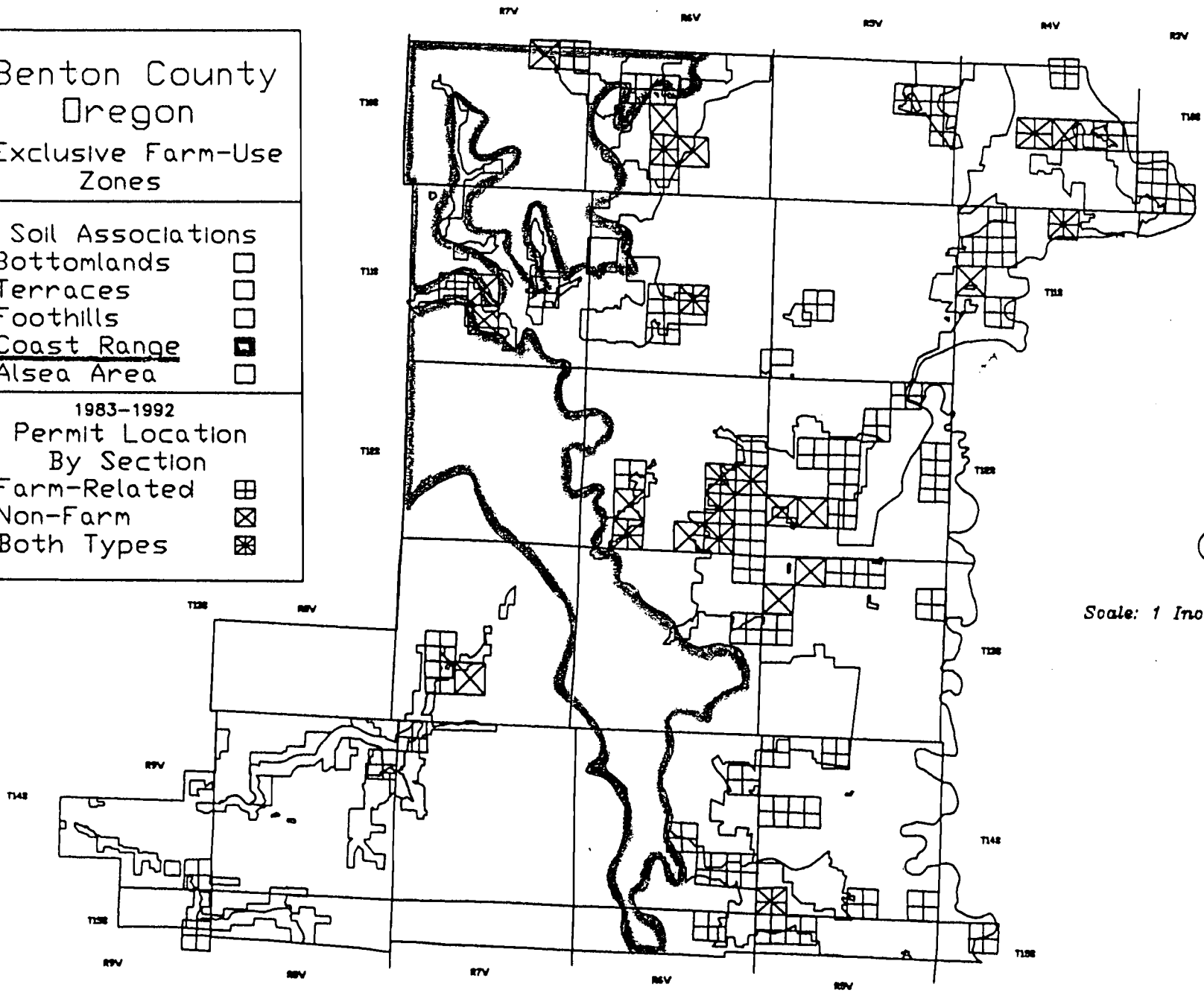
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 Sources: Benton County Survey Office;
 Benton County Development Office;
 Soil Survey of the Benton County, Or. Area

