APPENDIX A
FEDERAL, STATE, REGIONAL, AND LOCAL POLICIES

Federal, State, Regional, and Local Policies

When the Metro Council adopted the Urban Growth Management Functional Plan in 1996, one of the purposes was to address regional fish and wildlife habitat as a matter that has a "significant impact upon the orderly and responsible development of the metropolitan area." ORS 268.390(1). Regional conservation of identified fish and wildlife habitat is consistent with many other state and federal policies and laws. The Metro Policy Advisory Committee recognized this connection in October 2000, when it adopted the "Purpose, Vision, Goal, Principles and Context" (Vision Statement) for the development of Metro's fish and wildlife program.

The Vision Statement recommended that the Metro Council address these state and federal policies, in particular the Endangered Species Act (ESA). MPAC recommended that Metro develop a program that could satisfy federal agency standards, and comply with the ESA "so that local governments could use it if they choose." Metro's fish and wildlife program will have important connections with many other state and federal programs, and will aid in local compliance with those programs. The discussion below describes relevant federal and state requirements and how Metro's program may be coordinated with those requirements.

Federal Policy

Endangered Species Act (ESA)

The purpose of the ESA is "to provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved." 16 USC 1531(b). The act requires federal agencies to identify critical habitat for endangered and threatened species, create a recovery plan for those species and in some circumstances issue regulations that provide for the conservation of such species. Above all, the act prohibits any individual, group of individuals, states, cities and counties from "taking" a listed species.[1]

Twelve species of salmon and steelhead are listed as either threatened or endangered in the Columbia River and Willamette River Basins. (See Table A-1). The federal agency responsible for these species is the National Oceanic and Atmospheric Administration Fisheries unit (NOAA Fisheries). All of these species are present in the Portland metropolitan area at some point in their life cycle. They either migrate through the metropolitan area as adults or juveniles, or may spawn and rear in metropolitan area streams. Most of these salmonids were listed in 1997, 1998 and 1999. NOAA Fisheries is currently undertaking a review of those listed species to determine whether their status should be revised. This review could result in species being reclassified from endangered to threatened or visa versa, or candidate species (those proposed for listing in the past) being listed as endangered or threatened. One such species that exists in the metropolitan area is the lower Columbia River Coho Salmon.

[1] The term "take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct. 16 USC 1532(19).

Numerous other fish and wildlife species and species of concern may also be found in the Metro region. These include as listed species: Aleutian Canada goose and Peregrine falcon; species of concern: Pacific western big-eared bat, Northwestern pond turtle, Tricolored blackbird, Olive-sided flycatcher, Little willow flycatcher, Northern red-legged frog, Long-eared myotis (bat), Fringed myotis (bat), Long-legged myotis (bat), Yuma myotis (bat), Green sturgeon and Pacific lamprey.

Table A-1: Endangered Species Act status of West Coast salmon & steelhead

Species	ESU (Date)	Status
Coho Salmon	Lower Columbia River/Southwest WA ESU (7/95)	Proposed
Chinook Salmon	Snake River Fall-run (4/92)	Threatened
	Snake River Spring/Summer-run (4/92)	Threatened
	Lower Columbia River (3/99)	Threatened
	Upper Willamette River (3/99)	Threatened
	Upper Columbia River Spring-run (3/99)	Endangered
Chum Salmon	Columbia River (3/99)	Threatened
Sockeye	Snake River (11/91)	Endangered
Steelhead	Upper Columbia River (8/97)	Endangered
	Snake River Basin (8/97)	Threatened
	Lower Columbia River (3/98)	Threatened
	Upper Willamette (3/99)	Threatened
	Middle Columbia River (3/99)	Threatened

The listing of species as threatened or endangered triggers a requirement for the responsible federal agency to create a recovery plan for that species or their habitat. NOAA Fisheries lists threatened and endangered species by Evolutionarily Significant Units (ESU) which encompass geographic areas that may include multiple river basins. For recovery planning purposes, NOAA Fisheries has combined five ESUs into the Columbia Basin "recovery domain" for listed salmonids. The Willamette River Basin is part of that recovery domain. Recovery planning must address problems at both the ESU scale and the smaller scale of independent populations of fish. For example, NOAA Fisheries has identified independent populations of threatened steelhead in the McKenzie, Calapooia, Santiam and Clackamas river basins.

NOAA Fisheries is currently developing recovery plans for listed salmonid species. As explained in more detail below, much of that work will be accomplished through the Northwest Power Planning Council's subbasin planning process. While it is anticipated that the recovery plans will be detailed and comprehensive, the measures identified by the plans will apply only to federal actions, or actions that have a federal nexus (i.e., federally funded). Strictly speaking, individuals and state and local governments are not bound by these recovery plans. However, the recovery plans are likely to represent the best guidance for conducting local actions that may have an adverse impact on the listed species. It may also be several years before the recovery plans are fully implemented. Until that time, local governments must implement their own measures to avoid taking listed species. These measures can take the form

of a section 4(d) limit, a section 10 habitat conservation plan, or modifying regulation of local land development to minimize the risk of take.

Metro's inventory of regionally significant fish and wildlife habitat has identified habitat upon which listed salmonids depend for some part of their life histories. Coordinating Metro's program with NOAA Fisheries recovery plan as it is developed will not only assist in long-term recovery of the species, but also with local compliance with the ESA.

Clean Water Act (CWA)

The Clean Water Act (CWA) sets a national goal to "restore and maintain the chemical, physical and biological integrity of the Nations waters." 33 U.S.C.A. 1251. In Oregon, the CWA is implemented by the Department of Environmental Quality (DEQ) with review and approval by the U.S. Environmental Protection Agency (EPA). The DEQ has the responsibility for protecting the beneficial uses of rivers, streams and lakes of the state. Beneficial uses include drinking water, cold water fisheries, industrial water supply, recreation and agricultural uses. The DEQ carries out this responsibility in part by identifying those water bodies which are not meeting current water quality standards. This inventory is commonly referred to as the section 303(d) list. The 1998 303(d) list included over two hundred miles of rivers and streams in the Metro region which did not meet water quality parameters for one or more pollutants. For the entire state, about 5,000 miles of water quality limited rivers and streams have been added to the 303(d) list since 1998.

For waters identified on the 303(d) list, DEQ must develop total maximum daily loads (TMDL) for those pollutants that exceed water quality standards. These TMDLs apply to both point sources (end of pipe) and nonpoint sources (no specific origin). The daily load allocations become part of plans at the watershed scale intended to meet water quality standards. Depending upon where the watershed is located, different state agencies, local governments and land owners will be responsible for developing the water quality plans. In urban areas, local governments, watershed councils, landowners and stakeholders will likely be the parties responsible for such plans.

In addition to developing water quality plans in connection with TMDLs, some cities and counties are also responsible for stormwater management. Generally, large cities, smaller cities within urbanized areas, and cities outside urbanized areas with populations over 10,000 are required to have permits to operate municipal separate storm sewer systems that discharge into surface waters of the state. These permits require cities to implement water quality protections for their municipal operations and for construction and post construction run-off control from urban development.

Beginning in December 2002, individual projects that disturb one or more acres of land need National Pollutant Discharge Elimination System (NPDES) 1200-C general permit coverage. These permits govern stormwater discharges. One of the requirements of these permits is an erosion and sediment control plan that applies before during and after construction. The plan must demonstrate how erosion will be controlled and limited so that sediment does not have an adverse impact on receiving water bodies.

While Metro does not have responsibility or authority to regulate water quality, the Title 3 water quality land use requirements are already consistent with many DEQ rules. Metro's fish and wildlife program will further assist the region with improving water quality for the beneficial use of supporting cold water fisheries.

Pacific Northwest Electric Power Planning and Conservation Act (Northwest Power Act)

The 1980 Northwest Power Act requires the Bonneville Power Administration ("BPA") to implement a Fish and Wildlife Program that mitigates for the degradation to both fish and wildlife habitat caused by the Columbia Hydropower System. Complying with the Fish and Wildlife Program is achieved primarily through subbasin plans developed with oversight from the Northwest Power Planning Council. The subbasin plans consist of three parts: (1) a subbasin assessment describing existing and historic resource conditions, (2) an inventory if existing activities, and (3) a management plan that addresses the key limiting factors in the subbasin. A "lead entity" is contracted to coordinate the subbasin planning. The BPA provides funding for producing the subbasin plan, technical assistance related to the plan, and ultimately for on-the-ground projects that implement the plan.

The connection between NPPC subbasin planning and NOAA Fisheries recovery planning for listed salmonids has recently been strengthened. The Regional Administrator for NOAA Fisheries envisions that subbasin plans will become components of federal recovery plans. NOAA Fisheries and NPPC collaborated on developing a Technical Guide for Subbasin Planners with the intent of enabling those planners to produce a subbasin plan that would satisfy local recovery plan requirements under the ESA.

The NPPC has contracted with the Willamette Restoration Initiative (WRI) to coordinate the creation of the Willamette Subbasin Plan. The subbasin planning process accommodates and encourages participation by watershed councils, stakeholders, and local governments. The information generated by Metro's Fish and Wildlife Habitat Conservation program will be valuable to that planning process and contribute as a building block of NOAA Fisheries recovery plan. Coordination between Metro and WRI on the subbasin planning will be extremely important because the subbasin plan will prioritize needs and projects in the Lower Willamette and Clackamas River basins that will potentially qualify for federal funding support, and will constitute local components of NOAA Fisheries recovery plan for listed salmonids.

The Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Fishery Conservation and Management Act was originally passed in 1976 and amended by the Sustainable Fisheries Act of 1996. These statutes require federal agencies to consult with NOAA Fisheries on activities that may adversely affect "essential fish habitat" ("EFH"). The Magnuson – Stevens Act defines EFH as "those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity."

The Pacific Fishery Management Council has identified EFH for the pacific coast salmon fishery. Those areas generally include "those waters and substrate necessary for salmon production needed to support a long-term sustainable salmon fishery and salmon contributions to

a healthy ecosystem."[2] To meet that goal, EFH must include all streams, lakes, ponds, wetlands and the habitat historically accessible to salmon in Washington, Oregon, Idaho and California. The Sandy River, Clackamas River, Tualatin River, and Lower Willamette River basins have all been identified as EFH for chinook and coho salmon. These basins include streams and habitat in urban areas.

The Magnuson – Stevens Act does not contain requirements for state, local or private entities. NOAA Fisheries typically considers EFH at the same time it conducts ESA Section 7 consultations. However, the Pacific Fishery Management Council considers EFH to be a common interest among all parties, and a tool to promote healthy and sustainable coastal fisheries.

State Policy

Oregon Plan for Salmon and Watersheds

The mission of the Oregon Plan for Salmon and Watersheds is "to restore our native fish populations – and the aquatic systems that support them – to productive and sustainable levels that will provide substantial environmental, cultural and economic benefits." It was initiated in 1995 to address restoration of coastal coho salmon. In April 1997, the Oregon Legislature incorporated other related efforts into one overarching framework: "The Oregon Plan for Salmon and Watersheds." It is designed to restore the healthy function of Oregon's natural aquatic systems. It represents commitments on behalf of government, interest groups and private citizens from all sectors of the State.

The local watershed councils are the bedrock of the Oregon Plan. The councils are composed of citizens who are concerned about their rivers and watersheds. They are formed and operate according to two principles adopted by the Legislature: 1) that the watershed council be a voluntary, local group, and 2) the council represents a balance of interested and affected persons within the watershed. The primary tasks of a watershed council are to conduct an assessment of the watershed and create an action plan for improving the watershed.

Six watershed councils are currently operating in the Metro region: Columbia Slough Watershed Council, Sandy River Basin Watershed Council, Clackamas Basin Watershed Council, Tualatin River Watershed Council, Tryon Creek Watershed Council, and Johnson Creek Watershed Council. Each of these groups is funded to some degree by the Oregon Watershed Enhancement Board (OWEB). In addition to doing their assessment and action plans, these watershed councils do a heroic amount of community outreach and education. Close cooperation between Metro and the watershed councils will fulfill the purpose of the Oregon Plan and help identify key restoration opportunities that are important to those communities in the region.

There is a Willamette Chapter to the Oregon Plan for Salmon and Watersheds. In 1998 former Governor John Kitzhaber founded Willamette Restoration Initiative (WRI) by appointing a diverse group of business, government, farming, conservation and community representatives to serve on a board. The group was charged with identifying the means to address the Willamette River's many problems from water quality to lost habitat. In February 2001, the Willamette

[2] Identification and Description of Essential Fish Habitat, Adverse Impacts and Recommended Conservation Measures for Salmon, Pacific Fishery Management Council, 1999.

Restoration Initiative published its "Willamette Restoration Strategy" which is the Willamette Chapter of the Oregon Plan. The Strategy identifies 27 critical actions that are necessary in the Willamette River Basin to improve the river and its ecosystems. The recommendations from the Strategy will strongly influence local plans that seek to protect natural resources in and along the Willamette River.

Native Fish Conservation Policy

In November 2002, the Oregon Fish and Wildlife Commission adopted the Native Fish Conservation Policy. The purpose of the policy is: "to ensure the conservation and recovery of native fish in Oregon." OAR 635-007-0502. The policy focuses on "naturally produced native fish" which are those fish species that "reproduce and complete their full life cycle in natural habitats." OAR 635-007-0501(33). The reason for this focus on naturally produced fish is that those "native fish are the primary basis for Endangered Species Act delisting decisions and the foundation for long-term sustainability of native species and hatchery programs."

The Oregon Department of Fish and Wildlife is responsible for developing conservation plans for native fish species with priority on those species listed under the state ESA or as state "sensitive species." OAR 635-007-0505(3). The conservation plans will use the Oregon Plan for Salmon and Watersheds and input from "local and regional forums" as the context for the development, implementation, and coordination of the plans. Although Metro's fish and wildlife program is not restricted to protecting native fish species, the program will offer some protection to the habitats upon which native fish depend and provide an opportunity to coordinate with ODFW on applicable conservation plans.

Oregon Endangered Species Rules

The Oregon Endangered Species Act is intended to manage the listed "species and their habitats so that the status of the species improves to a point where listing is no longer necessary." Species are listed under the state act when: (1) they are native, and (2) they are in danger of extinction throughout any significant portion of its range within this state (endangered) or (3) likely to become an endangered species within the foreseeable future throughout any significant portion of its range within this state (threatened). OAR 635-100-0105(3). The state act also lists a species as "sensitive" when the "wildlife species, subspecies, or populations that are subject to a decline in number of sufficient magnitude to qualify their listing as Threatened due to loss in quantity or quality of habitat or other factors." OAR 635-100-0001(4).

The Oregon Department of Fish and Wildlife (ODFW) is required to develop survival guidelines for certain threatened or endangered species. The survival guidelines include water quality, water quantity and habitat requirements that apply on state property. The state act requires any agency in charge of state owned property to consult with ODFW to ensure that all actions on such property are consistent with the survival guidelines developed for affected species. OAR 635-100-1030. Lower Columbia River Coho salmon are listed as endangered under the state act and ODFW has adopted survival guidelines for the coho. At the time of listing, the species was only found in the Clackamas and Sandy River basins. Lower Columbia River Coho are candidate species for listing under the federal ESA.

Oregon Wetland Regulatory Program

The Oregon Division of State Lands (DSL) administers Oregon's removal/fill law (ORS 196.800-196.990). Using similar definitions as the federal government, DSL determines wetland boundaries and water bodies that meet the definition of "waters of the state." A permit is required for fill equal to or exceeding 50 cubic yards or more of material in any waters of the State at one location. Likewise, a permit is required for removal of more than 50 cubic yards of material in any waters of the state in any calendar year. Waters of the state means natural waterways including all tidal and nontidal bays, intermittent and constantly flowing streams, lakes, wetlands, and other bodies of navigable and non-navigable water.

Oregon Division of State Lands Essential Indigenous Anadromous Salmonid Habitat

In an effort to identify and protect essential habitat for salmon and trout, the Oregon Legislature in 1993 required the DSL to identify essential indigenous anadromous salmon habitat. DSL has defined such habitat as: "habitat that is necessary to prevent the depletion of indigenous anadromous salmonid species during their life history stages of spawning and rearing." OAR 141-102-0020(1). The agency has mapped essential habitat throughout the state. The essential habitat designation carries with it a requirement for a "permit for activities involving the fill or removal of any amount of material in essential habitat, unless the activity is exempt" by state law. OAR 141-102-0000(3).

Regional Policy

Several policies adopted by the Metro Council with the direction of citizens in the region influence the ESEE consequences analysis. These policies provide the framework for protecting natural resources while managing urban growth in the region. Natural resources, including riparian corridors and water quality, play a key role in the livability of the Metro region. Key policies are described below.

Metro Charter

Metro's 1992 Charter requires Metro to address issues of regional significance such as land use and transportation planning as well as regional parks and open spaces. Through its Charter-mandated responsibilities, the Metro Council has provided leadership in addressing growth management issues by working with citizens, elected officials and diverse interest groups to craft a vision of how the region will grow and to adopt policies to achieve that vision. In the course of debating how growth will be managed, the Metro Council identified the protection of natural systems – floodplains, rivers, streams and wetlands – as a cornerstone for these regional policies. Metro has determined in the *Region 2040 Growth Concept* that protecting these systems is essential to maintaining the region's livability and economic well being as well as providing habitat, water quality and flood management benefits.

Metro's role in identifying natural resource protection measures and incentives within its boundary has been established with adoption of the *Regional Urban Growth Goals and Objectives (RUGGOs), Region 2040 Growth Concept* and the *Urban Growth Management Functional Plan.* Natural resources by their very nature cross jurisdictional boundaries and are best managed with regional, watershed-wide protection strategies. Metro has a role in working with local jurisdictions to determine the protection of these important resources, just as it determines parking standards, transportation networks and land use densities for the region. Through extensive public involvement, the Metro Council has identified the need to balance

natural resource protection with urban development while the region grows. If coordination with citizens and elected officials outside of the Metro area can be achieved, natural resource protection can be ensured for entire watershed systems.

Future Vision Report

The 1992 Metro Charter required Metro to develop and consider a vision for the region's future development. Metro's 1995 *Future Vision Report* recognizes the region's unique ecosystem and the value of improved air and water quality. It states that the region should manage watersheds to protect, restore and maintain the integrity of streams, wetlands and floodplains, and their multiple biological, physical and social values. It also states that "...We value natural systems for their intrinsic value, and recognize our responsibility to be stewards of the region's natural resources." It identifies the need for "...restored ecosystems protected from future degradation and decline." While not a regulatory document, the *Future Vision Report* has greatly influenced the content of Metro's regional plans.

Regional Urban Growth Goals and Objectives

Metro's Regional Urban Growth Goals and Objectives (RUGGO), amended in 1995, identify goals and planning activities for the Metro region. Several RUGGO chapters relate to watersheds and riparian corridors. Two chapters relate to water resources: Objective 12: Watershed Management and Regional Water Quality and Objective 13: Urban Water Supply. Objective 12.1 states: "Metro will develop a long-term regional strategy for comprehensive water resources management, created in partnership with the jurisdictions and agencies charged with planning and managing water resources and aquatic habitats. The regional strategy shall meet federal and state water quality standards and complement, but not duplicate, local integrated watershed plans."

Objective 15: Natural Areas, Parks, Fish and Wildlife Habitat calls for an open space system capable of sustaining or enhancing native wildlife and plant populations. It recognizes the need for a regionwide system of linked significant wildlife habitats and states that this system should be preserved, restored where appropriate, and managed to maintain the region's biodiversity. The *Region 2040 Growth Concept* included a 200-foot environmental greenway along all streams in the region to ensure connectivity throughout the natural landscape. The Land Conservation and Development Commission (LCDC) acknowledged the RUGGOs for compliance with the statewide planning goals in 1996.

The Stream and Floodplain Protection Plan (Title 3)

Title 3, the *Stream and Floodplain Protection Plan,* (1996 *Urban Growth Management Functional Plan*) establishes regional performance standards to address water quality and floodplain management and recommends actions for the protection of fish and wildlife habitat. In June 1998, the Metro Council adopted revisions to Title 3, including water quality and floodplain maps that show where Title 3 applies. Section 5 of Title 3 (which was essentially unchanged by the 1998 amendments) directed Metro staff to address fish and wildlife habitat. The purpose of Section 5 is to: "conserve, protect and enhance fish and wildlife habitat within the fish and wildlife habitat conservation areas to be identified on the water quality and flood management area map by establishing performance standards and promoting coordination by Metro of regional urban watersheds." The completed sections of Title 3 meet the requirements for Statewide Planning Goal 6 (water quality) and Goal 7 (flood management), while Section 5

relates to Goal 5. LCDC acknowledged the water quality and floodplain protection components of Title 3 for compliance with Goals 5, 6 and 7 in 2000.

Greenspaces Master Plan

The Metro Greenspaces Master Plan, adopted by Metro Council in 1992, articulated the vision for a cooperative, interconnected system of parks, natural areas, trails and greenways for fish, wildlife and people. The Master Plan recommended tools to protect greenspaces such as acquisition, education and restoration. In 1995, voters passed Bond Measure 26-26 directing Metro to purchase regionally significant natural areas. Since then over 9,000 acres of natural areas have been acquired for permanent protection. Metro's Parks and Greenspaces Department also provides education programs and works to restore its properties.

Local Goal 5 programs

Most of the local jurisdictions in the Metro region have adopted Goal 5 programs that have been acknowledged by the Department of Land Conservation and Development as being in compliance with the state rule. Some of these programs were developed prior to Goal 5 rule revisions in 1996, while a few have been done more recently. The rule requires local jurisdictions to balance the need to protect natural resources against other state goals such as housing (Goal 10) and transportation (Goal 12) while providing ample opportunity for citizen involvement (Goal 1). Thus, the state rule allows local jurisdictions' Goal 5 programs to be in compliance with state law while being inconsistent with each other. However, Metro's code required an analysis of the consistency of local natural resource protection prior to conducting a regional ESEE analysis and a regional protection program.

Metro staff conducted an analysis of local Goal 5 programs beginning in 1999 and culminating in a report (*Local Plan Analysis: A Review of Goal 5 Protection in the Metro Region)* to the Metro Council in August 2002. The local plan analysis demonstrated that there are many inconsistencies and inadequacies in natural resource protection in the Metro region. An important reason for the inconsistency in local protection is that the Goal 5 rule does not set a specific standard, rather it lays out a process for jurisdictions to follow. The process described by state law allows jurisdictions to choose which resources to protect and the level of protection received after balancing the consequences of protection with the economic, social, and energy needs within the jurisdiction. Most jurisdictions choose to "limit" conflicting uses in resource areas, the Goal 5 Rule defines this choice as "conflicting uses should be allowed in a limited way that protects the resource to the desired extent." This language gives local governments wide discretion in designing protection programs.

If protecting natural resources is an important piece of maintaining livability within the region, as stated in Metro's Regional Urban Growth Goals and Objectives (RUGGOs), then it is critical to provide a more consistent level of protection throughout the region. This ESEE analysis identifies the tradeoffs of allowing, limiting, or prohibiting development consistently across the region.

Appendix B

Portland Metro Area – DEQ's 303 (d) Listed Pollutants of TMDLs

APPENDIX B
Portland Metro Area – DEQ's 303 (d) Listed Pollutants of TMDLs as per the 1998 Listing of Water Quality Limited Waterbodies.

TMDL	303 (D) LISTED POLLUTANTS
Lower Columbia River – Tenasillahe Island to Willamette River	Bacteria, Dissolved Oxygen, pH, Temperature, Total Dissolved Gas (from Dams), Arsenic, PCB, DDE, DDT
Lower Columbia River –Willamette River to Bonneville Dam	pH, Temperature, Total Dissolved Gas (from Dams), Arsenic, PCB, DDE, DDT
Lower Columbia – Sandy River	Temperature
Clackamas River – Mainstem	Temperature
Clackamas River – Fish Creek	Habitat Modification
Lower Willamette – Blue Lake	Aquatic Weeds or Algae, pH
Lower Willamette – Bybee Lake	Aquatic Weeds or Algae, Biological Criteria, Flow Modification, Habitat Modification, pH
Lower Willamette – Columbia Slough	Bacteria, Chlorophyll a, Dissolved Oxygen, Nutrients, pH, Temperature, DDE, DDT, PCBs, 2,3,7,8 TCDD (Dioxin), Lead
Lower Willamette – Fairview Creek	Bacteria, Nutrients, pH
Lower Willamette – Fairview Lake	Nutrients
Lower Willamette – Johnson Creek	Bacteria, Temperature, DDT, Dieldrin
Lower Willamette – Smith Lake	Aquatic Weeds or Algae, Biological Criteria, Flow Modification, Habitat Modification, pH
Lower Willamette – Spring Brook Creek	Bacteria
Lower Willamette – Tryon Creek	Temperature
Willamette River Mainstem – Mouth to Willamette Falls	Bacteria, Biological Criteria, Temperature, Mercury, Pentachlorophenol, Arsenic
Tualatin Basin – Ash Creek	Bacteria, Biological Criteria, Dissolved Oxygen, Temperature
Tualatin Basin – Beaverton Creek	Bacteria, Biological Criteria, Dissolved Oxygen, Temperature
Tualatin Basin – Bronson Creek	Bacteria, Biological Criteria, Chlorophyll a, Dissolved Oxygen, Temperature
Tualatin Basin – Burris Creek	Bacteria, Chlorophyll a, Dissolved Oxygen
Tualatin Basin – Butternut Creek	Bacteria, Biological Criteria, Dissolved Oxygen, Temperature
Tualatin Basin – Carpenter Creek	Bacteria, Dissolved Oxygen
Tualatin Basin – Cedar Creek	Bacteria, Chlorophyll a, Dissolved Oxygen
Tualatin Basin – Cedar Mill Creek	Bacteria, Biological Criteria, Temperature
Tualatin Basin – Chicken Creek	Bacteria, Dissolved Oxygen
Tualatin Basin – Christenson Creek	Bacteria, Dissolved Oxygen
Tualatin Basin – Council Creek	Dissolved Oxygen
Tualatin Basin – Dairy Creek	Bacteria, Dissolved Oxygen, Temperature, pH
Tualatin Basin – Fanno Creek	Bacteria, Chlorophyll a, Dissolved Oxygen, Temperature, Arsenic, Manganese, Iron
Tualatin Basin – Gales Creek	Bacteria, Dissolved Oxygen, Temperature, pH
Tualatin Basin – Hall Creek	Bacteria, Dissolved Oxygen
Tualatin Basin – Heaton Creek	Bacteria
Tualatin Basin – Hedges Creek	Bacteria, Biological Criteria, Dissolved Oxygen, Temperature
Tualatin Basin – Johnson Creek	Bacteria, Biological Criteria, Dissolved Oxygen, Temperature
Tualatin Basin – McFee Creek	Bacteria, Dissolved Oxygen
Tualatin Basin – McKay Creek	Bacteria, Temperature
Tualatin Basin – Nyberg Creek	Bacteria, Chlorophyll a, Dissolved Oxygen, Temperature
Tualatin Basin – Rock Creek	Bacteria, Biological Criteria, Chlorophyll a, Dissolved Oxygen, Temperature
Tualatin Basin – Scoggins Creek	Dissolved Oxygen
Tualatin Basin – Summer Creek	Bacteria, Biological Criteria, Dissolved Oxygen, Temperature
Tualatin Basin – Willow Creek	Bacteria, Dissolved Oxygen, Temperature
Tualatin River – Mainstem	Bacteria, Temperature

Courtesy Don Yon, Oregon DEQ, 2003.

APPENDIX B
Portland Metro Area – DEQ's 303 (d) Listed Pollutants of TMDLs as per the 2002 Listing of Water Quality Limited Waterbodies.

TMDL	303 (D) LISTED POLLUTANTS
Clackamas River – Mainstem	*E. coli*, Temperature
Willamette River – Mainstem	Aldrin, Biological Criteria, DDT, DDE, Dieldrin, Fecal Coliform, Iron, Manganese, Mercury, PCB, Pentachlorophenol, Polynuclear Aromatic Hydrocarbons (PAHs), Temperature
Lower Columbia – Sandy River	Dissolved Oxygen, *E. coli*, Temperature
Willamette River – Smith Lake	Aquatic Weeds or Algae, pH
Willamette River – Blue Lake/Arata Creek and Bybee Lake	Aquatic Weeds or Algae, pH
Willamette River – Columbia Slough	Iron, Manganese, Temperature
Willamette River – Fairview Lake/ Osburn Creek	PH
Willamette River – Johnson Creek	DDT, Dieldrin, Fecal Coliform, PCB, Polynuclear Aromatic Hydrocarbons (PAHs), Temperature
Willamette River – Spring Brook Creek	Temperature
Willamette River – Kellogg, Mt. Scott, and Phillips Creeks	*E. coli*
Willamette River – Tryon Creek	Temperature
Tualatin Basin – Knoll Wetland	Chromium, Copper, Lead, Silver, Zinc

Courtesy Don Yon, Oregon DEQ, 2003.

Note: This list is shorter than the 1998 list not because water quality has improved, but because TMDLs were developed for many 303(d)-listed reaches.

Appendix C

Economic Report and Literature Review

APPENDIX D

ESEE Consequences by Generalized Regional Zones

Development scenario	Economic consequences: SINGLE FAMILY RESIDENTIAL (SFR)			
	Class I, II and III Riparian/wildlife		Class A, B, and C Upland wildlife habitat	
	Positive	***Negative***	***Positive***	***Negative***
ALLOW	• Property owners realize full development potential. • Protection of amenity/quality of life values associated with the build environment in urban areas. • Expanding UGB not required.	• Degradation of ecosystem services and values. • Higher loss of ecosystem services and values for resources in Class I compared with Classes II and III. • See full table of interactions for tradeoffs of low-, medium, and high-valued SFR with Class I, II, III resources. • Municipal expenditures in the future re environmental laws may increase. • Municipal expenditures in the future re flood management and water quality may increase. • Damages and costs associated with flooding and landslides may increase. • Cooling costs in summer may increase. • Increased risk of foregoing future uses of resources. • Increased risk of irreversible outcome with possible negative economic results. • May include restoration costs. • May negatively impact jobs and income that depend on quality of ecosystem services.	*Similar to Riparian*	*Similar to Riparian except:* • Degradation of ecosystem services associated with habitat that supports salmon. Negative consequences on related commercial, recreational, spiritual and intrinsic values. • Higher loss of ecosystem services and values for resources in Class A compared with Classes B and C. • See full table of interactions for tradeoffs of low-, medium, and high-valued SFR with Class A, B, and C resources. • Negative impacts on employment that depends on quality of salmon habitat.
LIMIT	The economic tradeoffs associated with a limit decision will fall between the tradeoffs of allow and prohibit. Limit tradeoffs will depend on the specifics of the limit decision (severely limit, moderately limit, or slightly limit), the land use and property in question, and the mitigation possibilities.			

Development scenario	Economic consequences: SINGLE FAMILY RESIDENTIAL (SFR)			
	Class I, II and III Riparian/wildlife		Class A, B, and C Upland wildlife habitat	
	Positive	***Negative***	***Positive***	***Negative***
PROHIBIT	• Protection of riparian resource and associated ecosystem services and values. • Greater protection of services and values for Class I resource compared with Class II and III. • May reduce future costs re environmental regulations. • May reduce future costs re flood management and water quality. • May reduce future damage and costs re flooding and landslides. • May reduce "heat-island" effect and cooling costs in summer. • No restoration costs. • Reduced risk of foregoing future uses of resources. • Reduced risk of irreversible outcome with possible negative economic results. • May protect jobs and income that depend on quality of ecosystem services.	• Negative consequences on development value of property. Substitutability or reconfiguration of land use may mitigate this consequence. • 1% of SFR has "High" land value. • 98% of SFR ranked "Low" on 2040 Design Types. • 78% of SFR ranked "Low" on all measures of development value. • See full table of interactions for tradeoffs of low-, medium, and high-valued SFR with Class I, II, III resources. • Expanding the UGB to mitigate negative impacts on amount of developable land may increase costs associated with expanding or extending infrastructure and other sprawl-related costs. • SFR accounts for 46% of total resource lands and will experience more negative impacts than other land uses.	*Similar to Riparian except:* • Protection of wildlife habitat that supports salmon and related commercial, recreational, spiritual, and intrinsic values. • May protect jobs and income that depend on quality of salmon habitat. • See full table of interactions for tradeoffs of low-, medium, and high-valued SFR with Class A, B, and C resources.	*Similar to Riparian*

Development scenario	Economic consequences: MULTI-FAMILY RESIDENTIAL (MFR)			
	Class I, II and III Riparian/wildlife		Class A, B, and C Upland wildlife habitat	
	Positive	***Negative***	***Positive***	***Negative***
ALLOW	*Similar to SFR except:* • Reduced need for UGB expansion and associated costs.	*Similar to SFR. except:* • Increased negative impacts on economic costs and damage associated with stormwater (flooding) and water quality. • See full table of interactions for tradeoffs of low-, medium, and high-valued MFR with Class I, II, III resources.	*Similar to SFR.*	*Similar to SFR except:* • See full table of interactions for tradeoffs of low-, medium, and high-valued MFR with Class A, B, C resources.
LIMIT	*Similar to SFR.*	*Similar to SFR.*	*Similar to SFR.*	*Similar to SFR.*
PROHIBIT	*Similar to SFR.*	*Similar to SFR. except:* • MFR accounts for 5% of significant resources. • 66% of MFR lands ranked low on land value and 4% ranked high. • 86% of MFR ranked "Low" on 2040 Design Types. • 68% ranked "Low" on all measures of development value. • See full table of interactions for tradeoffs of low-, medium, and high-valued MFR with Class I, II, III resources. • Increased concentration of development means that the marginal demand to expand UGB will be less than for SFR.	*Similar to SFR.*	*Similar to SFR except:* • See full table of interactions for tradeoffs of low-, medium, and high-valued MFR with Class A, B, C resources.

Development scenario	Economic consequences: COMMERCIAL (COM)			
	Class I, II and III Riparian/wildlife		Class A, B, and C Upland wildlife habitat	
	Positive	***Negative***	***Positive***	***Negative***
ALLOW	*Similar to MFR except:* • No employment impacts specific to development use. • No impacts on related income and income-tax revenue to municipalities.	*Similar to MFR except:* • Increased costs and damage associated with stormwater (flooding) and water quality. • See full table of interactions for tradeoffs of low-, medium, and high-valued COM with Class I, II, III resources.	*Similar to MFR.*	*Similar to MFR except:* • See full table of interactions for tradeoffs of low-, medium, and high-valued COM with Class A, B, C resources.
LIMIT	*Similar to MFR.*	*Similar to MFR.*	*Similar to MFR.*	*Similar to MFR.*
PROHIBIT	*Similar to MFR.*	*Similar to MFR except:* • COM contains 5% of significant resources. • Negative impacts on employment specific to development use. Substitutability or reconfiguration of land use may mitigate this impact. • Negative impacts on related income and income-tax revenue to municipalities. • 81% COM ranked "Low" land value. • 57% COM ranked "Low" employment and 0.2% ranked "High" employment. • 77% COM ranked "Low" on 2040 Design Type • 63% COM ranked "Low" on all measures of development value. 9% COM ranked high on one measure. • See full table of interactions for tradeoffs of low-, medium, and high-valued COM with Class I, II, III resources.	*Similar to MFR.*	*Similar to MFR except:* • See full table of interactions for tradeoffs of low-, medium, and high-valued COM with Class A, B, and C resources.

Development scenario	Economic consequences: INDUSTRIAL (IND)			
	Class I, II and III Riparian/wildlife		Class A, B, and C Upland wildlife habitat	
	Positive	***Negative***	***Positive***	***Negative***
ALLOW	*Similar to MFR except:* • No employment impacts specific to development use. • No impacts on related income and income-tax revenue to municipalities.	*Similar to MFR except:* • Increased costs and damage associated with negative impacts on ecosystem services. • IND accounts for 14% of significant resources. • See full table of interactions for tradeoffs of low-, medium, and high-valued IND with Class I, II, III resources.	*Similar to MFR.*	*Similar to MFR except:* • See full table of interactions for tradeoffs of low-, medium, and high-valued IND with Class A, B, and C resources.
LIMIT	*Similar to MFR.*	*Similar to MFR.*	*Similar to MFR.*	*Similar to MFR.*
PROHIBIT	*Similar to MFR.*	*Similar to MFR except:* • Negative impacts on employment specific to development use. Substitutability or reconfiguration of land use may mitigate this impact. • Negative impacts on related income and income-tax revenue to municipalities. • 93% ranked "Low" land value. • 70% ranked "Low" employment. • 32% ranked "Low" 2040 Design Type and 60% ranked "High." • 24% ranked "Low" on all measures of development value. 61% ranked "High" on at least one measure.	*Similar to MFR.*	*Similar to MFR.*

Development scenario	Economic consequences: MIXED-USE CENTERS (MUC)			
	Class I, II and III Riparian/wildlife		Class A, B, and C Upland wildlife habitat	
	Positive	***Negative***	***Positive***	***Negative***
ALLOW	*Similar to MFR and COM, depending on land use.*	*Similar to MFR and COM, depending on land use except:* • MUC accounts for 2% of significant resources. • See full table of interactions for tradeoffs of low-, medium, and high-valued MUC with Class I, II, III resources.	*Similar to MFR and COM, depending on land use.*	*Similar to MFR and COM, depending on land use except:* • See full table of interactions for tradeoffs of low-, medium, and high-valued MUC with Class A, B, and C resources.
LIMIT	*Similar to MFR and COM, depending on land use.*	*Similar to MFR and COM, depending on land use.*	*Similar to MFR and COM, depending on land use.*	*Similar to MFR and COM, depending on land use.*
PROHIBIT	*Similar to MFR and COM, depending on land use.*	*Similar to MFR except:* • Negative impacts on employment specific to development use. Substitutability or reconfiguration of land use may mitigate this impact. • Negative impacts on related income and income-tax revenue to municipalities. • 74% ranked "Low" land value. • 41% ranked "Low", 49% ranked "Medium," and 10% ranked "High" employment. • 24% ranked "Low," and 19% ranked "High" on 2040 Design Types. • 17% ranked "Low" on all measures of development value, 64% ranked "Medium" on at least one measure, and 19% ranked "High" on at least one measure.	*Similar to MFR and COM, depending on land use.*	*Similar to MFR and COM, depending on land use.*

Development scenario	Economic consequences: RURAL (RUR)			
	Class I, II and III Riparian/wildlife		Class A, B, and C Upland wildlife habitat	
	Positive	***Negative***	***Positive***	***Negative***
ALLOW	*Similar to SFR.*	*Similar to SFR except:* • RUR accounts for 7% of significant resources. • See full table of interactions for tradeoffs of low-, medium, and high-valued RUR with Class I, II, III resources.	*Similar to SFR.*	*Similar to SFR except:* • See full table of interactions for tradeoffs of low-, medium, and high-valued RUR with Class A, B, and C resources.
LIMIT	*Similar to SFR.*	*Similar to SFR.*	*Similar to SFR.*	*Similar to SFR.*
PROHIBIT	*Similar to SFR.*	*Similar to SFR except:* • 100% of RUR ranked "Low" on land value. • 84% ranked "Low" and 15% ranked "High" on 2040 Design Types. • 83% ranked "Low" on all measures of development value, 15% ranked "High" on at least one measure.	*Similar to SFR.*	*Similar to SFR.*

Development scenario	Economic consequences: PARKS AND OPEN SPACE (POS)			
	Class I, II and III Riparian/wildlife		Class A, B, and C Upland wildlife habitat	
	Positive	*Negative*	*Positive*	*Negative*
ALLOW	*Similar to RUR.*	*Similar to RUR except:* • POS contain approximately 20% of the Goal 5 significant resources. • See full table of interactions for tradeoffs of low-, medium, and high-valued POS with Class I, II, III resources.	*Similar to RUR.*	*Similar to RUR except:* • See full table of interactions for tradeoffs of low-, medium, and high-valued POS with Class A, B, and C resources.
LIMIT	*Similar to RUR.*	*Similar to RUR.*	*Similar to RUR.*	*Similar to RUR.*
PROHIBIT	*Similar to RUR.*	*Similar to RUR except:* • In general, this category has no development value.	*Similar to RUR.*	*Similar to RUR.*

Development scenario	Economic consequences: IMPACT AREAS			
	Class I, II and III Riparian/wildlife		Class A, B, and C Upland wildlife habitat	
	Positive	***Negative***	***Positive***	***Negative***
ALLOW	*Depends on land use. May be similar to SFR, COM, IND, POS.*	*Depends on land use. May be similar to SFR, COM, IND, POS.* • See full table of interactions for tradeoffs of low-, medium, and high-valued Impact Areas with Class I, II, III resources.	*Depends on land use. May be similar to SFR, COM, IND, POS.*	*Depends on land use. May be similar to SFR, COM, IND, POS.* • See full table of interactions for tradeoffs of low-, medium, and high-valued Impact Areas with Class A, B, C resources.
LIMIT	*Depends on land use. May be similar to SFR, COM, IND, POS.*	*Depends on land use. May be similar to SFR, COM, IND, POS.*	*Depends on land use. May be similar to SFR, COM, IND, POS.*	*Depends on land use. May be similar to SFR, COM, IND, POS.*
PROHIBIT	*Depends on land use. May be similar to SFR, COM, IND, POS.*	*Depends on land use. May be similar to SFR, COM, IND, POS.*	*Depends on land use. May be similar to SFR, COM, IND, POS.*	*Depends on land use. May be similar to SFR, COM, IND, POS.*

Development scenario	Social consequences: SINGLE-FAMILY RESIDENTIAL Riparian and wildlife habitat resources	
	Positive	***Negative***
ALLOW	• Maintain housing options • No change in property rights • No takings concern • Maintain personal financial security (equity) • Equitable impact on property owners *Wildlife habitat same as riparian, except:* • Less vegetation may reduce risk of wildfires • Less habitat may reduce number of undesirable species	• May lose cultural heritage • May not protect salmon and may impact Native American culture and regional identity • May change neighborhood character and sense of place • Scenic values may be lost • Incompatible land uses may lose buffers • May degrade environmental quality and affect health • May lose recreational and educational opportunities • Loss of tree canopy and vegetation may increase stress levels and impact mental health • May increase risk of landslides and floods if tree canopy and vegetation are removed • Loss of intergenerational equity
LIMIT	• Maintain housing options when development can occur with minimal impact to the resource • Preserve some buffering of incompatible uses • Retain some or most of our cultural heritage • Provide salmon more of a chance to recover and lessen impacts on Native American culture and regional identity • Retain most neighborhood character and sense of place • Preserve most scenic values • Maintain environmental quality and reduce negative health impacts • Retain most educational and recreational opportunities • Retention of tree canopy and vegetation may reduce stress levels and positively impact mental health • Reduce risk of landslides and floods • Provide some amount of intergenerational equity	• May reduce option for large-lot single-family homes • Regulations may affect property rights – owners may not be able to develop land to same extent • May result in takings concerns • Could have a negative impact on property values and thus decrease personal financial security • Impact on property owners is not equitable – only those with significant resources are impacted *Wildlife habitat same as riparian, except:* • More vegetation could increase risk of wildfires • More habitat could increase number of undesirable species
PROHIBIT	• Preserve cultural heritage • Provide salmon a chance to recover and lessen impacts on Native American culture and regional identity • Preserve or increase buffers between incompatible land uses • Retain neighborhood character and sense of place • Preserve scenic values • Maintain and possibly improve environmental quality and reduce negative health impacts • Retain educational and recreational opportunities • Retention of tree canopy and vegetation may reduce stress levels and positively impact mental health • Reduce risk of landslides and floods • Provide intergenerational equity	• Reduce housing options and opportunities (Even if residential land is provided outside the UGB it is not equivalent to land in existing neighborhoods) • May impact housing affordability • Regulations would impact property rights – owners may not be able to develop land to same extent • Likely to result in takings concerns • Could have a negative impact on property values and thus decrease personal financial security • Impact on property owners is not equitable – only those with significant resources are impacted *Wildlife habitat same as riparian, except:* • More vegetation could increase risk of wildfires • More habitat could increase number of undesirable species

Development scenario	Social consequences: MULTI-FAMILY RESIDENTIAL Riparian and wildlife habitat resources	
	Positive	***Negative***
ALLOW	• Maintain housing options • No change in property rights • No takings concern • Equitable impact on property owners *Wildlife habitat same as riparian, except:* • Less vegetation may reduce risk of wildfires • Less habitat may reduce number of undesirable species	• May lose cultural heritage • May not protect salmon and thus impact Native American culture and regional identity • May change neighborhood character and sense of place • Scenic values may be lost • Incompatible land uses may lose buffers • May degrade environmental quality and impact health • May lose recreational and educational opportunities • Loss of tree canopy and vegetation may increase stress levels and impact mental health • May increase risk of landslides and floods if tree canopy and vegetation are removed • Loss of intergenerational equity
LIMIT	• Maintain housing options when development can occur with minimal impact to the resource • Preserve some buffering of incompatible uses • Retain some or most of our cultural heritage • Provide salmon more of a chance to recover and lessen impacts on Native American culture and regional identity • Retain most neighborhood character and sense of place • Preserve most scenic values • Maintain environmental quality and reduce negative health impacts • Retain most educational and recreational opportunities • Retention of tree canopy and vegetation may reduce stress levels and positively impact mental health • Reduce risk of landslides and floods • Provide some amount of intergenerational equity	• May reduce opportunities to develop at high density • May impact housing affordability • Regulations may impact property rights – owners may not be able to develop land to same extent • Limit decision may result in takings concerns • Impact on property owners is not equitable – only those with significant resources are impacted *Wildlife habitat same as riparian, except:* • More vegetation could increase risk of wildfires • More habitat could increase number of undesirable species
PROHIBIT	• Preserve cultural heritage • Provide salmon a chance to recover and lessen impacts on Native American culture and regional identity • Preserve or increase buffers between incompatible land uses • Retain neighborhood character and sense of place • Preserve scenic values • Maintain and possibly improve environmental quality and reduce negative health impacts • Retain educational and recreational opportunities • Retention of tree canopy and vegetation may reduce stress levels and positively impact mental health • Reduce risk of landslides and floods • Provide intergenerational equity	• Reduce housing options and opportunities (even if residential land is provided outside the UGB, it is not equivalent to land in existing neighborhoods) • May impact housing affordability • Regulations would impact property rights – owners may not be able to develop land to same extent • Likely to result in takings concerns • Impact on property owners is not equitable – only those with significant resources are impacted *Wildlife habitat same as riparian, except:* • More vegetation could increase risk of wildfires • More habitat could increase number of undesirable species

Development scenario	Social consequences: MIXED-USE CENTERS	
	Riparian and wildlife habitat resources	
	Positive	***Negative***
ALLOW	• Maintain housing options • Maintain employment opportunities • Does not impact 2040 densities and development in centers • Allows residents opportunity to live near where they work • No change in property rights • No takings concern • Equitable impact on property owners *Wildlife habitat same as riparian, except:* • Less vegetation may reduce risk of wildfires • Less habitat may reduce number of undesirable species	• 2040 growth concept emphasizes importance of green corridors, a healthy ecosystem • May lose cultural heritage • May not protect salmon and thus impact Native American culture and regional identity • May change neighborhood character and sense of place • Scenic values may be lost • Incompatible land uses may lose buffers • May degrade environmental quality and impact health • May lose recreational and educational opportunities • Loss of tree canopy and vegetation may increase stress levels and impact mental health • May increase risk of landslides and floods if tree canopy and vegetation are removed • Loss of intergenerational equity
LIMIT	• Maintain housing options when development can occur with minimal impact to the resource • Maintain employment opportunities if development can occur with minimal impact to the resource • Preserve some buffering of incompatible uses • Retain some or most of our cultural heritage • Provide salmon more of a chance to recover and lessen impacts on Native American culture and regional identity • Retain most neighborhood character and sense of place • Preserve most scenic values • Maintain environmental quality and reduce negative health impacts • Retain most educational and recreational opportunities • Retention of tree canopy and vegetation may reduce stress levels and positively impact mental health • Reduce risk of landslides and floods • Provide some amount of intergenerational equity	• May impact 2040 growth concept if development in centers is curtailed • May reduce opportunities to develop at high density • May reduce employment and housing opportunities • May impact housing affordability • Regulations may impact property rights – owners may not be able to develop land to same extent • Limit decision may result in takings concerns • Impact on property owners is not equitable – only those with significant resources are impacted *Wildlife habitat same as riparian, except:* • More vegetation could increase risk of wildfires • More habitat could increase number of undesirable species

Development scenario	Social consequences: MIXED-USE CENTERS	
	Riparian and wildlife habitat resources	
	Positive	***Negative***
PROHIBIT	• Preserve cultural heritage • Provide salmon a chance to recover and lessen impacts on Native American culture and regional identity • Preserve or increase buffers between incompatible land uses • Retain neighborhood character and sense of place • Preserve scenic values • Maintain and possibly improve environmental quality and reduce negative health impacts • Retain educational and recreational opportunities • Retention of tree canopy and vegetation may reduce stress levels and positively impact mental health • Reduce risk of landslides and floods • Provide intergenerational equity	• Negative impact to 2040 growth concept if development in centers is curtailed • Reduce housing and employment options and opportunities. Even if residential and employment land is provided outside the UGB, it is not equivalent to land in existing neighborhoods and centers. • May impact housing affordability • Regulations would impact property rights – owners may not be able to develop land to same extent • Likely to result in takings concerns • Impact on property owners is not equitable – only those with significant resources are impacted *Wildlife habitat same as riparian, except:* • More vegetation could increase risk of wildfires • More habitat could increase number of undesirable species

Development scenario	Social consequences: COMMERCIAL Riparian and wildlife habitat resources	
	Positive	***Negative***
ALLOW	• Maintain employment opportunities • No change in property rights • No takings concern • Equitable impact on property owners *Wildlife habitat same as riparian, except:* • Less vegetation may reduce risk of wildfires • Less habitat may reduce number of undesirable species	• 2040 growth concept emphasizes the importance of green corridors and a healthy ecosystem • May lose cultural heritage • May not protect salmon and thus impact Native American culture and regional identity • Scenic values may be lost • Incompatible land uses may lose buffers • May degrade environmental quality and impact health • May lose recreational and educational opportunities • Loss of tree canopy and vegetation may increase stress levels and impact mental health • May increase risk of landslides and floods if tree canopy and vegetation are removed • Loss of intergenerational equity
LIMIT	• Maintain employment opportunities if development can occur with minimal impact to the resource • Preserve some buffering of incompatible uses • Retain some or most of our cultural heritage • Provide salmon more of a chance to recover and lessen impacts on Native American culture and regional identity • Preserve most scenic values • Maintain environmental quality and reduce negative health impacts • Retain most educational and recreational opportunities • Retention of tree canopy and vegetation may reduce stress levels and positively impact mental health • Reduce risk of landslides and floods • Provide some amount of intergenerational equity	• May reduce employment opportunities • Regulations may impact property rights – owners may not be able to develop land to same extent • Limit decision may result in takings concerns • Impact on property owners is not equitable – only those with significant resources are impacted *Wildlife habitat same as riparian, except:* • More vegetation could increase risk of wildfires • More habitat could increase number of undesirable species
PROHIBIT	• Preserve cultural heritage • Provide salmon a chance to recover and lessen impacts on Native American culture and regional identity • Preserve or increase buffers between incompatible land uses • Preserve scenic values • Maintain and possibly improve environmental quality and reduce negative health impacts • Retain educational and recreational opportunities • Retention of tree canopy and vegetation may reduce stress levels and positively impact mental health • Reduce risk of landslides and floods • Provide intergenerational equity	• Reduce employment options and opportunities. Even if employment land is provided outside the UGB, it is not equivalent to land in existing neighborhoods and centers. • Regulations would impact property rights – owners may not be able to develop land to same extent • Likely to result in takings concerns • Impact on property owners is not equitable – only those with significant resources are impacted *Wildlife habitat same as riparian, except:* • More vegetation could increase risk of wildfires • More habitat could increase number of undesirable species

Development scenario	Social consequences: INDUSTRIAL Riparian and wildlife habitat resources	
	Positive	***Negative***
ALLOW	• Maintain employment opportunities • No change in property rights • No takings concern • Equitable impact on property owners *Wildlife habitat same as riparian, except:* • Less vegetation may reduce risk of wildfires • Less habitat may reduce number of undesirable species	• May lose cultural heritage • May not protect salmon and thus impact Native American culture and regional identity • Scenic values may be lost • Incompatible land uses may lose buffers • May degrade environmental quality and impact health • May lose recreational and educational opportunities • Loss of tree canopy and vegetation may increase stress levels and impact mental health • May increase risk of landslides and floods if tree canopy and vegetation are removed • Loss of intergenerational equity
LIMIT	• Maintain employment opportunities if development can occur with minimal impact to the resource • Preserve some buffering of incompatible uses • Retain some or most of our cultural heritage • Provide salmon more of a chance to recover and lessen impacts on Native American culture and regional identity • Preserve most scenic values • Maintain environmental quality and reduce negative health impacts • Retain most educational and recreational opportunities • Retention of tree canopy and vegetation may reduce stress levels and positively impact mental health • Reduce risk of landslides and floods • Provide some amount of intergenerational equity	• May reduce employment opportunities • Regulations may impact property rights – owners may not be able to develop land to same extent • Limit decision may result in takings concerns • Impact on property owners is not equitable – only those with significant resources are impacted *Wildlife habitat same as riparian, except:* • More vegetation could increase risk of wildfires • More habitat could increase number of undesirable species
PROHIBIT	• Preserve cultural heritage • Provide salmon a chance to recover and lessen impacts on Native American culture and regional identity • Preserve or increase buffers between incompatible land uses • Preserve scenic values • Maintain and possibly improve environmental quality and reduce negative health impacts • Retain educational and recreational opportunities • Retention of tree canopy and vegetation may reduce stress levels and positively impact mental health • Reduce risk of landslides and floods • Provide intergenerational equity	• Reduce employment options and opportunities. Even if employment land is provided outside the UGB, it is not equivalent to land in existing neighborhoods and centers. • Regulations would impact property rights – owners may not be able to develop land to same extent • Likely to result in takings concerns • Impact on property owners is not equitable – only those with significant resources are impacted *Wildlife habitat same as riparian, except:* • More vegetation could increase risk of wildfires • More habitat could increase number of undesirable species

Development scenario	Social consequences: RURAL	
	Riparian and wildlife habitat resources	
	Positive	***Negative***
ALLOW	• *Metro does not regulate agricultural activities, thus the impacts of allowing, limiting or prohibiting agricultural disturbances to the resource are not described here* • Maintain housing and employment opportunities in the future if land is to be urbanized • No change in property rights • No takings concern • Equitable impact on property owners *Wildlife habitat same as riparian, except:* • Less vegetation may reduce risk of wildfires • Less habitat may reduce number of undesirable species	• May lose cultural heritage • May not protect salmon and thus impact Native American culture and regional identity • Scenic values may be lost • Incompatible land uses may lose buffers • May degrade environmental quality and impact health • May lose recreational and educational opportunities • Loss of tree canopy and vegetation may increase stress levels and impact mental health • May increase risk of landslides and floods if tree canopy and vegetation are removed • Loss of intergenerational equity
LIMIT	• Maintain housing and employment opportunities in future if urbanized and development occurs with minimal impact to the resource • Preserve some buffering of incompatible uses • Retain some or most of our cultural heritage • Provide salmon more of a chance to recover and lessen impacts on Native American culture and regional identity • Preserve most scenic values • Maintain environmental quality and reduce negative health impacts • Retain most educational and recreational opportunities • Retention of tree canopy and vegetation may reduce stress levels and positively impact mental health • Reduce risk of landslides and floods • Provide some amount of intergenerational equity	• May reduce housing and employment opportunities in future if land is to be urbanized • Regulations may impact property rights – owners may not be able to develop land to same extent • Limit decision may result in takings concerns • Impact on property owners is not equitable – only those with significant resources are impacted *Wildlife habitat same as riparian, except:* • More vegetation could increase risk of wildfires • More habitat could increase number of undesirable species
PROHIBIT	• Preserve cultural heritage • Provide salmon a chance to recover and lessen impacts on Native American culture and regional identity • Preserve or increase buffers between incompatible land uses • Preserve scenic values • Maintain and possibly improve environmental quality and reduce negative health impacts • Retain educational and recreational opportunities • Retention of tree canopy and vegetation may reduce stress levels and positively impact mental health • Reduce risk of landslides and floods • Provide intergenerational equity	• Reduce housing and employment options and opportunities – if area is to be urbanized in the future will impact land available for housing and employment • Regulations would impact property rights – owners may not be able to develop land to same extent • Likely to result in takings concerns • Impact on property owners is not equitable – only those with significant resources are impacted *Wildlife habitat same as riparian, except:* • More vegetation could increase risk of wildfires • More habitat could increase number of undesirable species

Development scenario	Social consequences: PARKS AND OPENSPACE	
	Riparian and wildlife habitat resources	
	Positive	***Negative***
ALLOW	• Maintain or increase opportunities for active recreation if parks are converted to ball fields, boat ramps, or other community structures *Wildlife habitat same as riparian, except:* • Less vegetation may reduce risk of wildfires • Less habitat may reduce number of undesirable species	• May lose cultural heritage • May not protect salmon and thus impact Native American culture and regional identity • Scenic values may be lost • May degrade environmental quality and impact health • May lose recreational and educational opportunities • Loss of tree canopy and vegetation may increase stress levels and impact mental health • May increase risk of landslides and floods if tree canopy and vegetation are removed • Loss of intergenerational equity
LIMIT	• Maintain existing active park use and provide new opportunities if development occurs with minimal impact to the resource • Retain some or most of our cultural heritage • Provide salmon more of a chance to recover and lessen impacts on Native American culture and regional identity • Preserve most scenic values • Maintain environmental quality and reduce negative health impacts • Retain most educational and recreational opportunities • Retention of tree canopy and vegetation may reduce stress levels and positively impact mental health • Reduce risk of landslides and floods • Provide some amount of intergenerational equity	• May reduce opportunities for active recreation *Wildlife habitat same as riparian, except:* • More vegetation could increase risk of wildfires • More habitat could increase number of undesirable species
PROHIBIT	• Preserve cultural heritage • Provide salmon a chance to recover and lessen impacts on Native American culture and regional identity • Preserve scenic values • Maintain and possibly improve environmental quality and reduce negative health impacts • Retain educational and recreational opportunities • Retention of tree canopy and vegetation may reduce stress levels and positively impact mental health • Reduce risk of landslides and floods • Provide intergenerational equity	• Reduce opportunities for active recreation *Wildlife habitat same as riparian, except:* • More vegetation could increase risk of wildfires • More habitat could increase number of undesirable species

Development scenario	Social consequences: IMPACT AREA	
	Riparian and wildlife habitat resources	
	Positive	*Negative*
ALLOW	Same as described above depending on the regional zoning category	Same as described above depending on the regional zoning category
LIMIT	Same as described above depending on the regional zoning category	Same as described above depending on the regional zoning category
PROHIBIT	Same as described above depending on the regional zoning category	Same as described above depending on the regional zoning category

