City of Montesano

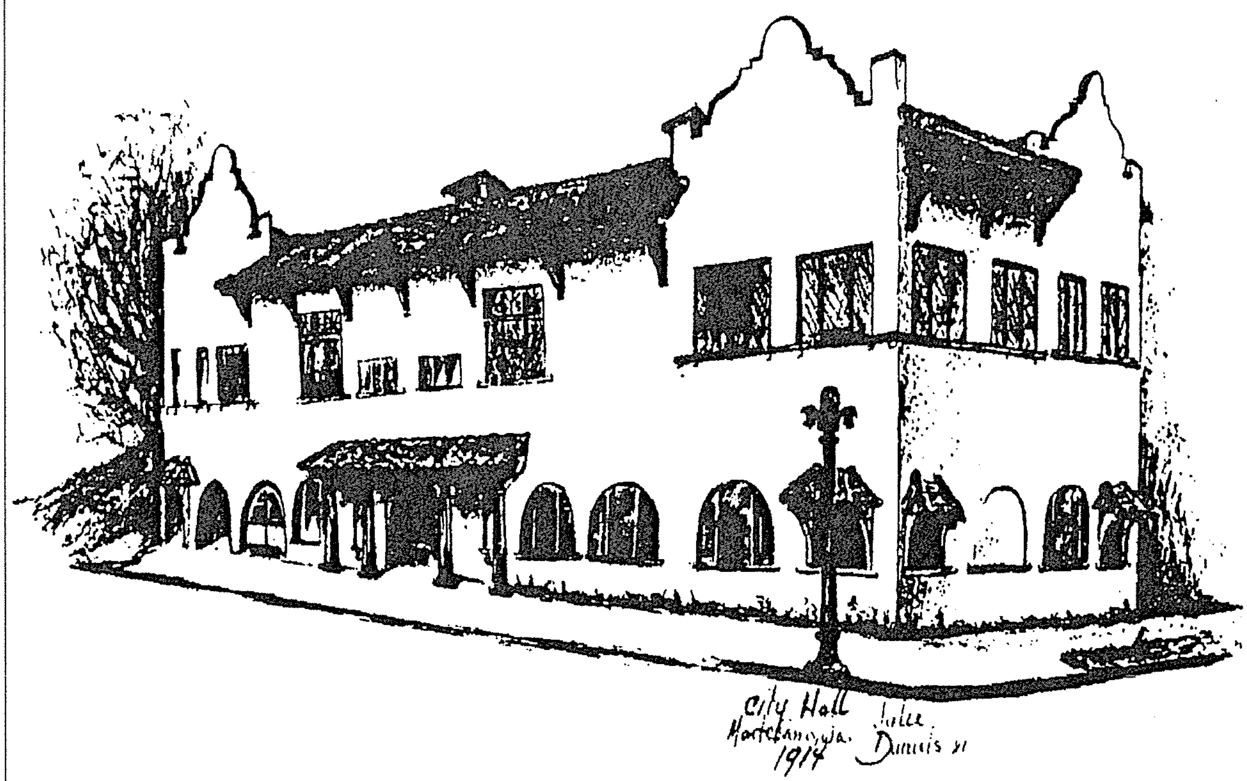
Preliminary Classification and Designation

of

NATURAL RESOURCE LANDS

AND

CRITICAL AREAS



March 5, 1992

The Grays Harbor Regional Planning Commission

City of Montesano

RESOLUTION NO. 496

Preliminary Classification and Designation

of

NATURAL RESOURCE LANDS

AND

CRITICAL AREAS

Reviewed by
Montesano Planning Commission, Regular Meeting, January 16,1992
Montesano Planning Commission, Special Meeting, January 30,1992
Montesano Planning Commission, Special Meeting, February 3, 1992
Montesano City Council, Public Hearing, February 11, 1992
Montesano City Council/Planning Commission, Work Session, February 20, 1992
Montesano City Council, Public Hearing-Continued, February 25, 1992
Montesano Planning Commission, Special Meeting, March 3, 1992
Montesano City Council, Adoption w/ Corrections, March 10, 1992

Prepared by

The Grays Harbor Regional Planning Commission

March 5, 1992

City of Montesano

Resolution No. 496
to
Classify and Designate Natural Resource Lands and Critical Areas

WHEREAS the State of Washington adopted a Growth Management Act in 1990 which required the City of Montesano to designate its natural resource lands and critical areas by September 1, 1991;

WHEREAS the City of Montesano was granted an extension by the Department of Community Development until March 1, 1992 to complete its natural resource lands and critical area designations;

WHEREAS natural resource lands include agricultural lands, forest lands, and mineral resource lands that are not characterized by urban growth and that have long-term commercial significance;

WHEREAS forest lands are located within the City of Montesano;

WHEREAS critical areas include wetlands, aquifer recharge areas, geologically hazardous areas, frequently flooded areas, and fish and wildlife habitat conservation areas;

WHEREAS wetlands, aquifer recharge areas, geologically hazardous areas, frequently flooded areas, and fish and wildlife habitat conservation areas are located within the City of Montesano;

WHEREAS in making its designations the City of Montesano is required to consider the guidelines to classify agriculture, forest, and mineral lands and critical areas adopted by the Department of Community Development;

WHEREAS the classification guidelines are "minimum guidelines", they also must allow for regional differences that exist in Washington state;

WHEREAS ***classification*** means to define categories to which natural resource lands and critical areas will be assigned;

WHEREAS ***designation*** means to establish, for planning purposes: the classification scheme; the general distribution, location and extent of the uses of land, where appropriate, for agriculture, forestry, and mineral extraction; and the general distribution, location and extent of critical areas;

WHEREAS classifications and designations included herein are **Preliminary Classifications and Designations**, that are early steps in the overall comprehensive planning process, and that will ultimately be modified as appropriate and incorporated into the Comprehensive Plan for the City of Montesano;

THE CITY COUNCIL FOR THE CITY OF MONTESANO DEFINES, CLASSIFIES, AND DESIGNATES FOREST LANDS, WETLANDS, AQUIFER RECHARGE AREAS, GEOLOGICALLY HAZARDOUS AREAS, FREQUENTLY FLOODED AREAS, AND FISH AND WILDLIFE HABITAT CONSERVATION AREAS LOCATED WITHIN THE CITY OF MONTESANO AS FOLLOWS HEREIN; THE CITY COUNCIL FOR THE CITY OF MONTESANO HAS FURTHER CONSIDERED EXISTING DEFINITIONS AND GUIDELINES FOR MINERAL RESOURCE LANDS AND AGRICULTURAL LANDS, AND FINDING NO SUCH LANDS WITHIN THE CITY OF MONTESANO, MAKES NO DESIGNATION OF THESE LANDS.

City of Montesano

Resolution
to
Classify and Designate Natural Resource Lands and Critical Areas
in
Compliance with the Growth Management Act of 1990 as Amended

Resolution No. __496__ (Classification and Designation)

APPROVED AND ADOPTED THIS __10th__ DAY OF __March__, 1992.

____
A. L. Jack Frost, Mayor

ATTEST ______________________________

____
Daniel O. Glenn, City Attorney

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of
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for
the City of Montesano

INTRODUCTION

The Growth Management Act of 1990 as amended (GMA) requires the City of Montesano to classify and designate natural resource lands and critical areas located within the City. By March 1, 1992, the City must adopt regulations that protect its designated critical areas by precluding incompatible land uses and development. Then beginning July 1, 1992, the development regulations of the City of Montesano shall not be inconsistent with the City's comprehensive plan.

Classification and designation are early steps in the comprehensive planning process. Classifying (defining categories to which natural resource lands and critical areas will be assigned) may be accomplished by adopting an existing classification system, modifying an existing system to local needs, or developing a new system that is compatible with land use plans and the conservation and protection measures to be used. Designating (identifying and formally applying the selected classification system) is accomplished by establishing the classification system and the general distribution, location, and extent of resource lands and critical areas. Inventory and mapping may be included in the process. For critical areas with inadequate inventory information, performance standards and definitions may be used to identify specific critical areas during permitting.

Maps are included in this document to show the approximate locations of natural resource lands, critical areas, and related information. Although the maps are useful for portraying the approximate geographic location of information, they are not sufficiently accurate to be used for regulatory purposes. They are for informational purposes only. Field delineation is required to determine jurisdictional boundaries for regulatory purposes. As informational maps, they may be frequently updated over time as new information from aerial photo interpretation, field inventory, or delineation becomes available.

Natural Resource Lands Designations (RCW 36.70A.170) are intended to conserve natural resource lands for long-term resource production, to allow continuance of existing and ongoing resource management operations, and to include:

- **Agricultural lands** that are not already characterized by urban growth and that have long-term significance for the commercial production of food and other agricultural products;

- **Forest lands** that are not already characterized by urban growth and that have long-term significance for the commercial production of timber; and

- **Mineral resource lands** that are not already characterized by urban growth and that have long-term significance for the extraction of minerals.

Critical Area Designations (RCW 36.70A.170) are intended to protect critical areas by precluding inappropriate land uses or developments, to assist the City in recognizing differences between critical areas (i.e., recognize hazards to public health and safety vs. values to the public welfare), and to include:

- **Wetlands**;

- **Aquifer recharge areas** with a critical recharging effect on aquifers used for potable water;

- **Frequently flooded areas** that are lands in the floodplain subject to a one percent or greater chance of flooding in a given year;

- **Geologically hazardous areas** that because of their susceptibility to erosion, sliding, earthquake, or other geologic events, are not suited to the siting of commercial, residential, or industrial development consistent with public health or safety concerns; and

- **Fish and wildlife habitat conservation areas** managed to maintain species in suitable habitats within their natural geographic distribution so that isolated subpopulations are not created.

Document Format

Classification and designation are important early steps in the overall process of developing a local comprehensive land-use plan. Cities are allowed to develop alternative classification systems to the *"Minimum Guidelines to Classify Agriculture, Forest, Mineral Lands and Critical Areas"* (365-190 WAC) due to local conditions and regional differences. The City of Montesano has considered the Minimum Guidelines for each of its designations and has used the Minimum Guidelines, modified and used the Minimum Guidelines, or developed and used an alternative approach where appropriate.

For each natural resource land and critical area designation the following information is provided:

- The definition existing in Washington state law and recognized and accepted by the City of Montesano;

- The Minimum Guideline Approach to the designation;

- Alternative approaches, if appropriate, to the designation;

- A description of the designation including general characteristics and values;

- A description of the local condition and occurrence of the natural resource land or critical area relative to its designation; and

- A policy statement recommending a classification system and definition, applying the definition to the land by mapping, and establishing designation amendment procedures.

NATURAL RESOURCE LANDS

Classification and designation are intended to assure the long-term conservation of natural resource lands. In furtherance of this intention, the City of Montesano reaffirms the planning goals (RCW 36.70A.020) established by GMA and related to natural resource lands designations including:

- Prevent the inappropriate conversion of undeveloped land into sprawling, low-density development.
- Encouraging economic development that is consistent with the City of Montesano Comprehensive Plan and assisting the state to encourage economic growth in areas experiencing insufficient economic growth.
- Protecting the property rights of landowners from arbitrary and discriminatory actions and assuring that private property shall not be taken for public use without just compensation having been made.
- Maintaining and enhancing natural resource-based industries, including productive timber, agriculture, and fisheries industries.
- Encouraging the conservation of productive forest lands and productive agricultural lands, and discouraging incompatible uses.

There are considerations to classifying and designating natural resource lands that are common to agricultural lands, forest lands, and mineral resource lands. These lands are not already characterized by urban growth. That is, the lands do not have growth located on them that makes intensive use of the land for the location of buildings, structures, and impermeable surfaces, to such a degree as to be incompatible with the primary use of such land for the production of food, other agricultural products, or fiber, or the extraction of mineral resources. All natural resource lands are to be conserved for the long-term production of commodity and other values. Any lands classified and designated as natural resource lands should be lands that are devoted to natural resource production, and there should be a strong likelihood of long-term natural resource use of the land. Such lands are characterized as having "long-term commercial significance. That means that the growing capacity, productivity, and soil composition of the land for long-term commercial production, in consideration with the land's proximity to populated areas and the possibility of more intense uses of the land, must be included in designating these lands. Such considerations may be indicated by:

- The availability of public facilities and services;
- Tax status and parcel size;
- Demographic and development trends and considerations (e.g., relationship and proximity to urban growth areas, land use settlement patterns, intensity of nearby land uses, and history of land development permits issued nearby);
- Economic trends and considerations (e.g., proximity to points of use or markets, local economic conditions, life of resource, availability of resource, and land values under alternative uses);
- Physiographic considerations (e.g., topography, availability and quality of water supply, and the extent of resource).

Where natural resource lands are also designated as critical areas, the City of Montesano has weighed the compatibility of adjacent land uses and development with the continuing need to protect the functions and values of critical areas.

Agricultural Lands

Agricultural land is land primarily devoted to the commercial production of horticultural, viticultural, floricultural, dairy, apiary, vegetable, or animal products or of berries, grain, hay, straw, turf, seed, Christmas trees not subject to the excise tax imposed by RCW 84.33.100 through 84.33.140, or livestock, and that has long-term commercial significance for agricultural production. RCW 36.70A.030(2); WAC 365-190-030(1)

Minimum Guidelines Approach to Classification - WAC 365-190-050

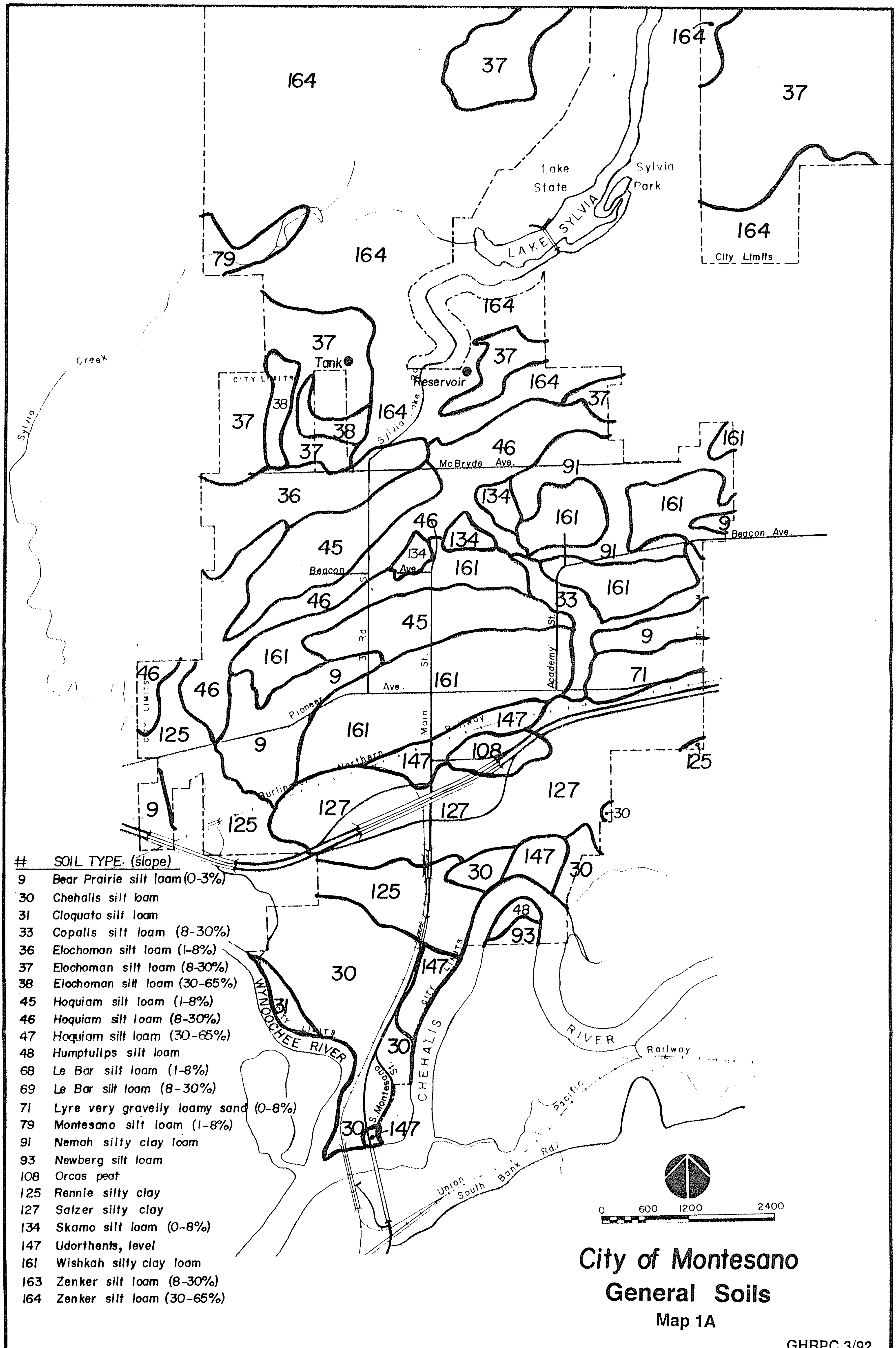
- Use the USDA-SCS *"Land-Capability Classification"* system as defined in *"Agriculture Handbook No. 210."* Consider, also, the proximity to populated areas and the potential for more intensive uses of the land.
- Consider the classification of "prime" and "unique" farmland soils as mapped by USDA-SCS.
- Classify agricultural lands of local importance not included in "prime" or "unique" farmland classes. These lands include wetlands used for long-term agricultural and designating these wetlands is consistent with the resource lands objectives of GMA.

Alternative Approaches to Classification

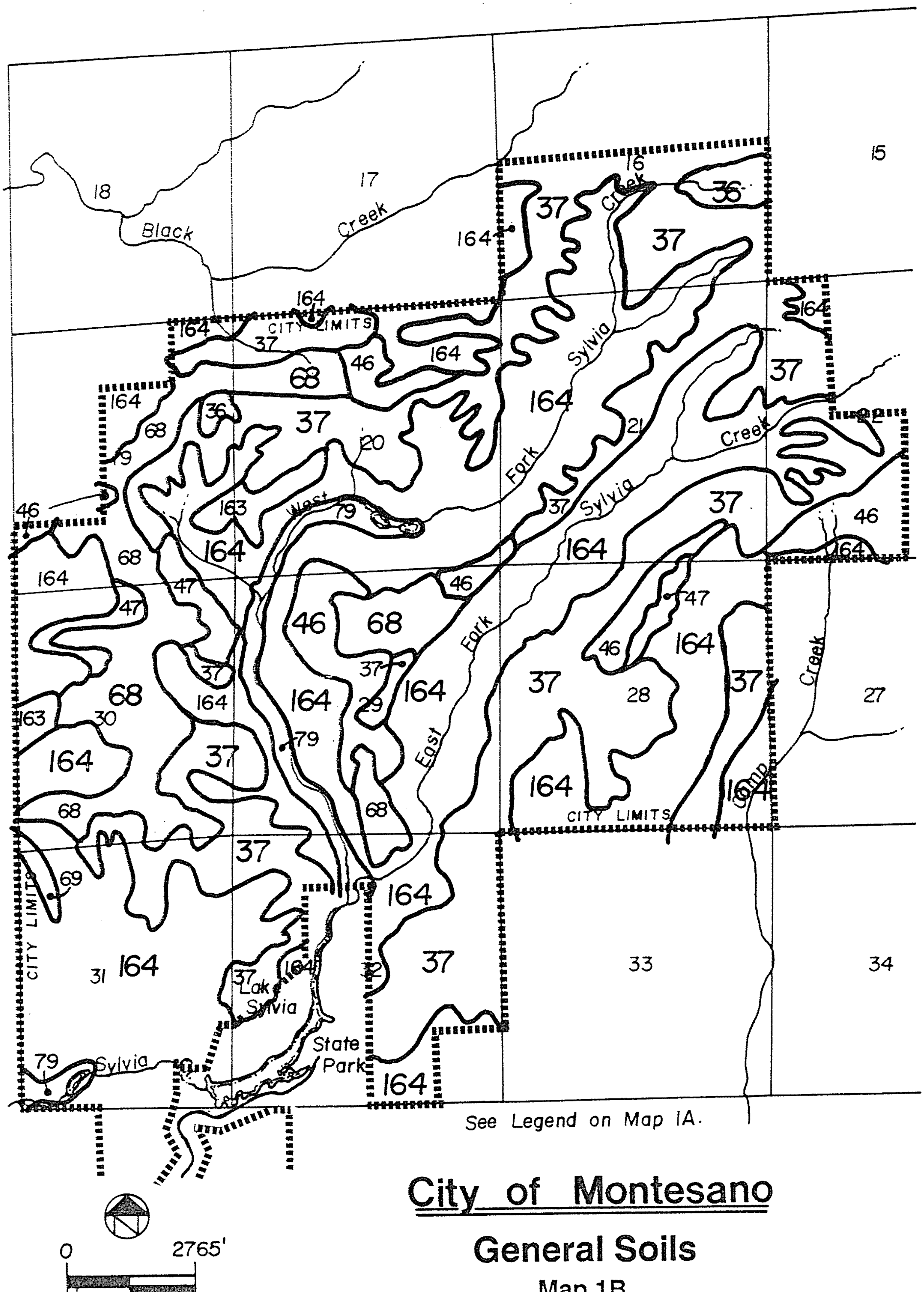
- Compare designation as "prime farmland" by map unit in USDA-SCS Soil Survey Reports with mapping of prime and unique farmlands in the USDA-SCS Important Farmland Map. Relate this information to land-capability classes.
- Consider the designations of Agricultural Use Districts in the *"Agricultural Element of the Grays Harbor County Comprehensive Plan"* adopted in May 1981.

