

FLOOD PLAIN LAND USAGE AND REGULATIONS:
SALEM, EUGENE-SPRINGFIELD URBAN AREAS

by

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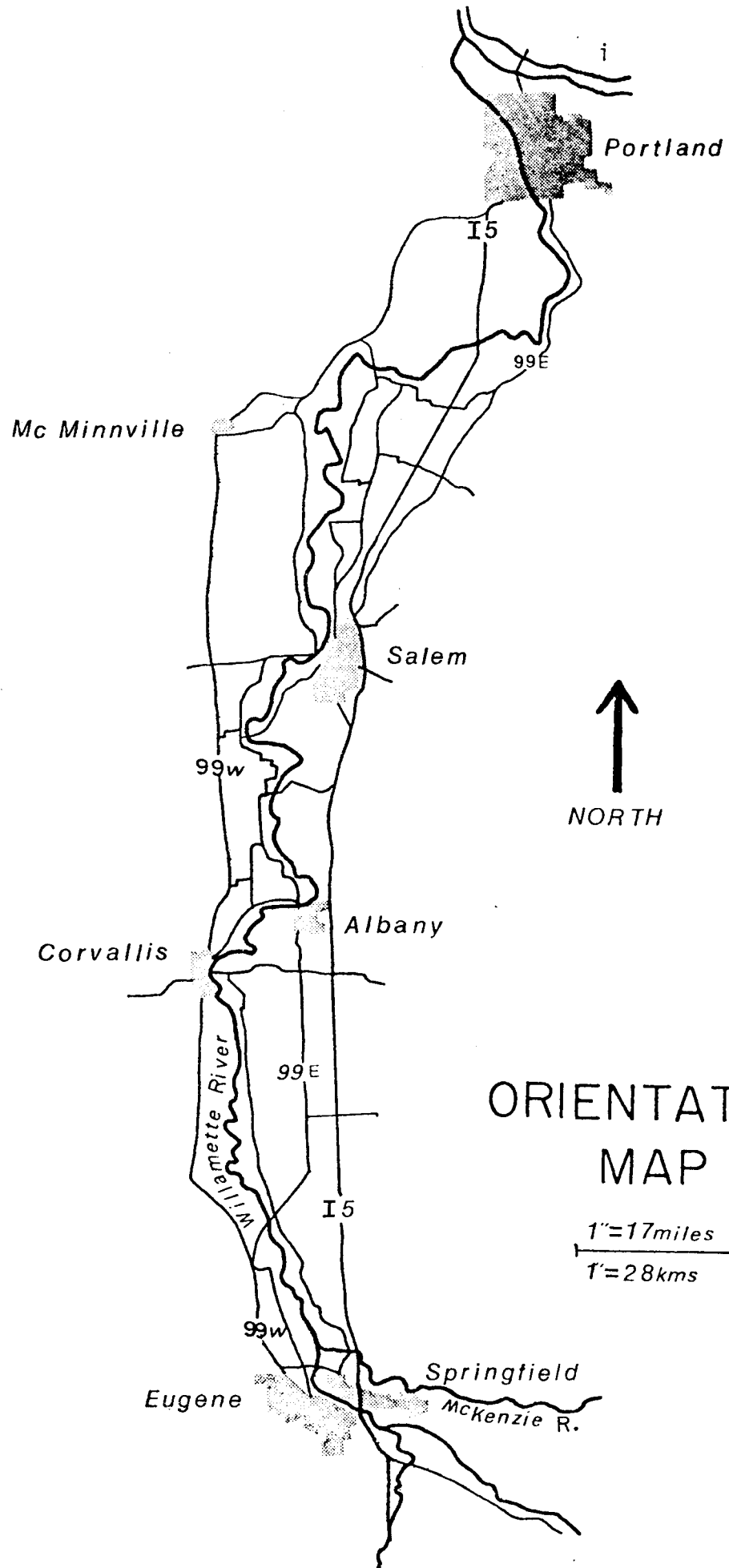
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ABSTRACT

The Salem and Eugene-Springfield Urban Areas are faced with the task of managing the flood plain lands which lie near them. In the past, flood plain usage was not regulated and many dollars worth of damage has occurred to land and structures. This type of thinking is now changing, and most communities are developing flood plain management programs.

The first step in preparing a flood plain management program is to inventory existing land uses. The second step is to set up criteria for development through zoning ordinances, sub-division codes, and flood plain management policies and goals.

This paper presents the existing land uses of the Salem and Eugene-Springfield Urban Flood Plains, and the regulations which are aimed at controlling development of these areas.



ORIENTATION MAP

1"=17miles
1'=28kms

FLOOD PLAIN LAND USAGE AND REGULATIONS:

SALEM, EUGENE-SPRINGFIELD URBAN AREAS

¹Historically, waterways have been attractors of growth. The level land adjacent to streams and rivers provided opportunities for agricultural production while the waterways themselves provided a source of water supply and transportation. Urban centers naturally developed in such locations. However, the choice of such sites many times resulted in a conflict between man and nature. When called upon to carry greater than normal quantities of water, streams and rivers occasionally inundate the comparatively flat areas immediately adjacent to the normal stream channels. In actuality, these areas are only extensions of the normal stream channels, and are commonly referred to as flood plains. Conflicts inevitably arise when urban center or other developed uses are constructed in a flood plain. Flooding of such areas involves a hazard to both life and property.

The urban centers of the Willamette Valley were attracted to waterways for the same reasons as other urban centers were attracted to waterways elsewhere. The populations of these urban centers are now growing at a high rate, and one of the many problems associated with this growth relates to where these new people settle. Land use needs include space for homes, businesses, and recreation. The smooth to gently undulating surfaces of the Willamette Valley flood plains, which are readily accessible to many of the expanding urban centers,

are viewed by some as providing reasonable areas for settlement to take place.

