

# **Harney County Watershed Council Area Watershed Health Indicators**

Prepared for

**The Oregon Watershed Enhancement Board  
Salem, Oregon**

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**May, 2009**

# Harney County Watershed Council Area Watershed Health Indicators

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## INTRODUCTION

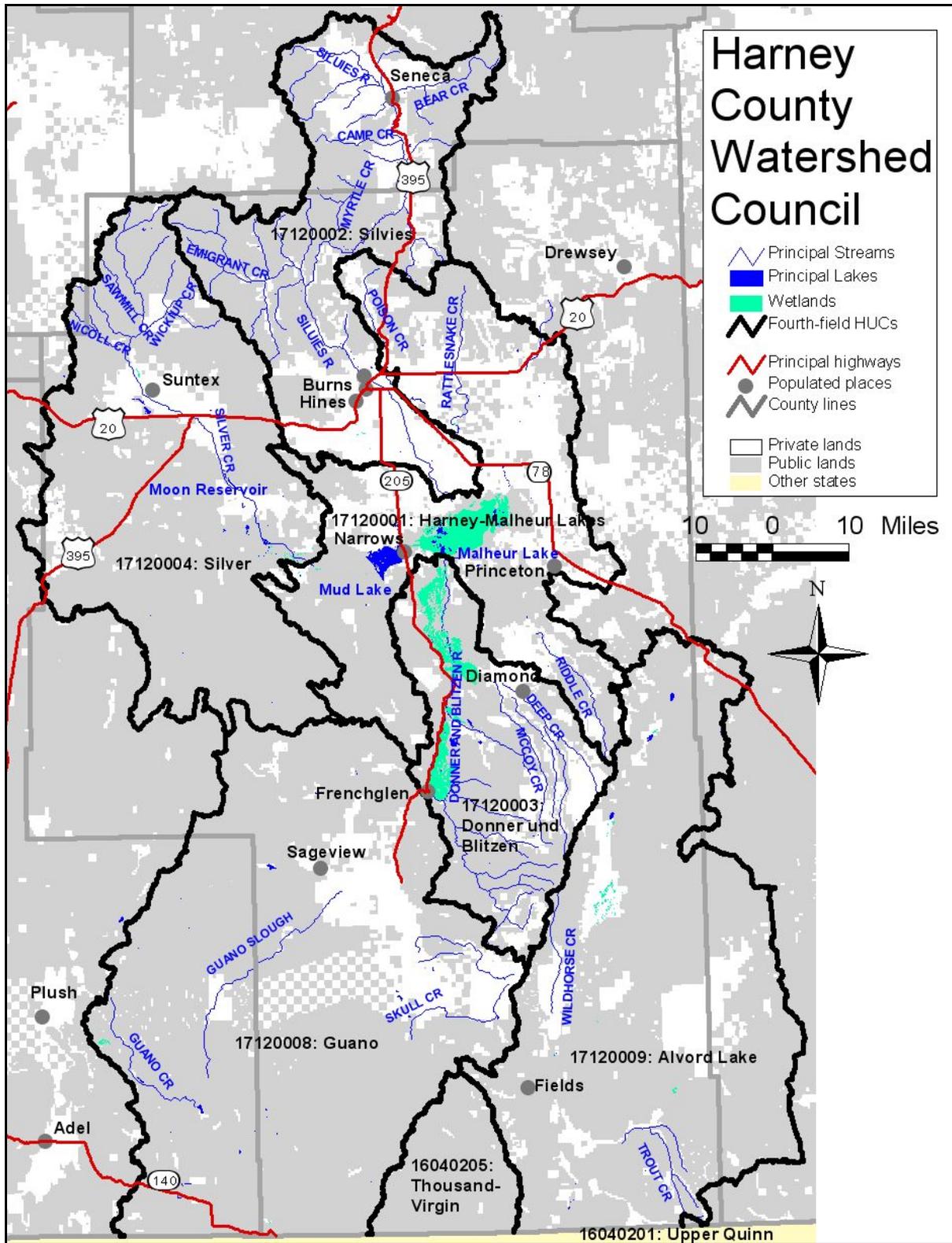
The Harney County watersheds lie primarily in the Malheur Lakes Basin section of the Northern Basin and Range Ecoregion. Part of the northern basin in the Silver and Silvies subbasins are part of the Blue Mountains ecoregion. The landscape is comprised of numerous flat basins separated by isolated mountain ranges. Several important mountains are fault blocks, with gradual slopes on one side and steep basalt rims and cliffs on the other side. Elevations range from 4,100 feet at Malheur Lake to more than 9,700 feet on Steens Mountain. In the rain shadow of the Cascades Mountains, the Northern Basin and Range is Oregon's driest ecoregion and marked by extreme ranges of daily and seasonal temperatures. The central basin receives an average of 6 inch of rain per year, with the surrounding mountains receiving an average of 15 inches per year.

The extreme southeastern corner of the state has desert-like conditions, with an annual precipitation of only 8-12 inches. Runoff from precipitation and mountain snowpack often flows into low, flat playas where it forms seasonal shallow lakes and marshes. Most of these basins contained large deep lakes during the late Pleistocene, between 40,000 and 10,000 years ago. As these lakes, which don't drain to the ocean, dried through evaporation, they left salt and mineral deposits that formed alkali flats. They are extremely important stopover sites for migratory shorebirds due to the rich source of invertebrate prey. Sagebrush communities dominate the landscape. Due to the limited availability of water, sagebrush is usually widely spaced and associated with an understory of forbs and perennial bunchgrasses such as bluebunch wheatgrass and Idaho fescue.

The Harney Watershed Council encompasses seven 4<sup>th</sup> Field HUCs as listed below and shown in Figure 1.

**Table 1. Area of subbasins and stream miles for Harney County Watershed Council.**

HUC4	Area in Oregon (mi <sup>2</sup> )	Total area (mi <sup>2</sup> )	Stream Miles (Oregon only)		
			Perennial	Intermittent/ephemeral	Total
17120001: Harney-Malheur Lakes	1,481	1,481	177	1,752	1,929
17120002: Silvies	1,271	1,271	1,214	1,797	3,011
17120003: Donner und Blitzen	790	790	489	845	1,334
17120004: Silver	1,696	1,696	299	2,711	3,010
17120008: Guano	2,568	2,965	267	3,247	3,514
17120009: Alvord Lake	1,995	2,164	610	3,419	4,029
16040205: Thousand-Virgin	270	1,158	29	584	613
16040201: Upper Quinn	3	3,536	3.3	1.3	4.7



## Purpose and Scope

The goal of this project was to summarize limiting factors<sup>1</sup> that are limiting the health of watersheds. This report fulfills the Oregon Watershed Enhancement Board's legislative mandate to establish priorities that will help guide funding decisions in line with OWEB's mission to achieve healthy watersheds and sustainable communities. A decision making process for establishing priorities will necessarily involve additional factors such as cost effectiveness, willing partners and opportunities for partnerships.

The OWEB project aimed to summarize limiting factor information at the fifth field HUC scale in a consistent manner across the state. In the closed basins, data is very limited and therefore the information was summarized at the fourth field HUC scale. This report represents a summary of the information available at this time and should be revisited and updated as additional information becomes available.

## INFORMATION SOURCES

Information on watershed conditions in these basins is contained in broad-scale evaluations or in limited site-specific studies of fish and wildlife populations, riparian conditions, and water quality. The following sources were evaluated for information in describing watershed health, however, these sources do not each contain information for every 4<sup>th</sup> field HUC in the basin.

- The Oregon Conservation Strategy (ODFW 2006) is useful in describing ecoregion scale limiting factors and current restoration strategies.
- The Oregon Native Fish Status Report (ODFW 2005) assesses the population status of native fish populations and identifies factors thought to be limiting population sustainability.
- ODFW Aquatic Habitat Inventory Data Base (ODFW 2009)
- Riparian Conditions – Proper Functioning Condition Data (BLM 2009)
- ODEQ Water Quality Limited Stream Lists: 303(d) lists (ODEQ 2009)
- OWRD Flow Restoration Priority Areas (OWRD 2003)
- Watershed Council – Watershed Assessments

The summary of watershed health indicators is organized in the following manner.

1. Limiting factors for key terrestrial and aquatic habitats are described at the ecoregion scale for the Northern Basin and Range Ecoregion.
2. Limiting factors and conservation opportunities are then stepped down to the 4<sup>th</sup> field HUC, where information is available, to include:
  - a. Recommended Conservation Actions in specific Opportunity Areas

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<sup>1</sup> Limiting factor in this context is used broadly to refer to physical factors in the environment that preclude the achievement of water quality goals, fish and wildlife habitat, or sustainable water and soil resources.

- b. Native Fish Populations: Status, limiting factors, and opportunities
  - c. Fish Habitat Assessments
  - d. Water Quality Summary
  - e. Riparian Conditions
  - f. Wetlands information
  - g. Uplands – primarily invasive species and noxious weeds
3. Issues and Opportunities identified by Watershed Councils

### ***Organization of Document***

The summary of limiting factors or watershed health indicators is organized in the following manner.

- 4. Limiting factors for key terrestrial and aquatic habitats are described at the ecoregion scale for the Northern Basin and Range Ecoregion.
- 5. Limiting factors and conservation opportunities are then stepped down to the 4<sup>th</sup> field HUC, where information is available, to include:
  - a. Recommended Conservation Actions in specific Opportunity Areas
  - b. Native Fish Populations: Status, limiting factors, and opportunities
  - c. Fish Habitat Assessments
  - d. Water Quality Summary
  - e. Riparian Conditions
  - f. Wetlands information
  - g. Uplands – primarily invasive species and noxious weeds
- 6. Issues and Opportunities identified by Watershed Councils

## **ECOREGION SCALE LIMITING FACTORS**

The Conservation Strategy (ODFW 2006) identifies characteristic habitat types in the ecoregion and identifies threats and recommended approaches to lessen the effect of these threats.

### **Northern Basin and Range Ecoregion**

Conservation strategy habitats in the Northern Basin and Range Ecoregion include: sagebrush shrublands (particularly big sagebrush habitats), aspen woodlands, riparian, wetlands, and aquatic habitats.

Invasive species and altered fire regimes are the greatest terrestrial conservation issues in this ecoregion. As a result of altered fire regime, encroachment of juniper has displaced grasses and sagebrush, especially in the northern portions of the ecoregion. However, old-growth juniper that is beneficial to wildlife, occurs in some areas, especially in rock outcrops where grasses and sagebrush are uncommon and where fire is less of a factor.

Water quality is impacted by high temperatures In the Northern Basin and Range ecoregion and in some areas by bacteria, pollutants, and aquatic weeds. Water is limited in the ecoregion, fully allocated in storage and other uses.

Aquatic habitats are affected by altered channel and flow conditions, obstructions, and poor riparian condition. Efforts to assess the quality of aquatic habitats are ongoing and obtaining an understanding of natural temperature and water quality dynamics in the ecoregion is a research priority.

### ***Watershed Health Limiting Factors***

These limiting factors for watershed health were identified at the broad scale for the Northern Basin and Range Ecoregion and are applicable to areas within the Malheur Lakes Basin (171200) (Oregon Conservation Strategy, ODFW 2006).

- Invasive Terrestrial Species (Cheatgrass/juniper/noxious weeds)
- Invasive Aquatic Species
- Altered Fire Regimes
- Ongoing recovery from historic overgrazing
- Off Highway Vehicle Use/ Unmanaged Recreation
- Water distribution – fully allocated in storage and other uses
- Water Quality – primarily high stream temperature (applicability of state standards to desert streams is identified as a research need)
- Water Quality – Some areas may be impacted by bacteria, pollutants, and aquatic weeds
- Aquatic Habitats – altered channel and flow conditions, migration barriers, and poor riparian conditions.
- Non-native animals

### **Blue Mountain Ecoregion**

The Blue Mountain Ecoregion includes the northern areas of the Silvies and Silver subbasins. Strategy Habitats in the Blue Mountains Ecoregion include: ponderosa pine woodlands, aspen woodlands, grasslands, sagebrush steppe and shrublands, wetlands, riparian, and aquatic habitats. habitats have been impacted by interrelated changes in ecological processes due to fire suppression, selective harvest practices, and unsustainable grazing. These changes have resulted in undesirable changes in vegetation that has increased vulnerability of forests to insects, disease, and uncharacteristically severe wildfire. Similarly, these changes have lead to increased

invasive species and increased vulnerability to wildfire in sagebrush shrublands and steppe. Habitat loss and potential habitat loss are greatest in lower elevation valley bottom habitats (e.g., riparian, wetlands, shrublands), where native vegetation has been converted to agricultural uses.

