Level Г	V Ecoregio	ns	Physiography		Geology		Soils			Climate	e	Potential Natural Vegetation*/	Land Cover and Land Use
	[Area (square miles)		Elevation/ Local Relief (feet)	Surficial and Bedrock	Order (Great Group)	Common Soil Series	Temperature/ Moisture Regimes	Precipitation Mean annual (inches)		Mean Temperature January min/max; July min/max (°F)	Present Vegetation *Source: Kuchler, 1964	
1a. Coas Low	stal vlands		Low marine terraces, marine estuaries, beaches, sand dunes, and spits with sloughs, shallow freshwater coastal lakes. Low gradient, meandering, tannic streams and rivers occur.	0-400/ 10-180	Quaternary marine and non-marine terrace deposits, beach and dune sands, and alluvium.	Spodosols (Haplorthods), Entisols (Fluvaquents), Inceptisols (Humaquepts), Andisols (Fulvudands, Melanudands)	Bullards, Netarts, Coquille, Clatsop, Nestucca, Brenner, Lint, Quillamook. Soil textures range from silty clay loam to sandy loam.	Isomesic/ Udic	60-85. Often covered by coastal fog.	200-240	36/50; 52/68	Spruce-cedar-hemlock forest/ Sitka spruce, western hemlock, Douglas-fir canopy, with salal, sword fern, vine maple, and Oregon grape in the shrub layer. Riparian areas: red alder, western redcedar, and bigleaf maple with salmonberry understory; California bay-laurel common in the south. Estuaries and coastal wetlands: Baltic rush, Lyngby's sedge, tufted hairgrass, Pacific silverleaf, and seaside arrowgrass with shore pine, sweet gale, and Hooker's willow. Stabilized dunes support shore pine over salal, rhododendron, and evergreen blueberry, with dune wildrye, Chilean strawberry, and dune bentgrass.	Forest, wetland, pastureland, and residential recreational, commercial, and port development. Wildlife habitat, livestock grazing, and logging. Channelization and diking have converted floodplain wetlands in pastures for dairy farms; associated stream degradation has occurred.
b. Coas Upla		1177	Coastal headlands, high marine terraces, hills, and low mountains with medium to high gradient, tannic streams.	400-2500/ 100-1400	Quaternary colluvium. Tertiary siltstone, sandstone, tuffaceous rocks, volcanics, conglomerate, and scattered intrusive rocks. Cretaceous and Jurassic sedimentary rocks. Mesozoic or Paleozoic schist.	Inceptisols (Dystrudepts), Andisols (Fulvudands)	Astoria, Templeton, Reedsport, Ecola, Tolovana	Isomesic/ Udic	70-125. Often covered by coastal fog.	190-240	36/48; 52/68	Spruce-cedar-hemlock forest/ Douglas-fir, and/or western hemlock canopy, with salal, sword fern, vine maple, Oregon grape, rhododendron, and evergreen blueberry shrub layer. Wetter slopes and riparian areas: red alder, bigleaf maple, and western redcedar; salmonberry and currant understory. Grasslands on headlands.	Mostly forest; also pastureland. Logging, wildlife habitat, dairy farming, recreation, a rural residential, residential, and commercia development. Sitka spruce was dominant in canopy before intensive logging.
d. Volca	canics		Steeply sloping mountains and capes. High gradient, cascading streams and rivers occur with relatively stable summer flows.	600-4100; sometimes to sea level/ 600-3000	Quaternary colluvium. Tertiary basalt, pillow lava, tuffaceous basalt, breccia, scattered intrusive rocks, and basaltic sandstone, siltstone, and conglomerate.	Andisols (Fulvudands, Hapludands), Ultisols (Palehumults)	Knappton, Hemcross, Klistan, Harslow, Caterl, Laderly, Murtip	Mesic, Frigid/ Udic	70-200	100-190	30/46; 50/76	Hemlock-Douglas-fir forest/ Douglas-fir and/or western hemlock canopy, with salal, sword fern, vine maple, Oregon grape, and rhododendron shrub layer. Wetter slopes and riparian areas: western redcedar, bigleaf maple, and red alder canopy; salmonberry and oxalis understory. Grassy coastal headlands and mountaintop balds: Roemer's fescue, thin bentgrass, California oatgrass, and diverse forbs.	Forest. Logging, wildlife habitat, rural residential development, and recreation.
f. Will:	lapa Hills	751	Low, rolling hills and low, gently sloping mountains with medium gradient streams and rivers. Drainage density is low.	0-1300; max. 3300/ 300-1000	Quaternary colluvium. Mostly Tertiary marine sandstone, siltstone, mudstone, and tuffaceous rocks.	Andisols (Hapludands), Alfisols (Hapludalfs), Inceptisols (Dystrudepts, Eutrudepts)	Vernonia, Scaponia, Braun, Anunde, Rinearson, Alstony	Mesic/ Udic	50-100	100-210	31/46; 50/76	Hemlock-Douglas-fir forest/ Douglas-fir and/or western hemlock canopy, with sword fern, vine maple, salal, Oregon grape, and rhododendron shrub layer. Wetter slopes and riparian areas: red alder, western redcedar, and bigleaf maple in the canopy, salmonberry and oxalis beneath.	Mostly forest; some pastureland. Logging wildlife habitat, and some rural residential development.
0	-Coastal imentary	3739	Moderately sloping, dissected mountains with medium to high gradient streams.	300-3000/ 600-1500	Quaternary colluvium. Eocene marine sandstone, siltstone, mudstone, and conglomerate.	Inceptisols (Dystrudepts, Eutrudepts), Ultisols (Palehumults, Haplohumults)	Preacher, Bohannon, Digger, Blachly, Honeygrove, McDuff	Mesic/ Udic	60-130.	110-200	32/48; 48/78	Hemlock-Douglas-fir forest/ Douglas-fir and/or western hemlock canopy, with salal, sword fern, vine maple, Oregon grape, and rhododendron shrub layer; tanoak on drier slopes to the south. Wetter slopes and riparian areas: bigleaf maple, western redcedar, grand fir, and red alder in the canopy, salmonberry and oxalis beneath; California bay-laurel increases to the south.	Mostly forest; some pastureland in valleys. Logging, wildlife habitat, and some rural residential development.
h. Sout Oreg Coas Mou	gon	692	Dissected mountains with high gradient streams and rivers. Part of the Siskiyou Mountains are in this ecoregion.	0-4000/ 800-2600	Quaternary colluvium. Cretaceous and Jurassic siltstone, shale, sandstone, conglomerate, graywacke, granite, diorite, and serpentine.	Inceptisols (Dystrudepts, Eutrudepts)	Etelka, Whobrey, Remote, Digger, Umpcoos, Rinearson	Mesic, Frigid/ Udic	70-140	170-220	36/52; 52/76	Hemlock canopy, with salal, sword fern, vine maple, Oregon grape, and rhododendron shrub layer. Wetter slopes and riparian areas: California bay-laurel, western redcedar, bigleaf maple, grand fir, red alder in the canopy, salmonberry and oxalis beneath.	Mostly forest; some pastureland in valleys. Logging, recreation, wildlife habitat, and re residential development.
li. Redv	wood Zone	31	Dissected coastal mountains and foothills with medium gradient streams.	50-1800/ 600-1400	Quaternary colluvium. Lower Cretaceous and upper Jurassic sandstone, conglomerate, and graywacke.	Inceptisols (Dystrudepts), Ultisols (Haplohumults)	Bosland, Floras, Loeb	Isomesic/ Udic	80-95. Fog affected.	190-280	38/50; 50/74	Redwood forest/ Coast redwood and Douglas-fir. with vine maple, rhododendron, sword fern, and oxalis.	Forest. Logging, recreation, wildlife habita and rural residential development.

	3.		WILLAMETTE V	ALLEY								
	Level IV Ecoregio	ns	Physiography	Geology		Soils			Climat	e	Potential Natural Vegetation*/	Land Cover and Land Use
		Area (square miles)		Elevation/ Local Relief (feet) Surficial and Bedrock	Order (Great Group)	Common Soil Series	Temperature/ Moisture Regimes	Precipitation Mean annual (inches)		Mean Temperature January min/max; July min/max (°F)	Present Vegetation *Source: Kuchler, 1964	
3	a. Portland/ Vancouver Basin	269	Nearly level to undulating terraces and floodplains with low gradient, meandering streams and rivers. Numerous wetlands, oxbow lakes, ponds, and a few buttes occur.	0-300; buttes to 625/ 20-250 Quaternary unconsolidated and semi- consolidated, alluvium and glacial lacustrine deposits.	Mollisols (Argixerolls, Endoaquolls), Inceptisols (Dystroxerepts), Alfisols (Haploxeralfs), Entisols (Fluvaquents)	Sauvie, Rafton, Hillsboro, Multnomah, Latourell, Quatama. Soil texture ranges from silty clay loam to loam.	Mesic/ Xeric	37-50	165-210		Douglas-fir, Oregon oak woods and prairies/ Ash forest in wet depressions, black cottonwood groves on riverbanks and islands, Oregon white oak groves and Douglas-fir forests on uplands; prairie openings with camas, sedges, tufted hairgrass, fescue, and California oatgrass; alder, ash, and western redcedar in riparian areas.	Urban, suburban, rural residential, commercial, and industrial development, pastureland, and nurseries. Remnant natural vegetation in riparian areas and wetlands.
3	b. Willamette River and Tributaries Gallery Forest	674	Floodplains with low gradient, incised, strongly meandering streams and rivers and associated oxbow lakes and meander scars. Historically the Willamette River was extensively braided.	40-500/ 10-80 Quaternary alluvium.	Mollisols (Haploxerolls, Endoaquolls), Vertisols (Endoaquerts)	Cloquato, Newberg, Chehalis, Wapato, Deep, well-drained highly fertile soils occur. Soil textures range from silty clay loam to fine sandy loam.	Mesic/ Xeric	40-50	165-210	33/46; 50/85	Mixed riparian hardwood and Douglas-fir forest/ Black cottonwood, Douglas- fir, Oregon ash, bigleaf maple, grand fir, Oregon white oak, and black hawthorn on well-drained floodplains; Pacific willow in backwater sloughs; diverse shrubs including Indian plum, ninebark, stream dogwood, and willows.	Cropland, pastureland, forested riparian areas, and urban, suburban, and rural residential development. Primary crops: vegetables and fruits. Historically there was extensive gallery forest.
3	c. Prairie Terraces	1971	Nearly level, slightly depressional, or undulating fluvial terraces with sluggish, meandering streams and rivers. Historically, seasonal wetlands and ponds were common. Many streams are now channelized.	160-500/ 10-150 Quaternary glacio-lacustrine deposits and alluvium.	Alfisols (Albaqualfs, Endoaqualfs), Mollisols (Argialbolls, Argixerolls), Inceptisols (Haploxerepts)	Woodburn, Aloha, Willamette, Dayton, Amity, Concord, Malabon, Coburg, Salem, Waldo, Bashaw. Soil textures range from deep silty clay loam to silt loam. Well drained to poorly drained.	Mesic/ Xeric	40-50	165-210		Mosaic of prairies and oak savannah/ Oregon white oak with camas, sedges, tufted hairgrass, fescue, and California oatgrass; occasional Douglas-fir groves; ash forest in wet depressions; ash, oak, maple, and fir riparian forest along sluggish streams with scattered cottonwood groves; some ponderosa pine to the south. Understory: poison oak, hazel, and Indian plum.	Cropland, nurseries, urban and rural residential development, and some forested riparian zones. Primary crops: grass seed (on terraces) and small grains (especially on reclaimed wetlands). Prairie and oak savanna once maintained by Native American burning.
3	d. Valley Foothills	2415	Rolling foothills with medium gradient, sinuous streams. A few buttes and low mountains occur.	200-1500; max. 2200/ 300-1000Quaternary colluvium. Miocene andesitic basalt and marine sandstone.	Alfisols (Haploxeralfs), Ultisols (Haplohumults, Palehumults), Mollisols (Haploxerolls), Inceptisols (Fragixerepts)	Bellpine, Jory, Nekia, Hazelair, Willakenzie, Laurelwood, Cascade. Soil textures range from deep silty clay loam to silt loam.	Mesic/ Xeric	45-60. Wettest in east.	165-210	50/80	Mosaic of oak woodlands and Douglas-fir forests/ Oak savanna and prairies with California oatgrass, fescue, blue wildrye, brodiaea and other prairie forbs. Douglas-fir forests with sword fern, oceanspray, hazel, baldhip rose, poison oak, and alien Himalayan blackberry.	Woodland, deciduous and evergreen forest, pastureland, vineyards, and orchards. Rural residential development, Christmas tree farms, and logging.