Development scenario	Environmental consequences: SINGLE FAMILY RESIDENTIAL			
	Class I Riparian resources		Class A Wildlife Habitat resources	
	Positive	*Negative*	*Positive*	*Negative*
ALLOW	• **Functional consequences:** no positive consequences noted beyond that provided by existing protection (e.g., Title 3) • Reduced need for UGB expansion (protects land outside UGB) • Low to medium density SFR may retain more trees/vegetation than most other zoning types; local studies show that increased forest canopy near streams and throughout the watershed is associated with healthier streams • This zoning type contains the largest amount of Class I Riparian Resources, therefore incentives and education could improve land stewardship, but would require substantial financial investment	• **Functional consequences:** Widespread loss of 3-5 primary ecological functions, including: microclimate and shade; streamflow moderation/water storage; bank stabilization, sediment and pollution control; large wood and channel dynamics; and organic material sources. Class I Riparian resources also contain a substantial portion of high-value wildlife habitat (not included in Class A or B wildlife habitat if falls in Class I riparian), which would also be compromised or removed • Medium to high density housing tends to retain less vegetation and add more imperviousness; these factors are known to harm streams and wetlands • Likely harm to salmon and wildlife through habitat loss and degradation • Increased pesticide and fertilizer use degrades water quality • Landscaping uses water • Continued development in flood areas • Continued wetland conversion • Non-native species introductions • Severity of consequences relates to: o housing density o proximity to water resources o amount of vegetation retained onsite o amount of effective imperviousness o stormwater management practices o landowner/land user outreach and education	*Similar to Class I Riparian Resources* • **Functional consequences:** no positive consequences noted • Low to medium density SFR may retain more natural land cover than most other zoning types, providing wildlife habitat and connectivity	• **Functional consequences:** Loss of key habitat characteristics including large patch size, shape (habitat interior), water resources, connectivity • High density housing may not retain trees and other vegetation; partial or complete loss of largest, most well-connected and water-rich patches • Extensive loss of valuable wildlife habitat • Non-native plant and animal species invasions • Increased adverse edge effects • Reduced wildlife food and cover • Reduced woody debris and snags • Pesticides may harm wildlife • Noise and light disturbances • Continued native species loss over time • Reduction in Neotropical migratory songbirds • Most extensive loss of habitat interior and associated species outside Class I riparian • Further decline of at-risk wildlife species; more species likely to become imperiled • Continued loss of Habitats of Concern and associated species • Wildlife crossings across roadways cause mortality

Development scenario	Environmental consequences: SINGLE FAMILY RESIDENTIAL			
	Class I Riparian resources		Class A Wildlife Habitat resources	
	Positive	*Negative*	*Positive*	*Negative*
LIMIT	• **Functional consequences:** May conserve some level of 3-5 existing primary ecological functions, depending on program, as well as Class A or B wildlife habitat falling within Class I riparian; extent depends on program • Reduced need for UGB expansion compared to "prohibit" • Strong potential for restoration and mitigation activities to offset negative ecological effects • Strong potential for BMP implementation and low impact development and innovative design standards • Hydrology less altered than "allow" • The large extent of Class I Riparian Resources in SFR represents substantial mitigation, restoration and land stewardship opportunities, but would require investment	• **Functional consequences:** Potential for substantial loss of 3-5 primary ecological functions, as described in Allow. Class A or B wildlife habitat falling within Class I riparian would also be compromised. Extent of loss depends on program. • See comments under "allow," except: • Hydrology less altered, less stream damage • Greater protection of flood areas and wetlands • Greater protection of steep slope areas • Fish and other aquatic wildlife habitat impaired, but extent of loss reduced • Water quality impacts likely, but degree depends on program effectiveness	• **Functional consequences:** Some retention of key habitat attributes (patch size, habitat interior, connectivity and water resources) for habitat outside Class I riparian • More habitat retained than Allow • Reduced edge effects • Fewer non-native species invasions • More connectivity retained • Less harm to native species • Reduced need for UGB expansion • Landscaping can provide diverse habitats • Low to moderate levels of development provide good habitat for some species • This zoning type contains the largest amount of Class A Wildlife Habitat resources outside of Riparian Class I, therefore represents mitigation, restoration and land stewardship opportunities	*Similar to "allow," but to a lesser degree depending on program options* • **Functional consequences:** Potential for reduction in habitat patch size, connectivity, and amount of interior habitat, reducing ecological function of habitat
PROHIBIT	• **Functional consequences:** Preservation of the most ecologically functional riparian areas, as well as some of the most important wildlife habitat remaining in the region, including Habitats of Concern (especially wetlands, bottomland hardwood) • Helps maintain hydrologic connectivity • Minimizes hydrologic alterations, reduces flooding • Retention of important salmon habitat	• **Functional consequences:** no adverse consequences noted to Class I resources • Increased need for UGB expansion • Potential for increased infrastructure intrusion into other resource areas due to avoiding Class I riparian areas	• **Functional consequences:** Retention of key habitat attributes (patch size, habitat interior, connectivity and water resources) for habitat outside Class I riparian • Retention of some of the best remaining wildlife habitats in the region • This option will provide key breeding habitat for Neotropical migrants, aquatic species and habitat interior specialists (but see next column) • Retains Habitats of Concern • Provides important source habitats for native wildlife and plant species • Reduced wildlife road crossing mortality	• **Functional consequences:** Continuing functionality of Class A habitat patches may depend on connectivity with other, less valuable habitat patches • If conflicting uses are prohibited in all Class A wildlife habitat patches, other habitat patches may be disproportionately removed or altered, thereby reducing the functionality of Class A habitat patches through connectivity loss • Class A patches are typically very large, therefore may result in a need for UGB expansions

Environmental consequences: SINGLE FAMILY RESIDENTIAL (SFR)

Development scenario	Class II Riparian resources		Class B Wildlife Habitat resources	
	Positive	***Negative***	***Positive***	***Negative***
ALLOW	*Similar to Class I riparian resources* • This zoning type contains the largest amount of Class II Riparian Resources, therefore represents substantial mitigation, restoration and land stewardship opportunities	*Similar to Class I riparian resources, except:* • Loss of restoration opportunities where ecological functions could be regained through tree canopy increases or other measures • Loss of functionality would be less because less ecological function exists; however, loss of this resource type would remove existing water quality filtration capacity or other ecological services, leaving waterways with little or no protection from conflicting uses	*Similar to Class I Riparian Resources* • SFR contains majority of Class B Wildlife Habitat Resources, therefore represents substantial mitigation, restoration and land stewardship opportunities	*Similar to Class A, except:* • Habitat interior loss less extensive than Class A • Loss of connectivity especially pronounced; extensive loss of migratory stopover habitat and movement corridors. Reduces value of Class A patches. • Loss of grassland and low-structure vegetation within 300 ft of streams; important to specific wildlife groups (e.g., grassland birds) • Loss of locally rare migratory stopover habitat and locally rare habitat patches with water resources
LIMIT	*Similar to Class I riparian resources, except:* • Retains restoration opportunities where ecological functions could be regained through tree canopy increases or other measures • Provides mitigation opportunities	*Similar to Class I riparian resources, except:* • Some loss of the features providing important ecological functions (scores 6-17), unless offset by mitigation and restoration activities	*Similar to Class A, except:* • More habitat connectivity between large habitat patches retained • Grassland and low structure habitat within 300 ft of stream may be retained • Low to moderate levels of development provide good habitat for some species, but this is most pronounced in Class A patches due to forest width	*Similar to "allow," but to a lesser degree depending on program options* • To the extent that conflicting uses remove the resource, habitat and connectivity will be lost
PROHIBIT	*Similar to Class I riparian resources, except:* • Retention of some critical ecological functions and ecosystem services provided by existing natural resources • Retains restoration opportunities where ecological functions could be regained through tree canopy increases or other measures • Provides mitigation opportunities	*Similar to Class I riparian resources, except:* • Increased need for UGB expansion, but less so than prohibit decision in Class I (scores of 6-18 – at least 1 primary function)	*Similar to Class A, except:* • Retention of some of the most important connectivity elements in the region • Retention of large upland habitat patches important to specific wildlife species • This option important for Neotropical migratory birds during migration • May provide important source habitats for native wildlife and plant species • Grassland and low-structure vegetation within 300 ft of streams would be retained	*Similar to Class A*

Environmental consequences: SINGLE FAMILY RESIDENTIAL (SFR)

Development scenario	Class III Riparian		Class C Wildlife Habitat resources	
	Positive	***Negative***	***Positive***	***Negative***
ALLOW	*Similar to Class I riparian resources, except:* • Low Value Riparian tends to have less forest or other vegetation than other classes, and includes developed floodplains, where functionality is already reduced • SFR and IND contain the majority of Low Value Riparian Resources, therefore SFR represents opportunities for improved ecological function through mitigation or restoration	*Similar to Class II riparian resources, except:* • The potential for losing existing ecological functions is reduced	*Similar to Class I, except:* • These patches tend to be relatively small, isolated, and lacking substantial water resources, and are therefore reduced in quality and functionality compared to Class A and B • Isolated patches may be associated with increased wildlife crossing mortality on roadways	*Similar to Class B, except:* • Only limited loss of habitat interior • Some loss of connectivity between patches • Important loss of migratory stopover habitat, because these patches tend to occur in areas lacking substantial wildlife habitat • Loss of upland patches lacking water resources but providing important habitat to specific wildlife species
LIMIT	*Similar to Class I riparian resources, except:* • Retains restoration opportunities where ecological functions could be regained through tree canopy increases or other measures • Provides mitigation opportunities	*Similar to Class I riparian resources, except:* • Loss of opportunities to add forest canopy along streams where low structure currently exists	*Similar to Class B, except:* • Most are small forested patches • Less likely to provide good habitat for some species, because these patches tend to be narrow, disconnected, and surrounded by development • Isolated patches may be associated with increased wildlife crossing mortality on roadways	*Similar to "allow," but to a lesser degree depending on program options* • To the extent that conflicting uses remove the resource, habitat and connectivity will be lost
PROHIBIT	*Similar to Class I riparian resources, except:* • Retention of some ecological functions and ecosystem services provided by existing natural resources (scores 1-5) • Retains restoration opportunities where ecological functions could be regained through tree canopy increases or other measures • Provides mitigation opportunities	*Similar to Class I riparian resources, except:* • Increased need for UGB expansion, but less so than Class II	*Similar to Class B, except:* • Not as important to regional connectivity, but may provide important local connectivity • Small, isolated patches provide important and locally rare stopover habitat to migratory birds	*Similar to Class B, except:* • Small isolated habitat patches may limit reproductive success due to edge effects and reduced habitat quality • Isolated patches may be associated with increased wildlife crossing mortality on roadways

Environmental consequences: SINGLE FAMILY RESIDENTIAL (SFR)

Development scenario	Impact areas around waterways (50-150 feet from resource)		Impact areas around habitat (25 feet)	
	Positive	***Negative***	***Positive***	***Negative***
ALLOW	• Opportunities for landowner education may reduce effects of existing and future environmentally harmful practices near waterways	• Potential for increased adverse impacts (e.g., pollution, altered hydrology, pesticide use, bacterial contamination, human disturbance...) to waterways due to existing and new conflicting uses in areas adjacent to waterways • These impacts are greater than in other areas because they are near water and because non-resource areas tend to lack natural filtration provided by riparian vegetation	• Opportunities for landowner education may reduce effects of existing and future environmentally harmful practices	• Potential for increased adverse effects adjacent to habitat areas, primarily forested but also low-structure vegetation, including: o Soil compaction, causing tree and other vegetation damage and increasing risk of tree falls o Increased vegetation trampling at edges of habitat patches o Introduction of trash and pollutants to wildlife habitat o Increased adverse edge effects o Increased light and noise disturbance o Increased potential for non-native plant and animal species invasions
LIMIT	• Retains restoration opportunities where riparian functions could be regained through planting tree canopy or other measures • May help protect existing water resources from current or future adverse effects due to conflicting uses • Provides mitigation opportunities • Incentives and landowner education could enhance ecological health over time	*Similar to "allow," but to a lesser degree*	• Retains restoration opportunities where habitat patch functions could be regained through planting tree canopy or other measures; for example, potential for decreased edge effects, increased interior habitat and increased connectivity to other patches and to water resources • Provides mitigation opportunities • Incentives and landowner education could enhance ecological health over time	• Similar to "allow," but to a lesser degree
PROHIBIT	*Similar to "limit," but to a greater degree*	• Primary negative consequences relate to social, economic and energy	*Similar to "limit," but to a greater degree*	• Primary negative consequences relate to social, economic and energy

Development scenario	Environmental consequences: MULTIFAMILY RESIDENTIAL (MFR)			
	Class I Riparian resources		Class A Wildlife Habitat resources	
	Positive	***Negative***	***Positive***	***Negative***
ALLOW	*Similar to Single Family Residential, except:* • Increased density within UGB reduces need for UGB expansions • Decreased infrastructure requirements per dwelling unit decreases overall infrastructure and roads needed, thereby reducing negative ecological effects	*Similar to Single Family Residential, except:* • Associated with higher levels of onsite imperviousness and lower levels of forest and vegetation, with increased negative stormwater and water quality impacts	*Similar to Single Family Residential, except:* • Increased density within UGB may limit expansion to new areas, protecting important outlying habitats	*Similar to Single Family Residential, except:* • Associated with higher levels of onsite imperviousness and lower levels of forest and vegetation, with increased negative effects on riparian wildlife and Neotropical migrants
LIMIT	*Similar to Single Family Residential, except:* • Increased density within UGB reduces need for UGB expansions • Decreased infrastructure requirements per dwelling unit decreases overall infrastructure and roads needed, thereby reducing negative ecological effects	*Similar to Single Family Residential, except:* • Onsite loss of ecological functions and ecosystem services likely to be more severe due to increased imperviousness and tree canopy loss, unless offset by mitigation and restoration activities	*Similar to Single Family Residential, except:* • Increased density within UGB may limit expansion to new areas, protecting important outlying habitats	*Similar to Single Family Residential, except:* • Associated with higher levels of onsite imperviousness and lower levels of forest and vegetation, with increased negative effects on riparian wildlife and Neotropical migrants • Higher level of development less valuable to wildlife
PROHIBIT	*Similar to Single Family Residential*	*Similar to Single Family Residential, except:* • Opportunity for increased density reduced, thereby increasing need for UGB expansion	*Similar to Single Family Residential*	*Similar to Single Family Residential*

Environmental consequences: MULTIFAMILY RESIDENTIAL (MFR)

Development scenario	Class II Riparian resources		Class B Wildlife Habitat resources	
	Positive	***Negative***	***Positive***	***Negative***
ALLOW	*Similar to Class I riparian resources*	*Similar to Class I riparian resources, except:* • Loss of restoration opportunities where ecological functions could be regained through tree canopy increases or other measures • Loss of functionality would be less because less ecological function exists; however, loss of this resource type would remove any remaining water quality filtration capacity or other ecological services, leaving waterways with little protection or buffering from conflicting uses	*Similar to Class I Riparian Resources*	*Similar to Class A, except:* • Habitat interior loss, but less extensive than Class A • Loss of connectivity especially pronounced; extensive loss of migratory stopover habitat and movement corridors. Reduces value of Class A patches. • In Type 2 habitat patches, loss of grassland and low-structure vegetation important to specific wildlife groups (e.g., grassland birds, meadow voles) • Loss of locally rare migratory stopover habitat and locally rare habitat patches with water resources • Associated with higher levels of onsite imperviousness and lower levels of forest and vegetation, with increased negative effects on riparian wildlife and Neotropical migrants • Higher density development less valuable to wildlife
LIMIT	*Similar to Class I riparian resources, except:* • Retains restoration opportunities where ecological functions could be regained through tree canopy increases or other measures • Provides mitigation opportunities	*Similar to Class I riparian resources, except:* • Loss of opportunities to add forest canopy along streams where low structure currently exists	*Similar to Class A, except:* • More habitat connectivity between large habitat patches retained • More grassland and low structure habitat retained (larger, better connected low structure patches fall in Class B)	*Similar to "allow," but to a lesser degree depending on program options* • To the extent that conflicting uses remove the resource, habitat and connectivity will be lost • Associated with higher levels of onsite imperviousness and lower levels of forest and vegetation, with increased negative effects on riparian wildlife and Neotropical migrants • Higher density development less valuable to wildlife
PROHIBIT	*Similar to Class I riparian resources, except:* • Retention of some critical ecological functions and ecosystem services provided by existing natural resources • Retains restoration opportunities where ecological functions could be regained through tree canopy increases or other measures • Provides mitigation opportunities	*Similar to Class I riparian resources, except:* • Increased need for UGB expansion, but less so than Class II	*Similar to Class A, except:* • Retention of some of the most important connectivity elements in the region • Retention of large upland habitat patches important to specific wildlife species • Preserves areas important for Neotropical migratory birds during migration • May provide important source habitats for native wildlife and plant	*Similar to Class A, except:* • If conflicting uses are prohibited in all Class B wildlife habitat patches, Class A and C may be disproportionately removed or altered, thereby reducing the functionality of Class B habitat patches through connectivity loss and increasing isolation

			species	

Development scenario	Environmental consequences: MULTIFAMILY RESIDENTIAL (MFR)			
	Low Value Riparian		Class C Wildlife Habitat resources	
	Positive	***Negative***	***Positive***	***Negative***
ALLOW	*Similar to Class I riparian resources, except:* • This class tends to have less forest or other vegetation than other classes, and includes developed floodplains; functionality already reduced here	*Similar to Class II riparian resources, except:* • The potential for losing existing ecological functions is reduced	*Similar to Class B, except:* • These patches tend to be relatively small, isolated, and lacking substantial water resources, and are therefore reduced in quality and functionality compared to Class A and B	*Similar to Class B, except:* • Only limited loss of habitat interior • Some loss of connectivity between patches • Important loss of migratory stopover habitat, because these patches tend to occur in areas lacking substantial wildlife habitat • Loss of upland patches lacking water resources but providing important habitat to specific wildlife species
LIMIT	*Similar to Class I riparian resources, except:* • Retains restoration opportunities where ecological functions could be regained through tree canopy increases or other measures • Provides mitigation opportunities	*Similar to Class I riparian resources, except:* • Loss of opportunities to add forest canopy along streams where low structure currently exists	*Similar to Class B, except:* • Most are small forested patches • Less likely to provide good habitat for some species, because these patches tend to be narrow, disconnected, and surrounded by development	*Similar to "allow," but to a lesser degree depending on program options* • To the extent that conflicting uses remove the resource, habitat and connectivity will be lost
PROHIBIT	*Similar to Class I riparian resources, except:* • Retention of some ecological functions and ecosystem services provided by existing natural resources • Retains restoration opportunities where ecological functions could be regained through tree canopy increases or other measures • Provides mitigation opportunities	*Similar to Class I riparian resources, except:* • Increased need for UGB expansion, but less so than Class II	*Similar to Class B, except:* • Not as important to regional connectivity, but may provide important local connectivity • Small, isolated patches provide important and locally rare stopover habitat to migratory birds	*Similar to Class B, except:* • Small isolated habitat patches may limit reproductive success due to edge effects and reduced habitat quality

Development scenario	Environmental consequences: COMMERCIAL (COM)			
	Class I, II and III Riparian resources		Class A, B, and C Wildlife Habitat resources	
	Positive	***Negative***	***Positive***	***Negative***
ALLOW	*Similar to MFR*	*Similar to MFR, except:* • Increased imperviousness and decreased canopy cover increase negative ecological effects	*Similar to MFR*	*Similar to MFR, except:* • Increased imperviousness and decreased canopy cover increase negative ecological effects • Increased human disturbance may negatively impact wildlife
LIMIT	*Similar to MFR*	*Similar to MFR, except:* • Increased imperviousness and decreased canopy cover increase negative ecological effects, to a lesser extent than allow	*Similar to MFR*	*Similar to MFR, except:* • Increased imperviousness and decreased canopy cover increase negative ecological effects to a lesser degree than allow • Increased human disturbance may negatively impact wildlife, but to a lesser degree than allow
PROHIBIT	*Similar to MFR*	• *Similar to MFR*	*Similar to MFR*	*Similar to MFR*

Development scenario	Environmental consequences: INDUSTRIAL (IND)			
	Class I, II and III Riparian resources		Class A, B, and C Wildlife Habitat resources	
	Positive	***Negative***	***Positive***	***Negative***
ALLOW	*Similar to MFR, except:* • SFR and IND contain the majority of Low Value Riparian Resources, therefore SFR represents opportunities for improved ecological function through mitigation or restoration	*Similar to MFR, except:* • Increased imperviousness and decreased canopy cover increase negative ecological effects • Increased toxics may be associated with this land use type • IND contains a substantial portion of Class I Riparian Resources and can be particularly detrimental to water quality	*Similar to MFR*	*Similar to MFR, except:* • Increased imperviousness and decreased canopy cover increase negative ecological effects
LIMIT	*Similar to MFR, except:* • IND contains a substantial portion of Class I Riparian Resources, representing opportunities for improved ecological function through mitigation, restoration, or programmatic protection • SFR and IND contain the majority of Low Value Riparian Resources, therefore SFR represents opportunities for improved ecological function through mitigation or restoration	*Similar to MFR, except:* • Increased imperviousness and decreased canopy cover increase negative ecological effects • Increased toxins may be associated with this land use type	*Similar to MFR*	*Similar to MFR, except:* • Increased imperviousness and decreased canopy cover increase negative ecological effects, but to a lesser extent than allow
PROHIBIT	*Similar to MFR* • Prohibiting conflicting uses would minimize water quality degradation • IND contains a substantial portion of Class I Riparian Resources, representing opportunities for improved ecological function through preservation and restoration	*Similar to MFR*	*Similar to MFR*	*Similar to MFR*

Development scenario	Environmental consequences: MIXED USE CENTERS (MUC)			
	Class I, II and III Riparian resources		Class A, B, and C Wildlife Habitat resources	
	Positive	***Negative***	***Positive***	***Negative***
ALLOW	• Because MUC zoning allows for a variety of land uses in the same area, it has potential for reducing the amount of land needed; UGB expansions less necessary • MUC tends to reduce VMT, thereby reducing water quality impacts due to transportation runoff • Less use of fertilizers, pesticides and herbicides than residential because less landscaping and vegetation present	• Mixed use development generates similar disturbance activities and consequences as residential and commercial, but to varying degrees depending on uses • MUC typically have high imperviousness and little tree canopy cover • Extensive loss of ecological functions and ecosystem services, with particular concerns regarding altered hydrology, stormwater and water quality • More parking areas and roads add pollutants to water resources	• Because mixed use zoning allows for a variety of land uses, it has potential for reducing the amount of land needed; UGB expansions less necessary • Incentives and education could improve land stewardship, but requires financial investment	*Similar to MFR and COM, depending on mix of land uses, except:* • Noise and light disturbances may be higher • Extent of vegetation loss may be higher
LIMIT	*Similar to MFR and COM, depending on mix of land uses, except:* • MUC tends to reduce VMT, thereby reducing water quality impacts due to transportation runoff	*Similar to MFR and COM, depending on mix of land uses*	*Similar to MFR and COM, depending on mix of land uses*	*Similar to MFR and COM, depending on mix of land uses*
PROHIBIT	*Similar to MFR and COM, depending on mix of land uses*	*Similar to MFR and COM, depending on mix of land uses*	*Similar to MFR and COM, depending on mix of land uses*	*Similar to MFR and COM, depending on mix of land uses*

Environmental consequences: RURAL (RUR)

Development scenario	Class I, II and III Riparian resources		Class A, B, and C Wildlife Habitat resources	
	Positive	***Negative***	***Positive***	***Negative***
ALLOW	*Similar to SFR, except:* • Lower imperviousness; more tree canopy and vegetation reduce harm to streams	*Similar to SFR, except:* • Increased pesticide use may be associated with this land use due to agriculture • Livestock degrade riparian area and water quality • Septic tanks are common and sometimes leak bacteria into waterways, reducing water quality	*Similar to SFR, except:* • Lower imperviousness; often more tree canopy and vegetation reduce extent of habitat loss and adverse edge effects • Less habitat fragmentation; tends to retain more connectivity between patches and to water • RUR lands with agricultural areas can provide important habitat for grassland and low structure-associated species	*Similar to SFR, except:* • Increased toxics may be associated with this land use type due to agriculture • Livestock degrade riparian area and reduce habitat quality • Wildlife crossings across roadways cause mortality
LIMIT	*See comments under "allow," except:* • Programmatic options may reduce loss of ecological functions • Impervious surface mitigation opportunities • Hydrology often less altered than other zoning types • Strong potential for BMPs, restoration and mitigation activities to offset negative ecological effects, but requires financial investment	*Similar to SFR, except:* • Increased pesticide use may be associated with this land use due to agriculture • Septic tanks are common and sometimes leak bacteria into waterways, reducing water quality	*Similar to SFR, except:* • Lower imperviousness; often more tree canopy and vegetation reduce extent of habitat loss and adverse edge effects • Less habitat fragmentation; tends to retain more connectivity between patches and to water • RUR lands with agricultural areas can provide important habitat for grassland and low structure-associated species	*Similar to SFR, except:* • Increased toxics may be associated with this land use type due to agriculture • Livestock grazing can damage riparian areas and reduce habitat quality • Wildlife crossings across roadways cause mortality
PROHIBIT	*Similar to SFR, except:* • Fewer water quality problems associated with leaky septic tanks, livestock • Less need to expand UGB	*Similar to SFR, except:* • Rural lands are low density and therefore tend to require more infrastructure per dwelling unit, increasing VMT and decreasing water quality	• Similar to SFR, except: • Prohibiting conflicting uses may decrease toxics associated with agriculture • Reduced livestock damage to habitat • Reduced wildlife road kill mortality •	*Similar to SFR, except:* • RUR lands with agricultural areas can provide important habitat for grassland and low structure-associated species

Development scenario	Environmental consequences: PARKS AND OPEN SPACE (POS)			
	Class I, II and III Riparian resources		Class A, B, and C Wildlife Habitat resources	
	Positive	***Negative***	***Positive***	***Negative***
ALLOW	*Similar to RUR, except:* • May be highly variable in natural land cover and management	*Similar to RUR, except:* • May be highly variable in natural land cover and management • Human disturbance may be higher	*Similar to SFR, except:* • May be highly variable in natural land cover and management	*Similar to RUR, except:* • May be highly variable in natural land cover and management
LIMIT	*Similar to RUR, except:* • May be highly variable in natural land cover and management	*Similar to SFR, except:* • May be highly variable in natural land cover and management • Human disturbance may be higher	*Similar to SFR, except:* • May be highly variable in natural land cover and management	*Similar to RUR, except:* • May be highly variable in natural land cover and management
PROHIBIT	*Similar to RUR, except:* • May be highly variable in natural land cover and management • Could help prevent human / pet disturbance to wildlife	*Similar to RUR, except:* • May be highly variable in natural land cover and management	*Similar to RUR, except:* • May be highly variable in natural land cover and management	*Similar to RUR, except:* • May be highly variable in natural land cover and management

Development scenario	Energy consequences: SINGLE FAMILY RESIDENTIAL *Fish and wildlife habitat*	
	Positive	***Negative***
ALLOW	• More compact form contributes to efficiencies in provision of services and reduction of travel distances • More compact development form may reduce VMT (Vehicle Miles Traveled per person) and fossil fuel use • Reducing VMT and fossil fuel use reduces air pollutants and heat • Represents the majority of buildable resource lands; opportunities for education and incentives	• Loss of trees and increased imperviousness lead to increased Urban Heat Island effect and global warming; increased air conditioning (AC) demand • Extensive loss of ecosystem services related to trees, plants; reduced air quality • Warmer air warms water; harms salmonids and other temperature-sensitive animals • Increased energy consumption to provide engineered solutions to replace natural systems to manage stormwater flow, reduce soil erosion, keep water cool, etc. • This land use type associated with increased offsite roads and infrastructure; large amount of buildable resource acres suggests high energy output for infrastructure creation, maintenance, and increased AC demand due to additional imperviousness • Decreased energy efficiency if housing is not required to use cluster design • Education and incentives, if implemented, would require substantial financial investment
LIMIT	• May reduce infrastructure requirements and enable use of existing infrastructure, thereby saving energy needed to create, install, and maintain all types of infrastructure • May allow energy-saving infrastructure development (e.g., gravity flow sewer or water lines) • Reducing VMT and fossil fuel use reduces air pollutants and heat • Increased forest cover can help remove energy-related air pollutants and reduce smog • Increased forest cover can cool air by shade, evapotranspiration, carbon storage; reduced Urban Heat Island effect, reduced global warming, reduced AC demand • May result in decreased energy consumption to manage stormwater runoff, reduce sedimentation and erosion and keep water cool • Tree retention is cheaper, easier, and less energy-consumptive than planting new trees • Limiting conflicting uses has the greatest potential for mitigation and restoration activities; may result in increased ecological function over time • Represents the majority of buildable resource lands; opportunities for education and incentives	*Negative consequences similar to "allow" option, but to a lesser degree* • Avoiding sensitive natural areas may increase energy-using infrastructure requirements • Increased miles of infrastructure and increased transportation systems lead to increased VMT • Avoiding sensitive natural areas may result in future need for UGB expansion • Loss of trees increases Urban Heat Island effect and global warming; increased air conditioning demand, impacts air quality • Allows greater transportation planning options compared to prohibit, while still retaining green infrastructure • Warmer air warms water; harms salmonids and other temperature-sensitive animals • Possible reduction in access to transportation modes such as bicycling, walking because extensive pathways often run along natural areas (program-dependent) • Education and incentives, if implemented, would require substantial financial investment
PROHIBIT	• Retention of substantial tree canopy and other vegetation may provide the strongest protection against warmer air and water due to Urban Heat Island effect and global warming (CO_2 storage) (although physical extent of Urban Heat Island effect likely to be expanded) • Opportunity for pleasant, accessible alternative means of transportation such as walking and bicycling through natural areas, if permitted under programmatic options • Likely to result in decreased need for future energy-requiring restoration and flood mitigation activities due to retention of tree and vegetation cover	• Limits transportation planning options • Limits infrastructure placement options • Increases extent of urban area and VMT • Potential for increased total imperviousness due to increased roads; energy is required to build and maintain roadways and other infrastructure • If utilities are prohibited from being installed along streams, may require pumping or other energy-requiring activities to take non-gravity driven pathways • Increased travel distance, fossil fuel use, air pollution, related warming of air and water • Extent of Urban Heat Island effect may increase, potentially increasing AC demand

Development scenario	Energy consequences: MULTIFAMILY RESIDENTIAL	
	Fish and wildlife habitat	
	Positive	***Negative***
ALLOW	*Similar to Single Family Residential, except:* • Buildable resource lands are less extensive • Can clear less land per unit to construct dwelling units than SFR, reducing overall extent of tree loss, infrastructure requirements, and need for UGB expansion	*Similar to Single Family Residential, except:* • Buildable resource lands are less extensive • Increased onsite imperviousness and tree loss add to Urban Heat Island effect and global warming on a per-acre basis
LIMIT	*Similar to Single Family Residential, except:* • Buildable resource lands are less extensive • Can clear less land per unit to construct dwelling units than SFR, reducing overall extent of tree loss, infrastructure requirements, and need for UGB expansion	*Similar to Single Family Residential, except:* • Buildable resource lands are less extensive • Increased onsite imperviousness and tree loss add to Urban Heat Island effect and global warming on a per-acre basis
PROHIBIT	*Similar to Single Family Residential*	*Similar to Single Family Residential*

Development scenario	Energy consequences: COMMERCIAL	
	Fish and wildlife habitat	
	Positive	***Negative***
ALLOW	*Similar to Single Family Residential, except:* • Buildable resource lands are less extensive	*Similar to Single Family Residential, except:* • Buildable resource lands are less extensive • High onsite imperviousness and tree loss add to Urban Heat Island effect and global warming on a per-acre basis • Further increases in energy consumption to provide engineered solutions to replace natural systems to manage stormwater flow, reduce soil erosion, keep water cool, etc.
LIMIT	*Similar to Single Family Residential* • Buildable resource lands are less extensive	*Similar to Single Family Residential, except:* • Buildable resource lands are less extensive • High onsite imperviousness and tree loss add to Urban Heat Island effect and global warming on a per-acre basis • Further increases in energy consumption to provide engineered solutions to replace natural systems to manage stormwater flow, reduce soil erosion, keep water cool, etc.
PROHIBIT	*Similar to Single Family Residential*	*Similar to Single Family Residential*

Development scenario	Energy consequences: INDUSTRIAL	
	Fish and wildlife habitat	
	Positive	***Negative***
ALLOW	*Similar to Single Family Residential, except:* • Buildable resource lands are less extensive, although still substantial	*Similar to Single Family Residential, except:* • Buildable resource lands are less extensive, although still substantial • High onsite imperviousness and tree loss add to Urban Heat Island effect and global warming • Further increases in energy consumption to provide engineered solutions to replace natural systems to manage stormwater flow, reduce soil erosion, keep water cool, etc. • Placement within the floodplain is common, increasing energy-requiring flood mitigation
LIMIT	*Similar to Single Family Residential, except:* • Buildable resource lands are less extensive, although still substantial	*Similar to Single Family Residential, except:* • Buildable resource lands are less extensive, although still substantial • High onsite imperviousness and tree loss add to Urban Heat Island effect and global warming • Further increases in energy consumption to provide engineered solutions to replace natural systems to manage stormwater flow, reduce soil erosion, keep water cool, etc. • Placement within the floodplain is common, increasing energy-requiring flood mitigation
PROHIBIT	*Similar to Single Family Residential, except:*	*Similar to Single Family Residential*

Development scenario	Energy consequences: MIXED USE CENTERS	
	Fish and wildlife habitat	
	Positive	***Negative***
ALLOW	*Similar to Single Family Residential, except:* • Buildable resource lands are less extensive • Higher density centers of employment and housing create compact urban form, reducing VMT, infrastructure, energy use • Provide efficient access to goods and services, enhance multi-modal transportation	*Similar to Single Family Residential, except:* • Buildable resource lands are less extensive
LIMIT	*Similar to Single Family Residential, except:* • Buildable resource lands are less extensive • Higher density centers of employment and housing create compact urban form, reducing VMT, infrastructure, energy use • Provide efficient access to goods and services, enhance multi-modal transportation	*Similar to Single Family Residential, except:* • Buildable resource lands are less extensive
PROHIBIT	*Similar to Single Family Residential* •	*Similar to Single Family Residential, except:* • This zoning type is the most energy-efficient land use; prohibit decision would reduce energy saving opportunities provided by land use and transportation efficiencies

Development scenario	Energy consequences: RURAL	
	Fish and wildlife habitat	
	Positive	***Negative***
ALLOW	*Similar to Single Family Residential, except:* • Buildable resource lands are less extensive • Imperviousness is typically lower and vegetation cover higher, reducing Urban Heat Island effect	*Similar to Single Family Residential, except:* • More infrastructure required per dwelling unit
LIMIT	*Similar toSingle Family Residential, except:* • Buildable resource lands are less extensive • Imperviousness is typically lower and vegetation cover higher, reducing Urban Heat Island effect	*Similar to Single Family Residential* • More infrastructure required per dwelling unit
PROHIBIT	*Similar to Single Family Residential*	*Similar to Single Family Residential* • More infrastructure required per dwelling unit

Development scenario	Energy consequences: PARKS AND OPEN SPACE	
	Fish and wildlife habitat	
	Positive	***Negative***
ALLOW	*Similar to Single Family Residential, except:* • Buildable resource lands are less extensive • Imperviousness is typically lower and vegetation cover higher, reducing Urban Heat Island effect • Less infrastructure required compared to other zoning types	*Similar to Single Family Residential*
LIMIT	*Similar toSingle Family Residential, except:* • Buildable resource lands are less extensive • Imperviousness is typically lower and vegetation cover higher, reducing Urban Heat Island effect • Less infrastructure required compared to other zoning types	*Similar to Single Family Residential*
PROHIBIT	*Similar toSingle Family Residential, except:* • Buildable resource lands are less extensive	*Similar to Single Family Residential*

Assumptions:

- At the regional scale, energy use is most strongly influenced by the extent and physical arrangement of transportation networks, the built environment, and green infrastructure. Options consistent with Region 2040 Growth Concept support energy conservation, especially fossil fuel use.
- Because options consistent with Region 2040 are a primary consideration, energy consequences differ little between:
    - riparian and wildlife habitat resources - tree retention and stream crossing considerations are most important
    - low-value and high value resources
    - types of land use (based on residential because that is most extensive land use; comments on differences among land uses included at end of table)

Metro's Phase II ESEE Analysis

Table of Contents

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METRO
People places • open spaces
Clean air and clean water do not stop at city limits or county lines. Neither does the need for jobs, a thriving economy, and good transportation choices for people and businesses in our region. Voters have asked Metro to help with the challenges that cross those lines and affect the 24 cities and three counties in the Portland metropolitan area.

A regional approach simply makes sense when it comes to protecting open space, caring for parks, planning for the best use of land, managing garbage disposal, and increasing recycling. Metro oversees world-class facilities such as the Oregon Zoo, which contributes to conservation and education, and the Oregon Convention Center, which benefits the region's economy.

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LIST OF MAPS

LIST OF TABLES

LIST OF FIGURES

CHAPTER ONE: INTRODUCTION

The natural environment is an important aspect of the uniqueness of the Metro region. Metro's policies have consistently placed a high level of importance on the protection of the natural environment as a means of maintaining the high quality of life citizens of this region expect. Healthy streams and upland areas provide habitat for many animals, fish such as salmon, and clean water for people, fish, and wildlife.

Residents of this region consistently say that contact with nature is important, and they value the natural biological diversity that is part of the Willamette Valley.[1] As Oregonians, state symbols are part of the cultural identity of residents in the Metro region. The Western Meadowlark was selected as Oregon's state bird by schoolchildren in 1927 (Marshall et al. 2003). It is currently a state-listed Species of Concern, and has been nearly lost from the Metro region due to loss of native grasslands and urban development. However, some birds still winter over in the region, and bird-watchers often seek them out in areas such as the agricultural lands around the Tualatin River. The state fish, Chinook salmon, has five evolutionary significant units (ESUs) in or near this region, and all five are listed as Threatened or Endangered under the federal Endangered Species Act. Contact with nature and the rich diversity of species and habitats native to this region are important parts of the region's cultural heritage. To the extent that these habitat is lost, so is a part of our culture, heritage, and natural history.

Much work has already been accomplished to protect and restore fish and wildlife habitat in the region. Metro and other organizations have purchased close to 11,000 habitat acres, thousands of volunteers work to restore habitat and remove invasive species, and most cities and counties have existing habitat protection programs. Metro's efforts are not isolated and build on the tremendous work that is going on in the region. However, Metro's habitat inventories and science review, as well as compliance with federal regulations such as the Endangered Species Act and Clean Water Act, demonstrate that additional habitat protection is needed. Metro's goal is to provide more consistent, effective protection to fish and wildlife habitat across the region.

Metro's approach to fish and wildlife habitat protection

The Metro Council and its local partners are conducting a three-step planning process to conserve, protect, and restore urban streams, waterways, and upland areas that provide important fish and wildlife habitat. State land-use planning laws and broad citizen concern about the need to protect and restore habitat guide this work.

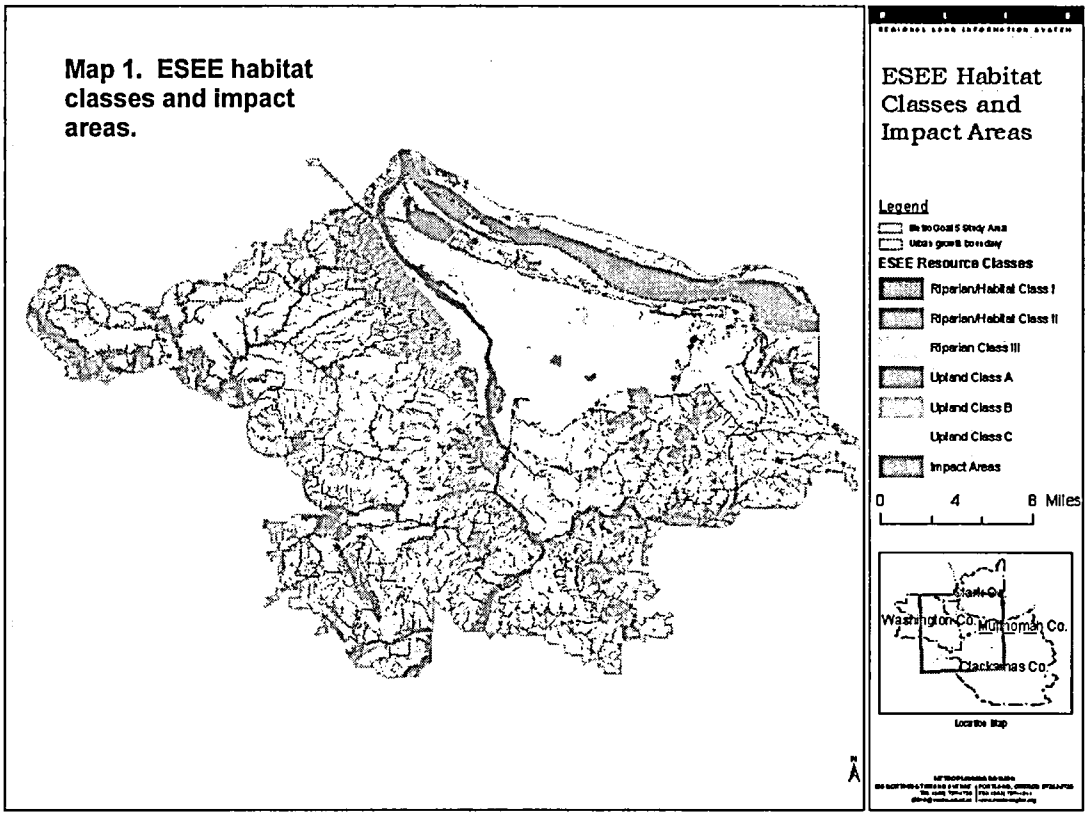
The Metro Council identified regionally significant fish and wildlife habitat in August 2002, based on a scientific assessment of functional habitat values, completing the first step of the planning process. Metro is currently completing the second step of the planning process: assessing the Economic, Environmental, Social, and Energy (ESEE) tradeoffs of protecting or not protecting regionally significant fish and wildlife habitat.

---

[1] May 2001 Davis and Hibbits phone survey commissioned by Metro, an October 2001 Moore Information survey sponsored by KGW-TV and the Portland Tribune, and an informal "SurveyPoint" poll available by phone and on Metro's website in 2001.

Metro's ESEE analysis is divided into two phases. The first phase was completed in fall 2003 with the release of the discussion draft ESEE Phase I report, which describes the general regional tradeoffs of allowing, limiting, or prohibiting conflicting uses in fish and wildlife habitat areas.[2] Map 1 shows the habitat and impact areas under consideration in the ESEE analysis.

Map 1. ESEE habitat classes and impact areas.



Key points from ESEE Phase I

Metro's approach for conducting a region-wide ESEE consequences analysis focused on achieving the goals of the 2040 Growth Concept. The goals in the Growth Concept, the Future Vision, the Regional Framework Plan (implemented through the Urban Growth Management Functional Plan), and Metro's Vision Statement for Protecting Fish and Wildlife Habitat all specify that the region should manage growth while protecting the natural environment, maintaining a high quality of life, and providing affordable housing options.

A key step in the ESEE analysis is to identify conflicting uses that "exist, or could occur" within regionally significant fish and wildlife habitat sites and identified impact areas. According to the Goal 5 rule, a conflicting use is a "land use, or other activity reasonably and customarily subject to land use regulations that could adversely affect a significant Goal 5 resource." Identifying conflicting uses is important to focus the ESEE analysis on various land uses and related

[2] Metro's Phase I Economic, Social, Environmental, and Energy Analysis (ESEE) April 2005.

disturbance activities that may negatively impact fish and wildlife habitat. In Metro's Phase I ESEE analysis, conflicting uses were identified from a regional perspective by examining generalized regional zones and by considering Metro's 2040 Growth Concept. Metro analyzed the distribution of its fish and wildlife habitat inventory among generalized regional zones, 2040 design type priorities, and impact areas.

The Goal 5 rule describes a process in which the ESEE consequences of allowing, limiting, and prohibiting conflicting uses are weighed with the need to preserve natural resources. These tradeoffs are described below. Metro considered the tradeoffs from a regional perspective. Some of the tradeoffs are different when considering local priorities and concerns; for example, from a regional perspective conflicting uses could be relocated or intensified in one area to account for habitat protection in another. This solution may not address the needs of a city to provide jobs or housing within its jurisdiction, to collect tax revenue, or to protect locally significant resources.

Economic tradeoffs

The key economic tradeoffs identified in the ESEE analysis include:

- Habitat lands have economic value for their urban development potential, which is measured using land value, employment density and 2040 design type designation. Generally, habitat land that is located in a primary 2040 design type designation (i.e., city center, regional center, industrial areas) has the highest value for urban development. Residential, lower density retail, and employment areas have lower value for urban development. Urban development value is not assigned to rural areas and parks.
- Habitat lands also have economic value for the ecosystem services they provide, such as flood control and water quality protection. Lands with the highest fish and wildlife values provide the highest level of ecosystem services.
- Competition between the use of habitat land for ecosystem services and urban development is minimal because the overlap between the highest value habitat and the highest value urban development land is relatively small.
- Much of the vacant, buildable land throughout the region is not part of the highest class of regionally significant fish and wildlife habitat.
- The majority of the highly valued habitat land is outside intensely developed urban areas and, thus, has lower urban development value.
- Lower-value habitat and urban development value areas are important for their cumulative contribution to the region's economy and habitat health.
- Habitat identified as having a low urban development value at the regional level may have high urban development value from a local perspective.
- By concentrating development in defined urban centers, some of the region's development needs can be met. However, accommodating demand for industrial land and single-family residential property will need special attention because these needs cannot be met fully in centers.
- Restricting the development of vacant habitat lands increases the likelihood of expanding the urban growth boundary (UGB).

Social tradeoffs

The key social tradeoffs identified in the ESEE analysis include:

- The social benefits of preserving fish and wildlife habitat areas are diverse and cross-cultural. Habitat areas are an integral part of the area's cultural heritage, regional identity, education, recreation, and public health.
- Public values must be balanced with personal and financial private property interests.
- The needs of future generations must be considered when determining how the land is used today.
- Consideration must be given to the additional time and resources needed for compliance and enforcement of new requirements.
- Preservation of land for habitat use within the urban area may result in the shifting of jobs and housing away from locations where people prefer to live and work.

Environmental tradeoffs

The key environmental tradeoffs identified in the ESEE analysis include:

- Development on highly valued fish and wildlife habitat land has a greater ecological impact than development on less valuable habitat land.
- Protection of both streamside and upland habitat is important to watershed health. Lower-valued upland wildlife areas can play a critical role in connecting habitat areas and supporting biodiversity.
- Trees are very important because they provide habitat, absorb pollution, and reduce water-related impacts by slowing and holding runoff.
- When development activity disturbs streams, the environmental impacts affect the immediate property and also are felt downstream.
- Protection of higher and lower-valued habitat supports healthy watersheds and creates restoration opportunities that, over time, can further improve the watershed.
- Some of the highest value habitat areas are located outside the UGB. If development needs cannot be accommodated within the existing UGB, conflict between habitat protection and urban development will increase as the UGB expands.

Energy tradeoffs

The key energy tradeoffs identified in the ESEE analysis include:

- Trees and other vegetation can reduce energy use because they cool and clean the air and water naturally.
- If protection results in additional expansion of the urban growth boundary to accommodate development needs, increased auto use could result in increased fuel (energy) use.
- Building in urban centers can reduce auto and energy use.

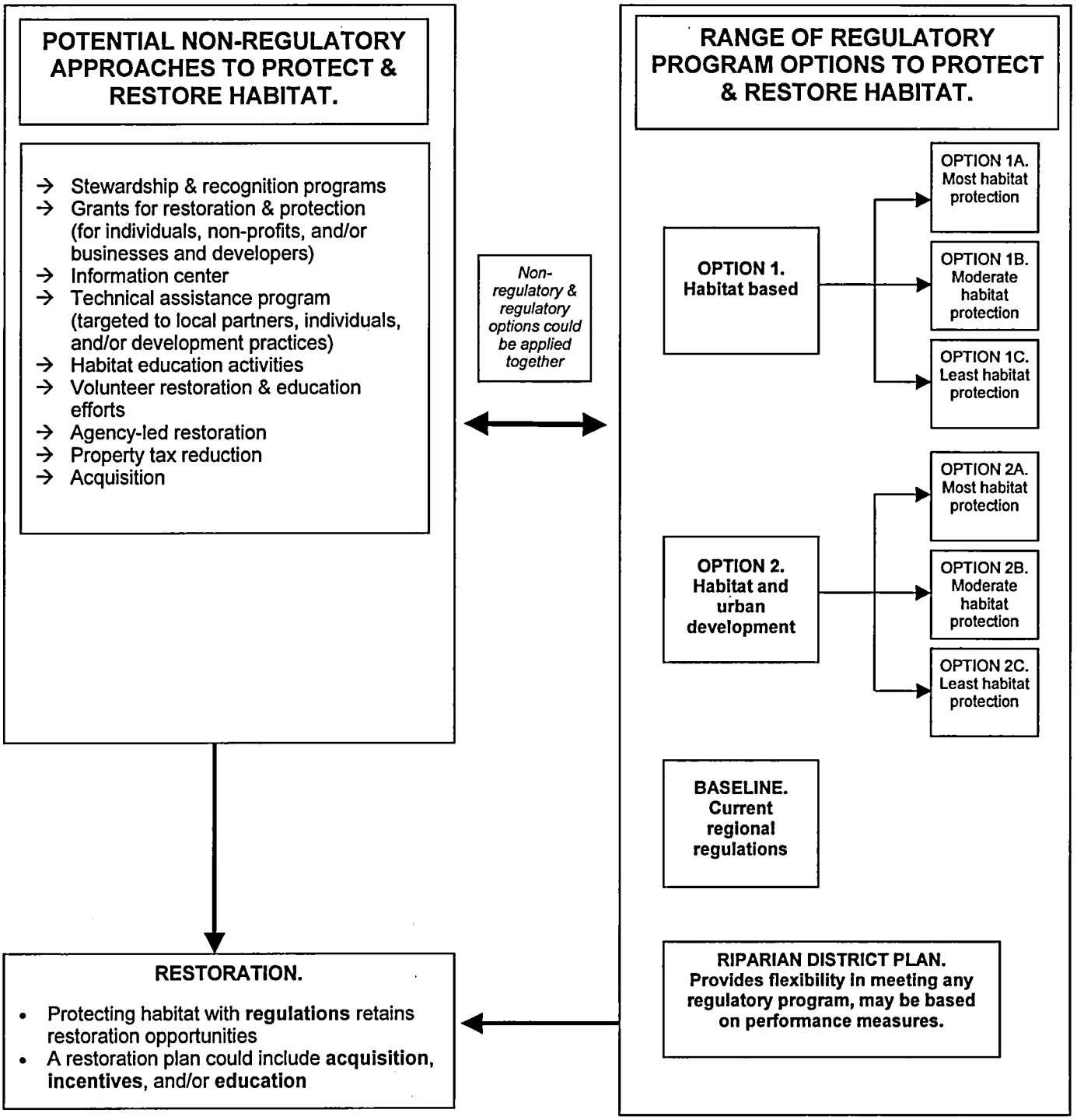
The results of the Phase I analysis showed that neither allowing all habitat land to be developed nor prohibiting development on all habitat land will satisfy the competing land use interests. Metro Council accepted the findings of the Phase I report and directed staff to evaluate six regulatory options that varied habitat protection levels.

Phase II ESEE analysis

This ESEE Phase II report describes several potential non-regulatory approaches to habitat protection and includes Metro's evaluation of the performance of the six program options

identified by the Metro Council in October 2003. The Program Option Chart (Figure 1-1) illustrates the six regulatory and various non-regulatory program approaches studied in the Phase II ESEE analysis. Program options are defined by applying a range of hypothetical allow, limit, and prohibit regulatory treatments to regionally significant fish and wildlife habitat and impact areas within Metro's jurisdiction. Non-regulatory approaches are described as possible components to program options. The results identified in this report will provide information to the Metro Council, local partners, and citizens in the region as the Council chooses a direction for program development in May 2004. The Metro Council is scheduled to consider a fish and wildlife program by December 2004 designed to protect the nature of the region for generations to come.

FIGURE 1-1: PROGRAM OPTION CHART



Format of report

This Phase II ESEE analysis includes four major chapters.

Chapter 2 focuses on non-regulatory approaches for protecting and restoring fish and wildlife habitat. A brief summary of existing efforts in the Metro region is included, followed by several potential approaches, most of which could build on existing programs. A cursory estimate of cost and effectiveness of the non-regulatory approaches is included.

Chapter 3 focuses on existing and potential regulations to protect fish and wildlife habitat. A summary of Metro's *Local Plan Analysis* (August 2002) describes the existing local Goal 5 protection plans. Due to inconsistencies of local plans, Metro uses Title 3 Stream and Floodplain Protection as a baseline for comparing the six regulatory program options. The baseline regulations are described, followed by a description of the regulatory options.

Chapter 4 includes the analysis of tradeoffs for the ESEE factors as well as other criteria including meeting federal guidelines and the increment of additional protection.

Chapter 5 summarizes Metro's analysis of the six regulatory program options, describes how the non-regulatory and regulatory tools could complement each other, and identifies the next steps in program development.

CHAPTER TWO: NON-REGULATORY TOOL OPTIONS

Introduction

A program to protect and restore fish and wildlife habitat can protect more habitat if it includes both regulatory and non-regulatory components. These approaches complement each other, as shown in the table below: non-regulatory tools can address habitat issues that are not covered under land use regulations (e.g., pesticide use) as well as decrease the social/economic impact of regulations (e.g., funds for restoration activities, technical assistance for habitat friendly development). An effective regional protection program could use regulations to establish baseline levels of protection and non-regulatory tools to support and in some cases exceed the baseline. Further, regulations could provide jurisdictions flexibility to meet protection standards under a variety of different circumstances. Regulatory and non-regulatory habitat protection tools can offer varying levels of protection, and can be applied to different habitat in the urban area. Choosing the right tool for the right habitat, location and situation is important, and will require additional analysis and the input and recommendations of the public and the Metro Council.

Table 2-1. Comparison of regulatory and non-regulatory approaches to protect and restore habitat.

Non-regulatory approaches	Regulatory approaches
1. Uncertain protection (acquisition provides certainty but requires funding and depends on willing sellers)	1. Certainty of protection (with adequate enforcement capability)
2. Restoration can be achieved with a variety of approaches (incentives are necessary)	2. Preserves restoration opportunities but does not achieve restoration (mitigation may be required but unlikely to increase overall ecological function)
3. Depends on willing landowners and good stewardship	3. Property rights concerns (takings, real or perceived)
4. Can apply to non-land use activities (e.g., gardening, landscaping, remodeling, etc.)	4. Triggered by development (e.g., building permit application)
5. Application is limited by dollars and the number of willing landowners	5. Consistent treatment of similar situations

Metro's Parks and Greenspaces Department, along with other local partners, commissioned a study of incentives for natural area protection in 2002 (*Incentives Report*).[3] The Metro Council has considered the *Incentives Report*, and the information that relates to fish and wildlife habitat protection has been incorporated into the Phase II ESEE analysis. The study included three parts: a study of 18 candidate incentives, landowner interviews, and implementation strategies for three promising programs. Potential non-regulatory approaches for protection and tools for restoration are described and evaluated based on cost and effectiveness. A summary of non-regulatory tools currently being used in the Metro region is also included. Any new or expanded non-regulatory tool would require funding at some level; potential funding sources will be considered when Metro develops a program to protect fish and wildlife habitat.

[3] Local partners include: City of Portland, City of Oregon City, and the Tualatin Hills Parks and Recreation District. *Tools for natural area protection*, February 2002.

Existing non-regulatory tools for habitat protection and restoration

Numerous non-regulatory programs focused on protecting fish and wildlife habitat exist in the Metro region. In 2003, Metro compiled and summarized the efforts of 31 groups[4] that focus habitat protection and restoration efforts within the UGB, providing a snapshot of current efforts.[5] Funding levels fluctuate and organizations come and go, but Metro's survey provides a picture of how much has been accomplished in the current environment with non-regulatory tools. Table 2-2, below, describes a few of the non-regulatory programs in the region.

Since there are so many different types of programs in the region, Metro's study of non-regulatory tools categorized habitat protection and restoration programs in the following ways:

- **Restoration and enhancement.** The watershed councils operating in the Metro area have identified many restoration and enhancement priorities, which have been implemented and funded by several types of government agencies and private organizations. Much of the grant money that flows into the region is used for restoration and enhancement, but the grants are highly competitive and are inadequate to meet the demand. For example, Metro's grant program with the US Fish and Wildlife Service funded only about 35 percent of the grant proposals over the past three years, leaving about $1.7 million of unfunded requests. These grant sources are also volatile and may change due to economic and political forces.
- **Education and outreach.** Some programs are focused on assisting private citizens and businesses in "green" consumer choices.[6] Other education efforts focus on living with wildlife, acquiring skills in watershed protection, and monitoring of fish and wildlife habitat. Outreach tools include articles in newsletters and on websites as well as brochures and books that inform the public and landowners about stewardship issues. In addition to informing the public about fish and wildlife habitat issues, education and outreach are often used to promote restoration and other habitat protection programs.
- **Land acquisition programs.** These programs are very effective in habitat protection and restoration and are usually applied to privately owned lands. Land may be purchased outright or with a conservation easement from willing landowners.

A summary of the known accomplishments from the organizations surveyed is described below.

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[4] The 31 groups investigated included: city governments, environmental services districts, park districts, soil and water conservation districts, watershed councils, federal programs, Metro, and non-profit organizations.
[5] *Accomplishment Report: Non-regulatory fish and wildlife stewardship in the Metro region* (Metro 2003).
[6] Including programs such as: alternatives methods of pest control, "Naturescaping," and "Green Building" construction methods.

Table 2-2. Examples of existing non-regulatory programs in the Metro region.

Focus	Programs
Restoration and enhancement	• *Oregon Watershed Enhancement Board (OWEB) General Grant Program.* Grants to carry out on the ground watershed restoration projects to restore aquatic habitat, improve water quality, and improve biodiversity. Projects include planting, culvert replacement, habitat improvements, wetland restoration, and others. (2002 total of $3,028,000 for Clackamas, Multnomah, and Washington counties; 31 projects). • *Metro/USFWS Greenspaces Grant Program.* Provides funding for urban projects that emphasize environmental education, habitat enhancement and watershed health. • *East Multnomah Soil & Water Conservation District grants.* Provides awards for conservation and restoration projects, ranging from $200-2,500, mostly on rural lands (funding is sponsored by the Fish and Wildlife Foundation). • *Wildlife Habitat Incentives Program (WHIP).* Implemented through Natural Resources Conservation Service (NRCS) to help landowners develop and improve wildlife habitat on their land. In Oregon approximately $350,000 (for the entire state) is targeted for salmon habitat, riparian habitat, and promotion of biodiversity. • *Environmental Quality Incentives Program (EQIP).* Provides payments through the NRCS to farmers and ranchers for assistance implementing conservation practices on their lands (including filter strips, manure management practices and others). Authorized by the 2002 Farm Bill, pays up to 74% of the costs of the implemented practice.
Education and outreach	• *Metro's Natural Gardening and Landscaping Program.* Metro offers free natural gardening seminars and workshops in spring and fall. Also includes a demonstration garden, summer garden tour, and educational materials. • *Downspout Disconnect Program.* City of Portland program that provides property owners with funds and technical expertise to disconnect downspouts to reduce flow into the stormsewer system. • *Eco Biz Program.* City of Portland program, started to recognize auto repair and service facilities that minimize their environmental impacts. Currently being extended to landscaping business. • *Metro's Green Streets Handbook.* A resource for designing environmentally sound streets that can help protect streams and wildlife habitat. • *Eco-roof Program.* Portland provides sewer rate discounts to developers that build greenroofs minimizing stormwater runoff. Also provides an eco-roof floor area bonus, in which each square foot of eco-roof equals an additional three square feet of building area in the downtown. • *G-Rated Incentive Program.* Portland program that encourages innovations in residential and commercial development and redevelopment for green building design practices. Provides up to $20,000 for commercial projects and $3,000 for residential projects.
Land acquisition programs	• *Metro Openspaces Acquisition Program.* Funded through $135 million bond measure approved by voters in 1995. Focuses on targeted natural areas and regional trails. • *Three Rivers Land Conservancy Acquisition Program.* Works to encourage donation of conservation easements to protect targeted open space in the Metro region. • *Johnson Creek Willing Seller Program.* Portland program allows landowners in Johnson Creek floodplain to sell their property to the City at fair market value. After acquisition, properties are restored to natural floodplain function. Funded largely with dollars from FEMA after the 1996 flood. • *Sherwood program.* Requires system development charge (SDC) for development in floodplains, fee waived if flood area is donated to the city.

