Bend Area General Plan

APPENDIX D:
Goal 5 Inventory, ESEE Analysis, Local Wetlands Inventory

Exhibit "A"

Goal 5 Inventory and Analysis Report

Adopted by City Council November 20, 2002
Effective December 20, 2002

City of Bend Periodic Review

Goal 5 Inventory and Analysis

December 2000

Prepared for the City of Bend
By Darcy McNamara, Bend Riverway

City of Bend Periodic Review, Goal 5 Inventory and Analysis

by Darcy McNamara, December 2000 on behalf of the Bend Riverway
with edits and additions by the City of Bend Planning Staff

Contributors:

- Christina Veverka: Wetland inventory, public involvement
- Pamela Bodie, MLA. Research, public involvement, mapping, and regulatory analysis

The Bend Riverway is a community project of the Bend Park and Recreation Foundation.

Other documents prepared concurrently for Goal 5:

Goal 5 Reference Material for the City of Bend
City of Bend Local Wetlands Inventory

Acknowledgements

Many thanks to:
Mike Byers, Principal Planner, City of Bend
Wendy Robinson, Senior Planner, City of Bend

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Steven George, Oregon Department of Fish and Wildlife
Kyle Gorman, Oregon Water Resources Department
David Dobkin, High Desert Ecological Research Institute
Jan Houck, Oregon State Parks
Bonnie Lamb, Oregon Department of Environmental Quality
Dave Leslie, Deschutes County Community Development
Laren Woolley, Oregon Department of Land Conservation and Development

ACRONYMS

UGB	Urban Growth Boundary
ESEE	Economic, Social, Environment and Energy
FIRM	Federal Insurance Rate Map
OSW	Oregon Scenic Waterway
OFWAM	Oregon Freshwater Wetland Assessment Methodology
LWI	Local Wetland Inventory
NWI	National Wetland Inventory
SWI	State Wetland Inventory
OAR	Oregon Administrative Rule

Agency and Committee Acronyms

BUAPC	Bend Urban Area Planning Commission
BMPRD	Bend Metro Park and Recreation District
COID	Central Oregon Irrigation District
DEQ	Department of Environmental Quality
DLCD	Department of Land Conservation and Development
DSL	Oregon Division of State Lands
FEMA	Federal Emergency Management Agency
LCDC	Land Conservation and Development Commission
LUBA	Land Use Board of Appeals
ODFW	Oregon Department of Fish and Wildlife
OPRD	Oregon State Parks and Recreation Department
TID	Tumalo Irrigation District

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EXECUTIVE SUMMARY

Background
In February 2000, the State of Oregon's Department of Land Conservation and Development approved the City of Bend's work program to conduct a "periodic review" of its General Plan and development codes to make sure they are consistent with new state planning goals and rules. One of the topics the City must review are the planning rules for state land use planning Goal 5, "to conserve open space and protect natural and scenic resources." There are seven basic steps to the Goal 5 review:

1. Determine the scope of work for the Goal 5 review
2. Collect information about Goal 5 resource sites (inventory)
3. Determine the adequacy of the information
4. Determine the significance of the resource sites
5. Adopt a list of significant resource sites
6. Conduct an analysis of the consequences of allowing, limiting or prohibiting conflicting uses for any significant sites (ESEE analysis) if applicable.
7. Develop and adopt a program to achieve Goal 5

The State developed the scope of work with the City of Bend (Step 1 above) and has directed the city to conduct a review of the following Goal 5 resources:

- Riparian areas (river, streams and associated areas)
- Wetlands
- Wildlife habitat
- Oregon Scenic Waterways

The city contracted with the Bend Riverway, a non-profit community project of the Bend Park and Recreation Foundation, to conduct an inventory of Goal 5 resources within the Urban Growth Boundary in Bend. This document focuses on Step 2 above and contains an inventory of riparian areas, wetlands, wildlife habitat and scenic waterways. This report also documents early public involvement conducted during the inventory process. In addition to this document, the Bend Riverway also prepared a separately bound appendix of related information titled Goal 5 Reference Material for the City of Bend, and the City of Bend Local Wetlands Inventory.

About the Inventory
The Goal 5 inventory was conducted in compliance with the procedures and requirements for complying with Goal 5 (OAR 660-023-0000). The inventory methodology varied somewhat for each of the four topic areas but, in general consisted of the following:

- Gather and review maps, aerial photos, studies, and reports from:
    - Federal, State and local agencies
    - Organizations and groups
    - Local knowledge
    - Existing information
- Request new studies and mapping from agencies
- Conduct site visits to key areas
- Confirm findings with State experts
- Prepare inventory report

Citizen Involvement

Citizen involvement plays an important role in the Goal 5 review. The State directs the city to provide timely notice to landowners and opportunities for citizen involvement at the earliest possible opportunity during the inventory process. Toward this end extensive work was done to identify stakeholders. Over 1400 stakeholders were invited by mail and the public was invited by paid advertisement and articles in the local newspaper, the Bend Bulletin, to attend one of two public meetings to gather early landowner and public comment on the inventory.

Additional efforts to contact special interest groups with knowledge of potential Goal 5 resources were undertaken. As a result information was gathered from over a dozen interest groups. Major landowners with potential Goal 5 resources were contacted. Further public involvement, including public hearings, will be conducted by the city during the Planning Commission and City Council review.

Findings

Riparian Areas

The Goal 5 riparian resources within the UGB are approximately ten miles of the Deschutes River and approximately a quarter-mile of Tumalo Creek. The city currently has river setbacks of varying widths (from 30 to 100 feet) on the Deschutes River. There are currently no setbacks for Tumalo Creek. A fill and removal restriction of 10 feet on either side of the top of bank applies to both. If either the Deschutes or Tumalo Creek is determined to be significant, the city must show that current riparian protections meet state goals or make appropriate changes. In order to meet the state's requirements the city may retain existing regulations, adopt the state's "safe harbor" regulations (50 – 75 foot riparian protection buffer depending on flow) or modify the safe harbor to match existing conditions and community values. An ESEE analysis (a review of the positive and negative economic, social, environmental and energy consequences that could result from a decision to allow, limit, or prohibit a conflicting use) is required for options other than the state specified safe harbor.

Wetlands

Local governments are required to use criteria and procedures established by the Land Conservation and Development Commission to identify significant wetlands under Statewide Planning Goal 5. To comply, a Local Wetlands Inventory (LWI) was

conducted for the City of Bend. The inventory revealed that there are no known significant Goal 5 wetland resources outside of the riparian corridor of the Deschutes River. The entirety of the Deschutes River within the UGB was evaluated as a single wetlands system at the recommendation of the Department of State Lands wetland biologist. The wetland meets the state criteria for significance, meaning that the city must meet the state goals for protecting it. This may be accomplished through a new wetland protection ordinance or by modifying existing river corridor regulations. A summary of the LWI methodology and findings are located in this document. The complete LWI is separately bound.

Wildlife Habitat

For the purpose of Goal 5, wildlife habitat is defined as a documented area that wildlife depends on for food, water, shelter, and reproduction. Examples include wildlife migration corridors, big game winter range, and nesting and roosting sites. The wildlife inventory for Bend relies upon information provided by Oregon Fish and Wildlife, local experts' previous reports and field visits. If significant wildlife habitat is located, the city is required to develop programs to protect wildlife habitat if none exist. ODFW concluded there are no significant Goal 5 wildlife habitat resources requiring protection in the UGB. ODFW did make number of specific land use and regulatory recommendations to the city for consideration. In addition, local citizens and a wildlife biologist expressed a strong interest in protecting elk and deer winter range within the UGB.

State Scenic Waterways

There are two sections of State Scenic Waterway within the City of Bend's UGB. They are located at the north and south ends of the river within the UGB. City regulations do not protect portions of the State Scenic Waterway due to the recent annexation of these areas into the city. The city must address these sections of the State Scenic Waterway in the city code.

BACKGROUND

Background

The State of Oregon is conducting a routine review to determine if the City of Bend is fulfilling the State's goals for protection of riparian areas, wetlands, wildlife habitat and scenic waterways. This process is called a periodic review for Goal 5.

The objective of Goal 5 is to protect natural resources and conserve scenic and historic areas and open spaces. To do this the state requires that "local governments adopt programs that will protect natural resources and conserve scenic, historic and open space resources for present and future generations. These resources promote a healthy environment and natural landscape that contributes to Oregon's livability."

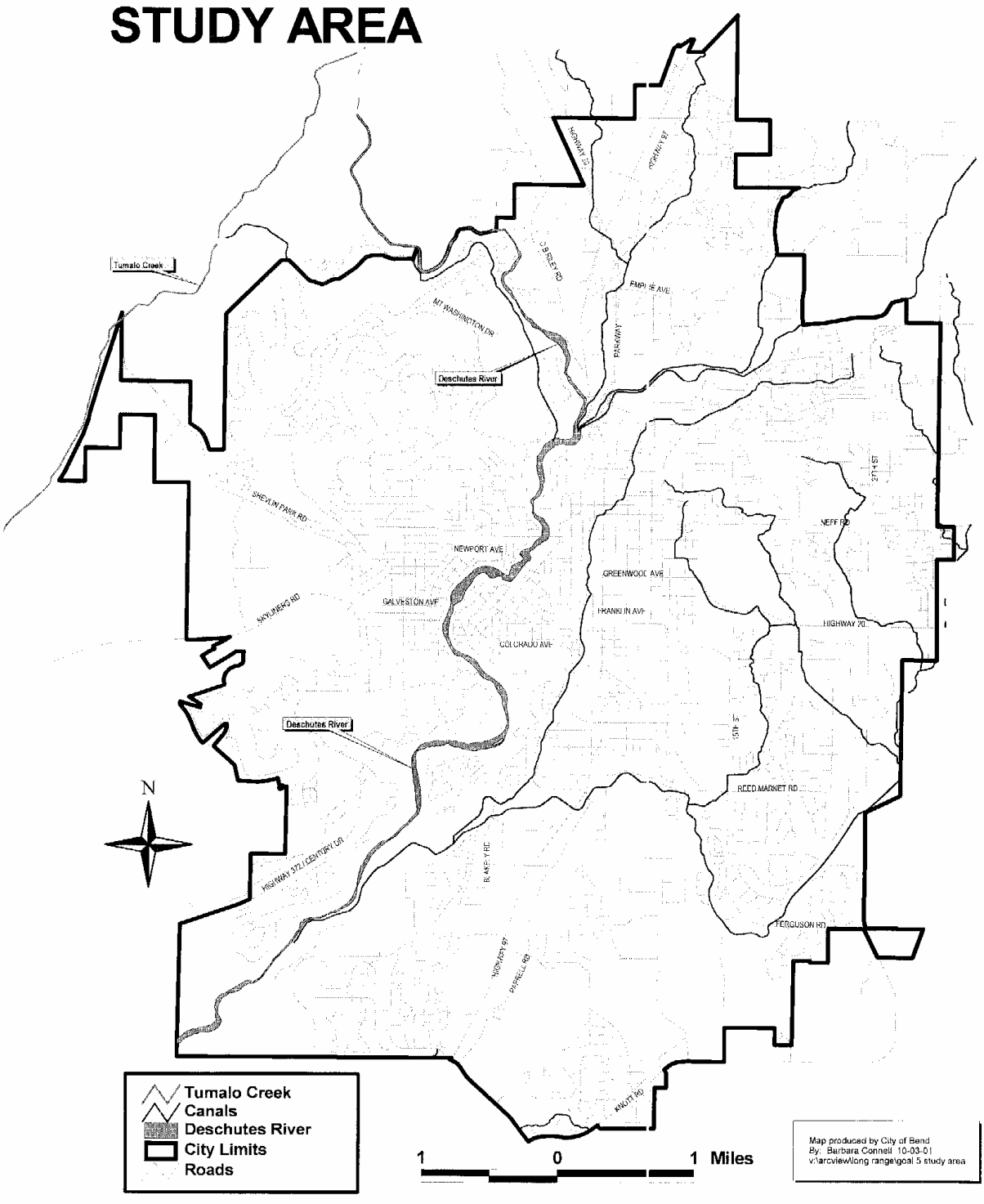
There are seven basic steps to the Goal 5 review:

1. Determine the scope of work for the Goal 5 review
2. Collect information about Goal 5 resource sites
3. Determine the adequacy of the information
4. Determine the significance of the resource sites
5. Adopt a list of significant resource sites
6. Conduct an analysis of the consequences of allowing, limiting or prohibiting conflicting uses for any significant sites (ESEE analysis)
7. Develop and adopt a program to achieve Goal 5

The State has directed the City of Bend to conduct an inventory and review existing methods of protection for the following areas:

- Riparian areas (river, streams and associated areas)
- Wetlands
- Wildlife habitat
- Oregon Scenic Waterways

The Bend Riverway, a non-profit community project of the Bend Park and Recreation Foundation, conducted the inventory. The inventory was conducted in compliance with OAR 660-023-0000, the "Procedures and Requirements for Complying with Goal 5," found in Goal 5 Reference Material, separately bound.



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CITIZEN INVOLVEMENT

Summary

Citizen involvement plays an important role in the Goal 5 review. The State directs the city to provide timely notice to landowners and opportunities for citizen involvement at the earliest possible opportunity during the inventory process. Toward this end extensive work was done to identify stakeholders. Over 1400 stakeholders were invited by mail and the public was invited by paid advertisement and articles in the Bend Bulletin, to attend one of two public meetings to gather early landowner and public comment on the inventory. Additional efforts to contact special interest groups with knowledge of potential Goal 5 resources were undertaken. As a result information was gathered from over a dozen interest groups. Major landowners with potential Goal 5 resources were contacted. Further public involvement, including public hearings, will be conducted by the city during the Planning Commission and City Council review. The separately bound Goal 5 Reference Material contains the State rule for citizen involvement (OAR 660-023-0060.)

Public comments were recorded and addressed in this report. Public concerns focused on wetlands and riparian areas, especially those on the Deschutes River at Colorado Street, the proposed Southern bridge crossing, and at Woodriver Village; and wildlife, especially bird, elk, fish and otter habitat. Appendix C contains a copy of the public meeting invitation sent to stakeholders, advertisements and articles on the public meeting, and agency comments. Letters from the public are separately bound in the Goal 5 Reference Material.

Public Meetings

Two public education and comment meetings were held regarding Goal 5 resources in the Bend Urban area. The City of Bend and the Bend Riverway, a local non-profit group hired by the city to work on Goal 5 issues, hosted the meetings. Twenty-one citizens attended the meetings. Fourteen written comment forms, one video, and 21 comments written on maps were gathered.

Notification

Notification of the public meeting included articles and paid advertisements in the Bulletin, a local daily newspaper, a mailing to identified stakeholders; and an announcement at the City Planning Commission meeting. See Appendix C for copies of the announcement.

A mailing to 1,475 stakeholders was mailed on June 6, 2000. The stakeholders were identified using Deschutes County Geographic Information Systems (GIS), and the Bend Riverway's mailing list of interested parties and stakeholders. The list included:

660 Landholders within 200' of the Deschutes River
440 Landholders within 1320' of the Scenic Waterways portion of the Deschutes River
1700 Bend Riverway mailing list
2800 Total

After merging the three lists 1475 addresses were identified. A complete list of stakeholders is available at the city's Long Range Planning Office. An article about the meetings ran in The Bulletin on June 8 and 19, and a paid advertisement ran in the Bulletin on June 11 and June 17 (see Appendix C for copy). The city Planning Commission was informed of the public meeting on June 5, 2000.

Meeting Process

Meetings were scheduled for 1:00 p.m. - 3:00 p.m. and again at 6:00 p.m. - 8:00 p.m. on June 22 to offer two opportunities for the public to be able to attend the meeting. A 20-minute presentation about Goal 5 was given by Mike Byers, City of Bend, and Darcy McNamara, Bend Riverway at both meetings. They described the Periodic Review process, what Goal 5 resources are and invited questions and comments from the public. The public had the opportunity to comment directly maps or forms, or mail-in comment sheets later.

Individual stations were provided for each major topic, (riparian, wetlands, State Scenic Waterways, and wildlife habitat) and were staffed to help answer public questions. Each table held maps showing affected areas and areas of interest, and each map was covered with an overlay to allow the public to write on the map, locating their local knowledge and concerns. A variety of flyers provided by the state were available to help answer questions and provide information concerning wetlands, State Scenic Waterways, and Goal 5 regulations. In addition, mail-in comment sheets were available on each topic area to invite additional and more detailed comments and concerns.

The meetings were staffed by Mike Byers and Wendy Robinson from the City of Bend, Steve George of the Oregon Department of Fish and Wildlife, and Darcy McNamara, Pam Bodie and Christine Veverka of the Bend Riverway. Representatives from State Parks and the Division of State Lands were invited, but unable to attend.

Public Comments from meeting

Public comment included 21 comments on map overlays, 14 comment sheets, and one video. Comments are summarized in this report and copies of citizen letters are in the separately bound Goal 5 Reference Materials. A list of those attending, original comment letters, a copy of the video and the maps are available at the City of Bend's Long Range Planning Office. The comments are recorded and addressed in the following tables.

Comments from Maps

from Public Meeting, June 22, 2000

Public Comment	Response
Scenic Waterway	
1. Trash and dumping along river off of Brookswood/Hollygrape	Area was identified & is a problem. However, it is well back from the edge of the rimrock above the river & is not affecting a Goal 5 resource.
Wetlands	
1. Hatfield Lakes: this is important bird habitat - is it protected?	n/a – not within Goal 5 study area
2. Wetland just off Woodriver Village Park - off of Oakwood Place (across from Mt. Bachelor Village)	Inventoried – Wetland #R8
3. Ward Ponds - off of Country Club Road and Brosterhouse	Inventoried – Wetland #U12
4. Wetland @ E of River in SW corner of UGB	Inventoried – Wetland #R9
Deschutes River Corridor (Riparian)	
1. NW Quiet River: houses here encroach on setback (Scenic Waterway). Lots are >50% in setback - why was house approved? why do we even have setbacks?	This area is not in the designated State Scenic Waterway area.
2. Swans nest between NW Wilmington and Scenic Heights Drive. Too much development?	Swans are not a Goal 5 resource according to ODFW.
3. Old Mill District - keep structure out of 100' setback - no variances.	Noted
4. Lots of bird nesting in Colorado St. Wetland (West side of river, upstream of bridge.)	Noted in inventory.
5. (Same Locations) Why are RR cars allowed in Riparian Area so close to the River?	They are setback from the river's ordinary high water mark. Bend lacks a setback from wetland edge.
6. (Same Location) Protect this riparian area	Noted. Area inventoried – Wetland # R5
7. Southern Crossing would degrade natural beauty of this section of the river.	Noted.
8. River (@ Mt. Bachelor Village) Fish habitat should include woody debris sources.	Woody debris was included in the wetlands inventory
9. River upstream of Mt. Bachelor Village - Bird Migration follows river, needs special protection of Riparian Habitat.	Bird inventory & info on the importance of river corridor included in report
10. Across from Mammoth Drive, along River: Otter and Beaver habitat	Noted. Not Goal 5 resources.
11. Below River Bluff Trail: Osprey fishing tree	Photographed and included in wetlands inventory – Wetland #R9

Comments from Maps Cont.

Public Comment	Response
12. Elk Meadow and Sunrise Village areas:	
Major Elk habitat	ODFW report states there is no Goal 5 elk habitat requiring protection / independent report notes habitat
Heron nesting (Great Blue)	Searched, but could not locate rookery in study area
Osprey, beaver, otter habitat and Bluebird habitat	ODFW report states there is no Goal 5 habitat for these species that requires protection

Public comments from comment sheets, letters and videos.

Comments from letters were divided into topic areas: General comments, Riparian, Scenic Waterways, Wetland Resources, Wildlife Resources. Comments from letters were edited for responses. Copies of the letters are separately bound in the Goal 5 Reference Materials. The original letters and video are on file in the City of Bend Long Range Planning Office.

*The comment number refers to a letter or comment from an individual. Some individuals made a number of points on different topics in their comments – these were addressed separately.

General Comments from Letters

#*	Comment	Response
G-1	Noise from proposed So. Crossing. Suggests only an access road to 22-acre open space	Any new code changes resulting from Goal 5 will apply to new bridges and new roads.
G-13	City should complete work on Goal 5 before giving final approval to projects that would have a significant impact on important wildlife or riparian areas.	State law does not require suspension of an application review or approval until Goal 5 is complete or new codes (if needed) are adopted. ODFW did not request a suspension.
G-14	Contact ODFW & Audubon for important habitat areas including non-game.	This has been done. See wildlife section for results.
G-3	Filled 6 litterbags of mostly construction debris on a river clean-up.	It is a violation of city code to litter in parks.
G-4	Strongly urges a detailed inventory of all Goal 5 resources – especially those designated as a wildlife refuge.	Inventories are as complete as possible given the resources and state requirements.
G-7	City should address Goal 10 simultaneously with Goal 5.	When the city plan was updated in 1998 the city satisfied the current state requirements for housing (Goal 10) planning.
G-8	Actively solicit input from ODFW, BMPRD, Audubon Society and others.	All have been contacted and have had input to the process.

Public Comments on Riparian Resources

#*	Comment	Response
G-3	Bend's codes should require more aesthetic landscaping near riparian areas	The BUAPC may require landscaping as allowed in the Deschutes River Combining Zone 10-10.22A (6) & Mixed Use Riverfront Zone 10-10.21A (6)(e).
G-3	Need public education initiative to promote river values for property owners including riparian vegetation, landscaping, use in insecticides, fertilizers, septic. How is Bend doing now on city owned land?	Non-profit groups like the Bend Riverway, Upper Deschutes Watershed Council has done some work in this area. City recently hired a Conservation Specialist that may be able to help in this area. City land was included in the inventory.

Public Comment on Scenic Waterways

#*	Comment	Response
G-12	Inventory should summarize basic standards of the 2 State Scenic Waterways in UGB. Also provide overview of how much development actually meets these standards. Build on work of Riverway and Bend Urban lands Survey and map developed & natural areas within the scenic waterway while there is still an opportunity to maintain a river corridor with a natural appearance.	Inventory summarizes Scenic Waterway requirements. It does not include an inventory of development meeting the criteria. The state is the responsible agency for compliance. Part of the inventory work included looking at the effect of regulations on developed and undeveloped land and identified the remaining high quality natural areas in the wetland inventory.

Public Comment on Wetland Resources

#*	Topic	Comment	Response
G-11	wetland	Wetlands should inventory document relative scarcity/abundance & condition/importance.	This was analyzed in the Local Wetland Inventory as part of OFWAM questionnaire.
G-11	wetland	Inventory should include wetlands at Newport Bridge, First Street, Colorado Bridge, Sawyer Park, and COID off Blakely & Ward Ponds (which may have been significantly altered recently). Hatfield Lake although outside UGB should also be inventoried due to valuable habitat.	All of the wetlands listed were inventoried except Hatfield Lake, which is outside the UGB and the study area. All non-riparian wetlands were determined to be not significant based on OFWAM methodology.
G-2	wetland	Develop incentives for golf courses to become Audubon certified (even though golf hazards are not Goal 5 resources.	This is suggested in the report for consideration by the city.
G-2	wetland	Hatfield Lake provides important wildlife habitat	Hatfield Lake is not within the UGB and therefore not included in the inventory.
G-8	wetland	Inventory all wetlands in UGB even those under ½ acre due to the scarcity of wetland areas in Central Oregon.	All wetlands, irrigation ponds, leaky irrigation ditches and golf hazards of any size were inventoried – precisely due to the scarcity of wetlands in our area. However, all non-riparian wetlands were determined to be not significant based on OFWAM methodology.

Public Comment on Wildlife Resources

#*	Comment	Response
G-10	Video of elk herd at elk meadow across from Brookswood Elementary on river and in meadow.	Video presents documented account of elk in the UGB. Issues of elk in the UGB are discussed in the report and in ODFW letter. ODFW states that the deer and elk migration range designations do not apply to within the UGB. Independent report recognizes habitat.
G-2	Locate intermittent flows into Deschutes & include in inventory. Concerned about adverse impacts on fish habitat & water quality due to sediment & run-off.	There are no known natural flows into the Deschutes in the UGB. Stormwater runoff does enter the river via culverts. Concerns about water quality will be addresses in the city's review of Goal 6 issues with DEQ.
G-5	Have documented elk, osprey, deer, and coyote visiting property adjacent to forest service land (Bachelor View) on a regular basis.	These species and the importance to wildlife of USFS land adjacent to the UGB were included in the inventory.
G-6	Somewhat concerned about development west of Broken Top. It is a large bird nesting area with blue-birds, winter wrens, hairy & Lewis woodpecker, flickers, swallows, meadowlark, nuthatches, sparrow, hawk, green tailed towhee, spotted towhee, olive sided & Western peewee, flycatchers & more. Development will reduce habitat.	Development will reduce and fragment habitat for the species listed. These species and more are listed in the inventory. However, they are not considered Goal 5 resources (species of statewide significance).
G-6	Concerned about development on elk habitat at Elk Meadow. Has viewed elk there & area needs to be reestablished as elk habitat.	Elk herd has been well documented in the area. Reestablishment of habitat after the fire is occurring naturally, but slowly over time.
G-7	Elk herd with10-70 head visit area on southern boundary of UGB each winter (usually between December & May). Elk follow very specific, unwavering routes on both sides of river. Area elk are using is a designated Area of Special Interest by city, within State Scenic Waterway & has a special tax status as a wildlife refuge. Permits are currently being reviewed by city (large PUD on east, short plat on west). Although area	Thank you for the specific information about the herd's movement. The information has been documented in the inventory. The development proposed on the property will reduce and/or fragment the habitat for the elk.

	was recently annexed into city habitat values are still present. Both sides of river should be protected.	

Wildlife Resources cont.

#*	Comment	Response
G-8	Important that inventory describe and map deer and elk winter range within UGB including current & historical use. Winter ranges which may have been dropped from ODFW maps due to new location inside city limits should be given full consideration.	ODFW has shown areas within the UGB as elk & deer migration areas, but because these areas are now within UGB they are not recognized by ODFW.
G-9	There is an osprey nest on the west side of the river near south UGB boundary that is used annually. Bald eagle and great blue heron are seen in area.	Thank you. Nest is noted and photographed in the inventory.
G-3	Concerned about [current] development impacts and possible encroachments on setbacks on the riparian area and wildlife habitat in Sawyer Park and the south boundary on the west side of the Deschutes.	New homes south of Sawyer Park are reducing upland habitat, but are within current city regulations for riparian setbacks in that area. Lot subdivision on the west side of the river at the south UGB may have an impact on elk migration to the east side of the river.
G-14	Ward Ponds & Hatfield lake have provided habitat historically for shorebirds that are not found elsewhere in Bend. Identify & assess mapped and actual winter deer and elk range. Include Elk Meadow on both sides of Deschutes and Tumalo Creek.	Ward Pond has been inventoried in the wetland inventory. It is not significant based on Goal 5 methodology because is artificially created. Hatfield Lake is outside UGB. Elk habitat is discussed in the inventory.

Other Public Involvement

Over a dozen interest groups were contacted by letter and phone to inform them of the Goal 5 process and solicit additional information for the Goal 5 inventory. The groups included:

1. ARLU-DeCo, Bob Bates (phone)
2. Central Oregon Audubon Society, Chris Carey (phone)
3. Central Oregon Flyfishers*, Dave McNall
4. Deschutes Basin Land Trust, Brad Chalfant (phone)
5. Deschutes Basin Resources Conservancy*, Lisa Nye
6. Deschutes Soil and Water Conservation District, Jeff Rola (phone)
7. Friends of Bend, John Neilson, Liz Rewick (meeting)
8. High Desert Ecological Research, David Dobkin (meeting)
9. Morrow Planning, Catherine Morrow (meeting)
10. Natural Areas Association, Reid Schuller (phone)
11. Oregon Native Plant Society, Stu Garrett (phone)

12. Oregon Natural Desert Association, Tim Lillebo (phone)
13. Oregon Trout*, Jim Myron
14. Sierra Club*, Sandy Lonsdale
15. Sisters Forest Planning Association, Paul Dewey (meeting)
16. Trout Unlimited*, Dave Nolte
17. Upper Deschutes Watershed Council, Barbara Lee (meeting)
18. Wilderness Management Institute, Bob Davison (meeting)

*no response to letter and/or follow-up call.

In addition a number of potentially affected landowners with large parcels or publicly owned property were contacted about the inventory and the Goal 5 process. They include the owners of riparian wetlands as follows:

- Bend Metro Park and Recreation District (meeting with Carrie Ward and Bruce Ronning)
- Brooks Resources (meeting with Mike Hollern)
- Central Oregon Irrigation District (phone call with Ron Nelson)
- River Bend Limited Partnership (meeting with Bill Smith and Mary Campbell)
- Riverhouse Resort (left message for Wayne Purcell)
- Thompson, Stephen (left message)
- Tumalo Irrigation District (meeting with Elmer McDaniel)

The Planning Commission was informed of the Goal 5 process with periodic updates from staff. These included reports on the following dates:

1/25/99	Mike Byers presented a memo summarizing Periodic Review process
4/10/00	Mike Byers presented memo outlining inventory process
6/5/00	Mike Byers informed Commission of the upcoming public meeting
2/12/01	Mike Byers provided an update on the results of the inventory and next steps
6/11/01	Mike Byers presented a slide show on riparian issues and provided draft General Plan and Zoning Code amendments to the Commission

Future Public Involvement

Future public involvement will include public hearings before the Planning Commission and the City Council. Both bodies will review the inventory and analysis, and make decisions about the significance of Goal 5 resources.

GOAL 5 WORK ITEMS

Riparian Areas

Summary

The state requires that riparian resources be inventoried and, if determined to be significant, they must be protected. The Goal 5 riparian resources within the UGB are along approximately 9 miles of the Deschutes River and approximately a quarter-mile of Tumalo Creek. A combination of a safe harbor inventory (defined below) and a standard Goal 5 inventory of these resources was conducted. The city currently has river setbacks of varying widths (from 30 to 100 feet) on the Deschutes River. There are currently no setbacks in the city code for Tumalo Creek. A fill and removal restriction of 10 feet on either side of the top of bank applies to both. If either the Deschutes or Tumalo Creek is determined to be significant, the city must show that current riparian protections meet state goals or make appropriate changes. In order to meet the state's requirements the city has options ranging from determining that the existing regulations fulfills the safe harbor requirement and submitting it to the state for review, to adopting the safe harbor regulations to match the state requirements or, modifying the safe harbor to match existing conditions and community values. An ESEE analysis (a review of the positive and negative economic, social, environmental and energy consequences that could result from a decision to allow, limit, or prohibit a conflicting use) is required for options other than safe harbor.

Goal 5 Riparian Resources Defined

A riparian area is the area adjacent to a river, lake, or stream, consisting of the area of transition from an aquatic ecosystem to a terrestrial ecosystem. A riparian area is one component of a riparian corridor. A riparian corridor is a Goal 5 resource that includes the water areas, fish habitat, adjacent riparian areas, and wetlands within the riparian area boundary. Note: areas along irrigation canals and laterals are not Goal 5 riparian resources.

Local governments are required to conduct an inventory process and determine significant riparian corridors by following either the safe harbor methodology or the standard Goal 5 inventory process. The inventory methods are described below. See Goal 5 Reference Material, separately bound for the complete state rule on inventory methodology.

At the conclusion of either inventory process, the city is required to develop programs to protect significant Goal 5 riparian resources if programs (regulations) do not already exist. The city must coordinate with appropriate state and federal agencies when adopting programs intended to protect riparian resources.

Safe Harbor Inventory Process
The safe harbor inventory process defines significant riparian corridors using a standard setback distance from all fish bearing streams. The setback distances are predetermined by the state. For streams with an average annual stream flow greater than 1000 cubic feet per second the riparian corridor boundary is 75 feet upland from the top of each bank. For streams with an average annual stream flow less than 1000 cubic feet per second, the riparian boundary is 50 feet from the top of bank. Riparian wetlands are included in the riparian corridor. In locations along the river corridor where there are predominantly steep cliffs the city must apply the standard inventory methodology. This inventory finds that in some areas where steep cliffs are present there are also intermittent but substantial riparian areas. In these areas, a combination of safe harbor and standard inventory methodology may be appropriate. The safe harbor provisions specify use restrictions in riparian corridors and provide options for hardship variance and restoration in lieu of fully meeting the safe harbor standards.

Standard Goal 5 Inventory Process
The standard Goal 5 inventory process consists of a more detailed inventory and analysis process which includes identifying land uses which conflict with protection of riparian corridor and adopting a program to achieve Goal 5 (policies, zoning, land use ordinances or other mechanisms). The first step is to inventory the resource using the following steps: a) collect information about the resource sites; b) determine the adequacy of the information; c) determine the significance of the resource sites; d) adopt a list of significant resource sites. Upon completion of the inventory the city must weigh the importance of protecting the significant riparian corridor against the need for allowing conflicting uses by conducting an ESEE analysis (a review of the positive and negative economic, social, environmental and energy consequences that could result from a decision to allow, limit, or prohibit a conflicting use).

Inventory Methodology

A combination of safe harbor and standard inventory methods were used for the riparian inventory for the City of Bend. The inventory was conducted concurrently with the riparian portion of the Local Wetlands Inventory (LWI). See the Wetlands section of this document for information about the LWI.

The inventory for the Deschutes River and Tumalo Creek consisted of:

- field visits to most of the nine miles of Deschutes River corridor and the portion of Tumalo Creek within the Urban Growth Boundary;
- field visits to all riparian wetland areas;
- a review of the extensive inventory work conducted in 1998 by the Bend Riverway as documented in The Bend Riverway, A Community Vision;
- discussions with individuals and groups to collect local knowledge (see list in the Citizen Involvement section.)
- a review of the Bend Urban Lands Survey, completed in 1999;

- an analysis of aerial photos (1 inch = 1680 feet) dated June 2000;
- an analysis of average annual flows;
- an analysis of topographic maps (1 inch equals 100 feet);
- a review and analysis of current riparian setbacks and other policies and regulations;
- a review of existing land use;
- a review of the General Plan zoning;
- an analysis of the safe harbor setback of 75 and 50 feet;

In addition the following resources were consulted:
- United States Geological Service (USGS) 7.5 quadrangle maps;
- National Wetlands Inventory maps;
- Federal Emergency Management Agency (FEMA) FIRM (Federal Insurance Rate Maps) flood maps (dates August 1988);
- Aerial photos dated August 1998
- Additional resources were consulted and are located in Appendix B.

To assist in the analysis of the effectiveness of the safe harbor method, a map was developed showing the city's current minimum riparian setbacks for the Deschutes River as required by the Deschutes River Design Review Corridor Combining Zone. See maps titled "Deschutes River Design Review Corridor," showing these setback distances.

The Deschutes River was divided into three areas called "reaches" to aid in the inventory. A reach was defined as a stretch of the river with similar characteristics. The three reaches: South Canyon, Pioneer and Awbrey are identified on the maps titled "Deschutes River Design Review Corridor." The reaches were defined with the assistance of a Department of State Lands wetlands biologist. The break between South Canyon and Pioneer was determined by changes in topography and landforms, surrounding vegetation, water characteristics (rapids to flat calm water). The break between Pioneer and Awbrey was determined by changes in topography and landform, a large dam (33 feet high) and flow rates during irrigation. Each reach is described in detail in the Inventory Results section.

In areas where the top of each bank is not clearly defined, or where the predominant terrain consists of steep cliffs, local governments are required to conduct a standard inventory methodology rather than apply the safe harbor provisions of this section. For the purposes of this inventory, a steep slope is defined as an area with:
- 60 percent slope or greater and
- a vertical rise of 20 feet or greater and
- a continuous horizontal length of 50 feet or more.

Inventory Results

There are only two riparian corridors with Bend's UGB. They are the approximately 9 miles of the Deschutes River and approximately a quarter-mile of Tumalo Creek. Based on the criteria in OAR 660-023-0030 both areas could be determined to be significant

Goal 5 riparian resources. The criteria (quality, quantity, and location) are evaluated as follows:

Criteria for Determining Significant Riparian Resources

The criteria for riparian areas is determined using the standard Goal 5 inventory as follows:

Quality

Both the Deschutes and Tumalo Creek are high quality riparian resources in terms of wildlife habitat, scenic beauty, native vegetation, fishery resources, water quality, and recreation and education opportunities according to:

- The Bend General Plan
- Bend Riverway Plan
- Bend Urban Lands Survey
- Oregon Department of Fish and Wildlife

Quantity

There are only two riparian corridors within the 32.25 square miles of the City of Bend's UGB making these resources unique.

Location

The area around Bend is called the High Desert. Bend is located in a transition zone between the ponderosa pine and shrub-steppe vegetation zones in the High Lava Plains Physiographic Province of Oregon. Juniper, ponderosa pine, bunchgrass, bitter brush and sagebrush characterize the area. All riparian resources are of regional significance in the high desert.

Riparian Functions

There are many functions performed by riparian areas. A riparian area provides a buffer zone between upland land uses and water resources, protection or enhancement water quality, erosion prevention, and flow moderation. They can provide important wildlife habitat and contribute to in-stream habitat for fish. The Deschutes provides a very important riparian corridor for migratory song birds.

An undisturbed, densely vegetated riparian area traps sediment, inhibits erosion and filters runoff that originates from impervious surfaces, lawns, golf courses etc. A well-developed riparian area can moderate in-stream temperatures by shading the water. A cold water temperature is critical for some species of fish. A wider riparian corridor with dense woody vegetation will provide more interior area with good cover for wildlife. In comparison a lawn or maintained riparian edge is not useful to most wildlife, provides little or no hydrologic buffering or erosion control.

Description of the Deschutes River Reaches

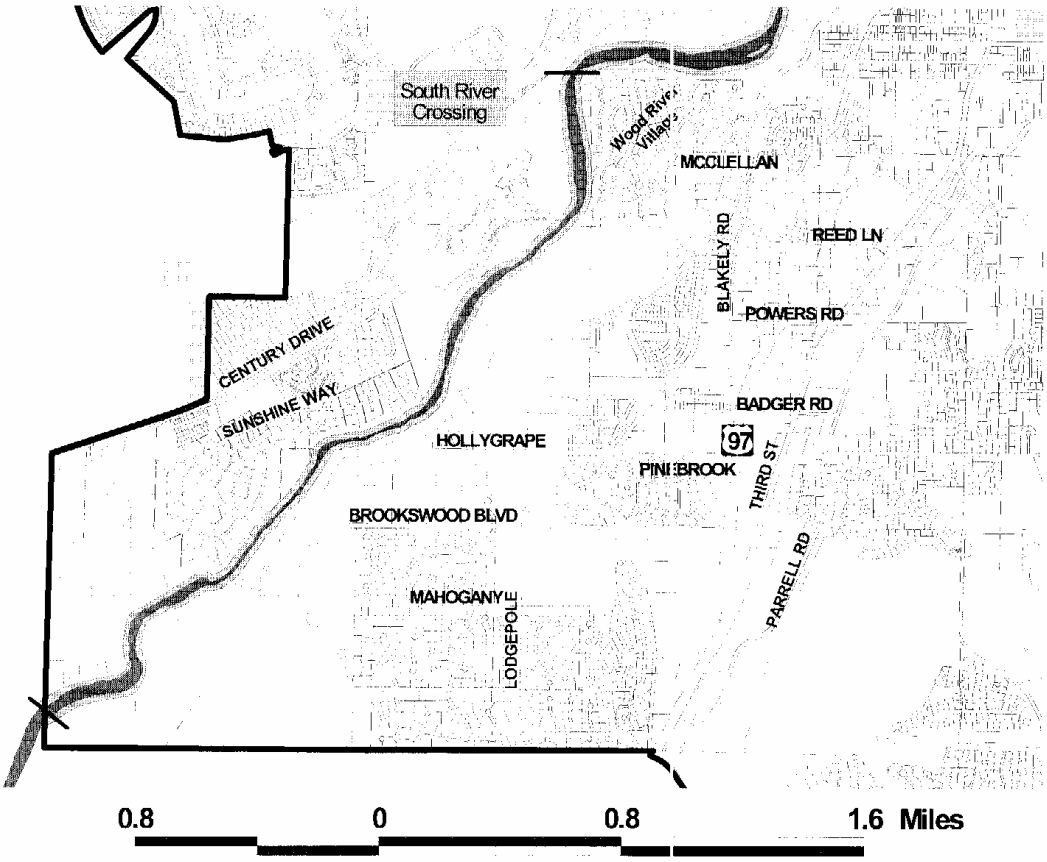
For planning purposes the Deschutes River was divided into three areas called reaches. Running downstream from south to north the reaches are: South Canyon, Pioneer, and Awbrey. The following is a description of each reach. See the Inventory Methodology section for information on how river reaches were determined. Maps of each reach follow the description.

South Canyon

Location: From south UGB to the approximate location of the proposed Southern bridge crossing (at northern end of Mt. Bachelor Village Resort.)

This is the most undeveloped stretch of river in the Bend Riverway. The river is in a steep rocky canyon for most of its length. Water is fast and the canyon is narrow. There is white water with deep pools and waterfalls. Lava rock is a dominant feature with boulder fields and steep slopes. There are areas of impressive rimrock. Upstream from the Reach boundary on the west side of the river is US Forest Service land and the river above the diversion is designated an Oregon Scenic Waterway. Deschutes River Woods, a large low-density sub-division is on the upstream, east side of the river outside of the UGB. The Central Oregon Irrigation District (COID) facilities feature prominently in this Reach. The diversion for the Central Oregon Canal originates in the southern end of the Reach. This is only the second diversion of the Deschutes River. A steel flume and canal road runs north from the diversion for 1.5 miles along the river on the east side. An underground COID hydro facility is located on the east riverbank across the river from Mt. Bachelor Village Resort. Public access is limited in this Reach, as most of the land is privately owned. Other than the resort, there are no currently no commercial businesses on this stretch of river (although a retirement home is proposed.) Woodriver Park is a small, unimproved neighborhood park within the Wood River subdivision. It has a 1/4 mile unimproved nature trail along the river. Advanced (non-motorized) boaters occasionally launch from the park. Mt. Bachelor Village has a 1.2-mile nature trail along the east bank of the river. The trail is privately owned but the walking public is currently allowed. COID maintains a third trail that is open to the public and runs east to west down to the river. In addition many people use the flume road for recreation which is in private (COID) ownership. Much of the area is forested with Ponderosa of varying ages. The Awbrey Hall fire came through the southern portion of the Reach in 1990 destroying 22 homes and altering wildlife habitat. Streamside vegetation is well developed along river's edge providing excellent wildlife habitat. There are three important wetland areas, at the south UGB border, along COID's property and at the COID hydro facility. All are primarily on the east side of the river. Wintering elk herds are often seen in the south end of the Reach from late December to early May. They cross the river in a couple of places. The meadow and forested areas are especially important for the elk herd and deer during severe winters. Other wildlife frequently seen include heron, osprey, hawks, kestrel, otter, porcupine, and mink. An osprey nest is used annually and a heron rookery may exist in the area – but is likely outside the UGB. Knapweed and other invasive weeds are gaining at toe-hold throughout the Reach - primarily along the canal and associated road and at the north end of the Reach.

DESCHUTES RIVER DESIGN REVIEW CORRIDOR
SOUTH CANYON REACH
UGB to South River Crossing



Pioneer Reach

Location: From approximately location of the proposed Southern bridge crossing to the North Canal Dam. The area is divided into three units: Old Mill, Downtown, and 1st Street

Old Mill Unit: From approximately the proposed Southern bridge crossing to Colorado Street Bridge:

This area is undergoing tremendous change. Formerly it was home to the Shevlin-Hixon and the Brooks Scanlon lumber mills. The river was used to move logs and river access was closed to the public. Today most of the mill buildings are gone or are being reconstructed. A new park, office buildings, retail, a movie theater and restaurants are built, under construction or planned. Almost the entire Old Mill Unit is disturbed. A riparian vegetation fringe is reestablishing along the river's edge. There is a well-defined transition to upland, usually 20 feet or less, from the river. The upland is mostly knapweed and other non-native species. Much of the area was rezoned to "mixed-use riverfront" which provides guidelines for development that includes encouraging public access. Two new bridges were recently opened - a footbridge and a vehicular bridge. As the area develops, public access will increase. There is an extensive, well-developed scrub-shrub wetland created by the Colorado dam (which was built in 1916 to create a millpond.) An undeveloped riverfront trail skirts the western shores of the river between the construction. As the trail heads upstream, the river sweeps west and the construction area is left behind. Tall red-gold cliffs topped by office buildings and a hotel border this area. Portions of the cliff contain one of the best areas in the world for viewing pyroclastic ash flow tuff from an eruption at Broken Top Mountain. Across the river to the east is the site of the old log deck where logs were stored by the mills. A new bridge, road and park are in the planning phases (called the Southern River Crossing) for this area. Storing logs for over 50 years has resulted in organic debris up to 20 feet deep on the site. At the writing of this report (November 2000) this fill was being removed. Prior to the beginning of the fill removal, the area was rapidly being overtaken by knapweed and will soon be again. Despite all the construction and lack of vegetative cover throughout most of the Reach, wildlife, from waterfowl to mammals, is frequently seen including otter, mink, osprey and trumpeter swan.

Downtown Unit: From Colorado Street to Newport Bridge (Bend Hydroproject):

This is the most developed reach in the UGB. It is characterized by large riverfront parks, a vibrant downtown and lovely old homes. The river is relatively wide and slow moving throughout most of the reach. Mirror Pond, a beloved feature in the landscape, is created by the Bend Hydroproject dam that has been in place since 1910. There are a few small islands in the river that are washing away. Silt is building up in the quieter waters behind the dam, creating very shallow areas. This area was dredged in the early 1980's. Much of the river is edged by concrete or rock wall that has been in place since the 1920's. There are large expanses of lawn adjacent to the river and sporadic areas of healthy riverside vegetation. The parks have large mature trees with some younger trees and limited understory vegetation. Wildlife species most often seen includes Canada geese, mute swans, ducks and other waterfowl, mink, river otter, and beaver. The best quality habitat is found in the north and south ends of the reach unit. People are a key feature in this reach and there is lots of public access. The river is an important tourist attraction,

bringing people to the area for scenic beauty as well as many special events in the parks. Powerlines cross the river at the Galveston bridge and Pacific Park - disrupting bird flight.

First Street Unit: From Newport Bridge to North Canal Dam:
The river flows from the Newport Bridge over the dam associated with the Bend Hydroproject through an area with homes and multifamily units on the west and Pacific Power Hydro plant and sub station on the east. The river runs under Portland Avenue over the Steidl Dam which creates an area of quiet water in front of Pioneer Park. Tumalo Irrigation District (TID) has a diversion on the westside of the river at this location. A new fish screen is planned. Tumalo Irrigation District placed the irrigation canal underground and this has created the opportunity to develop the Deschutes River trail that runs for ¾ of a mile along this unit and continues on for another 3 miles. The eastside of the river has developed into a large wetland that has some of the highest quality urban wildlife habitat in Bend and the area is home to otter, osprey, owl, and marmot along with other animals. The river is backed up by the North Canal dam and is slow and meandering with lots of cattails and rushes. The dam creates a pond area that is best viewed from Riverview Park which has several parking spots and a developed boardwalk for wildlife viewing and fishing.