**Watershed Health Limiting Factors**

Watershed health limiting factors identified within the Blue Mountains Ecoregion (Oregon Conservation Strategy, ODFW 2006) include:

- Altered Fire Regimes
- Vulnerable Low Elevation Habitat Types (valley bottom grasslands, dry forests, wetlands, and shrublands are mostly on private lands)
- Development and increased growth.
- Recreational vehicle use.
- Water distribution in arid areas and wildlife entrapment in water developments.
- Fish Passage and Screening

**STREAMFLOW RESTORATION PRIORITY AREAS**

The Water Resources Department and the Department of Fish and Wildlife jointly identified priority areas for streamflow restoration in basins throughout the state with input from OWRD watermasters (OWRD 2003). These priority areas represent watersheds in which there is a combination of need and opportunity for flow restoration to support fish recovery efforts under the Oregon Plan for Salmon and Watersheds. Flow restoration needs for fish were identified by ODFW and flow restoration opportunities were identified by OWRD staff. These two rankings are combined to identify the priority areas. Restoring streamflows is based on voluntary local actions.

Flow restoration priorities for the Harney Watershed Council area are shown on the OWRD website ([file:///C:/2009/OWEB%20Southern/OWRD/mgmt\\_opsw.shtml](file:///C:/2009/OWEB%20Southern/OWRD/mgmt_opsw.shtml)). The geographic areas overlay several 5<sup>th</sup> field HUC's so the information is shown in the table below rather than in the 4<sup>th</sup>-field HUC sections.

**Table 2. Harney County Stream Flow Priority Areas.**

<b>Streamflow Priority</b>	<b>Priority</b>	<b>HUC 5</b>
<b>17120001 Harney Malheur Lakes</b>		
Poison Cr Sl > Ninemile Sl - At Mouth	Priority	1712000101: North Basin
Poison Cr Sl > Ninemile Sl - At Mouth	Priority	1712000102: Malheur Slough
<b>17120002 Silvies</b>		
Scotty Cr > Silvies R - At Mouth	Priority	1712000201: Upper Silvies River
Silvies R > W Fk Silvies R - Ab Trout Cr	Current Resources Priority	1712000201: Upper Silvies River
Bear Cr > Silvies R - At Mouth	Current Resources Priority	1712000202: Bear Creek

Silvies R > W Fk Silvies R - Ab Trout Cr	Current Resources Priority	1712000203: Trout Creek
Camp Cr > Silvies R - At Mouth	Priority	1712000203: Trout Creek
Silvies R > W Fk Silvies R - Ab Trout Cr	Current Resources Priority	1712000205: Silvies Canyon
<b>17120003 Donner and Blitzen</b>		
Donner Und Blitzen R > Malheur L - At Mouth	Current Resources Priority	1712000302: Upper Donner und Blitzen River
Donner Und Blitzen R > Malheur L - At Mouth	Current Resources Priority	1712000303: Middle Donner und Blitzen River
Cucamonga Cr > Kiger Cr - At Mouth	Current Resources Priority	1712000304: Kiger Creek
Kiger Cr > Donner Und Blitzen R - At Mouth	Priority	1712000304: Kiger Creek
Kiger Cr > Donner Und Blitzen R - Ab Cucamonga Cr	Priority	1712000304: Kiger Creek
Mccooy Cr > Kiger Cr - At Mouth	Priority	1712000304: Kiger Creek
Donner Und Blitzen R > Malheur L - At Mouth	Current Resources Priority	1712000305: Lower Donner und Blitzen River
<b>17120009 Alvord Lake</b>		
Trout Cr > Alvord Desert - At Mouth	Priority	1712000902: Alvord Lake
Big Trout Cr > Trout Cr - Ab Unn Str	Priority	1712000902: Alvord Lake
Whitehorse Cr > Alvord Desert - Ab Unn Str	Priority	1712000904: Whitehorse Creek
Willow Cr > Alvord Desert - Ab Unn Str	Priority	1712000906: Willow Creek

## Wetlands

Wetlands are an important resource in the Harney Lakes Basin. The Malheur National Wildlife Refuge protects a vast complex of wetlands in the high desert. Malheur Refuge consists of more than 187,000 acres of prime habitat, including 120,000 acres of wetlands on the Pacific Flyway (USFWS 2009).

Several data sources were evaluated for possible wetland information. The National Wetland Inventory (NWI) covers approximately a third of the basin so NWI was not useful for the evaluation. The NRCS digital soil survey and the Oregon Natural Heritage Program were also evaluated (See the Appendix), and were not considered robust enough to be useful. The Oregon Conservation Strategy (ODFW 2006) provided an indication of gain or loss of wetlands in the county as indicated in Table 2.

**Table 3. Current vs Historic Wetlands evaluated in the Oregon Conservation Strategy.**

Hydrologic Unit Code	Current Wetlands	Historic Wetlands	Loss	Gain
16040205: Thousand-Virgin	-	-	-	
17120001: Harney-Malheur Lakes	3,726	35,167	31,441	
17120002: Silvies	33,588	22,202		11,386
17120003: Donner und Blitzen	4,558	15,517	10,959	
17120004: Silver	4,657	11,923	7,266	
17120008: Guano	206	1,148	941	
17120009: Alvord Lake	182	260	77	

As indicated in the table significant wetland loss has occurred in much of the basin. In the Silvies HUC, wetlands has increased by over 11,000 acres in comparison to the reported historic acreage.

## **HARNEY MALHEUR LAKES HUC (17120001)**

### ***Conservation Opportunity Areas***

Conservation Opportunity Area features, key habitats, and recommended conservation actions from the Oregon Conservation Strategy (ODFW 2006) are listed below. Location of the Conservation Opportunity Areas are shown in Figure 2.

### **Harney-Malheur Opportunity Area (NBR-08)**

This area includes Harney Lake and Malheur Lake, extending south to include the Donner and Blitzen River floodplain, and west to Silver Lake.

#### **Special Features:**

- Area encompasses the Malheur National Wildlife Refuge.
- Includes some of most important wetland habitats in the west.
- Area receives heavy use by migrating waterfowl and other waterbirds.
- Area has a high diversity of breeding waterbirds, including the largest population of nesting sandhill cranes in Oregon.
- There is potential for significant increase in nesting waterfowl with effective carp control.

#### **Key Habitats:**

- Riparian
- Wetlands

#### **Recommended Conservation Actions:**

- Control invasive carp and restore natural flows and channels in Blitzen River
- Maintain alkaline wetland habitats
- Manage wetlands to control, and where possible, eliminate carp
- Promote early detection and suppression of invasive weeds
- Restore drainage and manage water flows to maintain or enhance wetland habitats. Use fishways, traps, and screens to limit carp migration to enhance productivity of wetlands and other aquatic habitats
- Work with private lands to conserve wetlands and waterfowl/shorebird habitat

### **Aquatic**

#### **A. Native Fish Status Report**

The information below is summarized from Volume I and Volume II of the ODFW Native Fish Status Report (ODFW 2005) with the focus on identifying limiting factors. Refer to the ODFW website for the complete report (<http://www.dfw.state.or.us/fish/ONFSR/report.asp>).

### Malheur Lakes Redband Trout Status

The Malheur Lakes Redband Trout Species Management Unit (SMU) population is considered Potentially at Risk.

#### Limiting Factors:

Movement of fish between populations is severely limited by warm water temperatures, barriers, and low flow conditions particularly in the summer.

Populations in Poison, Prater, Coffeepot, Rattlesnake, Cow and Riddle creeks are naturally isolated from other populations. These streams are not connected to other systems and dissipate onto the valley floor. An unusually long wet cycle or change in climate may be necessary to reestablish connectivity between these populations.

**Summary:** The Malheur Lakes Redband Trout SMU (3<sup>rd</sup> Field HUC scale) is comprised of ten populations in the closed interior basin of Harney and Malheur lakes. Historically, all streams were interconnected and fish could move to the lakes and among populations. Currently, populations are isolated by natural and manmade barriers. Only the Blitzen population is known to express a migratory life history. Redband trout in the SMU are widely distributed in small and medium sized streams and moderately abundant during high water years. The SMU meets five of the six interim criteria and is classified as ‘potentially at risk’. Limited data sets and inferences from other information for populations in this SMU provide a qualified level of confidence in the assessment of the interim criteria.

**Table 4. Redband Trout Population Status and Limiting Factors (ODFW 2005).**

Fifth Field HUC	Population Status	Limiting factors
1712000101: North Basin	<b>Coffeepot Creek:</b> Fails the population status criteria for Distribution and Productivity.	Limited distribution; undocumented abundance; no connection to habitats capable of producing large migratory individuals.  Populations are naturally isolated from other populations.
1712000101: North Basin	<b>Prater Creek:</b> Fails the population status criteria for Distribution, Abundance and Productivity.	Abundance and distribution not documented but assumed to be extremely limited; not connected to other populations and habitats capable of producing large migratory individuals.  Populations are naturally isolated from other populations.
1712000101: North	<b>Rattlesnake Creek:</b> Fails the	Rattlesnake Creek exhibits high density;

Basin	population status criteria for Productivity.	small to moderate distribution; resident life history; although large fish have been observed in this population the fluvial component is not considered large enough to significantly enhance productivity.  Populations are naturally isolated from other populations.
1712000106: Riddle Creek	<b>Riddle Creek</b> Fails the population status criteria for Productivity.	Moderate distribution and abundance; not connected to other populations or habitats capable of supporting a migratory life history.  Populations are naturally isolated from other populations.

## B. Fish Habitat

There are stream surveys for three streams in the ODEQ Aquatic Habitat Inventory Project (ODFW 2009) as shown in the table below. The habitat data was evaluated only for fine sediments, bank erosion, and shade. See Appendix for an explanation of how the habitat condition status was evaluated.

**Table 5. Aquatic Habitat Limiting Factors in the Harney Malheur Lakes subbasin.**

Stream	Stream Miles	Status	Limiting Factor	survey date
Coyote Creek	4.8	Limiting	sediment, shade	2001
Riddle Creek	4.2	Limiting	sediment, shade, bank erosion	2001
Smyth Creek	4.2	Limiting	shade	2001

## C. Water Quality

### Water Quality Limited Streams, 2004-2006 303(d) List (ODEQ)

The following table shows only the streams from the 303(d) list (ODEQ 2009) that are currently listed as Water Quality Limited. This includes two categories on the list, “303d” and “Category 5” which require completion of a TMDL. Other categories such as “delisted” or “TMDL not needed” are not shown in this list.

**Table 6. Water Quality Limited Streams identified by ODEQ.**

Water Body	River Miles	Parameter	Season	Criteria	Status
Coffeepot Creek	0 to 10.3	Temperature	Year Around (Non-spawning)	Redband or Lahontan cutthroat trout: 20.0 degrees C	Cat 5: Water quality limited, 303(d) list, TMDL needed

Water Body	River Miles	Parameter	Season	Criteria	Status
Coyote Creek	0 to 7.8	Temperature	Year Around (Non-spawning)	Redband or Lahontan cutthroat trout: 20.0 degrees C	Cat 5: Water quality limited, 303(d) list, TMDL needed
Mill Creek	0 to 7.1	Temperature	Summer	Rearing: 17.8 C	303(d)
Paul Creek	0 to 10.2	Temperature	Summer	Rearing: 17.8 C	303(d)
Rattlesnake Creek	0 to 15.1	Temperature	Year Around (Non-spawning)	Redband or Lahontan cutthroat trout: 20.0 degrees C	Cat 5: Water quality limited, 303(d) list, TMDL needed

### ***Riparian***

Proper Functioning Condition (PFC) assesses the physical functioning of riparian-wetland areas. PFC defines a minimum level for assessing the physical functioning of riparian-wetland areas through consideration of hydrology, vegetation, and soil/landform attributes (BLM 1998). PFC data that was available from BLM in electronic format is summarized in the table below.

**Table 7. Proper Functioning Condition Rating of Riparian Areas.**

HUC5	Miles Rated	% Proper Functioning Condition (PFC)	% Functional at Risk			% Non-functional (NF)
			upward trend (FARU)	no apparent trend (FARN)	downward trend (FARD)	
1712000101: North Basin	9.3	86%	14%	0%	0%	0%
1712000102: Malheur Slough	3.0	83%	17%	0%	0%	0%
1712000106: Riddle Creek	25.2	32%	27%	41%	0%	0%

### ***Uplands***

Information on noxious and invasive weeds was summarized from the BLM “Weeds” geodatabase. Information from the database includes the weed species, acres in the

4th field HUC, and the threat category of the species. See the Appendix for further information. The weed threat categories are:

- 1) “T” Weeds - These weeds represent an economic threat to the state of Oregon.
- 2) “A” Weeds - These are weeds of known economic importance which occur in the state in small enough infestations to make eradication/containment possible; or which are not known to occur, but their presence in neighboring states makes future occurrence in Oregon seem imminent.
- 3) “B” Weeds - These are weeds of economic importance which are regionally abundant, but which may have limited distribution in some counties.