General Description, Local Occurrence, and Values

Soils information was compiled from the *"Soil Survey of Grays Harbor County Area, Pacific County, and Wahkiakum County, Washington"* (Soil Survey). The United States Department of Agriculture - Soil Conservation Service (USDA-SCS) prepared the Soil Survey in cooperation with the Washington Department of Natural Resources and the Washington State Agriculture Research Center using 1979 data. The Grays Harbor County area encompasses the southern three-fourths of Grays Harbor County. The Soil Survey contains detailed maps that delineate areas dominated by one or more major kinds of soil or miscellaneous area (areas, such as dunes, having little or no soil material and supporting little or no vegetation). Map units are identified and named according to the taxonomic classification of the dominant soils or miscellaneous area. The objective of mapping was to separate the landscape into segments having similar uses and management requirements. The delineation of such landscape segments on maps provides sufficient information for developing resource plans, but if intensive use of small areas is planned, onsite investigation is needed to precisely define and locate soils and miscellaneous areas. Soil Survey information and mapped boundaries (See Map 1: General Soils) were used by the City of Montesano to identify potential agricultural and forest lands and areas of hydric soil, wetlands, and geological hazards.



City of Montesano
General Soils
Map 1A
GHRPC 3/92
SOIL TYPE (slope)
9 Bear Prairie silt loam (0-3%)
30 Chehalis silt loam
31 Cloquato silt loam
33 Copalis silt loam (8-30%)
36 Elochoman silt loam (1-8%)
37 Elochoman silt loam (8-30%)
38 Elochoman silt loam (30-65%)
45 Hoquiam silt loam (1-8%)
46 Hoquiam silt loam (8-30%)
47 Hoquiam silt loam (30-65%)
48 Humptulips silt loam
68 Le Bar silt loam (1-8%)
69 Le Bar silt loam (8-30%)
71 Lyre very gravelly loamy sand (0-8%)
79 Montesano silt loam (1-8%)
91 Nemah silty clay loam
93 Newberg silt loam
108 Orcas peat
125 Rennie silty clay
127 Salzer silty clay
134 Skamo silt loam (0-8%)
147 Udorthents, level
161 Wishkah silty clay loam
163 Zenker silt loam (8-30%)
164 Zenker silt loam (30-65%)
0 600 1200 2400
Lake Sylvia State Park
LAKE SYLVIA
City Limits
Sylvia Creek
Tank
Reservoir
Sylvia Lake Rd
McBryde Ave.
Beacon Ave.
Pioneer Ave.
3rd St.
Main St.
Academy St.
Burlington Northern Railway
WYNOOCHEE RIVER
CHEHALIS RIVER
S. Montesano St.
Union Pacific Railway
South Bank Rd.



City of Montesano

General Soils

Map 1B

GHRPC 3/9

Twenty-five soil map units (TABLE I) are identified within the City of Montesano and are listed by soil map unit number with their land-capability class. Land-capability classes are used to indicate potential suitability of each soil map unit for agricultural purposes.

TABLE I. Land-Capability Classification

	Soil Map Unit	Class		Soil Map Unit	Class
9	Bear Prairie silt loam, 0-3%	IIIs	69	Le Bar silt loam, 8-30%	IVe
30	Chehalis silt loam	IIw	71	Lyre very gravelly loamy sand, 0-8%	IVe
31	Cloquato silt loam	IIw	79	Montesa silt loam, 1-8%	IIIw
33	Copalis silt loam, 8-30%	IVe	91	Nemah silty clay loam	VIw
36	Elochoman silt loam, 1-8%	IIIe	93	Newberg silt loam	IIw
37	Elochoman silt loam, 8-30%	IVe	108	Orcas Peat	VIw
38	Elochoman silt loam, 30-65	VIe	125	Rennie silty clay loam	VIw
45	Hoquiam silt loam, 1-8%	IIIe	127	Salzer silty clay	VIw
46	Hoquiam silt loam, 8-30%	IVe	134	Skamo silt loam, 0-8%	IIIe
47	Hoquiam silt loam, 30-65%	VIe	147	Udorthents, level	IVs
48	Humptulips silt loam	IIIw	161	Wishkah silty clay loam	IIIw
68	Le Bar silt loam, 1-8%	IIIe	163	Zenker silt loam, 8-30%	IVe
			164	Zenker silt loam, 30-65%	VIe

The USDA-SCS Land-Capability Classification employs eight capability classes and four subclasses. Lower numbers indicate land better suited to cultivation and other uses, while higher numbers indicate land less suited for agricultural uses. The risks of soil damage or limitations in use increase from Class I to Class VIII. Capability classes are defined as follows:

Lands Suited to Cultivation and Other Uses

Class **I** - soils having few limitations that restrict their use.

Class **II** - soils having some limitations that reduce the choice of plants or require moderate conservation practices.

Class **III** - soils having severe limitations that reduce the choice of plants, require special conservation practices, or both.

Class **IV** - soils having very severe limitations that restrict the choice of plants, require very careful management, or both.

Lands Limited in Use and Generally Not Suited for Cultivation

Class **V** - soils having little or no erosion hazard but have other limitations impractical to remove that limit their use largely to pasture, range, woodland, or wildlife food and cover.

Class **VI** - soils having severe limitations that limit their use largely to pasture or range, woodland, or wildlife food and cover.

Class **VII** - soils having very severe limitations that restrict their use largely to grazing, woodland, and wildlife.

Class **VIII** - soils and miscellaneous areas having limitations that preclude their use for commercial plant production and restrict their use to recreation, wildlife , or water supply or esthetics purposes.

Capability Subclasses indicate the type of conservation problem or limitation and are defined as follows:

Subclass **(e)** - erosion and runoff problems
Subclass **(s)** - root zone limitations
Subclass **(w)** - excess water
Subclass **(c)** - climatic limitations

The USDA Soil Conservation Service designates soils as prime farmland that "have an adequate and dependable supply of moisture from precipitation or irrigation. Temperature and growing season are favorable, and the level of acidity or alkalinity is acceptable. The soils have few, if any, rocks and are permeable to water and air. They are not excessively erodible or saturated with water for long periods and are not flooded during the growing season. The slope ranges mainly from 0 to 8 percent. Soils that have a high water table, are subject to flooding, or are droughty may qualify as prime farmland soil if the limitations are overcome by drainage, flood control, or irrigation." According to the Soil Survey, thirteen Map Units within the City of Montesano potentially include prime farmland soils:

- Map Unit 9, Bear Prairie silt loam, 0-3%, Capability Class IIIs
- Map Unit 30, Chehalis silt loam, Capability Class IIw
- Map Unit 31, Cloquato silt loam, Capability Class IIw
- Map Unit 36, Elochoman silt loam, 1-8%, Capability Class IIIe
- Map Unit 45, Hoquiam silt loam, Capability Class IIIe
- Map Unit 48, Humptulips silt loam, Capability Class IIIw
- Map Unit 68, Le Bar silt loam, Capability Class IIIe
- Map Unit 79, Montesa silt loam, 1-8%, Capability Class IIIw
- Map Unit 91, Nemah silty clay loam, Capability Class VIw
- Map Unit 125, Rennie silty clay loam, Capability Class VIw
- Map Unit 127, Salzer silty clay, Capability Class VIw
- Map Unit 134, Skamo silt loam, 0-8%, Capability Class IIIe
- Map Unit 161, Wishkah silty clay loam, Capability Class IIIw

The subclass modifiers "w", "s", and "e" indicate that excess water (due to poor drainage, wetness, high water table, or overflow), soil limitations within the rooting zone (i.e., shallowness, stones, low moisture-holding capacity, low fertility that is difficult to correct, or salinity), or erosion problems can interfere with cultivation. The Nemah, Rennie, and Salzer soils -- Capability Class VIw -- have severe limitations making them generally unsuitable for cultivation. The Bear Prairie, Elochoman, Hoquiam, Humptulips, Le Bar, Montesa, Skamo, and Wishkah soils have severe limitations that reduce the choice of plants or require special conservation practices. The Chehalis, Cloquato, and Newberg soils may be suitable for agricultural production, although they have some limitations due to excess water that reduce the choice of plants or require moderate conservation practices.

No areas of the City are designated as an Agricultural Use District in the *"Agricultural Element of the Grays Harbor County Comprehensive Plan."* In the north part of the City, the Montesa silt loam soil (Map Unit 79) is restricted to the banks of Sylvia Creek in the Chapin Collins Memorial Forest and would not appropriately be designated as agricultural land.

Policy Statement

The City of Montesano has considered prime and unique farmlands as designated by the Soil Conservation Service in the USDA Land-Capability Classification system, the USDA-SCS Soil Survey, the USDA-SCS Important Farmlands Map, Agricultural Use District designations of the Grays Harbor County Comprehensive Plan, and the consistency of agricultural lands designations with the City of Montesano Shoreline Master Program; and having found all areas currently within the City, including areas that are managed for agricultural production, to be either managed as forest lands or to be lands already characterized by urban growth or having the potential for urban growth, and therefore not meeting the definition of agricultural lands of long-term commercial significance; designates no areas within the City of Montesano as Agricultural Lands.

Forest Lands

Forest land is land primarily useful for growing trees, including Christmas trees subject to the excise tax imposed under RCW 84.33.100 through 84.33.140, for commercial purposes, and that has long-term commercial significance for growing trees commercially.
RCW 36.70A.030(8); WAC 365-190-060(6)

Minimum Guidelines Approach to Classification - WAC 365-190-060

- Use the private forest land grades of the Department of Revenue (WAC 458-40-530); and determine which land grades constitute forest land of long-term commercial significance, based on local and regional, physical, biological, economic, and land use considerations. Also, consider the proximity to populated areas and the potential for more intensive uses of the land.

Alternative Approaches to Classification

- Consider the USDA-SCS Soil Survey, Table 6: "Woodland Management and Productivity" to classify soils based on the ordination symbol. The symbol is composed of a number, indicating potential productivity in cubic meters of wood per hectare (14.3 cubic feet per acre) per year, and a letter symbol indicating the major kind of soil limitation. Some common woodland management concerns are reflected by slight, moderate, or severe ratings for equipment limitations, seedling mortality, windthrow hazard, and plant competition.

General Description, Local Occurrence, and Values

The Private Forest Land Grading (PFLG) system of the Department of Revenue incorporates consideration of growing capacity, productivity, and soil composition of the land. Forest land of long-term commercial significance will generally have a predominance of the higher private forest land grades. However, the presence of lower private forest land grades within areas of predominately higher grades need not preclude designation as forest land.

The potential productivity of common trees is expressed as a Site Index. The index is determined by measuring the height and age of selected trees for a given species. In western Washington Site Index reflects the total average height of dominant and codominant trees that are allowed to grow for 50 years after reaching a base height of 4½ feet. The greatest timber yield can be expected for trees growing on soils with high site index. Twenty-four soil map units (TABLE II.) are identified within the City of Montesano and tree species, site index (Soil Survey and PFLG), private forest land grade, and operability class are listed for each. Site Index and PFLG are used to indicate the potential productivity of common tree species on various soils and to identify potential forest resource lands.

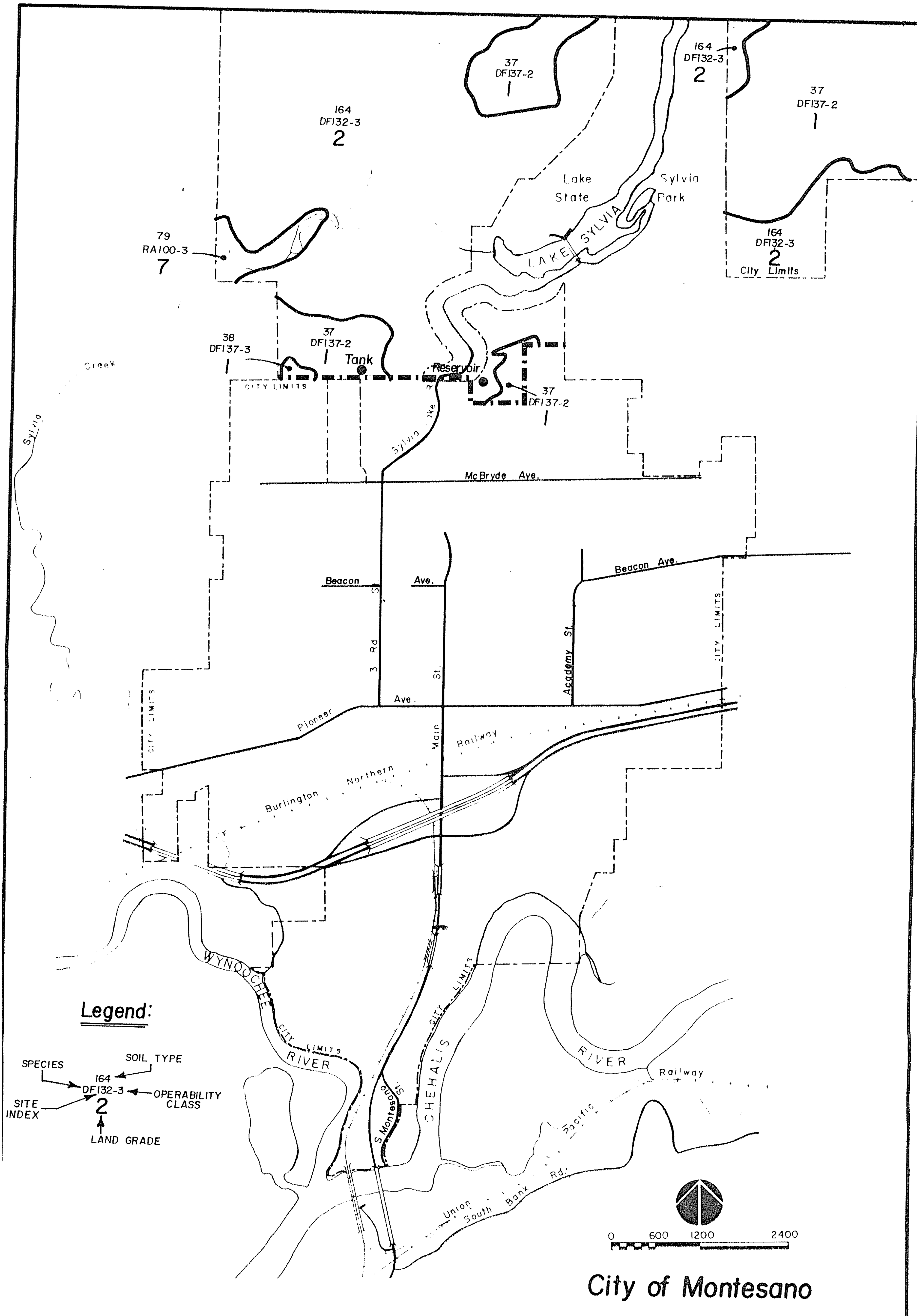
<u>TABLE II. Forest Site Index</u>

Soil Map Unit		Species	SI	PFLG	Soil Map Unit		Species	SI	PFLG
9	Bear Prairie silt loam, 0-3%	Doug-fir	137	DF137-2,1	68	Le Bar silt loam, 1-8%	Doug-fir	131	DF130-2,2
		Alder	106				Hemlock	117	
30	Chehalis silt loam	Doug-fir	130	DF130-2,2	69	Le Bar silt loam, 8-30%	Doug-fir	131	DF130-2,2
31	Cloquato silt loam	Doug-fir	130	DF130-2,2			Hemlock	117	
33	Copalis silt loam, 8-30%	Doug-fir	126	DF124-2,2	71	Lyre v.grvly lmy sand,0-8%	Doug-fir	119	DF114-1,2
		Hemlock	113		79	Montesa silt loam, 1-8%	Alder	102	RA100-3,7
36	Elochoman silt loam, 1-8%	Doug-fir	136	DF137-2,1	91	Nemah silty clay loam	Alder	86	RA86-4, 7
		Hemlock	124		93	Newberg silt loam	Doug-fir	120	DF120-2,2
37	Elochoman silt loam, 8-30%	Doug-fir	136	DF137-2,1	108	Orcas peat		None	N/C 8
		Hemlock	124		125	Rennie silty clay loam	Alder	99	RA99-4, 8
38	Elochoman silt loam, 30-65%	Doug-fir	136	DF137-3,1	127	Salzer silty clay	Alder	85	RA85-4, 8
		Hemlock	124		134	Skamo silt loam, 0-8%	Doug-fir	115	
45	Hoquiam silt loam, 1-8%	Doug-fir	127	DF132-2,2			Alder	101	RA101-3,7
		Hemlock	113		147	Udorthents, level		None	N/C 8
46	Hoquiam silt loam, 8-30%	Doug-fir	127	DF132-2,2	161	Wishkah silty clay loam	Hemlock	110	WH110-3,3
		Hemlock	113				Alder	85	
47	Hoquiam silt loam, 30-65%	Doug-fir	127	DF132-2,2	163	Zenker silt loam, 8-30%	Doug-fir	133	DF132-3,2
		Hemlock	113				Hemlock	122	
48	Humptulips silt loam	Alder	93	RA93-2, 8	164	Zenker silt loam, 30-65%	Doug-fir	133	DF132-4,2
							Hemlock	122	

N/C = Noncommercial; SI = Site Index; PFLG = Private Forest Land Grade (Species, Site, Operability Class, Land Grade)