DESCHUTES RIVER DESIGN REVIEW CORRIDOR
PIONEER REACH

South River Crossing to North Unit Dam

1 0 1 2 Miles

BEND UGB
DESCHUTES RIVER
30 FT SETBACK
40 FT SETBACK
100 FT SETBACK
PARK
TAXLOTS

Map produced by City of Bend
By: J. Fulghum 10-8-01
v:\arcview\long range\overlay

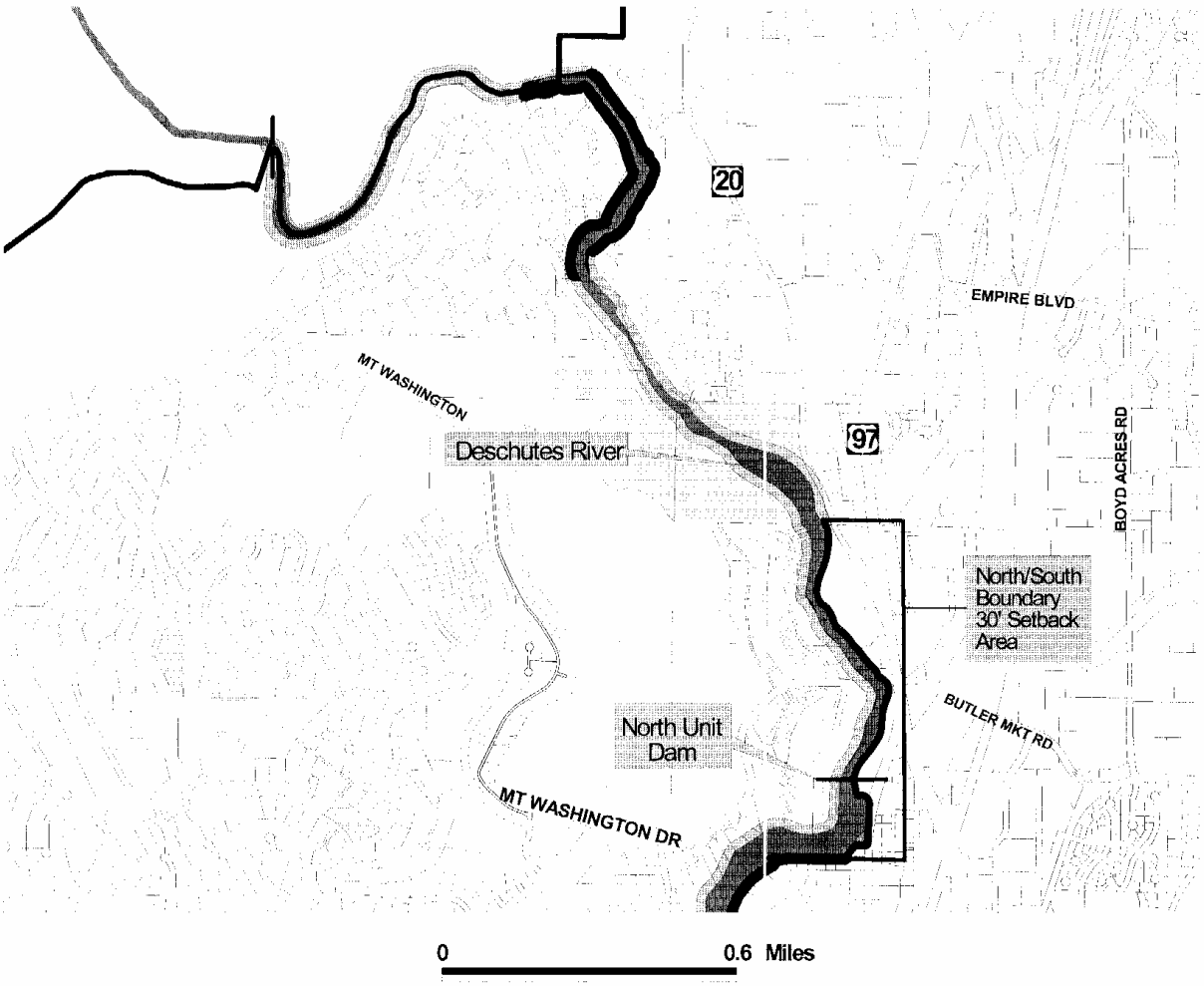
N

Awbrey Reach

Location: From the North Canal Dam to the north UGB (located on the river just west of the ravine on the north side of Awbrey Butte)

Below the dramatic North Canal Dam the water is fast and moves swiftly through a scenic canyon. The water level varies a great deal due to three diversions at the dam. In the winter the water is high and flowing fast through the steep canyon. It is a popular white water kayaking run. In the summer when the water is diverted, the river becomes a small creek. All of the water rights in this section of the river have been assigned which can result in very low flows (30 cubic feet per second is the agreed upon lowest flow.) This water fluctuation influences the type, amount and location of the riverside vegetation. The river flows under the Mount Washington bridge and past motels and houses that line the riverbanks. It then flows through Sawyer Park, a 61-acre natural park with a mature forest, well-developed scrub-shrub wetland, and streamside vegetation that provides excellent wildlife habitat for many species including hummingbirds, owls, deer, and mink. The river passes several more housing developments and then curves to the west. Land use along the remainder of this Reach is entirely residential with most houses perched on the rimrock cliffs. The South Canyon and Awbrey Reaches are physically very similar (natural features, wildlife, steep canyons, rocks, cliffs, mature trees, native vegetation, and primarily residential land use) and are valued by the community similarly in the Bend Riverway, A Community Vision.

DESCHUTES RIVER DESIGN REVIEW CORRIDOR
AWBREY REACH
North Unit Dam to UGB

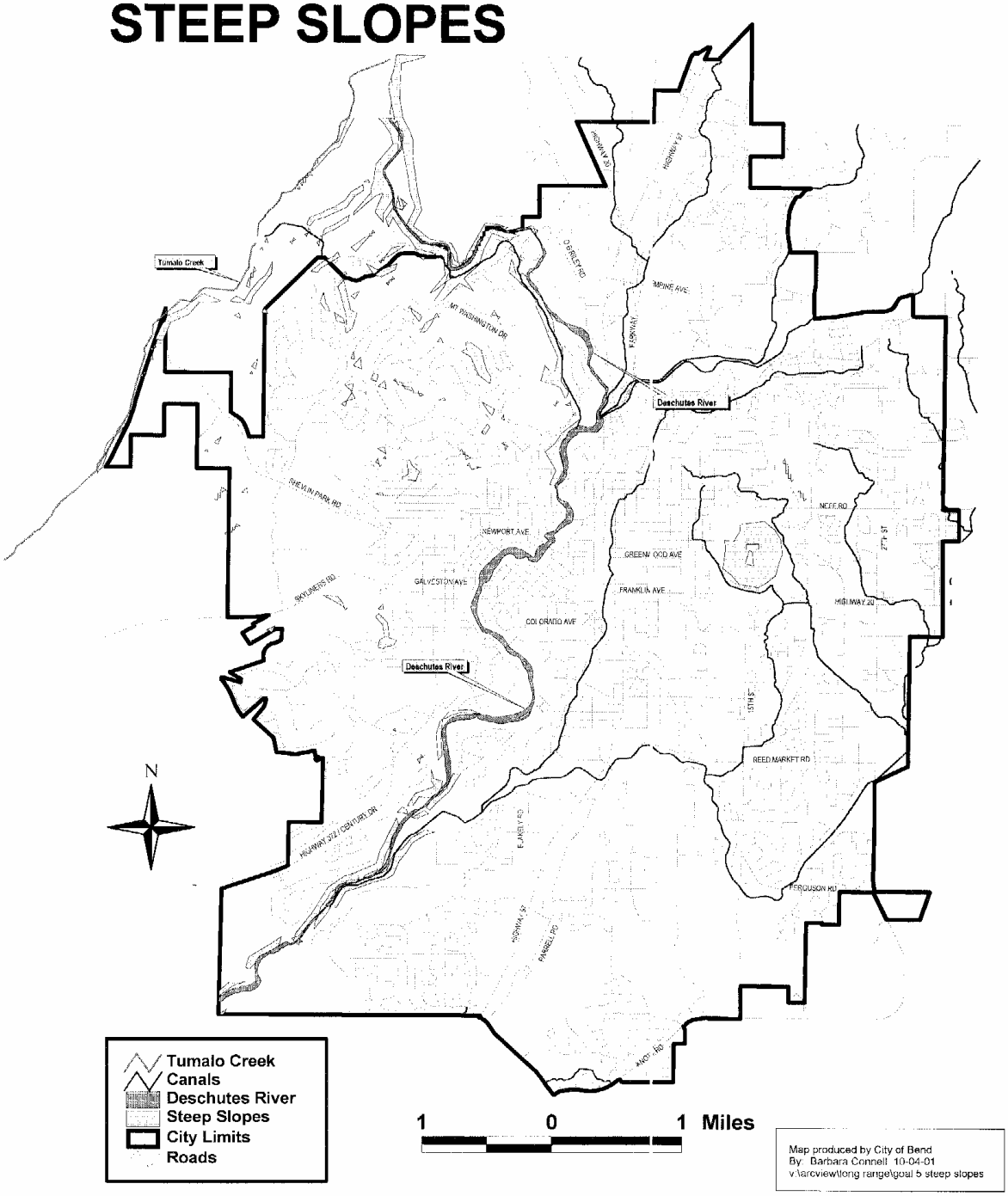


Steep Slopes, Floodplains and Areas of Special Interest

Steep Slopes

Areas of steep slopes were defined for the purposes of this report in the Inventory Methodology for Riparian Areas. The map on the following page shows general patterns of significant steep slope areas in Bend, and most of the cliffs in the canyons of the Deschutes River corridor. Cliff conditions may exist along the river in areas not shown on this map; at the same time, flatter and broader riparian areas may be present where steep slopes are indicated. Steep slopes are located in nearly all of South Canyon and Awbrey Reach and a short section in Pioneer Reach in the Old Mill Unit. In the areas of steep slopes Division of State Lands is primarily concerned about setbacks for vegetation for wetlands and riparian areas– mature trees in particular are protected on steep slopes. The state wants to protect trees that might have the opportunity to fall into the river because they add structure and nutrients important to a quality riparian condition. Ponderosa Pine is the tallest, most common tree in the river corridor. It grows to a potential height of 100 feet. Cottonwood can potentially grow taller (120 feet), but they are rare in the riparian area. The potential tree height (PTH) can figure into the setback distance for riparian protection.

STEEP SLOPES



Flood Plains

Flow in the Deschutes River is controlled by the Wickiup Dam and has very little fluctuation. The river is tightly controlled and rises and falls as dictated by irrigation and water storage needs. Maps showing the 100-year flood plain are maintained by the Federal Emergency Management Agency (FEMA). The river in Bend has only flooded significantly once in the past 20 years. The flood was due to an ice buildup that caused water to back up and eventually flood homes along Riverfront Street. This problem has been prevented since, by the installation of an ice boom when the temperatures dip. There has been some minor flooding just south of Sawyer Park and outside the area mapped by FEMA. The city has requested FEMA reassess this area and include it on the FIRM (Federal Insurance Rate Map) map if necessary.

Areas of Special Interest

There are two "Areas of Special Interest" (ASI) designated in the General Plan located along the banks of the Deschutes. These areas were designated to be conserved as a means of retaining the visual character and quality of the community. ASI's 29 and 33 encompass the river canyons and rimrock in the north and south portions of the urban area. See a City of Bend General Plan map for location. Regulations to protect ASI's were not adopted at the time they were designated.

Riparian Vegetation Inventory

Riparian vegetation is dependent on the pattern and availability of water. Examples of riparian vegetation commonly found along the Deschutes in the study area include; willow, alder, Oregon ash, spiraea, cattail, bulrush, and sedges. Depending on topography, soils, hydrology and other factors, riparian vegetation can extend inland for 100 feet or more. This is not the case along the Deschutes in Bend. A tightly controlled hydrologic flow combined with steep topography and low precipitation result in relatively narrow riparian vegetation borders along the river. The transition from riparian (or wetland) to upland is often abrupt and easily defined. There are however a number of flatter areas that formerly served as floodplains. Most of these areas have been severely disturbed over the past 100 years and may no longer support extensive riparian vegetation. This disturbance takes many forms including:

- permanent structures in riparian area
- fill placed in area changing the amount of water available in root zone
- maintenance (pruning, mowing or brush hogging riparian vegetation)
- replacement vegetation (lawn)
- hard edges placed on river's edge (rip rap, rock walls)

Each of these disturbances reduces the ability of native riparian vegetation to grow. Remedies to reestablish riparian vegetation include:

- remove structures from riparian area
- remove fill and reestablish natural grade and plant riparian vegetation
- reduce or limit maintenance
- remove non native vegetation and replace with riparian

- remove hard edges, re-contour grade and plant riparian vegetation

The diversions on the Deschutes have altered the natural flooding pattern of the river causing a disruption in the riparian vegetation. Water diversions (resulting in lower than naturally occurring flows) during the normal plant growing season have allowed woody vegetation to encroach unnaturally into the flood plain, constricting the river channel in places.

In a riparian area cottonwoods are often the tallest trees – growing 120 feet high or more. Cottonwoods usually require a flooding regime and coarsely textured soils (mineral soils) for reproduction. The flow in the Deschutes is tightly controlled in Bend and rarely floods. Lack of regular flooding may have reduced the cottonwood population. There are only a few cottonwood trees remaining in the study area. The following table has a list of riparian plants found along the Deschutes. See the Local Wetlands Inventory for a more extensive plant list.

Native Riparian Vegetation Likely to be found on the Deschutes River

Plant Type	Scientific Name	Common Name
Tree	Fraxinus oregana	Oregon ash
	Populus trichocarpa	black cottonwood
	Salix lasiandra	willow
Shrubs	Alnus sp. (probably not A. sinuata)	alder
	Angelica arguta	
	Heracleum lanatum	cow parsnip
	Prunus virginiana var. demissa	
	Rosa woodsii var. ultramontana (furthest away from river channel)	wild rose
	Salix geyeriana	geyer willow
	Spirea douglasii	spirea or hardhack
	Symphoricarpos albus	snowberry
Herbs	Lemna minor	duck weed
	Mentha arvensis	mint
	Mimulus guttatus	monkey-flower
	Montia perfoliata	miner's lettuce
	Polygonum coccineum	water smartweed
	Urtica dioica	nettle
	Veronica americana	veronica
Grass or grass like	Carex aquatilis	water sedge
	Carex canescens	gray sedge
	Carex vesicaria	inflated sedge
	Glyceria elata	
	Juncus balticus	
	Scirpus microcarpus	small-fruited bull rush
	Typha latifolia	cat-tail

Source: Reid Schuller 1999.

Safe Harbor Inventory Results

The safe harbor inventory and setbacks are based on the amount of average annual flow determined by cubic feet per second (cfs). The average annual flow of the Deschutes varies considerably from year to year. To determine average annual water year flows, data from 1966-1999 (33 years) was analyzed. After consultation with Kyle Gorman, watermaster with the Oregon Water Resources Department, it was determined that the river through Bend can be split into three distinct areas based on water flow. The three areas are:

- Upstream of the COID diversion (approximately river mile 170) the average annual flow is above 1000 cfs.
- The North Canal Dam (approximately river mile 165) flow is significantly below 1000 cfs due to significant irrigation diversions at the North Canal Dam
- The cfs between the COID diversion and the North Canal Dam gradually decreases as the river flows downstream. Flows from the Old Mill District to Portland Street are an average of 966 cfs.

The flow is reduced seasonally in Bend due to significant irrigation diversions within the UGB. See the following table for more detailed information. It is clear that the Deschutes would be over 1000 cfs flowing through Bend if not for diversions. However, the river has been diverted for irrigation for nearly 100 years. There has been action in recent years to maintain higher stream flow, including lining canals and repairing leaks. Despite these efforts, it is anticipated that significant amounts of water will continue to be diverted from the Deschutes in this area and that flows will average below 1000 cfs during the planning cycle.

Average Annual Flows in the upper Deschutes River 1966 – 1999

	Month (flows shown are cubic feet per second – cfs)												
Location	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**April**	**May**	**June**	**July**	**August**	**Sept**	**Yearly**
Deschutes River at Benham Falls	1030	718	796	870	912	969	1280	1861	2096	2185	2032	1749	**1375**
Arnold	*34.5*	*6.6*	*3.9*	*4.1*	*6.1*	*5.7*	*27.8*	*90.9*	*103.9*	*106.6*	*105.0*	*90.7*	***49***
COI Main Canal	*168.4*	*32.8*	*31.9*	*28.6*	*30.2*	*31.3*	*211.7*	*459.7*	*491.7*	*532.9*	*533.5*	*442.8*	***250***
Old Mill Flows to Portland Ave	717.2	569.1	649.8	726.8	765.6	821.8	930.4	1199.9	1390.2	1436.0	1283.6	1105.8	**966**
TID diversion @ 1st St.	*9.8*	*3.5*	*0.6*	*0.0*	*0.0*	*0.1*	*4.8*	*35.8*	*49.0*	*93.3*	*116.6*	*85.8*	***33***
Flows at 1st St Rapids to North Canal Dam	707.4	565.6	649.2	726.7	765.6	821.8	925.6	1164.1	1341.2	1342.7	1167.1	1020.0	**933**
North Unit Main Canal	*257*	*2*	*2*	*0*	*0*	*32*	*293*	*542*	*634*	*649*	*475*	*403*	*274*
North Canal	*174*	*26*	*26*	*23*	*27*	*24*	*216*	*444*	*498*	*522*	*524*	*444*	*246*
Swalley Canal	*57*	*7*	*6*	*6*	*7*	*6*	*50*	*94*	*115*	*110*	*117*	*93*	*56*
Deschutes River below Bend	255.6	577.4	650.3	730.8	761.3	777.4	353.3	80.2	69.5	53.9	58.8	83.5	**371**

Canal diversions in italics Source: Oregon Water Resources Department

Tumalo Creek has an annual average water year flow well below 1000 cfs as seen in following table.

Average Annual Flows in Tumalo Creek 1966 – 1987

	Month (flows shown are cubic feet per second – cfs)												
Location	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**April**	**May**	**June**	**July**	**August**	**Sept**	**Yearly**
Tumalo Creek at Shevlin	57	70	75	73	76	74	74	83	114	50	10	24	**65**

Source: Oregon Water Resources Department

The following table has an analysis of the current setbacks compared with the safe harbor setback requirements on the Deschutes River - by location. The current setbacks vary from 30 feet in areas zoned commercial, 100 feet in the Deschutes River Corridor Design Review Combining Zone, and 40 feet for the remaining areas. The 100-foot setback can be reduced to 40 feet through a variance. The three maps titled "Deschutes River Design Review Corridor" show the city's current setbacks on the Deschutes River.

Using the safe harbor method, the South Canyon Reach upstream of the COID diversion (in areas without steep slopes) requires a 75-foot riparian protection setback from the top of each bank. The remainder of the river downstream of the COID diversion requires a 50-foot setback from the top of each bank. Tumalo Creek requires a 50-foot setback.

Comparison of Current and Safe Harbor Setbacks

Location	Current Setback	Other regulations	Safe Harbor**	Comparison & Comment
South Canyon: From the southern UGB boundary (approximately the north boarder of Deschutes River Woods) to approx. location of proposed Southern Bridge Crossing.	100 feet Deschutes River Design Review required. Variance can reduce setback to 40 feet.	Steep slopes triggers standard Goal 5 inventory. Area upstream of COI diversion is within State Scenic Waterway. ASI #33 runs the entire length of reach on both sides of river. Fill and removal prohibited within 10 feet of top of bank.	75 feet upstream from COI intake; 50 feet in remainder of reach.	The city's 100-foot setback exceeds safe harbor requirements, except for 40 foot allowed variance.* State requires standard inventory methodology in areas of steep slopes. 10 foot fill and removal standard is 40 to 65 feet short of safe harbor.
Pioneer Reach - *Old Mill Unit*: Mixed Use Riverfront zone from Southern Crossing to Colorado Street.	100 feet Design Review required. Variance can reduce setback to 40 feet.	MR zoning has special requirements. ASI #33 runs entire length of eastside of river. Fill & removal prohibited w/in 10 feet of top of bank.	50 feet (based on estimated annual flow of 966 cfs). Safe harbor does not apply in areas of steep slopes.	The city's 100-foot setback exceeds safe harbor require-ments, except for 40 foot allowed variance.* 10 foot fill & removal is 30 feet short of safe harbor.
Pioneer Reach *–Downtown Unit*: From Colorado Street to Newport Bridge (Bend Hydroproject)	40 foot.design review on all but north edge as follows: 100 foot design review with allowed variance to 40 foot from Colorado Bridge to south edge of Miller property on E, N edge of McKay Park.	Fill and removal prohibited within 10 feet of top of bank.	50 feet (based on estimated annual flow of 966 cfs)	Safe harbor represents a 10 foot increase in the 40 foot setback area. Area with 100 foot setback exceeds safe harbor requirements, except for 40 foot allowed variance.* 10 foot fill and removal is 40 ft short of safe harbor. Most of area completely developed. A few undeveloped properties (Miller). Eight major parks.

Pioneer Reach – *First St. Unit*: Newport Bridge to North Canal Dam	A mix of 30, 40 and 100 feet setbacks. 100 foot can be reduced to 40 feet with a variance.	Fill and removal prohibited within 10 feet of top of bank.	50 feet (based on estimated annual flow of 966 cfs).	Safe harbor represents a 20 ft. increase in areas with a 30 ft. setback, 10 ft. in areas with a 40 ft. setback. Area with 100 ft. setback exceeds safe harbor requirements, except for 40 foot allowed variance.* 10 foot fill and removal is 40 feet short of safe harbor.

Location	Current Setback	Other regulations	Safe Harbor**	Comparison & Comment
Awbrey Reach: North Canal Dam to north UGB (west of ravine on north side of Awbrey Butte.)	100 foot design review with allowed variance to 40 feet on all but: 30 foot setback on east side of river from dam to Sawyer Park; 40 foot on both sides through Rimrock subdivision.	Steep slopes triggers standard Goal 5 inventory. Fill and removal prohibited within 10 feet of top of bank. ASI #29 runs along both sides of river from north edge of Sawyer Park beyond north UGB. State Wild & Scenic designation starts at south edge of Sawyer and runs north beyond UGB.	50 feet (based on annual flow of 371 cfs). Safe harbor does not apply in areas of steep slopes.	Safe harbor represents a 20 foot increase in areas with a 30 foot setback, a 10 foot increase in areas with a 40 foot setback. Area with 100 foot setback exceeds safe harbor requirements, except for 40 foot allowed variance.* 10 foot fill and removal is 30 feet short of safe harbor.

*The city's 100-foot setback exceeds the safe harbor, however, the 40-foot setback allowed by variance, does not meet safe harbor standards.
** Setback measured from upland edge of significant riparian wetland units.

Location	Current Setback	Other Regulations	Safe Harbor	Comparison and Comment
Tumalo Creek: North (downstream) from Aspen Hall pond	The Deschutes River Corridor structure setback standards do not apply to Tumalo Creek	City's 10 foot Fill and Removal conditional use permit standard applies to Tumalo Creek.	In general, the Goal 5 safe harbor 50 foot inventory setback could apply based on average annual flow of 65 cubic feet per second. However, steep slope exception may apply in parts	Fill and Removal review standard is 40 feet less than safe harbor setback.

Regulatory Analysis

This section summarizes the state requirements, reviews the city's current policies and regulations and then compares the two. The purpose of this section is to provide decision-makers and the community with a comparison of what the state requires with what the city already has on the books. The next section, Options for Protection, offers alternatives on how the city might proceed.

What the State Requires

Once a section the river or stream is designated significant, the state requires the following for the safe harbor method:

- a riparian boundary prescribed by the state (75 feet or 50 feet depending on flow)
- an ordinance preventing permanent alteration of the riparian area by:
  - grading
  - placement of permanent structures or impervious surfaces
- an ordinance to control the removal of riparian vegetation within the riparian boundary

All of the above requirements have some exceptions and a hardship variance process is required. Please see the complete text in OAR 660-023-0090 in the separately bound Goal 5 Reference Material. If the city chooses not to use the safe harbor and follow the standard inventory process, an ESEE analysis (a review of the positive and negative economic, social, environmental and energy consequences that could result from a decision to allow, limit, or prohibit a conflicting use) must be completed.

Safe Harbor Setbacks for Bend

Using the safe harbor guidelines, the South Canyon Reach upstream of the COID diversion (in areas without steep slopes) requires a riparian corridor boundary with a 75-foot setback for structures and vegetation removal from the top of each bank. The remainder of the river downstream of the COID diversion requires a 50-foot setback from the top of each bank because the average river flow is less than 1000 cfs. Tumalo Creek requires a 50-foot setback. A standard inventory is required in areas of steep slopes or cliffs. Areas of steep slopes were defined for the purposes of this report in the Inventory Methodology for Riparian Areas. Steep slopes are located in nearly all of South Canyon and Awbrey Reach and a short section in Pioneer Reach in the Old Mill Unit. Within these canyons are intermingled some flatter and broader areas adjacent to the river. Where these areas exist, the safe harbor guidelines of Goal 5 may be appropriate.

Existing City of Bend Policies

Policies from the Bend General Plan that are specific to riparian areas include the following from the Natural Features and Open Space chapter. Note: there are two large Areas of Special Interest on the river.

3. Beginning no later than 1999 and every three years thereafter, the Bend City Council or its designee shall hold public hearings to receive information identifying Areas of Special Interest and natural features. The city and county shall use this information to

update and clarify the designation of Areas of Special Interest and natural features on the Plan Map. [There are two large Areas of Special Interest on the Deschutes River.]

4. The city and county shall review proposed developments that include Areas of Special Interest and natural features identified on the Plan Map to ensure they follow the policies of this Plan.

14. The Bend Metro Park and Recreation District shall acquire strategic areas along the rivers, streams, and canals to protect and conserve scenic, recreational, and natural values, and make such areas accessible to the community.

17. The city and county shall seek opportunities to retain the banks and canyon of the Deschutes River as public or private open space throughout its entire length within the planning area.

18. Within the Areas of Special Interest designated on the Plan Map, the city and county may allow developments that carry out the intent of the Plan to enhance the variety and livability of the Bend Urban Area, and provided that such developments:
- are not subject to natural hazards;
- would not inflict irreversible harm to the riparian zone;
- would enhance public open space, parks and access;
- are designed to be compatible with natural features; and
- provide access to the river or a trail along the river corridor to the extent allowed by law.

19. The city and county shall prepare development regulations to further reduce visual and ecological impacts of development along Tumalo Creek and the Deschutes River.

20. The city shall request that the ODFW develop a list of trees and vegetation appropriate for planting along the Deschutes River. The list shall be used during design review of proposed riverfront development when landscaping or screening issues are considered.

Existing City of Bend Regulations

In addition to the policies in the General Plan, the city has adopted numerous regulations and zoning conditions in the Bend City Code. The important regulations providing protection to the Deschutes are:

Deschutes River Corridor Design Review Combining Zone 10.10.22A

Applies to: 100 feet on both sides of river within UGB
- Setbacks varying from 30 to 100 feet
- Building Height
- Design Review
- Building Design standards

Fill and removal standards 10.10.25(26)

Applies to: 10 feet on both sides of river within UGB

- Restricts removal of vegetation and material from riverbank or wetlands

Floodplain Combining Zone (10.22)

Applies to areas identified on the Flood Insurance Rate Map (FIRM), as 100-year flood areas.

- Requires structures in the floodplain to be flood proofed.

Mixed Use Riverfront zoning (10.10.21A)

Applies to: Primarily Old Mill District area

- Special riverfront standards for redevelopment of industrial area

Areas of Special Interest

Applies to: Specific areas identified on General Plan map (ASI 33 & 29 on river)

- Upland Areas of Special Interest were identified and are protected by zoning ordinance amendments on September 19, 2001 (NS-1803). Regulations covering River Corridor Areas of Special Interest have been proposed as part of the Goal 5 program which is based on this inventory.

The following section contains pertinent edited excerpts from the codes outlined above.

Deschutes River Combining Zone

The Deschutes River Combining Zone (10-10.22A) includes the following conditions for the Deschutes River. Please note that the following is edited to capture the essence of the code. For a complete version of 10-10.22A refer to the separately bound Goal 5 Reference Material.

It is the purpose of the Deschutes River Corridor Design Review Zone to:

a) Recognize and respect the unusual natural beauty and character of the river.
b) Conserve and enhance the existing riparian zone along the Deschutes River.
c) Allow the community flexibility in reviewing development proposals within the Areas of Special Interest that are designated on the Bend Area General Plan.
d) Maintain the scenic quality of the canyon and rimrock areas of the Deschutes River.
e) Conserve and enhance property values.
f) Preserve, protect and enhance water quality.
g) Encourage development, preservation and enhancement of reasonable public access to the river for recreational use and visual enjoyment.

All new development, structures, additions and exterior alterations to structures within the Deschutes River Corridor are subject to a design review process by the Bend Urban Area Planning Commission (BUAPC).

Within the Deschutes River Corridor the following minimum standards shall apply:

A. Building and Parking Setbacks. 100 foot setback area. For the areas described below, the setback for all new buildings, parking lots and loading areas shall be a

minimum of 100 feet from the ordinary high water mark unless a lesser setback is approved. In no case shall the setback be less than 40 feet from the ordinary high water mark of the Deschutes River.

- The east and west bank from the Arizona/Commerce Street line to the southern boundary of the Bend Area General Plan map;
- The east bank from the southern property line of Magill's Landing Subdivision to the northern property line of the Bend Riverside Motel;
- The east bank from the southern property line of Sawyer Park to the southern boundary of the Rimrock West Subdivision;
- The east and west banks from the northern boundary of the Rimrock West subdivision to the northern boundary of the Bend Area General Plan map and
- The west bank north of the Park District property known as "Flume Park" to the southern boundary of the Rimrock West Subdivision.

After the applicant has demonstrated through design review that the project provides at least the following, the BUAPC may approve a lesser setback:

- Protection of water quality, and fish and wildlife habitat;
- The improvement or restoration of riverfront riparian areas by the creation of new riparian vegetation areas or by improvements to existing riverfront riparian areas through appropriate plantings, and;
- The provision of open space along the riverfront:

B. Commercial Property. For all existing commercially zoned property within the Deschutes River Corridor in existence upon the adoption of this ordinance, the setback for all buildings, parking lots, and loading areas shall be 30 feet from the ordinary high water mark of the Deschutes River.

C. Other Areas. For the areas not described above, all buildings, parking lots, and loading areas shall be 40 feet from the ordinary high water mark of the Deschutes River. In no case shall the setback be less than 40 feet from the ordinary high water mark of the Deschutes River.

The BUAPC may approve features to enhance or support public use such as sidewalk, streets, plazas, bridges.

Maximum building height shall be limited to 30 feet at the minimum setback line. The BUAPC may allow increases in building heights as allowed by code.

In addition to the minimum standards above, the BUAPC shall review the development using the following design criteria and may require the following as consistent with purpose of the ordinance:

a) Conservation of natural features
b) Compatibility with existing area
c) Colors and material compatibility with surrounding area
d) Increased setbacks, limitations of building heights

e) Public access along the riverfront
f) Enhanced site landscaping

Fill and Removal 10.10.25(26)

No person shall fill or remove any material or remove any vegetation within the bed and banks of any stream, river or wetland (defined as 10 feet on either side of the top of bank) unless approved by a Hearings Body. To apply to fill or remove vegetation from within 10 feet of the river, stream or wetlands a plan must be filed. The Hearings officer must consider the effects on the following:

- Hydrology, water supply and water quality
- aquatic life and wildlife habitat
- recreation, aesthetics, and economics
- character of area

Floodplain Combining Zone

The Floodplain Combining Zone (FP Zone Section 10.22). Applies to the areas identified on the Flood Insurance Rate Map (FIRM), as special flood hazard areas inundated by 100-year flood and floodway areas. The purpose of this section is to promote the public health, safety, and general welfare, and to minimize public and private losses due to flood conditions. The code:

- Regulates residential buildings in the floodplain to be elevated 1 foot above base flood elevation
- Requires non-residential structures to be floodproofed
- Regulates construction materials and methods
- Specifies land development standards to be designed to minimize flood damage
- Provides regulations for alteration of watercourses so that the flood carrying capacity is not diminished

A Hearings Body may grant a variance if it finds the variance will not result in increased flood heights, additional threats to public safety or extraordinary public expense.

Mixed-use Riverfront Zone

The Mixed-use Riverfront Zone or MR Zone (Section 21A). All land within 100 feet of the river is subject to the River Corridor Design Review (10.10.22A above). The MR zone also includes the following conditions for the Deschutes River:

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The purpose of this zone is to implement the General Plan policies for the creative redevelopment of mill site properties adjacent to the Deschutes River. It is intended to allow for a mix of uses that:

- Provide a variety of employment opportunities and housing types;
- Foster pedestrian and other non-motor vehicle activity;

- Ensure functionally coordinated, aesthetically pleasing and cohesive site planning and design;
- Ensure compatibility of mixed-use developments with the surrounding area and minimize off-site impacts associated with the development; and
- Encourage access to, and enjoyment of, the Deschutes River.

Areas of Special Interest

Although "Areas of Special Interest" are called out in the General Plan, there are currently no regulations protecting them. See policies number 3, 4, and 18 in the section called "Existing Policy" or refer to the General Plan Chapter 2 in the Goal 5 Reference Material document for the complete text of the policies.

Comparison of the State Goal with the City of Bend's Existing Regulations

Setbacks

The 100-foot setback currently required on much of the river exceeds those required by the state as a safe harbor guidelines (75 or 50 feet). However, the planning commission may approve a lesser setback of no less than 40-feet from the ordinary high water mark. This allowance is consistently less than required by safe harbor. The setbacks of 30 and 40 feet on the remainder of the river are less than the state requirements for safe harbor. See Table 5 for locations of setbacks. The state allows alteration of the 75 or 50-foot safe harbor setback in certain cases (see below) but does not allow a reduction of the setback like the city currently does.

Alteration of the Riparian Area

The state's safe harbor requires the city to have an ordinance to prevent permanent alteration of the riparian area caused by grading, placement of structures or impervious surfaces (with exceptions.) The city's Fill and Removal regulation (10.10.26) appears to fulfill this safe harbor requirement *except that the area protected by the city is only 10 feet from the top of the bank.* To fulfill safe harbor requirements, the protected area would need to be expanded to 75 or 50 feet as appropriate according to flow. The city's regulation allows for applicants to apply for a conditional use permit through a hearing body. The regulation provides specific criteria to the hearing body for consideration when evaluating a request for a conditional use. Most of the criteria deal with mitigating impacts. The state safe harbor requires that the city's ordinance allow hardship variances in the case of map error or if the lot is rendered unbuildable by the regulation.

The state safe harbor specifies exceptions for streets, roads, paths; drainage facilities, utilities, and irrigation pumps; water-related and water-dependant uses; and replacement of existing structures if they are designed and constructed to minimize intrusion into the riparian area. The city's regulation appears to be consistent with this.

Removal of Riparian Vegetation

The city's Fill and Removal rule (10.10.26) regulates the removal of vegetation within 10 feet of either side of the riverbank. The Deschutes River Combining Zone

(10.10.22A(6)(a)) promotes the conservation of natural features including those in riparian areas. The Mixed-Use Riverfront Zone ((10.10.21A(6)(e)(A)) states that the design and development of landscaping shall "retain and conserve riparian vegetation within the bed and banks of the Deschutes River and adjacent to the river to the maximum extent practicable." The intent of these regulations appears to be consistent with the state goal except that the area protected by the city varies from a minimum of 10 feet from the top of the bank up to 100 feet based on the findings of the BUAPC or a hearing body. As with the Alteration of the Riparian Area section above, the state rules appear to be strict on the required variances (see above). The state also requires the city to provide the following exceptions in the regulation: removal of non-native vegetation is allowed and should be replaced with native plant species; removal of vegetation necessary for the development of water-related or water-dependant uses is allowed; and the regulation shall include a provision for hardship variances.

One of the largest concerns for Bend with regard to vegetation removal is private and public areas of lawn along the river. The state suggests in an example ordinance, that existing lawn in the riparian area may be maintained but not expanded and riparian vegetation should never be replaced by lawn. If codified by Bend, this may present design challenges for areas such as the new 22-acre riverfront park and the Old Mill District. Both areas are currently devoid of any native vegetation 10-20 feet from the top of the river bank.

Options for Protection

The city must determine if there are significant riparian Goal 5 resources within the UGB. If any portion of the Deschutes River or Tumalo Creek within the UGB is designated significant, the resource must be protected. Important factors in determining significance were analyzed in the Inventory Results section to aid in this process.

Information provided in the Regulatory Analysis section demonstrated that the Bend Code provides varied setback protection to the Deschutes riparian corridor. If riparian areas are determined to be significant the city must show that current riparian protections meet state goals or make appropriate changes. The following range of options has been developed as a starting point for discussion. An ESEE analysis (a review of the positive and negative economic, social, environmental and energy consequences that could result from a decision to allow, limit, or prohibit a conflicting use) must be conducted for the chosen option other than the safe harbor. The Goal 5 administrative rule (OAR 660-23) provides direction on conducting the ESEE analysis.

Range of Options for Setbacks

A. *No change for Deschutes, new setbacks for Tumalo:* Retain the existing setbacks and regulations protecting the Deschutes. Add similar setbacks for Tumalo Creek. Retain the current variance requirements.

The current setback regulations of 30, 40 and 100-feet on the Deschutes vary depending on the area and primarily reflect zoning and existing land use. They were developed from information in the River Study conducted in the 1980's. Property owners on the river are aware of the setbacks and seem to understand their importance. They are tailored to the existing uses in the area. The setbacks can be confusing and are sometimes difficult to administer because they vary. The 100-foot setbacks are greater than those recommended by the state (75 and 50 feet). However, the planning commission may reduce the city setbacks to 40-feet, which is less than required by safe harbor. The state safe harbor does not allow a reduction of the setback. An ESEE analysis is required to explore these differences. Add a safe-harbor (50-foot setback) or other protection for Tumalo Creek.

B. Current Setbacks Retained – Variance Language Modified to Safe Harbor for Deschutes, Add setback regulations for Tumalo: Retain the existing setbacks of 30, 40 and 100 feet on the Deschutes. Modify the allowed setback reduction to 50 to meet the safe harbor setback. Add safe harbor setback (50-foot setback) or other protection for Tumalo Creek. A majority of the areas along the river currently has 100-foot setbacks including:

- All of South Canyon Reach
- All of the Old Mill Unit in the Pioneer Reach
- Portions of 1st Street Unit of Pioneer Reach
- Most of Awbrey Reach

In many cases the city has reduced the setback to 40-feet as allowed with a variance. Current regulations state that a setback reduction from 100 feet to 40 can be considered after the applicant has demonstrated that the project provides at least the following: protection of water quality and fish and wildlife habitat; the improvement or restoration of riparian areas and; the provision of open space along the riverfront. The safe harbor setback requires a procedure for a hardship variance in the case of a map error or if a lot is rendered unbuildable. Under the safe harbor, an applicant may also receive authorization to alter up to 50 percent of the riparian setback area upon a demonstration that equal or better protection will be ensured through restoration or enhancement – but the setback is not reduced. This option would affect landowners that were anticipating receiving a reduction in their setback through current code.

The areas with 30 and 40-foot setbacks with very few exceptions are already built out. These areas are a bit confusing to administer (a good map will be helpful) and they afford less protection than safe harbor standards. An ESEE analysis would likely only be necessary for the 30 and 40-foot setbacks.

C. Safe Harbor: Except in areas of steep slopes, use the safe harbor method and which requires a consistent 75-foot setback on the upstream portion of South Canyon Reach (above the COID diversion) and a 50-foot setback on remainder of the river (except in areas of steep slopes.) Retain the 100 foot setback (or reduce to 75-

feet) on areas of steep slopes in South Canyon and Awbrey Reaches. Add language to the regulations regarding setbacks for significant riparian wetland units. Modify the current variance requirements to match the safe harbor hardship procedures. ESEE analysis is not required for the safe harbor option. Note: In areas of steep slopes, the actual setback distance must be based on inventory findings, rather than automatic use of the safe harbor option.

Setback widths vary from 30 to 100 feet now, so this option will affect property owners in different ways. See the table on Current Setbacks for more information. Some will be able to use more of their property (primarily those in the unsloped areas of the South Canyon and Awbrey Reaches) and some will have more constraints (those with property in the Pioneer Reach). The property owners in the South Canyon and Awbrey Reaches with steep slopes would have a reduced setback.

The primary impact of this option is on the Pioneer Reach. Much of this area is already built out at approximately a 40-foot setback. This setback would increase by 10 feet. The regulation would need to address existing development. There are some large undeveloped properties in the Pioneer Reach, scattered throughout, primarily in the Old Mill Unit. All of the large undeveloped parcels are zoned commercial or Mixed Use Riverfront.

A consistent 75-foot setback on both South Canyon and Awbrey would be easier to regulate than the current regulations, which vary from 30 to 40 to 100 feet along the river. Although 75-feet is less than the current setback for all of South Canyon and most of the 100-foot setback is often reduced to 40-feet, the minimum allowed. A 40-foot setback in the Pioneer Reach reflects today's reality, but is less than the safe harbor of 50 or 75 feet and an ESEE analysis would have to weigh this option.

The city would need to develop safe harbor setback requirements for the protection of significant riparian wetlands. This requires measuring the riparian setback from the upland edge of the wetland. The city currently has only the 10 foot Fill and Removal restrictions on wetlands.

The safe harbor setback contains a procedure for a hardship variance in the case of a map error or a lot is rendered unbuildable. An applicant may also receive authorization to alter up to 50 percent of the riparian setback area upon a demonstration that equal or better protection will be ensured through restoration or enhancement. This is a different from the current city regulation that allows a reduction of the 100-foot setback to 40-feet after the applicant has demonstrated that the project provides at least the following: protection of water quality and fish and wildlife habitat; the improvement or restoration of riparian areas and; the provision of open space along the riverfront.

Range of Options for the Alteration of the Riparian Area

A. *Retain Existing Fill and Removal Regulation*: The city may decide it does not wish to change the regulation. An ESEE analysis is necessary for this option.

B. *Modify Fill and Removal Regulation to Match Safe Harbor*: Modify the language in the Fill and Removal regulation to meet safe harbor protections. This means an increase in the fill and removal setback from 10 feet to 75 feet in the upper South Canyon and 50 feet on the remainder of the river and Tumalo Creek in addition to changes to the conditional use allowance.

Range of Options for Removal of Riparian Vegetation

A. *Retain Existing Vegetation Removal Regulations*: No change to existing to regulations. An ESEE analysis is necessary.

The city would argue that a 10-foot minimum fill and removal area on each river or creek bank is adequate in conjunction with other safeguards in the Combining Zone and MR zone that require BUAPC review. The city would have to address the situation of vegetation clearing in the absence of a building permit. In other words, if a person just wants to clear land (riparian vegetation) more than 10 feet from the river they currently do not need a permit – therefore sidestepping BUAPC review.

B. *Modify Vegetation Removal Regulation to Match Safe Harbor:* Increase the fill and removal area to match safe harbor. Add language to the city's regulations to more closely match the state's administrative rule, primarily regarding exceptions to the regulation. Add language to retain and conserve riparian vegetation on Tumalo Creek. An ESEE analysis would not be required under this option.

This represents an increase in riparian protection, especially in areas with significant riparian vegetation. This regulation may include limitations or suggestions on what can be planted within the riparian area. There are several areas, primarily in the Old Mill unit that currently have limited riparian or native vegetation due to historic disturbances, alterations in the topography by added fill to the area, and on-going construction. Noxious weeds are prevalent in the riparian area in some places. An ordinance could address areas with little or no existing riparian vegetation. The reestablishment of riparian areas (which may include grading and planting) goes beyond that required by Goal 5. However, if this issue is not addressed, some of the riverfront may remain unsightly and/or knapweed infested seed banks. Incentives could be developed for restoration and enhancement.

Wetlands

Summary

Local governments are required to use criteria and procedures established by the Land Conservation and Development Commission to identify significant wetlands under Statewide Planning Goal 5. To comply, a Local Wetlands Inventory (LWI) for the City of Bend was conducted. When approved by the state the LWI will replace the National Wetland Inventory map for the study area. The inventory revealed that there are no known significant Goal 5 wetland resources outside of the riparian corridor of the Deschutes River. The entirety of the Deschutes River within the UGB was evaluated as a single wetland system at the recommendation of the Department of State Lands wetland biologist. Within this system, ten specific wetland units have been inventoried that meet the state criteria for significance, meaning that the city must meet the state goals for protecting it. This may be accomplished through a new wetland protection ordinance or by modifying existing river corridor regulations. A summary of the LWI methodology and findings are located in this document. The complete City of Bend Local Wetlands Inventory is separately bound.

Goal 5 Wetlands Defined

Wetlands are areas that are inundated or saturated with water long enough to support plants that are adapted to life in saturated soils. Wetlands share three common characteristics:

- **Water** in abundance over a period of time. The prolonged seasonally or permanently saturated area creates the wetland (developing hydric soil that support wetland plants)
- **Hydric soils** are distinctive soils formed by saturated conditions
- **Wetland plants**, or "hydrophytes" are water loving plants with special adaptations for living in hydric soils.

Local governments are required conduct an inventory to identify, classify, and protect significant wetland areas. The standard Goal 5 inventory methodology does not apply for wetlands. Instead, local governments are required to conduct a systematic survey called a Local Wetlands Inventory (LWI). Wetland functions to be evaluated in the LWI include wildlife and fish habitat, water quality and floodwater retention.

At the conclusion of the LWI process, the city is required to develop programs to protect significant Goal 5 wetland resources if such programs do not already exist. The city must coordinate with appropriate state and federal agencies when adopting programs intended to protect wetland resources. Wetlands are the only Goal 5 resource with a state-mandated set of criteria to determine if the resource is significant. The criteria are outlined in the next section.

Locally Significant Wetland Criteria

Wetlands are the only Goal 5 resource with a specific methodology to determine whether or not the resource is significant. A summary of the methodology follows. For the complete administrative rule for identifying significant wetlands refer to OAR 141-86-300 in the separately bound Goal 5 Reference Material.

Exclusions

Wetlands can not be designated as locally significant if they fall within any one of the following categories (list edited for the City of Bend).

Wetlands artificially created entirely from upland that are:

- Created for the purpose of controlling, storing, or maintaining stormwater
- Ditches without a free and open connection to natural waters of the state and which do not contain food or game fish
- Less than one acre in size and created unintentionally as the result of:
    - Irrigation water overflow or leakage; or
    - Construction activity not related to compensatory mitigation for permitted wetland impacts; or
- Of any size and created for the purpose of wastewater treatment, farm or stock watering, settling of sediment, or as a golf course hazard.

Significant Criteria

A local government must identify a wetland as locally significant if it meets one or more of the following criteria:

1. The wetland performs any one of the following functions at the levels indicated below using the Oregon Freshwater Wetland Assessment Methodology (OWFAM):
    - "Diverse" wildlife habitat; or
    - "Intact" fish habitat; or
    - "Intact" water quality function; or
    - "Intact" hydrologic control function.

2. The wetland is less than one-fourth mile from a water body listed by the Department of Environmental Quality as water quality limited (303 (d) list), and the wetland's water quality function is described as "intact" or "impacted or degraded" using OFWAM. A local government may determine that a wetland is not significant under this subsection if the wetland does not provide water quality improvements.

3. The wetland contains one or more rare plant communities as defined by OFWAM.

4. The wetland is inhabited by a federal threatened or endangered, or a state sensitive, threatened or endangered species, unless the appropriate state or federal agency indicates that the wetland is not important for the maintenance of the species.

5. The wetland has a direct surface water connection to a stream segment mapped by the Oregon Department of Fish and Wildlife as habitat for indigenous anadromous

salmonids, and the wetland is determined to have "intact" or "impacted or degraded" fish habitat function using OFWAM.