4	•		CASCADES										
]	Level IV Ecoregie	ons	Physiography		Geology		Soils	-		Climate	e	Potential Natural Vegetation*/	Land Cover and Land Use
		Area (square miles)		Elevation/ Local Relief (feet)	Surficial and Bedrock	Order (Great Group)	Common Soil Series	Temperature/ Moisture Regimes	Precipitation Mean annual (inches)		Mean Temperature January min/max; July min/max (°F)	Present Vegetation *Source: Kuchler, 1964	
4a.	Western Cascades Lowlands and Valleys	3905	Westerly-trending low mountain ridges, buttes, and valleys with reservoirs and medium gradient rivers and streams. U-shaped, glaciated valleys are found in the east.	600-4000/ 400-3000	Quaternary colluvium. Tertiary andesitic, basaltic, and rhyolitic lava flows and breccia.	Inceptisols (Dystrudepts), Ultisols (Palehumults, Haplohumults)	Klickitat, Kinney, Peavine, Orford, Honeygrove, Gustin, Harrington	Mesic/ Udic	60-90	120-180	31/41; 47/78	Mostly cedar-hemlock-Douglas-fir forest/ Douglas-fir, western hemlock, western redcedar, bigleaf maple, red alder, vine maple, salal, rhododendron, Oregon grape, huckleberry, thimbleberry, swordfern, oxalis, hazel, and blackberry,	Mostly forest; some pastureland in lower elevation valleys. Logging and recreation.
4b.	Western Cascades Montane Highlands	2729	Partly glaciated. Mountains that are steeply sloping and highly dissected with buttes, ridges, and scattered lakes in glacial rock-basins. Medium to high gradient streams occur.	3000-6500/ 2000-3100	Quaternary colluvium and volcanic ash. Tertiary andesitic and basaltic lava flows and breccia.	Inceptisols (Dystrudepts), Andisols (Hapludands, Haplocryands, Fulvicryands), Ultisols (Palehumults)	Illahee, Mellowmoon, Scaredman, Lempira, Telemon, Snowlin, Keel, Hummington	Frigid (mostly in south), Cryic (mostly in north/ Udic	70-120	80-120	26/37; 44/75	Mostly silver fir–Douglas-fir forest; some fir–hemlock forest/ Pacific silver fir, western hemlock, mountain hemlock, Douglas-fir, noble fir, bigleaf maple, red alder, and Pacific yew. Understory plants include vine maple, rhododendron, Oregon grape, huckleberry, and thimbleberry.	Forest. Logging and recreation. Important water source for lower elevation urban, suburban, and agricultural areas.
4c.	Cascade Crest Montane Forest	1909	Glaciated. Undulating plateau punctuated by buttes, volcanic cones, lava flows, and mountains. Meandering, medium gradient streams cross the subdued, glaciated terrain. Many lakes occupy glacial rock-basins.		Quaternary colluvium, volcanic ash, glacial deposits, and volcanic rocks. Pliocene basaltic and andesitic lava flows, breccia, and pyroclastic deposits.	Spodosols (Haplocryods, Humicryods), Andisols (Fulvicryands)	Lastance, Talapus, Thader, Mt. Hood, Dinzer	Cryic/ Udic	55-100	30-90	21/35; 43/72	Mostly fir-hemlock forest/ Mostly Pacific silver fir, mountain hemlock, and subalpine fir; some noble fir, Douglas-fir, and lodgepole pine. Understory: vine maple, huckleberries, rhododendron, beargrass, twinflower, and wintergreen. Mountain meadows support sedges, dwarf willows, and tufted hairgrass.	Forest. Recreation and some logging. Importa water source for lower elevation urban, suburban, and agricultural areas.
4d.	Cascades Subalpine/ Alpine	331	Glaciated. Steeply sloping to undulating mountains and volcanic peaks with cascading streams, glacial cirques, and tarns. Glaciers and year-round snowfields occur on the highest peaks.	5000-11239/ 1600-6200	Quaternary colluvium, glacial deposits, basalt, and andesite.	Entisols (Cryorthents)	Bare rock and rubble	Cryic/ Udic, Perudic	75-140	0-30	16/31; 38/65	Mostly alpine meadows and barren; some fir-hemlock forest/ Herbaceous and shrubby subalpine meadow vegetation; scattered stands of mountain hemlock, whitebark pine, and subalpine fir. Wet meadows support Brewer's sedge, Holm's sedge, black alpine sedge, tufted hairgrass, and alpine aster.	Bare rock, glaciers, snow fields, subalpine meadows, and forest. Recreation. Important water source for lower elevation urban, suburban, and agricultural areas.
4e.	High Southern Cascades Montane Forest	915	Glaciated. High, undulating plateau punctuated by volcanic peaks. Many tarns occur. Drained by medium to high gradient streams.	4000-8200/ 150-2500	Quaternary glacial deposits, volcanic ash, pumice, and colluvium. Pliocene and Miocene andesite and olivine basalt.	Andisols (Vitricryands, Haplocryands), Spodosols (Haplocryods)	Castlecrest, Timbercrater, Llaorock, Winopee	Cryic/ Udic	45-70	70-100	23/37; 44/74	Mostly fir-hemlock forest/ Mountain hemlock, lodgepole pine, Pacific silver fir; some grand fir, white fir, and Shasta red fir. Understory plants include woodrush, prince's pine, lupine, and sidebells shinleaf. At highest elevations: white bark pine and open meadows support Shasta buckwheat, Newberry knotweed, and Brewer's sedge.	Mostly forest; open meadows and bare rock a higher elevations. Recreation and some loggin and livestock grazing.
4f.	Southern Cascades	1414	Mid-elevation mountains that are moderately dissected. Medium to high gradient streams and rivers occur. Reservoirs and a few large lakes of glacial origin occur.	max. 6200/	Quaternary colluvium. Tertiary pyroclastic rocks, basalt, basaltic andesite, breccia, tuff, sandstone, and siltstone.	Ultisols (Palexerults), Inceptisols (Dystroxerepts, Haploxerepts), Alfisols (Haploxeralfs), Mollisols (Argixerolls)	Freezener, Straight, Shippa, Dumont, Geppert, Vena, Farva, Pinehurst, Coyata	Mesic/ Xeric	45-80	80-180	30/45; 49/85	Mostly mixed conifer forest/ Lower elevations: Douglas-fir, ponderosa pine, white fir (grand fir/white fir hybrids), incense cedar, and some sugar pine. Higher elevations: Shasta red fir, mountain hemlock, whitebark pine. Understory: snowberry, twinflower, Oregon grape, serviceberry, golden chinkapin, and oceanspray.	Forest and open forest. Logging, recreation, and some livestock grazing. Important water source for lower elevation urban, suburban, an agricultural areas.

