

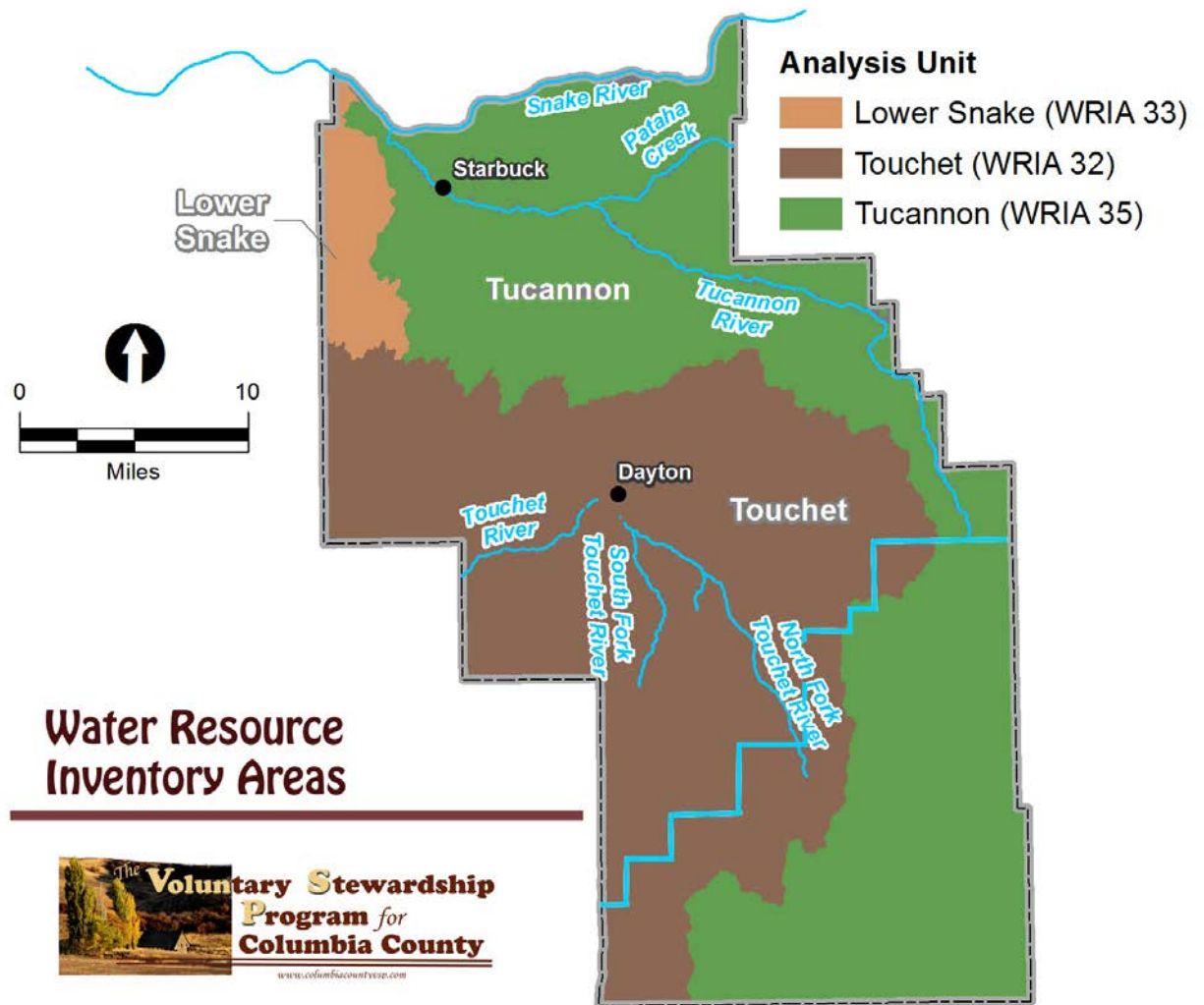
Appendix B-2: Watershed Analysis Units

Appendix B-2: Water Resource Inventory Areas

For the purposes of the Columbia County Voluntary Stewardship (VSP) Work Plan (Work Plan) three Water Resource Inventory Areas (WRIAs) were identified to develop a more localized planning approach during implementation of the Work Plan (see Figure 1). Although the Work Plan and the goals and benchmarks discussed in the Work Plan (Section 5) apply County-wide, the following WRIAs will help realize more localized watershed objectives during implementation. These WRIAs are defined by the following WRIA boundaries:

