Chapter 5
Scio and the Natural Environment

The City of Scio was incorporated in 1866 and is a well-established community located in the agriculturally rich Willamette Valley of Oregon. Ancient lava flows provide Scio with tree covered hills to the north and south. Thomas Creek descends from the Cascade foothills to the east of Scio and passes through the center of the community before it discharges into the South Santiam River.

Scio has historically provided goods and services to the rural agricultural areas surrounding the city. Many people from the surrounding countryside identify Scio as their home town. This in part may be attributed to the fact that the Scio post office and all of the K-12 public schools of the Scio School District 95-C are located inside the City.

Scio is 12 miles east of Interstate 5 and close to the population centers of Corvallis, Albany and Salem in the south central Willamette Valley. State Hwy 226 and Linn County arterial roads provide easy access and connections from Scio to I-5 and the communities of Albany, Jefferson, Lebanon, Lyons and Stayton. Map NR-1 shows Scio's geographic location in the Willamette Valley.

5.1 Climate

Scio enjoys a moderate climate with characteristics of a marine coastal climate during the winter months, punctuated with rainy and overcast days. During the summer, the climate is similar to a warm, dry Mediterranean climate with low humidity. Scio has normal summer daily high temperatures ranging from 65° to 80° Fahrenheit. Most summers have fewer than ten days with a daily high temperature over 90° F. Winters are mild with an average day-time temperature of 43°F. Average night-time low temperatures are in the 30's during the winter months.

Scio receives approximately 55 inches of precipitation a year, with 75% of the precipitation falling between October and April. Scio can expect approximately 120-140 days with some rain each year. Snow is infrequent, but snowfall may occur from late November to mid-February. Because of the unrestricted movement of colder air and the tendency of cool air to settle at lower elevations, Scio and the surrounding area can experience a frost-free growing season in excess of 220 days.

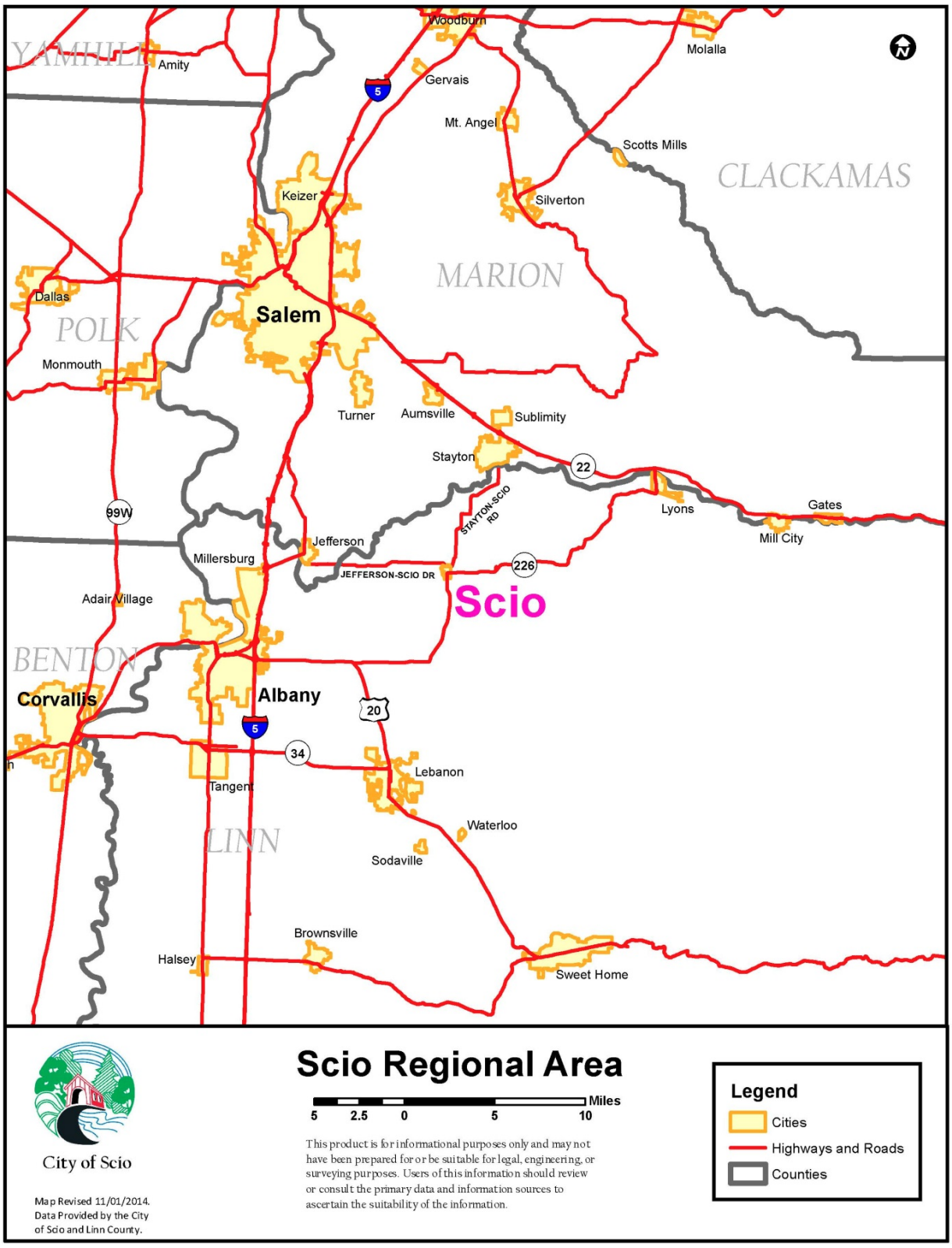
5.2 Air Quality

Air quality in Scio is generally clear and good. The air flow of the region can usually be counted upon to move any pollution out of the area. However, because of the physical shape and dimension of the Willamette Valley, periods of poor air circulation brought on by inversions and other weather phenomena can cause pollutions to become trapped, resulting in slow dissipation and less than clean fresh air.

Air quality in Scio and the mid-Willamette Valley has historically been negatively impacted by smoke from forest fires, slash burning and summer agricultural field burning to remove straw and stubble from grass fields. Since 1991 the Oregon Department of Environmental Quality has heavily regulated field burning in the Willamette Valley.

Map NR-1

Scio's Geographic Location in the Willamette Valley



Implementation of these restrictions has significantly reduced the number of days when smoke from field burning impacts local air quality. However, air quality in the mid-Willamette Valley is impacted by urban and rural activities. Vehicle emissions, industrial emissions, wood stove smoke and the burning of vegetation and debris, as well as natural sources such as air borne dust and smoke from wildfires add small particulates to the air that absorb and scatter light.[1]

The Oregon Department of Environmental Quality (DEQ) Air Quality Division is responsible for protecting Oregon's air quality. DEQ monitors air pollution to ensure that communities meet the national ambient air quality health standards (NAAQS). Air pollutants of greatest concern in Oregon are:

- Ground-level **ozone**, commonly known as smog
- Fine particulate matter (mostly from wood smoke, other combustion sources, cars and dust) known as **PM2.5** (2.5 micrometers and smaller diameter)
- Hazardous air pollutants (also called **Air Toxics)**

DEQ provides several tools for monitoring air quality in the Willamette Basin including a daily Air Quality Index (AQI) reading by city and county for particulate matter, carbon monoxide, and ozone. Particle pollution is often highest during the coldest times of the day, typically in the evening and early morning. DEQ provides air quality health advisories to the public when the AQI reaches levels that are classified as "unhealthy for sensitive groups" or "unhealthy". The City of Albany is the closest community with an AQI.

DEQ's 2013 Annual Air Quality Report shows that air quality index for Albany was "Good" 305 days, moderate for 56 days and unhealthy for sensitive groups for 4 days in November 2013.[2] For the period 2005 to 2013, Albany averaged 329 "Good" air quality days annually, 90% of the time. The AQI did not show any days in 2013 where air quality was identified as unhealthy. Overall, air quality has improved over the past three decades. From 1985 to 2010, DEQ data shows air quality in western Oregon's mid-Willamette Valley cities has improved, with lower particulate and carbon monoxide levels and steady ozone levels. [3]

5.3 Geology

The Scio area can be divided into distinct geologic units. The most recent of these units range in age from one million to fifteen thousand years ago and are the result of Pleistocene glacial melt waters. Geologic units within this age group from the most recent to the oldest are: Quaternary Alluvium, Quaternary Lower Terrace and Quaternary Middle Terrace. All of the above geologic units are considered fluvial deposits pointing to their water transported origin. The remaining two

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1 Oregon State University, Institute for Natural Resources, Willamette Basin Explorer. Air and Air Quality | Willamette Basin Explorer

2 2013 Oregon Annual Air Quality Report, Oregon Department of Environmental Quality, July 2014, pp. 3 and 60. http://www.deq.state.or.us/aq/forms/2013AirQualityAnnualReport.pdf

3 2010 Oregon Air Quality Summaries, Oregon Department of Environmental Quality, June 2011. http://www.deq.state.or.us/aq/forms/2010annualReport.pdf

geologic units are referred to as bedrock and appeared much earlier in geologic time. These units are the Little Butte Formation and Columbia River Basalt and range in age from 30 million to 10 million years before present.

The following is a brief discussion of the characteristics of each geologic unit in order from the oldest to the youngest.

Little Butte Formation:

The Little Butte Formation is found on exposed areas of the Cascade foothills in the Willamette Valley. Little Butte volcanic material is found on the flanks of Hungry Hill, Franklin Butte and the southern side of the ridge north of Scio. It consists of a variety of volcanic materials including breccias (fragmented cemented rocks), tuffs (porous rocks), ash deposits, and dens, dark basaltic flow rock.

Weathering of the Little Butte Formation produces rubbly loams over the basaltic rocks and deep clay soils over the tuffs on gentle slopes. Deep soil and bedrock failures typify much of the breccias and tuffs.

Columbia River Basalts:

The Columbia River Basalts are found on Franklin Butte, Hungry Hill, and form a flat-topped ridge north of Scio. Map NR-2 "Scio Planning Area Geology" shows three Columbia River Basalt types found in the Scio area: Columbia River Basalt (unspecified), Grand Ronde Basalt and Wanapum-Frenchmen Springs Basalt. These basalts were the result of multiple lava flows which occurred 15 to 20 million years ago and flowed from eastern Oregon/Idaho, covered the Columbia River Plateau and valleys all the way to the Pacific Ocean. The Columbia River Basalts are dense, dark basalt which usually weathers to a reddish-brown rubbly loam.