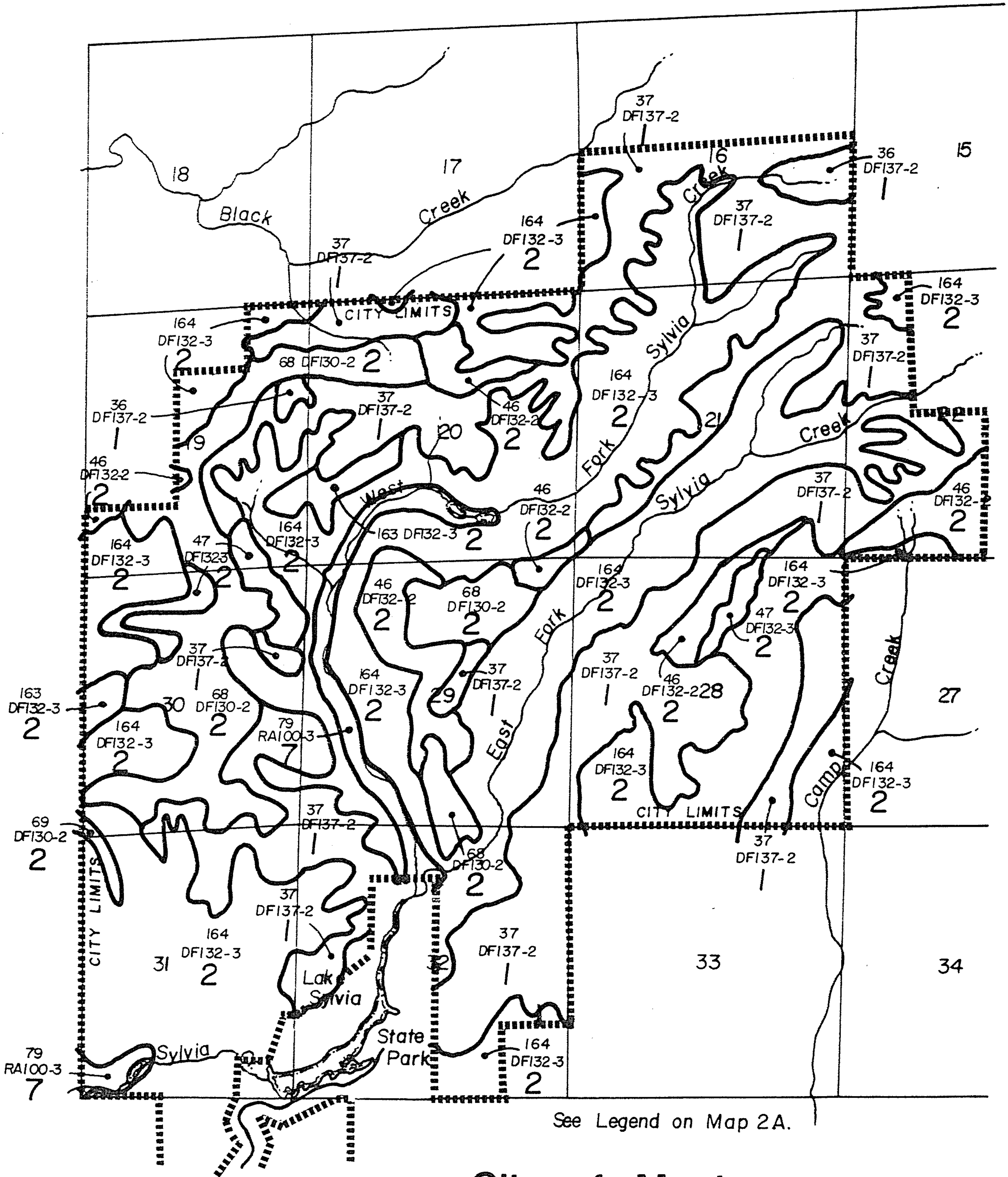
The City of Montesano Tree Farm (also called the Chapin Collins Memorial Forest, City Watershed, and City Forest) was purchased from Neil Cooney in 1931 for $12,000. The entire area was logged by Cooney between 1900 and 1920. The Tree Farm (See Map 2: Forest Lands), which is located directly north of the urbanized area of the City, encompasses 5,000 acres of some of the most productive timberland in the state. The Clemons Tree Farm -- the nation's first tree farm -- surrounds the City's Tree Farm which in turn surrounds Lake Sylvia State Park. The City of Montesano Tree Farm was also recently designated as a tree farm in the American Tree Farm System. In considering an application for the American Tree Farm System, the American Forestry Association reviewed the City's Forest Management Plan.

The City initially purchased the logged-over land in order to control and protect its watershed. When City wells were drilled in 1973 the emphasis for forest management shifted from watershed protection to maximizing timber production and revenue to the City. Over the past five years timber harvest from the Tree Farm has returned more than $100,000 per year in state excise taxes to Grays Harbor County for redistribution to various taxing districts in the county. The City anticipates a sustainable harvest on 100 acres per year; although, the average annual area harvested between 1973 and 1991 was only 81 acres.



Map 2A
Forest Lands

GHRPC 3/92



City of Montesano

Forest Lands

Map 2B

Policy Statement

The City of Montesano has considered the private forest land grades of the Department of Revenue, forest site index as designated by the USDA-SCS Soil Survey, and the history and intended management of the City of Montesano Tree Farm; and having recognized that the City manages its 5,000 acre Tree Farm for the long-term commercial production of forest products; designates the City of Montesano Tree Farm as Forest Lands.

The City of Montesano having found the lands south of the City of Montesano Tree Farm to be generally characterized by urban growth and therefore not meeting the definition of forest lands of long-term commercial significance; designates no other lands within the City as Forest Lands.

Although there are lands within the City designated as forest lands and also lands not so designated, it is the intent of the City of Montesano that permitted commercial tree harvesting be allowed in conjunction with urban development activities within the area of the City not designated as forest lands.

Mineral Resource Lands

Mineral resource land is land primarily devoted to the extraction of minerals or that has known or potential long-term commercial significance for the extraction of minerals. WAC 365-190-070(14)

Minerals include gravel, sand, and valuable metallic substances. RCW 36.70A.030(11); WAC 365-190-070(12)

Minimum Guidelines Approach to Classification - WAC 365-190-070

- Identify and classify aggregate (sand and gravel) and mineral (metallic) resource lands from which the extraction of minerals occurs or can be anticipated. Classify other minerals as appropriate.
- Classify areas into mineral resource lands based on geologic, environmental and economic factors, existing land uses, and land ownership.
- Consider maps and information on location and extent of mineral deposits provided by the Washington State Department of Natural Resources (DNR) and the U.S. Bureau of Mines. Also, consider the detailed minerals classification system provided by DNR.
- Consider classifying known and potential mineral deposits so that access to mineral resources of long-term commercial significance is not knowingly precluded.
- Consider the effects of proximity to populated areas and the possibility of more intense uses of the land.
- Consider physiographic characteristics including:

  - Physical and topographical characteristics of the mineral resource site;
  - Depth of the resource;
  - Depth of the overburden;
  - Physical properties of the resource;
  - Life of the resource; and
  - Resource availability in the region.

Alternative Approaches to Classification

- None considered.

General Description, Local Occurrence, and Values

No extraction of minerals occurs or is anticipated within the City of Montesano, including the extraction of sand or gravel. There are no known or potential mineral resources of long-term commercial significance within the City.

Policy Statement

The City of Montesano has considered maps and information provided by the Washington State Department of Natural Resources and the U.S. Bureau of Mines; and having identified no mineral resource lands within the City having long-term commercial significance for extracting aggregate or valuable metallic substances or from which the extraction of minerals occurs or is anticipated; designates no lands within the City as Mineral Resource Lands.

Although no lands within the City are designated as mineral resource lands, it is the intent of the City of Montesano that the normal and permitted removal, transportation, or deposition of fill materials for construction or other approved uses shall not be precluded.

CRITICAL AREAS

Classification and designation are intended to preclude land uses and developments which are incompatible with critical areas. In furtherance of this intention, the City of Montesano reaffirms the planning goals (RCW 36.70A.020) established by GMA and related to critical area designations including:

- Encouraging the retention of open space and developing recreational opportunities, conserving fish and wildlife habitat, increasing access to natural resource lands and water, and developing parks.

- Protecting the environment and enhancing the high quality of life, including air and water quality, and availability of water within the City of Montesano.

Neither the Growth Management Act nor the Minimum Guidelines define incompatible land uses or developments. The City of Montesano intends to define "incompatible land uses and developments" through its designations that follow herein and through subsequent critical area protection measures.

There are several considerations in designating critical areas that distinguish them from natural resource lands. Natural resource lands of long-term commercial significance are intended to be conserved. Critical areas must be protected by precluding incompatible land uses and developments. Precluding incompatible uses and development does not mean prohibiting all uses or development. Rather, it means governing changes in land uses, new activities, or developments that could adversely affect critical areas. Some critical areas present a hazard to public health and safety; others are of value to the public welfare. For some critical areas the risk posed to the public by use or development can be mitigated or reduced by engineering or design; for other critical areas that risk cannot be effectively reduced except by avoiding the critical area. Inventories and mapped information is often more readily available for natural resource lands than for critical areas. In the circumstances where critical areas cannot be readily identified, performance standards or definitions can be adopted for the designation. Critical area can then be specifically identified during permit processing or development authorization. Because it is the intent of the City of Montesano to consider performance standards when developing protection measures for critical areas, performance standards are not fully considered in these preliminary designations. The process that the City of Montesano intends to use to designate critical areas is as follows:

- Adopt a definition, summary of general considerations, description of local conditions, and a policy statement for each critical area;

- Prepare maps for each critical area based on information available at the time of mapping; and

- Update the maps as new information becomes available from inventory, aerial photo interpretation, field surveys, special studies, delineations, and permit processing.

Wetlands

Wetlands are areas that are inundated or saturated by surface water or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas. Wetlands do not include those artificial wetlands intentionally created from nonwetland sites, including, but not limited to, irrigation and drainage ditches, grass-lined swales, canals, detention facilities, wastewater treatment facilities, farm ponds, and landscape amenities. However, wetlands may include those artificial wetlands intentionally created from nonwetland areas created to mitigate conversion of wetlands, if permitted by the county or city. RCW 36.70A.030(17); WAC 365-190-030(22)

Minimum Guidelines Approach to Classification - WAC 365-190-080(1)

- Use the definition of wetlands in RCW 36.70A.030(17) and consider using the DOE "Washington State Four-tier Wetland Rating System" (TABLE III). If Four-tier is not selected as the wetlands rating system, include the rationale for that decision in the next annual report to DCD.

TABLE III. Washington State Four-Tier Wetland Rating System

Category I Wetlands Criteria

(i) Documented habitat recognized by federal or state agencies for threatened or endangered species of plant or possibly extinct or extirpated plant, animal, or fish.
(ii) Documented high quality Natural Heritage wetland sites or high quality native wetland communities which qualify as a Natural Heritage wetland site.
(iii) Documented habitat of regional (Pacific Coast) or national significance for migratory birds.
(iv) Regionally rare native wetland communities.
(v) Wetlands with irreplaceable ecological functions (i.e., peat, mature forested, or estuarine wetlands, or Eel grass beds and kelp beds).

Category II Wetlands Criteria

(i) Documented habitat for sensitive species of plant, animal or fish recognized by federal or state agencies.
(ii) Documented Priority Habitats and Species recognized by state agencies.
(iii) Wetlands with significant functions which may not be adequately replicated through creation or restoration.
(iv) Freshwater wetlands with significant habitat value greater than or equal to 22 points as determined by the DOE Wetlands Rating Field Data Form.

Category III Wetlands Criteria

(i) Wetlands where the habitat score for significant habitat value is less than or equal to 21 points as determined by the DOE Wetlands Rating Field Data Form.

Category IV Wetlands Criteria

(i) Wetlands less than one acre, and hydrologically isolated, and comprised of one vegetated class that is dominated (>80% areal cover) by one species from the List of Native Species.
(ii) Wetlands less than two acres, and hydrologically isolated, with one vegetated class, and > 90% of areal cover is any combination of species from the List of Invasive/Exotic Plant Species.

- In developing a wetlands rating system, consider in addition to the Washington State Four-tier Wetlands Rating System, wetlands functions and values, degree of sensitivity to disturbance, rarity, and ability to compensate for destruction or degradation.
- The National Wetlands Inventory (NWI) may be used as an information source for determining the approximate distribution and extent of wetlands. This inventory provides maps of wetland areas according to the definition of wetlands issued by USFWS.
- Consider the methodology in the *"Federal Manual for Identifying and Delineating Jurisdictional Wetlands"* (Federal Manual), issued in January 1989; and Regulatory Guidance Letter 90-7 (RGL 90-7), issued in November 1990 for regulatory delineations by the US Army Corps of Engineers (Corps).

Alternative Approaches to Classification

- Use the Grays Harbor Regional Planning Wetland Rating System (TABLE IV).

TABLE IV. Regional Planning Alternative Wetlands Rating System

Category "A" wetlands are to remain in their natural condition, and include:

(a) Wetlands preserved, encumbered, or otherwise protected from use by federal, state or local action;
(b) Wetlands intentionally created or enhanced to mitigate conversion of other wetlands, as permitted by the City;
(c) Wetlands that are high-quality and regionally-rare ecosystems with irreplaceable wetland functions; or
(d) Wetlands of exceptional local significance as designated by the City.

Category "B" wetlands are developed only after an approved and appropriate mitigation plan is in place, and include:

(a) Marshes, bogs, swamps, or similar areas subject to the provisions of the Shoreline Master Program for the City of Montesano;
(b) Estuarine wetlands.

Category "C" wetlands are considered as uplands when the following criteria apply:

(a) Areas not subject to the Shoreline Master Program for the City of Montesano.
(b) Areas falling under a Section 404 Clean Water Act nationwide permit or a "headwaters and isolated waters" nationwide permit issued by the U.S. Army Corps of Engineers;
(c) Artificial wetlands intentionally created from nonwetland sites, including, but not limited to irrigation and drainage ditches, grass-lined swales, canals, detention facilities, wastewater treatment facilities, farm ponds, and landscape amenities; or
(d) Isolated wetlands for which interstate or foreign commerce use can not be demonstrated.
(e) Isolated wetlands with little or no demonstrated beneficial functions, including groundwater recharge and surface flow maintenance, flood and erosion control, enhanced water quality, fish or wildlife habitat, or recreational and aesthetic opportunities.

- Use USDA-SCS Soil Survey to identify hydric soils and the USDA-SCS farm wetland mapping.
- Consider the DNR Natural Heritage Program which identifies high-quality native wetlands.

General Description and Values

"Wetlands are fragile ecosystems which serve a number of important beneficial functions. Wetlands assist in the reduction of erosion, siltation, flooding, ground and surface water pollution, and provide wildlife, plant, and fisheries habitats. Wetlands destruction or impairment may result in increased public and private costs or property losses." WAC 365-190-080(1)

Wetlands perform many important natural functions of general benefit to the City of Montesano. By regulating stormwater, they reduce the potential for flooding. Wetlands protect shorelines from erosion, maintain stream flow rates, and provide wildlife and fisheries habitat attractive to both the city's residents and its visitors. As water moves through wetland areas, sediments and pollutants are trapped, enhancing water quality. The city's drinking water likely comes from an aquifer recharged through wetlands.

Land owners can specifically benefit from their wetlands. Hay, dairy goods, cranberries, oysters, peat, bulb crops, wild game, fish, and timber are just a few examples of some of the agricultural and forestry products that are derived from wetlands. Homeowners with shallow wells benefit from the ability of wetlands to cleanse and recharge groundwater.

Many wetlands, including some within the City of Montesano, also have significant value for industrial, commercial, or residential development due to their proximity to urban infrastructure. Some wetlands may provide the potential for innovative ways of treating wastewater.

<u>Wetlands Classification Systems</u>

GMA requires the City of Montesano to consider the Minimum Guidelines when designating resource lands and critical areas. The Minimum Guidelines seem to require counties and cities that are not currently rating wetlands to consider a wetlands rating system that reflects the relative function, value, and uniqueness of wetlands within their jurisdiction. It is suggested, not required, that cities consider Four-tier. The Minimum Guidelines require that the rationale for not using Four-tier be reported to DCD, but GMA requires reporting on planning progress only for counties and cities adopting a comprehensive plan under the Growth Management Act. The City of Montesano adopted its comprehensive plan under Chapter 35A.63 (Planning and Zoning in Code Cities) of the Optional Municipal Code (Title 35A). The City of Montesano is not required to adopt a comprehensive plan under the Growth Management Act (Chapter 36.70A); therefore, the City is neither required to submit reports on planning progress to DCD, nor is the City of Montesano required to justify a decision to not use Four-tier as its wetlands rating system.

The City of Montesano has reviewed and considered Four-tier. Its potential drawbacks appear to outweigh any advantages for the City. Considerable technical training is required before regulatory staff could accurately determine the appropriate wetland category. Even so, some steps in the process involve subjective interpretations of a site. Also, many of the wetland characteristics that the rating system evaluates are not fully understood. As a result Four-tier places a heavy emphasis on wildlife habitat functions and values and less emphasis on hydrologic and soils considerations. Early in the process an office data form is completed. Nearly all of the questions on the form are directed at fish and wildlife habitat concerns or DNR Natural Heritage Program native wetland designations. A positive response to any question places the wetland in Category I or II. Wetlands of Local Significance could be designated by the City in Category I, II, or III. According to DOE "the indicators of significant hydrologic functions are more complex and costly to assess and were considered inappropriate to use in this context." Except for peat wetlands, soils are not mentioned in the Four-tier wetlands rating data forms.

In addition to technical considerations, the City of Montesano is concerned with some key assumptions upon which Four-tier is based. It is assumed that the location and boundaries of wetlands being rated are known in advance. Perhaps such a strategy makes sense from a regulatory perspective; but for classifying and designating wetlands, as the City of Montesano intends, to determine when delineation is needed for federal, state, or local permitting, exact boundary determination for wetlands or wetland categories is not anticipated prior to classification. Also, Four-tier "was designed to be used with the 1989 *Federal Manual for Identifying and Delineating Jurisdictional Wetlands*." The 1989 Federal Manual is no longer used for federal section 404 Clean Water Act permit determinations. Additionally, Four-tier is intended to be used with the DOE Model Wetlands Protection Ordinance. Of grave concern to the City of Montesano is the pending litigation directed at the State of Washington and local governments adopting the DOE Model Ordinance and the Four-tier Wetlands Rating System.

The City of Montesano has also reviewed and considered the Regional Planning Alternative Wetlands Rating System. This system is intended to be used to identify local, state, and federal wetlands regulatory jurisdiction. It will also categorize all of the wetland systems rated by Four-tier. By identifying jurisdictional boundaries of wetlands within the City, the City of Montesano will be better able to comply with GMA designation requirements, meet the goals of both GMA and the City, and plan for future growth in a manner that protects the City's most beneficial wetlands.

