

APPENDIX C

Ecological Section descriptions and Table A-1 showing the percentage of ecological sections in each elk management zone (IDFG 2005a, McNab et al. 2007).

Okanogan Highland Section

This is a mountainous area in which glacial lakes, rivers, and streams are prevalent. Rivers and streams are rapid-flowing, particularly during spring runoff. The Pend Oreille River, Pend Oreille Lake, and Priest Lake are major waterbodies. Creeks are prevalent, and many flow through glacial outwash and debris material within narrow valleys; glacial lakes and wet meadows are also common. Rock strata are characterized by extreme metamorphism and deformation, and deposits of glacial till, outwash, and debris cover much of the landscape.

The climate is maritime-influenced. Precipitation occurs mostly as snow; the area receives 76–203 cm (30–80 in) of precipitation per year. Rain on snow is common at lower elevations. June and July are wet months, and the months of August through November are dry. Annual average temperature ranges from -1° C to 14° C (30°–58° F), with a mean temperature of 7° C (44° F). Warmest months are late July through August. The growing season varies with elevation, lasting 45 days at the highest elevations and up to 140 days in lower valleys. Cover types include forests of western white pine (*Pinus monticola*), western larch (*Larix occidentalis*), and Douglas-fir, as well as mountain grasslands.

Communities are mostly small and rural, but populations and development in some municipalities have been greatly increasing during recent years. Sandpoint, Bonners Ferry, and Post Falls are the largest population centers. Summer residences are common at lakes and large river systems. Forestry, livestock grazing, mining, and localized agriculture are principal land uses. Participation in outdoor recreation is rapidly increasing.

Flathead Valley Section

The Purcell and Cabinet mountains are dominant landforms. Perennial streams are common, as well as small lakes, bogs, and wetlands. The Kootenai River and Clark Fork River are major waterbodies that pass through. Soils are generally moderately deep to deep with loamy to sandy textures. Most of the soil contains volcanic ash. Annual precipitation ranges from 46 cm to >254 cm (18 to >100 in); most precipitation falls as snow; summers tend to be dry. Climate is cool-temperate with some maritime influence. Temperature averages 2–7° C (36–45° F), and the growing season ranges from 45 to 120 days. While maritime influences create relatively mild winter conditions, influxes of arctic air are frequent. Forests of hemlock (*Tsuga* spp.)-Sitka spruce (*Picea sitchensis*), larch, fir-spruce, and western white pine dominate the section.

Communities are small and sparsely distributed. Timber harvest and recreation are important land uses, and livestock grazing and farming occur in some valley areas.

Bitterroot Mountains Section

This area comprises steep, dissected mountains with sharp crests and narrow valleys. Elevation ranges from 366 m to 2,135 m (1,200–7,000 ft). Soil is shallow to moderately deep with loamy to sandy textures and usually contains volcanic ash. Perennial streams are generally fairly steep and deeply incised. Major rivers include the Coeur d'Alene, St. Maries, St. Joe, and Clearwater.

Annual precipitation averages 102–203 cm (40–80 in). Most precipitation falls as snow, and summers are relatively dry. Annual average temperature ranges from 2° C to 7° C (36–45° F). Climate is maritime-influenced, having cool and moist overall conditions with relatively mild winters and drier summers. The growing season varies with elevation and ranges from 45 to 100 days. Dominant cover types are Douglas-fir and lodgepole pine (*P. contorta*) forests, and mountain grasslands.

Communities are generally small and many are situated along major waterbodies. Coeur d'Alene is the major population center. Mining, timber harvest, and recreation are dominant land uses; livestock grazing is locally important.

Blue Mountains Section

Hells Canyon of the Snake River is a major feature on this landscape. A wide, uplifted plateau occurs in the western portion, and mountains characterize the eastern portion. In addition to the Snake River, waterbodies include the lower reaches of the Salmon River, portions of the Payette and Weiser rivers, and numerous streams, as well as several reservoirs, springs, and alpine lakes. Elevation ranges from 225 m to 3,100 m (750–9,400 ft). Most mountains are 1,200–2,300 m (4,000–7,500 ft) in elevation. Soil often contains volcanic ash. An ash mantle is relatively undisturbed on gentle north slopes under forest canopies, but on southerly exposures ash has been mostly removed by erosion.