**Table 8. Threat of noxious weeds identified by acreage.**

Common Name	Threat	Acres
Russian knapweed	B	2.15
White top (Hoary cress)	B	277.93
Musk thistle	B	
Spotted knapweed	B, T	124.59
Diffuse knapweed	B	2.43
Yellow starthistle	B, T	0.97
Canada thistle	B	302.46
Bull thistle	B	91.18
Field bindweed	B	4.56
Houndstongue	B	
Russian olive	?	
Halogeton	B	12.21
black henbane	?	
St.Johnswort (Klamath weed)	B	
Perennial pepperweed	B	266.61
Dalmatian toadflax	B,T	353.20
Yellow toadflax	B	
Scotch thistle	B	11.83
Mediterranean sage	B	
Tansy ragwort	B, T	
Medusahead rye	B	3431.57
smallflower tamarisk	?	
Puncturevine	B	
North Africa grass	?	
Total		4881.71

### ***Watershed Council Identified Issues and Recommendations***

The Harney-Malheur Lakes Subbasin Assessment (HCWC 2001) provided the following recommendations (not in a priority order).

**Issue 1.** Lowering of the water table due to an increase in the number of wells.

**Recommendation:** Need for a database for location of wells and baseline of seasonal/periodic groundwater fluctuations.

**Issue 2.** Carp Control.

**Recommendation:** Continue development and use of selective carp management.

**Issue 3.** Weed Control.

**Recommendation:** a) Education regarding existing data bases on noxious weeds. b) Recommend continuance of government assistance for both riparian and upland weed control. c) Encourage interagency and private cooperation to increase efficiency in weed control programs.

**Issue 4.** Ecological balance of native plant communities.

**Recommendation:** Continue to manage for ecological balance through the density of conifers, reduction of invasive juniper populations, prescribed burning and other management control programs.

**Issue 5.** Roads density in the Harney-Malheur Subbasin.

**Recommendation:** Create an inventory of the roads in the subbasin and assess their effect on watershed management.

**Issue 6.** Riparian conditions throughout the basin.

**Recommendation:** Protect existing aspen stands and other deciduous species. Reintroduce willows, cottonwood, and alder in areas where they have been depleted.

**Issue 7.** Water retention/stream bank stability.

**Recommendation:** Utilize the placement of large woody debris and other methods of slowing the rush of water during peak flows.

**Issue 8.** Insufficient data exist on stream flows within the basin.

**Recommendation:** Encourage the collection of data by installing and monitoring gauging stations on both public and private lands.

## **SILVIES HUC (17120002)**

### ***Conservation Opportunity Areas***

Conservation Opportunity Area features, key habitats, key species and recommended conservation actions from the Oregon Conservation Strategy (ODFW 2006) are listed below. Location of the Conservation Opportunity Areas are shown in Figure 2.

### **NBR-07. Silvies River Floodplain**

#### **Special Features:**

- Seasonal wetlands maintained by flood irrigation and managed for hay production and livestock grazing provide high quality habitats for migrating waterfowl and other waterbirds, especially in spring.
- Floodplain habitats support significant numbers of nesting sandhill cranes and other waterbirds.
- Floodplain wetland restoration work undertaken by Ducks Unlimited, Harney Soil and Water Conservation District, Natural Resources Conservation Service, and other partners is restoring more than 2,000 acres of wetland and floodplain habitats along lower Silvies River.

#### **Key Habitats:**

- Aquatic
- Riparian
- Wetlands

#### **Key Species:**

- Black-necked Stilt
- Franklin's Gull
- Sandhill Crane
- Oregon Great Basin Redband Trout

#### **Recommended Conservation Actions:**

- Initiate or continue wet meadow conservation and restoration efforts
- Maintain or enhance in-channel watershed function, connection to riparian habitat, flow and hydrology
- Maintain traditional agricultural practices that enhance habitat for migratory birds
- Manage fish passage to control carp

- Manage livestock grazing to promote recovery and maintenance of wetland and riparian habitats
- Promote delayed haying to protect nesting birds
- Restore floodplain wetlands

### **Silver Creek-Emigrant Creek (BM-08)**

This area is comprised of the Continental Zone Highlands subregion located west of the Silvies River along the southern edge of the ecoregion.

#### **Special Features:**

Area contains approximately 16% of the ecoregion's ponderosa pine habitat

#### **Key Habitats:**

- Aquatic
- Ponderosa Pine Woodlands
- Riparian
- Wetlands and Wet Meadows

#### **Key Species:**

- Columbia Spotted Frog
- Flammulated Owl
- Malheur Mottled Sculpin
- Oregon Great Basin Redband Trout

#### **Recommended Conservation Actions:**

- Initiate or continue wet meadow conservation and restoration efforts
- Restore and maintain riparian habitats
- Use fire and thinning to restore and enhance ponderosa pine forests

### **Bear Valley (BM-09)**

Located south of John Day, along the Silvies River. The area encompasses the wetlands and riparian habitat in the valley.

#### **Special Features:**

- Ecosystem management is already being employed here by some private land owners [Oregon Biodiversity Project website].
- Large wetland complex is keystone of Silvies River headwaters system, with major influence on downstream flows and water quality.

- This area provides significant percentage of the ecoregion's habitat for the upland sandpiper and bobolink.

**Key Habitats:**

Riparian  
Wetlands And Wet Meadows

**Key Species:**

Columbia Spotted Frog  
Bobolink  
Sandhill Crane  
Upland Sandpiper  
Inland Columbia Basin Redband Trout  
Malheur Mottled Sculpin  
Oregon Great Basin Redband Trout

**Recommended Conservation Actions:**

- Initiate or continue wet meadow conservation and restoration efforts
- Maintain or restore riparian habitat and ecological function; ensure sufficient habitat complexity for wildlife

**Silvies River (BM-10)**

The area includes the Silvies River from the ecoregion border to Bear Valley.

**Special Features:**

- Extensive opportunities exist in this area for redband trout recovery, primarily related to fish passage and screening. These projects would provide a comprehensive migratory component for redband trout populations.
- Area has extensive wet meadows and important riparian habitats.

**Key Habitats:**

- Aquatic
- Riparian
- Wetlands and Wet Meadows

**Key Species:**

- Oregon Great Basin Redband Trout

**Recommended Conservation Actions:**

- Maintain or enhance in-channel watershed function, connection to riparian habitat, flow and hydrology
- Maintain or restore riparian habitat and ecological function; ensure sufficient habitat complexity for wildlife

***Aquatic***

**A. Native Fish Status Report**

The information below is summarized from Volume I and Volume II of the ODFW Native Fish Status Report (ODFW 2005) with the focus on identifying limiting factors. Refer to the ODFW website for the complete report (<http://www.dfw.state.or.us/fish/ONFSR/report.asp>).

**Malheur Lakes Redband Trout Status (Silvies Population)**

The Malheur Lakes Redband Trout Species Management Unit (SMU) population is considered Potentially at Risk.

**Limiting Factors:**

Lack of connectivity to Malheur Lake, degraded mainstem habitats, and non-native species.

**Summary:** The Malheur Lakes Redband Trout SMU (3<sup>rd</sup> Field HUC scale) is comprised of ten populations in the closed interior basin of Harney and Malheur lakes. Historically, all streams were interconnected and fish could move to the lakes and among populations. The Silvies River drains into Malheur Lake from the forested Blue Mountains and contains a resident redband population. The Silvies population fails the productivity criteria due to lack of connectivity to Malheur Lake assumed due to impassable irrigation diversion.

**Table 9. Redband Trout Population Status and Limiting Factors (ODFW 2005).**

Fourth Field HUC	Population Status	Limiting factors
17120002: Silvies River	<b>Silvies River:</b> Fails the population status criteria for Productivity.	Widely distributed; moderately abundant; migratory life history not documented and connection to Malheur Lake is assumed not possible due to impassable irrigation diversions. Mainstem habitats inhospitable during summer months; presence of non-native species.

## B. Fish Habitat

There are stream surveys for four streams in the ODFW Aquatic Habitat Inventory Project (ODFW 2009) as shown in the table below. The habitat data was evaluated only for fine sediments, bank erosion, and shade. See the Appendix for an explanation of how the habitat condition status was evaluated.

**Table 10. Habitat Limiting Factors Identified by Stream Mile.**

Stream	Stream Miles	Status	Limiting Factor	survey date
Bear Creek	6.8	Moderate	shade	1990
Landing Creek	3.7	Limiting	sediment, shade, bank erosion	2002
Mountain Creek	5.3	Moderate	sediment, shade	1998
Skull Creek	5.3	Moderate	sediment, shade	2002

## C. Water Quality

### Water Quality Limited Streams, 2004-2006 303(d) List (ODEQ)

The following table shows only the streams from the 303(d) list (ODEQ 2009) that are currently listed as Water Quality Limited. This includes two categories on the list, “303d” and “Category 5” which require completion of a TMDL. Other categories such as “delisted” or “TMDL not needed” are not shown in this list.

**Table 11. Water Quality Limited Streams identified by ODEQ.**

Water Body	River Miles	Parameter	Season	Criteria	Status
Hay Creek	0 to 12.3	Temperature	Summer	Rearing: 17.8 C	303(d)
Little Bear Creek	0 to 5.8	Temperature	Year Around (Non-spawning)	Redband or Lahontan cutthroat trout: 20.0 degrees Celsius 7-day-average maximum	Cat 5: Water quality limited, 303(d) list, TMDL needed
Myrtle Creek	0 to 17.6	Temperature	Summer	Rearing: 17.8 C	303(d)
Scotty Creek	0 to 9.5	Temperature	Summer	Rearing: 17.8 C	303(d)
Silvies River	0 to 104.8	Dissolved Oxygen	Year Around (Non-spawning)	Cool water: Not less than 6.5 mg/l	Cat 5: Water quality limited, 303(d) list, TMDL needed

Water Body	River Miles	Parameter	Season	Criteria	Status
Silvies River	0 to 104.8	Temperature	Year Around (Non-spawning)	Redband or Lahontan cutthroat trout: 20.0 degrees Celsius 7-day-average maximum	Cat 5: Water quality limited, 303(d) list, TMDL needed
Skull Creek	0 to 5.9	Temperature	Summer	Rearing: 17.8 C	303(d)

### **Riparian**

Proper Functioning Condition (PFC) assesses the physical functioning of riparian-wetland areas. PFC defines a minimum level for assessing the physical functioning of riparian-wetland areas through consideration of hydrology, vegetation, and soil/landform attributes (BLM 1998). PFC data that was available from BLM in electronic format is summarized in the table below.

**Table 12. Proper Functioning Condition by Percentage of Stream Length.**

HUC5	Miles Rated	% Proper Functioning Condition (PFC)	% Functional at Risk			% Non-functional (NF)
			upward trend (FARU)	no apparent trend (FARN)	downward trend (FARD)	
1712000203: Trout Creek	6.0	87%	12%	0%	1%	0%
1712000205: Silvies Canyon	6.5	14%	14%	27%	45%	0%
1712000206: Emigrant Creek	7.2	52%	48%	0%	0%	0%
1712000208: Silvies River-West Fork Silvies River	3.6	0%	100%	0%	0%	0%

### **Uplands**

Information on noxious and invasive weeds was summarized from the BLM “Weeds” geodatabase. Information from the database includes the weed species, acres in the 4th field HUC, and the threat category of the species. See the Appendix for further information. The weed threat categories are:

- 1) “T” Weeds - These weeds represent an economic threat to the state of Oregon.

2) “A” Weeds - These are weeds of known economic importance which occur in the state in small enough infestations to make eradication/containment possible; or which are not known to occur, but their presence in neighboring states makes future occurrence in Oregon seem imminent.

3) “B” Weeds - These are weeds of economic importance which are regionally abundant, but which may have limited distribution in some counties.