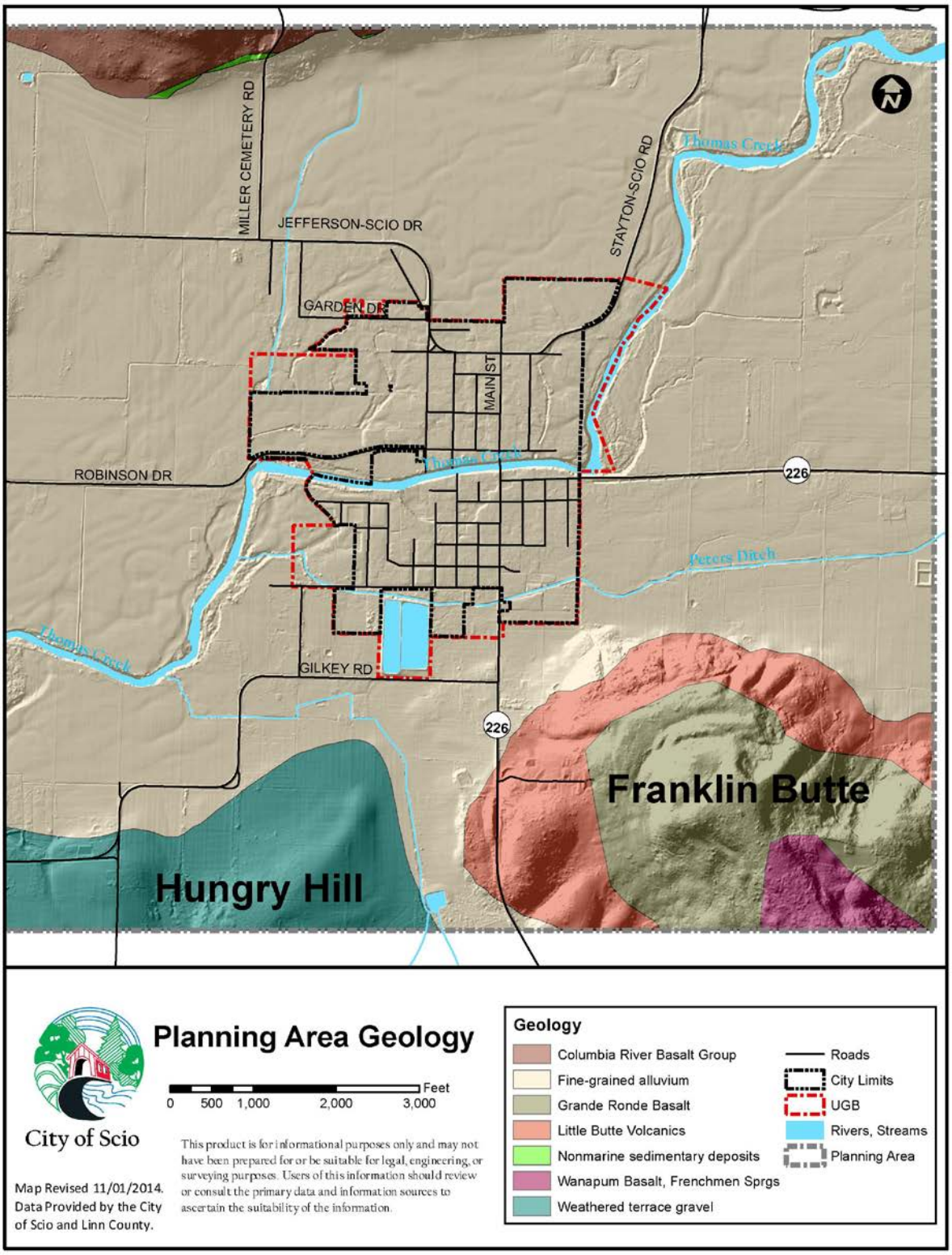
Quaternary lower and middle terrace deposits:

The Quaternary lower terrace deposits consist of low-lying river gravels south and east of Scio, and in the vicinity of West Scio. The lower terrace lies above the level of flooding. Soils developed on the lower terrace surface are dominated by sands and gravels. The lower terrace deposits consist of pebble gravels and sands of fluvial origin. The average thickness is approximately 20 to 30 feet.

The Quaternary middle terrace deposits consist of flat-lying, moderately elevated pebble gravels, sands, and silts of fluvial (river) origin. In the Scio Planning Area, these occur north of Hungry Hill and at the northern edge of the planning area.

Elevation of the middle terrace gravels varies from 300 to 500 feet above sea level. Thickness seldom exceeds 20 to 30 feet. The deposits consist of moderately to deeply weathered gravels, sands, and silts. In well-drained regions, reddish-brown silty loam soils up to several feet thick are developed on the middle terrace gravels. In areas of exceptionally flat terrain and poor drainage, clay-rich soils develop. North of Scio, course gravels are weathered to soft clay soils to a depth of 10 to 20 feet. Individual boulders are distinguishable on the basis of color, but are as soft as the surrounding material and can be easily cut with a knife.

Map NR-2
Scio Planning Area Geology



Quaternary Alluvium:

Thomas Creek is one of the small streams that flow from the Cascade foothills to the west in the southern/central Willamette Valley. The unconsolidated deposits of poorly sorted minor gravel, sand, silt and clay occupy the flood plain of Thomas Creek are assigned to the Quaternary basin (Qbf) alluvium. Organic, fine-grained soils are present in the marshy areas of poor drainage. Flooding and stream-bank erosion are hazards associated with the Quaternary alluvium. Map NR-2 shows fine grained alluvial soils cover the entire Scio UGB.[4]

5.4 Soils

Soil information is useful as a planning tool and should be viewed in two ways:

1. Agricultural suitability classes; and
2. Development characteristics and/or restraints.

Agricultural Suitability:

Agricultural suitability classes have been assigned to all soil types by the United States Department of Agriculture, Natural Resource Conservation Service (NRCS). In western Oregon soils are predominantly within Classes I, II, III and IV. Within the Scio Planning Area soils are predominantly Class II and Class III in the alluvial plain along Thomas Creek. Lesser classes of soils are found on the hills north and south of the city.

The Land Conservation and Development Commission has mandated that soils in Classes I, II, III and IV be preserved for agricultural use, forest use and open space. Statewide planning Goal 3 "Agricultural Lands" states: *"Agricultural lands shall be preserved and maintained for farm use, consistent with existing and future needs for agricultural products, forest and open space and with the state's agricultural land use policy expressed in ORS 215.243 and 215.700."*

The state recognizes some development does take place on Class I-IV soils. Goal 3, state statute and administrative rules which protect Class I-IV soils as prime agricultural lands were not designed to stop development within cities, but to preserve agricultural land and prevent unnecessary encroachment from urban sprawl. Goal 3 clearly states the inventory and protection of agricultural lands is not required within the urban growth boundaries of cities with acknowledged comprehensive plans.

Map NR-3 shows agricultural soil classes. The City of Scio is surrounded by prime agricultural lands with Class II and Class III soils. Prior to amending the Scio Urban Growth Boundary and converting these agricultural lands to urban uses, the city will need to address the land use planning and urbanization requirements of statewide planning goals 2, 3, 4 and 14 and OAR 660-024 to justify the city's need to add any of the Class II and III resource lands to the Scio UGB to accommodate future growth of the city.

[4] *Origin, Extent, and Thickness of Quaternary Geologic Units in the Willamette Valley, Oregon*, Jim E. O'Connor, Andrei Sarna-Wojcicki, Karl C. Wozniak, Daniel J. Polette and Robert J. Fleck, Prepared in cooperation with Oregon Water Resources Department, U.S. Geological Survey Professional Paper 1620, 2001.

Development Characteristics of the Soils:

All soils within the City of Scio and the surrounding planning area have been cataloged and studied with regards to their suitability for development. The information provided herein was obtained from the *Soil Survey of the Linn County Area, Oregon* prepared by the U.S. Department of Agriculture, Natural Resource Conservation Service, formerly known as the Soil Conservation Service.[5] Map NR-4 identifies the specific soil types by the NRCS soil code number. Table NR-1 provides a fact sheet for each soil type.

Soil characteristics which effect development are primarily related to foundation suitability. Soils are generally referred to as being "not limited", "somewhat limited" or "very limited" with regards to development characteristics. A rating of "not limited" indicates the soil will pose few problems for development. On the other hand, a rating of "very limited" indicates there may be one or more problems and that prior to development the problem needs to be addressed.

In most cases, the NRCS soil rating indicates if development restrictions are present and also the cause of the problem. In Scio the soil information indicates that most soils have a "very limited" rating for development. The restrictive characteristics are flooding, low strength and shrink-swell. If a soil has a "very limited" rating it does not mean that development cannot take place; only the soil needs to be modified prior to development in order to avoid problems at a later time.

Drainage Capabilities of the Soils:

To aid in the identification of drainage problem areas, soils information is used (Table NR-1). The soils in the Scio UGB are alluvial soils which are subject to periodic flooding. The following list are the soils found inside the Scio UGB with their drainage capabilities.

Soils Inside the Scio UGB

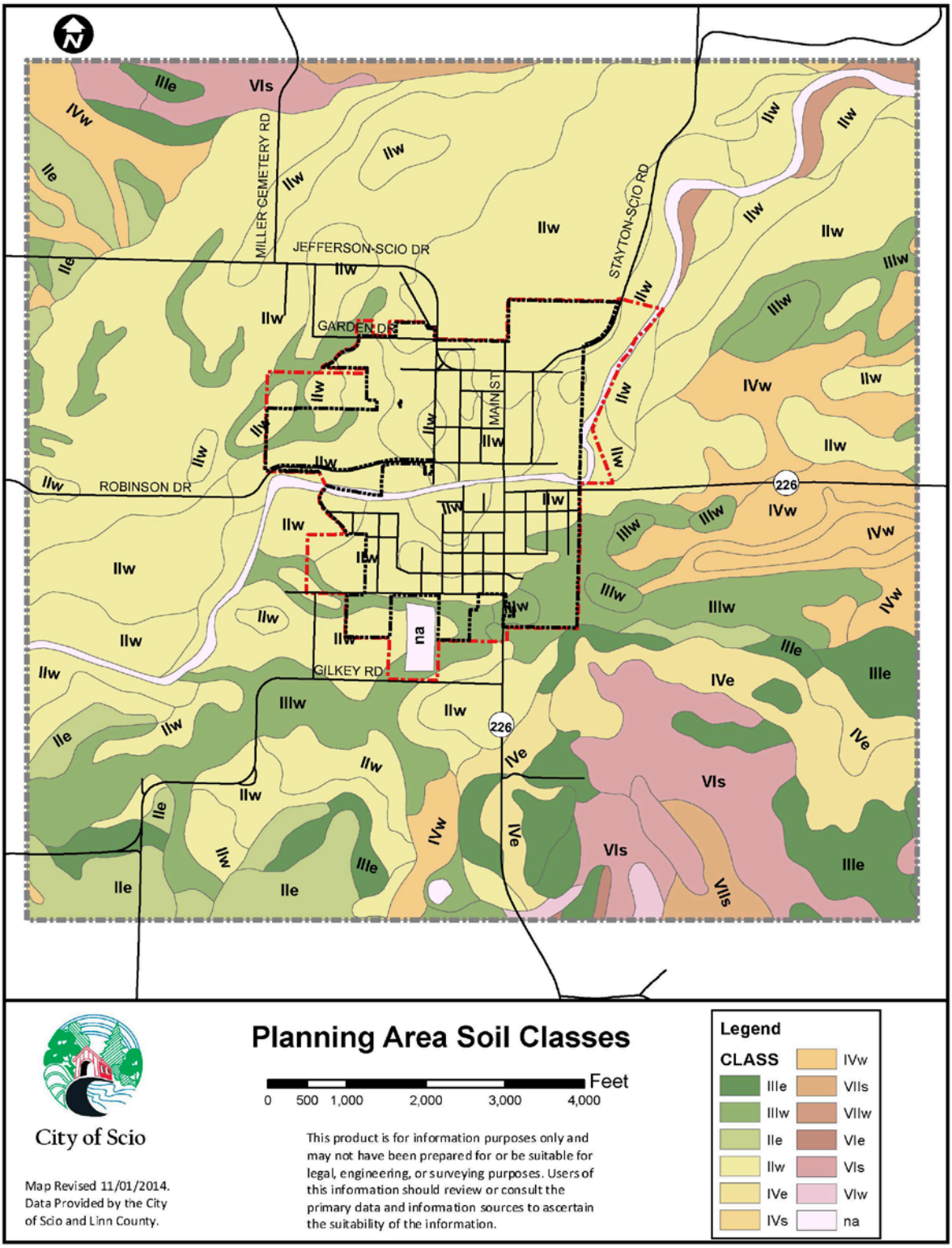
21	Chehalis silty clay loam	Well drained
23	Clackamas gravelly silty loam	Poor drainage
25	Cloquato silt loam	Well drained
26	Coburg silty clay loam	Moderately well drained
28	Conser silty clay loam	Poor drainage
67	McBee silty clay loam	Moderately well drained
73	Newberg Fine sandy loam	Excessively well drained
99	Wapato silty clay loam	Poor drainage

Aside from natural conditions which affect drainage, man-made features can disrupt or improve local drainage. The Public Facilities chapter will address measures the city has taken to improve drainage in addition to identifying areas within the city that now have drainage problems.