9.		EASTERN CASC	ADES	S SLOPES AND I	FOOTHILI							
Level IV Ecoregio	Area (square miles)	Physiography	Elevation/ Local Relief (feet)	Geology Surficial and Bedrock	Order (Great Group)	Soils Common Soil Series	Temperature/ Moisture Regimes	Precipitation Mean annual (inches)	Climat Frost Free Mean annua (days)	Mean Temperature	Potential Natural Vegetation*/ Present Vegetation *Source: Kuchler, 1964	Land Cover and Land Use
9b. Grand Fir Mixed Forest	162	High, glaciated plateaus, mountains, and canyons containing high gradient, streams and rivers. Scattered lakes in glacial rock-basins occur.	2500-4900/ 600-1800	Quaternary colluvium, volcanic ash, and loess. Pleistocene, Pliocene, and Miocene andesite basalt, and tuffaceous rock.	Andisols (Vitrixerands), Inceptisols (Dystroxerepts), Alfisols (Haploxeralfs)	Yallani, Bins, Bindle, Ketchly	Frigid/ Xeric	35-55	50-90	16/32; 47/77	Mostly grand fir–Douglas-fir forest and ponderosa shrub forest/ Grand fir, Douglas-fir, ponderosa pine, and western larch. Understory plants include vine maple, hazel, snowberry, and oceanspray.	Forest. Logging and recreation. Important water source for lower elevation areas.
9c. Oak/Conifer Foothills	461	Foothills, low mountains, plateaus and valleys. Perennial and intermittent, mostly medium gradient streams and rivers occur.	Mostly 600- 3000/ 200-1200	Quaternary volcanic ash, breccia, loess, colluvium, fluvial deposits, basalt, and basaltic andesite. Tertiary basalt, andesite, tuffaceous rock, and intrusive rocks.	Mollisols (Haploxerolls), Inceptisols (Haploxerepts)	Wamic, Hesslan, Skyline	Mesic/ Xeric	16-40	90-140	26/40; 53/82.	Douglas-fir forest, Oregon oak woods, and ponderosa shrub forest/ Eastern areas: Oregon white oak woodlands and ponderosa pine. Western areas: Douglas-fir. Some grasslands also occur. Understory plants include Idaho fescue, bluebunch wheatgrass, antelope bitterbrush, Oregon grape, hazel, and snowberry.	Mostly woodland and forest; also some grassland. Logging, recreation, livestock grazing, rural residential development, orchards, and, in valleys, grain and hay farming.
9d. Ponderosa Pine/ Bitterbrush Woodland	1077	Undulating volcanic plateau with canyons containing medium gradient perennial streams. The volcanic-influenced hydrogeology produces consistent, year-round stream flow.	Mostly 2400-5000; max. 6000/ 250-1800	Quaternary volcanic ash, pumice, colluvium, and buried glacial outwash deposits. Pleistocene and Pliocene olivine basalt and olivine-bearing andesite.	Andisols (Vitrixerands)	Sisters, Wanoga, Fremkle, Allingham, Circle. Well-drained, loamy sand to gravelly sandy loam derived from volcanic ash.	Frigid/ Xeric	16-35	50-90	20/40; 40/82	Mostly ponderosa shrub forest/ Ponderosa pine. From lower to higher elevations, understory vegetation varies from antelope bitterbrush to greenleaf manzanita to snowberry. Riparian areas support mountain alder, stream dogwood, willows, and sedges.	Woodland. Logging, livestock grazing, and recreation.
9e. Pumice Plateau	4236	High elevation, nearly level to undulating volcanic plateau with isolated buttes, marshes, spring-fed creeks, streams with low to medium gradients.	4200-8300/ 200-2000	Thick Quaternary volcanic ash and pumice. Pleistocene basalt and andesite. Miocene olivine basalt.	Andisols (Vitricryands)	Shanahan, Lapine, Steiger, Yawhee. Well- to excessively-drained, coarse soils derived from pumice and ash.	Cryic/ Xeric	16-30	10-50	14/37; 38/80	Ponderosa shrub forest/ Flats and depressions: lodgepole pine. Slopes: ponderosa pine. Higher altitudes: white fir. Understory plants: antelope bitterbrush and Idaho fescue. Riparian areas support mountain alder, stream dogwood, willows, and quaking aspen.	Forest. Logging, livestock grazing, and recreation.
9f. Pumice Plateau Basins	640	High elevation basins containing forested wetlands, marshes, lakes, reservoirs, and both medium and low gradient rivers. Extensive marsh areas are found in the south.	4100-5200/ Mostly less than 50-200; max. 800	Thick Quaternary volcanic ash and pumice; also Quaternary semi-consolidated lacustrine and fluvial sediments.	Andisols (Cryaquands, Vitricryands), Mollisols (Cryaquolls)	Tutni, Sunriver, Wickiup. Mostly mucky silt loam, loamy sands, and sandy loam.	Cryic/ Aquic	20-25	10-50	12/38; 38/80	Lodgepole pine and wetlands; scattered ponderosa shrub forest on driest soils/ La Pine Basin: mostly lodgepole pine and wet, forested wetlands containing willow, aspen, and lodgepole pine; on driest sites, ponderosa pine. Sycan and Upper Klamath marshes: wetland vegetation.	Forest, marshland, wetland meadows, and forested wetlands. Livestock grazing, rural residential development, duck hunting, and recreation. Important habitat for migratory waterfowl.
9g. Klamath/ Goose Lake Basins	1039	Pluvial lake basins containing floodplains, terraces, and low-gradient streams.	4000-5400/ mostly less than 50-200; max. 400	Quaternary unconsolidated and semi- consolidated lacustrine and fluvial sediments.	Histosols (Haplohemists), Aridisols (Haplodurids), Inceptisols (Humaquepts), Mollisols (Haploxerolls, Endoaquolls, Argixerolls), Andisols (Cryaquands)	Lather, Henley, Tulana, Kirk, Lakeview, Ozamis, Drews, Deter. Mostly very deep to deep, peaty muck, clay loam, silt loam, and loam.	Mesic/ Xeric	10-18	90-120	21/39; 51/85	Mostly sagebrush steppe/ Bluebunch wheatgrass, Idaho fescue, Antelope bitterbrush, mountain big sagebrush, low sagebrush, basin wildrye, and basin big sagebrush. Historically, extensive wetlands of tules, cattails, and sedges.	Shrub- and grass-covered rangeland, wetland, cropland, and rural residential development. Many wetlands drained for agriculture. Wildlift habitat and wildlife refuges occur. Primary crops: alfalfa, potatoes, and small grains.
9h. Fremont Pine/ Fir Forest	1672	Steeply to moderately sloping mountains and high plateaus with high gradient intermittent and ephemeral streams. Reservoirs, a few glacial rock-basin lakes, and many springs occur.	5000-8000/ 800-2000	Quaternary colluvium, thin volcanic ash, and thin pumice. Miocene basalt, rhyolite, tuffaceous lava flows, sandstone, and siltstone.		Winterim, Royst, Mound, Woodchopper, Rogger, Polander	Cryic, Frigid/ Xeric	15-40	30-70	15/38; 42/85	Ponderosa shrub forest/ Lower altitudes: mostly ponderosa pine and western juniper. Higher altitudes: mostly white fir, whitebark pine, and lodgepole pine. Understory plants include snowberry, heartleaf arnica, Wheeler bluegrass, Antelop bitterbrush, and longstolon sedge.	Forest and woodland. Logging, grazing, and recreation.
9i. Southern Cascades Slope	515	Gently to moderately sloping mountains containing streams with medium to high gradients. A few permanent lakes occur.	3600-6300/ 400-2700	Quaternary colluvium and glacial outwash deposits. Miocene basaltic andesite.	Mollisols (Argicryolls, Argixerolls, Haplocryolls)	Woodcock, Pokegema, Pinehurst, Greystoke	Cryic, Frigid/ Xeric	25-40	30-70	20/34; 47/82	Ponderosa shrub forest/ Ponderosa pine. Higher elevations: white fir, Shasta red fir, and Douglas-fir. Understory plants include Idaho fescue, antelope bitterbrush, Ross sedge, western fescue, snowberry, and chinkapin.	Woodland and forest. Logging, grazing, and recreation.
9j. Klamath Juniper Woodland	784	Undulating hills, benches, and escarpments containing medium gradient streams. A few small plateau lakes occur but reservoirs common.	4400-6200/ 250-1800	Quaternary colluvium and volcanic ash. Miocene olivine basalt, tuffaceous sandstone, and siltstone.	Mollisols (Argixerolls, Haploxerolls)	Lorella, Nuss, Merlin, Royst, Winterim	Mesic, Frigid/ Xeric	12-20	60-120	21/40; 49/83	Ponderosa pine, juniper woodland, and sagebrush steppe/ Wetter areas: ponderosa pine with understory of antelope bitterbrush and bunchgreasses. Drier sites: low sagebrush, Wyoming big sagebrush, Idaho fescue, bluebunch wheatgrass, and Sandberg bluegrass. Western juniper and mountain-mahogany occur on shallow, rocky soils.	Mosaic of woodland and sagebrush–grassland. Livestock grazing, logging, and recreation. Reservoirs provide irrigation water to lower elevation ecoregions.

Level IV Ecoregie	ons	Physiography		Geology		Soils			Climate	e	Potential Natural Vegetation*/	Land Cover and Land Use
	Area (square miles)		Elevation/ Local Relief (feet)	Surficial and Bedrock	Order (Great Group)	Common Soil Series	Temperature/ Moisture Regimes	Precipitation Mean annual (inches)		Mean Temperature January min/max; July min/max (°F)	Present Vegetation *Source: Kuchler, 1964	
10c. Umatilla Plateau	3712	Nearly level to rolling, loess-mantled plateau. Glacial features such as patterned-ground are common. Most streams are ephemeral.	1000-3200/ Mostly 200- 600; valleys to 1000	Quaternary loess over Tertiary basalt.	Mollisols (Haploxerolls). Surface layers are thinner and have less organic matter than in the adjacent Ecoregion 10i.		Mesic/ Aridic, Xeric	9-15	100-170	52/86	Mostly wheatgrass-bluegrass; also some sagebrush steppe/ Bluebunch wheatgrass, Sandberg bluegrass, and Idaho fescue. On very shallow soils: stiff sagebrush. Alien cheatgrass covers broad areas.	Mostly cropland; some grassland. Non- irrigated winter wheat is grown using the crop fallow rotation method. Irrigated land grows winter wheat, alfalfa, and barley.
10e. Pleistocene Lake Basins	1407	Nearly level to undulating lake plain. Little surface water runoff.	300-1200/ 10-200	Quaternary lacustrine and alluvial deposits. During the Pleistocene Epoch, contained ancient Lake Condon.	Aridisols (Haplocambids, Haplodurids), Entisols (Torripsamments)	Sagehill, Warden, Quincy, Winchester, Koehler, Adkins	Mesic/ Aridic	7-10	140-200	30/41; 60/89	Sagebrush steppe/ Needleandthread, Indian ricegrass, bluebunch wheatgrass, Sandberg bluegrass, and basin big sagebrush. Alien cheatgrass covers broad areas.	Mostly irrigated cropland; some rangeland; and irrigated poplar tree farms for pulp. Crops winter wheat, potatoes, alfalfa, and silage corr
10g. Yakima Folds	109	Anticlinal ridges. Mostly ephemeral and intermittent streams.	1000-2200/ 500-1000	Quaternary loess over Tertiary basalt.	Mollisols (Haploxerolls)	Ritzville (surface texture: very fine sandy loam)	Mesic/ Aridic	10-12	150-170	26/40; 55/87	Wheatgrass-bluegrass and sagebrush steppe/ Needleandthread, bluebunch wheatgrass, Sandberg bluegrass, Wyoming big sagebrush, and basin big sagebrush. Alien cheatgrass covers broad areas.	Mostly cropland; also shrub- and grass- covered rangeland. Non-irrigated winter whea Irrigated winter wheat, barley, and alfalfa.
10i. Deep Loess Foothills	146	Lower elevation, northwest-facing slopes of the eastern Blue Mountains. Perennial streams fed by snow melt from adjacent high mountains.	1500-3500/ Mostly 100- 600; valleys to 1000	Quaternary loess over Tertiary basalt.	Mollisols (Haploxerolls, Argixerolls). Surface layers are darker with organic matter than Ecoregion 10c.	Athena, Waha, Palouse, Gwin	Mesic/ Xeric	15-25	120-190		Wheatgrass-bluegrass/ Idaho fescue, Sandberg bluegrass, and bluebunch wheatgrass.	Non-irrigated cropland and, on steeper slopes, rangeland. Primary crops: winter wheat, barle alfalfa, and green peas. Annual cropping (without wheat–fallow rotation) is practiced.
10k. Deschutes/ John Day Canyons	674	Very steep to precipitous canyonlands containing the Deschutes and John Day rivers.	200-3600/ 1000-2000	Quaternary colluvium. Tertiary basalt. Rock outcrops are very common.	Mollisols (Haploxerolls)	Lickskillet, Wrentham, Nansene. Soils contain a high amount of rock fragments throughout their profiles.	Mesic/ Aridic; steep north-facing slopes: Xeric	9-14	100-190	52/84	Sagebrush steppe/ Bluebunch wheatgrass, Idaho fescue, Sandberg bluegrass, Wyoming big sagebrush, and cheatgrass. Riparian vegetation in narrow canyons: white alder, mockorange, western clematis, and chokecherry.	Sparsely covered by grasses and shrubs. Livestock grazing and wildlife habitat.
10n. Umatilla Dissected Uplands	743	Dissected, hilly uplands with a terrace-like appearance. Slopes are rolling to very steep.	1600-4400/ 500-1500	Quaternary colluvium intermixed with loess. Tertiary basalt.	Mollisols (Argixerolls, Haploxerolls)	Mostly Gwin, Gurdane, Waha, Rockly, Gwinly, Waterbury. On forested slopes: Umatilla, Kahler.	Mesic; north- facing forested slopes: Frigid/ Xeric	15-25	100-160	52/82	Wheatgrass–bluegrass/ Idaho fescue, bluebunch wheatgrass, and Sandberg bluegrass. Forested, higher elevation, north-facing slopes: Douglas-fir, ponderosa pine, snowberry, pinegrass, and ninebark.	Mostly grass-covered rangeland and wildlife habitat; on higher elevation, north-facing slopes: forest.