Safe Harbor Method

Once a wetland has been determined to be significant the city must either conduct an ESEE analysis or use the safe harbor method to protect the wetlands. Under the safe harbor the city is required to adopt an ordinance to protect significant wetlands. It must include restrictions on grading, excavation, placement of fill, and vegetation removal other than perimeter mowing and other cutting necessary for hazard prevention; and includes a variance procedure to consider hardship variances and claims of map error. See Goal 5 Reference Material (660-023-0100(4)) for the complete text.

Inventory Methodology

A Local Wetlands Inventory (LWI) was conducted for the City of Bend in accordance with the standards and procedures in the Oregon Administrative Rules (141-086-0110). The LWI is a separately bound document titled City of Bend Local Wetland Inventory.

The inventory and mapping process was fully documented in order to ensure accuracy and consistency throughout the process. Documentation includes:

- Wetland determination procedures used
- Dates and scales of source maps and air photos used
- Technical staff members and qualifications
- Field data sheets for each wetland field-verified, including wetland code, and for all sites sampled that failed to meet wetland criteria
- Field maps, sample plot, notes, any measurements taken and topographical maps with wetland determinations

Maps and resources consulted for the City of Bend LWI include:

- US Soil Conservation Service county soil survey
- National Wetlands Inventory map
- FEMA floodplain maps
- USGS topographic map 7.5 minute series, Bend Quadrangle
- Color aerial photos dated June 2000. 1 inch = 1680 feet
- Color aerial photos dated August 1998
- Topographic maps 1 inch = 100 feet prepared by City of Bend
- Existing Conditions Report in the Bend Riverway, A Community Vision
- Other resources located in the Reference section of this document

Agencies and local knowledge consulted include:

- Oregon Department of Fish and Wildlife
- Deschutes County
- Local Knowledge individuals – at early public involvement meeting
- Local Knowledge Groups:

1. ARLU-DeCo, Bob Bates
2. Central Oregon Audubon Society, Chris Carey
3. Deschutes Basin Land Trust, Brad Chalfant
4. Deschutes Soil and Water Conservation District, Jeff Rola
5. Friends of Bend, John Neilson, Liz Rewick
6. High Desert Ecological Research Institute, David Dobkin
7. Morrow Planning, Catherine Morrow
8. Natural Areas Association, Reid Schuller
9. Oregon Native Plant Society, Stu Garrett
10. Oregon Natural Desert Association, Tim Lillebo
11. Sisters Forest Planning Association, Paul Dewey
12. Upper Deschutes Watershed Council, Barbara Lee

To begin the inventory process, information on wetlands within the City of Bend Urban Growth Boundary was compiled onto one working map. The information included:

- Wetlands identified from the National Wetlands Inventory map greater than ½ acre
- Riparian wetlands identified in the Bend Riverway Existing Conditions Report;
- Hydric soil information from the US Soil Conservation Service county soil survey ;
- Floodplain location information from FEMA;
- Wetlands or possible wetlands identified from air photos
- Golf course locations
- Irrigation canal locations
- Sites to check based on local knowledge

Each potential wetland was assigned a unique number. All wetlands and possible wetlands were then field verified by Riverway staff (see the LWI for staff qualifications.) All wetlands were classified by type according to the U.S. Fish and Wildlife Service's Classification of Wetlands and Deepwater Habitats of the United States (Cowardin classification). The OFWAM manual questions were completed in the field for all riparian wetlands. Each site was photographed.

All of the identified non-riparian wetlands and golf hazards were field checked and those that were less than one acre and artificially created met the exclusion criteria. For these sites a modified short form was filled out for each site that documented use and hydrologic source. The modified form includes information on the function of the wetland.

Upon completion of the fieldwork, a staff wetland biologist (Dana Field) from the Department of State Lands (DSL) field checked the work. Three field analyses were conducted by DSL, confirming wetland sites.

The LWI consists of a summary report with referenced data sheets, maps and photos. It is organized by the following categories:

- Riparian wetlands
- Non-riparian wetlands greater than 1 acre
- Non-riparian wetlands less than 1 acre
- Golf hazards less than one acre

A summary sheet was prepared for each wetland for inclusion in the LWI. The summary sheet includes:

- Individual wetland code
- Street address or equivalent sufficient to locate site
- Public Land Survey identifier (Township, Range, Section, Quarter Section)
- Approximate wetland size (in acres)
- Wetland Classifications (Cowardian system)
- Soil type(s)
- Hydrologic basin
- Description of wetland, including dominant plant community or communities
- Affected tax lots
- Hydrology source and use of artificially create wetland
- Field verification date(s)

All identified wetlands greater than 0.5 acres were located generally on a map included in the LWI. Mapping for non-excluded wetlands (riparian wetlands and non-riparian wetlands greater than 1 acre) was done on topographical maps (1 inch = 100 feet) at an accuracy of approximately 25 feet. The approximate acreage for each wetland was calculated.

The OFWAM manual questions were completed for all riparian wetland units. Each site was photographed. Each riparian wetland unit boundary was determined and mapped on topographical maps scaled 1 inch equals 100 feet. The wetland determination was conducted by city and Riverway staff by analyzing the vegetation and topographical breaks. A check of this work was conducted by DSL staff.

Inventory Results

After careful analysis of aerial photos, the National Wetlands Inventory and soils map, discussions with those with local knowledge, and extensive fieldwork it was concluded that there are no known Goal 5 wetland resources within the City of Bend's UGB other than those within the riparian corridor of the Deschutes River. There appear to be no significant wetlands in the upland areas of the UGB.

As for the wetlands along the Deschutes River, DSL staff determined that the entire river corridor is a hydrologically connected wetland system that should be treated as a whole. This corridor supports ten specific wetland units that meet the definition of significant as defined by the state. These significant wetlands are shown on the map on p. 48. According to Goal 5, wetlands that meet the definition of significant must be protected.

A quick summary of the inventory results is as follows:

- The Deschutes River corridor is treated as one wetland system
    - The wetland system fit the criteria of a significant wetland

    - The wetland system was divided into three wetland areas (A, B, and C) and inventoried
    - 10 wetland units were inventoried in the riparian area
- 8 non-riparian wetlands greater than 1 acre were inventoried
- 39 non-riparian wetlands meeting the exclusion criteria were inventoried
    - 20 non-riparian wetlands less than 1 acre
    - 19 golf hazards less than 1 acre
- All non-riparian wetlands met the exclusion criteria (due to size or hydrologic source)
- No riparian wetlands were found on Tumalo Creek (only about ¼ mile of the creek is within the UGB. There are many wetlands on the creek outside the UGB.)

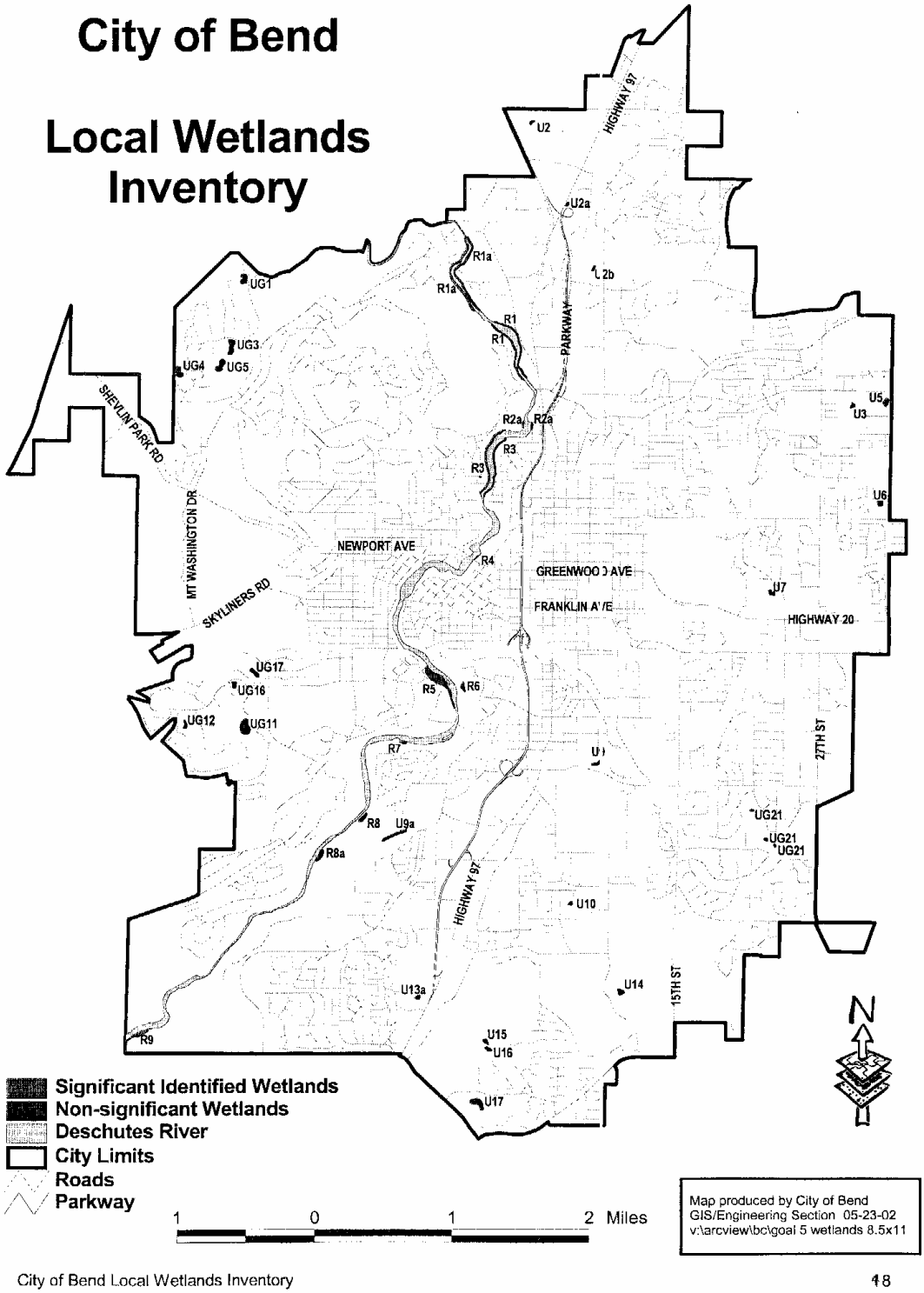
All identified non-riparian wetlands greater than ½ acre were inventoried including irrigation ponds, golf hazards, wastewater treatment facilities, ornamental ponds, and areas where irrigation conduits have leaked. All appeared to be artificially created entirely from upland and fed by irrigation water based on pipes and ditches nearby. Bend's non-riparian wetlands fall into the following categories, which are excluded, from being significant Goal 5 resources:

Wetlands artificially created entirely from upland that are:

- Created for the purpose of controlling, storing, or maintaining stormwater
- Less than one acre in size and created unintentionally as the result of:
  -Irrigation water overflow or leakage; or
- Of any size and created for the purpose of wastewater treatment, farm or stock watering, settling of sediment, or as a golf course hazard.

Some of these ponds have well developed wetland vegetation. They may be very old as irrigation began in about 1904. Some have been prevented from establishing wetland vegetation through maintenance practices. It is possible that some may be have been wetlands, wet meadows or low spots in the topography prior to the routing of irrigation water. If the hydrology is altered (leaky conduits fixed, water diverted away from the site, etc.) and a wetland remains over time (without an artificial source of water), it may be a significant Goal 5 resource. It is possible, but not likely that any of these artificially created areas will persist without irrigation water based on the soils map which does not indicate any wetland soils away from the river.

The map titled "Identified Wetlands" shows all the wetlands that were inventoried or investigated for inventory. (Those determined by the GIS analyst at Deschutes County to be under 1/2 acre are shown on the map, but were not inventoried.) Refer to the LWI for detailed inventory information on the non-riparian wetlands that did not meet the criteria for significant wetlands. The remainder of this section will focus on those wetlands that meet the criteria for significant wetlands in Bend.



City of Bend Local Wetlands Inventory

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Wetland Functions
Wetlands provide many benefits to people and their environment. They can function to help control floods, enhance water supplies, improve water quality and provide diverse wildlife habitat. Using the OFWAM methodology, wetlands in Bend were evaluated based on the following functions:

- Wildlife Habitat
- Fish Habitat
- Water Quality
- Hydrologic control
- Sensitivity to impact
- Enhancement potential
- Education value
- Recreation value
- Aesthetic quality

Deschutes River Riparian Wetlands
The only wetlands meeting the definition of significance as Goal 5 resources are found within the Deschutes River riparian corridor. In fact the entire riparian corridor is considered a single wetland system for the purpose of the Local Wetland Inventory. The corridor includes ten significant wetland units within the riparian area boundary. The corridor is measured from and includes the upland edge of these wetlands.

The river was divided into three areas for inventory purposes. The inventory areas match the riparian reaches (South Canyon, Pioneer, and Awbrey) are mapped and described in detail in the Inventory Results for Riparian Area section of this report. Each reach contains important wetland units that are described below. Much more detail, including the complete OFWAM information, is available in the separately bound Local Wetland Inventory.

South Canyon Reach - Wetland A
Location: From south UGB to the approximate location of the proposed Southern Crossing bridge.

There are three wetland units that are particularly well developed. They are described below. See the map titled "South Canyon Reach Riparian and Wetland Area" and the description of the South Canyon reach in the Inventory Results section of Riparian Areas. Please refer to the LWI for complete information.

South Canyon Reach Wetland Units

Legend: W: west; E: east; B: both sides of river

Name	Map Code	Location	Description	Approx. Size in Acres
South UGB	R9	At south UGB, primarily on E side of river	Includes a pond created by dredging. Osprey nest on W side of river. Extends beyond UGB. Area on both sides of river currently undeveloped.	Land 2.5 Water 5
North COID	R8a	Across from south end of Mt. Bachelor Village, primarily on E side of river	Evidence of flooding, dense scrub-shrub. Knapweed infestation in adjacent upland. No development nearby.	Land 1.5 Water 2
COID Hydro Plant	R8	Adjacent to COID hydro plant on E side of river, across from Mt. Bachelor Village – primarily on E side	Well-developed wetland located at point water is returned to river from hydro- plant. Evidence of flooding. Only development is hydro- plant.	Land 1 Water 2.5

Pioneer Reach – Wetland B

Location: From approximately location of the proposed Southern Crossing bridge to the North Canal Dam

There are five wetland units that are particularly well developed. They are described below. See also the description of this Reach in the Inventory Results section of Riparian Areas. Please refer to the LWI for complete information.

Pioneer Reach Wetland Units

Legend: W: west; E: east; B: both sides of river

Name	Map Code	Location	Description	Approx. Size in Acres
Log Deck	R7	At (old) Log Deck footbridge, primarily on E side of river downstream from bridge	Very small wetland area. Wildlife (otter, muskrat, mink) seen often. Much enhancement potential. Will be part of new park.	Land <1 Water 8.5
Colorado Street	R5	Upstream from Colorado St. bridge, primarily on W side of river	Created by Colorado St. dam built in 1916 for log storage. One of two large, high quality wetlands in study area. Very natural, but quite hidden although next to busy road. Birding & education opportunities.	Land 6.5 Water 11
Bend Hydro-plant	R4	Downstream from Newport bridge, adjacent to Elks building, primarily on E side of river	Small wetland area created by Bend Hydroproject, built in 1910. Parking lot adjacent to riparian edge.	Land 1 Water 1.1
1st Street	R3	From 1st Street on W and Revere on E, continuing on both sides of river to River's Edge Golf Course	One of two large, high quality wetlands. Formed by the backup of North Canal Dam. Significant diversity, high quality wildlife habitat. Protected from development by rock cliffs on E, river trail on W. Dominated by scrub-shrub with well forested upland adjacent. Serious invasion of yellow iris.	Land 5 Water 10
Riverview Park	R2a	Upstream of North Canal Dam, primarily on E side of river	Smaller wetland caused by North Unit dam built in 1920. Wildlife (otter, osprey) seen frequently. Undeveloped on W, busy road on E – but at higher elevation.	Land 2.5 Water 3

Awbrey Reach Wetland C

Location: From the North Canal Dam to the north UGB (located on the river just west of the Mt. Washington ravine)

There are two wetland units that are particularly well developed. They are described below. See also the description of this reach in the Inventory Results section of Riparian Areas. Please refer to the LWI for complete information.

Awbrey Reach Wetland Units

Legend: W: west; E: east; B: both sides of river

Name	Map Code	Location	Description	Approx. Size in Acres
Sawyer Park South	R1	Both sides of river from Riverhouse footbridge to Sawyer Park footbridge	Very important natural wetland. Dominated by scrub-shrub but high interspersion with emergents. High quality wildlife habitat. Most protected as park.	Land 5 Water 4.5
Sawyer Park North	R1a	From north end of Sawyer Park to private footbridge in RimRock Subdivision.	Series of smaller wetlands along river. Mostly scrub-shrub. Provides important habitat for wildlife on riparian corridor. Bordered by residential development, but protected by being in canyon.	Land 3 Water 5

OFWAM Summary of Functions and Values

Important Riparian Wetlands adjacent to the Deschutes River and Tumalo Creek

Name	Unit	Wildlife Habitat	Fish Habitat	Water Quality	Hydrologic Control	Sensitivity to Future Impacts	Enhance-ment Potential	Education	Recreation	Aesthetic Quality
South UGB	R9	**Diverse**	Impacted	Impacted	Impacted	Potentially Sensitive	NA	Not appropriate	Not appropriate	Pleasing
North COID	R8a	**Diverse**	Impacted	**Intact**	Impacted	Potentially sensitive	NA	Potential	Potential	Pleasing
COID Hydroplant	R8	**Diverse**	**Intact**	Impacted	Impacted	Potential	NA	Educational	Potential	Pleasing
Log Deck	R7	Some	Impacted	**Intact**	**Intact**	Sensitive	High	Educational	Potential	Pleasing
Colorado St.	R5	Some	Impacted	**Intact**	**Intact**	Potentially	High	Potential	Recreation	Pleasing
Bend Hydroplant	R4	Some	Impacted	Impacted	**Intact**	Potential	High	Potential	Recreation	Moderate
1st Street	R3	Some	Impacted	**Intact**	**Intact**	Potential	NA	Educational	Potential	Pleasing
Riverview Park	R2a	**Diverse**	Impacted	Impacted	**Intact**	Potential	NA	Potential	Recreation	Pleasing
Sawyer Park South	R1	Some	Impacted	Impacted	**Intact**	Potential	NA	Educational	Recreation	Moderate
Sawyer Park North	R1a	**Diverse**	Impacted	Impacted	**Intact**	Potential	NA	Educational	Recreation	Moderate

Bold type indicates the function level meets the criteria for a locally significant wetland. Only one **bolded** function is needed to meet the state requirements for a locally significant wetland.

All of the riparian wetland units meet the criteria for a locally significant wetland.

Regulatory Analysis

This section summarizes the state requirements for wetland protection, reviews the city's current policies and regulations and then compares the two. The purpose of this section is to provide decision-makers and the community with a comparison of what the state requires with what the city already has on the books. The next section, Options for Protection, offers alternatives on how the city might proceed.

What the State Requires

Local governments are required to use criteria and procedures established by the Land Conservation and Development Commission to identify significant wetlands under Statewide Planning Goal 5. The City of Bend must protect significant wetlands as defined by the state. See "Goal 5 Wetlands Defined" in this chapter for more information or refer to OAR 141-86-300.

There are three distinct categories of wetland in Bend. Excluded wetlands, requiring no further protection under Goal 5, wetlands greater than one acre that are not significant, and significant wetlands that require protection.

Excluded Wetlands

All of the non-riparian wetlands under one acre fit the exclusion criteria. All are created unintentionally as the result of irrigation water overflow or leakage; or were created for the purpose of wastewater treatment, farm or stock watering, settling of sediment, or as a golf course hazard.

Wetlands Greater Than One Acre that are Not Significant

There are eight wetlands that are greater than one acre but do not meet the requirements for a significant wetland.

Significant Wetlands

Only the ten wetland units within the Deschutes River corridor met the criteria for significant wetlands. The entire riparian corridor was considered a single wetland system after field review by DSL staff.

Additional Comments on State Requirements

Once approved by the Division of State Lands, the LWI will be used in place of the National Wetlands Inventory (NWI) and will be incorporated into the Statewide Wetlands Inventory (SWI). A LWI fulfills the location and quantity information required for Goal 5 analysis, but not quality. In order to meet the quality information required for Goal 5 analysis, a wetland quality assessment must be conducted. The quality assessment may be conducted in conjunction with the inventory or at a later date.

A LWI provides good information for planning purposes and on location of potentially regulated wetlands, but is not of sufficient detail for regulatory certainty under the state

Removal-Fill Law. It is important to note that state and federal regulations apply to wetlands regardless of whether or not they are mapped in the LWI.

When the LWI is approved by the Division, the local jurisdiction shall notify by mail within 120 days all landowners of record whose parcel contains a wetland that: (1) Their parcel(s) was included in the wetlands study area; and (2) There is a wetland mapped on their parcel.

Existing City of Bend Policies
There are no policies specific to wetland protection in Bend's general plan.

Existing City of Bend Regulations
The City has the following regulations specific to wetlands:

Fill and Removal 10.10.25(26)

> … no person shall fill or remove any material or remove any vegetation, regardless of the amount, within the bed and banks of any stream or river, or in any wetland, unless such fill or removal is approved as a conditional use by the Hearings Body.

Subdivision Code:

> Section 6.015 (3) Street Layout and Cul-de-sacs. … Cul-de-sacs and dead end streets shall only be permitted when the following conditions are met:
>
> - presence of a wetland or water body which cannot be crossed; or
>
> Section 6.020 (2) Size of Blocks. No block shall be longer than 1,200 feet … except where street location is restricted by natural topography, wetlands, or other bodies of water.

MR Zone 10.10.21A

> (6)Building and Site Development Standards. (e)(A) Retain and conserve riparian vegetation within the bed and banks of the Deschutes River and adjacent to the river to the maximum extent practicable**.** There shall be no net loss of natural wetlands adjacent to the river.
>
> Note: Land use decisions are primarily made by local governments, but wetlands are also regulated by both the Oregon Division of State Lands and the U.S Army Corps of Engineers.

Comparison of the State Goal with the City of Bend's Existing Regulations
Excluded Wetlands: Bend's current Fill and Removal regulation may apply to excluded wetlands. There is no criteria excluding them in the code. No further protection is required under Goal 5 unless these areas prove to be natural wetlands when/if the hydrology supporting them is altered or removed.

Wetlands Greater Than One Acre that are Not Significant: Bend's current Fill and Removal regulation may apply to these areas. There is no criteria excluding them in the code. No further protection is required under Goal 5 unless these areas prove to be natural wetlands when/if the hydrology supporting them is altered or removed.

Significant Wetlands: Under the safe harbor the city is required to adopt an ordinance to protect significant wetlands. It must include restrictions on grading, excavation, placement of fill, and vegetation removal other than perimeter mowing and other cutting necessary for hazard prevention; and includes a variance procedure to consider hardship variances and claims of map error. Currently the city has a Fill and Removal ordinance (10.10.25(26)) that applies to wetlands. The setback for Fill and Removal is 10 feet from either side of the wetland edge. There are a couple mentions of wetlands in the Subdivision Code and a no net loss regulation in the MR Zone.

Options for Protection

Because all of the significant wetlands are within the Deschutes River Corridor, the city has the option of using the riparian setback regulations along with other existing regulations to protect wetlands. Depending on changes in the riparian ordinance, wetlands on the river would receive additional protection in the form of building setbacks, buffer area for fill and removal and vegetation removal.

The city also has the option to separate wetland resources from riparian resources and adopt a wetland ordinance. In either case, language should be considered to protect significant non-riparian wetlands in the event one is discovered or an excluded wetland is determined to be a natural wetland.

Wildlife Habitat

Summary

For the purpose of Goal 5, wildlife habitat is defined as a documented area that wildlife depends on for food, water, shelter, and reproduction. Examples include wildlife migration corridors, big game winter range, and nesting and roosting sites. The wildlife inventory for Bend relies upon information provided by Oregon Fish and Wildlife, local experts' previous reports and field visits. If significant wildlife habitat is located, the city is required to develop programs to protect significant wildlife habitat if none exist. ODFW concluded there are no Goal 5 wildlife habitat resources requiring protection in the UGB. ODFW did make number of specific land use and regulatory recommendations to the city for consideration. In addition, local citizens and a wildlife biologist expressed a strong interest in protecting elk and deer winter range within the UGB.

Goal 5 Wildlife Habitat Defined

For the purpose of Goal 5, wildlife habitat is defined as a documented area that wildlife depends on for food, water, shelter, and reproduction. Examples include wildlife migration corridors, big game winter range, and nesting and roosting sites. An area is documented when it is identified on a map published or issued by a state or federal agency or by a professional with demonstrated expertise in habitat identification.

Local governments are required to conduct an inventory of wildlife habitat and then determine if it is significant by following either the safe harbor or standard Goal 5 methodology. See the separately bound Goal 5 Reference Material for the complete rule.

At the conclusion of the inventory process, the city is required to develop programs to protect wildlife habitat if they do not already exist. The city must coordinate with appropriate state and federal agencies when adopting programs intended to protect threatened, endangered, or sensitive species habitat areas.

Inventory Methodology

The wildlife inventory relies upon information provided by Oregon Fish and Wildlife, local experts, and the following local written reports:

- Bend Riverway Existing Conditions Report (an appendix within the Bend Riverway Community Vision.) This report was written in 1999 and provides extensive information about wildlife and habitat along the Deschutes River corridor. The report was the work of a non-profit group guided by a 38 member technical advisory committee that included seven biologists from ODFW, US Fish and Wildlife Service, non-profit agencies and the private sector.

- Bend Urban Land Survey. This report was completed in 1999 and is an inventory and ranking treatment of 33 Areas of Special Interest, the Deschutes River Corridor and Tumalo Creek. Volunteers completed field assessments over a period of two years. Local and state agencies were involved in designing the methodology employed in the report. Wildlife, vegetation and habitat were identified for all the sites.

Numerous other resources were used and are compiled in the Reference section of this report. As required by the state, the inventory includes a review of current information on:

- Threatened, endangered, and sensitive wildlife species habitat information;
- Sensitive bird site inventories;
- Wildlife species of concern and/or habitats of concern identified and mapped by ODFW (e.g., big game winter range and migration corridors, golden eagle and prairie falcon nest sites, and pigeon springs).

In addition the following work was completed:

- Reviewed current aerial photos for wildlife corridors
- Contacted local wildlife experts:
  - Steven George, ODFW biologist
  - Ted Wise, ODFW fish biologist
  - Bob Davison, Wildlife Management Institute
  - Chris Carey, President, Central Oregon Audubon (and ODFW wildlife biologist)
- Solicited local knowledge from community at public meetings
- Conducted field visits to areas with reported local knowledge on elk habitat, a heron rookery, osprey nests, and quality wildlife habitat in Areas of Special Interest and Deschutes River corridor.

Inventory Results

The Oregon Department of Fish and Wildlife (ODFW) has identified a number of Goal 5 resources in the City of Bend in a recent report requested for this inventory. The report includes five big game species, ten birds, generic non-game species and a variety of habitats as Goal 5 resources. No threatened or endangered species were singled out for protection. The complete ODFW report can be found in Appendix C.

Threatened and Endangered Species

The ODFW inventory for threatened or endangered wildlife or fish species does not include any sites within the City of Bend UGB. Red-band trout is a state listed sensitive species that is found in the Deschutes River. Spotted frog is being considered for listing in the area by the federal government but there is no identified habitat for them within the UGB.

Big Game

Six species of big game that are considered sensitive in the State and are Goal 5 resources were identified by ODFW in Deschutes County. Antelope are listed for the county, but are not found in the UGB.

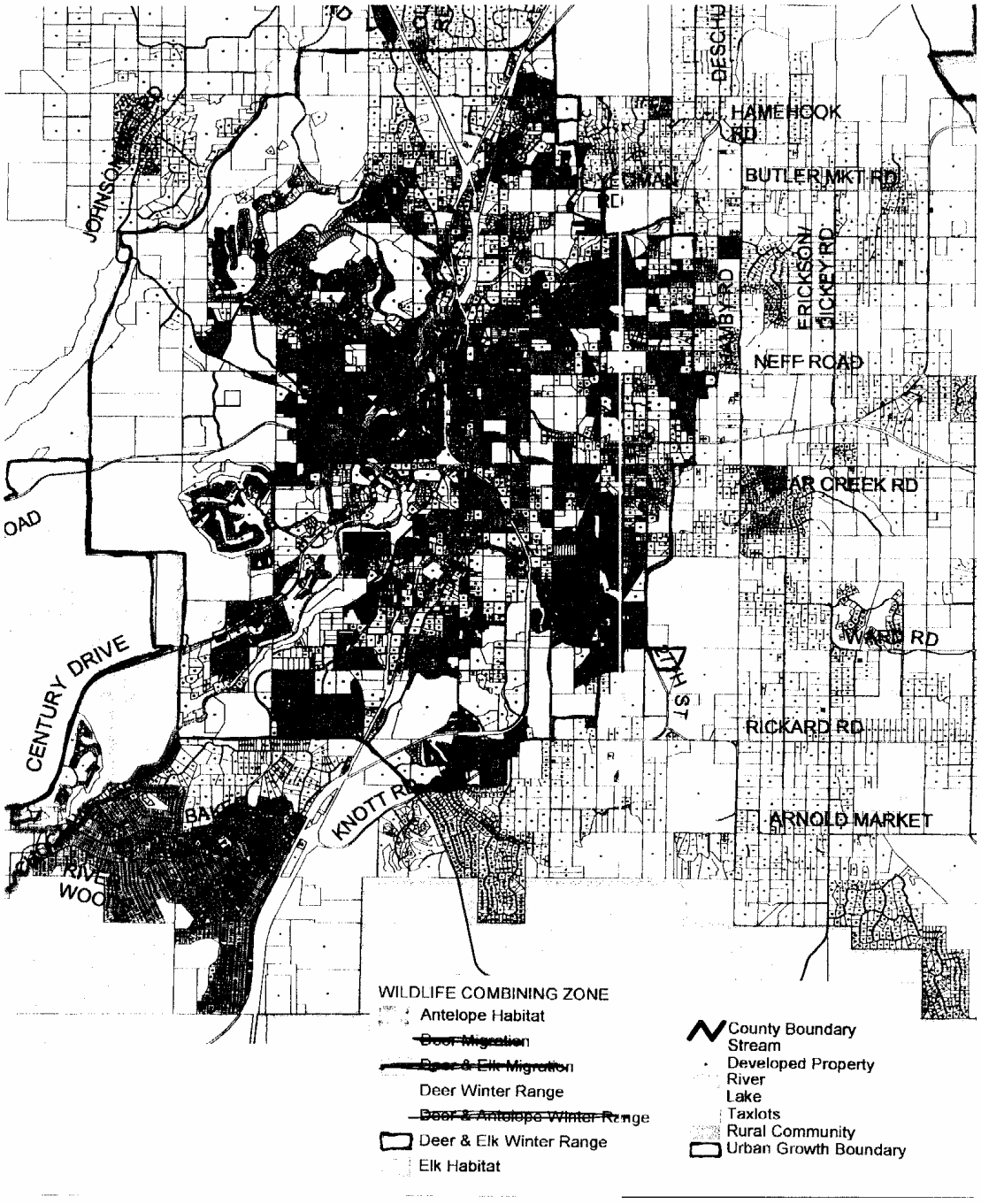
Big Game Resources

Resource	Resident w/in UGB	Occasional w/in UGB	Population Estimate in County*	Comment
Antelope	No	No	600	Population declining
Black bear	No	Yes, rarely	100	
Cougar	No	Yes, rarely	50	Populations increasing
Elk	No	Yes, primarily in southern & western fringes in winter (December to May)	1,000	Populations increasing
Mule deer	Yes	Yes	25,000	
Silver grey squirrel	Yes, common	Yes	500	

*Estimate for Deschutes County, 2000. Source ODFW

The ODFW report states that there are no Goal 5 big game habitats that need protection within the city limits of Bend. Deschutes County has adopted ordinances with the aim of protecting big game habitats directly adjacent to the city limits. The ODFW reports states "these habitats are extremely important to the overall health of these big game herds and are extremely critical to our ability to manage these herd at the levels the public desires." The report further states that the county ordinances are adequate but are not practical for the city to adopt.

ODFW Wildlife Habitat Map



Bob Davison, a local wildlife biologist and Northwest Field Representative of the Wildlife Management Institute wrote with comments on big game habitat. For the purposes of this inventory, Mr. Davison is recognized as a professional with demonstrated expertise in habitat identification under OAR 660-023-0110.

Mr. Davison states that the area locally known as "Elk Meadow" in the southwest corner of the UGB should be evaluated and included in the Goal 5 inventory. He notes that Elk Meadow encompasses roughly 320 acres, of which approximately 200 acres are valuable as big game winter range. The following is an excerpt from Mr. Davison's letter. The entire letter is located in Appendix C.

"About 200 elk utilize this site and the surrounding general area in the winter. The site also is heavily utilised by mule deer as winter range. Big game winter range, particularly elk winter range, within Bend's Urban Growth Boundary (UGB) is very limited and becoming increasingly rare and degraded. While elk occasionally utilize other areas along the western and southern fringes of the City, no other location within the City of Bend regularly provides anywhere close to as much winter range for as many elk as the 200 acres in the vicinity of Elk Meadows.

"The big game winter range in the vicinity of Elk Meadows is significant wildlife habitat within the City of Bend's UGB. No other comparable site for these Goal 5 resources exists within the UGB. Under OAR 660-023-0110, wildlife habitat inventory information shall include habitats of concern, such as big game winter range, identified and mapped by the Oregon Department of Fish and Wildlife (ODFW.)"

"*According to the ODFW, the loss of the 200 acres of big game winter range in the vicinity of Elk Meadows "will reduce the capacity of this area to winter elk and reduces the number of elk that could winter in this area." The effect of any loss of this big game winter range is that "the population may have to be reduced" to keep its numbers in balance with what the remaining habitat can support. Such consequences would be significant to the continued existence of these Goal 5 resources within the City of Bend.*

"The cumulative effects on big game winter range and other Goal 5 resources also are significant and increasing. Throughout the West and in the Bend area, the big game habitat in greatest jeopardy is that which is at relatively low elevation and at the wildland/urban interface, such as the big game winter range in the vicinity of Elk Meadows. Evidence is increasing that the greatest effects to these habitats result not from the direct effects of a particular action, but from the combination of individually minor effects of multiple actions over time. The ODFW has stated that there already "has been tremendous impact to fish and wildlife resources in this area from human disturbance."

Local citizens also identified elk and deer winter range in the southern and western edges of the UGB. Riverfront property owners in the south end of the UGB have consistently reported viewing between 10 and 70 members of the Benham Falls elk herd feeding in the winter months in an area known locally as "Elk Meadow." The elk are present on and off on both sides of the river from late December to late April or early May, presumably depending on the snow pack in the higher elevations. In fact, as this report is being

written (the second week in December, 2000) there have been several sightings of about a dozen elk moving into the UGB and an elk was killed by a vehicle on Century Drive near Widgi Creek.

Local residents report that the elk follow specific routes on both sides of river. The area was burned in 1990 during the Awbrey Hall fire and the habitat changed significantly from a forested area to an open meadow. The area on the eastside of the river has been recognized as a wildlife refuge in the past and the owner has received special tax credit for many years for protecting the area. Both sides of the river are within a city designated Area of Special Interest (#33) and is within the State Scenic Waterway. The area was recently annexed into the city and a large development has been proposed for the area on the east side of the river. The ODFW report states that "Human activities have been documented to have a negative effect on these big game habitats."

Birds

The following is a list of birds that use habitat in Deschutes County. The list was compiled by ODFW and represents birds that are especially sensitive to human activity.

- Coopers hawk
- golden Eagle
- goshawks
- great blue heron
- northern Bald Eagle
- osprey
- peregrine falcon
- prairie falcon
- sharp-shinned hawks
- spotted owl

The ODFW states that there are currently no bird habitat sites within the City of Bend UGB that need protection from conflicting uses.

In addition to the sensitive bird species identified by ODFW, there are many birds frequenting the Bend area. There are at least three active osprey nests in the river corridor in the UGB. Osprey are a Goal 5 resource. Two nests are human-built platforms and one appears to be a natural nest. Our area provides important migratory bird habitat in the winter. The following list was compiled by Chris Carey, President of the Central Oregon Audubon Society for the Bend Riverway in 1999.

Birds of the Deschutes River in Bend, Oregon

Abundance Symbols:

C: Common, certain to be seen in suitable habitat
U: Uncommon, may be present only during appropriate season and habitat
R: Rare, a few seen most years in appropriate season and habitat
A: Accidental, seen fewer than ten times since records have been kept

Seasonal Use Symbols:

R: Resident, occurs all year, nests nearby
M: Migrant, seen mostly in migration or nests away from river corridor
B: Breeds and nests in general vicinity of river

Bird Inventory

Type	Species	Abundance	Seasonal Use
Loons & Grebes	Pied-bill Grebe	O	M
Pelicans, Herons	American white pelican	A	M
	Double-crested Cormorant	C	M
	Great blue heron	C	R
Waterfowl	Tundra swan	R	M
	Mute swan	C	R
	Trumpeter swan	C	R
	Canada goose	C	R
	Wood duck	U	M
	Green-wing teal	U	M
	Mallard	C	R
	Northern pintail	U	M
	American wigeon	C	R
	Ring-neck duck	U	M
	Common goldeneye	U	M
	Barrow's goldeneye	R	M
	Bufflehead	U	M
	Hooded merganser	U	M
	Common merganser	U	M
Raptors	Turkey vulture	U	M
	Osprey	C	B
	Bald eagle	U	M
	Northern harrier	R	M
	Sharp-shinned hawk	U	R
	Cooper's hawk	U	R
	Red-tailed hawk	U	R
	American kestrel	U	R
	Merlin	R	M
	Peregrine falcon	A	M
	Prairie falcon	R	M
Gallinaceous birds	California quail	C	R
Rails, Cranes	American coot	U	M
Shorebirds	Killdeer	C	R
	Spotted sandpiper	U	B
	Common snipe	U	B

Type	Species	Abundance	Seasonal Use
Gulls, Terns	Ring-billed gull	U	M
	California gull	U	M
	Caspian tern	R	M
Doves	Rock dove	C	R
	Mourning dove	C	R
Cuckoos	Yellow-billed cuckoo	A	B
Owls	Great horned owl	C	R
	Northern Saw-whet owl	R	R
	Pygmy owl	R	B
Nighthawks, Swifts	Common Nighthawk	C	B
	Vaux's Swift	U	M
Hummingbirds	Anna's hummingbird	U	B
	Rufous hummingbird	C	B
	Costa's hummingbird	A	B
Kingfisher	Belted kingfisher	U	R
Woodpeckers	Red-naped sapsucker	U	R
	Downy woodpecker	U	R
	Hairy woodpecker	U	R
	Northern flicker	C	R
Flycatchers	Olive-sided flycatcher	U	M
	Western wood-pewee	C	B
	Hammond's flycatcher	U	M
	Dusky flycatcher	U	M
Swallows	Tree swallow	C	B
	Violet-green swallow	U	M
	N. rough-winged swallow	U	M
	Bank swallow	U	M
	Cliff swallow	C	B
	Barn swallow	U	B
Jays, Magpies, Crows	Steller's jay	C	R
	Scrub jay	R	R
	Pinyon jay	U	R
	Clark's nutcracker	U	R
	Black-billed magpie	C	R
	American crow	U	M
	Common raven	C	R
Chickadees, Bushtit	Mountain chickadee	C	R
	Bushtit	U	R
Nuthatches, Creepers	Red-breasted nuthatch	C	R
	White-breasted nuthatch	U	R
	Pygmy nuthatch	C	R
	Brown Creeper	U	R
Wrens, Dipper	Rock wren	U	B
	House wren	C	B
	American dipper	U	R
Kinglets	Golden-crowned kinglet	C	R
	Ruby-crowned kinglet	C	R
Bluebirds, Thrushes	Western bluebird	U	M
	Mountain bluebird	U	M
	Townsend's solitare	U	R
	Hermit thrush	U	B
	American Robin	C	R
	Varied thrush	U	M

Type	Species	Abundance	Seasonal Use
Waxwings	Bohemian waxwing	U	M
	Cedar waxwing	U	R
Starling	European starling	U	R
Vireos, Warbler	(Solitary) vireo		
	(Warbling) vireo		
	Orange-crowned warbler	C	M
	Yellow warbler	C	B
	Yellow-rumped warbler	C	R
	Black-throated gray warbler	U	M
	Townsend's warbler	U	M
	MacGillivray's warbler	U	B
	Wilson's warbler	C	M
Tanager, Grosbeak	Western tanager	U	B
	Black-headed grosbeak	U	B
	Lazuli bunting	U	M
Towhee, sparrows	Green-tailed towhee	U	B
	Spotted towhee	C	R
	Fox sparrow	U	B
	Song sparrow	C	R
	Lincoln sparrow	U	M
	Golden-crowned sparrow	U	M
	White-crowned sparrow	C	M
	Dark-eyed sparrow	C	R
Blackbirds, Orioles	Red-winged blackbird	C	B
	Western Meadowlark	U	B
	Yellow-headed blackbird	U	B
	Brewer's blackbird	C	B
	Brown-headed blackbird	C	B
Finches	Cassin's finch	C	R
	House finch	C	R
	Red Crossbill	C	R
	Pine siskin	C	R
	Evening grosbeak	U	R
Weaver Finch	House sparrow	C	R

Source: Chris Carey, 1999

Habitat

Habitats that are identified by ODFW as providing a tremendous amount of habitat for a diverse range of wildlife species are:

- Wetlands
- River corridors
- Areas of Special Interest
- Open spaces

The ODFW report notes that these areas have extremely high value for wildlife and measures should be established to protect these areas from human development. Wetland and river corridors have been identified and inventoried for this report. Areas of Special Interest have been inventoried in the Bend Urban Land Survey.

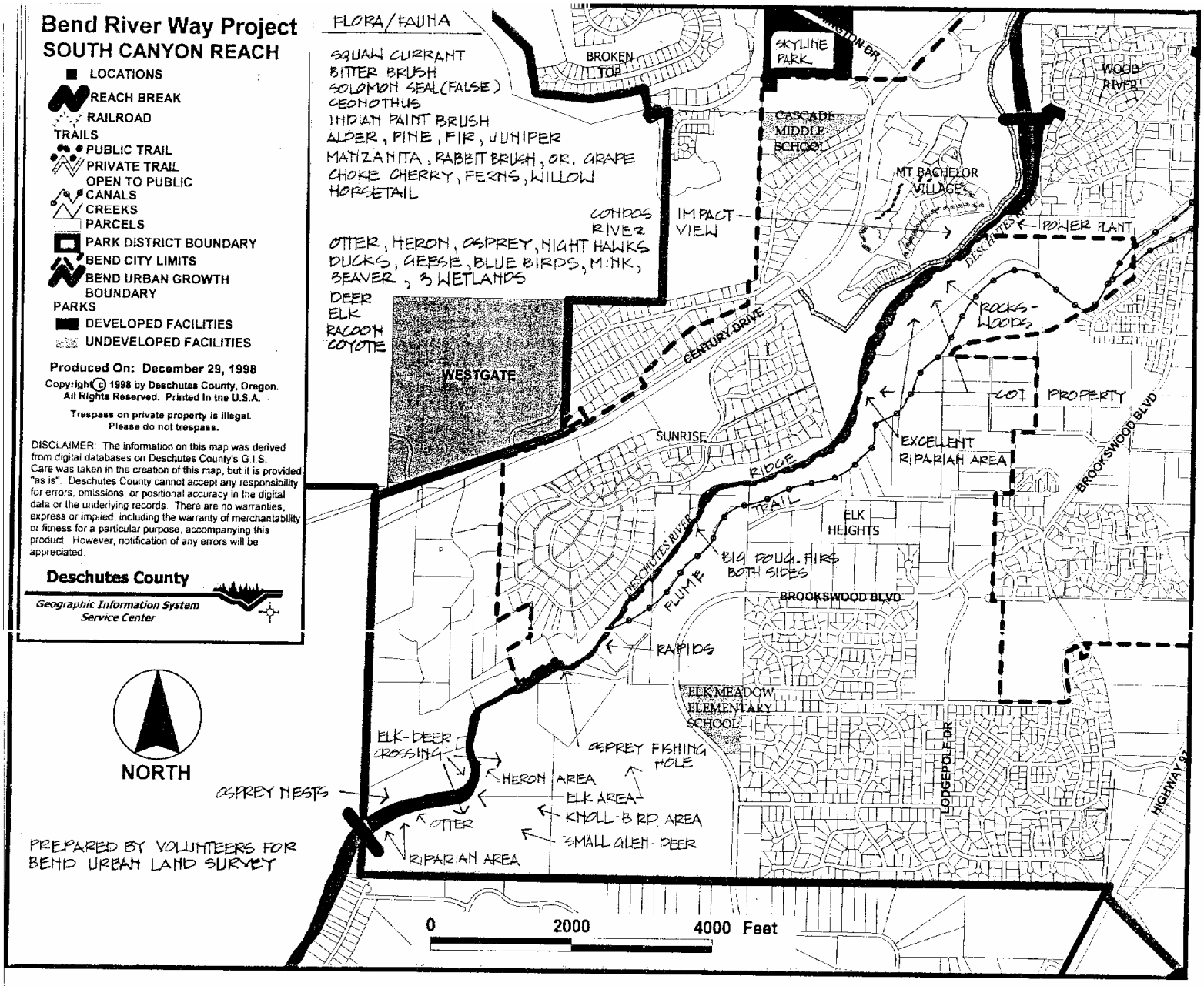
Wildlife habitat describes what wildlife needs to live: food, water, and shelter or cover. Habitat varies for each kind of wildlife species, but in general good habitat includes water; vegetative cover in all kinds of types and sizes like grasses, shrubs, trees or rocks, cliffs, snags or other good hiding places; and food. Food can either be the plants themselves or, in the case of predators, prey that is available in and around the habitat area. Poor quality wildlife habitat would be an area with no water, lacking vegetation or having only a few kinds of plants.

There is some very good quality wildlife habitat along the river. In particular the three large riparian wetland units identified and mapped in the Local Wetland Inventory as Colorado, 1st Street and Sawyer South (Map codes R5, R3, & R1) provide diverse, high quality habitat. The connecting riparian and wetland vegetation make the entire river area a good corridor for wildlife to move up and down.

Areas of low quality habitat include those with concrete walls along the river and large lawns. Large mature trees and snags are a missing component along much of the river (with the exception of some of the parks.) Snags and mature trees can provide necessary perches and nesting habitat including cavity nests. Overhead wires are of concern for the safety of birds. Birds use the river corridor like a highway and on rare occasion birds contact the overhead wires and become injured or die.

Please refer to the Inventory Results in the riparian chapter for descriptions of areas and features in the river.

The following maps were prepared by volunteers for the Bend Urban Land Survey and show habitat, known wildlife areas, and vegetation in the river corridor. These maps do not have a complete list of plants or wildlife in the area but focus on what each reach is known for and unique species that are seen regularly in the area. The Reach breaks on these maps are slightly different than in the remainder of this report. There are five Reaches instead of three.