- Lower Snake (WRIA 33)
- Touchet (WRIA 32)
- Tucannon (WRIA 35)

Figure 1
Watershed Analysis Units Map



Sources

Data used for this appendix was obtained from the following sources:

| Title | Date | Author(s) |
|---|------|--|
| GIS Data | | |
| PRISM Climate Group Precipitation Data | 2012 | Oregon State University |
| USDA Agricultural Landcover | 2011 | US Dept of Agriculture |
| WSDA Agricultural Landcover | 2011 | US Dept of Agriculture |
| National Wetland Inventory Data | 2010 | US Fish & Wildlife Service |
| Streams and Rivers Data | 2015 | WA Dept of Natural Resources |
| Priority Habitat and Species Data | 2010 | WA Dept of Fish & Wildlife |
| Critical Aquifer Recharge Area | 2015 | WA Dept of Health |
| Water Erosion Potential | 2014 | Natural Resources Conservation Service |
| Wind Erosion Susceptibility | 2014 | Natural Resources Conservation Service |
| Special Flood Hazard Areas | 2010 | Federal Emergency Mgt Agency |
| Hydraulic Unit Code (HUC) 10 data | 2013 | Bureau of Land Mgt |
| Watershed Resource Inventory Area (WRIA) | 2000 | WA Dept of Ecology |
| Public Lands (Gap Analysis Program) | 2016 | US Geologic Survey |
| Public Lands (Public Lands Inventory) | 2014 | WA Recreation & Conservation Office |
| Public Lands (Non-DNR Major Public Lands) | 2016 | WA Dept of Natural Resources |

Lower Snake Water Resource Inventory Areas

The Lower Snake WRIA comprises a small portion in the northwest corner County and is bordered on the north edge by the Snake River (WRIA 33). There are 19,505 acres in this unit, 18,580 (95.3%) of which are privately-owned. Of that private land, the landcover types include 13,914 acres (71.3%) of dryland crops and 4,666 acres (23.9%) in rangeland. There is no irrigated ag land in this unit.

Profile

Precipitation in the unit ranges from 10 to 20 inches in the Lower Snake unit. Groundwater is generally located in basalt aquifers. The soils here are dominantly from the loess soil group, well-drained, medium-textured and underlain by bedrock.

Critical Areas

There are 18,273 acres of ag land intersecting with critical areas in the Lower Snake unit, which is nearly 94% of the ag land.

Fish and Wildlife Habitat Areas (FWHAs) are mapped as Priority Habitat and Species (PHS) within the Lower Snake unit. 4,345 acres of private agricultural lands include mapped PHS areas. The two primary species here are mule deer and ring-necked pheasant.

There are no wetlands within this unit. There are 74 miles of streams which includes 112 acres of frequently flooded areas. In addition, there are no critical aquifer recharge areas in this unit. A large portion of the private ag lands in this unit, 18,173 acres, have a water erosion potential. There are 2,297 acres which have a wind erosion potential.

Critical Area Functions

Critical area functions, including water quality, habitat, soil, and hydrology, are discussed below. This discussion focuses on existing functions and potential stressors on functions from agricultural activities on private lands.

Water Quality Function

- Riparian vegetation, where it occurs, includes a mix of native and introduced trees and shrub. These areas provide stream cover, which reduces temperatures and helps to filter surface and groundwater inputs.

Habitat Function

- Upland and riparian habitat: Upland and riparian habitat in agricultural areas primarily occurs in the margins between fields. These areas and the cultivated fields provide habitat opportunities for pollinators, shelter and migration corridors for terrestrial species, and forage and breeding opportunities, particularly for a variety of avian and terrestrial species. The shrub-steppe uplands are primarily used as rangeland.
- Aquatic habitat: The Snake River is the prominent feature in the Lower Snake unit, providing a variety of riparian habitats. As noted above, there are no designated wetlands in this unit. Riparian vegetation provides cover and food inputs for aquatic species.

- Wildlife and habitat: Priority species occurrences in the Lower Snake unit include ring-necked pheasant and mule deer.

Soil and Hydrology Functions

- The primary surface water movement is centered on the Snake River. All drainages lead to this significant water body.
- The soils are characterized as loess soils with moderate water erosion susceptibility.