**Table 13. Threat of noxious weeds identified by acreage.**

<b>Common Name</b>	<b>Threat</b>	<b>Acres</b>
Russian knapweed	B	1.56
White top (Hoary cress)	B	10.33
Musk thistle	B	
Spotted knapweed	B, T	0.16
Diffuse knapweed	B	8.46
Yellow starthistle	B, T	
Canada thistle	B	33.97
Bull thistle	B	220.89
Field bindweed	B	
Houndstongue	B	26.19
Russian olive	?	
Halogeton	B	
black henbane	?	
St.Johnswort (Klamath weed)	B	
Perennial pepperweed	B	0.00
Dalmatian toadflax	B,T	50.08
Yellow toadflax	B	
Scotch thistle	B	17.49
Mediterranean sage	B	
Tansy ragwort	B, T	0.00
Medusahead rye	B	645.76
smallflower tamarisk	?	
Puncturevine	B	
North Africa grass	?	
<b>Total</b>		<b>1014.89</b>

***Watershed Council Identified Issues and Recommendations***

The Silvies Subbasin Assessment (HCWC 2000) provided the following recommendations (not in a priority order).

**Issue 1.** Lowering of the water table due to an increase in the number of wells.

**Recommendation:** Need for a database for location of wells and baseline of seasonal/periodic groundwater fluctuations.

**Issue 2.** Carp control.

**Recommendation:** Continue development and use of selective carp management.

**Issue 3.** Weed control.

**Recommendation:** a) Education regarding existing data bases on noxious weeds. b) Recommend continuance of government assistance for both riparian and upland weed control. c) Encourage interagency and private cooperation to increase efficiency in weed control programs.

**Issue 4.** Stream bank restoration.

**Recommendation:** a) public education. b) encourage assistance programs for riparian enhancement.

**Issue 5.** Public Awareness

**Recommendation:** Provide information to general public about assessments and improvement projects.

**Issue 6.** Ecological balance of native plant communities.

**Recommendation:** Continue to manage for ecological balance through the density of conifers, reduction of invasive juniper populations, prescribed burning and other management control programs.

**Issue 7.** Roads in the Silvies Sub-basin.

**Recommendation:** Create an inventory of the roads in the subbasin and assess their effect on watershed management.

**Issue 8.** Fish Passage and Fish Screens

**Recommendation:** Provide information to private landowners on funding sources for fish passage and fish screening.

**Issue 8.** Structural integrity of existing dams along the Silvies River.

**Recommendation:** Educate public on funding for improving structural integrity of problem dams.

## **DONNER UND BLITZEN HUC (17120003)**

### ***Conservation Opportunity Areas***

Conservation Opportunity Area features, key habitats, and recommended conservation actions from the Oregon Conservation Strategy (ODFW 2006) are listed below. Location of the Conservation Opportunity Areas are shown in Figure 2.

### **Harney-Malheur Opportunity Areas (NBR-08) (Includes Donner and Blitzen)**

This area includes Harney Lake and Malheur Lake, extending south to include the Donner and Blitzen River floodplain, and west to Silver Lake.

#### **Special Features:**

- Area encompasses the Malheur National Wildlife Refuge.
- Includes some of most important wetland habitats in the west.
- Area receives heavy use by migrating waterfowl and other waterbirds.
- Area has a high diversity of breeding waterbirds, including the largest population of nesting sandhill cranes in Oregon.
- There is potential for significant increase in nesting waterfowl with effective carp control.

#### **Key Habitats:**

- Riparian
- Wetlands

#### **Key Species:**

- American White Pelican
- Black-necked Stilt
- Ferruginous Hawk
- Franklin's Gull
- Sandhill Crane
- Snowy Egret
- Swainson's Hawk
- Western Snowy Plover

#### **Recommended Conservation Actions:**

- Control invasive carp and restore natural flows and channels in Blitzen River
- Maintain alkaline wetland habitats
- Manage wetlands to control, and where possible, eliminate carp

- Promote early detection and suppression of invasive weeds
- Restore drainage and manage water flows to maintain or enhance wetland habitats. Use fishways, traps, and screens to limit carp migration to enhance productivity of wetlands and other aquatic habitats
- Work with private lands to conserve wetlands and waterfowl/shorebird habitat

### **Steens Mountain-Alvord Basin (NBR-09)**

This area is divided into several parts including the Alvord Lake Basin, the Steens Mountain Uplands, the Pueblo Mountains, and the Steens Mountain High Lava Plains.

#### **Special Features:**

- The unique habitat in this area is widely recognized as having significant biological value for plants and animals, resulting in many rare and endemic species.
- This area has exceptional diversity of high-quality habitats with high value for a wide variety of wildlife.
- Most of area receives some degree of protection under the Steens Mountain Cooperative Management and Protection Act.
- Area contains approximately 70% of the ecoregion's aspen and mountain mahogany woodlands
- This is an important area for migratory birds.

#### **Key Habitats:**

- Aquatic
- Aspen Woodland
- Big Sagebrush Shrublands
- Riparian
- Wetlands
- Key Species:
- Long-billed Curlew
- Sandhill Crane
- Alvord Cutthroat Trout
- Borax Lake Chub
- Catlow Tui Chub
- Catlow Valley Redband Trout
- Lahonton Cutthroat Trout
- Malheur Mottled Sculpin
- Sage-associated Species

#### **Recommended Conservation Actions:**

- Control spread of western juniper to maintain habitat values in sagebrush, aspen, and riparian habitats

- Initiate or continue wet meadow conservation and restoration efforts
- Maintain alkaline wetland habitats
- Manage livestock grazing to promote recovery and maintenance of riparian habitats
- Promote early detection and suppression of invasive weeds
- Restore and maintain complex, continuous sage habitat
- Restore aspen woodlands and forests

**Aquatic**

**A. Native Fish Status Report**

The information below is summarized from Volume I and Volume II of the ODFW Native Fish Status Report (ODFW 2005) with the focus on identifying limiting factors. Refer to the ODFW website for the complete report (<http://www.dfw.state.or.us/fish/ONFSR/report.asp>).

**Malheur Lakes Redband Trout Status**

The Malheur Lakes Redband Trout Species Management Unit (SMU) population is considered Potentially at Risk in the basin due to low productivity. The Blitzen River population is an exception, it meets all the minimum population criteria.

**Limiting Factors:**

The Blitzen River population is identified as passing all population criteria, however, restoring natural flows and channels has been identified as a restoration action.

**Summary:** Only the Blitzen population expresses a migratory life history and passes the criterion. Other populations are limited by distribution, a lack of connectivity to other populations, and a migratory life history, poor habitat quality, and presence of non-native species.

**B. Fish Habitat**

There are stream surveys for eight streams in the ODFW Aquatic Habitat Inventory Project (ODFW 2009) as shown in the table below. The habitat data was evaluated only for fine sediments, bank erosion, and shade. See the Appendix for an explanation of how the habitat condition status was evaluated.

**Table 14. Habitat Limiting Factors identified by Stream Mile.**

Stream	Stream Miles	Status	Limiting Factor	survey date
Ankle Creek	4.0	Limiting	sediment, shade	2002
Dingle Creek	5.5	Moderate	sediment, shade, bank erosion	2005

Kiger Creek	7.3	Adequate		2005
Mccoey Creek	6.7	Moderate	shade, bank erosion	2005
Mccoey Creek Tributary A	8.0	Adequate		2005
Mud Creek	3.3	Limiting	sediment, shade, bank erosion	2002
South Ankle Creek	3.8	Limiting	sediment, shade, bank erosion	2002
Yank Creek	3.5	Limiting	sediment, shade, bank erosion	2003

### C. Water Quality

#### Water Quality Limited Streams, 2004-2006 303(d) List (ODEQ)

The following table shows only the streams from the 303(d) list (ODEQ 2009) that are currently listed as Water Quality Limited. This includes two categories on the list, “303d” and “Category 5” which require completion of a TMDL. Other categories such as “delisted” or “TMDL not needed” are not shown in this list.

**Table 15. Water Quality Limited Streams identified by ODEQ.**

Water Body	River Miles	Parameter	Season	Criteria	Status
Ankle Creek	0 to 7.6	Temperature	Summer	Rearing: 17.8 C	303(d)
Bridge Creek	0 to 3.1	Iron	Year Around	Table 20 Toxic Substances	Cat 5: Water quality limited, 303(d) list, TMDL needed
Bridge Creek	0 to 3.1	Manganese	Year Around	Table 20 Toxic Substances	Cat 5: Water quality limited, 303(d) list, TMDL needed
Bridge Creek	0 to 15.7	Beryllium	Year Around	Table 20 Toxic Substances	Cat 5: Water quality limited, 303(d) list, TMDL needed
Bridge Creek	0 to 15.6	Temperature	Year Around (Non-spawning)	Redband or Lahontan cutthroat trout: 20.0 degrees Celsius 7-day-average maximum	Cat 5: Water quality limited, 303(d) list, TMDL needed
Bridge Creek Canal	0 to 1.5	Temperature	Year Around (Non-spawning)	Redband or Lahontan cutthroat trout: 20.0 degrees Celsius 7-day-average maximum	Cat 5: Water quality limited, 303(d) list, TMDL needed

Water Body	River Miles	Parameter	Season	Criteria	Status
Deep Creek	0 to 7.2	Temperature	Summer	Rearing: 17.8 C	303(d)
Donner and Blitzen River	0 to 77.3	Temperature	Year Around (Non-spawning)	Redband or Lahontan cutthroat trout: 20.0 degrees Celsius 7-day-average maximum	Cat 5: Water quality limited, 303(d) list, TMDL needed
Fish Creek	0 to 7.5	Temperature	Summer	Rearing: 17.8 C	303(d)
Indian Creek	0 to 4.2	Temperature	Year Around (Non-spawning)	Redband or Lahontan cutthroat trout: 20.0 degrees Celsius 7-day-average maximum	Cat 5: Water quality limited, 303(d) list, TMDL needed
Little Blitzen River	0 to 12.8	Beryllium	Year Around	Table 20 Toxic Substances	Cat 5: Water quality limited, 303(d) list, TMDL needed
Little Blitzen River	0 to 12.8	Temperature	Year Around (Non-spawning)	Redband or Lahontan cutthroat trout: 20.0 degrees Celsius 7-day-average maximum	Cat 5: Water quality limited, 303(d) list, TMDL needed
McCoy Creek	0 to 26.2	Temperature	Year Around (Non-spawning)	Redband or Lahontan cutthroat trout: 20.0 degrees Celsius 7-day-average maximum	Cat 5: Water quality limited, 303(d) list, TMDL needed
Mud Creek	0 to 4.8	Temperature	Summer	Rearing: 17.8 C	303(d)

### ***Riparian***

Proper Functioning Condition (PFC) assesses the physical functioning of riparian-wetland areas. PFC defines a minimum level for assessing the physical functioning of riparian-wetland

areas through consideration of hydrology, vegetation, and soil/landform attributes (BLM 1998). PFC data that was available from BLM in electronic format is summarized in the table below.

**Table 16. Proper Functioning Condition by Percentage of Stream Length.**

HUC5	Miles Rated	% Proper Functioning Condition (PFC)	% Functional at Risk			% Non-functional (NF)
			upward trend (FARU)	no apparent trend (FARN)	downward trend (FARD)	
1712000301: Headwaters Donner und Blitzen River	68.3	76%	24%	0%	0%	0%
1712000302: Upper Donner und Blitzen River	46.4	76%	13%	8%	0%	3%
1712000303: Middle Donner und Blitzen River	6.8	76%	0%	16%	8%	0%
1712000304: Kiger Creek	31.3	82%	8%	7%	3%	0%

***Uplands***

Information on noxious and invasive weeds was summarized from the BLM “Weeds” geodatabase. Information from the database includes the weed species, acres in the 4th field HUC, and the threat category of the species. See the Appendix for further information. The weed threat categories are:

- 1) “T” Weeds - These weeds represent an economic threat to the state of Oregon.
- 2) “A” Weeds - These are weeds of known economic importance which occur in the state in small enough infestations to make eradication/containment possible; or which are not known to occur, but their presence in neighboring states makes future occurrence in Oregon seem imminent.
- 3) “B” Weeds - These are weeds of economic importance which are regionally abundant, but which may have limited distribution in some counties.

**Table 17. Threat of Noxious Weeds Identified by Acreage.**

Common Name	Threat	Acres
Russian knapweed	B	0.003
White top (Hoary cress)	B	2.89
Musk thistle	B	
Spotted knapweed	B, T	6.13
Diffuse knapweed	B	1.95

Yellow starthistle	B, T	
Canada thistle	B	1770.03
Bull thistle	B	1125.08
Field bindweed	B	
Houndstongue	B	
Russian olive	?	
Halogeton	B	0.17
black henbane	?	
St.Johnswort (Klamath weed)	B	0.01
Perennial pepperweed	B	126.10
Dalmatian toadflax	B,T	0.10
Yellow toadflax	B	
Scotch thistle	B	68.18
Mediterranean sage	B	0.09
Tansy ragwort	B, T	0.01
Medusahead rye	B	12.84
smallflower tamarisk	?	
Puncturevine	B	0.003
North Africa grass	?	0.08
<b>Total</b>		<b>3113.65</b>

**Watershed Council Identified Potential Issues**

**(Note: These potential issues were generally not identified to specific locations.)**

1. Hydrology and water use
  - a. Excessive demand of groundwater can affect surface water.
  - b. Water rights
  - c. Water storage
  - d. Need to monitor existing wells to evaluate adequate recharge.
  - e. Need to identify ground water contamination sources.
  - f. Connectivity of groundwater sources.
  - g. Efficiency of use of water, e.g., flood irrigation vs other methods.
  - h. Impact of upslope vegetation on hydrology.
  
