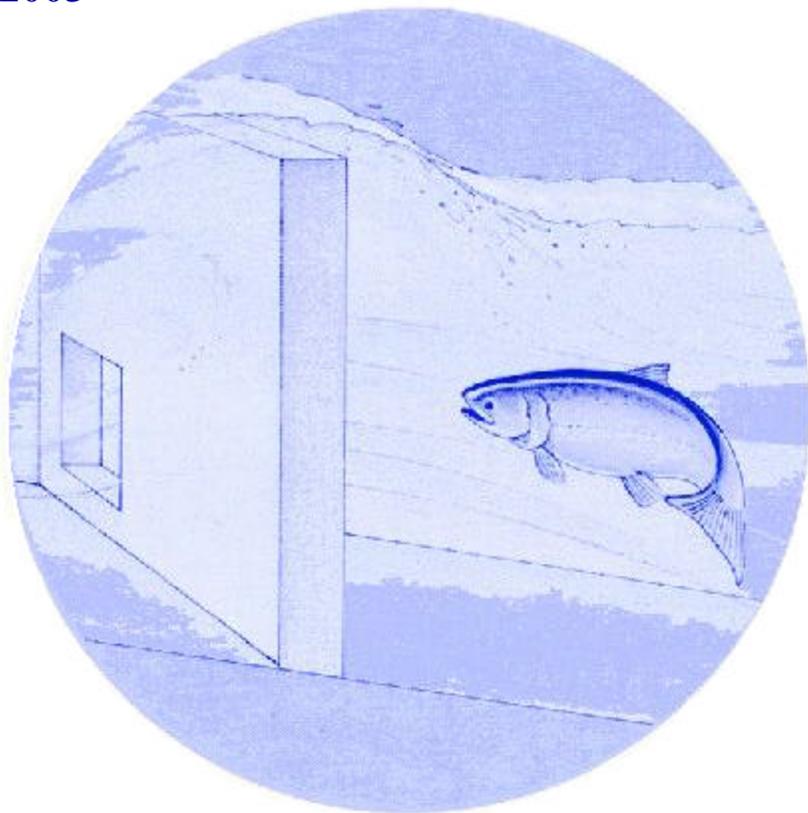


Yakima Habitat Improvement Project Master Plan

**Technical Report
2003**



DOE/BP-00010171-1



April 2003

This Document should be cited as follows:

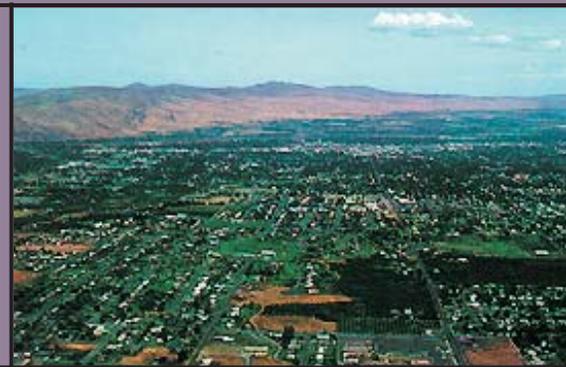
Golder Associates, Inc., "Yakima Habitat Improvement Project Master Plan", Project No. 2002-03800, 89 electronic pages, (BPA Report DOE/BP-00010171-1)

Bonneville Power Administration
P.O. Box 3621
Portland, Oregon 97208

This report was funded by the Bonneville Power Administration (BPA), U.S. Department of Energy, as part of BPA's program to protect, mitigate, and enhance fish and wildlife affected by the development and operation of hydroelectric facilities on the Columbia River and its tributaries. The views in this report are the author's and do not necessarily represent the views of BPA.

Yakima Habitat Improvement Project

Master Plan



Prepared by



for City of Yakima
with funding from
Bonneville Power Administration

**FINAL
MASTER PLAN**

FOR

THE YAKIMA HABITAT IMPROVEMENT PROJECT

BPA PROJECT NO. 2002-038-00

Submitted to:

*Dueane Calvin
City of Yakima*

Submitted by:

*Golder Associates Inc.
18300 NE Union Hill Road, Suite 200
Redmond, Washington 98052*

April 22, 2003

023-1097.41
042203df1.doc

ACKNOWLEDGEMENTS

The Yakima Habitat Improvement Master Plan is a product of the dedicated efforts of many individuals representing a range of organizations. The development of the Master Plan was made possible by generous funding support from the Bonneville Power Administration. Jessica Wilcox, as the BPA Contracts Officer for the project, provided extensive input and assistance in development of the Plan. Rebecca Halgarth and Shannon Stewart also provided BPA review and input on the Plan.

Representatives of 21 federal, tribal and state agencies, agricultural interests, and conservation organizations were part of a Technical Work Group that provided time and input in developing and reviewing the Plan. These individuals included:

Gary Beeman	Washington State Department of Transportation
Betsy Bloomfield	The Nature Conservancy
Al Brown	Yakima Greenway Foundation
Kelly Clark	Yakima County Planning Dept.
Steve Croci	U.S. Fish and Wildlife Service
Rick Deiker	Yakima-Tieton Irrigation District
Jim Esget	US Bureau of Reclamation
Joel Freudenthal	Yakima County Surface Water Management
Dave Garrettson	Naches-Cowiche Canal Company
Bill Gillespie	Natural Resource Conservation Service
Jeff Graham	US Bureau of Reclamation
Kale Gullett	NOAA Fisheries
George Marshall	Ahtanum Irrigation District
Patrick Monk	Irrigation Districts
Julie Morgan	Yakima County Planning Dept.
Dave Myra	Natural Resource Conservation Service
Scott Nicolai	Yakama Nation YKFP
David Nunn	North Yakima Conservation District
Lisa Pelly	Washington Water Trust
Bill Rathbone	City of Union Gap
Derek Sandison	Washington Department of Ecology
Mike Tobin	North Yakima Conservation District
Richard Visser	Department of Fish & Wildlife
Jessica Wilcox	Bonneville Power Administration, Fish and Wildlife
Yolanka Wulff	Washington Water Trust

Five members of the Technical Work Group also provided additional time in prioritizing parcels for acquisition. These individuals included: Kelly Clark (Yakima County Planning Dept.), Joel Freudenthal (Yakima County Surface Water Management), Jeff Graham (US Bureau of Reclamation), Julie Morgan (Yakima County Planning Dept.), and Richard Visser (Department of Fish & Wildlife).

Extensive collection of GIS data was performed to complete this Master Plan. Tom Sellestad (City of Yakima), Mike Vashon and staff at the Yakima County GIS Department, Gil Lensingrav (WDFW) and Paul Huffman (Yakama Nation) provided tremendous support and response in providing GIS data for this project.

TABLE OF CONTENTS

ACKNOWLEDGEMENTS I

EXECUTIVE SUMMARY 1

1.0 INTRODUCTION..... 1

 1.1 Background..... 1

 1.2 Project Goals..... 2

 1.3 Master Plan Objectives and Structure..... 3

 1.4 Issues Addressed by the Master Plan..... 4

 1.4.1 Habitat acquisition/protection of tributaries 4

 1.4.2 Partnership projects on the Yakima River..... 4

 1.4.3 Coordination of Acquisition Efforts 4

 1.4.4 Ownership and Management of Acquired Lands 4

 1.4.5 Related Critical Habitat Projects..... 5

2.0 PROJECT LOCATION..... 6

 2.1 Land Ownership 6

 2.2 Land Use and Land Cover..... 6

 2.3 Climate 6

 2.4 Geology and Soils..... 6

 2.5 Streams..... 7

 2.5.1 Ahtanum Creek..... 7

 2.5.2 Bachelor and Hatton Creeks 7

 2.5.3 Cowiche Creek..... 7

 2.5.4 Naches River..... 8

 2.5.5 Wide Hollow Creek..... 8

 2.5.6 Spring Creek..... 8

 2.5.7 Yakima River 9

 2.6 Fish Distribution..... 9

 2.6.1 Spring Chinook 9

 2.6.2 Summer Steelhead..... 9

 2.6.3 Coho..... 10

 2.6.4 Bull Trout..... 10

 2.6.5 Cutthroat Trout/Rainbow Trout 10

 2.7 Fish Access/Barriers..... 11

 2.8 Riparian Condition 12

 2.8.1 Substrate..... 12

 2.9 Gravel Mining..... 13

 2.10 Water Quality..... 13

 2.11 Hatcheries/Artificial Production 13

3.0 SUMMARY OF RELATED HABITAT ACTIVITIES 14

4.0 PROJECT COORDINATION..... 16

4.1	Current Efforts	16
4.1.1	TWG	16
4.2	Future Recommendations	17
5.0	APPROACH FOR YAKIMA RIVER PARCELS	19
6.0	PROJECT PRIORITIZATION APPROACH FOR TRIBUTARY HABITAT	21
6.1	Phase I Prioritization Overview	21
6.1.1	GIS data development	21
6.1.2	Phase I project prioritization criteria	22
6.1.3	Project criteria scoring	23
6.1.4	Quality Assurance/Quality Control	23
6.1.5	Sample Parcel Analysis	23
6.2	Phase I Results	25
6.3	Phase II Prioritization	26
6.3.1	Phase II Criteria	26
6.3.2	Phase II expert review.....	27
6.4	Phase II Prioritization Results.....	27
6.5	Phase II Recommendations	28
7.0	PROPERTIES IDENTIFIED FOR HABITAT ACQUISITION ON TRIBUTARIES	29
7.1	Recommendations for Acquisition	29
7.2	High Priority Parcels.....	29
7.3	Schedule for Acquisition.....	29
8.0	STRATEGY FOR ACQUISITION OF TRIBUTARY HABITAT	33
8.1	Overall Approach	33
8.2	Land Ownership	33
8.3	Identification of Landowners for Property Acquisition	34
8.4	Overview of Land Acquisition Process.....	34
8.4.1	Documents Needed for Land Acquisition	34
8.4.2	Cultural Resource Survey.....	36
8.4.3	Land Audit	36
8.4.4	Land Appraisal.....	36
8.4.5	SEPA/NEPA compliance	36
9.0	MANAGEMENT PLAN FOR ACQUIRED TRIBUTARY HABITAT.....	38
9.1	Management Responsibility and Potential Partnerships	38
9.2	Site Inventory of Existing Conditions	39
9.3	Site Specific Considerations	39
9.4	Follow-up and Long-term Monitoring and Maintenance.....	40
9.5	Staffing and Administration of the Project.....	40
9.5.1	Habitat Improvement Project Coordinator	40
9.5.2	Stewardship Coordinator	41
9.5.3	Steering Committee	41
9.5.4	Volunteers.....	41

10.0 MONITORING AND EVALUATION OF ACQUIRED LANDS42

 10.1 Baseline Information..... 42

 10.1.1 Yakima Basin Benthic Index of Biotic Integrity (B-IBI)..... 42

 10.1.2 Salmonid Screening Habitat Enhancement and Restoration (SSHEAR)..... 42

 10.1.3 Ahtanum Creek Stream Assessment..... 43

 10.2 Monitoring and Evaluation 43

 10.2.1 Defined objectives 43

 10.2.2 Indicators..... 43

 10.2.3 Recommendations 43

 10.2.4 Timeline and Determined Frequency of Measurements 44

 10.2.5 Analysis, Documentation, and Feedback..... 44

11.0 RELATED CRITICAL HABITAT PROJECTS45

 11.1 Tributary Projects Identified by TWG Members 45

 11.2 Projects Identified in the Governors Action Plan..... 46

12.0 RECOMMENDATIONS48

 12.1 Communication and Coordination 48

 12.2 Partnerships in Yakima River Acquisition Efforts 48

 12.3 Tributary Land Acquisition 48

 12.4 Land Management..... 49

 12.5 Project Administration and Staffing 50

 12.6 Effective Monitoring and Evaluation..... 50

 12.7 Related Critical Habitat Projects..... 50

13.0 REFERENCES51

LIST OF TABLES

Table 1 Yakima Urban Area Related Habitat Projects

Table 2 Technical Work Group Members

Table 3 Current Stream Survey Activities By Agency

Table 4 GIS Layers Used In Phase I Analysis

Table 5 Scoring Criteria For Phase I Prioritization

Table 6 Phase I Prioritization Results

Table 7 Final List of Properties for Acquisition

Table 8 Priority Parcels and Associated RPAs

Table 9 Parcel Acquisition Schedule

Table 10 Habitat Acquisition Project Documentation Requirements

LIST OF FIGURES

Figure 1	Project Location Map
Figure 2	Number of Salmonid Species Present
Figure 3	Project Summary Map
Figure 4	Conceptual Model of GIS-Based Habitat Ranking
Figure 5	Project Selection Criteria
Figure 6	Priority Areas
Figure 7	Endangered and Threatened Species
Figure 8	FEMA Floodway and 100 Year Floodplain
Figure 9	Land Use
Figure 10	Stream Length
Figure 11	National Wetlands Inventory – Wetlands
Figure 12	Proximity to a Stream
Figure 13	Riparian Buffer Width Delineation Coverage
Figure 14	Spring Chinook – Spawning and Rearing
Figure 15	Fall Chinook – Spawning and Rearing
Figure 16	Coho – Spawning and Rearing
Figure 17	Steelhead – Spawning and Rearing
Figure 18	Phase 1 Parcel Prioritization Results – Overview
Figure 19	Final Parcels Identified for Tributary Habitat Acquisition
Figure 20	Recent and Ongoing Stream Surveys in Yakima Urban Growth Area

LIST OF APPENDICES

Appendix A	Summary of GIS Layers Collected and Created
------------	---

LIST OF ACRONYMS

ASR	Aquifer Storage and Recovery
B-IBI	Benthic Index of Biotic Integrity
BiOp	Biological Opinion
BOR	US Bureau of Reclamation
BPA	Bonneville Power Administration
CBSP	Columbia Basin System Planning
CFS	Cubic Feet Per Second
CREP	Conservation Reserve Enhancement Program
CWA	Clean Water Act
DNR	Department of Natural Resources
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
GIS	Geographical Information System
LFA	Limiting Factors Analysis
LTA	Land Trust Alliance
MOA	Memorandum of Agreement
NEPA	National Environmental Policy Act
NOAA	National Oceanic and Atmospheric Administration
NPPC	Northwest Power Planning Council
NYCD	North Yakima Conservation District
PCB	Polychlorinated Biphenyls
PFC	Properly Functioning Condition
PI	Priority Index
RM	River Mile
RPAs	Reasonable and Prudent Alternatives
SEPA	State Environmental Policy Act
SRFB	Salmon Recovery Funding Board
SSHEAR	Salmonid Screening Habitat Enhancement and Restoration
TWG	Technical Work Group
UGA	Urban Growth Area
USDA	US Department of Agriculture
USFWS	US Fish and Wildlife Service
USGS	US Geological Survey
WCC	Washington Conservation Commission
WDFW	Washington Department of Fish and Wildlife
WRIA	Water Resource Inventory Area
WTP	Water Treatment Plant
YKFP	Yakima Klickitat Fisheries Project
YRBWEP	Yakima River Basin Water Enhancement Project
YRWWTP	Yakima Regional Wastewater Treatment Facility
YTAHP	Yakima Tributary Access Habitat Program

EXECUTIVE SUMMARY

The Yakima Urban Growth Area (UGA) is a developing and growing urban area in south-central Washington. Despite increased development, the Yakima River and its tributaries within the UGA continue to support threatened populations of summer steelhead and bull trout as well as a variety of non-listed salmonid species. In order to provide for the maintenance and recovery of these species, while successfully planning for the continued growth and development within the UGA, the City of Yakima has undertaken the Yakima Habitat Improvement Project. The overall goal of the project is to maintain, preserve, and restore functioning fish and wildlife habitat within and immediately surrounding the Yakima UGA over the long term.

Acquisition and protection of the fish and wildlife habitat associated with key properties in the UGA will prevent future subdivision along riparian corridors, reduce further degradation or removal of riparian habitat, and maintain or enhance the long term condition of aquatic habitat. By placing these properties in long-term protection, the threat of development from continued growth in the urban area will be removed. To most effectively implement the multi-year habitat acquisition and protection effort, the City has developed this Master Plan. The Master Plan provides the structure and guidance for future habitat acquisition and restoration activities to be performed within the Yakima Urban Area. The development of this Master Plan also supports several Reasonable and Prudent Alternatives (RPAs) of the NOAA Fisheries 2000 Biological Opinion (BiOp), as well as the Water Investment Action Agenda for the Yakima Basin, local planning efforts, and the Columbia Basin Fish and Wildlife Authority's 2000 Fish and Wildlife Program.

This Master Plan also provides the framework for coordination of the Yakima Habitat Improvement Project with other fish and wildlife habitat acquisition and protection activities currently being implemented in the area. As a result of the planning effort leading to this Master Plan, a Technical Working Group (TWG) was established that represents most, if not all, fish and wildlife agencies/interests in the subbasin. This TWG met regularly throughout the planning process to provide input and review and was instrumental in the development of this plan.

Preparation of this plan included the development of a quantitative prioritization process to rank 40,000 parcels within the Urban Growth Area based on the value of fish and wildlife habitat each parcel provided. Biological and physical criteria were developed and applied to all parcels through a GIS-based prioritization model. In the second-phase of the prioritization process, the TWG provided local expert knowledge and review of the properties.

In selecting the most critical areas within the Urban Growth Area for protection, this project assessed the value of fish and wildlife habitat on the Yakima River. Well-developed habitat acquisition efforts (e.g., Yakima River Basin Water Enhancement Project by the Bureau of Reclamation and Yakama Nation acquisition projects) are already underway on the Yakima River mainstem. These efforts, however, face several limitations in protection of floodplain function that could be addressed through the support of the Yakima Habitat Improvement Project. This Master Plan integrates tributary habitat acquisition efforts with those ongoing on the Yakima River to best benefit fish and wildlife in the Urban Growth Area.

The parcel ranking process identified 25 properties with the highest fish and wildlife value for habitat acquisition in the Yakima Urban Area. These parcels contain important fish and wildlife corridors on Ahtanum and Wide Hollow Creeks and the Naches River. The fifteen highest-ranking parcels of the 25 parcels identified were considered very high priority for protection of fish and wildlife habitat. These 15 parcels were subsequently grouped into four priority acquisition areas.

This Master Plan outlines a four-year schedule for acquisition, protection, and restoration of the 25 highest ranked properties. The proposed acquisition order recognizes the outstanding character of habitat and apparent connectivity benefits among the 15 highest-ranking parcels. The time critical nature of subdivision and zoning changes of specific parcels within the UGA has also been considered. Priority area properties are considered to have the highest need for immediate acquisition and preservation and are recommended for acquisition as a group. The remaining ten properties were grouped as medium and low priority within the acquisition order and are recommended for acquisition on an individual basis.

This plan also details the importance of long-term land management, restoration and monitoring of properties acquired and protected through the Yakima Habitat Improvement Project. Management plans will be required to address both initial needs and long-term stewardship of acquired properties. Potential partnerships in ownership and long term management responsibility are addressed. Monitoring and evaluation of these lands is also critical. Land management and monitoring and evaluation activities are described within this Master Plan.

In conclusion, this Master Plan was developed under the premise that it is a “working plan”. Land transfer processes, land management, and salmonid and habitat issues are constantly changing and becoming more integrated and complex in the Yakima Urban Area. This acquisition plan must keep pace with these changes. As new information becomes available, additional parcels or groups of parcels may be identified as beneficial for fish and wildlife protection, and land management and monitoring strategies for the acquired lands may be altered.

1.0 INTRODUCTION



The Yakima Habitat Improvement Project was funded through a **grant** from the Bonneville Power Administration (BPA) to the City of Yakima (project sponsor) under BPA's Fish and Wildlife Program FY 2002 funding cycle. The development of this plan supports the Biological Opinion (BiOp) issued by NOAA Fisheries. The BiOp is a reinitiation of consultation on operation of the Federal Columbia River Power System and includes the juvenile fish transportation program and 19 Bureau of Reclamation projects in the Columbia Basin. Particularly, this plan addresses Reasonable and Prudent Alternatives (RPAs) 150, 152, and 153 of the BiOp.

This plan relates directly to RPA 150 since BPA funding of this project would protect currently productive non-Federal habitat containing listed salmon and steelhead. This RPA especially applies if the habitat is at risk of being degraded. The protection of habitat within the Yakima Urban Growth Area (UGA) is particularly critical in this regard because urban growth, high development pressure and rezoning are threatening the existence of remaining high quality tributary habitat within the area.

This plan assists BPA in meeting its goal for RPA 153 of working with agricultural programs and negotiating and funding long term protection of 100 miles of riparian buffers per year. Partners of this project include the North Yakima Conservation District and the Natural Resources Conservation Service. This project has identified high quality riparian buffers in the project area that require long term protection.

This plan also assists BPA in meeting requirements of RPA 152 and would be used to coordinate and support habitat enhancement measures undertaken by other agencies, states, tribes, and local governments. This project, sponsored by the City of Yakima, currently provides coordination of habitat activities within the UGA through the Yakima Habitat Improvement Project's Technical Work Group (TWG). The TWG includes associated federal, state, local agencies, tribes, agricultural interests, and private conservation organizations.

Locally, this plan supports open space plan recommendations specified in the Yakima 2015 Plan and the Yakima Urban Area Comprehensive Plan, as well as the Water Investment Action Agenda for the Yakima Basin and the Columbia Basin Fish and Wildlife Authority's 2000 Fish and Wildlife Program. Work prescribed in this plan has been integrated with other fish and wildlife habitat acquisition and improvement projects ongoing within the Yakima Urban Growth Area, particularly the Bureau of Reclamation's Yakima River Basin Water Enhancement Project and the Yakama Nation's projects in the Selah floodplain.

1.1 Background

The Yakima Urban Growth Area (UGA) is located near the center of the Yakima Basin at the confluence of the Naches and Yakima Rivers. The area is comprised of the City of Yakima and the City of Union Gap, along with urbanizing portions of Yakima County (Terrace Heights and West Valley). Tributaries to the Naches and Yakima Rivers within the urban growth area include Wide Hollow, Bachelor, Hatton, Ahtanum, Spring, and Cowiche Creeks.

Historically, spring chinook, summer chinook, coho, sockeye, and summer steelhead utilized rivers and creeks in the Yakima Urban Area Boundary to support various stages of spawning and/or rearing, or for migration to upstream areas. The productivity of the rivers and creeks in this area, however, has significantly declined as urbanization has increased. The opportunity to restore and enhance fish production through the preservation and protection of the riparian corridors is considered to be of great importance.

Over the past 100 years, the rivers and creeks within the Yakima Urban Growth Area have been significantly impacted as a result of agriculture, and more recently, urban development. These changes have negatively impacted the fish and wildlife habitat potential of these streams. Channels have been relocated, levees have been constructed, vegetation removed, off-channel areas filled, roadway culverts removed, wetlands filled, houses and roadways constructed on filled channels, and other physical changes have occurred. As a result of these physical changes, the water quality in some of the rivers and creeks has exceeded standards for temperature, fecal coliform, dissolved oxygen, total suspended solids, turbidity, pesticides (DDT; 4, 4-DDE; 4, 4-DDD), and has significantly impacted their ability to support a normative structure and function for aquatic and terrestrial habitat.

This proposed acquisition of lands is considered an initial step in a long-term program aimed at protecting and restoring fish and wildlife habitat in and around the Yakima Urban Growth Area. The acquisition of lands provides for the rebuilding of a healthy, naturally producing fish and wildlife population by protecting the habitat and biological systems and allowing for restoration within the rivers and creeks of the Yakima Urban Area. Ultimately, fee simple land acquisition and acquisition of development rights on the tributaries, in concert with active fish and wildlife habitat protection projects ongoing on the Yakima River, will create a corridor of protection, preservation, and enhancement of normative structure and function of the waterways in the urban area. The quality of aquatic and terrestrial habitat will be improved by restoring or enhancing floodplain connectivity, providing productive aquatic and wildlife areas, and increasing water quality, ecological interaction, riparian communities and watershed function.

1.2 Project Goals

The overall goal of the Yakima Habitat Improvement Project is to maintain, preserve and restore functioning fish and wildlife habitat within the Yakima Urban Growth Area over the long term. A project of this scope involves a multi-year effort comprised of acquisition, restoration and land management. Coordination of a project of this scale among associated entities is critical. As such, this first phase of the project includes a series of foundation building efforts such as:

- Summary of other completed and ongoing fish and wildlife habitat improvement efforts in the basin;
- Integration of this program with US Bureau of Reclamation and Yakama Nation projects;
- Establishment of a Technical Work Group (TWG) that has helped guide the master planning process over a period of 8 months, and will continue to be utilized during implementation of the Master Plan;
- Summary and review of pertinent physical and ecological data;
- Prioritization of parcels for habitat acquisition based on fish and wildlife habitat value, and;
- Development of a Habitat Master Plan that outlines acquisition and management strategies to protect fish and wildlife habitat and provides scientific justification for the proposed actions.

The proposed Yakima Habitat Improvement Project's fish and wildlife habitat acquisitions are consistent with a primary goal of the Northwest Power Planning Council's Columbia Basin Fish and Wildlife program. This goal states, "wherever feasible, this program will be accomplished by protecting and restoring the natural ecological functions, habitats, and biological diversity of the

Columbia River Basin”. The acquisitions support a primary assumption underlying the Council’s Fish and Wildlife Program. Namely, that the 2000 Fish and Wildlife Program is, “a habitat-based program, rebuilding healthy, naturally producing fish and wildlife populations by protecting, mitigating, and restoring habitats and the biological systems within them, including anadromous fish migration corridors.”

1.3 Master Plan Objectives and Structure

This Master Plan provides the justification, structure and guidance for future habitat acquisition activities to protect fish and wildlife habitat within the Yakima Urban Growth Area. The Plan also provides support for application to BPA for continued funding of the recommended habitat acquisition projects.

One objective of this plan is to coordinate with other local fish and wildlife agencies (US Bureau of Reclamation, Yakama Nation, WDFW, City of Union Gap, Yakima County, etc.) to avoid duplication and integrate existing habitat programs designed to protect fish and wildlife habitat within the Urban Growth Area. Another important objective of the plan is to use a quantitative prioritization procedure to rank parcels with respect to their value as fish and wildlife habitat. Biological and physical criteria were developed and a ranking formula designed. Prioritization of the parcels was conducted using the biological and physical criteria within a detailed GIS-based ranking model.

Included in this Plan is:

- a summary of ongoing/completed complementary fish and wildlife projects occurring within the Yakima Urban Area (Section 3.0; and Table 1);
- a description of the interagency coordination efforts associated with development of the Plan (Section 4.0; Table 2 and 3);
- a description of the criteria and parcel prioritization process for acquisition of fish and wildlife habitat (Section 5.0 and 6.0; Table 4, 5, and 6);
- a listing of recommended acquisition projects (Section 7.0; Table 7, 8, and 9);
- a strategy for acquisition and long term management of the lands, (Section 8.0 and 9.0); and
- a monitoring and evaluation plan to document changes to the habitat over time, benefits accruing to fish and wildlife, and assess the overall effectiveness of this program (Section 10.0).

This Master Plan was developed under the premise that it is a “working plan”. As new information becomes available, (e.g., fish distribution data, landowner interest and willingness to sell, development pressures, adjudicated water rights, fish barrier removal) additional parcels or groups of parcels may be identified as beneficial for acquisition. Previously selected areas may also be removed from the list for potential acquisition or re-prioritized in the future as a result of new information.

1.4 Issues Addressed by the Master Plan

1.4.1 Habitat acquisition/protection of tributaries

The habitat of portions of Ahtanum, Bachelor, Hatton, Spring, Cowiche and Wide Hollow Creeks and the Naches River were reviewed and ranked based on fish and wildlife value to determine the highest priority parcels for acquisition. The plan outlines the physical and biological criteria and the quantitative prioritization process used for ranking parcels for habitat acquisition. An overview of the highest-ranking fish and wildlife areas recommended for habitat acquisition is provided. A strategy for acquisition of the high priority parcels is presented that connects identified willing sellers and the BPA federal land acquisition process.

1.4.2 Partnership projects on the Yakima River

This project also assessed the potential for protection of fish and wildlife habitat on the Yakima River mainstem adjacent to the Cities of Yakima and Union Gap. Key acquisition projects that would most greatly enhance the normative structure and function of the Yakima system in this area were identified. Well-developed habitat acquisition efforts (e.g., Yakima River Basin Water Enhancement Project by the Bureau of Reclamation and Yakama Nation acquisition projects) are currently ongoing on the Yakima River mainstem. However, these projects face several limitations that could be addressed through the Yakima Habitat Improvement Project. This project integrates its habitat acquisition efforts with those ongoing on the Yakima River to maximize the benefit for fish and wildlife in the Urban Growth Area.

To ensure coordination, scientists involved in various local projects are members of the TWG for this project. To avoid duplication of effort, it was determined that the primary focus of this project would be the tributaries in the area; while the direct efforts mentioned above would focus on the mainstem Yakima River. Due to the ongoing and well-established efforts on the Yakima River, the role of the City of Yakima in habitat acquisition efforts on the Yakima River differs from that outlined in the tributary habitat acquisition strategy. It is recommended that the City of Yakima maintain a supporting role to the US Bureau of Reclamation's ongoing YRBWEP acquisition efforts on the Yakima River in the urban area. Lead organizations working on parcel acquisition along the Yakima River in the urban area currently include the US Bureau of Reclamation, Yakama Nation, and state and local agencies including conservation and irrigation districts.

1.4.3 Coordination of Acquisition Efforts

This plan describes the development of a framework for coordination of fish and wildlife habitat improvement efforts within the Yakima Urban Area by federal, state, local and tribal agencies as well as private conservation organizations. The use of a multi-agency/organization TWG in guiding the content of the Plan is also discussed. Recommendations for long-term coordination efforts are prescribed. Coordination of this effort with fish and wildlife protection efforts on the Yakima River within the Urban Growth Area is emphasized throughout the plan.

1.4.4 Ownership and Management of Acquired Lands

Options and recommendations for ownership of acquired lands as well as staffing needs and recommended organizational structure for stewardship of acquired fish and wildlife habitat are presented by priority area. Management plans will be required to address both initial needs and long-term stewardship of acquired properties, and the content and general recommendations of the management plans are discussed in this Master Plan. Recommendations for ongoing monitoring and

evaluation activities of the project's progress in restoring habitat and fish production over the long term are also outlined.

1.4.5 Related Critical Habitat Projects

The effects of the Yakima Habitat Improvement Project can best be realized if it is implemented in concert with other related critical fish and wildlife habitat projects. The Master Plan describes a few important related habitat projects that when implemented, would provide added benefits to the land acquisition efforts.