Annual average precipitation is 23–46 cm (9–18 in) in valleys and 43 to 254 cm (17–100 in) in mountains. Annual average temperature ranges from -2° C to 11° C (28–52° F). The growing season varies considerably with elevation and lasts for 30–130 days. The varied climate and landscape supports diverse cover types: ponderosa pine (*P. ponderosa*), fir-spruce, lodgepole pine, sagebrush, and larch.

Human settlements are small and scattered, occurring primarily in valleys along rivers. Mining, timber harvest, agriculture, livestock grazing, and recreation are primary land uses.

Idaho Batholith Section

This area is characterized by extensive mountainous terrain; alpine ridges, cirques, and large U-shaped valleys with broad bottoms, and other features of glacial origins dominate many areas, such as the Sawtooth Mountains. Waterbodies are predominant, including major portions of the Salmon, Clearwater, Payette, and Boise rivers. Many perennial streams and lakes are present, as well as a number of reservoirs. Elevation ranges from 425 m to 3,400 m (1,400–11,000 ft). Soils are generally shallow to moderately deep loam and sand. Volcanic ash accumulations in some soils have caused them to be especially productive. Dominant vegetation communities include Douglas-fir and lodgepole pine forests, and sagebrush.

Annual precipitation ranges from 51 cm to 203 cm (20–80 in), much of which falls as snow during fall, winter, and spring. Climate is maritime-influenced with cool temperate weather and dry summers. Average annual temperature ranges from 2° C to 7° C (35–46° F) but may be as low as -4° C (24° F) in the high mountains. The growing season lasts 45–100 days.

The northern portion of the section is primarily wilderness, with few small communities. Communities in southern areas are typically small and concentrated along rivers. Larger towns, such as Stanley and McCall are the focus of tourism and recreation. Timber harvest and recreation are dominant land uses, with livestock grazing and mining of local importance.

Challis Volcanics Section

This section is dominated by mountain ranges, including the White Cloud Peaks, Pioneer Mountains, Smoky Mountains, Boulder Mountains, White Knob Mountains, and portions of the Salmon River Range. There are some glaciated areas. Major waterbodies include the Wood River, Big Lost River, and the Salmon River, and many perennial streams and alpine lakes exist. Elevation ranges from 1,200 m to 3,600 m (4,000–11,800 ft). Douglas-fir and lodgepole pine forest dominate higher elevations; sagebrush-steppe occurs from valley bottoms to timberline.

Climate is influenced by prevailing winds from the west and the general north-south orientation of mountain ranges. Precipitation ranges from 25 cm to 120 cm (10–45 in) annually with an average of 56 cm (22 in). The majority of precipitation occurs during fall, winter, and spring. A rain shadow effect from high mountain barriers to the west reduces precipitation in this section. Summers are dry with low humidity. Much of the precipitation that falls at lower elevations during summer months evaporates. Average annual air temperature is 3–10° C (34–50° F) but may be as low as -4° C (24° F) in the high mountains. The growing season ranges from 70 to 120 days.

Approximately one-half of the land is forested and major land uses are timber harvest, livestock grazing, and recreation. Mining for gold and silver is also an important use. The Wood River Valley, including Ketchum, Hailey, and Bellevue, is the population center. Development in this scenic valley has been rapid and extensive during recent decades.

Beaverhead Mountains Section

This area includes the highest mountain ranges in the state. Landscapes are characterized by sharp alpine ridges, cirques, and glacial valleys at higher elevations, contrasting with wide dry valleys, alluvial terraces, and flood plains at lower elevations. Intermittent streams are common, indicating the arid nature of the area. Lakes occur in glaciated areas at higher elevations. Major rivers include the Lemhi, Beaverhead, Big Lost, and Little Lost. Elevation ranges from 1,100 m to 3,860 m (3,600–12,662 ft). Mountain soils are generally shallow to moderately deep loam and sandy containing rock fragments. Valley soils are moderately deep loam and clay.