[5] *Soil Survey of the Linn County Area, Oregon*, U. S. Department of Agricultural, Natural Resource Conservation Service, formerly the Soil Conservation Service, by Russell W. Langridge, SCS, 1987. http://www.nrcs.usda.gov/Internet/FSE_MANUSCRIPTS/oregon/OR639/0/or639_text.pdf

Map NR-3

Scio Planning Area Agricultural Soil Classes



Map NR-4

Scio Planning Area Soils by NRCS Soil Code

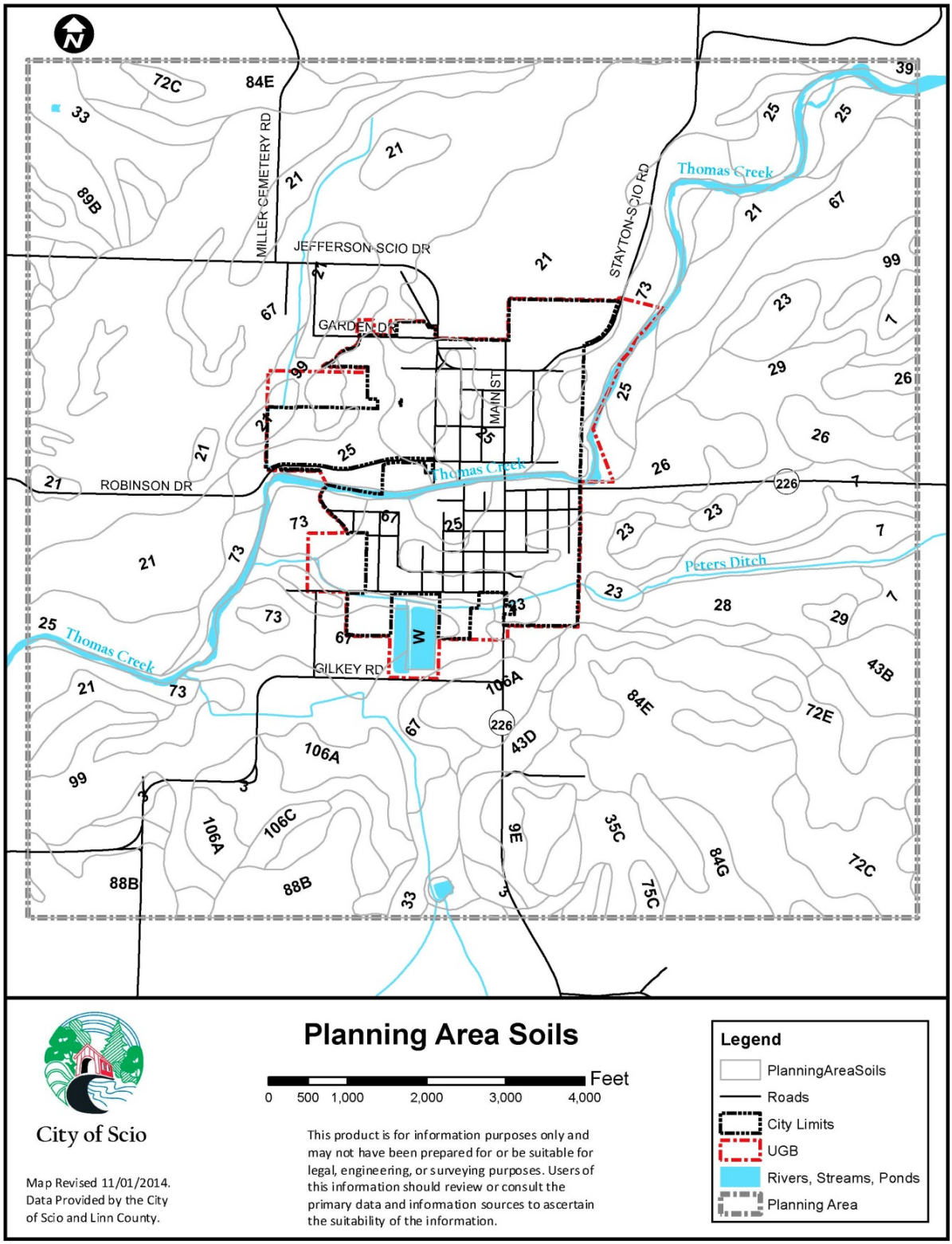


Table NR-1 SCIO PLANNING AREA SOIL FACT SHEET									
Soil Name and Code[6]		Agricultural Class	% Slope	Foundation Suitability			Shallow Excavation	Restrictions	Drainage
				Basement	Without Basement	Commercial Building			
Soils within the Scio UGB									
21	Chehalis silty clay loam	II w	0-3	very limited	very limited	very limited	somewhat	Floods, low soil strength	Well drained
23	Clackamas gravelly silt loam	III w	0-3	very limited	very limited	very limited	very limited	Wet, seasonal high water	Somewhat poor
25	Cloquato silt loam	II w	0-3	very limited	very limited	very limited	somewhat	Floods	Well drained
26	Coburg silty clay loam	II w	0-3	very limited	very limited	somewhat	very limited	Wetness, moderately slow permeability, low soil strength, shrink-swell	Moderately well drained
28	Conser silty clay loam	III w	0-2	very limited	very limited	very limited	very limited	Wetness, slow permeability, flooding, shrink-swell, low soil strength	Poor
67	McBee silty clay loam	II w	0-3	very limited	very limited	very limited	very limited	Flooding, wetness, low soil strength	Moderately well drained
73	Newberg fine sandy loam	II w	0-3	very limited	very limited	very limited	somewhat	Flooding, rapid permeability	Excessively drained
99	Wapato silty clay loam	III w	0-3	very limited	very limited	very limited	very limited	Wetness, moderately slow permeability, flooding	Poor
Soils outside the Scio UGB and within the Planning Area									
3	Amity silt loam	II w	0-3	very limited	very limited	very limited	very limited	Wetness, low soil strength	Poor
7	Awbrig silty clay loam	IV w	0-2	very limited	very limited	very limited	very limited	Wetness, slow permeability, shrink-swell, low soil strength, flooding	Poor
9E	Bellpine silty clay loam	IV e	20-30	very limited	very limited	very limited	very limited	Depth to bedrock, slow permeability, slope, low soil strength, shrink swell	Well drained
29	Courtney gravelly silty clay loam	IV w	0-3	very limited	very limited	very limited	very limited	wetness, very slow permeability, flooding	Poor
33	Dayton silt loam	IV w	0-2	very limited	very limited	very limited	very limited	Wetness, very slow permeability, shrink-swell, low soil strength	Poor
35C	Dixonville-Philomath-Hazelair complex	VI s	3-12	very limited	very limited	very limited	very limited	Shallow depth to bedrock, wetness, slow permeability, low soil strength, shrink-swell	Well drained
39	Fluvents-Fluvaquents complex, nearly level	VI e	0-3	not rated	not rated	not rated	not rated	Flooding	Moderately well drained
43B	Hazelair silty clay loam	III e	2-7	very limited	very limited	very limited	very limited	Wetness, very slow permeability, depth to bedrock, low soil strength, shrink-swell	Moderately well drained
43D	Hazelair silty clay loam	IV e	7-20	very limited	very limited	very limited	very limited	Wetness, very slow permeability, depth to bedrock, slope, low soil strength, shrink-swell	Moderately well drained
72C	Nekia silty clay loam	III e	2-12	very limited	somewhat	somewhat	very limited	Depth to bedrock, moderately slow permeability, low soil strength	Well drained
72E	Nekia silty clay loam	IV e	20-30	very limited	very limited	very limited	very limited	Depth to bedrock, moderately slow permeability, slope, low soil strength	Well drained
75C	Panther silty clay loam	VI w	2-12	very limited	very limited	very limited	very limited	Wetness, very slow permeability, low soil strength, shrink-swell	Poor
84E	Ritner cobbly silty clay loam	VI s	2-30	very limited	very limited	very limited	very limited	Slope, depth to bedrock, moderately slow permeability, shrink-swell	Well drained
84G	Ritner cobbly silty clay loam	VII s	30-60	very limited	very limited	very limited	very limited	Slope, depth to bedrock	Well drained
88B	Salkum silty clay loam	II e	2-8	not limited	not limited	somewhat	somewhat	moderately slow permeability, low soil strength	Well drained
89B	Santiam silt loam	II e	3-6	very limited	somewhat	somewhat	very limited	Wetness, slow permeability, shrink-swell, low soil strength	moderately well drained
106A	Woodburn silt loam	II w	0-3	very limited	somewhat	somewhat	very limited	Shrink-swell, low soil strength, wetness, slow permeability	moderately well drained
106C	Woodburn silt loam	II e	3-12	very limited	somewhat	very limited	very limited	Shrink-swell, low soil strength, wetness, slow permeability	moderately well drained

6 U. S. Department of Agriculture, Natural Resource Conservation Service, Soil Survey Database http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/survey/?cid=nrcs142p2_054226

5.5 Natural and Geologic Hazards

Within the Scio Planning Area natural and geologic hazards are present. These hazards including flooding, stream bank erosion, steep slopes and areas of mass movement/landslides, earthquakes, severe weather and wildfire.

The *Linn County Natural Hazard Mitigation Plan*, the county-wide natural hazards assessment and mitigation plan, was updated in 2010. The Linn County plan includes the three phases of hazard assessment: 1) hazard identification; 2) vulnerability assessment and 3) risk analysis. It recommends hazard mitigation strategies the County and communities can take to reduce the impacts on private property, public infrastructure, critical facilities and the public if a natural hazard event occurs.[7] Critical facilities and public infrastructure in Scio include City Hall, the Scio Rural Fire District's main fire station, the City's water and sewer facilities and local schools.

The Oregon Department of Geology and Mineral Industries (DOGAMI) has mapped geologic hazards in the state. DOGAMI's website includes an interactive GIS map with layers showing the various geologic and natural hazards which can affect any part of the state. [8]

Severe Weather:

There is a high probability that in any given year Linn County and the Willamette Valley will be affected by a severe winter storm with heavy rain, ice, snow and/or high winds. Although damaging winter storms do not occur every year, severe winter storms occur once every four years.

The Willamette Valley does not experience major snow, freezing rain or ice events in a normal winter. Snowfall accumulations in Scio are typically less than 6" or less for the entire winter. However, large snow events do occur when moist Pacific storms hit cold air trapped in the valley. The Scio/Albany area had a 9"-12" snowfall accumulation on February 7, 2014, but larger accumulations are possible. A 1969 storm dumped more than three feet on the southern Willamette Valley. Ice storms, with ice accumulation of ¼" to ½", affect Linn County approximately once a decade. More common are windstorms, with wind speeds in excess of 50 mph, which accompany Pacific storms that sweep through the valley. On February 7, 2011 a cold core tornado touched down in Aumsville causing damage to a number of local businesses and homes.

Small communities can be significantly affected when severe weather occurs. Flooding from heavy rain and snow melt can block roads and damage structures. Ice, wind and snow can damage overhead power, telephone lines, cell towers and antennas interrupting service from utilities. Road

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7 *Linn County Hazard Mitigation Plan*, prepared by the Linn County Planning and Building Department, November 2010.