SOURCES: Alt, D.D, and Hyndman, D.W., 1978, Roadside geology of Oregon: Missoula, Montana, Mountain Press Publication Company, 268 p. Anderson, E.W., Borman, M.M., and Krueger, W.C., 1998, The ecological provinces of Oregon - a treatise on the basic ecological geography of the State: Corvallis, Oregon Agricultural Experiment Station, SR990, 138 p. Andrews, E.W., 1956, Some soil-plant relationships in eastern Oregon: Journal of Range Management, v. 9, pp. 171-175. Arno, S.F., and Hammerly, R.P., 1977, Northwest trees - identifying and understanding the region's native trees: Seattle, The Mountaineers, 222 p. Atzet, T., and McCrimmon, L.A., 1990, Preliminary plant associations of the southern Oregon Cascade Mountain province: U.S. Department of Agriculture-Forest Service, Pacific Northwest Region, Siskiyou National Forest, draft report, 330 p. Atzet, T., and Wheeler, D.L., 1984, Preliminary plant associations of the Siskiyou Mountain province: U.S. Department of Agriculture–Forest Service, Pacific Northwest Region, 315 p. Barbour, M.G., and Billings, W.D., eds., 1988, North American terrestrial vegetation: Cambridge, Cambridge University Press, 434 p. Bastasch, R., 1998, Waters of Oregon - a source book on Oregon's water and water management: Corvallis, Oregon State University Press, 278p. Bratz, R.D., 1952, The distribution of biota in Oregon: Corvallis, Oregon State College, Zoology Department, unpublished thesis, 184 p. Brown, H.A., Bury, R.B., Darda, D.M., Diller, L.V., Peterson, C.R., Storm, R.M., 1995, Reptiles of Washington and Oregon: Seattle, Washington, Seattle Audubon Society, Trailside Series, 176 p. Burns, R.E., 1973, Cultural change, resource use and the forest landscape - the case of the Willamette National Forest: Eugene, University of Oregon, Ph.D. dissertation, 217 p.

Seattle, University of Washington, Ph.D. dissertation, 75 p. Station, General Technical Report, PNW-GTR-395, 114 p.

intermountain west: New York, Hafner Publishing Company, v. 1, 270 p. - distribution, habitat, and natural history: Corvallis, Oregon State University Press, 482 p. pumice region: Ecology, v. 47, p. 122-138. folded map in pocket.

Franklin, J.F., and Dyrness C.T., 1988, Natural vegetation of Oregon and Washington: Corvallis, Oregon State University Press, 452 p. Gordon, K.L., 1953, The natural areas of Oregon: Corvallis, Oregon State College, School of Science, Museum of Natural History, 23 p. Guard, B.J., 1995, Wetland plants of Oregon and Washington: Vancouver, Canada, Lone Pine Publishing, 239 p.

Habeck, J.R., 1961, The original vegetation of the Willamette Valley, Oregon: Northwest Science, v. 35, no. 2, p. 65-77.

//gonzo/ecoregions/jobs/j400.sandy.or/back/or_back_v15.ind jac/aw 6/5/2003

Summary Table: Characteristics of the Ecoregions of Oregon

Carver, G.A., 1972, Glacial geology of the Mountain Lakes Wilderness and adjacent parts of the Cascade Range, Oregon: Clarke, S.E., and Bryce, S.A., 1997, Hierarchical subdivisions of the Columbia Plateau and Blue Mountains ecoregions, Oregon and Washington: Portland, Oregon, U.S. Department of Agriculture-Forest Service, Pacific Northwest Research Cronquist, A., Holmgren, A.H., Holmgren, N.H., and Reveal, J.L., 1972, Intermountain flora - vascular plants of the Csuti, B., Kimerling, A.J., O'Neil, T.A., Shaughnessy, M.M., Gaines, E.P., and Huso, M.M.P., 1997, Atlas of Oregon wildlife Dyrness, C.T., and Youngberg, C.T., 1966, Soil-vegetation relationships within the ponderosa pine type in the central Oregon Fenneman, N.M., 1931, Physiography of the western United States: New York, McGraw-Hill Book Company, Inc., 534 p., Ferguson, D., and Ferguson, N., 1978, Oregon's Great Basin country: Burns, Oregon, Gail Graphics, 178 p.

Halverson, N.M., Topik, C., and Van Vickle, R., 1986, Plant association and management guide for the western hemlock zone – Mt. Hood National Forest: U.S. Department of Agriculture-Forest Service, Pacific Northwest Region R6-ECOL-232A-1986, 111 p. Heilman, P.E., Anderson, H.W., and Baumgartner, D.E., 1979, Forest soils of the Douglas-fir region: Pullman, Washington State University, Cooperative Extension Service, 298 p. Hemstrom, M.A., Emmingham, W.H., Halverson, N.M., Logan, S.E., and Topik, C., 1982, Plant association and management guide for the Pacific silver fir zone, Mt. Hood and Willamette National Forests: U.S. Department of Agriculture–Forest Service, Pacific Northwest Region R6-ECOL-100-1982a, 104 p. Hemstrom, M.A., Logan, S.E., and Pavlat, W., 1987, Plant association and management guide – Willamette National Forest: U.S. Department of Agriculture-Forest Service, Pacific Northwest Region R6-Ecol-257-B-86, 312 p. Hitchcock, C.L., and Cronquist, A., 1973, Flora of the Pacific Northwest: Seattle, University of Washington Press, 730 p. Johannessen, C.L., Davenport, W.A., Millet, A., and McWilliams, S., 1971, Vegetation of the Willamette Valley: Annals of the Association of American Geographers, v. 61, p. 286-302. Johnson, D.H., and O'Neil, T.A., managing directors, 2001, Wildlife-habitat relationships in Oregon and Washington: Corvallis, Oregon State University Press, 736 p. Kagan, J., and Caicco S., 1996, Manual of Oregon actual vegetation: Oregon GAP Analysis Program, Idaho Cooperative Fish and Wildlife Research Unit, University of Idaho in cooperation with the Oregon Department of Fish and Wildlife and the Oregon Natural Heritage Program, 190 p. Larsen, D.M., 1976, Soil resource inventory – Deschutes National Forest: U.S. Department of Agriculture–Forest Service, Pacific Northwest Region, 381p. Loy, W.G. (ed.), Allan, S., Buckley, A.R., and Meacham, J.E., 2001, Atlas of Oregon, second edition: Eugene, Oregon, University of Oregon, 215 p.