Annual precipitation ranges from 25 cm to 127 cm (10–50 in) with most precipitation falling as snow in fall, winter, and spring. Winters are cold, and growing season conditions are dry. Soil moisture is not sufficient for tree growth on some south and west aspects below timberline, and shrub-steppe communities often extend from valley floors to mountain tops. Primary forest types are lodgepole pine and Douglas-fir. Average annual temperature is 2–8° C (36–46° F). The growing season ranges from 45 to 100 days.

Communities occur primarily at lower elevations along rivers and are sparse and small. Livestock grazing is the dominant land use. Timber harvesting, mining, and recreation are also important land uses.

Palouse Prairie Section

This section is characterized by dissected loess-covered basalt plains, undulating plateaus, and river breaklands. Elevation ranges from 220 m to 1,700 m (720–5,700 ft). Soils are generally deep, loamy to silty, and have formed in loess, alluvium, or glacial outwash. Lower reaches and confluence of the Snake and Clearwater rivers are major waterbodies.

Climate is maritime influenced. Precipitation ranges from 25 cm to 76 cm (10–30 in) annually, falling primarily during fall, winter, and spring; winter precipitation is mostly snow.

Summers are relatively dry. Average annual temperature ranges from 7° C to 12° C (45–54° F). The growing season varies with elevation and lasts 100–170 days. Historically, mountain grasslands dominated, with areas of ponderosa pine. However, the landscape has been largely converted to agricultural production (primarily wheat).

Population centers include Lewiston and Moscow, and small agricultural communities are dispersed throughout.

Owyhee Uplands Section

This area is characterized by deeply dissected canyons formed through the combination of erosion and geologic uplifting. Lava formations are prevalent and are older than those of the Snake River Plain. The Owyhee Mountains are composed primarily of granite, and most of the uplands are rhyolites, ash deposits, and wind-blown loess. Elevation ranges from 1,200 m to 2,500 m (4,000–8,000 ft). The Snake, Owyhee, and Bruneau rivers are the major waterbodies and are among the few perennial waterbodies represented. Small streams are typically intermittent and arise from snow accumulation at higher elevations, but some streams are fed by springs. Few small lakes and reservoirs are present.

Precipitation ranges from 20 cm to 40 cm (7–15 in) annually. Much precipitation is lost to evaporation during summer months. Average annual temperature ranges from 2° C to 8° C (35–45° F). The growing season varies with elevation, ranging from 120 days to <60 days at higher elevations. Vegetation communities are sagebrush and pinyon (*Pinus* spp.)-juniper (*Juniperus* spp.).

Residential communities are small and sparsely distributed in the central and southern parts of the region, but the northern part of the section is the urban center of the state containing about one-half of the state's population. Livestock grazing, dryland and irrigated agriculture, and recreation are major land uses.

Snake River Basalts and Basins Section

The landscape comprises extensive plains, isolated buttes, and block-faulted mountains. The surface is a lava plateau with a thin windblown soil layer covering it. Lava flows prevalent throughout the area vary in thickness from <30 m (100 ft) to thousands of meters. Shield volcanoes, cinder cones, and lava ridges are common. Craters of the Moon National Monument is an example of the recent volcanic features. Elevation ranges from 900 m to 2,000 m (3,000–6,000 ft). The Snake River, American Falls Reservoir, Lake Walcott, and Mud Lake are major waterbodies, and few other perennial surface waterbodies are present.

Precipitation ranges from 12 cm to 30 cm (5–12 in) annually and is evenly distributed throughout fall, winter, and spring, but is low in summer. Precipitation during summer months is generally lost to evaporation. Average annual temperature ranges from 4° C to 13° C (40–58° F). The growing season ranges from 60 to 165 days, decreasing from west to east and with elevation. Enough precipitation falls in some foothills for dry farming. Desert shrub and sagebrush cover types dominate the area.