Benton County
 Oregon
 Exclusive Farm-Use
 Zones

- Soil Associations
- Bottomlands
 - Terraces
 - Foothills
 - Coast Range
 - Alsea Area

- 1983-1992
 Permit Location
 By Section
- Farm-Related
 - Non-Farm
 - Both Types



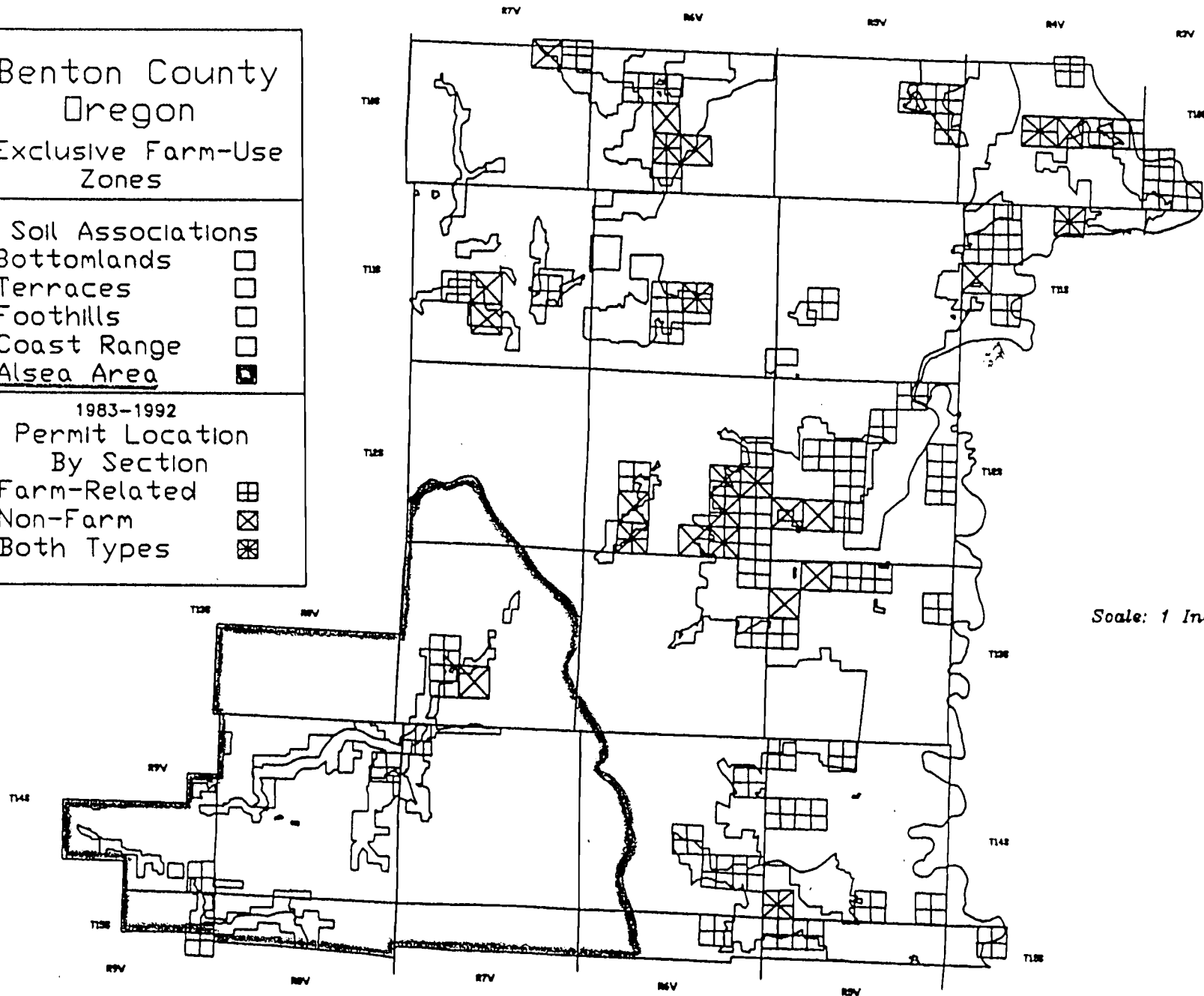
Scale: 1 Inch = 4.73 Miles

By Patrick J. Clinton 1983
 Sources: Benton County Survey Office;
 Benton County Development Office;
 Soil Survey of the Benton County, Or. Area