L	evel IV Ecoregi	ons	Physiography		Geology		Soils			Climat	e	
		Area (square miles)		Elevation/ Local Relief (feet)	Surficial and Bedrock	Order (Great Group)	Common Soil Series	Temperature/ Moisture Regimes	Precipitation Mean annual (inches)	Frost Free Mean annual (days)		
11a.	John Day/ Clarno Uplands	5022	Moderately to highly dissected hills and low mountains. Hills are rolling to steep and mountain slopes are steeply sloping. Scattered buttes occur. Includes valleys formed by the John Day and Crooked rivers.	Mostly 1200-4500; max. 5500/ 400-2500; max. 3700	Quaternary volcanic ash, alluvium, and piedmont gravels. Tertiary basalt, tuff, andesite, rhyolite, and breccia.	Mollisols (Argixerolls, Palexerolls, Haploxerolls, Durixerolls), Aridisols (Haplargids, Paleargids, Haplocambids), Vertisols (Haploxererts)	Ruckles, Hack, Tub, Simas, Sorf, Powder, Kimberly, Day, Brisbois, Drinkwater, Oxwall	Mostly Mesic; also Frigid/ Mostly Aridic; also Xeric	9-16	70-150	21/39; 47/84	Whe Idah Wes (llb) blac
11b.	John Day/ Clarno Highlands	2475	Moderately to highly dissected, steeply sloping low mountains and rolling hills. Includes broad streams fed more by springs than by snow melt.	3000-6200/ 200-2000	Quaternary colluvium and, especially on north- facing slopes, volcanic ash. Tertiary basalt, andesite, tuffs, breccia, and ash beds.	Andisols (Udivitrands, Vitrixerands), Mollisols (Argixerolls, Haploxerolls, Palexerolls)	Hankins, Klicker, Tolo, Royst, Top, Piersonte, Boardtree, Pilotbutte, Yawkey, Humarel, Lamulita, Btree	Frigid/ Xeric	16-28	30-100	20/37; 45/79 Continental- type climate.	Wes junij bitte fir, r map
11c.	Maritime- Influenced Zone	1391	Dissected, gently-sloping to hilly volcanic plateau and mountain valleys. Springs occur.	3000-6000/ 150-1600	Quaternary volcanic ash, colluvium, and, at low elevations, loess. Mostly Tertiary basalt.	Andisols (Udivitrands, Vitrixerands), Inceptisols (Haploxerepts), Mollisols (Argixerolls, Haploxerolls)	Olot, Syrupcreek, Tamara, Downeygulch, Lowerbluff, Tolo, Klicker, Anatone, Fivebit, Bocker, Albee	Frigid/ Xeric	20-40	40-80	22/36; 48/77 Marine- influenced climate.	Wes pine cove Herl Sand
11d.	Melange	1228	Mid-elevation mountains. Few perennial streams.	3500-7400/ 600-3400	Quaternary colluvium. Tertiary basalt, andesite, and rhyolite. Cretaceous and Jurassic granitic rocks. Triassic partly metamorphosed limestone, marble, chert, argillite, shale, graywacke, serpentine, greenstone, and schist. Paleozoic limestone and argillite.	Alfisols (Haploxeralfs), Andisols (Vitricryands, Udivitrands), Inceptisols (Dystrocryepts, Dystroxerepts, Haploxerepts), Mollisols (Argixerolls, Haploxerolls)	Gutridge, Threecent, Honeymooncan, Angelpeak, Vanandamine, Bordengulch, Analulu, Bluecanyon, Vogel, Cotay Lemonex, Highhorn, Huntrock	Cryic, Frigid/ Udic, Xeric	16-35	30-90	17/34; 46/79	Wes pine huck sedg pricl
11e.	Wallowas/ Seven Devils Mountains	526	Deeply dissected mid-elevation mountains. Perennial streams fed by snow melt.	3000-6400/ 400-2600	Quaternary colluvium, loess, volcanic ash, and glacial till. Mostly Tertiary basalt. Triassic sedimentary, metasedimentary, volcanic, and metavolcanic rocks. Cretaceous and Jurassic igneous rocks.	Alfisols (Haploxeralfs), Andisols (Udivitrands), Inceptisols (Haploxerepts), Mollisols (Argixerolls, Haploxerolls)	Tamarackcanyon, Anatone, Limberjim, Rebarrow, Tamara, Gutridge, Klickson, Klicker, Bigcow	Frigid/ Xeric, Udic	20-40	30-60	18/33; 46-77 Northwest is marine- influenced.	Wes Dou map twin
11f.	Canyons and Dissected Highlands	1093	Steeply sloping, upper canyons and dissected plateaus.	Mostly 4000-6000; min. 3000/ 400-2000	Quaternary colluvium, alluvium, volcanic ash, and loess. Mostly Tertiary basalt; also some Tertiary lacustrine and fluvial deposits.	Andisols (Udivitrands, Vitrixerands), Inceptisols (Dystroxerepts), Mollisols (Argialbolls, Haploxerolls)	Limberjim, Syrupcreek, Tamara, Anatone, Olot, Bocker Albee, Kamela, Cowsly	Frigid/ Higher zones: Udic. Lower zones: Xeric	15-30	30-90	18/33; 46-78	Grar fir, v arnic thim
11g.	Canyons and Dissected Uplands	1091	Deep, river canyons and dissected plateaus.	Mostly 1000- 5000; 6000 maximum/ 800-4000	Quaternary alluvium. On terraces and north-facing slopes: Quaternary ash mixed with colluvium. On south-facing slopes: Quaternary lacustrine deposits. Extensive Tertiary basalt. Deepest canyons: Cretaceous igneous rocks, Jurassic granite, diorite, mudstone, shale, siltstone, and tuff, and Triassic sedimentary, metamorphic, and volcanic rocks.	Andisols (Vitrixerands), Mollisols (Argixerolls, Haploxerolls)	Kettenbach, Gwin, Bocker, Imnaha, Mallory, Harlow, Cherrycreek, Lickskillet, Fivebit, Klicker, Klickson, Threebuck	Mesic, Frigid/ Xeric, Aridic	10-20	70-180	21/34; 50/80	Whe slop blue gran hack Exot snov
11h.	Continental Zone Highlands	1555	Moderately dissected, mountainous volcanic plateau. Mountain slopes are steep. Scattered cinder cones occur.	4000-6700/ 400-2000	Quaternary colluvium and volcanic ash. Tertiary basalt, andesite, rhyolite, ash fall tuffs, and breccia.	Mollisols (Argixerolls, Haploxerolls)	Egyptcreek, Royst, Klicker, Gaib, Anatone. Soils are shallow and stony.	Frigid/ Xeric	16-30	50-80	17/35; 45/79 Continental- type climate.	Wes Pone mou pine
11i.	Continental Zone Foothills	3715	Foothills, hills, and scattered buttes. A few perennial streams occur and originate in the surrounding mountain ranges.	1800-6000/ Mostly 200- 2500; max. 3700	Quaternary colluvium and volcanic ash. Tertiary basaltic and tuffaceous rocks. Jurassic and Triassic graywacke, siltstone, and limestone. Triassic gabbro and metamorphic rock.	Mollisols (Argixerolls), Aridisols (Durargids, Haplocambids), Entisols (Torriorthents)	Ruckles, Ateron, Snell, North Powder, Gwinly, Durkee, Virtue, Snaker	Mesic, Frigid/ Aridic, Xeric	9-18	50-140	17/34; 50/84 Continental- type climate.	Mos fescu grea
11k.	Blue Mountain Basins	1084	Nearly flat to rolling alluvial valleys containing floodplains, fluvial terraces, scattered buttes, and, in the Wallowa Valley, outwash terraces, moraines, and a low elevation basalt plateau.	2600-5000/ less than 25-200; maximum 1400	Mostly Quaternary alluvium; also Quaternary terrace gravels, fanglomerate, and, in Wallowa Valley, lacustrine, fluvial, and outwash deposits. Tertiary basalt.	Mollisols (Haploxerolls, Argixerolls, Endoaquolls, Durixerolls, Palexerolls, Argialbolls), Inceptisols (Halaquepts, Endoaquepts), Andisols (Haploxerands)	Wingville, Balm, Catherine, Redmount, Reavis, Harlow, Snell, Conley, Baker, Zumwalt, Powwatka, Chesnimus, Silverlake, Minam, Langrell, Rondowa, Haines, Umapine, Hot Lake	Mesic, Frigid/ Xeric	Wallowa and Grande Ronde valleys: 13- 25. Baker Valley: 10- 16.	70-160	19/35; 47/85. Wallowa and Grande Ronde valleys: more marine influence than Baker Valley.	Wall
111.	Mesic Forest Zone	2226	Dissected, volcanic plateau and mid-elevation mountains. Intermittent headwater streams or larger perennial streams fed by snow melt from adjacent high mountains.	Mostly 4000-7000; maximum 7700/ 400-2500	Quaternary volcanic ash and colluvium. Extensive Tertiary basalt and andesite. Also Cretaceous and Jurassic granitic rocks, Jurassic and Triassic sedimentary or volcanic rocks, and Triassic and Paleozoic partly metamorphosed sedimentary and volcanic rocks.	Andisols (Vitricryands, Udivitrands), Inceptisols (Dystrocryepts, Dystroxerepts, Haploxerepts), Mollisols (Argixerolls). Thick volcanic ash retains moisture well and enhances soil productivity.	Cold slopes: Mountemily, Troutmeadows, Bucketlake, Angelpeak, Bordengulch, Prouty, Ufish. Cool moist slopes: Gorham Gulch, Limberjim, Syrupcreek, Tamara, Threecent. Dry slopes: Klicker, Analulu, Endcreek.	Mostly Cryic/ Udic. Lower elevations: Frigid/ Udic and, on south-facing slopes, Xeric	30-60. Mostly snow. Snow persists late into spring.	15-70	19/34; 45/74. Marine- influenced.	Gran mou hone mois slope sedg
11m.	Subalpine– Alpine Zone	540	High elevation, glaciated mountains with aretes, cirques, mountain slopes, tarns, permanent snowfields, and a remnant glacier. High gradient streams with boulder and cobble substrates.	6500-9900/ 600-3000	Quaternary glacial, volcanic ash, and colluvial deposits. Tertiary basaltic, andesitic, and intrusive rocks. Extensive Cretaceous and Jurassic granitic rocks. Jurassic, Triassic, and Paleozoic sedimentary and volcanic rocks. Rock outcrops occur.	Andisols (Vitricryands), Inceptisols (Eutrocryepts, Dystrocryepts)	Angelpeak, Mountemily, Teewinot, Moran, Troutmeadows, Chinacap, Fruitcreek, Cornucopiapeak. Soils are rocky; rock outcrop and rubble land is extensive.	Cryic/ Udic and, on south-facing slopes, Xeric	35-80 Mostly snow.	10-30	15/32; 40/69	West Enge sage krun outc
11n.	Deschutes River Valley	1576	Broad, nearly level to rolling valley with deeply incised streams. Southern part: capped by basalt and nearly level. Northern part: where basalt cap is absent, terrain more rolling and dissected.	2000-4000; buttes to 5300/ 10-300; max. 2000	Quaternary basalt and fluvial, lacustrine, and tuffaceous deposits. Tertiary sedimentary and volcanic rocks; Tertiary fluvial deposits from the old Cascade Range are capped, south of Redmond, by Tertiary basalt. Rock outcrops are common.	Mollisols (Haploxerolls, Argixerolls), Entisols (Torripsamments)	Deschutes, Agency, Caphealy, Stukel, Deskamp, Gosney, Cullius. Soils have a high content of sand- sized volcanic ash.	Aridic/ Mesic	8-12	70-140	22/41; 46/84	Sage sage need whit blac
110.	Cold Basins	400	Cold, wet valleys and basins. Streams, if not channelized, are meandering.	3600-6000/ mostly level-400	Quaternary alluvium and lacustrine deposits. Tertiary tuffaceous sediment.	Mollisols (Cryaquolls, Endoaquolls, Haploxerolls, Durixerolls)	Silvies, Damon, Damore, Welch, Rastus, Sumpley. Silt- or clay- textured soils are common. Water tables are typically high.	Frigid, Cryic/ Xeric, Aquic	12-25	less than 20-50	16/36; 43/80	Mos sage rush