8 Oregon Department of Geology and Mineral Industries, Interactive Statewide Geohazards Viewer. Oregon HazVu: Statewide Geohazards Viewer

flooding, fallen trees and limbs can hinder emergency responders and create problems for utility companies trying to maintain or restore services.[9]

Severe weather also includes summer heat waves, when temperatures in the Willamette Valley exceed 90° Fahrenheit for more than 3 consecutive days. Heat waves in July 1981 and July/August 2009 saw valley temperatures exceed 100° for four consecutive days. Although summer heat waves can create dangerous short-term events the risk of extended periods of drought are low. The Linn County Natural Hazards Mitigation Plan reports there are no records of severe drought in Linn County and a very low probability that drought will affect the County once every 75-100 years. [10]

Thomas Creek Flood Hazards and Erosion:

Flooding from Thomas Creek is a reoccurring hazard that has shaped the land and has had the most consistent impact on the Scio community. Flood hazards are discussed in Section 5.8 of this chapter. Stream bank erosion along Thomas Creek has led to the placement of a revetment along the south bank of Thomas Creek near Hwy 226 to control erosion of the stream bank. The placement of revetments usually indicates stream bank erosion has taken place and an effort has been made to stem future erosion. East of the bridge on Main Street about 100 yards upstream, Thomas Creek makes a 90 degree turn to the north. The cutting edge of Thomas Creek at this point is working into the south bank along Highway 226. Properties along the south bank of Thomas Creek appear to have lost some ground to bank erosion.

Steep Slopes, Landslides and Mass Movement:

There are no hillside steep slopes inside the Scio UGB. Steep slopes exceeding 25% are found on the Franklin Butte and the hills to the north of the City. Small areas on Franklin Butte are subject to landslide hazards. DOGAMI's statewide landslide information database shows areas on the slopes of Franklin Butte which have been subject to historic landslides and there are deposits of loose landslide material (talus colluvium) at the base of the slopes.[11] Map NR-5 "Landslides and Landslide Deposits in the Scio Planning Area" shows these historic landslide areas and deposits.

Map NR-6 "Planning Area Slope" shows erosion has created some steep banks along the Thomas Creek and the Peters Ditch channel as well as along a number of small ditches and drainage courses that drain to Thomas Creek. These streamside and ditch line slopes include riparian areas where streamside vegetation is needed to stabilize soils and protect the channels from further erosion.

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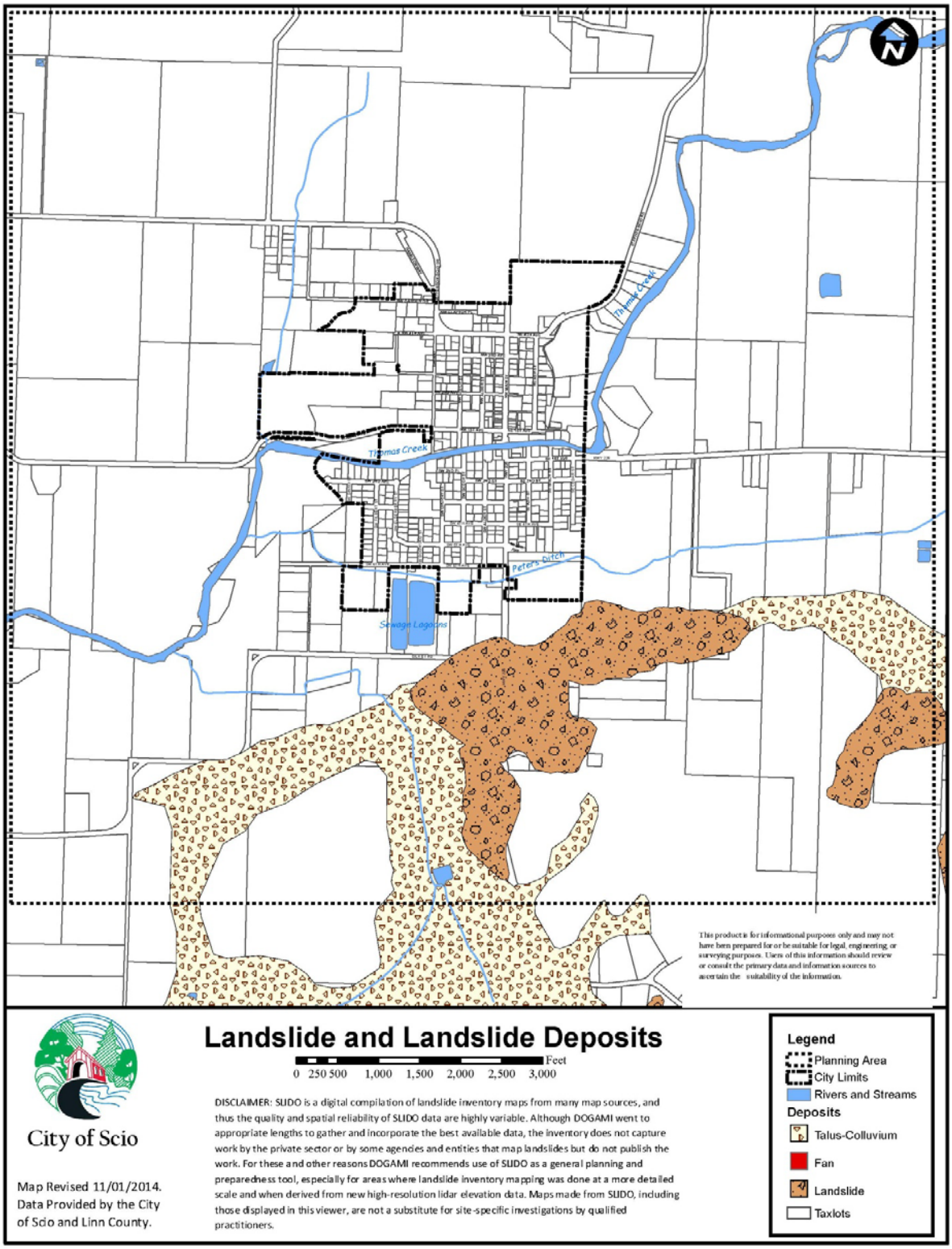
9 *Linn County Hazard Mitigation Plan*, prepared by the Linn County Planning and Building Department, November 2010, pp. 9-5 to 9-13.

10 *Linn County Hazard Mitigation Plan*, prepared by the Linn County Planning and Building Department, November 2010, pp. 10-1 to 10-3.

11 Oregon Department of Geology and Mineral Industries, Interactive Statewide Geohazards Viewer, and DOGAMI | Statewide Hazards Viewer - Hazards and Assets, and IMS-22, GIS Overview Map of Potential Rapidly Moving Landslide Hazards in Western Oregon, North Santiam River quadrant, by R. Jon Hofmeister and others, 2002,

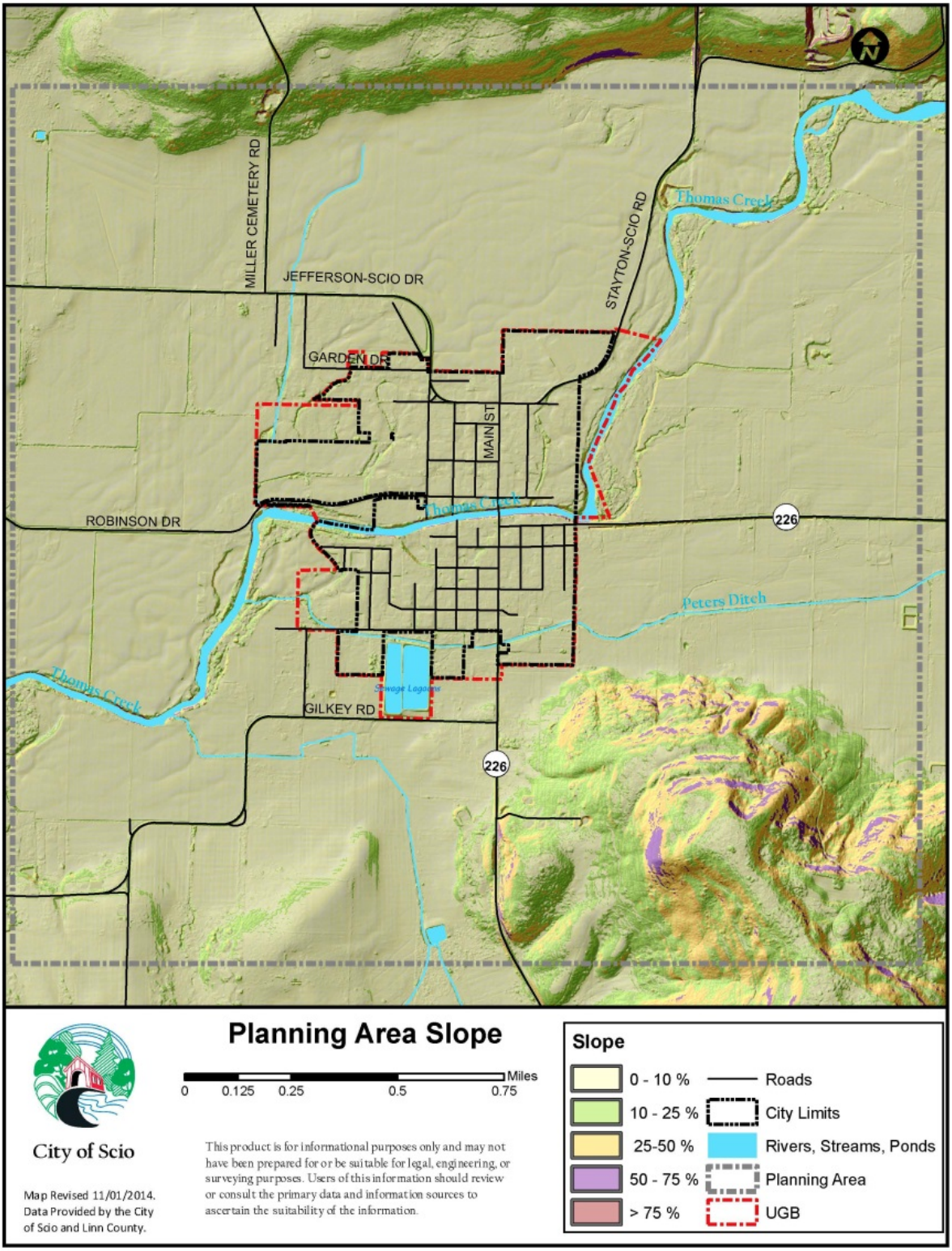
Map NR-5

Landslides and Landslide Deposits in the Scio Planning Area



Map NR-6

Scio Planning Area Slopes



Volcanic Hazards:

Mount Jefferson, the Three Sisters and other mountains in the Cascade Range are part of the active chain of volcanoes that comprise the Ring of Fire along the Pacific Rim. DOGAMI has mapped severe and moderate hazard zones for areas that may be directly impacted by mudflows, debris flows, lava flows or major ash falls. The closest hazard zone to Scio is a moderate hazard from mudflows or debris flows in the North Santiam Canyon. The hazard zone extends from the Mt. Jefferson Wilderness to an area west of Stayton. Airborne volcanic ash from an eruption can also affect areas of the Willamette Valley depending on the scale of the eruption and wind directions.