2. Channel Habitat
  - a. Some channels need rock or wood to improve fish habitat.
  - b. Conflicting values of different channel types.
    - i. Natural stream channels may not maximize flood irrigation.
    - ii. Channelized reaches do not provide good fish habitat.
  - c. Function/condition of existing stream channel systems.
  
3. Fish and Fish Habitat
  - a. Mitigation for temperature and sedimentation.
  - b. Placement of LWD
  - c. Fish passage at diversions, need for fish screens
  - d. Carp control

- e. Stream bank stability and riparian health
4. Wetlands
    - a. There are areas that need protection and restoration (a data gap)
    - b. Out of stream uses for irrigation and wetlands conflicts with instream flows.
  5. Riparian zones
    - a. Stream miles classified as Functional at Risk or Non-Functional need restoration.
    - b. Impact of livestock, wild horses, and wildlife on riparian areas.
    - c. Human uses in riparian areas.
  6. Water Quality
    - a. Increased water temperature (highly variable)
    - b. There is a debate as to applicability of DEQ temperature standards.
  7. Sedimentation
    - a. There are sedimentation issues, but not documented.
    - b. Impact of roads on stream sediments.
  8. Land and Resource Use
    - a. Juniper encroachment – effect on range, hydrology, and water availability
    - b. Noxious weeds effect on rangelands
    - c. Predators, varmints,

## Silver HUC (17120004)

### *Conservation Opportunity Areas*

Silver Creek-Emigrant Creek (BM-10) Conservation Opportunity Area straddles the boundary with the Silvies HUC (171200020). Please refer to that section for description of key habitats, key species and recommended conservation actions (Figure 2).

### *Aquatic*

#### **A. Native Fish Status Report**

The information below is summarized from Volume I and Volume II of the ODFW Native Fish Status Report (ODFW 2005) with the focus on identifying limiting factors. Refer to the ODFW website for the complete report (<http://www.dfw.state.or.us/fish/ONFSR/report.asp>).

#### **Malheur Lakes Redband Trout Status (Silver Population)**

The Malheur Lakes Redband Trout Species Management Unit (SMU) population is considered Potentially at Risk. The Silver Creek population fails the productivity criteria.

#### **Limiting Factors:**

Lack of connectivity to Malheur Lake, degraded mainstem habitats, and non-native species.

**Summary:** The Malheur Lakes Redband Trout SMU (3<sup>rd</sup> Field HUC scale) is comprised of ten populations in the closed interior basin of Harney and Malheur lakes. Historically, all streams were interconnected and fish could move to the lakes and among populations. The Silver Creek system originates at lower elevations on Snow Mountain and drains into the highly alkaline Harney Lake. The upland and mountain reaches are typically cold, swift streams with rocky bottoms, and the lower reaches are slow and warm in summer with sandy and muddy substrates. The Silver Creek population fails the productivity criteria.

**Table 18. Redband Trout Population Status and Limiting Factors (ODFW 2005).**

<b>Fourth Field HUC</b>	<b>Population Status</b>	<b>Limiting factors</b>
17120004: Silver	<b>Silver Creek:</b> Fails the population status criteria for Productivity.	Widely distributed; moderately abundant; migratory life history appears to be absent -movement to and from Moon Reservoir has not been documented; poor habitat conditions in portions of the basin; presence of non-native species.

## B. Fish Habitat

There are stream surveys for eight streams in the ODFW Aquatic Habitat Inventory Project (ODFW 2009) as shown in the table below. The habitat data was evaluated only for fine sediments, bank erosion, and shade. See the Appendix for an explanation of how the habitat condition status was evaluated.

**Table 19. Habitat Limiting Factors identified by Stream Mile.**

Stream	Stream Miles	Status	Limiting Factor	survey date
Claw Creek	6.0	Moderate	shade, bank erosion	1998
Dairy Creek	5.0	Moderate	sediment, shade	1998
Mineral Creek	5.0	Moderate	shade, bank erosion	1998
Nicoll Creek	7.0	Moderate	shade, bank erosion	1998
Rough Creek	6.0	Moderate	sediment, shade	1998
Sawmill Creek	5.0	Moderate	sediment, shade	1998
Silver Creek	4.0	Limiting	sediment, shade, bank erosion	1998
Wickiup Creek	5.3	Moderate	shade	1998

## C. Water Quality

### Water Quality Limited Streams, 2004-2006 303(d) List (ODEQ)

The following table shows only the streams from the 303(d) list (ODEQ 2009) that are currently listed as Water Quality Limited (303(d), Category 4 and Category 5). The streams in this subbasin are listed only as “303(d)” status, which indicates they were recently added to the database. Other categories such as “delisted” or “TMDL not needed” are not shown in the table.

**Table 20. Water Quality Limited Streams identified by ODEQ.**

Water Body	River Miles	Parameter	Season	Criteria	Status
Claw Creek	0 to 15.1	Temperature	Summer	Rearing: 17.8 C	303(d)
Egypt Creek	0 to 8.9	Temperature	Summer	Rearing: 17.8 C	303(d)
Nicoll Creek	0 to 14.1	Temperature	Summer	Rearing: 17.8 C	303(d)
Salt Canyon	0 to 1.2	Temperature	Summer	Rearing: 17.8 C	303(d)
Sawmill Creek	0 to 10.7	Temperature	Summer	Rearing: 17.8 C	303(d)
Silver Creek	8.3 to 63.6	Temperature	Summer	Rearing: 17.8 C	303(d)
Wickiup Creek	0 to 9	Temperature	Summer	Rearing: 17.8 C	303(d)

### *Riparian*

Proper Functioning Condition (PFC) assesses the physical functioning of riparian-wetland areas. PFC defines a minimum level for assessing the physical functioning of riparian-wetland

areas through consideration of hydrology, vegetation, and soil/landform attributes (BLM 1998). PFC data that was available from BLM in electronic format is summarized in the table below.

**Table 21. Proper Functioning Condition by Percentage of Stream Length.**

HUC5	Miles Rated	% Proper Functioning Condition (PFC)	% Functional at Risk			% Non-functional (NF)
			upward trend (FARU)	no apparent trend (FARN)	downward trend (FARD)	
1712000401: Headwaters Silver Creek	11.5	75%	9%	0%	0%	16%
1712000402: Claw Creek	5.9	53%	24%	11%	0%	12%
1712000403: Upper Silver Creek	1.5	36%	0%	0%	64%	0%
1712000404: Buzzard Creek	3.0	14%	0%	0%	0%	86%

### ***Uplands***

Information on noxious and invasive weeds was summarized from the BLM “Weeds” geodatabase. Information from the database includes the weed species, acres in the 4th field HUC, and the threat category of the species. See the Appendix for further information. The weed threat categories are:

- 1) “T” Weeds - These weeds represent an economic threat to the state of Oregon.
- 2) “A” Weeds - These are weeds of known economic importance which occur in the state in small enough infestations to make eradication/containment possible; or which are not known to occur, but their presence in neighboring states makes future occurrence in Oregon seem imminent.
- 3) “B” Weeds - These are weeds of economic importance which are regionally abundant, but which may have limited distribution in some counties.

**Table 22. Threat of Noxious Weeds Identified by Acreage.**

Common Name	Threat	Acres
Russian knapweed	B	94.45
White top (Hoary cress)	B	51.34
Musk thistle	B	0.26
Spotted knapweed	B, T	132.65
Diffuse knapweed	B	125.61
Yellow starthistle	B, T	
Canada thistle	B	3.43

Bull thistle	B	92.15
Field bindweed	B	
Houndstongue	B	
Russian olive	?	10.02
Halogeton	B	
black henbane	?	0.58
St.Johnswort (Klamath weed)	B	0.03
Perennial pepperweed	B	61.93
Dalmatian toadflax	B,T	17.81
Yellow toadflax	B	
Scotch thistle	B	3.39
Mediterranean sage	B	0.90
Tansy ragwort	B, T	
Medusahead rye	B	3147.06
smallflower tamarisk	?	
Puncturevine	B	
North Africa grass	?	
<b>Total</b>		<b>3741.58</b>

***Watershed Council Identified Potential Issues***

## ALVORD LAKE HUC (17120009)

### ***Conservation Opportunity Areas***

Conservation Opportunity Area features, key habitats, and recommended conservation actions from the Oregon Conservation Strategy (ODFW 2006) are listed below.

Location of the Conservation Opportunity Areas are shown in Figure 2.

### **NBR-09. Steens Mountain-Alvord Basin**

This area is divided into several parts including the Alvord Lake Basin, the Steens Mountain Uplands, the Pueblo Mountains, and the Steens Mountain High Lava Plains.

#### **Key Habitats:**

Aquatic  
Aspen Woodland  
Big Sagebrush Shrublands  
Riparian  
Wetlands

#### **Recommended Conservation Actions:**

- Control spread of western juniper to maintain habitat values in sagebrush, aspen, and riparian habitats
- Initiate or continue wet meadow conservation and restoration efforts
- Maintain alkaline wetland habitats
- Manage livestock grazing to promote recovery and maintenance of riparian habitats
- Promote early detection and suppression of invasive weeds
- Restore and maintain complex, continuous sage habitat
- Restore aspen woodlands and forests

### **NBR-11. Trout Creek Mountains**

#### **Special Features:**

- *Aspen and mountain mahogany woodlands provide important breeding habitat for many rare songbirds in Oregon including probable or confirmed nesting of the Gray-headed Junco and Virginia's warbler. [Important Bird Areas website]*
- *Area includes several Wildlife Study Areas and an Area of Critical Environmental Concern.*
- *Trout Creek and Oregon Canyon Mountains contain several rare fish species.*

#### **Key Habitats:**

- Aquatic
- Aspen Woodland
- Big Sagebrush Shrublands

- Riparian

**Recommended Conservation Actions:**

- *Manage livestock grazing to promote recovery and maintenance of wet meadow and riparian habitats*
- *Restore and maintain complex, continuous sage habitat*
- *Restore riparian zones and protect rare fish habitats*

**Aquatic**

**A. Native Fish Status Report**

The information on native fish status is summarized from Volume I and Volume II of the ODFW Native Fish Status Report (ODFW 2005) with the focus on identifying limiting factors. Refer to the ODFW website for the complete report (<http://www.dfw.state.or.us/fish/ONFSR/report.asp>).

**Alvord Cutthroat Trout Status**

The Alvord Cutthroat SMU is classified as ‘extinct’.

The Alvord Cutthroat Trout SMU is comprised of one population in Trout Creek, a tributary to ancient Lake Alvord. After the desiccation of Alvord Lake, approximately 10,000 years ago, native cutthroat trout were restricted to a few perennial streams in the Trout Creek basin, Oregon and the Virgin – Thousand Creek drainage, Nevada. Extinction of Alvord cutthroat trout rapidly followed the introduction of rainbow trout in 1929.

**Borax Lake Chub Status**

The Borax Lake Chub (*Gila boraxobius*) Species Management Unit (SMU) population is considered “at Risk”.

**Limiting Factors:**

Lack of recent monitoring efforts since 1997, a recent increase in recreational off-road vehicle use around the lake, and potential future impacts to the aquifer from geothermal groundwater withdrawal on private lands remain as threats to the Borax Lake chub and its habitat.

**Summary:**

The Borax Lake Chub SMU consists of one population that inhabits a single 4.1 hectare lake in the Alvord Desert, Harney County, Oregon. Only three of six interim risk criteria were met, thereby classifying this SMU as “at risk”. The basis for its listed status is not

population size, but the security of a very limited, unique, isolated, and vulnerable habitat. Borax Lake is a natural lake fed by geothermal springs, which is perched 10 meters above the desert floor on fragile salt deposits. Numerous recovery measures implemented since listing have improved the conservation status of Borax Lake chub and protection of its habitat.