Restoration and enhancement

On the ground restoration and enhancement programs and projects were conducted by all of the organizations surveyed, with the exception of the Federal programs that fund many of the efforts. The Americorps program provides much needed labor; the U.S. Fish and Wildlife Service (USFWS) provides $300,000 per year to fund environmental education, conservation and restoration grant projects; and the Natural Resources Conservation Service (NRCS) cost-share program implements restoration projects on rural lands in the region. Environmental service districts[7] conduct much of the revegetation efforts, planting a substantial portion of the trees and plants in the year surveyed. Much of this work is accomplished through Portland's Bureau of Environmental Services (BES) "Watershed Revegetation Program." BES provides their services as a contractor outside of the city projects, contracting with organizations like Metro.

Watershed Councils and Park Districts also carry out projects in restoration and enhancement. Watershed councils frequently work in partnership with environmental service districts and other organizations. City governments and non-profits make extensive use of volunteers to conduct habitat restoration. Over 15,000 volunteers worked on restoration and enhancement efforts in the Metro region in 2002, contributing 49,150 hours of labor to remove 76 tons, 30 truckloads, and 382 cubic yards of debris and restoring 162 acres of land.[8] The Soil and Water Conservation Districts in the Metro region support restoration and enhancement efforts by helping landowners to revise land management practices to reduce erosion and non-point pollution of streams and rivers.

Education and outreach

Education and outreach programs are an important component of fish and wildlife habitat protection. Most of the organizations surveyed by Metro include some type of education and outreach in their work programs. Hands-on education is very popular, and significant amounts of volunteer time and resources are spent on this aspect of fish and wildlife habitat protection and restoration. A majority of habitat education programs included in Metro's study were conducted by non-profits. The Audubon Society of Portland surpassed all other organizations in attendance and number of classes due to the popularity of their bird and animal oriented classes. Also significant was the contribution by the environmental service districts, providing classes for school children and adults.

Park districts also provide educational programs. The Tualatin Hills Nature Park provides many adults and children with a hands-on experience in one of Washington County's oak savannahs. Portland Parks takes many school children to Hoyt Arboretum, Powell Butte, and Forest Park. Metro provides classes at regional parks[9], natural gardening, and recycling programs. Watershed Councils often work to educate residents as well; one example is the Slough School education program conducted by the Columbia Slough Watershed Council (funded by grants from OWEB and the Metropolitan Greenspaces Program).

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[7] Washington County's Clean Water Services (CWS), Clackamas County's Water Environmental Services (WES), and Portland's Bureau of Environmental Services (BES).

[8] *Accomplishment Report: Non-regulatory fish and wildlife stewardship in the Metro region* (Metro 2003).

[9] 10,000 people annually, including 7,000 children.

The organizations reviewed for this study used a number of tools to reach out to the public. More than 406,000 newsletters, 106,000 brochures and other promotional materials were distributed throughout the region in one year about environmental health in the Metro region. As is the case almost everywhere, the Internet is a fast growing outreach tool. A partial sample[10] of web-based outreach organizations reported 120,500 website hits and 15,000 electronically mailed newsletters during the sample year. Technical support to landowners interested in revising management practices on their properties was limited, and is mostly provided by the soil and water conservation districts which focus efforts on rural and agricultural areas.

Land acquisition

Land acquisition programs are used by a select set of organizations. The high cost of land limits the ability of many smaller organizations to purchase land. Primarily city governments, Metro, federal programs, and a few non-profit organizations utilize acquisition programs. Since 1995, all of the programs combined have succeeded in protecting 10,925 acres of land in the Metro region that is explicitly managed for fish and wildlife habitat protection (Table 2-3 below).[11] Close to 80 percent of the land that Metro has purchased is located outside of the urban growth boundary. Much of the restoration and enhancement work, as well as education and outreach activities, occur on these lands.

Table 2-3. Acres of land purchased for fish and wildlife habitat (as of August 2003).

Organization	Outright purchase or donation	Conservation easements	Total
Metro	7,872	81	7,953
Cities/Environmental Service Districts/Parks	2,035	4	2,039
Non-profits	769	164	933
Total	10,757	168	**10,925**

Metro's 1995 Open Spaces Bond Measure provided an impetus for acquisition to other organizations. The Open Spaces land acquisition program has acquired 7,953 acres, of those acres a little over 80 acres are conservation easements. In addition, through their own programs (bond measures or system development charge funds) the cities of Gresham, Portland, and Lake Oswego have acquired 1,254 acres of parks and open spaces. Since 1995 Portland Parks and Tualatin Hills Park and Recreation Districts have acquired 621.3 acres of habitat land, some through land donations and the rest funded by system development charges.

The city of Portland currently operates a willing seller floodplain acquisition program targeted to the Johnson Creek floodplain. The program was established after the floods of 1996, and used funds from the Federal Emergency Management Agency (FEMA) and the Department of Housing and Urban Development (HUD). More than 106 acres of floodplain have been acquired, although the major sources of funding have been used up. The City of Portland Bureau

[10] Not including Metro's website.
[11] As of August 2003.

of Environmental Services (BES) contributes $300,000 of Capital Improvement Project money to the program each year.

The Three Rivers Land Conservancy (TRLC) and the Wetlands Conservancy have acquired 769 acres inside the urban area to protect wetlands, riparian areas, and uplands that meet strict criteria in their value added to fish and wildlife habitat restoration and enhancement. TRLC also has a conservation easement program that has grown to 164 acres in the past decade. These lands are still privately owned but are strictly managed for their natural resource values in perpetuity.

Summary

While there is substantial evidence of non-regulatory approaches accomplishing habitat protection, restoration, and education in the Metro region, these efforts have not been successful in preventing a decline in overall ecosystem health. As described and catalogued in Metro's *Technical Report for Goal 5* and *Riparian Corridor and Wildlife Habitat Inventories*, the amount and quality of fish and wildlife habitat has been in steady decline over time. Most non-regulatory programs are dependent on unsteady sources of grant funding, volunteerism, and good stewardship, often without recognition or reward. Each program conducts important work, but even taken as a whole over the past decade only a small portion of the habitat in the region received the attention needed. There is a much greater need for restoration dollars; technical assistance for landowners, developers, and local jurisdictions; and permanent protection for critical habitats than is currently available.

Potential non-regulatory tools for protection and restoration

Non-regulatory tools are a key component of a strategy to protect fish and wildlife habitat. Incentives, education, and acquisition strategies are popular among landowners and can be used in conjunction with regulations and where regulations do not apply. For example, local land use regulations are generally triggered by a proposal for new development or redevelopment. Non-regulatory strategies can apply to other activities such as landscaping and reducing pesticide and herbicide use. Non-regulatory tools for habitat protection include acquisition (outright purchase and conservation easements), property tax relief, and good stewardship agreements.

Restoration is a critical component of an effective fish and wildlife habitat protection program. Without active restoration efforts, ecological conditions will likely deteriorate further, even if most habitat lands are protected through regulations. Mitigation for the negative environmental impacts of development may be included as part of a regulatory program. However, actions to restore habitat to a condition better than exists today cannot be required as part of a regulatory program; restoration could be included as a major part of a non-regulatory approach. Regulations can protect land that can then be restored through non-regulatory approaches to provide better functioning habitat.

Based on the results of the *Incentives Report* and Metro's analysis of existing non-regulatory tools for habitat protection and restoration, the following potential non-regulatory tools are examined:

- Stewardship and recognition programs
- Financial incentives (grants, incentives for green streets, property tax reduction)
- Education (information center, technical assistance, other education activities)
- Volunteer activities
- Agency-led restoration
- Acquisition (outright purchase, conservation easements, revolving acquisition fund)

A brief examination of potential costs and effectiveness of potential non-regulatory programs is included in Table 2-5 at the end of this chapter.

Stewardship and recognition programs

These programs publicly acknowledge landowners, businesses and other entities for conserving open space, protecting or restoring habitat areas, making financial contributions or carrying out good stewardship practices in general. Public agencies and nonprofit organizations can administer the programs, and the recognition could take the form of media publicity, awards ceremonies, or plaques and certificates. These programs, while not widely applied in the Metro region, have much potential for encouraging conservation behavior when combined with other programs.

A good stewardship agreement between a landowner and an organization interested in protecting or restoring habitat and monitoring success over time can be used to achieve some level of habitat protection. Such a program would recruit landowners to agree to voluntary stewardship agreements that allow residents to make a commitment to care for the land in a manner that promotes habitat value. A stewardship agreement program would be most effective when combined with other incentives such as education, technical assistance, and grants.

Landowner recognition programs on their own generally provide no permanent protection of resources because participation is voluntary. However, administrative costs may be relatively low compared to funding for programs such as acquisition that provide definitive permanent protection. This tool is most likely to be effective when integrated with other tools (e.g., grants and education) as part of an overall conservation strategy.

Potential programs

1. ***Yearly report.*** Develop a report (printed and/or on website) to publicize innovative examples of restoration, protection and habitat friendly development in the Metro region.
2. ***Stewardship recognition program.*** Develop a regional fish and wildlife habitat stewardship program that recognizes landowners for restoring and protecting habitat on their land and habitat friendly development practices. Sponsor a yearly award ceremony, provide certificates, and encourage media coverage.
3. ***Stewardship agreements.*** Develop signed voluntary stewardship agreements between a property owner and Metro or another sponsor for habitat protection. Most likely to be effective when used in conjunction with small grants and long-term monitoring.

Financial incentives

Achieving restoration on private and public lands typically requires some type of financial incentive to induce property owners to conduct activities such as planting of native vegetation, removal of invasive species, and other habitat improvements.

Grants

Grants for restoration can provide the incentive for supportive landowners and other organizations to restore habitat on private and public lands. A small grant program, targeted to watershed councils, non-profit organizations, or local governments, could be created similar to Metro's recent grants for regional and town center planning efforts. Applicants could submit projects one or two times per year, and they could be reviewed and ranked based on established criteria. Small grants given in strategic places could build on existing work and encourage more efforts in targeted areas.

Funding can leverage additional benefits such as education and volunteerism. Private landowners may be interested in the concept of improving the habitat value on a portion of their land, and the availability of dollars can provide the impetus to conduct restoration activities. Many grants are provided with a required match of either dollars or in-kind materials or labor. These incentives provide landowners who contribute a portion of the proposed cost for conservation or restoration activities with additional funding opportunities. There are several programs in place for rural land in agriculture or forestry use, and some for urban lands. A grant program could target specific activities along stream reaches or within watersheds in coordination with watershed action plans to accomplish the most effective restoration. A monitoring component of a restoration plan would be essential to assess effectiveness over time at restoring habitat function.

As part of a regional habitat friendly development program, Metro could develop a *Habitat-oriented Development Program* similar to Metro's Transit-oriented Development (TOD) Program to encourage construction of new developments or redevelopment that protects and restores fish and wildlife habitat. This would require funds to provide the incentives for developers to practice habitat friendly development. For example, 1000 feet of a stream in the Tryon Creek watershed will be daylighted (removed from pipes) through incentives provided to a housing redevelopment project.[12]

Potential programs

A small grant program could be targeted to residential or individual landowners, or targeted towards development and business practices. Grants could also be aimed at watershed councils or other non-profit groups.

1. ***Small grant program for restoration.*** Develop a small grant program to accomplish restoration on private or public property within the identified regionally significant fish and wildlife habitat areas. With larger grants require long-term monitoring.
2. ***Habitat friendly development grants.*** Provide grants to encourage habitat friendly development, similar to Metro's grant programs to encourage and support Transit-Oriented Development (TOD) and regional and town center planning.

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[12] *Oregonian*, "Developer keeps at creek crusade" 10/3/2003.

3. ***Wildlife crossing/culvert replacement grants.*** Provide grants to encourage culvert replacement and wildlife crossings around the region.

Incentives for green streets

The Metro Council could establish a priority for funding transportation projects based on their impacts to regionally significant fish and wildlife habitat. This could help to prevent additional damage to habitat in the region and also provide incentives to restore habitat that has been impacted by development. A criterion could be added to the MTIP funding priorities that focuses on habitat issues, such as culvert replacement or removal, wildlife crossing improvements, or implementation of Green Streets design standards. Alternatively, a separate category or bonus points could be assigned to projects that meet habitat criteria to allow for the funding of projects that improve transportation and habitat in the region.

Property tax reduction

Providing landowners with a reduction in property taxes in exchange for habitat protection or restoration is not a new idea. There are many federal programs that encourage landowners to do just that; however, most of these programs are applicable to farm or forest land. There are two state programs that could be applicable within the urban area: the *Riparian Lands Tax Incentive Program* and the *Wildlife Habitat Conservation and Management Program.* Both of these programs would require county or city action to be implemented. The riparian tax incentive program allows for a tax exemption for property within 100 feet of a stream provided the land is protected and managed for habitat value. The program is limited to 200 stream miles per county. The wildlife habitat program allows designated habitat land to be taxed at a special, reduced rate as long as it is protected and managed for habitat value. This program is not limited by acres and can be applied to riparian or upland habitat.

Property tax reduction is a useful tool to provide motivated landowners with an incentive to manage their land for habitat values, and can also serve as a mechanism to achieve some restoration if a habitat management plan includes requirements for enhancement of existing habitat. However, property tax reductions would reduce jurisdictional revenues. Once enrolled in the program, these properties could also be targeted by agencies that conduct restoration activities such as Metro, Portland's Bureau of Environmental Services, or Clean Water Services in Washington County for greater public benefit. Habitat protection and restoration may be most effective ecologically if this tool is applied strategically, for example, in a specific stream reach or headwater area. This tool could serve as an important incentive to encourage landowners to work in a coordinated fashion to leverage ecological improvements in a specific area. If used on a "first-come, first-served" basis, there may be a scattered approach and less ecological benefit overall. A downside to using property tax relief as a tool for habitat protection is that a landowner can leave the program at any time, the only penalty being payment of back taxes, similar to opting out of a farm or forest tax deferral program.

Education

Information center for fish and wildlife habitat protection

One of the biggest challenges with any incentive/non-regulatory program is getting information into the hands of people who can use it. An "information center" that includes technical assistance, recognition programs, and potentially small grant funds could serve as a "one-stop

shop" providing landowners and others with information and referrals needed to protect and restore fish and wildlife habitat. A center could also include assistance to landowners and others on regulatory compliance and provide coordination between multiple agencies. Metro has some experience providing information to the public – the Recycling Information Center has assisted people with recycling questions since 1981. Other Metro information programs that benefit the environment include Natural Gardening, Soils for Salmon, and Greenspaces education programs and grants. A similar system could be developed to provide landowners and others the information they need to protect fish and wildlife habitat. An alternative to a fully-fledged information center is a permanent hotline residents could call for information on habitat protection and restoration.

Potential programs

1. ***Hotline.*** Provide a permanent hotline for fish and wildlife habitat protection and restoration, include number on all brochures, handbooks, and other educational materials. The hotline could serve as a referral service to other experts in the region.
2. ***Information center.*** Develop an information center, similar to the Recycling Information Center but on a much smaller scale. Citizens could call and talk to a person about habitat protection and restoration or development questions.

Habitat education

Many landowners would like to manage their land in a way that benefits fish and wildlife habitat. However, frequently people do not know if certain activities are detrimental (using herbicides and pesticides), if there are alternatives (natural gardening), what to do to improve habitat (plant native plants, remove invasive species like ivy), and how to connect to agencies and organizations that provide grants and/or volunteers to help improve habitat. A program could be developed to focus efforts to increase people's awareness of the connections between their activities and the health of streams and rivers, similar to fish stencil programs. Landowners in regionally significant habitat areas could be targeted to raise awareness of how individual activities impact fish and wildlife habitat. Education activities would be most effective when used in conjunction with a stewardship certification program, grant programs, and regulatory programs.

Metro currently has several education programs that help fish and wildlife habitat in the Parks and Greenspaces Department and the Solid Waste and Recycling Department. Many other organizations in the region also provide classes about the environment. Several possible programs are described below.

Potential programs

1. ***Brochure.*** Provide an educational brochure about protecting and restoring habitat to be mailed once per year to landowners with significant habitat (also include on website).
2. ***Coordinate with other organizations.*** Distribute information about regionally significant fish and wildlife habitat through education programs provided by other organizations.
3. ***Expand existing education programs.*** Add to existing workshops and classes. Develop a program similar to "Naturescapeing" or "Natural Gardening" on habitat protection and restoration.
4. ***Curriculum for schools.*** Develop a curriculum for schools; work with teachers to implement.

Technical assistance

Technical assistance programs are noted for being responsive to landowner needs, providing practical information, and having knowledgeable resource staff. Such a program would not provide direct protection to habitat, but would offer a means of improving stewardship and enhancement by private landowners. Technical assistance could help supplement cost-sharing programs, such as grants, to further protection and restoration efforts. Technical assistance could be focused on landowners, development practices, and/or local partners. Metro has provided technical assistance to local partners throughout the implementation of the Regional Framework Plan and the Regional Urban Growth Management Functional Plan. This has proved especially important in the implementation of Title 3 (stream and floodplain protection) and planning for 2040 centers.

Metro could work with local partners to develop technical assistance, incentives, recognition programs, and awards for development that helps protect fish and wildlife habitat. Metro, in conjunction with local partners, could develop regional low impact development standards and designs to reduce development impacts on fish and wildlife habitat. The Green Streets Handbook serves as a successful model of technical assistance for transportation infrastructure.

Potential programs

1. ***Local partners.*** Provide assistance to staff from local jurisdictions and other organizations to enable them to assist property owners. If a regulatory program is chosen, provide assistance to local jurisdiction staff to aid in implementation.
2. ***Individual property owners.*** a) Develop and distribute materials focused on habitat protection, restoration and enhancement. b) Dedicate staff to assist property owners in habitat protection and restoration activities on a demand basis. c) Dedicate staff for a one-on-one outreach effort to property owners with high quality habitat, include workshops one to two times per year.
3. ***Development and business practices.*** a) Develop and distribute a manual on habitat-friendly development and green business practices. b) Dedicate staff to assist developers/businesses in habitat protection/restoration on a demand basis. c) Dedicate staff to proactively seek out developers/business owners to achieve habitat friendly development and restoration, include workshops one to two times per year.

Volunteer activities

Much habitat restoration has already been accomplished in the region through the efforts of volunteers. There are many groups that coordinate activities, including SOLV (the statewide Oregon non-profit organization founded in 1969 by Governor Tom McCall), Watershed Councils, Riverkeepers, and Friends' organizations. For example, the Friends of Forest Park organizes major efforts throughout the year to remove English ivy from the park and Friends of Trees organizes more than a dozen native planting events in natural areas each year. Metro currently works with volunteers to both educate (volunteer naturalists) and restore habitat. Involving volunteers in habitat restoration projects both helps to accomplish work and provides a forum for education and awareness of the fish and wildlife in the region. Metro could expand current efforts and partner with non-profit groups and public agencies to coordinate restoration activities to encourage restoration in areas that are designated as regionally significant fish and wildlife habitat.

Potential programs

1. ***Focus existing programs.*** Encourage existing volunteer organizations to focus restoration efforts in regionally significant fish and wildlife habitat areas.
2. ***Provide funding.*** Provide funds to existing volunteer organizations to conduct restoration on public lands with regionally significant fish and wildlife habitat.

Agency-led restoration

Several government agencies currently sponsor and conduct restoration. For example, Metro carries out restoration activities on its own properties to enhance existing habitat value. Metro is currently working with public landowners in the Clackamas River basin on a program to halt the spread of and hopefully eradicate Japanese knotweed – a tenacious non-native plant that overtakes riparian areas. Some agencies, such as the City of Portland's Bureau of Environmental Services, conduct restoration on private lands if they are invited to do so. Agency sponsored restoration could be used in conjunction with other incentive and regulatory programs to accomplish regional restoration goals.

Potential programs

1. ***Provide funding for public lands.*** Provide funds to agencies that conduct restoration to focus efforts in regionally significant habitat areas.
2. ***Provide funding for private lands.*** Provide funds to agencies to conduct restoration for private property owners with regionally significant habitat in exchange for habitat protection.

Acquisition

The most certain way to protect habitat is to acquire it. There are various ways to acquire land such as outright purchase, development rights, and property transfers. These programs address social concerns of fairness as well as real and perceived takings, since they conform to a market-based approach for habitat conservation.

Metro began focusing attention on fish and wildlife habitat protection in the early 1990's, identifying natural areas of regional significance and eventually developing the Greenspaces Master Plan to protect a system of regionally significant natural areas. Metro's $135 million bond measure passed in 1995 to primarily purchase open space and develop regional trails. The bond measure identified 14 target areas and six trail and greenway projects. These came from the Greenspaces Master Plan that identified "regionally significant" natural areas following an exhaustive inventory. Sites were selected based on the following criteria:

- Immediacy or threat of development
- Accessibility to residents of the region
- Protection of large contiguous blocks (patch size)
- Expanding on existing regionally significant areas that are protected

If additional funding to purchase habitat land was secured, an acquisition program could focus on regionally significant fish and wildlife habitat, targeted to achieve specific goals. The goals

could include protection of Habitats of Concern, floodplains, regional connector habitat, strategically located, high-value habitat, and key restoration opportunities. Table 2-4 below shows the acres of undeveloped land in Metro's fish and wildlife habitat inventory. This helps to describe the magnitude of land that falls within the habitat inventory. For example, Riparian Class I contains over 11,000 acres of undeveloped habitat land. Based on the cost of land purchased through Metro's 1995 Open Spaces Bond Measure, land costs inside the UGB average about $45,000/acre and outside the UGB average about $8,600/acre. Due to the expense, acquisition clearly is not a tool that could be used alone to protect even this most ecologically valuable habitat.

Table 2-4. Acres of undeveloped habitat land.

Habitat classification	Total undeveloped habitat land
Riparian Class I	11,614
Riparian Class II	5,365
Riparian Class III	682
Wildlife Class A	8,643
Wildlife Class B	8,211
Wildlife Class C	4,711
Total	**39,226**

Outright purchase

A fee simple purchase of habitat land provides permanent protection but depends on willing sellers. Property is purchased for market prices and thus an acquisition program must be well funded to be effective on a large scale. For example, Metro's Open Spaces acquisition program was funded through a $135 million bond measure approved by voters in May 1995. As of July 15, 2003, Metro had acquired more than 7,935 acres of land for regional natural areas and regional trails and greenways, in 251 separate property transactions at a cost of $1.2 million.[13] These properties protect 70 miles of stream and river frontage.

Regional Revolving Land Purchase Fund

Sometimes valuable fish and wildlife habitat is located on only a portion of a property, and the rest of the parcel is either already developed (e.g., a house) or could be developed in the future. If these parcels are purchased through an acquisition program two concerns arise. First, if the property has a house or other existing use, Metro or another purchasing agency would then be in the position of either renting the useable portion of the property or retiring it from the marketplace and shouldering high maintenance costs. Second, the overall purchase cost of such a parcel would be high, and would effectively reduce available funds for other targeted habitat acquisitions. A program could be developed to purchase habitat land, place development restrictions or conservation easements to protect the habitat areas, and then sell or exchange (via land swaps) the remainder of the land for development or continued use. Funds from the sale could then be used to protect additional land. Such a program could maximize the use of conservation dollars by protecting only the habitat areas on a parcel of land, rather than the entire parcel.

[13] Part of the $135 million bond measure went to local jurisdictions for local parks and greenspaces purchases.

Conservation easement

A conservation easement is a legal agreement between a landowner and a land trust or government agency that permanently limits use of the land in order to protect its habitat values. It allows landowners to continue to own and use their land and to sell it or pass it on to heirs. Conservation easements offer great flexibility. An easement on a property containing rare wildlife habitat might prohibit any development, for example, while one on a farm might allow continued farming. An easement may apply to a portion of the property and need not require public access.

Conservation easements can be donated or purchased. If the donation benefits the public by permanently protecting important conservation resources and meets other federal tax code requirements, it can qualify as a tax-deductible charitable donation. The amount of the donation is the difference between the land's value with the easement and its value without the easement. Conservation easements could be used effectively to target dollars for protecting critical habitat areas. A few organizations currently use conservation easements in the region. A strategy could be developed to collaborate with groups that currently use this tool to protect portions of the regionally significant fish and wildlife habitat identified in Metro's inventory. In addition, agency-sponsored revegetation could be offered to landowners as an incentive to establish conservation easements.

Metro currently has eight easements acquired through the open spaces program (81.1 acres total). One is a flood easement, the other seven are conservation easements. The flood easement is not included in acreage numbers, but the other seven are included. Three easements were donated (59.11 acres), three were purchased (15.89 acres), and one was acquired through an exchange of a 25-year agricultural lease on one acre of property - easement is on 6.1 acres.

Conservation easements have some drawbacks. The legal agreements are complex and time-consuming, and the level of effort (both time and dollars) is often comparable to an outright purchase. Additionally, some property owners would prefer to sell their land outright rather than be encumbered with a conservation easement. Finally, after a conservation easement is in place, it requires resources and staff time to monitor it to ensure it is being followed, and to enforce in instances where its requirements have been disregarded.

Summary

There are many types of non-regulatory tools that could be used to protect and restore fish and wildlife habitat in the region. All of these tools require some type of funding, whether to pay for staff or provide direct dollars to purchase or restore land. Moreover, the success of non-regulatory tools also relies on the willingness of property owners and businesses to invest time and resources, and often to change historic practices. Many of the non-regulatory tools could be implemented at either the local or regional level. Table 2-5 on the following pages describes some of the implementation issues and costs associated with the non-regulatory tools identified in this analysis.

Acquisition is the most effective non-regulatory tool to achieve definitive habitat protection. Acquisition achieves permanent protection and also preserves land to be restored at a later date. However, the high cost of purchasing land, especially within the urban growth boundary, the

dependence of an acquisition program on willing sellers, and the fact that much of the habitat is on partially developed land limits the effectiveness of such a program.

Many of the other non-regulatory habitat protection and restoration tools considered here are most effective when used in combination with each other and/or along with a regulatory program. A regulatory program can provide the incentive and motivation to develop innovative solutions to land development while protecting habitat. Grants and technical assistance are the tools that could be most effective in protecting and restoring habitat, in the absence of an acquisition program. A stewardship recognition program could help promote grants and serve to educate others about innovative practices. Coordinating with existing agencies and volunteer groups that conduct restoration as well as providing funds to focus efforts could be effective in enhancing regionally significant habitat.

Table 2-5. Potential non-regulatory programs for fish and wildlife habitat protection.

What	Effectiveness	Partnerships	Cost*
Stewardship & recognition programs 1. *Accomplishments report* to publicize innovative examples of restoration, protection, and habitat friendly development in region. 2. *Stewardship program* to recognize landowners for restoring and protecting habitat on their land and habitat friendly-development/business practices, include a yearly award ceremony. 3. *Voluntary stewardship agreements* between a property owner and either Metro or another sponsor for habitat protection.	• Limited acreage of total habitat covered • Long-term protection uncertain • Monitoring may increase effectiveness • Relies on willing participants • More effective when used with cost-sharing, grants and technical assistance to encourage more successful projects	Could be implemented by Metro, a local partner, or Watershed Councils.	Low to Medium
Grants for restoration & protection 1. *Residential owner.* Small grant program to accomplish restoration on private or public properties within resource area. 2. *Development activities and business practices.* Provide grants to: • businesses for habitat restoration • developers to encourage habitat friendly development or redevelopment • cities and counties for wildlife crossing and culvert replacement projects	• Effectiveness depends on funding, technical assistance and education, and long-term monitoring • Provides on-the-ground protection and restoration accomplishments • Grants to developers could effectively encourage innovative practices • Limited acreage of total habitat covered • Could increase effectiveness of regulations	A grant program could be implemented at the local or regional level. Partner with Watershed Councils and other groups.	Medium to High
Information center 1. *Hotline* for fish and wildlife habitat protection and restoration. (Calls would be returned periodically). 2. *Call center* for fish and wildlife habitat protection and restoration, referral to other agencies. (Immediate response).	• Effectiveness depends on publicity, technical expertise, and longevity • Depends on extensive marketing campaign and longevity	Could be implemented at the regional level and/or through partnerships.	Low to Medium
Habitat education activities 1. *Educational brochure* on maintaining and enhancing fish and wildlife habitat to be mailed once per year to landowners with significant habitat (also include on website). 2. *Coordinate* with existing organizations that provide habitat-oriented classes, distribute information on regionally significant resources. 3. *Add to Metro's existing workshops and classes* (e.g., Parks Dept. nature classes, tours, and birdwatching events; Solid Waste Dept. "Naturescaping" and "Natural Gardening" classes). 4. *Curriculum* for schools, work with teachers to implement.	• A long-term commitment is required to change behaviors and practices • Over time an education program can reach a large number of people • Could provide consistent message and economy of scale across the region	Could be implemented by Metro, local partners, Watershed Councils, or other non-profits.	Low to Medium
Technical assistance program *Focused on local partners* 1. Assistance to local jurisdiction staff and other organizations to enable them to assist property owners in their jurisdictions 2. Provide assistance to local jurisdiction staff to aid in implementation of a regulatory program (if one is chosen)	• Level of commitment and longevity of program would be key to effectiveness • Technical assistance supports stewardship programs and grants • Technical assistance could increase the effectiveness of a regulatory program	Could be implemented at the regional level and/or through a partnership with other jurisdictions and agencies (e.g.,	Low to Medium

What	Effectiveness	Partnerships	Cost*
Focused on residential, individual owners 3. Develop and distribute materials focused on habitat protection, restoration & enhancement 4. Dedicate staff to assist property owners in habitat protection/ restoration activities on a demand basis 5. Dedicate staff for a one-on-one outreach effort to property owners with high quality habitat, include workshops 1-2 times/year *Focused on development and business activities* 6. Develop and distribute a manual on habitat-friendly development and green business practices 7. Dedicate staff to assist developers/businesses in habitat protection/restoration activities on a demand basis 8. Dedicate staff to proactively seek out developers/business owners to achieve habitat friendly development, restoration; include workshops	• Most effective with high staff to client ratio; no single agency could address needs of so many properties without adequate staff • Knowledgeable staff is critical to providing effective technical assistance	Portland's Office of Sustainable Development).	
Volunteer activities 1. *Partner* with existing volunteer organizations to focus restoration efforts in regionally significant habitat areas. 2. *Provide funds* to existing volunteer organizations (e.g., SOLV) to conduct restoration on public lands with regionally significant habitat.	• Substantial restoration work currently conducted with volunteer efforts • Supports education efforts by training volunteers • Easier access on public lands	Coordinate with existing programs, such as Watershed Councils, friends' groups, SOLV.	Low to High
Agency-led restoration activities 1. *Restoration on public lands.* Provide funds to agencies (e.g., Metro, Portland Bureau of Environmental Services, Clean Water Services) that conduct restoration to focus on regionally significant habitat. 2. *Restoration on private lands.* Provide funds to agencies for restoration on private lands in exchange for habitat protection.	• A trained and experienced staff with monitoring capability could lead to effective restoration work • Maintenance and monitoring of the restoration site over time is necessary to accomplish effective long-term restoration	Implemented at regional and local partner level.	Medium to High
Property tax relief (Programs exist under Oregon state law) 1. Riparian Lands Tax Incentive Program 2. Wildlife Habitat Conservation and Management Program	• Limited landowner enrollment • Requires ongoing management plan with Oregon Department Fish & Wildlife • Landowners can opt out of program with payment of back taxes	Counties implement, Metro could facilitate implementation; encourage application in urban area.	Medium
Acquisition 1. Outright purchase 2. Conservation easement 3. Revolving acquisition fund 4. Donation/bequest program	• Most effective in long-term preservation • Properties may require maintenance • Conservation easements complex to negotiate • Revolving acquisition fund could make effective use of limited dollars	Could be implemented at federal, regional, or local level or by a non-profit.	High

***About cost:** High (grants, restoration, acquisition); Medium (dedicated staff); Low (materials only, some staff)

CHAPTER THREE: EXISTING REGULATORY ENVIRONMENT AND REGULATORY PROGRAM OPTIONS

Existing regional and local environmental regulations already cover a portion of the region's habitat land. Since 1998, cities and counties have implemented Metro's protection standards for flood management and water quality (Title 3) along streams and floodplains. Approximately 30 percent of regionally significant fish and wildlife habitat currently covered by Title 3 regulations achieves some, but not all, of the habitat protection needed in these areas. Very few of the wildlife areas in Metro's habitat inventory are covered by consistent regional standards.

In addition to implementing Title 3, some cities and counties have adopted local regulations to protect habitat. Regulations vary in the amount of habitat area they cover and in the level of protection they provide. None of them regulate all regionally significant fish and wildlife habitat within their jurisdiction. This chapter includes:

- a description of the baseline regulations (Title 3) for purposes of analysis
- a summary of Metro's analysis of local Goal 5 programs, and
- a description of the six regional regulatory program options to protect fish and wildlife habitat.

Baseline for analysis (Title 3)

This section describes the starting point for this Phase II ESEE analysis – a baseline from which to measure ESEE tradeoffs of the increment of additional protection posed by each option.

Metro's Title 3 (Water Quality and Flood Management Plan) provides a level of fish and wildlife habitat protection that is consistent across the region. For this reason, Title 3 serves as a proxy for measuring existing levels of protection and is the baseline for this analysis. Habitat outside of Title 3 management areas receives no additional regionally consistent protection. Although many local jurisdictions do provide protection beyond Title 3, none of them regulate all regionally significant habitat lands within their jurisdictions. A comparison of several local Goal 5 programs is made in the next section.

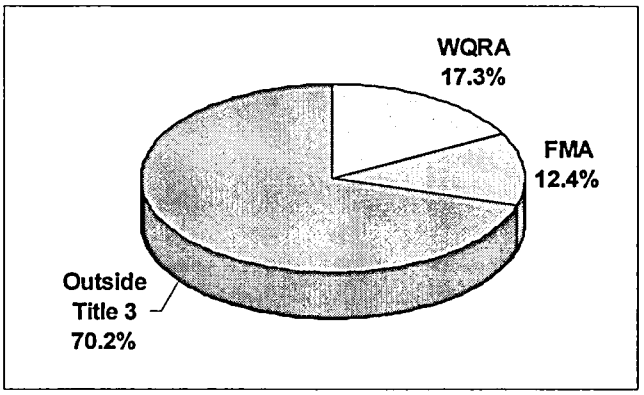
The water quality resource areas (WQRA) and flood management areas (FMA) established in Title 3 protect some of the regionally significant Goal 5 fish and wildlife habitat. Table 3-1 shows Title 3 coverage of fish and wildlife habitat and impact areas. Figures 3-5 and 3-6 graphically illustrate this information.

Table 3-1: Title 3 coverage of fish and wildlife habitat and impact areas (within Metro's jurisdiction)

Fish and wildlife habitat class	Acres within WQRA	Acres within FMA	Total WQRA/ FMA	Acres Outside Title 3	Total Acres	% WQRA/ FMA of Total Acres
Class I RC/WH	13,144	6,803	19,947	7,929	27,876	21%
Class II RC/WH	1,893	1,948	3,841	4,051	7,893	4%
Class III RC/WH	177	2,543	2,720	1,711	4,432	3%
Class A WH	214	108	322	19,359	19,682	0%
Class B WH	69	18	87	12,802	12,889	0%
Class C WH	42	92	134	7,328	7,463	0%
Impact Areas	1,067	419	1,486	14,235	15,721	2%
Total	***16,606***	***11,931***	***28,537***	***67,415***	***95,956***	***30%***

Habitat location (i.e., within WQRAs, within FMAs, outside Title 3), development status (vacant vs. developed), and conflicting land use (e.g., industrial development vs. single-family residential) are important factors for assessing the ESEE tradeoffs of additional protection proposed by the six program options.

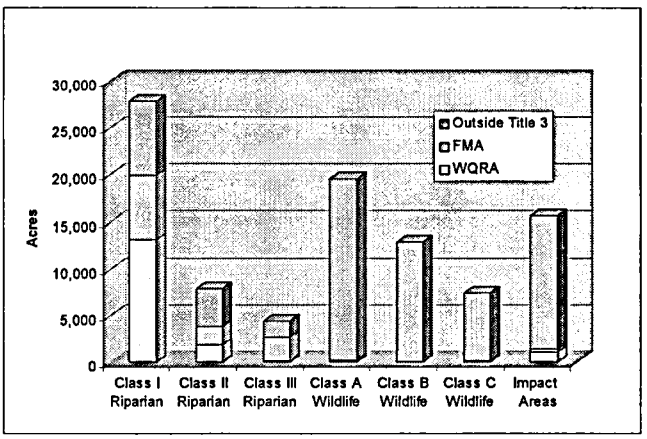
Figure 3-5. Proportion of habitat and impact areas covered by Title 3 (within Metro's jurisdiction).



Habitat location

Figure 3-5 shows that approximately 30 percent of habitat and impact areas are currently covered by Title 3 (28,537 acres). Title 3 achieves some, but not all, of the habitat protection needed in these areas. Most of the protection occurs in Class I-III riparian/wildlife corridors (see Figure 3-6); almost none of the upland wildlife habitat is covered by Title 3.

Figure 3-6. Title 3 coverage of habitat classes and impact areas (within Metro's jurisdiction).



Title 3 performance standards differ in WQRAs and FMAs. Water quality resource areas vary in width from 15 feet to 50 feet from the water feature, and up to 200 feet in steeply sloped areas. New development is ***not allowed*** in these areas unless there is no practical alternative for locating it. In flood management areas, however, new development is ***allowed*** subject to the base zone or existing flood hazard overlay zones and Title 3 development standards (e.g., balance cut

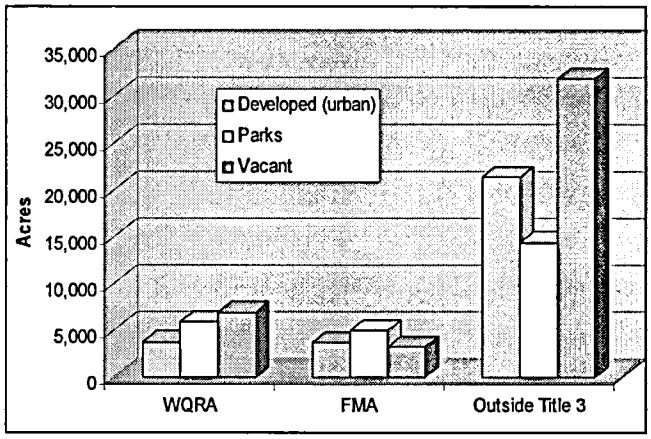
and fill). FMAs include the 100-year floodplain, flood area and floodway, and the 1996 flood inundation area.

The increment of additional protection would be greater in the FMAs than in the WQRAs if disturbance areas are limited by a Goal 5 program because Title 3 does not currently limit disturbance area size in FMAs. The increment of additional protection would be greatest in habitat and impact areas outside Title 3, where it is assumed for this analysis that habitat is not currently protected.

Development status

Development status also plays a part in assessing the increment of additional protection. As described in the Phase I ESEE analysis, development status refers to whether habitat land is developed or vacant. Figure 3-7 shows development status of habitat land and impact areas inside Metro's jurisdiction.

Figure 3-7. Development status of habitat and impact areas (within Metro's jurisdiction).



Developed habitat is land with improvements (e.g., buildings, roads) and specific land uses (e.g., residential, industrial). Two subsets are included in this category: developed urban and parks. An example of habitat categorized as developed urban is dense forest canopy over a developed residential subdivision. Thirty percent of habitat and impact areas (28,734 acres) is developed with urban uses. Parks are categorized as developed land because they generally are not available for urban development. Approximately 28 percent (26,841 acres) of the habitat and impact areas are in park status or zoned parks and open spaces (POS). Generally, the impact of additional protection would be less in developed habitat land than in vacant habitat land, at least in the short term because the regulations would apply to new land use development and would not affect existing development. Over time as redevelopment occurs, however, new Goal 5 regulations would apply.

Vacant land is defined as land without buildings, improvements or identifiable land use. Metro's vacant lands inventory includes vacant portions of developed tax lots that are one-half acre or larger. Vacant land also has two subsets: constrained (by Title 3 WQRA and FMA) and buildable (vacant land outside Title 3). Forty-four percent of habitat and impact areas is vacant (41,965 acres). The impact of additional protection will be greatest on vacant habitat land outside Title 3 areas. Factors other than Title 3 can affect the ability to develop vacant land, such as utility corridors.

Conflicting land uses

Phase I of the ESEE analysis examined conflicting uses; that is, a land use that could adversely affect regionally significant fish and wildlife habitat. Conflicting uses were identified using

Metro's seven regional zones – a compilation of local jurisdictions' zones (see Chapter 3 of the Phase I ESEE Analysis for a full discussion of conflicting uses). Zoning plays a part in assessing ESEE tradeoffs. For example, the increment of additional protection on land zoned for parks would likely be less than habitat land zoned for urban uses (e.g., industrial). Some uses that would conflict with habitat protection may occur in a variety zones such as roads, public utilities, and regionally significant public facilities (major medical facilities and educational institutions). These special uses will be considered in the program development phase.

In summary, the ESEE analysis considers current regulations, development status and regional zoning in assessing the consequences of limiting, allowing or prohibiting development in fish and wildlife habitat areas. Thirty percent of the fish and wildlife habitat inventory overlaps with Title 3 water quality and flood management areas; 70 percent is outside Title 3. The increment of additional protection is influenced by where the habitat is located (in WQRA/FMA vs. outside Title 3), development status of the habitat (developed vs. vacant), and conflicting land uses (regional zones). Title 3 standards focus on streams, floodplains and wetlands; upland wildlife habitat is not covered for the most part. Developed land will experience the impacts of program options through the eventual redevelopment and expansion of existing land uses. Vacant land not covered by Title 3 will experience the most immediate impact of regulatory program options. The extent of the effects varies further by the nature of the land use. The next section describes local Goal 5 programs.

Local Goal 5 programs

Metro conducted a review of local jurisdiction's plans for habitat protection from 1999 to 2002, resulting in the *Local Plan Analysis: A review of Goal 5 protection in the Metro region (August 2002).* Most of the local jurisdictions in the Metro region have adopted Goal 5 programs that have been acknowledged by the Department of Land Conservation and Development as being in compliance with the state rule. Some of these programs were developed prior to the Goal 5 rule revisions in 1996, while a few have been completed more recently.

The Goal 5 rule requires a three-step process, as described in the introduction to this report. However, local governments may also choose to utilize the State "safe harbor" approach rather than conduct an inventory using the standard methodology described above (OAR 660-23-020). A safe harbor approach may be used for riparian corridors and wildlife habitat. Using the safe harbor approach, a local government may determine the boundaries of significant riparian corridors within its jurisdiction using a standard setback distance from all fish-bearing lakes and streams (OAR 660-23-090(5)). This setback distance is determined as follows:

(a) for streams with average annual stream flow greater than 1,000 cubic feet per second (cfs), the riparian corridor boundary is 75 feet upland from the top of each bank
(b) for lakes and fish-bearing streams with average annual stream flow less than 1,000 cfs, the riparian corridor boundary is 50 feet upland from the top of each bank

Goal 5 is a process goal – the state does not prescribe a specific outcome as it does in other land use planning goals. The rule requires local jurisdictions to balance the need to protect natural resources against other state goals such as housing (Goal 10) and transportation (Goal 12) while providing ample opportunity for citizen involvement (Goal 1). Thus, the state rule allows local

jurisdictions' Goal 5 programs to be in compliance with state law while being inconsistent with each other. However, Metro's code required an analysis of the consistency and/or adequacy of local natural resource protection prior to conducting a regional ESEE analysis and a regional protection program. The key findings from the *Local Plan Analysis* are reviewed below.

The Goal 5 process begins with the inventory of Goal 5 resource sites, providing information to locate and evaluate resources and to develop programs to protect such resources (OAR 660-023-0030(1)). The standard inventory process involves four steps. However, depending on the type of Goal 5 resource, not every step must be applied in the inventory stage.

Inconsistencies

Fish and wildlife habitat in the Metro region receive inconsistent treatment and protection across jurisdictions, considering the pervasive inconsistencies in Goal 5 inventory methodologies, data layer formats, ESEE analyses, and program decisions of local jurisdictions. Outside of the State safe harbor for riparian areas and wetlands, the Goal 5 rule provides little guidance to local governments on methods of protection, except the requirement that a protection program include clear and objective standards. The Goal 5 protection programs of local jurisdictions within the Metro region are inconsistent with each other on a number of levels. Some programs offer exclusive protection for riparian and wetland areas, prohibiting development unless exceptional circumstances apply, whereas other jurisdictions offer limited development within their most significant resource areas. Furthermore, protection levels for limited development range anywhere from five percent development to at least fifty percent development on significant natural resource land. Finally, there is no consistency between local jurisdictions' review processes, mitigation and enhancement procedures, or their monitoring and enforcement mechanisms.

Inadequacies

It is often difficult to determine what specific protection will be applied to resources by local governments when implementing Goal 5 programs. This not only leads to inconsistent protection around the region, but also may result in inadequate protection of natural resources. The most consistent protection is Metro's Title 3 regulations for protecting water quality and floodplain function.[14] In addition, several jurisdictions in the region have adopted the State's Safe Harbor provisions under Goal 5, which provide protection specific to fish-bearing streams based on stream size. Local jurisdictions' riparian corridor protection programs that do vary from either Title 3 or the State Safe Harbor range from 30 feet on a class I stream (Lake Oswego) to as much as 150 feet on a principal river (Clackamas County).[15]

Figure 1 compares the minimum widths recommended in the scientific literature[16] to the riparian corridor protection provided by Metro's Title 3 regulations and the State Safe Harbor. As the figure illustrates, even the maximum protection provided by Title 3 on steep slopes (200 ft.)

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[14] This is why Metro is using Title 3 protection as a baseline for analysis purposes in the evaluation of the six program options, described later in this report.

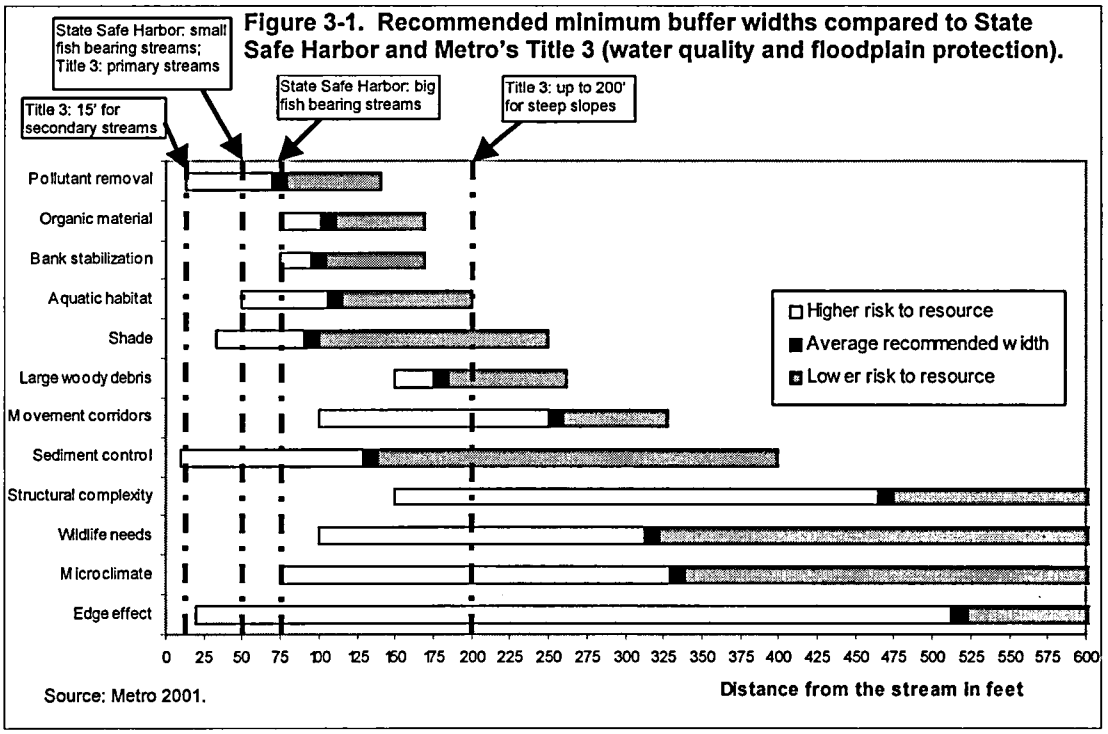
[15] *(See Local Plan Analysis* section on inconsistencies – program decisions for more detail on local jurisdictions' programs.*)*

[16] See Metro's *Technical Report for Goal 5* (2002).

meets the average recommended width for only seven of the twelve functions included on the chart. However, the 200-foot vegetated corridor provides some protection for all twelve functions.[17] Furthermore, the State Safe Harbor, when applied to larger fish-bearing streams (75 ft), only meets the average recommended minimum width for one function, pollutant removal. The 75-foot buffer does not even meet the minimum recommendations for four functions, including one of the most important for listed salmon – large woody debris[18]. The 50-foot buffer provided by the State Safe Harbor on smaller fish-bearing streams and by Metro's Title 3 on primary streams only provides minimal protection for five functions. For smaller streams, those draining less than 50 acres, Title 3 provides for a 15-foot buffer that barely meets the most minimal scientific recommendations for two functions.

In effect, there is not a regulatory program in the region that provides sufficient protection for riparian corridors based on consideration of all the functions necessary for fish and wildlife habitat. While it is unlikely that any regulatory program could be implemented that would fully protect all of the functions depicted in Figure 3-1, habitat protection in the Metro region does not comport with the scientific knowledge of what is needed for full fish and wildlife habitat protection.

Figure 3-1. Recommended minimum buffer widths compared to State Safe Harbor and Metro's Title 3 (water quality and floodplain protection).



[17] These 12 functions were identified in Metro's *Technical Report for Goal 5* that included a review of the scientific literature related to fish and wildlife habitat.

[18] Obviously, large woody debris does reach the stream at distances of less than 75 feet, providing some level of function to instream habitat. However, several studies have shown that larger buffer widths are necessary to provide adequate levels of large woody debris to both instream and riparian (terrestrial) habitats. Thus, any distance that is less than one site potential tree height (average in Metro region determined to be 150 ft) allows for a very high risk to the resource.

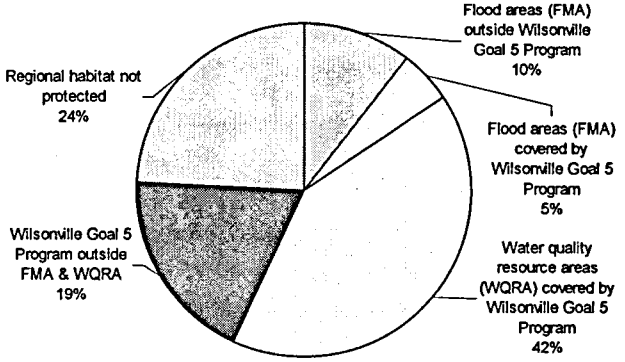
As described in the *Local Plan Analysis*, local protection of upland wildlife habitat is limited throughout the region. Only eight jurisdictions[19] have identified upland areas not associated with streams or wetlands for regulatory protection. By default, some steeply sloped areas are regulated due to natural hazards, such as earthquakes and landslides. The planning guidelines for upland habitats[20] recommend protection of large areas and retention of native vegetation. However, based on Metro's review of local regulations, protection of these areas in the region does not meet the scientific recommendations. Tree protection ordinances occur most frequently. However, ordinances that specifically protect upland habitat by limiting development are more effective but less common. For example, Lake Oswego requires protection of significant tree groves, but allows for up to 50 percent of the trees on a site to be removed for development purposes. Other jurisdictions such as Sherwood and Tigard require a tree inventory and provide incentives for retention of trees through the permit process. The city of Portland limits disturbance in upland areas and has established an ordinance for land divisions that requires preservation of existing tree canopy.

Comparison of three local programs with Metro's baseline regulations

For purposes of the Phase II ESEE Analysis, Metro chose three local Goal 5 programs as examples to compare the extent of the regional fish and wildlife habitat inventory covered by local environmental zones. These local zones also overlap, in many cases, with Title 3 water quality resource areas and flood management areas (see Figure 3-1 above). The extent of this overlap, as well as additional habitat areas covered by local environmental zones, is shown in Figures 3-2 to 3-4 for the cities of Wilsonville, Lake Oswego, and Portland.

The City of Wilsonville's Significant Resource Overlay Zone (SROZ) Ordinance as well as other ordinance requirements[21] exceed Metro's Title 3 baseline for water quality resource areas and flood management areas. Wilsonville's SROZ ordinance, combined with additional lands covered by Title 3 flood management restrictions, applies to 76 percent (927 acres) of regionally significant habitat. Twenty-four percent (296 acres) of regionally significant habitat is not covered by the SROZ ordinance or the Title 3 baseline (Figure 3-2). Wilsonville's SROZ ordinance

Figure 3-2. How existing habitat protection in Wilsonville addresses 1,222 acres of regionally significant habitat



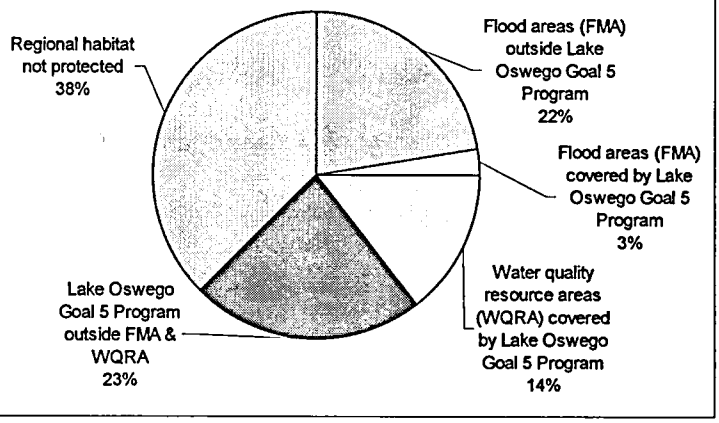
[19] Beaverton, Hillsboro, Lake Oswego, Milwaukie, Portland, Wilsonville, Clackamas County, Multnomah County, and Washington County have specifically mentioned wildlife habitat not associated with riparian corridors in local code.

[20] See Metro's *Technical Report for Goal 5* (2002).

[21] Significant Resource Overlay Zone Section 4.139 of the Zoning Ordinance; see also Planning and Development Ordinance Section 4.172 (Floodplain Regulations), Section 4.171.06 (Protection of Natural Features and other resources); Section 4.6 (Tree Preservation and Protection).

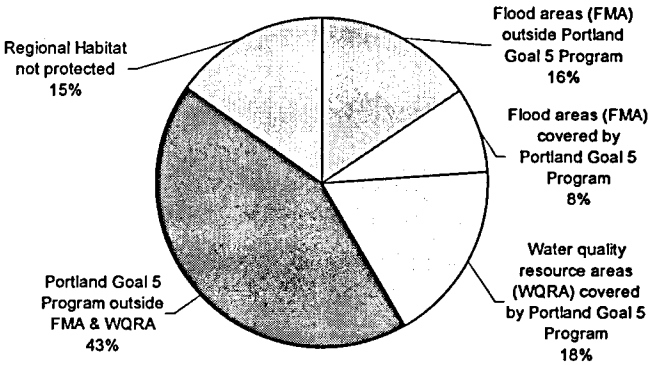
prohibits development within the overlay zone and impact area unless an applicant submits a significant resource impact report and mitigates for habitat loss. The City of Lake Oswego's Sensitive Lands Overlay District as well as other ordinance requirements exceed Metro's Title 3 baseline for water quality resource areas and flood management areas.[22] Lake Oswego's Sensitive Lands Overlay District, combined with additional lands covered by Title 3 flood management areas, applies to 1,627 acres (62 percent) of regionally significant habitat. There are 976 acres comprising 38 percent of regionally significant habitat that are not covered by the Sensitive Lands Overlay District or Title 3 flood management restrictions. (Figure 3-3). The Sensitive Lands Overlay District includes resource protection and conservation overlay zones to protect stream corridors, wetlands, and tree groves, and establishes mitigation requirements for habitat loss. Significant isolated tree groves and tree groves associated with wetlands or streams receive additional protection.

Figure 3-3. How existing habitat protection in Lake Oswego addresses 2,603 acres of regionally significant habitat



The City of Portland's Environmental Overlay Zone Regulations as well as other ordinance requirements exceed Metro's Title 3 baseline for water quality resource areas and flood management areas.[23] Portland's Environmental Overlay zones, combined with additional lands covered by Title 3 water quality and flood management restrictions, applies to 24,296 acres (85 percent) of regionally significant habitat. There are 4,374 acres comprising 15 percent of regionally significant habitat that are not covered by Portland's environmental overlay zones or Title 3 flood management restrictions (Figure 3-4). Portland's environmental overlay zones include the protection zone and the conservation zone. The protection zone applies to the most significant habitat, and strictly limits development in

Figure 3-4. How existing habitat protection in Portland addresses 28,659 acres of regionally significant habitat



[22] Sensitive Lands Overlay District (Section 48.17 of the Development Code); see also Section 17 (Floodplain Standards), Section 55 (Tree Ordinance), Section 48.17.600 (Mitigation)

[23] Environmental Zones (Section 33.430 of the Zoning Code); see also Greenway Zone (Section 33.440 of the Zoning Code), Open Space Zone (Section 33.100 of the Zoning Code), Flood Hazard Areas (Section 24.50 of the Building Code).

these areas; the conservation zone applies to significant habitat and allows development as long as adverse impacts are avoided, minimized, and mitigated.