2.0 PROJECT LOCATION

Development of the Yakima Habitat Master Plan focused on acquisition planning for lands located within the Yakima Habitat Improvement project area. This area is essentially equivalent to the Yakima Urban Area and its immediate surrounds. Areas located a few miles outside the Yakima Urban Area were included in the parcel ranking and were considered for purchase through the Yakima Habitat Improvement project in order to maintain the complex habitat relationships and connectivity associated with upstream effects on aquatic habitat.

2.1 Land Ownership

The Yakima Habitat Improvement project area is located entirely within Yakima County in south central Washington (Figure 1). Land ownership throughout the project area includes that held by cities, Washington State, Yakima County, Yakama Indian Nation, conservation organizations, and private landowners. The project area encompasses the Urban Growth Area of the City of Yakima and the City of Union Gap, a portion of the City of Selah, and Yakama Tribal lands. The City of Yakima covers 19.26 square miles (12326.35 acres), with a population of approximately 73,000. The City of Selah covers 4.37 square miles (2796.5 acres), with a population of 6,310 (based on the 2000 U.S. Census). The amount of land area in Union Gap is 3.88 square miles (2483.19 acres) with a population of approximately 3120.

2.2 Land Use and Land Cover

The primary land uses in the project area vicinity include residential, commercial, livestock, and limited irrigated agriculture and forestry. Gravel mining occurs in the Yakima River floodplains. Other land cover characteristics according to data from USGS (2003) include urban developed land, cropland/grassland mosaic, and grassland.

2.3 Climate

Climate in the project area is influenced by the Cascade Mountains. The average annual precipitation ranges from 5 to 10 inches (USGS 2003). Summer days are clear, hot, and dry while nights are usually cool. Winters are relatively wet and cloudy with cold periods.

2.4 Geology and Soils

Geologic structure closely controls the topography in and around the Yakima Urban Area. The project area is located in valley lowlands with Cowiche Mountain to the west, Yakima Ridge to the northeast, Ahtanum Ridge to the southwest, and Rattlesnake Hills to the southeast. Geologic units in the project area include Yakima Basalt, Ellensburg Formation, and Cemented Basalt Gravel (Foxworthy 1962). The general soil survey map for Yakima County shows soils in the project area as mainly Quincy-Hezel (USDA 1985). These are very deep, somewhat excessively drained, and nearly level to moderately steep soils on terraces. Some Umapine-Wenas soils are evident as well as Harwood-Gorst-Selah and some Rock Creek-McDaniel. Umapine-Wenas soils are very deep, somewhat poorly drained and artificially drained, nearly level and gently sloping soils on flood plains. Harwood-Gorst-Selah soils are moderately deep and shallow, well drained, nearly level to steep soils, on high-dissected terraces. Rock Creek-McDaniel soils are very shallow and very deep, well drained, nearly level to steep soils on plateaus and ridge tops on uplands (USDA 1985).

2.5 Streams

Streams located in the project area include the Yakima and Naches Rivers and tributaries including Ahtanum, Bachelor, Cowiche, Hatton, Spring, and Wide Hollow Creeks, along with 27.9 miles of unnamed tributaries and other water bodies. The location of these rivers and streams are depicted in Figure 1.

2.5.1 Ahtanum Creek

Ahtanum Creek is a western tributary to the lower Yakima River, entering at RM 106.9. The project boundary encompasses 11.9 miles of Ahtanum Creek. The primary land use in the lower Ahtanum (downstream of Tampico) is agriculture (WDFW 1998). There is considerable residential and industrial development taking place along the lower mainstem of Ahtanum Creek, confining channels and resulting in the failure of channels to naturally respond to recovery from channel disturbances (NPPC 2001, Washington Conservation Commission 2001, and Dominguez 1997). Low elevation riparian areas are easily accessible, roads are built close to streams, and some riparian areas have been logged (DNR 1997, as cited in Tri-County 2000). Extensive areas along lower Ahtanum Creek have been diked, agricultural fills confine several reaches, and several reaches have lost floodplain connectivity (Washington Conservation Commission 2001). Flooding of adjacent private lands from Ahtanum Creek overbank flows has led to increased diking and channelization of the Creek.

Agricultural development and associated irrigation delivery have altered stream channels on lower Ahtanum Creek (Washington Conservation Commission 2001, as stated in Tri-County 2000). Irrigation diversions begin in the Ahtanum system at the John Cox Ditch. Although this is a small diversion (~12cfs), the geomorphic effect of the diversion dam has caused channel adjustments and provoked maintenance activities that alter the continuum of the Creek. The middle portion of Ahtanum Creek from the late 1940's until 2000 was dewatered after June 10 by irrigation diversions. In 2000, the Wapato Irrigation Project and the Yakama Nation agreed to keep enough water in the creek for migration through the summer months. There continue to be water quantity issues in the creek at other locations as well (Washington Conservation Commission 2001).

2.5.2 Bachelor and Hatton Creeks

Bachelor and Hatton Creeks flow into Ahtanum Creek from the north. Bachelor Creek was previously a natural channel while portions of Hatton Creek were historically part of a natural side channel, or spring fed channel, and other sections are entirely artificial. Both creeks now serve as irrigation conduits for the Ahtanum Irrigation District (Washington Conservation Commission 2001). Additionally, Hatton Creek receives flow from Bachelor Creek via an underground pipe located about a mile below the Ahtanum Irrigation District Main Canal. The outlet of Bachelor Creek is outfitted with a barrier that presumably precludes anadromous fish access into the system. Thus, Bachelor and Hatton Creeks are not to be considered fish habitat, although some "resident" salmonids appear to make it through the dewatered periods in residual pools (K. Gullett personal communication. 2003). The project area encompasses 9.1 miles of Bachelor Creek, and 3.9 miles of Hatton Creek within its boundaries. There are numerous unscreened diversions on Bachelor and Hatton Creek that function as fish barriers to these creeks.

2.5.3 Cowiche Creek

Cowiche Creek is a southern tributary of the Naches River. It drains a moderately large watershed (120 mi²) and flows 7.5 miles through a very narrow canyon before splitting into South and North Forks. Cowiche Creek and its forks are confined throughout its length and never contained extensive

anastomosing reaches, although beaver dams and ponds were and still are common below the forested area (NPPC 2001). Land uses include grazing, agriculture, residential and recreation (Washington Conservation Commission 2001). The project area includes 5.9 miles of Cowiche Creek.

2.5.4 Naches River

The Naches River is the largest tributary to the Yakima River. The lower portion of the Naches watershed includes agricultural land uses (including orchard, cereal crops, irrigated pasture, and hay production (Washington Conservation Commission 2001), City of Yakima and Yakima Greenway owned property. The lower Naches has a large floodplain (Washington Conservation Commission 2001). There has been severe floodplain loss in the reach from twin bridges to the confluence with the Yakima River. In this lower reach only about 30% of the floodplain remains (mostly the river itself) while the rest has been cut off by SR 12 (Washington Conservation Commission 2001, as stated by Freudenthal). The project area encompasses 3.3 miles of the downstream most portion of this river.

2.5.5 Wide Hollow Creek

Wide Hollow Creek is a western tributary to the Yakima River, flowing along the southern edge of Union Gap and Yakima. This creek suffers from many of the problems associated with urban streams, including impacts from stormwater runoff, leaking septic, and agricultural practices (mostly hay and pasture) (WDFW 1998). Wide Hollow Creek has multiple chemical and physical water quality impairments related to pesticides, metals, and other contaminants and is listed on the Washington 303(d) list for impaired waterbodies.

Tributaries to Wide Hollow Creek include Cottonwood Creek (the major tributary to Wide Hollow Creek), which has intermittent flow; numerous springs and some Yakima-Tieton Irrigation District return flow during the irrigation season (Washington Conservation Commission 2001). Wide Hollow Creek flows through a developed/developing urban area, and the stream tends to be incised and it has been dredged through part of the cities of Yakima and Union Gap (Washington Conservation Commission 2001, as stated in CBSP 1990). Severe bank sloughing caused by overgrazing is evident in several small reaches from RM 0.2-0.6 (Washington Conservation Commission 2001). There are 11.5 miles of Wide Hollow Creek within the project boundary.

The lower portion of Wide Hollow Creek has a fish barrier related to a historic mill and has been redirected through a culvert to flow under the City of Union Gap. There is some discussion currently ongoing among state and local agencies of the potential realignment of Wide Hollow Creek into a new channel that would flow to the south and connect with Ahtanum Creek, thus circumventing the flow through the area of Union Gap (R. Visser personal communication 2002).

Hydrology of Wide Hollow Creek is severely altered as it is used as an irrigation conveyance by the Congdon Ditch. Wide Hollow is spring-fed downstream of 50th street and historically it likely provided excellent rearing habitat. Upstream of 50th street, Wide Hollow Creek was probably an intermittent stream, which flowed from December through May. This natural hydrology has since been changed as the Congdon Ditch re-routes sediment competent flows down Wide Hollow in June and July (J. Freudenthal personal communication 2003).

2.5.6 Spring Creek

Spring Creek is a left bank tributary to Bachelor Creek. The entire 2.6 miles of Spring Creek are within the project boundary. Water in Spring Creek maintains cool flow in the summer

(J. Freudenthal personal communication. 2003). Spring Creek, however, is a tributary to Bachelor Creek and as such is blocked to anadromous fish access. A portion of Spring Creek has been redirected into a culvert where it flows under the Yakima County Airport. The Yakima Fish Hatchery was historically located on Spring Creek.

2.5.7 Yakima River

The project area encompasses 9.9 miles of the mainstem Yakima from approximately Selah Gap (RM 116.4) to the southernmost boundary of Union Gap (RM 106). This reach borders the City of Yakima and is characterized by numerous side-channels, islands, and backwater areas. Dikes confine the full extent of the natural floodplain through much of this reach (NPPC 2001). The Naches River, Wide Hollow, and Ahtanum Creeks all drain into the Yakima within the project boundaries. According to the 2001 WRIA 37/38 Limiting Factors Analysis, this floodplain reach has extensive floodplain urbanization encroachment. The lower 5 km has extensive upwelling, with a fair amount of interconnected floodplain habitat.

2.6 **Fish Distribution**

This section provides an overview of fish distribution within the Yakima Urban Area. Graphical summaries of fish distribution data have been developed by both WDFW and by the Washington Conservation Commission in the Salmonid Limiting Factors Analysis (Washington Conservation Commission 2001). For some species in some locations, the distributions varied between the two sources. It was generally accepted by the TWG that the distributions portrayed in the Limiting Factors Analysis (LFA) were more recent, more developed and thus more accurate than those available from WDFW. As a result, for the purposes of the acquisition prioritization process, we utilized the LFA distributions for all anadromous salmonid species. The LFA does not contain distribution data for bull trout and other resident fish species. For these species the WDFW fish distribution data was utilized.

The Yakima subbasin supports at least 48 species of anadromous, resident native, and exotic fish (NPPC 2001), and several are present in the project area. Based on information provided in the 2001 Subbasin Summary, the resident native and exotic fish include mountain whitefish, chiselmouth, carp, northern pike minnow, dace species, redbreast shiner, sucker species, pumpkinseed, bass, and sculpin species. The anadromous fish distribution and status are described in more detail below. Salmonid species distribution is presented in Figure 2.

2.6.1 Spring Chinook

Spring chinook (*Oncorhynchus tshawytscha*) still spawn in most of their historic range within the project area. Within the project area they are currently found primarily in the Yakima River, Naches River, and possibly in accessible reaches of Cowiche Creek (NPPC 2001). According to the Limiting Factors Analysis (Washington Conservation Commission 2001), Ahtanum Creek does not presently support a spring chinook run though current STREAMNET data suggest they use the lower 2.9 miles of Ahtanum Creek for rearing and migration (STREAMNET 2003). NOAA Fisheries determined on March 9, 1998 that spring chinook of the Mid Columbia ESU did not warrant listing under the ESA (63 FR 11482).

2.6.2 Summer Steelhead

Within the project area, summer steelhead (*Oncorhynchus mykiss*) are present in the Yakima River, Naches River, Cowiche, Wide Hollow and Ahtanum Creeks (NPPC 2001). According to the Yakima

Subbasin Summary (NPPC 2001), it is probable that the historical spawning distribution of summer steelhead included virtually all accessible portions of the Yakima Basin, with highest spawning densities occurring in complex, multi-channel reaches of the mainstem Yakima and Naches, and in third and fourth order tributaries with moderate (1-4%) gradients. NPPC (2001) reports 99% usage of Cowiche Creek, primarily for spawning and rearing. 1.6 million hatchery steelhead have been planted in the upper Yakima and Naches since 1961 (WCC 2001). Mid-Columbia River Summer steelhead are listed as threatened under the ESA (57 FR 14517).

STREAMNET reports summer steelhead utilization of Ahtanum Creek in its entirety, with the first half-mile from the mouth primarily used for migration, and the rest of the stream primarily as spawning and rearing ground. Detailed redd counts which describe steelhead spawning on the lower Ahtanum have been collected by the Yakama Nation from 1998 to 2002.

2.6.3 Coho

Coho salmon (*Oncorhynchus kisutch*) are found in the project area. In recent years, coho spawning has been documented in side channels of the mainstem Yakima between Roza Dam and the town of Wapato (~RM 100); in Naches River below the Tieton confluence; and in Ahtanum Creek, Wide Hollow Creek, and Cowiche Creek (NPPC 2001). Although endemic coho were extirpated in the early 1980s, low levels of natural reproduction of hatchery-reared coho, out planted as smolts, is now occurring in both the Yakima and Naches Rivers (NPPC 2001). The Yakama Nation has released between 85,000 and 1.4 million coho smolts in the Yakima Basin annually since 1985 (Washington Conservation Commission 2001). Their acclimation and release points are located primarily in middle Yakima mainstem below Sunnyside Dam (from RM 95 - RM 104) (Washington Conservation Commission 2001). Most recently coho were released in the upper Yakima and Naches Rivers in an effort to recover them to more suitable habitat.

2.6.4 Bull Trout

There are thirteen bull trout (*Salvelinus confluentus*) populations in the Yakima basin (Washington Conservation Commission 2001). Distinct stocks present in the project area are found in the Yakima River, Ahtanum Creek, and Naches River. The mainstem Yakima stock is fluvial; the Ahtanum Creek stock may be a resident stock; and fluvial/resident forms are present in the Naches (WDFW 1998). All bull trout stocks in the Yakima basin are native fish sustained by wild production. According to WDFW, Yakima River and Ahtanum Creek stocks are critical and the status of the Naches stock is unknown (WDFW, SaSI Bull Trout/Dolly Varden Appendix 1998).

A smolted bull trout was captured in a screw trap in lower Ahtanum Creek in February 2003 (E. Andersen, personal communication 2003). The impact of flow regulation and lack of adequate spawning migration flows in lower Ahtanum Creek may preclude the exchange of individuals from the mainstem Yakima.

2.6.5 Cutthroat Trout/Rainbow Trout

Cutthroat trout (*Oncorhynchus clarki*) are present in the Ahtanum watershed and accessible portions of Cowiche Creek (NPPC 2001). Ahtanum Creek cutthroat are actually pure westslope cutthroat trout. These fish were found to be 1 of 5 genetically pure strains of cutthroat in the Yakima Basin, and could be important for reintroduction efforts in the future.

Resident rainbow trout inhabit most of the lower reaches of the Yakima's tributaries and the Naches River and lower reaches of its tributaries. They are also present in Ahtanum Creek and tributaries (NPPC 2001).

2.7 Fish Access/Barriers

Fish access is a primary issue throughout the streams of the project area. Several agencies are currently addressing fish barrier issues in tributaries within the Urban Growth Area. As these barriers are addressed and mitigated, the presence of fish species and life stages in the tributaries described above is expected to change. This will have implications on the results of this project in future years, and therefore this Master Plan can be viewed as a work plan to be updated annually as habitat improvements in the UGA continue to occur.

In the Ahtanum watershed, the middle portion of Ahtanum Creek from the late 1940's until 2000 was dewatered after June 10 by irrigation diversions creating a fish passage blockage. In 2000, the Wapato Irrigation Project and the Yakama Nation agreed to keep enough water in the creek for migration through the summer months. There continue to be water quantity issues in the creek at other locations as well.

There are 15 unscreened diversions on Hatton Creek, and nine unscreened diversions on Bachelor Creek (Washington Conservation Commission 2001). Pumps and gravity ditches divert water from these "creeks" during the irrigation season (April 15-July 10). The diversions from Ahtanum Creek into Bachelor and Hatton Creeks were merged in 1994 at the diversion site for Bachelor Creek, the old diversion to Hatton Creek eliminated, and Hatton Creek linked to Bachelor Creek via a 500-foot long enclosed pipe (Washington Conservation Commission 2001). Bachelor Creek is screened at the diversion site, and both channels have barriers at the downstream end to prevent anadromous salmonid entry into the channels (Washington Conservation Commission 2001).

In Wide Hollow Creek, an Alaska steep pass fishway was installed near the mouth, however, juvenile salmon cannot migrate upstream beyond it (Washington Conservation Commission 2001). A number of debris jams in areas of heavy residential development have formed in Wide Hollow Creek in the past and may have impaired access (NPPC 2001, Washington Conservation Commission 2001).

According to CBSP 1990, fish passage barriers are the primary salmonid limiting factor in Cowiche Creek. There are 5-6 unscreened diversions with associated structures that may be passage barriers (Washington Conservation Commission 2001, as stated by Schille). In the project area a rubble check dam in the Naches River diverts flow into Cowiche Creek, and then into the Fruitvale Power Canal. This structure impairs adult passage at lower flows, and impairs juvenile passage at all flows (Washington Conservation Commission 2001). The Fruitvale Power Canal is screened, and has a well functioning by-pass, but other diversions are unscreened (WFDW 1998).

Naches has two large diversion dams – the Wapatox and Naches Cowiche – though only the Naches Cowiche is in the project area. Each of these diversion dams maintains screening structures that were installed in order to prevent upstream migrating adults or downstream migrating juvenile salmonids from being entrained at the irrigation systems (NPPC 2001).

Though not a fish barrier, mixing of Cowiche Creek and Naches River waters as a result of the Fruitvale Power Canal diversion from the Naches River is problematic for salmonid homing in this area. The mixing of waters in the location of the canal may cause disorientation between fish heading for the upstream portions of Cowiche Creek and those heading upstream on the Naches River.

2.8 Riparian Condition

Riparian buffers within the Yakima Urban Area have been delineated by Golder Associates from 1996 aerial photos and converted into a GIS shape file as part of this project. Figure 13 depicts the riparian buffer coverage. This information is available for future reference as the recommendations for this plan evolve over time.

Riparian resources are limited in the project area. Vegetation in the project area include sagebrush and associated desert shrubs and grasses, with trees becoming more abundant as elevation increases (Foxworthy 1962). Cottonwood, willow and associated phreatophytes grow in belts and clumps along streams and marshy areas (Foxworthy 1962). Areas with particularly severe impacts due to construction and maintenance of dikes, levees, and roads include the mainstem Yakima in the vicinity of the City of Yakima and virtually the entirety of the Naches River (NPPC 2001). Grazing, agriculture, and numerous homes and cabins have compromised bank stability and riparian vegetation along Ahtanum Creek (NPPC 2001). According to the North Yakima Conservation District, riparian condition in the lower 8-9 miles of Ahtanum (downstream of Tampico) is generally poor with some remnant patches of functional riparian vegetation. In addition, riparian condition in this area is severely impacted by grazing and residential encroachment, particularly in the lower end (Washington Conservation Commission 2001).

The riparian community of the lower 3-4 miles of Cowiche Creek has been altered but not severely degraded by residential development; the same is true of the middle portion of the creek in regard to agricultural development (NPPC 2001). The moderate gradient of Cowiche Creek and its forks is associated with many pools, riffles, and glides; large woody debris and overhanging/submerged vegetation is abundant in the mainstem and South Fork (NPPC 2001). Banks are stable except where grazing-induced sloughing has occurred from RM 10 to 12 on the South Fork and on the lower three miles of the North Fork (WDFW 1998).

Riparian condition in Wide Hollow Creek is generally poor. Riparian vegetation consists of narrow buffers with clumps of mature willow that provide shaded areas interspersed with sunny areas (Washington Conservation Commission 2001). Riparian vegetation is non-existent from RM 0.2-0.6 and from RM 1.3-2.5, due to impacts from overgrazing (Washington Conservation Commission 2001).

2.8.1 Substrate

Excessive sediment is present in streams in the Urban Growth Area. The amount of fine sediments deposited in the middle and lower Yakima, from Wilson Creek to the Columbia confluence, has severely degraded many miles of spawning habitat and partially or completely filled pools essential to juvenile rearing and adult holding (NPPC 2001). In the Yakima River the supply and composition of gravels has been affected by 1) construction of irrigation dams, 2) extensive leveeing, 3) removal of floodplain deposits of alluvial gravel by aggregate operators and for road and rail grades, and 4) alteration of the natural hydrograph (Washington Conservation Commission 2001).

Excessive sediment loading poses similar problems in a number of important tributaries, the lower Naches River, Ahtanum and Cowiche Creeks. In these tributaries, increased sediment loading is caused by excessive road density in the watershed, roads located immediately adjacent to streams, poorly maintained roads and/or bank destabilization associated with overgrazing (NPPC 2001). The gradient in the lower 8-9 miles of Ahtanum Creek is slight to moderate, and bank sloughing from overgrazing has caused the deposition of a large amount of sand and mud (CBSP 1990).

Sedimentation and substrate have been rated as fair in Wide Hollow Creek, and poor in the Naches (CBSP 1990).

2.9 Gravel Mining

Two thirds of floodplain mines in the state (by area) are along the Yakima River and its major tributaries, the Naches and Cle Elum Rivers (Kondolf et al 2001). There are numerous large commercial floodplain gravel pits along lower reaches of the rivers, and more than a hundred smaller, shallower gravel pits throughout the basin – approximately one floodplain pit per river kilometer (Kondolf et al 2001). These have implications to the aquatic habitat as a result of disturbance of floodplain and riparian function, and water quality and sediment issues. Yakima County is currently conducting a floodplain gravel pit study to determine these affects. Discussions are ongoing regarding the potential of reconnecting inactive floodplain pits to the river channel to provide additional habitat.

2.10 Water Quality

Water quality varies in the project area. Ahtanum Water quality is fair downstream of Tampico, though summer temperatures are frequently excessive in the lower reaches (WDFW 1998), resulting from removal of riparian vegetation and consequent loss of shading, and low flows resulting from irrigation withdrawals (NPPC 2001). Cowiche Creek is included on the Clean Water Act (CWA) Section 303(d) impaired water quality list for fecal coliform, instream flow, and temperature. The Naches River is listed for pH, silver and temperature. Wide Hollow Creek is listed for 4,4'-DDD, 4,4'-DDE, fecal coliform, dissolved oxygen, and temperature; and the lower Yakima is listed for temperature, instream flow, DDTs, dieldrin, pH, turbidity, PCBs, fecal coliform, dissolved oxygen, and various metals.

2.11 Hatcheries/Artificial Production

Salmonids have been released by Washington State in the Yakima subbasin since the early 1930s. Hatchery and/or supplementation facilities in the project area include the Naches Hatchery, Stiles Pond Coho Acclimation Release Site, Nelson Raceway, and the Yakima hatchery (closed in 1992).

3.0 SUMMARY OF RELATED HABITAT ACTIVITIES

This section provides a summary of fish and wildlife habitat activities and studies recently completed or in progress by major agencies and stakeholders within the Yakima Urban Area. This information is vital to ensure coordination and avoid duplication among the activities being conducted by a multitude of agencies or organizations within the project area. Thorough understanding of the location and goals of these ongoing projects provides context for the Habitat Improvement Project and assists in identifying areas in which acquisition of fish and wildlife habitat could provide habitat connectivity.

Resource agency representatives were contacted to obtain information on recently completed or ongoing ecological projects within the project area. Field visits with agency and organization personnel to document the attributes of the various projects were conducted. Agencies and interest groups met to review and comment on the list of projects identified as well as the project location summary map.

Approximately 30 ongoing or recently completed habitat conservation related projects were identified in or immediately adjacent to the Yakima Urban Area. Habitat acquisition efforts on the Yakima River by the Bureau of Reclamation and its partners and by the Yakama Nation were particularly important due to their direct relevance to projects identified on tributaries in this plan. Other efforts include work funded by multiple sources including BPA, the Salmon Recovery Funding Board (SRFB), the Washington Department of Transportation, Washington Department of Ecology, and Centennial Clean Water Fund and Clean Water Act 319 funds among others. These projects include land and water rights acquisition, habitat restoration, educational and outreach activities, and habitat improvements such as culvert or fish barrier removal or large woody debris placement. Projects are currently being conducted on the Yakima and Naches Rivers as well as Cowiche, Ahtanum and Wide Hollow Creeks.

Over 20 current or recent research or monitoring efforts related to salmonid habitat and biology were also identified through this process. These projects are being implemented by the Yakima Nation, state and federal agencies, universities, and Yakima County. Assessments and research efforts included large-scale monitoring and evaluation projects associated with coho reintroduction in the basin, water quality assessments, hydrology and stream condition assessments, floodplain gravel pit studies, and a detailed analysis of the geomorphic condition of Yakima River reaches, among others.

Table 1 summarizes the project information compiled on existing or recently completed work or studies pertaining to the fish and aquatic habitat of Yakima Urban Area. Figure 3 provides an overview of the locations of these projects.

TABLE 1
Yakima Urban Area Related Habitat Projects

Funding Agencies	Proponents	Project Title	Status	Contact	Stream/River	Project Area	Project Location	Type of Project	Project Description
Habitat Projects									
BPA	US Bureau of Reclamation, Yakima Field Office	1995-033-00 O and M of Yakima River Basin Fish Protection	Active	Kate Puckett (509)575-5848 x205 kpuckett@pn.usbr.gov	Bachelor Creek, Hatton Creek, Naches River, Cowiche Creek	Yakima River Subbasin	46-37-48.33, 120-46-02.23 Bachelor-Hatton Screens; 46-44-52.48, 120-48-03.52 Naches/Cowiche Screens; 46-44-52.54, 120-48-05.11 Naches/Selah Screens; 46-37-29.50, 120-33-08.86 Old Union Screens; 46-37-30.53, 120-33-49.66 Union Gan Screens	Fish Passage	Operate and maintain BPA owned fish screening and trapping facilities located throughout the Yakima River basin to prevent injury or mortality to anadromous and resident fish, and to protect BPA's capital investment.
BPA	Yakama Nation	1992-062-00 Lower Yakima Valley Habitat Unit Acquisition	Active	Tracy Hames (509) 865 - 6262 tracyhames@yakama.com	Yakima River	Yakima River/tributaries	Yakima River and tributaries on Yakama Nation	Acquisition and restoration	Protecting and restoring native floodplain habitats along anadromous fish-bearing waterways in the agricultural area of the Yakama Reservation (2,500 acres/year). Acquire an easement on Double Z Ranch (435 acres) and obtain an additional 4,420 acres of habitat.
BPA	Yakima Nation	1997-047-00 Yakima Basin Side Channel Survey and Rehabilitation	Complete	Scott Nicolai (509)962- 6142 snicolai@yakama.com	Yakima River	Yakima River	Wapato Reach of Yakima River	Habitat Restoration	This project is a completed survey of side channel of the Yakima River.
BPA	Yakama Nation, WDFW	1997-051-00 Yakima River Side Channels	Active	Scott Nicolai (509)962- 6142 snicolai@yakama.com	Yakima River	Yakima river	Yakima River	Habitat Protection and Restoration	The project goal is to protect and restore off-channel rearing habitats in priority mainstem reaches. Involved purchase of 59 acres of floodplain habitat on the lower Naches River and 137 acres of prime floodplain habitat on the Yakima River near Union Gan in 2000.
BPA	Yakama Nation	1996-033-30 Lower Yakima Fish Culture	Active	Bill Fine	Yakma River	Yakima River	Yakima River	O and M	O and M for fish production, training, foster tribal hatcheries
BPA	Kittitas County Water Purveyors, the Kittitas County Conservation District, the North Yakima Conservation District, the Ahtanum Irrigation District in Yakima County, the U.S. Bureau of Reclamation and Washington Department of Fish and Wildlife.	2002-025-00 Yakima Tributary Access and Habitat Program	Active	Carol A. Ready (509)925-6158 krdwq@elltel.net Bill Gillespie NRCS	Wide Hollow Creek, Ahtanum Creek, Cowiche Creek	Wide Hollow Creek, Ahtanum Creek, Cowiche Creek	Multiple Locations	Fish Passage, Habitat Restoration	Implement fish enhancements (fish passage, screens and riparian habitat) on Yakima tributaries based on prioritized schedule developed through a collaborative approach of local, state, federal and tribal interests. Conduct early actions in 2002.
BPA	City of Yakima Public Works	2002-038-00 Improvement Project for the Yakima Basin	Active	Duane Calvin 509-576-6480 dcalvin@ci.yakima.wa.us	Yakima Basin	Yakima Urban Area	46 40 Approximate West Boundary; 46 32 Approximate East Boundary; 120 40 Approximate North Boundary; 120 23 Approximate South Boundary.	Habitat Acquisition	Habitat master plan for protection of aquatic/terrestrial habitat; improvements of water quality; reconnection of the flood plain; restoration/protection of the riparian habitat and natural hydrologic regime.
BPA	CRITPIC	9403200 Bachelor-Hatton Passage Improvement	Complete	Peter Lofee	Bachelor Creek, Hatton Creek	Bachelor/Hatton	Multiple Locations	Fish Passage	Land acquisition to provide fish passage at the Bachelor - Hatton site.
BPA, Yakama Nation	Yakama Nation	Yakima-Klickitat Fisheries Project	Active	Scott Nicolai 509-962- 6142 snicolai@yakama.com	Yakima	Yakima & Klickitat River Basins	Aspects of this project take place throughout the entire Yakima Subbasin.	Supplementation	A supplementation project designed to use artificial propagation in an attempt to maintain or increase natural production while maintaining long-term fitness of the target population and keeping ecological and genetic impacts to non-target species within specified limits.
CCWF	Yakima County	Wrecking Yard Floodplain Rehabilitation	Active	Joel Freudenthal (509) 574 2322 joel.freudenthal@co.yakima.wa.us	Yakima River/Naches River	Yakima River/Naches River	various	Floodplain improvement	Working with wrecking yards in the Naches and Yakima River Floodplains to develop BMPs
CCWF	Yakima County	Critical Habitat Acquisition	Active	Kelly Clark (509)574-2230 kelly.clark@co.yakima.wa.us	Naches River	Naches River	River mile 3-30	Habitat Acquisition	Acquire critical habitat
City of Union Gap	City of Union Gap	West Vally Mall Blvd Mitigation Project	Active	Bill Rathbone (509) 575-3638	Ahtanum Creek	Ahtanum Creek	Ahtanum Creek	Acquisition and restoration	Purchase of 30 acres along Ahtanum Creek and restore stream and wetlands
Department of Transportation	Department of Transportation	Highway 12/Old Naches Highway Interchange	Active	Gary Beeman (509)577-1750 beemang@wsdot.wa.gov	Naches River	Naches River	Highway 12/Old Naches Highway	Construction, acquisition, and mitigation	Land acquisition and wetland/habitat mitigation associated with construction of highway interchange.
Department of Transportation	Department of Transportation	Naches River Reaches Study	Active	Gary Beeman (509)577-1750 beemang@wsdot.wa.gov	Naches River	Naches River	Cowiche Creek confluence to mouth of Naches River	Study	Collection of hydraulic and channel morphology data.
Department of Transportation	Department of Transportation	SR 24 Bridge Replacement	Active	Gary Beeman (509)577-1750 beemang@wsdot.wa.gov	Yakima River	Yakima River	82nd Street to Key Road on Highway SR 24	Construction, acquisition, mitigation	Construction, land acquisition, hydraulic information, and mitigation, associated with SR 24 bridge replacement and reroute.
Department of Transportation	Department of Transportation, Yakima County	Powerhouse Bridge Replacemnr	Active	Gary Beeman (509)577-1750 beemang@wsdot.wa.gov	Naches River	Naches River	Powerhouse Bridge Highway 12	Construction, acquisition, mitigation	Construction, land acquisition, hydraulic information, and mitigation, associated with SR 24 bridge replacement and reroute.
Funded under section 319 of the Clean Water Act, US Fish and Wildlife Service, and USDA	Yakama Nation	Cowiche Riparian Restoration (15 restoration projects)	Complete	Scott Nicolai 509-962- 6142 snicolai@yakama.com	Cowiche Creek	Cowiche Creek	various	Restoration, water quality, education	A total of 15 restoration projects were implemented. Water quality monitoring was conducted, and education extended to the public classroom, where presentations were given on fish habitat and water quality to schoolchildren.
North Yakima Conservation District, WDFW, SRFB, Tree Top Inc.	Tree Top Inc.	Sprayfield Riparian Enhancement Project	Active	Tree Top (509) 697-7251 e mail: faq@treetop.com	Yakima River	Yakima River	River mile 120 on the Yakima River.	Bank Stabilization	The project is designed to end erosion along the border of the apple processor's spray field adjoining the river, as well as increasing flood plain accessibility through removal of an existing dike.
Regional Fisheries Enhancement Group	WDFW	JM Perry Fish Barrier Removal	Active	Regional Habitat Program Manager Ted Clausing (509) 457-9317 clausnac@dfw.wa.gov	Wide Hollow Creek	Wide Hollow	Wide Hollow	Fish Passage	Fish barrier removal
SRFB	North Yakima Conservation Dist.	Ahtanum Ridge Business Park Stream Resoration	Active	Michael Tobin (509) 454-5737 mike-tobin@wa.nacdn.net	Wide Hollow Creek	Wide Hollow	Ahtanum Ridge Business Park	Revegetation	Re-vegetation of Wide Hollow Creek at Ahtanum Ridge Business Park
SRFB	North Yakima Conservation District	Buckskin Slough Restoration	Active	Michael Tobin (509) 454-5737 mike-tobin@wa.nacdn.net	Naches River	Naches River	Naches River floodplain near Cowiche Creek	Restoration	Rehabilitation of Buckskin Slough