Population centers include Idaho Falls and Pocatello, and small communities are dispersed primarily along the Snake River corridor. Livestock grazing and dryland and irrigated farming are major land uses. Recreation is also important.

Northwestern Basin and Range Section

This area is characterized by north-south trending mountain ranges and volcanic plateaus interspersed with broad, nearly level basins and valleys. The elevational range is 1,200–2,200 m (4,000–7,200 ft). Large alluvial fans have developed at the mouths of most canyons, and playas and marshes occur in valleys and basins. Water is scarce except at higher elevations. Few streams are present, and groundwater is a major water source for agricultural and residential uses. Sagebrush-steppe and desert shrub are dominant cover types.

Summers are hot and dry, and winters are cold and dry. Precipitation ranges from 10 cm to 79 cm (4–20 in) annually. Precipitation is evenly distributed throughout fall, winter, and spring. Average annual temperature is 5–10° C (41–50° F). The growing season ranges from 30 to 140 days.

Residential communities are small and sparsely distributed. Livestock production is the primary land use. Mining occurs in some areas.

Overthrust Mountains Section

Landscapes are characterized by minor mountain ranges and broad valleys. Mountain ranges include the Webster, Aspen, Portneuf, Bannock, and Bear River ranges. Linear valleys and ridges are products of thrust faults. Rivers are of 2 major drainage basins, flowing either into the Snake River or into the Great Salt Lake in Utah. Important rivers include the South Fork of the Snake River, Portneuf River, and Bear River. A few lakes and wet meadows are associated with higher elevations above 1,500 m (5,000 ft). Large waterbodies include Bear Lake and Palisades Reservoir. Elevation ranges from 1,300 m to 3,000 m (4,400–9,900 ft). Sedimentary rock formations, such as limestones, siltstone, sandstones, and shales, are predominant.

Climate is influenced by prevailing winds and general north-south orientation of mountain ranges. Precipitation ranges from 40 cm to 100 cm (16–40 in) annually with most occurring during fall, winter, and spring. Precipitation occurs mostly as snow above 1,800 m (6,000 ft). The majority of precipitation falls as snow in winter. Summers are dry. Annual average temperature is 2–10° C (35–50° F). The growing season lasts 80–120 days.

Population centers are primarily along the Portneuf and Bear rivers and include Pocatello and Preston. Approximately 70% of the land is forested with fir-spruce or lodgepole pine; sagebrush dominates lower elevations and small pockets of alpine tundra occur on high mountains. Timber harvest, livestock grazing, and recreation are major land uses. Phosphate mining is an important land use in some areas.

Yellowstone Highlands Section

This area comprises the western margins of the Yellowstone Plateau. Much of this area has been glaciated and moraines are common. Perennial streams, wet meadows, and lakes are numerous and prevalent. Major waterbodies include Henrys Lake, Henrys Fork of the Snake River, and Island Park Reservoir. Elevation ranges from 1,500 m to 2,500 m (5,100–8,500 ft). Soils in basins and valleys are generally coarse and shallow to moderately deep.

Precipitation ranges from 51 cm to 114 cm (20–45 in) annually with most occurring during fall, winter, and spring. Precipitation occurs mostly as snow above 1,800 m (6,000 ft) and mostly as rain during the growing season. Climate is cold, moist continental. Temperature averages 2–8° C (35–47° F). The growing season lasts 25–120 days with a shorter growing season at higher

elevations. Dominant cover types are lodgepole pine or fir-spruce forests, sagebrush, and alpine tundra.

Communities are small and primarily scattered along the Henrys Fork. Recreation, timber harvest, and livestock grazing are dominant land uses. A small amount of forage and other crops are grown in some valleys.