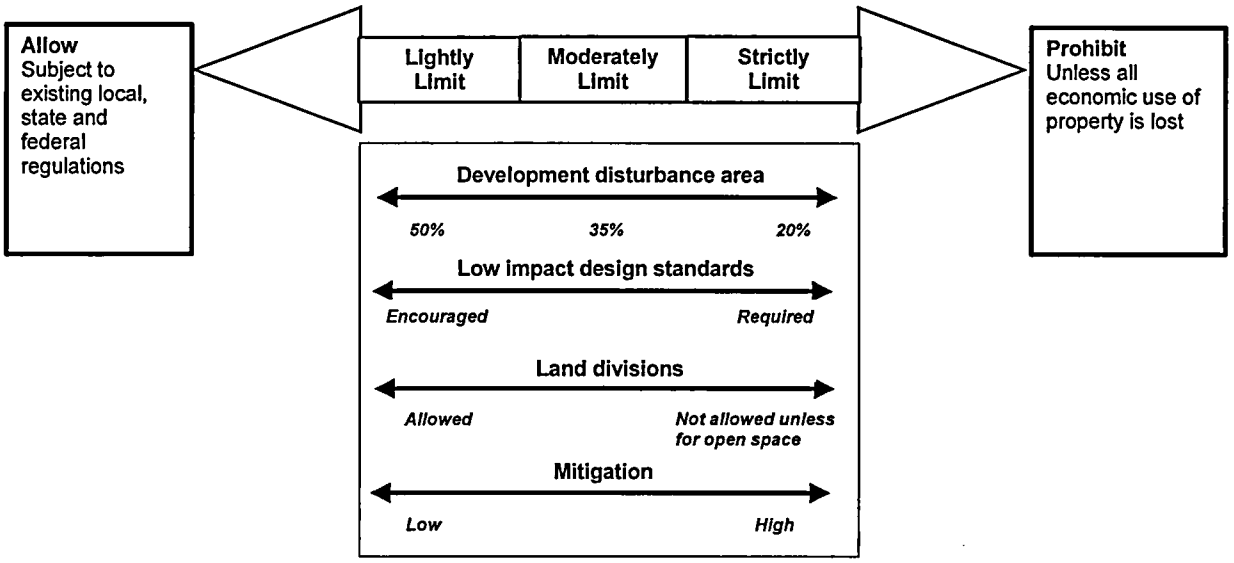
In summary, this comparison shows that at least some local programs currently exceed the minimum standards of Title 3 water quality resource areas and flood management areas. As a result, a portion of regionally significant habitat not covered by the Title 3 baseline receives protection by local programs. While it would be helpful to know the increment of local protection beyond the Title 3 baseline, the difficulties of measuring the extent of this coverage and the level of protection provided under all local government plans is well established in Metro's *Local Plan Analysis.*

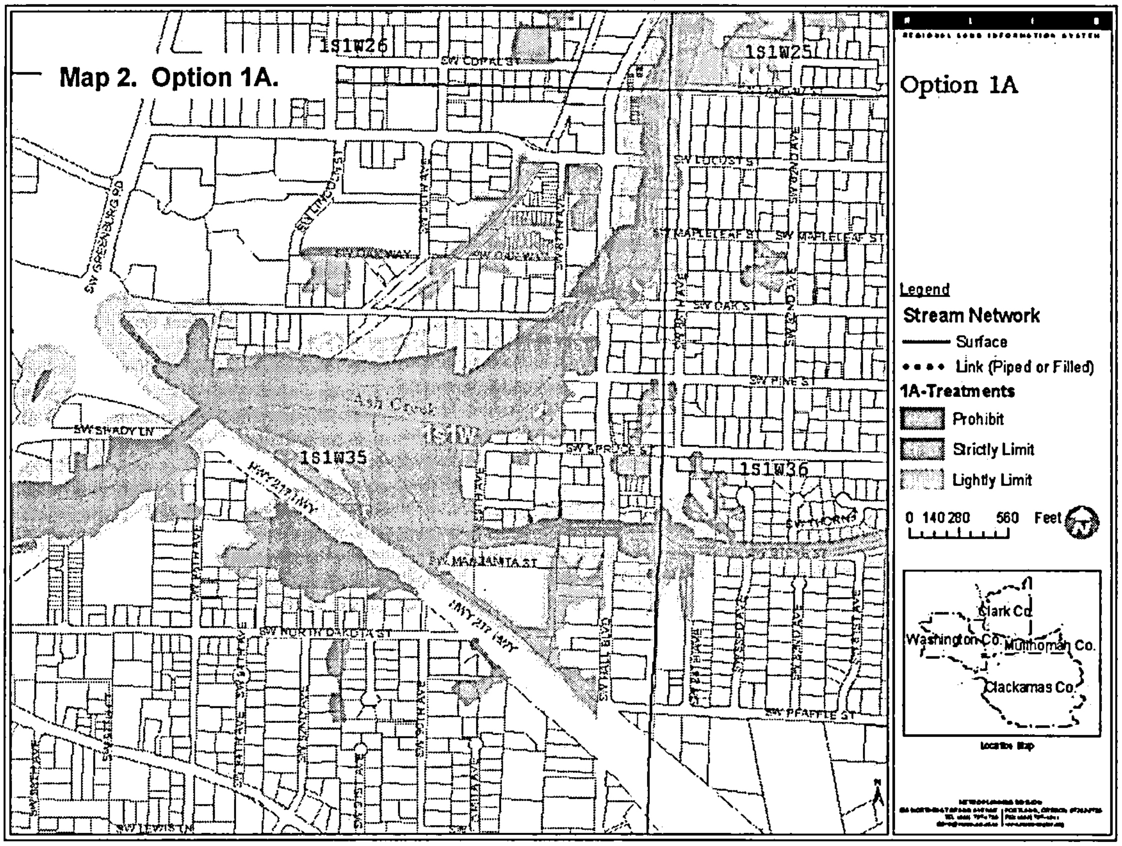
Regulatory program options

The Goal 5 rule requires Metro and local governments to develop a program to protect regionally significant fish and wildlife habitat based on ESEE decisions to allow, limit, or prohibit conflicting uses in significant resource sites. The six regulatory program options described in this section were developed to support Metro Council's decision. Maps 2-7 on the following pages depict the regulatory options for a specific geographic area that includes a regional center and several habitat types. These maps profile the differences among the options due to habitat types and urban development values.

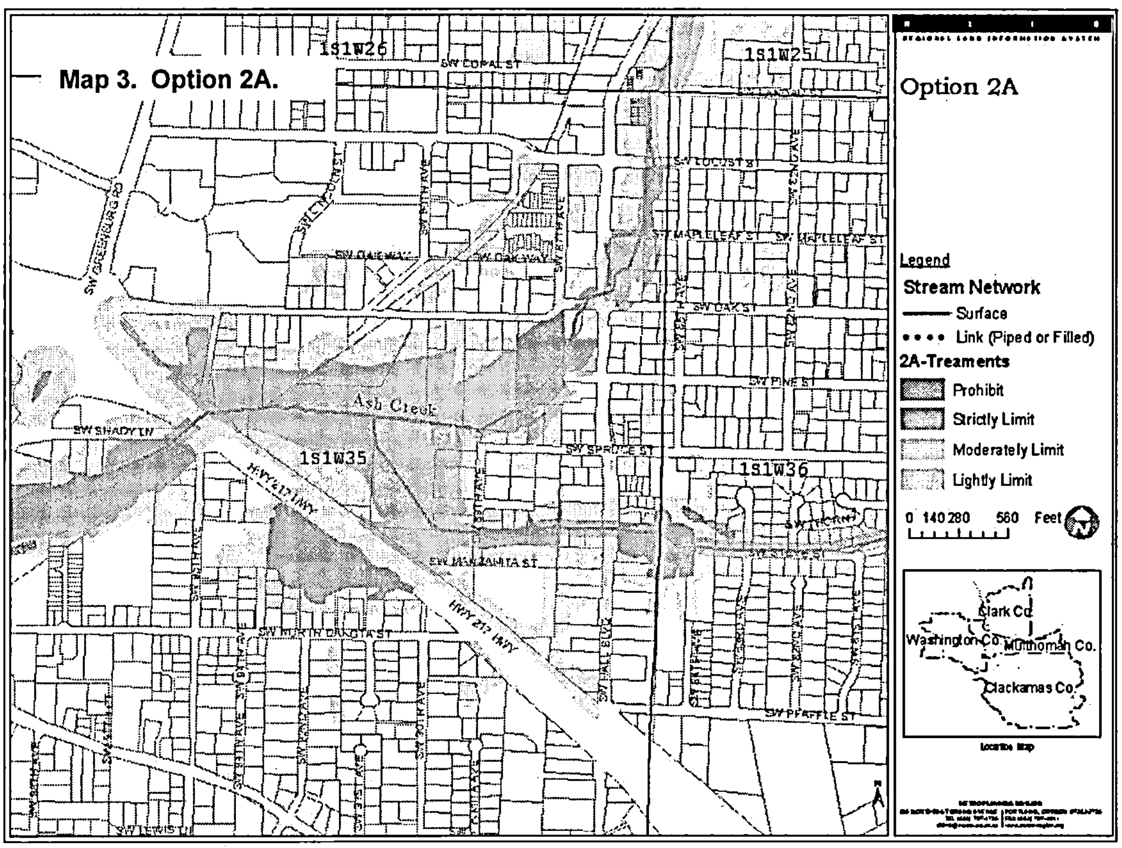
In each of the six options, allow, limit or prohibit "treatments" are assigned to each of the fish and wildlife habitat classes and impact areas. This results in a range of scenarios that provide varying levels of habitat protection. Figure 3-8 below shows the range of treatments (from least to most). In this analysis, the limit category has been expanded to three levels (lightly limit, moderately limit, strictly limit) to provide a continuum of protection approaches. The information in Figure 3-8 represents ***potential targets*** for protecting fish and wildlife habitat while allowing some level of development to occur. These potential targets are preliminary and are subject to revision during the third step of the Goal 5 process – the program development phase.

Figure 3-8. Allow, limit and prohibit treatments.
Range of Limit Treatments

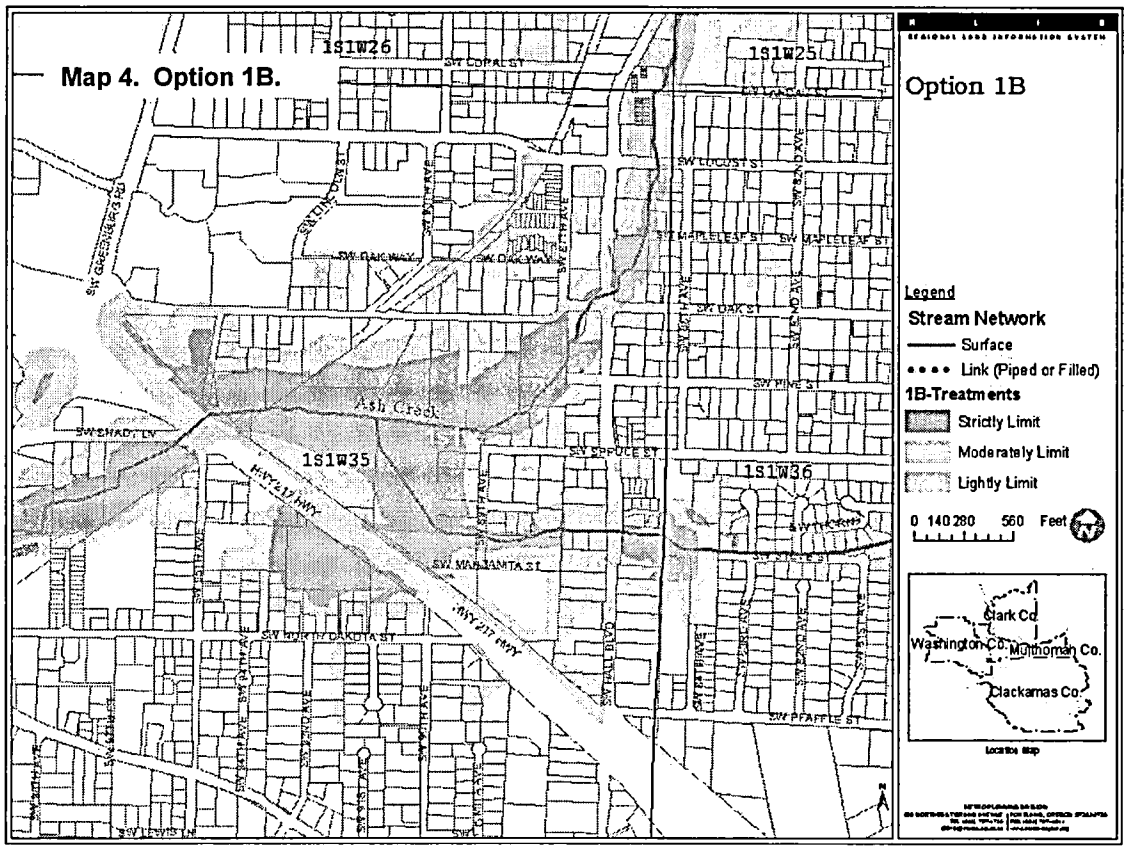


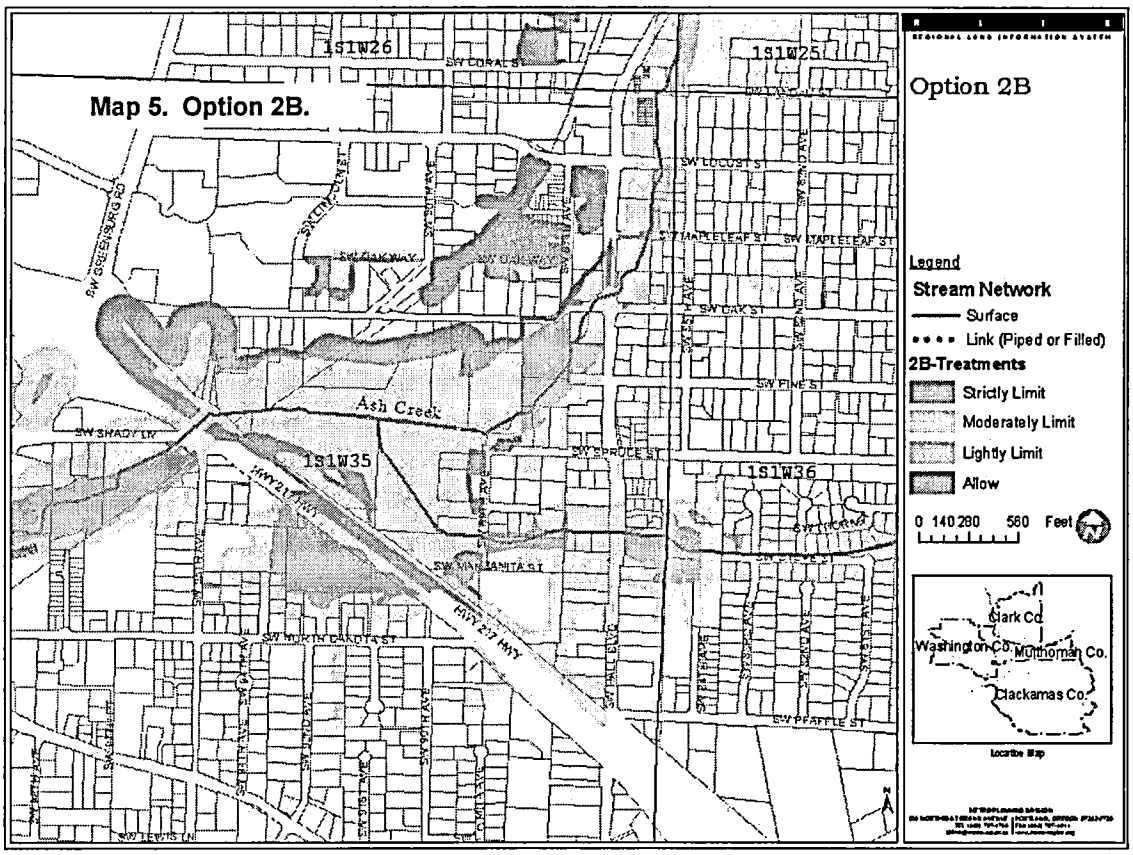


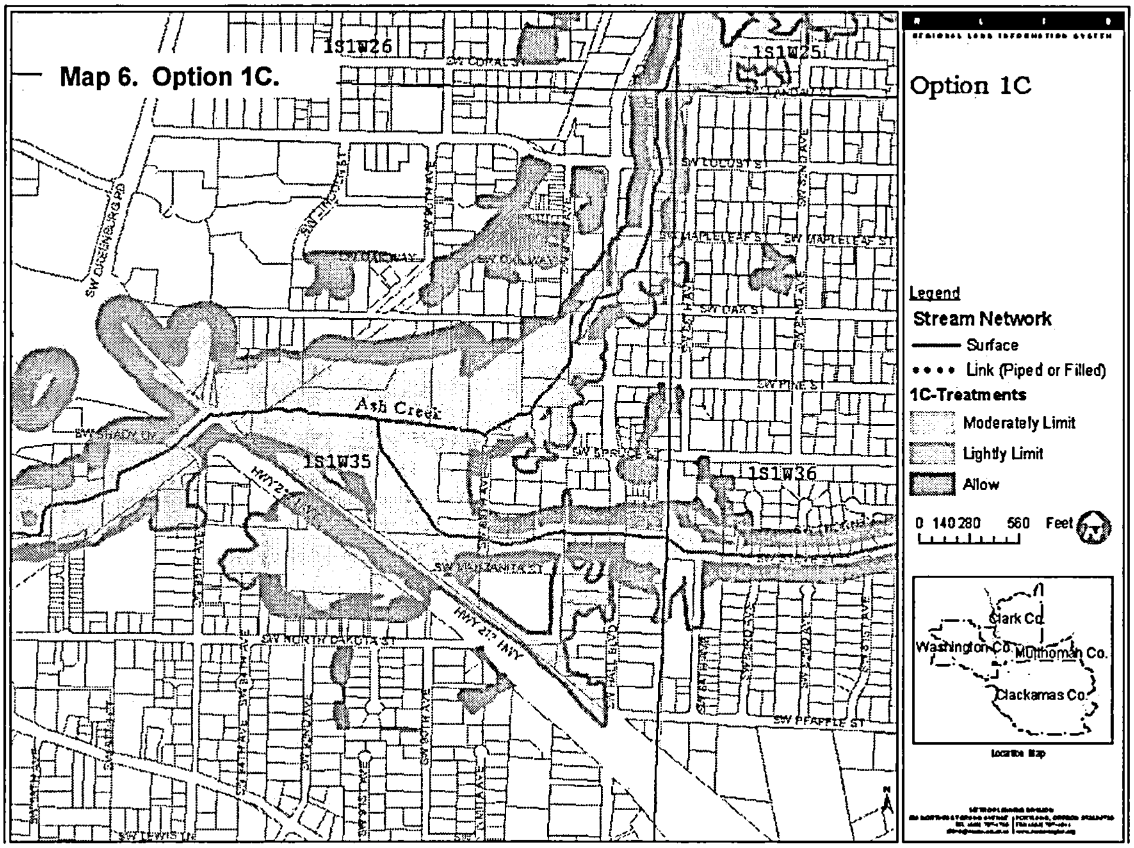
Map 2. Option 1A.
Option 1A
1S1W26
1S1W25
1S1W35
1S1W36
Ash Creek
SW COPAL ST
SW LOCUST ST
SW MAPLELEAF ST
SW OAK ST
SW PINE ST
SW SPRUCE ST
SW SHADY LN
SW GREENBURG RD
SW OAK WAY
HWY 217 FWY
SW MANZANITA ST
SW NORTH DAKOTA ST
SW PFAFFLE ST
SW LEWIS LN
SW THORN
Legend
Stream Network
Surface
Link (Piped or Filled)
1A-Treatments
Prohibit
Strictly Limit
Lightly Limit
0 140 280 560 Feet
Clark Co.
Washington Co.
Multnomah Co.
Clackamas Co.
Location Map

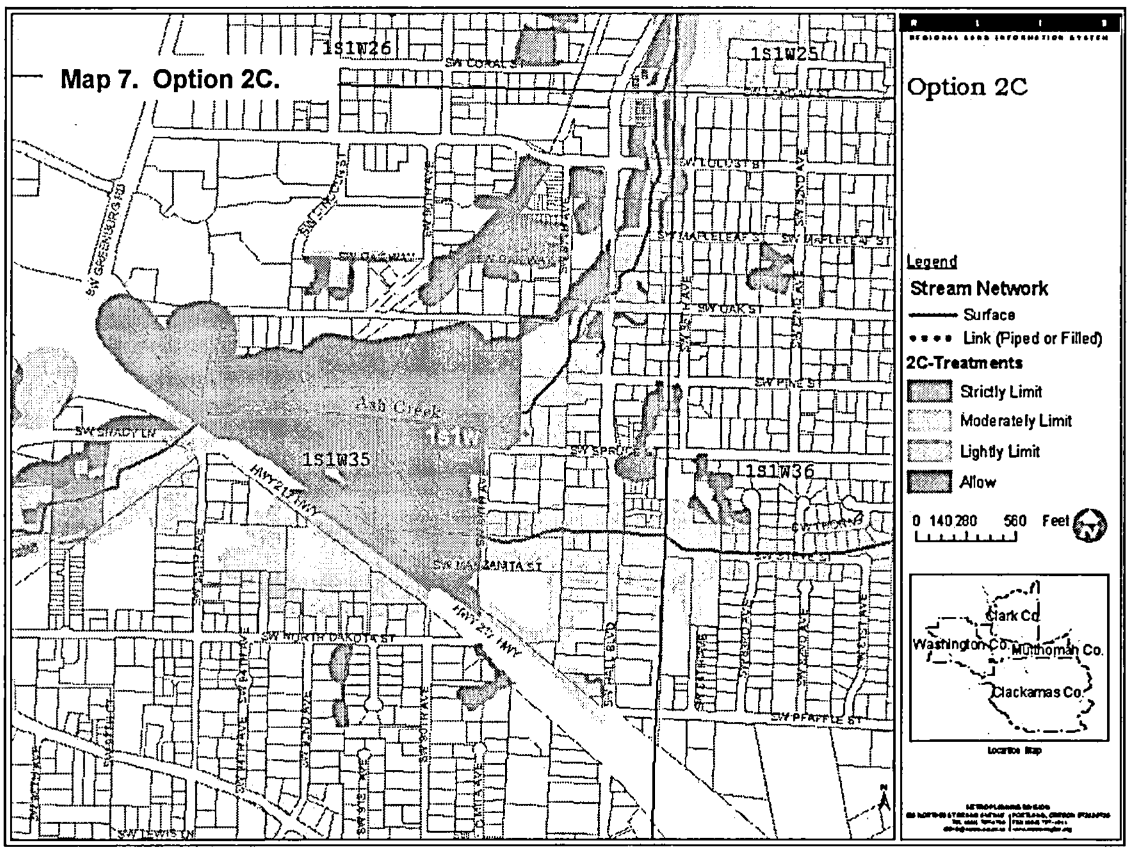


Map 3. Option 2A.
Option 2A
1S1W26
1S1W25
1S1W35
1S1W36
Ash Creek
SW COPAL ST
SW LOCUST ST
SW MAPLELEAF ST
SW OAK ST
SW PINE ST
SW SPRUCE ST
SW SHADY LN
SW GREENBURG RD
SW OAK WAY
HWY 217 FWY
SW MANZANITA ST
SW NORTH DAKOTA ST
SW PFAFFLE ST
SW LEWIS LN
SW THORN
Legend
Stream Network
Surface
Link (Piped or Filled)
2A-Treaments
Prohibit
Strictly Limit
Moderately Limit
Lightly Limit
0 140 280 560 Feet
Clark Co.
Washington Co.
Multnomah Co.
Clackamas Co.
Location Map


Map 4. Option 1B.
1S1W26
1S1W25
1S1W35
1S1W36
Ash Creek
Option 1B
Legend
Stream Network
Surface
Link (Piped or Filled)
1B-Treatments
Strictly Limit
Moderately Limit
Lightly Limit
0 140 280 560 Feet
Clark Co.
Washington Co.
Multnomah Co.
Clackamas Co.


Map 5. Option 2B.
1S1W26
1S1W25
1S1W35
1S1W36
Ash Creek
Option 2B
Legend
Stream Network
Surface
Link (Piped or Filled)
2B-Treatments
Strictly Limit
Moderately Limit
Lightly Limit
Allow
0 140 280 560 Feet
Clark Co.
Washington Co.
Multnomah Co.
Clackamas Co.


Map 6. Option 1C.
Option 1C
1S1W26
1S1W25
1S1W35
1S1W36
Ash Creek
SW CORAL ST
SW LOCUST ST
SW MAPLELEAF ST
SW OAK ST
SW PINE ST
SW SPRUCE ST
SW MANZANITA ST
SW NORTH DAKOTA ST
SW PFAFFLE ST
SW LEWIS LN
SW SHADY LN
SW GREENBURG RD
HWY 217
Legend
Stream Network
Surface
Link (Piped or Filled)
1C-Treatments
Moderately Limit
Lightly Limit
Allow
0 140 280 560 Feet
Clark Co.
Washington Co.
Multnomah Co.
Clackamas Co.
Locator Map


Map 7. Option 2C.
Option 2C
1S1W26
1S1W25
1S1W35
1S1W36
Ash Creek
SW CORAL ST
SW LOCUST ST
SW MAPLELEAF ST
SW OAK ST
SW PINE ST
SW SPRUCE ST
SW MANZANITA ST
SW NORTH DAKOTA ST
SW PFAFFLE ST
SW LEWIS LN
SW SHADY LN
SW GREENBURG RD
HWY 217
Legend
Stream Network
Surface
Link (Piped or Filled)
2C-Treatments
Strictly Limit
Moderately Limit
Lightly Limit
Allow
0 140 280 560 Feet
Clark Co.
Washington Co.
Multnomah Co.
Clackamas Co.
Locator Map

Habitat-based options (1A, 1B, 1C)

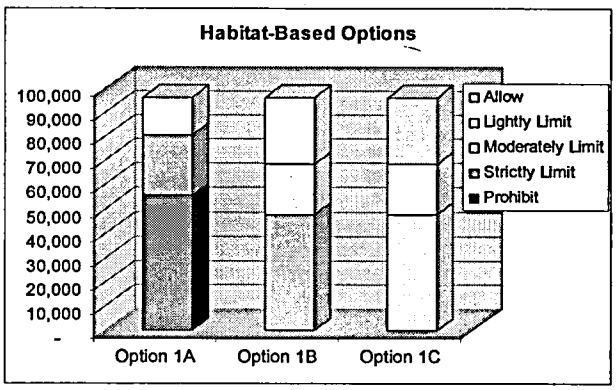
The three habitat-based options (Options 1A, 1B, and 1C) use habitat quality as the basis for varying protection regardless of land uses or urban development values. This approach recognizes fish and wildlife habitat as fixed assets in the urban landscape and orients urban development patterns around habitat areas based on the ecological values present. Ecological values were measured during Metro's Goal 5 inventory process and were based on landscape features (e.g., trees, woody vegetation, wetlands, etc.) and the ecological functions they provide (e.g., shade, streamflow moderation, wildlife migration, nesting and roosting sites, etc.). The inventory was then classified into six categories for the ESEE analysis (Class I-III riparian/wildlife corridors and Class A-C upland wildlife habitat) to distinguish higher value habitat from lower value habitat. Class I riparian/wildlife corridors and Class A upland wildlife habitat are the highest valued habitats.

Table 3-2: Habitat-based options (1A, 1B, 1C)

Fish & Wildlife Habitat Classification	Option 1A *Treatment*	Option 1B *Treatment*	Option 1C *Treatment*
Class I Riparian/Wildlife	P	SL	ML
Class II Riparian/Wildlife	P	ML	LL
Class III Riparian/Wildlife	SL	LL	A
Class A Upland Wildlife	P	SL	ML
Class B Upland Wildlife	SL	ML	LL
Class C Upland Wildlife	SL	LL	A
Impact Areas	LL	LL	A

Note: P = Prohibit; SL = Strictly Limit; ML = Moderately Limit; LL = Lightly Limit; A = Allow

Figure 3-9: Habitat-based program options



This approach assumes that all habitat lands have development value. As the ecological value decreases, the recommended treatment becomes less restrictive of development. In these options, the two high value habitat types (Class I riparian and Class A wildlife) would receive the same level of regulatory protection in industrial areas as they would in residential areas. In other words, these options establish a more equal shared responsibility for habitat protection across land uses.

Table 3-2 shows allow, limit and prohibit (ALP) treatments for each option. Figure 3-9 shows habitat and impact area acreage affected by ALP treatments under the three options. In Option 1A, the highest value habitat (Class I and II riparian and Class A wildlife) receives the highest level of protection, while lower valued habitat (Class III riparian and Class B and C wildlife) receives lower levels of protection. In Options 1B and 1C, habitats receive decreasingly lower levels of protection. In Option 1C, the lowest value habitat areas do not receive any protection other than existing local, state and federal regulations. Impact areas would face little or no regulatory requirements.

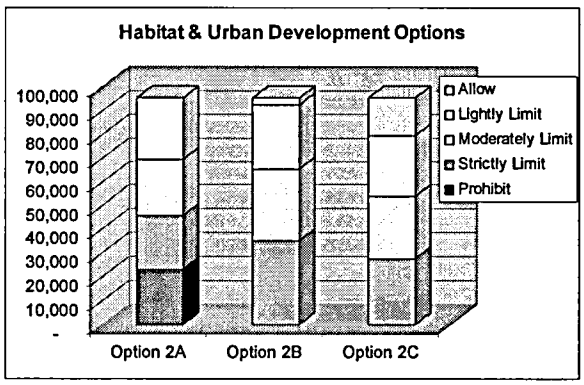
Habitat and urban development-based options (2A, 2B, 2C)

The three habitat and urban development-based options (2A, 2B, and 2C) use habitat values and urban development values as the basis for varying protection. Urban development values were categorized as high, medium or low in the Phase I ESEE analysis based on three measures: land value, employment density and 2040 design type hierarchy (based on Metro's 2040 Growth Concept). Areas receiving a high score in any of the three measures are called "high urban development value"; areas receiving no high scores but at least one medium score are called "medium urban development value"; and areas receiving all low scores are called "low urban development value." Areas without urban development value – parks and open space (both inside and outside the UGB) and rural areas outside the UGB – were not assigned development value.

High priority 2040 Growth Concept design types include the central city, regional centers and regionally significant industrial areas. Medium priority 2040 Growth Concept design types include town centers, main streets, station communities, other industrial areas and employment centers. Inner and outer neighborhoods and corridors are considered low priority 2040 Growth Concept design types. In the recent expansion areas, interim design types were used to determine urban development value.

Tables 3-3, 3-4 and 3-5 show the allow, limit and prohibit (ALP) treatments for each option. Habitat protection levels are adjusted based on urban development value in these options. For example, a Class I riparian corridor located within a regional center or industrial area (high urban development value) would receive less protection than one that passes through an inner or outer neighborhood (low urban development value) in all three tables. Figure 3-10 shows habitat and impact area acreage affected by ALP treatments under the three options.

Figure 3-10: Habitat and urban development-based program options



Option 2A provides the highest level of protection for high valued riparian habitat and less protection for wildlife and other habitat areas. Commercial and industrial areas, which are important to the region, have less protection than other areas in Option 2A. In Options 2B and 2C, the level of protection on the most highly valued habitat decreases, while the levels of protection in the high value urban development areas decrease even more. In Option 2C,the most highly valued urban development areas have no habitat protection, regardless of habitat quality. In all three habitat and urban development-based options, rural areas and parks and open spaces receive more protection than other areas due to their relatively low urban development value. Impact areas would face little or no regulatory requirements in these options.

Table 3-3. Habitat and urban development-based program option (2A) and ALP treatments.

Fish & Wildlife Habitat Classification	HIGH Urban Development Value	MEDIUM Urban Development Value	LOW Urban Development Value	Other Areas*
	Treatment	*Treatment*	*Treatment*	*Treatment*
Class I Riparian/Wildlife	SL	SL	P	P
Class II Riparian/Wildlife	ML	ML	SL	SL
Class III Riparian/Wildlife	LL	LL	LL	ML
Class A Upland Wildlife	LL	ML	ML	SL
Class B Upland Wildlife	LL	LL	ML	ML
Class C Upland Wildlife	LL	LL	LL	ML
Impact Areas	LL	LL	LL	LL

*Other areas include parks and open space within Metro's jurisdiction and areas outside the UGB with no design type.

Table 3-4: Habitat and urban development-based program option (2B) and ALP treatments.

Fish & Wildlife Habitat Classification	HIGH Urban Development Value	MEDIUM Urban Development Value	LOW Urban Development Value	Other Areas*
	Treatment	*Treatment*	*Treatment*	*Treatment*
Class I Riparian/Wildlife	LL	ML	SL	SL
Class II Riparian/Wildlife	LL	LL	ML	ML
Class III Riparian/Wildlife	A	LL	LL	ML
Class A Upland Wildlife	LL	ML	ML	SL
Class B Upland Wildlife	LL	LL	ML	ML
Class C Upland Wildlife	A	LL	LL	ML
Impact Areas	A	LL	LL	LL

*Other areas include parks and open space within Metro's jurisdiction and areas outside the UGB with no design type.

Table 3-5: Habitat and urban development-based program option (2C) and ALP treatments

Fish & Wildlife Habitat Classification	HIGH Urban Development Value	MEDIUM Urban Development Value	LOW Urban Development Value	Other Areas*
	Treatment	*Treatment*	*Treatment*	*Treatment*
Class I Riparian/Wildlife	A	LL	ML	SL
Class II Riparian/Wildlife	A	LL	LL	ML
Class III Riparian/Wildlife	A	A	A	ML
Class A Upland Wildlife	A	LL	ML	SL
Class B Upland Wildlife	A	LL	LL	ML
Class C Upland Wildlife	A	A	A	ML
Impact Areas	A	A	LL	LL

*Other areas include parks and open space within Metro's jurisdiction and areas outside the UGB with no design type.

Habitat acreage by allow, limit and prohibit treatments in program options

Table 3-6 below compares all six options and shows the number of acres that would be covered by each option and treatment type. For example, in Option 1A, 55,450 habitat acres would receive a prohibit treatment (almost 70 percent of habitat acres), whereas 23,084 acres in Option 2A (27 percent of habitat acres) would receive a prohibit treatment. The acreage in this table is for habitat areas and impact areas within Metro's jurisdictional boundary. Approximately 80,200 acres are fish and wildlife habitat; impact areas cover approximately 15,720 acres.

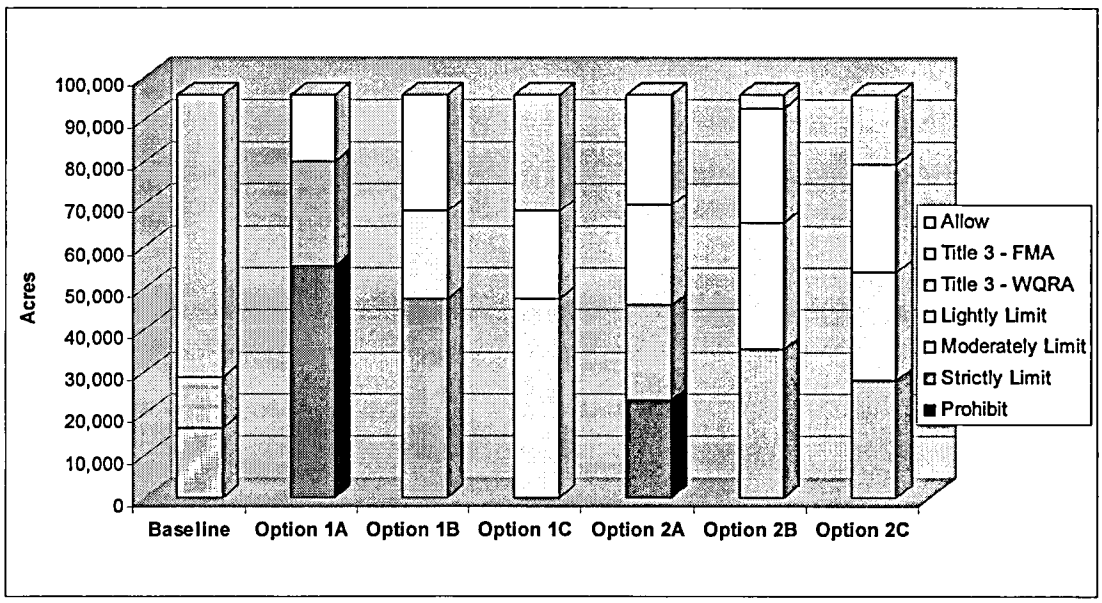
Table 3-6: Habitat and impact area acreage within Metro's jurisdictional boundary by allow, limit and prohibit treatments

Treatment	Option1A	Option 1B	Option 1C	Option 2A	Option 2B	Option 2C
Prohibit	55,450	0	0	23,084	0	0
Strictly Limit	24,784	47,557	0	22,775	35,212	27,872
Moderately Limit	0	20,782	47,557	23,965	30,352	25,983
Lightly Limit	15,721	27,616	20,782	26,131	27,323	25,727
Allow	0	0	27,616	0	3,069	16,374
Total	*95,956*	*95,956*	*95,956*	*95,956*	*95,956*	*95,956*

Figure 3-11 graphically illustrates the information in Table 3-6. The bar on the far left represents Title 3 protection of fish and wildlife habitat. Title 3 acreage is distributed within each of the bars representing the six options. However, these bars do not show in which treatment category this acreage occurs. For example, the 28,540 acres of Title 3 management areas may fall into any one of the treatment categories depending on the program option.

A comparison of the option bars shows that Option 1A provides the greatest habitat protection among the options with a total of 55,450 acres (Class I and II riparian/wildlife, Class A wildlife) covered by a prohibit treatment, and 15,721 acres (Class III riparian/wildlife, Class A and B wildlife) covered by a strictly limit treatment. The bars representing Option 2A-C show more variation in treatment than the habitat-based options, which is a result of considering urban development values. Option 1C provides the least habitat protection among these three options, considering the larger acreage in allow and lightly limit and lack of any habitat in strictly limit.

Figure 3-11: Comparison of options by allow, limit and prohibit treatments



These six program options are evaluated based on their economic, social, environmental and energy consequences in Chapter 4. Most of the data used in this analysis is shown in Table 3-7 (on the following two pages).

Table 3-7: Fish and wildlife habitat classes and impact areas by development status and development value (inside Metro's jurisdiction)

Fish & Wildlife Habitat Class & Urban Development Value	Option 1A	Option 1B	Option 1C	Option 2A	Option 2B	Option 2C	Developed (urban)			Developed (parks)			Total Devel. Habitat Acres	Vacant			Total Vacant Habitat Acres	Total Devel. & Vacant Habitat Acres
							Inside Title 3 WQRA	*Inside Title 3 FMA*	*Outside WQRA/ FMA*	*Inside Title 3 WQRA*	*Inside Title 3 FMA*	*Outside WQRA/ FMA*		*Inside Title 3 WQRA*	*Inside Title 3 FMA*	*Outside WQRA/ FMA*		
Class I Riparian/Wildlife Corridors																		
High	P	SL	ML	SL	LL	A	175	71	36	0	0	0	282	592	516	833	1,942	2,224
Medium	P	SL	ML	SL	ML	LL	254	66	140	0	0	0	460	1,274	288	545	2,107	2,567
Low	P	SL	ML	P	SL	ML	968	272	1,003	0	0	0	2,243	2,281	796	2,020	5,097	7,340
Other Areas	P	SL	ML	P	SL	SL	432	239	179	5,449	3,999	2,045	12,342	1,718	556	1,128	3,402	15,744
Total Acres							***1,829***	***648***	***1,357***	***5,449***	***3,999***	***2,045***	***15,327***	***5,866***	***2,156***	***4,527***	***12,549***	***27,876***
Class II Riparian/Wildlife Corridors																		
High	P	ML	LL	ML	LL	A	104	99	70	0	0	0	273	42	310	316	668	941
Medium	P	ML	LL	ML	LL	LL	184	39	186	0	0	0	409	123	128	434	686	1,095
Low	P	ML	LL	SL	ML	LL	607	102	793	0	0	0	1,502	227	262	875	1,364	2,866
Other Areas	P	ML	LL	SL	ML	ML	126	46	140	266	708	515	1,801	213	254	721	1,188	2,990
Total Acres							***1,021***	***286***	***1,189***	***266***	***708***	***515***	***3,986***	***606***	***954***	***2,347***	***3,907***	***7,893***
Class III Riparian/Wildlife Corridors																		
High	SL	LL	A	LL	A	A	22	918	127	0	0	0	1,066	0	6	41	48	1,114
Medium	SL	LL	A	LL	LL	A	42	487	321	0	0	0	851	2	4	125	131	982
Low	SL	LL	A	LL	LL	A	78	914	452	0	0	0	1,444	4	14	333	351	1,795
Other Areas	SL	LL	A	ML	ML	ML	25	152	57	3	45	123	405	1	3	133	137	541
Total Acres							***167***	***2,471***	***956***	***3***	***45***	***123***	***3,766***	***7***	***27***	***632***	***666***	***4,432***
Class A Wildlife Habitat																		
High	P	SL	ML	LL	LL	A	11	7	50	0	0	0	67	5	17	185	207	275
Medium	P	SL	ML	ML	ML	LL	12	0	88	0	0	0	101	6	0	365	372	473
Low	P	SL	ML	ML	ML	ML	20	2	2,031	0	0	0	2,054	25	2	4,726	4,753	6,807
Other Areas	P	SL	ML	SL	SL	SL	17	36	468	80	42	8,307	8,952	38	1	3,138	3,176	12,127
Total Acres							***60***	***45***	***2,637***	***80***	***42***	***8,308***	***11,173***	***74***	***21***	***8,414***	***8,508***	***19,682***
Class B Wildlife Habitat																		
High	SL	ML	LL	LL	LL	A	1	2	56	0	0	0	58	1	1	357	359	417
Medium	SL	ML	LL	LL	LL	LL	1	0	206	0	0	0	208	7	1	801	809	1,016
Low	SL	ML	LL	ML	ML	LL	15	2	2,674	0	0	0	2,690	15	3	3,094	3,112	5,802
Other Areas	SL	ML	LL	ML	ML	ML	2	1	640	16	4	1,481	2,144	11	4	3,494	3,509	5,653
Total Acres							***19***	***4***	***3,576***	***16***	***4***	***1,481***	***5,100***	***34***	***10***	***7,746***	***7,789***	***12,889***
Class C Wildlife Habitat																		
High	SL	LL	A	LL	A	A	3	6	109	0	0	0	118	4	38	421	462	580
Medium	SL	LL	A	LL	LL	A	2	1	313	0	0	0	317	10	4	809	822	1,139
Low	SL	LL	A	LL	LL	A	4	2	1,348	0	0	0	1,354	7	15	1,715	1,737	3,091
Other Areas	SL	LL	A	ML	ML	ML	1	5	256	9	21	892	1,184	3	0	1,465	1,468	2,653
Total Acres							***10***	***15***	***2,026***	***9***	***21***	***892***	***2,973***	***23***	***56***	***4,410***	***4,489***	***7,463***

Note: WQRA/FMA = Water Quality Resource Area/Flood Management Areas
P = Prohibit; SL = Strictly Limit; ML = Moderately Limit; LL = Lightly Limit; A = allow
Source: Metro 2003

Table 3-7 (cont.): Fish and wildlife habitat classes and impact areas by development status and development value (inside Metro's jurisdiction)

Fish & Wildlife Habitat Class & Development Value	Option 1A	Option 1B	Option 1C	Option 2A	Option 2B	Option 2C	Developed (urban)			Developed (parks)			Total Devel. Habitat Acres	Vacant			Total Vacant Habitat Acres	Total Devel. & Vacant Habitat Acres
							Inside Title 3 WQRA	*Inside Title FMA*	*Outside WQRA/ FMA*	*Inside Title 3 WQRA*	*Inside Title 3 FMA*	*Outside WQRA/ FMA*		*Inside Title 3 WQRA*	*Inside Title 3 FMA*	*Outside WQRA/ FMA*		
Impact Areas																		
High	LL	LL	A	LL	A	A	76	123	698	0	0	0	897	39	48	391	478	1,375
Medium	LL	LL	A	LL	LL	A	154	34	1,429	0	0	0	1,617	109	5	709	824	2,440
Low	LL	LL	A	LL	LL	LL	402	45	6,596	0	0	0	7,043	96	12	1,524	1,631	8,674
Other Areas	LL	LL	A	LL	LL	LL	52	6	801	103	143	1,005	2,109	37	2	1,084	1,123	3,232
Total Acres							***684***	***208***	***9,523***	***103***	***143***	***1,005***	***11,665***	***280***	***68***	***3,708***	***4,056***	***15,721***
Grand Total							***3,792***	***3,678***	***21,265***	***5,926***	***4,962***	***14,368***	***53,990***	***6,890***	***3,293***	***31,783***	***41,965***	***95,956***

Note: WQRA/FMA = Water Quality Resource Area/Flood Management Areas
RC/WH = riparian corridor, wildlife habitat; WH = upland wildlife habitat
P = Prohibit; SL = Strictly Limit; ML = Moderately Limit; LL = Lightly Limit; A = allow
Source: Metro 2002

CHAPTER FOUR: ANALYSIS OF REGULATORY PROGRAM OPTIONS

Six regulatory options are under consideration for land classified as regionally significant fish and wildlife habitat, as described in Chapter Three. Five potential regulatory treatments are applied in each of the options, ranging from allowing conflicting uses to prohibiting conflicting uses in habitat areas. The potential consequences of applying these treatments to fish and wildlife habitat are considered and evaluated with 19 criteria identified by the Metro Council in October 2003; 17 criteria are derived from the economic, social, environmental, and energy tradeoffs and two additional criteria consider how well the six regulatory options would assist in meeting the requirements of the federal Endangered Species Act and the Clean Water Act.

The criteria are based on the tradeoffs identified in the Phase I ESEE analysis of protecting or not protecting regionally significant fish and wildlife habitat. For example, the economic analysis identified the tradeoffs related to development opportunities and the regional economy. The economic analysis also identified the economic values associated with ecosystem services provided by fish and wildlife habitat. The criteria are assumed to have equal weight in the evaluation of program options. Table 4-1 below describes the evaluation criteria.

Table 4-1. Evaluation criteria.

Economic factors	**Description**
1. Supports the regional economy by providing development opportunities (such as residential, commercial, industrial)	The regional economy depends on urban development. Metro identified priorities for urban development based on land value, employment potential and regional growth management priorities (2040 Growth Concept).
2. Supports economic values associated with ecosystem services (such as flood control, clean water, recreation and amenity values).	Stream corridors and upland wildlife habitat provide economic value (e.g.,habitat provides services that can significantly reduce public and private costs over the long term). Higher value habitat provides more ecosystem services.
3. Promotes recreational use and amenities	Focuses on the recreational benefits – both active and passive – of retaining habitat. Options that protect more high quality habitat will help protect the recreational amenity values.
4. Distribution of economic tradeoffs	Highlights land uses (regional zoning) and ownership classes (public vs. private) that would bear a disproportional share of impacts.
5. Minimizes need to expand the urban growth boundary (UGB) and increase development costs.	Describes the effects of program options on the need to expand the urban growth boundary (UGB).
Social factors	
6. Minimizes impact on property owners	Potential regulations have different impacts on residential, business and rural property owners. Options that provide more habitat protection have more impact on property owners.
7. Minimizes impact on location and choices for housing and jobs	Applying regulations to protect habitat may affect the urban land supply and relates to people's basic needs for housing and jobs.
8. Preserves habitat for future generations	Species diversity, environmental quality and the potential economic benefits derived from fish and wildlife habitat are important for people today as well as future generations.
9. Maintains cultural heritage and sense of place	Fish and wildlife habitat provides important values such as cultural heritage (salmon) and regional identity (people move here to enjoy the proximity to the natural environment).

10. Preserves amenity value of resources (quality of life, property values, views)	Fish and wildlife habitat provides amenity values such as quality of life, increased property values and regional attractiveness.
Environmental factors	
11. Conserves existing watershed health and restoration opportunities	Preserving habitat protects existing ecosystem functions (such as clean, cold, reliable water sources) that promote a healthy watershed and retains lower quality habitat for future restoration opportunities.
12. Retains multiple habitat functions provided by forest areas	Forest cover is important to maintain healthy fish and wildlife habitat and a diversity of species in the region. Forested areas may be found in developed areas (such as neighborhoods) and on vacant land. Trees are more likely to be lost in vacant areas than in existing neighborhoods.
13. Promotes riparian corridor connectivity and overall habitat connectivity	Habitat connectivity is important to fish and wildlife. Stream corridor connectivity allows fish to travel safely to upstream areas. Many fish and wildlife species must make seasonal journeys to meet basic needs for food, shelter and breeding.
14. Conserves habitat quality and biodiversity provided by large habitat areas	Large habitats are more valuable to native wildlife than smaller ones because more wildlife species are retained over time. Animals sensitive to human disturbance still have a place to live.
15. Supports biodiversity through conservation of sensitive habitats and species	Some habitats once common are now scarce (such as wetlands, native meadows, white oaks, healthy urban streams). Sensitive species depend on these rare habitats; their loss could significantly impact biodiversity.
Energy Factors	
16. Promotes compact urban form	A compact urban form conserves energy by reducing auto travel times and need for roads.
17. Promotes green infrastructure	Trees and other vegetation reduce energy demand by decreasing water and air temperature, flooding, and air pollution associated with energy use.
Other criteria	
18. Assists in protecting fish and wildlife protected by the federal Endangered Species Act	The Endangered Species Act's ultimate goal is to recover species and conserve the ecosystems upon which they depend so they no longer need regulatory protection. Protecting slopes, wetlands, riparian functions, hydrologic conditions and areas of high habitat value may help species recover and prevent future listings.
19. Assists in meeting water quality standards required by the federal Clean Water Act	Protecting slopes and wetlands, habitat near streams, hydrologic conditions, and forested areas can assist local jurisdictions in meeting the standards of the federal Clean Water Act.

This chapter includes detailed analysis of the performance of the six regulatory program options against the criteria. It includes a ranking of the options for each criterion.

Evaluation of economic criteria

This section of the Phase II ESEE analysis compares the potential economic tradeoffs of the six regulatory programs. Based on the analysis of economic consequences in Phase I, Metro developed five criteria to measure the performance of program options in addressing the potential economic impacts. These criteria are:

1. Supports urban development priorities.
2. Supports economic values of ecosystem services.
3. Supports recreational access and amenities.
4. Distributes economic tradeoffs.
5. Minimizes need to expand the urban growth boundary (UGB).

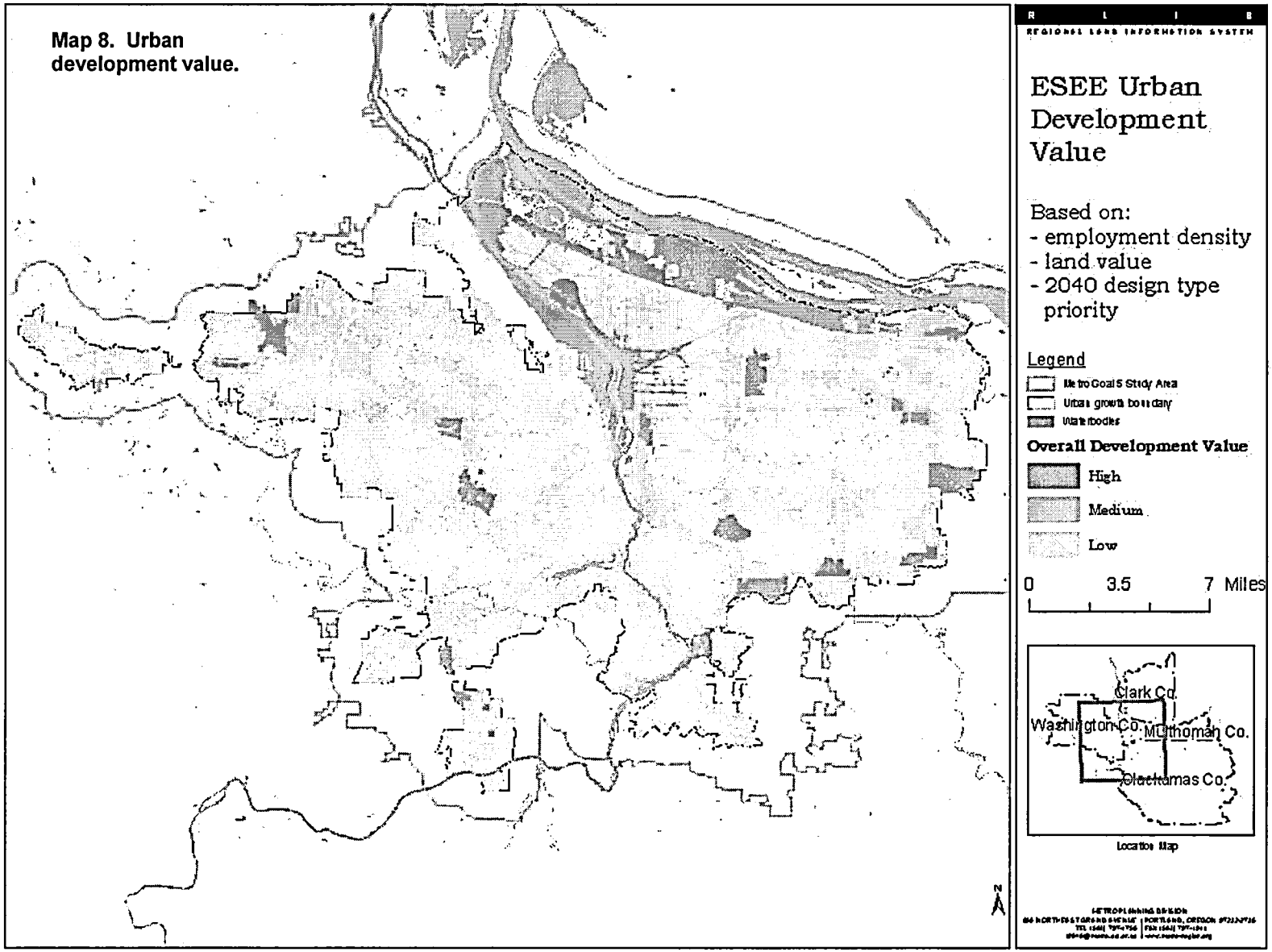
1. Supports urban development priorities.

This criterion uses the land rankings developed in Phase I of the ESEE analysis as a tool to identify where lands with high, medium or low development value are affected by allow, limit, or prohibit treatments under the six regulatory program options.

Not all land has the same economic importance for development. For example, land zoned for parks is assumed to have less economic importance than land zoned for industrial uses. In Phase I of the ESEE analysis, a method was developed to rank the relative economic importance of land for development, or "development value." Urban lands were ranked into three categories – "high," "medium" and "low" – using three measures: land value, employment density and 2040 design types (based on Metro's 2040 Growth Concept). Land value and employment density describe relative economic importance based on the current land use and labor demands. The 2040 design type hierarchy ranks land using development priorities as described by Metro's regional goals for future land use and development.

Lands that ranked high scored high on at least one of the three measures. Lands that ranked medium scored medium on at least one of the three measures, and lands that ranked low scored low on each of the three measures. A fourth category of lands, "other lands," describes primarily non-urban lands that are not ranked for development value. Approximately half of these lands are inside the UGB, half are outside. These lands include parks and open space and agricultural and forestry land. Describing the economic consequences of program options using these measures provides information on current and future economic tradeoffs of protecting fish and wildlife habitat. Map 8 shows the urban development values.

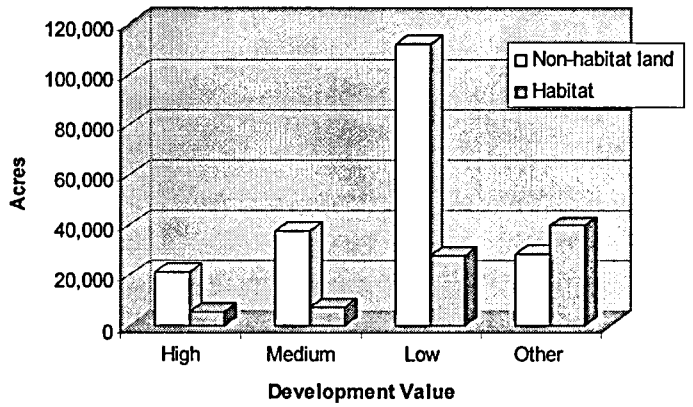
Map 8. Urban development value.



Potential impacts on urban development priorities

The economic analysis for this criterion evaluates urban development values on land containing fish and wildlife habitat. Comparing the acres of land that contain habitat with the total acres of land in Metro's jurisdiction provides insight into the relative magnitude of land affected by the six regulatory program options. Figure 4-1 illustrates the distribution of lands in Metro's jurisdiction (approximately 280,000 acres) by habitat status (non-habitat vs. habitat) and development value (high, medium, low).

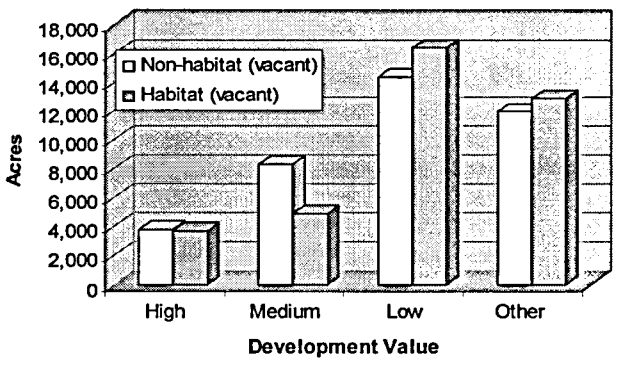
Figure 4-1: Non-habitat and habitat land by urban development value in Metro's jurisdiction.



This analysis assumes that Goal 5 treatments that protect habitat (i.e., prohibit or limit) could restrict urban use and development of these lands and/or increase development costs. About a quarter of the lands in Metro's jurisdiction with high, medium and low development values could potentially be affected by Goal 5 treatments and may have considerable negative consequences for the regional economy. Sixty-three percent of "other" lands in Metro's jurisdiction also contain fish and wildlife habitat. To the extent that program options protect habitat on these lands rather than on urban lands, negative impacts on urban development priorities may be limited.

Goal 5 treatments could impact half of all vacant land in Metro's jurisdiction. Figure 4-2 shows the breakdown of vacant lands in Metro's jurisdiction with and without fish and wildlife habitat. It describes a significant impact because in general, developing vacant land costs less and takes less time than redeveloping land, which makes this land more desirable for expanding urban development priorities. Also, because these lands are currently vacant and more easily developed, the negative impacts of reduced property value, increased development costs, and reduced employment associated with limit and prohibit treatments may begin in the short term.

Figure 4-2: Vacant non-habitat and habitat land by urban development value in Metro's jurisdiction.



Comparing Figure 4-1 with Figure 4-2 shows that a larger proportion of vacant land ranked high and low contain habitat compared with the average for all lands in Metro's jurisdiction.

Figure 4-3 Developed non-habitat and habitat by urban development value in Metro's jurisdiction.

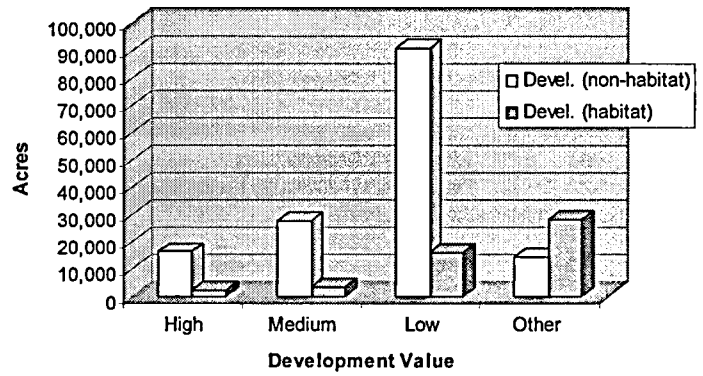


Figure 4-3 illustrates that most developed land in Metro's jurisdiction does not contain fish and wildlife habitat. Limit and prohibit treatments would affect development values on approximately 15 percent of the developed land in Metro's jurisdiction. Negative impacts on property value, development costs, and employment would accrue over the long term as redevelopment takes place on these lands.

Protecting habitat acres that otherwise could be developed under current regulations may reduce the developable area of a parcel, which could also reduce the parcel's market value. This result is more likely with strictly limit and prohibit treatments and less likely with lightly limit and moderately limit treatments.

Protection may also require modifying development plans, such as changing access routes or altering a development's configuration. Such changes may increase development costs, which may also negatively impact property values. Limiting developable area or increasing development costs for commercial or industrial sites may also negatively impact the site's employment potential. To the extent that protection limits or prevents developing land uses consistent with the 2040 Growth Concept, these actions may negatively impact the region's long-term planning goals.

Program options with the greatest support for use and development of land would rank highest for this criterion. These options have the greatest number of acres affected by allow, lightly limit and moderately limit treatments. Program options that least support use and development of land would rank lowest. These options have the greatest number of acres affected by strictly limit and prohibit treatments.

Measuring the criterion

Table 4-2 shows the number of acres of habitat land and impact areas in the four urban development categories (high, medium, low, and other) affected by allow, limit, and prohibit treatments for the six program options. Habitat acres considered developed, but in park status, are excluded from this table because they generally are not available for urban development.

Table 4-2: Acres of fish and wildlife habitat & impact areas by urban development priorities affected by program options (parks not included).