TABLE 1
Yakima Urban Area Related Habitat Projects

Funding Agencies	Proponents	Project Title	Status	Contact	Stream/River	Project Area	Project Location	Type of Project	Project Description
SRFB, BPA	City of Yakima	Naches River Water Treat. Plant Screen	Active	Dueane Calvin (509) 576-6480	Naches River	Naches River	Water Treatment Plant	Fish Passage	Will provide immediate fish protection, instream flow will be enhanced, general water quality improved, bank near intake will be enhanced, and impacts to fish from current maintenance requirements eliminated.
SRFB, Regional Fisheries Enhancement Group	WDFW, Yakima County Parks and Recreation	West Valley Park	Active	Regional Habitat Program Manager: Richard Visser (509) 457-9308 OR Yakima County Parks & Recreation: David Veley (509) 574-2430	Wide Hollow Creek	Wide Hollow Creek	Waiting	Habitat Restoration	Project includes extensive plantings, grade controls and removal of a berm along Wide Hollow Creek.
SRFB, WDFW	WDFW	Woody Debris Placement	Active	Richard Visser (509) 457-9308	Yakima River, Naches River	Yakima river, Naches river	Various	Habitat Enhancement	Placement of woody debris in the Yakima and Naches rivers.
SRFB, Yakima County Department of Corrections	Yakima County Department of Corrections	Restoration of natural habitat along publicly owned riverbanks, creeks, and tributaries throughout the greater Yakima County area.	Active	Sgt. Karen Kelley (509) 574-2836	Yakima River Basin	Yakima River Basin	Various	Habitat Restoration	Using inmate work crews to replant native vegetation, provide fencing and remove exotic weeds on public and private property along streams.
USBR	USBR,WDFW,YN,Yakima County, BPA, NRCS	Yakima River Basin Water Enhancement Program (YRBWEP)	Active	Jim Esget, Program Manager, 509-575-5848	Yakima River	Yakima River	Various on Yakima River	Water conservation, fishery enhancement	A multi-faceted program intended to, in part, demonstrate water conservation techniques and enhance the fishery of the Yakima River basin by working with State and Federal natural resource agencies and other interested groups.
USBR (Boise)	North Yakima Conservation Dist.	Naches River Re-Vegetation	Active	Michael Tobin (509) 454-5737 mike-tobin@wa.nacdn.net	Naches River	Naches River	1/4 mile downstream of the 16th ave intersection with the freeway.	Re-Vegetation	Re-vegetation of native species around USBR Naches River gauging station facility.
USBR, BPA	Washington Department Fish and Wildlife, North Yakima Conservation District, Department of Ecology, Yakima City Parks	Yakima Basin Environmental Education Training Program Habitat Projects (Wide Hollow Creek/West Valley Schools)	Active	Julie Larsen (509) 575-5848 ext. 253 jlarsen@pn.usbr.gov Jim Esget USBR	Yakima Basin	Wide Hollow Creek Yakima River	various	Primarily education with components of restoration, water quality, supplementation	Students maintain the newly built nature trail, plant and access riparian corridor areas, do water quality testing, and litter clean up at this on-going restoration and salmon release site behind West Valley Junior High and Middle School.
WDOE	USBR,WDFW,YN,Yakima County, BPA, NRCS	Water Rights Purchase Program	Active	Derek Sandison dsan461@ecy.wa.gov	Yakima River	Yakima River	Various on Yakima River	Water conservation, fishery enhancement	Purchase of water rights to support YRBWEPprogram above.
Studies									
BPA	Yakama Nations	Ahtanum Creek Watershed	Active	Dave Lind	Ahtanum Creek	Ahtanum Creek	45.5098, 121.0217 Western and Upstream Terminus: 46.5365.	Assessment	Conduct a watershed assessment in the agricultural portion of the Ahtanum
BPA	WDFW	2000-074-02 Baseline Key Ecological Functions	Complete	Tom O'Neill 541-753-2199 Northwest Habitat Institute	Yakima Basin	Yakima River	Yakima River	Monitoring and Evaluation	M and E based project
BPA	Washington Trout	2000-048-00 Yakima Basin Index of Biotic Integrity	Active	Nick Gayeski (425)788-1167 nick@washingtontrout.org	Yakima Basin	Yakima River Naches river	Naches and Yakima River	Stream Condition Assessment	Develop and refine a multimetric Index of Biotic Integrity (IBI) for assessing anthropogenic impacts on aquatic health in the mid- and upper-Yakima Basin, including the naches River Basin, using benthic macroinvertebrate insects.
BPA	CRITFIC	9105900 Inventory Habitat and Food Abundance Data	Active	Peter Lofee	Yakima River	Upper and Lower River	Various	Study	Determine the impact of increased salmonid production on resident trout population by making an assessment of the competition for food and a measure of food resource partitioning in the Yakima Basin.
BPA	Mobrand Biometrics	9404600 COLUMBIA BASIN ECOSYSTEM MANAGEMENT	Active	Lars E. Mobrand (206)463-5003	Yakima River basin	Yakima River Subbasin	Basin	Modelling	Implement an integrated watershed management framework built upon the complexity and connectivity of salmon life histories and their habitat across the time space grid that defines their range.
BPA	CWU/UM	Yakima River Reaches Study	Complete	Jack Stanford UM Flathead Lake Biological Station or Ublacker: Central Wahsington University	Yakima River	Yakima River	Yakima River	Study	Study and prioritize Yakima River reaches for restoration
BPA	Yakama Nation	1995-063-25 YKFP - Monitoring and Evaluation	Active	Melvin Sampson (509) 865-6262 me@yakama.com	Yakima Basin	Yakima Basin	Basin	Monitoring and Evaluation	Monitors YKFP interns of natural production, harvest, ecological and genetic impacts, guides adaptive management within the project area and provides detailed information on supplementation of the region.
CCWF	North Yakima Conservation District	Tributaries Water Quality Study	Active	Michael Tobin (509) 454-5737 mike-tobin@wa.nacdn.net	Wide Hollow Creek Ahtanum Creek Cowiche Creek	Wide Hollow Creek Ahtanum Creek Cowiche Creek	Various	Water quality study	Field measurement of physical water quality parameters including temperature, conductivity, DO
CCWF SRFB	WDFW,WDNR,YN, USBR,Yakima County, Ecology	Yakima River Floodplain Mining Impact Study	Active	Kelly Clark (509)574-2230 kelly.clark@co.yakima.wa.us	Yakima River basin	Yakima River	Yakiam River floodplain	Gravel pond study	Investigate the potential impacts of floodplain mines along the Yakima River
Department of Ecology, Tri-County Water Resource Agency	Tri-County Water Resource Agency	Yakima River Basin Watershed Management Plan Lower/Upper Yakima & Naches WRIAs 37/38/39 Water Quality - Habitat	Phase III complete December 2002	Greg Schuler (509) 454-3619 (Ecology) or Jim Milton (509) 574-2650 (Tri-County Water Resource Agency)	Yakiam Subbasin	Yakima River Basin	Basin	Planning	The Level 1 Assessment for the habitat component has been completed and accepted by the Planning Unit for incorporation into the Assessment Document for the Yakima Basin. This completes the Phase 2 - Level 1 Assessment, which covers water quantity, water quality and habitat in the basin. The Planning Unit is scheduled to launch into a concerted Phase 3 (Planning) effort starting January 2001.
Northwest Power Planning Council	Various	Salmon and Steelhead Production Plan (Yakima Subbasin Supplemental)	Complete	Bruce Suzumoto (503)222-5161 ext.325 bsuzumoto@nwppc.org	Yakima River basin	Yakima River Basin	Basin	Planning	Habitat protection needs and species specific anadromous fish production plans were developed for spring chinook, summer steelhead, fall chinook, summer chinook, coho, and sockeye. Subbasin Summary is an update of this report.
USDA	Ahtanum TAG	Ahtanum Creek Watershed Assessment	Active	Derek Sandison dsan461@ecy.wa.gov	Ahtanum Creek	Ahtanum	Ahtanum Watershed	Assessment	Assessment will facilitate science-based strategies to restore streamflow to reaches of Ahtanum Creek that dewater annually and thus provide favorable, year-round conditions for all life stages of steelhead, coho, bull trout and other aquatic species. Similar to project 4 below: coordinating with YN to be complementary.
USGS	USGS	Yakima Basin NAWQA	Active	Greg Fuhrer: Project Chief gfuhrer@usgs.gov (503) 251-3231	Yakima River Basin	Yakima River Basin	Multiple Locations	Water quality study	Assess the status and trends in the quality of freshwater streams and aquifers, and provide a sound understanding of the natural and human factors that affect the quality of these resources

TABLE 1
Yakima Urban Area Related Habitat Projects

Funding Agencies	Proponents	Project Title	Status	Contact	Stream/River	Project Area	Project Location	Type of Project	Project Description
USGS & US Bureau of Reclamation	Multiple	Yakima Watershed and River System Management Program (WARSMP)	Active	Randy Parker, (303) 236-4882, ext. 295 rsparker@usgs.gov Terry Fulp, (303) 492-8572 tfulp@cadswes.colorado.edu	Yakima River basin	Yakima River Basin	Yakima River	Water management	A program to aid in basin-scale water and environmental resource management by coupling watershed models that describe the physical hydrologic setting, routing and reservoir management models that account for downstream water use, and reach-specific hydraulic and biogeochemical models conditioned on upstream streamflow
USGS, Yakama Indian Nation, Tri-County Water Resource Agency	Yakama Indian Nation, Tri-County Water Resource Agency	Ground Water in the Yakima River Basin, Washington, and its Relation to the Surface Water Resource	Active	Yakima River Basin Watershed Information Center, h2info@cwu.edu , phone: (509) 963-1190 Tri-County Water Resource Agency, phone: (509) 574-2650 Yakama Indian Nation, Water Resources, yinwater@yakama.com USBR Norbert Ries	Yakima River basin	Yakima River Basin	Basin	Flow Study	Describe the ground-water flow system and its interaction with surface water, and integrate this information into a water-resources management tool—a numerical model.
Washington Conservation Commission	Washington Conservation Commission	Limiting Factors Analysis	Complete	Eric Anderson WDFW ANDEREA@dfw.wa.gov	Yakima River basin	Yakima Subbasin	Basin	LFA	LFA recently completed.
WDFW	WDFW	SASSI	Active	Craig Busack (360) 902-2765 BUSACCSB@dfw.wa.gov	Yakima River basin	Yakima River Basin	Yakima River	Stock Status	A standardized, uniform approach to identifying and monitoring the status of Washington's salmonid fish stocks.
Yakima County	Yakima County	Surface Water Management Assessment	Active	Joel Freudenthal (509) 574 2322 joel.freudenthal@co.yakima.wa.us	Wide Hollow Creek Ahtanum Creek Bachelor Hatton Creek	Wide Hollow Creek Ahtanum Creek Bachelor Hatton Creek	Wide Hollow Creek Ahtanum Creek Bachelor Hatton Creek	Assessment	GPS, channel morphology, and habitat information collection for development of stormwaer management
Department of Transportation	Department of Transportation	Naches River Reaches Study	Active	Gary Beeman (509)577-1750 beemange@wsdot.wa.gov	Naches River	Naches River	Cowiche Creek confluence to mouth of Naches Ri ver	Study	Collection of hydraulic and channel morphology data.
Yakima County	Yakima County	Comprehensive Flood Hazard Management Plan	Active	Joel Freudenthal (509) 574 2322 joel.freudenthal@co.yakima.wa.us	Yakima River/Naches River	Yakima River/Naches River	Yakima River/Naches River	Planning	Development of Yakima River CFHMP and Naches River CFHMP
Organizations Contacted With No Current Projects									
	Audobon Society	No Projects Identified		Leslie Wahl (509)452-9183 rewahl@televar.com					
	Mule Deer Foundation	No Projects Identified		George Justice (509)697-3122 or Ron Knapp (360) 856-2188					
	Pheasants Forever	No Projects Identified		Bob Graf (509)697-8167					
	Wild Turkey Federation	No Projects Identified		Dan McKinney (509)965-1971					
	Rocky Mountain Elk Foundation	No Projects Identified		Jerry Perryman (509)698-4210					
	Washington DNR	No Projects Identified		Steve Wezel (509)925-8510					
	NMFS (NOAA Restoration Center)	No Projects Identified		Perry Gayaldo Perry.Gayaldo@noaa.gov					

4.0 PROJECT COORDINATION

A critical component of the entire Habitat Improvement Project is the ongoing coordination of protection and restoration activities amongst local entities in the project area. The City of Yakima intends to coordinate closely with other ongoing efforts to avoid duplication and enhance the effectiveness of all projects in the Yakima Urban Growth Area. The City has formed a Technical Working Group (TWG) that meets regularly to assure communications amongst all of the entities involved in similar projects. Membership to the TWG is open, and the City encourages participation of all entities involved in related projects in and adjacent to the project area.

4.1 Current Efforts

4.1.1 TWG

Master Plan development and the habitat acquisition prioritization process were completed with the input and review of a TWG. This TWG is comprised of experts from federal, state, tribal and local agencies and private organizations active in aquatic habitat, salmonid and planning issues within the Yakima Urban Growth Area. Members of the TWG are listed in Table 2.

TABLE 2
TWG Members

ORGANIZATION TYPE	REPRESENTATIVE	AGENCY
Federal Agencies	Steve Croci	U.S. Fish and Wildlife Service
	Kale Gullett	National Marine Fisheries Service
	Jim Esget	US Bureau of Reclamation
	Jeff Graham	US Bureau of Reclamation
	Jessica Wilcox	Bonneville Power Administration, Fish and Wildlife
	Dave Myra	Natural Resource Conservation Service
	Bill Gillespie	Natural Resource Conservation Service
Tribes	Scott Nicolai	Yakama Nation YKFP
Irrigation	Rick Deiker	Yakima-Tieton Irrigation District
	Patrick Monk	Ahtanum Irrigation District
	George Marshall	Ahtanum Irrigation District
	Dave Garrettson	Naches-Cowiche Canal Company
Local Agencies	Dueane Ca lvin	City of Yakima
	Joel Freudenthal	Yakima County Surface Water Management
	Kelly Clark	Yakima County Planning Dept.
	Mike Tobin	North Yakima Conservation District
	David Nunn	North Yakima Conservation District
	Bill Rathbone	City of Union Gap
	Lis a Pelly	Washington Water Trust
	Yolanka Wulff	Washington Water Trust
	Betsy Bloomfield	The Nature Conservancy
	Julie Morgan	Yakima County Planning Dept.
	Al Brown	Yakima Greenway Foundation
State Agencies	Richard Visser	Department of Fish & Wildlife
	Gary Beeman	Washington State Department of Transportation
	Derek Sandison	Washington Department of Ecology

Input from the TWG was obtained at meetings held in Yakima in September and November 2002, and January and March 2003.

A TWG subgroup was formed to provide input and review on final selection of parcels for habitat acquisition. The subgroup performed a formal review of highly ranked parcels, and met in March 2003 to provide input that finalized the parcel selection list. This subgroup consisted of representatives from the Bureau of Reclamation, Washington Department of Fish and Wildlife, Yakima County, and the Yakama Nation.

4.2 Future Recommendations

Given the on-going nature of this habitat acquisition Master Planning effort, and its linkage to other efforts in the area, it is critical that project coordination efforts continue throughout implementation of the Master Plan. As described in Section 3.0, there are multiple complementary habitat efforts currently ongoing in the Yakima Urban Area, and without continued coordination amongst these efforts, it will be difficult to avoid duplication of work efforts and to identify connectivity among projects.

It is therefore a recommendation of this plan that the TWG that was developed to support and review development of this Master Plan continue to play an active role in the ongoing efforts. Since planning for these types of actions and activities within the urban area should be a locally driven process, the coordination of the TWG should continue to be overseen by a local entity, such as the City of Yakima.

It is further recommended that as the effort continues, the TWG should maintain its schedule of quarterly meetings. These meetings could be used to provide updates and discuss land acquisition schedule; parcels selected for acquisition during that quarter; ownership and stewardship issues for individual parcels; status or findings of related projects that could alter or affect scheduled acquisition efforts; and opportunities for collaborative funding initiatives.

Meetings between personnel involved in the City of Yakima's Habitat Improvement Project and the Bureau of Reclamation's Yakima River Basin Water Enhancement Project should continue as the project is implemented. Coordination of these two major undertakings is critical to the success of fish and wildlife habitat acquisition efforts within the Yakima Urban Growth Area.

Stream survey efforts are currently ongoing on all the tributaries in the Yakima Urban Area. These efforts and the agencies responsible are outlined in Table 3. Continued coordination of these efforts is critical in reducing work duplication and maximizing data transfer. This effort is currently coordinated by the Washington Department of Fish and Wildlife and should continue. Quarterly TWG meetings could be used for information transfer on this topic.

TABLE 3

Current Stream Survey Activities by Agency

TRIBUTARY	STREAM SURVEY TYPE	AGENCY/ORGANIZATION
Ahtanum Creek	SSHEAR, PFC, Riparian Inventory, Vegetation Classification, Channel Cross-sections	Washington Department of Fish and Wildlife (Screen Shop); Yakima County, Yakama Nation; Golder Associates (for Washington Department of Ecology)
Wide Hollow Creek	TFW Habitat Inventory, Channel Cross-sections; SSHEAR	Yakima County; North Yakima Conservation District
Bachelor Creek	Channel Cross-sections; Canopy Cover; SSHEAR	Yakima County, North Yakima Conservation District
Hatton Creek	Channel Cross-sections; Canopy Cover	Yakima County
Cowiche Creek	SSHEAR	North Yakima Conservation District

5.0 APPROACH FOR YAKIMA RIVER PARCELS

As stated earlier in the plan, the goal of the Yakima Habitat Improvement Project is to maintain, preserve and restore functioning fish and wildlife habitat within the Yakima Urban Growth Area over the long term. Although fish and wildlife habitat within the Yakima Urban Growth Area includes the Yakima River, the primary focus of this project is the fish and wildlife habitat associated with the tributaries to the Yakima River. There are two primary reasons for this focus:

1. Well-developed land acquisition efforts (through the Yakima River Basin Water Enhancement Project (YRBWEP) and the Yakama Nation activities on Selah floodplain) are already underway on the Yakima River within the Urban Growth Area; and
2. The majority of significant habitat parcels on the Yakima River are currently in public or private conservation ownership as a result of previous or ongoing acquisition efforts.

Through YRBWEP, the US Bureau of Reclamation (BOR) and associated agencies are currently pursuing water conservation and land acquisition on the Yakima River. The Yakima River Basin Water Enhancement Project Act of 1994 authorizes activities to reduce water diversions by improving conveyance and distribution systems and on farm irrigation facilities and by changing water operations and management. To meet the goals of this program, the BOR has purchased land within the Union Gap reach of the City of Yakima. The Yakama Nation is also involved in habitat acquisition efforts within the Selah floodplain of the Yakima River.

Although successful in their acquisition efforts thus far, the YRBWEP effort by the BOR is limited in part by constraints associated with the project's funding requirements for acquisition. For example, the project cannot fund purchase of properties outside of levees, or parcels that are no longer connected to the present floodplain (although historically such property may have been located within the flood plain). These limitations may preclude YRBWEP acquisition of one or more key properties that would enable full reconnection of acquired habitats to the floodplain and the Yakima River itself. Furthermore, there are other critical, related projects beyond simple land acquisition that would augment current Yakima River rehabilitation efforts under YRBWEP. It is these key properties and projects that the Yakima Habitat Improvement Project can address on the Mainstem Yakima River in partnership with the BOR and other involved entities.

In order to assist the BOR and the Yakima Nation in identifying additional key fish and wildlife habitat for acquisition, this project included an assessment of riparian habitat on the Yakima River, as described in Section 6.0 of this plan. The results of the Yakima River portion of the prioritization model are being shared with the YRBWEP program and the Yakama Nation to assist in their acquisition efforts.

Overall, the role of the City of Yakima in habitat acquisition efforts on the Yakima River differs from that outlined in the tributary habitat acquisition strategy. It is recommended that the City of Yakima maintain a supporting role to the ongoing YRBWEP acquisition efforts on the Yakima River in the Urban Growth Area. Lead organizations working on parcel acquisition along the Yakima River in the Urban Growth Area currently include the US Bureau of Reclamation, Yakama Nation, state and local agencies, and conservation and irrigation districts.

The YRBWEP project provides a solid coordinating entity for acquisition of lands on the Yakima River. The City of Yakima Habitat Improvement Project can best support this effort by being involved as an active partner if and when the City's participation would benefit the project and complement YRBWEP's efforts in reconnecting parcels to the River and floodplain.

Yakima Habitat Improvement project monies could be used to purchase properties in the historic floodplain that are outside of the scope of the YRBWEP. As well, the Yakima Habitat Improvement Project could provide support for reconnecting the floodplain by identifying and partnering on other critical related floodplain and habitat projects along the Yakima River corridor.

6.0 PROJECT PRIORITIZATION APPROACH FOR TRIBUTARY HABITAT

The prioritization approach used to identify optimal fish and wildlife habitat parcels for acquisition included two phases. In Phase I of the prioritization process, a Geographic Information System (GIS)-based model was created to analyze and rank parcels based on a prescribed set of fish and wildlife habitat criteria represented by a series of GIS coverages or layers. In Phase II, a subgroup of the TWG reviewed and rated the high-ranking parcels derived from the Phase I model based on consideration of additional variables (e.g., water quality, historic floodplain, proximity to other projects, etc).

6.1 Phase I Prioritization Overview

Phase I of the prioritization process included the implementation of a GIS-based analysis that ranked approximately 40,000 parcels within the Yakima Urban Growth area based on habitat-related criteria for the purpose of acquisition. The analysis was used to combine multiple physical and biological characteristics, attribute them to each individual parcel and rank the parcels based on scores assigned to each characteristic. (Figure 4 presents a conceptual model of the GIS-based analysis used to attribute biological and physical criteria to individual parcels and subsequently rank them. Figure 5 shows the ranking criteria and associated GIS data layers used in the ranking process).

The ESRI ArcView extension Modelbuilder was used to integrate the individual characteristics and score the parcels. The end result of the analysis was a list of all parcels within the Urban Growth Area ranked by cumulative habitat score. Parcels were grouped by percentiles (e.g. 80 to 90%) for display and mapping purposes. The details of the approach are described below.

6.1.1 GIS data development

Implementation of Phase I of the project selection process involved collection, assembly and creation of a series of GIS data layers. Requests for available GIS coverages were made to all federal, state, tribal, and local entities known to be working within the Yakima Urban Growth Area. The GIS coverages obtained are listed in Appendix A.

In addition to the GIS layers collected from other sources, Golder Associates created several project specific GIS data layers. GIS layers created for use in this project include riparian buffers, habitat priority areas, proximity of each parcel to a stream or river, and stream length contained by each parcel.

A total of 14 GIS coverages were used to depict the Phase I criteria in the GIS ranking of parcels for habitat acquisition potential. The individual coverages used and their source data are presented in Table 4. Each of these coverages was individually attributed to each of the approximately 40,000 parcels within the Yakima Urban Growth area prior to analysis. A final representation of each of the coverages as they were utilized in the GIS-based analysis is presented in Figures 5-17.

TABLE 4
GIS Layers Used in Phase I Analysis

DATA TYPE	DATA SOURCE ^a
Endangered and Threatened Species	WRIA 37-39 LFA, WDFW Bull Trout
100 Year Flood Plain	Yakima County, FEMA
Land Use	City of Yakima, Assessors Data Base by parcel
Coho Life Stages	WRIA 37-39 LFA
Fall Chinook Life Stages	WRIA 37-39 LFA
Spring Chinook Life Stages	WRIA 37-39 LFA
Steelhead Life Stages	WRIA 37-39 LFA
Number of Species	WRIA 37-39 LFA, WDFW Resident Fish Species
Wetlands	NWI, National Wetlands Inventory Data
Priority Areas	Golder Associates
Proximity Areas	Golder Associates
Parcels containing Riparian Area not adjacent to or containing streams	Golder Associates
Parcels containing Riparian Area adjacent to or containing streams	Golder Associates
Stream length per parcel	Golder Associates

^aGIS Coverages of fish distribution obtained from both WDFW and the WRIA 37-39 Limiting Factors Analysis (WCC 2001) were reviewed for incorporation into the project prioritization model. Based on input from TWG members, and Golder's review and comparison of coverages, the LFA coverage was selected for use for all salmonid species. Because the LFA coverage is not available for bull trout and other species of trout (rainbow, brook, etc.), the WDFW coverage was utilized for these species.

6.1.2 Phase I project prioritization criteria

Based on a review of all available GIS coverages, a list of physical and biological criteria for parcel ranking were developed. These criteria were selected based on their relationship to habitat condition and the availability of a GIS coverage to represent them over the entire project area. Draft Phase I criteria were reviewed and critiqued in a TWG meeting in November 2002. Based on input received from the TWG, the criteria were revised and a final list of Phase I criteria was developed. The criteria selected for Phase I of the project prioritization process included:

Physical Criteria

- Priority Area Location
- Stream Length
- Land Use
- Proximity to Stream

Biological Criteria

- Endangered or Threatened Species
- Number of Salmonid Species
- Steelhead Life Stages
- Spring Chinook Life Stages
- Fall Chinook Life Stages
- Coho Life Stages

- Bull Trout Life Stages
- Wetlands
- Riparian Buffer Width
- Falls within 100 year floodplain

6.1.3 Project criteria scoring

In order to quantitatively rate each parcel based on Phase I criteria, the frequency distribution of each of the individual parameters over the total number of parcels was evaluated to determine the quantitative scoring of individual prioritization criteria. Each parameter was given equal weight within the scoring process with a potential maximum score of 8 and a potential minimum score of 0. As there were more biological criteria than physical criteria, biological criteria rated more heavily in the process. Table 5 shows the scores assigned to each of the criteria.

The parcels were then loaded into the ESRI ArcView Model Builder extension software. In ModelBuilder, the 14 GIS shapefiles were converted into model grids with identical cell sizes. The ArcView ModelBuilder extension was used to summarize and average the values of the 14 model grids (each depicting a specific habitat characteristic) among the individual parcels. A detailed process summary of the GIS analysis for Phase I of the project prioritization is provided in Figures 4 and 5.

6.1.4 Quality Assurance/Quality Control

GIS data analysis was reviewed to determine if the model output coincided with the inputs of the various individual GIS coverages. Individual parcels were randomly and systematically queried. Any inconsistencies in the data outputs were reviewed and model inputs were corrected as needed.

6.1.5 Sample Parcel Analysis

An example of how an individual parcel (Parcel number 16) was scored in the GIS analysis is provided. In the preliminary step of the prioritization process, the GIS system provided a score for the parcel for each of the biological and physical criteria. Parcel 16 received the following scores for each of the criteria:

Priority Area: The parcel was located in a designated priority area and received the maximum possible score of **8 out of 8** for this category.

Stream Length: The stream length associated with this parcel ranged from 228-695 feet thus it received a score of **6 out of 8** for this category.

Land Use: This parcel had a designated land use of Vacant Land (a favorable land use for acquisition). As a result the parcel score the maximum score of **8 out of 8** for this category.

Proximity to Stream: This parcel was adjacent to the stream and therefore received a maximum potential score of **8 out of 8** for this category.

Endangered or Threatened Species: The parcel “contained” one endangered species (steelhead) and thus received a score of **4 out of 8** for this category.