Earthquake Hazards:

Western Oregon has historically been impacted by major subduction earthquakes in the Cascadia subduction zone at the boundary of the two tectonic plates, the North American Plate and the Juan de Fuca Plate, below the Pacific Ocean off the Oregon coast. The last major subduction earthquake occurred in 1700. Scientists have determined these major subduction earthquakes occur every 400 to 500 years. Since the last major subduction earthquake off the Oregon coast occurred in 1700, DOGAMI estimates there is a 7% to 12% chance that a major subduction earthquake will occur by the year 2060. If a 9.0+ magnitude or larger Cascadia subduction zone earthquake occurs, very strong shaking is expected in the central Willamette Valley including the Scio area.

Crustal earthquakes also occur in western Oregon along fault lines in the North American Plate. There have been three 3.0 to 3.6 magnitude earthquakes north of Salem since 1999 and the larger 5.6 magnitude Scotts Mills "Spring Break" earthquake in March 1993.[12] DOGAMI has utilized USGS data and to identify potentially active fault lines in Oregon. These fault lines are locations where the faults have seen movement in the last 1.6 million years and there is the potential for a damaging earthquake if the fault moves. There are no active fault lines identified in the Scio area.

Scio's alluvial soils are subject to liquefaction during a major earthquake event. Severe shaking from an earthquake can cause wet sandy silty loam soils to liquefy when continuously shaken and compromise their ability to support buildings and structures.

Wildfire:

Wildfire is defined as "an uncontrolled burning of wildlands (forest, brush, or grassland)." It poses a significant risk to life and property in the Wildland Urban Interface (WUI) areas, the border between the urban area and nearby forest, brush or grasslands.

The *Linn County Community Wildfire Protection Plan* includes a county-wide risk assessment, goals and action steps describing how emergency responders and local communities can prepare for and respond to the wildfire threats throughout the county. Scio has been identified as one of the Linn County communities which is at risk from wildfire. The maps within the *Linn County Community Wildfire Protection Plan* show there is low risk of wildfire in the City of Scio but moderate risk in

[12] Pacific Northwest Seismic Network, PNSN Recent Events | Pacific Northwest Seismic Network

portions of the Scio Rural Fire Protection District in the WUI interface where homes are located near forest lands.

The plan recommends strategies to educate the public on the threat of wildfire and steps property owners and communities can take to reduce fuel availability, create defensible space around structures and use building materials to minimize the threat wildfire poses to structures and property. The Scio Rural Fire Protection District is the local government entity responsible for working with local property owners and coordinating the implementation of the plan's action steps with the Linn County Fire Defense Board, Linn County, state and federal agencies. [13]

5.6 Water

Water in the Scio area has been studied in two ways: a) groundwater and b) surface water.

Groundwater is subsurface water contained in the soils and gravels below the surface and is confined in aquifers.[14] Based on information from the Oregon Water Resources Department (OWRD) the water table in Scio is at or near the surface of the land during the winter months. Scio's location near the foothills of the Cascades and the alluvial soils in the Thomas Creek floodplain provide a good location for groundwater accumulation and enables the aquifer to recharge quickly. Groundwater in Scio is hydraulically connected to Thomas Creek.

A groundwater hydrology study of the Willamette Valley in 2005 concluded there are several factors that contribute to the long-term stability of water levels in shallow wells in the Southern Willamette Valley (Albany/Scio area south to Eugene). The report findings indicate groundwater levels in the basin-fill sediments, as are found in Scio, show little variability since the 1960s. Recharge is relatively direct and efficient because water levels show direct response to winter precipitation and a close correlation to stream levels. Recharge is sufficient to fully saturate the aquifer during most winters.[15]

Well records in the Scio area indicate water is available at depths ranging from 20 feet below the surface to as deep as 205 feet. These well records also show the gallons per minute (gpm) rating for individual wells increases with depth.[16] The City of Scio has two municipal wells (Wells 3 & 4) that were drilled to a depth of 210 feet and have the capacity to produce 790 gpm. Water bearing levels for both wells are found in the sedimentary sand and gravel layers. The water bearing zone for Well #3 extends from approximately 50' to 204' and Well #4 from 92' to 195' deep. In granting the Water Right Permit for Well #4, the OWRD and the Oregon Department of Fish and Wildlife

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[13] *Linn County Community Wildfire Protection Plan*, prepared for Linn County by ECO Northwest, November 2007.

[14] An aquifer is a layer of rock or gravel through which water can move. Water reaches the aquifer through cracks. Water is held in an aquifer by hard rocks or clay above and below the aquifer through which water cannot pass.

[15] *Groundwater Hydrology in the Willamette Basin*. United States Department of the Interior, U. S. Geological Survey in cooperation with the Oregon Department of Water Resources. Scientific Investigations Report 2005–5168. 2005, p. 53.

[16] Oregon Department of Water Resources. Well log records and *Groundwater Reports #13 and #25*. Records of wells, water levels, & chemical quality of water in the Lower Santiam River Basin, Middle Willamette Valley, Oregon, D.C. Helm, 1968, U.S.G.S.

concluded there is potential for substantial interference with stream flows in Thomas Creek. During periods of low stream flows, the City will be required to reduce the amount of water pumped from the well.

Surface Water: Thomas Creek is the primary surface water source in the Scio area. Thomas Creek originates in the old Cascades approximately 26 miles east of Scio and at an elevation of almost 4000 feet. Peters Ditch, a small improved channel which flows west through the southern end of Scio, is the only other surface water in the area. Peters Ditch originates approximately two miles east of Scio near Richardson Gap.

5.7 Wetlands

Wetlands are those areas that are inundated or saturated by surface water or groundwater at a frequency or duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands provide fish and wildlife habitat. They also provide flood protection, recharge the local aquifer and enhance water quality. In the past wetlands were viewed as land by which the best use could be achieved by draining for agriculture, dredging or filling for industrial and housing developments. The City of Scio recognizes the importance of preserving wetland areas.

There are six locally significant wetlands inside the Scio Urban Growth Boundary. The inventory and identification of locally significant wetlands are included in the City of Scio Local Wetland Inventory and Maps, compiled by SWCA Environmental Consultants as part of the Multi City/County Water Resource Assessment Project completed by Lane Council of Governments. The Scio Local Wetlands Inventory (LWI) and assessment complies with Goal 5 requirements. Table NR-2 lists the locally significant wetlands by type of wetlands within the Scio UGB.

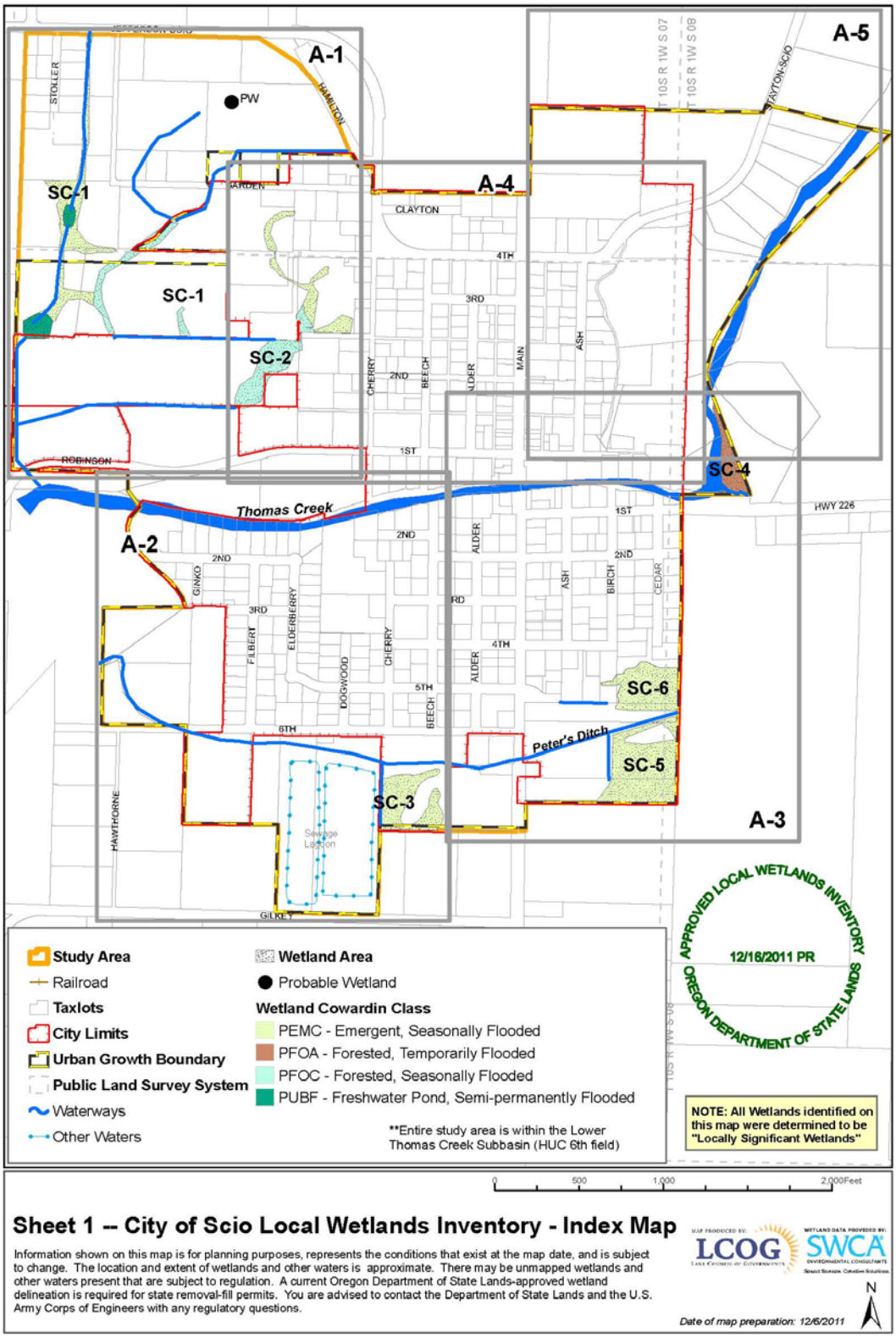
Table NR-2
Types of Wetlands within the Scio UGB[17]

Wetland Classification	Abbrev	Classification Description	Area (Acres)	Percent of Wetlands
Palustrine Emergent Wetland	PEM	Wetlands with rooted herbaceous vegetation that stand erect above the water or ground surface	11.72	72%
Palustrine Scrub-Shrub Wetland	PSS	Wetlands dominated by shrubs and tree saplings less than 20 feet high	0	0%
Palustrine Forested Wetland	PFO	Wetlands dominated by trees that are greater than 20 feet high	3.80	24%
Palustrine Unconsolidated Bottom Wetland	PUB	At least 25% cover of particles smaller than stones and a vegetative cover less than 30%.	0.70	4%
		Total	**16.22**	**100%**

[17] *Local Wetland Inventory Report for the City of Scio*, Prepared for the City of Scio and Lane Council of Governments, SWCA Environmental Consultants, Portland, OR Approved by State of Oregon Department of State Lands, December 16, 2011. P. 8.

Map NR-7

Locally Significant Wetlands in the Scio Wetlands Study Area



The quality of wetlands in the Scio study area was assessed using the Oregon Freshwater Wetland Assessment Methodology (OFWAM; Roth et al. 1996). OFWAM is used to evaluate the relative quality of wetlands primarily for planning and educational purposes. OFWAM evaluates wildlife habitat, fish habitat, water quality, and hydrologic control functions. Where applicable, other measures to determine Locally Significant Wetlands were implemented.

Most of the wetlands identified in Scio are former main channels or flood channels of Thomas Creek and are therefore part of the hydrology of Thomas Creek. These wetlands are only flooded on a seasonal or temporary basis. At times, these wetlands serve to temporarily store flood waters and thereby slow the flow of flood water. In general, downstream flood damage can be lessened by the protection of wetlands. When floodwaters are diverted to a series of wetlands adjacent to the stream channel, flood peaks of tributary streams do not occur simultaneously so that flood waters do not all reach the main stream at the same time. All of the wetlands provide diverse wildlife habitat.