Treat-ment	Program Options	*HIGH* Urban Development Value			MEDIUM Urban Development Value			LOW Urban Development Value			Other Areas		
		Dev. urban	*Vacant inside Title 3*	*Vacant outside Title 3*	*Dev. urban*	*Vacant inside Title 3*	*Vacant outside Title 3*	*Dev. urban*	*Vacant inside Title 3*	*Vacant outside Title 3*	*Dev. urban*	*Vacant inside Title 3*	*Vacant outside Title 3*
Allow	Option 1A	0	0	0	0	0	0	0	0	0	0	0	0
	Option 1B	0	0	0	0	0	0	0	0	0	0	0	0
	Option 1C	2,081	135	853	2,785	134	1,643	9,841	148	3,572	1,354	45	2,683
	Option 2A	0	0	0	0	0	0	0	0	0	0	0	0
	Option 2B	2,081	135	853	0	0	0	0	0	0	0	0	0
	Option 2C	2,762	1,621	2,544	2,785	134	1,643	2,798	40	2,048	0	0	0
Lightly limit	Option 1A	897	87	391	1,617	114	709	7,043	108	1,524	859	39	1,084
	Option 1B	2,081	135	853	2,785	134	1,643	9,841	148	3,572	1,354	45	2,683
	Option 1C	331	355	673	617	260	1,235	4,192	507	3,970	955	483	4,215
	Option 2A	2,207	160	1,394	2,992	142	2,444	9,841	148	3,572	859	39	1,084
	Option 2B	681	1,486	1,691	3,402	394	2,878	9,841	148	3,572	859	39	1,084
	Option 2C	0	0	0	1,178	1,828	2,146	11,235	614	5,493	859	39	1,084
Moderately limit	Option 1A	0	0	0	0	0	0	0	0	0	0	0	0
	Option 1B	331	355	673	617	260	1,235	4,192	507	3,970	955	483	4,215
	Option 1C	349	1,132	1,018	561	1,568	911	4,296	3,104	6,746	1,372	2,312	4,266
	Option 2A	273	352	316	510	258	799	4,744	45	7,821	1,138	22	5,092
	Option 2B	0	0	0	561	1,568	911	6,246	534	8,696	1,450	489	5,814
	Option 2C	0	0	0	0	0	0	4,296	3,104	6,746	1,450	489	5,814
Strictly limit	Option 1A	1,243	50	819	1,375	28	1,734	5,488	58	5,143	1,138	22	5,092
	Option 1B	349	1,132	1,018	561	1,568	911	4,296	3,104	6,746	1,372	2,312	4,266
	Option 1C	0	0	0	0	0	0	0	0	0	0	0	0
	Option 2A	282	1,109	833	460	1,562	545	1,502	489	875	834	505	3,859
	Option 2B	0	0	0	0	0	0	2,243	3,077	2,020	1,372	2,312	4,266
	Option 2C	0	0	0	0	0	0	0	0	0	1,372	2,312	4,266
Prohibit	Option 1A	622	1,484	1,334	970	1,820	1,345	5,798	3,593	7,621	1,684	2,779	4,987
	Option 1B	0	0	0	0	0	0	0	0	0	0	0	0
	Option 1C	0	0	0	0	0	0	0	0	0	0	0	0
	Option 2A	0	0	0	0	0	0	2,243	3,077	2,020	850	2,274	1,128
	Option 2B	0	0	0	0	0	0	0	0	0	0	0	0
	Option 2C	0	0	0	0	0	0	0	0	0	0	0	0

Results

Figures 4-5 through 4-8 (at the end of this section) illustrate the findings in Table 4-2 for the four categories of urban development value: high, medium, low, and other lands. Program options that emphasize allow, lightly limit and moderately limit treatments rank higher for this criterion because, for the range of Goal 5 treatments, these would likely have the least negative impact on property values, employment and 2040 design types. Program options that rank higher for high and medium lands are not the same program options that rank higher for low and other lands. Low and other lands, however, account for more acres of land than high and medium lands.

Basic statistics

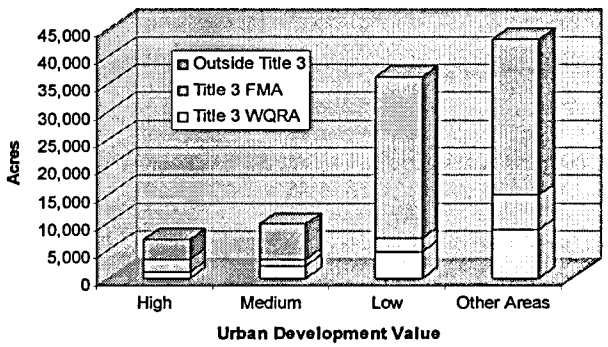
In total the analysis includes 95,956 acres of urban and non-urban fish and wildlife habitat and impact areas. This criterion would affect 53,015 acres of urban lands (ranked for development priority).

- 6,925 acres of land ranked high (habitat land – 5,550 acres; impact areas – 1,375 acres)
- 9,713 acres of land ranked medium (habitat land – 7,273 acres; impact areas – 2,440 acres)
- 36,376 acres of land ranked low (habitat land – 27,702 acres; impact areas – 8,674 acres)
- 42,940 acres of other areas, the non-urban lands that have not been ranked by high, medium, or low development value (habitat land – 39,708; impact areas – 3,232 acres)

Baseline protection (Title 3)

- Title 3 Water Quality and Flood Management Plan currently limits development in Water Quality Resource Areas, and requires specific design standards for development in Flood Management Areas. Any negative impacts of Goal 5 treatments on these lands represent marginal changes in development conditions rather than absolute changes compared with development conditions on the lands without Title 3 regulations. Some local regulations exceed Title 3 protection levels; therefore, the actual marginal changes in development conditions are less than if only Title 3 regulations were considered. However, for reasons stated in Chapter 3, it is not possible to measure the additional increment of land protection beyond the Title 3 baseline for all jurisdictions within the region.

Figure 4-4: Title 3 coverage of habitat & impact areas by urban development value.



- Figure 4-4 shows that Title 3 currently covers almost half of habitat lands with high development values.
- Approximately one-third of habitat lands with medium development values and one-fifth of lands with low urban development values currently receive Title 3 protection.

Potential economic tradeoffs vary by Goal 5 treatments

The extent to which the six program options support urban development priorities depends in part on the mix of allow, limit, and prohibit (ALP) treatments that comprise each program

option. The ALP treatments will affect the amount of land protected, prescribe mitigating habitat damage, and identify guidelines on development design and land division. To the extent that land outside Title 3 WQRAs are covered by local programs, they would not necessarily be affected by regional program options.

- *Protecting habitat.* The proposed definition of Goal 5 treatments for protecting habitat range from no additional protection under allow treatments, to limiting conflicting uses to varying degrees (lightly limit, moderately limit, strictly limit), to prohibiting conflicting uses in habitat areas.

- *Mitigation.* In addition to protecting significant amounts of habitat from development the potential ALP treatments also call for mitigating negative ecological impact of developing habitat lands. Mitigation requirements may increase with increasing protection.

  Mitigation requirements may increase the cost of developing lands that contain habitat, which could negatively impact the urban development priorities. The actual impacts on development costs would depend on the percentage of habitat cover, the negative impacts of development on habitat, and the specifics of the mitigation requirements.

- *Design guidelines and land divisions.* The potential ALP treatments may include locating development as far away as possible from water features and minimizing fragmentation of wildlife habitat. Lightly limit and moderately limit treatments may encourage using low impact development techniques. These treatments may also encourage land divisions that designate habitat as open space. Planned densities will most likely not be affected under lightly and moderately limit treatments. Strictly limit treatments may require low impact development practices and require land divisions for dedicated open space. Prohibit treatments may not allow development.

  Potential ALP treatments that include design standards and land division restrictions may increase development costs. The actual impacts on development costs would depend on the details specific to the parcel and land use.

- *Allow Treatment.* The allow treatment would have no impact on development priorities beyond existing federal, state, or local regulations. Goal 5 would have no incremental or additional impact on lands affected by an allow treatment.
- *Impact Areas.* A majority lands categorized as impact areas are already developed (66 percent). (See Phase I ESEE report for information on impact areas.) These lands would receive allow or lightly limit treatments upon redevelopment.

Potential economic tradeoffs of treatments vary by the development status of lands

The development status of lands would influence the timing of the economic impacts of program options on urban development priorities.

- *Vacant lands outside Title 3.* These lands are currently vacant and are unconstrained by Title 3 (water quality and flood management). However, these lands could be constrained by federal, state, and local regulations, which apply beyond Title 3 boundaries. These lands would likely be developed first and experience the most immediate impacts of program options.

- *Vacant lands inside Title 3.* Development on these lands is constrained by current regulations aimed at protecting water quality and flood areas. Similar to vacant lands outside Title 3, vacant lands inside Title 3 would likely experience economic impacts of program options in the short run. The magnitude of Goal 5 impacts on these lands, however, would likely be less (depending on the strictness of Goal 5 treatments applied) because existing regulations limit development on these lands.
- *Developed urban lands.* Lands classified as developed urban would experience economic impacts of program options through redevelopment or expanding existing land uses. Current Title 3 regulations apply to redevelopment actions, so Goal 5 treatments could result in a marginal increase in development constraints depending on the treatment applied. These impacts would likely occur farther into the future compared with impacts on vacant lands inside and outside Title 3.

Comparison of program options

Lands with high urban development value (See Figure 4-5)

- Option 2C provides the greatest support for lands with high urban development value among the six program options. This result holds for developed lands, vacant lands outside Title 3 and vacant lands inside Title 3.
- In descending order of support for urban development priorities the remaining options rank: 2B, 1C, 2A, 1B, and 1A. Option 1C, which emphasizes habitat protection, performs better under this criterion than does Option 2A, which emphasizes urban development values.
- The ranking of the program options described above applies to developed urban lands and vacant lands outside Title 3. This ranking also reflects the outcome for vacant lands inside Title 3 except that Options 2A and 1B perform similarly rather than 2A dominating 1B.

Lands with medium urban development value (See Figure 4-6)

- Option 2C also performs best for lands with medium urban development value. This result also holds for the three development categories of land.
- The order of the remaining program options for medium value lands under this criterion reflects the order for high value lands except that Option 1C performs better than remaining options in the following order: 1C, 2B, 2A, 1B, 1A.
- The above ranking holds for developed urban and vacant lands outside Title 3. For vacant land inside Title 3 Options 2A and 1B perform comparably rather than 2A performing better than 1B as indicated above.

Lands with low urban development value (See Figure 4-7)

- Option 1C, which was designed to emphasize habitat protection, performs better than the other options under this criterion for lands with low urban development value. This result holds for the three development categories.
- In descending order of support for urban development priorities the remaining options rank: 2C, 2B, 1B, 2A, 1A.
- This ranking holds for developed urban and vacant lands outside Title 3. For vacant land inside Title 3, Options 2B and 1B perform comparably rather than Option 2B performing better 1B as indicated above.

Other lands (See Figure 4-8)

- As with lands ranked low, Option 1C also provides the greatest support for urban development values for other lands. This result holds for the three development categories.
- In descending order of support for urban development priorities, the remaining options rank: 1B, 2C and 2B are comparable, 2A and 1A.
- This ranking holds for developed urban and vacant lands outside Title 3. For vacant land inside Title 3, Option 1B performs similarly to Options 2C and 2B rather than Option 1B performing better than the other two.

Figure 4-5: Comparison of allow, limit, prohibit treatments for HIGH urban development value.

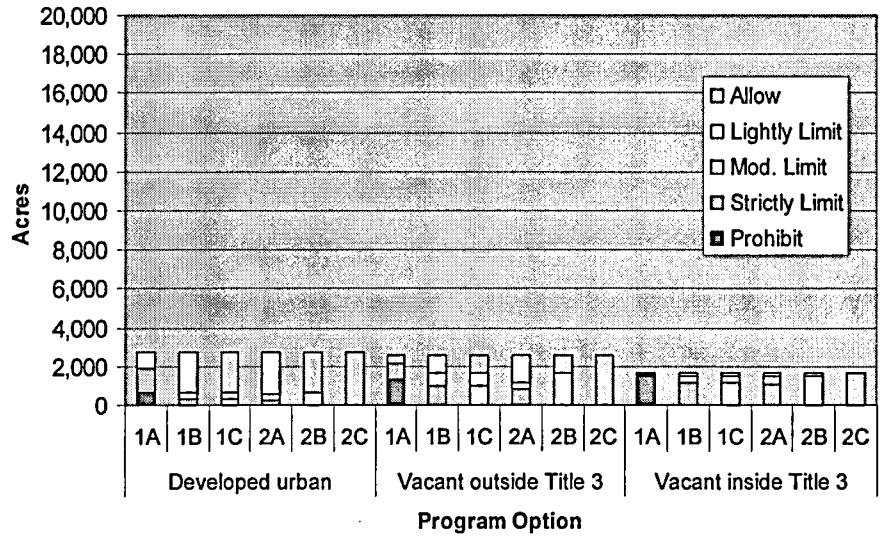


Figure 4-6: Comparison of allow, limit, prohibit treatments for MEDIUM urban development value.

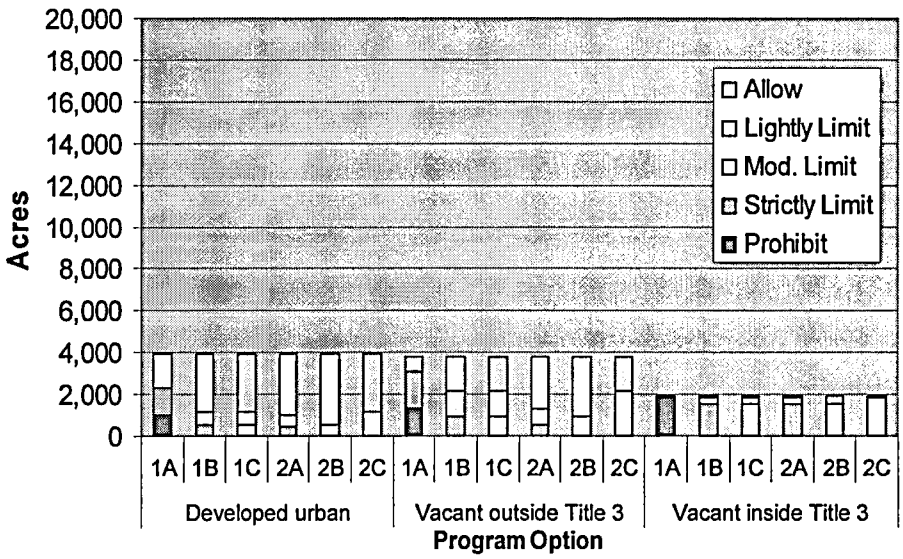


Figure 4-7: Comparison of allow, limit, prohibit treatments for LOW urban development value.

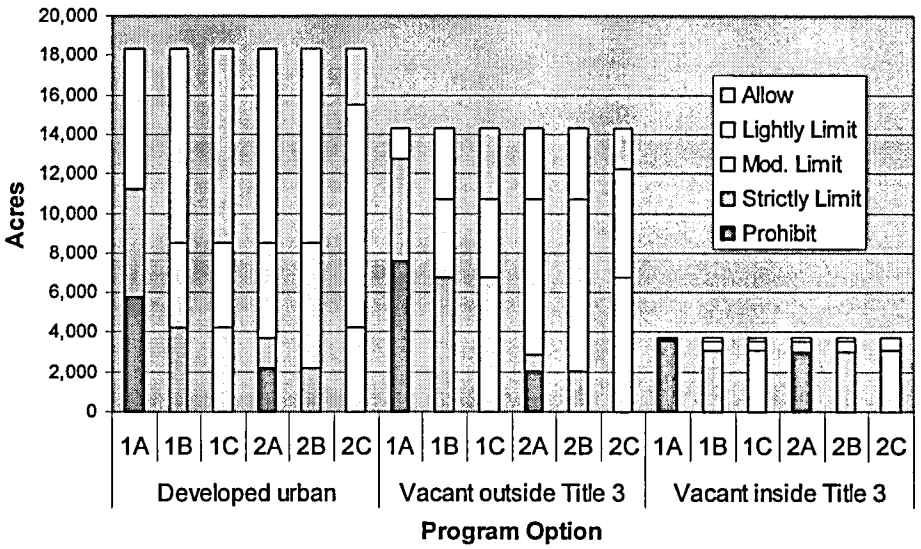
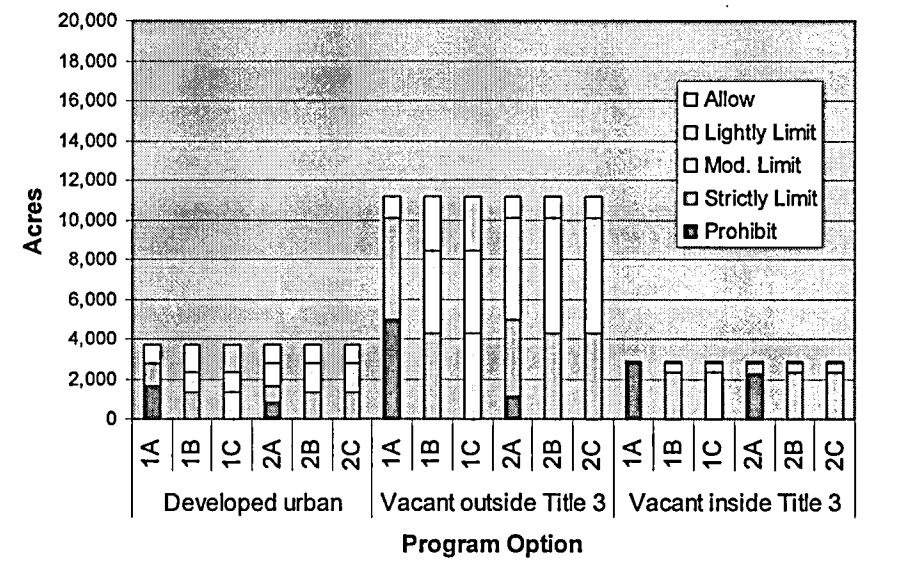


Figure 4-8: Comparison of allow, limit, prohibit treatments for OTHER areas (parks and open space, rural lands).



Summary

Table 4-3 summarizes the ranking of program options based on the outcome for lands with high urban development value. These lands contain the greatest concentration of high valued lands and lands with the highest employment density.

Table 4-3: Performance of options in meeting Economic Criterion 1: supports urban development priorities.

Rank	Option	Performance
1	2C	Option 2C provides the greatest support for urban development priorities among the six options, as described by the impacts on lands ranked "high." It has the greatest number of acres affected by allow treatments, which have no negative impacts on development, and no acres affected by strictly limit or prohibit treatments.
2	2B	Options 2B and 1C are second to Option 2C in the number of allow acres. 2B has more acres affected by lightly limit than 1C. 2B has zero acres affected by moderately limit, 1C has the most acres affected by moderately limit of any option. For these reasons 2B dominates 1C.
3	1C	Option 1C dominates option 2A because 1C has acres affected by allow treatments. 2A has no allow acres.
4	2A	Option 2A has more lightly limit acres than 1B or 1A. Option 1B has more acres affected by moderately limit and strictly limit than 2A. Option 1A is the only option with acres affected by prohibit treatments.
5	1B	Option 1B dominates 1A because it has more acres affected by lightly limit treatments and no acres affected by prohibit treatments.
6	1A	Option 1A has the greatest negative impact from prohibit treatments and the greatest negative impact overall on urban-development priorities of the six options.

Note that the ranking of program options based on the *average* outcome for the *total acres* in the analysis differs from the ranking in Table 4-3. A summary based on the average for all acres weighs more heavily the impacts on lands ranked low and other lands, because these rankings contain more acres than do lands with high or medium rankings. The ranking of program options based on the average for all acres is: 1C, 2C, 2B, 1B, 2A, 1A.

2. Supports economic values of ecosystem service

The acres of habitat protected by program options help determine the extent to which the options retain ecosystem services and related economic values. Regionally significant fish and wildlife habitat is ranked into six classes based on the amounts and types of ecological functions and wildlife characteristics: Class I-III riparian/wildlife corridors and Class A-C upland wildlife habitat. Areas with more ecological functions and/or areas with functions closer to streams, wetlands, or floodplains rank higher than areas with fewer functions or with functions further away from water features (see Chapter 4 of Metro's Phase I ESEE analysis for full discussion of ecosystem services).

Potential impacts on the value of ecosystem services

Metro's inventory and ranking focused on the ecological functions and wildlife characteristics that affect a habitat's biophysical health and wellbeing. Well-functioning habitats also produce ecosystem services that benefit society. Table 4-4 below lists the ecological functions and wildlife characteristics that were considered in ranking of fish and wildlife habitat, the related ecosystem services that benefit society, and where these ecosystem services occur in the inventory classes.

Table 4-4: Ecological functions, wildlife characteristics and related ecosystem services that benefit society.

Ecological function	Ecosystem service	Where ecosystem services occur in Metro's habitat classes
Microclimate, shade, and cooling of water temperature	Decreased summer temperatures, which helps reduce energy demand for cooling.	All habitat classes
Moderated stream flow and improved water storage	Reduced flood damage and flood management costs.	All habitat classes
Bank stabilization and sediment and pollution control	Improved water quality. Reduced demand for water filtration and treatment. Reduced landslides and related damage and clean-up costs.	All habitat classes
Large woody debris and channel dynamics	Reduced flood damage and flood-management costs.	Class I or II riparian/wildlife corridors
Well-functioning riparian areas in general	Increased amenity and intrinsic values associated with riparian areas.	All habitat classes
Habitats of concern and habitats for unique and sensitive species	Increased populations of salmon and other species and associated increases in commercial, recreational, spiritual and intrinsic values.	Class I riparian/wildlife corridors, Class A upland wildlife habitat
Well-functioning wildlife habitats in general	Increased amenity and intrinsic values associated with wildlife habitat.	All upland wildlife classes and Class I-II riparian/wildlife corridors

Source: ECONorthwest and Metro's inventory and ranking of riparian and wildlife resources.

The analysis of program options and their associated impacts on ecosystem services and related economic values assumes:

- Areas that provide more of the ecological functions and wildlife characteristics illustrated in Table 4-4 provide more ecosystem services and value to society than do areas that provide fewer functions and characteristics.
- Actions that enhance or protect ecosystem services also enhance or protect the economic values associated with those services. Actions that degrade these services will have the opposite effect.

This criterion emphasizes protecting habitats and associated ecosystem services. Criterion 1 emphasizes just the opposite, developing habitat in support of urban development priorities. In general, options that performed well under the Criterion 1, emphasizing urban development priorities, perform poorly under Criterion 2, because they degrade ecosystem functions, wildlife habitat, and the associated ecosystem services listed in Table 4-4. The resulting negative economic consequences over the long term may include:

- Higher summer temperatures with associated increased cooling costs in summer.
- Increased air pollution and associated impacts and costs.
- Increased flooding with related property damage, and disruption of commercial, business, and industrial activity, and increased transportation disruptions and costs.
- Increased landslides that may threaten residential, commercial and industrial properties, transportation routes and water quality.
- Decreased water quality and associated increased treatment costs.
- Reduced amenity and intrinsic values associated with habitat and species.

Degrading habitat on a regional scale, such as the lands in Metro's jurisdiction, may generate significant negative economic consequences, especially over the long term. Protecting these resources over the long term may yield economic benefits throughout the region. (See Metro's Phase 1 ESEE Report for information on methods of estimating the value of the affected ecosystem services and the magnitudes of the values.)

Environmental Criterion 1 (conserves existing watershed health and restoration opportunities) describes the impact of program options on the amount and quality of ecosystem functions for fish and wildlife habitat. It is assumed that program options that promote or protect these functions also promote or protect the related ecosystem services and values to society. It is also assumed that options that rank high on this environmental criterion will also rank high for related ecosystem services and economic values.

The analysis of program options and their impacts on the value of ecosystem services builds upon the biophysical analysis of ecosystem functions. The ecosystem functions provide the ecosystem services that society values. This criterion describes the impacts of program options on related ecosystem services and values to society. Not incidentally, to assign values to the ecosystem services derived from the biophysical analysis of ecosystem functions does not double count the economic importance of ecosystem functions or ecosystem services. The two

analyses— biophysical and economic—are separate, with the economic analysis converting the findings of the biophysical analysis to different units of measurement.

Measuring the criterion

Table 4-5 shows the number of acres of habitat, by habitat class, affected by allow, limit, and prohibit treatments for the six program options. The habitat classes are subdivided for developed and vacant acres. As described in Economic Criterion 1, vacant acres will experience the most immediate impacts of program options. Developed lands will experience impacts of program options through the eventual redevelopment and expansion of existing land uses.

Table 4-5: Retention of ecosystem services by program option (in number of acres of habitat).

Program treatment		Option 1A		Option 1B		Option 1C		Option 2A		Option 2B		Option 2C	
		Developed	Vacant	Developed	Vacant	Developed	Vacant	Developed	Vacant	Developed	Vacant	Developed	Vacant
Class I	A	0	0	0	0	0	0	0	0	0	0	282	1,942
	LL	0	0	0	0	0	0	0	0	282	1,942	460	2,107
	ML	0	0	0	0	15,327	12,549	0	0	460	2,107	2,243	5,097
	SL	0	0	15,327	12,549	0	0	742	4,050	14,585	8,499	12,342	3,402
	P	15,327	12,549	0	0	0	0	14,585	8,499	0	0	0	0
Class A	A	0	0	0	0	0	0	0	0	0	0	67	207
	LL	0	0	0	0	0	0	67	207	67	207	101	372
	ML	0	0	0	0	11,173	8,508	2,154	5,125	2,154	5,125	2,054	4,753
	SL	0	0	11,173	8,508	0	0	8,952	3,176	8,952	3,176	8,952	3,176
	P	11,173	8,508	0	0	0	0	0	0	0	0	0	0
Class II	A	0	0	0	0	0	0	0	0	0	0	273	668
	LL	0	0	0	0	3,986	3,907	0	0	682	1,354	1,911	2,050
	ML	0	0	3,986	3,907	0	0	682	1,354	3,303	2,553	1,801	1,188
	SL	0	0	0	0	0	0	3,303	2,553	0	0	0	0
	P	3,986	3,907	0	0	0	0	0	0	0	0	0	0
Class B	A	0	0	0	0	0	0	0	0	0	0	58	359
	LL	0	0	0	0	5,100	7,789	266	1,168	266	1,168	2,898	3,921
	ML	0	0	5,100	7,789			4,834	6,622	4,834	6,622	2,144	3,509
	SL	5,100	7,789					0	0	0	0	0	0
	P	0	0	0	0	0	0	0	0	0	0	0	0
Class III	A	0	0	0	0	3,766	666	0	0	1,066	48	3,361	530
	LL	0	0	3,766	666	0	0	3,361	530	2,295	482	0	0
	ML	0	0	0	0	0	0	405	137	405	137	405	137
	SL	3,766	666	0	0	0	0	0	0	0	0	0	0
	P	0	0	0	0	0	0	0	0	0	0	0	0
Class C	A	0	0	0	0	2,973	4,489	0	0	118	462	1,789	3,021
	LL	0	0	2,973	4,489	0	0	1,789	3,021	1,671	2,559	0	0
	ML	0	0	0	0	0	0	1,184	1,468	1,184	1,468	1,184	1,468
	SL	2,973	4,489	0	0	0	0	0	0	0	0	0	0
	P	0	0	0	0	0	0	0	0	0	0	0	0

Notes for table 4-5:
Developed: sums parks and urban acres because the focus of this criterion is the retention of habitat irrespective of development status
Vacant: sums constrained and unconstrained acres (by Title 3 baseline regulations) for the same reason above.

Results

Figures 4-9 through 4-11 illustrate the findings in Table 4-5. Program options that protect more fish and wildlife habitat overall, as well as more of the most valuable habitat, rank higher for this criterion.

Figure 4-9: Performance of program options for Class I and Class A habitat.

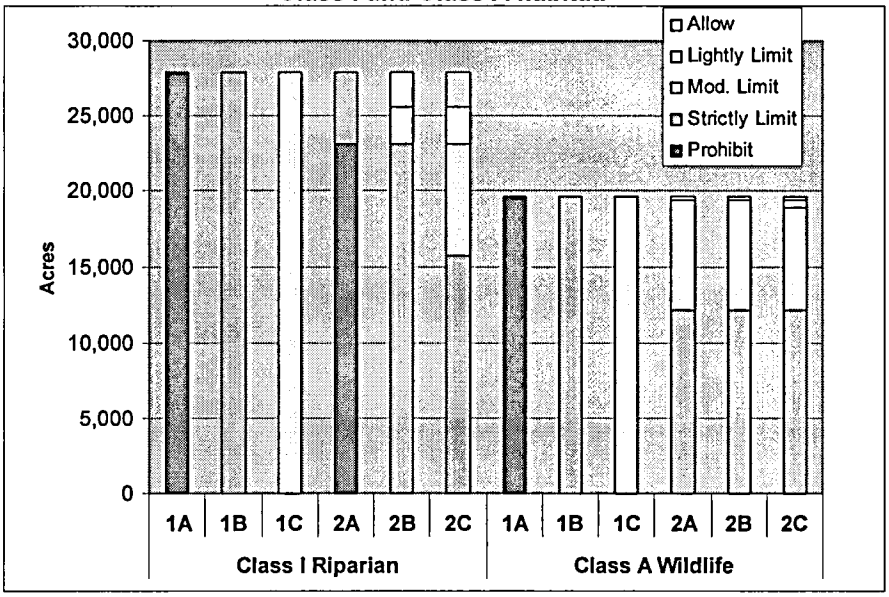


Figure 4-10: Performance of program options for Class II and Class B habitat.

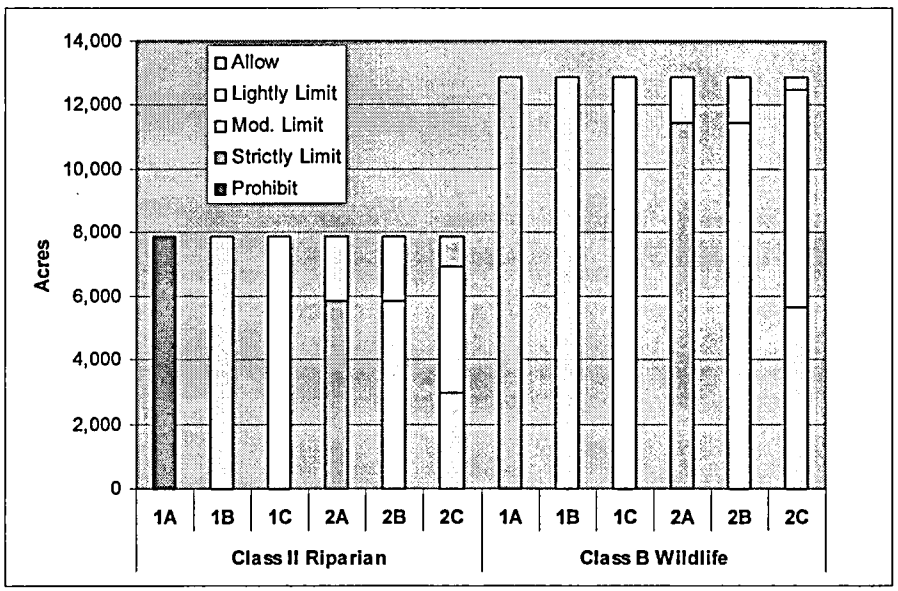
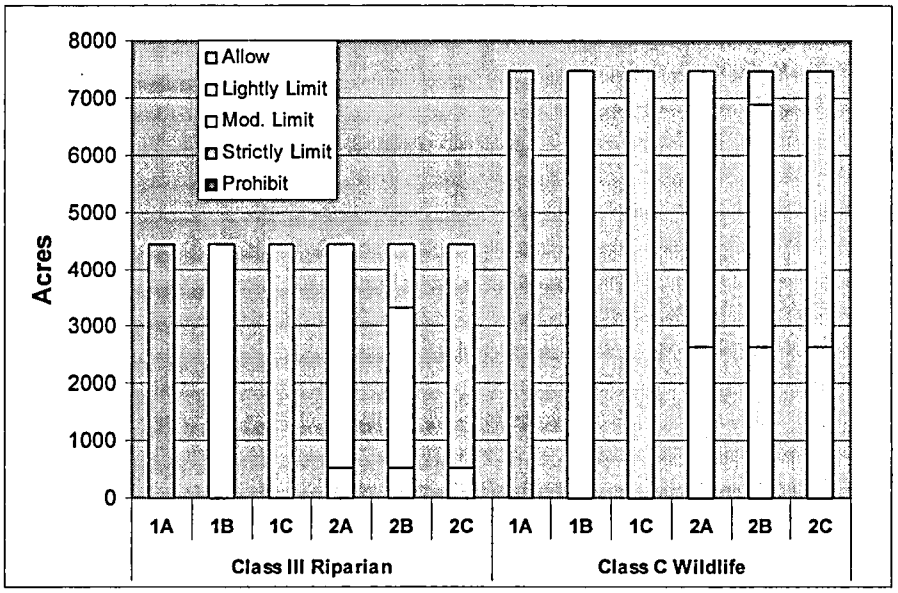


Figure 4-11: Performance of program options for Class III and Class C habitat.



Basic statistics

- This analysis includes 40,201 acres of Class I, II, and III riparian/wildlife corridors and 40,032 acres of Class A, B, and C wildlife habitat.
- The highest quality riparian/wildlife corridors (Class I) account for 69 percent of the total number of acres of riparian habitat.
- The highest quality wildlife habitat (Class A) account for 49 percent of the total number of acres of wildlife habitat.

Baseline protection (Title 3)

- Program options that provide the least protection to habitat lands will, in general, have more negative impacts on Class A, B, and C lands over the long term compared to the impacts on Class I, II, and III lands, because the lands in the latter group receive more baseline protection from Title 3. For example, nearly half of Class I and a quarter of Class II riparian/wildlife corridors are included in Title 3 Water Quality Resource Areas.
- Title 3 Water Quality Resource Areas (WQRA) and Flood Management Areas (FMA) protect 72, 49, and 61 percent of Class I, II, and III lands, respectively (See Chapter 3, *Baseline for Analysis*).
- To the extent that the WQRAs and FMAs also protect the ecosystem services specific to Class I through III habitat lands, they also protect the associated economic values.
- Title 3 provides almost no protection for Class A, B, and C lands or the associated ecosystem services and values. Inside Title 3 protection, Class A lands account for two percent, Class B lands for one percent, and Class C lands for two percent.

Comparison of program options

Class I, II, and III riparian/wildlife corridors

- Option 1A promotes the greatest retention of ecosystem services and associated economic values among the six options for Class I, II, and III lands. This result holds for developed and vacant land in Metro's jurisdiction.
- In descending order of retaining ecosystem services and associated values, the remaining options rank: 2A, 1B, 2B, 2C, 1C.

Class A, B, and C upland wildlife

- The six program options perform similarly for Class A and B lands but not for Class C lands.
- Similar to Class I, II, and III lands, Option 1A promotes the greatest retention of ecosystem services and associated economic values among the six options for Class A and B lands.
- In descending order for lands in Class A and B, the remaining options rank: 1B, 2A = 2B, 2C, and 1C. This ranking applies to developed and vacant land.
- Option 1A also promotes the greatest retention of ecosystem services and associated economic values among the six options for Class C lands.
- In descending order for lands in Class C, the remaining options rank: 2A, 2B, 2C, 1B, 1C. This ranking applies to developed and vacant land.

Summary

Table 4-6 summarizes the performance ranking of the program options based on the average outcome for the total acres in the analysis. As a group, Class I, II and III lands cover approximately the same number of acres as the lands in Class A, B and C. Thus, the outcomes for these two groups receive approximately the same weight. The outcomes for the individual classes, however, do not receive equal weights because the number of acres in each class differs. The classes rank in the following descending order based on the acres of lands in the class expressed as a percentage of the total acres in the analysis: Class I (35 percent of total acres), Class A (25 percent), Class B (16 percent), Class II (9 percent), Class C (9 percent), and Class III (6 percent). The results in Table 4-6 reflect the weighting of the results for the individual classes based on these percentages.

Table 4-6: Performance of options in meeting Economic Criterion 2: promotes retention of ecosystem services

Rank	Option	Performance
1	1A	This option provides the greatest retention of ecosystem services and related economic values among the six options. This is true for all classes of habitat and for developed and vacant lands.
2	2A	Comparable to Option 1B in overall retention of ecosystem services and related values. Option 2A retains more higher quality riparian services, while Option 1B retains more higher quality wildlife habitat services.
3	1B	See the description for Option 2A.
4	2B	Performs comparable to Option 2A for Class A and B lands. For all other lands, Option 1B performs better.
5	2C	Performs consistently behind Options 2B, and consistently dominates Option 1C.
6	1C	This option provides the least retention of ecosystem services and related economic values of the six options. This ranking applies for all classes of habitat and for developed and vacant lands.

The proposed Goal 5 guidelines include mitigating adverse impacts of development on habitat. Detailed mitigation guidelines have not yet been developed. The site-specific nature of habitat and the impacts of development on the habitat will also influence the type and amount of Goal 5 mitigation that may be required. Given these uncertainties, and the conclusions from Metro's Technical Report for Goal 5 that mitigating habitat damage in urban areas faces considerable challenges, the ranking of program options in Table 4-6 does not reflect the outcome of potential Goal 5 mitigation.

3. Promotes recreational access and amenities.

This criterion ranks program options based on the extent to which they promote recreational access and amenities. The analysis of this criterion uses data similar to that for the analysis of Environmental Criterion 1 and Economic Criterion 2 – acres of habitat protected. The criterion, however, focuses on the subset of total habitat acres that support recreational opportunities. Metro classifies these lands as parks and open space.

The analysis of this criterion distinguishes between public and private recreational lands because ownership may influence the impacts of program options on recreational access. For example, public ownership implies more open access to recreational opportunities. Private ownership implies that access requires membership or has other restrictions. Public park and open space lands include parks, schools and rights-of-way. Private park and open space lands includes golf courses and cemeteries.

Potential impacts on recreational opportunities

In general, the program options would have a limited impact on the number of acres of recreational and open space lands. This is true for two reasons. First, existing land uses either support recreational use and open space directly (e.g., public parks or golf courses) or support recreation related uses indirectly (e.g., schools). The options would have more limited impacts on the number of acres of these types of land uses compared with the more intensive urban development uses described in Criterion 1. The second reason is that the large majority of the lands in this analysis are publicly owned. Public ownership makes it unlikely (though not impossible) that recreational and open space uses will change significantly in the future.

The options may impact the *quality* of recreational and open space experiences on the lands at issue in this analysis. Options that protect more habitat, and more higher quality habitat, will help protect the recreational related amenity values associated with the habitat. The analysis of program options and their associated impacts on recreational access and amenities assumes:

- Fish and wildlife habitat provide recreation and open space related ecosystem services and values to society. Higher quality habitat provides higher quality ecosystem services and values compared with lower quality habitat.
- Actions that enhance or protect habitat also enhance or protect the recreation and open space related amenities that influence the quality of recreational experiences. Actions that degrade these services will have the opposite effect.
- Program options that protect habitat lands with more restrictive treatments will also promote greater access to recreational opportunities and higher quality recreational experiences. Options that provide less protection will have the opposite effect.

Other lands outside park and open space can contribute to recreational experiences and amenities. For example, bird and fish habitat on non-parklands contribute to the amenity value of bird watching and fishing on parklands. The analysis of Criterion 3 focuses only on parks and open spaces; thus, it likely underestimates the true scope and values of recreational amenities affected by Goal 5 program options.

Measuring the criterion

Table 4-7 below shows the habitat acres that support recreation (25,265 acres) by ownership (public vs. private) and by allow, limit, and prohibit treatments for the six program options.

Table 4-7: Acres in parks and open space lands by ownership and by program treatment

Program Options	Program treatments	Publicly owned	Privately owned	Total acres	Public: % of total	Private: % of total
Option 1A	Prohibit	19,046	2,372	21,418	89%	11%
	Strictly limit	2,076	521	2,596	80%	20%
	Moderately limit	0	0	0	0%	0%
	Lightly limit	950	302	1,252	76%	24%
	Allow	0	0	0	0%	0%
Option 1B	Prohibit	0	0	0	0%	0%
	Strictly limit	17,967	1,959	19,926	90%	10%
	Moderately limit	2,301	692	2,993	77%	23%
	Lightly limit	1,804	542	2,346	77%	23%
	Allow	0	0	0	0%	0%
Option 1C	Prohibit	0	0	0	0%	0%
	Strictly limit	0	0	0	0%	0%
	Moderately limit	17,967	1,959	19,926	90%	10%
	Lightly limit	2,301	692	2,993	77%	23%
	Allow	1,804	542	2,346	77%	23%
Option 2A	Prohibit	10,311	1,185	11,495	90%	10%
	Strictly limit	8,736	1,187	9,923	88%	12%
	Moderately limit	2,076	521	2,596	80%	20%
	Lightly limit	950	302	1,252	76%	24%
	Allow	0	0	0	0%	0%
Option 2B	Prohibit	0	0	0	0%	0%
	Strictly limit	17,967	1,959	19,926	90%	10%
	Moderately limit	3,155	933	4,088	77%	23%
	Lightly limit	950	302	1,252	76%	24%
	Allow	0	0	0	0%	0%
Option 2C	Prohibit	0	0	0	0%	0%
	Strictly limit	17,967	1,959	19,926	90%	10%
	Moderately limit	3,155	933	4,088	77%	23%
	Lightly limit	0	0	0	0%	0%
	Allow	950	302	1,252	76%	24%

Results

Figure 4-12 displays the information from Table 4-7. It shows that the large majority of land at issue in this case is in public ownership. Figure 4-13 shows park lands by quality of habitat and by ownership. The large majority of park lands in this analysis also contains the highest quality fish and wildlife habitat.

Figure 4-12: Performance of program options for parks and open space lands, by ownership.

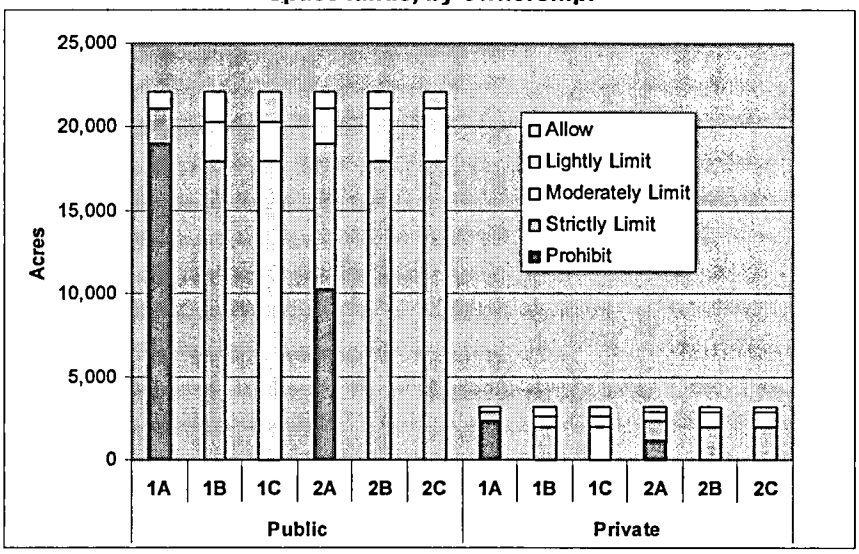
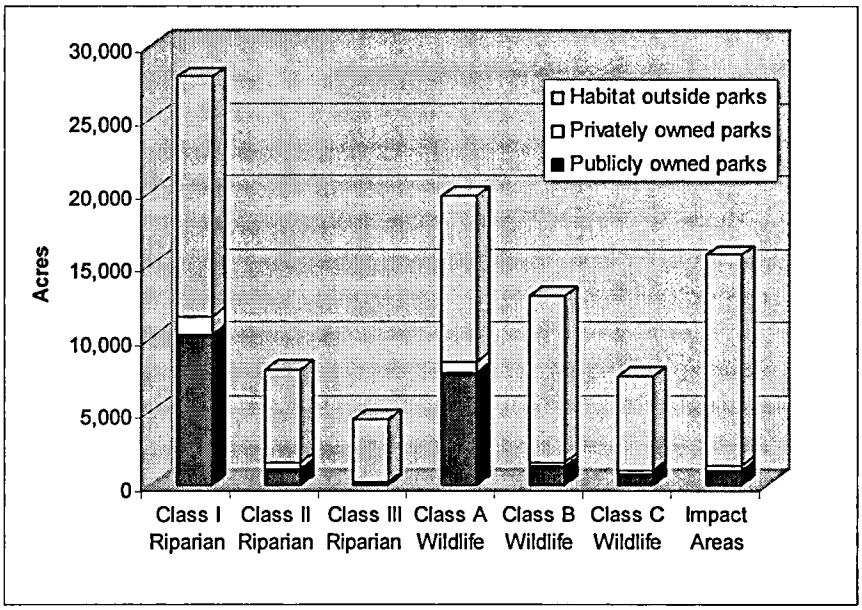


Figure 4-13: Park lands by habitat class and ownership.



Program options that protect more park and open space lands overall will more likely promote recreational access, higher quality recreational experiences and score higher for this criterion. Program options that protect more *public* park and open space lands will more likely promote recreational access with fewer restrictions compared with protecting *private* park and open space lands. The quality of remaining habitat land will also affect the quality of recreational experiences.

Basic statistics

- The analysis for this criterion includes 25,265 acres of park and open space lands.
- 22,071 acres, or 87 percent, are publicly owned; 3,194 acres, or 13 percent, are privately owned.

Comparison of Program Options

Park and open space lands in public ownership

- Option 1A promotes recreational access to the greatest extent of the six program options by protecting over 21,000 acres of public and private park and open space lands with prohibit treatments. Given that the large majority of these lands also contains Class I and Class A habitat, this option also protects habitat lands that provide the highest quality recreational and open space amenities.
- In descending order of promoting recreational access and the quality of recreational amenities, the options rank: 2A, 2B, 1B, 2C, 1C.
- Two of the options that take into account urban development values rather than quality of habitat, 2A and 2B, perform better under this criterion than do options 1B and 1C, which were designed with greater habitat protection in mind.

Park and open space lands in private ownership

- The program options rank the same for privately owned park lands as they do for lands in public ownership.
- Ownership does influence the performance of the less protective treatments of the program options. In general, private lands account for a higher proportion of the less protective treatments compared with their portion of the total park and open space acres. For example, under option 1B, private park land accounts for 23 percent of the lands with moderately and lightly limit treatments. But these lands account for 13 percent of the total park lands. In general, private lands receive a larger percentage of the less protective treatments and a smaller percentage of the more protective treatments relative to public lands.

Summary

Table 4-8 summarizes the ranking of the performance of the program options based on the average outcome for the total acres in the analysis.

Table 4-8. Performance of options in meeting Economic Criterion 3: promotes recreational access and amenities.

Rank	Option	Performance
1	1A	This option promotes the greatest access to recreational opportunities, and highest quality recreational experiences among the six options. This holds for both public and private park lands. This option protects over 21,000 acres with prohibit treatments, the most of any option.
2	2A	This option relies on a mix of prohibit and strictly limit treatments. It performs better than options 1B and 1C, which take habitat protection into account.
3	2B	This option relies on a mix of limit treatments, without allow or prohibit treatments. This option also performs better than options 1B and 1C.
4	1B	This option relies on a mix of limit treatments, without allow or prohibit treatments. Option 2B dominates this option even though both rely on a mix of limit treatments.
5	2C	This option relies on a mix of limit and allow treatments.
6	1C	This option provides the least support for recreational opportunities and quality of recreational experiences among the six options. This holds for both public and private park lands.

4. Distributes economic tradeoffs

This discussion of Criterion 4 has two parts. The first part considers the distributional impacts of program options on property owners as described by public and private land. The second considers the distributional impacts on land use as described by regional zoning types.

The other economic criteria (1, 2, 3 and 5) in this analysis rank program options on a scale, for example, from least to most supportive of urban development priorities. The analysis for this criterion does not emphasize ranking program options because they do not vary significantly by land ownership or regional zone. It focuses instead on describing the extent to which the strictness of program options (e.g., allow vs. lightly limit, or lightly limit vs. moderately limit, etc.) varies by ownership or by regional zone. This criterion highlights property owners or regional zones that would bear a greater burden of the land use impacts that may stem from the more restrictive Goal 5 treatments.

Distribution of impacts by property ownership

This portion of the analysis describes the impact of program options on land ownership as measured by acres of public and private land. Economic Criterion 1 describes the impacts of program options on urban development values. In this criterion, the *distribution* of the impacts of program options on public and private lands that support the urban development values (described in Criterion 1) are examined. Similar to the analysis of Economic Criterion 1, the analysis for this criterion also assumes that the Goal 5 program options that protect habitat would restrict use and development of public and private land. Restrictions are assumed to be more likely with prohibit and strictly limit treatments and less likely with lightly limit or allow treatments.

Measuring the criterion

Table 4-9 shows the breakdown of Goal 5 allow, limit, and prohibit treatments by public and private lands for each program option.

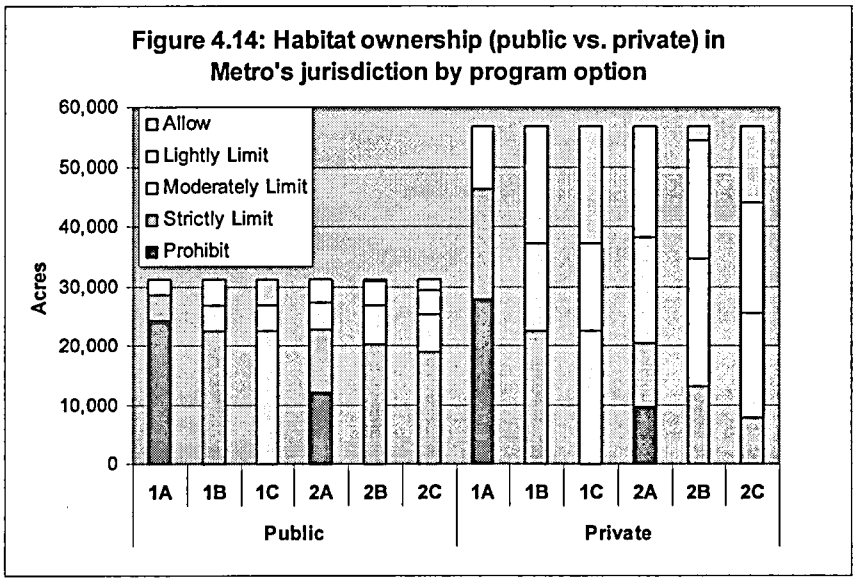
Table 4-9: Habitat and impact area acres by land ownership and program options.

Program	Program	Acres of Resource In Taxlots			% of Resource In Taxlots			% of Treament In Taxlots			% of Ownership In Taxlots		
Option	Treatment	Private	Public	Total*	Private	Public	Total*	Private	Public	Total*	Private	Public	Total*
	P	27,840	24,341	52,182	32%	28%	59%	53%	47%	100%	49%	78%	59%
	SL	18,423	4,156	22,579	21%	5%	26%	82%	18%	100%	32%	13%	26%
	ML	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0%
	LL	10,491	2,534	13,025	12%	3%	15%	81%	19%	100%	18%	8%	15%
	AL	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0%
Option 1A	Total*	56,754	31,032	87,786	65%	35%	100%	65%	35%	100%	100%	100%	100%
	P	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0%
	SL	22,527	22,507	45,034	26%	26%	51%	50%	50%	100%	40%	73%	51%
	ML	14,797	4,245	19,042	17%	5%	22%	78%	22%	100%	26%	14%	22%
	LL	19,431	4,280	23,710	22%	5%	27%	82%	18%	100%	34%	14%	27%
	AL	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0%
Option 1B	Total*	56,754	31,032	87,786	65%	35%	100%	65%	35%	100%	100%	100%	100%
	P	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0%
	SL	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0%
	ML	22,527	22,507	45,034	26%	26%	51%	50%	50%	100%	40%	73%	51%
	LL	14,797	4,245	19,042	17%	5%	22%	78%	22%	100%	26%	14%	22%
	AL	19,431	4,280	23,710	22%	5%	27%	82%	18%	100%	34%	14%	27%
Option 1C	Total*	56,754	31,032	87,786	65%	35%	100%	65%	35%	100%	100%	100%	100%
	P	9,658	12,197	21,855	11%	14%	25%	44%	56%	100%	17%	39%	25%
	SL	10,972	10,525	21,497	12%	12%	24%	51%	49%	100%	19%	34%	24%
	ML	17,495	4,629	22,124	20%	5%	25%	79%	21%	100%	31%	15%	25%
	LL	18,630	3,680	22,310	21%	4%	25%	84%	16%	100%	33%	12%	25%
	AL	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0%
Option 2A	Total*	56,754	31,032	87,786	65%	35%	100%	65%	35%	100%	100%	100%	100%
	P	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0%
	SL	13,230	20,256	33,486	15%	23%	38%	40%	60%	100%	23%	65%	38%
	ML	21,456	6,550	28,006	24%	7%	32%	77%	23%	100%	38%	21%	32%
	LL	19,639	3,974	23,613	22%	5%	27%	83%	17%	100%	35%	13%	27%
	AL	2,430	251	2,681	3%	0%	3%	91%	9%	100%	4%	1%	3%
Option 2B	Total*	56,754	31,032	87,786	65%	35%	100%	65%	35%	100%	100%	100%	100%
	P	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0%
	SL	7,740	18,953	26,693	9%	22%	30%	29%	71%	100%	14%	61%	30%
	ML	17,923	6,319	24,241	20%	7%	28%	74%	26%	100%	32%	20%	28%
	LL	18,291	3,997	22,288	21%	5%	25%	82%	18%	100%	32%	13%	25%
	AL	12,801	1,763	14,564	15%	2%	17%	88%	12%	100%	23%	6%	17%
Option 2C	Total*	56,754	31,032	87,786	65%	35%	100%	65%	35%	100%	100%	100%	100%

* Total habitat acres differ from original number (95,955 acres) because some areas do not have tax lots (e.g., roads).

Results

Figure 4-14 illustrates the findings from Table 4-9.



Basic Statistics

- Privately owned land accounts for 56,745 acres, or 65 percent of the total acres in this analysis.
- Publicly owned land accounts for 31,031 acres, or 35 percent of the total acres in this analysis.

Comparison of program options

- The ranking of program options from least to most restrictive does not vary by property ownership. The program options rank, from least to most restrictive: 1C, 2C, 2B, 1B, 2A, and 1A.
- Even though the rank of program options does not vary by ownership, the degree of restriction does vary by public or private ownership. In general, publicly owned lands bear a higher proportion of the most restrictive Goal 5 treatments than do privately owned lands, relative to the distribution of public and private acres in the analysis. For example, Option 1C, which is the least restrictive option, splits the number of acres affected by the most restrictive treatment (moderately limit) evenly between public and private land (see Table 4.11 below). However, private land accounts for 65 percent, and public land accounts for 35 percent of total acres. If the impacts of the most restrictive treatment were distributed proportionally based on the number of acres of private and public lands in the analysis, private lands would receive approximately 65 percent of the most restrictive treatment and public lands 35 percent.

Table 4-10: Distribution of Allow, Limit and Prohibit Treatments between Private and Public Land for Option 1C.

Treatment	Private Lands (65% of total acres)	Public Lands (35% of total acres)	Total
Prohibit	0%	0%	
Strictly Limit	0%	0%	
Moderately Limit	50%	50%	100%
Lightly Limit	78%	22%	100%
Allow	82%	18%	100%

- The reverse is true for the less restrictive treatments. The less restrictive Goal 5 treatments affect private lands in a proportion greater than their percentage of total acres in the analysis. Public lands receive less-than-proportional impacts from the less restrictive treatments.
- For example, private lands account for 65 percent of the acres in the analysis but account for 78 percent of the acres affected by lightly limit treatments and 82 percent of the acres affected by allow treatments. Public lands, in contrast, account for 35 percent of the acres but 22 percent of the lightly limit treatments and 18 percent of allow treatments.

Distribution of impacts by regional zoning type

In this portion of the analysis, the impacts of program options on land uses in Metro's jurisdiction are described. There are seven regional zones (see Metro's Phase I ESEE report for a description of regional zoning types).

- Single-family residential (SFR)
- Multi-family residential (MFR)
- Mixed-use centers (MUC)
- Commercial (COM)
- Industrial (IND)
- Parks and open space (POS)
- Rural (RUR)

Potential impacts on zoning types

In this part of the analysis, it is assumed that program options that protect habitat would restrict land uses as described by regional zoning types. Land use restrictions are assumed to be more likely with prohibit and strictly limit treatments and less likely with moderately or lightly limit treatments.

The extent to which any one zoning type bears a disproportional share of acres affected by program options, relative to the zoning type's share of total acres in Metro's jurisdiction, are considered. Also described for a given program option are the land uses that receive less restrictive treatments (e.g., moderately limit and lightly limit) and those that receive more (e.g., strictly limit and prohibit).

Measuring the criterion

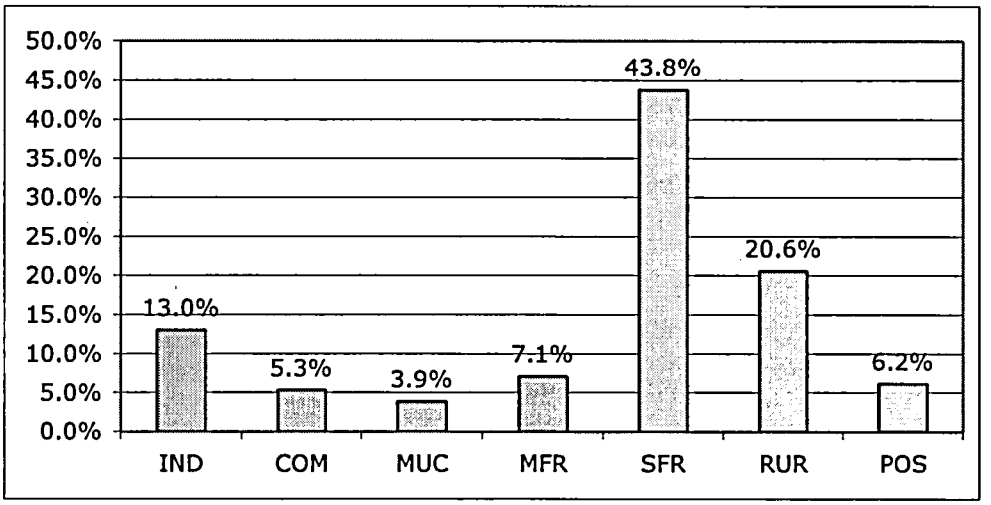
This criterion is measured by evaluating the number of acres in each zoning type affected by allow, limit and prohibit treatments.

Results

As background to the analysis of the distributional impacts of program options on land uses, Metro considered the extent to which any one zoning type bears a disproportional share of impacts from Goal 5 treatments relative to the zoning type's share of total acres in Metro's jurisdiction. Such an outcome would occur if a zoning type accounts for a larger proportion of the acres affected by a program option relative to the zoning type's proportion of total acres in Metro's jurisdiction.

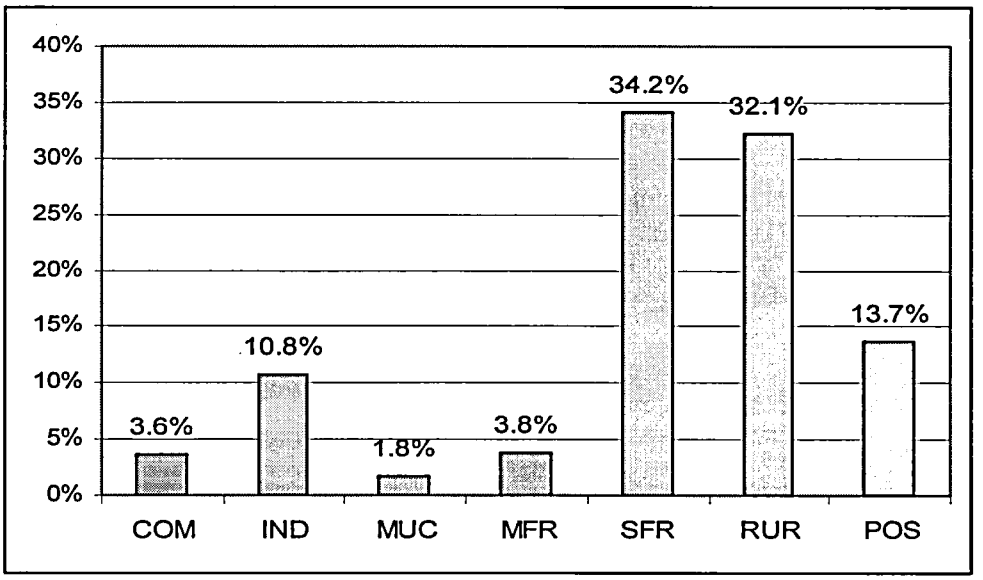
Figures 4-15 and 4-16 illustrate the relevant distributions. Figure 4-15 shows the percentage of total acres in Metro's jurisdiction by zoning type. For example, industrial lands (IND) account for 13 percent of the total acres in Metro's jurisdiction. Figure 4-16 shows the distribution of acres affected by program options, by zoning type. Industrial lands, for example, account for approximately 11 percent of the total acres affected by program options.

Figure 4-15: Percentage of total acres in Metro's jurisdiction by zoning type.