Bend River Way Project
SOUTH CANYON REACH
LOCATIONS
REACH BREAK
RAILROAD
TRAILS
PUBLIC TRAIL
PRIVATE TRAIL
OPEN TO PUBLIC
CANALS
CREEKS
PARCELS
PARK DISTRICT BOUNDARY
BEND CITY LIMITS
BEND URBAN GROWTH BOUNDARY
PARKS
DEVELOPED FACILITIES
UNDEVELOPED FACILITIES
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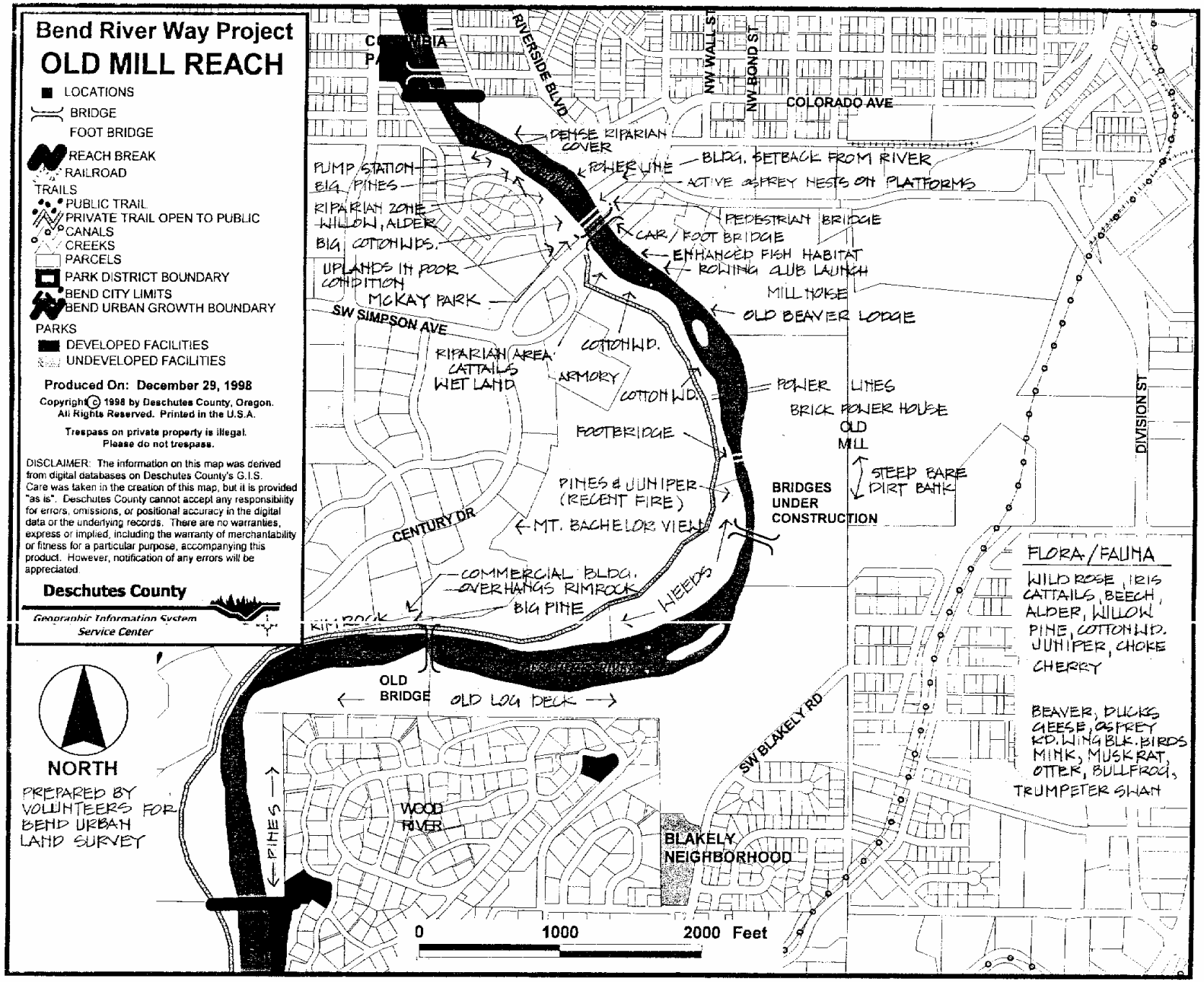
Deschutes County
Geographic Information System Service Center
NORTH
FLORA/FAUNA
SQUAW CURRANT
BITTER BRUSH
SOLOMON SEAL(FALSE)
CEONOTHUS
INDIAN PAINT BRUSH
ALDER, PINE, FIR, JUNIPER
MANZANITA, RABBIT BRUSH, OR. GRAPE
CHOKE CHERRY, FERNS, WILLOW
HORSETAIL
OTTER, HERON, OSPREY, NIGHT HAWKS
DUCKS, GEESE, BLUE BIRDS, MINK,
BEAVER, 3 WETLANDS
DEER
ELK
RACOON
COYOTE
PREPARED BY VOLUNTEERS FOR
BEND URBAN LAND SURVEY
BROKEN TOP
SKYLINE PARK
WOOD RIVER
CASCADE MIDDLE SCHOOL
MT BACHELOR VILLAGE
CONDOS
RIVER VIEW
IMPACT
POWER PLANT
ROCKS-WOODS
COI PROPERTY
WESTGATE
CENTURY DRIVE
SUNRISE RIDGE TRAIL
EXCELLENT RIPARIAN AREA
BROOKSWOOD BLVD
ELK HEIGHTS
DESCHUTES RIVER
FLUME
BIG DOUG. FIRS BOTH SIDES
RAPIDS
ELK MEADOW ELEMENTARY SCHOOL
LODGEPOLE DR
HIGHWAY 97
ELK-DEER CROSSING
OSPREY FISHING HOLE
OSPREY NESTS
HERON AREA
ELK AREA
KNOLL-BIRD AREA
SMALL GLEN-DEER
OTTER
RIPARIAN AREA
0
2000
4000 Feet


Bend River Way Project
OLD MILL REACH
LOCATIONS
BRIDGE
FOOT BRIDGE
REACH BREAK
RAILROAD
TRAILS
PUBLIC TRAIL
PRIVATE TRAIL OPEN TO PUBLIC
CANALS
CREEKS
PARCELS
PARK DISTRICT BOUNDARY
BEND CITY LIMITS
BEND URBAN GROWTH BOUNDARY
PARKS
DEVELOPED FACILITIES
UNDEVELOPED FACILITIES
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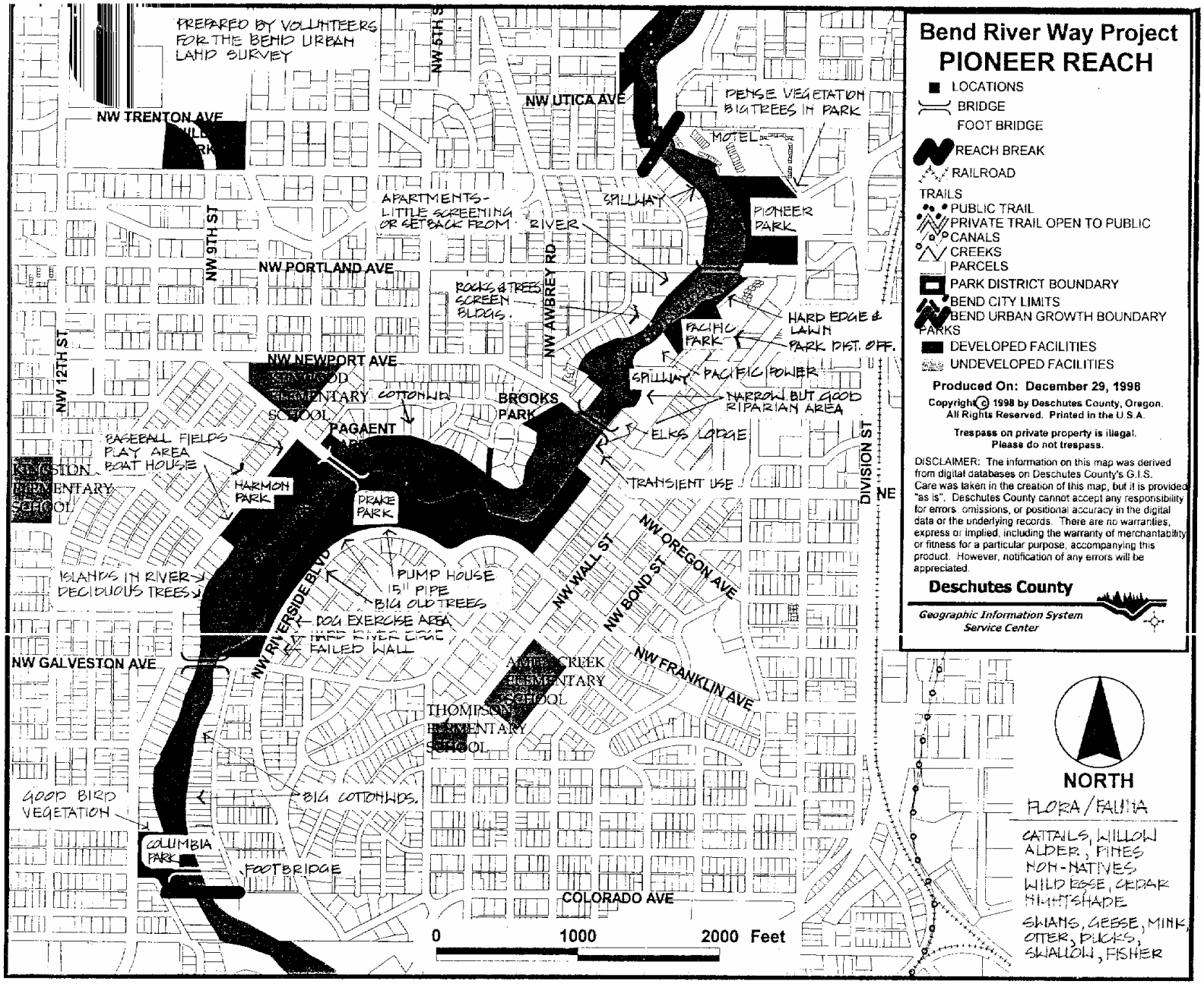
Deschutes County
Geographic Information System Service Center
NORTH
PREPARED BY VOLUNTEERS FOR BEND URBAN LAND SURVEY
RIVERSIDE BLVD
NW WALL ST
NW BOND ST
COLORADO AVE
DENSE RIPARIAN COVER
POWER LINE
BLDG. SETBACK FROM RIVER
ACTIVE OSPREY NESTS ON PLATFORMS
PUMP STATION
BIG PINES
RIPARIAN ZONE WILLOW, ALDER
BIG COTTONWDS.
UPLANDS IN POOR CONDITION
PEDESTRIAN BRIDGE
CAR / FOOT BRIDGE
ENHANCED FISH HABITAT
ROWING CLUB LAUNCH
MILL HOUSE
OLD BEAVER LODGE
McKAY PARK
SW SIMPSON AVE
RIPARIAN AREA CATTAILS WET LAND
COTTONWD.
ARMORY
COTTONWD.
POWER LINES
BRICK POWER HOUSE
OLD MILL
FOOTBRIDGE
DIVISION ST
STEEP BARE DIRT BANK
PINES & JUNIPER (RECENT FIRE)
BRIDGES UNDER CONSTRUCTION
MT. BACHELOR VIEW
CENTURY DR
COMMERCIAL BLDG. OVERHANGS RIMROCK
BIG PINE
WEEDS
RIMROCK
OLD BRIDGE
OLD LOG DECK
SW BLAKELY RD
PINES
WOOD RIVER
BLAKELY NEIGHBORHOOD
FLORA / FAUNA
WILD ROSE, IRIS CATTAILS, BEECH, ALDER, WILLOW PINE, COTTONWD. JUNIPER, CHOKE CHERRY
BEAVER, DUCKS, GEESE, OSPREY RD. WING BLK. BIRDS MINK, MUSKRAT, OTTER, BULLFROG, TRUMPETER SWAN
0
1000
2000 Feet


PREPARED BY VOLUNTEERS FOR THE BEND URBAN LAND SURVEY
NW TRENTON AVE
NW 4TH ST
NW UTICA AVE
DENSE VEGETATION BIG TREES IN PARK
MOTEL
APARTMENTS - LITTLE SCREENING OR SETBACK FROM RIVER
SPILLWAY
PIONEER PARK
NW 9TH ST
NW PORTLAND AVE
ROCKS & TREES SCREEN BLDGS.
NW AWBREY RD
HARD EDGE & LAWN
PARK DIST. OFF.
PACIFIC PARK
NW 12TH ST
NW NEWPORT AVE
SPILLWAY
PACIFIC POWER
NARROW BUT GOOD RIPARIAN AREA
COTTONWD
BROOKS PARK
PAGAENT
ELKS LODGE
DIVISION ST
NE
BASEBALL FIELDS
PLAY AREA
BOAT HOUSE
KINGSTON ELEMENTARY SCHOOL
HARMON PARK
PEAKE PARK
TRANSIENT USE
NW WALL ST
NW OREGON AVE
NW BOND ST
ISLANDS IN RIVER
DECIDUOUS TREES
PUMP HOUSE
15" PIPE
BIG OLD TREES
DOG EXERCISE AREA
NW RIVERSIDE BLVD
FAILED WALL
NW GALVESTON AVE
NW FRANKLIN AVE
ARNOLD CREEK ELEMENTARY SCHOOL
THOMPSON ELEMENTARY SCHOOL
GOOD BIRD VEGETATION
BIG COTTONWDS.
COLUMBIA PARK
FOOTBRIDGE
COLORADO AVE
0
1000
2000 Feet
Bend River Way Project
PIONEER REACH
LOCATIONS
BRIDGE
FOOT BRIDGE
REACH BREAK
RAILROAD
TRAILS
PUBLIC TRAIL
PRIVATE TRAIL OPEN TO PUBLIC
CANALS
CREEKS
PARCELS
PARK DISTRICT BOUNDARY
BEND CITY LIMITS
BEND URBAN GROWTH BOUNDARY
PARKS
DEVELOPED FACILITIES
UNDEVELOPED FACILITIES
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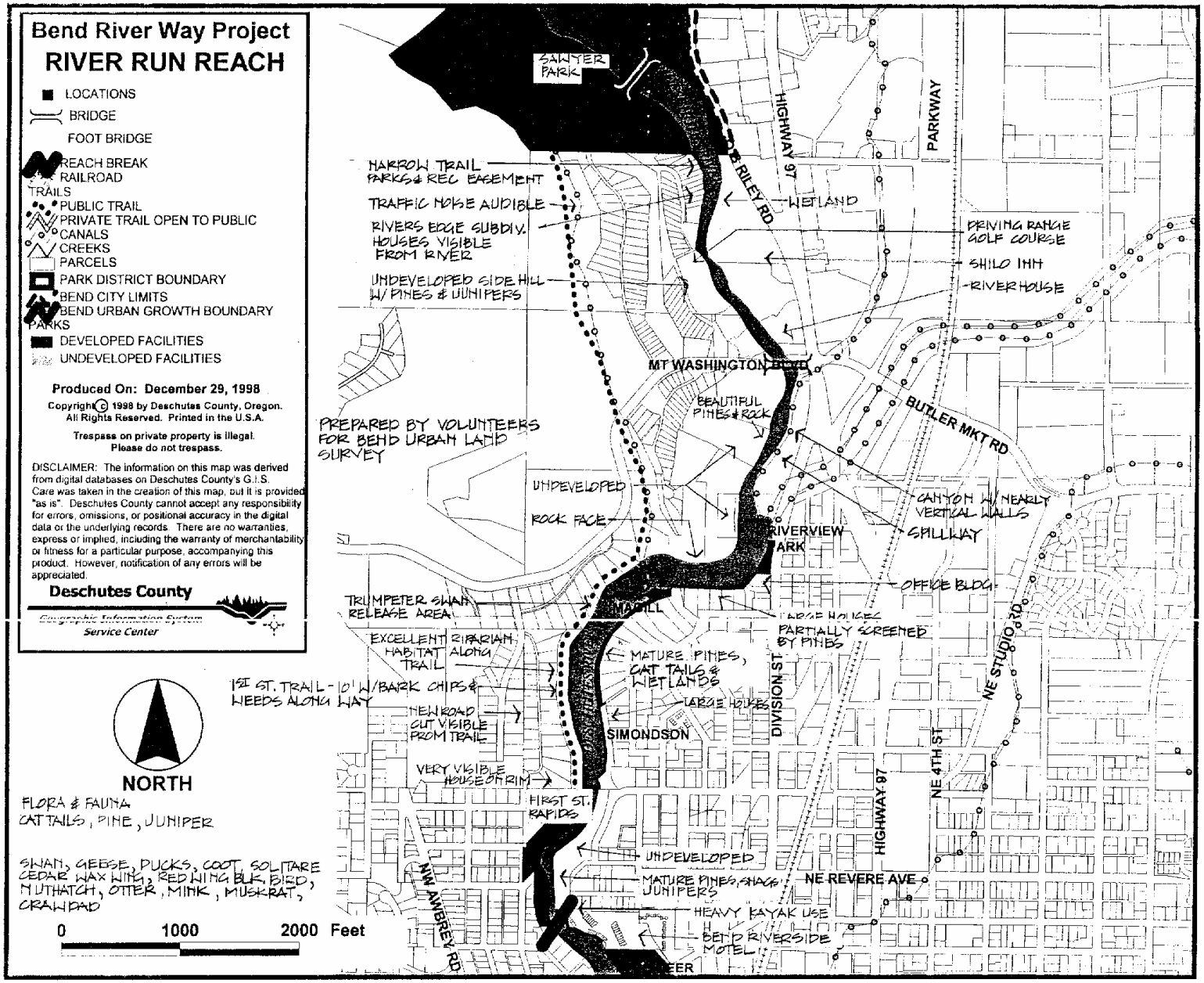
Deschutes County
Geographic Information System Service Center
NORTH
FLORA / FAUNA
CATTAILS, WILLOW ALDER, PINES
NON-NATIVES
WILD ROSE, CEDAR
NIGHTSHADE
SWANS, GEESE, MINK, OTTER, DUCKS, SWALLOW, FISHER


Bend River Way Project
RIVER RUN REACH
LOCATIONS
BRIDGE
FOOT BRIDGE
REACH BREAK
RAILROAD
TRAILS
PUBLIC TRAIL
PRIVATE TRAIL OPEN TO PUBLIC
CANALS
CREEKS
PARCELS
PARK DISTRICT BOUNDARY
BEND CITY LIMITS
BEND URBAN GROWTH BOUNDARY
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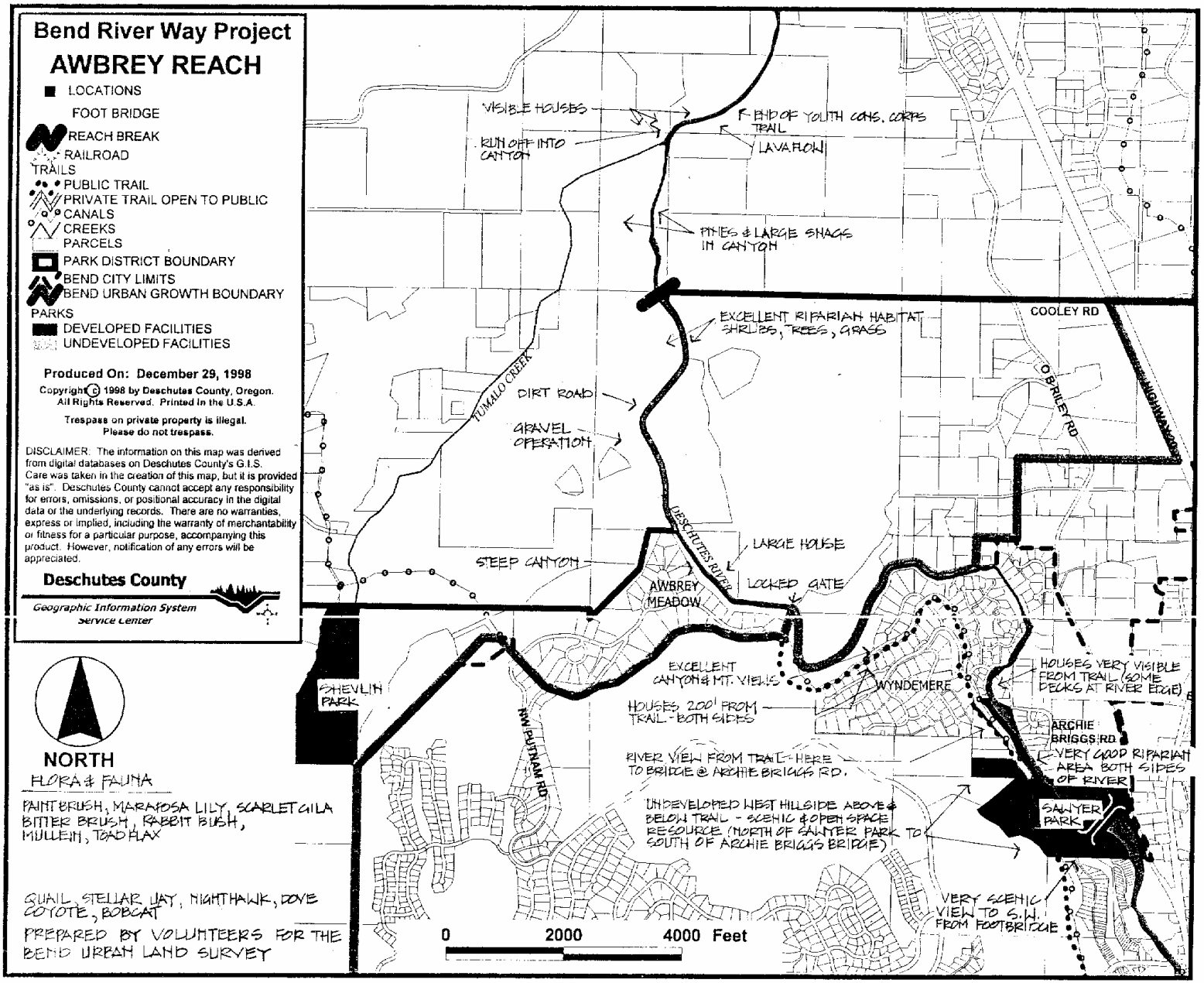
Deschutes County
Geographic Information System
Service Center
NORTH
FLORA & FAUNA
CAT TAILS, PINE, JUNIPER
SWAN, GEESE, DUCKS, COOT, SOLITARE CEDAR WAX WING, RED WING BLK. BIRD, NUTHATCH, OTTER, MINK, MUSKRAT, CRAWDAD
0 1000 2000 Feet
SAWYER PARK
HIGHWAY 97
PARKWAY
RILEY RD
NARROW TRAIL PARKS & REC EASEMENT
TRAFFIC NOISE AUDIBLE
RIVERS EDGE SUBDIV. HOUSES VISIBLE FROM RIVER
UNDEVELOPED SIDE HILL W/ PINES & JUNIPERS
WETLAND
DRIVING RANGE GOLF COURSE
SHILO INN
RIVER HOUSE
MT WASHINGTON BLVD
BUTLER MKT RD
BEAUTIFUL PINES & ROCK
PREPARED BY VOLUNTEERS FOR BEND URBAN LAND SURVEY
UNDEVELOPED
ROCK FACE
CANYON W/ NEARLY VERTICAL WALLS
SPILLWAY
RIVERVIEW PARK
OFFICE BLDG.
TRUMPETER SWAN RELEASE AREA
MAXWELL
LARGE HOUSES PARTIALLY SCREENED BY PINES
EXCELLENT RIPARIAN HABITAT ALONG TRAIL
MATURE PINES, CAT TAILS & WETLANDS
1ST ST. TRAIL - 10' W/BARK CHIPS & WEEDS ALONG WAY
NEW ROAD CUT VISIBLE FROM TRAIL
LARGE HOUSES
SIMONDSON
DIVISION ST
NE STUDIO RD
VERY VISIBLE HOUSE ON RIM
FIRST ST. RAPIDS
HIGHWAY 97
NE 4TH ST
UNDEVELOPED
MATURE PINES, SHACK JUNIPERS
NE REVERE AVE
HEAVY KAYAK USE
BEND RIVERSIDE MOTEL
NW AWBREY RD


Bend River Way Project
AWBREY REACH
LOCATIONS
FOOT BRIDGE
REACH BREAK
RAILROAD
TRAILS
PUBLIC TRAIL
PRIVATE TRAIL OPEN TO PUBLIC
CANALS
CREEKS
PARCELS
PARK DISTRICT BOUNDARY
BEND CITY LIMITS
BEND URBAN GROWTH BOUNDARY
PARKS
DEVELOPED FACILITIES
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Deschutes County
Geographic Information System Service Center
NORTH
FLORA & FAUNA
PAINTBRUSH, MARIPOSA LILY, SCARLET GILA BITTER BRUSH, RABBIT BUSH, MULLEIN, TOAD FLAX
QUAIL, STELLAR JAY, NIGHTHAWK, DOVE COYOTE, BOBCAT
PREPARED BY VOLUNTEERS FOR THE BEND URBAN LAND SURVEY
VISIBLE HOUSES
RUN OFF INTO CANYON
F- END OF YOUTH CONS. CORPS TRAIL
LAVA FLOW
PINES & LARGE SNAGS IN CANYON
EXCELLENT RIPARIAN HABITAT SHRUBS, TREES, GRASS
COOLEY RD
O'BRILEY RD
HIGHWAY 97
TUMALO CREEK
DIRT ROAD
GRAVEL OPERATION
DESCHUTES RIVER
LARGE HOUSE
STEEP CANYON
AWBREY MEADOW
LOCKED GATE
SHEVLIN PARK
EXCELLENT CANYON & MT. VIEWS
WYNDEMERE
HOUSES VERY VISIBLE FROM TRAIL (SOME DECKS AT RIVER EDGE)
HOUSES 200' FROM TRAIL - BOTH SIDES
NW PUTNAM RD
ARCHIE BRIGGS RD
VERY GOOD RIPARIAN AREA BOTH SIDES OF RIVER
RIVER VIEW FROM TRAIL - HERE TO BRIDGE @ ARCHIE BRIGGS RD.
SAWYER PARK
UNDEVELOPED WEST HILLSIDE ABOVE & BELOW TRAIL - SCENIC & OPEN SPACE RESOURCE (NORTH OF SAWYER PARK TO SOUTH OF ARCHIE BRIGGS BRIDGE)
VERY SCENIC VIEW TO S.W. FROM FOOTBRIDGE
0
2000
4000 Feet

Non Game/Diversity

The most comprehensive wildlife study in urban Bend occurred in 1990. It focused on the area between the Old Mill District and the Bend Hydroproject (Newport Avenue). Fifty-six total wildlife species were observed during the survey that took place in June including 47 birds, eight mammals, and one reptile. The following table combines the information from that survey with additional information gathered in recent years.

Riparian Corridor Wildlife Inventory for the Deschutes River in Bend

Wildlife Type	Common Name
Amphibians	Pacific chorus frog long toed salamander Western toad
Reptiles	garter snake rubber boa Western fence lizard gopher snake
Non-game mammals	bats beaver coyote desert cottontail golden mantle gray squirrel least chipmunk mink porcupine raccoon river otter skunk

Source: PacificCorp 1990; Chris Carey, Wildlife Biologist, ODFW for the Bend Riverway 1999.

Non-Native Invasive Species

There has not been a non-native invasive plant or wildlife survey in Bend. Known problem species within the UGB include wildlife such as cowbirds, bullfrogs, and starlings, and plants like Dalmatian toadflax, yellow iris, and knapweed.

Knapweed and toadflax are currently the most problematic species in Bend. Infestations have appeared in the area in just the past 10 years. Knapweed in particular now lines portions of the river corridor on the Deschutes and Tumalo Creek, the canals, trails and are rapidly filling disturbed areas on vacant lots. Yellow iris starts below the Colorado Bridge on the Deschutes and continues downstream. It appears to be outcompeting the cattails. Toadflax is found in small and large patches throughout the city.

A confirmed sighting of bullfrog tadpoles was recorded at the Colorado Street wetland in the summer of 1999. Bullfrogs are known to inhabit areas upstream where they are outcompeting and preying on the spotted frog. Starlings are problematic especially at the landfill where control measures have been undertaken.

Fish

There are two species of native fish left in the Deschutes in the Bend area – the red band trout and the mountain whitefish. Red band trout is a state listed sensitive species. They are affected by low water in the spring and summer when water is drawn from the rivers for irrigation, as well as habitat loss. Bull trout, a native fish that grows to great size has not been seen in the Bend area since the 1950's. There are several non-native fish that were legally introduced. Brown trout were introduced in the early 1900's and kokanee were introduced in the 1950's. Large mouthed bass and tui chub have been planted illegally. Other fish in the river include the brown bull catfish, bluegill, and black crappy. These fish have been planted far upstream and move through the city on their way downstream.

ODFW does not stock fish within the Bend Urban Growth Boundary. Hatchery-raised rainbow trout are stocked above Benham Falls upstream of Bend. These fish can, and do, move downstream to Bend. The Deschutes supports resident populations of red band trout, mountain whitefish and brown trout.

Several factors affect fish: flow fluctuation, water temperature, and habitat. The flow fluctuations on the Deschutes are great due to the retention of water in upstream reservoirs and the diversion of water within Bend for irrigation. The lowest flows coming into Bend are during the winter months when much of the precipitation falls as snow. Temperatures need to be cold for reproduction and rearing. Shallow, slow moving waters with no vegetative cover heat up more rapidly and to higher temperatures than faster moving or deeper waters with trees and shrubs overhanging.

Probably the single most important component missing from the Deschutes River in the Bend area for fish is in-stream structure. The Oregon Freshwater Wetland Assessment Methodology (OFWAM) assessment and function results for fish habitat pointed this out clearly. There is a lack of woody debris, large organic debris, and rocks in the river. ODFW is assisting a developer in placing whole trees and rocks in the river in the Old Mill District for fish habitat.

Fish need clean gravel bars for spawning. Silt will cover up their eggs, suffocating them. Quality spawning grounds are essential for a healthy fishery. There are high quality spawning areas in the south part of the UGB and there is a potential for high quality areas below the North Canal Dam.

Another factor affecting fish is their ability to move up and down the river safely. There are four dams within the UGB. Only two dams have fish ladders that allow fish to pass upstream. See the following table.

Dams within Bend's UGB

Name	Location / Pond Name	Built	Operator	Fish Ladder
Colorado Dam	Colorado Street Bridge / creates unnamed 6.5 acre wetland.	1916	River Bend Limited Partnership	Yes. Installed in 1998.
Bend Hydroelectric Project	Just north of Newport Bridge / creates Mirror Pond.	1910	Pacific Power and Light	No. Historically there was a wooden fish ladder.
Steidl Dam	Above 1st Street rapids / creates unnamed pond adjacent to Pioneer Park.	1922	Tumalo Irrigation Dist.	Yes.
North Canal Dam	South of Mt. Washington Blvd. / creates "Swan Pond" in front of Riverview Park.	1914	Jointly managed by COID & Swalley Irrigation Dist.	No.

Source: Kyle Gorman, Watermaster, District 11, 1999

There are five diversions in Bend - four have fish screens. Three of the screens will be replaced in the near future. Fish screens on diversions are critical to fish health. They are essential in order to move fish safely around a canal diversion. A well-designed screen is important so fish are not injured. There are two types of screens used in Bend. A drum screen provides a physical barrier to the fish preventing it from entering the canal. A louvered screen deters the fish by altering the fish's behavior. They approach the screen, don't like the looks of it and shy away. The louvered screens are less harmful to fish because they don't physically contact the screen.

Diversions for Irrigation in Bend's UGB

Diversion Name	Diversion Location	Fish Screen	Typical Summer Max. Flows
Central Oregon Canal	East side of river below Elk Meadow Elementary school	Yes. Perforated plate screen. Fixed panel with self-cleaning brush. Black paint has camouflaged this screen.	550 cfs
TID Bend Feed Canal or DCMID Canal	West side of river at 1st Street Rapids	There is a louvered fish screen at present. A new screen is being designed. (DCMID is the Deschutes Co. Municipal Improvement Dist.)	140 cfs
Swalley Irrigation Canal	East side of river at North Canal dam	Yes. Louvered. Improved screen proposed by ODFW.	115 cfs
North Canal or Pilot Butte Canal	East side of river at North Canal dam	No. Proposed by ODFW.	550 cfs
North Unit Main Canal	East side of river at North Canal dam	Yes. Has a drum screen. Will be upgraded.	800 cfs

COID = Central Oregon Irrigation Dist. TID = Tumalo Irrigation Dist.,
ODFW = Oregon Dept. of Fish and Wildlife; cfs = cubic feet per second.
Sources: Kyle Gorman, Watermaster, District 11; Ted Wise, Fish Biologist, ODFW, 1999.

Hydroprojects, Dams, Impoundments and Diversions

Name	Location	Description and Comments
Central Oregon Canal	East side of river across from Sunrise Village.	This is the second diversion on the Deschutes River. It serves east Bend, Alfalfa and Powell Butte. Upstream from the diversion is designated a State Wild and Scenic Waterway. The diversion has a fish screen that was painted black to blend with the environment. The water is carried via a flume that was originally wooden and installed in 1901. Trees were planted in front of the flume to screen it from the Sunrise Village subdivision across the river. The canal road runs north for about 1.5 miles to a hydroelectric plant. The road is not open to the public, but many use it for hiking and biking.
COID Hydroelectric Plant	Off Brookswood Blvd. On east side of river. Mt. Bachelor Village trail is across river	Completed in 1989, this hydrofacility supplies 6 megawatts of electricity to the main power grid (equal to about 2,200 homes.) During high flow years the excess water from the Central Oregon Canal is diverted to the hydroplant to generate electricity. After running through the plant, the water is returned to the river. The plant is visible from the south end of the Mt. Bachelor Village trail.
Colorado Street Dam	On Colorado Street	This dam was built by the lumber mill operators to create log storage and to provide water for fire protection. The last mill closed in 1993 and these functions are no longer important. However, over the years, a 5-acre wetland with importance to wildlife has been created due to backup from the dam.
Bend Hydroelectric Project & Mirror Pond	Dam is just north of Newport Bridge	Mirror Pond has been described by many as the heart and soul of Bend. Surrounded by lovely old homes and well-kept public parks, this 40-acre impoundment is created by the Bend Hydroelectric Project. The powerhouse was built in 1910, bringing hydroelectric power to Central Oregon. Operated by Pacific Power, the project produces 1,100 kilowatts of electricity or enough for 400 homes. The dam was issued a Federal Energy Relicensing Commission (FERC) license in 1970 as project 2643. The license expired in 1993. A relicensing study was undertaken in 1990 in anticipation of renewal. However, FERC decided a license was not necessary because the river is not designated a navigable waterway. Mirror Pond acts as a settling pond for nutrient-enriched sediment from upstream sources, primarily bank erosion due to fluctuating water flows. In the late 1970's, silt filled in the pond resulting in shallow water depths. A Mirror Pond Citizens Committee was formed in 1975 to study the siltation problem. A report recommending dredging as a solution was published in 1981 (Winzler, et. al. 1981). As a result, the pond was dredged in 1982 at a cost of $275,000. The dredged material was pumped from the pond upstream and used as fill in a low area on the west bank of the river in the Old Mill district. According to the report done prior to dredging, the silt is expected to build up again 20 years from the dredging date.
Steidl Dam & TID Bend Feeder Canal	In front of the Riverside Motel near Pioneer Park.	This dam was built in 1922 to raise the height of the water in order to divert it into the Bend Feed Canal. The Deschutes River trail begins on the west side of the river at 1st Street Rapids on top of the buried Bend Feed Canal. The canal was buried in the 1970's. Historians disagree with the name Steidl dam because that was that original name of the North Canal Dam, but Steidl is the name in common use today.

Name	Location	Description and Comments
North Canal Dam & North Canal, Swalley Irrigation Canal and North Unit Main Canal	Just north of Riverview Park.	This impressive 33 foot tall dam was built to raise the height of the water for three diversions – North Canal (Pilot Butte Canal), Swalley Canal, and North Unit Main Canal. The dam is adjacent to Division Street, but not visible to passers by. The area surrounding the dam on the westside was recently rezoned to commercial. There is a Park District easement for a fisherman trail on the west side of the river from Mt. Washington Boulevard to the dam. Today, otter play on and around the dam. An osprey fishes in the pond where the trumpeter swans were released in 1998. The North Canal, also known at the Pilot Butte Canal, is managed by COID and goes to Redmond and Terrebonne. The Swalley Irrigation Canal goes to the north part of Bend. The North Unit Main Canal, managed by the North Unit Irrigation District, goes to Madras with no water deliveries until north of the Crooked River. It is currently being lined with concrete to reduce water loss.

COI = Central Oregon Irrigation District; TID = Tumalo Irrigation District
Sources: Kyle Gorman, Watermaster, District 11; Clark Satre, Manager, Pacific Power & Electric, 1999.

Regulatory Analysis

This section summarizes the state requirements for wildlife habitat protection, reviews the city's current policies and regulations and then compares the two. The purpose of this section is to provide decision-makers and the community with a comparison of what the state requires for wildlife habitat protection with what the city already has on the books. The next section, Options for Protection, offers alternatives on how the city might proceed.

What the State Requires

At the conclusion of the inventory process, the city is required to develop programs to protect significant wildlife habitat if they do not already exist. The city must coordinate with appropriate state and federal agencies when adopting programs intended to protect threatened, endangered, or sensitive species habitat areas.

Under the "safe harbor" rules in the Goal 5 administrative rules, local governments may determine that "wildlife" does not include fish, and that significant wildlife habitat is only those sites where one or more of the following conditions exist. The habitat has been documented:

- as critical to the life of a federal threatened or endangered wildlife species or an Oregon threatened, endangered, or sensitive species;
- to have occurrences of more than incidental use by a threatened or endanger species as described above;
- as a sensitive bird nesting, roosting, or watering resource site for osprey or great blue herons;
- to be essential to achieving policies or population objectives specified in a wildlife species management plan adopted by the Oregon Fish and Wildlife Commission;

- by ODFW as habitat for a wildlife species of concern and/or as a habitat of concern (e.g., big game winter range and migration corridors, golden eagle and prairie falcon nest sites, or pigeon springs).

Safe Harbor for Wildlife Habitat in Bend

Under the safe harbor guidelines, Bend has no significant wildlife habitat according to ODFW. ODFW recommends that the city adopts protection language in the event significant wildlife sites are located. Although ODFW has determined that there is no significant wildlife habitat in Bend, there are at least three active osprey nests and nesting platforms within the UGB. Ospreys are a significant wildlife resource under the safe harbor. The ODFW report states that no sites require protection in Bend but that if sites are identified they should be protected.

In addition, there is documented big game habitat and elk and deer winter range in portions of the south and west UGB. This habitat was identified by Bob Davison, a professional with demonstrated expertise in habitat identification. Mr. Davison states in a letter, "The 200 acres in the vicinity of Elk Meadows clearly has been identified by the ODFW as providing winter range for big game, and it has been mapped previously by the ODFW as such. Consequently, the 200 acres of big game winter range in the vicinity of Elk Meadows may be considered significant by the City of Bend under the safe harbor criteria set forth in OAR 660-023-0040(e)." See Appendix C for the complete letter. Under the safe harbor this big game habitat is considered a significant resource. ODFW has noted that these winter range designations do not apply to the City of Bend.

Recommendations from ODFW

While ODFW did not identify any significant wildlife habitat, the agency had the following recommendations and suggestions for the City of Bend. Each of these recommendations can be read in their entirety in Appendix C.

<u>Big Game</u>

- Recognize the mapped sensitive big game habitat that is recognized by Deschutes County.
- Develop housing density standards that are lower (RL) and maintain these levels on lands within one mile of the County adopted habitats. This would allow a "buffering" effect to minimize human disturbance in these areas. This is similar to the existing language within the plan dealing with the Urban Reserve Area zoning. However, this language falls short of specific language that would adequately protect these resources. In addition, ordinances that require "cluster" development in these areas could preserve valuable open space which would increase the effectiveness of protecting these important Goal 5 habitats.

<u>Riparian and Wetland Habitats</u>

- Utilize the U.S. Fish and Wildlife Service maps to identify wetlands greater than five acres.
- Incorporate the many important wetlands and riparian areas identified by the Bend Riverway into the Bend Area General Plan.

- When considering development near wetlands less than five acres, consult with the ODFW on a case by case basis.
- Establish measures to protect these areas (riparian and wetland habitats) from human development. Appropriate uses would be parks and open spaces.

Wildlife Diversity
- Utilize the ODFW Wildlife Diversity Plan as a guide and reference for the maintenance and enhancement of Oregon's vertebrate nongame wildlife resource.
- Include the numerous values associated with non-game wildlife and the data and recommendations identified by the Bend Riverway in the Bend Area General Plan.
- Continue protection of open spaces, wetlands, riparian areas, and Areas of Special Interest
- Construct ordinance language that minimizes or prevents housing developments within open spaces, wetlands, riparian areas, and Areas of Special Interest.

Critical Bird Sites
- Protect bird sites through the development of site specific management plans. Management plans assure that the proposed use and activities will not destroy or result in abandonment of the sensitive species form a nest site.
- Provide language within the plan that if bird sites are located, protection measures can be established.

Wildlife Interactions
- Encourage programs such as the Waterfowl Advisory Committee to continue.
- Amend the city code, which allows only peace officers to discharge weapons in the city (5.025) to include ODFW employees. This would allow ODFW employees respond to calls for injured or problem wildlife.
- Strongly discourage artificial feeding of deer
- Continue to encourage adequate garbage control to reduce black bear interactions.

Existing City of Bend Policies Regarding Wildlife Habitat

Two goals of the Bend Area General Plan are preserving wildlife habitat and establishing a system of wildlife corridors that are interconnected with trails and greenways. The river corridor is recognized in the plan as "the most important, and most diverse, wildlife area." There are two large areas in the Deschutes River corridor identified as "Areas of Special Interest." The areas (located at the north and south ends of the UGB) were recently inventoried in the Bend Urban Land Survey. As part of the city's Periodic Review "Areas of Special Interest" will be reviewed.

Bend Area General Plan Goals:

The follow goals are from the Bend General Plan:

To help ensure Bend's livability, the following additional goals should be implemented to provide long-term protection of open space and natural features:

- preserve interesting and distinct geologic formations and areas of natural vegetation;
- preserve water resources, riparian areas, and wildlife habitats;

- establish a system of trails, greenways and wildlife corridors that are interconnected;
- encourage environmental awareness so that citizens will become stewards of our natural areas;
- support the coordinated efforts of public agencies, private organizations and individuals to preserve and enhance the area's natural features and open space.

The following policies are from Chapter 2 of Bend's General Plan and area specific to wildlife habitat protection. See also the Regulatory Analysis Section for Riparian Areas of this report for additional policies protecting the river corridor that also provide habitat protection.

5. Major rock outcrops, stands of trees, or other prominent natural features identified in the General Plan shall be preserved as a means of retaining the visual character and quality of the community.
6. Natural tree cover should be retained along streets in new developments to retain the natural character of Central Oregon within the urban area as the community grows.
7. All residential development should respect the natural ground cover of the area, and the city and county shall work with developers to preserve mature trees within the subdivision.
8. The city shall develop standards to conserve mature native trees and standards that describe the types of trees for commercial and industrial developments that are compatible with Central Oregon's climate.
9. The city and county shall participate with other governments, special districts, non-profit organizations, land trusts, interested businesses, and citizens in protecting open space.
10. The city shall develop flexible subdivision and development standards that make it easier for developers to provide open space within a neighborhood.

16. The city and county will consider how best to protect important native fauna and flora within the Bend urban area, as identified by the open space and natural features inventory.
21. The city and county shall ensure through conditions of approval that development in the Urban Reserve Area adjacent to or within one mile of lands designated by the County's wildlife overlay zone incorporate setbacks or buffers to protect designated wildlife areas.
22. All trout spawning areas shall be considered significant habitat and shall be protected.
23. The city and county shall promote and support educational programs on riparian natural history, river maintenance and courtesies, impacts of habitat alteration, and habitat disturbance by domestic animals and human activities.
24. The city and county shall request that the USFS and ODFW adopt a winter elk management plan for the Benham Falls elk herd. Emphasis should be given to identification of their sensitive habitat in order to minimize potential conflict with development and recreational activities.

Existing City of Bend Regulations Regarding Wildlife Habitat

The Deschutes River Combining Zone (10.10.22A) has a number of regulations pertaining to habitat. Please refer to the Regulatory Analysis section in the Riparian chapter for more information.

The Fill and Removal regulation 10.10.25(26) prohibits activities within 10 feet of the river, which affords some protection to the riparian corridor where some of the most important wildlife habitat exists. In addition the subdivision code and the Mixed Use Riverfront (MR) zone have the following provisions for preserving natural features and habitat.

Subdivision Code (10.13)
Section 1.010 Purpose [of subdivison code] is to:

> 2. Encourage development in harmony with the natural environment and within resource carrying capacities.

Section 3.060. The Hearings Body shall not approve a tentative plan for a proposed subdivision unless the Hearings Body finds:

> 1. The subdivision contributes to orderly development and land use patterns in the area, and provides for the preservation of natural features and resources such as streams, lakes, natural vegetation, special terrain features, and other natural resources.

Section 6.020 (3) regarding connecting access corridors:
…The Hearing Body may determine that construction of a separate access corridor [for a subdivision] is inappropriate or impracticable. Such evidence may include but is not limited to:

> B. When the access corridor would cross a natural area with significant natural habitat and construction would be incompatible with protection of natural values.

MR Zone (10.10.21A):
Landscaping and Open Space. The design and development of landscaping and open space shall:

- Retain and conserve riparian vegetation within the bed and banks of the Deschutes River and adjacent to the river to the maximum extent practicable. There shall be no net loss of natural wetlands adjacent to the river.
- Emphasize the use of native trees, shrubs, or other plants adapted for survival and growth in the high desert life zone.

Comparison of the State Goal with the City of Bend's Existing Regulations
The state agency protecting wildlife, ODFW, has not identified any Goal 5 resources for wildlife habitat in the City of Bend UGB. Therefore, the city, which has policies and some regulations for protecting natural features and habitat, especially along the river corridor, is likely in compliance with the Goal 5. The city lacks procedures to deal with Goal 5 resources in the event any (state) significant wildlife habitat is located.

Options for Protection

The following range of options has been developed as a starting point for discussion. An ESEE analysis (a review of the positive and negative economic, social, environmental and energy consequences that could result from a decision to allow, limit, or prohibit a conflicting use) must be conducted for the chosen option other than the safe harbor. The Goal 5 administrative rule (OAR 660-23) provides direction on conducting the ESEE analysis. When working to protect threatened endangered or sensitive habitat the city must coordinate with appropriate state and federal agency.

A. *Safe Harbor:* City follows the safe harbor guidelines. This requires no new regulations. An ESEE analysis is not required.

   Regulations could be developed that provide direction in the event a Goal 5 wildlife resource is located.

B. *Adopt regulations to protect key species and/or habitat identified in the inventory.* This could be accomplished by new wildlife habitat regulations or by additions to existing regulations such as the Deschutes River Combining zone, Subdivision code, Fill and Removal codes.

   Regulations could be developed to recognize species or habitats noted in the Goal 5 rule such as: red-band trout (state sensitive), osprey, heron, and elk (big game winter range/migration corridor). An ESEE analysis may be required, but it could be argued that these are all species or habitats that fall under the safe harbor guidelines. The only difference is that ODFW does not require protection for these species and habitats in Bend.

C. *Beyond Safe Harbor:* Implement ODFW recommendations and adopt regulations to implement existing city policy.

   The city could review and consider for adoption, the recommendations suggested by ODFW. In addition, the city could direct staff to review existing city policy and suggest regulations to ensure the city's policies for wildlife habitat are implemented. It should be noted that some of the city's policies are similar in intent to those suggested by ODFW. This would require an ESEE analysis if accomplished under Goal 5.