TABLE 5
Scoring Criteria for Phase I Prioritization

PARAMETER	SCORING CRITERIA	SCORE
Physical Criteria		
<i>Priority Area Location</i>	Parcel is located within a delineated habitat acquisition priority area	8
	Parcel is not located within a delineated habitat acquisition priority area	0
<i>Stream Length</i>	> 695 feet	8
	228 - 695 feet	6
	1- 228 feet	2
	no stream length present	0
<i>Land Use</i>	Parcel contains vacant land, undeveloped, agricultural, etc uses	8
	Parcel contains commercial, industrial, residential, etc uses	0
<i>Proximity to Stream</i>	Parcel contains or is adjacent to stream or river	8
	Parcel is within ¼ mile of stream or river	4
	Parcel is >1/4 mile from stream or river	0
Biological Criteria		
<i>Endangered or Threatened Species</i>	2 threatened species known to be present	8
	1 threatened species known to be present	4
	0 endangered or threatened species known to be present	0
<i>Number of Salmonid Species (Existing and Potential)</i>	>6 salmonid species or races	8
	4-5 salmonid species or races	6
	1-3 salmonid species or races	4
	0 salmonid species or races	0
<i>Steelhead Life Stages</i>	Spawning and rearing both	2
	Spawning or rearing only	1
	Neither spawning nor rearing	0
<i>Spring Chinook Life Stages</i>	Spawning and rearing both	2
	Spawning or rearing only	1
	Neither spawning nor rearing	0
<i>Fall Chinook Life Stages</i>	Spawning and rearing both	2
	Spawning or rearing only	1
	Neither spawning nor rearing	0
<i>Coho Life Stages</i>	Spawning and rearing both	2
	Spawning or rearing only	1
	Neither spawning nor rearing	0
<i>Wetlands</i>	Wetlands present	8
	Wetlands not present	0
<i>Riparian Buffer Width</i>	> 83 feet	8
	37-83 feet	6
	1-37 feet	4
	Riparian area present, but parcel not adjacent to stream	2
	0	0
<i>Falls within 100 year floodplain</i>	Majority of parcel falls within the floodway	8
	Majority of parcel falls within the 100 year floodplain	4
	Majority of parcel does not fall within the 100 year floodplain or floodway	0
<i>Total Possible Score</i>		80

Number of Salmonid Species: This parcel contained 4-5 salmonid species and thus scored **6 out of 8** for this category.

Steelhead Life Stages: The parcel contained both spawning and rearing habitat for steelhead and thus scored **2 out of 2** for this category.

Spring Chinook Life Stages: The parcel contained only rearing habitat for spring chinook and thus scored **1 out of 2** for this category.

Fall Chinook Life Stages: The parcel contained neither spawning nor rearing habitat for spring chinook and thus scored **0 out of 2** for this category.

Coho Life Stages: The parcel contained both spawning and rearing habitat for coho and thus scored **2 out of 2** for this category.

Wetlands: The parcel contained a wetland and thus received a score of **8 out of 8** for this criteria.

Riparian Buffer Width: The riparian buffer on this parcel had an average width > 83 feet. It received **8 out of 8** points for this criteria.

Floodplain: The majority of this parcel fell within the floodway. The parcel received a score of **8 out of 8** for this criteria.

The individual criteria scores were for Parcel 16 were summed to provide a total score of 69 points. The maximum score achievable, based on Phase I criteria, is 80 points. As a result, Parcel 16 received a final rating of 86 %.

6.2 Phase I Results

Each parcel received a cumulative score and a percentage rating of the maximum total score achievable. Figure 18 depicts the final Phase I results based on parcel percentage ranking for individual parcels along the Naches River, and Cowiche, Wide Hollow, Bachelor, Hatton, Spring, and Ahtanum Creeks. The Yakima River was not included in this analysis.

Of particular note in the analysis was the overall low score of parcels located on Wide Hollow Creek. Parcels on Wide Hollow Creek received lower overall scores than those of other tributaries. There were several reasons for this. Fish blockage at the downstream end of Wide Hollow Creek restricts passage of juvenile salmonids. This resulted in Wide Hollow having a lower fish presence score, fish life stages score, and overall number of salmonids score. In addition, riparian buffers on Wide Hollow were generally narrower than those of other tributaries and thus resulted in a lower score for this criteria.

Overall, parcels that received a final score of 80 % or higher of the maximum possible score were included in the Phase II evaluation. A total of 33 parcels received a ranking of 80 % or higher in the Phase I process. The 33 high ranking parcels and their associated information are presented in Table 6.

TABLE 6
Phase I Prioritization Results

Phase I Rank and Parcel ID	Acres	Tributary	Score
1	14.5000	Naches	97%
2	20.2300	Naches	95%
3	7.4600	Naches	95%
4	9.620	Naches	95%
5	23.1600	Naches	95%
6	15.6000	Cowiche/Naches	95%
7	30.0600	Naches	95%
8	5.700	Naches	94%
9	16.3800	Naches	92%
10	4.4000	Cowiche/Naches	92%
11	0.6500	Naches	91%
12	9.0300	Naches	90%
13	13.0500	Ahtanum	89%
14	7.2500	Ahtanum	89%
15	0.3900	Naches	87%
16	16.9500	Ahtanum	86%
17	5.400	Ahtanum	86%
18	9.9100	Ahtanum	86%
19	26.5100	Ahtanum	86%
20	52.4500	Ahtanum	84%
21	13.1700	Wide Hollow	82%
22	4.7400	Ahtanum	81%
23	5.9100	Cowiche/Naches	81%
24	68.8500	Wide Hollow	80%
25	25.9200	Naches	80%
26	5.2400	Ahtanum	80%
27	365.080	Naches	80%
28	41.3800	Ahtanum	80%
29	68.5300	Ahtanum	80%
30	22.8800	Ahtanum	80%
31	36.2700	Ahtanum	80%
32	5.5900	Ahtanum	80%
33	17.9400	Ahtanum	80%

6.3 Phase II Prioritization

6.3.1 Phase II Criteria

The 33 highest ranking parcels from the Phase I prioritization were forwarded on to Phase II for final prioritization.

In Phase I of the process, the TWG developed a draft list of prioritization criteria that would be useful in rating parcels for habitat acquisition but for which no available GIS coverage existed or could be

easily employed. These criteria were considered in the review of parcels to be completed in the Phase II process. This Phase II list of criteria was reviewed and critiqued by TWG members during a November 2002 meeting. The Phase II criteria were revised based on comments from the TWG and include:

- Water Rights
- Connectivity
- Documented Instream Flow/WQ issues
- Fish Barriers
- Historical Floodplain
- Potential Water Quality Improvements
- Expert Review
- Potential Partnerships
- Landowner Willingness to Sell
- Funding

6.3.2 Phase II expert review

In February 2003, five habitat and planning representatives, comprised of a subgroup of TWG members, provided review of the 33 high-ranking parcels. This group included representatives of the US Bureau of Reclamation (Jeff Graham), Washington Department of Fish and Wildlife (Richard Visser), the Yakama Nation (Scott Nicolai), and Yakima County (Kelly Clark, Joel Freudenthal, and Julie Morgan). Phase II project prioritization criteria as well as their own institutional knowledge of the Yakima Urban Growth Area were considered in the review. The group rated the 33 parcels as:

- Yes/No parcel for acquisition and
- If Yes, then whether they ranked as High, Medium or Low priority for acquisition.

In an initial review of the 33 high ranking parcels, the TWG felt that the most important properties for acquisition were agricultural and/or vacant lands on Ahtanum Creek threatened by development, as well as those properties at the confluence of Cowiche Creek and the Naches River. This initial ranking by the TWG shifted some of the focus of the Phase I prioritization results away from the Naches River and towards Ahtanum Creek.

The development potential of specific parcels was also investigated to determine if there was immediate threat, thus affecting the priority area ranking and subsequent timing of acquisition. Most properties were noted as having some potential for development based on current zoning. Properties zoned as Valley Rural had a higher potential for development than those listed as Agricultural. It was also noted how access, critical areas, and floodplain regulations would affect the manner in which all of these properties could be divided. These issues were considered in the final Phase II ranking of parcels.

6.4 **Phase II Prioritization Results**

The initial review of the 33 properties by the TWG subgroup also omitted three parcels from further consideration.

- Parcel number 11: This parcel was deemed inappropriate for acquisition because of its location in the channel area of the Naches River.

- Parcel number 19: This parcel was already owned by the City of Union Gap and managed and protected as a mitigation site for the Valley Mall Blvd expansion project. Stream restoration and habitat improvement activities have already been conducted on this parcel.
- Parcel 24: This parcel has been developed as part of the Ahtanum Ridge Business Park and is no longer suitable for acquisition.

In March 2003, the TWG prioritization subgroup met to review the final rankings of parcels. In their final review of the remaining 30 properties, the TWG omitted five additional properties that occurred as high ridge properties that border the Naches River to the north.

A final list of 25 properties were accepted as having the greatest need for habitat protection/acquisition. These parcels are described in more detail in Section 7.0.

6.5 Phase II Recommendations

On the final list of 25 parcels, the TWG agreed that 15 of the 25 parcels were of extremely high priority for fish and wildlife habitat protection and had a high degree or potential of connectivity. The TWG decided that these parcels should be grouped into priority areas. The 15 parcels were grouped into 4 priority areas (A, B, C, and D), as depicted in Figure 19. These four priority groups of parcels were highly recommended for acquisition projects for the protection of fish and wildlife habitat in and around the Yakima UGA, and should be pursued immediately upon the availability of necessary funds.

The remaining ten parcels were rated as either medium or low priority for acquisition and were recommended for individual purchase after priority area parcels have been acquired. Parcels that were ranked low were considered important for acquisition only because the assessed cost of acquisition of these parcels per acre was very favorable.

7.0 PROPERTIES IDENTIFIED FOR HABITAT ACQUISITION ON TRIBUTARIES

7.1 Recommendations for Acquisition

The Phase I and Phase II habitat acquisition prioritization process, as described in Section 6.0, identified 25 properties considered as having important fish and wildlife value for habitat acquisition in the Yakima Urban Area. Acquisition and protection of these properties will prevent subdivision and subsequent development, reduce further degradation such as removal of riparian habitat, and maintain or enhance the long term condition of aquatic habitat. By placing these properties in long term protection, the threat of impacts from development from continued growth in the urban area will be significantly reduced.

Table 7 provides the characteristics of these highly ranked properties including the assessed value of property and improvements for each parcel, associated water body, and potential partnerships for owning and managing the land. These privately-owned properties were all ranked high (80 % or higher habitat score) during the Phase I scoring. A sub-committee of the Technical working Group for this project also rated the properties as important to acquire during the Phase II evaluation. Acquiring these twenty-five properties would protect approximately 438 acres of fish and wildlife habitat adjacent to Athanum, Cowiche, Bachelor and Wide Hollow Creeks. These 25 properties are all recommended by this plan for habitat acquisition as part of the Yakima Habitat Improvement Project.

7.2 High Priority Parcels

The fifteen highest-ranking parcels, of the 25 top parcels identified were considered high priority for protection of fish and wildlife habitat. These parcels were subsequently grouped into four priority acquisition areas (A, B, C, and D) as shown in Figure 19. Protection of the habitat associated with these fifteen parcels addresses several RPAs and components of the NPPC's Fish and Wildlife Plan. Several of the parcels with current agricultural land use could meet an additional RPA associated with the potential of implementing CREP (Conservation Reserve Enhancement Program) on these lands. CREP is a USDA program that provides funds for the protection of riparian buffers on agricultural lands.

Table 8 provides a list of these 15 high priority parcels, their ranking, what RPA's they would meet if purchased and what components of the NPPC's fish and wildlife plan they would meet.

7.3 Schedule for Acquisition

A schedule for acquisition of the 25 properties was developed and approved by the TWG (Table 9). The proposed acquisition order recognizes the outstanding character of fish and wildlife habitat and apparent connectivity benefits among the 15 highest-ranking parcels. Priority area properties are considered to have the highest need for immediate acquisition and preservation and are recommended for acquisition as a group.

The remaining ten properties were grouped as medium and low priority within the acquisition order and are recommended for acquisition on an individual basis. These parcels have been identified as having important fish and wildlife habitat, but should be acquired and protected in later years of the program as funding allows or as ideal opportunities arise.

TABLE 7
Final List of Properties for Acquisition

Parcel HIP Identi- fication #	Priority Area	Associated Waterbody	Area (acres)	Assessed Land Value	Assessed Improvement Value	Potential Ownership and Management Partnerships
20	A	Ahtanum Creek	52.45	\$83,050.00	None	City of Yakima/City of Union Gap
32	A	Ahtanum Creek	5.59	\$5,600.00	None	City of Yakima/City of Union Gap
13	B	Ahtanum Creek	13.05	\$33,800.00	\$500.00	City of Yakima/City of Union Gap/Yakima County
14	B	Ahtanum Creek	7.25	\$16,450.00	None	City of Yakima/City of Union Gap/Yakima County
16	B	Ahtanum Creek	16.95	\$80,500.00	None	City of Yakima/City of Union Gap/Yakima County
17	B	Ahtanum Creek	5.4	\$10,250.00	None	City of Yakima/City of Union Gap/Yakima County
18	B	Ahtanum Creek	9.91	\$63,300.00	None	City of Yakima/City of Union Gap/Yakima County
22	B	Ahtanum Creek	4.74	\$19,600.00	None	City of Yakima/City of Union Gap/Yakima County
6	C	Naches River/Cowiche Creek	15.6	\$27,000.00	\$36,000.00	City of Yakima/Cowiche Canyon Conservancy/NYCD
10	C	Naches River/Cowiche Creek	4.4	\$19,800.00	None	City of Yakima/Cowiche Canyon Conservancy/NYCD
23	C	Naches River/Cowiche Creek	5.91	\$20,350.00	\$22,300.00	City of Yakima/Cowiche Canyon Conservancy/NYCD
28	D	Ahtanum Creek	41.38	\$122,800.00	\$37,300.00	City of Yakima/USFWS/Yakima County
29	D	Ahtanum Creek	68.53	\$175,000.00	\$47,900.00	City of Yakima/USFWS/Yakima County
30	D	Ahtanum Creek	22.88	\$54,900.00	None	City of Yakima/USFWS/Yakima County
33	D	Ahtanum Creek	17.94	\$38,250.00	None	City of Yakima/USFWS/Yakima County
21	NA	Wide Hollow Creek	13.17	\$20,300.00	None	City of Yakima/City of Union Gap
12	NA	Naches River	9.03	\$3,600.00	None	City of Yakima/North Yakima Conservation District
9	NA	Naches River	16.38	\$16,850.00	None	City of Yakima/North Yakima Conservation District
4	NA	Naches River	9.62	\$3,700.00	None	City of Yakima/North Yakima Conservation District
5	NA	Naches River	23.16	\$38,200.00	\$45,500.00	City of Yakima/North Yakima Conservation District
26	NA	Ahtanum Creek	5.24	\$43,200.00	\$7,000.00	City of Yakima/City of Union Gap/Yakima County
31	NA	Ahtanum Creek	36.27	\$100,650.00	\$69,400.00	City of Yakima/City of Union Gap/Yakima County
2	NA	Naches River	20.23	\$2,250.00	None	City of Yakima/North Yakima Conservation District
3	NA	Naches River	7.46	\$350.00	None	City of Yakima/North Yakima Conservation District
8	NA	Naches River	5.7	\$250.00	None	City of Yakima/North Yakima Conservation District
Total			438.24	\$1,000,000.00	\$265,900.00	

TABLE 8

Priority Parcels and Associated Reasonable and Prudent Alternatives

Map #	Rank	Priority Area	Acres	Land Use	Threatened Species Present	Steelhead Spawning and Rearing	Applicable RPAs
20	1	A	43.10	Current Use Agricultural	Steelhead	Contains both	150;152;153
32	2	A	2.66	Current Use Agricultural	Steelhead	Contains both	150;152;153
13	3	B	9.66	Agricultural Not Current Use	Steelhead	Contains both	150;152
14	4	B	6.30	Vacant Land	Steelhead	Contains both	150;152
16	5	B	15.40	Vacant Land	Steelhead	Contains both	150;152
17	6	B	4.70	Agricultural Not Current Use	Steelhead	Contains both	150;152
18	7	B	9.30	Vacant Land	Steelhead	Contains both	150;152
22	8	B	4.50	Current Use Agricultural	Steelhead	Contains both	150;152;153
6	9	C	13.50	Current Use Agricultural	Steelhead; bull trout	Contains both	150;152;153
10	10	C	11.33	Current Use Agricultural	Steelhead; bull trout	Contains both	150;152;153
23	11	C	12.75	Current Use Agricultural	Steelhead	Contains both	150;152;153
28	12	D	44.11	Agricultural Not Current Use	Steelhead	Contains both	150;152
29	13	D	69.00	Agricultural Not Current Use	Steelhead	Contains both	150;152
30	14	D	21.96	Agricultural Not Current Use	Steelhead	Contains both	150;152
33	15	D	15.30	Agricultural Not Current Use	Steelhead	Contains both	150;152

TABLE 9
Parcel Acquisition Schedule

Schedule for Acquisition	Parcel HIP Identification #	Priority Area	Area (acres)	Assessed Land Value	Assessed Improvement Value
Years 1 and 2	20	A	52.45	\$83,050.00	None
Years 1 and 2	32	A	5.59	\$5,600.00	None
Years 1 and 2	13	B	13.05	\$33,800.00	\$500.00
Years 1 and 2	14	B	7.25	\$16,450.00	None
Years 1 and 2	16	B	16.95	\$80,500.00	None
Years 1 and 2	17	B	5.4	\$10,250.00	None
Years 1 and 2	18	B	9.91	\$63,300.00	None
Years 1 and 2	22	B	4.74	\$19,600.00	None
Years 1 and 2	6	C	15.6	\$27,000.00	\$36,000.00
Years 1 and 2	10	C	4.4	\$19,800.00	None
Years 1 and 2	23	C	5.91	\$20,350.00	\$22,300.00
Years 1 and 2	28	D	41.38	\$122,800.00	\$37,300.00
Years 1 and 2	29	D	68.53	\$175,000.00	\$47,900.00
Years 1 and 2	30	D	22.88	\$54,900.00	None
Years 1 and 2	33	D	17.94	\$38,250.00	None
Years 1 and 2 Totals	15 parcels		291.98	\$770,650.00	\$144,000.00
Year 3	21	NA	13.17	\$20,300.00	None
Year 3	12	NA	9.03	\$3,600.00	None
Year 3	9	NA	16.38	\$16,850.00	None
Year 3	4	NA	9.62	\$3,700.00	None
Year 3	5	NA	23.16	\$38,200.00	\$45,500.00
Year 3	26	NA	5.24	\$43,200.00	\$7,000.00
Year 3	31	NA	36.27	\$100,650.00	\$69,400.00
Year 3 Totals	7 parcels		112.87	\$226,500.00	\$121,900.00
Year 4	2	NA	20.23	\$2,250.00	None
Year 4	3	NA	7.46	\$350.00	None
Year 4	8	NA	5.7	\$250.00	None
Year 4 Totals	3 parcels		33.39	\$2,850.00	\$0.00
Sum of Years 1-4	25 parcels		438.24	\$1,000,000.00	\$265,900.00

8.0 STRATEGY FOR ACQUISITION OF TRIBUTARY HABITAT

8.1 Overall Approach

High priority parcels that have been identified as habitat acquisition projects are listed in Section 7.0 of this plan. However, to be successful, habitat acquisition planning in the Yakima Urban Area should be an ongoing process. Each year, land acquisition priorities will be re-evaluated as new information is gathered and funding becomes available. New information may include water rights, barrier removal, updated fish distribution data, knowledge of interested and willing sellers, new and increased development pressures, land rezoning, or placement of land on the public real estate market. Questions to address on an annual basis include:

- Have updated fish distribution data increased the fish habitat value of the property?
- Is the property in imminent danger of rezoning or development?
- Are there multiple partnership interests in the project?
- Are there any potential funding sources independent of BPA funding available?
- Have fish passage barriers been removed such that additional critical habitat is identified for acquisition?
- Are water rights available with property purchase?

If new information indicates that a property not originally identified in Section 6.0 of this Master Plan should be given a higher priority for acquisition, the property will be reviewed by the project sponsor. The new property will be brought before the TWG for review and consideration before a purchase decision is made. Yakima City Council has the final ability to approve or reject any acquisitions to be held in title by the City of Yakima.

8.2 Land Ownership

Land acquired for the purposes of habitat conservation as described under this Master Plan could be held in title by the City of Yakima, as the project sponsor, upon completion of the purchase. In certain instances, a different entity may be more appropriate to hold ultimate title to the land. This may occur in many cases where the land is adjacent to or in continuity with land owned by another entity for habitat conservation purposes. It may also occur as a result of a particular property being in more direct relationship to the habitat conservation goals of another entity. In these instances, the property title could be transferred from the City of Yakima to the other entity upon completion of purchase or may be directly titled to the other entity from the current landowner. The manner by which these alternate ownerships will occur will be detailed in an intergovernmental agreement provided with the land acquisition proposal to BPA.

In addition to BPA, the City will seek partnership, potentially with other agency or non-profit organizations, to address long-term management for each acquisition. Ultimate management and stewardship activities for acquired lands are detailed in Section 9.0 of this plan.

8.3 Identification of Landowners for Property Acquisition

Sellers will be identified by several means:

- All landowners owning land identified in final parcel selection as described in Section 7.0 will be contacted by mail and phone by the City of Yakima to determine their interest in selling land.
- The City staff, or its consultants, will follow real estate market trends to identify additional sites that may become available as the land acquisition process continues.
- As public outreach on the project continues and more landowners become aware of the program, the City will review sale proposals provided by interested landowners.

8.4 Overview of Land Acquisition Process

BPA's Realty Office will perform the initial steps in the formal acquisition of lands for habitat conservation. These steps include MOAs with the project sponsor, appraisals, hazardous materials surveys, land audits, a cultural resource survey, and SEPA/NEPA compliance. In assisting a project sponsor in the land acquisition process, BPA completes several steps. The components of this process are outlined in the Overview of BPA Land Acquisition Process on the following page.

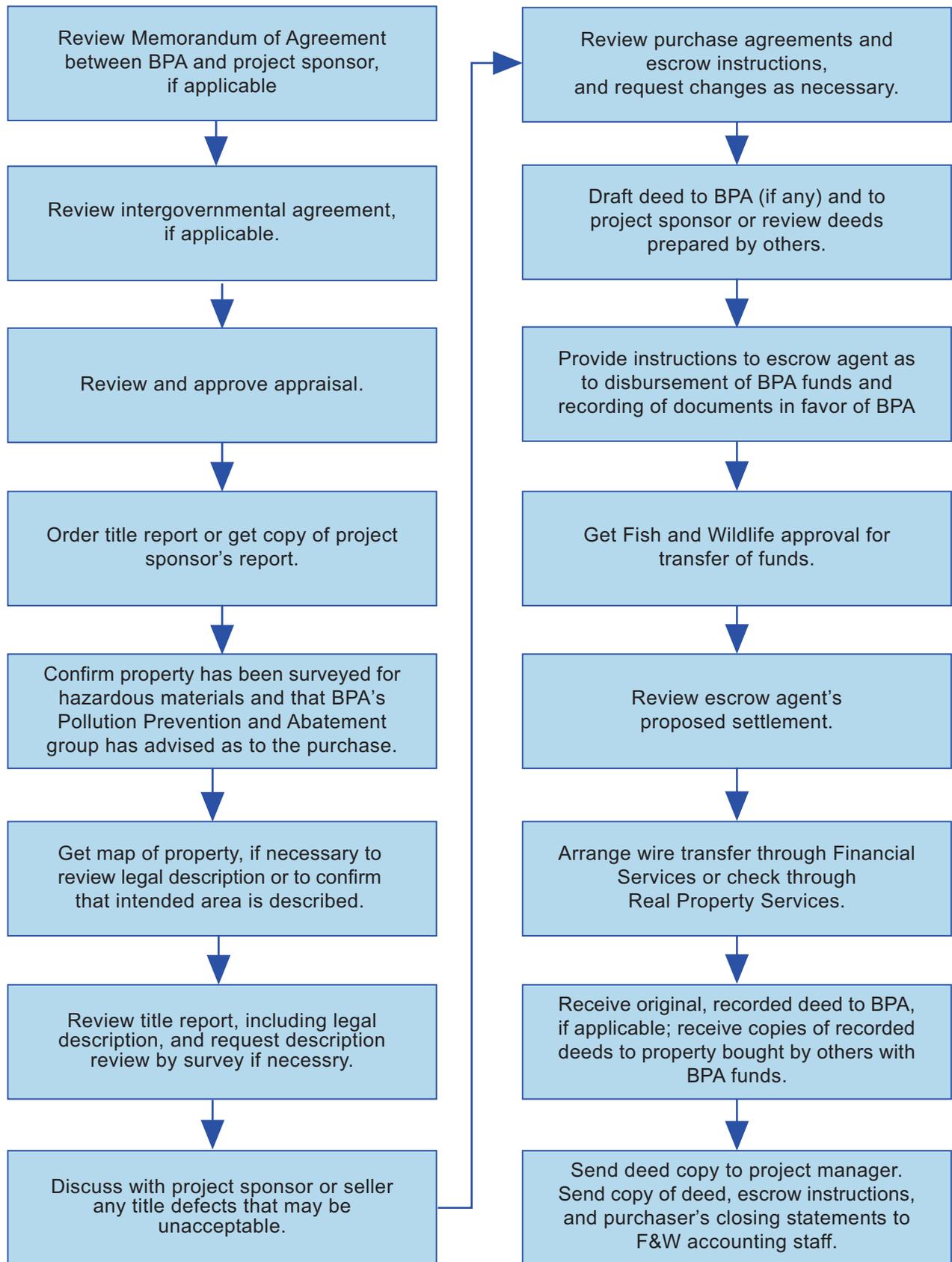
8.4.1 Documents Needed for Land Acquisition

BPA's real estate division requires specific documentation in order to complete the land acquisition transaction process. Documents to be assembled for BPA and the responsible party for providing the documentation are shown in Table 10. The documents and the party responsible for providing the documentation are described.

TABLE 10

Habitat Acquisition Project Documentation Requirements

Document	Party Responsible
Signed Memorandum of Agreement between BPA and project sponsor	BPA
Signed Intergovernmental Agreement (if applicable)	BPA
Real estate appraisal	Project sponsor (unless appraisal is done by BPA)
Appraisal review statement by BPA appraiser	BPA
Hazardous materials survey report by BPA or review by BPA	BPA
Title report	Project sponsor
Map or drawing showing boundaries of property to be purchased	Project sponsor
Copy of purchase agreement	Project sponsor
Name and phone number of escrow agent	Project sponsor
Copy of draft deed from the seller	Project sponsor (or closing agent)



OVERVIEW OF BPA LAND ACQUISITION PROCESS

8.4.2 Cultural Resource Survey

The laws addressing protection of cultural resources in federal land acquisition projects include the National Historic Preservation Act, American Indian Religious Freedom Act, and the Native American Graves Protection Act. These Acts are applicable to the acquisition projects recommended in this Master Plan.

For each acquisition recommended in this Plan, an overview survey and literature search is required to establish whether there are cultural resources on the property requiring long-term management and funding. The cost of conducting the survey and literature search should be included in the land acquisition project budget. The State Historic Preservation Office or the Tribal Historic Preservation Office must concur with the survey results, and a Memorandum of Agreement must be negotiated if significant cultural resources would be adversely affected by the acquisition and/or subsequent land management activities.

8.4.3 Land Audit

Phase I Environmental Site Assessments must be completed for federal property acquisitions. These Environmental Site Assessments help determine whether hazardous substances or petroleum products are present or likely to be present on a property, and whether these substances are being released into structures on the property, into the ground, groundwater, or surface water of the property.

Phase I Environmental Site Assessments typically include on-site inspection, review of existing data, interviews with owners or project personnel, and review of federal, state, and local records. Information is collected and compiled in a report by the BPA Environmental Land Action Coordinator who uses the *American Society of Testing and Materials, Standard Practice for Environmental Site Assessments* as a guideline. If there is an existing report from a non-BPA entity, it must be reviewed by the Environmental Land Action Coordinator. A scope of work and cost estimate are provided if environmental sampling or further investigation (Phase II) is required.

8.4.4 Land Appraisal

Land appraisals for habitat acquisition can be accomplished in one of two ways. A BPA appraisal officer in the realty office can complete the appraisal or a local, independent appraiser hired by the project sponsor can complete it. It may be necessary for the project sponsor to hire a local appraiser if the schedule of the BPA appraiser does not coincide with the acquisition project timeframe or if a local entity would be more appropriate for other reasons (e.g., sensitivity to having a local presence). BPA must provide prior approval of the local appraiser if one is hired to complete the work.

8.4.5 SEPA/NEPA compliance

The National Environmental Policy Act (NEPA) applies to *all* activities that BPA funds, authorizes, or carries out. Under the National Environmental Policy Act (NEPA) projects are categorized based on their likelihood of having effects on the environment. This includes activities or projects funded through the BPA Fish and Wildlife Program, including the Yakima Habitat Improvement Project.

BPA's Guide to Meeting Environmental Requirements (BPA 2001) outlines the requirements necessary for the City of Yakima and BPA to fulfill environmental responsibilities associated with parcel acquisition. When acquisition activities begin, a list of properties to be acquired, grouped by priority area, should be submitted to the BPA NEPA lead with appropriate details. The BPA NEPA lead will work to make sure the project has proper NEPA coverage, Endangered Species Act

consultations, public involvement, cultural resource consultations, floodplain/wetland authorizations, and other pertinent environmental coverage.

Initial discussions with the BPA NEPA lead indicate that a Supplemental Analysis to BPA's Watershed Management Program Environmental Impact Statement will be performed for all properties individually, or groupings of properties, depending on the schedule and proposal for acquisition. Requirements of the supplemental analyses for land acquisitions include completion of the NEPA Compliance Checklist for Watershed Management Projects, a cultural resources survey, an environmental land audit, and a public involvement component. For the public involvement component, nearby landowners and the general public must be notified and have an opportunity to comment on the land acquisition prior to purchase. Timeframe for the entire process can range from 1 day to 6 months.

Short and long term management activities for parcels once they have been acquired are described in Section 9.0 of this plan, and will also require NEPA analysis and documentation. The Yakima Habitat Improvement project sponsor should work with the BPA NEPA lead as soon as possible as management actions are determined for acquired lands. Depending on the types of management actions identified, requirements may include, Endangered Species Act consultation, cultural resource surveys, and various Federal, State and local permits (such as a 404 Permit from the U.S. Army Corps of Engineers). Land management plans developed for the acquired properties will also require a public involvement component.