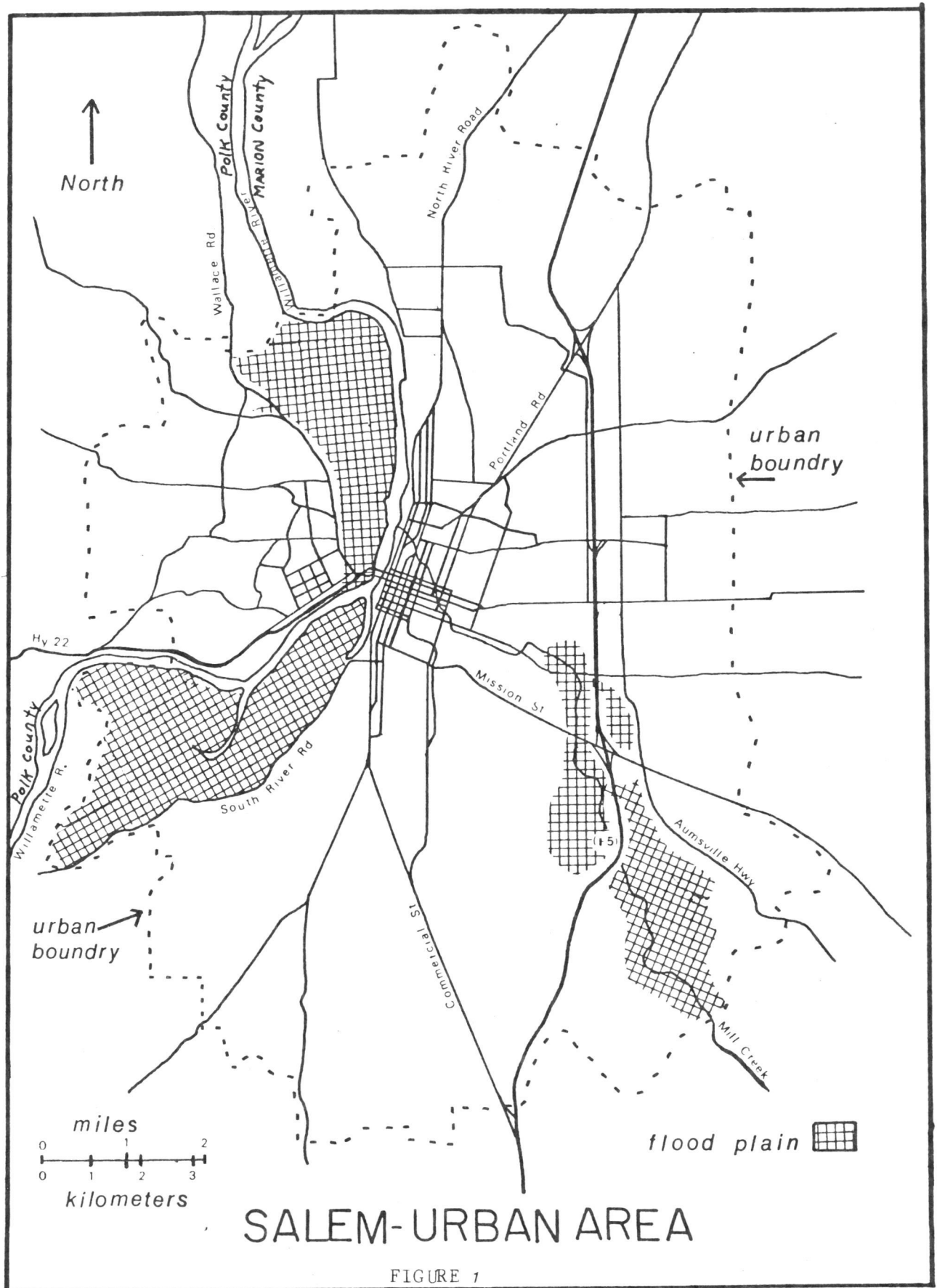
One of the most important considerations in land use planning is the manner in which the land is currently being used. Most existing developed uses will remain in the future and will have a strong influence on the future pattern of development and land use. This study intends to show land use patterns which now exist on two flood plain areas in the Willamette Valley. The areas studied are the flood plains located within the Salem "urban boundary," as defined by the "Salem Area Transportation Plan," (Fig. 1, pp. 4) and the flood plain located within the Eugene-Springfield "urban area," as defined as the "urban service area", in the "Eugene-Springfield Metropolitan Area Plan Diagram - 1990 General Plan," (Fig. 2, pp. 5).

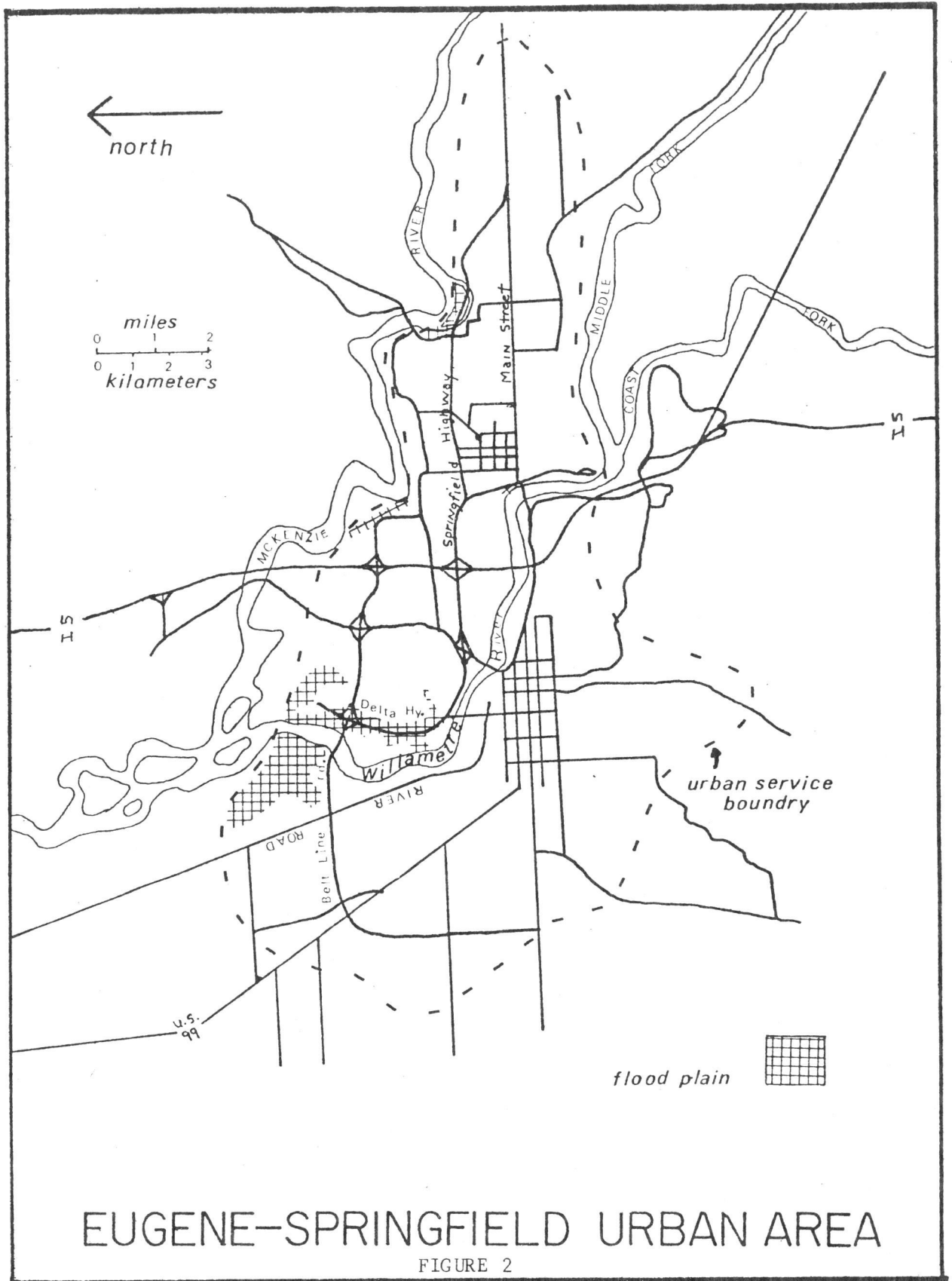
In addition to examination of the urban flood plain land uses in the Salem and Eugene-Springfield metropolitan areas, this study also compares the present land uses of the two area, examines the policies and regulations of Polk, Marion, and Lane Counties which deal with flood plains, and compares the policies and regulations of these agencies to each other.