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The Spatial Distribution of Farm-Related Permit Sites

Twenty-nine of the farm-related permits were sited on the bottomlands of the county representing 37% of the cases in the study. Twenty-four or 31% were sited on the Willamette Valley terraces. Eighteen or 23% were in the foothills. Five were in the Alsea area and two were in the coast range.

The set of farm-related dwelling sites rated class 'D' were evenly distributed with six on the bottomlands, six on the valley terraces, and six in the foothills. One was in the coast range.

The set of class 'C' permits were evenly distributed as well, with eight on the bottomlands, seven on the valley terraces, and six in the foothills. One was in the coast range and three were in the Alsea area.

Those farm-related permits rated class 'B' tended to be approved more for sites on the bottomlands of the county, with eight on bottomlands, three on the valley terraces, and two in the foothills. One was in the Alsea area.

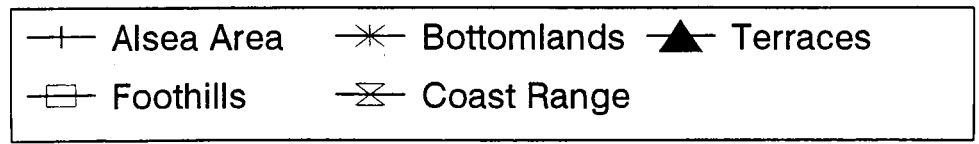
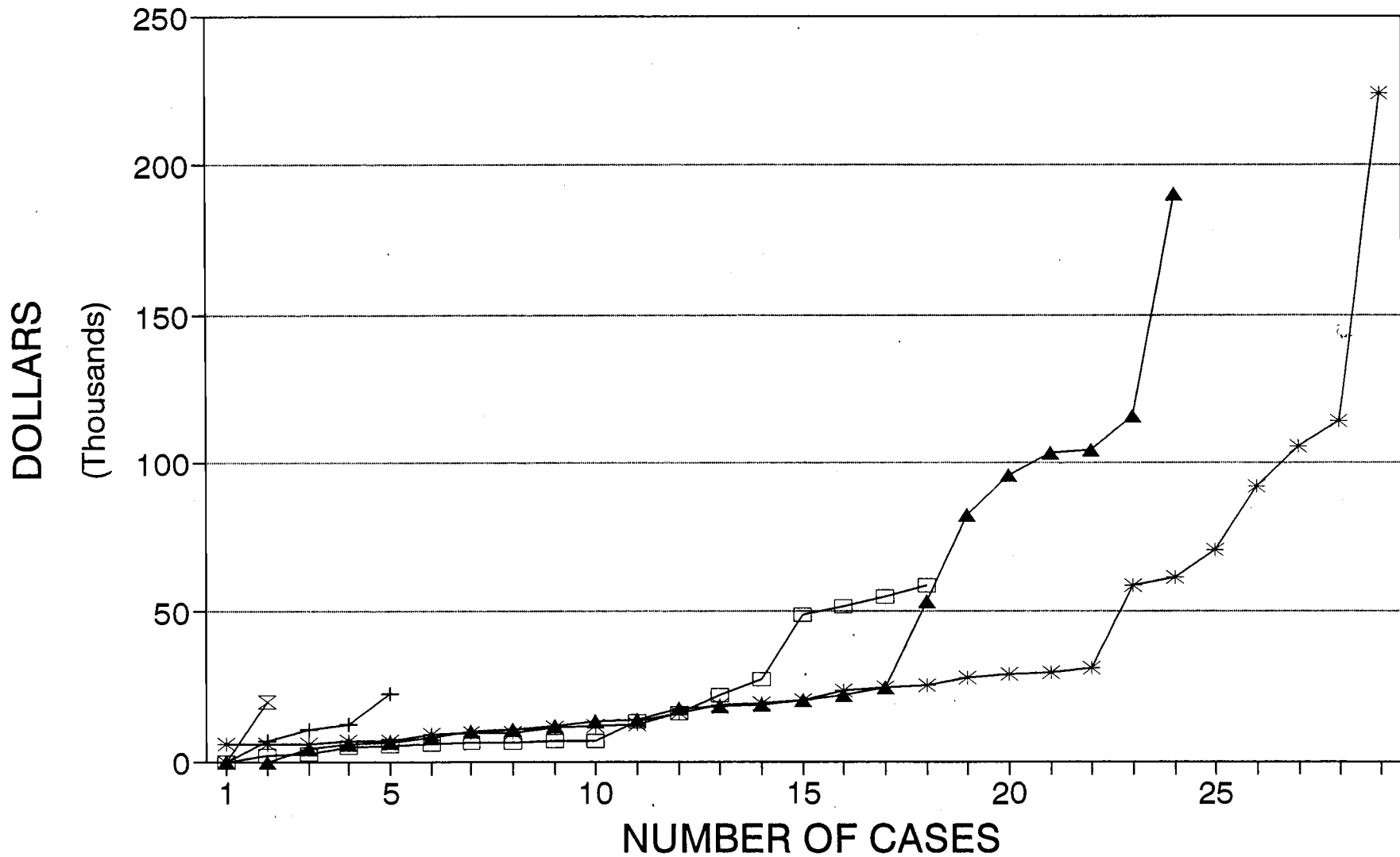
None of the farm-related permits sited on parcels rated class 'A' were sited in the Alsea area or the coast range. Seven were on the bottomlands, seven on the valley terraces, and four in the foothills.