State Scenic Waterways

Summary

There are two sections of State Scenic Waterway within the City of Bend's UGB. They are located at the extreme north and south ends of the river within the UGB. City regulations do not protect portions of the State Scenic Waterway due to the recent annexation of these areas into the city. The city must address these sections of the State Scenic Waterway in the city code.

Goal 5 Scenic Resources Defined

Any designated Oregon State Waterway (OSW) is defined as a significant Goal 5 resource, requiring protection. The State Scenic Waterways program was established in 1970 to protect free-flowing rivers. The designation covers rivers, lakes and adjacent lands that have outstanding scenic, fish, wildlife, geological, botanical, historic, archeological, and outdoor recreation values of present and future benefit to the public. The Governor, Legislature, or a vote of the people can establish Oregon State Waterways. A scenic waterway includes the river and all land within a quarter mile of its banks. Oregon Parks and Recreation Department administers the program and each scenic waterway has specific management rules.

During periodic review, local governments are required to amend plans and land use regulations to address any designated Oregon Scenic Waterway and associated corridor not addressed by the plan. An inventory is not necessary. The city must declare all OSW's a significant Goal 5 resource. The city must coordinate with appropriate state agencies when adopting programs intended to protect OSW's. Refer to Goal 5 Reference Material for more information.

Inventory Methodology

According to Goal 5 rules, no inventory is required or necessary because the areas are already designated by the state.

Inventory Results

An inventory was not necessary for Oregon Scenic Waterways because they have been identified and designated by the State of Oregon. The OSW's within the Bend UGB were identified, mapped and described for this report. (See map in binder pocket.)

In 1988, a statewide voter initiative added two areas of the Deschutes River at the north and south ends of the Bend UGB to the State Scenic Waterways program. Both areas have adopted management plans. The plans are administered by the Oregon State Parks

and Recreation Department. In the management plans both of Bend's OSW's are classified as River Community Areas based on the density of structures or other developments, already existing or provided for in zoning. Scenic river segments considered "Community Areas" are managed to allow development that and blends into the natural character of the surrounding landscape This also means protecting riparian vegetation, and encouraging activities to the enhance the landscape.

Segments of these two River Community Areas are within the Bend UGB, and, as of the 1999 annexation, portions are now within the city limits. A portion of (east bank of the river) of the North Bend River Community Area in the Bend Urban Reserve Area, is outside the city but within Deschutes County. Deschutes County has provided regulation to protect this area in its Zoning Codes, primarily in Chapters 18.84 and: Landscape Management Combining Zone, with specific reference to the area within the boundaries of State Scenic Waterways.

The inland boundary of an OSW is one-quarter mile on either side of the river. The following is a description of Oregon Scenic Waterways located within Bend's UGB.

Oregon Scenic Waterways in Bend

Area Name	Location	Description of Management
Upper Deschutes: South Bend River Community Area	The southernmost 1.5 miles of the river in the UGB. From the southern UGB to the COI diversion across from Sunrise Village. River mile 172-171.	The Upper Deschutes River Scenic Waterway Management Plan adopted in 1996 contains rules that govern this area. Specific rules address setbacks, building color, vegetation retention, river crossings, screening and timber harvest within a ¼ mile of the river.
Middle Deschutes: North Bend River Community Area	From the southern boundary of Sawyer Park to the north UGB. Approx. river mile 164-161.*	Middle Deschutes management plan adopted in 1993 governs this area. More general rules address the same issues listed above.

*the east bank (river right) of a portion of this segment is outside the city limits because the Urban Growth Boundary is defined by the river. This section is still an OSW protected by Deschutes County.

Regulatory Analysis

This section summarizes the state requirements, reviews the city's current policies and regulations for Oregon Scenic Waterway protection and then compares the two. The purpose of this section is to provide decision-makers and the community with a comparison of what the state requires with what the city already has on the books. The next section, Options for Protection, offers alternatives on how the city might proceed in protecting OSW's.

What the State Requires
Local governments are required to designate OSW's as significant Goal 5 resources. At the first periodic review following adoption of a management plan for an established OSW, the local government must adopt a Goal 5 program for OSW's and associated corridors.

Local governments have a choice to follow either ESEE standards and procedures or the safe harbor provisions. As a safe harbor, a local government may adopt only those provisions necessary to carry out the State's management plan. If the city wishes to consider an option other than safe harbor, an ESEE analysis (a review of the positive and negative economic, social, environmental and energy consequences that could result from a decision to allow, limit, or prohibit a conflicting use) must be conducted.

In either case, the local program for the OSW's must be consistent with the management plans already adopted by Oregon Parks and Recreation Commission. Regulation applicable to development and use for the OSW segments in Bend are defined in the US Forest Service's Comprehensive Management Plan for the Upper Deschutes Wild and Scenic River and State Scenic Waterway and the US Forest Service, BLM Oregon Parks and Recreation's Middle Deschutes/Lower Crooked Wild and Scenic River's Management Plan.

Oregon Parks and Recreation must be notified of activities and uses proposed within an OSW, to determine if the project will be in compliance with the scenic waterway regulations. Such activities include cutting of trees, mining, and construction of roads, railroads, utilities, buildings or other structures.

Existing City of Bend Policies and Regulations
Bend policies and regulations do not recognize the two segments of Oregon Scenic Waterway within the UGB. The City of Bend General Plan stresses the importance of the Deschutes River and has established policies for the protection of the river and adjacent lands. The City of Bend has provided regulations in its Zoning Codes for protection of the character along the Deschutes River, and for development and use on adjacent lands, but neither the General Plan nor the Zoning Codes address specifically the State Scenic Waterway River Community Areas.

It should be noted that the river is bordered by the city on one side and Deschutes County on the other in the North Bend Community Area. The county has already adopted language to comply with State Scenic Waterways.

Comparison of the State Goal with the City of Bend's Existing Regulations
The state requires that the City of Bend recognize the segments of Oregon Scenic Waterways within the UGB in the General Plan and in the Bend City Code. Currently the city does not have any language in the General Plan or the City Code addressing OSW's.

Options for Protection

In order to comply with state law, the City of Bend needs to recognize and protect the segments of Oregon Scenic Waterway within the Urban Growth Boundary. The city has several options for protecting OSW's. In all cases, the Oregon State Parks and Recreation Department (OPRD) still must review each and every permit application within the OSW boundary (1/4 mile on each side of the river in OSW designated areas.) The city can refer the permit applications to OPRD before, during, or after the city's review of the permit. The ORPD would prefer a concurrent review, that way they are not holding up the permit process for the applicant at one end or the other. If the city chooses to adopt all or part of the review requirements for State Scenic Waterways it should reduce State Park's review time.

Because of a shared boundary with Deschutes County in the North Bend Community Area of the OSW, a policy and code consistent with that already adopted by the county may be helpful in administering State Scenic Waterways. In addition, a consistent approach on both sides of the river may be less confusing for property owners on both sides of the river.

The following is a suggested starting point for discussion about compliance with the Oregon Scenic Waterways Act:

> Add language to the General Plan and Bend City Code recognizing the two segments of Oregon Scenic Waterway within the UGB. Identify and map the areas on the General Plan Map and develop an overlay for the zoning map.
>
> Adopt language consistent with the state and with Deschutes County for the protection of these areas **or** language referring permit applications to the Oregon State Parks and Recreation Department for review and compliance as required by law.

APPENDIX A: GLOSSARY

General Definitions

Definitions from OAR 660-023-0010

(1) "Conflicting use" is a land use, or other activity reasonably and customarily subject to land use regulations, that could adversely affect a significant Goal 5 resource (except as provided in OAR 660-023-0180(1)(b)). Local governments are not required to regard agricultural practices as conflicting uses.

(2) "ESEE consequences" are the positive and negative economic, social, environmental, and energy (ESEE) consequences that could result from a decision to allow, limit, or prohibit a conflicting use.

(3) "Impact area" is a geographic area within which conflicting uses could adversely affect a significant Goal 5 resource.

(4) "Inventory" is a survey, map, or description of one or more resource sites that is prepared by a local government, state or federal agency, private citizen, or other organization and that includes information about the resource values and features associated with such sites. As a verb, "inventory" means to collect, prepare, compile, or refine information about one or more resource sites. (See resource list.)

(5) "PAPA" is a "post-acknowledgment plan amendment." The term encompasses actions taken in accordance with ORS 197.610 through 197.625, including amendments to an acknowledged comprehensive plan or land use regulation and the adoption of any new plan or land use regulation. The term does not include periodic review actions taken in accordance with ORS 197.628 through 197.650.

(6) "Program" or "program to achieve the goal" is a plan or course of proceedings and action either to prohibit, limit, or allow uses that conflict with significant Goal 5 resources, adopted as part of the comprehensive plan and land use regulations (e.g., zoning standards, easements, cluster developments, preferential assessments, or acquisition of land or development rights).

(7) "Protect," when applied to an individual resource site, means to limit or prohibit uses that conflict with a significant resource site (except as provided in OAR 660-023-0140, 660-023-0180, and 660-023-0190). When applied to a resource category, "protect" means to develop a program consistent with this division.

(8) "Resource category" is any one of the cultural or natural resource groups listed in Goal 5.

(9) "Resource list" includes the description, maps, and other information about significant Goal 5 resource sites within a jurisdiction, adopted by a local government as a part of the comprehensive plan or as a land use regulation. A "plan inventory" adopted under OAR 660-016-0000(5)(c) shall be considered to be a resource list.

(10) "Resource site" or "site" is a particular area where resources are located. A site may consist of a parcel or lot or portion thereof or may include an area consisting of two or more contiguous lots or parcels.

(11) "Safe harbor" has the meaning given to it in OAR 660-023-0020(2).

Safe Harbor Definition

Definitions from 660-023-0020

(2) A "safe harbor" consists of an optional course of action that satisfies certain requirements under the standard process. Local governments may follow safe harbor requirements rather than addressing certain requirements in the standard Goal 5 process. For example, a jurisdiction may choose to identify "significant" riparian corridors using the safe harbor criteria under OAR 660-023-0090(5) rather than follow the general requirements for determining "significance" in the standard Goal 5 process under OAR 660-023-0030(4).

Riparian Corridor Definitions

Definitions from OAR 660-023-0090

(1) For the purposes of this rule, the following definitions apply:

(a) "Fish habitat" means those areas upon which fish depend in order to meet their requirements for spawning, rearing, food supply, and migration.

(b) "Riparian area" is the area adjacent to a river, lake, or stream, consisting of the area of transition from an aquatic ecosystem to a terrestrial ecosystem.

(c) "Riparian corridor" is a Goal 5 resource that includes the water areas, fish habitat, adjacent riparian areas, and wetlands within the riparian area boundary.

(d) "Riparian corridor boundary" is an imaginary line that is a certain distance upland from the top bank, for example, as specified in section (5) of this rule.

(e) "Stream" is a channel such as a river or creek that carries flowing surface water, including perennial streams and intermittent streams with defined channels, and excluding man-made irrigation and drainage channels.

(f) "Structure" is a building or other major improvement that is built, constructed, or installed, not including minor improvements, such as fences, utility poles, flagpoles, or irrigation system components, that are not customarily regulated through zoning ordinances.

(g) "Top of bank" shall have the same meaning as "bankfull stage" defined in OAR 141-085-0010(2).

(h) "Water area" is the area between the banks of a lake, pond, river, perennial or fish-bearing intermittent stream, excluding man-made farm ponds.

Wetland Definitions

Definitions from OAR 660-023-0100

Wetland: State Reg. Definition: An area that is inundated or saturated by surface water or ground water at a frequency and duration sufficient to support, and that under normal circumstances does support, a prevalence of vegetation typically adapted for life in saturated soil conditions

Definitions from OAR 141-086-0200

(1) "Delineation" means identifying and marking the wetland/non-wetland boundary of each wetland identified.
(2) "Determination" means identifying an area as wetland or non-wetland.
(3) "Division" means the Oregon Division of State Lands and/or its Director or designate.
(4) "Inventory" means a systematic survey of an area to identify, classify and map the approximate boundaries of wetlands, and includes the supporting documentation required by these rules.
(5) "Mapping" means transferring the identified and delineated wetlands to a base map.

Definitions from OAR 141-086-0330
(1) "Director" means the Director of the Division of State Lands or the Director's designee.
(2) "Division" means the Division of State Lands.
(3) "Indigenous Anadromous Salmonids" are chum, sockeye, Chinook and Coho salmon, and steelhead and cutthroat trout, that are members of the family Salmonidae and are listed as sensitive, threatened or endangered by a state or federal authority.
(4) "Inhabited by" means that a plant or animal species uses the site for rearing, feeding, or breeding or as a migration or dispersal corridor. This does not include incidental use of the site by an animal species.
(5) "Locally Significant Wetlands" or "LSW" are those wetland sites that provide functions or exhibit characteristics that are pertinent to community planning decisions made at a local scale, for example within a UGB. These wetland sites shall be identified by local governments according to the criteria and procedures in sections 141-086-0340 and 141-086-0350.
(6) "Native Plant Community" is used here to indicate a recognized assemblage of plant species indigenous to Oregon. All such wetland plant communities are listed in the most recent version of Classification and Catalog of Native Wetland Plant Communities in Oregon (Oregon Natural Heritage Program).
(7) "Rare Plant Community" is defined as relictual, uncommon or unique in Oregon, determined by number of occurrences and threats following national heritage program criteria (i.e., rarity ranking of G1-G3 or S1-S3). The most concise listing of wetland plant communities in Oregon that meet this standard for rarity is found in Appendix G of the Oregon Freshwater Wetland Assessment Methodology (Oregon Division of State Lands, 1996). The rarity rank of all wetland plant communities is also listed in the most recent version of Classification and Catalog of Native Wetland Plant Communities in Oregon (Oregon Natural Heritage Program).
(8) "Wetlands" means those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.

Bed or Banks of Stream or River. The physical container of the waters of a stream or river lying below bank-full stage, and the land 10 feet on either side of the container.

APPENDIX B: REFERENCES

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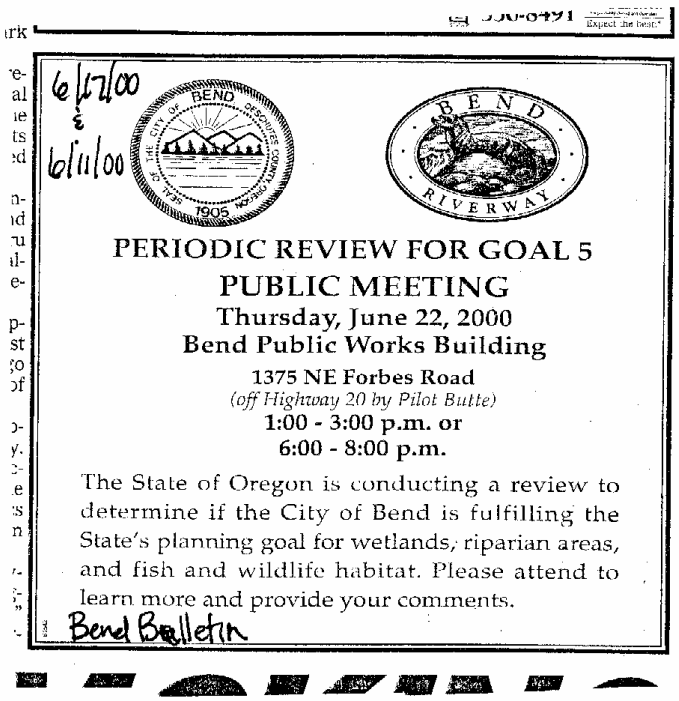
APPENDIX C: CITIZEN AND AGENCY INVOLVEMENT



6/19/00 Bend Bulletin

cal traffic only to Riverside Avenue.

Contact: Roger Prowell, Bend's assistant water supervisor, 317-3017.

Bend assembling wetlands inventory

The city of Bend is conducting an inventory of wetlands, streams, sensitive fish and wildlife habitat areas and state scenic waterways.

Public comment to aid in compiling the inventory of resources within the Bend urban growth boundary will be accepted Thursday at the Bend Public Works Building, 1375 NE Forbes Road (off Highway 20 near Pilot Butte).

Meetings are scheduled from 1 to 3 p.m. and 6 to 8 p.m.

The inventory was spurred by the state of Oregon's periodic review to determine whether the city of Bend is fulfilling the state's planning goals for natural resources.

At both meetings, there will be a short presentation on the state's goals followed by a public opportunity to meet with city staff, view maps and provide comments, according to a city release.

The inventory work will continue through the summer and information will be presented to the Bend Planning Commission in the fall.

Bend Riverway is helping the city with the inventory project.

Comments can also be mailed to Bend Riverway, 200 NW Pacific Park Lane, Bend, OR 97701. Comments are due by July 1.

CIVIC CALENDAR

Today

Redmond Planning Commission: 7 p.m., council chambers, Redmond Police Department, 777 SW Deschutes Ave. Contact: 923-7725.

Bend assembling wetlands inventory 6/8/00

The city of Bend is conducting an inventory of wetlands, streams, sensitive fish and wildlife habitat areas and state scenic waterways.

Public comment to aid in compiling the inventory of resources within the Bend urban growth boundary will be accepted June 22 at the Bend Public Works Building, 1375 NE Forbes Road (off Highway 20 near Pilot Butte). Meetings are scheduled from 1 to 3 p.m. and 6 to 8 p.m.

The inventory was spurred by the state of Oregon's periodic review to determine whether the city of Bend is fulfilling the state's planning goals for natural resources.

At the afternoon and evening meetings, there will be a short presentation on the state's goals followed by a public opportunity to meet with city staff, view maps and provide comments, according to a city release.

The inventory work will continue through the summer and information will be presented to the Bend Planning Commission in the fall.

Bend Riverway is helping the city with the inventory project.

Comments can also be mailed to Bend Riverway, 200 NW Pacific Park Lane, Bend 97701.

Comments are due by July 1.

Agency letter: ODFW

September 22, 2000

City of Bend
Planning Division
City Hall Annex
745 NW Bond
PO Box 431
Bend, OR 97709

Attn: Darcy McNamara

Re: City of Bend Periodic Review

Attached is the Oregon Department of Fish and Wildlife response to the City of Bend's Periodic Review (PR). Included in the Department's assessments are narratives on: big game, wetlands, nongame, threatened and endangered program, critical bird sites, riparian protection, and an update on wildlife inventories.

The attached map is courtesy of Deschutes County. It should be used for general reference only. Precise locations of Deschutes County approved combining zones should be available from Deschutes County. The Deer Migration, Deer and Elk Migration, Deer and Antelope Winter Range designations do not apply to the City of Bend.

Thank you for the opportunity to comment on the City of Bend's plan review. If you have any questions regarding our comments, please contact me.

Sincerely,
Steven George
Deschutes District Wildlife Biologist
Deschutes Watershed

ODFW Report. For Big Game habitat map see Wildlife Chapter

The City of Bend in the 1998 Bend Area General Plan has identified the value of wildlife to the city. The plan, in part, states "Bend is a community that values the area's natural features and wildlife." Furthermore the plan has a specific goal "to preserve water resources, riparian areas, and wildlife habitats." The plan's policies cover wildlife habitat and offer some broad concepts to protect these.

Big Game

Big Game that are considered sensitive in the State and are a Goal 5 resource are mule deer, antelope, elk, cougar, black bear, and silver grey squirrels. Deer, silver grey squirrels, and black bear are currently maintaining stable populations levels. The numbers of elk, and cougar have been increasing over the last several years. Antelope populations have been declining over the last several years. See Table 1 for updated population estimates for Deschutes County. The City of Bend currently has resident and seasonal populations of mule deer. Elk are occasional visitors during the winter, primarily in the southern and western fringes of the city. Black bear and cougar are only occasionally seen within the Bend City limits while silver grey squirrels are commonly observed.

Table 1. Big Game Population Estimates, Deschutes County, 2000.

Species	Number
Mule Deer	25,000
Elk	1,000
Antelope	600
Cougar	50
Bear	100
Silver Grey Squirrel	500

Within the Bend Urban Growth Boundary there are no Goal 5 big game habitats that need protection. However, ODFW recommends that the City of Bend recognize the mapped sensitive big game habitats that is recognized by Deschutes County. Please reference the attached map for these locations. These habitats are extremely important to the overall health of these big game herds and are extremely critical to our ability to manage these herds at levels the public desires. Human activities have been documented to have a negative effect on these big game habitats. Deschutes County has adopted ordinances that attempt to protect these resources. These ordinances are adequate to protect these resources within the County but are not practical for the City to adopt. Our recommendation is that the City adopt ordinances that help in protecting these neighboring resources.

One suggestion would be to develop housing density standards that are lower (RL) and maintain these levels on lands within one mile of the County adopted habitats. This would allow a "buffering" effect to minimize human disturbance in these areas. This is similar to the existing language within the plan dealing with the Urban Reserve Area zoning. However, this language falls short of specific language that would adequately protect these resources. In addition, ordinances that require "cluster" development in these areas could preserve valuable open space which would increase the effectiveness of protecting these important Goal 5 habitats.

Riparian and Wetland Habitats

The U.S. Fish and Wildlife Service conducted a high altitude photographic wetland inventory in 1985. One deficiency in the mapping program was that wetlands smaller than five acres in size were not identified as significant. The Department recommends that the City of Bend utilize the U.S. Fish and Wildlife Service maps to identify wetlands greater than five acres. Additionally, the Bend Riverway project identifies many important wetlands and riparian areas that should be incorporated into the Bend Area General Plan. Also, when considering development near wetlands less than five acres, we recommend consulting with the ODFW on a case by case basis.

The Bend Area General Plan has identified the river corridors as "the most important, and most diverse, wildlife area." Furthermore the plan identifies "Areas of Special Interest" within the City of Bend. These

areas have extremely high value for wildlife. Measures should be established to protect these areas from human development. Appropriate uses would be parks and open spaces.

Wildlife Diversity

The Department suggests that Deschutes County utilize the ODFW Wildlife Diversity Plan as a guide and reference for the maintenance and enhancement of Oregon's vertebrate nongame wildlife resource. The Bend Riverway project identified numerous values associated with non-game wildlife. The Bend Area General Plan should include this data and recommendations within the plan. Open spaces, wetlands, riparian areas, and Areas of Special Interest provide a tremendous amount of habitat for a diverse range of wildlife species. Continued protection of these areas is essential to provide the diverse wildlife that is treasured within the Bend area. The largest threat to these habitats is from housing developments. The City of Bend should construct ordinance language that minimizes or prevents housing developments within these areas.

Threatened and Endangered Program

In 1985 the Oregon Legislature adopted SB-533 outlining a process where the Department of Fish and Wildlife (ODFW) could develop a list of threatened or endangered wildlife or fish species. At the writing of this document, the ODFW Commission has adopted Administrative Rules (OAR 635-100-100 to 130) that deal with this program. Currently the ODFW inventory for these species does not include any sites within the City of Bend.

Critical Bird Sites

ODFW has identified a list of bird species that are especially sensitive to human activity: Northern Bald and Golden Eagles, Spotted Owl, Osprey, Goshawks, Coopers and Sharp-shinned Hawks, Peregrine and Prairie Falcons, Great Blue Herons, and Band-tailed Pigeons. Only one of these species (Band-tailed Pigeon) does not utilize habitat in Deschutes County. The purpose of providing special protection for sensitive birds is to assure that their habitat areas are protected from the effects of conflicting uses or activities. Protection of bird sites can be achieved through the development of site specific management plans. Management plans assure that the proposed use and activities will not destroy or result in abandonment of the sensitive species form a nest site. Currently there are no sites within the City of Bend that merit this protection. However, we recommend that provisions be provided within the plan that if sites are located, protection measures could be established at that time for those sites.

Wildlife Interactions

Wherever there is wildlife the potential exists for undesirable wildlife interactions. The City of Bend is not unique in that these interactions have occurred and will occur in the future. Programs such as the Waterfowl Advisory Committee is excellent avenues to deal with some of these situations and should be encouraged to continue. Trapping as authorized by the City Commission and the State of Oregon has controlled other situations such as damaging or nuisance waterfowl and furbearing wildlife.

Other wildlife species can also cause problems within the city. Law enforcement personnel and ODFW employees on numerous occasions are called in to remedy injured or problem wildlife. Currently the Bend City Code (5.025) only allows peace officers to discharge weapons. ODFW employees are no longer peace officers and therefore cannot legally discharge a weapon within the City of Bend. It would be our recommendation that this code be amended to include ODFW employees while acting in their official capacity. Without this inclusion ODFW employees will no longer be able to respond to these situations.

Because of the growth of the City of Bend in recent years more and more people are interacting with wildlife. Some of this interaction is with large carnivores (cougar) and black bears. Cougar tend to be attracted to the City of Bend by following their prey source, which is deer. When residents feed deer they artificially increase the natural population that would exist in that location. This not only increases damage to ornamental shrubs and flowers by deer but also increases the chance that people will come in contact with cougar. It would be our recommendation that artificial feeding of deer be strongly discouraged within the City of Bend. Continuing to encourage adequate garbage control can reduce black bear interactions.

Wildlife Biologist Letter

Letter submitted by Bob Davison, Northwest Field Representative, Wildlife Management Institute

November 16, 2000

City of Bend
745 NW Bond Street
P.O. Box 431
Bend, OR 97700

Attn: Ms. Darcy McNamara

I am writing as a wildlife biologist and Northwest Field Representative of the Wildlife Management Institute to provide information relevant to the City of Bend's inventory of Goal 5 resources. The Wildlife Management Institute, founded in 1911, is a private, nonprofit, scientific and educational organization staffed by experienced natural resource professionals dedicated to improving the management of wildlife and wildlife habitat in North America by working closely with local governments, state wildlife management agencies, federal natural resource agencies, and conservation groups

The area commonly known as "Elk Meadows" and the adjacent lands on either side of the Deschutes River in the southwest corner of the City of Bend is a Goal 5 resource site and should be included in the inventory of wildlife habitat. This area encompasses roughly 320 acres, of which approximately 200 acres are valuable as big game winter range. About 200 elk utilize this site and the surrounding general area in the winter. The site also is heavily utilized by mule deer as winter range. Big game winter range, particularly elk winter range, within Bend's Urban Growth Boundary (UGB) is very limited and becoming increasingly rare and degraded. While elk occasionally utilize other areas along the western and southern fringes of the City, no other location within the City of Bend regularly provides anywhere close to as much winter range for as many elk as the 200 acres in the vicinity of Elk Meadows.

The big game winter range in the vicinity of Elk Meadows is significant wildlife habitat within the City of Bend's UGB. No other comparable site for these Goal 5 resources exists within the UGB. Under OAR 660-023-0110, wildlife habitat inventory information shall include habitats of concern, such as big game winter range, identified and mapped by the Oregon Department of Fish and Wildlife (ODFW). The 200 acres in the vicinity of Elk Meadows clearly has been identified by the ODFW as providing winter range for big game, and it has been mapped previously by the ODFW as such. Consequently, the 200 acres of big game winter range in the vicinity of Elk Meadows may be considered significant by the City of Bend under the safe harbor criteria set forth in OAR 660-023-0040(e).

According to the ODFW, the loss of the 200 acres of big game winter range in the vicinity of Elk Meadows "will reduce the capacity of this area to winter elk and reduces the number of elk that could winter in this area."[1] The effect of any loss of this big game winter range is that "the population may have to be reduced" to keep its numbers in balance with what the remaining habitat can support.[2] Such consequences would be significant to the continued existence of these Goal 5 resources within the City of Bend.

The cumulative effects on big game winter range and other Goal 5 resources also are significant and increasing. Throughout the West and in the Bend area, the big game habitat in greatest jeopardy is that which is at relatively low elevation and at the wildland/urban interface, such as the big game winter range in

[1] August 9, 2000, letter from Steven George, ODFW, to City of Bend
[2] *Ibid.*

the vicinity of Elk Meadows. Evidence is increasing that the greatest effects to these habitats result not from the direct effects of a particular action, but from the combination of individually minor effects of multiple actions over time. The ODFW has stated that there already "has been tremendous impact to fish and wildlife resources in this area from human disturbance."[3]

Thank you for your consideration of our comments.

Sincerely,

/s/

Robert P. Davison, Ph.D.
Northwest Field Representative

[3] July 12, 2000, letter from Steven George, ODFW, to City of Bend.

Exhibit "B"

Conflicting Uses, ESEE Analysis, and Goal 5 Program

Adopted by City Council November 20, 2002
Effective December 20, 2002

Community Development Department

November 2002

City of Bend

CONFLICTING USES, ESEE ANALYSIS, AND GOAL 5 PROGRAM

TABLE OF CONTENTS

Conflicting Uses, ESEE Analysis and Goal 5 Program

Introduction

This document serves as the basis for General Plan policies and implementing measures adopted to provide appropriate levels of protection to Bend's inventoried Goal 5 natural and scenic resources. The intent of Statewide Land Use Goal 5 is "To protect natural resources and conserve scenic and historic areas and open spaces." Goal 5 resources covered in this document are those found to be significant in the *City of Bend Periodic Review Goal 5 Inventory and Analysis* (December 2000). That inventory identified significant riparian and wetland resources along the Deschutes River and Tumalo Creek waterways. This document also identifies two River Corridor Areas of Special Interest (ASI) along the Deschutes River as significant scenic views and sites. These ASI's, comprising the South Canyon (generally upstream of the southern bridge crossing alignment) and a second canyon area downstream from Sawyer Park, were originally designated on Bend's General Plan map in the mid-1970's.

Where significant resources are identified under Statewide Land Use Goal 5, state law requires that local jurisdictions develop and adopt a program to conserve and protect those resources. Depending on the type of resource and its characteristics, it may be necessary to identify conflicting uses and activities that could adversely affect the resource. Where conflicting uses are identified, state law requires an analysis of the potential environmental, social, energy and economic (ESEE) consequences of prohibiting, limiting, or permitting the conflicting use. The results of the conflicting uses/ESEE analysis (or "safe harbor" provisions, as applicable)form the basis for a program to provide appropriate levels of protection to the resources.

This document deals with significant Goal 5 resources along the Deschutes River and Tumalo Creek in two sections. Section 1 discusses riparian and wetland resources as identified in the *City of Bend Periodic Review Goal 5 Inventory and Analysis.* Section 2 covers the River Corridor Areas of Special Interest along the Deschutes River as designated in the City's 1978 General Plan. Within each section, conflicting uses are first identified based on the

designated impact area. State law (OAR 660-23-010(1)) defines "conflicting use" as follows: "A land use, or other activity reasonably and customarily subject to land use regulations, that could adversely affect a significant Goal 5 resource…" In considering conflicting uses, state law also requires that an examination of conflicting uses include those uses allowed outright or conditionally within zoning districts affecting property where significant resources are found. The identification of conflicting uses is followed in each section by an ESEE consequences analysis. The ESEE analysis is presented in the form of tables in which likely or potential economic, social, environmental, and energy consequences of allowing, limiting, or prohibiting conflicting uses are summarized.

Goal 5 also requires a determination of the "impact area" to be considered for ESEE analysis. The impact area is the area within which allowed conflicting uses could adversely affect the resource. For purposes of this analysis, the impact areas for the Deschutes River and Tumalo Creek are considered to be the boundary of the Waterway Overlay Zone (WOZ). In the case of the Deschutes River, the WOZ boundary is the outermost of the four sub-zones that make up the WOZ: the Riparian Corridor, the Flood Plain Combining Zone, the Deschutes River Design Review Combining Zone, and the River Corridor Areas of Special Interest. The WOZ boundaries are therefore defined as the impact area for the Deschutes River riparian, wetland, and scenic (ASI) resources. In the case of Tumalo Creek, the only WOZ sub-zone which is applied is the Riparian Corridor, extending a distance of 50 ft. from the ordinary high water mark along both sides of the creek. Therefore, for purposes of ESEE analysis, the Tumalo Creek impact area is considered to be land within 50 ft. of the ordinary high water mark on both sides.

The final element of each section outlines the Goal 5 program for each resource type. The Goal 5 program presents the City's approach to providing appropriate levels of protection to the resources, based on inventory data, identification of conflicting uses, the ESEE analysis, or safe harbor provisions, in the case of riparian and wetland resources. This program serves as the basis for General Plan policies regarding these important resources and for specific implementing measures contained in the City Code.

Adequacy of Information

The Goal 5 Inventory and Analysis documents the information relied on in making determinations that significant riparian, wetland, and scenic resources exist in Bend. That inventory includes by reference a number of sources containing very detailed information about Goal 5 resource sites. Though not physically incorporated in the Goal 5 Inventory and Analysis, these referenced sources are public documents and are available for review at Bend City Hall. These sources include those specified in state law (OAR 660-023-0090[4]) as well as numerous additional sources (see Appendix B of the Goal 5 Inventory

and Analysis).

The City of Bend finds the information contained and referenced in the Goal 5 Inventory and Analysis to be adequate for determining the location, quality, and quantity of riparian, wetland, and scenic resources for each of the designated sites.

The Goal 5 Inventory and Analysis finds that there are only two riparian corridors (Deschutes River and Tumalo Creek) within the 32.2 square miles of the City of Bend. It also finds that the only significant wetlands are those lying within the Deschutes River corridor. Riparian and wetland resources are relatively scarce in the Bend area due to the dry, high desert climate and lava plains physiographic conditions. The scarcity of these resources in the region contributes to their significance in Bend.

Section 1

Riparian and Wetland Resources

The *City of Bend Periodic Review Goal 5 Inventory and Analysis* (December 2000) finds that the Deschutes River and Tumalo Creek riparian corridors are significant within Bend. The Deschutes River riparian corridor also includes significant wetlands. While irrigation canals and other minor waterways are found elsewhere in the city, only the Deschutes River and Tumalo Creek corridors have been found to contain significant riparian or wetland resources.

For riparian and wetland resources, the Goal 5 Inventory and Analysis divides the Deschutes River in Bend into three reaches: South Canyon, Pioneer, and Awbrey. Each of these reaches is considered a resource site, as described in OAR 660-023-0090(3). For each reach, the Goal 5 Inventory and Analysis summarizes findings concerning the location, quality, and quantity of riparian and wetland resources. These summaries are based on more detailed data contained in documents referenced in the inventory. Principal reference sources for riparian and wetland resources include the City of Bend Local Wetlands Inventory Report, the *Bend Riverway, a Community Vision*, and *The Bend Urban Lands Survey.* These sources in particular contain detailed information concerning the natural features, trees and vegetation, wildlife, land use, habitat value, existing/anticipated conflicts with adjacent land uses, wildlife linkages, scenic resources, and other characteristics of the three reaches.

For significant riparian resources, there are two options under state law for designating areas of the waterway corridor within which measures to protect the resources will be applied. The first option is to adopt riparian corridor designations that meet minimum width standards as specified in administrative rules adopted for Goal 5 (known as the "safe harbor" option). Under the second option, the City may choose to specify and protect riparian corridors that deviate from safe harbor widths. Where this is done the City is required to justify different corridor widths by identifying conflicting uses and by conducting an ESEE analysis. Having considered conflicting uses and the related ESEE consequences, the City must then develop and adopt a program to provide appropriate levels of protection for the resource. Bend's Goal 5 program for the Deschutes River uses a combination of safe harbor riparian corridor designation and corridor widths that are based on conflicting use/ESEE analysis. Generally, where the corridor is less disturbed and there are fewer conflicting uses, safe harbor corridors are designated. Along the more urbanized segments of the river, varying corridor widths are designated in response to a detailed conflicting uses/ESEE analysis. River segments where

the safe harbor option or the conflicting uses/ESEE option is applied are described below, based on the three corridor "reaches" identified in the Goal 5 inventory.

Conflicting Uses:

Deschutes River - South Canyon Reach

The South Canyon Reach runs from the south UGB to the alignment of the southern bridge crossing (Reed Market Rd. extension). The Goal 5 Inventory and Analysis Report finds that much of the South Canyon reach is characterized by steep canyon walls. In some areas these canyon walls are nearly vertical and rise almost directly from the edge of the river, leaving little room for riparian conditions. In other segments of the South Canyon, the canyon walls are less steep or are located back some distance form the river's edge. Where this is the case, slopes abutting the river are much gentler, and the riparian corridor is broader. Contour maps consulted for the inventory indicate that some of these relatively flat areas in the South Canyon extend landward from the river's edge for distances of more than 100 ft. before steep cliffs begin to rise abruptly.

Conflicting uses for the South Canyon reach are summarized below, based on zoning designations.

Residential Urban Standard Density (RS) The RS zone is applied to property abutting nearly all of the west side of the South Canyon reach, and on the east side of the reach for about a distance of one mile upstream of the future southern bridge crossing site. As stated in the Zoning Code, the RS zone is intended to "provide for the most common urban residential densities in places where community sewer services are or will be available and to encourage, accommodate, maintain and protect a suitable environment for family living," (Sec. 10-10.10). The primary permitted use type is single-family dwellings, developed at density ranges of 2.0-7.3 units per gross acre. Conditional uses permitted in this zone include schools, churches, parks, and a variety of public utility and other supporting uses. Any of these uses could conflict with significant riparian or wetland resources. Typical yard landscaping and maintenance activities associated with residential uses can also be considered conflicting uses. As discussed in the *Goal 5 Inventory and Analysis Report,* these activities may include removal of native vegetation, the planting of lawns and ornamental shrubs and trees, and on-going application of fertilizers and pesticides.

Much of the west side of the river in the South Canyon reach is already developed with single-family residential subdivisions, recreational facilities,

condominiums, and time-share units. Most of these developments are located on top of the canyon rimrock. Some dwellings in these areas are placed at the edge of the rimrock. There are limited opportunities for new development immediately adjacent to the river because of the presence of steep canyon walls. Where such opportunities exist, there is the potential for new development to encroach into the riparian corridor, removing native vegetation and replacing it with structures, lawns, ornamental plants, driveways, and other features that could adversely affect riparian and wetland resources.

Residential Urban Low Density (RL) Within the South Canyon reach, this zone applies to both sides of the river for a distance of about one-half mile downstream from the UGB. It also applies to about 1.25 miles of property fronting the east side of the river in the middle portion of the reach. The RL zone permits primarily residential uses at densities ranging from 1.1 to 2.2 units per gross acre. Conditional uses permitted in this zone include churches, schools, parks, and a variety of public utility and other supporting uses. Any of these uses could conflict with significant riparian or wetland resources. Typical yard landscaping and maintenance activities can also be considered conflicting uses. As discussed in the Goal 5 Inventory and Analysis Report, these activities may include removal of native vegetation, the planting of lawns and ornamental shrubs and trees, and on-going application of fertilizers and pesticides.

While much of the RL zoned property in the South Canyon reach is currently vacant, several large subdivisions have been approved and are under development on the east side of the river. These subdivisions are located on top of the canyon wall. Dwellings built on these lots will generally pose little threat to the riparian corridor lying at the foot of the canyon, provided dwellings do not encroach to the edge of the rimrock or remove native vegetation growing on the canyon wall.

Deschutes River – Pioneer Reach

The Pioneer Reach runs from the southern bridge crossing alignment to the North Canal Dam. As described in the *Goal 5 Inventory and Analysis Report,* much of this reach is highly urbanized and otherwise altered by landscaping and non-native vegetation. Conflicting uses for the Pioneer Reach are summarized below, based on zoning designations.

Industrial General (IG) This zoning district applies to property flanking the east side of the river, for a distance of approximately 2,500 ft. downstream from Wood River Village. The IG zone permits a wide variety of manufacturing, processing, assembly, storage, and warehousing uses. It also permits some limited commercial development as conditional uses, and certain types of public uses and facilities, as well as parking and utilities needed to support

permitted uses. Any of these uses could conflict with riparian and wetland resources. This property is currently owned by the Bend Metro Park and Recreation District, and is proposed for development as a park. It is currently vacant. This is also the site of the new southern bridge crossing, and an extension of Reed Market Rd., to be built during FY 2002-03. Over the last 90 years the riparian character of this site has been seriously degraded through use as an industrial log storage and loading area. Native soils and all riparian vegetation were long ago removed. The long history of heavy industrial use on this site has left about 15 ft. of densely compacted sawdust and other organic debris.

Industrial Light (IL) IL zoning applies to property along the west side of the river for a distance of roughly 1,500 ft. downstream from the north boundary of Wood River Village. This zone permits a wide variety of light manufacturing, processing, storage, and warehousing uses. It also permits some limited commercial development as conditional uses, certain types of public uses and facilities, as well as parking and utilities needed to support permitted uses. Any of these uses could conflict with riparian and wetland resources. The riparian corridor in this zone is narrow, and opportunities for substantial new industrial development are limited due to the presence of rimrock. A dirt trail runs adjacent to this stretch of the river.

Mixed-Use Riverfront (MR) This zone has been designated along both sides of the river for a distance of nearly a mile, to the north boundary of McKay Park. The MR zone was adopted in 1995 to stimulate and facilitate the redevelopment of key sites previously in use for many decades as lumber mills. Adoption of the MR zone followed a lengthy process during which public input concerning the most appropriate and desirable types of development for the former mill properties was solicited and considered. These properties occupy a key position in Bend; the MR zoning process acknowledged this importance, and formalized a commitment on the part of the community. The effect of this commitment was to encourage and support private redevelopment in a manner that revitalizes this area economically, brings people to shops, housing, employment, and the river, and restores natural resource values.

The stated purpose of the MR zone is to "implement the General Plan policies for the creative redevelopment of mill site properties adjacent to the Deschutes River. It is intended to allow for a mix of uses that: (a) Provide a variety of employment opportunities and housing types; (b) Foster pedestrian and other non-motor vehicle activity; (c) Ensure functionally coordinated, aesthetically pleasing and cohesive site planning and design; (d) Ensure compatibility of mixed-use developments with the surrounding area and minimize off-site impacts associated with the development; and (e) Encourage access to, and enjoyment of, the Deschutes River," (Bend Code Sec. 10-10.21A). Accordingly, the MR zone permits a wide variety of light industrial, commercial, residential

and supporting uses, provided they are designed to achieve the general purposes of the MR zone, as outlined above.

Master development plans for the Old Mill District project have been approved for all of the MR acreage adjacent to the Deschutes River. These master plans are under development and have brought about a large-scale mix of retail uses, office buildings, a cinema, and an outdoor amphitheater. About 20 acres of MR land on the west side of the river, south of Columbia St., and 5 acres on the east side of the river, abutting the Reed Market Rd. extension, remain undeveloped at this time.

The natural riparian character of the MR zone was basically eliminated some 90 years ago due to its long use for transporting and storing logs and producing lumber. Native soils and all riparian vegetation were long ago removed and replaced by some 15 ft. of densely compacted sawdust and other organic debris. The banks of the river in much of the MR zone were re-contoured as part of the Old Mill District master development plan, and a narrow strip of vegetation was restored between the water and a paved pedestrian trail. A significant exception to this altered condition is the 6.5-acre wetland created by the Colorado bridge and dam, adjacent to the west side of the river.

Existing uses and future development activity in the MR zone must be considered conflicting uses under Goal 5. However, future development in this zone can also serve as the means for restoration of this badly degraded riparian corridor. Standards for new development in the MR zone include the following (Sec. 10-10.21A[6]):

> Retain and conserve riparian vegetation within the bed and banks of the Deschutes River and adjacent to the river to the maximum extent practicable. There shall be no net loss of wetlands adjacent to the river.
>
> Emphasize the use of native trees, shrubs, or other plants adapted for survival and growth in the high desert life zone.

The goal to encourage access to, and enjoyment of, the Deschutes River also creates the potential for conflicting uses. In the MR zone in particular, the river can serve as both an educational and an aesthetic resource. Pedestrian trails, viewpoints, and other interpretive features will be needed to provide public access and enjoyment of the river. Although conflicting uses, such improvements need not have significant adverse impacts on riparian resources if they are limited in terms of scale and placement.

Residential Urban Medium Density (RM) Within the Pioneer Reach, this zone applies to a mostly built-out area abutting the east side of the river,

between the MR zone and the Galveston Ave. bridge. It also applies to land on both sides of the river between the Newport Bridge and Steidl Dam. The RM zone permits primarily residential uses at densities ranging from 7.3 to 21.7units per gross acre. Conditional uses permitted in this zone include schools, churches, parks, and a variety of public utility and other supporting uses. Any of these uses could conflict with significant riparian or wetland resources. Typical yard landscaping and maintenance activities associated with residential uses can also be considered conflicting uses. As discussed in the *Goal 5 Inventory and Analysis Report,* these activities may include removal of native vegetation, the planting of lawns and ornamental shrubs and trees, and on-going application of fertilizers and pesticides.

There is little vacant land in RM zoned areas within the Pioneer Reach. Most of the properties are small lots developed with single-family dwellings or small multiple-unit buildings. A typical development pattern has the dwelling facing the street, with a landscaped yard lying between the back of the building and the river. This yard often consists mainly of lawn, with occasional shrubs and trees which may be non-native ornamentals. A program to protect significant riparian and wetland resources will need to acknowledge these conditions and their on-going maintenance as potentially conflicting uses.

Residential Urban Standard Density (RS) The RS zone is applied generally to property abutting the river along the middle and northern sections of Pioneer Reach. As stated in the Zoning Code, the RS zone is intended to "provide for the most common urban residential densities in places where community sewer services are or will be available and to encourage, accommodate, maintain and protect a suitable environment for family living," (Sec. 10-10.10). The primary permitted use type is single-family dwellings, developed at density ranges of 2.0-7.3 units per gross acre. Conditional uses permitted in this zone include schools, churches, parks, and a variety of public utility and other supporting uses. Any of these uses could conflict with significant riparian or wetland resources. Typical yard landscaping and maintenance activities associated with residential uses can also be considered conflicting uses. As discussed in the *Goal 5 Inventory and Analysis Report,* these activities may include removal of native vegetation, the planting of lawns and ornamental shrubs and trees, and on-going application of fertilizers and pesticides.

As with the RM zone, there is relatively little vacant land in RS zoned areas within the Pioneer Reach. Most properties are small lots developed with single-family dwellings. A typical development pattern has the dwelling facing the street, with a landscaped yard lying between the back of the building and the river. This yard often consists mainly of lawn, with occasional shrubs and trees which may be non-native ornamentals. The RS zone also includes several of Bend's major parks, including Drake Park. These parks include large lawns, hard-surface trails, and retaining walls at the river's edge and within the riparian corridor. Because of the high level of existing development, small-lot

pattern, and previous disturbance of the riparian corridor in the RS zone, there is relatively little opportunity for large-scale restoration of natural riparian conditions. A program to protect significant riparian and wetland resources will need to acknowledge these existing uses and conditions, and their on-going maintenance, as potentially conflicting uses.

Central Business District (CB) The CB zone flanks a short segment of the middle portion of the Pioneer Reach, making up part of Bend's downtown core. Uses permitted in the CB zone include traditional downtown uses, such as retail stores, offices, restaurants, banks, and dwelling units, as a secondary use. Conditional uses include food stores, parking lots, and buildings over 45 ft. in height. Any of these uses could conflict with significant riparian or wetland resources.

This part of the CB zone is made up of a mix of business properties and publicly owned parcels that provide access to the river, and serve as a continuation of Drake Park. Most of these properties have lawns and landscaped areas lying between the river and adjacent buildings, as well as intermittent walls at the shoreline that make up a hard riparian edge. All of these existing conditions can be considered potentially conflicting uses. Because of the high level of existing development, small-lot pattern, and previous disturbance of the riparian corridor in the CB zone, there is relatively little opportunity for large-scale restoration of natural riparian conditions. A program to protect significant riparian and wetland resources will need to acknowledge these existing uses and conditions, and their on-going maintenance.

Commercial Limited (CL) Within the Pioneer Reach the CL zone is applied to a small area on the east side of the river at the Newport Bridge, at the Bend Riverside Motel Condominiums, and to a larger area along both sides of the river behind the North Canal Dam. The CL zone permits a wide variety of conventional commercial uses, including retail stores, auto sales, restaurants, banks, offices, motels, service stations, and dwelling units that are secondary to a primary commercial use. Conditional uses permitted include new dwelling units, car washes, department stores, theaters, and a variety of institutional and public uses. Any of these uses could conflict with significant riparian or wetland resources.