### Coyote Lake Lahontan Cutthroat Trout Status

The Coyote Lake Lahontan cutthroat trout (*Oncorhynchus clarkii henshawi*) Species Management Unit (SMU) population is considered “at Risk” and is designated as threatened in the Endangered Species Act. The Coyote Lake SMU is comprised of five native cutthroat trout populations.

#### Limiting Factors:

Distribution is naturally fragmented, restricted by barrier falls and a discontinuous stream network.

#### Summary:

Lahontan cutthroat trout populations in the Coyote Lakes basin are remnant of a larger population inhabiting pluvial Lake Lahontan during the Pleistocene era. The Coyote Lake Lahontan Cutthroat Trout SMU is comprised of five populations – Willow Cr., Whitehorse Cr. complex, Doolittle Cr., and Antelope Cr. All populations express a resident life history strategy; however large individuals in the Willow and Whitehorse Complex populations suggest a migratory component may exist.

**Table 23. Lahontan Cutthroat Trout Population Status and Limiting Factors (ODFW 2005).**

Fourth Field HUC	Population Status	Limiting factors
1712000906: Willow Creek	<b>Willow Creek:</b> Fails the population status criteria for distribution.	Adequate distribution, but isolated from other populations; impacts to habitat in lower reaches and presence of headcut potentially impacts the intrinsic potential.
1712000904: Whitehorse Creek	<b>Whitehorse Complex:</b> Passes the six population status criteria.	Lower portions of Whitehorse and Little Whitehorse creeks are severely impacted by grazing and agricultural practices; drying in the lower portion of Little Whitehorse Creek due to drought and grazing disrupts connectivity of Little Whitehorse to the greater Whitehorse system, this periodic connection potentially reduces productivity in the Whitehorse Complex.
1712000904: Whitehorse Creek	<b>Doolittle Creek:</b> Fails the population status criteria for distribution, abundance, and productivity.	Limited distribution and abundance; during dry years and summer months distribution shrinks to just a few beaver ponds which are severely impacted by heavy grazing; not connected to habitats

		capable of supporting a migratory life history.
1712000904: Whitehorse Creek	<b>Cottonwood Creek:</b> Fails the population status criteria for distribution, abundance, and productivity.	Extremely limited distribution; low abundance; and isolated from other populations; not connected to habitats capable of supporting a migratory life history.
1712000904: Whitehorse Creek	<b>Antelope Creek:</b> Fails the population status criteria for distribution, abundance, and productivity.	Extremely restricted and isolated distribution; abundance undocumented but likely limited; not connected to habitats capable of supporting a migratory life history.

## B. Fish Habitat

There are stream surveys for eight streams in the ODFW Aquatic Habitat Inventory Project (ODFW 2009) as shown in the table below. The habitat data was evaluated only for fine sediments, bank erosion, and shade. See the Appendix for an explanation of how the habitat condition status was evaluated.

**Table 24. Habitat Limiting Factors identified by Stream Mile.**

Stream	Stream Miles	Status	Limiting Factor	survey date
Cottonwood Creek	6.5	Moderate	sediment, bank erosion	1993
Cow Camp Tributary	4.0	Limiting	sediment, shade, bank erosion	1994
Doolittle Creek	4.0	Limiting	sediment, shade, bank erosion	1993
Fifteen Mile Creek	5.7	Moderate	sediment, bank erosion	1993
Little Whitehorse Creek	5.2	Moderate	sediment, bank erosion	1992
Whitehorse Creek	6.8	Moderate	sediment, shade, bank erosion	1993
Willow Creek	5.0	Moderate	sediment, shade, bank erosion	1992
Willow Creek Trib	9.0	Adequate		1992

## C. Water Quality

### Water Quality Limited Streams, 2004-2006 303(d) List (ODEQ)

The following table shows only the streams from the 303(d) list (ODEQ 2009) that are currently listed as Water Quality Limited. This includes two categories on the list, “303d” and “Category 5” which require completion of a TMDL. Other categories such as “delisted” or “TMDL not needed” are not shown in this list.

**Table 25. Water Quality Limited Streams identified by ODEQ.**

Water Body	River Miles	Parameter	Season	Criteria	Status
Big Trout Creek	0 to 16.6	Temperature	Summer	Rearing: 17.8 C	Cat 4A: Water quality limited, TMDL approved

Denio Creek	0 to 6.1	Temperature	Summer	Rearing: 17.8 C	Cat 4A: Water quality limited, TMDL approved
Little Wildhorse Creek	0 to 2.5	Temperature	Summer	Rearing: 17.8 C	Cat 4A: Water quality limited, TMDL approved
Van Horn Creek	0 to 8.2	Temperature	Summer	Rearing: 17.8 C	Cat 4A: Water quality limited, TMDL approved
Willow Creek	0 to 33.6	Dissolved Oxygen	Year Around (Non-spawning)	Cool water: Not less than 6.5 mg/l	Cat 4A: Water quality limited, TMDL approved
Willow Creek	0 to 33.5	Temperature	Summer	Rearing: 17.8 C	Cat 4A: Water quality limited, TMDL approved
Willow Creek	0 to 5.3	Temperature	Summer	Rearing: 17.8 C	Cat 4A: Water quality limited, TMDL approved

### **Riparian**

Proper Functioning Condition (PFC) assesses the physical functioning of riparian-wetland areas. PFC defines a minimum level for assessing the physical functioning of riparian-wetland areas through consideration of hydrology, vegetation, and soil/landform attributes (BLM 1998). PFC data that was available from BLM in electronic format is summarized in the table below.

**Table 26. Proper Functioning Condition by Percentage of Stream Length.**

HUC5	Miles Rated	% Proper Functioning Condition (PFC)	% Functional at Risk			% Non-functional (NF)
			upward trend (FARU)	no apparent trend (FARN)	downward trend (FARD)	
1712000901: Cottonwood Creek	38.3	81%	15%	3%	0%	2%
1712000902: Alvord Lake	102.1	74%	14%	5%	1%	5%
1712000903: Big Alvord Creek	35.2	99%	0%	1%	0%	0%
1712000904: Whitehorse Creek	80.0	86%	9%	4%	1%	1%
1712000906: Willow Creek	31.4	93%	0%	0%	3%	4%
1712000907: Summit Creek	15.9	90%	6%	4%	0%	0%

## **Uplands**

Information on noxious and invasive weeds was summarized from the BLM “Weeds” geodatabase. Information from the database includes the weed species, acres in the 4th field HUC, and the threat category of the species. See the Appendix for further information. The weed threat categories are:

- 1) “T” Weeds - These weeds represent an economic threat to the state of Oregon.
- 2) “A” Weeds - These are weeds of known economic importance which occur in the state in small enough infestations to make eradication/containment possible; or which are not known to occur, but their presence in neighboring states makes future occurrence in Oregon seem imminent.
- 3) “B” Weeds - These are weeds of economic importance which are regionally abundant, but which may have limited distribution in some counties.

**Table 27. Threat of Noxious Weeds Identified by Acreage.**

<b>Common Name</b>	<b>Threat</b>	<b>Acres</b>
Russian knapweed	B	173.44
White top (Hoary cress)	B	22.95
Musk thistle	B	
Spotted knapweed	B, T	8.42
Diffuse knapweed	B	5.87
Yellow starthistle	B, T	6.86
Canada thistle	B	48.13
Bull thistle	B	310.70
Field bindweed	B	0.30
Houndstongue	B	
Russian olive	?	0.18
Halogeton	B	30.59
black henbane	?	
St.Johnswort (Klamath weed)	B	0.01
Perennial pepperweed	B	503.79
Dalmatian toadflax	B,T	0.002
Yellow toadflax	B	
Scotch thistle	B	490.35
Mediterranean sage	B	2.26
Tansy ragwort	B, T	
Medusahead rye	B	1178.88
smallflower tamarisk	?	0.01
Puncturevine	B	7.76
North Africa grass	?	
<b>Total</b>		<b>2790.48</b>

## **Watershed Council Identified Issues and Recommendations**

The Alvord Lake Subbasin Assessment (HCWC 2006) identified Cheatgrass, Noxious Weeds and Western Juniper expansion as the three largest threats to watershed health.

Identified issues and actions include:

1. Streams/Riparian Zones: Stream miles classified as Functional at Risk, Non-Functioning or having a downward trend should be improved.
2. Water Quality: Watershed enhancement projects in the riparian zone should establish a goal of developing healthy riparian plant communities.
3. Cheatgrass: Control Cheatgrass to maintain it at current or less cover amounts.
4. Noxious Weeds: Control noxious weeds to maintain it at current or less cover amounts.
5. Sediment: Maintain road crossings and roads adjacent to streams in a condition that minimizes sediment entering the stream channel.

## **GUANO HUC (17120008)**

Harney County WC is currently completing a watershed assessment for this basin (estimated date: 2009). When that is complete this summary should be updated.

### ***Conservation Opportunity Areas***

Conservation Opportunity Area (COA) features, key habitats, and recommended conservation actions from the Oregon Conservation Strategy (ODFW 2006) are listed below. The description for the Steens Mountain-Alvord Basin COA (NBR-09) which includes part of the Guano subbasin is described under the Donner and Blitzen HUC (17120003). Location of the Conservation Opportunity Areas are shown in Figure 2.

### **Hart Mountain Area (NBR-05)**

This area encompasses the Hart Mountain National Wildlife Refuge. It extends north to include the Orejana Canyon Wilderness Study Area and south just past the Guano Creek Wilderness Study Area.

### **Key Habitats:**

- Aquatic
- Aspen Woodland
- Big Sagebrush Shrublands
- Riparian
- Wetlands

### **Key Species:**

- Ferruginous Hawk
- Sage Grouse
- Swainson's Hawk
- Catlow Tui Chub
- Catlow Valley Redband Trout
- Sheldon Tui Chub
- Pronghorn Antelope
- Pygmy Rabbit

### **Recommended Conservation Actions:**

- Initiate or continue wet meadow conservation and restoration efforts
- Maintain alkaline wetland habitats
- Maintain and restore aspen habitats
- Maintain and restore sagebrush-steppe habitats

- Promote early detection and suppression of invasive weeds
- Restore and maintain complex, continuous sage habitat

**NBR-06. Basque Hills-Hawk Mountain area plains**

This area encompasses most of Basque Hills and Rincon Wilderness Study Areas, and parts of two others (Spalding, Hawk Mountain), focusing on the greatest concentrations of sagebrush habitat.

**Key Habitats:**

- Aspen Woodland
- Big Sagebrush Shrublands
- Wetlands

**Recommended Conservation Actions:**

- Control invasive weeds in unique high-quality grasslands
- Initiate or continue wet meadow conservation and restoration efforts
- Restore and maintain complex, continuous sage habitat

**Aquatic**

**A. Native Fish Status Report**

The information below is summarized from Volume I and Volume II of the ODFW Native Fish Status Report (ODFW 2005) with the focus on identifying limiting factors. Refer to the ODFW website for the complete report (<http://www.dfw.state.or.us/fish/ONFSR/report.asp>).

**Catlow Valley Redband Trout Status**

The Catlow Valley Redband Trout (*Oncorhynchus mykiss newberrii*) Species Management Unit (SMU) population including the Guano basin population is considered “at Risk”.

**Limiting Factors:**

Lack of connectivity between populations and degraded habitat are the primary limiting factors.

**Summary:**

The Catlow Valley Redband Trout SMU is comprised of five populations. Three resident populations occur in Home, Threemile, and Skull creeks, located on the east side of the valley. These populations drain the Catlow Rim on the west side of South Steens Mountain. Two populations exist on Hart Mountain on the west side of Catlow Valley in Rock and Guano creeks. Rock Creek flows north into the valley and supports a resident/migratory life history. Guano Creek flows south off Hart Mountain and

eventually north through Catlow Slough to Catlow Valley. All streams historically flowed into pluvial Lake Catlow before it dried 10,000 years ago. The Native Fish Status Report (ODFW 2005) identifies Guano as an existing redband trout population, however, some controversy exists over whether redband trout are native to the system.