Source: ECONorthwest with data provided by Metro.

Figure 4-16: Percentage of total acres of habitat, by zoning type.



Source: ECONorthwest with data provided by Metro.

Figure 4-18. Impact of options on businesses (developed & vacant MFR, MUC, COM & IND): 15,857 acres total.

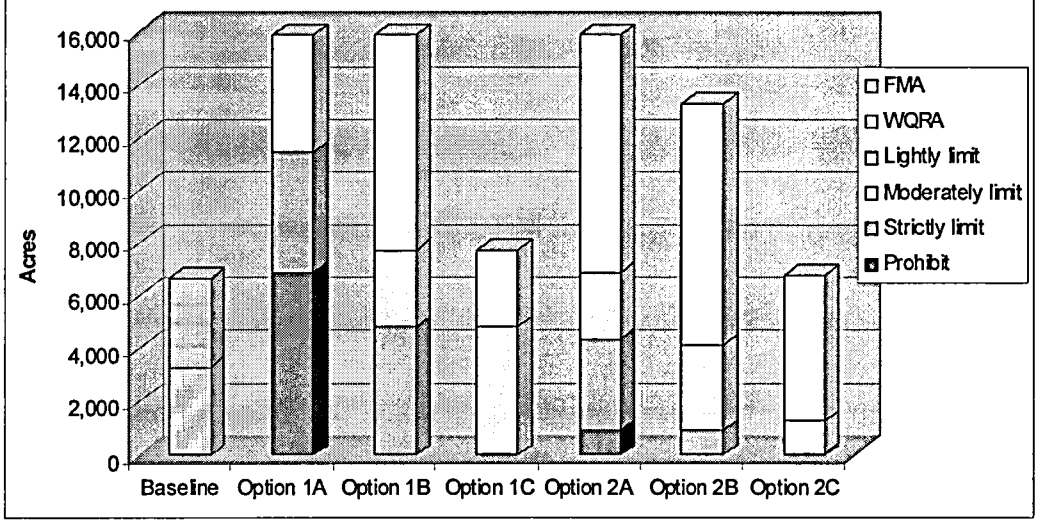


Figure 4-19. Impact of options on rural areas (developed & vacant): 26,459 acres total.

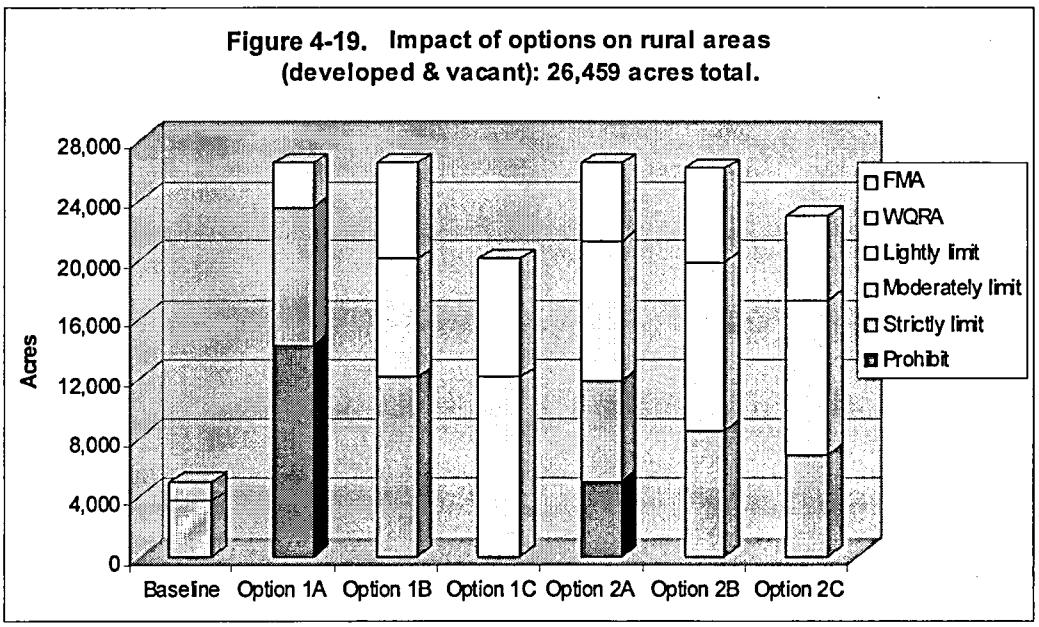
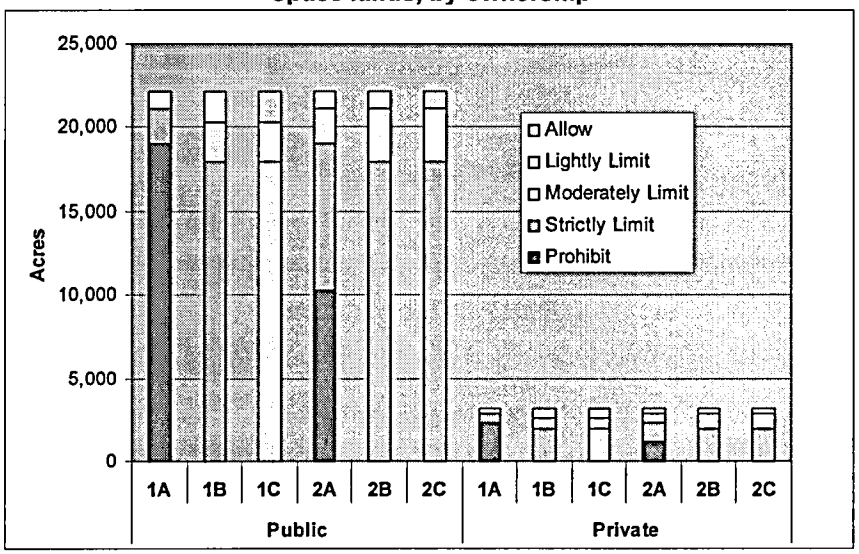


Figure 4-20: Performance of program options for parks and open space lands, by ownership



Basic Statistics

The number of acres that Goal 5 treatments would affect, by regional zone:

- SFR 26,521 acres
- MFR 2,886 acres
- MUC 1,625 acres
- COM 2,124 acres
- IND 9221 acres
- POS 13,118 acres
- RUR 26,460 acres.

Comparison of program options

- The ranking of program options, from least to most restrictive, varies little for residential, business-related, or rural land uses. In general, the program options that would restrict SFR lands the most would also restrict business-related (MFR, MUC, COM, IND) and rural (RUR) land uses the most.
- The ranking of program options for residential, business-related and rural land uses, from least to most restrictive, is 1C, 2C, 2B, 1B, 2A, and 1A. The only exception to this ranking is that for MUC and IND, 2C dominates 1C as the least restrictive option.
- The ranking of program options varies slightly for parks (POS) relative to the other regional zones. The ranking for POS, from least to most restrictive, is 1C, 1B, 2B, 2C, 2A, and 1A.
- Even though the rankings of program options would vary little among the regional zones, the limitations the program options would place on land uses would vary by regional zone. In general, the Goal 5 treatments under Criterion 4 would favor business-related land uses over POS, RUR, and SFR land uses. The non-business related land uses (POS, RUR, and SFR) would typically receive more restrictive Goal 5 treatments than would business-related land uses (MFR, MUC, COM, IND), for a given program option. For example, for option 1C,

approximately 38 percent of SFR lands would receive an allow treatment. For COM lands, 52 percent would receive an allow treatment. Option 1C ranks as the least restrictive option for both SFR and COM. See Table 4-11.

Table 4-11: Distribution of allow, limit and prohibit treatments for Option 1C by regional zone.

Treatment	SFR	MFR	MUC	COM	IND	POS	RUR
Allow	38%	52%	47%	52%	52%	9%	24%
Lightly Limit	25%	18%	19%	21%	17%	8%	30%
Moderately Limit	37%	29%	33%	27%	31%	83%	45%
Strictly Limit	0%	0%	0%	0%	0%	0%	0%
Prohibit	0%	0%	0%	0%	0%	0%	0%
Total	100%	100%[1]	100%[1]	100%	100%	100%	100%[1]

1: Total reflects rounding for the percentage by treatment.

- Among the non-business-related land uses, the ranking of regional zones from most restricted to least restricted is POS, RUR, and SFR. This ranking applies for all options.
- IND lands receive the least restrictive Goal 5 treatments of any of the regional zones.
- Among the business-related land uses, the ranking from most to least restricted is (in general) MFR, MUC, COM, and IND. This ranking applies primarily for options 2A, 2B and 2C. For example, for option 2C, approximately 71 percent of IND lands would receive an allow treatment. The comparable figures for the other business-related land uses are 25 percent for MFR, 49 percent for MUC, and 46 percent for COM. See Table 4-12.

Table 4-12: Distribution of allow, limit and prohibit treatments for Option 2C, by Regional Zone.

	SFR	MFR	MUC	COM	IND	POS	RUR
Allow	14%	25%	49%	46%	71%	0%	13%
Lightly Limit	49%	50%	47%	42%	26%	5%	21%
Moderately Limit	36%	25%	4%	12%	2%	12%	40%
Strictly Limit	1%	0%	0%	0%	0%	83%	26%
Prohibit	0%	0%	0%	0%	0%	0%	0%
Total	100%	100%	100%	100%	100%[1]	100%	100%

1: Total reflects rounding for the percentage by treatmen

t.

5. Minimizes need to expand the urban growth boundary (UGB).

In this discussion of Criterion 5, the effects of the program options on the need to expand Metro's urban growth boundary (UGB) are described. The program options that would have the least impact on the need to expand the UGB rank higher for this criterion.

Potential impacts on the need to expand the UGB

State land use laws require that Metro's UGB accommodate anticipated population and employment growth over the next twenty years. As the area's population grows and urban development intensifies, pressure to expand the UGB increases. By how much and where to expand the UGB depends on a variety of factors including population distribution, the suitability of land on the urban fringe, and the intensity of in-fill development within the existing UGB. The program options that protect fish and wildlife habitat to a greater extent may also decrease the amount of developable land available inside the UGB. As the amount of developable land inside the UGB decreases, the likelihood that the UGB will expand in response to population and development growth increases.

Previous expansions of the UGB and related developments provide a context for the analysis of the impacts of program options on the need to expand the UGB. Metro's UGB expansions and related developments include:

- In 1995, the Metro Council adopted the 2040 Growth Concept, which anticipated adding 15,000 to 19,000 acres to the UGB over 50 years.
- In 1998-99, Metro added 4,000 acres to the UGB.
- In May of 2002, voters approved ballot measure 26-29, which prohibits higher densities in existing neighborhoods. Increasing urban densities as a means of avoiding or minimizing UGB expansions cannot target existing neighborhoods and will focus instead on downtown city centers and transportation corridors.

- In December of 2002, Metro Council added 18,638 acres to the UGB, with 2,851 of these acres dedicated to employment needs.
- Metro's current deliberations on UGB expansion include a proposal to add 2,000 acres targeting industrial use.

The assumption is made in this criterion that the program options which would restrict to a greater extent the development of vacant lands would increase the likelihood of expanding the UGB. Impacts on vacant land would have the most immediate impact on vacant land because these lands provide the greatest development opportunities.

Program options that increase the likelihood of expanding the UGB may also contribute to sprawl related economic consequences, such as increased travel times, increased vehicle miles traveled with associated increased concentrations of air pollutants, and increased costs of extending or expanding roads, water and sewer infrastructure. Program options that minimize UGB expansions by promoting development within the existing UGB may minimize sprawl related costs but may generate other economic consequences. For example, developing lands within the existing UGB, at the expense of riparian and wildlife habitat, would reduce the concentrations or availability of habitat related ecosystem services near population centers. In effect, development would push these resources and associated ecosystem services further out to the urban fringe away from employment and population concentrations.

Measuring the criterion

Table 4-2 in Criterion 1 (supports urban development priorities) shows the number of acres of lands in the four urban development categories (high, medium, low, and other) affected by allow, limit, and prohibit treatments for the six program options. It also shows impacts by development status including vacant lands inside and outside Title 3 protection. The analysis for this criterion uses the data in Table 4-2.

Results

Comparison of program options

Lands with high urban development value

- Option 2C provides the least restrictive impact on vacant lands inside and outside Title 3 and would have the least likelihood of promoting UGB expansions of the six program options.
- In ascending order of increasing restrictions on vacant lands outside Title 3 and increasing the likelihood of UGB expansions—the remaining options rank: 2B, 1C, 2A, 1B, and 1A. This ranking also reflects the outcome for lands inside Title 3 except that Options 2A and 1B perform comparably rather than 2A performing better 1B.

Lands with medium urban development value

- The results for lands with medium urban development value reflect the outcome for lands with high value.

Lands with low urban development value

- Option 1C performs better than the other options under this criterion in that it would have the least restrictive impact on vacant lands inside and outside Title 3, and would be the least likely to promote UGB expansions of the six program options.

- In ascending order of increasing restrictions on vacant lands outside Title 3, and increasing likelihood of promoting UGB expansions, the remaining options rank: 2C, 2B, 1B, 2A, and 1A. This ranking also reflects the outcome for lands inside Title 3 except that Options 2B and 1B have about the same effect rather than 2B dominating 1B.

Other lands

- Option 1C also performs better under this criterion for park land and rural inside and outside Title 3.
- In ascending order of increasing restrictions on vacant lands outside Title 3, and increasing likelihood of promoting UGB expansions, the remaining options rank: 1B, 2C and 2B are comparable, 2A, and 1A. This ranking also reflects the outcome for lands inside Title 3 except that Option 1B performs similarly to Options 2C and 2B rather than dominating these options.

Summary

Table 4-13 summarizes the ranking of the performance of the program options based on the average outcomes for the total acres in the analysis. This summary weighs more heavily the impacts on vacant lands ranked low and other lands because these rankings contain more acres of land than do vacant lands with high or medium rankings.

Table 4-13: Performance of options in meeting Economic Criterion 5: minimizes the need to expand the UGB.

Rank	Option	Performance
1	1C	Option 1C provides the greatest support for developing vacant land among the six options and will least likely promote UGB expansions. It has the greatest number of acres affected by allow treatments, which have no negative impacts on development, and no acres affected by strictly limit or prohibit treatments.
2	2C	Option 2C is second only to Option 1C in supporting the development of vacant lands and in the number of acres affected by allow treatments. No acres affected by prohibit treatments.
3	2B	Option 2B supports developing vacant land to a greater extent than does Option 1B because the allow treatments in this option generate no negative development impacts and there are no negative impacts from prohibit treatments.
4	1B	All Goal 5 treatments for Option 1B would have some negative impact on developing vacant land. Option 2B dominates 1B because it has allow treatments for high-valued vacant land. 1B has no allow treatments. This option supports developing vacant land to a greater extent than do Options 2A and 1A primarily because it has no negative impacts from prohibit treatments.
5	2A	Option 2A would have a slightly more negative impact on developing vacant lands, and thus promote UGB expansions to a greater extent, than Option 1B because of the negative impacts associated with prohibit treatments.
6	1A	Option 1A has the greatest negative impact from prohibit and strictly limit treatments and the greatest negative impact overall on developing vacant land of the six options. This option would likely promote UGB expansions to a greater extent than the other options.

Evaluation of social criteria

The Goal 5 process requires local governments to make a decision to allow, limit, or prohibit conflicting uses to protect fish and wildlife habitat based on balancing the consequences of the four ESEE factors. Based on the analysis of social consequences in Phase I, Metro developed five criteria to measure the performance of the six regulatory program options in addressing the potential social impacts. These criteria are:

1. Minimizes impact on property owners,
2. Minimizes impact on location and choices for housing and jobs,
3. Preserves habitat for future generations,
4. Maintains cultural heritage and sense of place, and
5. Preserves amenity value of habitat.

Some of the key questions considered in the analysis were:

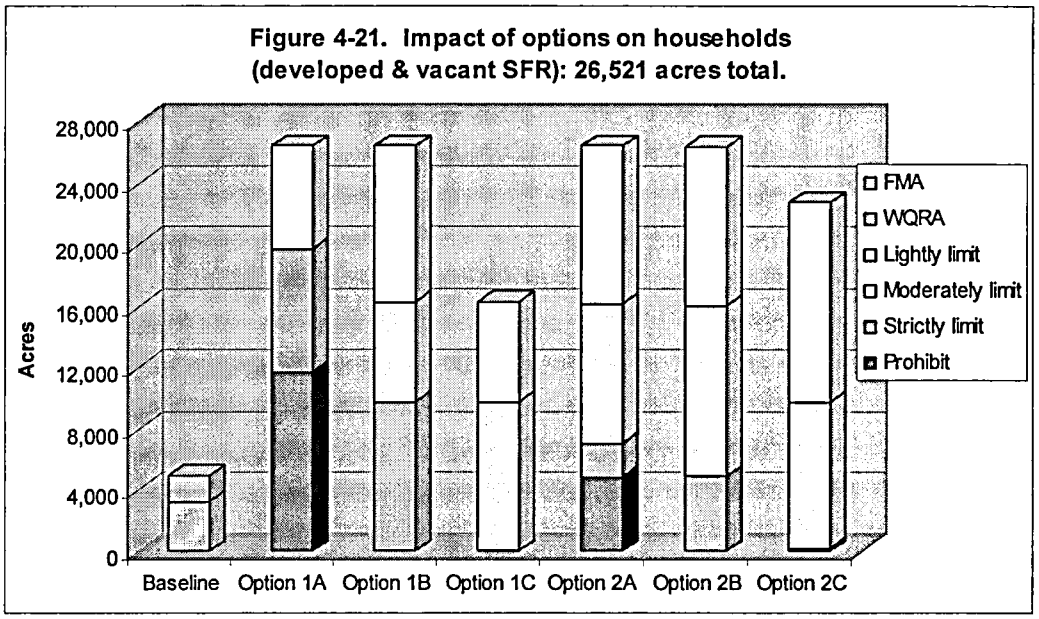
- How much of the habitat and impact areas are affected?
- How much of the habitat land is already protected to some extent by the baseline?
- Do the effects differ by habitat class?
- Do the effects differ by urban development values?
- What would be affected by a decision to "allow" or 'lightly limit" the impact areas?

1. Minimizes impact on property owners

Property ownership and land use regulations are sensitive issues central to habitat protection. Landowners may be concerned about impacts to property rights, takings issues, and the distribution of the burden of protecting habitat. Other landowners may be supportive of protection programs despite being personally affected for several reasons including an appreciation of habitat and the wish to see it remain in addition to the increased property values that can result from trees and proximity to water. For this criterion the data is analyzed by three main groups: households, businesses, and rural areas. It should be noted that, because treatments may be applied to only a portion of a lot, and several treatments could apply to the same lot, considering the acres affected by each treatment might produce statistics that tend to magnify potential impacts greater than they likely would be felt. Metro has already stated that potential regulations will not be imposed on particular, buildable lots if the result would be to render such lots unbuildable.

Potential impact on households

For residential land in particular, personal financial security or the expectation to maintain, develop or redevelop land within the existing regulatory framework could be impacted by a program option. A decision to allow, limit, or prohibit conflicting uses in fish and wildlife habitat has an impact on individual landowners. Thirty-four percent of the habitat lands are located in areas zoned for single-family residential uses, a third of which is in impact areas. Many residential properties are on small lots, thus options impacting more residential land could affect a large number of property owners, when compared to business and rural properties that have large lots. Figure 4-21 shows the distribution of the treatments on residential land (developed and undeveloped) for each option.



Results

The following observations are made from Figure 4-21 above.

Basic statistics & baseline protection

- 34 percent (26,521 acres) of habitat and impact areas are SFR.
- A third of the 26,521 acres of SFR land in Figure 4-21 is in impact areas, two-thirds has habitat value.
- SFR lands are distributed across all habitat classes.
- Most SFR lands fall in the low urban development value category.
- Baseline protection only covers a small portion of single-family land, with WQRA restrictions applied to about 10 percent and an additional five percent covered by FMA design guidelines.

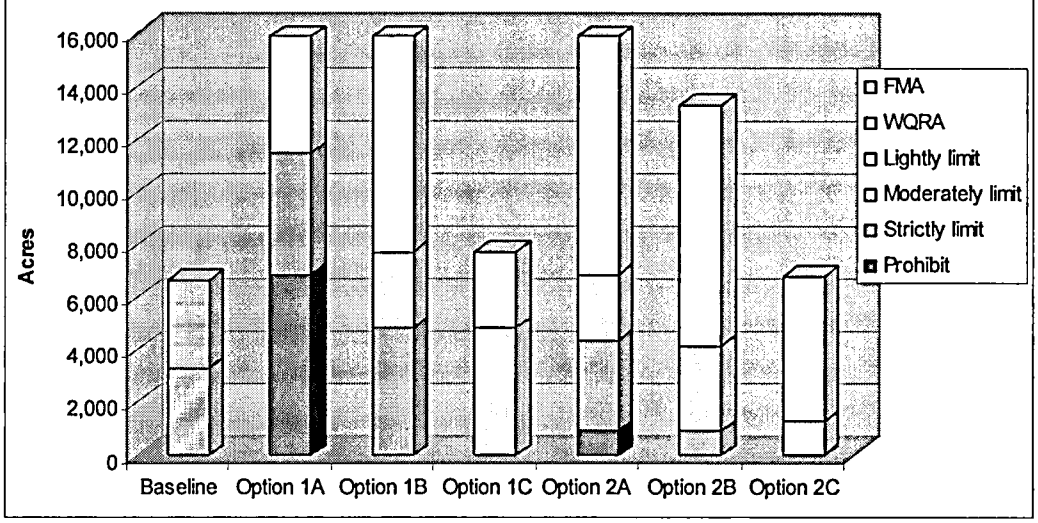
Comparison of options

- The urban development value options (2A-C) apply more stringent treatments to SFR lands than most other zoning types; while the habitat based options (1A-C) apply treatments to zoning types depending on habitat value.
- Option 1C, followed closely by 2C, has the least stringent treatments applied to the largest acreage of land zoned for single-family uses.
- Options 1A, 1B, 2A, and 2B each would apply some type of limit or prohibit decision to ***all*** land zoned for single-family with significant habitat.
- Option 1A would have the most impact on households, applying a prohibit treatment to 40 percent of the land, a strictly limit treatment to about 30 percent, and lightly limit to the remaining 30 percent (the impact areas).

Potential impact on businesses

Land used for business purposes, whether developed or vacant, would also be impacted by any of the regulatory program options. For developed land, the impact would be in the future if a property owner chose to redevelop and was required to follow new Goal 5 regulations. Reducing development opportunities and/or requiring specific habitat friendly development practices could impact vacant land. Restrictions on development could have an overall impact on the regional economy, (see economic criteria). Most business land includes commercial and industrial properties and apartment complexes located on large lots. This reduces the number of property owners potentially impacted. Figure 4-22 below shows the distribution of the treatments on land used for businesses (developed and undeveloped) for each option. Land used for businesses includes multi-family (MFR), mixed-use centers (MUC), commercial (COM), and industrial (IND).

Figure 4-22. Impact of options on businesses (developed & vacant MFR, MUC, COM & IND): 15,857 acres total.



Observations

The following observations are made from Figure 4-22 above.

Basic statistics & baseline protection

- Seventeen percent (15,857 acres) of total habitat and impact areas are zoned for business purposes.
- A third of the 15,857 acres of business land is in impact areas, two-thirds have habitat value.
- Baseline protection covers almost 40 percent of land used for business purposes, with WQRA restrictions applied to close to 20 percent and an additional 20 percent covered by FMA design guidelines.
- About 25 percent of business land contains the highest value riparian and wildlife habitat.

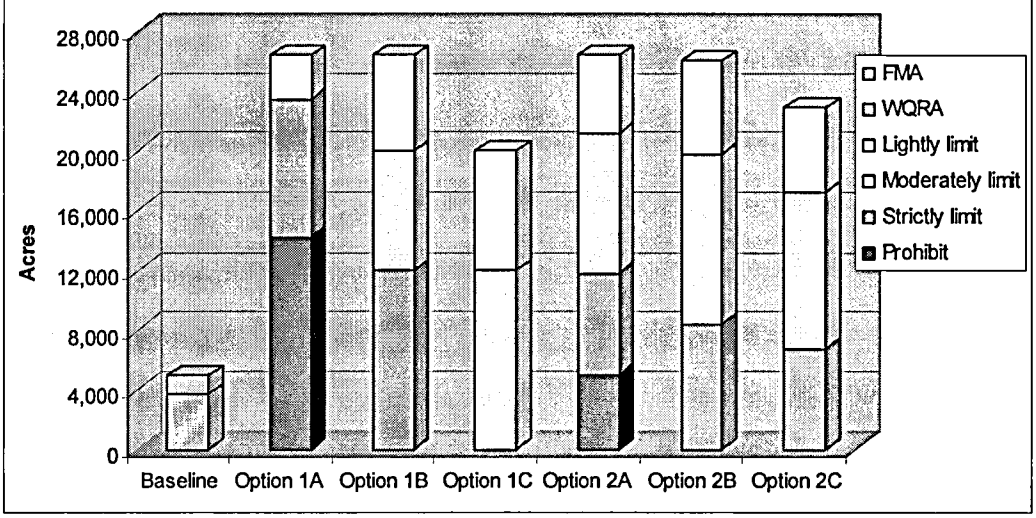
Comparison of options

- The urban development value options (2A-C) apply less stringent treatment to most business land; while the habitat based options (1A-C) apply treatments to zoning types depending on the habitat value.
- Option 2C, followed by 1C, has the least stringent treatments applied to the largest acreage of land zoned for businesses. Over 50 percent of business land receives an allow treatment in 2C.
- Option 2B provides substantially more protection than 1C and 2C, but less than 1A, 1B and 2A since about 20 percent of the land would receive an allow treatment.
- Options 1A, 1B and 2A each would apply some type of limit or prohibit decision to ***all*** land zoned for businesses with significant habitat.
- Option 1A would have the most impact on businesses with significant habitat, applying a prohibit treatment to over 40 percent of the land, strictly limit to about 30 percent, and lightly limit to the remaining 30 percent (impact areas).

Potential impact on rural areas

Much of the regionally significant fish and wildlife habitat falls on rural land, over 26,000 acres. Rural properties tend to be larger than those in other zones, impacting a smaller number of property owners but a large number of acres. Land uses include some residential and a substantial amount of farming and timber production. Farm and forestry practices have special regulations under Senate Bill 1010 and are not regulated by Metro. However, if these properties were urbanized in the future they would be subject to a regional fish and wildlife habitat protection program if those areas were to eventually become urbanized. Figure 4-23 shows how rural areas might be impacted by the six regulatory program options and how much of the rural landscape is covered by the baseline regulations.

Figure 4-23. Impact of options on rural areas (developed & vacant): 26,459 acres total.



Results
The following observations are made from Figure 4-23 above.

Basic statistics & baseline protection

- Twenty-eight percent (26,459 acres) of total habitat and impact areas are in rural areas.
- About 15 percent of the 26,459 acres of rural land is in the impact area, 85 percent has habitat value.
- Baseline protection only covers about 15 percent of rural land, with WQRA restrictions applied to about 10 percent and close to five percent covered by FMA design guidelines.
- Over 40 percent of rural land contains the highest value riparian and wildlife habitat.
- Urban development values apply to rural zoning with design types that fall inside Metro's urban growth boundary.

Comparison of options

- The urban development value options (2A-C) apply the most stringent treatments to rural areas that do not have a design type; while the habitat based options (1A-C) apply treatments to zoning types depending on the habitat value.
- Option 1C, followed by 2C, has the least stringent treatments applied to the largest acreage of rural land.
- Option 2B would apply an allow treatment to about two percent of rural lands, otherwise it is similar to 1B in the treatments applied.
- Options 1A, 1B and 2A each would apply some type of limit or prohibit decision to ***all*** rural land with significant habitat.
- Option 1A would have the most impact on rural land with significant habitat, applying a prohibit treatment to about 50 percent of the land, strictly limit to about 35 percent, and lightly limit to the remaining 15 percent.

Performance of options

All six regulatory options have some impact on landowners. The options that apply more stringent treatments to a larger part of the landscape have more of an impact than the options that apply lightly limit or allow treatments. The affect of applying the urban development values in Options 2A-C benefits business land substantially more than single-family residential and rural areas. In addition, the Metro Council's commitment not to adopt a program that would render currently buildable lots as unbuildable also moderates, to some degree, the impact that any option would have on property owners.

Table 4-14. Performance of options in meeting Social Criterion 1: minimizes impact on property owners.

Rank	Option	Performance
1	Option 1C	This option affects the fewest property owners with stringent treatments.
2	Option 2C	Most business land receives an allow treatment under this option but a substantial number of residential and rural property owners are affected.
3	Option 2B	Urban development values reduce amount of business land receiving strict treatments but residential and rural areas receive strictly and moderately limit treatments.
4	Option 1B	This option affects the same number of property owners as Options 1A and 2A, but none would receive a prohibit treatment and a larger number would receive lightly limit.
5	Option 2A	Despite applying urban development values, this option affects a large number of property owners with stringent treatments, especially in residential and rural areas.
6	Option 1A	This option affects the most property owners with the highest level of restrictions.

2. Reduces impact on types/locations of jobs and housing

The urban land supply is a social issue because it relates to people's basic needs for housing, jobs and urban services. A constriction of the existing land supply could negatively affect the social needs these lands serve (e.g., housing and employment). An urban growth boundary (UGB) expansion could offset the impacts, but urbanizing rural land spreads the development pattern towards the periphery of the region. This could increase travel times and congestion and could encroach further on fish and wildlife habitat in rural areas.

Potential impact on housing location and choices

Residential zones (SFR and MFR) make up the largest component of buildable land in the fish and wildlife habitat inventory. The types of housing opportunities available may change depending on habitat protection. Rather than reduce the number of housing units allowed on a lot, regulations may allow for the same units in a denser configuration, such as rowhouses, condominiums, or apartments. Clustering units on smaller lots in a subdivision may allow fish and wildlife habitat to be preserved. However, these potential changes have social impacts. Many people who might choose to purchase or rent a single-family home with a yard may not view these other housing options as equivalent. The location of the housing is important as well. Housing opportunities closer to existing employment, shopping, and entertainment will not be replaced by residentially zoned land in areas on the urban fringe. Housing affordability may also be affected if protecting fish and wildlife habitat results in changes to the land supply. Figures 4-24 and 4-25 show how the options treat vacant single and multi-family land as compared to the baseline.

Figure 4-24. Treatment of vacant single family habitat land: (11,250 vacant, 15,271 developed acres)

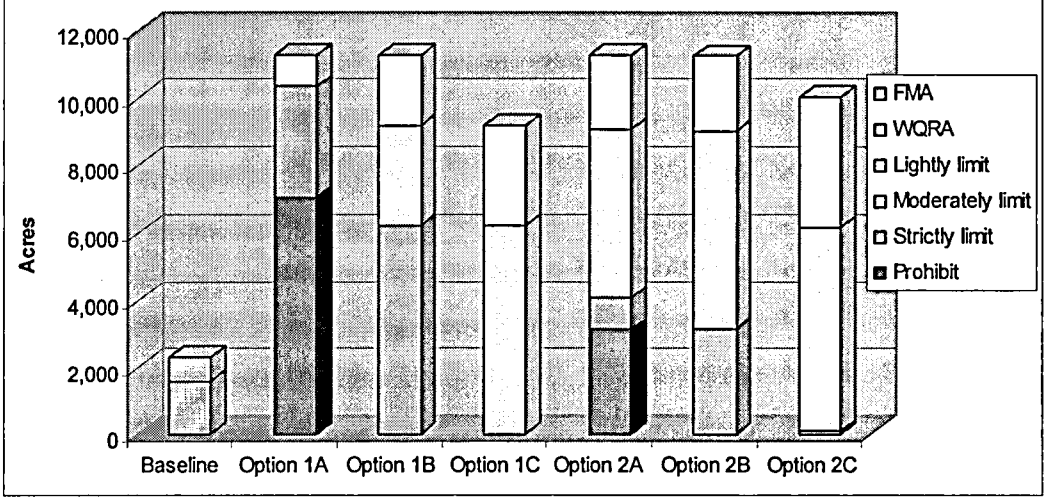


Figure 4-25. Treatment of vacant multi-family habitat land: (1,060 vacant, 2,886 developed acres).

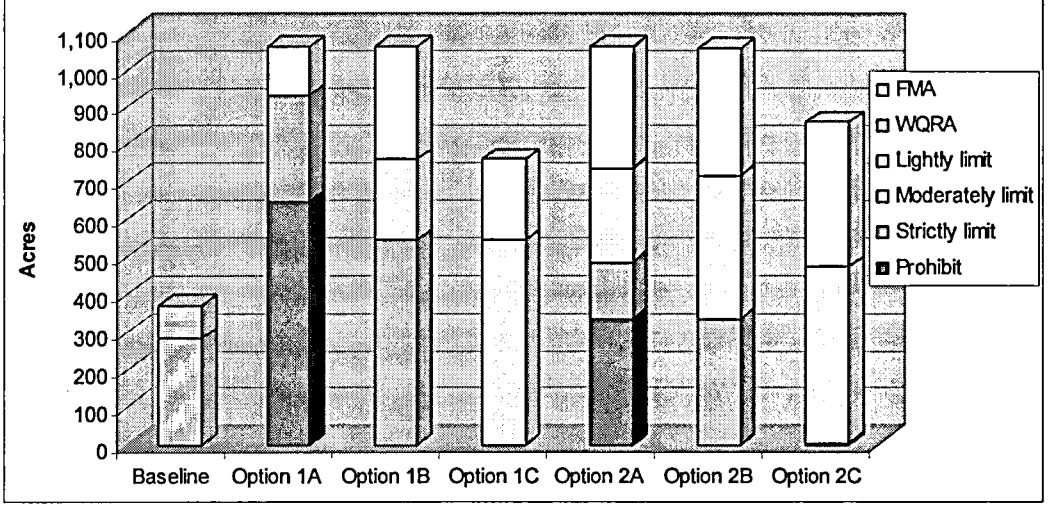


Table 4-15. Vacant residential land: acres potentially affected.

	Status of vacant land	Allow		Lightly limit		Moderately limit		Strictly limit		Prohibit	
		SFR	MFR	SFR	MFR	SFR	MFR	SFR	MFR	SFR	MFR
Option 1A	Inside Title 3	0	0	63	16	0	0	33	7	2,214	348
	Outside Title 3	0	0	851	114	0	0	3,256	278	4,833	297
	% covered by baseline	*0.0%*	*0.0%*	*6.9%*	*12.3%*	*0.0%*	*0.0%*	*1.0%*	*2.5%*	*31.4%*	*54.0%*
Option 1B	Inside Title 3	0	0	85	19	297	47	1,927	304	0	0
	Outside Title 3	0	0	1,960	282	2,676	168	4,304	238	0	0
	% covered by baseline	*0.0%*	*0.0%*	*4.2%*	*6.3%*	*10.0%*	*21.9%*	*30.9%*	*56.1%*	*0.0%*	*0.0%*
Option 1C	Inside Title 3	85	19	297	47	1,927	304	0	0	0	0
	Outside Title 3	1,960	282	2,676	168	4,304	238	0	0	0	0
	% covered by baseline	*4.2%*	*6.3%*	*10.0%*	*21.9%*	*30.9%*	*56.1%*	*0.0%*	*0.0%*	*0.0%*	*0.0%*
Option 2A	Inside Title 3	0	0	88	20	39	16	386	86	1,797	249
	Outside Title 3	0	0	2,071	305	4,980	236	572	62	1,318	86
	% covered by baseline	*0.0%*	*0.0%*	*4.1%*	*6.2%*	*0.8%*	*6.3%*	*40.3%*	*58.1%*	*57.7%*	*74.3%*
Option 2B	Inside Title 3	5	1	145	29	362	92	1,797	249	0	0
	Outside Title 3	9	2	2,080	315	5,499	286	1,352	86	0	0
	% covered by baseline	*35.7%*	*33.3%*	*6.5%*	*8.4%*	*6.2%*	*24.3%*	*57.1%*	*74.3%*	*0.0%*	*0.0%*
Option 2C	Inside Title 3	84	8	409	110	1,762	248	55	5	0	0
	Outside Title 3	1,138	193	3,442	276	4,319	219	41	0	0	0
	% covered by baseline	*6.9%*	*4.0%*	*10.6%*	*28.5%*	*29.0%*	*53.1%*	*57.3%*	*100.0%*	*0.0%*	*0.0%*

Results

The following observations are made from Figures 4-24 and 4-25, and Table 4-15.

Basic statistics and baseline protection

- Thirteen percent of habitat and impact areas comprise vacant residential land (SFR and MFR).
- Baseline protection only covers about 17 percent of vacant single-family land and about 30 percent of multi-family land. More restrictive WQRA restrictions are applied to about 10 percent of SFR land and a little over 20 percent of MFR land. An additional seven percent of SFR and eight percent of MFR are covered by FMA design guidelines.

Comparison of options

- Applying urban development values (options 2A-C) does not substantially change treatments applied to residential land.
- *Minimum impact:* Option 1C, followed by 2C, would apply the least stringent treatments to the largest acreage of residential land (both SFR and MFR). 2,346 acres (SFR & MFR) in option 1C and 1,423 acres in 2C would receive an allow treatment.
- *Maximum impact:* a prohibit designation would affect 7,700 acres in 1A and 3,450 acres in 2A of vacant SFR & MFR.
- Options 1A, 1B and 2A each would apply some type of limit or prohibit decision to ***all*** residential land with significant habitat.
- Option 1A would have the most impact on residential land with significant habitat, applying a prohibit treatment to almost 60 percent of SFR and over 55 percent of MFR,

strictly limit to about 30 percent (both SFR and MFR), and the remaining acres would receive a lightly limit treatment.

- Option 2A is more restrictive on MFR than SFR: about 40 percent of MFR is covered by prohibit and strictly limit treatments compared to about 30 percent of SFR.
- As described above, some of the vacant residential land is already covered by baseline regulations that limit housing location and development options. Limit and prohibit treatments would have less impact in those areas.
- All options apply a lightly limit treatment to some portion of the vacant residential land. A small percentage is already covered by baseline regulations in all options, but in options 1C and 2C over 20 percent of MFR land that receives a lightly limit treatment is covered by baseline, reducing the impact.
- All options except for 1A apply a moderately limit treatment to some portion of the vacant residential land with significant habitat. In options 1C and 2C over 50 percent of land receiving a moderately limit treatment is covered by baseline regulations, reducing the impact.
- All options except for 1C apply a strictly limit treatment to some portion of the vacant residential land with significant habitat. In 1A only a small percentage of land receiving strictly limit is covered by baseline, but in all other options the area covered by baseline that receives strictly limit ranges from 31 percent to 100 percent, reducing the impact.
- Only options 1A and 2A apply a prohibit treatment to vacant residential land with significant habitat. A significant portion of the habitat that would receive a prohibit treatment is covered by baseline, especially in 2A with 58 percent of SFR and 74 percent of MFR, reducing the impact.

Jobs

Employment opportunities typically occur on land that is zoned for commercial, industrial, or institutional uses. Vacant land zoned for commercial, industrial, or mixed-use development makes up 28 percent of the land within the fish and wildlife habitat inventory, and almost half is not constrained by Title 3. The location of these lands is an important factor in determining the social impact of allowing, limiting, or prohibiting use in these areas. Metro is able to add land to the UGB if employment capacities are reduced due to habitat protection.

However, it is important to consider the social impacts of adding employment land on the urban fringe. Will job opportunities located in newly developed areas be equivalent to lost opportunities located near existing concentrations of housing? Residents choosing to work in locations further from their homes will incur additional travel expenses as well as a reduction in quality of life due to more time spent commuting and away from home. Additionally, the types of jobs may be different, as a company that might choose to locate in an existing commercial or industrial area may not choose to move to a new location. Figure 4-26 graphically depicts the treatments for vacant employment land by option as compared to the baseline. Table 4-16 provides additional information on the existing environmental constraints on vacant employment land and the increment of regulations added by option.

Figure 4-26: Treatment for vacant employment habitat land (COM/MUC/IND): 6,915 acres total.

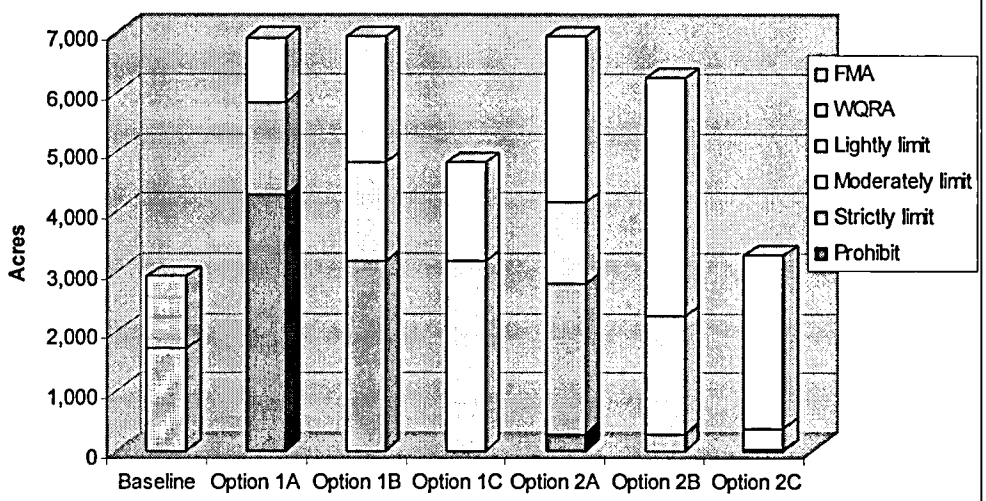


Table 4-16. Vacant employment land: acres potentially affected.

	Status of vacant land	Allow		Lightly limit		Moderately limit		Strictly limit		Prohibit	
		COM/ MUC	IND	COM/ MUC	IND	COM/ MUC	IND	COM/ MUC	IND	COM/ MUC	IND
Option 1A	Inside Title 3	0	0	21	162	0	0	7	78	572	2,077
	Outside Title 3	0	0	229	671	0	0	486	964	599	1,046
	% covered by baseline	*0.0%*	*0.0%*	*8.4%*	*19.4%*	*0.0%*	*0.0%*	*1.4%*	*7.5%*	*48.8%*	*66.5%*
Option 1B	Inside Title 3	0	0	26	235	133	458	442	1,624	0	0
	Outside Title 3	0	0	511	1,328	370	678	433	676	0	0
	% covered by baseline	*0.0%*	*0.0%*	*4.8%*	*15.0%*	*26.4%*	*40.3%*	*50.5%*	*70.6%*	*0.0%*	*0.0%*
Option 1C	Inside Title 3	26	235	133	458	442	1,624	0	0	0	0
	Outside Title 3	512	1,328	370	678	433	676	0	0	0	0
	% covered by baseline	*4.8%*	*15.0%*	*26.4%*	*40.3%*	*50.5%*	*70.6%*	*0.0%*	*0.0%*	*0.0%*	*0.0%*
Option 2A	Inside Title 3	0	0	28	259	85	442	366	1,514	121	101
	Outside Title 3	0	0	690	1,783	364	479	215	403	46	18
	% covered by baseline	*0.0%*	*0.0%*	*3.9%*	*12.7%*	*18.9%*	*48.0%*	*63.0%*	*79.0%*	*72.5%*	*84.9%*
Option 2B	Inside Title 3	2	120	141	1,224	337	872	121	101	0	0
	Outside Title 3	66	491	799	1,814	405	359	46	18	0	0
	% covered by baseline	*2.9%*	*19.6%*	*15.0%*	*40.3%*	*45.4%*	*70.8%*	*72.5%*	*84.9%*	*0.0%*	*0.0%*
Option 2C	Inside Title 3	86	1,187	393	1,021	120	104	2	4	0	0
	Outside Title 3	561	1,812	650	827	105	41	1	3	0	0
	% covered by baseline	*13.3%*	*39.6%*	*37.7%*	*55.2%*	*53.3%*	*71.7%*	*66.7%*	*57.1%*	*0.0%*	*0.0%*

Results

The following observations are made from Figure 4-26 and Table 4-16.

Basic statistics and baseline protection

- Seven percent of habitat and impact areas are vacant and zoned for employment (MUC, COM, IND).
- Baseline protection covers about 40 percent of the vacant employment land in the habitat inventory. More restrictive WQRA restrictions are applied to about 20 percent of employment land; about 18 percent is covered by FMA design guidelines.

Comparison of options

- Applying urban development values (options 2A-C) substantially changes treatments applied to employment land.
- *Minimum impact:* Option 2C has the least impact on job location and choices, as it applies an allow treatment to 3,646 acres of vacant employment land.
- *Maximum impact:* Applying urban development values reduces the number of vacant acres that would receive a prohibit treatment from 4,300 in 1A to 286 in 2A.
- Options 1A, 1B and 2A each would apply some type of limit or prohibit decision to ***all*** employment land.
- Option 1A would have the most impact on employment land, applying a prohibit treatment to almost 60 percent, strictly limit to a little over 20 percent, and lightly limit to the remaining 20 percent (impact areas).
- As described above, some of the vacant employment land is already covered by baseline regulations that limit job location and development options. Limit and prohibit treatments would have less impact in those areas
- The urban development value options (2A-C) apply stricter treatments to more land that is already covered by baseline than the habitat-based options (1A-C), reducing the potential impact on jobs.
- Most of the vacant employment land that would receive a prohibit treatment in Option 2A is already covered by baseline regulations. Similarly, in Option 1A a substantial portion of the land that would receive a prohibit treatment is covered by baseline.

Performance of options

All six regulatory options have some impact on housing and job location and choices. The options that apply more stringent treatments to a larger part of the landscape are likely to have more of an impact than the options that apply lightly limit or allow treatments. Applying the urban development values in Options 2A-C benefits employment land more than residential land.

Table 4-17. Performance of options in meeting Social Criterion 2: Jobs and housing location and choices.

Rank	Option	Performance
1	Option 2C	Employment land benefits the most from the application of the urban development values, however residential land would receive almost as the same treatments as in Option 1C.
2	Option 1C	Residential land fares better under this option but employment land is substantially more impacted than in Option 2C.
3	Option 2B	Urban development values affect the amount of employment land receiving stringent treatments; residential land receives some benefit as well.
4	Option 1B	This option applies a similar level of protection to residential and employment land.
5	Option 2A	Employment land fares substantially better than residential land under this option.
6	Option 1A	This option has a significant effect on the location and choices available for jobs and housing.

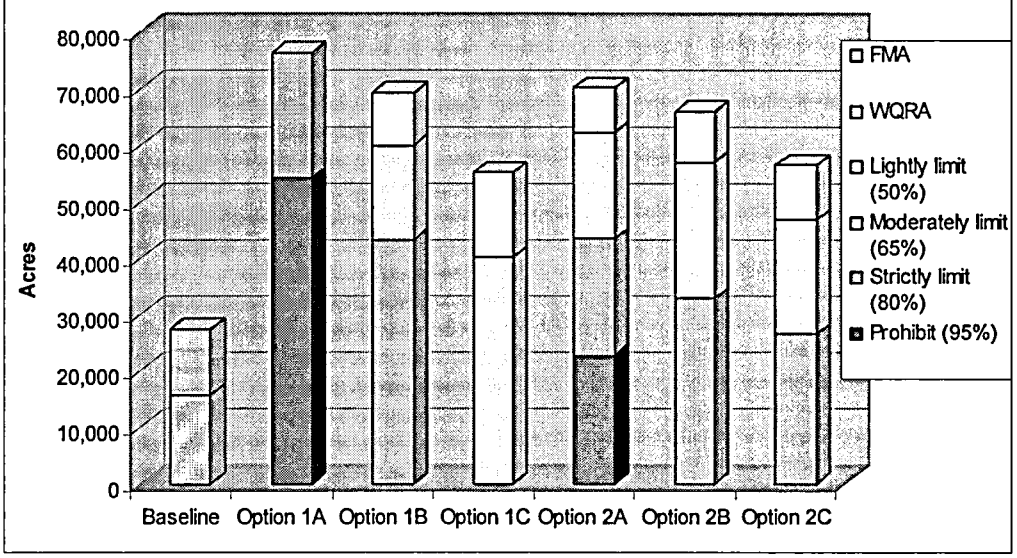
3. Preserves resources for future generations

An important social responsibility for people today is to preserve resources for future generations. The Iroquois Confederacy stated: "In every deliberation, we must consider the impact of our decisions on the next seven generations." This criterion is based on the concept that our children and grandchildren should be able to enjoy the resources we do now, from the perspective of species diversity and environmental quality as well as the potential economic benefits derived from fish and wildlife habitat. An example is the plethora of pharmaceutical applications found in the natural world, from the Amazon jungle to the cancer fighting agents found in the yew tree.

One way to assess the performance of each option in addressing this criterion is the total number of habitat acres protected. An allow treatment can be assumed to protect zero acres and therefore is not shown in Figure 4-27 on the following page, while a prohibit treatment can be assumed to do a substantial job of protecting habitat where applied. The three types of limit protect the habitat to varying degrees.

While the role of restoration is important for the environmental health of the future, Environmental Criterion 1 addresses this. Opportunities for restoration are best addressed by options that protect existing habitat.

Figure 4-27. Potential habitat protected by option (includes developed and vacant land - ALP assumptions applied to vacant land; does not include impact area).



Results

The following observations are made from Figure 4-27.

Basic statistics and baseline protection

- All habitat land is included in this criterion, 80,234 acres.
- Baseline protection covers about 30 percent of the habitat inventory (not including impact areas), or 27,300 acres. More restrictive WQRA restrictions are applied to about 15 percent of habitat land; about 15 percent is covered by FMA design guidelines.

Comparison of options

- Applying ALP disturbance area assumptions to the base of 80,234 acres results in varying levels of habitat protection. This ranges from a minimum of 41,000 acres protected in Option 1C to a maximum of 72,000 acres in Option 1A.
- Options 1A and 2A would apply the stringent treatments to the most acres, preserving the most habitat for future generations.
- Option 1C leaves the most habitat at risk for loss to future generations.

Performance of options

All six regulatory options protect some habitat for future generations. The options that apply more stringent treatments to a larger part of the landscape would preserve more habitat and potential for restoration.

Table 4-18. Performance of options in meeting Social Criterion 3: Preserves habitat for future generations.

Rank	Option	Performance
1	Option 1A	Preserves the most habitat for future generations by applying strict treatments to all habitat types.
2	Option 2A	Applying urban development values reduces the amount of habitat preserved but this option still protects a substantial amount of habitat.
3	Option 1B	A moderate level of protection is applied across the landscape, focused on high value habitat.
4	Option 2B	Close to the same level of protection as 1B, but more habitat is left unprotected in areas of high urban development value.
5	Option 2C	Habitat in areas of high urban development value is not preserved, more protection than Option 1C.
6	Option 1C	Leaves the most habitat at risk for loss to future generations, also reduces potential for restoration.

4. Maintains cultural heritage and sense of place

Protection of fish and wildlife habitat preserves many important social values. These include our cultural heritage, regional identity, sense of place, and neighborhood character. Opportunities for education abound in areas with healthy fish and wildlife habitat. Part of the region's cultural heritage is the retention of the salmon and other endangered species. The salmon are a ubiquitous symbol for the Pacific Northwest, and a key aspect of Native American culture. It is difficult to measure how well these more ambiguous values are retained by the application of the six potential program options. As a proxy for a more specific quantitative measure, retention of Habitats of Concern and Riparian/wildlife Class I habitat is used to assess how well each option addresses this criterion (the same measurements are used in Environmental Criterion 5). Habitats of Concern are places that have been identified by local field biologists and other experts as providing habitat for critical species, while Class I riparian areas are essential to providing habitat for threatened and endangered salmon, as well as birds, deer and other wildlife that are of cultural importance in the region.

Figure 4-28. Treatment of Habitats of Concern by option (developed & vacant): 25,822 acres.

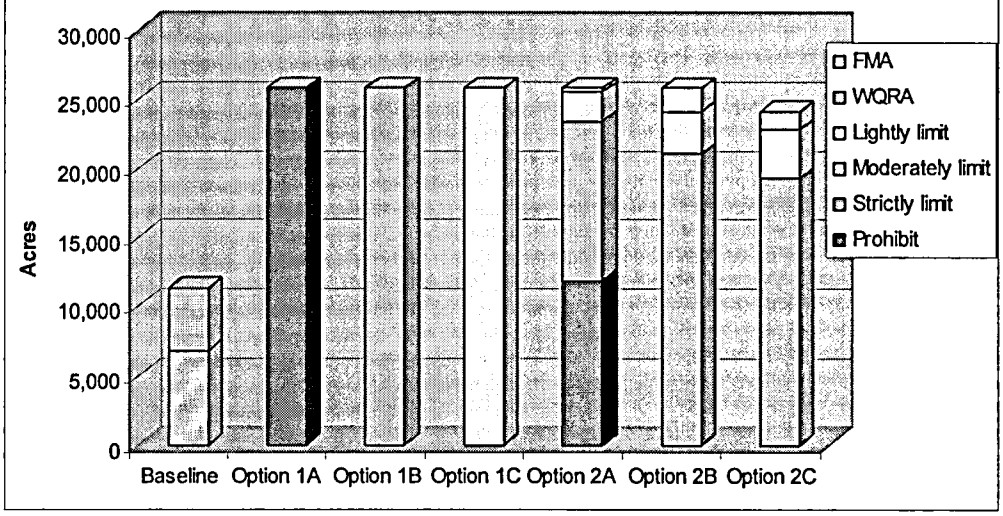
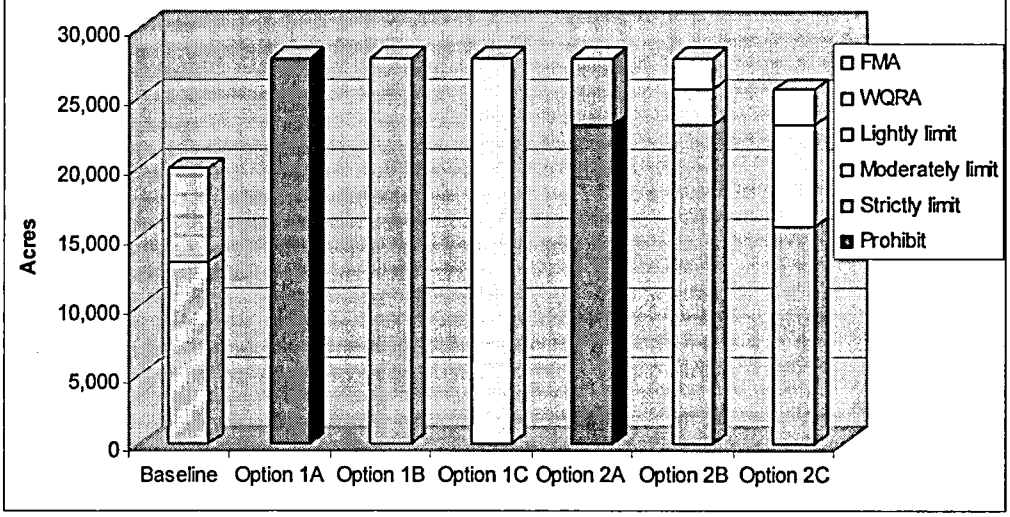


Figure 4-29. Protection level of Class I Riparian/wildlife habitat by option: (developed and vacant) 27,876 acres.



Results

The following observations are made from Figures 4-28 and 4-29.

Basic statistics and baseline protection

- Class I riparian includes 27,872 acres, Habitats of Concern (HOCs) encompass 25,822 acres. Some of the HOCs are included in the Class I riparian, but it is useful to consider them as a group due to their importance.
- Baseline protection covers about 65 percent of the Class I habitat and about 40 percent of HOCs. More restrictive WQRA restrictions are applied to about 42 percent of Class I and 22 percent of HOCs; FMA design guidelines cover a little over 20 percent of Class I and about 18 percent of HOCs.

Comparison of options

- Option 1A, 1B, and 2A would apply a strictly limit or prohibit treatment to all Class I habitat.
- Applying urban development values leads to loss of a small amount of HOCs and Class I habitat with allow and lightly limit treatments.
- Option 1C would apply the least stringent treatments to the largest amount of HOCs and Class I habitat.

Performance of options

All six regulatory options help to preserve cultural heritage and sense of place. The options that apply more stringent treatments to a larger part of the landscape have more of a positive impact than the options that apply lightly limit or allow treatments.

Table 4-19. Performance of options in meeting Social Criterion 4: Cultural heritage and sense of place.

Rank	Option	Performance
1	Option 1A	Does the best job of preserving cultural heritage and sense of place when measuring the effect on Class I habitat and Habitats of Concern. However, if a prohibit treatment resulted in an expansion of the urban growth boundary the resulting environmental effects could negatively impact cultural heritage and the salmon.
2	Option 2A	Comparable to 1A, however the application of urban development values would result in slightly less protection of cultural heritage and sense of place in areas with high urban development value.
3	Option 1B	Applies a strictly limit treatment to all Class I habitat and Habitats of Concern, providing substantial benefit to salmon and other endangered species but without as much potential for expansion of the UGB.
4	Option 2B	A large amount of Class I and Habitats of Concern receive stringent treatments in this option, with lightly limit applied to areas of high urban development value.
5	Option 2C	Similar to 2B, however a small amount of these highest value habitat areas would be lost due to the application of an allow treatment in high urban development value areas.
6	Option 1C	Applies the lowest level of protection to the highest value habitat, putting some of the social values contained in cultural heritage and sense of place at risk of loss.

5. Preserves amenity value of resources

The amenity value of habitat land on quality of life, property values, and regional attractiveness is an important consideration. For example, proximity to some types of natural areas actually increases property values, thus preservation of these habitats could positively impact nearby property owners. Private individuals and firms can capture the value of location, such as nearby parks, open space or schools, or good accessibility to services or transportation infrastructure. This results in higher demand and higher dollar valuation of these properties. On the other hand, public parks, schools, highways, and other perceived amenities capture individual or commercial value by the usage, time, and willingness of people to pay for them.

One way to assess the effectiveness of each option in addressing this criterion is the reliability of protection provided to the fish and wildlife habitat. An option that relies more on regulations and applies strict treatments to habitat land is more likely to produce reliable protection. Options that rely less on regulations and more on voluntary actions or incentives that are dependent on funding sources may be less likely to provide certainty of habitat protection. Thus, the amenity value that attracted landowners to purchase particular properties in the first place may be lost due to the absence or ineffectiveness of protection measures on adjacent lands. Figures 4-30 to 4-33) on the following page graphically depict the treatments to vacant land in the highest four habitat classes as a proxy for retaining amenity value.

Figure 4-30. Treatment of vacant Class I Riparian/wildlife land by option: 12,549 acres total.

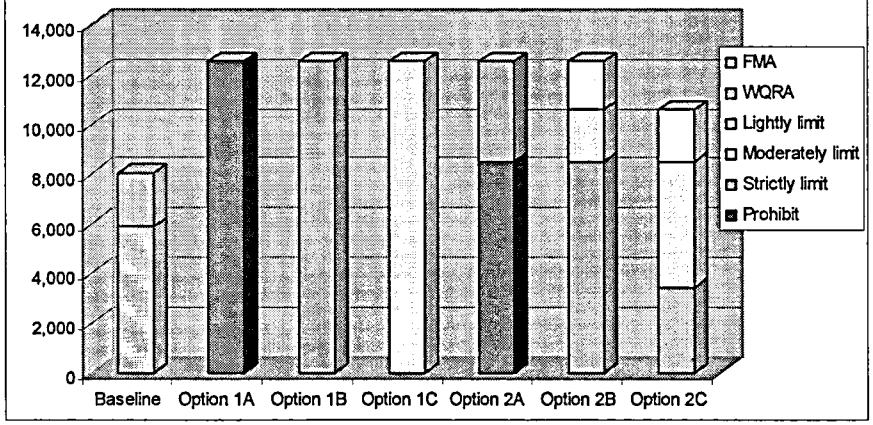


Figure 4-31. Treatment of vacant Class II Riparian/wildlife land by option: 3,907 acres total.