Indirect Effects of Agriculture on Critical Area Functions

Indirect effects occur within areas that are not adjacent to or within critical areas. Within the Lower Snake unit, agricultural activities can have indirect effects on surface and groundwater quality function and quantity (hydrology function) where the community's loess soils have moderate water infiltration properties. Moderate water erosion susceptibility areas are designated across the Lower Snake unit, which can affect soil health and agricultural viability, and have been identified as a management concern for this area. Water erosion is a concern in steeper slope areas or can be exacerbated by intensive crop management practices or wildfire (NRCS 2006).

Other major resource concerns include loss of shrub-steppe habitat, nutrient contribution to receiving waters and water quality impacts, floodplain development, wetland and riparian habitat degradation, and inefficient water supply.

Critical Area Functions by Agricultural Type

The table on the next page provides a breakdown of critical areas for the Lower Snake WRIA separated into dryland, irrigated crops and rangelands.

Lower Snake Unit Critical Areas by Agricultural Type (Private)

| Streams and Riparian Areas | Dryland Crops | | Irrigated Crops | | Rangelands | |
|---------------------------------|---------------|-------------------|-----------------|-------------------|------------|-------------------|
| | Miles | % of Stream Miles | Miles | % of Stream Miles | Miles | % of Stream Miles |
| Streams Total | 39 | 53 | 0 | 0.0 | 35 | 47 |
| Riparian Areas Total | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 |
| Other Critical Area Types | Dryland Crops | | Irrigated Crops | | Rangelands | |
| | Acres | % of Dryland | Acres | % of Irrigated | Acres | % of Rangeland |
| Wetlands | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 |
| PHS (Game Species) | 1,832 | 13 | 0 | 0.0 | 2,513 | 54 |
| Birds | 1,072 | 7 | 0 | 0.00 | 440 | 9 |
| Chukar | 0 | 0.00 | 0 | 0.00 | 2 | 0.37 |
| Ring-necked Pheasant | 1,072 | 7 | 0 | 0.00 | 436 | 9 |
| Mammals | 2,847 | 20 | 0 | 0.00 | 2,076 | 44 |
| Bighorn Sheep | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 |
| Mule Deer | 761 | 5 | 0 | 0.00 | 2,076 | 44 |
| Northwest White-tailed Deer | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 |
| Rocky Mountain Elk | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 |
| Frequently Flooded Areas | 18 | 0.1 | 0 | 0.0 | 94 | 2 |
| Critical Aquifer Recharge Areas | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 |
| Water Erosion Potential | 13,744 | 98 | 0 | 0.0 | 4,429 | 94 |
| Moderate | 391 | 3 | 0 | 0.0 | 27 | 0.05 |
| Severe to Very Severe | 13,353 | 96 | 0 | 0.0 | 4,402 | 94 |
| Wind Erosion Potential (1 to 4) | 1,447 | 10 | 0 | 0.0 | 850 | 18 |

Indirect Effects of Agriculture on Critical Area Functions

Indirect effects occur within areas that are not adjacent to or within critical areas. Within the Lower Snake unit, agricultural activities can have indirect effects on surface and groundwater quality function and quantity (hydrology function) where the community's loess soils have moderate water infiltration properties. Moderate water erosion susceptibility areas are designated across the Lower Snake unit, which can affect soil health and agricultural viability, and have been identified as a management concern for this area. Water erosion is a concern in steeper slope areas or can be exacerbated by intensive crop management practices or wildfire (NRCS 2006).

Other major resource concerns include loss of shrub-steppe habitat, nutrient contribution to receiving waters and water quality impacts, floodplain development, wetland and riparian habitat degradation, and inefficient water supply.

Objectives and Key Practices

Protection/Enhancement Objectives for the Lower Snake WRIA unit:

- Protect and restore riparian, wetland, grassland, prairie, shrub-steppe, and other habitats within the Lower Snake unit
- Address soil compaction, accelerated erosion, and reduction in water infiltration and soil holding capacity from agricultural activities, particularly in moderately to severe water erosion potential areas located throughout the unit
- Encourage and implement vegetated buffer strips, and reduced-till/direct seed operations
- Discourage commercial fertilizer over-application and resulting excess nutrient contribution to receiving waters
- Manage livestock grazing and winter-feeding operations, which can result in excess sediment, and bacteria and nutrient contributions to receiving waters
- Restore and enhance natural floodplain, riparian, and wetland capacities to increase aquifer recharge, improve water quality, provide aquatic and riparian habitat, and reduce the duration and severity of flood events within the Lower Snake unit.
- Protect aquatic life and water quality in streams within the unit
- Implement water resources conservation efforts for multiple uses, including agriculture