12.	
Level IV Ecoregio	ons
	Area (square miles)
12a. Treasure Valley	499
12j. Unwooded Alkaline Foothills	489

78	8.]	KLAMATH MOU	NTAI	INS						
I	Level IV Ecoregic	ons	Physiography		Geology		Soils			Climate	е
		Area (square miles)		Elevation/ Local Relief (feet)	Surficial and Bedrock	Order (Great Group)	Common Soil Series	Temperature/ Moisture Regimes	Precipitation Mean annual (inches)	Frost Free Mean annual (days)	Mean Temperature January min/max; July min/max (°F)
78a .	Rogue/Illinois Valleys	285	Terraces and floodplains in mountain valleys.	900-2000/ mostly less than 100- 200; max. 600	Quaternary fluvial terrace and floodplain deposits.	Mollisols (Haploxerolls, Argixerolls), Alfisols (Palexeralfs), Inceptisols (Haploxerepts, Endoaquepts)	On floodplains: Newberg, Camas, Evans. On valley terraces: Medford, Foehlin, Central Point. On fans: Ruch, Barron, Clawson.	Mesic/ Xeric	20-60	120-180	31/47; 51/89
78b.	Oak Savanna Foothills	818	Moderately sloping mountain foothills with medium gradient streams.	1400-4000/ 400-2000	Quaternary colluvium and alluvium. In east: Eocene basaltic lava flows. In west: Jurassic sandstone and shale.	Mollisols (Haploxerolls, Argixerolls), Inceptisols (Haploxerepts), Vertisols (Haploxererts)	Medco, McMullin, McNull, Brader, Debenger, Carney	Mesic/ Xeric	25-45	110-160	28/45; 50/87
78c.	Umpqua Interior Foothills	921	Foothills and narrow interior valleys containing fluvial terraces and floodplains.	400-2800/ less than 100-1900	Quaternary alluvium and colluvium. Pliocene marine sandstone. Eocene basalt.	Mollisols (Haploxerolls, Argixerolls, Argiaquolls), Alfisols (Haploxeralfs), Inceptisols (Dystroxerepts)	On terraces: Conser, Newberg, Roseburg. On foothills: Oakland, Sutherlin, Nonpareil.	Mesic/ Xeric	30-50	120-180	34/49; 53/84
78d.	Serpentine Siskiyous	440	Highly dissected mountains containing perennial, high gradient streams.	1500-4300/ 600-2400	Quaternary colluvium. Jurassic ultramafic and related rocks.	Alfisols (Haploxeralfs), Inceptisols (Dystroxerepts)	Pearsoll, Dubakella, Eightlar, Perdin, Gravecreek	Mesic, Frigid/ Xeric	45-120	70-140	32/44; 49/82
78e.	Inland Siskiyous	2610	Highly dissected mountains with high gradient streams. A few small lakes are found at higher elevations.	800-7000/ 1000-2800	Quaternary colluvium. Jurassic granitic rocks, shale, and sandstone.	Alfisols (Haploxeralfs), Inceptisols (Haploxerepts, Dystroxerepts), Ultisols (Haploxerults)	Vannoy, Caris, Offenbacher, Josephine, Beekman, Kanid, Siskiyou, Tethrick	Mesic, Frigid/ Xeric	35-70	90-160	29/44; 50/86
78f.	Coastal Siskiyous	853	Highly dissected mountains with high gradient streams.	600-5300/ 1000-2700	Quaternary colluvium. Cretaceous and Jurassic conglomerate, sandstone, and siltstone.	Inceptisols (Dystrudepts, Dystroxerepts), Ultisols (Palehumults, Palexerults)	Fritsland, Bravo, Cassiday, Deadline, Barkshanty, Nailkeg, Jayar, Althouse, Skymor, Atring, Kanid, Acker	Mesic, Frigid/ West: Udic; East: Xeric	70-130	100-190	38/50; 50/76
78g.	Klamath River Ridges	121	Highly dissected mountains containing high gradient streams.	3800-7500/ 800-3000	Quaternary colluvium. Miocene and Oligocene basaltic and andesitic flows. Jurassic granitic rocks.	Mollisols (Argixerolls, Haploxerolls)	Skookum, McMullin, McNull	Mesic/ Xeric	25-35	90-160	24/42; 49/88

L	evel IV Ecoregic	ons	Physiography		Geology		Soils			Climate	9
		Area (square miles)		Elevation/ Local Relief (feet)	Surficial and Bedrock	Order (Great Group)	Common Soil Series	Temperature/ Moisture Regimes	Precipitation Mean annual (inches)	Frost Free Mean annual (days)	Mean Temperature January min/max; July min/max (°F)
80a.	Dissected High Lava Plateau	3984	Dissected, nearly level to undulating, elevated volcanic plateau characterized by external drainage and sheer-walled canyons. Streams are fed by snow-melt and springs. A few, scattered intermittent lakes occur.	Mostly 4300- 6500; gorges to 3000/ 100-200; gorges to 1200	Quaternary basaltic and andesitic flows and alluvium. Tertiary basaltic, rhyolitic, andesitic, and dacitic rocks.	Aridisols (Argidurids, Haplargids), Mollisols (Argixerolls, Durixerolls)	Dewar, Arbidge, Colthorp, Anawalt, Buncelvior, Vanwyper	Mesic, Frigid/ Mostly Aridic bordering on Xeric	9-14	50-130	18/38; 51/88
80d.	Pluvial Lake Basins	2092	Nearly level to gently sloping, internally-drained basins containing lake terraces, playas, beach plains, and lower alluvial fans.	4200-5500/ less than 20- 200	Quaternary lacustrine, playa, alluvial, and marsh deposits. Volcanic ash layer present near the Cascade Range.	Aridisols (Paleargids, Haplocambids), Mollisols (Haploxerolls, Argixerolls)	Millican Valley: Stookmoor, Gardone. Fort Rock and Christmas valleys: Fort Rock, Abert, Bonnick. Catlow Valley and Harney Basin: Spangenburg, Lawen, Reallis, Catlow. Most soils coarse-textured and well-drained. In Millican, Christmas, and Fort Rock valleys: ash-rich soils.	Frigid/ Mostly Aridic bordering on Xeric	8-12	50-100	17/38; 42/82
80e.	High Desert Wetlands	1651	Nearly-level basins containing remnant wetlands, floodplains, alluvial terraces, sloughs, lakes, lake plains, and reservoirs. Lake levels fluctuate seasonally and from annually.	4000-5000/ less than 25- 250	Quaternary alluvial and lacustrine sediments. Tertiary basalt and tuffaceous sediment.	Mollisols (Endoaquolls), Vertisols (Epiaquerts), Aridisols (Natrargids), Inceptisols (Halaquepts), Histosols (Haplosaprists)	Ausmus, Poujade, Lolak, Reese, Housefield, Ozamis, Jimgreen, Boulder Lake. Somewhat poorly- to very poorly-drained soils with high water tables and seasonal ponding.	Frigid/ Aridic almost Xeric; in growing season usually Aquic conditions.	8-12	50-80	20/42; 47/86
80f.	Owyhee Uplands and Canyons	2991	Highly dissected, undulating to very steeply sloping hills and mountains characterized by deep, precipitous river canyons, badlands, and caves.	2500-5500/ 200-1200	Mostly Tertiary tuffaceous rock, lacustrine sediments, fluvial deposits, and basalt. Rock outcrops are common.	Mollisols (Argixerolls, Palexerolls), Aridisols (Argidurids, Paleargids)	Ruckles, Brogan, Simas, Poall, Ruclick, Lookout	Mesic/ Aridic	8-14	80-160	17/35; 54/88
80g.	High Lava Plains	10262	Nearly level to undulating, elevated volcanic plateau that is internally drained by ephemeral and intermittent streams. Isolated buttes and volcanic cones occur. Scattered lakes and ephemeral pools are common.	Mostly 4200-6500/ Mostly 100- 2500	Mostly Tertiary basaltic, rhyolitic, and andesitic rocks as well as ash-flow tuffs.	Mollisols (Argixerolls, Durixerolls, Palexerolls), Aridisols (Haplargids, Argidurids, Haplodurids), Alfisols (Palexeralfs)	Anawalt, Actem, Brace, Coztur, Carryback, Raz, Ninemile, and, in depressions, Swalesilver. Soils are typically shallow to moderately deep to underlying claypan, duripan, or bedrock.	Frigid/ Aridic bordering on Xeric	9-14	50-80	18/35; 47/83
80j.	Semiarid Uplands	1041	Hills, low- and mid-elevation mountain slopes, volcanic cones, and buttes. Includes the low- and mid-elevation scarps of Hart Mountain and Steens Mountain. Mostly moderate to high gradient, perennial and intermittent streams.	4800-7500/ 400-3000	Quaternary colluvium. Tertiary andesite, basalt, rhyolite, and tuff. Rock outcrops are common.	Mollisols (Argixerolls, Haplocryolls, Argicryolls, Haploxerolls)	Westbutte, Ninemile, Baconcamp, Harcany, Fitzwater, Hackwood	Frigid, Cryic/ Aridic bordering on Xeric, Xeric	12-26	40-80	21/37; 50/80
80k.	Partly Forested Mountains	103	High elevation zone of Steens Mountain. Glacial features such as U-shaped valleys, moraines, cirques, and tarns occur. Perennial and intermittent, high gradient, cold streams occur that are fed by snow-melt or springs.	7500-9700/ 200-3500	Quaternary colluvial and morainal deposits. Tertiary rhyolitic and basaltic rocks. Rock outcrops are common.	(Mollisols (Argicryolls, Haplocryolls)	Baconcamp, Leemorris, Buckwilder, Hackwood	Cryic/ Xeric	26-45	30-50	19/35; 47/73
801.	Salt Shrub Valleys	725	Nearly flat to gently sloping, internally-drained basins flanked by alluvial fans and bajadas. Contains terraces, dunes, wetlands, hot springs, barren playas, and intermittent lakes. Mostly ephemeral and intermittent streams.	3500-4800/ less than 200	Quaternary alluvium, loess, and playa, lacustrine, and marsh deposits. Once inundated by Pleistocene pluvial lakes.	On basin floors: Aridisols (Aquicambids). On terraces: Aridisols (Argidurids). On alluvial fans: Aridisols (Haplocalcids, Haplocambids)	On basin floors: Alvodest, Droval. On terraces: Deppy, Tumtum. On alluvial fans: Outerkirk, Defenbaugh. Saline and alkaline soils are common on basin floors.	Mesic/ Aridic, Aridic bordering on Xeric	6-10	80-110	24/40; 59/86
80m.	Barren Playas	179	Nearly level, saline and alkaline playas that were once inundated by Pleistocene lakes. Sand dunes and mud flats occur. Playas are ponded during wet intervals and eroded by wind when dry.	4000-4500/ less than 25- 100	Quaternary lacustrine deposits.	Entisols (Torriorthents)	Saline and alkaline playas. Sediments are fine-grained and very slowly permeable.	Mesic/ Aquic	6-8	80-110	24/40; 59/86

University of Idaho Press, 332 p. biodiversity: Lake Oswego, OR., Defenders of Wildlife, 218 p.

Northwest Science, v. 66, p. 66-76. Sigler, W.F., and Sigler, J.W., 1987, Fishes of the Great Basin: Reno, University of Nevada Press, 425 p. Naturalist, v. 89, no. 1, p. 1-25.

SNAKE RIVER PLAIN

	Physiography		Geology		Soils			Climate	
n re s)		Elevation/ Local Relief (feet)	Surficial and Bedrock	Order (Great Group)	Common Soil Series	Temperature/ Moisture Regimes	Precipitation Mean annual (inches)	Mean annual	Mean Temperature January min/max; July min/max (°F)
	Flat to rolling valley containing many canals and incised rivers.	2100-2600/ 0-400	Quaternary alluvium, loess, lacustrine, and alluvial fan deposits.	Aridisols (Calciargids, Argidurids, Haplocambids, Haplodurids), Mollisols (Haploxerolls), Inceptisols (Halaquepts)	Powder, Umapine, Owyhee, Greenleaf, Nyssa, Frohman, Virtue	Mesic/ Aridic	8-11	110-180	19/35; 57/96
	Rolling foothills, hills, benches, alluvial fans, and scattered badlands. Few perennial streams occur.	2600-3500/ 0-1200	Quaternary alkaline lacustrine sediments. Tertiary tuffaceous sedimentary rocks.	Aridisols (Argidurids), Mollisols (Argixerolls), Entisols (Torriorthents)	Chilcott, Haw, Lolalita, Payette, Shoofly, Brogan	Mesic/ Aridic	9-12	100-160	19/35; 57/96

McGrath, C.L., Woods, A.J. Omernik, J.M., Bryce, S.A., Edmondson, M., Nesser, J.A., Shelden, J., Crawford, R.C., Comstock, J.A., and Plocher, M.D., 2002, Ecoregions of Idaho (color poster with map, descriptive text, summary tables, and photographs): Reston, VA., U.S. Department of Interior–U.S. Geological Survey, map scale 1:1,350,000. Myatt, W.G., 1958, The Willamette Valley: Worcester, Massachusetts, Clark University, Ph.D. dissertation, 230 p. Nussbaum, R.A., Brodie, E.D., Jr., and Storm, R.M., 1983, Amphibians and reptiles of the Pacific northwest: Moscow, Idaho: Oregon Biodiversity Project, Defenders of Wildlife, 1998, Oregon's living landscape – strategies and opportunities to conserve

wet intervals and eroded by wind when dry.