There are a number of terms used in this paper which may need to be defined because their meaning is not always clear. The definitions follow:

DEFINITIONS

Flood Plain: This term will be used to identify land





which has a one-percent chance of being inundated by flood waters in any one year. It is commonly called the 100 year flood plain.

Floodway: The minimum area for the passage of flood waters in order that flood heights upstream are not increased beyond an acceptable amount.²

Floodway Fringe: That portion of the flood plain lying outside of the designated floodway, but within the 100 year flood plain.³

Eugene-Springfield Urban Area: This is the "Urban Service Area" as defined on page 12 of the Eugene-Springfield Metropolitan Area - 1990 General Plan.⁴

Salem Urban Area: The area within the urban growth boundry as shown in the Salem Area Transportation Study - 1982 Amended Transportation Plan.

Research Procedures

The main procedures used in developing the information base for this study were as follows. Field observations were accomplished by traversing both study areas by automobile and the Salem area by airplane. Further investigation was done through examination of the various pertinent comprehensive and general plans. Other important documents were reviewed. Zoning ordinances of Marion, Polk, and Lane Counties were examined, and regulations concerning flood plains were extracted. Willamette River Greenway Study Books, two and four, were valuable for information which could be interpreted

from the aerial mosaic maps which they contain. Flood plain literature, building codes, planning goals, zoning maps, topographic maps, and political maps were also employed.

The final method used in preparing this study was contact with the local planning agencies. This contact was either through the mail, or from interviews at the planning agencies located within the study areas.

Flood plain data for Salem was taken from the Army Corps of Engineers maps, and the flood plain data for Eugene-Springfield was taken from a Lane Council of Governments map.

The existing land uses in the flood plain are classified into seven categories. These categories are open space, agricultural, recreational, commercial, residential, industrial, and state government lands. These are explained below:

Open Space Land: These are lands which are lying idle or not being used at this time.

Agricultural Land: Land which is being used for agricultural purposes. This includes the growing of grain, hay, grass seed, livestock, and farm homes.

Residential Land: Areas which have had homes developed on them.

Commercial Land: Retail and wholesale business establishments.

Industrial Land: Land being used for industrial purposes including sand and gravel operations.

State Government Land: A special classification which

includes only the lands which are part of the Oregon State Penitentiary system.

Each of these types of land will be examined and plotted on maps. Comments will be made in a letter section of this paper.

GEOGRAPHIC DESCRIPTION OF STUDY AREAS

The Willamette Basin is a broad synclinal trough, the axis of which roughly parallels the Willamette River. The basin is about 150 miles (241 kilometers) long and about 75 miles (120 kilometers) wide. The basin is bounded on the east by the Cascade Range, on the south by the Calapooya Mountains, on the west by the Coast Range, and on the north by the Columbia River.

The Willamette River lies within the western half of the basin. with an area of approximately 3,500 square miles (9,011 sq. kilometers), the valley extends almost the length of the basin at an average width of 30 miles (48 kilometers).⁵ The valley is generally level to rolling in topography with several groups of hills and buttes.

Both the Salem and the Eugene-Springfield urban areas lie within the bounds of the Willamette Valley. Salem lies just north of the approximate geographic center of the Willamette Valley, and Eugene-Springfield lies at the southern end of the valley.

The climate of the Willamette Valley is classified as Marine West Coast,⁶ with moderately warm, dry summers and mild, wet winters.

Salem

A look at Salem reveals an interesting combination of charact-

eristics. Although definitely urban in its commercial and political development, it still preserves a distinguishable rural flavor relative to the farm life that closely surrounds it. Population-wise as well, Salem is a cross between big-town governmental operations and small-town intimacy, making it a manageable yet challenging city. This challenge will be even greater in the future, as the metropolitan populations has now grown to 115,000.⁷

Because there are no major geologic barriers to impede development, Salem has developed in all directions. The Willamette River was once a barrier to the west, but this effect was overcome long ago. Yet, there remain four limitations to development in the Salem area. These limitations are, flood plains, building site limitations, septic tank filter field limitations, and landslide areas. Because this paper deals with existing land uses of flood plains, flood plains will be the only limitation discussed.

There are three large flood plain areas within the urban boundaries of the Salem area. Two are located adjacent to the Willamette River, one in Marion County, and one in Polk County. (Fig. 3, pp. 13). The third flood plain area lies adjacent to Mill Creek in the south-eastern part of Salem. (Fig. 4, pp. 14) For ease of identification the three flood plains areas will be known as the Willamette-Polk, the Willamette-Marion, and the Mill Creek Flood Plains.

The Willamette-Polk Flood Plain contains approximately 2,000 areas (809 hectares), and is located in Polk County. This flood plain is bounded to the west by Walker Road, and the 150 foot (46 meter) elevation contour, and to the north, south, and east by the Willamette River.

The Willamette-Marion Flood Plain is located southwest of Salem on Minto/Browns Island. It contains 2,300 acres (990 hectares) of land, is bounded to the north by the Willamette River, to the east and south by the Willamette Slough, and to the southwest by Illahe Hill.