Key Stewardship Practices for the Lower Snake WRIA unit:

- Critical area planting
- Upland and wetland wildlife habitat management
- Direct seed and/or reduced till
- Conservation cover
- Riparian herbaceous cover/filter strips
- Tree/shrub establishment
- Nutrient management
- Prescribed grazing
- Fencing
- Stream habitat improvement and management

Touchet Water Resource Inventory Area

The Touchet water resource inventory area (WRIA 32) comprises a large portion of the west and central part of the County and is bordered on the west edge by Walla Walla County. There are 256,538 acres in this unit, 196,306 (76.5%) of which are privately-owned. Of that private land, the landcover types include 121,890 acres (47.5%) of dryland crops, 600 acres (0.2%) of irrigated land and 73,509 acres (28.8%) in rangeland.

Profile

Precipitation in the unit ranges from 14 in the northern portion of the watershed unit to over 40 inches of moisture per year in the higher elevations of the southern part of the Touchet watershed unit. Groundwater is generally located in basalt aquifers. The soils in the northwestern and central parts (around Dayton) of this unit are dominantly from the loess soil group, well-drained, medium-textured and underlain by bedrock. Along the Touchet and its tributaries, the soils are well-drained, medium-textured with some gravelly and cobbly types mixed in and were formed in alluvium. The soils in the southern portion of this unit can include all of the above as well as soils formed from volcanic ash and weathered basalt.

Critical Areas

There are 181,800 acres of ag land intersecting with critical areas in the Lower Snake unit, which is nearly 71% of the ag land.

Fish and Wildlife Habitat Areas (FWHAs) are mapped as Priority Habitat and Species (PHS) within the Touchet WRIA. 166,360 acres of private agricultural lands include mapped PHS areas. The dominant species here are mule deer, white-tailed deer, Rocky Mountain elk and ring-necked pheasant.

There are 367 acres of wetlands identified within this unit. There are 1,007 miles of stream which includes 355 miles of riparian habitat. 4,451 acres are classified as frequently flooded areas. In addition, there are 6,091 acres of critical aquifer recharge areas in this unit. A large portion of the private ag lands in this unit, 179,835 acres, have a water erosion potential. There are 14,385 acres which have a wind erosion potential.

Critical Area Functions

Critical area functions, including water quality, habitat, soil, and hydrology, are discussed below. This discussion focuses on existing functions and potential stressors on functions from agricultural activities on private lands.

Water Quality Function

- Riparian vegetation, where it occurs, includes a mix of native and introduced trees and shrub. These areas provide stream cover, which reduces temperatures and helps to filter surface and groundwater inputs.

Habitat Function

- Upland and riparian habitat: Upland and riparian habitat in agricultural areas primarily occurs in the margins between fields. These areas and the cultivated fields provide habitat opportunities for pollinators, shelter and migration corridors for terrestrial species, and forage and breeding opportunities, particularly for a variety of avian and terrestrial species. The shrub-steppe uplands are primarily used as rangeland.
- Aquatic habitat: The Touchet River is the prominent feature in the Touchet unit, providing a variety of riparian habitats. As noted above, there are 367 acres of designated wetlands in this unit. Riparian vegetation provides cover and food inputs for aquatic species.
- Wildlife and habitat: Priority species occurrences in the Touchet unit include ring-necked pheasant, Rocky Mountain elk, white-tailed deer and mule deer.

Soil and Hydrology Functions

- The primary surface water movement is centered on the Touchet River. All drainages lead to this water body.
- The soils are characterized as predominately loess soils with moderate water erosion susceptibility.

Indirect Effects of Agriculture on Critical Area Functions

Indirect effects occur within areas that are not adjacent to or within critical areas. Within the Touchet unit, agricultural activities can have indirect effects on surface and groundwater quality function and quantity (hydrology function) where the community's loess soils have moderate water infiltration properties. Moderate water erosion susceptibility areas are designated across the Touchet unit, which can affect soil health and agricultural viability, and have been identified as a management concern for this area. Water erosion is a concern in steeper slope areas or can be exacerbated by intensive crop management practices or wildfire (NRCS 2006).

Other major resource concerns include loss of shrub-steppe habitat, nutrient contribution to receiving waters and water quality impacts, floodplain development, wetland and riparian habitat degradation, and inefficient water supply.