Six wetlands are identified within the Scio study area, totaling 16.22 acres (not including rivers and streams, deepwater habitats, or artificially created ponds such as detention ponds or treatment lagoons). Scio's wetlands are mostly emergent or forested with a small component of open water.[18]

Table NR-3
Cowardin Classification of all Wetlands within the Scio UGB[19]

Wetland Code	USFWS Wetland Classification				Total Acreage
	PEM	PES	PFO	PUB	
SC-1	2.64	0	1.07	0.70	4.41
SC-2	1.04	0	1.63	0	2.93
SC-3	1.96	0	0	0	1.96
SC-4	0	0	0.81	0	0.95
SC-5	3.82	0	0	0	3.82
SC-6	2.14	0	0	0	2.14
Totals	11.61	0	3.51	0.70	16.22

The locations and types of locally significant wetlands in the Scio Urban Growth Boundary are shown on Map NR-7.

[18] *Local Wetland Inventory Report for the City of Scio*, Prepared for the City of Scio and Lane Council of Governments, SWCA Environmental Consultants, Portland, OR Approved by State of Oregon Department of State Lands, December 16, 2011. pp 3-7.

[19] Ibid., *Local Wetland Inventory Report for the City of Scio*, p 8..

5.8 Flood Hazards

The Thomas Creek watershed is part of the South Santiam River subbasin of the larger Willamette River basin. It is 145 square miles and extends from its origins in the Cascade foothills 30+ miles east of Scio to its confluence with the South Santiam River, 8 miles downstream from Scio. Forest lands (73%), agricultural lands (26%) are the predominant land uses in the watershed. Approximately one-fifth of the land area is owned by the federal Department of the Interior, Bureau of Land Management.[20] There is one real-time flow gauge on Thomas Creek near Scio, USGS flow gage #TRS03 and can be viewed on the Northwest River Forecast Center website. [21]

Flooding from Thomas Creek is a significant issue for citizens of Scio. Shallow flooding with water up to 2' in depth in many areas of the City occurs when Thomas Creek and Peters Ditch overflow their banks. Residential areas and the Main Street businesses north of Thomas Creek and the industrial and residential areas adjacent to Peters Ditch in the south end of Scio are most impacted by these periodic flood events.

Floods occur when heavy rains fall in the Cascade foothills east of Scio and then flow quickly down the Thomas Creek drainage basin to the valley. If the foothills are covered with snow, rainfall coupled with melting snow can exacerbate the flood impacts. Flooding can occur during smaller 10-year and 25-year storm events as well as the major 50-year and 100-year storms like the 1964 and 1996 floods that affected the entire Willamette Valley.

Both Thomas Creek and Peters Ditch have been studied by the U.S. Army Corps to determine the extent of potential flooding during a 100-year storm. The Area of Special Flood Hazard identified by the Federal Emergency Management Agency in its *Flood Insurance Study (FIS) for Linn County*, [1] dated September 29, 2010, with accompanying Flood Insurance Rate Maps (FIRM) or Digital Flood Insurance Rate Maps (DFIRM), and other supporting data, were adopted by the Scio City Council. Map NR-8 shows the Special Flood Hazard areas inside the City.

The City has adopted flood hazard regulations requiring that the base floor elevation of new structures be raised at least two feet above the base flood elevation. Property owners are required to provide an engineer's elevation certificate demonstrating the new structures comply with the flood hazard regulations.

On January 18 and 19, 2012, Thomas Creek flooded residential and commercial areas of Scio. The location and timing of the flooding was monitored by the Scio Rural Fire District. Linn County Geographic Information Services (GIS) staff used data from the Thomas Creek flood gauge and the Fire District to create a map showing the inundation areas based on the water elevation of the creek at the gauge. Map NR-9 "January 18 and 19, 2012 Storm Flood Inundation Area" graphically shows the areas in Scio which were flooded when the Thomas Creek elevation gauge showed the creek was above 17', 18' and 19'.

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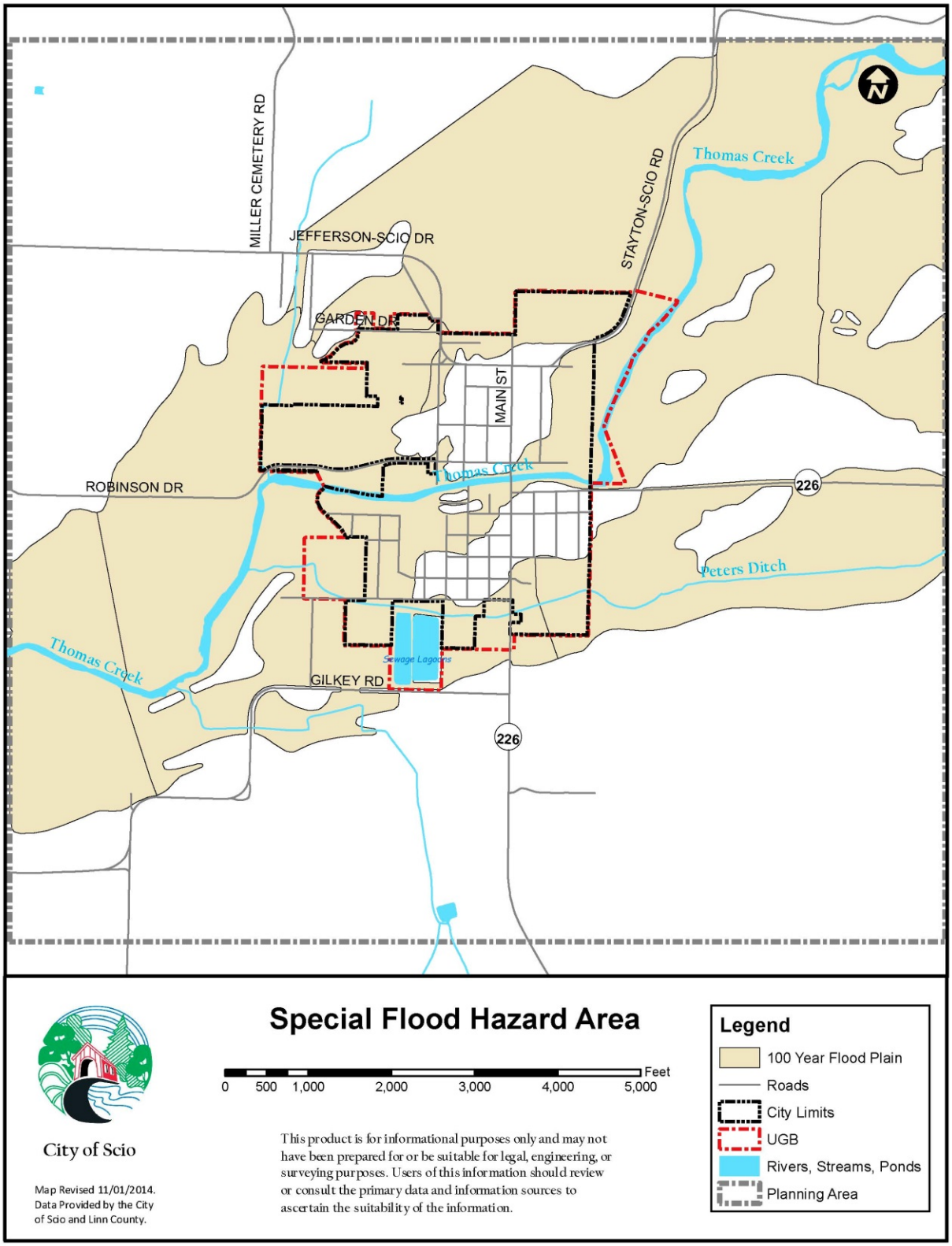
[20] Oregon Department of Environmental Quality, Willamette River Basin TMDL Plan, Chapter 9 – South Santiam Subbasin, September 2006. pp. 9-7.

[21] Northwest River Forecast Center, National Oceanic and Atmospheric Administration (NOAA), http://www.nwrfc.noaa.gov/river/station/flowplot/flowplot.cgi?TRSO3

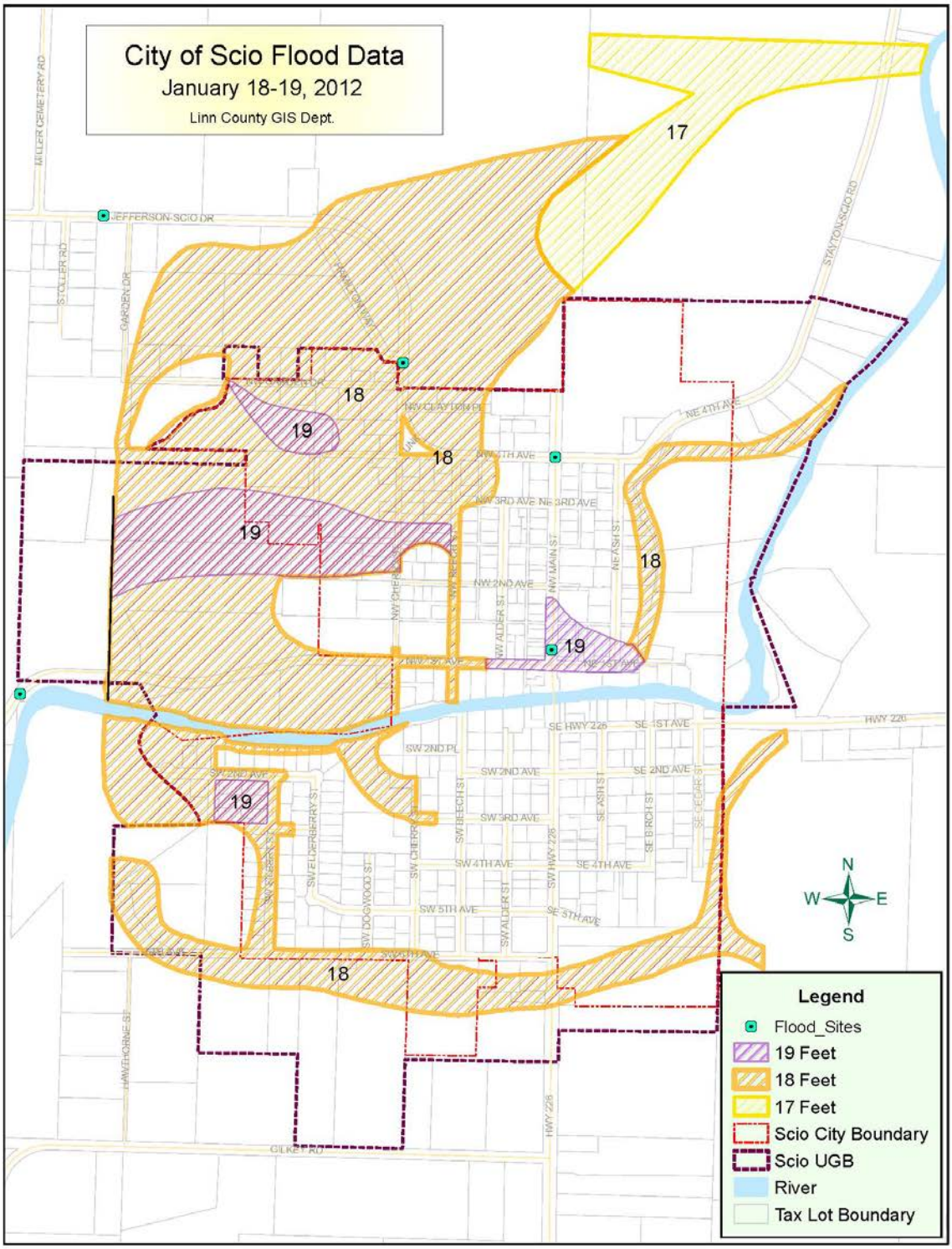
Map NR-8
Special Flood Hazard Area



Map NR-9

January 18 and 19, 2012 Storm

Flood Inundation Area Based on Thomas Creek Flow Elevation



5.9 Fish and Wildlife

Wildlife:

The Scio Local Wetlands Inventory includes a brief summary of sensitive wildlife species found within two miles of Scio. Information was obtained from the Oregon Biodiversity Information Center in March 2010. Sensitive wildlife species include:

- Willamette Valley larkspur
- Willamette Valley daisy
- thin-leaved peavine
- Nelson's sidalcea
- Northern Pacific pond turtle
- Oregon vesper sparrow.[22]

Fish:

Fish species in Thomas Creek include winter steelhead, spring Chinook salmon, trout, Oregon chub and other warm water species. The Upper Willamette winter steelhead and Upper Willamette spring Chinook salmon are listed as endangered species by the US Environmental Protection Agency.