The Mill Creek Flood Plain is the smallest of the three flood plains in the Salem area. It's 1,500 acres (635 hectares) of land are located adjacent to Mill Creek from a point just west of Interstate Highway Five, and near State Street, to the southern edge of the urban boundary located along the Aumsville Highway.

Eugene-Springfield

The Eugene-Springfield Metropolitan Area lies at the southern end of the Willamette Valley approximately 100 miles (161 kilometers) south of Portland. The Willamette River flows through the metropolitan area and the McKenzie River skirts the area to the north. The area which encompasses 90 square miles (233 sq. kilometers) and has a population of 140,000, has had rapid development since World War II. Here, as in the Salem area, there are no great barriers to growth, except Sunset Hill to the south, and this has led to urban sprawl in some instances.

The Eugene-Springfield Metropolitan Area has approximately 1,450 acres (586 hectares) of flood plain lands within the projected 1990 "urban services area". There is one large flood plain which lies in the Goodpasture Island area. This flood plain is located on both sides of the Delta Highway and extends across the Willamette

River to the west, where it is located to the north of Belt Line Road. (Fig. 5, pp. 15) There are three small flood plain areas consisting of no more than 100 acres (41 hectares) which are also located in the Eugene-Springfield area. Two of these are located on the McKenzie River flood plain and one is on the Willamette River flood plain. (Fig. 2, pp. 5)

FLOOD PLAIN LAND USAGE

The seven major types of land uses which have been identified in this paper will be discussed next. The use which would suffer the least amount of damage, during times of flooding, will be presented first, and the other uses will be presented in an order which correlates with potential damage.

Open Space Land

Salem

There are approximately 2,118 acres (856 hectares) of open space lands within the Salem Area Flood Plains. This represents 36 percent of the total flood plain in the Salem area. Open space land is the second largest land usage to be found on these flood plains.

There are 922 acres (312 hectares) of open space located on the Willamette-Marion Flood Plain. The majority of this land lies on Minto-Browns Island, which is a proposed city-county park site. The rest of the open space is distributed throughout the remainder of the area.

The 772 acres (312 hectares) of open space which is located

within the Willamette-Polk Flood Plain is dispersed to a great degree, and acts as barriers along roads, between agricultural lands, and also is found adjacent to the Willamette River.

The 424 acres (171 hectares) of open sapce, along Mill Creek borders two sand and gravel operations which are located west of the Aumsville Highway.

Eugene-Springfield

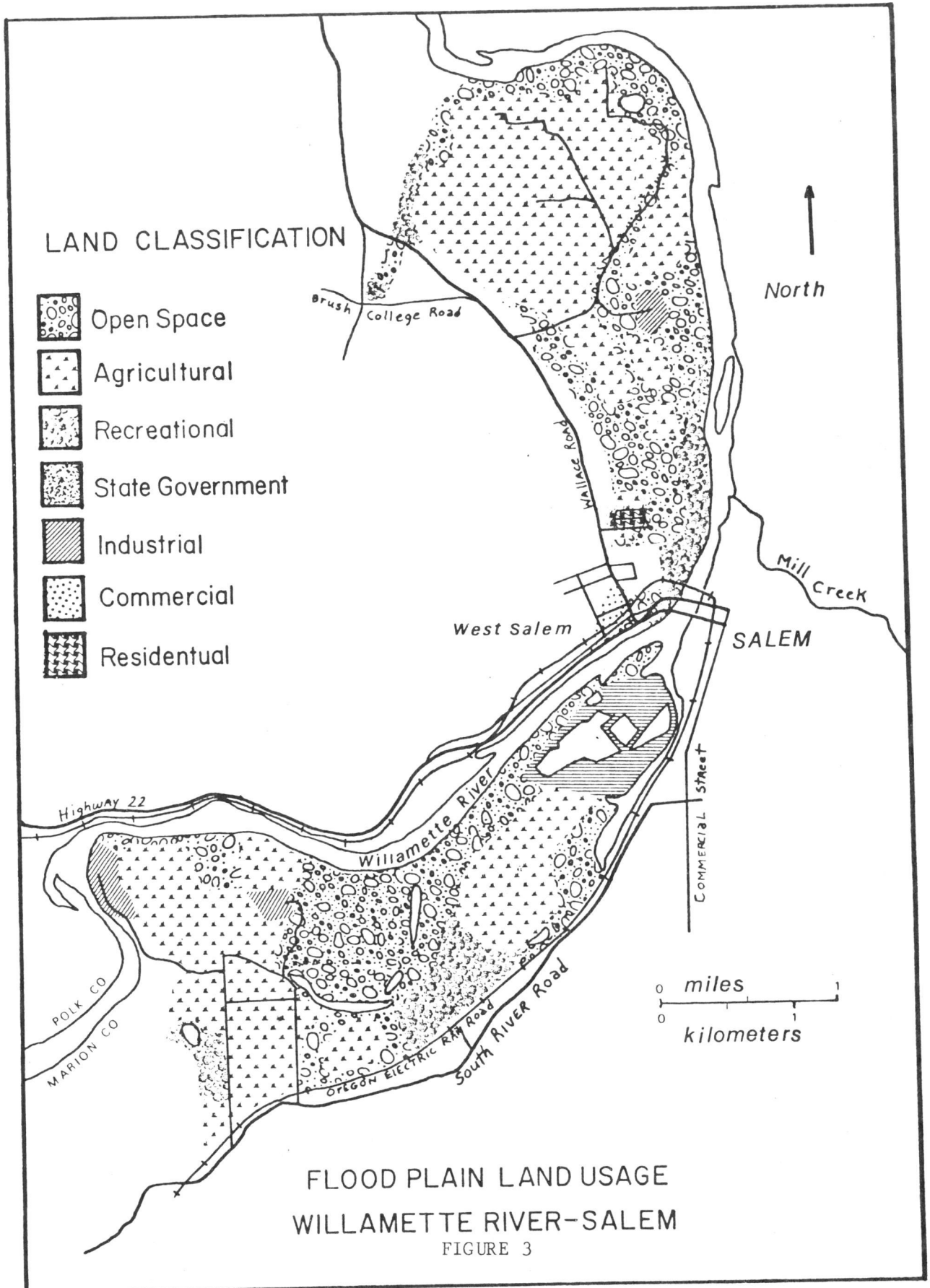
The open space area located on the Eugene-Springfield Flood Plain surrounds the Delta Highway on Goodpasture Island. This open space is approximately 275 acres (111 hectares) and represents 19 percent of the flood plain lands within the metropolitan area. This is an area of high grasses and small ponds, and is also adjacent to the Valley River Shopping Center, which is a local attraction in the Eugene locality.