Bear Lake Section

This section comprises Bear Lake, Bear Lake Valley, and dry hillsides and ridges to the east of Bear Lake. Bear Lake drains through Bear River, which is eventually a tributary of Great Salt Lake. Elevations range from 1,800 m to 2,400 m (5,900–7,800 ft).

Precipitation ranges from 40 cm to 100 cm (16–40 in) annually with most occurring during fall, winter, and spring. Precipitation occurs mostly as snow above 1,800 m (6,000 ft). Summers are dry with low humidity. Temperature averages 1–9° C (34–48° F). The growing season ranges from 50 to 180 days. Sagebrush and chaparral-mountain shrub cover types are common. Livestock grazing, agriculture, and recreation are primary land uses.

Table A-1. Ecological Sections for Idaho elk zones.

Elk zone	Ecological Sections*	Percentage of zone
Panhandle	Flathead Valley	10.1
	Okanogan Highlands	33.4
	Bitterroot Mountains	53.2
	Palouse Prairie	3.4
Palouse	Bitterroot Mountains	28.5
	Palouse Prairie	71.5
Dworshak	Bitterroot Mountains	66.7
	Palouse Prairie	33.0
	Idaho Batholith	0.3
Hells Canyon	Palouse Prairie	37.2
	Blue Mountains	62.8
Lolo	Bitterroot Mountains	61.4
	Idaho Batholith	38.6
Elk City	Palouse Prairie	8.8
	Blue Mountains	10.0
	Idaho Batholith	81.2
Selway	Idaho Batholith	100
Middle Fork	Idaho Batholith	51.8
	Challis Volcanics	48.2
Salmon	Idaho Batholith	50.7
	Challis Volcanics	20.0
	Beaverhead Mountains	29.3
Weiser River	Blue Mountains	78.5
	Owyhee Uplands	18.7
	Idaho Batholith	2.8
McCall	Blue Mountains	9.9
	Idaho Batholith	82.6
	Challis Volcanics	7.5
Lemhi	Beaverhead Mountains	98.3
	Snake River Basalts	1.7
Beaverhead	Beaverhead Mountains	89.1
	Snake River Basalts	10.9
Brownlee	Blue Mountains	92.1
	Owyhee Uplands	7.9
Sawtooth	Idaho Batholith	89.0
	Challis Volcanics	11.0
Pioneer	Challis Volcanics	77.2
	Beaverhead Mountains	19.8
	Owyhee Uplands	1.0
	Snake River Basalts	2.0

Table A-1. Continued.

Elk zone	Ecological Sections*	Percentage of zone
Owyhee-South Hills	Owyhee Uplands	74.7
	Northwestern Basin Range	17.3
	Snake River Basalts	8.0
Boise River	Idaho Batholith	83.8
	Owyhee Uplands	15.3
	Blue Mountains	0.9
Smokey Mountains	Idaho Batholith	54.3
	Challis Volcanics	33.3
	Owyhee Uplands	12.4
Bennett Hills	Owyhee Uplands	83.4
	Snake River Basalts	15.5
	Challis Volcanics	0.3
	Idaho Batholith	0.8
Big Desert	Snake River Basalts	99.5
	Challis Volcanics	0.4
	Beaverhead Mountains	0.1
Island Park	Beaverhead Mountains	18.3
	Snake River Basalts	47.0
	Yellowstone Highlands	34.7
Teton	Snake River Basalts	70.3
	Yellowstone Highlands	22.3
	Overthrust Mountains	7.4
Palisades	Snake River Basalts	36.7
	Overthrust Mountains	62.2
	Northwestern Basin Range	0.1
Tex Creek	Northwestern Basin Range	48.0
	Snake River Basalts	10.0
	Overthrust Mountains	42.0
Bannock	Northwestern Basin Range	50.5
	Snake River Basalts	12.7
	Overthrust Mountains	36.8
Bear River	Overthrust Mountains	87.7
	Northwestern Basin Range	6.3
	Bear Lake	6.0
Diamond Creek	Overthrust Mountains	79.2
	Northwestern Basin Range	3.2
	Bear Lake	17.6