Orr, E.L., and Orr, W.N., 1996, Geology of the Pacific Northwest: New York, McGraw-Hill, 409 p. Orr, E.L., Orr, W.N., and Baldwin, E.M., 1992, Geology of Oregon (4th ed.): Dubuque, Iowa, Kendall/Hunt, 254 p. Parsons, R.B., Balster, C.A., and Ness, A.O., 1970, Soil development and geomorphic surfaces, Willamette Valley, Oregon: Soil Science Society of America Proceedings, v. 34, no. 3, p. 485-491.

Pater, D.E., Bryce, S.A., Thorson, T.D., Kagan, J., Chappell, C., Omernik, J.M., Azevedo, S.H., and Woods, A.J., 1998, Ecoregions of Western Washington and Oregon (color poster with map, descriptive text, summary tables, and photographs): Reston, VA., U.S. Department of the Interior–Geological Survey, map scale 1:1,350,000. Reigel, G.M., Smith, B.G., and Franklin, J.F., 1992, Foothill oak woodlands of the interior valleys of southwestern Oregon:

Swedberg, K., 1973, A transition coniferous forest in the Cascade Mountains of northern Oregon: American Midland

Taylor, G.H., and Bartlett, A., 1993, The climate of Oregon (encompassing climate zones 1-9 as presented in nine separate special reports): Corvallis, Oregon State University, Oregon Climate Service, Agricultural Experiment Station, Special Report 913 through Special Report 921, nonpaginated. Taylor, G.H., and Daly, C., 1995, Oregon PRISM mean annual precipitation map, 1961-1990: Corvallis, Oregon State University, Oregon Climate Service, draft, hard copy scale 1:1,000,000. Taylor, G.H., and Hannan, C., 1999, The climate of Oregon – from rain forest to desert: Corvallis, Oregon State University Press, 211 p. Topik, C., Halverson, N.M., and High, T., 1988, Plant association and management guide for the ponderosa pine, Douglas-fir, and grand fir zones - Mount Hood National Forest: U.S. Department of Agriculture-Forest Service, Pacific Northwest Region, R6-ECOL-TP-004-88.

Towle, J.C., 1974, Woodland in the Willamette Valley - an historical geography: Corvallis, Oregon State University, Ph.D. dissertation, 159 p. Trimble, D.E., 1963, Geology of Portland, Oregon, and adjacent areas: U.S. Geological Survey Bulletin 1119, 119 p. Trimble, S., 1989, The sagebrush ocean – a natural history of the Great Basin: Reno, University of Nevada Press, 248 p. Tsutsui, S.H., 1979, Oregon's mid-Willamette Valley wetlands – agricultural uses, alternative uses, problems and trends: Corvallis, Oregon State University, Ph.D. dissertation, 191 p.

U.S. Department of Agriculture–Forest Service, 1936, Forest type map – State of Oregon: Portland, Oregon, U.S. Department of Agriculture–Forest Service, Pacific Northwest Forest and Range Experiment Station, 4 map sheets, scale 1:253,440. U.S. Department of Agriculture-Forest Service, Wallowa-Whitman National Forest, 1999, Hells Canyon National Recreation Area comprehensive management plan, revised draft environmental impact statement (electronic version), http://www.fs.fed.us/r6/w-w/hellscanyon/docs/frame.htm.