**Table 28. Redband Trout Population Status and Limiting Factors (ODFW 2005).**

Fifth Field HUC	Population Status	Limiting factors
1712000803: Guano Creek 1712000804: Upper Guano Slough 1712000806: Upper Guano Slough	<b>Guano Creek:</b> The redband population fails 4 out of 6 population criteria. However, the identification of this population is in question.	Distribution and abundance is not documented, but likely extremely limited; no evidence of natural production of redband trout.
1712000805: Rock Creek	<b>Rock Creek:</b> The redband population passes all population status criteria.	Distribution and abundance high; surveys show recolonization of habitat during high water years with large fish at high density. Land management changes on Hart Mountain Antelope Refuge has improved habitat conditions.
1712000809: Home Creek	<b>Home Creek:</b> The fish population fails the Productivity population status criteria.	Distribution adequate; abundance moderate; not connected to habitat capable of supporting a migratory life history; portions of habitat highly degraded. Actions to improve habitat quality are being implemented but fish and habitat response has not been documented.
Threemile Creek (1712000809: Home Creek HUC)	<b>Threemile Creek:</b> The fish population fails the Distribution and Productivity population status criteria.	Extremely limited distribution and abundance; lacks a migratory life history; portions of habitat highly degraded. Actions to improve habitat quality are being implemented including reconnecting the stream to Threemile Reservoir but fish and habitat response has not been documented.
1712000810: Skull Creek	<b>Skull Creek:</b> The fish population fails the Productivity population status criteria.	Extremely limited distribution and low abundance; a migratory life history has not been documented; data suggests productivity may be episodic, resulting in a discontinuous age class structure; numerous habitat improvement projects completed under the USFWS Conservation Agreement including passage at Skull Creek Reservoir – fish and habitat response to these projects has not been documented.

**B. Fish Habitat**

There are stream surveys for eight streams in the ODFW Aquatic Habitat Inventory Project (ODFW 2009) as shown in the table below. The habitat data was evaluated only for fine sediments, bank erosion, and shade. See the Appendix for an explanation of how the habitat condition status was evaluated.

**Table 29. Habitat Limiting Factors identified by Stream Mile.**

Stream	Stream Miles	Status	Limiting Factor	survey date
Guano Creek	5.0	Moderate	sediment, shade	1992
Home Creek	4.2	Limiting	sediment, shade, bank erosion	1994
Home Creek - Trib A	3.7	Limiting	sediment, shade, bank erosion	1995
Home Creek (Trib)	4.0	Limiting	sediment, shade, bank erosion	1995
Rock Creek	6.1	Moderate	shade, bank erosion	1991
Skull Creek	3.9	Limiting	sediment, shade, bank erosion	1995
Stockade Creek	7.0	Moderate	sediment	1992
Three Mile Creek	6.0	Moderate	shade, bank erosion	1994-1995

### C. Water Quality

#### Water Quality Limited Streams, 2004-2006 303(d) List (ODEQ)

The following table shows only the streams from the 303(d) list (ODEQ 2009) that are currently listed as Water Quality Limited. This includes two categories on the list, “303d” and “Category 5” which require completion of a TMDL. Other categories such as “delisted” or “TMDL not needed” are not shown in this list.

**Table 30. Water Quality Limited Streams identified by ODEQ.**

Water Body	River Miles	Parameter	Season	Criteria	Status
Home Creek	0 to 21.3	Temperature	Year Around (Non-spawning)	Redband or Lahontan cutthroat trout: 20.0 degrees Celsius 7-day-average maximum	Cat 5: Water quality limited, 303(d) list, TMDL needed
Rock Creek	0 to 52.5	Temperature	Year Around (Non-spawning)	Redband or Lahontan cutthroat trout: 20.0 degrees Celsius 7-day-average maximum	Cat 5: Water quality limited, 303(d) list, TMDL needed
Skull Creek	0 to 13.3	Temperature	Summer	Rearing: 17.8 C	303(d)

## Riparian

Proper Functioning Condition (PFC) assesses the physical functioning of riparian-wetland areas. PFC defines a minimum level for assessing the physical functioning of riparian-wetland areas through consideration of hydrology, vegetation, and soil/landform attributes (BLM 1998). PFC data that was available from BLM in electronic format is summarized in the table below.

**Table 31. Proper Functioning Condition by Percentage of Stream Length.**

HUC5	Miles Rated	% Proper Functioning Condition (PFC)	% Functional at Risk			% Non-functional (NF)
			upward trend (FARU)	no apparent trend (FARN)	downward trend (FARD)	
1712000805: Rock Creek	4.4	4%	0%	42%	0%	53%
1712000809: Home Creek	14.3	42%	58%	0%	0%	0%
1712000810: Skull Creek	3.0	28%	72%	0%	0%	0%
1712000805: Rock Creek	4.4	4%	0%	42%	0%	53%

## Uplands

Information on noxious and invasive weeds was summarized from the BLM “Weeds” geodatabase. Information from the database includes the weed species, acres in the 4th field HUC, and the threat category of the species. See the Appendix for further information. The weed threat categories are:

- 1) “T” Weeds - These weeds represent an economic threat to the state of Oregon.
- 2) “A” Weeds - These are weeds of known economic importance which occur in the state in small enough infestations to make eradication/containment possible; or which are not known to occur, but their presence in neighboring states makes future occurrence in Oregon seem imminent.
- 3) “B” Weeds - These are weeds of economic importance which are regionally abundant, but which may have limited distribution in some counties.

**Table 32. Threat of Noxious Weeds Identified by Acreage.**

Common Name	Threat	Acres
Russian knapweed	B	0.09
White top (Hoary cress)	B	5.50
Musk thistle	B	
Spotted knapweed	B, T	4.44
Diffuse knapweed	B	0.80

Yellow starthistle	B, T	0.01
Canada thistle	B	7.36
Bull thistle	B	51.11
Field bindweed	B	1.74
Houndstongue	B	
Russian olive	?	
Halogeton	B	4.79
black henbane	?	
St.Johnswort (Klamath weed)	B	0.004
Perennial pepperweed	B	0.13
Dalmatian toadflax	B,T	0.09
Yellow toadflax	B	
Scotch thistle	B	234.52
Mediterranean sage	B	167.49
Tansy ragwort	B, T	
Medusahead rye	B	
smallflower tamarisk	?	
Puncturevine	B	
North Africa grass	?	
<b>Total</b>		<b>478.06</b>

***Watershed Council Identified Issues and Recommendations***

Harney County WC is currently completing a watershed assessment for this basin (estimated date: 2009). When that is complete this summary can be updated.

## **THOUSAND VIRGIN HUC (16040205)**

Harney County WC is currently completing a watershed assessment for this basin (estimated date: 2009). When that is complete this summary should be updated.

### ***Conservation Opportunity Areas***

The Basque Hills-Hawk Mountain Area Plains (NBR-06) Conservation Opportunity Area (ODFW 2006) straddles the Guano and Thousand Virgin HUCs (Figure 2). The key habitats, key species and recommended conservation actions for this area are described in the Guano HUC section.

### ***Aquatic***

#### **A. Native Fish Status Report**

No native species populations are identified for this area in the Native Fish Status Report (ODFW 2005).

#### **B. Fish Habitat**

#### **C. Water Quality**

The following table shows only the streams from the 303(d) list (ODEQ 2009) that are currently listed as Water Quality Limited. This includes two categories on the list, "303d" and "Category 5" which require completion of a TMDL. Other categories such as "delisted" or "TMDL not needed" are not shown in this list.

### ***Uplands***

Information on noxious and invasive weeds was summarized from the BLM "Weeds" geodatabase. Information from the database includes the weed species, acres in the 4th field HUC, and the threat category of the species. See the Appendix for further information. The weed threat categories are:

- 1) "T" Weeds - These weeds represent an economic threat to the state of Oregon.
- 2) "A" Weeds - These are weeds of known economic importance which occur in the state in small enough infestations to make eradication/containment possible; or which are not known to occur, but their presence in neighboring states makes future occurrence in Oregon seem imminent.
- 3) "B" Weeds - These are weeds of economic importance which are regionally abundant, but which may have limited distribution in some counties.

<b>Common Name</b>	<b>Threat</b>	<b>Acres</b>
Russian knapweed	B	
White top (Hoary cress)	B	0.50
Musk thistle	B	
Spotted knapweed	B, T	
Diffuse knapweed	B	
Yellow starthistle	B, T	
Canada thistle	B	0.004
Bull thistle	B	123.39
Field bindweed	B	
Houndstongue	B	
Russian olive	?	
Halogeton	B	
black henbane	?	
St.Johnswort (Klamath weed)	B	
Perennial pepperweed	B	
Dalmatian toadflax	B,T	
Yellow toadflax	B	
Scotch thistle	B	2.65
Mediterranean sage	B	
Tansy ragwort	B, T	
Medusahead rye	B	
smallflower tamarisk	?	
Puncturevine	B	
North Africa grass	?	
<b>Total</b>		<b>126.54</b>

***Watershed Council Identified Issues and Recommendations***

To be identified from the watershed assessment that is underway. Completion expected by the end of 2009.

## **UPPER QUINN HUC (16040201)**

There is limited information on this basin.

### ***Conservation Opportunity Areas***

No Conservation Opportunity Areas were identified for this area in the Oregon Conservation Strategy (ODFW 2006).

### ***Aquatic***

#### **A. Native Fish Status Report**

Information on population status and limiting factors is summarized from the Oregon Native Fish Status Report (ODFW 2005).

#### **Quinn River Lahontan Cutthroat Trout Status (Sage Creek)**

The Quinn River Lahontan cutthroat trout (*Oncorhynchus clarkii henshawi*) Species Management Unit (SMU) population is considered “at Risk” and is designated as threatened in the Endangered Species Act.

#### **Limiting Factors:**

The remaining population of Lahontan cutthroat trout occurs in Sage Creek and is limited by restricted distribution and abundance, poor quality habitat and lack of a migratory life history.

#### **Summary:**

Lahontan cutthroat trout populations in the Quinn River basin are remnant of a larger population inhabiting pluvial Lake Lahontan during the Pleistocene era. The Quinn River Lahontan Cutthroat Trout SMU is comprised of four populations, three of which are now considered extinct due to hybridization with non-native rainbow trout. Sage Creek is the only population to persist in the SMU, has an extremely limited distribution and abundance, and is vulnerable to hybridization. The population is located above a barrier designed to slow the invasion of rainbow and hybrid trout.

#### **B. Fish Habitat**

#### **C. Water Quality**

#### **Water Quality Limited Streams, 2004-2006 303(d) List (ODEQ)**

The following table shows only the streams from the 303(d) list (ODEQ 2009) that are currently listed as Water Quality Limited. This includes two categories on the list, “303d” and “Category 5” which require completion of a TMDL. Other categories such as “delisted” or “TMDL not needed” are not shown in this list.

**Table 33. Water Quality Limited Streams identified by ODEQ.**

<b>Water Body</b>	<b>River Miles</b>	<b>Parameter</b>	<b>Season</b>	<b>Criteria</b>	<b>Status</b>
Cottonwood Creek	0 to 9	Temperature	Year Around (Non-spawning)	20.0 degrees Celsius 7-day-average maximum	Cat 5: Water quality limited, 303(d) list, TMDL needed
Indian Creek	1.9 to 7.1	Temperature	Year Around (Non-spawning)	20.0 degrees Celsius 7	Cat 5: Water quality limited, 303(d) list, TMDL needed
McDermitt Creek	0 to 12.3	Temperature	Year Around (Non-spawning)	20.0 degrees Celsius 7	Cat 5: Water quality limited, 303(d) list, TMDL needed
Mine Creek	0 to 4.5	Temperature	Year Around (Non-spawning)	20.0 degrees Celsius 7	Cat 5: Water quality limited, 303(d) list, TMDL needed
Riser Creek	0 to 0.6	Temperature	Year Around (Non-spawning)	20.0 degrees Celsius 7	Cat 5: Water quality limited, 303(d) list, TMDL needed
Sage Creek	0 to 1.4	Temperature	Year Around (Non-spawning)	20.0 degrees Celsius 7	Cat 5: Water quality limited, 303(d) list, TMDL needed
Sage Creek	0 to 5.2	Temperature	Year Around (Non-spawning)	20.0 degrees Celsius 7	Cat 5: Water quality limited, 303(d) list, TMDL needed

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## Appendix – Notes on Information Sources

### ODEQ 303(d) List

Oregon's 303(d) list is maintained as part of the 2004/2006 Integrated Report<sup>2</sup>. The 303(d) list contains several categories of streams including stream segments that have been delisted. For the purpose of this assessment we list only those water bodies that are active on the list. This includes three categories: 1) Category 5: Water quality limited, 303(d) list, TMDL needed, 2) Category 4A: Water quality limited, TMDL approved, and 3) stream bodies listed only as "303(d)".

The goal of the OWEB project is to identify watershed health limiting factors that helps establish priorities for restoring streams and watersheds. This information will assist OWEB in funding projects that address factors that prevent the achievement of healthy watersheds. The Oregon Native Fish Status Report (ODFW 2005) is useful in this regard because the individual population assessments identify habitat limiting factors at the watershed scale and management issues that could be addressed by assistance to landowners facilitated by the watershed council.

The methods summarized below were taken from Volume I of the report. Please refer to the methods description in the report and the individual species descriptions for details and documentation.