Unless the State of Washington funds, authorizes or carries out portions of the land acquisition process under this plan, SEPA will not be triggered for the proposed land acquisitions. As with NEPA, SEPA requirements may occur for management activities planned for the properties after acquisition. The Yakima Habitat Improvement project sponsor should work with the Yakima area SEPA lead as early as possible for individual properties as management actions are determined.

9.0 MANAGEMENT PLAN FOR ACQUIRED TRIBUTARY HABITAT

Any organization that owns land for habitat conservation purposes must commit to manage that land into the future. Lack of a plan to manage and monitor the property could lead to loss of or damage to the property's overall habitat value. Contingency provisions are also necessary in the event that the City or its partner owners can no longer fulfill its stewardship obligations.

Some considerations from the Land Trust Standards and Practices Handbook (LTA 1985) for short and long-term management of the lands acquired for the purpose of conservation include:

- **Financing Land Stewardship.** The City and its partner owners should understand the full financial and management implications of each property purchase including funding requirements for maintenance, improvements, monitoring, and enforcement.
- **Monitoring Properties.** The City and its partner owners should mark property boundaries and regularly monitor the property (at a minimum annually) for potential management problems (including trespass or overuse, vandalism, and safety hazards) and take action to rectify such problems.
- **Baseline Site Inventory.** For each property the city should conduct a baseline site inventory to record the existing initial condition of the property and to identify short and long term management activities.
- **Land Management Plan.** For each property, the City and its partner owners should have a management plan that identifies the goals for habitat conservation on the parcel and how to achieve them.
- **Land Stewardship Administration.** The City and its partner owners should perform administrative duties in a timely and responsible manner (this includes establishing policies, keeping records, filing forms, budgeting, and maintaining correspondence files).
- **Community Relations.** The City and its partner owners will need to develop and implement an outreach program that notifies neighbors, citizens and appropriate public officials of its ownership and management of conservation properties.
- **Contingency.** The City and its partner owners should make contingency provisions for all its conservation based land purchases in the event the City can no longer manage it.

9.1 Management Responsibility and Potential Partnerships

As discussed in Section 8.0 Strategy for Habitat Acquisition, the BPA project sponsor, the City of Yakima, will receive immediate title to the acquired property. In certain instances, other entities (such as the City of Union Gap, Yakima County, North Yakima Conservation District, US Fish and Wildlife Service, or a land trust) may be a more appropriate entity for ultimate ownership of the property. In this case, the title could be transferred from the project sponsor to another entity or arrangements could be made for another entity to gain title at the time of initial acquisition. Long term management by a land trust, that could own and manage the land in perpetuity should be considered.

Management of the acquired land is ultimately the responsibility of the owning agency. However, in many cases, partnerships could be established with other agencies, land trusts, or groups to perform stewardship activities and other land management tasks on either a short-term or long-term basis. A Memorandum of Agreement (MOA) should be established between partner agencies or organizations for short and long term contracted land management activities.

9.2 Site Inventory of Existing Conditions

Baseline documentation is one of the most important steps in successful land management. After purchase of a parcel, a site inventory of existing conditions should be conducted. The purpose of the baseline site inventory is to assess and document the current conditions of the property including its size, use, and resources at time of purchase. This information will allow the City or other sponsor to identify and document the significant features of the property to be protected and assess its future management needs. Information that should be reviewed in the baseline inventory, that has not been addressed by other BPA requirements and not included in other inventories conducted at time of land purchase (such as hazardous materials inventories) include:

- Existing building and infrastructure (fencing, ditches, pipes, tanks, etc) characteristics;
- Upland and riparian vegetation condition and type (presence of noxious weeds or disturbance increaser undesirable species; dead or decadent vegetation; species regeneration and age classes; etc);
- Soil characteristics and condition;
- Property access issues and considerations;
- Aquatic habitat and stream geomorphic characteristics and condition; and
- Recent land use.

A baseline inventory will identify immediate and short term management needs for the property. After reviewing the baseline inventory, a short-term management plan for the property should be developed. The short-term management plan should be developed in conjunction with the Steering Committee. All short term management plans need to be approved by the City Council or other entity owner. Action items included in the short-term management plan could include:

- noxious weed control and/or control of undesirable species;
- riparian enhancement or restoration (may include plantings of containerized shrubs or live staking);
- stream channel enhancement/re-configuration/stream bank stabilization;
- removal of buildings and infrastructure (fencing etc);
- garbage/litter removal;
- upland vegetation planting or restoration;
- aquatic habitat enhancements/removal of fish barriers or obstructions.

9.3 Site Specific Considerations

Some properties or portions of properties may be suited for low impact recreational use or public access. However, these activities will not be allowed if they will in any way impact fish and wildlife habitat and cultural resources at the site. Any uses other than those that will benefit fish and wildlife and cultural resources must be approved by BPA. In instances where there is no impact to fish and wildlife habitat or cultural resources, site specific considerations, such as trails, signage, naming and memorials for the acquired properties would follow recommendations and specifications outlined for open space in the Yakima Urban Area Comprehensive Plan and Yakima County Plan 2015.

Opportunities for trails and public access to properties will be determined on a site-by-site basis after initial purchase and short-term management activities have been completed. A long-term management plan should be developed for each property after short-term management activities are completed. Long-term management plans should be developed in association with the Steering Committee. All long-term management plans will need to be authorized by the City Council or other project sponsors and BPA.

9.4 Follow-up and Long-term Monitoring and Maintenance

A long-term monitoring and maintenance program is essential to ensure the successful removal of exotic, invasive vegetation and the successful establishment of new habitat. This could include:

- regular, long-term follow-up exotics control to prevent re-establishment of these plants. This may be by either mechanical (i.e., hand-pulling/removal of seedlings) and/or approved biodegradable chemical methods;
- removal of temporary check dams or other non-vegetative erosion control methods upon successful establishment of new plantings;
- litter clean-up;
- removal of guy wires upon successful establishment of new plantings;
- monitoring for subsequent streambank instability/erosion problems;
- monitoring for successful establishment of native species in re-seeded upland areas and re-planted riparian areas;
- patrolling for vandalism activities or other inappropriate behavior; and,
- monitoring of aquatic habitat as outlined in Section 10.0.

Long term monitoring and maintenance may most effectively be completed by partner agencies that have the infrastructure and necessary staffing to complete monitoring activities. Monitoring and maintenance can also be effectively coordinated with volunteer groups. Memorandums of Agreement could be developed between the City and partner agencies on these tasks.

9.5 Staffing and Administration of the Project

9.5.1 Habitat Improvement Project Coordinator

The Yakima Habitat Improvement Project should be staffed to implement the plan in the most efficient manner possible. Habitat acquisition planning, purchase and stewardship are complex and labor intensive endeavors. A key factor in the successful development and implementation of the habitat acquisition process will be the dedication of staff to this project. This cannot be achieved without a committed staff with responsibility for: maintaining plans; securing funding; coordinating communication between related agencies and organizations; implementing outreach programs; executing land purchases; developing proposals to acquire additional funding for restoration or maintenance activities; providing oversight of stewardship activities and updating plans to reflect changes in information. An acquisition coordinator should be provided by the project sponsor to implement this program.

This Habitat Improvement Project Master Plan should be treated as a working document. Land transfer processes, land management, and salmonid and habitat issues will constantly change and

become more integrated and complex in the Yakima Urban Area over time. This acquisition plan must keep pace with these changes. As with ownership and management, the most efficient and effective staffing and administration for the long-term management of acquired parcels will be determined. Partnerships with other agencies or organizations such as land trusts could ultimately provide the economy of scale to effectively staff and administer the Yakima Habitat Improvement Project.

9.5.2 Stewardship Coordinator

Proper land stewardship and daily management of acquired lands is a critical component in successful implementation of this program. This task is especially critical for newly acquired land. The duties of the project coordinator (described above) should include stewardship or a stewardship coordinator should be provided by the project sponsor or one of its partner organizations or agencies to successfully manage the acquired lands and coordinate volunteers.

9.5.3 Steering Committee

The Habitat Improvement Project will require continued coordination and input from the existing TWG. For purposes of implementation of this plan, the full TWG or a subgroup thereof could be utilized. This group would function as a project steering committee. Members would provide input and assistance as appropriate to land prioritization, acquisition, and stewardship activities. The Steering Committee should include representatives from key areas including:

- city services;
- land planning;
- federal, state, and tribal fish and habitat issues;
- land stewardship and conservation;
- agricultural/irrigation issues;
- volunteer programs;

9.5.4 Volunteers

The use of volunteers should not be overlooked as a means of providing more service on a limited budget. The use of volunteers promotes good public relations and increases staff capabilities and support for services. Recommendations of this plan include the following:

- Establishing an Urban Growth Area volunteer program.
- Enlisting the support of existing Friends organizations, service groups and prisons.
- Providing opportunities for residents to be involved in natural area restoration as often as possible.
- Coordinating volunteer efforts with existing volunteer efforts from other organizations and agencies.
- Establishing an Adopt-A-Parcel Program to promote ownership and pride in acquired parcels. Responsibilities of volunteers in this may include limited maintenance tasks, such as litter clean up, patrol for vandal or other inappropriate behavior, implementing management activities such as plantings or fencing, or hosting neighborhood activities.

10.0 MONITORING AND EVALUATION OF ACQUIRED LANDS

An integral component of habitat management is monitoring and evaluation. Monitoring and evaluation of land acquisitions is problematic, however, because the effects cannot be measured directly. In many acquisition projects, there is no “action” aside from acquisition, and prevention of future development/impacts. The most probable benefit of habitat-related acquisitions in the Urban Growth Area is that acquisition will *decrease* future degradation. Due to the difficulty in assessing the effectiveness of land acquisition projects, frequent, long-term monitoring is necessary to determine if habitat is improving or at a minimum, not degrading, on acquired lands.

If monitoring is to be effective, it must be seen as an ongoing process within the context of the Habitat Improvement Project Master Plan goals, and must occur over a sufficient time period to balance out natural variation and enable the detection of trends. Acquisition properties should be evaluated for baseline conditions within the first year of purchase (current habitat surveys may be applicable for baseline data in many cases), and periodically thereafter. It is the recommendation of this plan that monitoring of acquired lands occur at 1, 3, and 5 years post-acquisition and then every 5-10 years thereafter for the long term.

The primary goals of monitoring and evaluation as included in this Master Plan are to:

- provide an improved understanding of the local environment;
- assess the influence land acquisition has on environmental conditions; and
- provide a means for those managing the lands to demonstrate accountability.

10.1 Baseline Information

Baseline information is pivotal in monitoring and evaluation of land acquisitions under this plan. Baseline data will be compared against future monitoring data to determine trends in habitat conditions. There are several recently completed and ongoing monitoring efforts on the Yakima River and its tributaries within the Urban Growth Area that can provide essential baseline data on the aquatic habitat condition (Figure 20). This information, in conjunction with additional information outlined in the criteria for site inventory in Section 9.0, will provide strong baseline indicators of the current habitat condition at the time of purchase. Building on information that is readily available will make the monitoring and evaluation process as efficient as possible. Ongoing or recently completed monitoring efforts include:

10.1.1 Yakima Basin Benthic Index of Biotic Integrity (B-IBI)

Washington Trout is currently developing a multimetric Index of Biotic Integrity for the upper Yakima/Naches Basin using benthic macroinvertebrates to detect ranges of human impact on aquatic resource health under BPA contract number 20006. They have done sampling on Wide Hollow Creek, Ahtanum Creek, Cowiche Creek, the Naches, and mainstem Yakima River (personal comm. Nick Gayeski, Washington Trout March 19, 2003)

10.1.2 Salmonid Screening Habitat Enhancement and Restoration (SSHEAR)

The SSHEAR survey utilizes a Priority Index (PI) Model to prioritize stream reaches and quantify salmonid habitat both above and below manmade physical barriers (WDFW, 2000). Washington Department of Fish and Wildlife and Yakima County are doing a complete SSHEAR assessment on Ahtanum, Bachelor and Hatton Creeks. The Yakima Tributary Access and Habitat Program

(YTAHP) is currently doing the complete SSHEAR assessment on Cowiche Creek, and also plans to assess Wide Hollow Creek.

10.1.3 Ahtanum Creek Stream Assessment

Golder Associates Inc. completed a stream survey of a 10-mile portion of Ahtanum Creek with the goal to assess current riparian and aquatic habitat condition of Ahtanum Creek. Methodologies implemented included the Proper Functioning Condition methodology (Pritchard et. al 1998), a Lotic Health Assessment (Thompson et. al 1998), and a riparian vegetation classification (Hansen et. al 1986).

10.2 **Monitoring and Evaluation**

Basic elements important to any monitoring and evaluation program include defined objectives, indicators, methods, determined frequency of measurement, analysis of data, documentation, and feedback into planning, evaluation, and policy. Long term monitoring and evaluation of Yakima Habitat Improvement Project properties might best be completed by partnerships with agencies that have the available infrastructure and necessary staffing to complete the activities over the long term. Memorandums of Agreement could be formed between the City of Yakima or property owner and federal, state, or local agencies to complete the activities.

10.2.1 Defined objectives

As stated earlier, the objectives of land acquisition through this plan are to provide for the rebuilding of a healthy, naturally producing fish and wildlife population by protecting and providing for the future restoration of habitat and biological systems within the rivers and creeks of the Yakima Urban Growth Area. The purpose of conducting monitoring and evaluation will be to confirm those objectives are being met.

10.2.2 Indicators

Monitoring the health of aquatic ecosystems involves the measurement of several different variables. Examples of indicators useful in a habitat assessment program for acquired lands include:

- watershed indicators (such as road density, land use, land cover, and harvest history);
- riparian indicators (such as proportion of channel length containing disturbance increaser species);
- channel indicators (such as physical properties of the channel such as extent and quality of pools, amount of large woody debris);
- water quality indicators (such as water temperature, chemical constituents); and
- and biological indicators (such as salmonid populations; structure of the fish, amphibian, or macroinvertebrate assemblages; measures of biotic integrity) (Reeves et al 2000).

10.2.3 Recommendations

Indicators that would be most effective in evaluating the acquisitions proposed in this Master Plan could include elements from existing stream surveys. For each acquired property, we recommend general monitoring of the hydrology, vegetation, and soils using:

- the Properly Functioning Condition (PFC) Assessments method (Prichard et al 1998),
- SSHEAR habitat survey (WDFW),
- a detailed riparian condition assessment using the Lotic Health Assessment (Thompson et. al 1998),
- and a macroinvertebrate assessment using a Benthic Index of Biotic Integrity (B-IBI).

Additional data collected for the parcel should also include soils condition, extent and coverage of invasive species, upland vegetation, and wetland functional analyses (where they exist) as described in the Site Inventory Criteria in Section 9.0. For many parcels, much of these baseline data may already exist as a result of the ongoing projects mentioned above. Ultimately, repeat of these methods would be used to monitor and evaluate success of land acquisitions toward meeting the objectives of maintenance, preservation, and restoration of functioning aquatic and riparian habitat within the Yakima Urban Growth Area over the long term.

10.2.4 Timeline and Determined Frequency of Measurements

Acquired properties should be evaluated for baseline conditions within the first year of purchase, and periodically thereafter. It is the recommendation of this plan that monitoring of acquired lands occur at 1, 3, and 5 years post-acquisition to capture short term changes such as control of exotic species and survival and establishment of restoration efforts and then every 5-10 years thereafter.

If monitoring is to be effective, it must be seen as an ongoing process within the context of the Master Plan goals, and must occur over a sufficient time period to balance out natural variation and enable the detection of trends. There will not be immediate results, the benefits of land acquisition projects require a significant time period before they can be measured, and will depend to a major extent on cumulative impacts of multiple parcel acquisitions. The grouping approach to parcel acquisition outlined in this plan will assist in driving improvements along extended reaches of the tributaries.

10.2.5 Analysis, Documentation, and Feedback

Results from monitoring efforts will be reported as they occur. Upon evaluation, decisions may be made to change future monitoring efforts, management strategies, and restoration goals for the properties.

11.0 RELATED CRITICAL HABITAT PROJECTS

Based on coordinated efforts by members of the TWG and research conducted as part of this plan, several additional projects have been identified as key action items in the restoration and/or protection of riparian habitat in and around the Yakima Urban Area. This information has been gathered and presented in order to provide an overview of future fish and wildlife projects to ensure coordination among fish and wildlife managers in the region. Although these projects are not the responsibility of the project sponsor and are not intended to be funded under funding mechanisms associated with the plan, they are viewed as critical to restore and protect the normative structure and function of aquatic and riparian habitat in the project area and merit discussion.

As these related projects are carried out, changes may occur in the quality and condition of aquatic and riparian habitat and/or the distribution of aquatic species in the project area. For this reason, it is recommended that acquisition projects identified in this 2003 Master Plan be re-evaluated in subsequent years as additional miles of critical aquatic habitat are opened or improved as a result of related project efforts.

11.1 Tributary Projects Identified by TWG Members

The following projects have been identified by TWG members as early action opportunities that would significantly improve aspects of habitat.

Naches River

Channel modifications on the Naches River have occurred as a result of the City of Yakima's Fruitvale Canal irrigation diversion. Mixing of Cowiche Creek and Naches River water also occur in this area causing homing difficulties among salmonids. Realignment and consolidation of the Fruitvale Canal diversion and returns have been suggested as a means of addressing these fish and habitat issues.

Spring Creek

This spring brook channel has thermally benign winter characteristics, relative to the mainstem Yakima. Fish are blocked from passage and restricted to the lower end. Yakima County has recommended removal of the irrigation box weir at the lower end of Spring Creek. This will open additional spring fed rearing habitat and lower flood elevations in Union Gap. The Yakima Klickitat Fisheries Project has expressed that a failing culvert on the Walter Floyd property also precludes upstream migration on Spring Creek.

Cowiche Creek

The Yakima Tributary Access and Habitat Program (YTAHP) is a collaborative effort including irrigation districts, North Yakima Conservation District, Washington Department of Fish and Wildlife, US Bureau of Reclamation, Kittitas Water Purveyors, and Kittitas County Conservation District with funding from Bonneville Power Administration (BPA), the goal of YTAHP is to restore fish access to Yakima River tributaries that historically supported anadromous salmonids but are currently blocked due to passage barriers including unscreened diversions.

Within the Yakima Urban Area, the YTAHP program is focusing on surveying and removing and/or addressing barriers, including unscreened diversions from Ahtanum Creek, Wide Hollow Creek, and Cowiche Creek. As these barriers are removed, fish will access previously blocked areas of aquatic

habitat. As a result, this newly available habitat will likely become more valuable for acquisition under this Master Plan.

The Yakima Tributary Access and Habitat Program (YHTAP), North Yakima Conservation District (NYCD), and Yakima Klickitat Fisheries Project (YKFP) have identified three projects for early action mitigation on Cowiche Creek as part of their inventory of habitat conditions on Cowiche Creek:

1. Retrofit of a screen approximately 400 feet upstream from a wooden flume that crosses Cowiche Canyon Road. The existing screen is a debris screen with $\frac{3}{4}$ inch mesh.
2. Periodic removal of beaver dams that chronically block a steep grade into Cowiche Creek. At times, adult salmon cannot access the creek
3. The addition of a fish screen on Cowiche Creek near River Road.

Wide Hollow Creek

The fish blockage at the downstream end of Wide Hollow Creek negatively affected the prioritization of parcels on Wide Hollow due to the decreased number of salmonid species and life history stages present. Addressing this fish blockage and increasing fish species presence and life stages would increase the total prioritization score on Wide Hollow Creek. One suggested means for addressing this blockage is to relocate the creek. Such an effort would also have a dramatic effect on the total amount of habitat available for anadromous fish in the project area.

The Yakima-Klickitat Fisheries Program, Yakima County, WDFW, and NYCD identified the following key projects that warrant early action on Wide Hollow Creek:

1. Rerouting of lower Wide Hollow Creek to enhance juvenile fish passage upstream: the "Alaskan steep pass" ladder located on Wide Hollow Creek in Union Gap, at approximately Creek Mile 0.4, currently passes adults but not juveniles.
2. Removal of a barrier at the Fines Diversion that currently exists as a rock step structure and gravity-fed fish ring.

11.2 Projects Identified in the Governors Action Plan

The Yakima Basin Water Investment Action Agenda (Waldo, 2000) has recommended five projects in the vicinity of the project area that would improve water supply, water quality and fish benefits, while reducing conflicts among the water users. Although these projects are not a part of this Master Plan, nor are they intended to be funded under this Master Plan, they will have direct impacts on the quality of aquatic habitat in the project area and merit discussion.

Water Quality Ponds

The City of Yakima adopted a Storm Drainage Plan in 1995 that recommended the purchase of private lands at the outfall of existing storm drainage pipelines to surface waters and the construction of water quality ponds. The water quality ponds would reduce sediment impacts and peak flows to local water sources improving water quality and provide habitat mitigation to endangered and/or threatened species.

Yakima Regional Wastewater Treatment Facility

This project has two interrelated elements that will benefit water quality in the Yakima River watershed—eliminating use of a wastewater spray field and enhancing the performance of the treatment plant. The first element of the project involves eliminating use of the spray field at the Yakima Regional Wastewater Treatment Facility (YRWWTP) for wastewater treatment. Historically, food-processing water from Del Monte and other operations has been applied to the spray field for treatment. The spray field is adjacent to the Yakima River. Washington State Department of Ecology (Ecology) has expressed concern about the potential impact of spray field use upon groundwater quality and possible influence on river quality. Eliminating use of the spray field for wastewater treatment will eliminate the potential source of groundwater degradation, and will involve re-routing the food processing waste stream into the treatment plant itself. The total cost for new investments in the plant is approximately \$12.2M. The recommendation of the Governors Water Action Plan is to provide \$3.5M for the City to make improvements to ensure there are no near-term adverse impacts to groundwater.

Aquifer Storage and Recovery (ASR) Pilot Test

The ASR program is a water storage management tool that could provide benefits to the environment as a whole, and would also improve the reliability of the city's public drinking water supply. An ASR pilot test has been conducted and the hydrogeological results have shown that the program would be feasible. In 2002, the city submitted an application for development of an ASR program to Ecology.

Relocation Intake Fruitvale Power Canal

The Fruitvale Power Canal is screened to current standards, however the intake is structured such that it must travel a substantial distance through the river bottom area to reach the screen. Much of this channel traverse must be maintained annually. In addition, salmon homing issues are occurring as a result of mixing associated with Cowiche Creek waters and Naches River waters at the old Union Diversion. The proposed project would relocate the intake to the existing Nelson Dam, where diversion occurs immediately at the river's edge. It would also be necessary in this context to enlarge the capacity of the existing transmission main for approximately one-mile. This project also includes relocating the City's Raney well to the Nelson diversion. It may also include relocation of the old Union diversion to the same area. Restoration would occur in the areas of the old diversions and the lower Cowiche Creek. Relocating these diversions will alleviate the mixing issues associated with Cowiche Creek and Naches River waters and address salmon homing concerns in the area.

Water Treatment Plant Intake Modification

Upgrades to the existing intake for the City of Yakima's Naches River WTP are proposed to address the following needs: 1) to achieve current fish screening criteria, 2) to improve operations and maintenance for the WTP staff, and 3) to improve raw water quality to the WTP.

The Naches WTP intake system is currently being equipped with a fish screening system in accordance with WDFW and NOAA Fisheries standards. This system is scheduled to be operational in March 2003. In addition, over the next 4 - 6 years, the diversion through the Wapatox Power Plant for the Wapatox Ditch will be reduced from 200 cfs to 50 cfs.

12.0 RECOMMENDATIONS

This section provides a summary of the recommendations made throughout the Master Plan. These recommendations are provided to ensure the implementation of the Master Plan is as effective and efficient as possible over the short and long term.

12.1 Communication and Coordination

The City of Yakima (project sponsor) should continue to provide coordination for the acquisition of habitat on Yakima River tributaries within the Yakima Urban Area as recommended in this plan.

The TWG that was developed to support and review development of this Master Plan should continue to play an active and pivotal role in the ongoing efforts associated with the implementation of this Plan. The TWG should continue to conduct quarterly meetings under the direction of the project sponsor. The TWG should act as a Steering Committee in review and planning of future habitat acquisition and restoration projects.

The Yakima Habitat Improvement Plan should continue to coordinate its efforts with the subbasin planning efforts, salmon recovery efforts, watershed planning (HB 2514) efforts and CREP program efforts.

Washington Department of Fish and Wildlife is currently coordinating stream survey and monitoring activities within the Urban Growth Area. This effort should continue. The TWG meetings should also continue to be used as an avenue for information transfer on the stream survey and monitoring activities.

12.2 Partnerships in Yakima River Acquisition Efforts

The US Bureau of Reclamation's YRBWEP project provides a solid coordinating entity for acquisition of lands on the Yakima River. The City of Yakima Habitat Improvement Project can best support this effort by being involved as an active partner if and when the City's participation would benefit the project and complement YRBWEP's efforts in reconnecting parcels to the River and floodplain.

Yakima Habitat Improvement project monies could be used to purchase properties in the historic floodplain that are outside of the scope of the YRBWEP. As well, the Yakima Habitat Improvement Project could provide support for reconnecting the floodplain by identifying and partnering on other critical related floodplain and habitat projects along the Yakima River corridor.

12.3 Tributary Land Acquisition

Twenty-five properties were highly ranked for acquisition during the parcel prioritization process. Fifteen of those parcels were grouped into four priority acquisition areas. The remaining ten parcels remain on the acquisition list for individual acquisition. Contingent upon the availability of funds, it is recommended that all fifteen high ranking parcels within the four priority areas be acquired within the next two years under the Habitat Improvement Project. The remaining ten parcels should also be acquired as further funding allows.

Priority area parcels on Yakima River tributaries were grouped into four priority areas: A, B, C, and D as shown on Figure 19. An acquisition schedule for these priority areas was developed by the TWG. It is recommended that the parcels be acquired in the following order:

- Priority Area A: Year 1 and 2 (FY 2004 and 2005)
- Priority Area B: Year 1 and 2 (FY 2004 and 2005)
- Priority Area C: Year 1 and 2 (FY 2004 and 2005)
- Priority Area D: Year 1 and 2 (FY 2004 and 2005)
- Ten additional highly ranked parcels: Year 2 through 4 (FY 2005 through 2007)

Land acquisition priorities should be re-evaluated on an annual basis as new information becomes available and other related projects affect the quality of current tributary habitat in the UGA. Specifically, as adjudicated water right data become available, availability of water rights on associated parcels should be factored into the prioritization process.

In many circumstances an entity different from the project sponsor may be more appropriate to hold title to the individual parcels. Several organizations, the City of Union Gap, North Yakima Conservation District, the US Fish and Wildlife Service and Yakima County, have identified themselves as having potential interest in holding title to acquired properties within this project. Appropriate ownership for each parcel should continue to be identified as acquisition and management plans for parcels are developed.

Parcels held by landowners interested in selling properties, but not listed in the acquisition schedule, should be reviewed and considered by the City of Yakima and the TWG for acquisition. The ranking of these parcels should be re-evaluated within the overall acquisition schedule and availability of adequate funding.

Coordination with BPA real estate and NEPA leads should occur as early as possible in the proposed acquisition process to meet the appropriate environmental and federal land transaction requirements.

12.4 Land Management

The City and its partner owners should understand the full financial and management implications of each property purchase, including the funds required for maintenance, improvements, monitoring, and enforcement.

The City and its partner owners should mark property boundaries and regularly monitor the property (at least annually) for potential management problems--including trespass or overuse, vandalism, and safety hazards--and takes action to rectify such problems.

For each property, the City and its partner owners should have well developed short and long term management plans that identify the goals for habitat conservation/enhancement on the parcel and how to achieve them. A baseline site survey should be conducted upon purchase of the property. A long-term management plan should be developed for each property to be implemented after short-term management activities are completed. Long-term management plans should be developed in association with the Steering Committee. All long term management plans will need to be authorized by the project sponsors' authorizing entity (i.e. City Council) and reviewed by BPA.

Each long-term management plan should incorporate follow-up monitoring and maintenance programs that are essential to ensure the successful removal of exotic, invasive vegetation and the establishment of new habitat.

The City and its partner owners should perform administrative duties in a timely and responsible manner. (This includes establishing policies, keeping records, filing forms, budgeting, and maintaining correspondence files.)

The City and its partner owners will need to develop and implement an outreach program that notifies neighbors, citizens and appropriate public officials of its ownership and management of conservation properties.

12.5 Project Administration and Staffing

Committed staffing is necessary to implement the Master Plan most effectively. It is recommended that a Yakima Habitat Improvement Coordinator position be established.

Stewardship responsibilities for management of properties after acquisition must also be designated to the appropriate agency/personnel.

Volunteer organizations should be utilized in land management activities to the extent possible.

Memorandums of Agreement (MOA) should be developed between the ultimate landowner and TWG member agencies and organizations for land management activities as appropriate.

12.6 Effective Monitoring and Evaluation

Acquired properties should be evaluated for baseline conditions within the first year of purchase (if current surveys are incomplete) and periodically thereafter. It is the recommendation of this plan that monitoring of acquired lands occur at 1, 3, and 5 years post-acquisition and then every 5-10 years thereafter for the long term. Due to the difficulty in assessing the effectiveness of land acquisition projects, long-term monitoring is necessary to determine if habitat is improving or at a minimum not degrading on acquired lands. All monitoring reports will be submitted to BPA to be reviewed and placed on BPA's website.

MOAs should be developed between the landowner and partner agencies to most effectively complete monitoring and evaluation activities over the long term.