Most of the parcels in these areas are built-out, except for the properties lying adjacent to the North Canal Dam. The dam itself can be considered a conflicting use. In addition, existing development and landscaping on developed parcels south of the dam can be considered conflicting uses, as well as on-going building and landscape maintenance activities. Future development activities on those CL parcels adjacent to the North Canal Dam could also conflict with protection of significant riparian and wetland resources inventoried in this area.

Deschutes River – Awbrey Reach

The Awbrey Reach of the Deschutes River runs from the North Canal Dam to the north boundary of the Bend urban growth boundary. The Goal 5 Inventory and Analysis Report finds that much of the Awbrey Reach is characterized by steep canyon walls. In some areas these canyon walls are nearly vertical and rise almost directly from the edge of the river, leaving little room for riparian conditions. In other segments of the South Canyon, the canyon walls are less steep or are located back some distance from the river's edge. Where this is the case, slopes abutting the river are much gentler, and the riparian corridor is broader. Contour maps consulted for the inventory indicate that some of these relatively flat areas in the Awbrey reach extend landward from the river's edge for distances of more than 100 ft. before steep cliffs begin to rise abruptly.

Conflicting uses in the Awbrey reach are summarized below, based on zoning designations.

Commercial Limited (CL) The CL zoning designation adjacent to the North Canal Dam, discussed above in the summary of Pioneer Reach conflicting uses, continues into the Awbrey Reach along both sides of the river from the dam to the Mt. Washington Bridge. From that point CL zoning extends farther downstream along the east bank of the river for an additional distance of approximately 1,500 ft. to the south boundary of Sawyer Park. The same permitted uses in the CL zone described above are permissible along this segment of the river, and could be considered conflicting uses.

Downstream from the Mt. Washington Bridge two large motels front the river. A covered footbridge connects motel units on both sides of the river. This encroachment of buildings and landscaping has narrowed the river corridor and virtually eliminated natural riparian conditions. On-going maintenance of these buildings and other site improvements will continue. As a result, there is relatively little opportunity for large-scale restoration of natural riparian conditions in this area. A program to protect significant riparian and wetland resources will need to acknowledge these existing uses and conditions, and their on-going maintenance.

Residential Urban Standard Density (RS) The RS zone is applied to property abutting nearly all of both sides of the Awbrey reach. As stated in the Zoning Code, the RS zone is intended to "provide for the most common urban residential densities in places where community sewer services are or will be available and to encourage, accommodate, maintain and protect a suitable environment for family living," (Sec. 10-10.10). The primary permitted use type

is single-family dwellings, developed at density ranges of 2.0-7.3 units per gross acre. Conditional uses permitted in this zone include schools, churches, parks, and a variety of public utility and other supporting uses. Any of these uses could conflict with significant riparian or wetland resources. Typical yard landscaping and maintenance activities associated with residential uses can also be considered conflicting uses. As discussed in the Goal 5 Inventory and Analysis Report, these activities may include removal of native vegetation, the planting of lawns and ornamental shrubs and trees, and on-going application of fertilizers and pesticides.

Much of the property zoned RS adjacent to the river in the Awbrey reach is already developed with single-family residential subdivisions and recreational facilities. Most of these subdivisions are located on canyon rimrock. Some dwellings in these areas are placed near the edge of the rimrock. Sawyer Park occupies about one-third of a mile of river frontage on both the east and west banks in the RS zone. There are limited opportunities for new development immediately adjacent to the river because of the presence of canyon walls and steep rocky slopes. Where such opportunities exist, there is the potential for new development to encroach into the riparian corridor, removing native vegetation and replacing it with structures, lawns, ornamental plants, driveways, and other features that could adversely affect riparian and wetland resources.

Residential Urban Low Density (RL) Within the Awbrey reach, this zone applies to property along the river for a distance of about one-half mile, in the vicinity of Archie Briggs Rd. The RL zone permits primarily residential uses at densities ranging from 1.1 to 2.2 units per gross acre. Conditional uses permitted in this zone include churches, schools, parks, and a variety of public utility and other supporting uses. Any of these uses could conflict with significant riparian or wetland resources. Typical yard landscaping and maintenance activities can also be considered conflicting uses. As discussed in the Goal 5 Inventory and Analysis Report, these activities may include removal of native vegetation, the planting of lawns and ornamental shrubs and trees, and on-going application of fertilizers and pesticides.

Tumalo Creek

Approximately 1,100 ft. of Tumalo Creek flows through the northwestern edge of the city limits. The creek bed here is 20-40 ft. wide, with seasonal fluctuations in flow levels. This section of the creek and adjacent land are relatively undisturbed, and exist in essentially a natural condition. The Bend Metro Park and Recreation District is the landowner on both sides of the creek. No significant wetlands were found along this section of the creek.

As noted in the *Goal 5 Inventory and Analysis Report* average annual flows of Tumalo Creek are less than 1,000 c.f.s. Under Goal 5, the "safe harbor" riparian corridor width for streams with flow volumes less than 1,000 c.f.s. is 50 ft. That 50 ft. corridor is applied to land along both sides of Tumalo Creek. Due to this safe harbor designation, identification of conflicting uses and ESEE analysis are not required. Although 50 ft. corresponds to the specified Goal 5 safe harbor width, state administrative rules provide that where steep slopes or cliffs are present, the actual designated corridor width must be based on the findings of the inventory process (OAR 660-23-090[5][d]). The *Goal 5 Inventory and Analysis Report* finds that land along both sides of this segment of Tumalo Creek is characterized by steep slopes. In these areas, actual riparian conditions are found in narrow strips on either side, generally not exceeding 10 ft. While this finding might suggest a riparian corridor designation that is narrower than safe harbor, a safe harbor corridor of 50 ft. will easily encompass all identified riparian conditions and allow for protection of additional resources where they exist.

Impacts to Buildable Lands

For the Deschutes River, the Waterway Overlay Zone applies to property abutting approximately ten linear miles of river frontage in the City of Bend. For approximately half of this river frontage, the WOZ boundary is delineated by the boundary of the River Corridor Areas of Special Interest sub-zone. This sub-zone encompasses rock walls and rimrock in the South Canyon and Awbrey Reaches of the river. Although these reaches are zoned residential, lands within the River Corridor ASI boundaries are effectively unbuildable for housing due to topography and access limitations. Development standards of the River Corridor ASI sub-zone also require new structures adjacent to the ASI boundary to be set back at least 30 ft.. This standard could increase somewhat the amount of undeveloped land on parcels affected by this standard. However, the River Corridor ASI sub-zone also includes a provision allowing a development credit, to permit a density transfer from regulated portions of a site to non-regulated portions of the property. This same provision also allows for reduced yard setbacks in order to compensate for the 30 ft. setback. Finally, the River Corridor ASI sub-zone provides that where a parcel is located entirely within that sub-zone, it may be developed with a permitted use despite the ASI designation. These measures will work to ensure that where there may be buildable lands within or adjacent to the River Corridor ASI, those lands may be developed in accordance with the underlying zone.

Of the roughly five miles of river frontage not affected by the River Corridor ASI sub-zone, approximately 80% is already developed. The largest single portion of the undeveloped frontage is found in the MR zone. Virtually all of the

undeveloped frontage in the MR zone is subject to approved master plans that have preceded adoption of the WOZ. Development of these parcels will proceed in accordance with those master plans. The remaining portions of undeveloped, buildable river frontage lying between the South Canyon and Awbrey Reaches are zoned for commercial uses, and amount to approximately 1,600 lineal feet of property. With Riparian Corridor sub-zone widths of 30'-50' in these areas, it is estimated that a total of roughly two acres of vacant, buildable property could be restricted from full commercial development. The General Plan estimates that the city contains some 621 acres of vacant, buildable commercial land. This figure has been more recently updated to approximately 594 acres. The amount of vacant, buildable commercial land that could be affected by the Riparian Corridor sub-zone is negligible when compared to the city-wide inventory. It should also be noted that provisions of the Riparian Corridor sub-zone permit development of parcels that are completely within that sub-zone's boundaries in accordance with the underlying zone. The WOZ also permits encroachment of structures and impervious surfaces into the Riparian Corridor by up to 50% under certain circumstances. These measures are designed to ensure a reasonable level of development on parcels that are affected by development limitations imposed by the WOZ.

ESEE Consequences Analysis

As discussed above, for all of the South Canyon Reach, and much of Awbrey Reach of the Deschutes River, the program to conserve and protect Bend's significant Goal 5 riparian and wetland resources applies "safe harbor" corridor widths. A safe harbor corridor width is also designated for the entire stretch of Tumalo Creek that flows through Bend. Existing conditions and conflicting uses identified above and in the *Goal 5 Inventory and Analysis Report* suggest that narrower corridors (i.e. less than 50 ft.) are appropriate for other segments of the Deschutes River, particularly within the Pioneer Reach and part of the Awbrey Reach. Where this is the case, these narrower widths are justified by analyzing the environmental, social, energy, and economic (ESEE) consequences of allowing, limiting, or prohibiting the identified conflicting uses. Following is a series of tables summarizing likely ESEE consequences of allowing, limiting, or prohibiting conflicting uses as identified above for those river segments where designated riparian corridor widths deviate from safe harbor widths.

Table 1

South Canyon Reach – ESEE Analysis
Deschutes River West Side

Reach Segment	Consequences of Allowing or Prohibiting Conflicting Uses			
	Economic	Social	Environmental	Energy
South UGB to Alignment of Future Southern Bridge Crossing	New housing could be developed; existing housing could be expanded, providing construction employment opportunities. Existing resort developments could be enlarged, providing increased employment opportunities.	Residential and resort landscaping and construction of docks, walls, and other improvements in the water could have adverse impacts on recreation and visual quality of the river corridor.	Impervious surfaces (roofs, patios, decks, etc.) and use of fertilizers and pesticides in landscaped areas could adversely affect water quality; non-native vegetation reduces habitat quality. Protection of existing riparian conditions could lead to a healthier, expanded riparian corridor.	An existing pedestrian trail provides recreation opportunities for residents of nearby neighborhoods, reducing energy consumption. Housing adjacent to the river enables residents to enjoy water-related amenities and activities without need to travel elsewhere by car.

Table 2

South Canyon Reach – ESEE Analysis
Deschutes River East Side

Reach Segment	Consequences of Allowing or Prohibiting Conflicting Uses			
	Economic	Social	Environmental	Energy
South UGB to Alignment of Future Southern Bridge Crossing	New housing could be developed; existing housing near the river could be expanded, providing construction employment opportunities. Existing irrigation and hydro power facilities could be replaced or enlarged to support local economy.	Residential landscaping and construction of docks, walls, and other improvements in the water could have adverse impacts on recreation and the visual quality of the river corridor.	Impervious surfaces (roofs, patios, decks, etc.) and use of fertilizers and pesticides in landscaped areas could adversely affect water quality; non-native vegetation reduces habitat quality. Alterations to existing irrigation facilities could have impacts on riparian and wetland resources. Protection of existing riparian conditions could lead to a healthier, expanded riparian corridor.	Existing informal trails and irrigation maintenance road provide recreation opportunities for residents of nearby neighborhoods, reducing energy consumption. Housing adjacent to the river enables residents to enjoy water-related amenities and activities without need to travel elsewhere by car. Existing hydro power plant provides electrical power. On-going maintenance will be needed to maintain power production.

Table 3

Pioneer Reach – ESEE Analysis
Deschutes River West Side

Reach Segment	Consequences of Allowing or Prohibiting Conflicting Uses			
	Economic	Social	Environmental	Energy
S. boundary of Pioneer Reach to the north boundary of McKay Park	Industrial zoning could provide limited opportunities for new development, with potential increases in employment. Mixed-use zoning could permit new housing, commercial, and office uses; outdoor amphitheater and riverside trails are under development; public park contributes to land values.	New industrial or mixed-use developments could limit or enhance public access to the river. New amphitheatre and trails will enhance public access to the river; continued park maintenance provides public recreational opportunities.	Future industrial or mixed-use developments could encroach on wetlands and narrow riparian zone; impervious surfaces could adversely affect water quality. Noise from industrial or recreational activities could affect wildlife; non-native vegetation reduces habitat quality.	Mixed-use developments encourage energy-efficiency through proximity of housing, employment, shopping, and recreation. Existing park provides recreation opportunities to residents of nearby neighborhoods, reducing energy consumption.
From the north boundary of McKay Park to the Tumalo Irrigation District intake (south boundary of Block 15, Awbrey Heights Subdivision)	New housing could be developed; existing dwellings could be expanded.	Residential landscaping and construction of docks, walls and other improvements in the water could have adverse impacts on visual quality of the river corridor.	Impervious surfaces (roofs, patios, decks, etc.) and use of fertilizers and pesticides in back yards could adversely affect water quality; non-native vegetation reduces habitat quality.	A hydro plant operated by Pacific Power provides electricity; on-going maintenance and future modifications could be affected by riparian regulations. Housing abutting the river enables residents to enjoy water-related amenities and activities without need to travel elsewhere by car.

Reach Segment	**Consequences of Allowing or Prohibiting Conflicting Uses**			
	Economic	Social	Environmental	Energy
From the Tumalo Irrigation intake (south boundary of Block 15, Awbrey Heights Subdivision) to the North Unit Dam	New housing could be developed; existing dwellings could be expanded; CL zoning near North Unit Dam could permit new commercial development.	Residential landscaping and construction of docks, walls and other improvements in the water could have adverse impacts on visual quality of the river corridor; permitted commercial uses provide greater potential for noise and visual impacts.	Impervious surfaces (roofs, patios, decks, etc.) and use of fertilizers and pesticides could adversely affect water quality; non-native vegetation reduces habitat quality.	Housing and businesses abutting the river enables residents, employees, and customers to enjoy water-related amenities and activities without need to travel elsewhere by car.

Table 4

Pioneer Reach – ESEE Analysis
Deschutes River East Side

Reach Segment	Consequences of Allowing or Prohibiting Conflicting Uses			
	Economic	Social	Environmental	Energy
S. boundary of Pioneer Reach to the south boundary of the Mill Addition subdivision.	Industrial zoning could provide opportunities for new development, with potential increases in employment. Mixed-use zoning could permit additional housing, commercial, and office uses; future development of log deck park could enhance surrounding property values. Existing retail and office developments could stimulate additional economic development; future mixed-use and residential development could occur on vacant land north of Colorado.	New industrial or mixed-use developments could limit or enhance public access to the river; future log deck park would enhance public access to, and enjoyment of, the river.	Future park, mixed-use, and industrial developments could encroach on wetlands and narrow riparian zone; impervious surfaces could adversely affect water quality.	Mixed-use developments encourage energy-efficiency through proximity of housing, employment, shopping, and recreation; development of log deck park will provide recreation opportunities within walking distance of nearby neighborhoods.
From the south boundary of the Mill Addition subdivision to the north boundary of the Bend Riverside Motel Condominiums	Existing dwellings could be expanded, enhancing economic value; existing commercial, office, and public uses in downtown core could stimulate additional economic development; existing parks enhance nearby property values.	Parks, public uses, and commercial uses adjacent to the river enable safe, attractive and convenient access to the river corridor.	Impervious surfaces (sidewalks, parking lots, decks, etc.) and use of fertilizers and pesticides in back yards and parks could adversely affect water quality; non-native vegetation reduces habitat quality.	A hydro plant operated by Pacific Power provides electricity; on-going maintenance and future modifications could be affected by riparian regulations. Housing and businesses abutting the river enable residents, employees,

Reach Segment	**Consequences of Allowing or Prohibiting Conflicting Uses**			
	Economic	Social	Environmental	Energy
				and customers to enjoy water-related amenities and activities without need to travel elsewhere by car; pedestrian paths in parks encourage non-auto transportation.
From the north boundary of the Bend Riverside Motel Condominiums to the North Unit Dam	Existing dwellings could be expanded; CL zoning near North Unit Dam could permit some new or expanded commercial uses.	Residential landscaping and construction of docks, walls and other improvements in the water could have adverse impacts on visual quality of the river corridor; permitted commercial uses provide greater potential for noise and visual impacts.	Impervious surfaces (roofs, parking lots, decks, etc.) and use of fertilizers and pesticides could adversely affect water quality; non-native vegetation reduces habitat quality.	Housing and businesses abutting the river enable residents, employees, and customers to enjoy water-related amenities and activities without need to travel elsewhere by car.

Table 5

Awbrey Reach – ESEE Analysis
Deschutes River West Side

Reach Segment	Consequences of Allowing or Prohibiting Conflicting Uses			
	Economic	Social	Environmental	Energy
From the North Canal Dam to the Mt. Washington bridge	CL zoning could permit a wide variety of new commercial uses; proximity to the river enhances property values.	Future commercial development could limit or enhance public access to the river, and could affect the visual quality of the river corridor.	Future commercial developments could encroach on the narrow riparian zone; impervious surfaces could adversely affect water quality.	None.
From the Mt. Washington bridge to the south boundary of Sawyer Park	CL and RS zoning could permit additional housing and commercial uses, as well as expansion of existing uses; proximity to the river enhances property values.	Future commercial or residential development could limit or enhance public access to the river, and could affect the visual quality of the river corridor.	Future commercial or residential developments could further encroach on the narrow riparian zone; impervious surfaces could adversely affect water quality.	None.
From the south boundary of Sawyer Park to the North UGB	RS and RL zoning could permit additional housing, as well as expansion of existing dwellings; proximity to the river enhances property values.	Residential landscaping and construction of docks, walls and other improvements in the water could have adverse impacts on visual quality of the river corridor.	Impervious surfaces (roofs, patios, decks, etc.) and use of fertilizers and pesticides in back yards could adversely affect water quality; non-native vegetation reduces habitat quality. Public ownership of	Housing adjacent to the river enables residents to enjoy water-related amenities and activities without need to travel elsewhere by car.

			Sawyer Park contributes to environmental quality and supports healthy riparian and wetland conditions.	

Table 6

Awbrey Reach – ESEE Analysis
Deschutes River East Side

Reach Segment	Consequences of Allowing or Prohibiting Conflicting Uses			
	Economic	Social	Environmental	Energy
From the North Canal Dam to the Mt. Washington bridge	CL zoning could permit a wide variety of commercial and office uses, as well as utility structures; proximity to the river enhances property values.	New commercial or utility developments could limit or enhance public access to the river, and could affect the visual quality of the river corridor.	Future developments could encroach on wetlands and the narrow riparian zone; impervious surfaces could adversely affect water quality.	None.
From the Mt. Washington bridge to the south boundary of Sawyer Park	Existing motel and related commercial uses could stimulate additional economic development; future expansion of existing uses could enhance property values.	Existing motel uses limit public access to the river; future alterations could further affect the visual quality of the river corridor; enjoyment of the river is enhanced for customers of existing businesses.	Future alterations of existing uses could encroach further into the narrow riparian zone; additional impervious surface areas could adversely affect water quality.	None.
From the south boundary of Sawyer Park to the North UGB	RS and RL zoning could permit additional housing, as well as expansion of existing dwellings; proximity to the river enhances property values.	Residential landscaping and construction of docks, walls and other improvements in the water could have adverse impacts on visual quality of the river corridor.	Impervious surfaces (roofs, patios, decks, etc.) and use of fertilizers and pesticides in back yards could adversely affect water quality; non-native vegetation reduces habitat	Housing adjacent to the river enables residents to enjoy water-related amenities and activities without need to travel elsewhere by car.

			quality. Public ownership of Sawyer Park contributes to environmental quality and supports healthy riparian and wetland conditions.	

Goal 5 Program – Riparian and Wetland Resources

The conflicting uses and ESEE analysis above indicate that the city's significant riparian and wetland resources warrant protection, and that conflicting uses should be limited, or in some cases prohibited, in order to provide appropriate levels of protection. A program to protect these resources must designate those land areas where conflicting uses should be limited or prohibited.

Bend's Goal 5 program designates riparian corridors adjacent to all segments of the Deschutes River and Tumalo Creek as they flow through the city. The widths of these riparian corridors are measured landward horizontally from the line of ordinary high water (OHW), except that where a designated wetland is present, the width of the riparian corridor is measured from the upland edge of the wetland. The width of the corridor varies from segment to segment along the Deschutes River.

South Canyon Reach

For riparian resources, under OAR 660-023-0090(5) local governments may designate a safe harbor riparian corridor of 75 ft. measured from the top of bank, or line or ordinary high water (OHW),where stream flows are 1,000 cfs or greater. Where flows are less than 1,000 cfs, the safe harbor corridor width is 50 ft. Within the South Canyon reach, flows upstream of the COID intake exceed 1,000 cfs, dropping to slightly less than that volume downstream of the intake. Given these flows, provisions of OAR 660-023-0090(5) would allow for safe harbor riparian corridor designations of 75 ft. upstream of the COID intake, and 50 ft. downstream. However, OAR 660-023-009(5) also states that these safe harbor riparian corridor designations are not applicable where the predominant terrain consists of steep cliffs. As noted above, there are cliffs in the vicinity of the entire South Canyon reach, although there are also segments of the reach where the cliffs are far enough back from the top of bank to allow for a wider band of riparian vegetation and a relatively broad riparian corridor. Designation of safe harbor riparian corridors is appropriate in these locations.

Given these conditions, a combination of safe harbor riparian corridor designations and corridor designations based on the standard inventory process is applied to the South Canyon reach. For purposes of the Goal 5 inventory, steep slope or cliff conditions were considered to be present in an area having:

* 60 per cent or greater slope
* a vertical rise of 20 feet or more

* a continuous horizontal length of 50 ft. or more.

Where these steep slope conditions exist closer than 75 ft. horizontally from OHW upstream of the COID intake, the riparian corridor, as defined in OAR 660-023-0090(1) is considered to have a width of 30 ft. Where these steep slope conditions exist within 50 ft. horizontally of OHW downstream from the COID intake, the riparian corridor is likewise considered to have a width of 30 ft. These widths are based on data contained in the Goal 5 Inventory and Analysis Report, and the foregoing analysis of conflicting uses and ESEE consequences. Where steep slope conditions are not present within 75 ft. horizontally of OHW upstream of the COID intake, or within 50 ft. horizontally from OHW downstream of the COID intake, safe harbor riparian corridor designations are appropriate.

Pioneer Reach

As described in the Goal 5 Inventory and Analysis Report, much of this reach is highly urbanized and otherwise altered by landscaping and non-native vegetation. The Pioneer Reach contains the widest variety of urban conditions of any of the three reaches. These have had significant impacts on both the quality and the quantity of riparian and wetland resources. In and around the former Brooks Scanlon and Shevlin Hixon mill sites, the riparian character of this site has been seriously degraded over the last 90 years through use as an industrial log storage and loading area. Native soils and all riparian vegetation were long ago removed in this area. The long history of heavy industrial use on this site has left about 15 ft. of densely compacted sawdust and other organic debris.

The Pioneer Reach also includes several of Bend's major parks, including Drake Park. These parks include large lawns, hard-surface trails, and retaining walls at the river's edge and within the riparian corridor. The combination of the large parks and well-established residential neighborhoods result in a high level of existing development, a small-lot pattern, and previous disturbance of the riparian corridor in the central part of the Pioneer Reach. In this area there is relatively little opportunity for large-scale restoration of natural riparian conditions. An edge of the downtown business district also approaches the lower portion of the Pioneer Reach, creating further impacts from conflicting uses.

The more urban character of the Pioneer Reach, its greater variety of conflicting uses, and its limited potential for restoration of natural riparian conditions are acknowledged through riparian corridor designations that are narrower than those specified under Goal 5 safe harbor rules. The riparian corridor designation is generally limited to widths of 30-40 ft. A small segment of safe harbor 50 ft. corridor is designated along the west bank, upstream from the

North Canal Dam. However, the safe harbor corridor is not applicable to a portion of this segment, on the River's Edge Golf Course site, where a rock cliff forms a portion of the west bank. Where this steep cliff condition exists, the riparian corridor is reduced to 30 ft.

Awbrey Reach

As discussed above for the South Canyon Reach, local governments may designate a safe harbor riparian corridor of 50 ft. measured from the top of bank, where stream flows are less than 1,000 cfs. Within the Awbrey reach, flows in the Deschutes River are well below 1,000 cfs. As a result, provisions of OAR 660-023-0090(5) would allow for a safe harbor riparian corridor designations of 50 ft.. throughout Awbrey Reach. However, as noted in the Goal 5 Inventory and Analysis Report, the segment between the Mt. Washington Bridge and Sawyer Park is highly disturbed, with existing motel buildings lining both sides of the river and a very narrow, tightly regulated riparian area. In recognition of this conflicting use and its on-going operation, a riparian corridor designation of 30 ft. measured horizontally from top of bank is appropriate in this segment of Awbrey Reach.

OAR 660-023-009(5) also states that safe harbor riparian corridor designations are not applicable where the predominant terrain consists of steep cliffs. As noted in the conflicting uses analysis, there are cliffs in the vicinity of much of the Awbrey reach, although there are also segments of the reach where the cliffs are far enough back from the top of bank to allow for a wider band of riparian vegetation and a relatively broad riparian corridor.

Given these conditions, a combination of safe harbor riparian corridor designations and corridor designations based on the standard inventory process is appropriate for the Awbrey reach, apart from the segment lying between the Mt. Washington Bridge and Sawyer Park.

Where steep slope conditions (as defined above for the South Canyon Reach) exist within 50 ft. horizontally of OHW, the riparian corridor, as defined in OAR 660-023-0090(1), is considered to have a width of 30 ft., measured horizontally from OHW. This width is based on data contained in the Goal 5 Inventory and Analysis Report, and the foregoing analysis of conflicting uses and ESEE consequences. Where steep slope conditions are not present within 50 ft. horizontally from OHW, the safe harbor riparian corridor designation of 50 ft. is appropriate.

Specific corridor width designations for all reaches and segments of the Deschutes River and Tumalo Creek are summarized in the tables below. They are based on the ESEE analysis contained in this section. They also take into account existing inventoried conditions as identified in the *Goal 5 Inventory*

and Analysis Report, and the identification of conflicting uses contained in this section.

For each river segment listed in the following tables, the approximate widths of existing riparian vegetation at the edge of the river are indicated. These widths are based on data contained and referenced in the Goal 5 Inventory and Analysis Report, and as documented in a Goal 5 Summary Report presented to the Bend Planning Commission on June 11, 2001. Widths shown are approximate, based on direct observations. It is also important to note that in many areas there is potential for existing bands of riparian vegetation to become somewhat wider over time, as existing vegetation is protected and as additional native plants, trees, and shrubs are given an opportunity to become established. In some river segments listed below, riparian corridor boundaries exceed the approximate widths of existing vegetation. This recognizes that the width of the riparian area (as defined in OAR 660-023-0090[1]) may be greater than the width of existing vegetation. It also provides opportunities for establishment of additional riparian vegetation. In addition, in some cases the wider riparian corridor boundaries correspond to Goal 5 safe harbor dimensions.

All measurements of the riparian corridor boundary are made from the line of ordinary high water, except where significant wetlands have been identified in the Local Wetlands Inventory. In that case, measurement of the riparian corridor boundary begins at the upland edge of the wetland.

Table 7
Riparian Corridor Boundaries
For Deschutes River (West Side) and Tumalo Creek

DESCHUTES RIVER – WEST SIDE	Approximate Width of Existing Riparian Vegetation	Riparian Corridor Boundary
From the South UGB line to the COID intake	0-30 feet	30/75 feet[1]
From the COID intake to the Southern River Crossing	0-30 feet	30/50 feet[2]
From the Southern River Crossing to the north boundary of McKay Park	5-50 feet	40 feet
From the north boundary of McKay Park to the Tumalo Irrigation District intake (south boundary of Block 15, Awbrey Heights Subdivision)	5-15 feet	30 feet

DESCHUTES RIVER – WEST SIDE	Approximate Width of Existing Riparian Vegetation	Riparian Corridor Boundary
From the Tumalo Irrigation intake (south boundary of Block 15, Awbrey Heights Subdivision) to the Mt. Washington Drive bridge	5-20 feet	30/50 feet[3]
From the Mt. Washington Drive bridge to the south boundary of Sawyer Park	10-20 feet	30 feet
From the south boundary of Sawyer Park to the north UGB line	10-20 feet	30/50 feet[4]
TUMALO CREEK		
Both sides of creek within city limits	5-10 feet	50 feet

[1]Where steep slopes are present within 75 ft. horizontally of OHW, the Riparian Corridor Boundary is 30 ft. from OHW. Where steep slopes are not present within 75 ft. horizontally of OHW, the Riparian Corridor Boundary is 75 ft. from OHW.

[2]Where steep slopes are present within 50 ft. horizontally of OHW, the Riparian Corridor Boundary is 30 ft. from OHW. Where steep slopes are not present within 50 ft. horizontally of OHW, the Riparian Corridor Boundary is 50 ft. from OHW.

[3]Between the River's Edge Golf Course and the Mt. Washington Dr. bridge, where steep slopes are present within 50 ft. horizontally of OHW, the Riparian Corridor Boundary is 30 ft. from OHW. Where steep slopes are not present within 50 ft. horizontally of OHW, the Riparian Corridor Boundary is 50 ft. from OHW.

[4]Where steep slopes are present within 50 ft. horizontally of OHW, the Riparian Corridor Boundary is 30 ft. from OHW. Where steep slopes are not present within 50 ft. horizontally of OHW, the Riparian Corridor Boundary is 50 ft. from OHW.

Table 8
Riparian Corridor Boundary
For Deschutes River East Side

DESCHUTES RIVER – EAST SIDE	Approximate Width of Existing Riparian Vegetation	Riparian Corridor Boundary
From the South UGB line to the COID intake	5-20 feet	30/75 feet[1]
From the COID intake to the Southern River Crossing alignment	5-20 feet	30/50 feet[2]
From the Southern River Crossing alignment to the south boundary of the Mill Addition subdivision	5-20 feet	40 feet
From the south boundary of the Mill Addition subdivision to the north boundary of the Bend Riverside Motel Condominiums	0-15 feet	30 feet
From the north boundary of the Bend Riverside Motel Condominiums to the Mt. Washington Drive Bridge	0-20 feet	30/40 feet[3]
From the Mt. Washington Drive bridge to the south boundary of Sawyer Park	0-20 feet	30 feet
From the south boundary of Sawyer Park to the north UGB line	0-20 feet	30/50 feet[4]

[1]Where steep slopes are present within 75 ft. horizontally of OHW, the Riparian Corridor Boundary is 30 ft. from OHW. Where steep slopes are not present within 75 ft. horizontally of OHW, the Riparian Corridor Boundary is 75 ft. from OHW.
[2]Where steep slopes are present within 50 ft. horizontally of OHW, the Riparian Corridor Boundary is 30 ft. from OHW. Where steep slopes are not present within 50 ft. horizontally of OHW, the Riparian Corridor Boundary is 50 ft. from OHW.
[3]Between the North Unit Dam and the Mt. Washington Dr. bridge, where steep slopes are present within 50 ft. horizontally of OHW, the Riparian Corridor Boundary is 30 ft. from OHW. Where steep slopes are not present within 50 ft. horizontally of OHW, the Riparian Corridor Boundary is 50 ft. from OHW.
[4]Where steep slopes are present within 50 ft. horizontally of OHW, the Riparian Corridor Boundary is 30 ft. from OHW. Where steep slopes are not present within 50 ft. horizontally of OHW, the Riparian Corridor Boundary is 50 ft. from OHW.

The conflicting uses and ESEE analysis indicates that there are both negative and positive consequences of allowing or prohibiting conflicting uses within these riparian corridors. Based on this finding, Bend's Goal 5 program must limit or prohibit conflicting uses in order to protect and conserve significant riparian and wetland resources. Consistent with state law, most new land uses and development activities that could adversely affect inventoried riparian or

wetland resources must be excluded from the riparian corridor. New buildings and parking areas in particular have the potential to degrade or damage these resources, and should be prohibited or limited. It is also important to retain and restore native riparian and wetland vegetation where possible. However, water-related and water-dependent uses may be appropriate in some situations, as well as transportation facilities and various utility installations. Goal 5 does not prohibit public access to or within the riparian corridor. In fact, such water-related and water-dependent uses as parks, trails, viewpoints, interpretive features, etc. may be appropriate in these areas. These improvements can also serve the purpose of increasing public awareness and enjoyment of the city's waterways and natural resource values. In any case where such developments are permitted, it is important to have in place standards and procedures that will ensure minimum disturbance of riparian and wetland conditions, and encourage enhancement of the corridor.

Any program to protect significant Goal 5 resources must also include enough flexibility to allow for the on-going use and continued maintenance of existing structures and landscaping. As noted in the conflicting uses section, many developed parcels along the Deschutes River are occupied by homes and businesses that may encroach into designated riparian corridors. Even more common are landscaped yards and parks with lawns, ornamental plants, and other non-riparian vegetation that extend down to the riverbank. Goal 5 does not require that these existing conflicting uses be eliminated or converted to more natural conditions. At the same time, however, the city's Goal 5 program should encourage restoration of altered or degraded riparian areas. Efforts that landowners might undertake to remove existing river walls and riprap, re-grade steep banks, and restore native riparian vegetation should be supported.

The City of Bend's Goal 5 program for riparian and wetland resources is implemented through the Waterway Overlay Zone (WOZ), adopted as part of the zoning ordinance. The WOZ is the tool through which conflicting uses are limited or prohibited within the riparian corridor. It contains specific zoning and development standards not only for the riparian corridor, but also for several other waterway-related overlay zones. As an overlay zone, the WOZ and its sub-zones generally permit uses and development activities that are allowed by the primary underlying zone, e.g. RS, CL, or MR. However, the WOZ also applies special development standards intended to prevent or minimize impacts to Goal 5 resources. In general, these standards prevent alteration of the riparian area by grading or by placement of structures and other impervious surfaces, except under certain circumstances. However, water-related and water-dependent uses may be permitted, as well as a variety of public facilities. The WOZ also permits on-going repair and maintenance of existing uses, and allows development in situations where adherence to WOZ development standards might preclude reasonable use of the property. In all cases, development activity that is permitted within the riparian corridor must take place in a way that minimizes intrusion into the riparian area.

The careful balancing of protection measures for significant riparian and wetland resources against the need to permit reasonable levels of development ensures that these resources will thrive, while contributing to Bend's status as a special place.

Section 2

River Corridor Areas of Special Interest

Areas of Special Interest (ASI's)have been identified on the Bend Area General Plan map since the 1970's as important features in the landscape intended to be preserved as growth occurs. Among the ASI's designated at that time were the South and North Canyons of the Deschutes River corridor. The original designations of these ASI's were approximate. They were intended to take in rimrock and canyon areas along the river from the south UGB to the Old Mill District, and from the north boundary of Sawyer Park downstream to the city's north UGB. In updating the Bend General Plan through the periodic review process (2000-2003) the City was required to review and refine all ASI boundary designations and to adopt new code measures to provide appropriate levels of protection. Revised boundaries for the River Corridor ASI's are shown on the attached maps.

The Deschutes River corridor is a significant economic and recreational amenity within the city. The protection of the scenic quality of these river canyons as scenic resources is important. Such protection will also contribute to the overall health of the river and provide wildlife habitat.

The State does not require local jurisdictions to inventory scenic views and sites. Inclusion of scenic views and sites in the comprehensive plan is optional. However, in refining the boundaries of these previously designated ASI's along the Deschutes River corridor the City finds that the South and North Canyon areas are significant Goal 5 resources.

Since the original designation of these canyons as ASI's, the following forms of inventory data have been accumulated:

- Existing Areas of Special interest mapping
- The Bend Urban Land Survey report (1998-99)
- Field verification of the BULS inventory by staff
- Analysis of aerial photos dated June 2000
- Analysis of topographic maps using 1995 USGS Ortho Digital photos
- Field verification of "line of sight" relationships to building heights
- *City of Bend Periodic Review Goal 5 Inventory and Analysis* (December 2000)

In 1998-99, a local volunteer group named the Bend Urban Land Survey (BULS) team conducted an inventory of the river ASI's. This inventory identifies the habitat value, existing vegetation, scenic values and conflicting uses both existing and anticipated. Since this inventory was conducted, the area has experienced considerable development pressures. New large homes have been constructed along the canyon rim of both the north and south canyons. The visual quality and experience within the canyons is at risk.

Inventory data for the river canyon ASI's also include the Bend General Plan, the Bend Riverway Plan, the Bend Urban Lands Survey, the *City of Bend Periodic Review Goal 5 Inventory and Analysis* (December 2000) and data from Oregon Department of Fish and Wildlife to describe the wildlife habitat, scenic beauty, vegetation, water quality and recreational opportunities within the canyons. Photographs taken within both canyons also confirmed the analysis of the resource quality. Detailed descriptions of the canyons are included in both the Bend Urban Lands Survey and the *City of Bend Periodic Review Goal 5 Inventory and Analysis* (December 2000).

The scenic quality of the north and south canyon ASI's is further confirmed by the State of Oregon's designation of portions of these canyons as State Scenic Waterways. This designation applies to the South Canyon from the UGB to the Central Oregon Irrigation District intake, and to the North Canyon from the south boundary of Sawyer Park to the north UGB.

The north and south canyons are by far the most visually impressive segments of the Deschutes River within the city limits. The steep topography of the canyons make most types of development difficult if not impossible. There are areas below the canyon walls that are level. However, access to these areas is restricted again by topography. Both the north and the south canyons remain relatively undisturbed, although development pressures exist. The development area that most greatly impacts the river corridor is the canyon rim. Existing development along the rim is often highly visible from within the canyons and detracts from the natural beauty and wild experience within the river canyons.

Conflicting Uses

In both the South Canyon and North Canyon ASI's the dominant zoning designations are Residential Standard Density (RS) and Residential Low Density (RL). These are both residential zones intended to accommodate primarily single family dwellings. The north end of the South Canyon also contains some land zoned for industrial uses. Detailed descriptions of potential conflicting uses for these zones are as follows:

Residential Urban Standard Density (RS) The RS zone is applied generally to property abutting both sides of the South Canyon, as well as most of the North Canyon. As stated in the Zoning Code, the RS zone is intended to "provide for the most common urban residential densities in places where community sewer services are or will be available and to encourage, accommodate, maintain and protect a suitable environment for family living," (Sec. 10-10.10). The primary permitted use type is single-family dwellings, developed at density ranges of 2.0-7.3 units per gross acre. Conditional uses permitted in this zone include schools, churches, parks, and a variety of public utility and other supporting uses. Any of these uses could conflict with significant scenic views and sites. Typical yard landscaping and maintenance activities associated with residential uses can also be considered conflicting uses. As discussed in the *Goal 5 Inventory and Analysis Report,* these activities may include removal of native vegetation, the planting of lawns and ornamental shrubs and trees, and other activities that could affect the visual quality of the canyon.

Much of the RS land in both the South and North Canyons is platted into relatively large residential lots. Many of these lots are developed with single-family dwellings approaching the edge of the canyon. A typical development pattern has the dwelling facing the street, with the back of the house and a deck area overlooking the canyon. A program to protect significant scenic views and sites will need to acknowledge these existing uses and conditions, and their on-going maintenance, as potentially conflicting uses.

Residential Urban Low Density (RL) The RL zone is applied generally to properties at the south edge of the UGB in the South Canyon, and at the extreme northerly end of the North Canyon. As stated in the Zoning Code, the RL zone is intended to "provide large urban lots for development with a community water system and DEQ permitted community or municipal sewer systems." (Sec. 10-10.9D). The primary permitted use type is single-family dwellings, developed on lots ranging from 20,000 sq. ft. to 40,000 sq. ft. in size. Conditional uses permitted in this zone include schools, churches, parks, and a variety of public utility and other supporting uses. Any of these uses could conflict with significant scenic views and sites. Typical yard landscaping and maintenance activities associated with residential uses can also be considered conflicting uses. As discussed in the *Goal 5 Inventory and Analysis Report,* these activities may include removal of native vegetation, the planting of lawns and ornamental shrubs and trees, and other activities that could affect the visual quality of the canyon.

The RL land in the North Canyon is platted into relatively large residential lots. RL property in the South Canyon will be developed as single-family subdivisions. Many of the existing, platted lots approach the edge of the canyon. A typical development pattern has the dwelling facing the street, with the back of the house and a deck area overlooking the canyon. A program to

protect significant scenic views and sites will need to acknowledge these existing uses and conditions, and their on-going maintenance, as potentially conflicting uses.

Industrial Light (IL) IL zoning applies to property at the north end of the South Canyon, along the west side of the river. This zone permits a wide variety of light manufacturing, processing, storage, offices, and warehousing uses. It also permits some limited commercial development as conditional uses, certain types of public uses and facilities, as well as parking and utilities needed to support permitted uses. Any of these uses could conflict with the values of scenic views and sites. Most of the IL land in this area is developed with offices and service uses, and there is very little vacant land adjacent to the canyon. Opportunities for new development are further constrained due to the presence of the canyon wall and related rimrock. A dirt trail runs adjacent to this stretch of the river.

ESEE Consequences Analysis

As discussed above, there are a variety of conflicting uses that could have adverse impacts on the scenic and visual qualities of the River Corridor ASI's. This finding indicates that protection of these qualities could involve prohibiting or limiting conflicting uses to some degree. The following tables document the likely economic, social, environmental, and energy (ESEE) consequences of allowing, limiting, or prohibiting conflicting uses. Table 7 illustrates ESEE consequences for the South Canyon River Corridor ASI, and Table 8 covers the North Canyon River Corridor ASI.

South Canyon River Corridor ASI

The South Canyon ASI extends from the south UGB northward to the vicinity of the southern bridge crossing alignment and extension of Reed Market Rd. The Awbrey Hall fire of 1990 came up into the canyon from the south, crossing the river from west to east. Much of this area near the south UGB is devoid of tall trees. Further north the canyon has steep forested slopes and exposed rimrock. At various points along the South Canyon rim there are single-family homes, decks, and landscaped yards overlooking the canyon.

Table 9

ESEE Consequences – South Canyon River Corridor ASI				
Reach Segment	Economic	Social	Environmental	Energy
South Canyon from South UGB to the Southern Bridge Crossing	Potential new subdivision and home development near the south UGB. Potential infill housing along the canyon rim to the north. Limits on siting of houses could affect property values. At the north end industrial and mixed-use zoning could provide limited opportunity for new development with small potential for new jobs.	New development could further limit or enhance the ability for public access along the river. Increased development could have adverse visual impacts on the river canyon, especially as it approaches the canyon rim.	Increased residential densities could cause increased recreational use adversely affecting native vegetation and wildlife. New development increases impervious surfaces and could adversely affect water quality.	COI Irrigation diversion and hydro plant provide irrigation water for farm uses. On-going maintenance and facility modification could have adverse visual impact. Mixed-use zoning encourages energy efficiency through proximity of housing, transit and services.

North Canyon River Corridor ASI

The North Canyon begins at the north boundary of Sawyer Park and extends to the northerly edge of the UGB. The river begins to enter the canyon as it leaves Sawyer Park. The slopes are steep with vegetation. The west side is relatively undeveloped while the east side is scattered with platted lots and small acreage lots. The remaining segment of the canyon is very steep with rimrocks and tall vegetation on both sides of the river. Several homes have been constructed on the east rim.

Table 10

ESEE Consequences – North Canyon River Corridor ASI				
Reach Segment	Economic	Social	Environmental	Energy
North Canyon from Sawyer Park to the north UGB	Potential infill housing along the canyon rim. Limits on siting of houses could affect property values.	New residential development could further limit or enhance the ability for public access along the river. Increased development could have an adverse visual impact on the river corridor. Limits on siting of houses could affect homeowner satisfaction.	Increased residential densities could cause increased recreational use adversely affecting scenic quality, native vegetation and wildlife. New development increases impervious surfaces and could adversely affect water quality.	None.

Goal 5 Program: River Corridor Areas of Special Interest

The conflicting uses and ESEE analysis above indicate that the scenic views and sites associated with the River Corridor ASI's warrant protection, and that conflicting uses should be limited, or in some cases prohibited, in order to provide appropriate levels of protection. A program to protect these resources must designate those land areas where conflicting uses should be limited or prohibited.

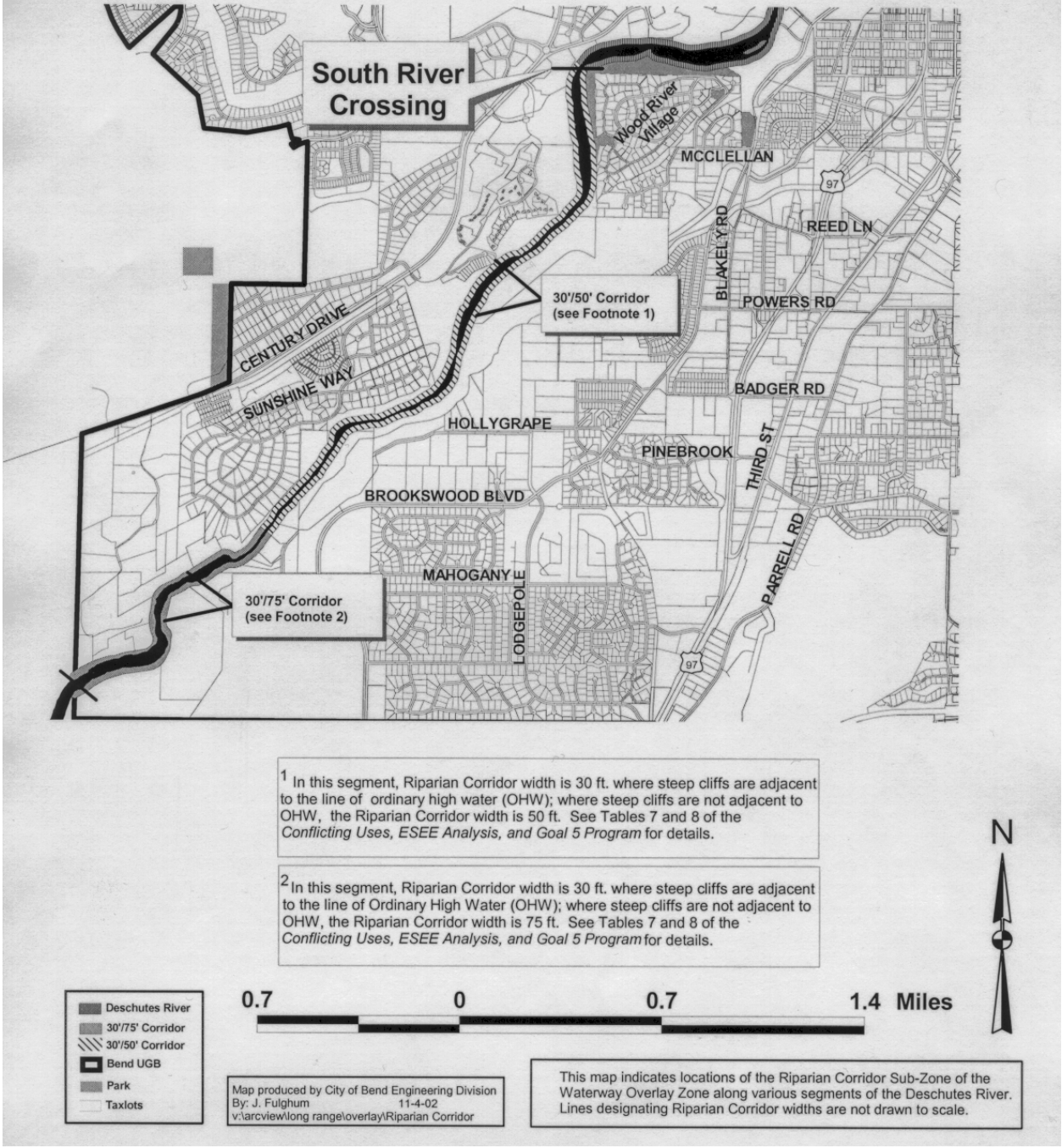
An important program goal for scenic views and sites in both the north and south canyon corridors is to retain the wild natural experience within the canyons. The visual resource area that has been inventoried is defined generally by the line of sight from within the corridor, by looking up from the river's edge up to the canyon rim. Boundaries determined in this way for the River Corridor ASI's have been designated as part of the Waterway Overlay Zone. These boundaries generally follow the tops of the North and South Canyons, taking in the canyon walls and edges. Within and immediately adjacent to these boundaries, conflicting uses should be regulated to ensure that adverse impacts to scenic views and sites are minimized.