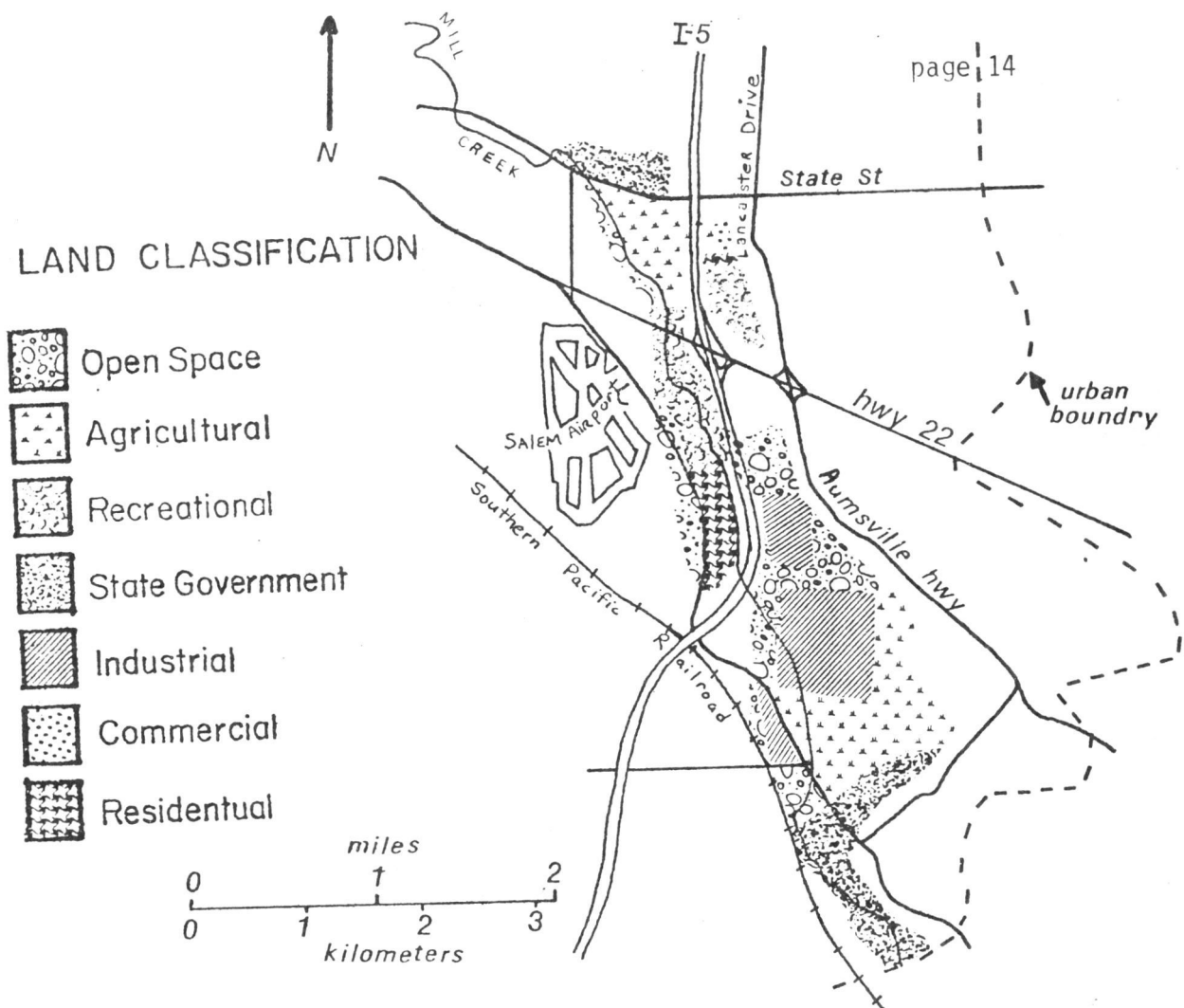
Agricultural Land

Salem

Agriculture is the largest single use of land on the Salem Area Flood Plain; representing 42 percent of the total flood plain, it encompasses approximately 2,500 acres (1,000 hectares), and plays a large part in the life of the Salem area. Of this, 1,050 acres (425 hectares) of agricultural land lies on the Willamette-Polk Flood Plain, 945 acres (382 hectares) lies on the Willamette-Marion Flood Plain, and 463 acres (189 hectares) are located on the Mill Creek Flood Plain.

The crops which are grown on these lands vary from location





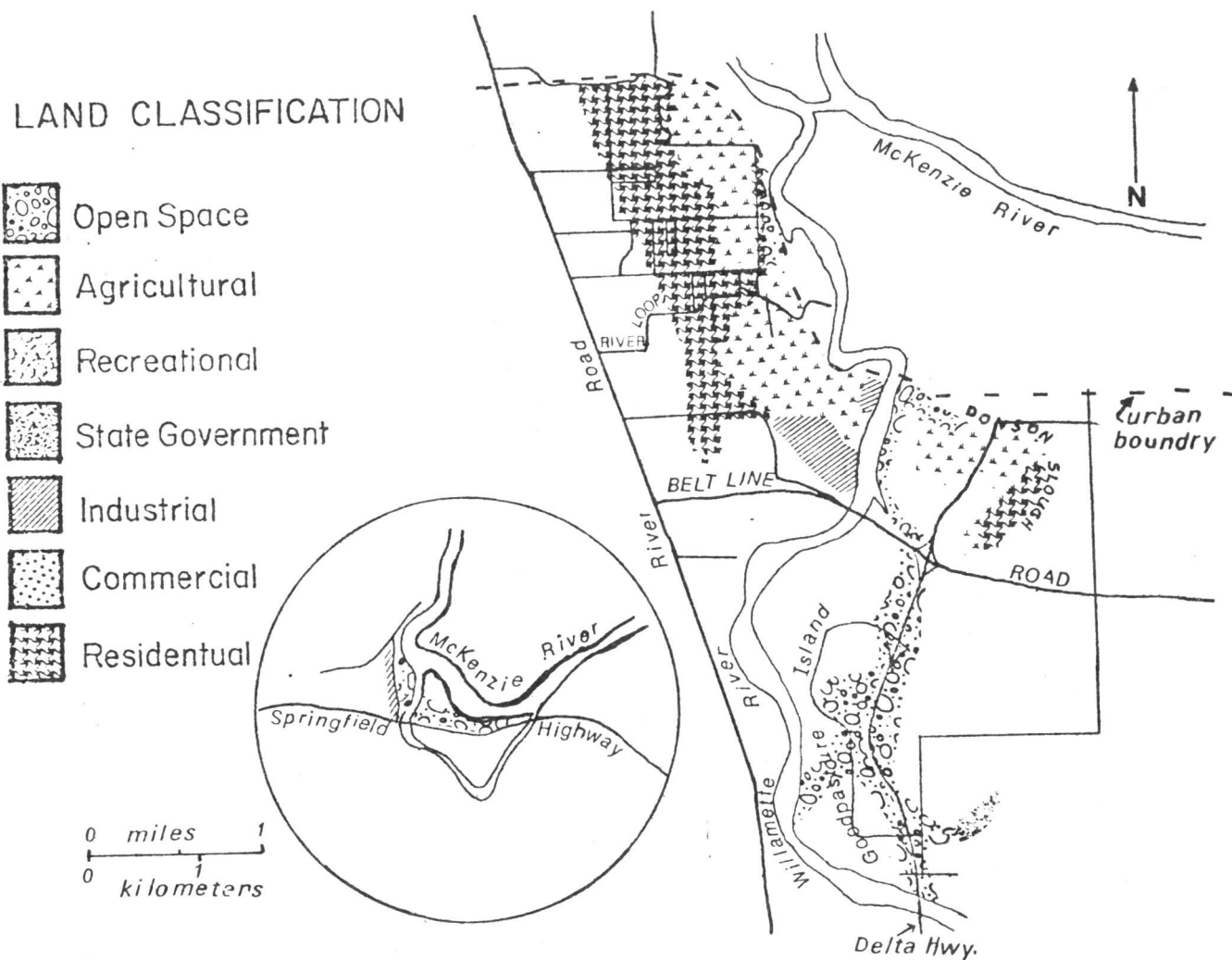
FLOOD PLAIN LAND USAGE, MILL CREEK-SALEM