The two farm-related permits sited on state-owned parcels were located in the Alsea area and on the valley terraces.

Figure 2. is a graphic representation of the distribution of farm-related dwelling permits issued during the study period by generalized landform location and estimated potential gross sales.

Figure 2.

Spatial Distribution Farm-Related Dwelling Permits 1983-92



Spatial Distribution of Non-Farm Dwelling Permit Sites

Seven of the non-farm permits were sited on the bottomlands of the county, representing 28% of the cases in the study. Six, or 24%, were sited on the Willamette Valley terraces. Ten or 40% were in the foothills. One was in the Alsea area and one was in the coast range.

The non-farm permit for a class 'A' rated parcel was sited in the foothills. The permit for a class 'B' rated parcel was sited on the bottomlands.

Two of the permits in the class 'C' category were sited on the bottomlands, one on the valley terraces, and one in the coast range.

In the category of non-farm dwelling permits for construction on parcels rated class 'D', four were sited on the bottomlands, five on the valley terraces, nine in the foothills, and one in the Alsea area.

The parcel owned by a tax exempt organization granted a non-farm dwelling permit was located on the bottomlands.

A summary of the spatial distribution of the dwelling permit sites in the study by permit type and evaluation classification is shown in table 6.

Table 6. THE SPATIAL DISTRIBUTION OF DWELLING CONSTRUCTION SITES APPROVED IN BENTON COUNTY, OREGON, EFU ZONES 1983-92

Permit Type	Location	Number of Permits by Parcel Class			
		Class A	B	C	D
Farm-Related					
	Bottomlands	7	8	8	6
	Valley Terraces	7	3	7	6
	Foothills	4	2	6	6
	Coast Range	0	0	1	1
	Alesea Area	0	1	3	0
	Class	A	B	C	D
Non-Farm					
	Bottomlands	0	1	2	3
	Valley Terraces	0	0	1	5
	Foothills	1	0	0	9
	Coast Range	0	0	1	0
	Alesea Area	0	0	0	1

Analysis

The spatial distribution of the dwelling permit sites in the study is fairly even between the bottomlands, valley terraces, and the foothills, with those in the coast range and the Alesea area being exceptions. There is a slight trend for farm-related permits to be sited at lower elevations and non-farm permits to be sited at higher elevations. This trend is also reflected in the relative conformity of permits to county standards.