Critical Area Functions by Agricultural Type

The table on the next page provides a breakdown of critical areas for the Touchet WRIA separated into dryland, irrigated crops and rangelands.

Touchet Unit Critical Areas by Agricultural Type (Private)

| Streams and Riparian Areas | Dryland Crops | | Irrigated Crops | | Rangelands | |
|---------------------------------|---------------|-------------------|-----------------|-------------------|------------|-------------------|
| | Miles | % of Stream Miles | Miles | % of Stream Miles | Miles | % of Stream Miles |
| Streams Total | 347 | 36 | 2 | 0.0 | 616 | 64 |
| Riparian Areas Total | 3 | 0.0 | 0 | 0.0 | 345 | 99 |
| Other Critical Area Types | Dryland Crops | | Irrigated Crops | | Rangelands | |
| | Acres | % of Dryland | Acres | % of Irrigated | Acres | % of Rangeland |
| Wetlands | 49 | 0.000 | 1 | 0.000 | 298 | 0.000 |
| PHS (Game Species) | 91,452 | 75 | 601 | 100 | 71,094 | 96 |
| Birds | 3,874 | 3 | 0 | 0.00 | 608 | 0.00 |
| Chukar | 0 | 0.00 | 0 | 0.00 | 0 | 0.0 |
| Ring-necked Pheasant | 3,874 | 3 | 0 | 0.00 | 608 | 0.00 |
| Mammals | 88,226 | 72 | 600 | 100 | 70,610 | 96 |
| Bighorn Sheep | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 |
| Mule Deer | 9,514 | 8 | 0 | 0.00 | 42,205 | 57 |
| Northwest White-tailed Deer | 87,361 | 72 | 600 | 100 | 47,485 | 64 |
| Rocky Mountain Elk | 4,995 | 4 | 0 | 0.00 | 41,260 | 56 |
| Frequently Flooded Areas | 1,978 | 2 | 189 | 32 | 2,031 | 3 |
| Critical Aquifer Recharge Areas | 360 | 0.0 | 6 | 0.0 | 5,394 | 7 |
| Water Erosion Potential | 115,940 | 95 | 85 | 14 | 61,416 | 83 |
| Moderate | 10,257 | 8 | 29 | 5 | 9,464 | 13 |
| Severe to Very Severe | 105,682 | 87 | 56 | 9 | 51,952 | 70 |
| Wind Erosion Potential (1 to 4) | 604 | 0.00 | 0 | 0.0 | 13,472 | 18 |

Indirect Effects of Agriculture on Critical Area Functions

Indirect effects occur within areas that are not adjacent to or within critical areas. Within the Touchet unit, agricultural activities can have indirect effects on surface and groundwater quality function and quantity (hydrology function) where the community's loess soils have moderate water infiltration properties. Moderate water erosion susceptibility areas are designated across the Touchet unit, which can affect soil health and agricultural viability, and have been identified as a management concern for this area. Water erosion is a concern in steeper slope areas or can be exacerbated by intensive crop management practices or wildfire (NRCS 2006).

Other major resource concerns include loss of habitat, nutrient contribution to receiving waters and water quality impacts, floodplain development, wetland and riparian habitat degradation, and inefficient water supply.

Objectives and Key Practices

Protection/Enhancement Objectives for the Touchet WRIA unit:

- Protect and restore riparian, wetland, grassland, prairie, shrub-steppe, and other habitats within the Touchet unit
- Address soil compaction, accelerated erosion, and reduction in water infiltration and soil holding capacity from agricultural activities, particularly in moderately to severe water erosion potential areas located throughout the unit
- Encourage and implement vegetated buffer strips, and reduced-till/direct seed operations
- Discourage commercial fertilizer over-application and resulting excess nutrient contribution to receiving waters
- Manage livestock grazing and winter-feeding operations, which can result in excess sediment, and bacteria and nutrient contributions to receiving waters
- Restore and enhance natural floodplain, riparian, and wetland capacities to increase aquifer recharge, improve water quality, provide aquatic and riparian habitat, and reduce the duration and severity of flood events within the Touchet unit.
- Protect aquatic life and water quality in streams within the unit
- Implement water resources conservation efforts for multiple uses, including agriculture

Key Stewardship Practices for the Touchet WRIA unit:

- Critical area planting
- Upland and wetland wildlife habitat management
- Direct seed and/or reduced till
- Conservation cover
- Riparian herbaceous cover/filter strips
- Tree/shrub establishment
- Nutrient management
- Prescribed grazing
- Fencing
- Stream habitat improvement and management

Tucannon Water Resource Inventory Area

The Tucannon water resource inventory area (WRIA 35) comprises a large portion of the eastern side of the County and is bordered on the north side by the Snake River and on the east edge by Garfield County. There are 283,018 acres in this unit, 139,398 (49.3%) of which are privately-owned ag land. Of that private land, the landcover types include 65,917 acres (23.3%) of dryland crops, 1,720 acres (0.6%) of irrigated land and 71,761 acres (25.4%) in rangeland.