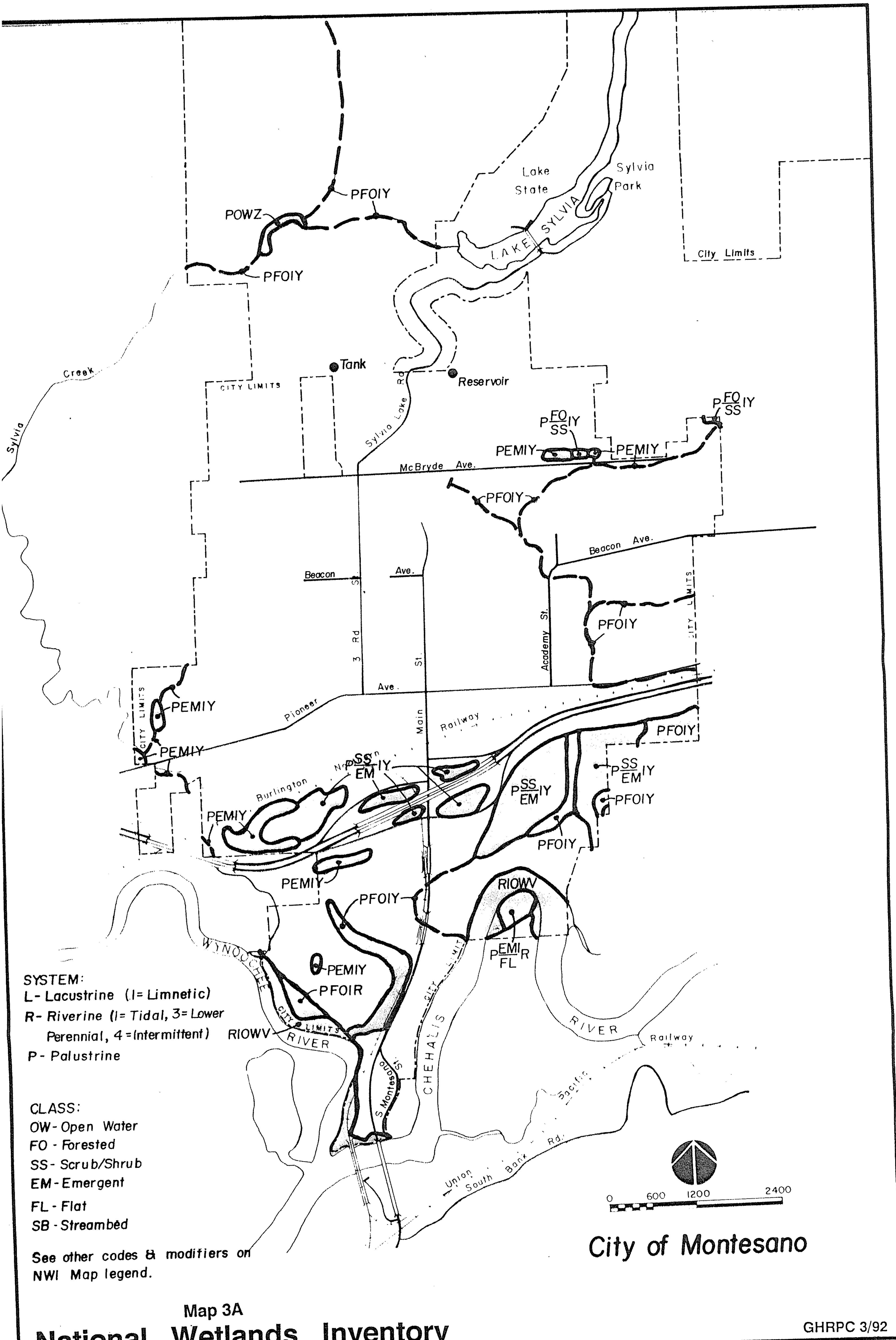
National Wetlands Inventory

The United States Fish and Wildlife Service (USFWS) initiated a national wetlands inventory in 1979. The NWI Maps for the City of Montesano (See Map 3: National Wetlands Inventory) are based on August 1981 small-scale (1:58,000) aerial photographs. USFWS staff interpreted wetland location, boundaries, and classification from the aerial photos, and superimposed their results on USGS 7½-minute (Scale 1:24,000) topographic quadrangles. Wetlands were classified based on the USFWS *"Classification of Wetlands and Deepwater Habitats of the United States"* by Cowardin et al. 1979. Although map accuracy of some wetlands was verified by a field check, no areas within the City of Montesano were so verified.

While these maps are useful for informational purposes, they are not at all useable for regulation. At the time of this national inventory, the current federal methodology for identifying and delineating wetlands was not yet developed. NWI maps often fail to identify wetlands, especially in forested areas, that become evident while processing Clean Water Act Section 404 permits. It is common for only half of the existing wetlands to be identified on NWI maps. Although the definition used by USFWS for the inventory is considered more inclusive (requires only wetlands hydrology and either wetland vegetation, hydric soils, or a saturated non-soil substrate) than the GMA definition (requires all three conditions: hydrology, hydrophytic vegetation, and hydric soils), it has proven inadequate for anticipating the extent of federal regulatory jurisdiction and actions. Omissions often occur due to limited field verification and the small scale of the base photography. Conversely, other areas are included as wetlands that do not meet the GMA definition. For example, the area of the City's new sewage treatment facility and the deep water area of the Chehalis River are included by the NWI mapping, but these do not meet the definition of wetlands used by GMA or the City of Montesano.

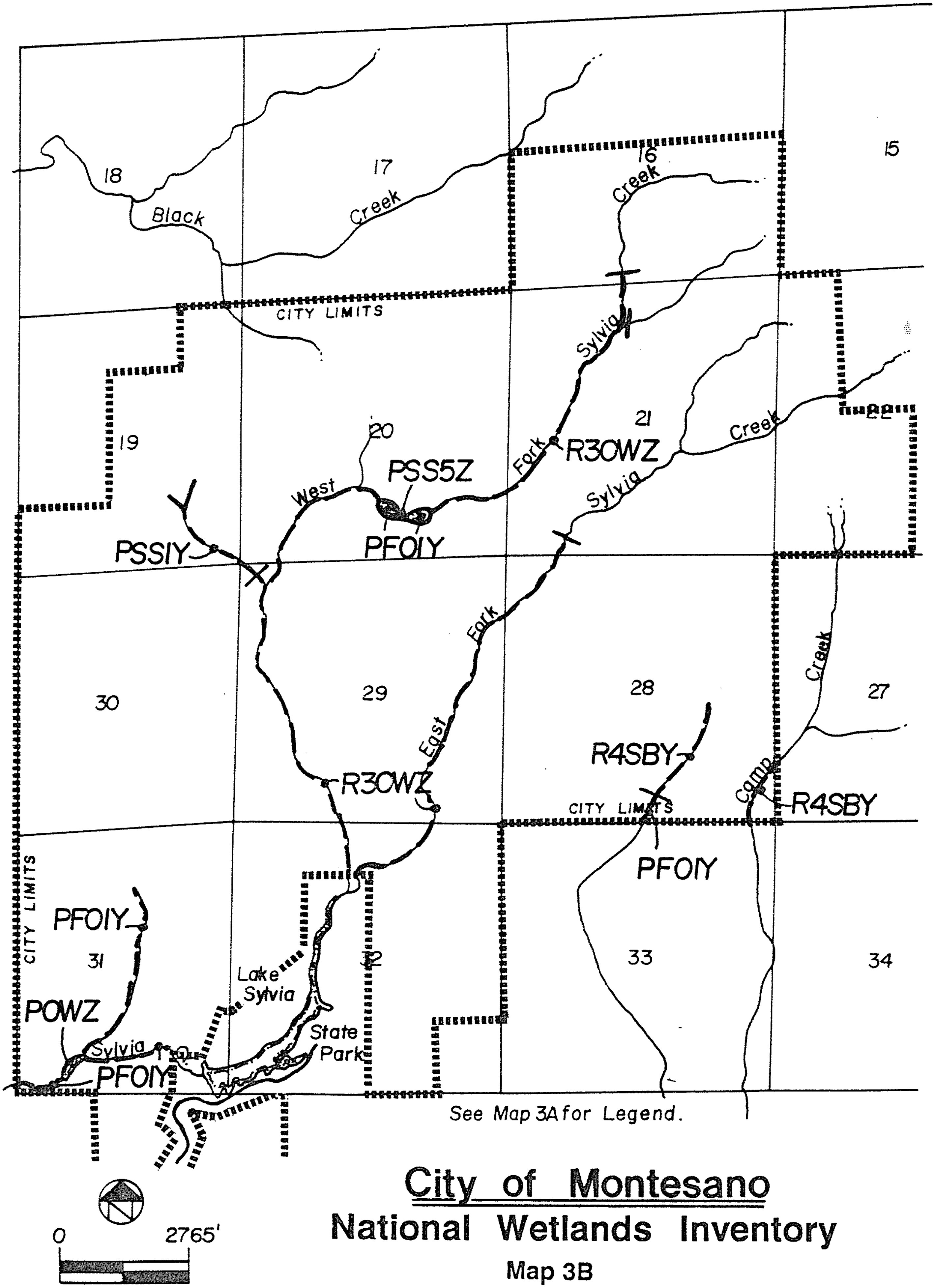
Federal Wetlands Delineation Manuals

The Federal Manual is no longer used to delineate wetlands for CWA permit determinations. Currently the 1987 *"Corps of Engineers Wetlands Delineation Manual"* (1987 Manual) is used to identify and delineate wetlands for purposes of Section 404 of the Clean Water Act. The 1992 Energy and Water Development Appropriations Act was signed into federal law in August 1991. It makes it illegal to use the Federal Manual. The Act requires the Corps of Engineers to use only the 1987 Manual for section 404 permit determinations under the Clean Water Act. The 1987 Manual will remain in force until revisions of the 1989 Federal Manual are finalized.



Map 3A

National Wetlands Inventory



City of Montesano

National Wetlands Inventory

Map 3B

GHRPC 3/92

Hydric Soils

The Federal Clean Water Act (CWA) and the GMA wetlands definitions require the presence of "saturated soil conditions." Over time such soil conditions produce hydric soils. In these soils excessive water replaces atmospheric gases between soil particles for prolonged time periods. As a result, anaerobic (without oxygen) microbiological processes predominate. The type of vegetation that prevails in these areas is limited to those species able to survive and replicate in saturated soil conditions.

The USDA-SCS identifies soil types having a substantial hydric component. A September 1989 listing of hydric soil types was provided to GHRPC. Map units with a hydric component may contain non-hydric components. Conversely, there may be hydric soils located outside of areas mapped as hydric soils. The stated objective of the Soil Survey maps "is not to delineate pure taxonomic classes but rather to separate the landscape into segments that have similar use and management requirements." For these reasons, according to the Soil Survey, "if intensive use of small areas is planned, onsite investigation to precisely define and locate the soils and miscellaneous areas is needed."

In order to understand the relationship between hydric soils, as classified by USDA-SCS, and other soil types, GHRPC reviewed the Soil Survey. Characteristics for hydric soils as well as other soil types with a seasonally high water table were summarized (TABLE V). The soil types listed encompass 152,622 acres in Grays Harbor County including 71,739 acres of hydric soil types. Soil types with a depth to the high water table greater than six feet (724,848 acres) are not included.

Some differences are evident between soils classified as hydric and those that are not. The Federal Manual specifies one criterion for hydric soils as a "water table at less than 18 inches from the surface for a significant period (usually a week or more) during the growing season if permeability is less than 6.0 inches/hour in any layer within 20 inches; or ..." Generally, the USDA-SCS classification is consistent with this criterion, but the permeability criterion is virtually meaningless in Grays Harbor County. Only nine soil types (representing three percent of all soils) in the Grays Harbor soil survey area have permeability greater than 6.0 inches/hour. The most common value listed for permeability in the upper 20 inches is 0.6 to 2.0 inches/hour.

Nearly all hydric soils listed are classified as hydrologic group D. Hydrologic group D includes "soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission." Flood control is often stressed as a benefit of wetlands. During prolonged rainy periods, hydric soils are saturated or nearly saturated. Slow infiltration rate, exhausted water holding capacity, and high runoff potential can limit the soil's capacity to store additional water. As a result, other soils (agricultural or forested) within the floodplain can be more effective in controlling flood waters.

This does not imply that hydric soils are ineffective in flood control, but rather that the mechanisms are more complex than can be described easily in a single map. Hydric soils are generally very deep and therefore, can have high water holding capacity. Early in the winter they can store a substantial quantity of runoff. Because water moves very slowly through these soils, it is released after flood waters have subsided, thus maintaining stream flow levels.

The infrequency of flooding for hydric soils is surprising. Flooding is not probable for about half of the hydric soil area, and occurs only rarely or occasionally in most of the others. Flooding is frequent, occurring more often than every other year, in only a few soil types. This emphasizes that hydric soils are saturated soils and not necessarily flooded soils.

Table V : SOIL SURVEY SUMMARY FOR GRAYS HARBOR OF HYDRIC SOILS AND OTHER SOILS WITH HIGH WATER TABLE

M.U.		G.H.	Hydric	Hydr				Flood	High Water Table			Potential for Wetla		Prime	Forest
Num	Map Unit Name	Acres	Soil?	Grp	Slope	Landform	Description	Freq	Depth-ft	Kind	Months	Plants	Wildlife	Farmland	Site Index
1	Aabab silt loam	4,702	No	D	0-3%	River Terrace	Vry deep,+/- poorly drained alluvium	Rare	1.0-2.5	Appr	Oct-Mar	Fair	Fair	Drained	RA100, WH
2	Arta silt loam	2,038	No	C	0-3%	Upland/Terrace	Vry deep, mod well drained sedmnts	None	2.0-3.5	Appr	Nov-Mar	Poor	Poor	Yes	RA 91,WH115
3	Arta silt loam	1,398	No	C	3-15%	Upland/Terrace	Vry deep, mod well drained sedmnts	None	2.0-3.5	Appr	Nov-Mar	Vry Poor	Vry Poor	No	RA 91,WH115
4	Arta silt loam	49	No	C	15-30	Upland/Terrace	Vry deep, mod well drained sedmnts	None	2.0-3.5	Appr	Nov-Mar	Vry Poor	Vry Poor	No	RA 91,WH115
8	Beaches, sand/gravel	2,825	Yes	*	level	Beach	Non-vegetated, wave-washed	Freq	*	*	*	*	*	No	N/A
39	Fluvaquents, tidal	1,433	Yes	D	0-1%	FloodPlain/Delta	Vry deep, well drnd; grass,saltplnts	Freq	0-1.0	Appr	Jan-Dec	Fair	Fair	No	N/A
44	Halbert muck	17,394	Yes	D	0-10%	Depressions	Shallw, poor drng; glacl outwsh pln	None	+1-0.5	Prch	Oct-May	Poor	Vry Poor	No	WH 70, SS
72	Lyre Variant sandyloam	1,437	No	C	0-3%	Bench/Vally Flr	Mod deep, mod well drnd; grvlly till	None	1.5-3.0	Prch	Nov-Mar	Poor	Vry Poor	No	DF132, RA
79	Montesa silt loam	4,587	No	C	1-8%	Alluvial fans	Very deep, +/- poorly drnd sedmnts	None	1.5-2.5	Appr	Oct-Apr	Poor	Vry Poor	Drained	RA102, DF
91	Nemah silty clay loam	8,491	Yes	D	0-2%	Terrace Depresn	Very deep, poorly drained alluvium	None	+1-0.5	Appr	Oct-Apr	Good	Fair	Drained	RA 86, RC
101	Norma sandy loam	647	Yes	D	0-2%	NarrowFloodPln	Vry deep, prly drained sndy allvium	None	+1-1.0	Appr	Nov-Apr	Good	Fair	Drained	RA 90, RC
102	Nuby silt loam	227	Yes	C	0-3%	Flood Plain	Vry deep, porly drnd, ditched/tiled	Occl	2.0-3.0	Appr	Oct-Apr	Poor	Vry Poor	Yes	RA103, RC
104	Ocosta silty clay loam	17,298	Yes	D	0-2%	FloodPlain/Delta	Vry deep, poorly drn bay alluvium	Rare	1.0-2.0	Appr	Jan-Dec	Poor	Vry Poor	Yes	RA 94, SS
108	Ocras peat	2,346	Yes	D	0-1%	Basin/Depressn	Vry deep,poorly drnd, betwn dunes	None	0.5-1.5	Appr	Jan-Dec	Fair	Fair	No	N/A
109	Oyhut silt loam	11,829	No	C	1-15%	Terrace	Mod deep,well drn wthrd gl outwsh	None	2.0-3.0	Prch	Nov-Apr	Vry Poor	Vry Poor	No	WH110, RC
110	Oyhut silt loam, cool	400	No	C	1-15%	Terrace	Mod deep,well drn wthrd gl outwsh	None	2.0-3.0	Prch	Nov-Apr	Vry Poor	Vry Poor	No	WH100, RC
125	Rennie silty cly loam	8,540	Yes	D	0-2%	Flood Plain	Very deep, poorly drained alluvium	Freq	+1-0.5	Appr	Oct-May	Good	Fair	Drained	RA 99, RC
126	Riverwash	2,327	Yes	*	level	River Bar	Rcnt clay, silt, sand, grvl alluvium	Freq	*	*	*	*	*	No	N/A
127	Salzer silty clay	6,152	Yes	D	0-2%	Flood Plain	Vry deep, prly drn;swale,dprn,chnnl	Freq	+1-0.5	Appr	Oct-May	Fair	Fair	Drained	RA 85, RC
132	Seastrand mucky peat	332	Yes	D	0-1%	Dune Depressns	Vry dp, prly drn, betwn dunes,dtchd	None	0.5-1.5	Appr	Jan-Dec	Good	Good	No	N/A
133	Seastrand Variant muck	1,067	Yes	D	0-1%	Dune Depresssns	Vry dp, prly drn, betwn dunes,dtchd	None	0.5-1.5	Appr	Jan-Dec	Good	Good	No	N/A
134	Skamo silt loam	6,054	No	C	0-8%	Terr/AluvialFans	Very deep, mod well drnd alluvium	None	1.5-3.0	Appr	Nov-Mar	Vry Poor	Vry Poor	Yes	DF115,RA101
138	Stimson silt loam	245	Yes	D	0-3%	Upland Depresn	Vry deep, prly drained loess alluv	None	0-0.5	Appr	Oct-Apr	Good	Fair	Drained	RA 95, RC
139	Swem gravelly silt loam	998	No	C	5-30%	Old Earthflows	Vry deep, mod well drnd baslt collv	None	2.5-3.5	Prch	Nov-Mar	Vry Poor	Vry Poor	No	DF125,WH114
140	Swem gravelly silt loam	556	No	C	30-65	Old Earthflows	Vry deep, mod well drnd baslt collv	None	2.5-3.5	Prch	Nov-Mar	Vry Poor	Vry Poor	No	DF125,WH114
141	Sylvia silt loam	4,317	No	C	1-5%	Old Lakebeds	Vry dp, mod wll drnd;lacstm siltclay	None	1.5-3.0	Prch	Nov-Mar	Poor	Vry Poor	Drained	WH120, DF
147	Udorthents	4,781	No	C	0-2%	Diked Tidelands	Vry deep,mod-exsvly well drn drdgn	Rare	2.0-6.0	Appr	Nov-May	Poor	Vry Poor	No	N/A
154	Willaby silt loam	12,620	No	C	1-15%	Terrace	Vry deep, mod well drained glac drift	None	2.0-3.0	Appr	Nov-Mar	Vry Poor	Vry Poor	No	DF125,WH110
155	Willapa silt loam	578	No	C	1-8%	Marine Terrace	Vry deep, mod well drn;wave-cut MT	None	2.5-3.5	Appr	Nov-Mar	Poor	Vry Poor	Yes	WH113, RC
156	Willapa silt loam	5,695	No	C	8-30%	Marine Terrace	Vry deep, mod well drn;wave-cut MT	None	2.5-3.5	Appr	Nov-Mar	Vry Poor	Vry Poor	No	WH113, RC
157	Willapa silt loam	4,264	No	C	30-70	Marine Terrace	Vry deep, mod well drn;wave-cut MT	None	2.5-3.5	Appr	Nov-Mar	Poor	Vry Poor	No	WH113, RC
160	Willapa silt loam	320	No	C	30-70	Marine Terrace	Vry deep, mod well drn;wave-cut MT	None	2.5-3.5	Appr	Nov-Mar	Vry Poor	Vry Poor	No	WH105, SS
161	Wishkah silty clay loam	14,260	No	C	0-2%	OldAlluvTerrace	Vry deep, prly drnd glac outwsh pln	None	2.5-3.5	Appr	Nov-Apr	Poor	Vry Poor	Yes	WH110,RA 85
162	Yaquina loamy finesand	2,415	Yes	D	0-1%	Depressions	Vry deep, prly drained betwn dunes	None	0-2.0	Appr	Nov-Apr	Fair	Fair	No	RA 90, SS

Total Table Acreage	152,622
Hydric Soil Types	71,739
Other Soil Types	80,883
Total Grays Harbor Soil Survey Acreage	877,470 (Excluding Qinault Indian Nation, Olympic National Forest, Olympic National Park)

Flooding not probable	None
Flooding unlikely but possible	Rare
Flooding less than once/2 yrs	Occl
Flooding more than once/2 yrs	Freq

Appr = Apparent Water Table - level at which water stands in uncased borehole
Prch = Perched Water Table above unsaturated zone
(+) = Water Table above soil surface
* = Not Indicated in SCS Tables
Potential is relative to establishing, improving, maintaining

Hydric Soil Classification from USDA-SCS

Hydrologic Groups: D=Very slow infiltration rate; C=Slow infiltration rate when wet

Table compiled from USDA-SCS Soil Survey of Grays Harbor County Area, Pacific County, and Wahkiakum County, Washington

Local Occurrence

The City of Montesano hydric soils map (See Map 4: Hydric Soils) was compiled from the USDA-SCS Soil Survey. The City of Montesano has considered hydric soils maps to be more reliable than NWI maps for predicting the outcome of federal CWA and state shoreline management permit processes for wetlands. But the classification and mapping of hydric soils is also the more likely to change as a result of redefining the hydrological criteria used as the basis for delineating wetlands.