Conclusions

The purpose of the monitoring portion of this research project was to demonstrate an application of a potential gross sales test and to provide information to Benton County planning staff. The quantitative aspects of the analysis are accurate within the limitations of the potential gross sales test, but the findings of the test remain estimates and not absolutes. While the qualitative aspects of the analysis are based upon standards found in Oregon Administrative Rules, they are somewhat simplified. The actual application of planning permit standards is more rigorous and requires more information than the scope of this analysis allows.

In terms of evaluating Benton County's permit decisions, the findings of this analysis are only valid as a general monitoring tool. An actual farm operation may, in fact, produce specialty crops or livestock yielding higher gross sales than estimated by this procedure. For example, a 15-acre parcel in strawberries or Asian pears could produce over \$40,000 in gross sales. A parcel that is farmed as part of a larger non-contiguous ownership unit or that uses rented or leased lands would not be detected in this analysis. Forestry and grazing practices are not included in this analysis although they may have been a factor in the approval of a farm-related dwelling permit.

Also, there was not an attempt to evaluate the impact on the commercial agriculture land base, or in surrounding commercial agricultural operations, or in the cumulative impacts of individual

permit decisions. While 49% of all farm-related dwelling permits were flagged for closer investigation because they fell below test thresholds and were located in prime commercial areas of bottomlands and valley terraces, altogether these permits totaled 38 over a 10-year period. Assuming site conditions justified some of the permits, it could be argued that the overall number of improper new farm dwellings in the EFU zone would be relatively small for a fast-growth county.

The potential gross sales procedure outlined in this paper can be a useful tool for county planners in reviewing a permit application or for state planners in monitoring compliance with state and local land use regulations. It can also be used by local planners for addressing the gross sales tests that are a part of the LCDC administrative rules for designation of small-scale agricultural lands. The administrative rule outlines a procedure using soil survey yields, indicator crops, and Extension Service gross sales estimates for applying gross sales tests (10,13). The procedure outlined in this study uses the same factors but provides a more parcel-specific database on which to base gross sales estimates and is more efficient to apply to a base map.

The procedure could have other applications as well, such as for spatial economic analysis, tax deferral analysis, and for evaluating alternative land uses. With more applications in different counties, refinements can improve and, perhaps, further simplify the procedure.

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Endnote:

Mathematical Representation
of the Potential Gross Sales Test

Let nVP_n = Value of Production for Crop n , Year n

Let nHA_n = Harvested Acres for Crop n , Year n

Let $VP_1/HA_1 < VP_2/HA_2 < VP_3/HA_3 < VP_4/HA_4 < VP_5/HA_5$

For Indicator Crops 1, 2, and 3

Let $\sum_{i=1}^5 1HA_n = X$; $\sum_{i=1}^5 2HA_n = Y$; $\sum_{i=1}^5 3HA_n = Z$

A) County level Potential Gross Sales per Acre

Estimate =

$$\frac{\sum_{i=1}^5 1HA_n}{X+Y+Z} \cdot \frac{\sum_{i=3}^5 1VP_n}{3} +$$

$$\frac{\sum_{i=1}^5 2HA_n}{X+Y+Z} \cdot \frac{\sum_{i=3}^5 2VP_n}{3} +$$

$$\frac{\sum_{i=1}^5 3HA_n}{X+Y+Z} \cdot \frac{\sum_{i=3}^5 3VP_n}{3}$$

B) Adjustment Percentage by Soil Class from
Assessor's Rent Schedule for irrigation class =

$$\frac{Rent_n}{\sum_{i=n1}^{nx} Rent_{n1..nx}} \cdot \frac{1}{nx}$$

The Adjusted Gross Sales Factor = A) • B)