FIGURE 4

to location; about one half of these lands are in orchards and the other half are in other crops.

Eugene-Springfield

Agriculture represents 42 percent of the use of the total Eugene-Springfield Urban Area Flood Plains lands, and is the number one use in the area. There are 604 acres (244 hectares) of agricultural lands, which are evenly divided between orchards and other crops.



FLOOD PLAIN LAND USAGE, EUGENE-SPRINGFIELD

FIGURE 5

The orchards are located west of the Willamette River along River Loop Road, and the other crops are located east of the river in the Dodson Slough area.

Recreational Land

Salem

The most predominate feature of the Salem Area Flood Plains,

concerning recreational lands, is that there are four golf courses located within their boundries. Salem Golf Club and part of Illahe Hills Country Club are located on the Willamette-Marion Flood Plain. Salem Town Golf Course is located east of Walker Road in Polk County, and Meadowland Golf Course is located adjacent to Interstate Highway Five and Highway Twenty-two, in Marion County. These four golf courses account for approximately 200 (81) of the 443 acres(179 hectares) of recreational land which lies within the Salem Urban Flood Plain boundries. The rest of the acreage is divided between three parks. These parks are Brush College, Cascade Gateway, and Wallace Marine. Brush College and Wallace Marine are located on the Willmaette-Polk Flood Plain and Cascade Gateway is located, near Interstate Five, on the Mill Creek Flood Plain. Recreational uses account for 8 percent of the Salem Flood Plain area.

Eugene-Springfield

Recreations lands account for just over 1 (one) percent of the Eugene-Springfield Urban Area Flood Plain. Island Park, located in Springfield along the Willamette River, is 15 acres (6 hectares) in size and accounts for almost all of the areas recreational land. There are 5 acres (2 hectares) of flood plain lands which are part of the Eugene Golf Club, which is located near Valley River Center.

State Government Land

This is a special classification which was established to deal with those sections of the Oregon State Penitentiary Complex and Penitentiary Annex which lie on the Mill Creek Flood Plain in the

Salem Urban Area. These lands account for 5 percent of the total flood plain in the Salem area and are approximately 300 acres (121 hectares) in size.

Industrial Land

Salem

The industrial lands of the Salem Urban Flood Plain are dominated by two major uses. These are Boise Cascade's industrial waste ponds, located at the northern tip of the Willamette-Marion Flood Plain, and four sand and gravel operations, two of which are located on the Mill Creek Flood Plain. The total area of these industrial lands is approximately 485 acres (231 hectares) and is 8 percent of the Salem Urban Flood Plain lands.

Eugene-Springfield

There are 75 acres (30 hectares) of land now being used for industrial purpose on the Eugene-Springfield Urban Flood Plain Area. This area contains three sand and gravel sites located north of Belt Line Road, which accounts for 5 percent of the total Eugene-Springfield Urban Flood Plain. There is also some light industry located between the McKenzie River and the Springfield Highway which accounts for 5 acres (2 hectares) of land.

Commercial Land

Salem

Commercial lands are very scarce in the Salem Urban Flood Plain, representing only .05 percent of the total flood plain lands.

There are two areas used for commercial activities at present. The first, a 22 acre (9 hectare) area of land, engaging in general retail commercial activities, is located in West Salem along Wallace Road, and the second, a 7 acre (3 hectare) area of land, is part of the South Salem Drive Inn on Lancaster Drive in the Mill Creek area.

Eugene-Springfield

There are no areas of commercial activity located within the bounds of the Eugene-Springfield Urban Flood Plain.

Residential Land

Salem

Salem has two small residential areas located on its flood plain which total 70 acres (28 hectares) of land. One 27 acre (11 hectare) residential area of low cost government housing is located in West Salem east of Wallace Road, on Taybin Road. There are 43 acres (17 hectares) of residential lands south of Cascade Gateway Park next to Turner Road. This area is a mobile home park known as Paradise Island. Residential lands account for just 1 (one) percent of use in the Salem Urban Flood Plains.

Eugene-Springfield

Land for homes is the second largest use of land on the Eugene-Springfield Urban Flood Plain. There are 477 acres (193 hectares) of land now being used for residential purposes in the Eugene-Springfield Urban Flood Plain Area. This represents 33 percent of the total area. Residential areas are located both to the east

and to the west of the Willamette River, and near Belt Line Road. A large residential neighborhood is located to the northwest of the Belt Line Road Bridge, and a small area consisting of a trailer court is located to the east. James Madison Junior High School also lies within the residential area to the northwest of the bridge.

Summary and Comments

The first section of this paper has shown the existing uses of the flood plains of two very similar urban areas. It has shown where these lands are located and their extent.