i		
erature n/max; ax (°F)	Potential Natural Vegetation*/ Present Vegetation *Source: Kuchler, 1964	Land Cover and Land Use
9; 4	Wheatgrass–bluegrass and juniper steppe woodland/ Bluebunch wheatgrass, Idaho fescue, basin wildrye, Wyoming big sagebrush, Thurber needlegrass. Western juniper woodland in transition to higher elevation ponderosa pine forest (llb). Riparian areas: white alder, mockorange, chokecherry, clematis, willows, black cottonwood, water birch.	Grassland, shrubland, woodland, rangeland, wildlife habitat; some irrigated pasture and alfalfa farming on the alluvial flats that flank major drainages. Broad areas of rangeland covered with alien cheatgrass.
7; 9 ntal- nate.	Western ponderosa pine forest/ Open ponderosa pine, some Douglas-fir, western juniper, mountain-mahogany, snowberry, mountain big sagebrush, antelope bitterbrush, elk sedge, Idaho fescue, bluebunch wheatgrass. Riparian areas: grand fir, mountain alder, red-twig dogwood, ninebark, Wood's rose, Rocky Mountain maple, willows.	Forest and woodland. Woodland grazing, logging, and recreation.
5; 7 ne- ced te.	Western ponderosa pine forest, grand fir–Douglas-fir forest/ Mostly ponderosa pine, some Douglas-fir, grand fir. Dense forest understory and riparian shrub cover: snowberry, spirea, ninebark, serviceberry, and red-twig dogwood. Herbaceous ground cover: heartleaf arnica, pinegrass, elk sedge, Idaho fescue, Sandberg bluegrass, and bluebunch wheatgrass.	Forested. Logging, grazing, wildlife habitat, and recreation.
4; 9	Western ponderosa pine forest, juniper steppe woodland/ Juniper, ponderosa pine, Douglas-fir, subalpine fir, lodgepole pine, western larch, grand fir, grouse huckleberry, snowberry, prince's pine, sidebells pyrola, twinflower, pinegrass, elk sedge, and heartleaf arnica. Riparian areas: mountain alder, red-twig dogwood, prickly currant, black currant, Columbia monk's hood, bluebells.	Forested. Woodland grazing, wildlife habitat, and mining; only limited logging occurs due to the difficulty in reforesting the droughty, exposed soils. Historic placer mining for gold has altered the structure of many streams.
3; 7 vest ne- ced.	Western ponderosa pine forest and grand fir–Douglas-fir forest/ Ponderosa pine, Douglas-fir, grand fir, western larch, ninebark, snowberry, Rocky Mountain maple, serviceberry, mountain big sagebrush, big huckleberry, grouse huckleberry, twinflower, prince's pine, elk sedge, and pinegrass.	Forest and shrubland. Woodland grazing, logging, wildlife habitat, and recreation. Mountain water is diverted or impounded for human use.
3; 8 4:	Grand fir–Douglas-fir forest and western ponderosa pine forest/ Douglas-fir, grand fir, western larch, ponderosa pine, ninebark, snowberry, oceanspray, heartleaf arnica, elk sedge. Riparian areas: mountain alder, stinking and prickly currant, thimbleberry, Columbia monk's hood. Wheatgrass–bluegrass/ Lower north-facing slopes and upper south-facing	Mostly forest; on steep, south-facing canyon slopes: grassland and shrubland. Logging, woodland grazing, wildlife habitat, and recreation. Mostly grassland and shrubland; some forest
1 ; 0	slopes: Douglas-fir, ponderosa pine, and Idaho fescue. Lower south-facing slopes: bluebunch wheatgrass and arrowleaf balsamroot. Upper north-facing slopes: grand fir, ninebark, and pinegrass. Riparian areas: Snake River (Hells Canyon)– hackberry, bluebunch wheatgrass. Overgrazed areas dominated by cheatgrass. Exotic annuals. Tributary Canyons–mock-orange, poison ivy, red-twig dogwood, snowberry, Rocky Mountain maple.	stands especially on upper, north-facing slopes. Wildlife habitat, livestock grazing, an recreation.
5; 9 ntal- nate.	Western ponderosa pine forest, grand fir–Douglas-fir forest, and sagebrush steppe/ Ponderosa pine, Douglas-fir, grand fir, juniper, antelope bitterbrush, snowberry, mountain-mahogany, mountain big sagebrush, stiff sagebrush, elk sedge, pinegrass, bluebunch wheatgrass, and Idaho fescue.	Forest with a xeric shrub or bunchgrass understory. Livestock grazing, logging, and recreation.
4; 4 ntal- nate. 5;	Mostly sagebrush steppe/ Bluebunch wheatgrass, mountain big sagebrush, Idaho fescue, Wyoming big sagebrush, Sandberg bluegrass, and, on schist, Nevada greasebush. Wheatgrass-bluegrass and sagebrush steppe/ Baker Valley: sagebrush steppe	Shrub- and grass-covered. Livestock grazing and wildlife habitat.
allowa ande alleys: arine e than alley.	composed of Wyoming big sagebrush, bluebunch wheatgrass, and Idaho fescue. Wallowa and Grande Ronde valleys: grassland containing bluebunch wheatgrass and Idaho fescue. Wetlands: tufted hairgrass, sedges, basin wildrye, and black greasewood.	commercial, residential, and rural residential development. Principal crops: alfalfa, peas, winter wheat, and grass seed. Most wetlands floodplains have been drained for agriculture
4; 4. le- ced.	Grand fir–Douglas-fir forest/ Cold slopes: Subalpine fir, Engelmann spruce, mountain hemlock, lodgepole pine, big huckleberry, grouse huckleberry, Utah honeysuckle, sidebells pyrola, roundleaved violet, and northwestern sedge. Cool moist slopes: grand fir, western larch, queen's cup beadlily, and prince's pine. Drier slopes: Douglas-fir, ponderosa pine, mountain maple, ninebark, pinegrass, elk sedge, and bigleaf sandwort.	Forested. Logging, woodland livestock grazin wildlife habitat, and recreation.
<u>2;</u> 9	Western spruce-fir forest; alpine meadows-barren/ Subalpine fir, whitebark pine, Engelmann spruce, and lodgepole pine. Dry south-facing slopes: mountain big sagebrush and Idaho fescue. Wet meadows: heather and Parry's rush. Treeline: krummholz. Alpine meadows of green fescue and Hood's sedge. Highest: rock outcrops, rubble land, and snowfields.	Forest, meadowland, or bare rock. Recreation wildlife habitat, and, outside of designated- wilderness areas, summer livestock grazing. Important water source for lower elevation areas.
l; 4	Sagebrush steppe/ Wyoming big sagebrush, Antelope bitterbrush, basin big sagebrush, mountain big sagebrush, bluebunch wheatgrass, Idaho fescue, and needleandthread. On shallow, rocky soils: western juniper. Riparian areas: white alder, black hawthorn, ponderosa pine and juniper. Introduced Himalayan blackberry, reed canarygrass, and sweet clover.	Shrubland, grassland, irrigated cropland and pastureland, some rangeland. Principal crops grass seed, winter wheat, potatoes, alfalfa ha mint, onions, carrots for seed, and garlic.
5; 0	Mostly sagebrush steppe; also wetlands/ Sedges, mountain big sagebrush, low sagebrush, and Idaho fescue. Wetlands and wet meadows: tufted hairgrass, Baltic rush, and alien Kentucky bluegrass.	Pastureland, shrubland, grassland, and wetlan Heavily grazed by cattle and elk. Meadow ha is harvested for winter livestock feed.
erature n/max;	Potential Natural Vegetation*/ Present Vegetation *Source: Kuchler, 1964	Land Cover and Land Use
ax (°F) 5; 6	Sagebrush steppe/ Wyoming big sagebrush, basin big sagebrush, bluegrass, bluebunch wheatgrass, cheatgrass, basin wildrye, Thurber needlegrass, and rabbitbrush. Saline areas: shadscale, greasewood, and inland saltgrass.	Irrigated cropland, pastureland, shrubland. grassland, and residential and commercial development. Primary crops: wheat, sugar beets, potatoes, onions, and alfalfa.
5; 6	Mostly sagebrush steppe/ Wyoming big sagebrush, bluebunch wheatgrass, Sandberg bluegrass, Thurber needlegrass, Indian ricegrass, and cheatgrass. Saline-alkaline areas: black greasewood, shadscale, fourwing saltbush, and inland saltgrass.	Shrub- and grass-covered rangeland and wildlife habitat; some irrigated hayland and pastureland near rivers.
erature	Potential Natural Vegetation*/ Present Vegetation	Land Cover and Land Use
n/max; ax (°F) 7; 9	*Source: Kuchler, 1964 Mostly Oregon oak woods; scattered Douglas-fir forest and grasslands/ Oregon white oak, madrone, California black oak, ponderosa pine, and grasslands. Common understory plants include California fescue, snowberry, and serviceberry. In riparian areas: willow and cottonwood.	Woodland, grassland, orchards, cropland, pastureland, and rural residential, residential, and commercial development.
5; 7	Oregon oak woods and Douglas-fir forest/ Oregon white oak and California black oak woodlands, madrone, and ponderosa pine, grassland savanna. Wetter areas: Douglas-fir and incense cedar. Understory species include oceanspray, poison oak, snowberry, Idaho fescue, California brome, roughstalk bluegrass, and ceanothus.	Woodland, forest, grassland–savanna, rangeland, orchards, and some row cropland. Rural residential development and some logging.
9; 4	Douglas-fir forest and Oregon oak woods/ Oregon white oak, Douglas-fir, ponderosa pine, grand fir, madrone, tanoak, and chinkapin. Understory plants include snowberry, salal, Oregon grape, poison oak, oceanspray, and swordfern.	Woodland, forest, pastureland, vineyards, orchards, cropland, and rural residential, commercial, and residential development.
4; 2 4:	Mixed conifer forest and montane chaparral/ Jeffrey pine, tanoak, incense cedar, Douglas-fir, and chaparral composed of manzanita, ceanothus, Idaho fescue, and Lemmon needlegrass. Soils derived from serpentine support unique understory species and sparse woodland vegetation. Mixed conifer forest/ Douglas-fir, ponderosa pine, Oregon white oak, California	Sparse woodland. Recreation, logging, and mining. Historical gold, nickel, chrome, copper, and mercury mining. Forest. Logging, recreation, rural residential
4; 6); 6	black oak, madrone, serviceberry, snowberry, Oregon grape, California fescue, and poison oak. Mostly mixed conifer forest/ Tanoak, Douglas-fir, madrone, bigleaf maple,	development, and mining. Forest. Logging, recreation, rural residential
6 2; 8	California laurel, Port Orford cedar, chinkapin, salal, rhododendron, and swordfern; some western hemlock in west on udic soils. Montane chaparral and mixed conifer forest/ Higher altitudes and north-facing slopes: Douglas-fir and white fir. Lower altitudes and south-facing slopes:	development, and some mining. Forest, woodland, savanna, and chaparral. Logging, livestock grazing, and recreation.
	ponderosa pine, western juniper, and chaparral. Oregon grape, western fescue, snowberry, bluebunch wheatgrass, and ceanothus.	
erature n/max;	Potential Natural Vegetation*/ Present Vegetation *Source: Kuchler, 1964	Land Cover and Land Use
ax (°F) 8; 8	Mostly sagebrush steppe/ Wyoming big sagebrush, low sagebrush, Douglas rabbitbrush, bluebunch wheatgrass, Idaho fescue, bottlebrush squirreltail, Sandberg bluegrass, Thurber needlegrass, Indian ricegrass, and cheatgrass. In rocky areas: scattered western juniper.	Mostly shrub- and grass-covered rangeland and wildlife habitat; some pastureland and cropland. Primary crops: hay and small grain Cheatgrass has replaced depleted bunchgrass in overgrazed areas.
3; 2	Sagebrush steppe/ Mountain big sagebrush, basin big sagebrush, basin wildrye, Indian ricegrass, Sandberg bluegrass, Thurber needlegrass, bluebunch wheatgrass, and, in Millican and Fort Rock valleys, Idaho fescue.	Shrub- and grass-covered rangeland and sprinkler irrigated cropland growing alfalfa.
2; 5	Sagebrush steppe/ In wetter areas: sedges, rushes, tufted hairgrass, black greasewood, mat muhley, creeping wildrye, and bluegrass. Elsewhere: basin big sagebrush, Wyoming big sagebrush, silver sagebrush, basin wildrye, Nevada bluegrass, bluebunch wheatgrass, Thurber needlegrass, and cheatgrass.	and irrigated cropland growing alfalfa and barley. Marshes and lakes are critical habitat for nesting and migratory birds plus associate upland birds and mammals. Federal wildlife
	greasewood, mat muhley, creeping wildrye, and bluegrass. Elsewhere: basin big sagebrush, Wyoming big sagebrush, silver sagebrush, basin wildrye, Nevada	and wildlife habitat; some irrigated pasturela and irrigated cropland growing alfalfa and barley. Marshes and lakes are critical habitat for nesting and migratory birds plus associate upland birds and mammals. Federal wildlife refuges occur. Mostly brush- and grass-covered rangeland
5; 8	greasewood, mat muhley, creeping wildrye, and bluegrass. Elsewhere: basin big sagebrush, Wyoming big sagebrush, silver sagebrush, basin wildrye, Nevada bluegrass, bluebunch wheatgrass, Thurber needlegrass, and cheatgrass. Sagebrush steppe/ Wyoming big sagebrush, basin big sagebrush, Douglas rabbitbrush, bluebunch wheatgrass, Idaho fescue, bottlebrush squirreltail, Sandberg	and wildlife habitat; some irrigated pasturelat and irrigated cropland growing alfalfa and barley. Marshes and lakes are critical habitat for nesting and migratory birds plus associate upland birds and mammals. Federal wildlife refuges occur. Mostly brush- and grass-covered rangeland and wildlife habitat; some hay and small grai farming. Cheatgrass has replaced depleted
2; 6 5; 8 5; 3	greasewood, mat muhley, creeping wildrye, and bluegrass. Elsewhere: basin big sagebrush, Wyoming big sagebrush, silver sagebrush, basin wildrye, Nevada bluegrass, bluebunch wheatgrass, Thurber needlegrass, and cheatgrass. Sagebrush steppe/ Wyoming big sagebrush, basin big sagebrush, Douglas rabbitbrush, bluebunch wheatgrass, Idaho fescue, bottlebrush squirreltail, Sandberg bluegrass, and cheatgrass. Rocky areas: scattered western juniper. Sagebrush steppe/ Wyoming big sagebrush, low sagebrush, mountain big sagebrush, bluebunch wheatgrass, Sandberg bluegrass, Thurber needlegrass, bottlebrush squirreltail, and Idaho fescue. Depressions: silver sagebrush, creeping	and wildlife habitat; some irrigated pasturelat and irrigated cropland growing alfalfa and barley. Marshes and lakes are critical habitat for nesting and migratory birds plus associate upland birds and mammals. Federal wildlife refuges occur. Mostly brush- and grass-covered rangeland and wildlife habitat; some hay and small grai farming. Cheatgrass has replaced depleted bunchgrasses in overgrazed areas. Shrub- and grass-covered rangeland and wildlife habitat. Cheatgrass has replaced

Saltbush–greasewood and sagebrush steppe/ Black greasewood, inland saltgrass, shadscale, bud sagebrush, rushes, basin wildrye, bottlebrush squirreltail, and and wildlife habitat; some irrigated cropland and wildlife habitat; some irrigated cropland cheatgrass. Alluvial fans and hills: Wyoming big sagebrush, spiny hopsage, Thurber needlegrass, Indian ricegrass, Sandberg bluegrass, and bottlebrush growing alfalfa and small grains. Water versions for livestock and cropland are Desert/ Mostly unvegetated; scattered very salt-tolerant plants occur such as alkali Mostly barren and nonarable. Recreation and sacaton and black greasewood. habitat for migratory birds.

U.S. Department of Agriculture-Natural Resources Conservation Service (formerly Soil Conservation Service), Various county soil surveys of Oregon: U.S. Department of Agriculture-Natural Resources Conservation Service. U.S. Department of Agriculture-Natural Resources Conservation Service, 1994, State soil geographic (STATSGO) data base – data use information: U.S. Department of Agriculture-Natural Resources Conservation Service, Miscellaneous Publication No. 1492. U.S. Department of Agriculture–Soil Conservation Service, 1986, General soil map – State of Oregon: U.S. Department of Agriculture–Soil Conservation Service in cooperation with the Oregon Agricultural Experiment Station, Department of the Interior-Bureau of Land Management, and U.S. Department of Agriculture-Forest Service, scale 1:500,000. U.S. Department of the Interior-Geological Survey, Various topographic sheets of Oregon: U.S. Department of the Interior-U.S. Geological Survey, scale 1:250,000. Vallier, T.L., and Brooks, H.C., eds., 1987, Geology of the Blue Mountains region of Oregon, Idaho, and Washington - the Idaho Batholith and its border zone: U.S. Geological Survey Professional Paper 1436, 196 p. Verts, B.J., and Carraway, L.N., 1998, Land mammals of Oregon: Berkeley, University of California Press, 668 p. Volland, L.A., 1976, Plant communities of the central Oregon pumice zone: Portland, Oregon, U.S. Department of Agriculture–Forest Service, Pacific Northwest Region, R 6 Area Guide 4-2, 110 p. Walker, G.W., and MacLeod, N.S., 1991, Geologic map of Oregon: U.S. Department of the Interior-Geological Survey, scale 1:500,000, 2 sheets. West, N.E., 1988, Intermountain deserts, shrub steppes, and woodlands in Barbour, M.G., and Billings, W.D, eds., North American Terrestrial Vegetation: Cambridge, Cambridge University Press, p. 209-230. Wiens, J.H., 1977, Land use distributions and changes in the Willamette Valley in relation to soil characteristics: Corvallis, Oregon State University, Ph.D. dissertation, 378 p.

> FOR SALE BY U.S. GEOLOGICAL SURVEY P.O. BOX 25286, DENVER, COLORADO 80225