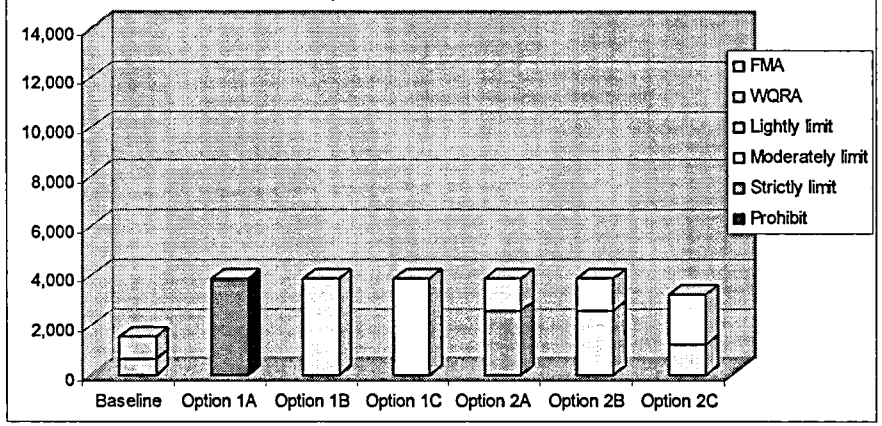


Figure 4-32. Treatment of vacant Class A Wildlife land by option: 8,508 acres total.

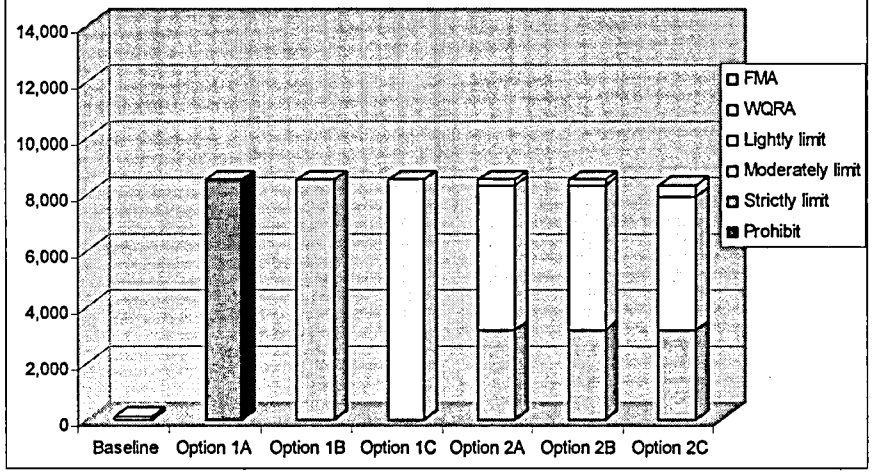
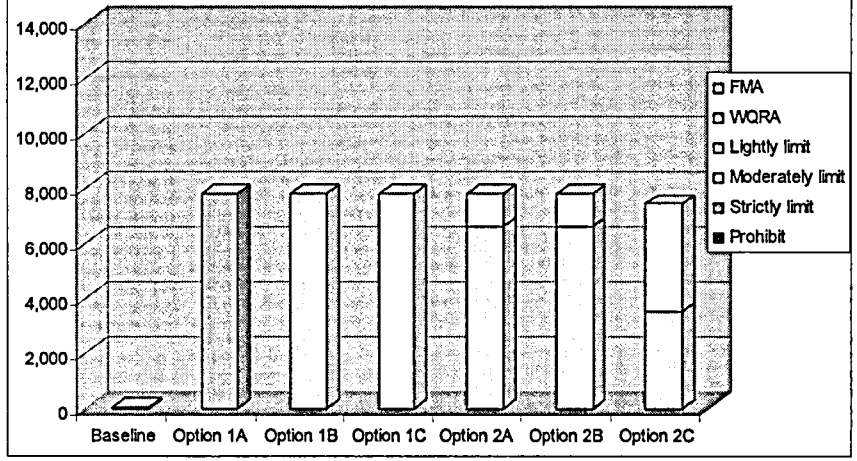


Figure 4-33. Treatment of vacant Class B Wildlife land by option: 7,789 acres total.



Results

The following observations are made from Figures 4-30 to 4-33.

Basic statistics and baseline protection

- Vacant Class I riparian includes 12,549 acres, vacant Class II riparian includes 3,907 acres, vacant Class A wildlife includes 8,508 acres, and vacant Class B wildlife includes 7,789 acres.
- Baseline protection covers about 65 percent of the Class I riparian, 40 percent of Class II riparian, and only one percent of Class A and B wildlife. More restrictive WQRA restrictions are applied to about 47 percent of Class I, 16 percent of Class II, about one percent of Class A and B wildlife; FMA design guidelines cover 17 percent of Class I, 24 percent of Class II, and a negligible amount of Class A and B wildlife.

Comparison of options

- Options 1A, 1B, and 2A would apply a strictly limit or prohibit treatment to all Class I habitat.
- Option 1A is the only option that would apply a prohibit treatment to Class A wildlife habitat and Class II riparian habitat, treatments for these habitat types range from strictly limit to allow in the other options.
- Applying urban development values does not substantially effect the treatment of Class A wildlife habitat, due to the fact that very little of this habitat type is in the high urban development category.
- Option 1C would apply the least stringent treatments to Class II and Class B habitats.

Performance of options

All six regulatory options help to preserve amenity value. The options that apply more stringent treatments to a larger part of the landscape have more of a positive impact than the options that apply lightly limit or allow treatments.

Table 4-20. Performance of options in meeting Social Criterion 5: Amenity value.

Rank	Option	Performance
1	Option 1A	Preserves amenity value consistently in all four of the highest habitat classes.
2	Option 2A	Applying the urban development values results in a small loss of amenity value in areas with high urban development value; preserves more amenity value in riparian habitat than wildlife habitat.
3	Option 1B	Applies consistent level of protection to all four habitat types, but riparian habitats are not as well preserved as in 2A.
4	Option 2B	Urban development values result in very similar protection for wildlife habitat as 2A, but riparian protection would be less than in 1B.
5	Option 2C	Amenity value provided by the highest value wildlife habitat receives similar protection to 2A, but the other three habitat categories receive less stringent treatment.
6	Option 1C	Retains the least amount of amenity value in wildlife habitat areas, provides a bit more protection for riparian habitat.

Evaluation of environmental criteria

The environmental portion of this phase of the ESEE analysis is intended to compare the potential effects of the six program options on fish and wildlife habitat. Five criteria will assist in this process:

1. Conserves existing watershed health and restoration opportunities;
2. Retains multiple functions provided by forest canopy cover;
3. Promotes riparian corridor continuity and overall habitat connectivity;
4. Conserves habitat quality and biodiversity provided by large habitat patches; and
5. Promotes biodiversity through conservation of sensitive habitats and species.

Criteria were selected based on the findings in Metro's Technical Report for Goal 5 and Phase I ESEE analysis (Metro 2002, Metro 2003). Charts depicting program performance for the most vulnerable habitat are embedded in the text. Habitat lands in parks and Title 3 WQRA are typically omitted from the graphs because they are currently afforded some protection. Habitat lands in Title 3 FMA are included in charts that illustrate vulnerability of the fish and wildlife habitat under the options because FMA areas do not protect vegetation.

The summary of each criterion includes a table ranking the programs in order of performance, from most to least protective. The criteria provide important new information about how each program performs relative to the others, and will aid Metro, its partners, and the public in designing a fish and wildlife habitat protection program appropriate to the region.

1. Conserves existing watershed health and restoration opportunities

The amount of fish and wildlife habitat protected or partially protected by each regulatory program option will help determine whether the option preserves habitat, existing ecosystem functions, and restoration opportunities for the future.

Potential impacts on fish and wildlife habitat

Partial or full loss of natural habitat impairs ecological functioning. The type and extent of impairment depends on the habitat class and, within each habitat class, the attributes that make each area valuable to fish and wildlife habitat. Metro's Phase I ESEE analysis (Metro 2003) describes the impacts on ecological systems when such functions are removed, and the Technical Report for Goal 5 (Metro 2002) describes how the region's natural habitats have been altered over time.

In riparian areas, highest value habitats provide the most functions. Class I riparian habitats provide at least three of the five key, or "primary," ecological functions mapped in the inventory. These areas are typically near streams and wetlands and often include forests or undeveloped floodplain areas; they are critical to maintaining aquatic habitat and water quality. Class II habitats provide one or two primary functions, and often also several secondary functions. Class III areas are lower value areas that still provide some degree of ecological function, such as small forest patches that are disassociated from the stream. Thus, protection of Class I is most important, followed by Class II, then Class III.

Wildlife habitat is similarly valued in a tiered approach; Class A is more valuable to wildlife than Class B, and Class B is more important than Class C. Metro mapped wildlife habitat based on spatial ecology principles, where large patches that are well connected to other patches, contain less edge habitat, and contain good water resources are considered most valuable. However, in the case of wildlife habitat, removal of lower valued habitats (Class C) can negatively impact the remaining habitats to a higher degree than for riparian due to connectivity issues (see criterion 3, Connectivity).[24]

Potential impacts on restoration opportunities

Restoration potential is preserved where habitat areas still exist (e.g., not paved); therefore, the level of protection provided by each program option illustrates the relative amount of potential restoration opportunities retained. This analysis does not identify the precise location or quality of restoration opportunities; however, because as habitats differ between classes, so do restoration opportunities. For example, areas of low-structure vegetation along streams may provide excellent opportunities to control non-native species and increase native tree and shrub cover; this would increase habitat to support diverse native wildlife communities. Native tree and shrub cover provide many vital ecological functions, including valuable riparian wildlife habitat, shading streams for cooler water, etc. Low-structure areas near streams are most typically found in Class II riparian and Class B wildlife.

Restoration opportunities are also found in high-value habitat areas; for example, Forest Park contains substantial amounts of non-native, invasive English Ivy. Efforts to control such invasions are ongoing. Because Forest Park is currently protected from development, the habitat and the restoration opportunities continue to exist. In upland areas, restoration is often needed to enhance wildlife habitat or control non-native species, particularly near forest edges. Thus, small habitat patches or long, narrow patches that contain a high proportion of edge habitat also provide restoration opportunities. Streams, wetlands, lakes and rivers can often be rehabilitated to create channel meanders, enhance water filtration capacity, or re-connect to natural floodplain areas.[25]

Metro's habitat inventories focused on the most important remaining habitats, and did not include every potential restoration opportunity due to the large scale nature of the regional inventory and because the Goal 5 rule applies to existing habitat.

Measuring the criterion

For each habitat class and each program option, the acreage that falls under various ALP designations is the measure for this criterion. The data is broken down between developed and vacant lands, because the time frame for habitat risk is different. Redevelopment will presumably occur over a longer time frame than new development. Additionally, habitats on

[24] It is important to consider the interactions between the riparian and wildlife inventories. The two inventories were conducted separately then reconciled so that a program could be developed for a single inventory map. As a result, some of each inventory was allocated to the other. For example, when Class I riparian coincided with any wildlife class, the wildlife portion became Class I riparian. Thus the loss of one habitat type may also include loss of another due to the extensive spatial overlap of the two inventories.

[25] Metro's Technical Report for Goal 5 (Metro 2002) includes a chapter describing how to go about watershed planning and prioritizing opportunities for restoration and other ecologically important activities.

vacant lands unconstrained by existing protection are more likely to be subjected to new conflicting uses. Title 3 WQRA acreage is excluded from this criterion because it is already partially protected (see introductory chapter). Similarly, Criterion 1 does not include parks, but focuses on habitat areas that may be placed at risk through development or redevelopment.

Results

Figures 4-34 through 4-37 illustrate the findings. Program options that are likely to protect more fish and wildlife habitat overall, as well as more of the most valuable habitat, are assumed to perform better than other options.

Basic statistics

- This criterion includes 80,143 acres of fish and wildlife habitat. Of that:
  - 27,851 acres are in class I riparian (34 percent of total)
  - 7,901 acres are in class II riparian (10 percent of total)
  - 4,434 acres are in class III riparian (6 percent of total)
  - 19,662 acres are in class A wildlife (25 percent of total)
  - 12,828 acres are in Class B wildlife (16 percent of total)
  - 7,468 acres are in Class C wildlife (9 percent of total)
- Riparian habitat comprises 17,500 acres (38 percent), while wildlife habitat comprises 28,960 acres (62 percent).

Baseline protection (Title 3)

- This analysis removed WQRA because it provides a degree of habitat protection.
- Of total habitat lands, 19 percent is in WQRA (7 percent parks, 4 percent in developed urban, and 8 percent in vacant).
- Of total habitat lands, 17 percent is in parks.
- If WQRA are included in the acreage figures, nearly half of Class I habitat and one-fourth of Class II habitat are WQRA, with all other habitat classes containing less than 5 percent WQRA.
- Fifteen percent of developed urban and vacant habitats are in Title 3 FMA, but vegetation is not protected in FMA and wetlands may be filled with proper DSL permission. Thus FMA does not protect habitat, and only partially protects the water storage function in riparian habitats. FMA are included as vulnerable to conflicting uses in Figures 4-34 through 4-37.
- The acres included under this criterion are outside WQRA and are subject to conflicting uses if no increase in protection level is applied; therefore, any program option that is not allow will provide incrementally more protection on the lands considered in Figures 4-34 through 4-37.

Potential effects of treatments vary by development status and habitat class

- Two-thirds of these habitat lands are vacant and one-third is developed urban. Treatments applied to vacant lands may have disproportionately high impacts compared to the same treatments applied to developed urban.
- Of vacant habitats, riparian comprises 34 percent, while wildlife comprises the remaining 66 percent. Of developed urban habitats, riparian only comprises 15 percent, with the remaining 85 percent in wildlife. These opposing trends indicate that treatments applied to vacant lands may disproportionately influence riparian habitats, whereas treatments applied to developed

urban lands may more strongly influence wildlife habitat.

- Class I dominates vacant riparian, comprising 63 percent of the acreage, but only 29 percent of developed urban riparian (Class III comprises half of the riparian acreage in developed urban). Treatments applied to vacant Class I riparian will profoundly influence the future ecological conditions of aquatic and riparian habitats.
- Class A comprises 41 percent of vacant wildlife and 32 percent of developed urban wildlife. Treatments applied to both vacant and developed urban wildlife will be important determinants of future wildlife conditions.
- Average riparian and wildlife habitat values tend to be lower in developed urban compared to vacant, because conflicting uses tend to degrade habitats. For example, developed floodplains do not retain the same ecological functions as the original floodplain, and riparian and wildlife habitat is more fragmented in developed areas.

Impact Areas

- Impact areas are designated where adjacent land use may harm the habitat.
- An allow decision in impact areas may harm remaining habitat over time, whereas a lightly limit decision may help protect habitat.
- Lightly limit program definitions may need to differ between habitats and impact areas, because impact areas, by definition, are not habitat. For example, impact areas to protect streams may require low impact development standards upon redevelopment.
- If a program option is selected that includes an allow decision for certain habitats, it would be sensible to administer an allow decision for adjacent impact areas, because impact areas are designed to address where adjacent land use might adversely affect *existing* resources.

Program Option performance

- In options 2A-2C, the urban development value plays a role in what may happen to the habitat because treatments change based on both habitat class and by urban development value. Options 1A-1C are based solely on habitat value.
- For wildlife habitat, options 1A and 1B are most protective.
- For riparian habitat, options 1A and 2A are most protective.
- Options 1C and 2C are the least protective for both riparian and wildlife habitat.
- Potential effects of program options depend in part on the amount of land falling within each habitat class; Class I, Class A and Class B contain the most acreage, whereas Class III and Class C hold the least. For example, options affording less protection to Class B (1C, 2B, 2C) will have greater adverse effects on overall wildlife habitat protection.
- Class C wildlife is most vulnerable to loss under all options (least protective treatments applied). Class II and III are also vulnerable under certain program options (e.g., 1C, 2C).

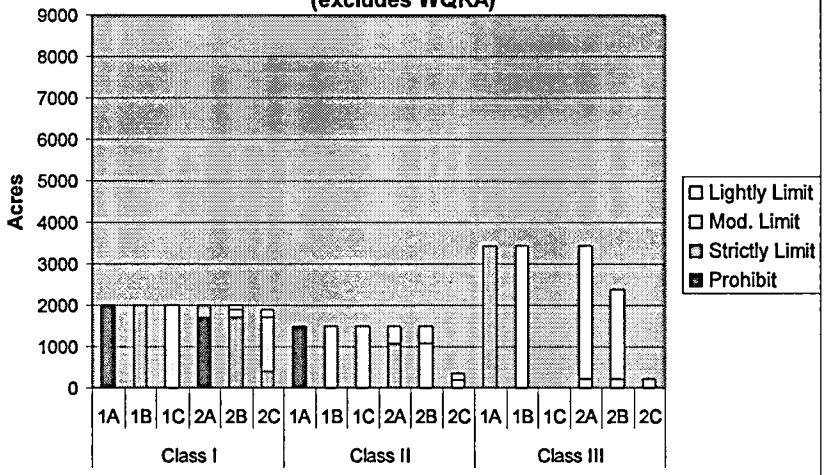
Summary

Program options show a marked decline in protection levels, as indicated in Table 4-21 below. The options that apply more stringent treatments to a larger portion of resources, particularly high value resources, will protect a larger proportion of regionally significant resources in the long term. Table 4-21 provides a ranking of program options for this criterion.

Table 4-21. Performance of options in meeting Environmental Criterion 1: Conserves existing watershed health and restoration opportunities.

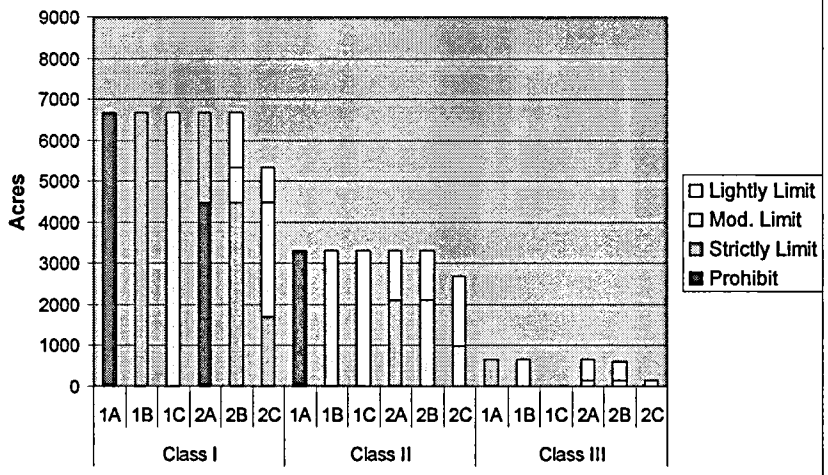
Rank	Option	Performance
1	1A	Charts 1a-1d indicate that this option will provide the most effective protection for the highest value resources (class I and class A habitat). This option also provides the highest protection levels for the remaining resource categories.
2	2A	This option still provides excellent protection for the majority of class I resources, and good protection for other riparian classes. The protection level is diminished, but still good for wildlife resources; however, option 1B provides better protection for wildlife habitat than 2A.
3	1B	Protection for all classes of riparian habitat is substantially reduced in this option compared to 1A and 2A. Class III riparian in appears to be particularly vulnerable. For wildlife habitat, this option performs at a higher level than 2A, but the importance of riparian habitat was considered first in this criterion.
4	2B	Performs moderately well for the higher classes in both riparian and wildlife habitat. This is the point at which protection levels drop off significantly for lower value resources. Poses substantial risk to habitat in classes III and C, due to lower protection levels and because some acreage is in the allow category.
5	2C	Lower protection levels for all resources. In particular, classes III and C are predominantly allow. Likely to result in substantial loss of riparian function unless extensive non-regulatory programs are put in place.
6	1C	Low protection levels for all habitat classes. Likely to result in significant habitat loss and ecosystem function over time in both developed and vacant lands.

Figure 4-34. Criterion 1a: Comparison of allow, limit, prohibit treatments by riparian class in developed urban lands (excludes WQRA)



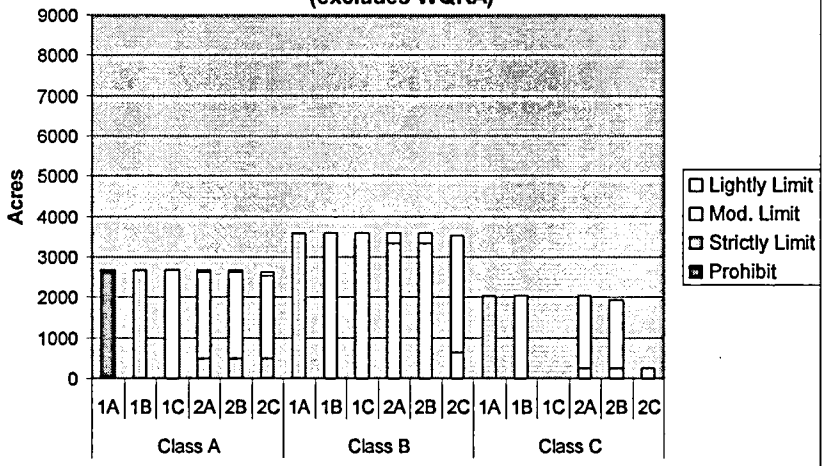
Program Option and Riparian Class
WQRA = 3,023 acres, non-WQRA = 6,909 acres

Figure 4-35. Criterion 1b: Comparison of allow, limit, prohibit treatments by riparian class in vacant lands (excludes WQRA)



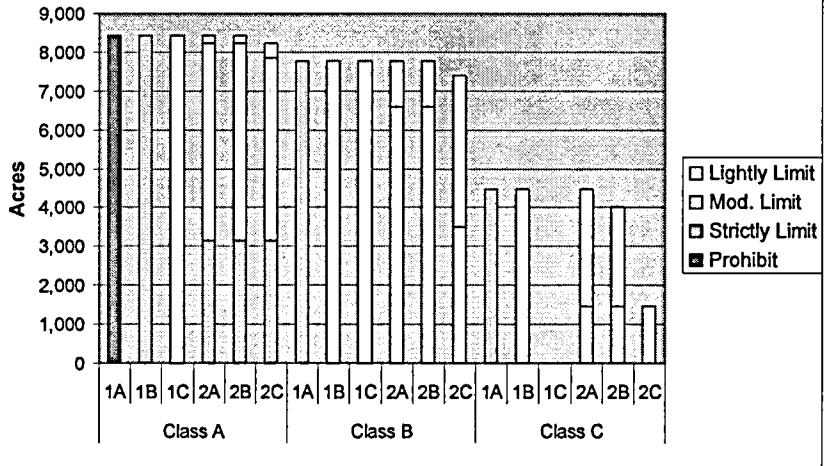
Program Option and Riparian Class
WQRA = 6,466 acres, non-WQRA = 10,636 acres

Figure 4-36. Criterion 1c: Comparison of allow, limit, prohibit treatments by wildlife class in developed urban lands (excludes WQRA)



Program Option and Wildlife Class
WQRA = 89 acres, non-WQRA = 8,286 acres

Figure 4-37. Criterion 1d: Comparison of allow, limit, prohibit treatments by wildlife class in vacant lands (excludes WQRA)



Program Option and Wildlife Class
WQRA = 133 acres, non-WQRA = 20,638 acres

2. Retains multiple functions provided by forest canopy cover

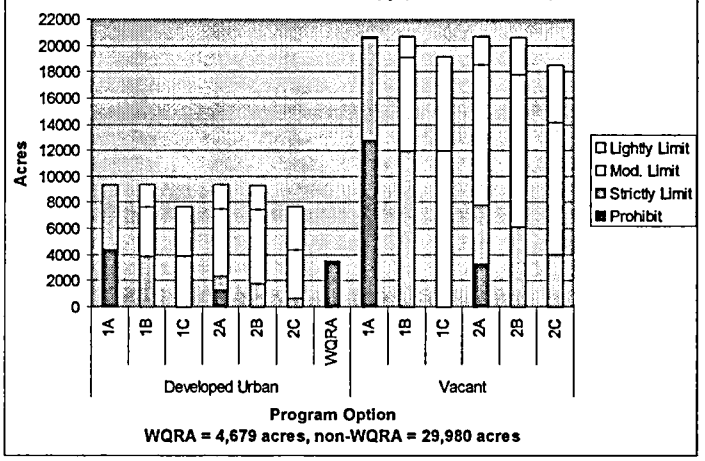
The Metro region is naturally forested, and trees play a pivotal role in maintaining healthy fish and wildlife habitat and regional biological diversity. Local studies affirm the importance of trees to stream health both near streams and throughout the watershed. Forest canopy plays a major role in all five ecological functions mapped in Metro's riparian habitat inventory, and forest habitat comprise the majority of the wildlife inventory.

Trees are also directly linked to each of the eight major ecological impact categories described in the ESEE Phase I discussion draft (Metro 2003). For example, trees help prevent altered hydrology and physical stream damage, and mitigate flooding caused by altered hydrology. They maintain water quality by taking up excess nutrients, heavy metals and other toxins, and provide shade over streams to cool water. Trees provide a primary source of wildlife habitat, and salmon and other aquatic wildlife frequently linger in shaded stream areas for thermal and predator protection.

Measuring the criterion

This criterion is measured by calculating the acreage of forest associated with each ALP category by program option. Forest canopy is a component of every habitat class, therefore this analysis does not differentiate by habitat class (for analysis by habitat classes, see criterion 1). The analysis does differentiate between vacant and developed status, because developed lands are less likely to experience much further tree loss, whereas vacant lands may be developed with substantial tree loss. However, forest loss can be an issue when redevelopment occurs, particularly when redevelopment occurs at higher densities. Program options that are likely to protect more acres of trees overall will receive a better rating in this criterion.

Figure 4-38. Criterion 2: Comparison of allow, limit, prohibit treatments for forest canopy (excludes WQRA)



WQRA = 4,679 acres, non-WQRA = 29,980 acres

Results

Figure 4-38 illustrates the findings from acreage calculations. Program options that are more likely to protect forest canopy cover are assumed to perform better than options providing less protection.

Basic statistics

- This criterion considers 50,134 acres of forested fish and wildlife habitat.
- Parks comprise 15,475 acres (31 percent of total forested acres), developed urban comprises 10,504 acres (21 percent of total forested acres), and vacant comprises 24,155 acres (48 percent of total forested acres).
- The bar chart for this criterion considers the most at-risk categories (developed urban and vacant, both outside WQRA).

Baseline protection (Title 3)

- WQRA comprise 2,916 forested park acres, 1,165 forested urban developed acres, and 3,514 forested vacant acres, or 15 percent of total forest habitat.
- Comprising about a third of forested lands, parks provide important protection to trees.
- The graph for criterion 2 excludes WQRA for the same reasons as stated in criterion 1.

Potential effects of treatment vary by development status

- Nearly half of forested habitat is in vacant lands. Of this, only 15 percent is protected as WQRA, while the remaining 85 percent is unprotected. Many of these lands are in rural zoning in new Urban Growth Boundary expansion areas.
- Of developed lands, two thirds receive some level of protection through parks or WQRA.
- Eleven percent of developed urban lands with forest are in WQRA. The remaining 9,339 acres are vulnerable to conflicting uses, particularly if redevelopment occurs at higher densities.
- Treatments applied to vacant lands may have disproportionately high impacts to forest habitat compared to the same treatments applied to developed urban lands.

Program option performance

- Options 1A and 1B are most protective of forest canopy in both developed urban and vacant lands. Options 2C and 1C are least protective.
- Options 2A and 2B fall in the mid-range in terms of protecting forest canopy.
- Option 1A is substantially more protective than option 1B. The difference between options 1B and 2A are less clear.
- The program options do not vary much between developed urban and vacant in terms of the proportions falling within allow, limit, prohibit designations.

Summary

Program options vary considerably in terms of forest canopy protection. The options that apply more stringent treatments to a larger part of the forested landscape will protect more forest canopy over the long term. Table 4-22 below provides a ranking of program options for this criterion, based on the most at-risk acres illustrated in Figure 4-38.

Table 4-22. Performance of options in meeting Environmental Criterion 2: Retains multiple functions provided by forest canopy.

Rank	Option	Performance
1	1A	Protects by far the most canopy cover of any other program option for vulnerable forested lands in both vacant and developed.
2	1B	Substantially less protection than option 1A, but still performs better than the remaining options. However, options 1B and 2A appear relatively close in terms of potential effects on the region's forest canopy. No Allow designations mean that all forest habitat would be afforded at least some level of protection.
3	2A	Similar to 1B.
4	2B	Little Allow (76 acres), but overall protection levels lower than options 1B and 2A.
5	2C	Low protection levels for forest canopy, with 38 percent of vacant and developed urban in Lightly Limit or Allow. Likely to result in significant habitat loss over time in both developed and vacant lands.
6	1C	Low protection levels for forest canopy, with 47 percent of vacant and developed urban in Lightly Limit or Allow. Likely to result in significant forest habitat loss over time.

3. Promotes riparian corridor continuity and overall habitat connectivity

Habitat connectivity is important to fish and wildlife for several reasons. Riparian, or longitudinal, connectivity ensures continued ecological functioning of streams and helps enable fish passage to areas upstream. Many fish and wildlife species must migrate seasonally to meet basic needs for food, shelter and breeding, and connections between habitat patches, including aquatic habitat, allow this migration to occur.

Fish and wildlife populations that are connected to each other are more likely to survive over the long term than an isolated population. In addition, when connectivity is lost between habitats the remaining habitat tends to become less native, attracting non-native and generalist wildlife species that can out-compete more sensitive native species, thereby reducing biodiversity. Metro's Phase I ESEE report describes the importance of connectivity to regional fish and wildlife habitat and populations (Metro 2003).

Measuring the criterion

Connectivity is an important indicator of habitat fragmentation. It is also very difficult to accurately measure, and prohibitively time-intensive to measure for six different program options. As a proxy for connectivity this criterion examines the following indicators:

- Criterion 3a: Riparian corridor continuity. Measures the amount of habitat within 150 feet of streams that falls within each allow, limit, prohibit designation for each program.
- Criterion 3b: The relative risk to all fish and wildlife habitat by program option.
- Criterion 3c: Discussion of the potential for disproportionate impacts by Metro's 27 subwatersheds.

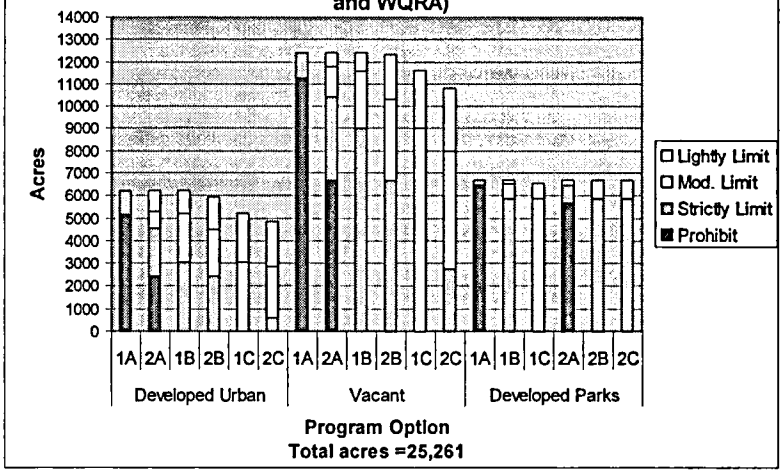
Results: Criterion 3a - Riparian corridor continuity

The figure below illustrates the findings. Program options that protect more habitat within 150 feet of streams are more likely to retain existing riparian corridor continuity.

Basic statistics

- This criterion includes 25,260 acres of fish and wildlife habitat near streams.
  - 6,186 acres are in developed urban (24 percent of total).
  - 12,395 are in vacant (49 percent of total).
  - 6,680 acres are in parks (26 percent of total).

Figure 4-39. Criterion 3a: Comparison of allow, limit, prohibit treatments for habitat within 150' of streams (includes parks and WQRA)



Baseline protection (Title 3)

- Of developed urban, 2,579 acres (40 percent) are in WQRA.
- Of vacant, 4,936 acres (40 percent) are in WQRA.
- Of parks, 3,221 acres (48 percent) are in WQRA.

This analysis included WQRA and parks because it constitutes a significant portion of riparian corridor continuity. The bar chart does not specifically delineate WQRA due to graph complexity.

Potential effects of treatments vary by development status

- About half of the acreage is vacant, with another quarter each in parks and developed urban. Parks are afforded some degree of protection, and so are WQRA.
- Excluding parks and WQRA, 7,459 acres are at risk in vacant. Less than half that amount, 3,607 acres, is in developed urban. Treatments applied to vacant habitat may have disproportionately high impacts on riparian corridor continuity.
- Parks are assumed to have some existing level of protection, but conflicting uses could impact these resources as well. However, nearly half of park acres are in WQRA.

Program option performance

- For all development statuses, Option 1A is most protective of habitat within 150 feet of streams, followed closely by Option 2A. Option 1B provides the next best protection, followed by 2B.
- Options 1C and 2C are least protective for these resources, and could negatively influence riparian corridor continuity.

Results: Criterion 3b – Relative risk to all fish and wildlife habitat

This sub-criterion is derived from Criterion 1. Figures 4-34 through 4-37 illustrate the findings. Program options that are likely to protect more fish and wildlife habitat overall, as well as more of the most valuable habitat, are assumed to perform better than other options. Here the findings from Criterion 1 are summarized as they related to Criterion 3b:

Basic statistics

- This criterion includes 80,143 acres of fish and wildlife habitat:
  - 27,851 acres are in Class I riparian (34 percent of total); of that, 2,005 developed acres are vulnerable (outside of parks or WQRA) and 6,683 vacant acres are vulnerable.
  - 7,901 acres are in Class II riparian (10 percent of total); of that, 1,475 developed acres are vulnerable and 3,301 vacant acres are vulnerable.
  - 4,434 acres are in Class III riparian (6 percent of total); of that, 3,427 developed acres are vulnerable and 659 vacant acres are vulnerable.
  - 19,662 acres are in Class A wildlife (25 percent of total); of that, 2,682 developed acres are vulnerable and 8,435 vacant acres are vulnerable.
  - 12,828 acres are in Class B wildlife (16 percent of total); of that, 3,580 developed acres re vulnerable and 7,756 vacant acres are vulnerable.
  - 7,468 acres are in Class C wildlife (9 percent of total); of that, 2,041 developed acres are vulnerable and 4,466 vacant acres are vulnerable.

Baseline protection (Title 3)

- See criterion 1 for baseline statistics.
- Nearly half of Class I habitat and one-fourth of Class II habitat are WQRA, with all other habitat classes containing less than 5 percent WQRA. This leaves lower habitat classes more vulnerable than the top two riparian classes.

Potential effects of treatments vary by development status and habitat class

- Class B and C wildlife habitat, in terms of acreage, provide disproportionately important connectivity links, such as stepping-stones between larger patches for migratory stopover and other wildlife movement.
- Class B and C wildlife habitat comprise 39 percent of vulnerable resources outlined above. Because these habitat patches are small, this equates to an high number of connector patches.
- Class B and C wildlife habitat tend to receive lower protective treatments in the program options compared to other habitat classes.
- The majority (68 percent) of vulnerable Class B and C acres are vacant, therefore program treatments applied to vulnerable vacant lands may have a disproportionate negative impact on regional connectivity.

Program Option performance

- Option 1A afford highest protection to Class B and C wildlife habitat, with strictly limit designations assigned to all acres.
- Option 1B provides less protection, but still provides protection to Class B and C habitat at the moderately and lightly limit levels, respectively.
- Options 2A and 2B provide less protection, but are generally similar to one another.
- Option 2C performs poorly, placing an allow designation on the majority of Class C habitat.
- Option 1C completely fails to protect vulnerable Class C habitat. Class C wildlife is most vulnerable to loss under all options (least protective treatments applied).

Results: Criterion 3c – Potential for disproportionate impacts by subwatershed

The findings for Criterion 3a are illustrated in the two figures below.

Basic statistics

- This criterion includes all 80,143 acres of regionally significant fish and wildlife habitat in Metro's 27 subwatersheds, plus 15,730 acres of impact areas (see context chapter for more information on distribution of impact areas by development status).
- Impact areas are addressed in this subcriterion because conflicting uses in impact areas may adversely impact fish and wildlife habitat.
- Resources sites with a lower percentage of fish and wildlife habitat typically contain proportionally more impact areas. These subwatersheds are also typically more developed.
- Of the total, 53,939 acres are in developed, while 41,934 are in vacant.
- The criterion discerns between the most vulnerable habitats and those with some existing protection.

Baseline protection (Title 3)

- Of developed urban habitat and impact areas, 3,795 acres (seven percent of developed urban; four percent of all acres) are in WQRA.
- Of vacant habitat and impact areas, 6,881 acres (16 percent of vacant; seven percent of all acres) are in WQRA.
- Of all acres, 25,212 acres (26 percent) are in parks, shown in black in Figure 4-40.

Potential effects of treatments vary by subwatershed

- Variability exists between subwatersheds; some subwatersheds contain more habitat/impact areas overall, while others contain varying proportions of habitat within the subwatershed.
- In all subwatersheds, WQRA comprises a relatively small proportion of acreage, whether considering vacant or developed urban habitat.
- The bar chart illustrates that some subwatersheds contain more vulnerable lands than others. For example, subwatersheds #8, 26, and 27 contain relatively high amounts of vulnerable developed habitat and impact areas; these areas would be most vulnerable under redevelopment. Subwatersheds #11, 18, and 27 contain relatively high amounts of vulnerable vacant habitat and impact areas; these habitat acres are more immediately vulnerable.
- Some subwatersheds contain low proportions of habitat and impact areas. Examples include subwatersheds #6, 20 and 24, containing from 20-22 percent of acres in habitat or impact areas. Because these subwatersheds contain relatively little existing habitat, program treatments could have disproportionately high impacts on existing connectivity.

Figure 4-40. Criterion 3c: Developed lands - Habitat and Impact areas in Metro's 27 subwatersheds

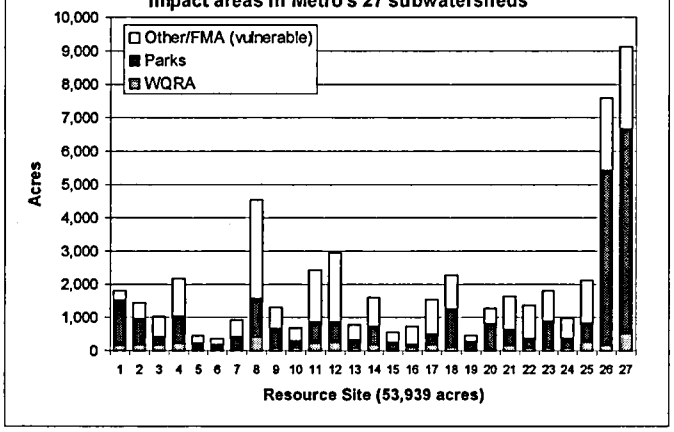
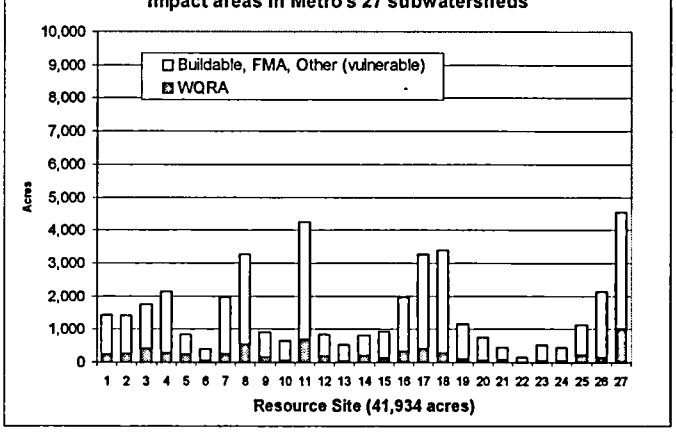


Figure 4-41. Criterion 3c: Vacant lands - Habitat and Impact areas in Metro's 27 subwatersheds



Program option performance

- Some subwatersheds contain more habitat and impact areas than others.
- Criterion 1 describes how the six options perform in terms of protecting various habitat classes. More protective options are more likely to retain existing connectivity.
- Large habitat patches (see criterion 4), while vulnerable to fragmentation, may not be as important to systemic connectivity as smaller patches or more linear habitats.
- Program options providing more protection to lower value habitat areas, which tend to be small but important connectors or stepping stones, are more likely to promote connectivity,

particularly in subwatersheds with lower proportions of habitat.

- Options 1A, 2A, and to a lesser extent, 1B are likely to best protect the region's existing connectivity.
- Options 2B, 2C and 1C are likely to significantly reduce connectivity in the region.

Summary

Program options show a marked decline in protection levels, as indicated in Table 4-23 below. The options that apply more stringent treatments to a larger portion of habitat, particularly high value habitat, will protect a larger proportion of regionally significant habitat in the long term. Table 4-23 provides a ranking of program options for this criterion.

Table 4-23. Performance of options in meeting Environmental Criterion 3: Promotes riparian corridor continuity and overall habitat connectivity.

Rank	Option	Performance
1	1A	Program option 1A perform best for all three sub-criteria. This option is most likely to promote riparian corridor continuity and overall habitat connectivity.
2	2A	For riparian corridor continuity (sub-criterion 3a) and protecting subwatersheds from disproportionate impacts (sub-criterion 3c), program option 2A performs best. However, for risk to smaller connector habitats (sub-criterion 3b), 1B is the best performer.
3	1B	This option performs better for protecting small connector habitats than 2A, but does not perform as well for riparian corridor continuity and protecting subwatersheds from disproportionate impacts.
4	2B	This program option performs at a reduced, but fairly consistent, level for all three sub-criteria.
5	2C	This option greatly reduces protection levels for all three sub-criteria, and is likely to result in significantly reduced regional connectivity.
6	1C	This option greatly reduces protection levels for all three sub-criteria, and is likely to result in significantly reduced regional connectivity. In particular, class C wildlife habitat is 100% allow under this option.

4. Conserves habitat quality and biodiversity provided by large habitat patches

The extent to which large habitat patches are disrupted by conflicting uses will help determine habitat quality. Program options that perform better in this regard are more likely to retain the region's biological diversity.

Potential impacts on fish and wildlife habitat

Large habitat patches are primarily forested areas, but also include wetlands. Larger habitat patches are more valuable to native wildlife than smaller patches because more species are retained over time, and species sensitive to human disturbance still have a place to live. Long-term trends in wildlife populations are directly related to the area of habitat available – the larger the patch size, the longer a population can sustain itself. Larger habitat patches also retain more natural predators to keep rodent populations in check[26].

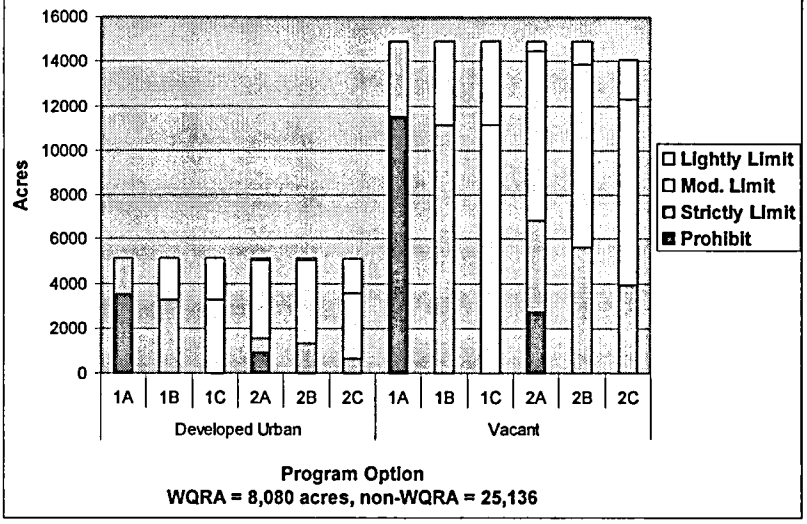
Habitat quality tends to be higher in large patches because negative edge effects, such as invasive species introductions and increased nest predation, are reduced. Local studies show that the complex multi-layered forest and shrub structure important to birds, small mammals and other wildlife is enhanced in larger habitat patches. Large patches also typically contain more woody debris.

Certain sensitive species and groups of species, such as Neotropical migratory songbirds and area-sensitive species, are likely to be negatively affected by less protective options. Large habitat patches are also linked, directly or indirectly, to each of the eight major ecological impact categories described in the ESEE Phase I discussion draft (Metro 2003). Thus, large habitat patches are a key component to retaining the region's biodiversity.

Measuring the criterion

Habitat patch size was a criterion in Metro's wildlife habitat inventory. Because the wildlife and riparian inventories were subsequently combined, portions of large habitat patches near waterways were incorporated into riparian Classes I and II. As a result, large patches were typically split into Class I and II riparian or Class A and B wildlife. For this criterion the wildlife model score prior to reconciling the two inventories, including patches scoring 6-9 points, was used in an effort to gauge the potential programmatic results on large habitat patches.

Figure 4-42. Criterion 4: Comparison of allow, limit, prohibit treatments for large habitat patches (excludes WQRA)



[26] See Metro's Technical Report for Goal 5, Metro 2002.

Results

For each program option, the acreage of large habitat patches that fall under various ALP designations was calculated. The data is reported separately for vacant and developed lands, for the reasons described under criterion 1; similarly, WQRA and parks are excluded in Figure 4-42. Figure 4-42 illustrates the most at-risk acres.

Basic statistics

- The total amount of large habitat patches, as defined in this criterion, is 38,360 acres.

Baseline protection (Title 3)

- Parks comprise 14,155 acres, or 37 percent of the total.
- WQRA comprise 8,090 acres (including 3,899 in parks) for 21 percent of the total.
- Six percent of the total habitat is in Title 3 FMA, but vegetation is not protected in FMA, therefore FMA areas do not protect large habitat patches.
- Excluding parks and WQRA, there are 20,014 acres of at-risk fish and wildlife habitat illustrated in Figure 4-42.
- The acres included in Figure 4-42 are subject to conflicting uses if no increase in protection level is applied; therefore, any program option that is not allow will provide incrementally more protection on these lands.

Potential effects of treatments vary by development status

- Excluding parks and WQRA, developed urban contains 26 percent of this habitat type, while 74 percent falls under vacant.
- The high percentage in vacant suggests that vacant habitat may be disproportionately affected by program choices.
- Developed urban is vulnerable as redevelopment occurs.
- The majority of habitat lands fall in single family residential zoning.
- Current trends for smaller lot sizes render large patches in both developed urban and vacant vulnerable to loss or fragmentation over time.

Program Option performance

- Urban development values in options 2A-2C substantially reduce protection of large habitat patches.
- For both vacant and developed urban habitat, Program Option 1A and to a lesser extent, Option 1B are most likely to keep large patches intact.
- Options 2A and 2B are marginal and may result in significant large patch encroachment.
- Options 2C and 1C are unlikely to retain large patches within the system.

Summary

Program options show a marked decline in protection levels, as indicated in Table 4-24 below. Options that apply stronger protection levels to large patches have a much greater chance of retaining the integrity of these important wildlife resources over time, and thus retaining good habitat quality and biodiversity. Incremental drops in protection may have more severe consequences in this criterion than in most other environmental criteria, because each drop in protection level raises the potential for large patch fragmentation.

Table 4-24. Performance of options in meeting Environmental Criterion 4: Conserves habitat quality and biodiversity provided by large habitat patches.

Rank	Option	Performance
1	1A	Figure 4-42 indicates that this option will provide the most effective protection for large habitat patches, with protection levels of Prohibit or Strictly Limit for all habitat.
2	1B	Protection level diminished, but still good, with Strictly or Moderately Limit for all habitat. However, any reduction in protection level will increase fragmentation of large patches, particularly with trends toward higher density development.
3	2A	Protection levels slightly lower than Option 1B. Three percent of vacant, unprotected habitat would fall under Lightly Limit in this option, with the remainder in Moderately Limit (51 percent), Strictly Limit (28 percent), or Prohibit (18 percent). No Allow.
4	2B	An incremental drop in protection levels compared to 2A. Seven percent of vacant, unprotected habitat would fall under Lightly Limit in this option, with the remainder in or Moderately Limit (55 percent) or Strictly Limit (38 percent).
5	2C	Substantially lower protection levels, with six percent of vacant, unprotected habitat in Allow, 12 percent in Lightly Limit, 56 percent in Moderately Limit, and 26 percent in Strictly Limit. No Prohibit. Likely to result in significant fragmentation of large patches.
6	1C	2C and 1C are fairly similar. 1C has decreased protection levels for all habitat classes, with 25 percent of vacant, unprotected habitat in Lightly Limit and 75 percent in Moderately Limit. Likely to result in significant fragmentation of large patches.

5. Promotes biodiversity through conservation of sensitive habitats and species

The amount and configuration of fish and wildlife habitat play important roles in the region's biodiversity, and these are addressed in Criteria 1 through 4. Also important, but not implicit in the first four criteria, are species and habitats that may be disproportionately at risk due to natural scarcity, habitat loss, or other factors.

Potential impacts on fish and wildlife habitat

For the purposes of this criterion both Habitats of Concern and Class I riparian habitat are included, because high-value riparian areas are widely acknowledged to be at-risk and because these habitats are mapped comprehensively for the region. In addition, known Species of Concern sightings are included to provide a relative measure of risk to wildlife. For these already-depleted habitats and species, a small habitat reduction could deal a major blow to regional biodiversity.

Criterion 5a: Habitats of Concern.

Habitats of Concern are specific areas known to provide a unique and at-risk habitat type, a unique and vital wildlife function, or both. Examples include wetlands, Oregon white oak habitat, riverine delta and island habitat, and critical migratory pathways. Habitats of Concern are premier wildlife areas that are elevated in importance and status within the inventory; all Habitats of Concern fall in either Class I riparian or Class A wildlife. Many of these areas, such as small wetlands, are less than the two-acre minimum established for the wildlife inventory but are included as Habitats of Concern due to their regional importance to biological diversity.[27] Program options providing more protection to these habitats will do a better job of retaining Habitats of Concern throughout the region.

Criterion 5b: Class I riparian.

The Habitats of Concern data is incomplete because it relies on local knowledge rather than comprehensive surveys. Therefore, for the purposes of this criterion Class I riparian habitat is also included because it is a widely acknowledged at-risk habitat and is mapped comprehensively for the region. Some of the implications of Class I habitat loss are described in Criterion 1. In addition to the ecological functions described there, high value riparian habitat contains more species than most other habitats; for example, the region's riparian areas are known to support approximately 93 percent of native bird species at some point in their lives. They also support more sensitive species, such as those found in Criterion 5c. Riparian areas provide vital fish and wildlife habitat connectivity throughout the region. The more a program option places Class I habitat at risk, the more negatively it will affect regional biological diversity.

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[27] Metro collected information on Species of Concern and Habitats of Concern for the Goal 5 wildlife habitat inventory from a variety of sources with site-specific knowledge of the region. ODFW, USFWS, the Oregon Biodiversity Project, and the Oregon-Washington chapter of Partners in Flight identify wetlands, native grasslands, Oregon white oak habitat, and riparian forests as the top four Willamette Valley habitats at risk. ODFW also lists urban natural area corridors as important at-risk habitats. Metro used these habitat types, plus other key contributors to diversity such as riverine islands and deltas and key migratory bird stopover habitats, to map Habitats of Concern.

Measuring the criterion

For each program option, acreage of Habitats of Concern (Criterion 5a) and Class I riparian (Criterion 5b) falling under various ALP designations was calculated. The two are reported separately and are not mutually exclusive.

The data are reported separately for vacant and developed urban habitats, for the reasons described under Criterion 1. Similarly, Title 3 Water Quality Resource Areas (WQRA) and parks are excluded from Figures 4-43 and 4-44 in order to focus on the habitats most at risk of development or other conflicting uses.

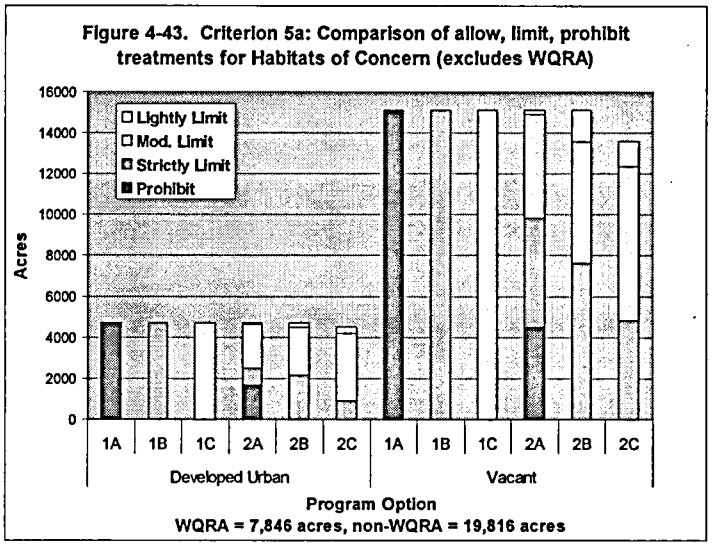


Figure 4-43. Criterion 5a: Comparison of allow, limit, prohibit treatments for Habitats of Concern (excludes WQRA)

WQRA = 7,846 acres, non-WQRA = 19,816 acres

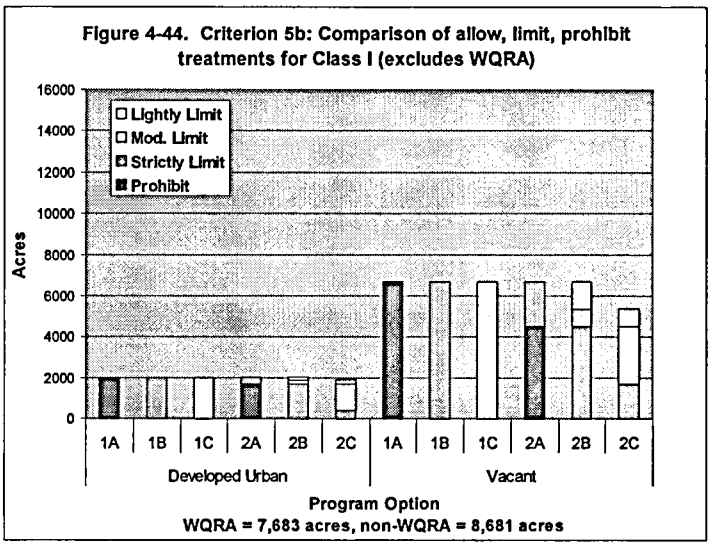


Figure 4-44. Criterion 5b: Comparison of allow, limit, prohibit treatments for Class I (excludes WQRA)

WQRA = 7,683 acres, non-WQRA = 8,681 acres

Results

Figures 4-43 and 4-44 illustrate Habitats of Concern, Class I riparian habitat, and Species of Concern, respectively. Program options that are likely to protect more at-risk habitats and species are assumed to perform better than other options.

Basic statistics: Habitats of Concern and Class I riparian

- The data illustrated by Figures 4-43 and 4-44 represent the portion of the habitat expected to be most at risk through development or redevelopment.
- The bar charts include 19,616 acres of Habitats of Concern and 8,688 acres of Class I riparian.
- Figures 4-43 and 4-44 exclude WQRA and parks from analysis for the same reasons stated in criterion 1.

Potential effects of treatments vary by habitat class, development status, and urban development value

- There are many more acres of vacant Habitats of Concern and Class I riparian than there are in developed urban. Therefore, the degree of protection afforded by each program option will have a stronger influence on vacant than on developed urban habitat.
- Where Habitats of Concern fall within Class I riparian, they are treated similarly under the various program options but where they are Class A wildlife, they receive lower protection

levels than Class I under options 2A-2C.

- This places non-riparian Habitats of Concern more at risk than riparian Habitats of Concern.

Program Option performance

- Options 1A and 1B are most protective of Habitats of Concern.
- Options 1A and 2A are most protective of riparian Class I.
- There is a larger discrepancy in protection levels between the two most protective options for Habitats of Concern than for Class I riparian.
- Options 1C and 2C are least protective for Habitats of Concern and are likely to result in substantial further loss of these depleted habitats.
- Options 2B and 2C are least protective of Class I riparian and are likely to result in substantial further loss of these depleted habitats. Option 1C is not much better.

Summary

Habitats of Concern and Class I riparian habitat are closely associated with declining or sensitive species in the region, and these habitats have declined greatly in extent and quality. It will be important to consider the relative rarity of the remaining habitats addressed in this criterion, because substantial further loss may result in regional species extirpations or potential Endangered Species Act listings. More protective options are more likely to prevent or minimize these undesirable results.

Table 4-25. Performance of options in meeting Environmental Criterion 5: Promotes biodiversity through conservation of sensitive habitats and species.

Rank	Option	Performance
1	1A	This option provides the highest protection levels for both Habitats of Concern and Class I riparian by assigning a Prohibit designation to all acres.
2 / 3	1B / 2A	Option 1B is important for Habitats of Concern, which includes more than twice as many acres as Class I riparian. However, Option 2A performs best for Class I riparian, and at a higher protection level than 1B provides Habitats of Concern.
4	2B	This option performs better than 1C or 2C for all Habitats of Concern, and for developed urban Class I riparian. However, for vacant Class I riparian it is difficult to discern whether Option 2B or 1C is more protective.
5	1C	Substantially lower protection levels, but consistent among development status and resource type, with all acres falling within Moderately Limit.
6	2C	Protection levels lowest of all options, with nine percent Allow in unprotected Habitats of Concern and 17 percent Allow in unprotected Class I riparian. Likely to result in substantial loss of sensitive habitats and sensitive species.

Evaluation of energy criteria

The analysis of energy criteria is intended to compare the potential effects of the six program options on energy use in the region. Two criteria will assist in this process:

1. Promotes compact urban form, and
2. Promotes green infrastructure.

Criteria were selected based on the findings in Metro's Technical Report for Goal 5 and Phase I ESEE analysis (Metro 2002, Metro 2003). The energy criteria discussed here are applied using data already collected in the Social, Environmental, and Economic Phase II ESEE analyses.

The summary of each criterion includes a table ranking the programs in order of performance, from most to least energy efficient as relates to each criterion. The criteria provide important new information about how each program performs relative to the others, and will aid Metro, its partners, and the public in designing an energy-efficient fish and wildlife habitat protection program.

1. Promotes compact urban form

A compact urban form conserves energy by reducing transportation related energy output and infrastructure needs, reduces the spatial extent of vegetation loss, and reduces the spatial extent of the urban heat island effect.[28] The amount of fish and wildlife habitat protected or partially protected by each regulatory program option and the zoning type and development status influence whether the option increases the need for Urban Growth Boundary expansions.

Importance of urban development priorities

The region's 2040 Growth Concept is designed to provide a compact urban form through efficient land use, a well-planned transportation system, and protection of natural areas. The second energy criterion below addresses natural area protection.

The extent to which a program option supports development priorities influences the ability to maintain a compact urban form, thus conserving energy by reducing transportation and infrastructure energy output. While program options 1A-1C consider only habitat value, program options 2A-2C incorporate the importance of land value, employment density, and the 2040 Design Types.

Importance of substitutability of lands

The Goal 5 rule requires Metro to consider the effect a Goal 5 program may have on the inventory of buildable lands. Any changes in density requirements may be difficult to reallocate within the current Urban Growth Boundary.

Some land uses can be more easily re-allocated, or substituted, to other parts of the region than other land uses. This can relate to a number of factors such as scarcity, lot size requirements, and the physical characteristics needed for certain land use types. For example, residential land

[28] See Metro's Economic, Social, Environmental and Energy Analysis (ESEE), September 2003.

comprises a majority of the region's vacant zoning and housing can be built on relatively small parcels in a variety of landscapes. As a result, residential lands to a certain extent can be flexible in how they are located on a site, and more sites may be available compared to other land use types. However, Metro cannot force existing residential neighborhoods to accommodate density increases.[29]

Conversely, industrial lands are much more difficult to relocate, and there is a regional shortage of industrial sites to meet our needs over the next 20 years. Industrial sites typically require flat terrain, access to transportation facilities, and some industrial sites need large contiguous parcels. Mixed use zoning, a highly energy efficient land use, can also be difficult to place in alternative sites if it doesn't meet market needs. Commercial land placement affects driving distance and infrastructure requirements.