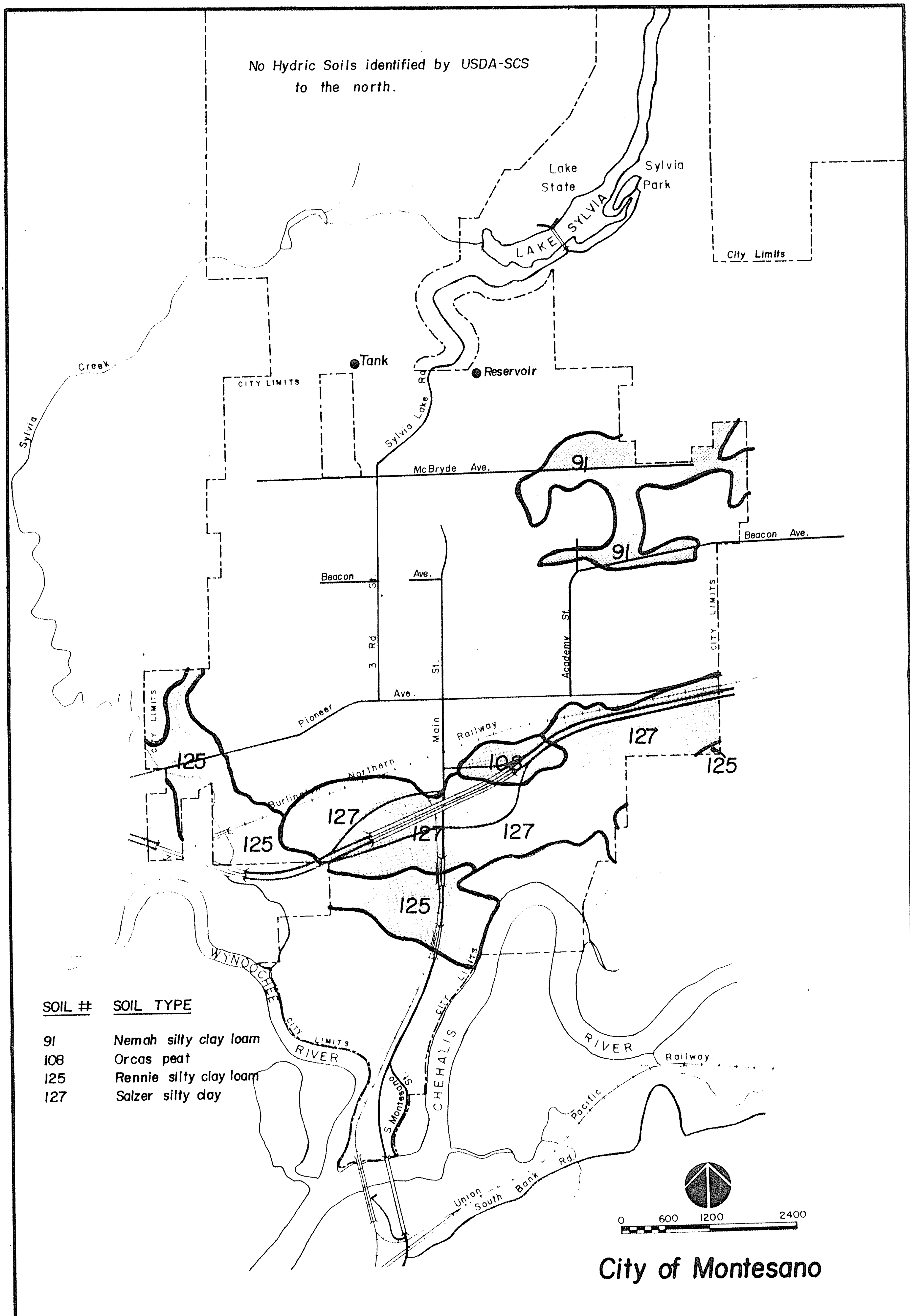
GHRPC prepared Wetland Maps (See Map 5: City of Montesano Wetlands) for the City. Initially, areas mapped as hydric soils were combined with areas mapped by NWI. Because wetlands are "transitional between land and water", areas of open water on NWI maps were excluded. Existing development, especially if filling was involved, was excluded due to the substantial impact of man on the landscape. Other information such as previous wetlands delineations or special studies conducted for the City were incorporated into the mapping. Such studies were conducted for the City during CWA Section 404 permit processing by the Army Corps of Engineers for siting the City's new wastewater treatment facility. Although there are areas mapped by USFWS on the NWI map as palustrine emergent wetlands or palustrine forested wetlands, the geotechnical study by Converse Consultants Northwest and site investigations by the Corps delineated wetland boundaries and excluded those areas of upland that had been erroneously mapped on the informational maps (i.e., NWI and Hydric Soils).

Aerial photos were reviewed by GHRPC to identify likely wetland areas that were overlooked as well as upland areas that were included. No photo interpretation and field verification is planned; although the results of such a process could be used to adjust the wetlands maps. City staff has made its own site investigation for wetlands and determined that an approximately 5-acre area of pasture between the Burlington Northern Railway and US Hwy. 12 is not wetland. Although the area is mapped as a possible hydric soil (Rennie silty clay loam), the upland grass species and higher elevation -- compared to the surrounding topography -- suggest that the area is not a wetland. USFWS did not field verify any of their photo interpretation within the City of Montesano while preparing the NWI maps. Inventory of selected areas of the City could be undertaken to improve the accuracy of the wetlands mapping.

Part of the area between the Washington Forest Products chip mill and Mary's River Lumber Company was previously determined to be uplands. The City issued a Shoreline Substantial Development Permit for access road relocation in December 1989. The area is designated as an urban shoreline under the City's SMP. DOE has reviewed and approved the permit application. Schofield Creek and its protected buffer are the only part of this area that are considered to be wetlands.

Policy Statement

The City of Montesano has considered the CWA, SMP, and GMA definitions of wetlands, the DOE Four-tier Wetlands Rating System, the Regional Planning Alternative Wetlands Rating System, the USFWS National Wetlands Inventory, the USDA-SCS Soil Survey, the methodology in the *"Federal Manual for Identifying and Delineating Jurisdictional Wetlands"*, Regulatory Guidance Letter 90-7, the 1987 Manual, and wetlands functions and values; adopts the GMA wetlands definition, the Regional Planning Alternative Wetlands Rating System, and the City of Montesano Wetlands Map as the basis for designating wetlands within the City of Montesano; and having identified that Category "A", Category "B", and Category "C" wetlands exist within the City; designates the areas mapped on the City of Montesano Wetlands Map as wetlands. The actual boundaries of Category "A" and Category "B" wetlands shall be delineated on the ground as required by federal, state, and City of Montesano permit requirements. The City of Montesano anticipates changes in the mapped boundaries as new information is developed from paper inventory, photo interpretation, field inventory, and completed wetlands delineations and studies.



Map 4
Hydric Soils

GHRPC 3/92

Aquifer Recharge Areas

Areas with a critical recharging effect on aquifers used for potable water are areas where an aquifer that is a source of drinking water is vulnerable to contamination that would affect the potability of the water. WAC 365-190-030(2)

Minimum Guidelines Approach to Classification - WAC 365-190-080(2)

- Where no specific studies have been done, use existing soil and surficial geologic information to determine where recharge areas are. To determine the threat to groundwater quality, existing land-use activities and their potential to lead to contamination should be evaluated.
- Classify recharge areas for aquifers according to the vulnerability of the aquifer. Vulnerability is the combined effect of hydrogeological susceptibility to contamination and the contamination loading potential.
- Use information from studies of aquifers and their recharge areas as the base for classifying and designating these areas.

Alternative Approaches to Classification

- Determine if any area of the City is designated as either a sole source aquifer by the US Environmental Protection Agency (EPA) or as a Ground Water Management Area by DOE.
- Consider the discussion and mapping for the water and wastewater planning elements of the 1991 *"Grays Harbor County Utilities Comprehensive Plan, Phase I"* (Utility Comp Plan).

General Description and Values

Potable water is an essential life sustaining element. All of Montesano's drinking water comes from groundwater supplies. Once groundwater is contaminated it is difficult, costly, and sometimes impossible to clean up. Preventing contamination is necessary to avoid physical harm to people, additional water treatment costs, and other hardships. The quality of groundwater in an aquifer is inextricably linked to its recharge area, but there are few studies of aquifers and their recharge areas in Washington state.

Examples of areas with a critical recharging effect on aquifers used for potable water include:

- Sole source aquifer recharge areas designated pursuant to the Federal Safe Drinking Water Act.
- Areas established for special protection pursuant to a ground water management program, chapters 90.44 and 90.54 RCW, and chapter 173-100 WAC.
- Areas designated for well-head protection pursuant to the Federal Safe Drinking Water Act.

Classification strategy for recharge areas should be to maintain the quality of the groundwater, with particular attention to recharge areas of high susceptibility. In recharge areas that are highly vulnerable, studies should be initiated to determine if groundwater contamination has occurred. Classification of these areas should include consideration of the degree to which the aquifer is used as a potable water source, feasibility of protective measures to preclude further degradation, availability of treatment measures to maintain potability, and availability of alternative potable water sources.

The Minimum Guidelines recommend classifying aquifer recharge areas according to vulnerability. Vulnerability is defined as the combined effect of hydrogeological susceptibility to contamination and the contaminant loading potential. Factors to consider in characterizing hydrogeologic susceptibility of the recharge area to contamination include:

- Depth to groundwater;
- Aquifer properties such as hydraulic conductivity and gradients;
- Soil texture, permeability, and contaminant attenuation properties; and
- Characteristics of the vadose zone (the unsaturated top layer of soil and geologic material) including permeability and attenuation properties;

To evaluate contaminant loading potential, the Minimum Guidelines recommend that general land uses, waste disposal site location, agricultural activities, well log and water quality test results, and other information about the potential for contamination be considered.

Land use activities can impact both groundwater supplies and water quality. Because aquifers are recharged by rainfall, impenetrable surfaces can impact the quantity of groundwater. Activities occurring on the surface can alter groundwater quality if contaminants are allowed to seep into the aquifer. Pinpointing exact sources of contamination is a very complex process and may be impossible. The nature of aquifers is such that contamination in any part of the aquifer is believed to affect water quality throughout the aquifer. However, aquifer functions are complex and not fully understood.

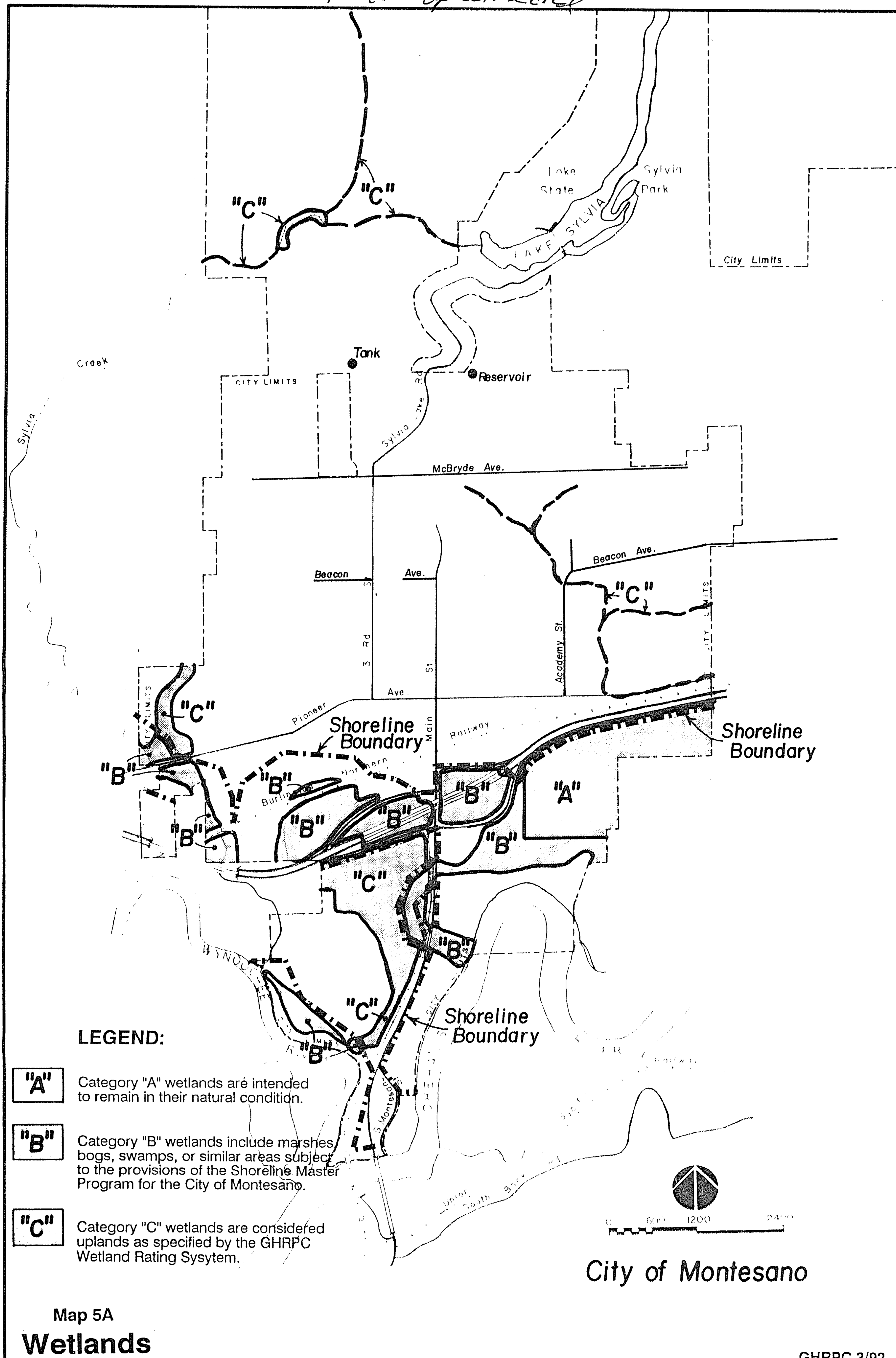
Long-term protection of aquifers will depend on controlling land use activities. Land uses are controlled by zoning, building codes, and health and sanitary codes. Zoning controls are appropriate measures for groundwater protection. They are applied to a specific geographic area and can include provisions to control specific uses or activities that may contaminate an aquifer. Natural area preservation can provide a non-regulatory mechanism for protecting aquifers. Because aquifers cross jurisdictional boundaries, it is necessary that protection measures be coordinated in order to be effective.

Local Conditions

The City of Montesano is located on the slopes and floodplain of the Chehalis Valley at the confluence of the Chehalis River and the Wynoochee River. The valley is formed by the Chehalis River cutting through Tertiary bedrock. Aquifers in central and eastern Grays Harbor County occur in geologically recent gravel deposits averaging about 200 feet thick -- the Chehalis Aquifer (See Map 6: Aquifer Recharge Areas). Near Montesano recent alluvial deposits extend from the floodplain to the vicinity of US Hwy. 12, and much of the City is built on an alluvial terrace. This terrace deposit, the Vashon Drift, forms the northern boundary of alluvial deposits. The hills in the north part of Montesano are composed of Miocene marine sedimentary rocks -- sandstones, siltstones, and conglomerates -- and basalt flows. The City Forest is underlain by peripheral bedrock.

The City of Montesano water supply system includes three active wells drilled in the alluvial deposits forming the Chehalis Aquifer. Two wells are located in Section 12-T17N-R8W, and both are 155 feet deep. Well No. 1 produces 500 gpm and Well No. 2 produces 900 gpm. Both are backup wells to the primary well, Well No. 3, located in Section 14-T17N-R8W, and producing 2,000 gpm. The City owns another well (Lukin Well) located in Section 9-T17N-R7W. This 102-feet deep well is capped and reserved for future use. Water from the wells is chlorinated and treated with fluoride as it is pumped into the system. A pipeline carries water from the wells to a storage tank and reservoir located east of Sylvia Lake Road and north of Wilder Hill Lane.

This Map Corrected



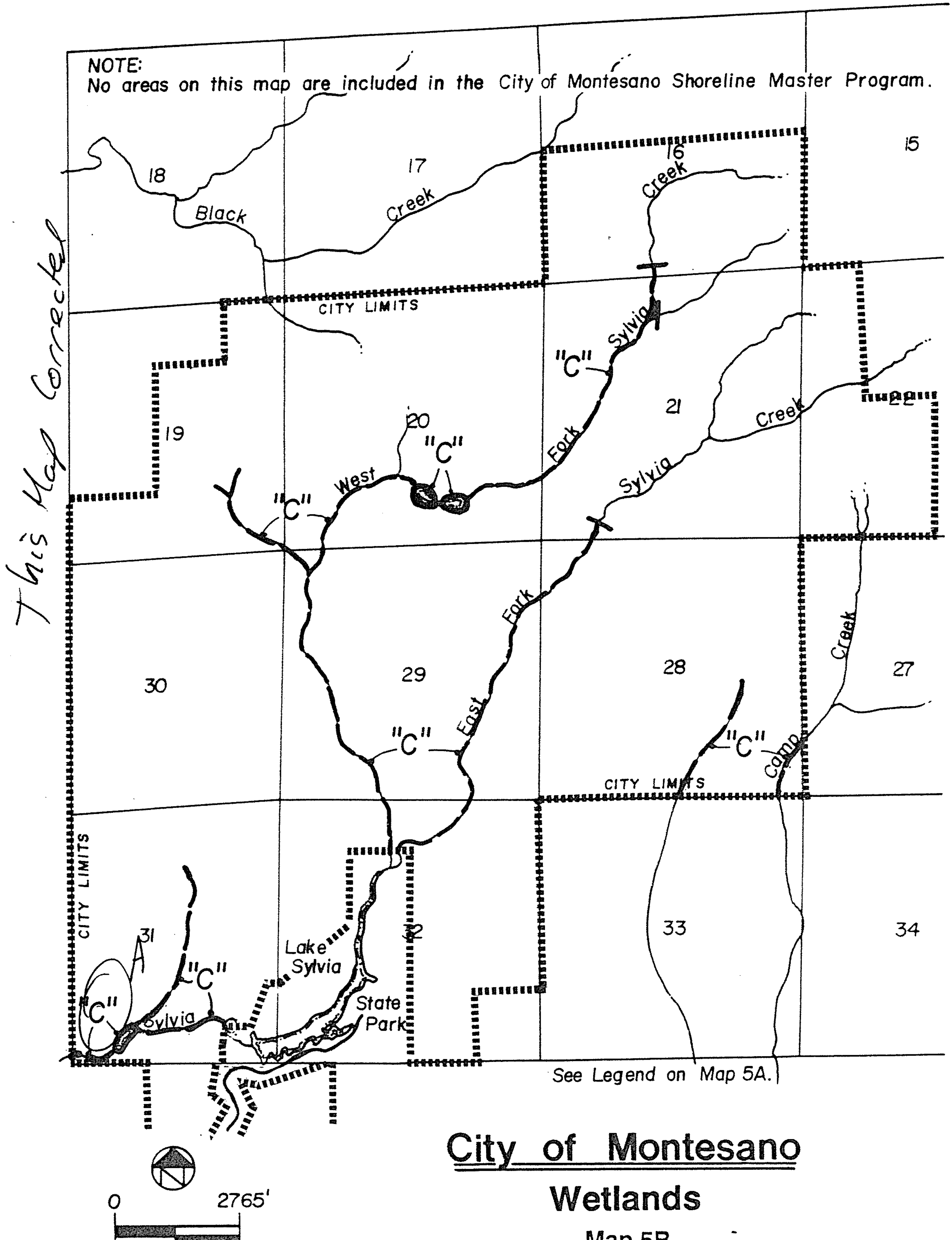
LEGEND:

"A"	Category "A" wetlands are intended to remain in their natural condition.
"B"	Category "B" wetlands include marshes bogs, swamps, or similar areas subject to the provisions of the Shoreline Master Program for the City of Montesano.
"C"	Category "C" wetlands are considered uplands as specified by the GHRPC Wetland Rating Sysytem.