Profile

Precipitation in the unit ranges from 12 in the northern portion of the watershed unit to over 40 inches of moisture per year in the higher elevations of the southern part of the Tucannon watershed unit. The soils in the northeastern and eastern parts of this unit are dominantly from the loess soil group, well-drained, medium-textured and underlain by bedrock. Along the Tucannon and its tributaries, the soils are well-drained, medium-textured with some gravelly and cobbly types mixed in and were formed in alluvium. The soils in the southern portion of this unit can include all of the above as well as soils formed from volcanic ash.

Critical Areas

There are 135,069 acres of ag land intersecting with critical areas in the Tucannon unit, which is nearly 48% of the ag land.

Fish and Wildlife Habitat Areas (FWHAs) are mapped as Priority Habitat and Species (PHS) within the Tucannon watershed unit. 71,070 acres of private agricultural lands include mapped PHS areas. The dominant species here are mule deer, white-tailed deer, Rocky Mountain elk, chukar and ring-necked pheasant.

There are 405 acres of wetlands identified within this unit. There are 510 miles of stream which includes 15 miles of riparian habitat. 3,330 acres are classified as frequently flooded areas. In addition, there are 267 acres of critical aquifer recharge areas in this unit. A large portion of the private ag lands in this unit, 133,408 acres, have a water erosion potential. There are 8,630 acres which have a wind erosion potential.

Critical Area Functions by Agricultural Type

The table on the next page provides a breakdown of critical areas for the Tucannon WRIA separated into dryland, irrigated crops and rangelands.

Tucannon Unit Critical Areas by Agricultural Type (Private)

| Streams and Riparian Areas | Dryland Crops | | Irrigated Crops | | Rangelands | |
|---------------------------------|---------------|-------------------|-----------------|-------------------|------------|-------------------|
| | Miles | % of Stream Miles | Miles | % of Stream Miles | Miles | % of Stream Miles |
| Streams Total | 128 | 27 | 3 | 0.0 | 351 | 73 |
| Riparian Areas Total | 0 | 0.0 | 0 | 0.0 | 14 | 100 |
| Other Critical Area Types | Dryland Crops | | Irrigated Crops | | Rangelands | |
| | Acres | % of Dryland | Acres | % of Irrigated | Acres | % of Rangeland |
| Wetlands | 28 | 8 | 13 | 4 | 325 | 88 |
| PHS (Game Species) | 21,563 | 33 | 1,572 | 91 | 46,505 | 65 |
| Birds | 3,171 | 5 | 592 | 34 | 11,964 | 17 |
| Chukar | 2,140 | 3 | 0 | 0.00 | 10,247 | 14 |
| Ring-necked Pheasant | 1,030 | 2 | 592 | 34 | 11,964 | 17 |
| Mammals | 21,120 | 32 | 1,445 | 84 | 45,510 | 63 |
| Bighorn Sheep | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 |
| Mule Deer | 5,707 | 9 | 567 | 33 | 32,448 | 45 |
| Northwest White-tailed Deer | 17,293 | 26 | 1,445 | 84 | 29,106 | 41 |
| Rocky Mountain Elk | 60 | 0.00 | 0 | 0.00 | 388 | 1 |
| Frequently Flooded Areas | 456 | 1 | 575 | 33 | 1,982 | 3 |
| Critical Aquifer Recharge Areas | 14 | 0.0 | 0 | 0.0 | 245 | 1 |
| Water Erosion Potential | 68,814 | 98 | 549 | 32 | 66,388 | 94 |
| Moderate | 10,497 | 16 | 99 | 6 | 2,042 | 3 |
| Severe to Very Severe | 54,317 | 82 | 451 | 26 | 64,345 | 90 |
| Wind Erosion Potential (1 to 4) | 2,183 | 3 | 320 | 19 | 5,081 | 7 |

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