The conflicting uses and ESEE analysis indicate that there are both negative and positive consequences of allowing or prohibiting conflicting uses within these River Corridor ASI's. Based on this finding, the City's Goal 5 program must limit or prohibit conflicting uses in order to protect and conserve significant scenic resources. New buildings, decks, other structures, and landscaping in particular have the potential to degrade or damage scenic qualities, and should be prohibited or limited within and adjacent to River Corridor ASI boundaries. It is also important to retain existing trees and other vegetation where possible. However, buildings and other site alterations may be appropriate when designed and carried out in ways that minimize visual impacts. In any case where such developments are permitted, it is important to have in place standards and procedures that will ensure minimum disturbance of scenic values, and encourage enhancement of these values.

Any program to protect significant Goal 5 resources must also include enough flexibility to allow for the on-going use and continued maintenance of existing structures and landscaping. As noted in the conflicting uses section, many developed parcels along the River Corridor ASI's are occupied by homes and other uses that approach or encroach into designated ASI boundaries. Even more common are landscaped yards and areas with lawns, ornamental plants, and other features. Goal 5 does not require that these existing conflicting uses be eliminated or converted to more natural conditions. At the same time, the city's Goal 5 program should encourage restoration of altered or degraded canyon areas.

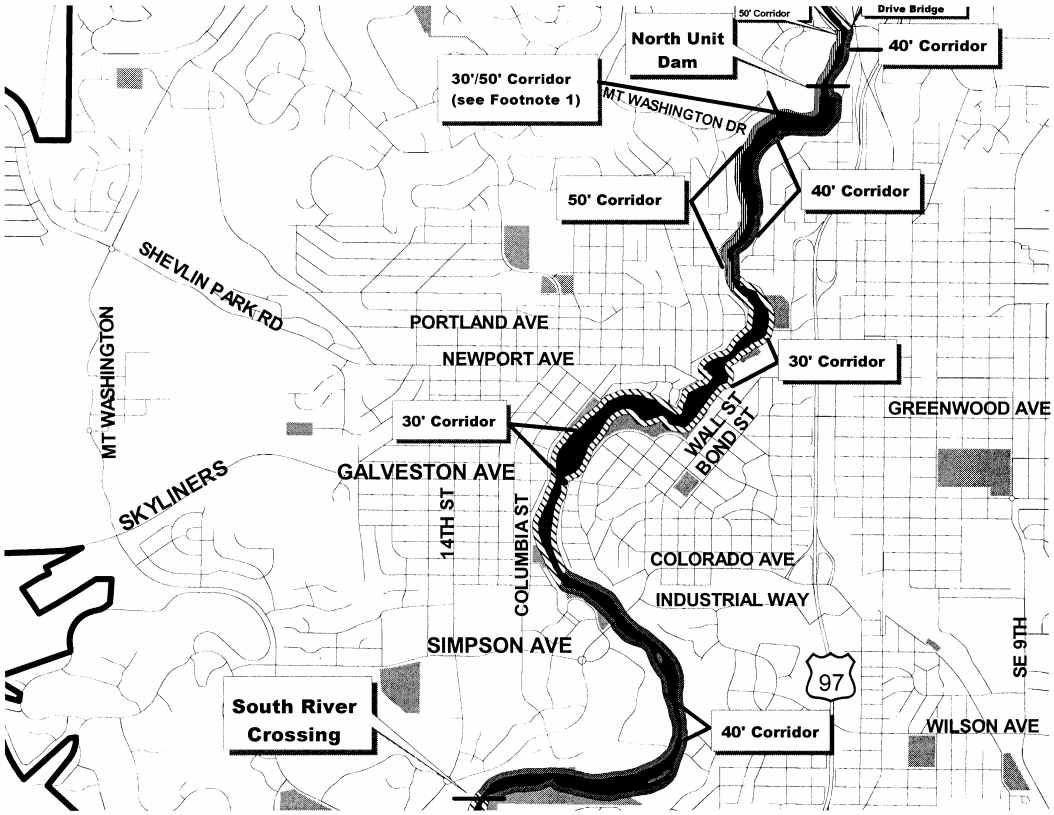
The City of Bend's Goal 5 program for scenic views and sites in the River Corridor ASI's is implemented through the Waterway Overlay Zone (WOZ), adopted as part of the zoning ordinance. The WOZ is the tool through which conflicting uses are limited or prohibited. It contains specific zoning and development standards not only for the River Corridor ASI's, but also for several other river-related overlay zones. As an overlay zone, the WOZ and its sub-zones generally permit uses and development activities that are allowed by the primary underlying zone, e.g. RS, RL, or IL. However, the WOZ also applies special development standards intended to prevent or minimize impacts to scenic resources. In general, these standards are designed to restrict new construction and removal of vegetation within the River Corridor ASI's and adjacent to the edges of the canyons. However, a variety of public facilities may be permitted, as well as tree removal when necessary to prevent hazard. The WOZ also permits on-going repair and maintenance of existing uses, and allows development in situations where adherence to WOZ development standards might preclude reasonable use of the property.

DESCHUTES RIVER RIPARIAN CORRIDOR
SOUTH CANYON REACH
UGB to South River Crossing



DESCHUTES RIVER RIPARIAN CORRIDOR
PIONEER REACH

South River Crossing to North Unit Dam



[1] In this segment, Riparian Corridor width is 30 ft. where steep cliffs are adjacent to the line of ordinary high water (OHW); where steep cliffs are not adjacent to OHW, the Riparian Corridor width is 50 ft. See Tables 7 and 8 of the *Conflicting Uses, ESEE Analysis, and Goal 5 Program* for details.

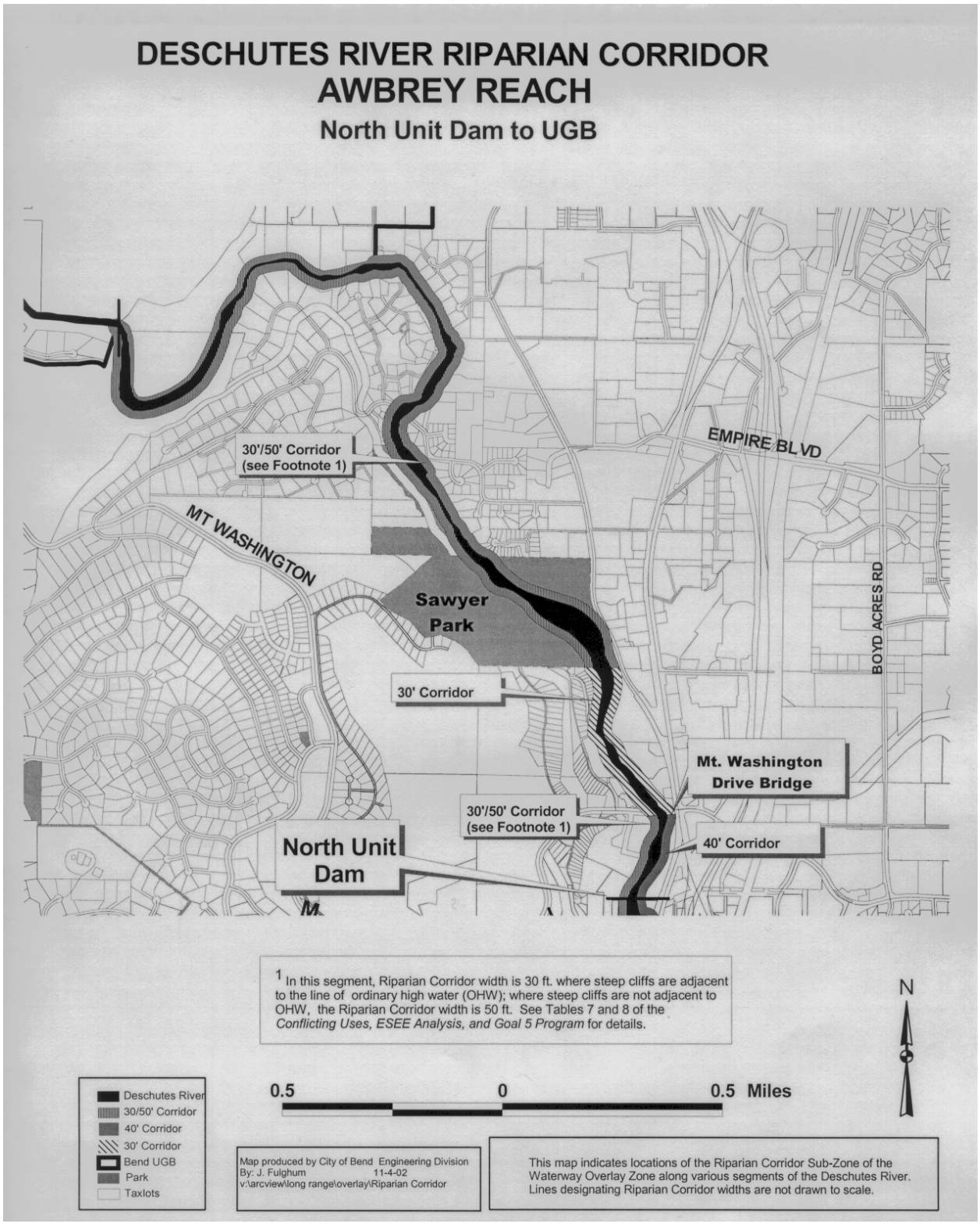
N

0.7 0 0.7 1.4 Miles

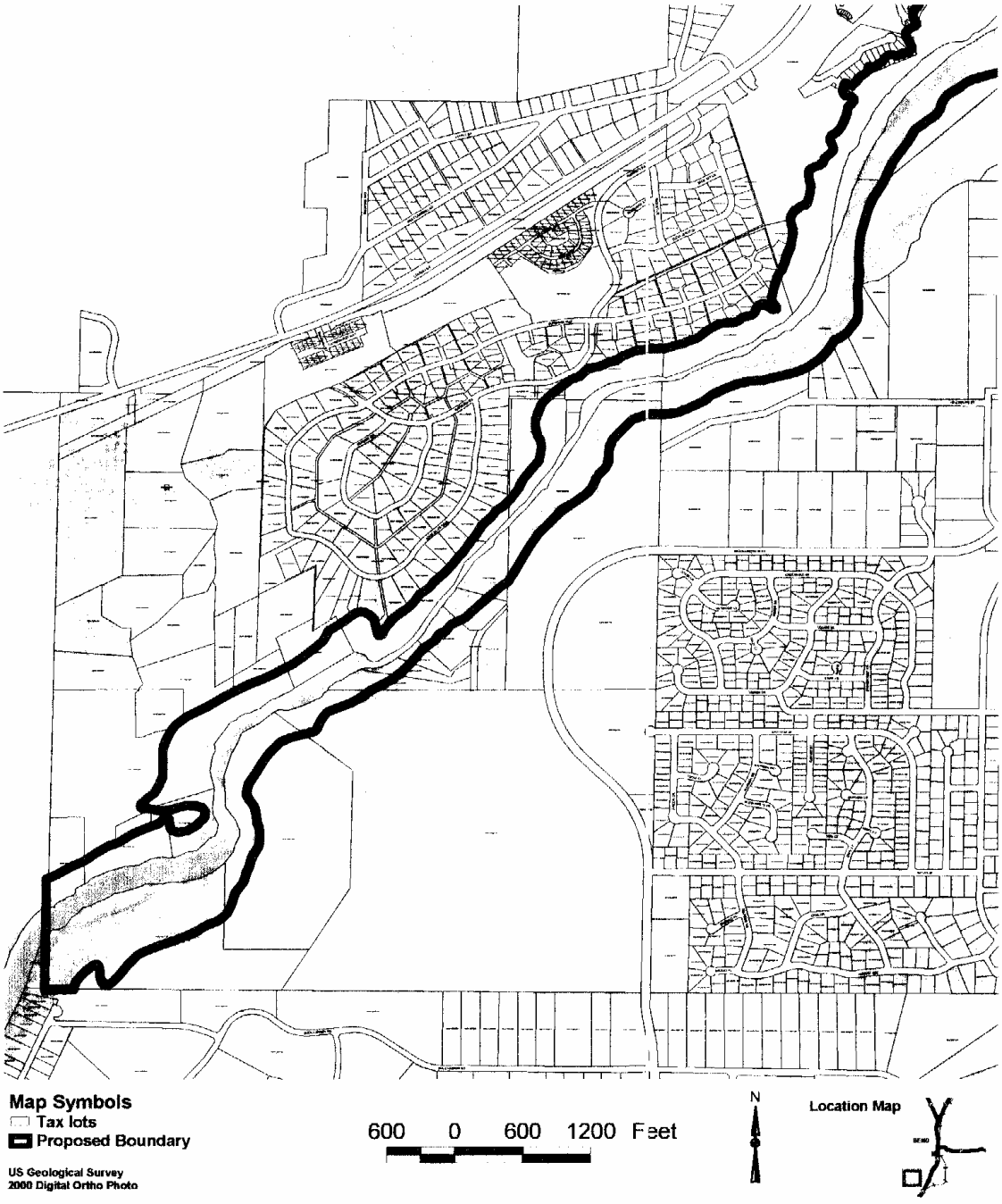
Deschutes River
50' Corridor
40' Corridor
30' Corridor
Bend UGB
Park
Taxlots

Map produced by City of Bend Engineering Division
By: J. Fulghum 11-4-02
v:\arcview\long range\overlay\Riparian Corridor

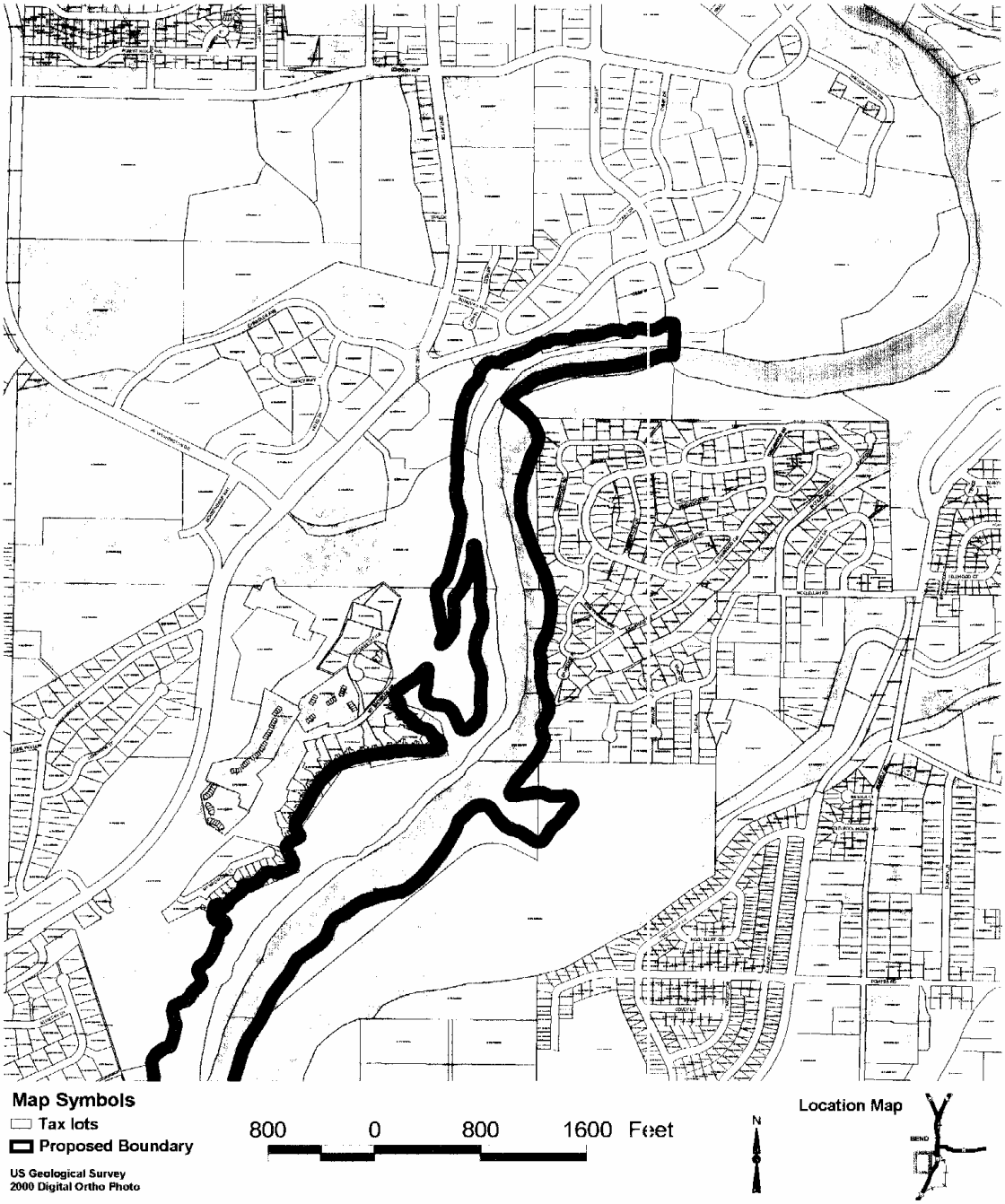
This map indicates locations of the Riparian Corridor Sub-Zone of the Waterway Overlay Zone along various segments of the Deschutes River. Lines designating Riparian corridor widths are not drawn to scale.


DESCHUTES RIVER RIPARIAN CORRIDOR
AWBREY REACH
North Unit Dam to UGB
30'/50' Corridor
(see Footnote 1)
EMPIRE BLVD
MT WASHINGTON
Sawyer
Park
BOYD ACRES RD
30' Corridor
Mt. Washington
Drive Bridge
30'/50' Corridor
(see Footnote 1)
40' Corridor
North Unit
Dam
1 In this segment, Riparian Corridor width is 30 ft. where steep cliffs are adjacent to the line of ordinary high water (OHW); where steep cliffs are not adjacent to OHW, the Riparian Corridor width is 50 ft. See Tables 7 and 8 of the Conflicting Uses, ESEE Analysis, and Goal 5 Program for details.
N
Deschutes River
30/50' Corridor
40' Corridor
30' Corridor
Bend UGB
Park
Taxlots
0.5
0
0.5 Miles
Map produced by City of Bend Engineering Division
By: J. Fulghum 11-4-02
v:\arcview\long range\overlay\Riparian Corridor
This map indicates locations of the Riparian Corridor Sub-Zone of the Waterway Overlay Zone along various segments of the Deschutes River. Lines designating Riparian Corridor widths are not drawn to scale.

River Corridor Areas of Special Interest
South Deschutes River Corridor - Part 1



River Corridor Areas of Special Interest
South Deschutes River Corridor - Part 2



River Corridor Areas of Special Interest
North Deschutes River Corridor
City of Bend Portion

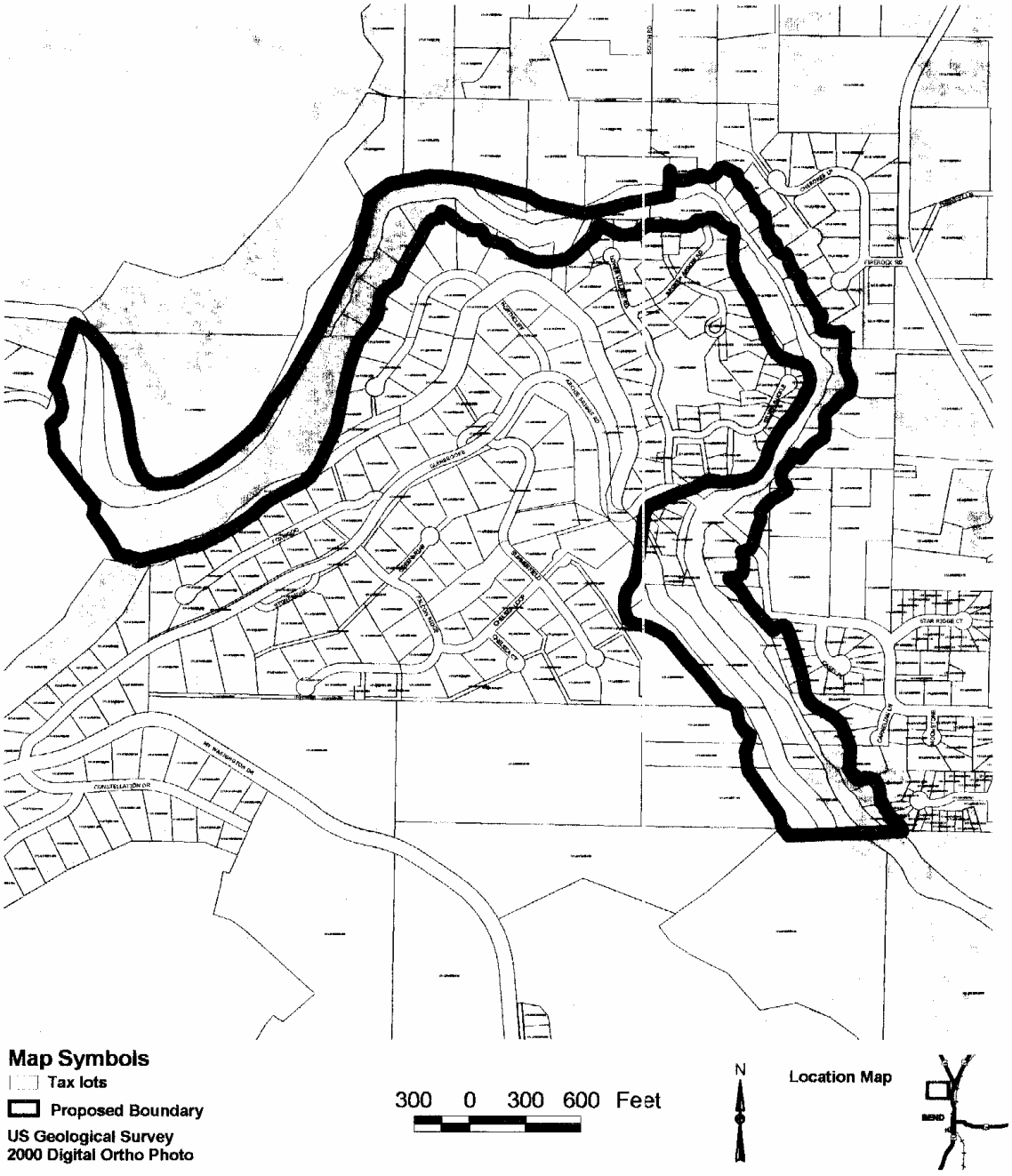


Exhibit "E"

Local Wetlands Inventory Report

Adopted by City Council November 20, 2002
Effective December 20, 2002

City of Bend

Local Wetlands Inventory Report

November 2002

Prepared by Darcy McNamara, Bend Riverway
Edited by Mike Byers, Principal Planner

Table of Contents

Note: See City of Bend Goal 5 Inventory and Analysis for floodplain map and for references.

Introduction

Local governments are required to use criteria and procedures established by the Land Conservation and Development Commission to identify significant wetlands under Statewide Planning Goal 5. To comply, a Local Wetlands Inventory (LWI) for the City of Bend was conducted. When approved by the state the LWI will replace the National Wetlands Inventory map for the Bend area. The inventory revealed that there are no significant Goal 5 wetland resources outside of the riparian corridor of the Deschutes River. The entirety of the Deschutes River within the UGB was evaluated as a single aquatic system. Within this aquatic system, a total of ten significant wetland units have been identified, meaning that the City must meet requirements in state law for protecting these wetland units. This may be accomplished through a new wetland protection ordinance or by modifying existing river corridor regulations. A summary of the LWI methodology and findings are located in the City of Bend Periodic Review Goal 5 Inventory and Analysis, which is separately bound.

Goal 5 Wetlands Defined

Wetlands are areas that are inundated or saturated with water long enough to support plants that are adapted to life in saturated soils. Wetlands share three common characteristics:

- **Water** in abundance over a period of time. The prolonged seasonally or permanently saturated area creates the wetland (developing hydric soil that support wetland plants)
- **Hydric soils** are distinctive soils formed by saturated conditions
- **Wetland plants**, or "hydrophytes," are water loving plants with special adaptations for living in hydric soils.

Local governments are required conduct an inventory to identify, classify, and assess the functions and condition of wetland areas. The standard Goal 5 inventory methodology does not apply for wetlands. Instead, local governments are required to conduct a systematic survey called a Local Wetlands Inventory (LWI) following rules adopted by the Division of State Lands (DSL). The LWI maps the approximate location of wetlands and provides information on the characteristics of those wetlands. A wetland function and condition assessment is done as part of the LWI using the *Oregon Freshwater Wetland Assessment Methodology* published by DSL (1996). Wetland functions to be evaluated include wildlife and fish habitat, water quality improvement and floodwater retention.

At the conclusion of the LWI process, the city is required to identify significant wetlands using criteria set by DSL and to develop programs to protect significant Goal 5 wetland resources. The city must coordinate with appropriate state and federal agencies when adopting programs intended to protect wetland resources. The significance criteria are outlined in the next section.

Locally Significant Wetland Criteria

Wetlands are the only Goal 5 resource with a specific methodology to determine whether or not the resource is significant. The significance determination is based upon the results of the wetland function and condition assessment. A summary of the significance criteria

follows. For the complete administrative rule for identifying significant wetlands refer to OAR 141-86-300 in the separately bound Goal 5 Reference Material.

Exclusions
Wetlands cannot be designated as locally significant if they fall within any one of the following categories (list edited for the City of Bend).

Wetlands artificially created entirely from upland that are:
- Created for the purpose of controlling, storing, or maintaining stormwater; or
- Ditches without a free and open connection to natural waters of the state and which do not contain food or game fish; or
- Less than one acre in size and created unintentionally as the result of irrigation water overflow or leakage; or as the result of construction activity not related to compensatory mitigation for permitted wetland impacts; or
- Of any size and created for the purpose of wastewater treatment, farm or stock watering, settling of sediment, or as a golf course hazard.

Significant Criteria
A local government must identify a wetland as locally significant if it meets one or more of the following criteria:

1. The wetland performs any one of the following functions at the levels indicated below using the *Oregon Freshwater Wetland Assessment Methodology* (OWFAM):
   - "Diverse" wildlife habitat; or
   - "Intact" fish habitat; or
   - "Intact" water quality function; or
   - "Intact" hydrologic control function.

2. The wetland is less than one-fourth mile from a water body listed by the Department of Environmental Quality as water quality limited (303 (d) list), and the wetland's water quality function is described as "intact" or "impacted or degraded" using OFWAM. A local government may determine that a wetland is not significant under this subsection if the wetland does not provide water quality improvements.

3. The wetland contains one or more rare plant communities as defined by OFWAM.

4. The wetland is inhabited by a federal threatened or endangered, or a state sensitive, threatened or endangered species, unless the appropriate state or federal agency indicates that the wetland is not important for the maintenance of the species.

5. The wetland has a direct surface water connection to a stream segment mapped by the Oregon Department of Fish and Wildlife as habitat for indigenous anadromous salmonids, and the wetland is determined to have "intact" or "impacted or degraded" fish habitat function using OFWAM.

Wetland Protection Program

Once a wetland has been determined to be significant the city must either conduct an Energy, Social, Environmental and Economic (ESEE) analysis of options to protect, partially protect

or allow full development of the significant wetland, or use the "safe harbor" method to protect the significant wetlands. The safe harbor program must include restrictions on grading, excavation, placement of fill, and vegetation removal other than perimeter mowing and other cutting necessary for hazard prevention; and include a variance procedure to consider hardship variances and claims of map error. See Goal 5 Reference Material (660-023-0100(4)) for the complete text.

Wetlands Inventory Methodology

A Local Wetlands Inventory (LWI) was conducted for the City of Bend in accordance with the standards and procedures in the Oregon Administrative Rules (141-086-0180 to 0240).

The inventory and mapping process was fully documented in order to ensure accuracy and consistency throughout the process. Documentation includes:

- Dates and scales of source maps and air photos used
- Technical staff members and qualifications
- Field data sheets

Maps and resources consulted for the City of Bend LWI include:

- U.S. Soil Conservation Service county soil survey
- National Wetlands Inventory map
- FEMA floodplain maps
- USGS topographic map 7.5 minute series, Bend Quadrangle
- Color aerial photos dated June 2000. 1 inch = 1680 feet
- Color aerial photos dated August 1998
- Topographic maps, 1 inch = 100 feet prepared by City of Bend
- Existing Conditions Report in the Bend Riverway, A Community Vision
- Other resources located in the Reference section of this document

Agencies and local knowledge consulted include:

- Oregon Department of Fish and Wildlife
- Deschutes County
- Local Knowledge individuals – at early public involvement meeting
- Local Knowledge Groups:
    1. ARLU-DeCo, Bob Bates
    2. Central Oregon Audubon Society, Chris Carey
    3. Deschutes Basin Land Trust, Brad Chalfant
    4. Deschutes Soil and Water Conservation District, Jeff Rola
    5. Friends of Bend, John Neilson, Liz Rewick
    6. High Desert Ecological Research Institute, David Dobkin
    7. Morrow Planning, Catherine Morrow
    8. Natural Areas Association, Reid Schuller
    9. Oregon Native Plant Society, Stu Garrett
    10. Oregon Natural Desert Association, Tim Lillebo
    11. Sisters Forest Planning Association, Paul Dewey
    12. Upper Deschutes Watershed Council, Barbara Lee

To begin the inventory process, information on wetlands within the City of Bend UGB was compiled onto one working map. The information included:

- Wetlands identified from the National Wetlands Inventory map
- Riparian wetlands identified in the Bend Riverway Existing Conditions Report;
- Hydric soil information from the U.S. Soil Conservation Service county soil survey;
- Floodplain location information from FEMA;
- Wetlands or possible wetlands identified from air photos
- Golf course locations
- Irrigation canal locations
- Sites to check based on local knowledge

Each potential wetland was assigned a unique number. All wetlands and possible wetlands were then field verified by Riverway staff. All wetlands were classified by type according to the U.S. Fish and Wildlife Service's Classification of Wetlands and Deepwater Habitats of the United States (Cowardin classification) and the Hydrogeomorphic (HGM) classification. The OFWAM manual questions were completed in the field for all riparian wetlands. Each site was photographed.

All of the identified non-riparian wetlands and golf hazards were field checked to determine if they met the "exclusion" criteria for significant wetlands, as described above. All of the non-riparian wetland sites met one or more of the exclusion criteria. For these sites, a modified short form was filled out that documented use and hydrologic source. The modified form includes information on the function of the wetland. Upon completion of the fieldwork, Dana Field (DSL wetlands planner) field checked the work.

The LWI includes the wetlands map showing all of the identified wetland sites, supporting maps used to develop the LWI, field data sheets, and photos.

A summary sheet was prepared for each wetland. The summary sheet includes:

- Individual wetland code
- Street address or equivalent sufficient to locate site
- Public Land Survey identifier (Township, Range, Section) for location of the wetland
- Approximate wetland size (in acres)
- Wetland Classifications (Cowardin and Hydrogeomorphic)
- Soil type(s)
- Hydrologic basin
- Description of wetland
- Hydrology source and use of artificially created wetlands
- Field verification date(s)

All identified wetlands greater than 0.5 acres were located generally on a map included in the LWI. Mapping for non-excluded wetlands (riparian wetlands) was done on topographical maps (1 inch = 100 feet) at an accuracy of approximately 25 feet. The approximate acreage for each wetland was calculated.

The OFWAM manual questions were completed for all riparian wetland units. Each site was photographed. Each riparian wetland unit boundary was determined and mapped on topographical maps scaled 1 inch equals 100 feet. The wetland determination was conducted

by city and Riverway staff by analyzing the vegetation and topographical breaks. A check of this work was conducted by DSL staff. A final LWI map was produced that includes all identified wetlands.

Inventory Results

Overview

Based upon the results of the LWI and a review of the significance criteria, it was determined that none of the non-riparian wetlands would qualify as Locally Significant Wetlands. This means that while they might be regulated wetlands under the Removal-Fill Law (administered by DSL) and/or the Clean Water Act (administered by the Army Corps of Engineers), they require no further analysis or protection as a Goal 5 wetland resource by the City of Bend. As for the wetlands along the Deschutes River, 10 wetland units were identified. OFWAM function and condition assessment information was compiled on each wetland unit in order to determine if they are locally significant wetlands.

A quick summary of the inventory results is as follows:

- Ten (10) wetlands were identified within the Deschutes River corridor
  - The corridor was divided into three reaches (South Canyon, Pioneer, and Awbrey) and inventoried for wetlands
  - All 10 wetland units meet the criteria for locally significant wetlands
- Forty-four (44) non-riparian wetlands were inventoried
  - All non-riparian wetlands met the exclusion criteria and are not locally significant wetlands (due to size and hydrologic source)
- No riparian wetlands were found on Tumalo Creek. (Only about ¼ mile of the creek is within the UGB. There are many wetlands on the creek outside the UGB.)

Wetlands provide important habitat for wildlife, provide flood storage, promote water quality and harbor a large part of the floral diversity in the Bend area. Of the eight mammals observed during a survey in 1990, six depended on wetlands for food or cover. And of the 47 bird species observed, wetlands provided habitat for 29 species. These observations were made along a segment of the river corridor from south portion of the Old Mill district (log deck) to just south of the Newport Street bridge (PacificCorp, 1990). The 10 significant wetland units identified in this LWI comprise a total of approximately 29 acres. By far the most important wetland for wildlife within the area of the survey is a 6.5 acre area just south of the Colorado Street bridge. This area has 2.2 acres of wetland shrubs like willow and alder and had 20 distinctly different vegetation zones. The wetland is dominated by sedges and cattails and had a number of open water areas that provide nesting, foraging and cover for birds. There are only a few other wetlands of this type along the river. One of special note is the area downstream from 1st Street Rapids. This wetland is developing in areas of slow moving water on both sides of the river.

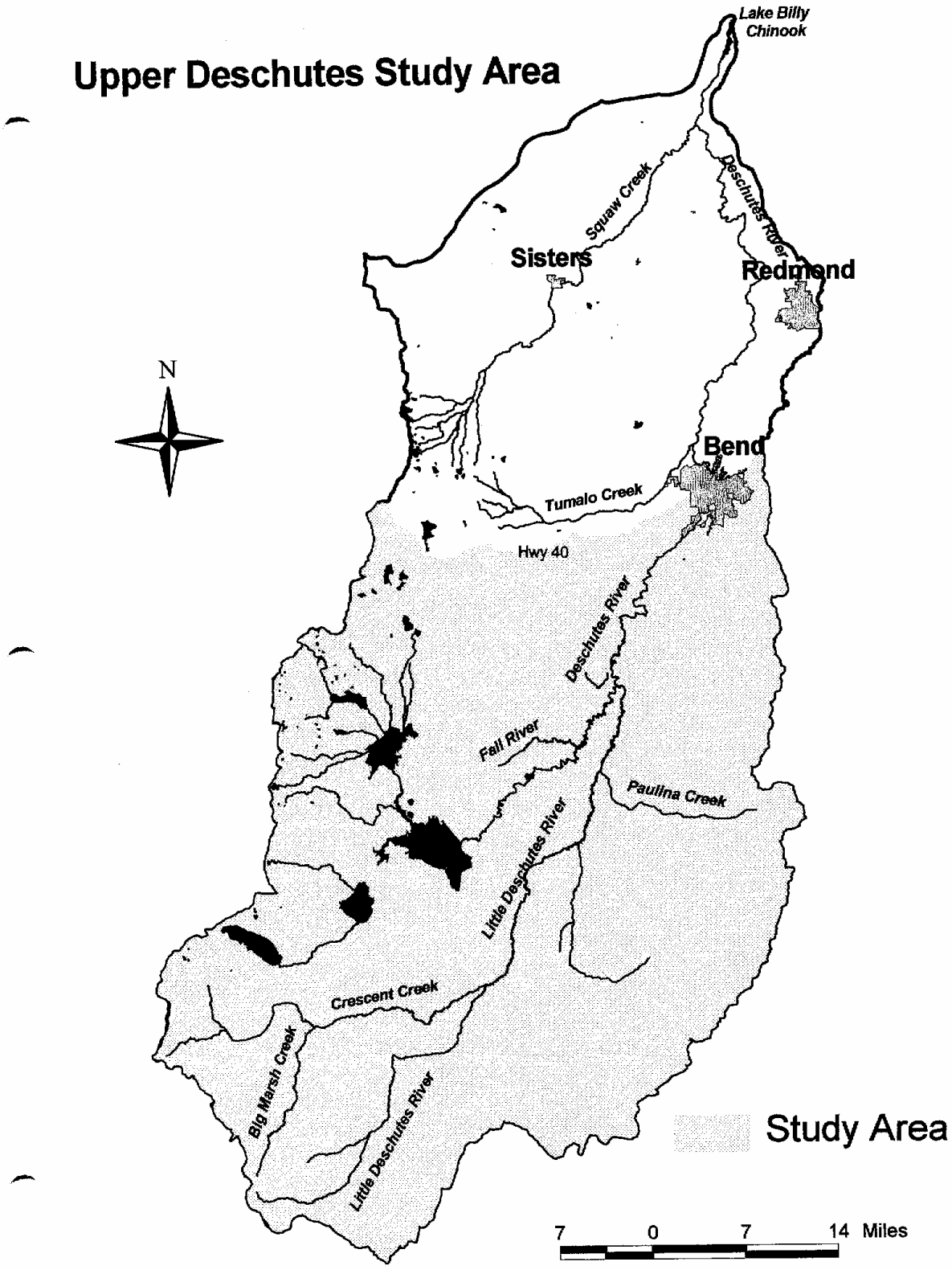
All identified non-riparian wetlands greater than ½ acre were inventoried including irrigation ponds, golf hazards, wastewater treatment facilities, ornamental ponds, and areas where irrigation conduits have leaked. All appeared to be artificially created entirely from upland and fed by irrigation water based on pipes and ditches nearby. Bend's non-riparian wetlands fall into the following categories, which are excluded from being significant Goal 5 wetland resources:

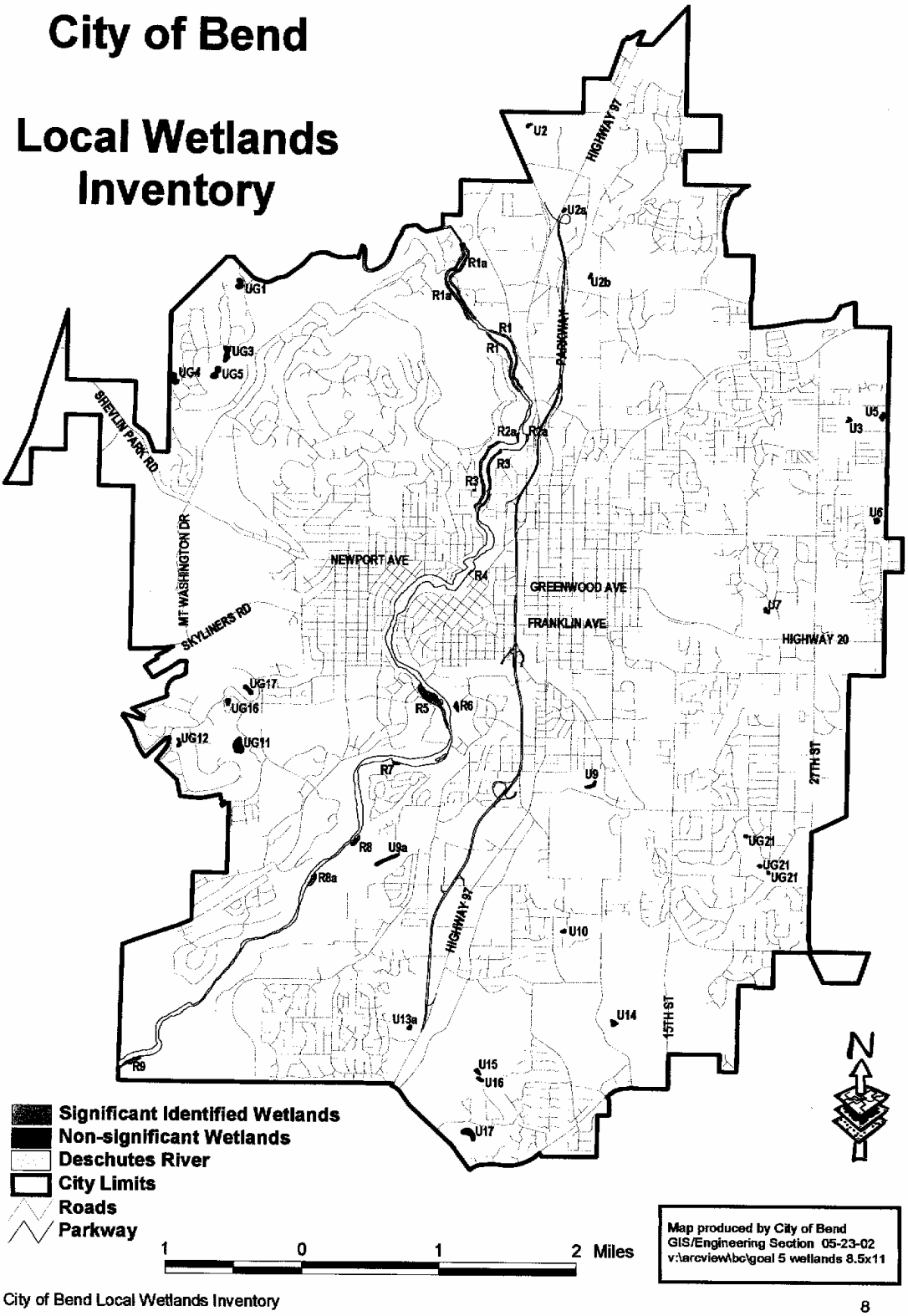
Wetlands artificially created entirely from upland that are:

- Created for the purpose of controlling, storing, or maintaining stormwater;
- Less than one acre in size and created unintentionally as the result of irrigation water overflow or leakage; or
- Of any size and created for the purpose of wastewater treatment, farm or stock watering, settling of sediment, or as a golf course hazard.

Some of these ponds have well developed wetland vegetation. They may be very old as irrigation began in about 1904. Some have been prevented from establishing wetland vegetation through maintenance practices. It is possible that some may have been wetlands, wet meadows or low spots in the topography prior to the routing of irrigation water. If the hydrology is altered (leaky conduits fixed, water diverted away from the site, etc.) and a wetland remains over time (without an artificial source of water), it may later be evaluated to determine if it is a significant Goal 5 wetland resource. It is possible, but not likely, that any of these artificially created areas will persist without irrigation water.

The map titled "City of Bend Local Wetlands Inventory" shows all the wetlands that were inventoried, coded by whether or not they are locally significant wetlands. Refer to the LWI non-riparian wetlands data sheets for detailed inventory information on the non-riparian wetlands that did not meet the criteria for significant wetlands. The remainder of this section will focus on those wetlands that meet the criteria for significant wetlands in Bend.


Upper Deschutes Study Area
Lake Billy Chinook
Squaw Creek
Deschutes River
Sisters
Redmond
N
Bend
Tumalo Creek
Hwy 40
Deschutes River
Fall River
Paulina Creek
Little Deschutes River
Crescent Creek
Big Marsh Creek
Little Deschutes River
Study Area
7 0 7 14 Miles



City of Bend Local Wetlands Inventory

8

SUMMARY OF SOIL TYPES IN BEND WITHIN 500 FEET OF DESCHUTES RIVER								
Map Number	Soil Name	Slope	General Location	Typical Plants	Drainage Class	Soil Permeability	Wetland wildlife habitat	Wetland Plant Suitability
61C	Henkle-Fryrear-Lava flow complex	0-15%	Volcanic uplands	Juniper, pine, sagebrush, fescue	Somewhat excessively drained	Moderately rapid	NR	NR
62D	Henkle-Fryrear-Lava flow complex	15-50%	Volcanic uplands	Juniper, pine, sagebrush, fescue	Somewhat excessively drained	Moderately rapid	NR	NR
72C	Laidlaw Sandy loam	0-15%	Swales in volcanic uplands	Ponderosa pine, juniper, bitterbrush, fescue	Well drained	Moderately rapid	NR	NR
81F	Lickskillet-Rock outcrop complex	45-80%	Canyon sideslopes	ND	Well drained	Rapid	Very poor	Very poor
85A	Lundgren sandy loam	0-3%	Glacial outwash plains	Ponderosa, Idaho fescue, wax currant, bitterbrush,	Well drained	Rapid	Very poor	Very poor
101E	Redcliff-Lickskillet-Rock outcrop complex	30-50%	Canyon sideslopes	Juniper, sagebursh, bitterbrush, wheatgrass	Well drained	Rapid	Very poor	Very poor
155C	Wanoga sandy loam	0-15%	Volcanic uplands	Pine, juniper, Ross sedge, sagebrush, bitterbrush	Well drained	Moderately rapid	NR	NR
155D	Wanoga sandy loam	15-30%	Volcanic uplands	Pine, juniper, Ross sedge, sagebrush, bitterbrush	Well drained	Moderately rapid	NR	NR
156C	Wanoga-Fremkle-Henkle complex	0-15%	Volcanic uplands	Pine, juniper, sagebrush, bitterbrush, Ross sedge on Wanoga	Well drained	Moderately rapid	NR	NR
157C	Wanoga-Fremkle-Henkle complex	0-15%	Volcanic uplands	Pine, juniper, sagebrush, bitterbrush, Ross sedge on Wanoga	Well drained	Moderately rapid	Very poor	Very poor
NR = No suitability rating		ND = No data						

This table is a synopsis of information from the USDA-SCS Soil Interpretations Record for soils mapped in the county ArcView database. Prepared by M. Byers, July 2000.

OFWAM Watershed Characterization

Summary of Watershed Characteristics

The following is a summary of watershed characteristics based on the questions on watershed setting (pgs. 30-33 in OFWAM manual). The actual answers to the questions follow this summary.

Watershed summary sheet for the City of Bend Local Wetlands Inventory

Characteristic	Description
Physical characteristics of the watershed	The watershed area for the LWI is defined as the upper and Little Deschutes basins, an area of approximately 1840 square miles. This area drains a variety of landscapes, including the High Cascades, lava plateaus, and high desert basins and ranges. The Cascades can receive 500 inches of snow annually, while the remaining area may receive only scant precipitation. Other than the main rivers and alpine lakes, water is scarce throughout most of the watershed. The Deschutes River, Little Deschutes, Tumalo Creek and Squaw Creek the main bodies. Numerous high alpine lakes are located in the Cascades and aside from them, very few wetlands are found outside the riparian corridors. Soils and the bedrock in the region are very porous (lava and sand) and precipitation dissipates quickly.
Land uses within the watershed	The majority of the watershed is undeveloped. Urban areas include Bend, Sisters, Redmond and LaPine. Agriculture is limited by topography and altitude. Grazing, ranching and farming occurs more heavily in the north. Timber harvesting occurs throughout watershed. Recreation (skiing, snowmobiling, equestrian, hiking, mountain biking and off road vehicle use) occurs throughout the entire watershed causing various levels of impact to resources.
Water Quality	The Oregon Department of Environmental Quality (ODEQ) maintains a network of ambient monitoring sites in the Deschutes Basin. These sites are monitored every other month and the results are compiled into a Water Quality Index Report (Cude, 1995). Sites on the Deschutes River include Pringle Falls, Harper Bridge (Sunriver), Mirror Pond, Lower Bridge, Hwy 26 at Warm Springs, and the Deschutes River Park at the mouth. Water quality in the Deschutes Basin is influenced by logging operations, recreational uses, residential growth, grazing, water withdrawals, and irrigated and non-irrigated agricultural operations. According to the Water Quality Index Report, water quality in the Deschutes River generally declines from upstream to downstream, and water quality trends show decreasing water quality over time as measured at the Warm Springs monitoring site. There are several segments that are water quality limited (severe or moderate). Impacted benefits include low dissolved oxygen, high nutrients, high sedimentation, low flow and lack of structure.