In 1996, BLM completed an analysis of the Thomas Creek watershed. In the report, BLM described historic fish runs in Thomas Creek:

> Winter steelhead and spring Chinook salmon are the anadromous fish native to the Willamette River above Willamette Falls. Historically, only winter steelhead trout and spring Chinook salmon could migrate over Willamette Falls into the upper Willamette Valley. The majority of these fish spawned in the Santiam River and Mckenzie River subbasins. Both species utilized Thomas Creek for spawning and rearing.[23]
>
> Thomas Creek is considered a key production area for winter steelhead, however, the wild spring Chinook run may no longer exist. The Oregon Department of Fish and Wildlife is releasing South Santiam stock spring Chinook in Thomas Creek. Resident populations of rainbow and cutthroat trout are found throughout the watershed. Several warm water fish species are found in Thomas Creek, but they are generally found below the town of Scio.[24]

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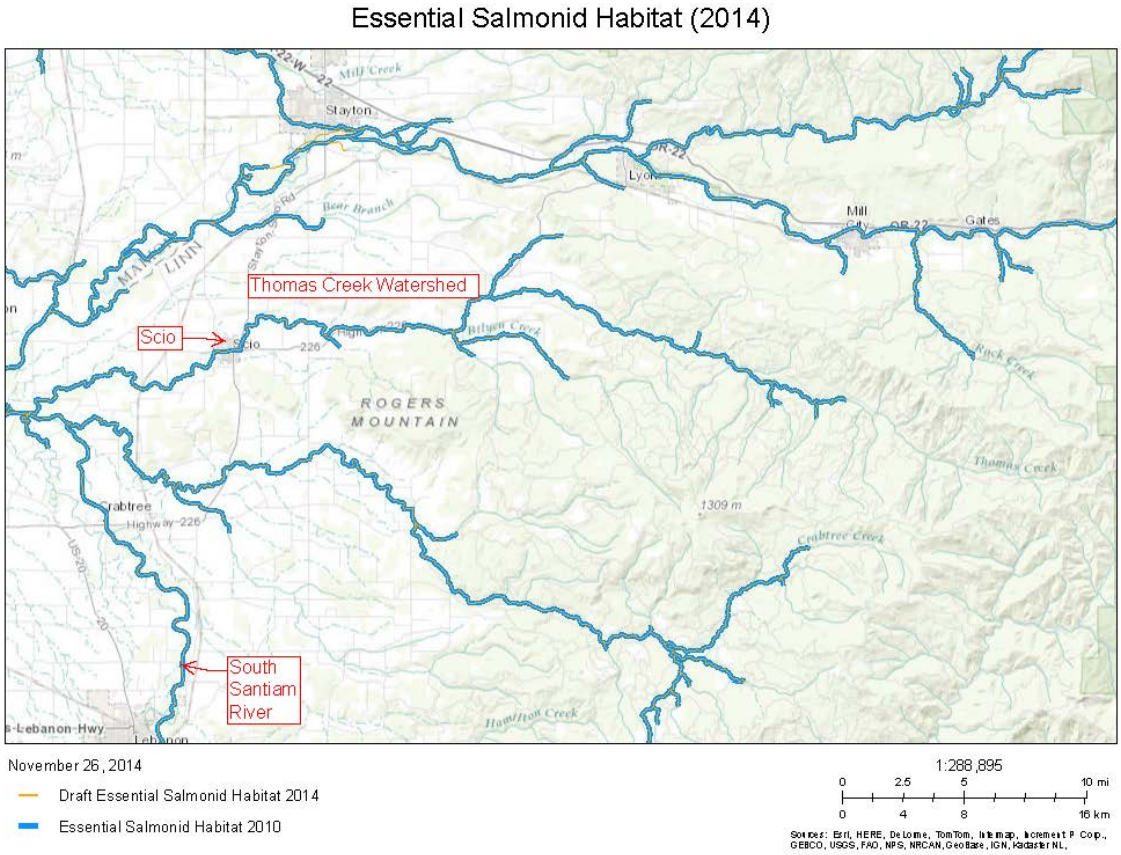
22 *Local Wetland Inventory Report for the City of Scio*, Prepared for the City of Scio and Lane Council of Governments, SWCA Environmental Consultants, Portland, OR Approved by State of Oregon Department of State Lands, December 16, 2011, page 2.

23 *Thomas Creek Watershed Analysis*, Bureau of Land Management (Salem District), Version 1.0, 1996. http://www.blm.gov/or/districts/salem/plans/files/watershed_analyses/sdo_thomascrk/sdo_wa_thomascr.pdf Chapter 4

24 Ibid., *Thomas Creek Watershed Analysis*, Bureau of Land Management (Salem District), Version 1.0, 1996. Chapter 2.

Spawning areas for listed salmon and steelhead are located east of the City of Scio in the upper portion of the Thomas Creek watershed. The Oregon Department of Fish and Wildlife has mapped all Oregon rivers and streams that are considered essential salmon habitat and require protection measures. Map NR-10 shows Thomas Creek is identified as essential salmon habitat.

Map NR-10
Thomas Creek - Essential Salmon Habitat



DEQ Willamette Basin TMDL Plan:

The Willamette River basin, including the South Santiam River subbasin and its tributaries, has been studied to determine if its rivers and streams exceed federal water quality standards under section 303(d) of the federal Clean Water Act (CWA). The Oregon DEQ has prepared the 303(d) list of stream segments that do not meet water quality criteria. The *Willamette Basin TMDL Plan* establishes Total Maximum Daily Load standards for temperature, bacteria and mercury in order to protect water quality and prevent further degradation of the river and its tributaries.

According to the *Willamette Basin TMDL Plan*, the South Santiam River subbasin has 11 stream segments on the 303(d) list for exceeding the water temperature criteria. Ten stream segments exceed the temperature criteria during the summer months from July through September. The list

includes all of the major creeks and streams east of Albany including the South Santiam River, Crabtree Creek, Thomas Creek and Neal Creek, a major tributary into Thomas Creek.[25]

Temperature is one of the TMDL standards because high stream temperatures can alter the biology in a stream segment and affect salmonids by inhibiting migration, rearing and spawning, impacting circulation and/or respiration or kill fish.

The TMDL plan states:

> Stream temperature is influenced by natural factors such as climate, geomorphology, hydrology, and vegetation. Human influenced or anthropogenic heat sources may include discharges of heated water to surface waters, the loss of streamside vegetation and reductions in stream shading, changes to stream channel form, and reductions in natural stream flows. The pollutant targeted in this TMDL is heat from the following sources: (1) heat from warm water discharges from various point sources (2) heat from human caused increases in solar radiation loading to the stream network, and (3) heat from reservoirs which, through their operations, increase water temperatures or otherwise modify natural thermal regimes in downstream river reaches. [26]

The Willamette Basin TMDL Plan concludes excessive heat loading is widespread in the tributaries that flow into the South Santiam River. DEQ data shows summer temperatures in Thomas Creek exceed the established water quality standards.

In 2000, DEQ and BLM staff measured late summer temperatures in Thomas Creek from Mile Post 0 to 19, including the stretch of the creek inside Scio. Maximum stream temperatures in the stream reach within the City of Scio exceeded 24° to 26° C. (75° to 78° F) for the period June 15th to September 15th.[27] These temperatures exceed the water quality standard thresholds and require the implementation of measures to enhance and/or protect habitat to enable cold-water salmonids to migrate and spawn. This includes the Upper Willamette spring Chinook salmon and Upper Willamette winter steelhead that spawn in the South Santiam River subbasin.

The following two tables from the TMDL Plan describe the impacts high water temperatures in a stream can have on anadromous fish (Table NR-4) and the optimal temperatures for spawning, rearing and migration (Table NR-5).[28]

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[25] Oregon Department of Environmental Quality, Willamette River Basin TMDL Plan, Chapter 9–South Santiam Subbasin, September 2006. pp. 9-9 http://www.deq.state.or.us/wq/tmdls/docs/willamettebasin/willamette/chpt9ssantiam.pdf

[26] Oregon Department of Environmental Quality, Willamette River Basin TMDL Plan, Chapter 4 – Temperature, September 2006, p. 4-5.

[27] Ibid., Willamette River Basin TMDL Plan, Chapter 9–South Santiam Subbasin, September 2006. pp. 9-11 to 9-21.

[28] Ibid., Willamette River Basin TMDL Plan, Chapter 9–South Santiam Subbasin, September 2006. pp. 9-11 to 9-12.

Table NR-4
Thermally Induced Cold Water Fish Mortality Modes

Modes of Thermally Induced Fish Mortality	Temperature Range	Time to
Instantaneous Lethal Limit – Denaturing of bodily enzyme systems	> 32°C (> 90°F)	Instantaneous
Incipient Lethal Limit – Breakdown of physiological regulation of vital bodily processes, namely: respiration and circulation	21°C - 25°C (70°F - 77°F)	Hours to Days
Sub-Lethal Limit – Conditions that cause decreased or lack of metabolic energy for feeding, growth or reproductive behavior, encourage increased exposure to pathogens, decreased food supply and increased competition from warm water tolerant species	17.8°C - 23°C (64°F - 74°F)	Weeks to Months

Table NR-5
Oregon's Biologically Based Temperature Criteria.[29]

Beneficial Use	Temperature Criteria
Salmon and Steelhead Spawning	∗13.0°C (55.4°F)
Core Cold Water Habitat Identification	*16.0°C (60.8°F)
Salmon and Trout Rearing and Migration	∗18.0 °C (64.4 °F)

∗ Stream temperature is calculated using the average of seven consecutive daily maximum temperatures on a rolling basis (7-day calculation).

DEQ data also suggest shade levels are less than system potential at Thomas Creek, Crabtree Creek, Hamilton Creek, and McDowell Creek. Excess heat loading occurs wherever inadequate shade levels are widespread.[30] The protection of existing tree cover and restoration of the riparian vegetation along the stream banks in the Thomas Creek watershed is recommended to reduce heat loading and enhance wildlife habitat.

The Scio Sewer Treatment Plant is the only point source discharge identified by DEQ along Thomas Creek. The City discharges treated wastewater from its two sewer lagoons on 6th Avenue to Thomas Creek at Mile 8.0 from November 1st to April 30th under terms of an NPDES permit issued by DEQ. The NPDES permit requires the city to meet water quality parameters for temperatures, BOD and suspended solids and adopt a TMDL plan for the City . The City's TMDL plan identifies strategies the City can implement to help reduce temperature loading in Thomas Creek. Strategies in the City's

[29] Oregon Department of Environmental Quality, *Willamette River Basin TMDL Plan*, Chapter 9 – South Santiam Subbasin, September 2006. Tables 9.4 and 9.5

[30] Ibid., p. 9-33.