Map 5A

Wetlands

GHRPC 3/92



City of Montesano

Wetlands

Map 5B

GHRPC 3/92

In 1984 Grays Harbor County adopted Ordinance 113 which complies with state requirements for on site disposal of domestic waste. Criteria considered to determine suitability include: soil depth, soil permeability, slope, depth to the water table, soil texture, size and shape of lots, and setbacks from streams, roads, and wells. The Grays Harbor County Utilities Comprehensive Plan refines the USDA-SCS Soil Survey by classifying soils based on their suitability for septic systems (TABLE VI: Septic System Soil Suitability). Because they do not reflect alternative systems for wastewater treatment, the SCS rating system for drainfield suitability is not used. The Utilities Comp Plan attempts to categorize soils in consideration of the specialized systems designed to overcome soil limitations that are allowed by Ordinance 113. Category 1 soils are the least restrictive and Category 3 soils the most restrictive. The lowlands between Aberdeen and Montesano, excluding the Central Park area, are generally in Category 3 due to high water table in the clayey soils. East of Montesano Category 3 predominates but areas suitable for conventional (Category 1) or alternative (Category 2) methods of wastewater disposal are interspersed throughout.

TABLE VI. Septic System Soil Suitability

	Soil Map Unit	Category		Soil Map Unit	Category
9	Bear Prairie silt loam, 0-3%	*1	69	Le Bar silt loam, 8-30%	1
30	Chehalis silt loam	1	71	Lyre very gravelly loamy sand, 0-8%	2
31	Cloquato silt loam	1	79	Montesa silt loam, 1-8%	3
33	Copalis silt loam, 8-30%	2	91	Nemah silty clay loam	3
36	Elochoman silt loam, 1-8%	*1	93	Newberg silt loam, 0-3%	1
37	Elochoman silt loam, 8-30%	1	108	Orcas Peat	3
38	Elochoman silt loam, 30-65	3	125	Rennie silty clay loam	3
45	Hoquiam silt loam, 1-8%	*1	127	Salzer silty clay	3
46	Hoquiam silt loam, 8-30%	*1	134	Skamo silt loam, 0-8%	2
47	Hoquiam silt loam, 30-65%	3	147	Udorthents, level	2
48	Humptulips silt loam	2	161	Wishkah silty clay loam	*3
68	Le Bar silt loam, 1-8%	1	163	Zenker silt loam, 8-30%	3
			164	Zenker silt loam, 30-65%	3

Category 1: Soils suitable for conventional septic systems: soils over 40 inches deep, well-drained, well-structured, and adequately permeable to septic tank effluent.

Category 2: Soils with limitations which will require an alternative system: soils which are too shallow, have a shallow restrictive layer, have a high water table, or drain too rapidly to meet standard rules for waste disposal.

Category 3: Unsuitable soils: soils which are too steep, have a water table that is too high, are more shallow than Category 1 or 2, or are land types such as quarries, beaches, river wash, or wetlands.

* : Predominant soils within the City which are developed.

Although the soils within the developed areas of Montesano are suitable for conventional septic systems, most soils within the vicinity of Montesano are classified as unsuitable (See Map 7: Aquifer Recharge Area). For these reasons, development in and around Montesano and the potential impacts on groundwater quality concerns the City. In response to these concerns, the City has developed a new STEP collection system and an aerated lagoon treatment system for wastewater. Most residences within the City are connected to this system, but the unincorporated area surrounding the City relies on septic systems.

The soils in the Montesano area include silts and clays with isolated gravel deposits. These fine-grained soils are often saturated between November and mid-June. This slows groundwater movement and results in a high seasonal water table. Such characteristics limit the capacity of the area surrounding Montesano to support extensive use of septic tank filter fields. The Aquifer Recharge Area Map is based on the "Groundwater Availability Map" and the "Central-County Sub-Area Soil Map" found in the *"Grays Harbor County Utilities Comprehensive Plan."*

Policy Statement

The City of Montesano has considered the GMA definitions for aquifer recharge areas, the DCD Minimum Guidelines, and the discussion and mapping for the water and wastewater planning elements of the 1991 *"Grays Harbor County Utilities Comprehensive Plan, Phase I"*; and having determined that the area of the City upon which the City wells are located is underlain by the Chehalis Aquifer; designates that area of the City mapped as the Chehalis Aquifer in the Utility Comp Plan as a primary Aquifer Recharge Area for the City and that area of terrace deposits of Vashon Drift as a secondary Aquifer Recharge Area; and for that area of peripheral bedrock underlaying the City of Montesano Tree Farm, the City designates no Aquifer Recharge Areas.

The City of Montesano recognizes its Aquifer Recharge Area designation as a <u>preliminary designation</u>. The City is committed to protecting water quality within the City and to compiling additional information through research, monitoring, and groundwater studies that will be needed to further classify and designate aquifer recharge areas used for potable water and that are vulnerable to contamination that would affect the potability of the water. It is also the intent of the City of Montesano to coordinate with Grays Harbor County and other public and private entities to identify and protect drinking water supplies.

Frequently Flooded Areas

Frequently Flooded Areas are lands in the floodplain subject to a one percent or greater chance of flooding in any given year. These areas include, but are not limited to, streams, rivers, lakes, coastal areas, wetlands, and the like. WAC 365-190-030 (7)

Minimum Guidelines Approach to Classification - WAC 365-190-080(3)

- Include, at a minimum, the 100-year floodplain designations of the Federal Emergency Management Agency (FEMA) and the National Flood Insurance Program.
- Consider the following when designating and classifying frequently flooded areas:
  (a) Effects of flooding on human health and safety, and to public facilities and services;
  (b) Available documentation including federal, state, and local laws, regulations, and programs; local studies and maps; and federal flood insurance programs;
  (c) The future flow floodplain, defined as the channel of the stream and that portion of the adjoining floodplain that is necessary to contain and discharge the base flood flow at build out without any measurable increase in flood heights;
  (d) The potential effects of tsunami, high tides with strong winds, sea level rise resulting from global climate change, and greater surface runoff caused by increasing impervious surfaces.

Alternative Approaches to Classification

- Consider the USDA-SCS Soil Survey, Table 15: "Water Features" to classify soils based on the frequency, duration, and timing of flooding.
- Use local records, studies, and delineations.

General Description and Values

Tidal and riverine flooding impacts Washington coastal areas. The most populated areas of Grays Harbor County experience flooding caused by high river flows accompanied by high tides. Astronomical tides, storm surge, and wave setup affect the still water level at the mouth of Grays Harbor and within the Grays Harbor Estuary. Riverine flooding occurs principally in the winter. Heavy rains and snowmelt contribute to high runoff flows in the winter. Storms bring heavy rains and also produce storm surge. High river flows held back by tidal influences produce the worst flooding at mouth of the Chehalis River.

Floodplains store flood waters, protect water quality, and are valuable for recreation, agriculture, and wildlife habitat. Development on floodplains reduces flood storage capacity, which can increase flooding on adjacent and downstream lands. Many floodplains include a floodway and floodway fringe. The floodway is the river channel and adjacent areas that contain deep and fast-flowing water during a 100-year flood. Shallower and slower flows characterize the floodway fringe during floods.

The National Flood Insurance Program was enacted by Congress in an effort to reduce losses from floods. The long-range objectives of the program are to reduce costs of disaster relief programs and to regulate building in flood hazard areas. The State Department of Ecology works with local governments to implement the National Flood Insurance Program and other regulatory programs aimed at reducing losses from flooding.

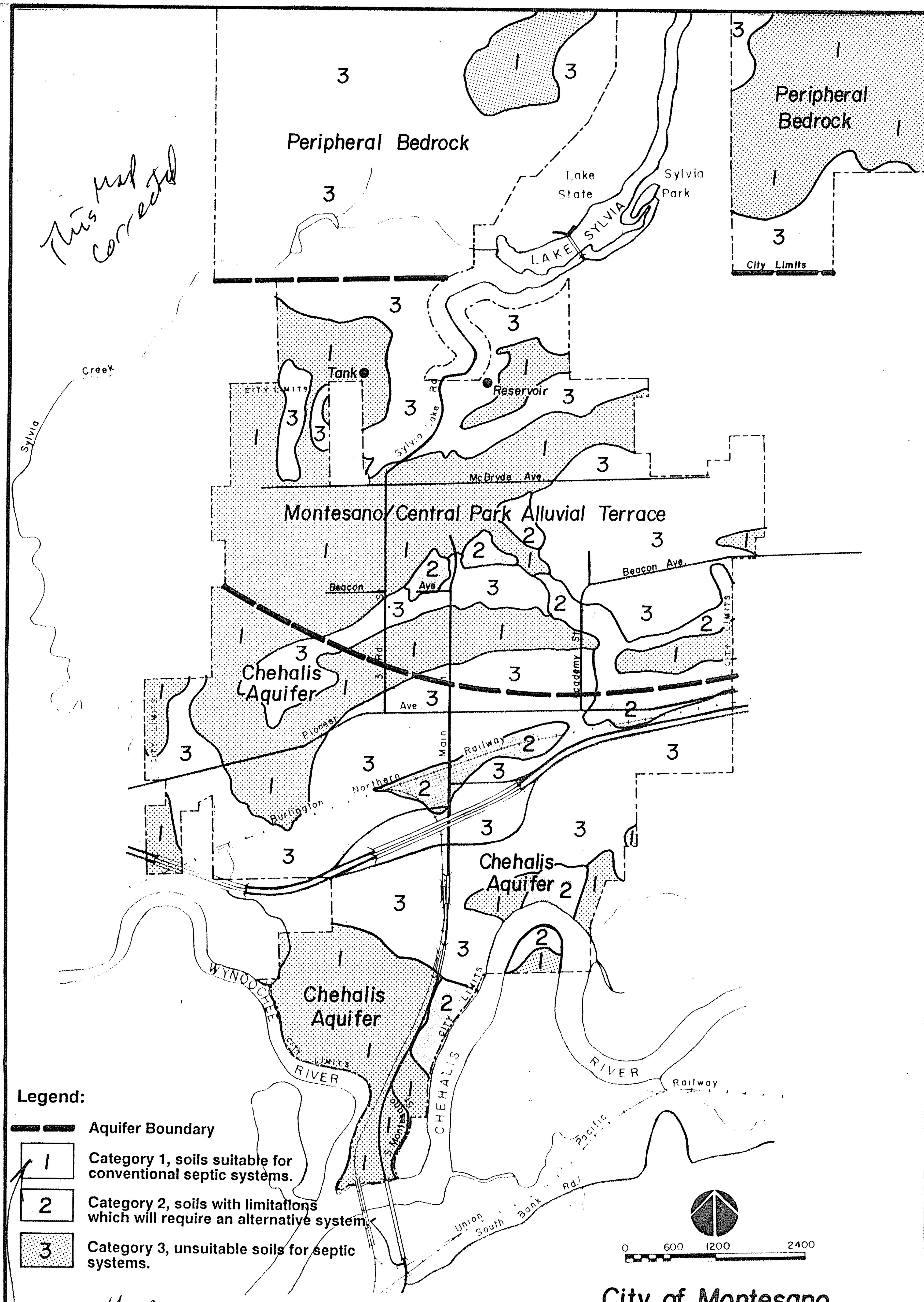
Local Occurrence

The 100-year floodplain for Montesano is generally located south of US Hwy. 12, but extends further north along Sylvia Creek and to the Burlington Northern Railroad east of Main Street (See Map 7: Floodplain). The floodplain map reflects a 1988 review and study of the floodplain by the Army Corps of Engineers during permit issuance for the City's new wastewater treatment facility. The 1981 FEMA Flood Insurance Rate Map for the area extended the 100-year floodplain boundary almost to the Burlington Northern Railroad and along its entire length within the City. The City of Montesano participates in the FEMA National Flood Insurance Program by regulating zoning districts.

Montesano experiences riverine flooding during the winter when heavy rains, and at times snow melt, produce the highest runoff. At times high tides restrict river flows and aggravate flood problems. A tsunami occurring at high tide could result in even worse flooding (See Seismic Hazards).

Policy Statement

The City of Montesano has considered areas designated by FEMA Flood Insurance Rate Maps, the USDA-SCS Soil Survey, and the 1988 regulatory work by the Corps of Engineers; and having found areas of the City susceptible to a one percent probability of flooding in any year; designates the 100-year floodplain depicted on the FEMA FIRMs, as modified by the Corps, as Frequently Flooded Areas.



Note: Two wells are located in Section 12-T17N-R8W (Wells No. 1&2), Well No. 3 is located in Section 14-T17N-R8W. The City owns another well (Lukin Well) located in Section 9-T17N-R7W.

Map 6

AQUIFER RECHARGE AREAS

GHRPC 3/92

Source: 1991 Grays Harbor County Utilities Comprehensive Plan, Phase 1; Figure 3.2.10: Groundwater

Geologically Hazardous Areas

*Geologically hazardous areas are areas that because of their susceptibility to erosion, sliding, earthquake, or other geological events, are not suited to **the** siting **of** commercial, residential, or industrial development consistent with public health or safety concerns.* RCW 36.70A.030(9); WAC 365-190-030(8); Bold text is not in WAC version.

Minimum Guidelines Approach to Classification - WAC 365-190-080(4)

- Consider the distinction between hazards that can be reduced or mitigated, with acceptable risk to public health and safety, by engineering, design, or modified construction practices; and hazards for which technology can not reduce the risks to acceptable levels.
- Classify geologically hazardous areas according to the threat they pose to health and safety when incompatible development is sited in hazardous areas. The following categories are suggested:

  - Known risk or suspected risk;
  - No risk;
  - Risk unknown - data not available to determine the presence or absence of geological hazard.

Alternative Approaches to Classification

- Establish a classification system for geologically hazardous areas that uses the risk categories suggested by the Minimum Guidelines, makes a distinction between acceptable and unacceptable risk to health and safety, and identifies the type of geological threat. Use the following categories:

  GH0 No risk of a geological threat exists, is suspected, or even warrants consideration as a hazard to public health and safety.

  GH1 Unknown risk for which data is not available to determine the presence or absence of a geological hazard or to make a reasonable assessment of risk to health and safety resulting from possible geological hazards. Based on potential risk to health and safety, additional information, which may include a geotechnical report, could be required.

  GH2A Known or suspected risk to health and safety is acceptable and need not be reduced or mitigated by exceptional engineering, design, or construction practices. Uniform Building Code (UBC) standards would apply to site development. Risk reduction or mitigation may be required for geological hazards that threaten property.

  GH2U Known or suspected risk to health and safety is unacceptable and must be reduced or mitigated by exceptional engineering, design, or construction practices or by avoiding the site. A geotechnical report would be required to provide recommendations for building standards that would meet or exceed the UBC standards that apply to site development and would reduce or mitigate the known or suspected risk to health and safety to an acceptable level.

  Use the following sub-categories to identify specific types of geological hazards for which the risk is known or suspected, or for which additional information may be required: (e) erosion, (l) landslide, (s) seismic, (m) mine, and (v) volcanic hazards; and areas subject to other (o) geological events including mass wasting, debris flows, rockfall, and differential settlement. For example, **GH2A-(e)** would be an Erosion Hazard Area for which the risk to public health and safety is acceptable without employing extraordinary measures to reduce or mitigate the risk.

General Description, Local Occurrences, and Values

Geological hazards pose a threat to the health and safety of citizens when incompatible commercial, residential, or industrial development is sited in areas of significant hazard. Some risks can be reduced or mitigated by engineering, design, or modified construction practices. When the risks can not be reduced to acceptable levels by technology, building in geologically hazardous areas is best avoided.

Policy Statement

The City of Montesano has considered the GMA definitions for geologically hazardous areas, the Minimum Guidelines, and the alternative classification system developed for the City by the Grays Harbor Regional Planning Commission; and having found areas within the City susceptible to landslide and earthquake hazards; designate Landslide Hazard Areas and Seismic Hazard Areas as follows herein. (See Map 8: Geologically Hazardous Areas)

Erosion Hazard Areas

> *Erosion hazard areas are those areas containing soils which, according to the United States Department of Agriculture Soil Conservation Service Soil Classification System, may experience severe to very severe erosion.* WAC 365-190-030(5)
>
> *Erosion is the wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.* USDA-SCS Soil Survey

Minimum Guidelines Approach to Classification - WAC 365-190-080(4)(c)

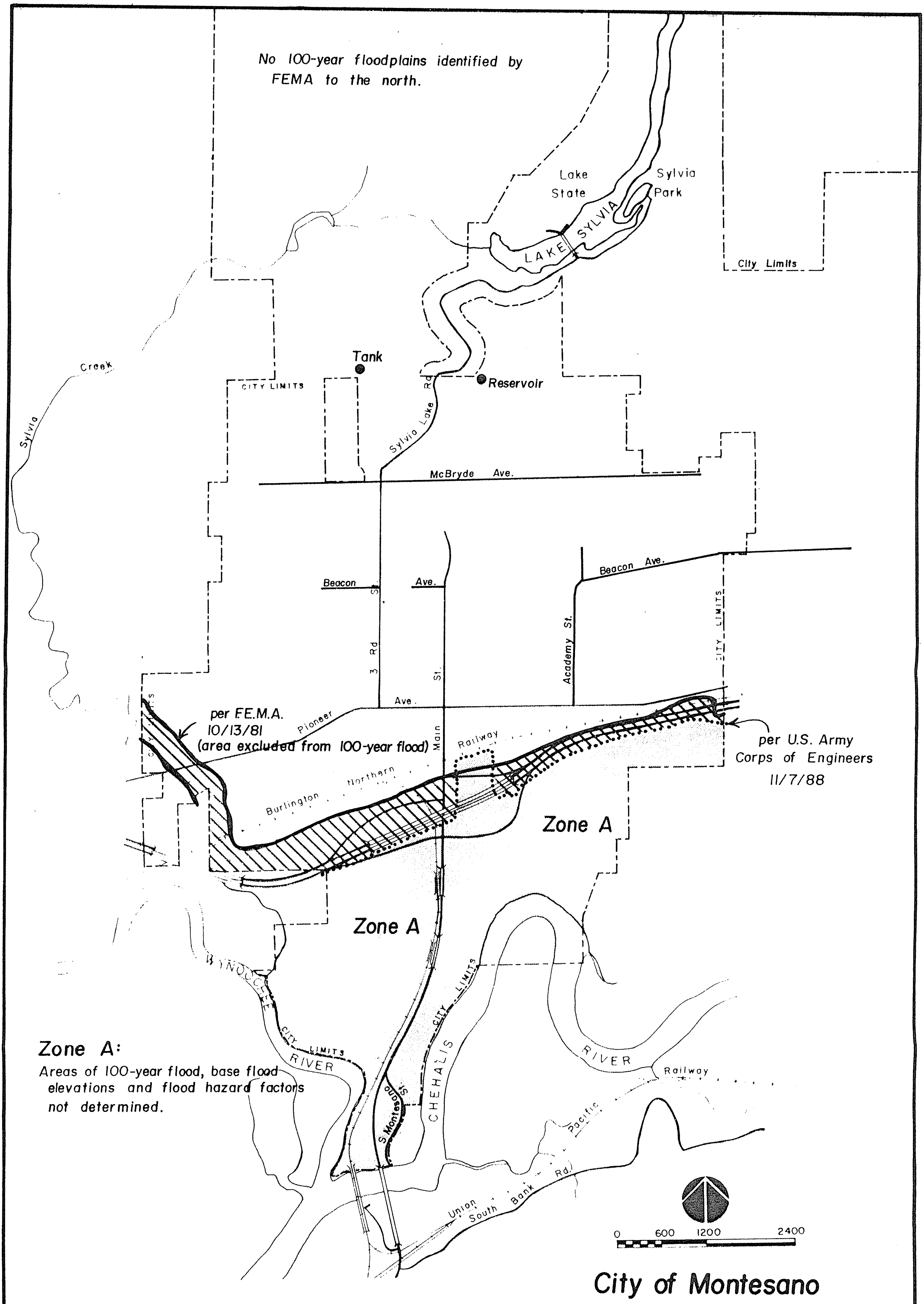
- Classify erosion hazard areas as having known or suspected risk, no risk, or unknown risk.