These areas, similar in climate, topography, and culture share a problem with the rest of the people of Oregon. As with most Oregonians, the people of Salem and the Eugene-Springfield Urban Areas have had to learn to live with continued growth. This growth, which has not always been controlled, needs to take place in the best possible locations. For this to occur there needs to be planning, and before that data gathering. This paper has brought data together which may help to show similarities and differences in the flood plain land uses of the Salem, and the Eugene-Springfield urban areas. It is the differences which may have the most meaning.

The most obvious difference in the two areas is the fact that the urban flood plain in the Salem area is four times as large as the flood plain in the Eugene-Springfield area. In Salem the flood plain encompasses 5,891 acres (2,383 hectares) of land,

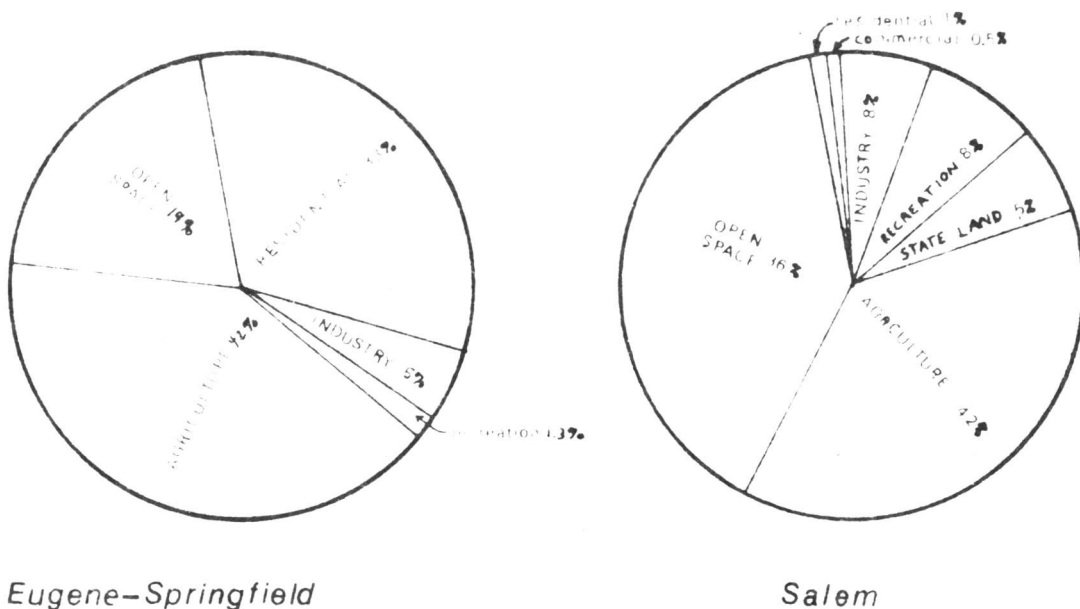


FIGURE 6 - THE PERCENTAGE OF LAND IN EACH TYPE OF USE

whereas the Eugene-Springfield Flood Plain is 1,451 acres (586 hectares).

On a percentage basis both areas have the same amount of agricultural lands located on their respective flood plains. There are also very large areas of open space located in both areas. The biggest difference in land use of the two areas lies in the fact that the Eugene-Springfield area has 33 percent of its urban flood plain lands being used for residential purposes, whereas only 1 (one) percent of the Salem Flood Plain is being used for this purpose. The Eugene-Springfield Urban Flood Plain area has 38 percent of its lands developed. Only 9.5 percent of the Salem Area Flood Plains is developed. This is where the main difference

in existing land use can be found. These developed lands are the lands which will receive, and cause the most damage during times of floods. These are the types of uses which most governmental agencies would like to try to keep out of the flood hazard areas.

In the future there may be added pressures to urbanize the flood plains in and around the Salem and the Eugene-Springfield areas, and because of this, land uses will be changing all the time. A need for constantly updated inventories of this land and its use will develop.

FLOOD PLAIN MANAGEMENT

For more than 100 years, the U.S. Army Corps of Engineers and other public and private agencies have been engaged in planning and constructing flood control projects in various parts of the country. But dams and flood walls cannot prevent all flooding. The federal government has spent more than seven billion dollars on flood control over the past 30 years, and overall benefits are expected to exceed the cost of that work. Yet annual flood losses, currently estimated at one billion dollars a year, at the national level are increasing.⁸ Attempts to reduce damage caused by flood have included floodproofing, watershed treatment, and flood warning systems. Only recently has the concept of regulating the use of the flood plains been accepted as a realistic flood damage reduction tool.

The trend in the last decade has been towards flood plain management: a blend of structural, regulatory, and other types of

measures designed not only to reduce flood damage but to safely permit certain uses of the flood plain. Flood plain management is one facet of comprehensive planning for an area.

There are two basic steps involved in flood plain management: first the delineation of the areas subject to flooding; and second, such local action as may be practicable to insure that development within the plain is consistent with the degree of flood hazard involved.

Marion and Polk Counties are the local governmental agencies which have the main task of regulating the land uses of the Salem Area Flood Plains. Lane County is the agency responsible in the Eugene-Springfield area. These agencies are guided by the seventh goal of the Oregon Land Conservation and Development Commission's Statewide Planning Goals and Guidelines. The seventh goal is "Areas Subject to Natural Disasters and Hazards".⁹

The primary purpose of flood plain regulations is to minimize danger to public health and safety. The secondary aim is to improve the general welfare by reducing economic loss due to interruption of business and industry or damage to homes and other property. A program that reduces damage will also reduce the number of appeals to public agencies for protection and relief from future floods. Flood plain regulations are not designed to confiscate property but to limit development to that which a reasonable and prudent person would allow based on a knowledge of the conditions which prevail. Development in a floodway constitutes a "public nuisance" by reducing the flow-carrying capacity of the channel and thus endangering others. Development

in the floodway fringe is less likely to damage other property but may endanger the occupant of the development unless installations are designed to overcome the flood conditions.

Zoning Regulations

The zoning ordinance is the most common method of controlling development in flood prone areas. It can be used to prevent construction of obstructions in floodway areas and to require fill, flood-proofing, or other protective measures for structures in floodway fringes. Both the Salem and the Eugene-Springfield Urban Areas have zoning ordinances which deal directly with flood plains.

Salem

Marion and Polk Counties regulate the flood plains of the Salem area with Flood Plain Overlay Zone Ordinances. Both counties use the same ordinance, Chapter 178.000, the purpose and intent of it is shown next.