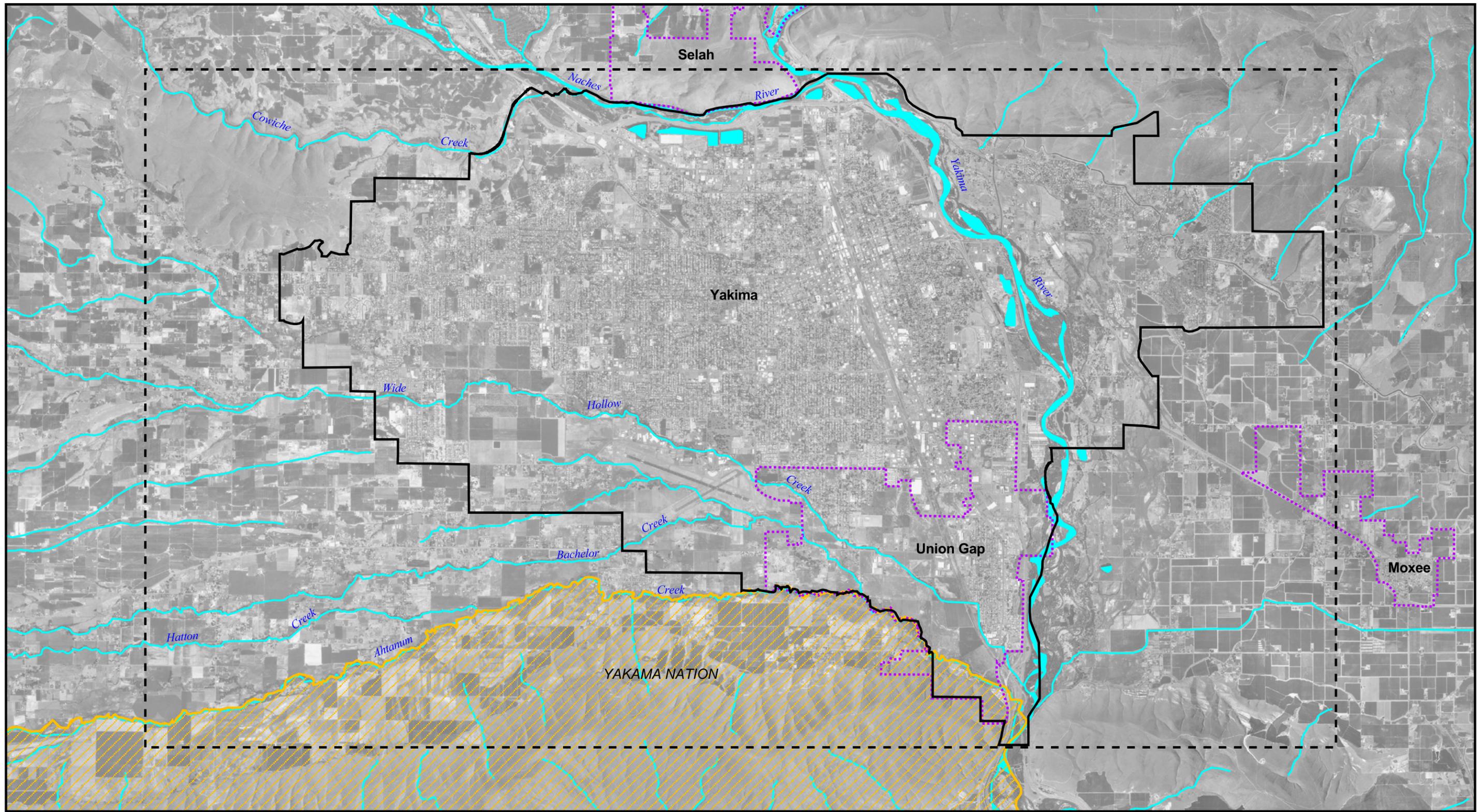
12.7 Related Critical Habitat Projects

Several additional corollary projects to the land acquisition efforts described in this plan have been identified as key action items in the restoration and/or protection of riparian habitat for tributaries of the Yakima Urban Area. These projects were identified to reduce overlap amongst complementary habitat projects, to collaborate and share information among the local habitat agencies and organizations, and integrate local habitat programs. The related projects were identified in discussions with TWG agencies and organizations or are listed in the Governors Action Plan. The City and its partners should be supportive of efforts to obtain funding and implement these related projects.

13.0 REFERENCES

- Columbia Basin System Planning. 1990. Yakima River Subbasin Salmon and Steelhead Production Plan.
- Dominguez, L. 1997. Cowiche, Foundation Creek, and Darland Mountain Watershed Analysis – Fish Habitat Assessment.
- Foxworthy, Bruce La Verne. 1962. Geology and Groundwater Resources of the Ahtanum Valley, Yakima county, Washington. Washington, U.S. Govt. Print. Off., 1962
- Kondolf, G. Mathias, Smeltzer, Matt, and Kimball, Lisa. 2001. Freshwater Gravel Mining and Dredging Issues. White paper prepared for Washington Department of Fish and Wildlife, Washington Department of Ecology, and Washington Department of Transportation. Center for Environmental Design and Research. University of California, Berkley, CA. 130 pp.
- StreamNet. 2003. Yakima County: Ahtanum Creek, tribe to Yakima River: Fish Distribution [map online]. Gladstone (OR): StreamNet [27 February 2003].
URL:http://query.StreamNet.org/Request.cfm?cmd=BuildQuery&NewQuery=BuildCriteria&Required=Run,County,Region,Stream&Region=24&County=174&ID=1204721465289&DataCategory=23&_Count=1
- Tri-County Water Resource Agency. 2000. Yakima Basin Watershed Assessment – Draft Final Report of the Habitat Subcommittee. Report produced by Richard Bain, PE.
- United States Geological Survey. 2003. USGS [27 February 2003]. Through the United States National Atlas [map online]. URL: <http://nationalatlas.gov/natlas/natlasstart.asp>
- United States Department of Agriculture. 1985. Soil Survey of Yakima County Area Washington.
- Washington Conservation Commission. 2001. Habitat Limiting Factors Analysis; Yakima River Watershed Water Resource Inventory Areas 37-39.
- Washington Department of Fish and Wildlife. 1998. Sunnyside Wildlife Area Implementation Work Plan. Olympia, Wash. 84pp.
- Washington Department of Fish and Wildlife. 1998. Washington Salmonid Stock Inventory: Appendix bull trout/Dolly Varden. (SaSI) Washington Department of Fish and Wildlife. 437 pp.
- Northwest Power Planning Council. 2001 Yakima Subbasin Summary. Laura Berg, editor, Yakima Nation.
- Waldo, James C. 2000. Yakima Basin Water Investment: An Action Agenda. Gordon Thomas Honeywell. Tacoma, WA.

FIGURES



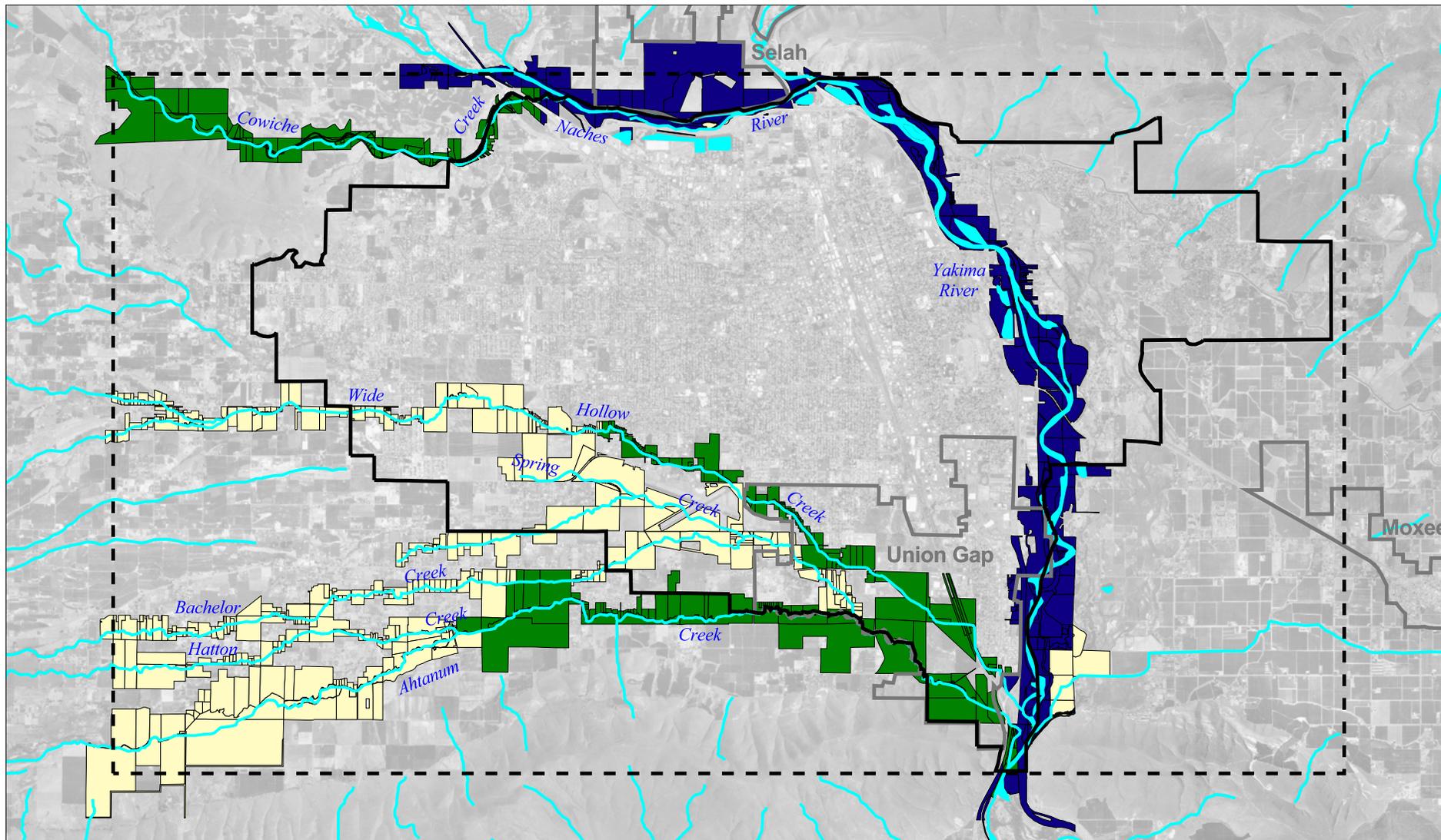
LEGEND

 Creeks and Streams	 Urban Growth Area Boundary
 Lakes	 City Limits
 Yakama Nation	 Study Area Boundary

0 1
 Scale 1" = 1 Mile
 Map Projection: Washington State Plane, NAD83, South, Feet
 Source: USGS, WSDOE, WSDOT



PROJECT LOCATION MAP			
CITY OF YAKIMA / HIP / WA			
Drawn: GE	Revision: 2	Date: Mar 31, 2003	Figure: 1



LEGEND

- 0 - 3 Salmonid Species *
- 4 - 5 Salmonid Species *
- 6 - 7 Salmonids Species *
- Urban Growth Area Boundary
- Water Bodies
- Watercourses
- Project Area

0 1.5
 Scale 1" = 1.5 Miles
 Map Projection: Washington State Plane, NAD 83, South Zone, Feet
 Source: USGS, WSDOE, City of Yakima, Golder Associates Inc.



This figure was originally produced in color. Reproduction in black and white may result in loss of information.

Number of Salmonid Species Present
 CITY OF YAKIMA/HIP/WA

Drawn: ATB	Revision: 3	Date: Mar 31, 2003	Figure: 2
------------	-------------	--------------------	------------------

* Spring Chinook, Fall Chinook, Coho, Steelhead, Bull Trout, Rainbow Trout, Brown Trout, Eastern Brook Trout

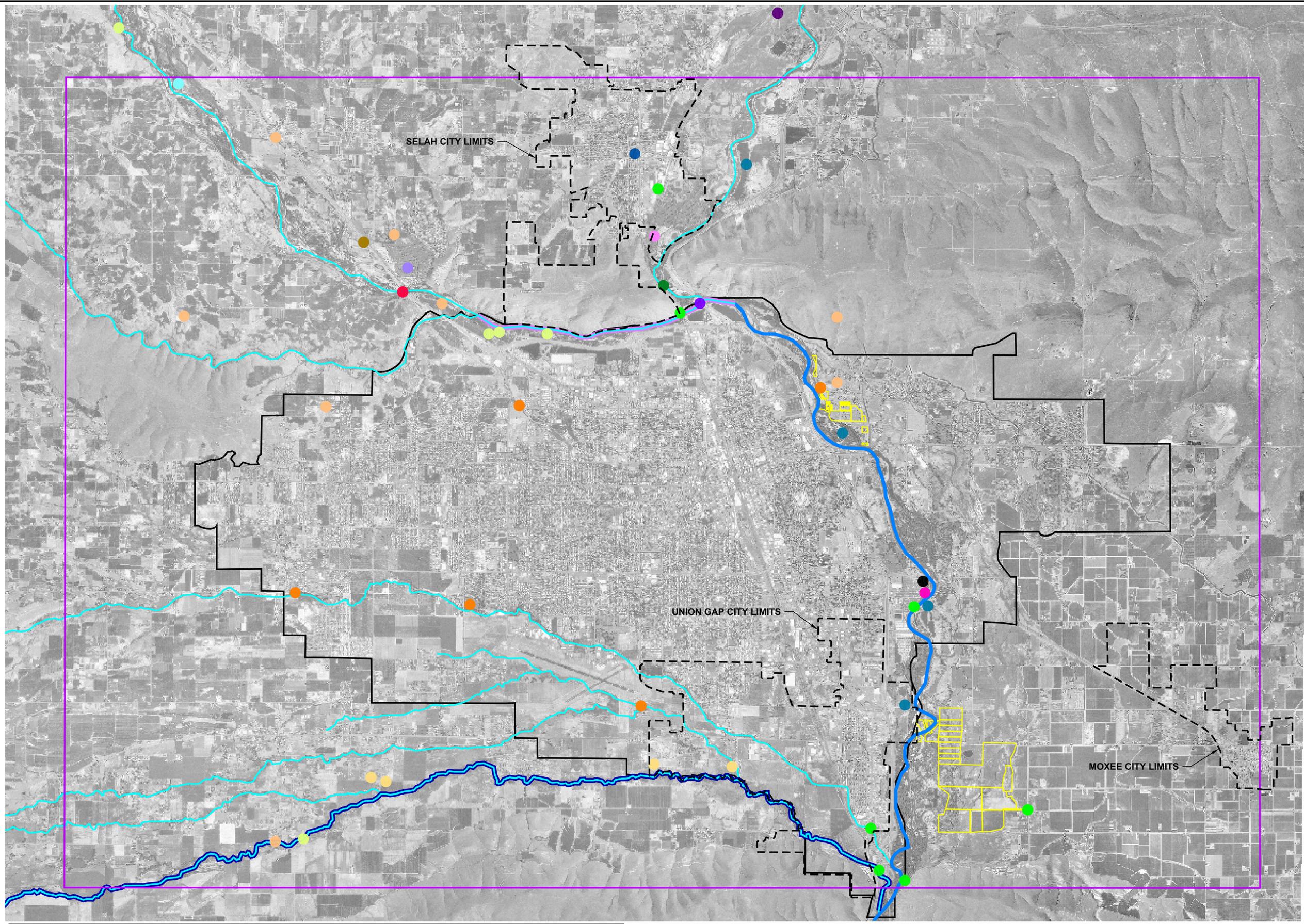
REV	DATE	BY	CHK	APP	DESCRIPTION

CITY OF YAKIMA/HIPWA

PROJECT SUMMARY MAP

REV	DATE	BY	CHK	APP	DESCRIPTION

FIGURE 3



LEGEND

	AHTANUM WATERSHED ASSESSMENT PROJECT		SPRAYFIELD RIPARIAN ENHANCEMENT PROJECT
	NACHES REACHES STUDY		YAKIMA SIDE CHANNEL
	YRBWEP PROPERTIES		FLOODPLAIN MINING STUDY
	HABITAT ACQUISITION IN THE YAKIMA BASIN		SELAH STORMWATER DESIGN
	YAKIMA BASIN BENTHIC INDEX OF BIOTIC INTEGRITY/REACHES STUDY		SELAH CHANNEL CHANGE
	YAKIMA TRIBUTARY ACCESS AND HABITAT PROGRAM		SR24 BRIDGE REPLACEMENT
	EVALUATION OF YAKIMA PASSAGE IMPROVEMENTS PROJECT		POWERHOUSE BRIDGE REPLACEMENT
	OLD NACHES HIGHWAY INTERCHANGE MITIGATION		BUCKSKIN SLOUGH RESTORATION
	YRBWEP ENVIRONMENTAL EDUCATION PROJECT SITES		NACHES RIVER REVEGETATION
	O&M OF YAKIMA RIVER BASIN FISH PROTECTION		TAYLOR DITCH ASSESSMENT
	NATIONAL WATER QUALITY ASSESSMENT PROGRAM		WRECKING YARD ACQUISITION/REHABILITATION

Drawing file: 023109712F02.dwg Apr 22, 2003 - 2:41pm

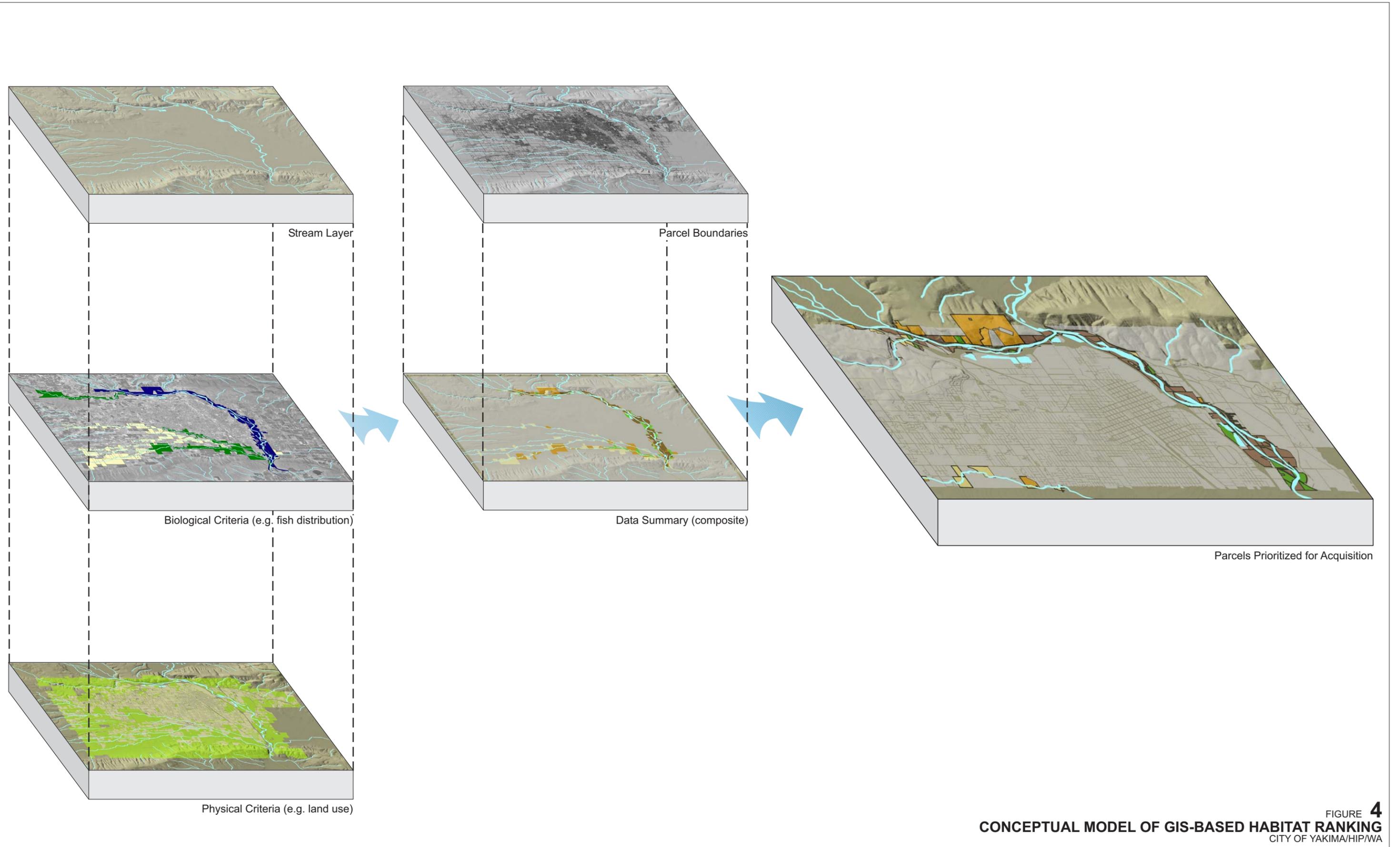


FIGURE 4
CONCEPTUAL MODEL OF GIS-BASED HABITAT RANKING
 CITY OF YAKIMA/HIP/WA

Parameters

Priority Areas
Delineated based on current projects, habitat inventory and meeting with TWG members

Stream Length
Defined by Golder Associates

Stream Proximity
Buffered WDFW streams coverage and attributed parcels

Endangered/Threatened Species
WDFW, LFA coverages

Land Use
Yakima County Assessors parcel classification

Fish Species Richness
WDFW, LFA coverages

Development Pressures
Yakima County Agricultural Lands coverage

Fish Life Stages
WDFW, LFA coverages

Riparian Buffer Width
Mapped by Golder Associates

Wetlands
NWI Wetlands coverage

100 Year Floodplain/Floodway
Yakima County FEMA coverage

Phase 1 Model Preparation

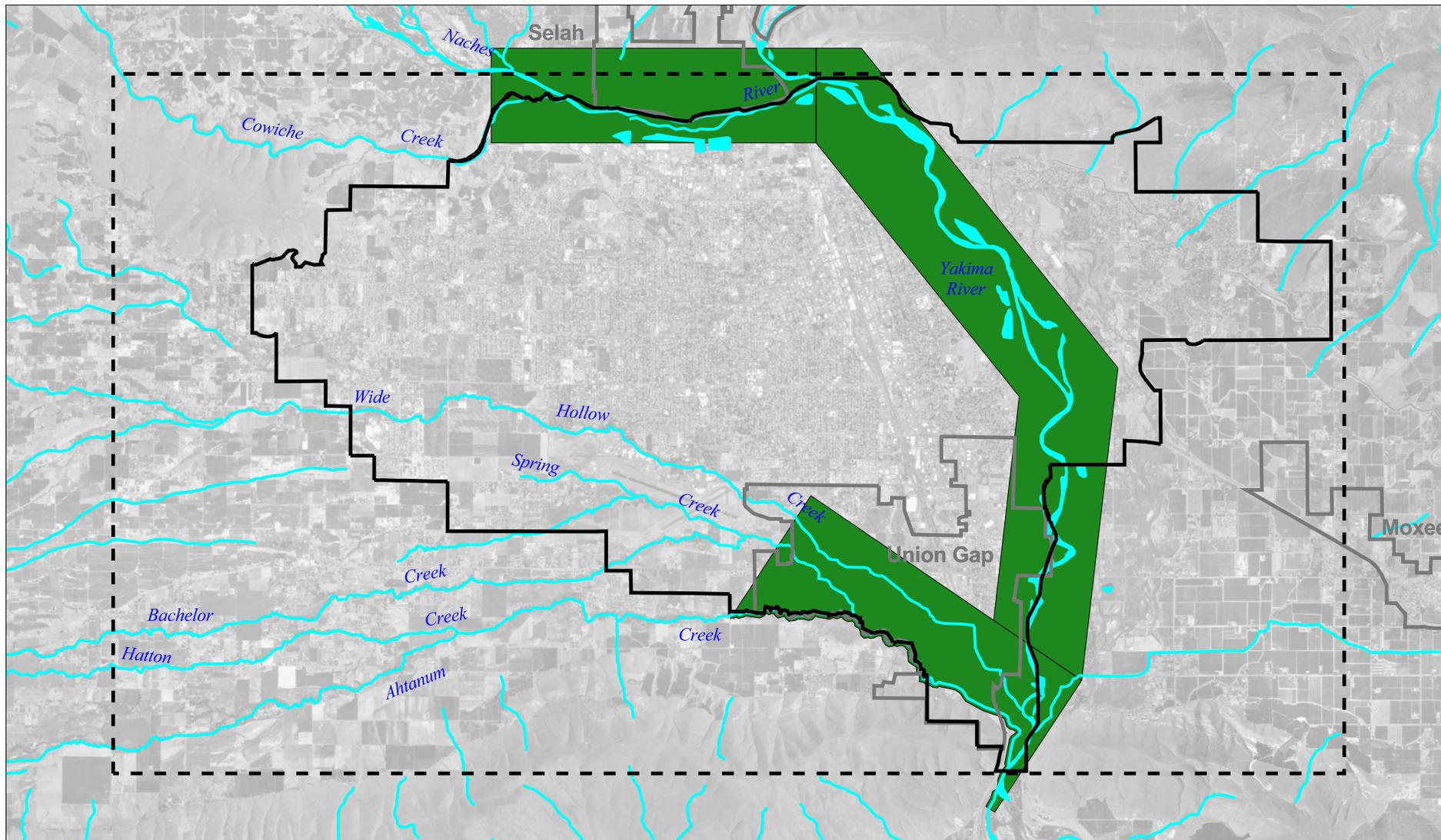
Convert to Grid

Reclassify

Mathmatical Overlay

Rank by Percentage

FIGURE 5
PROJECT SELECTION CRITERIA
CITY OF YAKIMA/HIP/WA



LEGEND

- Priority Areas *
- Urban Growth Area Boundary
- Project Area
- Water Bodies
- Watercourses

0

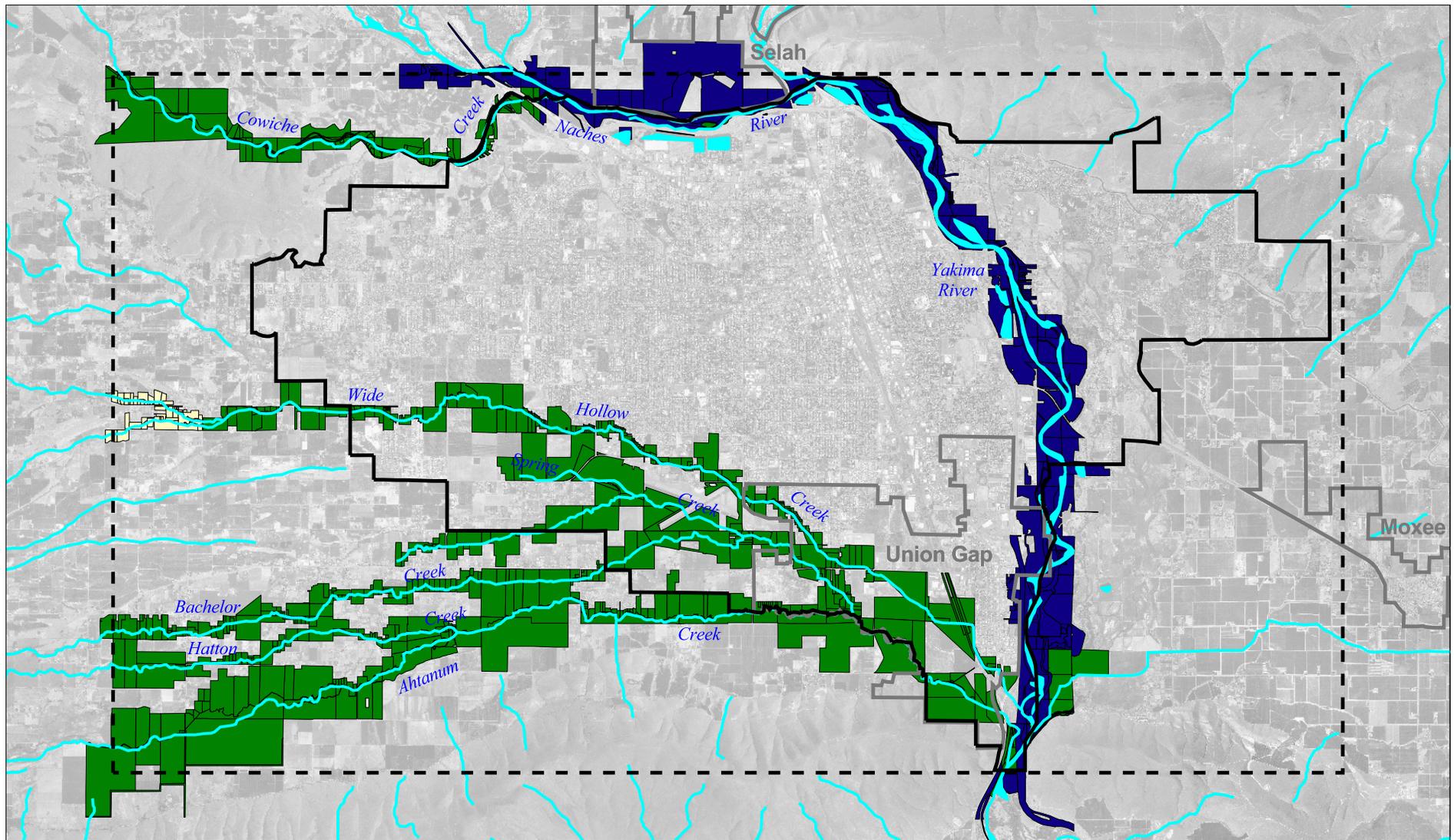
 1.5
 Scale 1" = 1.5 Miles
 Map Projection: Washington State Plane, NAD 83, South Zone, Feet
 Source: USGS, WSDOE, City of Yakima, Golder Associates Inc.



This figure was originally produced in color. Reproduction in black and white may result in loss of information.

Priority Areas			
CITY OF YAKIMA/HIP/WA			
Drawn: ATB	Revision: 3	Date: Mar 31, 2003	Figure: 6

* Note: Priority areas were defined based on discussion with TWG members and represent areas in which focused habitat acquisition efforts are ongoing or planned.