5-Year TMDL plan include completion of an inventory and protection measures for riparian areas along Thomas Creek and Peters Ditch and updating the City's public works design standards and development regulations for storm drainage.

Watershed Council:

The South Santiam Watershed Council works with individual property owners, the Oregon Watershed Enhancement Board, local governments and federal agencies to improve water quality. Recent projects have included annual water quality monitoring, stream restoration projects, riparian enhancement, fish passage barrier studies and youth education programs.

5.10 Forest Lands

Statewide Planning Goal 4 "Forest Lands" encourages the conservation, protection and management of forest resource lands. As with the agricultural lands LCDC has determined that Goal 4 requirements for forest lands do not apply within cities with acknowledged comprehensive plans.

The hydric soils in the Thomas Creek floodplain are non-forest lands. There are no productive forest lands inside the Scio UGB, but there are forest lands north and south of the City on the nearby hills and ridges.

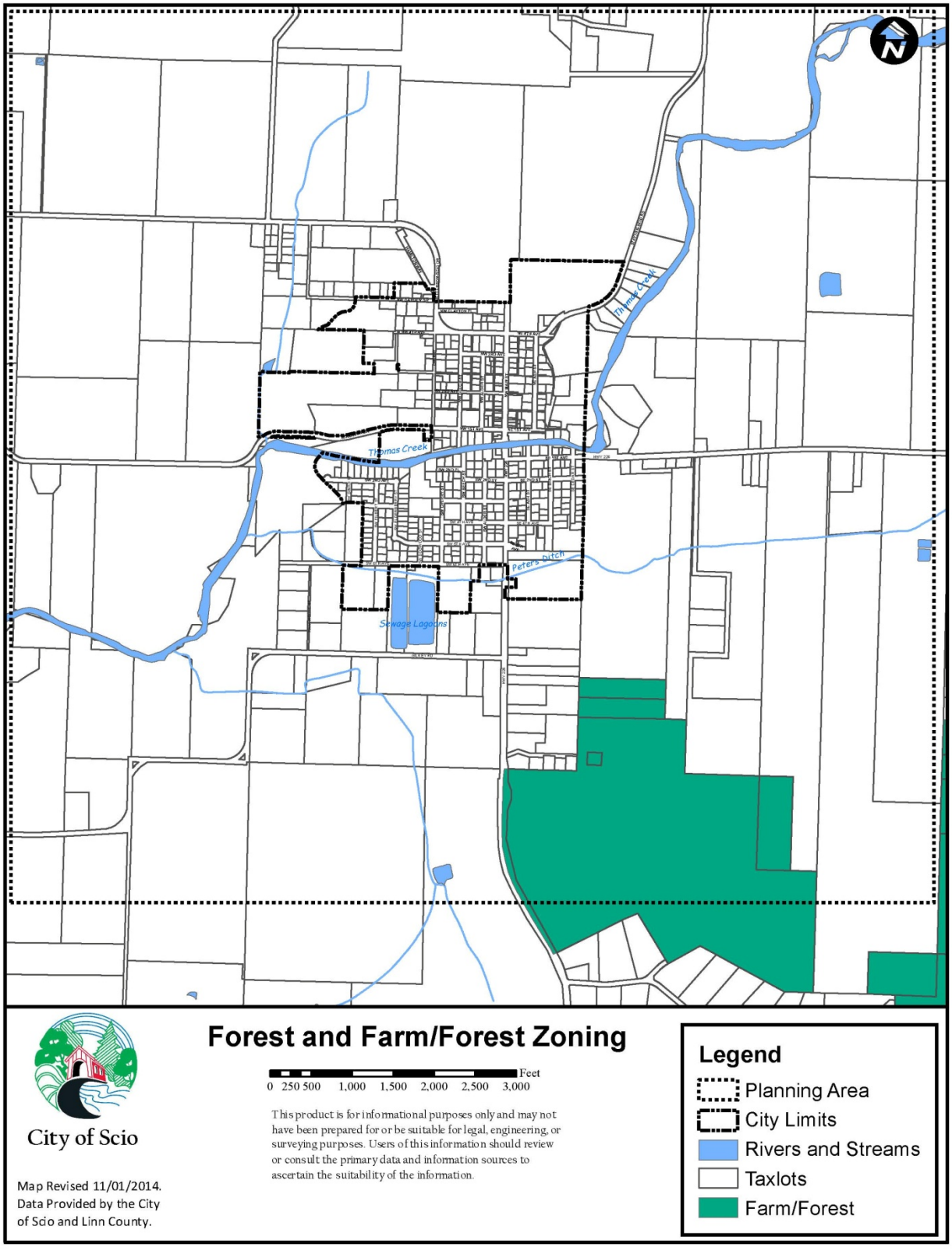
The Oregon Department of Forestry's land use planning goals are to preserve the forest land base, maintain the commercial productivity of Oregon's forests and minimize the conversion of productive farmland to non-forest or urban uses. [31] In order to accomplish these goals Linn County has zoned the forest lands near Scio for Farm/Forest (FF) and Exclusive Farm Use (EFU). Map NR-11 "Forest Lands in the Scio Planning Area" shows the lands just to the south of Scio on Franklin Butte which have been zoned for Farm/Forest uses. Further to the east in the Thomas Creek watershed there are large tracts of productive private and federal forest lands that Linn County has zoned Forest Conservation and Management (FCM).

South of the Scio UGB, there is existing residential development east of Highway 226 along the northwest flank of Franklin Butte. Large home sites in Linn County's RR-2.5 zone abut a Farm/Forest zone on Franklin Butte. If the Scio UGB is expanded to the south, there may be pressure to convert these larger tract residential lands to higher density urban uses and convert the adjacent farm/forest parcels to rural residential uses because of the natural amenities, views and close proximity to the City. Prior to amending the Scio UGB and converting any forest lands to more intense rural residential or urban uses, Linn County and the City of Scio city must address Goal 4 requirements to preserve and protect forest lands.

[31] Oregon Department of Forestry, Land Use Planning Handbook, 2003. http://www.oregon.gov/odf/resource_planning/docs/odf_land_use_planning_handbook_august_2003.pdf

Map NR-11

Forest Lands in the Scio Planning Area



5.11 Aggregate Resources

The Linn County Comprehensive Plan discusses the importance of and describes the location of aggregate resource sites within the County. According to the Linn County Planning Department, there are no aggregate resource sites in the City of Scio or within its Urban Growth Boundary.

Linn County's aggregate resource extraction sites map in the Linn County Comprehensive Plan shows three aggregate sites near the Scio Planning Area. Two of the mapped sites are located approximately 1 mile northeast and northwest of the City's UGB and the third site is approximately 3.5 miles south of the Scio UGB. The two sites near the Scio UGB are located on (1) Miller Cemetery Road and (2) northeast of the intersection of Stayton Scio Rd. and Brock Drive. The locations of these sites are identified in *Environmental Geology of Western Linn County*, Oregon Dept. of Geology and Mineral Industries Bulletin 84, 1974 written by J.D. Beaulieu, P.W. Hughes, R. K. Mathiot.[32]

[32] USGS National Geologic Map Database. Lebanon Quadrangle Maps, http://ngmdb.usgs.gov/Prodesc/proddesc_32998.htm

GOALS AND POLICIES
FOR NATURAL RESOURCES
AND ENVIRONMENTAL STEWARDSHIP

STATEWIDE PLANNING GOALS

Goal 3 - AGRICULTURAL LANDS: To preserve and maintain agricultural lands.

Goal 4 - FOREST LANDS: To conserve forest lands by maintaining the forest land base and to protect the state's forest economy by making possible economically efficient forest practices that assure the continuous growing and harvesting of forest tree species as the leading use on forest land consistent with sound management of soil, air, water, and fish and wildlife resources and to provide for recreational opportunities and agriculture.

Goal 5 - NATURAL RESOURCES, SCENIC AND HISTORIC AREAS, AND OPEN SPACES: To protect natural resources and conserve scenic and historic areas and open spaces.

Goal 6 - AIR, WATER AND LAND RESOURCE QUALITY: To maintain and improve the quality of air, water and land resources of the state.

Goal 7 - AREAS SUBJECT TO NATURAL HAZARDS: To protect people and property from natural hazards.

CITY OF SCIO GOALS AND POLICIES

NATURAL RESOURCES AND ENVIRONMENTAL STEWARDSHIP

Goal NR-1: **To cooperate with local, state and federal agencies in the prevention of pollution to the air, water and land and the protection and enhancement of sensitive environmental areas and natural resources.**

Goal NR-2: **To utilize Thomas Creek as a community asset, realizing its value as a resource, a natural environment and an educational study area.**

Policy NR-1: The City of Scio will cooperate with state and federal agencies which regulate environmental quality and shall adhere to the standards established by these agencies when the city is issuing any permits. This policy is intended to cover discharges and emissions which may impair air, water or land quality or exceed the established standards for noise or other emissions.

Policy NR-2: The City will work with state agencies, Linn County and local property owners to create opportunities for public access, view points and open space adjacent to Thomas Creek.

Policy NR-3: The City will encourage the protection of water quality and the enhancement of the riparian area and natural habitats along Thomas Creek. The City will complete an inventory and adopt protection measures for the riparian areas along Thomas Creek and Peters Ditch.

WETLANDS

Goal NR-3: To ensure identified significant wetlands will continue their functions unimpaired by development activity.

Policy NR-4: Wetlands identified as significant wetlands in the City of Scio Local Wetlands Inventory Report will be provided with protection from disturbance with protection measures that comply with Statewide Planning Goal 5 and Oregon Administrative Rule 660-division 23.

Policy NR-5: The City of Scio views wetlands as sensitive habitat for fish and wildlife. Development on properties containing wetlands may proceed under a Site Plan Review procedure to provide maximum opportunities to protect any significant wetlands.

Policy NR-6: The City of Scio will notify the Oregon Department of State Lands (DSL) of land development proposals that impact wetlands.

Policy NR-7: Wetland locations in the urban growth area will be given consideration for protection as open space as the city annexes property inside the UGB.

FLOOD AND OTHER NATURAL HAZARDS

Goal NR-4: To prevent losses as a direct result of natural hazards, by the identification of hazard areas and the control of development in hazard areas.

Policy NR-8: The City of Scio will utilize the best available information acceptable to the Federal Emergency Management Administration (FEMA) to identify special flood hazard areas.

Policy NR-9: The City of Scio will work with the Federal Emergency Management Administration's Flood Insurance Program and the U.S. Army Corps of Engineers to prevent losses that may be caused by flooding in Thomas Creek and Peters Ditch and to establish standards by which land can safely be developed.

Policy NR-10: The City of Scio will regulate development in areas subject to flooding in accordance with the adopted floodplain maps and the Scio Flood Hazards Ordinance.

FISH AND WILDLIFE

Goal NR-5: To protect and enhance fish and wildlife habitat.

Policy NR-11: The City of Scio will consider the vegetation cover along the banks of Thomas Creek as sensitive habitat for fish and wildlife and will cooperate with the State Department of Fish and Wildlife to protect habitat areas.

Policy NR-12: The City of Scio will review all development proposals and land divisions to assure the protection of sensitive habitat areas.

Policy NR-13: The City of Scio will cooperate with local, state and federal agencies which are involved in regulation of development along Thomas Creek.

RESERVED FOR FUTURE EXPANSION