Characteristic	Description
Biological characteristics of the watershed	The watershed is a transition zone between the ponderosa pine and shrub-steppe vegetation zones in the High Lava Plains Physiographic Province of Oregon. The area is characterized by juniper, ponderosa pine, bunchgrass, bitter brush and sagebrush. Numerous mammals including deer, elk, bear, cougar, beaver, river otter, mink, muskrat and bats are found in the watershed. Bird life is abundant – see chart in Goal 5 report. While there are no anadromous fish, other fish are abundant and the watershed is known as a world class fishing area.

The following are the answers regarding the Watershed Setting (OWFAM pages 29-32) for the Deschutes River and Tumalo Creek. The summary above is based on these answers.

1. Drainage Basin: Deschutes
2. Topography: Watershed area is the Upper Deschutes Watershed and the Little Deschutes Watersheds. Approximately 1840 square miles. Large area was selected because the entire Deschutes River in the assessment area (Bend UGB) was considered a single wetland.
3. Due to the size of the watershed analyzed, this was not calculated.
4. A and B. Flow in the Deschutes is modified by four dams within the assessment area. Main channel of the Deschutes –Tributaries Paulina Creek and Little Deschutes also have diversions.
5. A. Water is taken out of the river and creek for irrigation. Arnold Irrigation diversion is upstream of assessment area. There are five diversions for irrigation in the assessment area.
6. D. Dominant land use upstream from watershed is forested and natural areas.
7. A. Portions of the Deschutes River are water quality limited (303d listed). Severe and moderate 303(d) listings occur upstream of the assessment area within the watershed. Note that data is from 1988. (source: Bonnie Lamb, DEQ)
8. C. Deschutes River has one or more upstream reaches in moderate or severe water quality condition. This determination is based on a review of the 303(d) listings. Tumalo Creek does not have any listings upstream of the study area. (source, Bonnie Lamb, DEQ)
9. A. cold water: white fish; B. warm water: brown bull trout; C. Anadromous: none; D. wild population: red-band trout, mountain white fish (bull trout - extirpated); E. Introduced or hatchery: brook trout, kokanee, brown trout, large mouth bass, blue gill, black croppy. (source: Ted Wise, ODFW)
10. A. State Sensitive species: Redband trout
11. A, B, C. See complete list in the wildlife chapter of the City of Bend Goal 5 Inventory and Analysis.
12. B. No
13. B. Natural areas are fragmented but species movement is still possible except for fish. Fish are blocked by dams without fish ladders. Urban areas inhibit movement of larger species. River corridor through city facilitates movement of smaller mammals.

14. A. Landscape features at both ends of movement corridor include: large natural habitat areas at both ends. North: Redmond, Madras (urban areas); West: Cascade mountains, Sisters; East and South: High Desert

Deschutes River Riparian Wetlands

The only wetlands meeting the definition of significance as Goal 5 resources are found within the Deschutes River riparian corridor. There are 10 distinct, significant wetland units. The riparian corridor is measured from and includes the upland edge of these wetlands.

The river was divided into three areas, or river reaches, for inventory purposes. The inventory areas match the riparian reaches (South Canyon, Pioneer, and Awbrey) described in detail in the Inventory Results for Riparian Areas report. Each reach contains important wetland units that are described below.

South Canyon — Reach A — Wetland Summary Information

Location: From south UGB to the approximate location of the proposed Southern Crossing bridge.

This is the most undeveloped stretch of river in the Bend Riverway. The river is in a steep rocky canyon for most of its length. Water is fast and the canyon is narrow. There is white water with deep pools and waterfalls. Lava rock is a dominant feature with boulder fields and steep slopes. There are areas of impressive rimrock. Upstream from the Reach boundary on the west side of the river is US Forest Service land and the river above the diversion is designated an Oregon Scenic Waterway. Deschutes River Woods, a large low-density sub-division is on the upstream, east side of the river outside of the UGB. The Central Oregon Irrigation District (COID) facilities feature prominently in this Reach. The diversion for the Central Oregon Canal originates in the southern end of the Reach. This is only the second diversion of the Deschutes River. A steel flume and canal road runs north from the diversion for 1.5 miles along the river on the east side. An underground COID hydro facility is located on the east riverbank across the river from Mt. Bachelor Village Resort. Public access is limited in this Reach, as most of the land is privately owned. Other than the resort, there are currently no commercial businesses on this stretch of river (although a retirement home is proposed.) Woodriver Park is a small, unimproved neighborhood park within the Wood River subdivision. It has a 1/4 mile unimproved nature trail along the river. Advanced (non-motorized) boaters occasionally launch from the park. Mt. Bachelor Village has a 1.2-mile nature trail along the east bank of the river. The trail is privately owned but the walking public is currently allowed. COID maintains a third trail that is open to the public and runs east to west down to the river. In addition many people use the flume road for recreation which is in private (COID) ownership. Much of the area is forested with Ponderosa of varying ages. The Awbrey Hall fire came through the southern portion of the Reach in 1990 destroying 22 homes and altering wildlife habitat. Streamside vegetation is well developed along river's edge providing excellent wildlife habitat. There are three important wetland areas, at the south UGB border, along COID's property and at the COID hydro facility. All are primarily on the east side of the river. Wintering elk herds are often seen in the south end of the Reach from late December to early May. They cross the river in a couple of places. The meadow and forested areas are especially important for the elk herd and deer during severe winters. Other wildlife frequently seen include heron, osprey, hawks, kestrel, otter, porcupine, and mink. An osprey nest is used annually and a heron rookery may exist in the area – but is likely outside the UGB. Knapweed and other invasive weeds are gaining at toe-hold throughout the Reach - primarily along the canal and associated road and at the north end of the Reach.

South Canyon Reach "A" Wetland Units *Legend: W: west; E: east; B: both sides of river*

Name	Map Code	Location	Description	Approx. Wetland Size (acres)	Property Owners
South UGB	R9	At south UGB, primarily on E side of river	Includes a pond created by dredging. Osprey nest on W side of river. Extends beyond UGB. Area on both sides of river currently undeveloped.	2.5	Private individual (B)
North COID	R8a	Across from south end of Mt. Bachelor Village, primarily on E side of river	Evidence of flooding, dense scrub-shrub. Knapweed infestation in adjacent upland. No development nearby.	1.5	COID (E), Brooks Resources (W)
COID Hydro Plant	R8	Adjacent to COID hydro plant on E side of river, across from Mt. Bachelor Village – primarily on E side	Well-developed wetland located at point water is returned to river from hydro- plant. Evidence of flooding. Only development is hydro- plant.	1	COID (E), BMPRD (E); Brooks Resources (W)

General Information

Wetland Name:	South Canyon Reach "A: Wetland Units		TRS		**T18S, R11E, S13, and T18S, R12E, S6&7**
Tax Parcels:					
Wetland Map Codes:	R9, R8a, R8		Approximate acres:		**5**
Soil Series:			Hydrologic source:		Deschutes River
Wetland classification(s):	R3UB, PAB, PEM, PFO, PSS (Cowardin) Riverine flow-through (HGM)				
Investigators:	DMc, CV		Date:	July/Aug. 00	

Wetland classification codes:
R3UB = riverine upper perennial PEM = palustrine emergent PSS = palustrine scrub-shrub
PAB = palustrine aquatic bed PFO = palustrine forested
PUS = palustrine unconsolidated shore PUB = palustrine unconsolidated bottom

OFWAM Results

Oregon Freshwater Wetland Assessment (OFWAM) results for South Canyon Reach A Wetlands:

PART A - Wetlands of Special Interest for Protection

This part of the assessment is to determine whether the wetland is in a management plan, is protected by rules or law, or is uncommon in Oregon.	*Yes*	*No*
1. Does the wetland contain threatened, endangered or sensitive species?	x	
2. Is the wetland designated as critical habitat for threatened or endangered species?		x
3. Is the wetland a Registered State Natural Area, Area of Critical Environmental Concern, RNA or TNC Preserve?		x
4. Is the wetland of regional or national significance for migratory birds?		x
5. Is the wetland already protected as a local Goal 5 resource?		x
6. Is the wetland a designated State Outstanding Resource Water?		x
7. Is the wetland a protected area in a federal, state, or local management plan?	partly	
8. Is the wetland a protected mitigation site?		x
9. Is the wetland protected under a USDA conservation program?		x

Part B: Wetland Function and Condition Assessment Summary Results

See table on page 25

Significance Determination

Part A: Mandatory Exclusions

If answer is Yes to any of the following, do not proceed to PART B.

This wetland *cannot* be designated as significant if the answer is "Yes" to any of the criteria listed below. (OAR 141-086-0350)	*Yes*	*No*
1. Is this wetland artificially created entirely from upland *and:*		x
a. created for the purpose of controlling or storing stormwater		x
b. is used for active surface mining or as a log pond		x
c. is a ditch without open and free flowing connection to a river or stream and without fish		x
d. is less than 1 acre in size and created unintentionally from irrigation leak or construction		x
e. created for farm or stock watering or as a golf course hazard		x
2. Is this wetland or portion of the wetland contaminated by hazardous substances, materials or wastes?		x
Exclusion Criteria Satisfied?		x

Part B: Significance Criteria Summary (See table on page 25)

All three wetland units (R8, R8a, R9) in Reach "A" are significant wetlands based upon meeting the following criteria:

R8: Provides "Diverse" wildlife habitat and has "Intact" fish habitat
R8a: Provides "Diverse" wildlife habitat and has "Intact" water quality function
R9: Provides "Diverse" wildlife habitat
All: Provide habitat for state listed sensitive fish species—redband trout

Pioneer Reach — Reach B — Wetland Summary Information

Location: From approximately location of the proposed Southern Crossing bridge to the North Canal Dam

The south part of this wetland area is undergoing tremendous change. Formerly a lumber mill it is now being transformed into mixed use commercial and residential. The river was used to move logs and river access was closed to the public. Two new bridges were recently opened - a footbridge and a vehicular bridge. A third new bridge, and a road and park are in the planning phases (called the Southern River Crossing). There is an extensive, well-developed scrub-shrub wetland created by the Colorado dam (which was built in 1916 to create a millpond.) for this area. Across the river to the east is the site of the old log deck where logs were stored by the mills. Storing logs for over 50 years has resulted in organic debris up to 20 feet deep on the site. At the writing of this report (November 2000) this fill was being removed. Prior to the beginning of the fill removal, the area was rapidly being overtaken by knapweed and will soon be again. The area is mostly in the 100-year floodplain. Due to the amount of fill in the area it does not support riparian vegetation inland for more than 10 or 20 feet in most places. Despite all the construction and lack of vegetative cover throughout most of the Reach, wildlife, from waterfowl to mammals, is frequently seen including otter, mink, osprey and trumpeter swan. The wildlife viewing is good most likely due to the lack of cover.

Of the eight mammals observed during a survey in Pioneer Wetland B in 1990, six depended on wetlands for food or cover. And of the 47 bird species observed, wetlands provided habitat for 29 species. The survey area was in the south portion of the Old Mill district (log deck) to just south of the Newport Street bridge (PacificCorp, 1990). At the time there was a total of 42 acres of wetland encompassing 17 percent of the study area. Seventy percent of the wetlands were aquatic (underwater) and contained one plant species; a non-native plant called *elodea*. By far the most important wetland for wildlife within the area of the surveyed was a 5.38 acre area (now measured at 6.5 acres) just south of the Colorado Street bridge (Colorado Wetland Unit R5). This area has 2.2 acres of wetland shrubs like willow and alder and had 20 distinctly different vegetation zones. The wetland is dominated by sedges and cattails and had a number of open water areas that provide nesting, foraging and cover for birds. There are only a few other wetlands of this type on the river.

Moving north, out of the transforming Old Mill area, the river banks become more urbanized.
This is the most developed river area in the UGB. This area characterized by large riverfront parks, a vibrant downtown and lovely old homes. The river is relatively wide and slow moving throughout most of the reach. Mirror Pond, a beloved feature in the landscape, is created by the Bend Hydroproject dam that has been in place since 1910. There are a few small islands in the rivers that are washing away. Silt is building up in the quieter waters behind the dam, creating very shallow areas. This area was dredged in the early 1980's. Much of the river is edged by concrete or rock wall that has been in place since the 1920's. There are large expanses of lawn adjacent to the river and sporadic areas of healthy riverside vegetation. The parks have large mature trees with

some younger trees and limited understory vegetation. Wildlife species most often seen includes Canada geese, mute swans, ducks and other waterfowl, mink, river otter, and beaver. The river is an important tourist attraction, bringing people to the area for scenic beauty as well as many special events in the parks.

The river flows from the Newport Bridge over the dam associated with the Bend Hydroproject through an area with homes and multifamily units on the west and Pacific Power Hydro plant and sub station on the east. The river runs under Portland Avenue over the Steidl Dam, which creates an area of quiet water in front of Pioneer Park. Tumalo Irrigation District (TID) has a diversion on the westside of the river at this location. A new fish screen is planned. Tumalo Irrigation District placed the irrigation canal underground and this has created the opportunity to develop the Deschutes River trail that runs for ¾ of a mile along this unit and continues on for another 3 miles. The eastside of the river has developed into a large wetland that has some of the highest quality urban wildlife habitat in Bend and the area is home to otter, osprey, owl, and marmot along with other animals. The river is backed up by the North Canal dam and is slow and meandering with lots of cattails and rushes. The dam creates a pond area that is best viewed from Riverview Park which has several parking spots and a developed boardwalk for wildlife viewing and fishing. The following table contains information on the most important, well developed wetland units within the Pioneer (Wetland B) area.

Pioneer Reach "B" Wetland Units

Location: From approximately location of the proposed Southern Crossing bridge to the North Canal Dam

Legend: W: west; E: east; B: both sides of river

Name	Map Code	Location	Description	Approx. Wetland Size (acres)	Property Owners
Log Deck	R7	At (old) Log Deck footbridge, primarily on E side of river downstream from bridge	Very small wetland area. Wildlife (otter, muskrat, mink) seen often. Much enhancement potential. Will be part of new park.	<1	BMPRD (E & W), Brooks Resources
Colorado Street	R5	Upstream from Colorado St. bridge, primarily on W side of river	Created by Colorado St. dam built in 1916 for log storage. One of two large, high quality wetlands in study area. Very natural, but quite hidden although next to busy road. Birding & education opportunities.	6.5	Riverbend Limited Partnership (W); Private Individual(E) Mill "A" Associates (E)
Bend	R4	Downstream	Small wetland area	1	Pacific

Hydro-plant		from Newport bridge, adjacent to Elks building, primarily on E side of river	created by Bend Hydroproject, built in 1910. Parking lot adjacent to riparian edge.		Power
1st Street	R3	From 1st Street on W and Revere on E, continuing on both sides of river to River's Edge Golf Course	One of two large, high quality wetlands. Formed by the backup of North Canal Dam. Significant diversity, high quality wildlife habitat. Protected from development by rock cliffs on E, river trail on W. Dominated by scrub-shrub with well forested upland adjacent. Serious invasion of yellow iris.	5	TID (W), approx. 6 private owners (W); Private individual (E), BMPRD (E), approx. 12 private owners on NE end
Riverview Park	R2a	Upstream of North Canal Dam, primarily on E side of river	Smaller wetland caused by North Unit dam built in 1920. Wildlife (otter, osprey) seen frequently. Undeveloped on W, busy road on E – but at higher elevation.	2.5	Irrigation District(s)(E) BMPRD (E) Purcell(W)

General Information

Wetland Name:	Pioneer Reach B Wetland Units			TRS:	T18S, R12E, S5&6; T17S, R12E, S29,31, 32
Tax Parcels:					
Wetland Map Codes:	R2a, R3, R4, R5, R7		Approximate acres:	17	
Soil Series:			Hydrologic source:	Deschutes River	
Wetland classification(s):	R3UB, PAB, PEM, PFO, PSS (Cowardin) Riverine flow-through (HGM)				
Investigators:	DMc, CV	Date:	July/Aug. 00		

Wetland classification codes:

R3UB = riverine upper perennial PEM = palustrine emergent PSS = palustrine scrub-shrub
PAB = palustrine aquatic bed PFO = palustrine forested
PUS = palustrine unconsolidated shore PUB = palustrine unconsolidated bottom

OFWAM Results

Oregon Freshwater Wetland Assessment (OFWAM) results for South Canyon Reach A wetlands:

PART A - Wetlands of Special Interest for Protection

This part of the assessment is to determine whether the wetland is in a management plan, is protected by rules or law, or is uncommon in Oregon. A "Yes" answer to any of the following questions requires a management plan to protect the site.	*Yes*	*No*
1. Does the wetland contain threatened, endangered or sensitive species?	x	
2. Is the wetland designated as critical habitat for threatened, endangered or sensitive species?		x
3. Is the wetland a Registered State Natural Area, Area of Critical Environmental Concern, RNA or TNC Preserve?		x
4. Is the wetland of regional or national significance for migratory birds?		x
5. Is the wetland already protected as a local Goal 5 resource?	parts	
6. Is the wetland a designated State Outstanding Resource Water?		x
7. Is the wetland a protected area in a federal, state, or local management plan?		x
8. Is the wetland a protected mitigation site?		x
9. Is the wetland protected under a USDA conservation program?		x

Part B: Wetland Function and Condition Assessment Summary Results

See table on page 25

Significance Determination

Part A: Mandatory Exclusions

This wetland *cannot* be designated as significant if the answer is "Yes" to any of the criteria listed below. (OAR 141-086-0350)	*Yes*	*No*
1. Is this wetland artificially created entirely from upland *and:*		x
a. created for the purpose of controlling or storing stormwater		x
b. is used for active surface mining or as a log pond		x
c. is a ditch without open and free flowing connection to a river or stream and without fish		x
d. is less than 1 acre in size and created unintentionally from irrigation leak or construction		x
e. created for farm or stock watering or as a golf course hazard		x
2. Is this wetland or portion of the wetland contaminated by hazardous substances, materials or wastes?		x
Exclusion Criteria Satisfied?		x

Part B: Significance Criteria Summary (See table on page 25)

All five wetland units (R2a, R3, R4, R5, R7) in Reach "B" are significant wetlands based upon meeting the following criteria:

R2a: Provides "Diverse" wildlife habitat and has "Intact" hydrologic control function
R3: Has "Intact" water quality and hydrologic control functions
R4: Has "Intact" hydrologic control function
R5: Has "Intact" water quality and hydrologic control functions
R7: Has "Intact" hydrologic control function
All: Provide habitat for state listed sensitive fish species—redband trout

Awbrey Reach — Reach C — Wetland Summary Information

Location: From the North Canal Dam to the north UGB (located on the river just west of the ravine on the north side of Awbrey Butte)

Below the dramatic North Canal Dam the water is fast and moves swiftly through a scenic canyon. The water level varies a great deal due to three diversions at the dam. In the winter the water is high and flowing fast through the steep canyon. It is a popular white water kayaking run. In the summer when the water is diverted, the river becomes a small creek. All of the water rights in this section of the river have been assigned which can result in very low flows (30 cubic feet per second is the agreed upon lowest flow.) This water fluctuation influences the type, amount and location of the riverside vegetation. Sawyer Park is a 61-acre natural park with a mature forest, well-developed scrub-shrub wetland, and streamside vegetation that provides excellent wildlife habitat for many species including hummingbirds, owls, deer, and mink. The Deschutes River trail runs through Sawyer Park and follows the Tumalo Irrigation District canal along the cliff above the river. After leaving Sawyer Park the trail winds through the Wyndemere subdivision. Land use along the remainder of this Reach is entirely residential with most houses perched on the rimrock cliffs.

Awbrey Reach "C" Wetland Units

Location: From the North Canal Dam to the north UGB (located on the river just west of the Mt. Washington ravine)

Name	Map Code	Location	Description	Approx. Wetland Size (acres)	Property Owners
Sawyer Park South	R1	Both sides of river from Riverhouse footbridge to Sawyer Park footbridge	Very important natural wetland. Dominated by scrub-shrub but high interspersion with emergents. High quality wildlife habitat. Most protected as park.	5	BMPRD (B), Purcell(B), approx. 14 private owners(W) possible other private owners on W side
Sawyer Park North	R1a	From north end of Sawyer Park to private footbridge in Rimrock Subdivision.	Series of smaller wetlands along river. Mostly scrub-shrub. Provides important habitat for wildlife on riparian corridor. Bordered by residential development, but protected by being in canyon.	3	BMPRD(B), TID?(W), approx. 29 private owners (E), approx. 20 private owners (W)

General Information

Wetland Name:	Awbrey Reach Wetland Units			TRS:	T17S, R12E, S17, 18, 19, 20 & 29
Tax Parcels:					
Wetland Map Code:	R1, R1a		Approximate acres:	8	
Soil Series:			Hydrologic source:	Deschutes River	
Wetland classification(s):	R3UB, PAB, PEM, PFO, PSS (Cowardin) Riverine flow-through (HGM)				
Investigators:	DMc, CV	Date:	July/Aug. 00		

Wetland classification codes:
R3UB = riverine upper perennial PEM = palustrine emergent PSS = palustrine scrub-shrub
PAB = palustrine aquatic bed PFO = palustrine forested
PUS = palustrine unconsolidated shore PUB = palustrine unconsolidated bottom

OFWAM Results

Oregon Freshwater Wetland Assessment (OFWAM) results for Awbrey Reach C wetlands:

PART A - Wetlands of Special Interest for Protection

This part of the assessment is to determine whether the wetland is in a management plan, is protected by rules or law, or is uncommon in Oregon. A "Yes" answer to any of the following questions requires a management plan to protect the site.	*Yes*	*No*
1. Does the wetland contain threatened, endangered or sensitive species?	x	
2. Is the wetland designated as critical habitat for threatened, endangered or sensitive species?		x
3. Is the wetland a Registered State Natural Area, Area of Critical Environmental Concern, RNA or TNC Preserve?		x
4. Is the wetland of regional or national significance for migratory birds?		x
5. Is the wetland already protected as a local Goal 5 resource?		x
6. Is the wetland a designated State Outstanding Resource Water?		x
7. Is the wetland a protected area in a federal, state, or local management plan?		x
8. Is the wetland a protected mitigation site?		x
9. Is the wetland protected under a USDA conservation program?		x

Part B: Wetland Function and Condition Assessment Summary Results

See table on page 25

Significance Determination

PART A: Mandatory Exclusions

This wetland *cannot* be designated as significant if the answer is "Yes" to any of the criteria listed below. (OAR 141-086-0350) *Yes* *No*		
1. Is this wetland artificially created entirely from upland *and:*		x
a. created for the purpose of controlling or storing stormwater		x
b. is used for active surface mining or as a log pond		x
c. is a ditch without open and free flowing connection to a river or stream and without fish		x
d. is less than 1 acre in size and created unintentionally from irrigation leak or construction		x
e. created for farm or stock watering or as a golf course hazard		x
2. Is this wetland or portion of the wetland contaminated by hazardous substances, materials or wastes?		x
Exclusion Criteria Satisfied?		x

Part B: Significance Criteria Summary (See table on page 25)

Both wetland units (R1, R1a) in Reach "C" are significant wetlands based upon meeting the following criteria:

R1: Has "Intact" hydrologic control function
R1a: Provides "Diverse" wildlife habitat and has "Intact" hydrologic control function
Both: Provide habitat for state listed sensitive fish species—redband trout

Summary of OFWAM Results and Significance Determination for 10 Riparian Wetlands

Note: To meet the criteria for a locally significant wetland (LSW), at least one of the first 4 functions must be performed at the highest level of functioning (or wetland must meet one of the other significance criteria, like supporting listed species). **Bold font** in table indicates that the level of functioning for that ecological function meets the criteria for designating the wetland a LSW.

Name	Unit	Wildlife Habitat	Fish Habitat	Water Quality	Hydrologic Control	Sensitivity to Future Impacts	Enhancement Potential	Education	Recreation	Aesthetic Quality
South UGB	R9	**Diverse**	Impacted	Impacted	Impacted	Potentially Sensitive	NA	Not appropriate	Not appropriate	Pleasing
North COID	R8a	**Diverse**	Impacted	**Intact**	Impacted	Potentially sensitive	NA	Potential	Potential	Pleasing
COID Hydroplant	R8	**Diverse**	**Intact**	Impacted	Impacted	Potential	NA	Educational	Potential	Pleasing
Log Deck	R7	Some	Impacted	**Intact**	**Intact**	Sensitive	High	Educational	Potential	Pleasing
Colorado St.	R5	Some	Impacted	**Intact**	**Intact**	Potentially	High	Potential	Recreation	Pleasing
Bend Hydroplant	R4	Some	Impacted	Impacted	**Intact**	Potential	High	Potential	Recreation	Moderate
1st Street	R3	Some	Impacted	**Intact**	**Intact**	Potential	NA	Educational	Potential	Pleasing
Riverview Park	R2a	**Diverse**	Impacted	Impacted	**Intact**	Potential	NA	Potential	Recreation	Pleasing
Sawyer Park South	R1	Some	Impacted	Impacted	**Intact**	Potential	NA	Educational	Recreation	Moderate
Sawyer Park North	R1a	**Diverse**	Impacted	Impacted	**Intact**	Potential	NA	Educational	Recreation	Moderate

All of the riparian wetland units meet one or more of the criteria for a locally significant wetland.

Non-Riparian Wetlands

NATIONAL WETLANDS INVENTORY - NON-RIPARIAN MAPPED WETLAND SITES

Map #	Location	Size in Acres	Description	Finding
R6	Old Mill District between Deschutes River and "3 smoke stacks"	0.5	Hydrologic source is Deschutes River diversion. Purpose was to store water for fighting fires at sawmills. Edge has been reshaped and re-vegetated. Surrounded by development.	Not significant. Created for storing water for mill fires.
U1	Highway 20 and Cooley Road.	0.2	Hydrologic source is irrigation. Wet meadow. A pasture inundated with irrigation water. No inlet/outlet. Grasses – no riparian vegetation. 1.5 feet deep.	Excluded. Under ½ acre created unintentionally.
U2a	Across Highway 97 from south end of Mountain View Mall	0.4	Hydrologic source probably irrigation. Pond at residence with mowed grass edge. 15% of edge w/ carex. Less than 20 feet from Highway 97.	Excluded. Probably created for farm stock.
U2b	Off Boyd Acres Rd.	0.25	Hydrologic source is a well. Pond is completely lined by a rock wall. No riparian veg. In a pasture.	Excluded. Under ½ acre in size.
U3	New Leaf Academy	0.5	Hydrologic source is irrigation. Pond has waterfowl, frogs. Some riparian veg. At a school. Canoe used.	Not significant. Artificially maintained for aesthetics.
U4	Eagle & Starling Road in Sunpointe subdivision.	N/a	Site is a developed lot with a house on it. Probably a stock pond or irrigation pond on NWI map.	Excluded from mapping No longer exists.
U5	West side of Eagle Road near Promise lane	0.65	Hydrologic source is irrigation. Pond with some wildlife habitat, natural vegetation. Pond lilies, willow, cattails.	Not significant. Artificially maintained for aesthetics.
U6	Between Curtis & Eagle roads, behind church	0.5	Hydrologic source is irrigation. Pond edge with willow, trees. Yellow iris (non-native). Frogs & fish present.	Not significant. Artificially maintained for aesthetics.
U7	Rock Harbor Villa Mobile Home Park	0.5	Hydrologic source is irrigation. Waterfowl & deer present. Bulrush, cattails. Fenced for safety.	Not significant. Artificially maintained for aesthetics.
U8	9th Street between Zellner & Textron	N/A	Developed lot – building on site. Was on NWI map, but square site and staff believes it was reflection from aluminum can storage area.	Excluded from mapping No longer exists.
U9	North side of Reed Market road, approx. ½ mile east of intersection with Hwy 97	0.5	Hydrologic source is irrigation. Small pipe off COI main line feeds a little stream (1 foot wide). Well developed riparian vegetation along stream. With large willows. Deer bedding areas.	Not significant. Irrigation lateral away from river.
U9a	On COI's Hydro property. Adjacent to east side of entry road just after 2nd gate.	0.8	Hydrologic source is leak from a single delivery off COI mainline. Very diverse and well developed riparian vegetation. Deer use area for cover.	Not significant. Created unintentionally from leaking irrigation ditch.

Map #	Location	Size in Acres	Description	Finding
U10	North end of Niska Court	0.25	Hydrologic source is irrigation. Stocked. Heron, wood duck, geese, and other waterfowl use. Developed riparian vegetation with rushes and large willows.	Not significant. Less than ½ acre in size.
U11	Between Brosterhaus & Rae Roads	N/a	Dry upland infested w/cheat grass and mullein. Was on NWI map.	Excluded. Drained years ago.
U12	Jay Ward treatment plant on Murphy Road.	0.4	Waste water treatment pond for Juniper Utility Company.	Not significant. Less than ½ acre and used for wastewater treatment.
U13	Off Hwy 97, north of Romaine Village	0.25	Hydrologic source Arnold irrigation. Pond was created to test boats – now is ornamental. Has a deck on ¼ of pond. Half of pond is naturally vegetated w/ ponderosa and upland vegetation. No riparian vegetation.	Not significant. Less than ½ acre. Artificially maintained for aesthetics.
U13A	Hwy 97, north of Romaine Village	0.5	Hydrologic source Arnold irrigation. Probably from leaky ditch. There are additional ponds along the canal.	Mapped as non-significant wetland based on size and source as leaking irrigation ditch.
U14	Pines Mobile Home Park	1.3	Hydrologic source is catch basin & irrigation. Lawn edge, no riparian vegetation. Fenced. Stocked. Over 500 waterfowl visit in winter – they are fed.	Not significant. Created for controlling storm water.
U15	Bend Golf & Country – 9th Fairway	0.4	2 foot no mow. Narrow band. Treated. 10-15% of edge is vegetation buffer.	Excluded due to size and golf course water hazard
U15a	Bend Golf & Country – 8th Fairway	0.15	Untreated, fresh water circulation, some small vegetation on edge.	Excluded due to size and golf course water hazard
U16a	Bend Country Club irrigation pond	1.5	Hydrologic source is Arnold irrigation and well. Completely lined with plastic. Waterfowl in fall. Tadpoles and fish in pond.	Mapped as not significant Created for storing storm water
U16	Bend Golf & Country – 3rd Fairway	0.5	50% divers buffer. Treated, stocked.	Excluded due to size and golf course water hazard
U16b	Bend Golf & Country – 14th Fairway	0.5	6 inch grasses on edge. Small area w/cattails, treated.	Excluded due to size and golf course water hazard
U16c	Bend Golf & Country – 13th Fairway	0.5	1 foot vegetative buffer. Treated.	Excluded due to size and golf course water hazard

Map #	Location	Size in Acres	Description	Finding
U16d	Bend Golf & Country—11th Fairway	0.1	10% vegetative buffer. Treated.	Excluded due to size and golf course water hazard
U17	Mountain High Golf Course – large pond near clubhouse	1.0	Hydrologic source is Arnold irrigation and well. "Some" wildlife habitat. Aquatic vegetation. On bottom. Artificial stream 50 ft. long w/well developed riparian vegetation. Little riparian vegetation on pond.	Mapped as not significant due to artificial nature.
U17a	Mountain High Golf Course – small pond between 14th and 15th fairways	0.25	Hydrologic source is Arnold irrigation and well.	Not mapped due to size.
U18	East of Country Club Road.	0.4	Hydrologic source irrigation pipe. Located in a large field. Algae mats on pond. Large willows, some rushes.	Not mapped due to size.
U19	East of Country Club Road	0.25	No hydrologic source. Formerly irrigation pipe feed area. Now a dry basin and being reshaped and dug for top soil.	Excluded due to dry condition and earthwork.
U20	East of Country Club Road	0.8	No hydrologic source. Formerly fed by irrigation pipe. Now dry area.	Excluded. Dry and no longer used as irrigation storage.
U21	Orion Green Golf Course – center pond	.5	Filled by well or irrigation water; fountain in middle. Mowed grass edge with no significant riparian vegetation.	Not mapped due to size and golf course hazard.

INVENTORIED NON-RIPARIAN WETLANDS NOT ON NWI MAP – wetlands created since NWI map was produced

Map #	Location	Size in Acres	Description	Finding
UG1	Awbrey Glen PUD – along Putnam Road	.72	Well vegetated/forested area, treated. Golf Course PUD artificial water feature. Hydrologic source is well water.	Mapped as not significant wetland.
UG2	Awbrey Glen PUD – along Putnam Road	.3	4ft. no mow zone, 6 ft. natural vegetation, treated, buffer not as big as UG1. Golf Course PUD artificial water feature. Hydrologic source is well water.	Excluded due to size and being a golf course hazard.
UG3	Awbrey Glen PUD – Artificial fly fishing lake adjacent to Champion Drive	1.65	Some wildlife habitat. No riparian vegetation. Islands provide habitat. Pond stocked w/fish. Osprey fishing during site visit. Treated w/aquaclear. Golf Course PUD artificial water feature. Hydrologic source is well water.	Mapped as not significant wetland due to artificial source.
UG4	Awbrey Glen PUD Golf Course – between 8th and 7th fairway	1.38	Some wildlife habitat. 4 ft. no-mow zone. 50% edge is natural vegetation. 3 islands w/native vegetation. Treated w/aquaclear. Golf Course PUD artificial water feature. Hydrologic source is well water.	Mapped as not significant wetland.

Map #	Location	Size in Acres	Description	Finding
UG5	Awbrey Glen PUD Golf Course – near clubhouse between 18th & 1st fairways	1.35	Some wildlife habitat. 75% edge is natural vegetation. Lots of cattails. Stocked. Treated w/aquaclear. Golf Course PUD artificial water feature. Hydrologic source is well water.	Mapped as not significant wetland.
UG6	River's Edge golf course near clubhouse	.5	Some native veg. Stand of Pondos. Knapweed problem. Golf Course PUD artificial water feature. Water source is water pumped from Deschutes River.	Excluded due to size and golf course hazard.
UG7	River's Edge golf course – near 17th Fairway	.25	2 small ponds linked. Tadpoles in both. Some vegetative buffer.	Excluded due to size and golf course hazard.
UG8	River's Edge golf course – near 12th Fairway	.25	Some vegetative buffer. Has island.	Excluded due to size and golf course hazard.
UG9	River's Edge golf course – near 11th Fairway	.35	½ edge is mown grass, ½ weeds, knapweed. Tadpoles.	Excluded due to size and golf course hazard.
UG10	River's Edge golf course – near 6th Fairway	.4	75% cliff & tall veg. Buffer. 25% grass.	Excluded due to size and golf course hazard.
UG11	Broken Top PUD Clubhouse Lake	6.28	Hydrologic source is a groundwater well. "Some" wildlife habitat. 4 foot no-mow zone. 15% of edge is natural – remainder is lawn. Treated. Swans, osprey in area. Spawning pond above lake. Created for aesthetics.	Mapped as not significant wetland.
UG12	Broken Top PUD Golf Course – lake next to 4th Fairway	1.16	Hydrologic source is groundwater well. "Some" wildlife habitat. 40% of edge is natural w/willows, cattail. Stocked. Ducks & swans present. Fish structures (stumps). Planning native plantings.	Mapped as not significant wetland.
UG13	Broken Top PUD Golf Course – lake next to 5th Fairway	.8	Hydrologic source is groundwater well. No edge vegetation.	Excluded due to being outside UGB.
UG14	Broken Top PUD – creek and pond around Fall Creek Homes section	.35	Hydrologic source is groundwater well. Artificial creek with artificial pond constrained by road bridge with riparian plantings.	Excluded due to size and artificial feature.
UG15	Broken Top PUD – lake next to 13th Fairway	.9	Hydrologic source is groundwater well. 35% of edge is cattail	Excluded due to being outside UGB.
UG16	Broken Top PUD – artificial creek and lake in Painted Ridge section	.7	Hydrologic source is groundwater well. Horticultural landscaping, some rushes, stocked.	Mapped as not significant wetland.
UG17	Broken Top PUD – lake next to 17th Fairway	.78	Hydrologic source is groundwater well. Grass edge, no riparian.	Mapped as not significant wetland.

Planning and Regulatory Requirements and Analysis

This section summarizes the state requirements for wetland protection, reviews the city's current policies and regulations and then compares the two. The purpose of this section is to provide decision-makers and the community with a comparison of what the state requires with what the city already has on the books. The next section, Options for Protection, presents alternatives on how the city might proceed.

What the State Requires

Local governments are required to use criteria and procedures established by the Land Conservation and Development Commission and developed by the Division of State Lands to identify significant wetlands under Statewide Planning Goal 5. The City of Bend must protect significant wetlands as defined by the state. See "Goal 5 Wetlands Defined" in this report for more information or refer to OAR 141-86-300.

There are two distinct categories of wetlands in Bend. Excluded wetlands, requiring no further protection under Goal 5 (though they may be subject to state and federal regulation), and significant wetlands that require local protection.

Excluded Wetlands

All of the non-riparian wetlands identified in the study area fit the significant wetland exclusion criteria. All are created unintentionally as the result of irrigation water overflow or leakage, or were created for the purpose of wastewater treatment, farm or stock watering, settling of sediment, or as a golf course hazard.

Significant Wetlands

All of the 10 identified wetland units within the Deschutes River corridor met the criteria for significant wetlands.

Additional Comments on State Requirements

Once approved by the Division of State Lands (DSL), the LWI will be used in place of the National Wetlands Inventory (NWI) and will be incorporated into the Statewide Wetlands Inventory (SWI) maintained by DSL. A LWI provides good information for planning purposes and on location of potentially regulated wetlands, but is not of sufficient detail for regulatory certainty under the state Removal-Fill Law. Therefore, a wetland delineation of precise wetland boundaries is generally needed prior to site development near a mapped wetland. It is important to note that state and federal regulations may apply to wetlands regardless of whether or not they are mapped in the LWI.

When the LWI is approved by the Division, the local jurisdiction must notify by mail within 120 days all landowners of record whose parcel contains a wetland that: (1) Their parcel(s) was included in the wetlands study area; and (2) There is a wetland mapped on their parcel.

The city is also required to notify DSL of certain land use applications that appear to affect a wetland mapped on the LWI. DSL then responds to the city and the applicant regarding any state permit requirements.

Existing City of Bend Policies
There are no policies specific to wetland protection in Bend's general plan.

Existing City of Bend Regulations
The City has the following regulations specific to wetlands:

Fill and Removal 10.10.25(26)

> … no person shall fill or remove any material or remove any vegetation, regardless of the amount, within the bed and banks of any stream or river, or in any wetland, unless such fill or removal is approved as a conditional use by the Hearings Body.

Subdivision Code:

> Section 6.015 (3) Street Layout and Cul-de-sacs. … Cul-de-sacs and dead end streets shall only be permitted when the following conditions are met:
>
> - presence of a wetland or water body which cannot be crossed; or
>
> Section 6.020 (2) Size of Blocks. No block shall be longer than 1,200 feet … except where street location is restricted by natural topography, wetlands, or other bodies of water.

MR Zone 10.10.21A

> (6)Building and Site Development Standards. (e)(A) Retain and conserve riparian vegetation within the bed and banks of the Deschutes River and adjacent to the river to the maximum extent practicable**.** There shall be no net loss of natural wetlands adjacent to the river.
>
> Note: Land use decisions are primarily made by local governments, but wetlands are also regulated by both the Oregon Division of State Lands and the U.S Army Corps of Engineers.

Comparison of the State Goal with the City of Bend's Existing Regulations

Excluded Wetlands: Bend's current Fill and Removal regulation may apply to excluded wetlands. There is no criteria excluding them in the code. No further protection is required under Goal 5 unless these areas prove to be natural wetlands when/if the hydrology supporting them is altered or removed.

Significant Wetlands: Goal 5 requires the city to adopt an ordinance to protect significant wetlands. Under the "safe harbor" option, the protection program must include restrictions on grading, excavation, placement of fill, and vegetation removal other than perimeter mowing and other cutting necessary for hazard prevention; and include a variance procedure to consider hardship variances. Currently, the city has a Fill and Removal ordinance (10.10.25(26)) that applies to wetlands. The setback for Fill and Removal is 10 feet from either side of the wetland edge. There are a couple mentions of wetlands in the Subdivision Code and a no net loss regulation in the MR Zone.

Options for Protection

Because all of the significant wetlands are located within the Deschutes River Corridor, the city has the option of using the riparian setback regulations along with other existing regulations to protect wetlands. Depending on changes in the riparian ordinance, wetlands on the river would receive additional protection in the form of building setbacks, buffer area for fill and removal and vegetation removal. The Goal 5 riparian safe harbor option requires that the riparian corridor include all adjacent significant wetlands (using the safe harbor setback, for example, the riparian corridor would extend 50 feet back from the upland edge of the significant wetland).

The city must also address the wetland requirements in Goal 5, through either a safe harbor protection program or a "standard" program that includes an Environmental, Social, Energy, and Economic analysis of decisions to fully protect, partially protect, or not protect a significant wetland. Because all of the significant wetlands in Bend are also riparian wetlands that will be addressed through the riparian regulations, both the riparian and the wetland protection requirements pertain to all significant wetlands, and the more stringent requirements of either ordinance would apply.

Appendices

Staff qualifications

Darcy McNamara is the author of the City of Bend Local Wetland Inventory, conducted the fieldwork for the riparian wetlands and coordinated the public involvement for the inventory. She has an undergraduate degree in botany and a masters in urban ecology from the College of Foresty at the University of Washington. She was director of the Bend Riverway, a community project of the non-profit Bend Park and Recreation Foundation. She was formerly manager of over 15,000 acres of natural areas in Washington State.

Christina Veverka was lead on the fieldwork for the golf hazards and non-riparian wetlands. She assisted on the riparian wetlands and the public involvement. She has masters in botany.

Pamela Bodie was lead on obtaining pertinent city, county and state codes, map design and preparing materials for the public meeting. Ms. Bodie has a degree in landscape architecture.

Plant Inventory

Riverside Plant Inventory of Downtown & Old Mill District Source: PacificCorp 1990; *Reid Schuller 1999.*

Scientific Name	Common Name	Riparian Species
Achillea millefolium	common yarrow	
Alnus sinuata	Sitka alder	x
Alyssum alyssoides	pale alyssum	
Artemisia spp.	sagebrush	
Carex aquatilis v. aquatilis	water sedge	x
Carex canescens	gray sedge	x
Carex vesicaria	inflated sedge	x
Chamaesaracha nana	dwarf chamaesaracha	
Chrysanthemum leucanthemum	ox-eye daisy	
Chrysothamnus nauseosus	common rabbit-brush	
Cirsium vulgare	common thistle	
Collinsia parviflora	small-flowered blue-eyed Mary	
Descurainia sophia	flixweed	
Elodea canadensis	Canada waterweed	x
Eriophyllum lanatum v. integ.	common eriophyllum	
Erysimum asperum	rough wallflower	
Galium spp.	bedstraw	
Geum macrophyllum v. perincisum	Oregon avens	
Holosteum umbellatum	jagged chickweed	
Juncus spp.	rush	x
Juniperus occidentalis	western juniper	
Lemna spp.	duckweed	x
Linaria dalmatica	dalmatian toadflax	
Linum perenne	blue garden flax	
Lonicera utahensis	Utah honeysuckle	
Malva sylvestris	common mallow	
Mentzelia albicaulis	small-flowered mentzelia	
Microsteris gracilis v. humilior	pink microsteris	
Montia perfoliata	miner's lettuce	
Myosotis lax	small-flowered forget-me-not	
Nama spp.	nama	
Phacelia linearis	threadleaf phacelia	
Pinus ponderosa	ponderosa pine	
Poa nemoralis	woods bluegrass	
Potentilla anserina	common silverweed	x
Prunus virginiana v. demissa	common chokecherry	x
Purshia tridentata	bitter-brush	
Ribes cereum v. cereum	squaw currant	
Ribes inerme	whitestem gooseberry	
Rosa woodsii v. ultramontana	pearhip rose	
Rumex spp.	dock	x
Salix geyeriana	geyer willow	x
Salix lasiandra v. caudata	peach-leaf willow	x
Scirpus microcarpus	small-fruited bulrush	x
Senecio vulgaris	common groundsel	
Solanum dulcamara	felonwort	
Solidago spp.	goldenrod	
Spiraea douglasii v. douglasii	hardhack	x
Taraxacum officinale	common dandelion	
Typha latifolia	common cattail	x
Verbascum thapsus	flannel mullein	
Veronica americana	American brooklime	x
Viola arvensis	wild pansy	

Water Quality Information

Water Quality Parameters of Concern in Bend Riverway (ODEQ, 1998)

Stream Segment	River miles	Riverway Reach	Water Quality Parameter	Beneficial Use/ Standard	Season	Listing Status
Steelhead Falls to North Unit Main Canal	128-165	Awbrey River Run	Bacteria	Water Contact Recreation (fecal coliform<406)	Year-round	OK
			Dissolved Oxygen (DO)	Cold-water aquatic life (DO>8 mg/L)	Aug 1-Oct 31	OK
			Dissolved Oxygen	Salmonid spawning (DO>11 mg/L)	Nov 1-July 31	OK
			Flow Modification			**303(d) List**
			pH	**6.5-8.5**	**May 1-Sept 30**	**303(d) List**
			pH	6.5-8.5	Oct 1-Apr 30	OK
			Sedimentation			Need data
			Temperature	**Salmonid rearing (<64°F)**	**Summer**	**303(d) List**
North Unit Main Canal to Central Oregon Canal	165-171	River Run Pioneer Old Mill South Canyon	Bacteria	Water Contact Recreation (fecal coliform<406)	Year-round	OK
			Dissolved Oxygen	Cold-water aquatic life (DO>8 mg/L)	Aug 1-Oct 31	OK
			Dissolved Oxygen	Salmonid spawning (DO>11 mg/L)	Nov 1-July 31	OK
			Flow Modification			Need data
			Habitat Modification			Need data
			Nutrients			Need data
			pH	6.5-8.5	Fall-winter-spring	OK
			pH	**6.5-8.5**	**Summer**	**303(d) List**
			Sedimentation			Need data
			Temperature			Need data
Central OR Canal to Little Deschutes	171-192.5	South Canyon	Bacteria	Water Contact Recreation (fecal coliform<406)	Year-round	OK
			Dissolved Oxygen (DO)	Cold-water aquatic life (DO>8 mg/L)	Aug 1-Oct 31	OK
			Dissolved Oxygen	Salmonid spawning (DO>11 mg/L)	Oct 1-July 31	303(d) List
			Flow Modification			**303(d) List**
			Habitat Modification			**303(d) List**
			pH	6.5-8.5	Year-round	OK

			Sedimentation			**303(d) List**
			Temperature	Salmonid rearing (<64°F)	Summer	OK
			Turbidity		**Spr/Summer**	**303(d) List**

DO = dissolved oxygen
Source: Bonnie Lamb, Oregon Dept. of Environmental Quality