LEGEND

- Contains Two E/T Species
- Contains One E/T Species *
- Contains No E/T Species
- Urban Growth Area Boundary
- Water Bodies
- Watercourses
- Project Area

0

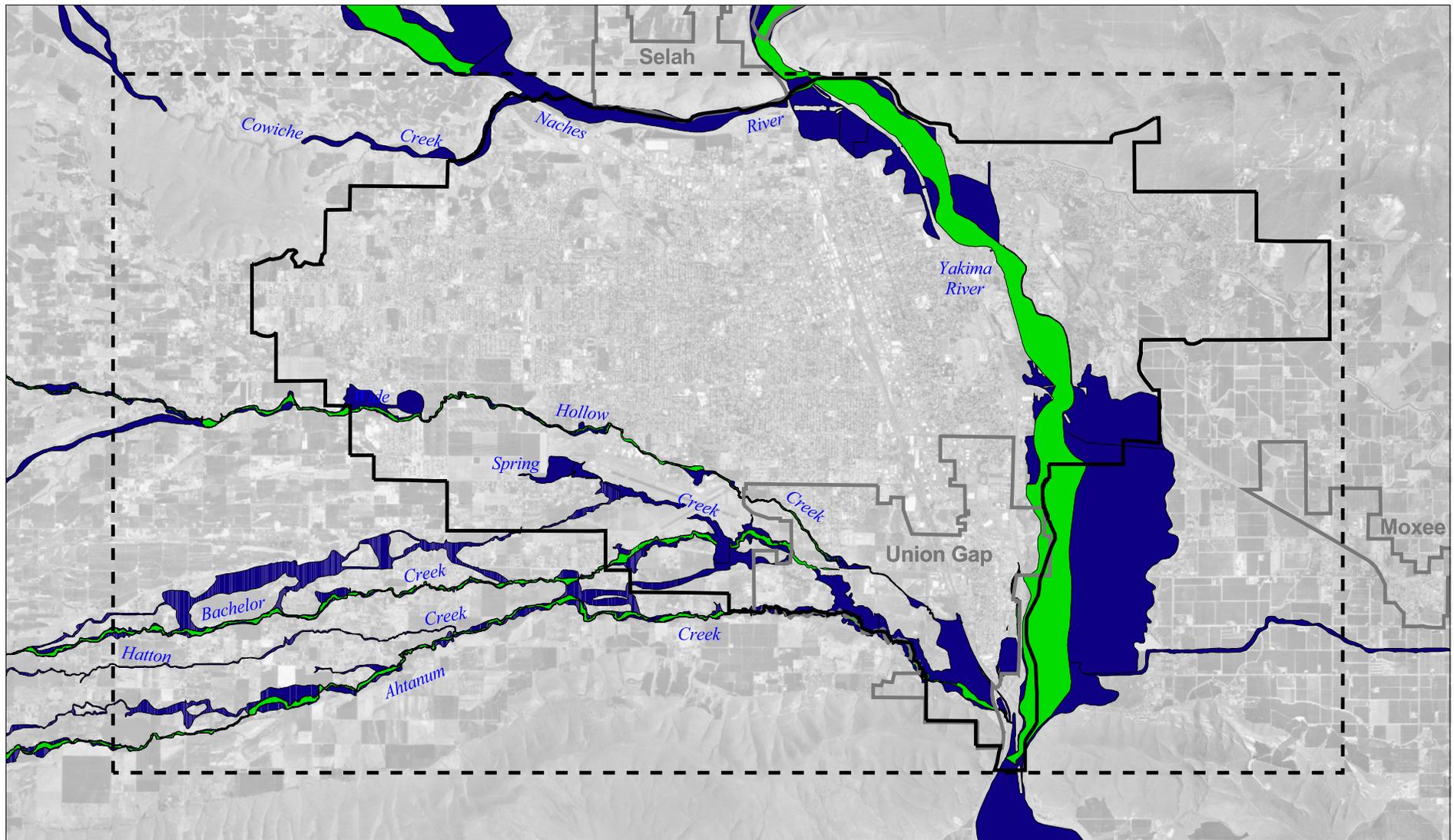
 1.5
 Scale 1" = 1.5 Miles
 Map Projection: Washington State Plane, NAD 83, South Zone, Feet
 Source: USGS, WSDOE, City of Yakima, Golder Associates Inc.



This figure was originally produced in color. Reproduction in black and white may result in loss of information.

Endangered and Threatened Species
CITY OF YAKIMA/HIP/WA

Drawn: ATB	Revision: 3	Date: Mar. 31, 2003	Figure: 7
------------	-------------	---------------------	------------------



LEGEND

- Floodway
- 100 Year Floodplain
- Water Bodies
- Watercourses
- Urban Growth Area Boundary
- Project Area

0

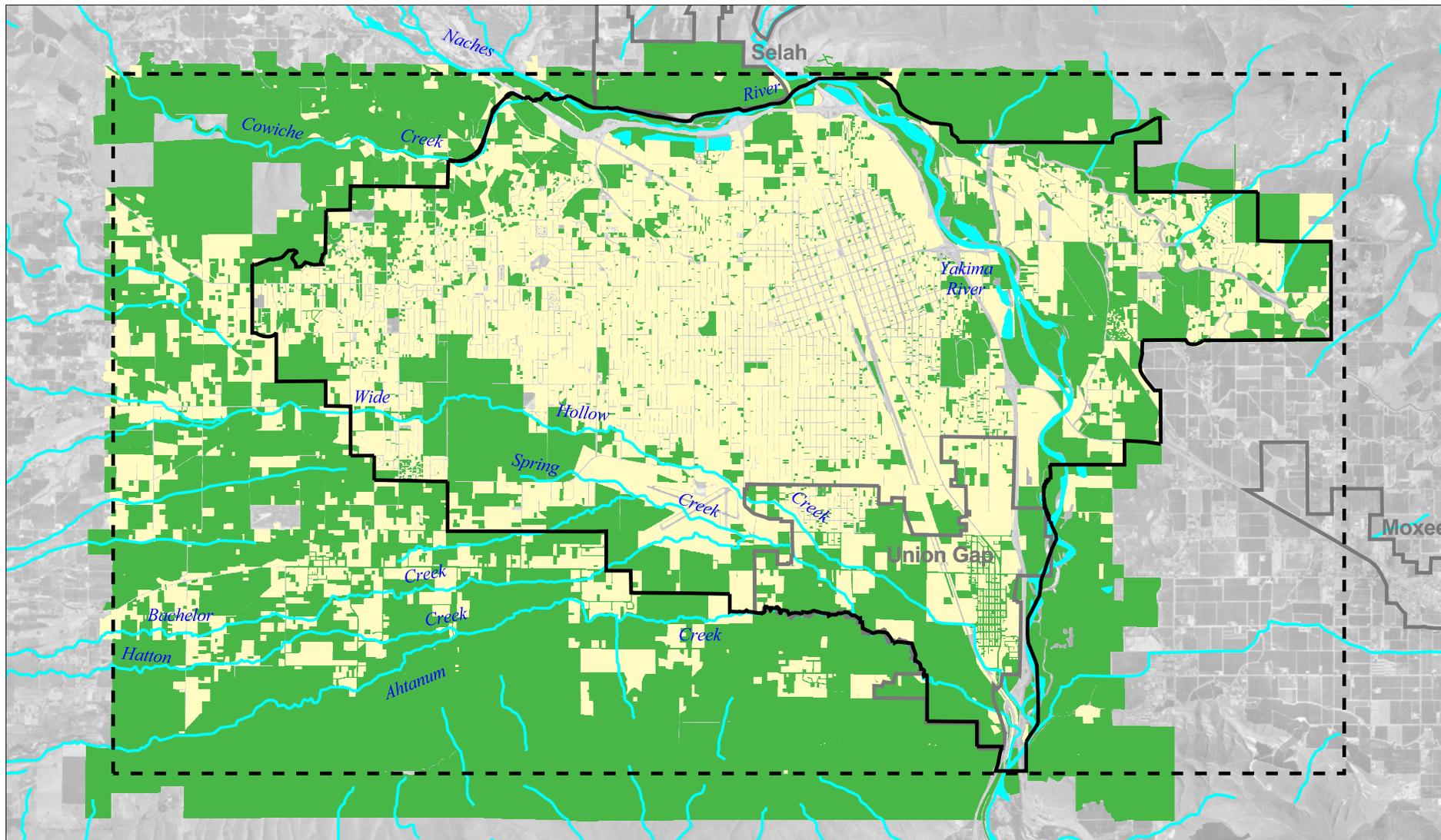
 1.5
 Scale 1" = 1.5 Miles
 Map Projection: Washington State Plane, NAD 83, South Zone, Feet
 Source: USGS, WSDOE, City of Yakima, Golder Associates Inc.



This figure was originally produced in color. Reproduction in black and white may result in loss of information.

FEMA Floodway and 100 Year Floodplain
 CITY OF YAKIMA/HIP/WA

Drawn: ATB	Revision: 3	Date: Mar 31, 2003	Figure: 8
------------	-------------	--------------------	------------------



LEGEND

- Land Use Favorable For Acquisition*
- Land Use Unfavorable For Acquisition*
- Urban Growth Area Boundary
- Project Area
- Water Bodies
- Watercourses



Scale 1" = 1.5 Miles

Map Projection: Washington State Plane, NAD 83, South Zone, Feet

Source: USGS, WSDOE, City of Yakima, Golder Associates Inc.



This figure was originally produced in color. Reproduction in black and white may result in loss of information.

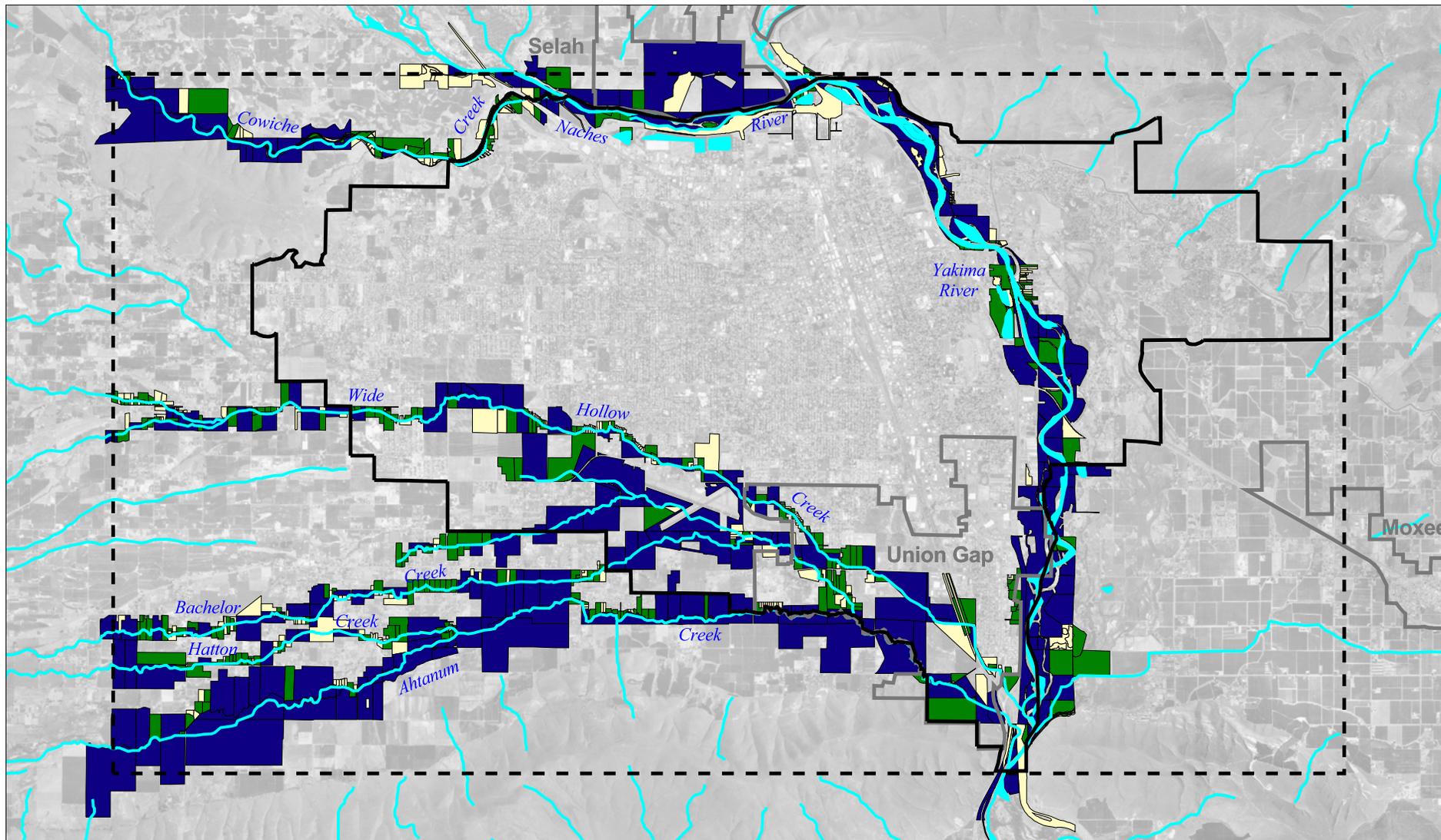
Land Use
CITY OF YAKIMA/HIP/WA

Drawn: ATB

Revision: 3

Date: Mar 31, 2003

Figure: **9**



LEGEND

Stream Length (Ft)

- 0 - 180
- 180 - 623
- 623 - 9615

Urban Growth Area Boundary

Water Bodies

Watercourses

Project Area



Scale 1" = 1.5 Miles

Map Projection: Washington State Plane, NAD 83, South Zone, Feet

Source: USGS, WSDOE, City of Yakima, Golder Associates Inc.



This figure was originally produced in color. Reproduction in black and white may result in loss of information.

Stream Length

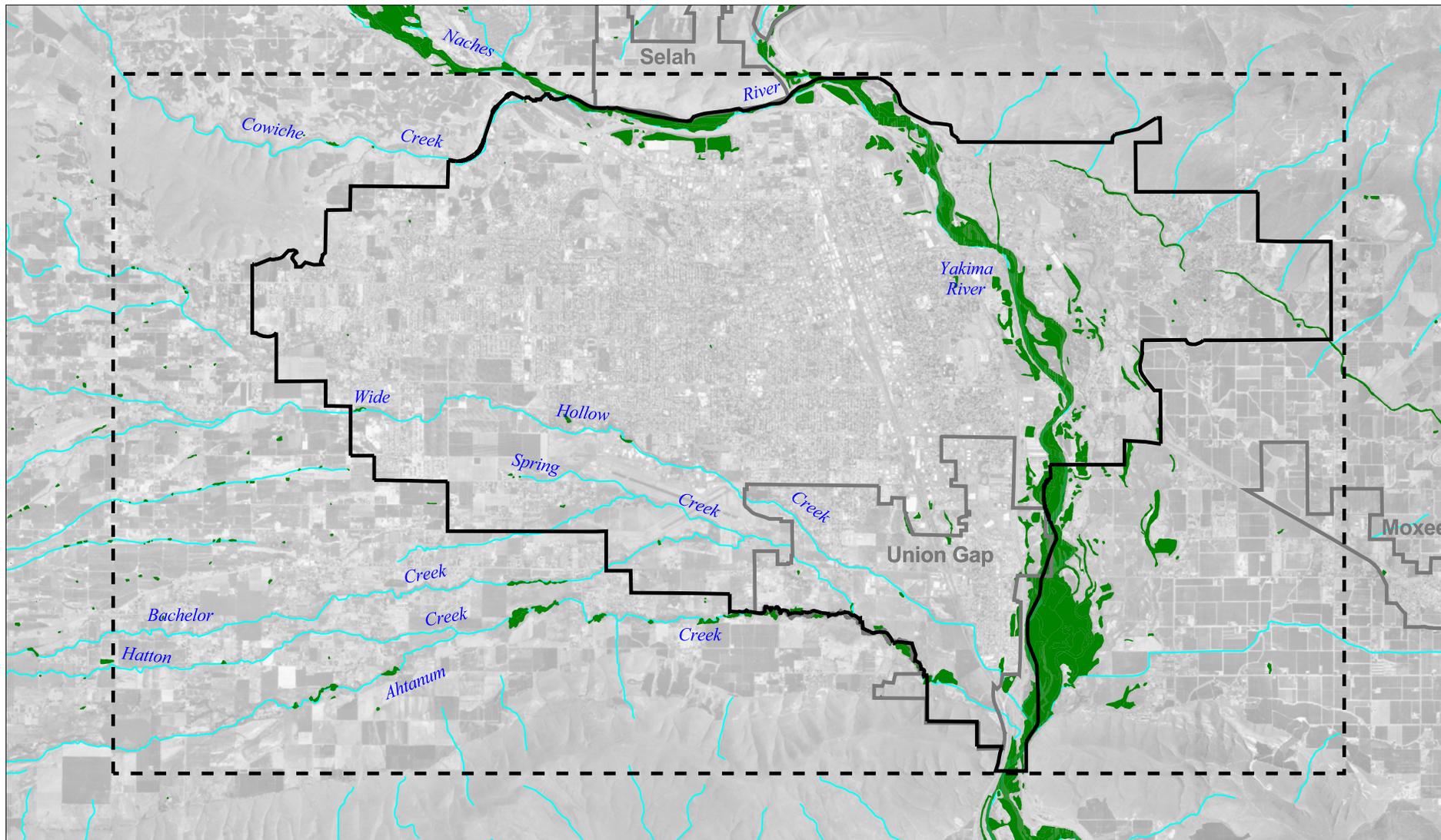
CITY OF YAKIMA/HIP/WA

Drawn: ATB

Revision: 4

Date: Mar 31, 2003

Figure: **10**



LEGEND

- NWI Wetlands
- Water Bodies
- Watercourses
- Urban Growth Area Boundary
- Project Area

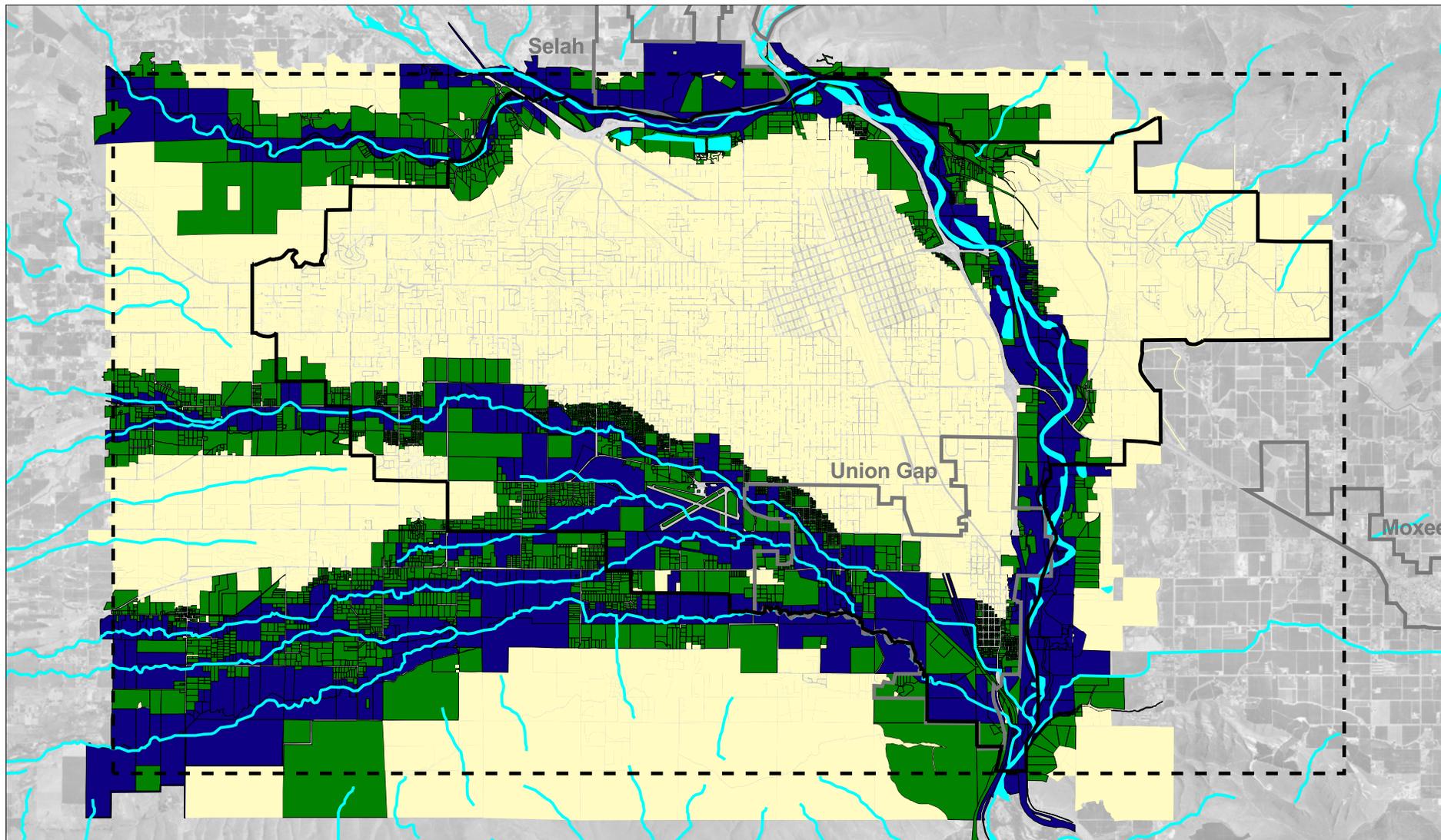
0

 1.5
 Scale 1" = 1.5 Miles
 Map Projection: Washington State Plane, NAD 83, South Zone, Feet
 Source: USGS, WSDOE, City of Yakima, Golder Associates Inc.



This figure was originally produced in color. Reproduction in black and white may result in loss of information.

National Wetlands Inventory - Wetlands			
CITY OF YAKIMA/HIP/WA			
Drawn: ATB	Revision: 3	Date: Mar. 31, 2003	Figure: 11



LEGEND

- Not Within a 1/4 Mile of a Stream
- Within 1/4 Mile of a Stream
- Containing or Adjacent to a Stream
- Urban Growth Area Boundary
- Project Area
-
- Water Bodies
- Watercourses

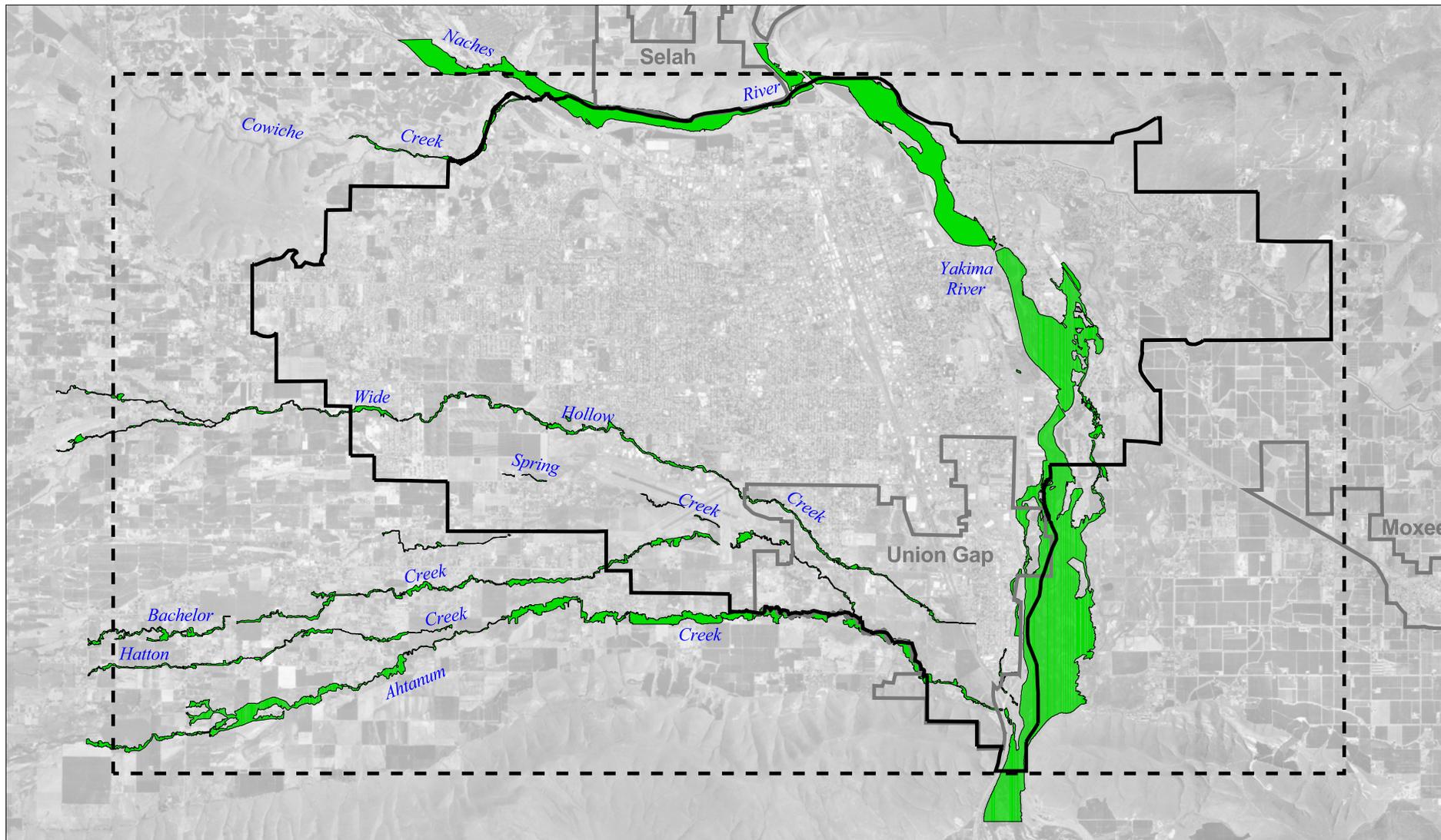
0 1.5
 Scale 1" = 1.5 Miles
 Map Projection: Washington State Plane, NAD 83, South Zone, Feet
 Source: USGS, WSDOE, City of Yakima, Golder Associates Inc.



This figure was originally produced in color. Reproduction in black and white may result in loss of information.

Proximity to a Stream
 CITY OF YAKIMA/HIP/WA

Drawn: ATB	Revision: 3	Date: Mar 31, 2003	Figure: 12
------------	-------------	--------------------	-------------------



LEGEND

- Riparian Buffer Width Delineation *
- Urban Growth Area Boundary
- Project Area

* Note: Developed by Golder for this project.



Scale 1" = 1.5 Miles

Map Projection: Washington State Plane, NAD 83, South Zone, Feet

Source: USGS, WSDOE, City of Yakima, Golder Associates Inc.

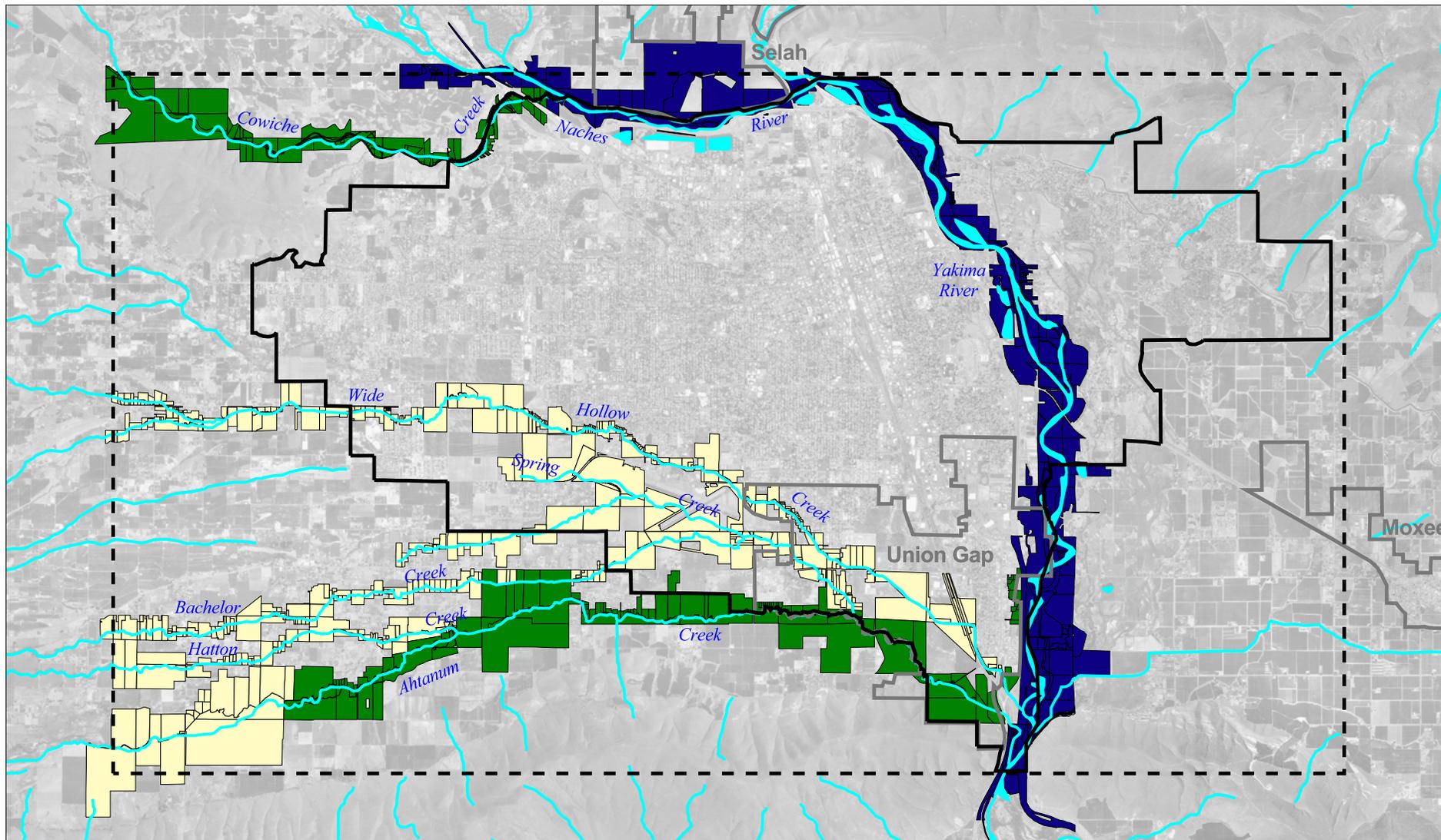


This figure was originally produced in color. Reproduction in black and white may result in loss of information.

Riparian Buffer Width Delineation Coverage

CITY OF YAKIMA/HIP/WA

Drawn: ATB	Revision: 3	Date: Mar 31, 2003	Figure: 13
------------	-------------	--------------------	-------------------



LEGEND

- | | | | |
|---|--|---|--------------|
|  | Spring Chinook - Spawning and Rearing |  | Water Bodies |
|  | Spring Chinook - Rearing Only |  | Watercourses |
|  | Spring Chinook - No Spawning and Rearing | | |
|  | Urban Growth Area Boundary |  | Project Area |



Scale 1" = 1.5 Miles

Map Projection: Washington State Plane, NAD 83, South Zone, Feet

Source: USGS, WSDOE, City of Yakima, Golder Associates Inc.



This figure was originally produced in color. Reproduction in black and white may result in loss of information.