¹⁰ 178.010. PURPOSE. It is the purpose of the Flood Plain Overlay Zone to regulate the use of those areas subject to periodic flooding and to permit and encourage the retention of open land uses that are compatible and harmonious in nature. In advancing these principles and general purposes of Polk County (Marion County) Comprehensive Plan and Zoning Ordinance, the specific intent of the zone is:

- (1) To combine with present zoning requirement, certain restrictions made necessary for the known

flood plains to promote the general health, welfare and safety of the County.

(2) To prevent the establishment of certain structures and land uses in areas unfit for human habitation because of the danger of flooding.

(3) To minimize danger to public health by protecting the water supply and promoting safe and sanitary drainage.

(4) To reduce the financial burden imposed on the public and governmental units by frequent and periodic flooding.

(5) To permit certain uses which can be strategically located in the flood plain which will not impede the flow of flood waters, or otherwise cause danger to life and property at, above or below their locations within the flood plain.

There are conditional uses which may be allowed in this zone, but they must meet certain criteria before the Planning Commission will approve the use. Conditions which must be met shall include: (1) modification of waste disposal and water supply facilities, (2) limitation on periods of use and operation, (3) imposition of deed restrictions, (4) location and arrangement of structures, (5) requirement for construction of channel modifications, dikes, levees, and other protective measures, (6) placement of survey bench marks, and (7) flood proofing measures designed to be consistent with the flood protection elevation for a particular area.

Subdivisions are not consistent with the purpose and intent

of this zone and are thus prohibited.

Eugene-Springfield

The Eugene-Springfield area is covered by the Lane Code, Chapter 11.500 which specifically deals with "special permit" areas.

Lane Code 11.505 requires that no dwelling, or structure of public assembly as defined in ORS 460.210, shall be located, moved, erected or constructed in any "Lane County Special Permit Area" until a special permit has been obtained from the Director of the Department of Environmental Management.¹¹

Special permits will be issued by the Director of the Department of Environmental Management when it is found that:

(1) The proposed site will not, during potential future flooding, be so inundated by flood water as to result in injury or serious danger of injury to property or to the health, safety and welfare of residents or potential residents of the immediate area.

(2) Finished floor elevation restriction on any proposed structure will place the finished floor of such structure at such an elevation so as to prevent damage to such structure during flooding.

(3) Any subsurface sewage disposal system for a proposed structure will not, during potential future flooding, adversely affect or endanger the health, safety and welfare of residents or potential residents of the area.

(4) Improvements are not proposed that will have a serious

tendency to change the flow of surface water during potential future flooding.

(5) Adequate provision has been made, or is available, for accessibility during potential future flooding so as to insure ingress and egress of emergency vehicles and services during potential future flooding. ¹²

Every permit within these areas is taken on an individual basis, and all considerations are taken into account such as: relative elevation, topography, ingress, egress, and historical data obtained from previous flooding. From this investigation a permit is either approved or denied based on its own individual merits.

Other Regulations and Policies

Salem

Marion County Planning Department has a Flood Plain Development Policy which deals with uses of the flood plains. The primary concern of the planning department is to insure that the rise and movement of flood waters does not damage personal property or endanger life. The second concern relates to the effect which dikes, fills, and structures may have on adjacent properties.

The Marion County Planning Department Flood Plain Development Policy is:

It shall be the policy of the staff to obtain both the 100 year regulated flood elevation and the property elevation before supporting any application. Furthermore, denial of the application will be recommended if evidence suggests

the moving waters or their displacement may create a hazard to life or property.¹³

As a requirement for participation in the National Flood Insurance Program, both Marion and Polk Counties have set up a system of flood plain management which directs development away from the flood hazard areas, and sets up regulations for flood proofing development within the flood plains.

Eugene-Springfield

Lane County also has adopted flood hazard Goals and Policies. The goals are, (1) to respect the natural limitations of the land in those areas identified as being subject to floods, and (2) to reduce the economic and social costs created by improper use of flood hazard areas. The policies are, (1) to develop and apply comprehensive flood hazard analysis and flood plain management data, including necessary land use regulations, and (2) to ensure that flood hazard areas are subjected to selected development, and are used only for compatible activities.¹⁴

In addition to these existing regulations, goals and policies, the Flood Insurance Administration of the Department of Housing and Urban Development will be developing flood insurance rate maps for the county later this year and the county has also applied for Land Conservation and Development Commission grant money to develop a complete Flood Hazard Management Program.

Summary and Comments

Marion, Polk, and Lane Counties are working towards better

flood plain management. This includes regulation, such as zoning and building codes, and also management practices and policies which educate people to the potential hazards. Flood plain management has been changing during the past decade and Marion, Polk, and Lane Counties are keeping step.

Land use regulations are a key part of a flood plain management program. It is one part of the program that can be applied effectively by local governments. However, just as flood control structures were considered the major answer in the past, it would be equally wrong to consider only flood plain regulations today. The counties can use these regulations in an overall plan with other agencies to best manage the flood plain.

Marion, Polk, and Lane Counties, working under the statewide goals and guidelines set up by the Land Conservation and Development Commission are well on their way to good flood plain management.

FOOTNOTES

- 1 Marion County Planning Department, Comprehensive Plan for Marion County, May 1972, p. 26.
- 2 Department of the Army, Corps of Engineers, Flood Plain - Handle With Care!, EP 1105-2-4, March 1974, p. 6.
- 3 University of Oregon Bureau of Governmental Reserach and Service, and State of Oregon Water Resources Board, Flood Plain Management - Oregon Cities and Counties, 1971, p. 2.
- 4 Lane Council of Governments, 1990 Plan, Eugene-Springfield Metropolitan Area 1990 General Plan, April 1976, p. 12.
- 5 Marion County Planning Department, op. cit. footnote 1, p. 7.
- 6 Heintzelman, O. H. and R. M. Highsmith, Jr., World Regional Geography, 3rd Ed., 1967, p. 358.
- 7 Marion County Planning Department, op. cit., footnote 1, p. 50.
- 8 University of Oregon, op. cit., footnote 3, p. 4.
- 9 Oregon Land Conservation and Development Commission, Statewide Planning Goals and Guidelines, December 1974, Tabloid p. 5.
- 10 Polk County Uniform Zone Code, "Flood Plain Overlay Zone,"
§ 178
- 11 Lane County Uniform Zone Code § 11.505 "Special Permit Required."
- 12 Lane County Uniform Zone Code § 11.510 "Issuance of Permits."

- 13 Marion County Planning Department Flood Plain Development Policy - Handout.
- 14 Taken from Flood Hazards - Goals & Policies, a mimeographed paper.

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