### Oregon Native Fish Status Report

The Oregon Native Fish Status Report describes the current conservation status of native fishes based on interim criteria defined in Oregon's Native Fish Conservation Policy [OAR 635-007- 0507]. The purpose of the Native Fish Conservation Policy (NFCP) is to ensure conservation and recovery of native fish in Oregon. The policy focuses on naturally-produced fish. This assessment focuses on groups of populations from a common geographic area with similar genetic and life history characteristics called *Species Management Units (SMUs)*. SMUs are groups of populations from a common geographic area that share similar life history, genetic, and ecological characteristics. Populations within an SMU are locally adapted to the specific conditions encountered in their native streams.

The status report is an interim assessment intended to flag acute problems and help identify priorities for more detailed conservation planning evaluations. Risk, as used in this report, refers to the risk to the conservation of a unique group of populations (e.g. SMU), not the risk of extinction. Interim criteria were based on six biological characteristics related to species performance. These include existing populations, habitat use distribution, abundance, productivity, reproductive independence, and

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<sup>2</sup> <http://www.deq.state.or.us/wq/assessment/rpt0406.htm>

hybridization. Each of these attributes was evaluated for every population based on benchmark values related to species viability, persistence probability, and conservation risks. Criteria for individual SMUs were met when at least 80% of existing constituent populations met the standard.

## ODFW Aquatic Inventories Project

Oregon Department of Fish and Wildlife (ODFW) Aquatic Inventories Project<sup>3</sup> assesses aquatic habitat using standard protocols. The habitat surveys provide a large number of possible habitat variables. For the purpose of this assessment we focused on variables that could be applied and interpreted across a large diverse landscape in the sagebrush desert stream systems. To accomplish this objective we selected native redband trout, *Oncorhynchus mykiss gairdneri*, as a representative indicator species and interpreted the variables based on habitat ratings adapted from Zoellick and Cade<sup>4</sup> (2006).

Zoellick and Cade (2006) evaluated abundance of redband trout relative to five site-specific variables (stream shading, bank cover, bank stability, fine sediment and adult cover habitat). They found that stream shade explained most of the variation in trout abundance and therefore stream shade was recommended as the primary habitat variable to evaluate in sagebrush desert streams. In these landscapes, livestock grazing is a potential issue so we included bank stability and fine sediments as habitat measures to evaluate.

The ODFW habitat survey measures three variables that are comparable to variables used by Zoellick and Cade. These variables are shown in the table below with the stream rating based on the BLM habitat rating referenced in Zoellick and Cade. We assigned numeric scores to indicate the degree of effect on aquatic habitat: 1) Limiting, 2) Moderate and 3) Adequate. The ODFW habitat data is reported by stream reach. Habitat ratings were calculated for each stream reach, and then the overall average rating calculated for the stream. The resulting rating provides an overall indication of stream habitat conditions.

<b>BLM Variable</b> (Zoellick & Cade 2006)	<b>ODFW Metric</b>	<b>Unit</b>	<b>Limiting (1)</b>	<b>Moderate (2)</b>	<b>Adequate (3)</b>
Percent Stream Shade (solar pathfinder)	SHADE	% shade	< 40	40 - 60	> 60%
Bank Stability (% eroding bank)	BANKEROSI	% eroding banks	> 20%	> 11 - 20%	< 11%
Percent Fine Sediment (Wolman Pebble Count or ocular)	RIFSNDOR	% riffle fines	> 25%	15 - 25%	< 15%

<sup>3</sup> <http://oregonstate.edu/dept/ODFW/freshwater/inventory/index.htm>

<sup>4</sup> B.W. Zoellick and B.S. Cade. 2006. Evaluating redband trout habitat in sagebrush desert basins in southwestern Idaho. N.A. J. Fisheries Management 26: 268-281.

## Proper Functioning Condition Assessment

Proper Functioning Condition (PFC) refers to the BLM method<sup>5</sup> of assessing riparian areas. Riparian wetlands are considered to be functioning properly when the riparian area is dissipating stream energy, filtering sediment, capturing bedload, aiding floodplain development, improving water retention, stabilizing streambanks and providing diverse habitats. The PFC assessment results in a rating of 1) PFC, 2) Functional – at risk, or 3) Nonfunctional.

Data obtained from BLM was summarized for each stream by percent of stream miles placed into each category.

## Noxious and Invasive Weeds

Information on noxious and invasive weeds was summarized from the BLM “Weeds” geodatabase<sup>6</sup>. Information from the database includes the weed species, acres in the 4th field HUC, and the threat category of the species. The weed threat categories are:

- 1) “T” Weeds - These weeds represent an economic threat to the state of Oregon.
- 2) “A” Weeds - These are weeds of known economic importance which occur in the state in small enough infestations to make eradication/containment possible; or which are not known to occur, but their presence in neighboring states makes future occurrence in Oregon seem imminent.
- 3) “B” Weeds - These are weeds of economic importance which are regionally abundant, but which may have limited distribution in some counties.

The common name, scientific name, code used in the database and Threat status for these species is shown in the table below.

Code	Listing	Common Name	Family	Scientific Name
ACRE3	B	Russian knapweed	Asteraceae	Acroptilon repens
CADR	B	White top (Hoary cress)	Brassicaceae	Cardaria draba
CANU4	B	Musk thistle	Asteraceae	Cardus nutans
CEBI2	B, T	Spotted knapweed	Asteraceae	Centaurea maculosa
CEDI3	B	Diffuse knapweed	Asteraceae	Centaurea diffusa
CESO3	B, T	Yellow starthistle	Asteraceae	Centaurea solstitialis
CIAR4	B	Canada thistle	Asteraceae	Cirsium arvense
CIVU	B	Bull thistle	Asteraceae	Cirsium vulgare
COAR4	B	Field bindweed	Convolvulaceae	Convolvulus arvensis

<sup>5</sup> Bureau of Land Management. 1998. Riparian area management: a user guide to assessing proper functioning condition and the supporting science for lotic areas. Technical Reference 1737-15, National Applied Science Center, Denver, CO.

<sup>6</sup> <http://www.blm.gov/or/gis/data-details.php?data=ds000117>

CYOF	B	Houndstongue	Boraginaceae	Cynoglossum officinale
ELAN	?	Russian olive	Elaeagnaceae	Elaeagnus angustifolia L.
HAGL	B	Halogeton	Chenopodiaceae	Halogeton glomeratus
HYNI	?	black henbane	Solanaceae	Hyoscyamus niger L.
HYPE	B	St.Johnswort (Klamath weed)	Hypericaceae	Hypericum perforatum
LELA2	B	Perennial pepperweed	Brassicaceae	Lepidium latifolium
LIDA	B,T	Dalmatian toadflax	Scrophulariaceae	Linaria dalmatica
LIVU2	B	Yellow toadflax	Scrophulariaceae	Linaria vulgaris
ONAC	B	Scotch thistle	Asteraceae	Onopordum acanthium
SAAE	B	Mediterranean sage	Lamiaceae	Salvia aethiopsis
SEJA	B, T	Tansy ragwort	Asteraceae	Senecio jacobaea
TACA8	B	Medusahead rye	Poaceae	Taeniatherum caput-medusae
TAPA4	?	smallflower tamarisk	Tamaricaceae	Tamarix parviflora DC.
TRTE	B	Puncturevine	Zygophyllaceae	Tribulus terrestris
VEDU	?	North Africa grass	Poaceae	Ventenata dubia (Leers) Coss.

## Wetlands

We evaluated several sources of information to get an indication of wetland loss/gain or alteration.

National Wetlands Inventory (NWI) digital data<sup>7</sup>: Used to identify the current (1980's) locations of wetlands, wetland types, and wetland disturbances

Natural Resources Conservation Service (NRCS) digital soil survey data<sup>8</sup>: Used to identify hydric soils, which may indicate locations of current or historic wetlands

Oregon Natural Heritage Program (ONHP) historic vegetation data set<sup>9</sup>: Used to identify historic wetland locations in areas lacking NWI and or soils data

National Land Cover Database (NLCD)<sup>10</sup>: Used to identify current wetland locations in areas lacking NWI and or soils data

However, these sources did not provide adequate coverage or sufficiently comparable information for interpretation. The most useful source of information on wetlands was the change from historic to current wetland acres summarized in the Oregon Conservation Strategy (ODFW 2006).

<sup>7</sup> <http://www.fws.gov/wetlands/>

<sup>8</sup> <http://soildatamart.nrcs.usda.gov/>

<sup>9</sup> [http://www.oregon.gov/DAS/EISPD/GEO/docs/metadata/historic\\_vegetation.htm](http://www.oregon.gov/DAS/EISPD/GEO/docs/metadata/historic_vegetation.htm)

<sup>10</sup> <http://seamless.usgs.gov/>

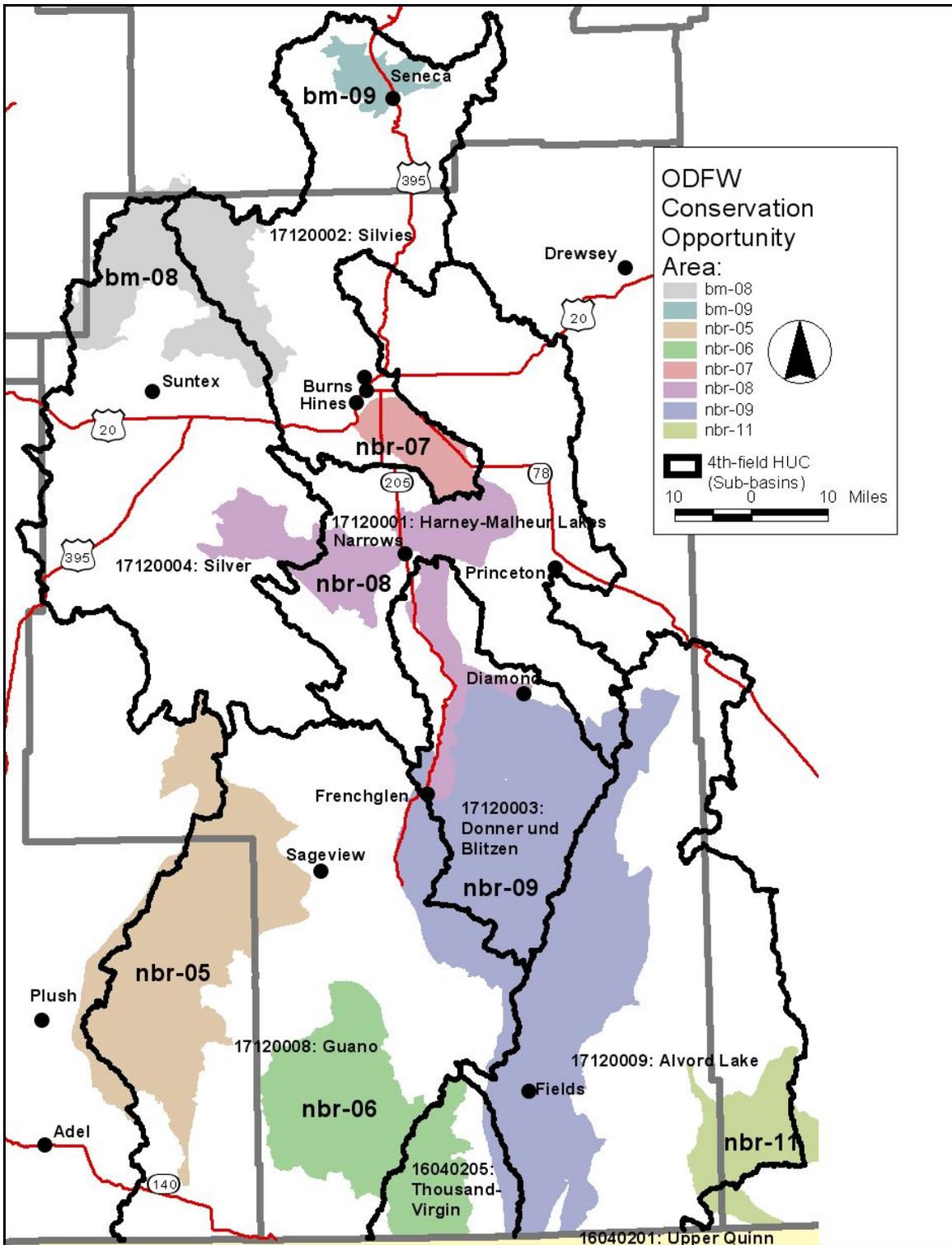


Figure 2. Conservation Opportunities identified in the Oregon Conservation Strategy (ODFW 2006).