Spring Chinook - Spawning and Rearing

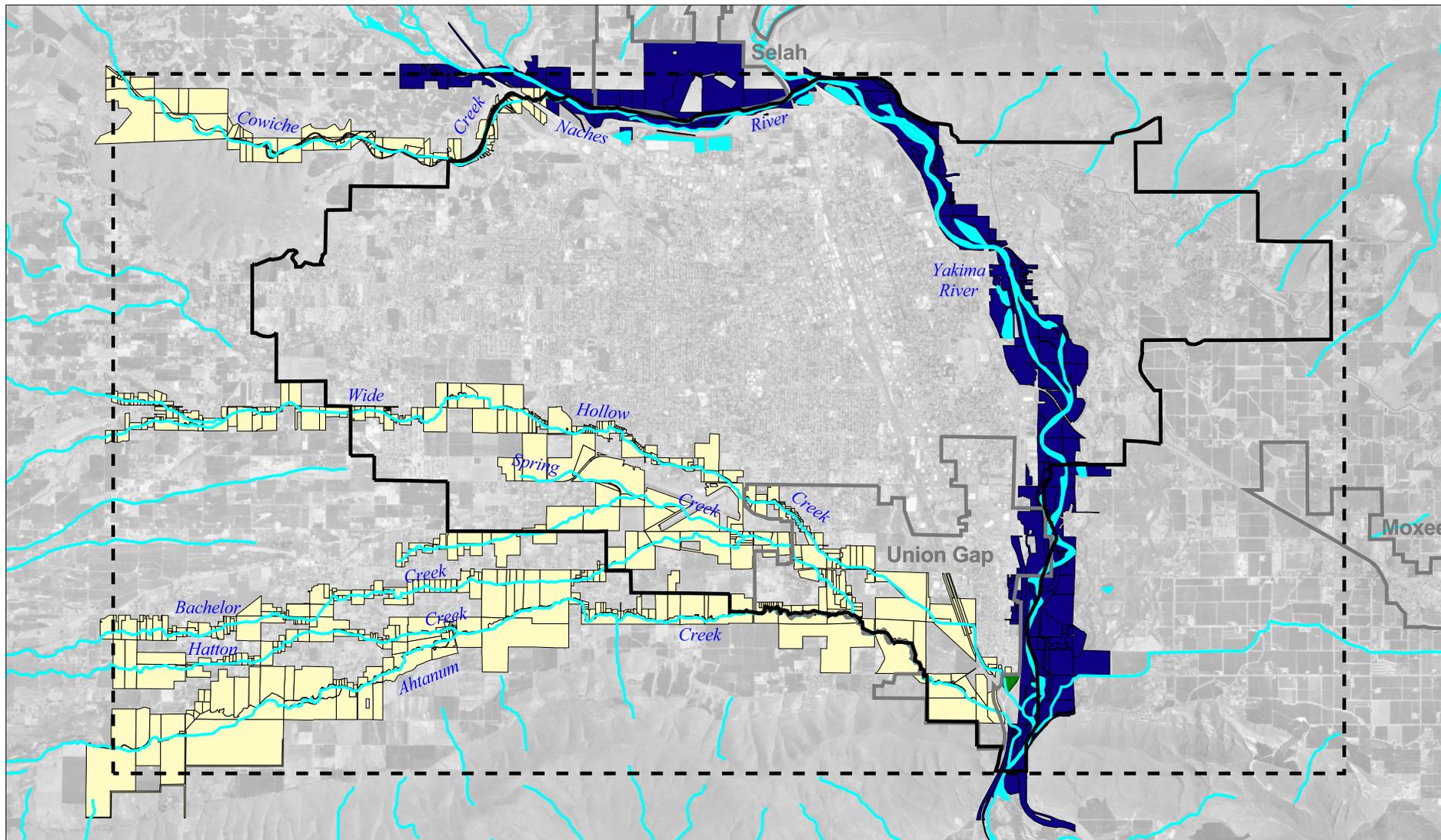
CITY OF YAKIMA/HIP/WA

Drawn: ATB

Revision: 3

Date: Mar. 31, 2003

Figure: **14**



LEGEND

- Fall Chinook - Spawning and Rearing
- Fall Chinook - Rearing Only
- Fall Chinook - No Spawning and Rearing
- Urban Growth Area Boundary
- Project Area
- Water Bodies
- Watercourses



Scale 1" = 1.5 Miles

Map Projection: Washington State Plane, NAD 83, South Zone, Feet

Source: USGS, WSDOE, City of Yakima, Golder Associates Inc.



This figure was originally produced in color. Reproduction in black and white may result in loss of information.

Fall Chinook - Spawning and Rearing

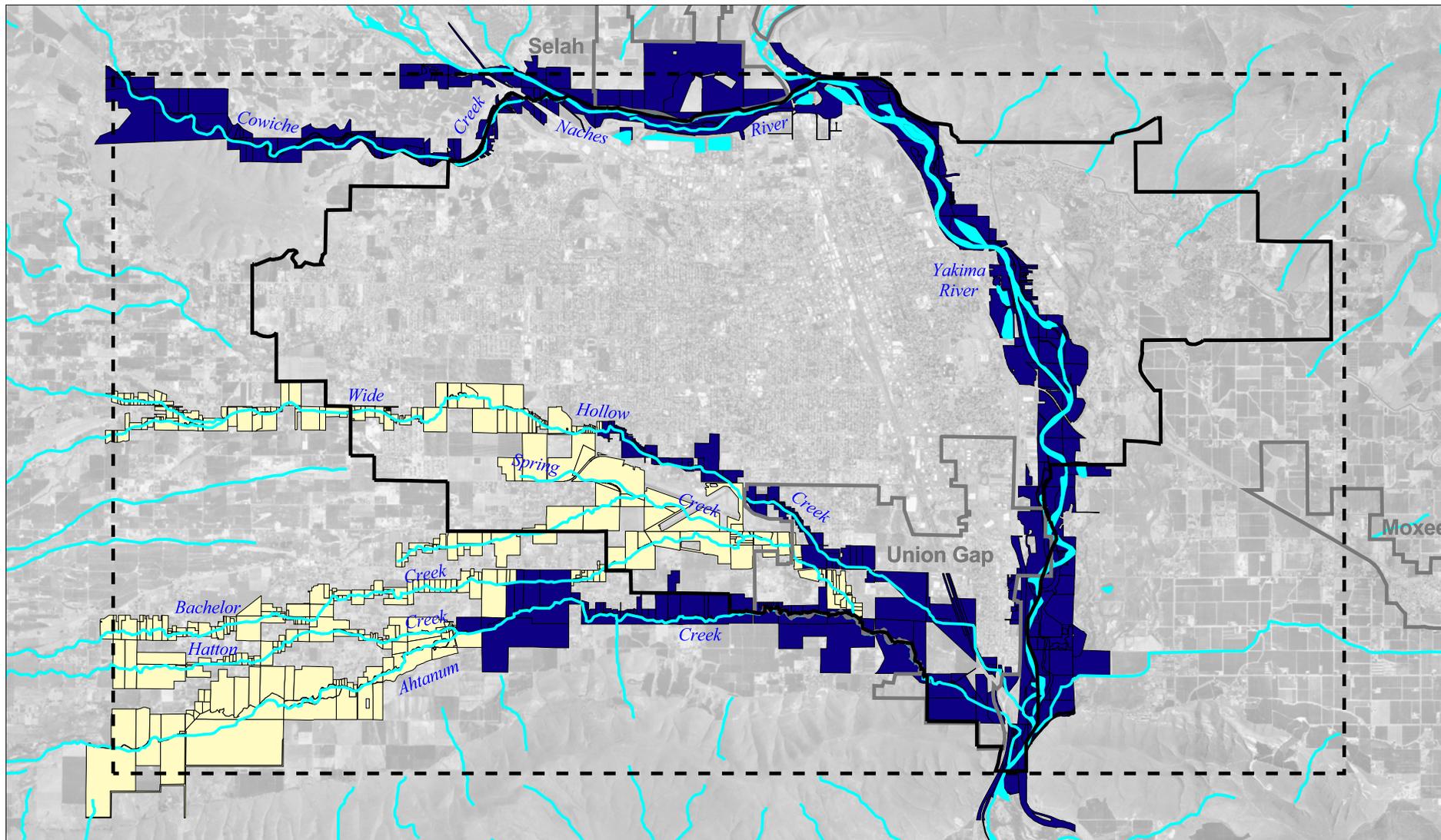
CITY OF YAKIMA/HIP/WA

Drawn: ATB

Revision: 3

Date: Mar 31, 2003

Figure: **15**



LEGEND

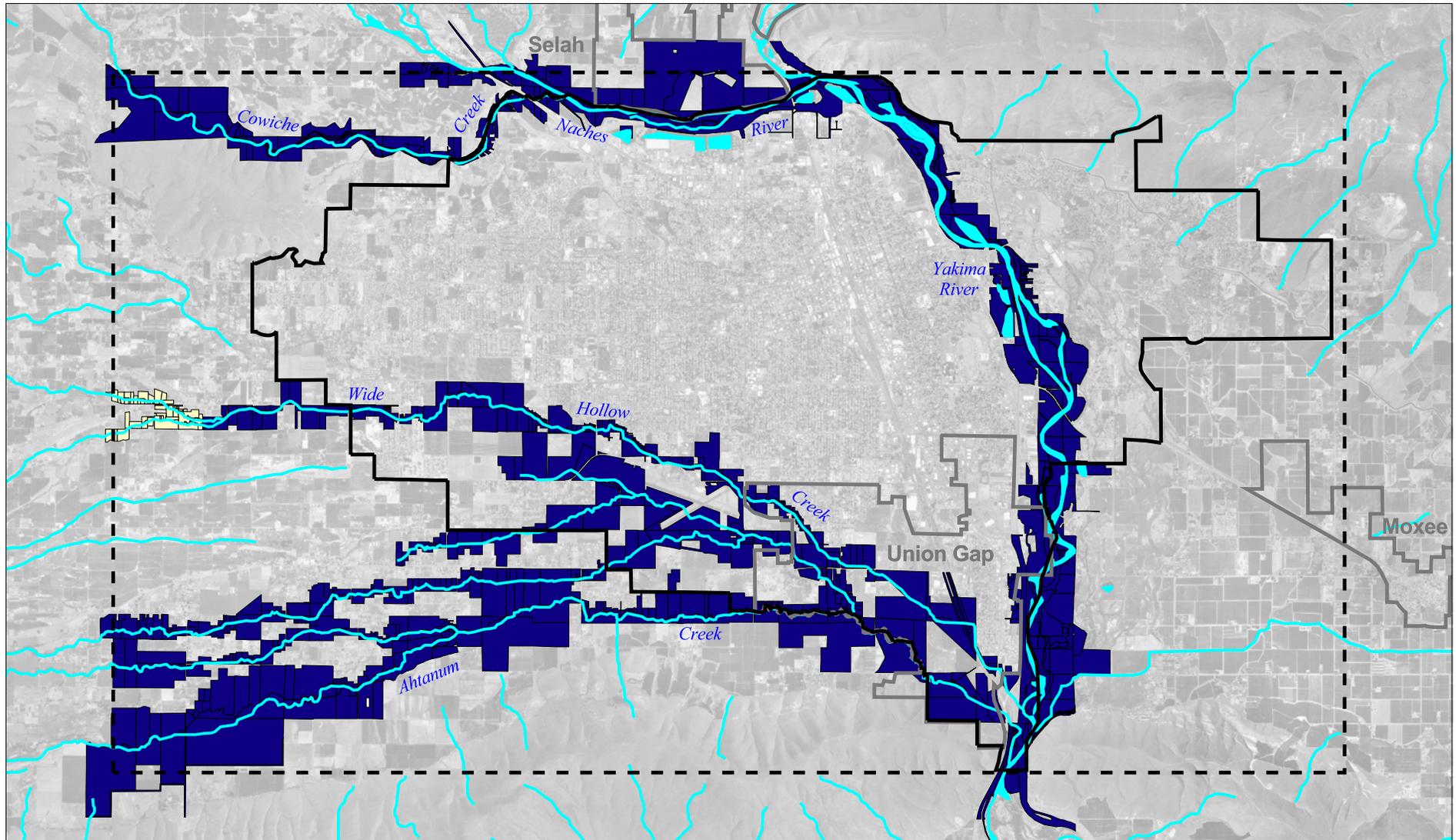
- Coho - Spawning and Rearing
- Coho - No Spawning and Rearing
- Water Bodies
- Watercourses
- Urban Growth Area Boundary
- Project Area

0 1.5
 Scale 1" = 1.5 Miles
 Map Projection: Washington State Plane, NAD 83, South Zone, Feet
 Source: USGS, WSDOE, City of Yakima, Golder Associates Inc.



This figure was originally produced in color. Reproduction in black and white may result in loss of information.

Coho - Spawning and Rearing			
CITY OF YAKIMA/HIP/WA			
Drawn: ATB	Revision: 3	Date: Mar 31, 2003	Figure: 16



LEGEND

- Steelhead - Spawning and Rearing
- Steelhead - No Spawning and Rearing
- Water Bodies
- Watercourses
- Urban Growth Area Boundary
- Project Area

0
0
1.5

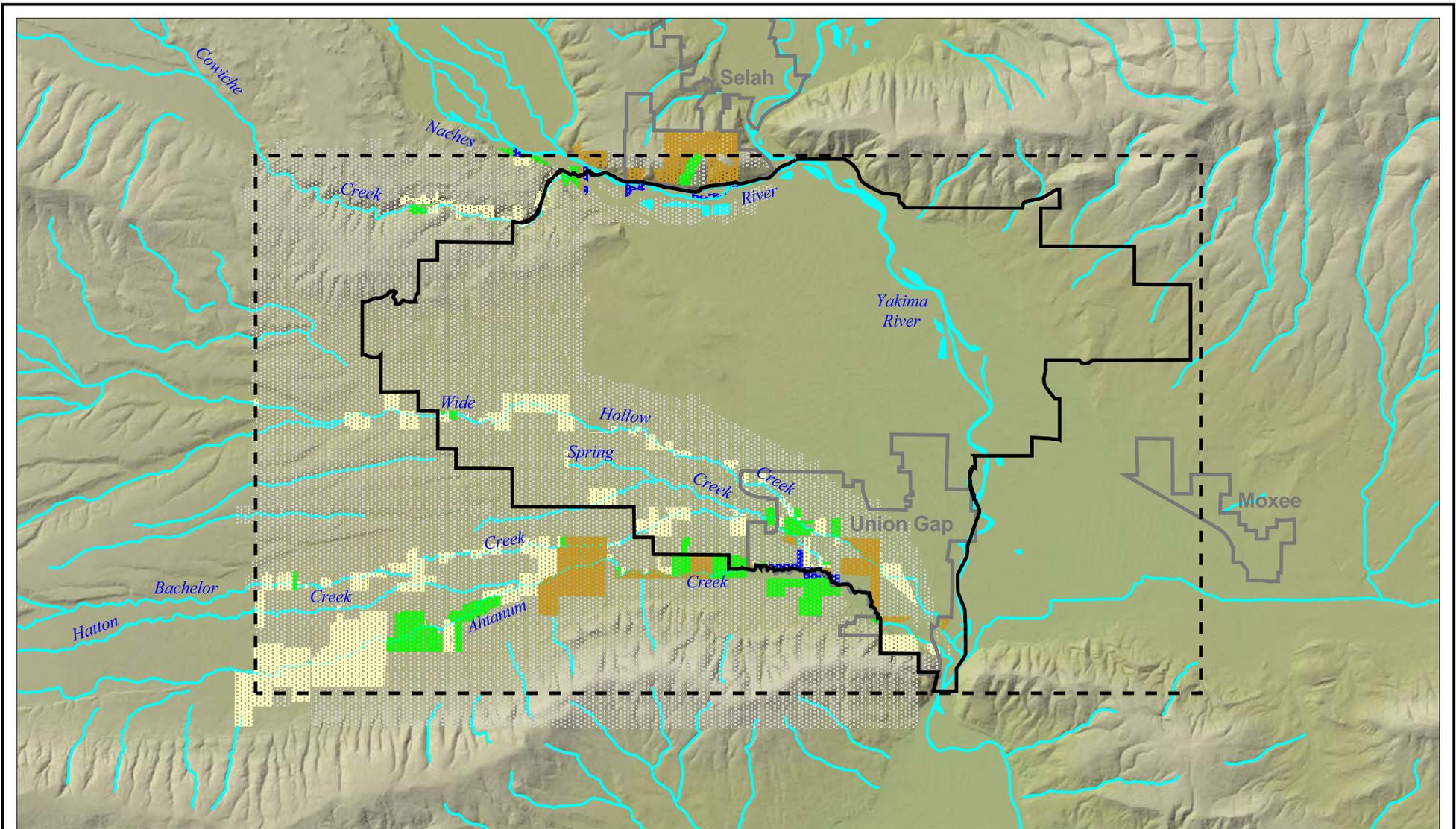
 Scale 1" = 1.5 Miles
 Map Projection: Washington State Plane, NAD 83, South Zone, Feet
 Source: USGS, WSDOE, City of Yakima, Golder Associates Inc.



This figure was originally produced in color. Reproduction in black and white may result in loss of information.

Steelhead - Spawning and Rearing
 CITY OF YAKIMA/HIP/WA

Drawn: ATB	Revision: 2	Date: Mar 31, 2003	Figure: 17
------------	-------------	--------------------	-------------------



LEGEND

Parcel Prioritization Score

- 0% - 60%
- 60% - 70%
- 70% - 80%
- 80% - 90%
- 90% - 100%

- Waterbodies
- Watercourses
- UGA Boundary
- Project Area

- City Limits



Scale 1" = 10,000 Feet

Map Projection: Washington State Plane, NAD 83, South Zone, Feet

Source: USGS, WSDOE, City of Yakima, Golder Associates Inc.



This figure was originally produced in color. Reproduction in black and white may result in loss of information.

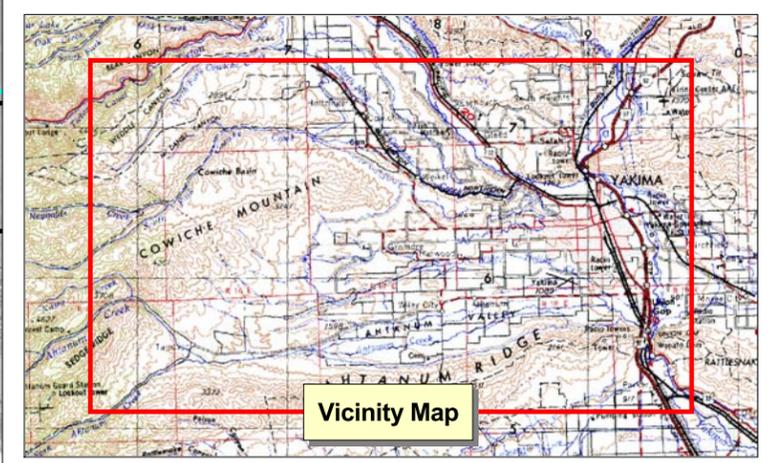
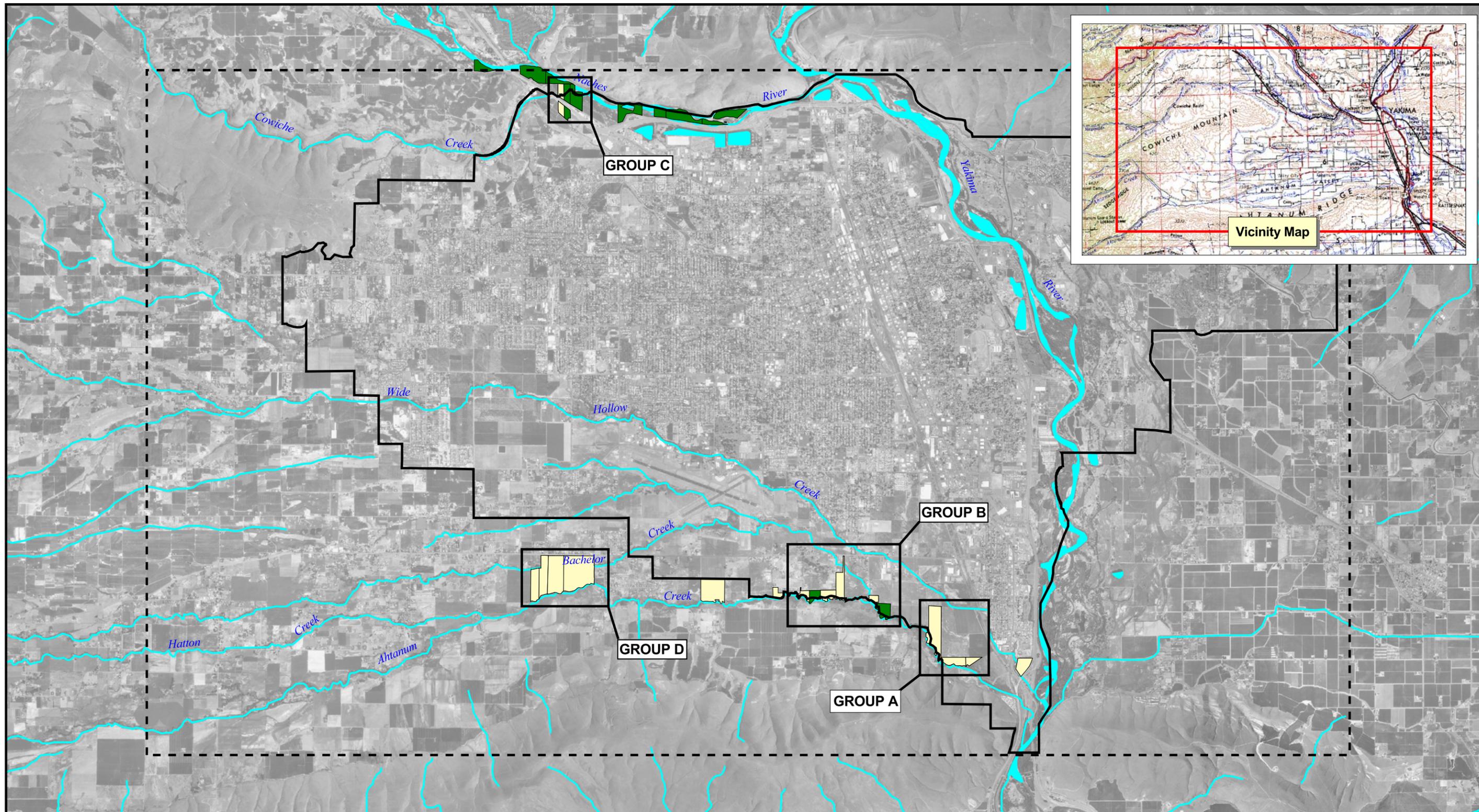
Phase 1 Parcel Prioritization Results - Overview
CITY OF YAKIMA/HIP/WA

Drawn: ATB

Revision: 4

Date: Mar 31, 2003

Figure: **18**



- LEGEND**
- Creeks and Streams
 - Lakes
 - UGA Boundary
 - Study Area Boundary

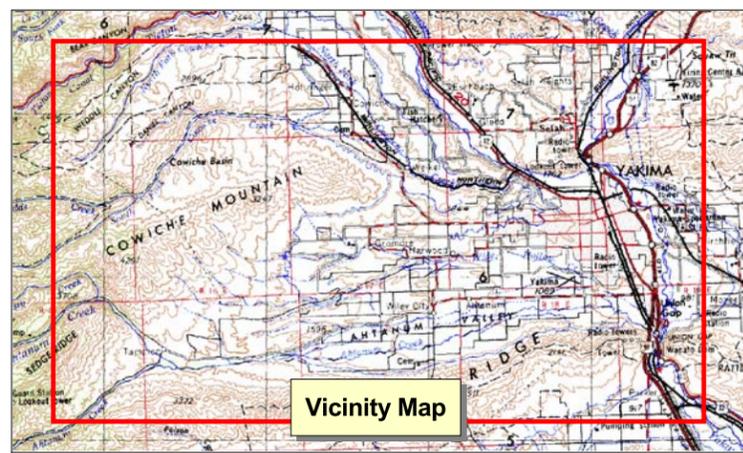
- TWG Grouping / Parcel Ranking**
- 80% - 90%
 - 90% - 100%
- Priority Area ***

* Note: Priority Areas were defined from parcel groupings provided by the TWG.

0 1
Scale 1" = 1 Mile
Map Projection: Washington State Plane, NAD83, South, Feet
Source: USGS, WSDOE, WSDOT



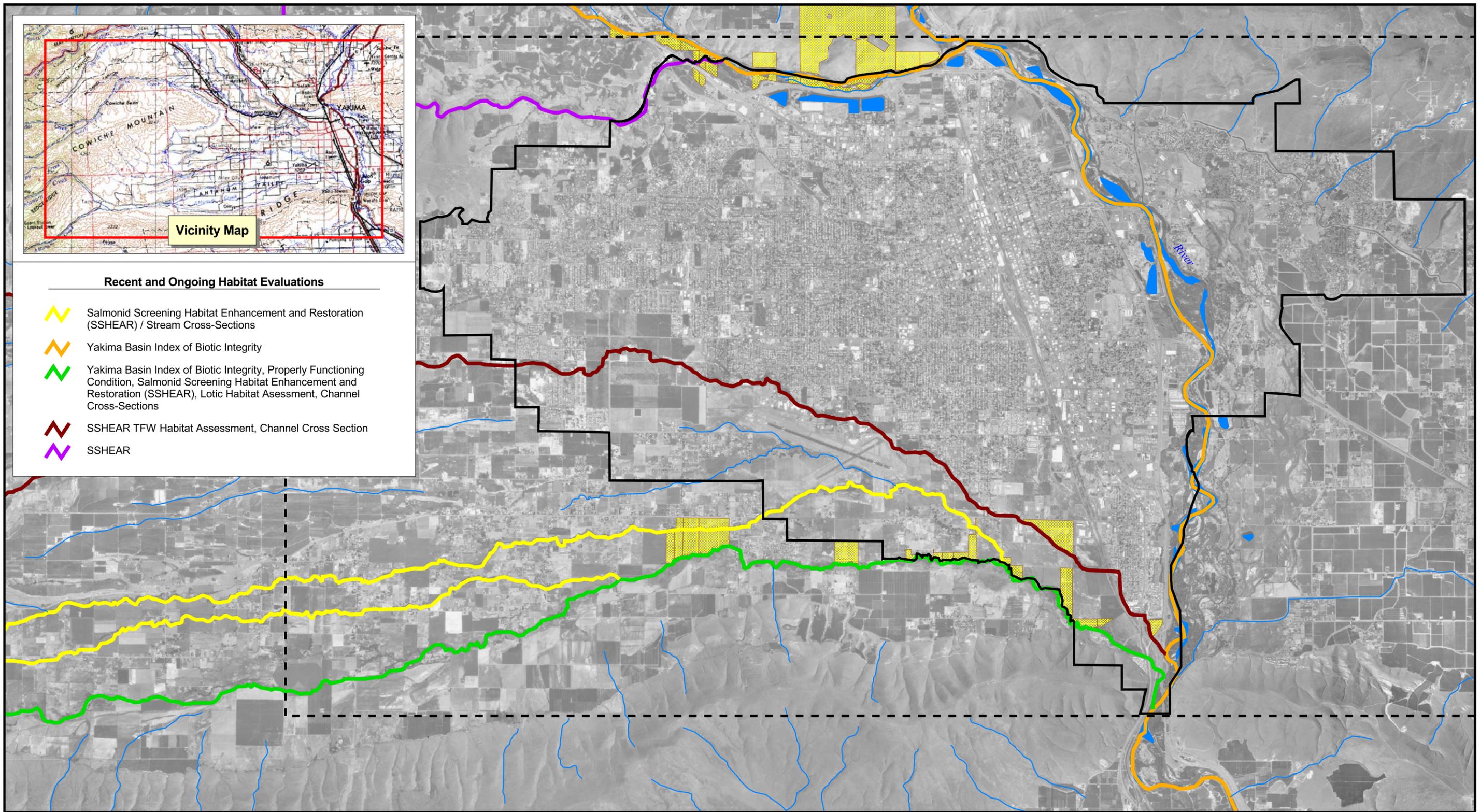
Final Parcels Identified for Tributary Habitat Acquisition			
CITY OF YAKIMA / HIP / WA			
Drawn: GE	Revision: 1	Date: Mar 31, 2003	Figure: 19



Vicinity Map

Recent and Ongoing Habitat Evaluations

-  Salmonid Screening Habitat Enhancement and Restoration (SSHEAR) / Stream Cross-Sections
-  Yakima Basin Index of Biotic Integrity
-  Yakima Basin Index of Biotic Integrity, Properly Functioning Condition, Salmonid Screening Habitat Enhancement and Restoration (SSHEAR), Lotic Habitat Assessment, Channel Cross-Sections
-  SSHEAR TFW Habitat Assessment, Channel Cross Section
-  SSHEAR



LEGEND

-  Yakima UGA Boundary
-  Study Area Boundary
-  Rivers
-  Priority Parcels

0 1
 Scale 1" = 1 Mile
 Map Projection: Washington State Plane, NAD83, South, Feet
 Source: USGS, WSDOE, WSDOT



Recent and Ongoing Stream Surveys in Yakima Urban Growth Area

CITY OF YAKIMA / HIP / WA

Drawn: GKL	Revision: 4	Date: Mar. 31, 2003	Figure: 20
------------	-------------	---------------------	-------------------

APPENDIX A

SUMMARY OF GIS LAYERS COLLECTED AND CREATED

APPENDIX A

Summary of GIS Layers Collected and Created

Source	Data type
Ahtanum Irrigation District	Hardcopy maps of Ahtanum Creek; GIS Coverage of Ahtanum Creek
City of Yakima	1998 Color Aerial photography
	Zoning
	Water pipes
	Wetlands
	Urban Growth Area
	Street lights
	Streets
	Soils
	Schools
	Rivers
	Railroads
	Police
	PLSS
	Pipes
	Parks
	Parcels
	FEMA
	Manholes
	Irrigation
	Hydrants
	Fire response
	Fire districts
	Drainage
	Creeks
	20 ft. contours
	City limits
	City contours
	Cities
	1990 census
	Canals
	Bike paths
	Airports
Climate Source LLC	PRISM precipitation and Temperature data
Golder Associates Inc.	Riparian Buffer Delineations
	Stream Length
	Priority Areas
	Proximity to Stream
National Wetlands Inventory	Wetlands
US Geological Survey	SSURGO
	100k Geology
	NLCD Land use (30 m resolution)
WAGDA	10 meter Digital Elevation Model (DEM)

Source	Data type
	7.5 minute USGS Topographic Quadrangles
	1996 USGS Digital Ortho Quarter Quads (DOQQ)
Washington Conservation Commission	WRIA 37-39 Limiting Factors Analysis
Washington Department of Fish and Wildlife	Bull Trout Distribution
	Resident Fish Distribution
	Anadromous Presence, Rearing and Spawning
	SASI Fish
	PHS Species
	Barriers
	Banks
	Facilities
	Hydrology
Washington Department of Ecology	100k Hydrology
Washington Department of Transportation	State Routes
	Reservations
Yakama Nation	1998 Bull trout distribution
	1998 Anadromous distribution
	Bank and streams
	Parcels
	2000 Aerial photography (30 meter resolution)
Yakima County	Agricultural resources data
	10 foot and 33 foot contours
	Ahtanum watershed outlines
	DIDs
	FEMA
	Parcels
	Riverine open water
	Soils, stream types
	Wetlands
	Orthophotos and aerial photos for 1947, 1968, 1992, and 1998