- Consider at least those areas identified by the USDA-SCS Soil Survey classification system as having severe rill and inter-rill erosion hazard.

Alternative Approaches to Classification

- Use the erosion hazard area sub-category (e) as described in the alternative classification system for geologically hazardous areas.

- Consider the USDA-SCS Soil Survey classes for water and wind erosion including:
  - No erosion hazard;
  - Slight erosion hazard presenting minor limitations that are easily overcome;
  - Moderate erosion hazard requiring special planning, design, or maintenance to overcome or minimize limitations;
  - Severe erosion hazard when limitations are so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may also be necessary; and
  - Very severe erosion hazard is not further defined.



Map 7

Floodplain

GHRPC 3/92

- Consider the USDA-SCS Soil Survey, Table 14: "Physical and Chemical Properties of the Soils." The table lists erosion factors for susceptibility of a soil to sheet and rill erosion by water (K) and an estimate of the maximum average annual rate of erosion by wind or water (T). "K" values range from 0.02 to 0.69 with higher numbers indicating greater susceptibility to sheet and rill erosion by water. "T" values (tons per acre per year) estimate the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period.

General Description, Local Occurrence, and Values

The Minimum Guidelines seem to limit the definition of erosion to those geologic events that result in the movement of soil particles over a wide area. Although rill and inter-rill erosion are specified, the definition would also include sheet erosion and splash erosion. Rill erosion (i.e., steep-sided channels resulting from accelerated erosion) tends to occur on steep slopes and is intensified by poor vegetative cover. A rill may be only a few inches deep and is generally not an impediment to farm machinery. Sheet erosion is the removal of a fairly uniform layer of soil from the land surface by runoff water. Splash erosion is the spattering of soil particles caused by the impact of raindrops on very wet soils. The loosened and separated particles may or may not be removed by surface runoff. All of these types of erosion increase in severity with increasing slope. Slope is the only basis for water erosion categories in the Soil Survey. Erosion is portrayed as slight for slopes less than 30%, moderate for slopes between 30 and 65%, and severe for slopes greater than 65%. The categories express limitations of soils in a wildland management context rather than in an urban development context. The City of Montesano contains no soils having severe water erosion hazard according to the Soil Survey. The steepest slopes are between 30% and 65%. The Soil Survey characterizes these slopes as having "moderate" erosion hazard. Because there may be some erosion danger on the steeper slopes, these slopes are classified as **GH1-(e)** - areas of unknown risk.

Wind erosion is categorized as severe or very severe or it is not discussed. It is more useful for agricultural, recreational, or woodland considerations than for assessing risks to urban development. Neither water erosion or wind erosion as defined by the Minimum Guidelines would present significant risk to public health or safety. The Soil Survey mentions no soils within the City in the discussion of wind erosion; therefore, the entire City is classified as **GH0-(e)** in regard to wind erosion.

All types of mass movement are characterized as geological events other than erosion. For example, stream bank erosion and undercutting by wave action are characterized as landslides. Although potential confusion results from the erosion terminology used in the Minimum Guidelines, the City of Montesano, consistent with the Minimum Guidelines, recognizes shoreline mass movement and other types of mass wasting as landslide events rather than erosion events.

Policy Statement

The City of Montesano has considered the erosion definition in the Minimum Guidelines, the Soil Survey erosion definitions and classification systems for rill and inter-rill erosion and erosion due to blowing sand, and an alternative classification system developed by the Grays Harbor Regional Planning Commission for classifying geologically hazardous areas; and finding no soils within the City having severe rill and inter-rill erosion, or soils that are susceptible to wind erosion; adopts the GMA erosion definition and the GHRPC classification system; designates no areas within the City of Montesano as Erosion Hazard Areas.

Landslide Hazard Areas

Landslide hazard areas are areas potentially subject to risk of mass movement due to a combination of geologic, topographic, and hydrologic factors. WAC 365-190-030(10)

Minimum Guidelines Approach to Classification - WAC 365-190-080(4)(d)

- Classify landslide hazard areas as having known or suspected risk, no risk, or unknown risk.

- Consider areas of historic failure as landslide hazard area, such as:
  - areas delineated by the USDA-SCS as having a severe limitation for building site development;
  - areas mapped as Class "u" (unstable), "uos" (unstable old slides), and "urs" (unstable recent slides) in the DOE *"Coastal Zone Atlas"*; and
  - areas designated as quaternary slumps, earthflows, mudflows, lahars, or landslides on maps published by USGS or the DNR Division of Geology and Earth Resources.

- Consider areas with all of the following characteristics: slopes greater than 15 percent, hillsides intersecting geologic contacts having a relatively permeable sediment overlying a relatively impermeable sediment or bedrock, and springs or ground water seepage.

- Consider other areas susceptible to landslide because of any combination of bedrock, soil, slope, slope aspect, structure, hydrology, or other factors including:
  - Areas that have shown movement during the Holocene epoch (from ten thousand years ago to the present) or which are underlain by mass wastage debris of that epoch;
  - Slopes that are parallel or sub-parallel to planes of weakness (such as bedding planes, joint systems, and fault planes) in subsurface materials;
  - Slopes having gradients steeper than 80% that are subject to rockfall during seismic shaking;
  - Areas potentially unstable as a result of rapid stream incision, stream bank erosion, or undercutting by wave action;
  - Areas that show evidence of, or are at risk from snow avalanches;
  - Areas located in a canyon or on an active alluvial fan, presently or potentially subject to inundation by debris flows or catastrophic flooding; or
  - Any area with a slope of 40 percent or steeper and with a vertical relief of ten or more feet except areas composed of consolidated rock. A slope is delineated by establishing its toe and top and measured by averaging the inclination over at least ten feet of vertical relief.

Alternative Approaches to Classification

- Use the landslide hazard area sub-category (l) as described in the alternative classification system for geologically hazardous areas.

General Description and Values

A combination of geologic, topographic, and hydrologic factors contribute to landslide hazard conditions. Gravity provides the driving force for landslides and groundwater acts as a lubricant as well as providing weight and pressure. Water reduces cohesion of the soil and increases the chance of sliding. Slope instability increases rapidly for slopes greater than 15 percent when unconsolidated surface materials overlay an impervious layer of material, such as clay.

Landslides occur in western Washington following heavy rains that saturate soils. Many soils on steep slopes are unstable, and they are much more likely to slide when saturated. Unconsolidated soils, underlain or inter-bedded with impermeable soil formations, are saturated during heavy rains when water cannot seep into the underlying material. Unconsolidated soils, steep slopes, and saturation of permeable soils inter-bedded with impermeable formations combine with gravity to cause landslides.

Human activity also increases the potential for landslides. Diverting water from impervious areas, removing vegetation, improperly placing and compacting fill, dumping of debris, cutting into hillsides for roads and utility lines, and excavating building sites as well as the weight of the buildings and the failure of retaining walls contribute to landslides. These activities when combined with the geologic, topographic, and hydrologic factors previously mentioned greatly increase landslide potential.

Local Occurrence

The Soil Survey classifies soils by slope gradient as a percentage. It also classifies soils according to limitations of the soil for building site development (See TABLE VII. Soil Limitations for Building Site Development). All soils with slopes greater than 8 percent are classified as having severe limitations for shallow excavations, buildings with and without basements, small commercial buildings, and local roads and streets. Even slopes greater than 15% can be considered hazardous when they are underlain by impermeable bedrock and permeable surface sediments are saturated. Slopes in the north part of the City meet all three criteria. The hills are underlain by Tertiary bedrock overlain by predominantly silt loam soils. With average rainfall of approximately 80 inches per year in the lower elevations, most soils reach saturation at some time during the winter months. Soils with slopes greater than 15% are designated as **GH2A-(l)** geologically hazardous areas due to suspected risk to public health and safety. Slopes greater than 15% are approximated by the Soil Survey Map Units which delineate soils with slopes ranging between 8% and 30%. The actual risk posed to health and safety would be determined by onsite inspection with appropriate mitigation determined at that time. Since adequate safeguards are generally provided by UBC standards, the risk to health and safety is deemed acceptable, but additional risk reduction or mitigation may be required on a site specific basis for landslide hazards that threaten property.

TABLE VII. Soil Limitations for Building Site Development

	Soil Map Unit	Limitations	Slope		Soil Map Unit	Limitations	Slope
9	Bear Prairie	Caving-Severe	0-3%	69	Le Bar	Slope-Severe	8-30%
30	Chehalis	Flooding	0-3%	71	Lyre	Caving-Severe	0-8%
31	Cloquato	Caving-Severe	0-3%	79	Montesa	Slope-Moderate	1-8%
33	Copalis	Slope-Severe	8-30%	91	Nemah	Ponding	0-2%
36	Elochoman	Slope-Moderate	1-8%	93	Newberg silt loam	Caving-Severe	0-3%
37	Elochoman	Slope-Severe	8-30%	108	Orcas Peat	Wetness	±Flat
38	Elochoman	Slope-Severe	30-65%	125	Rennie	Ponding/Flooding	0-2%
45	Hoquiam	Slope-Moderate	1-8%	127	Salzer	Flooding/Ponding	0-2%
46	Hoquiam	Slope-Severe	8-30%	134	Skamo	Slope-Moderate	0-8%
47	Hoquiam	Slope-Severe	30-65%	147	Udorthents	Caving-Severe	0-2%
48	Humptulips	Caving-Severe	0-3%	161	Wishkah	Shrink-Swell	0-2%
68	Le Bar	Slope-Moderate	1-8%	163	Zenker	Slope-Severe	8-30%
				164	Zenker	Slope-Severe	30-65%

The City of Montesano also contains soils having gentle slope but with severe limitations for shallow excavations due to the tendency for side walls or cutbanks to sloughing or caving. The Bear Prairie, Cloquato, Humptulips, Lyre, Newberg, Udorthents (Map Units 9, 31, 48, 71, 93, and 147) have severe limitations for shallow excavations due to caving. Udorthents soils along the banks of the Chehalis River are especially vulnerable to undercutting by river current and are susceptible to bank erosion. The north bank of the Chehalis River within the City is classified as a **GH2U-(l)** landslide hazard and all other soils with severe limitations for shallow excavations as a **GH2A-(l)** landslide hazard.
(See Map 8: Geologically Hazardous Areas)

Policy Statement

The City of Montesano has considered the types of areas and soils defined by the Minimum Guidelines as landslide hazard areas, the Soil Survey classification of slope and building site limitations, and an alternative classification system for geologically hazardous areas developed by the Grays Harbor Regional Planning Commission; and having found soils with the combination of geologic, topographic, and hydrologic factors that make landslides likely; designates soils with slopes greater than 15%, soils with slopes less than 15% but with severe limitations for shallow excavations due to sloughing and caving, and all shorelines experiencing bank erosion due to river current as Landslide Hazard Areas.

Seismic Hazard Areas

Seismic hazard areas are areas subject to severe risk of damage as a result of earthquake induced ground shaking, slope failure, settlement, or soil liquefaction. WAC 365-190-030(18)

Minimum Guidelines Approach to Classification

- Consider the record of earthquake damage in the past as one indicator of the potential for future earthquake damage.
- Because ground shaking is the primary cause of damage in Washington, consider the factors that affect the strength of ground shaking as follows:
  - Magnitude of the earthquake,
  - Distance from the source of the earthquake,
  - Type and thickness of geologic materials at the surface, and
  - Type of subsurface geologic structure.

Alternative Approaches to Classification

- Consider other hazards resulting from seismic activity including: surface faulting, flooding, tsunamis, and seiches.
- Be aware that materials not compacted (clay and silt deposits, sediments in river deltas, and materials used as landfill) generally amplify ground shaking more than consolidated sediments and bedrock.
- Consider the Seismotectonic Map of the Puget Sound Region, Washington (USGS Map I-1613). The City of Montesano is not included on this recent (1985) map, but it can be used to identify the location of known and suspected faults and earthquake epicenters in the Puget Sound Region from Olympia to the Canadian border.
- Review published resources of the Washington Division of Geology and Earth Resources (DGER): Library, Bibliographies, Information Circulars, and Newsletters.

General Description, and Values

Seismic hazard results from earthquakes (i.e., ground shaking caused by an abrupt shift of rock along a fault -- a fracture in the earth -- or large movement by opposing rock masses). An earthquake releases accumulated stress in rock masses which produces seismic waves and ground motion. Earthquakes are measured by magnitude, indicating earthquake size as calculated from wave amplitude, and by intensity, measured by the amount of ground shaking at a particular site. Earthquake magnitude, the distance to the epicenter, the type of faulting, depth, and type of material are important factors that affect the amount of ground shaking. Unconsolidated materials used as fill amplify ground motion. Settling and soil liquefaction occurs in areas underlain by low-density soils lacking cohesion that are typically found in association with a shallow water table.

Large earthquakes cause uplifting or subsidence of large areas. The bays of the Washington Coast have repeatedly subsided between three and six feet in the past. Historically, ground failures have resulted in landslides, soil liquefaction, and differential compaction. Soil liquefaction occurs when a shallow water table and saturated sand or silt shakes violently enough to rearrange individual soil grains. This usually compacts the deposit, but if inter-granular water cannot escape quickly enough to allow compaction, the load from overlying material and structures is temporarily transferred from the soil particles to the water and the deposit becomes liquified. The soil no longer supports overlying structures.

Differential compaction occurs when materials such as tidal sediments, glacial outwash, dredged muck, sawdust, and building rubble settle at different rates. Structural damage to buildings results from differential compaction of materials having different physical proprieties. Buried electrical, water, gas and sewage lines are also susceptible to damage.

The frequency of ground motion affects severity of damage. Tall buildings, bridges, and other large structures respond primarily to low frequency shaking while small structures respond to higher frequency. Building shape can influence the amount of damage. L or U-shaped buildings suffer more damage than symmetrical buildings. Large stresses develop at intersecting points between building segments. Buildings with sections varying in height or width may be more susceptible to damage because each section vibrates at its own natural frequency in response to ground shaking.

Tsunamis

Underwater earthquakes can cause a tsunami (a long-wavelength and long-period sea wave generated by the abrupt movement of the sea floor). In the open ocean, the distance between wave crests can be greater than 60 miles with the period varying between 5 minutes and 1 hour. Tsunamis can propagate at rates of 350 to 500 miles per hour, depending on the water depth.

The 1964 Alaskan earthquake (magnitude 9.2) produced a tsunami measuring nearly ten feet at the entrance to Grays Harbor. The wave height decreases to one-third of its height at the harbor entrance by the time it reaches the Aberdeen area. An earthquake occurring off shore, but near the coast could produce a wave 27-feet high at the entrance to Grays Harbor and nine feet at Aberdeen. A tsunami coinciding with high water at high tide or following heavy rains could flood much of the 100-year floodplain.

A disaster preparedness plan can be effective in reducing seismic hazards. Assigning responsibilities and identifying hazardous sites in advance of an earthquake can enable officials to respond more effectively and reduce damage and casualties. Frequently updating and distributing the plan improves its effectiveness. Grays Harbor County has a plan, *"Grays Harbor Emergency Services Operational Plan"*, most recently published in 1991 by Grays Harbor County Emergency Services.

Local Occurrence

Montesano and the Washington Coast are located in what is termed a subduction zone. The ocean floor, called the Juan de Fuca Plate is sliding beneath the coast. An earthquake of magnitude 8 or greater is possible. Although an earthquake of this magnitude has not occurred within recorded history, geological evidence from buried tidal marshes along the coast indicates that large earthquakes may occur at intervals of 400-500 years. Large Puget Sound earthquakes occurred in 1965 (magnitudes 6.5) and 1949 (magnitude 7.5). A 6.5-magnitude earthquake is expected to occur about every 35 years and a 7.5-magnitude earthquake about every 110 years.

Most of Grays Harbor County and all of the City of Montesano are within Seismic Risk Zone 2 of the Uniform Building Code. The range for UBC seismic zones lies between 0 and 4, with Seismic Zone 4 presenting the greatest risk of major damage due to proximity to major fault systems. The Alaskan subduction zone is in seismic zone 4. Mt. St. Helens is now in seismic zone 3, but prior to its eruption it was classified in seismic zone 2.

The most significant threat to the City of Montesano from earthquakes would be from landslides on steep slopes caused by ground shaking. Filled areas (Map Unit 147, Udorthents) would be susceptible to liquefaction or differential settlement when saturated. These soils are generally located south of the Burlington Northern Railroad and include the site of Mary's River Lumber Company. The threat posed by tsunamis is not as great for Montesano as for some coastal areas of Grays Harbor County, but the flood heights could be increased along the shorelines of the Chehalis River. Due to the suspected risk of sliding during an earthquake, steep slopes within the City of Montesano are classified as suspected seismic hazard areas of acceptable risk, **GH2A-(s)**. The Udorthents soil is also classified as **GH2A-(s)** due to the suspected risk of differential settlement during an earthquake.

Policy Statement

The City of Montesano has considered the Minimum Guidelines and the areas which would be affected by a seismic event; and having found steep slopes to be susceptible to sliding during an earthquake and filled-saturated soil areas (Udorthents) susceptible to soil liquefaction or differential compaction; adopt the GHRPC classification system for seismic hazards; designates soils with slopes greater than 15% and areas Udorthent soils as Seismic Hazard Areas. (See Map 8: Geologically Hazardous Areas)

Mine Hazard Areas

> *Mine hazard areas are those areas directly underlain by, adjacent to, or affected by mine workings such as adits, tunnels, drifts, or air shafts.* WAC 365-190-030 (13).

General Description and Local Occurrence

Coal mining activities between 1900 and the 1970s left some areas of the state (including areas of Lewis County and Thurston County) honeycombed with abandoned mine tunnels. Abandoned tunnels close to the surface pose a danger of ground subsidence. The DNR-DGER Library has an extensive collection of maps for locating coal mines. There is no history of coal mining within the City of Montesano.

Policy Statement

The City of Montesano has considered the Minimum Guidelines and the DCD *"Planning Data Source Book for Resource Lands and Critical Areas"*; and having found no indication of any mining activity within the City; designates no Mine Hazard Areas.

Volcanic Hazard Areas

Volcanic hazard areas include areas subject to pyroclastic flows, lava flows, and inundation by debris flows, mudflows, or related flooding resulting from volcanic activity. WAC 365-190-030(21)

General Description and Local Occurrence

The City of Montesano is located approximately 75 air miles due west of Mt. Rainier which is the closest volcano in the Cascade Range to the City. Although Mt. Rainier is considered to be the most dangerous volcano in the Cascade Range (according to DCD) because of its tendency to generate mud flows coupled with population densities in surrounding river valleys, it is located nearly four-times the distance (20 miles) within which flooding and other hazards present a risk. Ash fall may present the only potential risk to the City.

Policy Statement

The City of Montesano has considered the Minimum Guidelines and the DCD *"Planning Data Source Book for Resource Lands and Critical Areas"*; and being located well outside the distance considered to pose any risk from volcanic hazards; designates no Volcanic Hazard Areas.

Fish and Wildlife Habitat Conservation Areas

Fish and Wildlife habitat conservation is land management for maintaining species in suitable habitats within their natural geographic distribution so that isolated subpopulations are not created. This does not mean maintaining all individuals of all species at all times, but it does mean cooperative and coordinated land use planning is critically important among counties and cities in a region. In some cases, inter-governmental cooperation and coordination may show that it is sufficient to assure that a species will usually be found in certain regions across the state. WAC 365-190-080(5)

Minimum Guidelines Approach to Classification - WAC 365-190-080(5)

- Classify seasonal ranges and habitat elements with which federal and state listed endangered, threatened and sensitive species have a primary association and which, if altered, may reduce the likelihood that the species will maintain and reproduce over the long term.
- Determine which habitats and species are of local importance.
- Classify all public and private tidelands or bedlands suitable for shellfish harvest as critical areas. Consider the Washington Department of Health classification of commercial and recreational shellfish growing areas and consider the vulnerability of these areas to contamination. Include shellfish protection districts established pursuant to chapter 90.72 RCW in classifying critical shellfish areas.
- Classify kelp and eelgrass beds, identified by the DNR Aquatic Lands Division and DOE. Locations of kelp and eelgrass beds are compiled in the Puget Sound Environmental Atlas. Herring and smelt spawning times and locations are outlined in WAC 220-110-240 through WAC 220-110-26 and the Atlas.
- Identify naturally occurring ponds under twenty acres and their submerged aquatic beds that provide fish and wildlife habitat that do not include ponds deliberately designed and created from dry sites, such as canals, detention facilities, wastewater treatment facilities, farm ponds, temporary construction ponds (of less than three years duration) and landscape amenities; but may include those artificial ponds intentionally created from dry areas in order to mitigate conversion of ponds, if permitted by a regulatory authority.
- Use the classification system established in WAC 222-16-030 to classify waters of the state as defined in Title 222 WAC, the forest practices rules and regulations. May consider the following factors when classifying waters of the state:
  - Species present which are endangered, threatened, or sensitive, and other species of concern;
  - Species present which are sensitive to habitat manipulation;
  - Historic presence of species of local concern;
  - Existing surrounding land uses that are incompatible with salmonid habitat;
  - Presence and size of riparian ecosystems;
  - Existing water rights; and
  - The intermittent nature of some of the higher classes of waters of the state.
- Lakes, ponds, streams, and rivers planted with game fish, including those planted under federal, state, local, or tribal programs or which supports priority fish species identified by DOW.
- Identify state natural area preserves and natural resource conservation areas defined, established and managed by DNR.

Alternative Approaches to Classification

Priority habitats and priority species are being identified by the DOW for all lands in Washington state. While these priorities are those of DOW, they and the data on which they are based may be considered in classifying fish and wildlife habitat conservation areas.

Factors to consider when classifying and designating fish and wildlife habitat conservation areas, include:

- Creating a system of fish and wildlife habitat with connections between larger habitat blocks and open spaces;

- Level of human activity in such areas including the presence of roads and level of recreation type (passive or active recreation may be appropriate for certain areas and habitats);

- Protecting riparian ecosystems;

- Evaluating land uses surrounding ponds, and fish and wildlife habitat areas that may negatively impact these areas;

- Establishing buffer zones around these areas to separate incompatible uses from the habitat areas; and

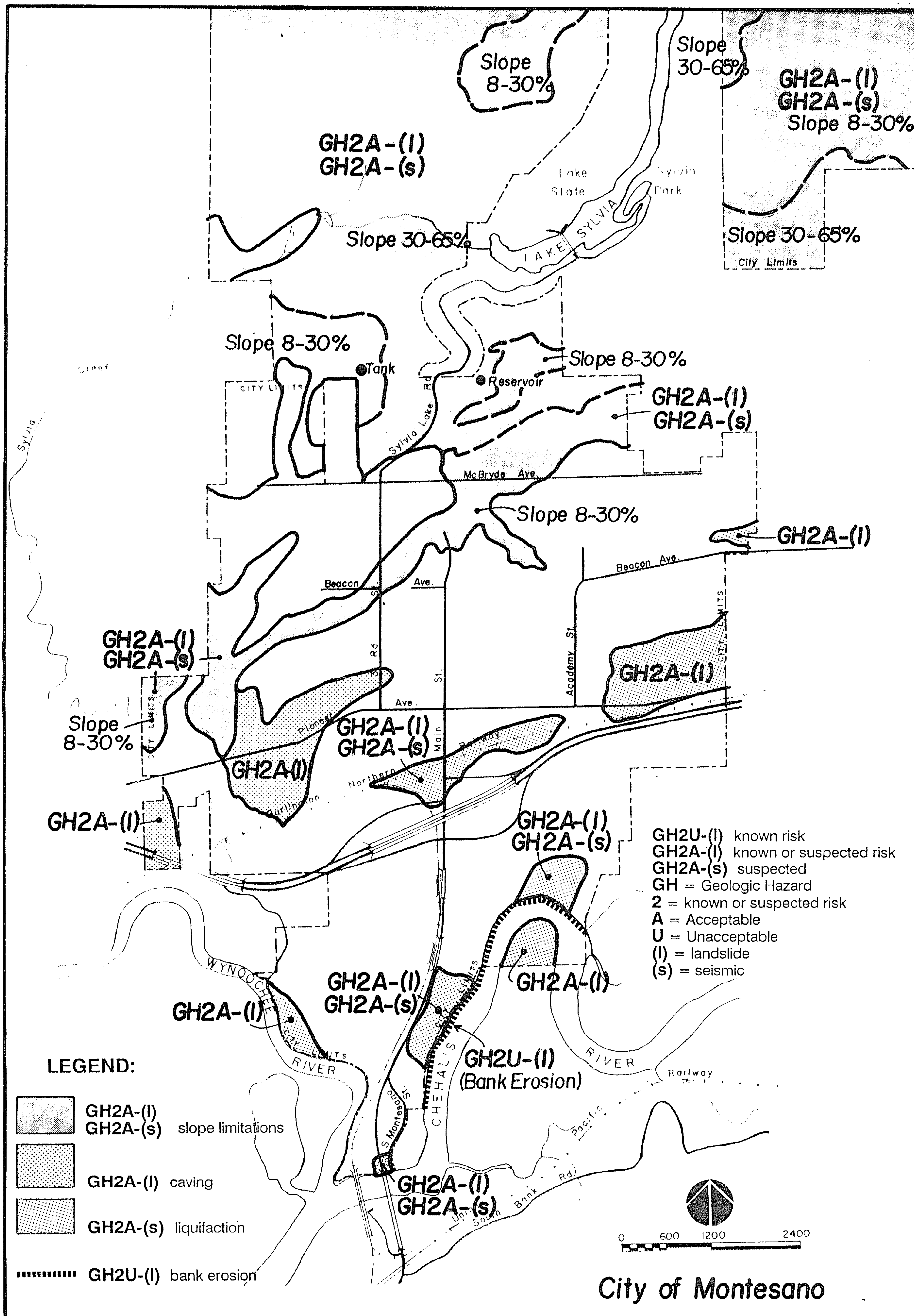
- Restoring lost salmonid habitat.

Local Occurrences

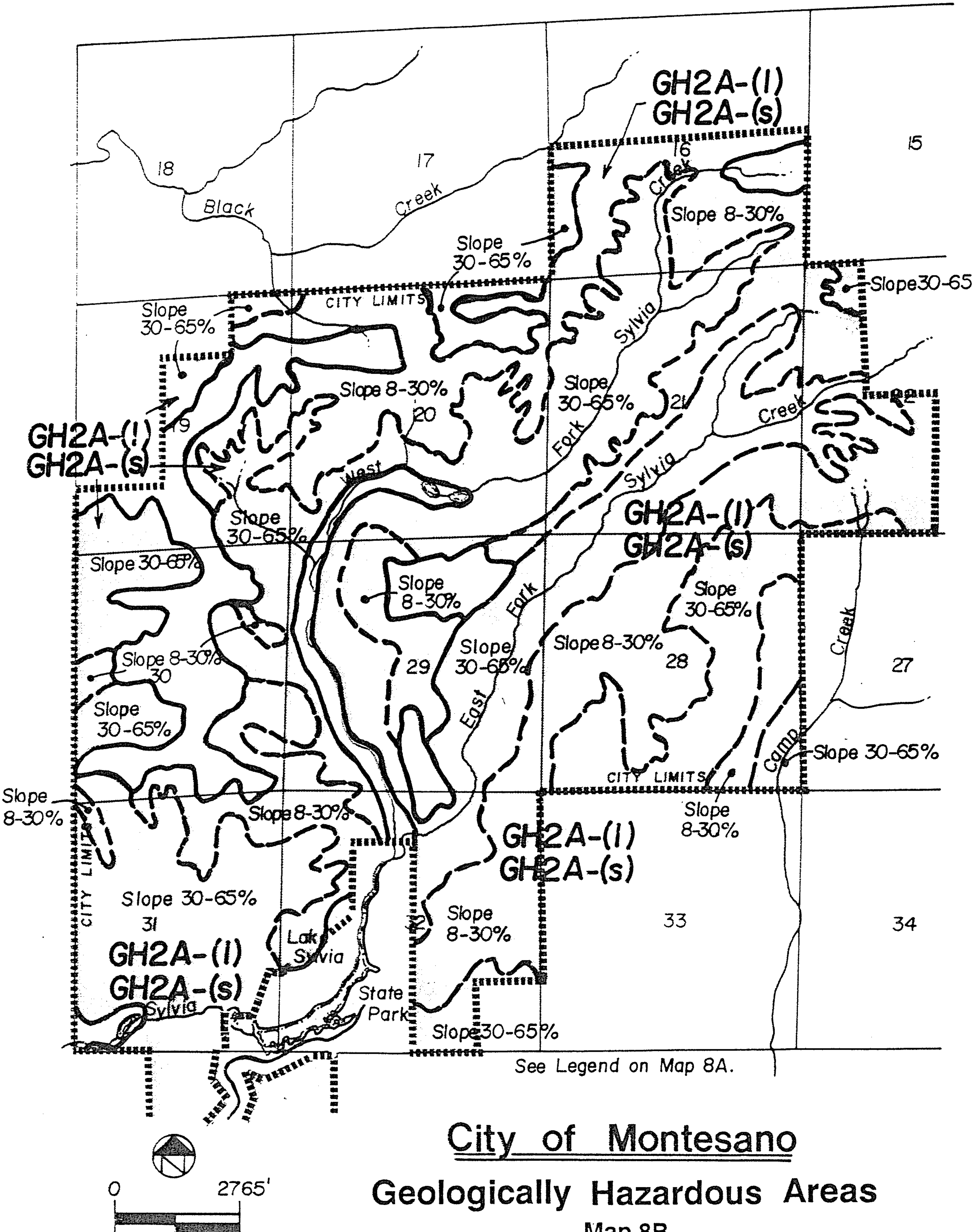
Critical wildlife habitat for the Olympic Mudminnow and Osprey nesting occurs only in the southern part of the City (See Map 9: Fish and Wildlife Habitat Conservation Areas). The Osprey (a Criteria 2 species under the Washington Department of Wildlife Priority Habitats and Species program) nests in an area designated as a Natural Environment under the City of Montesano Shoreline Master Program. A Category 2 species "is an uncommon species, including state monitor species, occurring in forest environments and may be affected by habitat loss or change". The Olympic Mudminnow (a Criteria 1 species under the WDW Priority Habitats and Species program) was identified as an individual occurrence by WDW Habitat Maps in Schofield Creek south of US Hwy 12 and west of SR 107.

Policy Statement

The City of Montesano has begun a preliminary consideration of fish and wildlife habitat conservation areas within the City; and having obtained habitat maps from the State Department of Wildlife; make a preliminary designation of Fish and Wildlife Habitat Conservation Areas as mapped; but it is the intent of the City to continue to gather information concerning this designation as well as other potential habitat areas; and to modify this preliminary designation as appropriate prior to adopting any interim measures for protecting Fish and Wildlife Habitat Conservation Areas.



Map 8A
Geologically Hazardous Areas

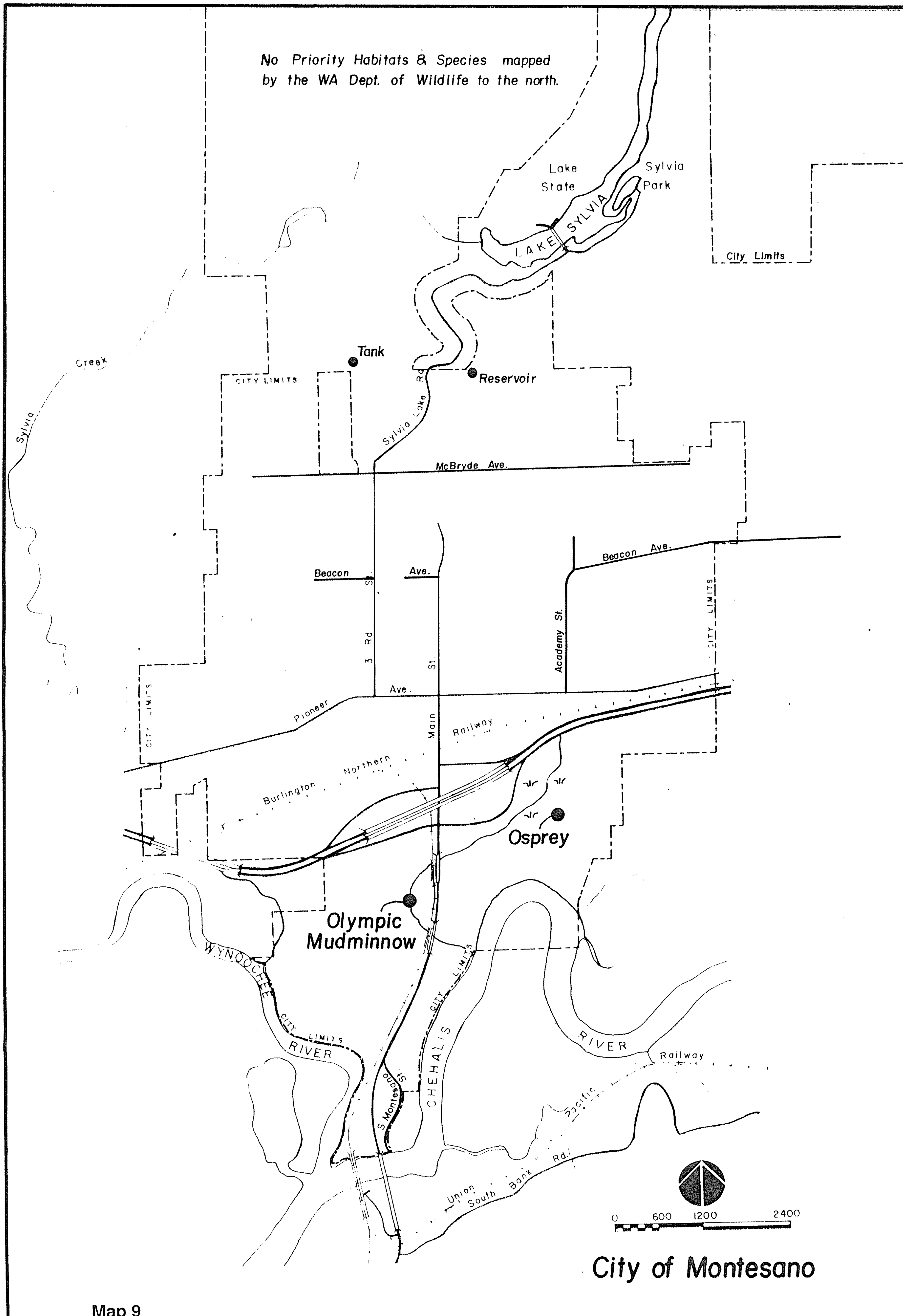


City of Montesano

Geologically Hazardous Areas

Map 8B

GHRPC 3/92



Map 9
Fish & Wildlife

GHRPC 3/92

Glossary of Terms, Agencies, and Publications

Agricultural Use District	Agricultural Lands Designation in *"Agricultural Element of the Grays Harbor County Comprehensive Plan"* adopted in May 1981
Aquifer Recharge Areas	Areas with a critical recharging effect on aquifers used for potable water
City	City of Montesano
Corps	United States Army Corps of Engineers
CWA	Federal Clean Water Act
Data Source Book	*"Planning Data Source Book for Resource Lands and Critical Areas"* February 1991, Washington State Department of Community Development
DCD	Washington State Department of Community Development
DGER	DNR, Division of Geology and Earth Resources
DNR	Washington State Department of Natural Resources
DOE	Washington State Department of Ecology
DOW	Washington State Department of Wildlife
EPA	United States Environmental Protection Agency
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
Four-tier	*"Washington State Wetlands Rating System for Western Washington"* October 1991, by the Washington State Department of Ecology
GHEMP	*"Grays Harbor Estuary Management Plan"* January 1986, by the Grays Harbor Regional Planning Commission
GHRPC	The Grays Harbor Regional Planning Commission
GMA	Washington State Growth Management Act of 1990 as Amended
gpm	gallons per minute
Hydric Soils	A soil that is saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper part (USDA-SCS, 1987)
Land Capability Class	From *"Land Capability Classification, Agriculture Handbook No. 210"* January 1973, by A. A. Klingebiel and P.H. Montgomery, USDA-SCS
Federal Manual	*"Federal Manual for Identifying and Delineating Jurisdictional Wetlands"* January 1989, An Interagency Cooperative Publication by USFWS, EPA, USDA-SCS, and the Army Corps of Engineers
1987 Manual	*"Corps of Engineers Wetlands Delineation Manual"* January 1987, by the Department of the Army Environmental Laboratory
Map Unit	"Detailed Soil Map Unit" - An area dominated by one or more major kinds of soil or miscellaneous areas. Same as a "Soil Phase", a division of a "Soil Series". Sometimes referred to as a "Soil Type."

Minimum Guidelines Chapter 365-190 WAC *"Minimum Guidelines to Classify Agriculture, Forest, Mineral Lands and Critical Areas"* 1991, by the Washington State Department of Community Development

NWI . . . . USFWS National Wetlands Inventory

PFLG . . . . Private Forest Land Grading system of Washington State Department of Revenue

RCW . . . . 1989 Revised Code of Washington as Amended (1990-1991 Supplement)

RGL 90-7 . . . . Army Corps of Engineers Regulatory Guidance Letter 90-7, September 1990

Soil Survey . . . . *"Soil Survey of Grays Harbor County Area, Pacific County, and Wahkiakum County, Washington"* 1979, by USDA-SCS in cooperation with DNR, and Washington State University Agriculture Research Center

Tree Farm . . . . City of Montesano Tree Farm, Chapin Collins Memorial Forest, City Forest, City Watershed

UBC . . . . Uniform Building Code

USDA . . . . United States Department of Agriculture

USDA-SCS . . . . United States Department of Agriculture - Soil Conservation Service

USFWS . . . . United States Fish and Wildlife Service

USGS . . . . United States Geologic Survey

Utilities Comp Plan . . *"Grays Harbor County Utilities Comprehensive Plan, Phase I"* October, 1991 by Parametrix, Inc.; Camp Dresser & Mckee, Inc.; and Economic & Engineering, Inc.

WAC . . . . Washington Administrative Code