Thus these land uses may be less substitutable within the existing Urban Growth Boundary than other land use types. New restrictions imposed by a program may limit the capacity for meeting housing and employment needs, and may increase energy use associated with the need for Urban Growth Boundary expansions and related transportation and infrastructure needs.

Measuring the criterion and results

As outlined above, urban development priorities and the substitutability of lands are both important to maintaining a compact urban form. Each of these is addressed in other ESEE criteria. Therefore no new data was collected for this criterion, and the results are available through other ESEE criteria:

- "Supports urban development priorities" (economic criterion 1), and
- "Reduces impact on types/location of jobs and housing" (social criterion 2).

Economic criterion 1, "Supports urban development priorities," assessed program performance for supporting urban development priorities. In descending order of performance, the program options for economic criterion 1 were ranked as follow: 1C, 2C, 2B, 1B, 2A and 1A.

Social criterion 2, "Reduces impact on types/locations of jobs and housing," assessed program performance for limiting new restrictions on vacant industrial, mixed use, and commercial lands (see figure xx in social section, "Treatment of vacant employment habitat land"). In descending order of performance, the program options for social criterion 1 ranked as follow: 2C, 1C, 2B, 1B, 2A and 1A.

Summary

Information pertaining to maintaining a compact urban form has already been assessed under economic criterion 1 and social criterion 2. The program performance for both criteria is similar but not identical, as summarized in the table below. For the energy criterion, emphasis was given to urban development priorities when program rankings differed (i.e., 2C and 1C), due to the importance of the 2040 Growth concept in regional planning.

[29] See Metro Ordinance #xxx.

Table 4-26. Performance of options in meeting Energy Criterion 1: Promotes compact urban growth form.

Rank	Option	Performance
1	1C	Provides the most support (lack of development restrictions) for lands with high urban development priorities and the second-best support for allowing development on existing vacant industrial, mixed use, and commercial lands.
2	2C	Substantial support for lands with high urban development value, and excellent support for lands with medium urban development value. Provides the best support for allowing development on existing vacant industrial, mixed use, and commercial lands.
3	2B	Good support for urban development priorities and allowing development on existing vacant industrial, mixed use, and commercial lands.
4	1B	Moderate support for maintaining a compact urban growth form. No prohibit treatments for urban development priorities, but significantly stronger impact than 2A or 1A. For vacant industrial, mixed use, and commercial lands, performs at a slightly reduced level compared to option 2A.
5	2A	Slightly less support for urban development priorities than 1B due to a small proportion of prohibit treatment. For vacant industrial, mixed use, and commercial lands, provides slightly more support than option 1B.
6	1A	Promotes compact urban form the least. Substantial restrictions possible on high urban development priorities and on development potential for existing vacant industrial, mixed use, and commercial lands.

2. Promotes green infrastructure

Trees and other vegetation reduce energy demand by moderating stream and air temperature increases, flooding, and air pollution associated with energy use.[30] Fish and wildlife habitat that are considered important or necessary to support cities and suburbs can be considered a type of infrastructure: "green infrastructure." The energy benefits provided by green infrastructure are a type of ecosystem service.

Ecosystem services may be defined as the processes and functions of natural ecosystems that sustain life and are critical to human welfare (see Evaluation of Energy, Criterion 2 for more detail). For example, trees help clean air and water, and wetlands and floodplains store water and help avert flooding. When ecosystem services are removed or diminished, a common alternative is to implement technological surrogates such as stormwater piping or water purification systems. Such solutions tend to require more energy than preserving existing green infrastructure and ecosystem functions.

Measuring the criterion and results

The amount of fish and wildlife habitat protected or partially protected by each program option, as well as the value of that habitat, help determine whether the option protects the energy-related green infrastructure and ecosystem services provided by trees, other vegetation, wetlands and floodplains. Green infrastructure and ecosystem services are strongly related.

This criterion is best assessed using a combination of three criteria from the environmental and economic ESEE:

- "Promotes retention of ecosystem services" (economic criterion 2);

[30] See Metro's Economic, Social, Environmental and Energy Analysis (ESEE), September 2003.

Nature in Neighborhoods pavilion staff schedule

NN Pavilion Staffing				
Friday, May 13 event set-up				
7 a.m. to 10 a.m.	Stage Right setting up backdrop displays, water feature, kiosks, etc. (Gina Whitehill-Baziuk)			
10 a.m. to 2 p.m.	Gina Whitehill Baziuk, Janice Larson, Karen Withrow, Marlon Warren, Mark Bosworth, Terry Asbun or Bill Stratton (OCC IT), Chari			
3 p.m.	volunteer training at booth at OCC			
	Saturday, May 14 (event open 10-6)		**Sunday, May 15 (event open 10-5)**	
	10 a.m.-2 p.m.	2 p.m.-6 p.m.	10 a.m.-2 p.m.	2 p.m.-5 p.m.
EVENT MANAGER	Gina	Gina	Gina	Gina
At Home				
lead: Jan O'Dell				
At Home salesperson	KB/10-1 Brian Newman	Jan	Lisa	Lisa
At Home greeter	Lisa	Lisa	Paul (intern)	Paul (intern)
Next Door				
lead: Heather/Lia	Heather	Heather	Heather	Heather
Next Door salesperson	Lia	Lia	Lia	Lia
Next Door greeter	9:30-12:30 Janelle Geddes	12-3 Rachel Fox/3-6 Howard Rasmussen	9:30-12:30 Jim Morgan	12-2:30 Monty Woods/2:30-5:30 Jeff Tucker
Next Door greeter	9:30-12:30 William Eadie	12-3 Rick Scrivens/3-6 Howard R.	9:30-12:30 Sue Lowe	2:30-5:30 Angie Kimpo
Next Door greeter	9:30-1:30 Susan Wells	1-6 Dennis Manzer		
Next Door greeter	9:30-1:30 Julianna Tennent	1-6 Kate Lokken		
By Design				
lead: Karen Withrow				
By Design salesperson	KW	KW	KW	KW
Interactive map assistant	Malu	Justin	Steve E.	Lori
Case studies staff	Chris	Lori	Paul	Chris
Flythrough navigator	Pam Peck	KK	**open**/(KK 12-2??)	Mark B.
Metro Councilor	Susan McLain	Susan McLain	10-1 Susan/1-2 Carl	2-3 Carl/**open**
Tualatin Basin staff	(5/4 Anne Madden to fill and call/email KW)			
Whole Display				
greeter	Kate Marx	Kate Marx	Kate Marx	2:30 - 5 Marilyn
greeter	Cheryl	Pam Peck	MJ	MJ
Tours				
OCC grounds, 11 a.m.			Deb Scrivens	
OCC grounds, 12:30 p.m.			Deb Scrivens	
OCC grounds, 2 p.m.			Deb Scrivens	
Workshops/Kids Area				
Saturday - Backyard Birds, noon - 12:45 p.m.			James Davis	
Saturday - Colorful World of Metro Recycled Latex Paint, 1 - 1:45 p.m.			Paulette Rossi	VCR/TV NEEDED
Saturday - Natural Gardening Tips, 2 - 2:45 p.m.			Glen Andresen	
Saturday - Backyard Birds, 3 - 3:45 p.m.			James Davis	
Sunday - Colorful World of Metro Recycled Latex Paint, 1 - 1:45 p.m.			Paulette Rossi	VCR/TV NEEDED
Sunday - Home Composting Tips, 2 - 2:45 p.m.			TV/VCR	VCR/TV NEEDED
Saturday - kids puppet show, noon - 1 p.m.		Recycleman & the Dumpster Divers		

- "Conserves existing watershed health and restoration opportunities (environmental criterion 1); and
- "Retains multiple functions provided by forest canopy cover (environmental criterion 2).

This combination of criteria appropriately addresses energy concerns. No new data was collected, and the detailed results are available through the relevant criteria in the environmental and economic sections.

Ecosystem services are addressed in economic criterion 2, "Promotes retention of ecosystem services." In that criterion, areas with more ecological functions and/or areas with functions closer to streams, wetlands, or floodplains ranked higher than areas with fewer functions or with functions further away from water features. Economic criterion 2 ranked identically to environmental criterion 1: 1A, 2A, 1B, 2B, 2C, and 1C.

Although green infrastructure is addressed in all environmental criteria environmental criterion 1, "Conserves existing watershed health and restoration opportunities" and criterion 2, "Retains multiple functions provided by forest canopy cover," are particularly relevant to energy use. These are the resources that protect existing ecosystem functions.

Environmental criterion 1 assesses the performance of program options in conserving existing watershed health and restoration opportunities based on protection levels for fish and wildlife habitat. In descending order of performance, the program options for environmental criterion 1 were ranked as follow: 1A, 2A, 1B, 2B, 2C, and 1C.

Environmental criterion 2 estimates how well each program option would protect existing forest canopy cover, identified in the Phase I ESEE analysis as a key energy-related feature. This is an important separate measure because although all forest is ecologically important to the region, not all forest ranks as high-value fish and wildlife habitat. In descending order of performance, the program options for environmental criterion 2 ranked as follow: 1A, 1B, 2A, 2B, 2C, and 1C.

Summary

Information pertaining to retaining green infrastructure and ecosystem services has already been assessed under economic criterion 1 and environmental criteria 1 and 2. The program performance for all three criteria is similar but not identical, as summarized in the table below.

Table 4-27. Performance of options in meeting Energy Criterion 2: Promotes green infrastructure.

Rank	Option	Performance
1	1A	Provides the most protection for all habitats and best protection to forest canopy cover and ecosystem services.
2	2A	Protection level substantial for high-value riparian habitat, and good for other habitat classes. Ecosystem services also reflect this ranking. However, 1B provides better protection for upland wildlife habitat. Options 2A and 1B fairly similar for forest canopy.
3	1B	Substantially reduced protection for all riparian habitat compared to 1A and 2A. Ecosystem services also reflect this ranking. For wildlife habitat, performs better than 2A. For forest canopy, fairly similar to option 2A.
4	2B	Options 2B, 2C and 1C ranked identically for habitat, tree canopy, and ecosystem service protection. Moderate performance for higher riparian and wildlife classes, but protection drops significantly for lower habitat classes. Similar findings for forest canopy and ecosystem services.
5	2C	Places nearly 40 percent of all forest canopy at risk through low or no protection levels. Low protection levels for all resources. May result in substantial loss of riparian and upland habitat functions, ecosystem services, and forest canopy over time.
6	1C	Places nearly half of all forest canopy at risk through low or no protection levels. Low protection levels for all resources. Most likely to result in substantial loss of riparian and upland habitat functions, ecosystem services, and forest canopy over time.

Evaluation of federal Endangered Species Act

The Endangered Species Act's (ESA's) ultimate goal is to recover species and conserve the ecosystems upon which they depend so they no longer need regulatory protection. Twelve salmon species or runs are listed as either threatened or endangered in the Columbia River and Willamette River basins. The National Oceanic and Atmospheric Administration (NOAA) Fisheries is the federal agency responsible for these species.

The U.S. Fish and Wildlife Service (FWS) has jurisdiction over terrestrial species and aquatic species that spend the majority of their life cycle in fresh water. Listed species under their jurisdiction that currently or historically occurred in the Metro region include bald eagle, bull trout, golden Indian paintbrush, Willamette daisy, water howellia, Bradshaw's lomatium, Kincaid's lupine, and Nelson's checker-mallow. The FWS was petitioned to list pacific lamprey, western brook lamprey and river lamprey in January 2003; processing of the petition has not yet been completed and is currently on hold. Additionally, several candidate species and species of concern are also known to occur in the Metro region. Although these species do not currently receive ESA regulatory protection, efforts to conserve these species may help to sustain existing populations and preclude the need for future listings.

Will a Metro fish and wildlife habitat protection program meet the ESA? There is no clear answer, because program details are not yet developed and it is not possible to fully predict the outcome of any program. It is also worth noting that the full suite of factors that affect the habitats upon which these species depend will not all be addressed in Metro's Goal 5 program. For example, stormwater runoff can have significant impacts on stream health and channel complexity, but Goal 5 is not designed to explicitly or comprehensively address stormwater management.

However, the Goal 5 program will help to define the types of land uses that will be allowed within and near regionally significant habitats, ultimately determining the degree to which these habitats and their ecological functions are conserved over time. The program's non-regulatory components, particularly the degree of investment in restoration, will also play a key role. An effective Metro program that provides adequate species protection could provide a template that could serve as a model for local jurisdictions to come into ESA compliance, and may also contribute to efforts designed to prevent future ESA species listings.

The federal ESA portion of this phase of the ESEE analysis is intended to compare the potential effects of the six program options on listed fish and wildlife and related species of conservation interest such as the three species of lamprey that have been petitioned for listing. Three criteria will assist this process:

1. Protects slopes, wetlands, and areas of high habitat value;
2. Maintains hydrologic conditions; and
3. Protects riparian functions.

These criteria provide important information about how each program performs relative to the others in protecting habitats and watershed health, and will aid Metro, its partners, and the public

determine the general consequences to fish and wildlife species under each program.

1. Protects slopes, wetlands and areas of high habitat value

Steep slopes are vulnerable to erosion and landslides that can negatively affect aquatic resources, particularly when trees and other vegetation are removed.[31] Wetlands provide important off-channel rearing habitat for young salmon and functions important to stream health. They also provide key habitat for many of the region's other known at-risk species – for example, bald eagles, northern red-legged frogs, northwestern pond turtles, and numerous neotropical migratory bird species[32]. At-risk species relate to the ESA because if they continue to decline, they may become future candidates for ESA listings. Habitats of Concern include wetlands, riparian bottomland forest, stands of Oregon white oak, native grassland, important migratory pathways, and other critical habitats that potentially support listed plants and animals, as well as numerous other at-risk species. Large habitat patches retain higher habitat quality than smaller patches and provide homes to species most sensitive to human disturbance, such as neotropical migratory songbirds[33], and maintaining the connections between these valuable habitats is vital to supporting the region's sensitive species over time.

Measuring the criterion

Steep slopes are addressed in Metro's riparian GIS model as a primary and secondary functional contributor to Bank Stabilization, Sediment and Pollution Control. Wetlands receive primary functional value in the riparian model under the Streamflow Moderation and Water Storage and Bank Stabilization, Sediment and Pollution Control criteria, and are also captured under Class I riparian as Habitats of Concern. Areas of highest habitat value, including all Habitats of Concern and most large habitat patches, are captured under Class I riparian and Class A wildlife habitat. In addition, large habitat patches were specifically addressed in environmental criterion 2. Thus, this criterion is best assessed using a combination of criteria from the Environmental ESEE:

- Class I riparian and Class A wildlife habitat derived from the criterion entitled "Conserves existing watershed health and restoration opportunities" (environmental criterion 1);
- Promotes riparian corridor continuity and overall habitat connectivity (environmental criterion 3);
- Conserves habitat quality and biodiversity provided by large habitat patches (environmental criterion 2); and
- Promotes biodiversity through conservation of sensitive habitats and species (environmental criterion 5).

Results

The data tables and graphs associated with this criterion are available in the Environmental ESEE section. Option 1A provides the most protection for this criterion, but Options 2A and 1B

[31] The ecological damage associated with excess sediments entering streams is described in Metro's Technical Report for Goal 5 (Metro 2002) and Phase I ESEE report (Metro 2003).
[32] See Metro's species list for at-risk species and their general habitat associations.
[33] Neotropical migratory songbirds have been identified by ODFW as an at-risk group of species. Local studies (Hennings and Edge 2003) confirm that Neotropical migrants are negatively associated with urbanization.

also provide substantial protection. Option 2B provides a moderate level of protection. Options 2C and 1C are least likely to protect sensitive species over time, because substantial habitat and connectivity may be lost.

Table 4-28. Performance of options in meeting ESA criterion 1: Protects slopes, wetlands, and areas of high habitat value.

Rank	Option	Performance
1	1A	Most protective of all variables assessed. Best option for protecting slopes, wetlands, and areas of high habitat value; most likely to reduce need for future ESA listings.
2 / 3	2A / 1B	Option 2A is second-most protective for Class I habitat, promoting overall connectivity. Option 1B is second-most protective for Class A habitat and large patches. Options 2A and 1B are similar in terms of protecting sensitive habitats and species.
4	2B	Incrementally less protection for all variables assessed. Options 2A and 2B are similar in terms of protecting Class A habitat.
5	2C	Ranks fifth for Class A, overall connectivity, and large patches. Ranks sixth for Class I and sensitive habitats. More likely to result in species depletion or loss over time, and may increase future ESA listings.
6	1C	Minimal protection for Class A, overall connectivity, and large patches. Ranks fifth for Class I and sensitive habitats. Most likely to result in species depletion or loss over time, and may increase future ESA listings.

2. Maintains hydrologic conditions

Hydrology, in part, refers to how water is delivered to streams and rivers during storms. Under natural hydrologic conditions in the Pacific Northwest, rainwater movement to streams is slowed and retained by trees, plants, wetlands, floodplains and soils. When these natural features are altered or removed and hard (impervious) surfaces are installed, rainwater is delivered quickly, in high volumes, to streams and rivers. This causes channel damage, excessive flooding, groundwater depletion, and alters habitat such that animals adapted to natural conditions are sometimes no longer able to survive there. Altered hydrology has strongly, negatively impacted the region's threatened salmon and other native aquatic species including lamprey.

All habitat in Metro's inventory is important to maintaining hydrologic conditions. In this naturally forested region, trees are particularly important to hydrology because they slow and store large quantities of stormwater.[34]

Measuring the criterion

This criterion is best assessed using a combination of criteria from the Environmental ESEE:

- "Conserves existing watershed health and restoration opportunities" (environmental criterion 1), and
- Retains multiple functions provided by forest canopy cover (environmental criterion 2).

[34] Metro's field studies showed that the amount of tree cover, both near streams and throughout watersheds, is positively associated with stream health (Frady et al. 2002).

Results

The data tables and graphs associated with this criterion are available in the Environmental ESEE section. Option 1A provides the most protection for this criterion, but Options 2A and 1B also provide substantial protection. Options 2C and 1C are least likely to protect sensitive species over time, because substantial habitat and connectivity may be lost. Less protective options may lead to an increase in future ESA species listings.

Table 4-29. Performance of options in meeting ESA criterion 2: Maintains hydrologic conditions.

Rank	Option	Performance
1	1A	This option provides the most protection and restoration opportunities for existing fish and wildlife habitat, and therefore provides the strongest regulatory approach to maintain current hydrologic conditions.
2 / 3	2A / 1B	Option 2A ranks second for conserving existing watershed health and restoration opportunities, but ranks third for retaining forest canopy cover. Both options could aid in maintaining hydrologic conditions, depending on the amount of habitat retained and whether new trees and habitat are added over time.
4	2B	Ranks fourth for conserving watershed health and restoration opportunities, as well as for conserving forest canopy. Unlikely to maintain hydrologic conditions over time without substantial non-regulatory investments.
5	2C	Ranks fifth for conserving watershed health and restoration opportunities, as well as for conserving forest canopy. Unlikely to maintain hydrologic conditions over time, even with substantial non-regulatory investments. Strong likelihood for increased harm to salmon habitat and increased potential for future ESA species listings.
6	1C	Ranks last for conserving watershed health and restoration opportunities, as well as for conserving forest canopy. Unlikely to maintain hydrologic conditions over time due to extensive loss of existing resources and loss of restoration opportunities. Strong likelihood for increased harm to salmon habitat and increased potential for future ESA species listings.

3. Protects riparian functions

Metro's extensive review of the scientific literature revealed that ecological functions are not limited to the areas nearest the stream. Existing riparian habitat areas protect water quality and provide key habitat to many of the region's at-risk species, including those living on the land or in water. Due to the extent of riparian habitat loss over time, all remaining riparian areas are important to stream health. Lower value areas not only contribute to watershed function, but also provide key restoration opportunities that may help improve watershed health and offset detrimental effects from future development elsewhere in the watershed.

Measuring the criterion

This criterion is derived from the riparian corridor portion of the criterion entitled "Conserves existing watershed health and restoration opportunities" (environmental criterion 1). It measures the amount of riparian habitat affected by allow, limit, prohibit treatments under each program option. Class I riparian receives special consideration in Table 4-29 due to the multiple ecological functions provided in these high-value areas.

Results

The data tables and graphs associated with this criterion are available in the Environmental ESEE section. It is important to note that no matter which option is selected, riparian habitat

may be lost and remaining habitat degraded over time due to continued development within the UGB and the urban effects associated with development, such as increased runoff and decreased water quality. The extent to which a program protects riparian function depends, in part, on non-regulatory program elements such as restoration in existing resources and new habitat creation in key areas of importance.

Option 1A provides the most protection for all riparian habitat. Option 2A provides less protection for habitat within one site potential tree height, and Option 1B is a substantial step downward in protection levels. Option 2B is slightly less protective of riparian habitat than Option 1B. Option 2C provides a substantially reduced level of protection for Class I and II habitat, and very little protection for Class III. Option 1C provides low level protection for Class I and II, and no protection at all for Class III riparian; this option is least likely to protect riparian functions. Options 1C and 2C are unlikely to protect existing sensitive species, and will likely result in future ESA listings over time as riparian habitat is lost or damaged.

Table 4-30. Performance of options in meeting ESA criterion 3: Protects riparian corridors

Rank	Option	Performance
1	1A	Most likely to retain existing riparian function and watershed health. Class I and II habitat in prohibit designation, and Class III in strictly limit. Most likely to help conserve sensitive species and aid in preventing future ESA listings.
2	2A	Incrementally less protection for riparian habitat, but generally still good protection levels for Class I and II. Protection drops significantly for Class III, with the majority in lightly limit designation.
3	1B	Substantially less protection compared to Options 1A and 2A. Class III riparian in appears to be particularly vulnerable, with lightly limit designations.
4	2B	Incrementally less protection than previous options. Moderate loss of high-value riparian habitat likely, with potential for negative effects on sensitive species. Protection levels drop off significantly for Class III habitat, with primarily lightly limit designation, similar to option 2A. May increase potential for future ESA listings.
5	1C	Class I receives moderately limit, Class II lightly limit, and Class III receives allow designations. Less likely to protect existing sensitive species than options above. May result in substantial loss of riparian habitat and increases potential for future additional ESA listings.
6	2C	Poor protection for riparian habitat. Least likely to protect existing sensitive species. Most likely to lead to future ESA listings.

Evaluation of federal Clean Water Act

The federal Clean Water Act (CWA) sets a national goal to "restore and maintain the chemical, physical and biological integrity of the Nation's waters." In Oregon, the Department of Environmental Quality (DEQ) implements the CWA, with review and approval by the U.S. Environmental Protection Agency.

The DEQ is responsible for protecting the beneficial uses of rivers, streams and lakes of the state. The DEQ carries out this responsibility in part by identifying those water bodies that are not meeting current water quality standards. This inventory is known as the 303(d) list. For waters identified on the 303(d) list, DEQ must develop total maximum daily loads (TMDLs) for those pollutants that exceed water quality standards. The TMDLs become part of implementation plans at the watershed scale intended to meet water quality standards. In urban areas, local governments are often the parties responsible for such plans, with input from watershed councils, landowners and other stakeholders.

The DEQ recently informed Metro Council that a Goal 5 program that provides shading, pollutant removal, and infiltration could protect and restore fish and wildlife habitat and help meet water quality standards in the Willamette and Tualatin Basins. Retaining fish and wildlife habitat, and the ecological functions these areas provide, is less expensive than constructing water quality treatment facilities. Potentially, the amount of Goal 5 resources preserved for protection and restoration may be an important management measure in a watershed's TMDL implementation plan.

The federal CWA criterion compares the potential effects of the six program options on the importance of fish and wildlife habitat to the region's water quality. Four criteria will assist this process:

1. Protects steep slopes and wetlands;
2. Protects resources within 150 feet of streams;
3. Maintains hydrologic conditions (see ESA criterion 2); and
4. Protects forested areas throughout the watershed.

Some of the criteria used to assess program performance related to the CWA are similar to those assessed for the federal ESA, because existing fish and wildlife habitat also protects water quality. These criteria provide important information about how each program performs relative to the others, and will aid Metro, its partners, and the public in determining the relative consequences to water quality under each program.

1. Protects slopes and wetlands

Steep slopes are vulnerable to erosion and landslides, particularly when trees and other vegetation are removed.[35] Wetlands collect and treat soil runoff and help control stream bank erosion to help meet turbidity, sedimentation, and nutrient TMDLs. Wetlands collect and treat

[35] The ecological damage associated with excess sediments entering streams is described in Metro's Technical Report for Goal 5 (Metro 2002) and Phase I ESEE report (Metro 2003).

pesticides, heavy metals, and other toxic pollutants to help meet TMDLs for these pollutants. Wetlands also collect and store water to provide base flow in streams during summer low-flow months, which helps meet temperature TMDLs.

Measuring the criterion

Steep slopes are addressed in Metro's riparian GIS model as a primary and secondary functional contributor to Bank Stabilization, Sediment and Pollution Control. Wetlands receive primary functional value in the riparian model under the Streamflow Moderation and Water Storage, Bank Stabilization, Sediment and Pollution Control, and are also captured as Class I riparian as a Habitat of Concern.

This criterion is best assessed using a subset of one of the criteria from the Environmental ESEE. Class I and Class II riparian habitat derived from the criterion entitled "Conserves existing watershed health and restoration opportunities" (environmental criterion 1) captures all wetlands and the majority of vegetated steep slopes near streams. As in the ESA criteria, the extent to which restoration is included as part of any Goal 5 program will help determine its effectiveness in protecting water quality.

Results

The data tables and graphs associated with this criterion are available in the Environmental ESEE section and associated appendices. Option 1A provides the most protection for Class I and II riparian habitat. Option 2A provides incrementally less. Options 1B and 2B fall in the middle. Options 1C and 2C perform poorly in protecting these habitat areas, and are likely to result in future 303(d) listings and TMDL requirements due to unprotected steep slopes and wetland areas.

Table 4-31. Performance of options in meeting CWA criterion 1: Protects slopes and wetlands.

Rank	Option	Performance
1	1A	Highest protection level for all Class I and Class II riparian habitat; most likely to protect steep slopes and wetlands. **For every program option, restoration will still be needed to meet temperature and other standards.**
2	2A	Excellent protection for Class I habitat. Good protection for Class II habitat, but definitely a step downward from 1A, with about two thirds of Class II in moderately limit designations and the remainder in Lightly Limit. Where steep slopes occur in Class II, may increase erosion and sedimentation and degrade water quality.
3	1B	Incrementally less protection for Class I and Class II habitat.
4	2B	Somewhat less protection for Class I and II habitat compared to Option 1B, but most habitat areas still receive strictly or moderately limit designations.
5	1C	Substantially reduced protection for steep slope areas and wetlands. Likely to result in non-compliance for existing TMDLs and future 303(d) listings and TMDL requirements.
6	2C	Poor protection for Class I resources (particularly in Developed Urban areas), and dismal protection for Class II. Highly likely to result in degraded water quality, non-compliance for existing TMDLs, and increased future 303(d) listings and TMDL requirements.

2. Protects resources within 150 feet of streams

The importance of riparian areas in maintaining water quality is well documented.[36] These areas provide shading to help meet temperature TMDLs, collect and treat soil runoff, and control stream bank erosion to help meet turbidity, sedimentation, and nutrient TMDLs. Riparian areas collect and treat bacteria in runoff to help meet bacteria TMDLs and collect and treat pesticides, heavy metals, and other toxic pollutants to help meet TMDLs for these pollutants. Like wetlands (and generally including wetlands), riparian areas collect and store water to provide base flow in streams during summer low-flow months, helping to meet temperature TMDLs.

Measuring the criterion

This criterion is assessed using the riparian corridor continuity portion of the criterion entitled "Promotes riparian corridor continuity and overall habitat connectivity" (environmental criterion 3a). It measures the amount of habitat within 150 feet of streams affected by allow, limit, prohibit treatments under each program option.

Results

The data tables and graphs associated with this criterion are available in the Environmental ESEE section. Option 1A provides the most protection for Class I and II riparian habitat. Option 2A, 1B and 2C provide incrementally less protection for areas within one site potential tree height, respectively. Options 1C and 2C perform very poorly in protecting these habitat areas, and are likely to result in future 303(d) listings and TMDL requirements due to habitat loss closest to streams, as well as non-compliance with existing TMDLs.

Table 4-32. Performance of options in meeting CWA criterion 2: Conserves habitat within 150 feet of streams.

Rank	Option	Performance
1	1A	Excellent performance for conserving existing habitat within 150 feet of streams, with primarily Prohibit plus some Strictly Limit designations. This option is most likely to assist in meeting current TMDLs and preventing future non-compliance issues. **For every program option, restoration will still be needed to meet temperature and other standards.**
2	2A	Substantial step downward from 1A, but still good protection levels. About half of the habitat within 150 feet of streams receives Prohibit treatment, with the remainder falling within the three degrees of limit. Loss of any habitat within this zone, particularly without restoring key areas, is likely to decrease water quality and increase CWA non-compliance issues.
3	1B	Incremental step downward from Option 2A. Increases likelihood of water quality issues and CWA non-compliance.
4	2B	Relatively small step downward from Option 1B, with similar repercussions possible.
5	1C	Very poor protection for near-stream habitat. Unlikely to conserve existing resources or retain restoration opportunities within 150 feet of streams. Highly likely to degrade water quality, resulting in non-compliance with current TMDLs and necessitating future 303(d) and TMDL listings.
6	2C	Similar to Option 1C, but slightly worse.

[36] See Metro's Technical Report for Goal 5 (Metro 2002) and Phase I ESEE Report (Metro 2003).

3. Maintains hydrologic conditions

This criterion is described and measured in ESA criterion 2. Altered hydrology is a leading cause of degraded water quality. The key negative effects associated with altered hydrology are described in Metro's Technical Report for Goal 5 and Phase I ESEE documents (Metro 2002, 2003). Program options for this criterion rank as follow, from best to worst in terms of maintaining hydrologic conditions: 1A, 2A/1B, 2B, 2C, and 1C.

4. Protects forested areas throughout the watershed

Trees are vitally important to the region's water quality, as demonstrated through local studies and as recognized by DEQ.[37] Trees provide infiltration to recharge both groundwater and down gradient streams, providing base flow for streams during summer low-flow months and helping to meet temperature TMDLs. Trees are especially effective in reducing sedimentation and erosion, runoff speed and volume, excess nutrients, and water temperature, thereby helping to meet nutrient, sediment, turbidity, and temperature TMDLs.

Measuring the criterion

This criterion is measured using Environmental criterion 2, "Retains multiple functions provided by forest canopy cover."

Results

The data tables and graphs associated with this criterion are available in the Environmental ESEE section. Option 1A provides the most protection for the region's upland and riparian forests. Option 1B provides substantially less protection, with Option 2A close behind. Options 1B and 2B fall in the middle. Option 2C performs very poorly in protecting forest canopy, and is likely to result in future 303(d) listings and TMDL requirements due to unprotected steep slopes and wetland areas.

[37] Metro's field studies showed that the amount of tree cover, both near streams and throughout watersheds, is positively associated with stream health (Frady et al. 2002).

Table 4-33. Performance of options in meeting CWA criterion 4: Protects forest canopy throughout the watershed.

Rank	Option	Performance
1	1A	Protects by far the most canopy cover of any other program option for vulnerable forested lands in both vacant and developed lands. This option is most likely to aid in current Clean Water Act compliance and help prevent future 303(d) listings and TMDL requirements. **For every program option, restoration will still be needed to meet temperature and other standards.**
2	1B	Substantially less protection than option 1A, but still performs better than the remaining options. However, options 1B and 2A appear relatively close in terms of potential effects on the region's forest canopy, and therefore, water quality. No Allow designations mean that all forested habitat would be afforded at least some level of protection.
3	2A	Similar to 1B, with slightly less protection.
4	2B	Little Allow, but overall protection levels lower than options 1B and 2A. Potential for significant forest loss and increased water quality issues.
5	2C	Low protection levels for forest canopy, with 38 percent of vacant and developed urban in Lightly Limit or Allow. Likely to result in significant forest canopy loss over time. Highly likely to degrade water quality, resulting in non-compliance with current TMDLs and likely necessitating future 303(d) and TMDL listings.
6	1C	Low protection levels for forest canopy, with 47 percent of vacant and developed urban in Lightly Limit or Allow. Likely to result in significant forest habitat loss over time. Highly likely to degrade water quality, resulting in non-compliance with current TMDLs and likely necessitating future 303(d) and TMDL listings.

Summary of analysis of regulatory options

Metro's analysis of the six regulatory program options against the 19 criteria provides a substantial amount of information for the Metro Council to use in their consideration of a program direction for protecting fish and wildlife habitat. Generally, the options that protect more habitat (Options 1A and 2A) perform similarly across criteria. The option that least protects the highest value habitat (Option 1C) and the option with the lowest level of protection for habitat in industrial areas and centers (Option 2C) also perform similarly. However, Option 2C favors factors important for urban development by focusing on the economic concerns, while Option 1C reduces protection equally for all land uses. Table 4-34 summarizes the analysis.

Table 4-34. Summary of program option analysis.

Criteria	Option 1A: Most habitat protection *Highest level of protection for all habitats*	Option 1B: Moderate habitat protection *High level of protection for highest value habitat, moderate protection for other habitats*	Option 1C: Least habitat protection *Moderate level of protection for higher value habitats, no protection for lowest value habitat*	Option 2A: Most habitat protection *Moderate level of protection in high urban development value areas, high level of protection in other areas*	Option 2B: Moderate habitat protection *Low level of protection in high urban development value areas, moderate level of protection in other areas*	Option 2C: Least habitat protection *No protection in high urban development value areas, moderate level of habitat protection in other areas*
Economic factors						
1. Supports the regional economy by providing development opportunities (such as residential, commercial, industrial)	**Ranks 6th**: Provides least development opportunities due to highest levels of habitat protection on residential, commercial and industrial lands.	**Ranks 4th:** Provides some development opportunities for residential, commercial and industrial.	**Ranks 2nd**: Provides substantial development opportunities for all types of development.	**Ranks 5th**: Provides minimal development opportunities because residential development in some high value habitat is prohibited.	**Ranks 3rd**: Provides moderate development opportunities due to less habitat protection in all commercial and industrial areas and some residential land.	**Ranks 1st**: Provides most development opportunities due to relaxed habitat protection; provides more development opportunities in commercial and industrial areas than in residential areas.
2. Supports economic values associated with ecosystem services (such as flood control, clean water, recreation, amenity values)	**Ranks 1st**: Retains most existing ecosystem services across all habitat classes. Highest protection for habitat.	**Ranks 3rd**: Retains moderate ecosystem services with moderate protection to high value habitat.	**Ranks 6th**: Retains least ecosystem services overall for all habitat classes.	**Ranks 2nd**: Retains substantial ecosystem services with strict protection to high and medium value stream corridors.	**Ranks 4th**: Retains some ecosystem services. Applies moderate protection to stream corridors but higher protection to upland wildlife habitat.	**Ranks 5th**: Retains minimal ecosystem services due to relaxed protection in areas with high and medium development value.
3. Promotes recreational use and amenities	**Ranks 1st**: Promotes the most recreational benefits by prohibiting development in highest quality habitat lands.	**Ranks 3rd**: Provides moderate recreational benefits by applying relatively strong protection to the highest value habitats.	**Ranks 6th**: Provides least recreational benefits because it applies only moderate protection to highest value habitat.	**Ranks 2nd**: Promotes substantial recreational benefits of stream corridors, does not apply same protection to wildlife habitat.	**Ranks 4th**: Promotes some recreational benefits, mostly on park land.	**Ranks 5th**: Promotes minimal recreational benefits mostly on park land.
4. Distribution of economic tradeoffs	**No rank:** Privately-owned habitat land bears greater proportion of highest protection than publicly-owned habitat.	**No rank**: Privately-owned and publicly-owned land bears equal proportion of highest protection.	**No rank:** Privately-owned and publicly-owned land bears equal proportion of highest protection.	**No rank:** Publicly-owned habitat land bears greater proportion of highest protection than privately-owned habitat land.	**No rank:** Publicly-owned habitat land bears greater proportion of highest protection than privately-owned habitat land.	**No rank:** Publicly-owned habitat land bears greatest proportion of highest protection.
5. Minimizes need to expand the urban growth boundary (UGB) and increase development costs.	**Ranks 6th**: Affects the need to expand the UGB the most; highest level of protection restricts development.	**Ranks 4th**: Moderately affects the need to expand the UGB because of restrictive protection levels.	**Ranks 1st**: Least need to expand UGB; lowest protection levels provide most development opportunity.	**Ranks 5th**: Substantially affects need to expand the UGB because of restrictive protection levels.	**Ranks 3rd**: Some need to expand UGB but less restrictive protection.	**Ranks 2nd**: Minimal need to expand the UGB because low level of protection provides development opportunity.
Social factors						
6. Minimizes impact on property owners	**Ranks 6th**: Affects the most property owners with the highest level of habitat protection regardless of zoning.	**Ranks 4th**: Moderately affects all property owners, but does not apply highest habitat protection anywhere.	**Ranks 1st**: Affects the least number of property owners and applies lower levels of habitat protection.	**Ranks 5th**: Substantially affects large number of property owners with strong protection, especially in residential and rural areas.	**Ranks 3rd**: Affects some business landowners with moderate protection, but high protection is applied to residential and rural owners.	**Ranks 2nd**: Minimally affects business landowners, but many residential and rural property owners are affected with lower levels of protection.
7. Minimizes impact on location and choices for housing and jobs	**Ranks 6th**: Most effect on the location and choices available for jobs and housing by	**Ranks 4th**: Moderate effect on the location and choices available for jobs and housing,	**Ranks 2nd**: Minimal effect on housing location and choices, some effect on job location	**Ranks 5th**: Substantial effect on housing location and choices, moderate effect on	**Ranks 3rd**: Some effect on job location and choices, moderate effect on housing	**Ranks 1st**: Least effect on job location and choices, minimal effect on housing location and

Criteria	Option 1A: Most habitat protection *Highest level of protection for all habitats*	Option 1B: Moderate habitat protection *High level of protection for highest value habitat, moderate protection for other habitats*	Option 1C: Least habitat protection *Moderate level of protection for higher value habitats, no protection for lowest value habitat*	Option 2A: Most habitat protection *Moderate level of protection in high urban development value areas, high level of protection in other areas*	Option 2B: Moderate habitat protection *Low level of protection in high urban development value areas, moderate level of protection in other areas*	Option 2C: Least habitat protection *No protection in high urban development value areas, moderate level of habitat protection in other areas*
	applying high protection levels to all habitats.	applies a medium protection level to residential and employment land.	and choices. Applies lower protection levels to all land regardless of zoning.	job location and choices. Applies high protection levels to residential land, medium protection levels to most employment land.	location and choices. Applies lower protection levels to employment land, moderate protection levels to residential land.	choices. Applies lowest protection levels to employment land, moderate protection levels to residential land.
8. Preserves habitat for future generations	**Ranks 1st:** Preserves the most habitat for future generations by applying high levels of protection to all habitats.	**Ranks 3rd:** Preserves a moderate amount of habitat for future generations, focuses protection on higher value habitats.	**Ranks 6th:** Preserves the least amount of habitat for future generations, applies lower level of protection to higher value habitats.	**Ranks 2nd:** Preserves a substantial amount of habitat for future generations. Higher protection levels applied to highest value stream corridors, moderate and high protection applied to other habitats.	**Ranks 4th:** Preserves some habitat for future generations. Applies some protection to highest value habitats and moderate protection to other habitats.	**Ranks 5th:** Preserves a minimal amount of habitat for future generations. Habitat in areas of high urban development value is not preserved, habitat in other areas receives low and moderate protection.
9. Maintains cultural heritage and sense of place	**Ranks 1st:** Provides the most protection for the highest value habitat, highest level of protection may result in need for expanding the UGB.	**Ranks 3rd:** Provides moderate protection for highest value habitat, less potential for expanding the UGB.	**Ranks 6th:** Provides the least protection to highest value habitat, habitat outside UGB at less risk.	**Ranks 2nd:** Provides substantial protection to highest value habitat, a small portion in high urban development value areas receive moderate protection.	**Ranks 4th:** Provides some protection to highest value habitat; applies low protection to habitat in high urban development value areas.	**Ranks 5th:** Provides minimal protection to highest value habitat, habitat in high urban development values receives no protection.
10. Preserves amenity value of resources (quality of life, property values, views)	**Ranks 1st:** Retains the most amenity value in the highest value habitats.	**Ranks 3rd:** Retains moderate level of amenity value in the highest value habitats.	**Ranks 6th:** Retains least level of amenity value in wildlife habitat, slightly more in stream corridors.	**Ranks 2nd:** Retains substantial amenity value in highest value habitats, more protection for streams than upland habitat.	**Ranks 4th:** Retains some level of amenity value in highest value habitat, more protection for streams than upland habitat.	**Ranks 5th:** Retains a minimal level of amenity value, highest value wildlife habitat receives more protection.
Environmental factors						
11. Conserves existing watershed health and restoration opportunities	**Ranks 1st:** Preserves most high value habitat; provides substantial protection to other habitats.	**Ranks 3rd:** Preserves moderate amount of all habitats; higher protection for highest value habitat.	**Ranks 6th:** Preserves least amount of habitat; moderate protection for higher value habitat; no protection for lowest value habitat.	**Ranks 2nd:** Preserves substantial amount of habitat. Highest protection levels for most high value habitat, moderate protection for other habitats.	**Ranks 4th:** Preserves some amount of habitat. Higher value habitats receive moderate protection levels; other habitats receive lower protection.	**Ranks 5th:** Preserves minimal amount of habitat. Provides low protection levels for all habitat classes, no protection for highest value habitat in some circumstances.
12. Retains multiple habitat functions provided by forest areas	**Ranks 1st:** Retains the most forest cover in both vacant and developed habitat lands.	**Ranks 2nd:** Retains substantial amount of forest cover in both vacant and developed habitat lands.	**Ranks 6th:** Retains least amount of forest cover, likely to result in significant forest habitat loss over time.	**Ranks 3rd:** Retains moderate amount of forest cover, some protection for all forested habitat areas and highest protection for forested habitat in stream corridors.	**Ranks 4th:** Retains some amount of forest cover, some protection for almost all forested habitat areas.	**Ranks 5th:** Retains minimal amount of forest cover, low protection levels for most forested habitat areas.
13. Promotes riparian corridor connectivity and overall habitat	**Ranks 1st:** Promotes most stream corridor continuity and overall habitat connectivity.	**Ranks 3rd:** Promotes moderate retention of connectivity. Provides small	**Ranks 6th:** Promotes least retention of connectivity and likely to result in most	**Ranks 2nd:** Promotes substantial retention of stream corridor continuity; moderate	**Ranks 4th:** Promotes some retention of connectivity in stream corridors and between	**Ranks 5th:** Promotes minimal retention of connectivity, likely to result in significantly

Criteria	Option 1A: Most habitat protection *Highest level of protection for all habitats*	Option 1B: Moderate habitat protection *High level of protection for highest value habitat, moderate protection for other habitats*	Option 1C: Least habitat protection *Moderate level of protection for higher value habitats, no protection for lowest value habitat*	Option 2A: Most habitat protection *Moderate level of protection in high urban development value areas, high level of protection in other areas*	Option 2B: Moderate habitat protection *Low level of protection in high urban development value areas, moderate level of protection in other areas*	Option 2C: Least habitat protection *No protection in high urban development value areas, moderate level of habitat protection in other areas*
connectivity		connector habitats with higher protection, does not preserve as much stream corridor continuity.	reduction of regional connectivity. No protection for small connector habitats.	protection for small connector habitats.	upland habitats.	reduced regional connectivity.
14. Conserves habitat quality and biodiversity provided by large habitat areas	**Ranks 1st**: Conserves the most large habitat areas.	**Ranks 2nd**: Conserves a substantial amount of large habitat areas, moderate risk for urban development fragmenting large habitats.	**Ranks 6th**: Conserves least amount of large habitat areas, likely to result in significant fragmentation.	**Ranks 3rd**: Conserves moderate amount of large habitat areas, small amount of low protection applied to portions of some large habitats.	**Ranks 4th**: Conserves some amount of large habitat areas, lower protection levels applied to all large habitats.	**Ranks 5th**: Conserves minimal amount of large habitat areas, likely to result in significant fragmentation of large habitats.
15. Supports biodiversity through conservation of sensitive habitats and species	**Ranks 1st**: Supports the most biodiversity by applying highest levels of protection to sensitive habitats and stream corridors.	**Ranks 2nd/3rd**: Supports a substantial amount of biodiversity, applies more protection to sensitive habitats than stream corridors.	**Ranks 5th**: Supports a minimal amount of biodiversity, applies moderate protection level to sensitive habitats and stream corridors.	**Ranks 2nd/3rd**: Supports a substantial amount of biodiversity, applies more protection to stream corridors than sensitive habitats.	**Ranks 4th**: Supports some biodiversity, applies higher protection to stream corridors than sensitive habitats.	**Ranks 6th**: Supports the least amount of biodiversity, likely to result in substantial loss of sensitive habitats and sensitive species.
Energy Factors						
16. Promotes compact urban form	**Ranks 6th**: Promotes compact urban form the least. Highest protection levels applied to vacant land intended for urban uses (housing & jobs).	**Ranks 4th**: Moderately promotes compact urban form. Some reduction in development potential on all habitat land.	**Ranks 1st**: Promotes compact urban form the most. Development allowed in lowest habitats, moderate protection to other habitat lands.	**Ranks 5th**: Minimally promotes compact urban form. Development opportunities reduced in all habitat areas.	**Ranks 3rd**: Promotes some amount of compact urban form. Development opportunities reduced in most habitat areas.	**Ranks 2nd**: Substantially promotes compact urban form. Development opportunities on business land less impacted than residential land.
17. Promotes green infrastructure	**Ranks 1st**: Conserves the most vegetation and forested areas.	**Ranks 3rd**: Conserves a moderate amount of vegetation and forested areas.	**Ranks 6th**: Conserves the least amount of vegetation and forested areas.	**Ranks 2nd**: Conserves a substantial amount of vegetation and forested areas.	**Ranks 4th**: Conserves some vegetation and forested areas.	**Ranks 5th**: Conserves a minimal amount of vegetation and forested areas.
Other criteria						
18. Assists in protecting fish and wildlife protected by the federal Endangered Species Act	**Ranks 1st**: Provides most protection to sensitive habitats; most protection for hydrology and riparian functions; most likely to protect sensitive species.	**Ranks 3rd**: Provides substantial protection to sensitive habitats and species. Similar to 2A, but provides less protection for hydrologic conditions.	**Ranks 6th**: Provides least protection to sensitive habitats and species, hydrology. Minimal protection for riparian functions.	**Ranks 2nd**: Provides substantial protection to sensitive habitats and species. Similar to 1B, but provides more protection for hydrologic conditions.	**Ranks 4th**: Provides some protection to sensitive habitats; less likely to maintain hydrologic conditions or riparian functions.	**Ranks 5th**: Provides minimal protection to sensitive habitats and species and hydrology. Provides least protection for riparian functions.
19. Assists in meeting water quality standards required by the federal Clean Water Act	**Ranks 1st**: Provides most protection for clean water. Most protective of forest canopy, habitat near streams and on steep slopes; most protection for hydrology.	**Ranks 3rd**: Provides moderate protection for clean water. Moderate protection for for slopes, wetlands, and resources near streams. Substantial protection for forested areas.	**Ranks 5th**: Provides minimal protection for the natural resources important to protecting water quality. Least protection for forested areas.	**Ranks 2nd**: Provides substantial protection for clean water, with strict protection for slopes, wetlands, and resources near streams. Moderate protection for forested areas.	**Ranks 4th**: Some protection for slopes and wetlands, hydrologic conditions, habitat near streams, hydrologic conditions and forest. Potential for decreased water quality.	**Ranks 6th**: Provides least protection for slopes and wetlands, habitat near streams, and hydrology; minimal protection for forested areas. Most potential for poor water quality.

CHAPTER FIVE: SUMMARY AND CONCLUSIONS

Protecting fish and wildlife habitat in the urban area is complex, and there are many important tradeoffs to balance. Metro's consideration of several non-regulatory tools for habitat protection describes several approaches that could be developed further, building on the restoration, education, and acquisition work that Metro currently does. Metro's analysis of the six regulatory program options identifies the number of affected acres of land in each habitat and urban development class, and describes the economic, social, environmental, and energy consequences associated with various protection levels. Evaluating the performance of each option against the 19 criteria provides the Metro Council with valuable information necessary to choose which type of regulatory approach makes the most sense for the region. Non-regulatory and regulatory tools can be complementary, increasing the effectiveness of each approach. This chapter includes:

- a brief summary of the potential non-regulatory tools,
- results of the analysis of the six regulatory options,
- a discussion of the interaction between non-regulatory and regulatory tools,
- potential funding sources, and
- the next steps in the development of a regional fish and wildlife habitat protection program.

Potential non-regulatory tools for habitat protection

While there is substantial evidence of current non-regulatory efforts accomplishing habitat protection, restoration, and education in the Metro region, they have not been successful in preventing the decline in overall ecosystem health. Most non-regulatory programs are dependent on unsteady sources of grant funding, volunteerism, and good stewardship, often without recognition or reward. Each program conducts important work, but even taken as a whole over the past decade only a small portion of the habitat in the region received the attention needed. There is a much greater need for restoration dollars; technical assistance for landowners, developers, and local jurisdictions; and permanent protection for critical habitats than is currently available.

There are many types of non-regulatory tools that could be used to protect and restore fish and wildlife habitat in the region. All of these tools require some type of funding, whether to pay for staff or provide direct dollars to purchase or restore land. Many of the non-regulatory tools could be implemented at either the local or regional level. Below is a list of tools identified in this report:

- Stewardship and recognition programs
- Grants for restoration and protection
- Information resources
- Technical assistance program
- Habitat education activities
- Volunteer activities
- Agency-led restoration activities
- Acquisition

Acquisition is the most effective non-regulatory tool to achieve habitat protection. Acquisition achieves permanent protection and also preserves land to be restored at a later date. However,

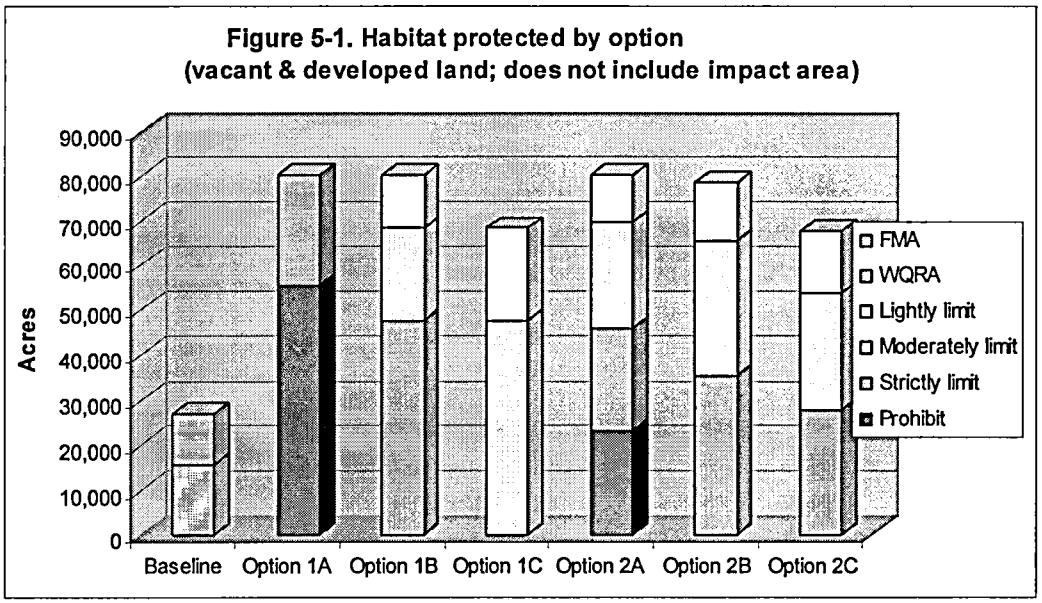
the high cost of purchasing land, especially within the urban growth boundary, and the dependence of an acquisition program on willing sellers limits the effectiveness of such a program.

Many of the other non-regulatory habitat protection and restoration tools considered in this report are most effective when used in combination with each other and/or along with a regulatory program. A regulatory program can provide the incentive and motivation to develop innovative solutions to land development while protecting habitat. Grants and technical assistance are the tools that could be most effective in protecting and restoring habitat, in the absence of an acquisition program. A stewardship recognition program could help promote grants and serve to educate others about innovative practices. Coordinating with existing agencies and volunteer groups that conduct restoration as well as providing funds to focus efforts could be effective in enhancing regionally significant habitat.

Comparison of regulatory options

Metro developed six regulatory options to protect land classified as regionally significant fish and wildlife habitat. Three of the options consider habitat quality (1A, 1B, and 1C) and three options (2A, 2B, and 2C) consider habitat quality and urban development value. Five possible treatments are applied in the options, identifying whether development would be allowed, lightly limited, moderately limited, strictly limited, or prohibited. The six options were evaluated based on how they met 19 criteria. Most of the criteria were based on the issues identified in Metro's general evaluation of the economic, social, environmental, and energy tradeoffs, two criteria were based on how well the options met the federal Endangered Species Act and Clean Water Act. Figure 5-1 graphically illustrates how the five treatment levels are applied in the six options as compared to the baseline regulations (Title 3).

Figure 5-1. Habitat protected by option
(vacant & developed land; does not include impact area)



Overall, the options that protect the highest-value habitat (Options 1A and 2A) perform similarly. The option that provides the least protection for the highest-value habitat (Option 1C) and the option with the lowest level of protection in the industrial and commercial areas (Option 2C) also perform similarly. However, Option 2C favors factors important for urban development while Option 1C reduces protection levels equally for all land uses. Table 5-1 compares the tradeoffs of applying the six regulatory options.

Table 5-1. Comparing the regulatory options.

Options 1A, 2A	Options 1B, 2B	Options 1C, 2C
• Reduces development opportunities within the existing urban growth boundary • Increases possibility of expanding the urban growth boundary, potentially increasing development costs (such as streets and utility connections) • Potentially adds to the cost of urban development (such as environmental review process, low impact development standards) • Protects the most habitat and restoration opportunities • Preserves the most ecosystem services (such as flood management and water quality) • Promotes conservation of sensitive species (such as Pileated woodpeckers and painted turtles) and at risk habitats (such as white oak forests and wetlands) • Supports cultural heritage (such as salmon), regional identity (such as proximity to open spaces), and amenity values (such as property values) • Greatest affect on the location and choices for jobs and housing • Increases property owner concerns about limiting use of land, especially single family residential	These options provide the middle ground between the most restrictive and least restrictive options.	• Provides the most development opportunities within the current urban growth boundary • Minimizes need to expand the urban growth boundary by allowing compact urban development • Supports urban centers and industrial areas by not applying new regulations (Option 2C) • Minimizes habitat protection and preserves the fewest restoration opportunities (but may increase future cost to restore ecosystem services such as flood control) • Increases habitat fragmentation along streams and between streams and upland habitats • Reduces variety of plants and animals that make up a healthy ecosystem • Increases energy demand for cooling air and water temperatures by removing trees and vegetation • Reduces opportunity for future generations to enjoy fish and wildlife habitat and their associated benefits • Minimizes property owner concerns about limiting use of land, especially residential and business land

Interaction of non-regulatory and regulatory tools

A program to protect fish and wildlife habitat may be most effective if it includes a variety of tools and approaches, both non-regulatory and regulatory. Both approaches have strengths and weaknesses, for example non-regulatory tools rely heavily on funding and willing landowners, while regulations only apply when triggered by a land use action. While regulatory and quasi-regulatory tools can offer some flexibility, regulations can and often are used to achieve a baseline level of protection. Protection can be greatly enhanced by supplementing a regulatory component with non-regulatory tools for fish and wildlife habitat protection. If a program option is chosen that includes less regulatory protection then it may be necessary to apply more non-regulatory approaches and a higher level of funding if the same level of habitat protection is

desired. The following constitutes a brief summary of how acquisition and incentives can interact with and increase the effectiveness of regulatory tools.

Incentives and regulations

When used in conjunction with regulations, the opportunity of incentives to encourage fish and wildlife habitat protection on private lands cannot be overstated. Through tax benefits, regulatory certainty, public recognition, cost sharing, and other incentives, landowners can be encouraged and rewarded for protecting valuable fish and wildlife habitat on their property. Takings issues, whether actual or perceived, are important to many property owners, thus regulatory programs may be unpopular. The application of incentives, however, can provide willing landowners some kind of compensation for conserving habitat on their land. Incentives can thus be used to support compliance with regulations or to fill in protection gaps for regionally significant habitat where regulations are not applied.

The Riparian Lands Tax Incentive Program (RLTIP), for example, can potentially apply in already urbanized areas to protect regionally significant riparian corridors adjacent to private property where the standards of buffer programs may be difficult to implement. Inside the UGB, where most of the significant riparian corridor habitat is developed rather than vacant, incentives can offer a tremendous opportunity to encourage voluntary protection and restoration. Other incentives[38] can apply to new development or redevelopment where habitat-friendly development is a feasible option for stormwater management and erosion and sediment control.

Acquisition and regulations

Just as incentive programs and regulatory tools can work together to protect significant habitat, combining acquisition with regulatory and quasi-regulatory approaches can create a more comprehensive protection strategy for fish and wildlife habitat. Further, where regulatory tools and incentive programs fail to provide adequate protection, acquisition of land from willing sellers offers a last line of defense for the habitat. Acquisition, by willing sellers, can be applied to conserve some of the remaining significant habitat.

Regulatory flexibility

Regulations to protect fish and wildlife habitat limit development options on land with habitat value. Some ways in which regulations could limit development include lowered density, minimum disturbance areas, and setbacks from significant resources. Incentives can work with regulations to allow development to occur in a manner that reduces the impact on the habitat. For example, cluster development, streamside buffers, and habitat-friendly development

[38] Such as: the City of Portland's Bureau of Environmental Services (BES) Ecobiz and Ecoroof Programs, the city's Office of Sustainable Development's (OSD) G-Rated Program, and Oregon Department of Environmental Quality's (DEQ) Nonpoint Source Pollution Control Facility Tax Credit Program (NSPCFTC). BES's Ecoroof Program, for example, provides developers with sewer rate discounts for building greenroofs on new buildings or for retrofits, while the DEQ's NSPCFTC program provides cost share opportunities for other innovative LID stormwater management designs. The soon-to-be-implemented Ecobiz program will serve to further encourage the use of LID for new and redevelopment by publicly recognizing landscapers who use these designs.

techniques can all provide some level of regulatory flexibility that allows development to occur while protecting habitat.

Cluster development

Clustering and open space development are land division and development tools used to conserve land on one portion of a site in exchange for concentrated development on another portion of the site. Typically, road frontages, lot sizes and setbacks are relaxed to allow the preservation of open space areas. Clustering has the potential for regulatory flexibility because ordinances implementing these tools can be designed to establish performance standards with objective evaluation criteria for protecting resources from development.

Riparian buffer performance standards

Riparian buffers frequently establish predominantly fixed-width setback standards to protect habitat in and around streams, wetlands and riparian areas. Buffer programs tend to regulate actions rather than establish standards to achieve a specific outcome or performance. However, the potential exists to establish performance standards when implementing buffer programs and to protect fish and wildlife habitat. Some of these standards can include, but are not limited to: variable-width provisions that allow a buffer to expand and contract with the landscape; maintaining or enhancing percentages of native forest cover within buffer areas; and reducing impervious surfaces and road crossings through buffer areas.

Low impact, habitat-friendly development

Low Impact Development (LID) tools, especially those for reducing impervious surfaces and controlling stormwater, contain the most flexible standards from a performance-based perspective. Since the primary objectives of LID are to improve hydrologic conditions and increase water quality in urban watersheds, many LID ordinances, whether mandatory or voluntary, provide flexibility in the types of practices that can be used to meet these objectives. Since LID tools also focus on improving water quality, many jurisdictions specify objective criteria that can be used to evaluate the outcome or performance. Such criteria include, but are not limited to: the number and lengths of roads and other impervious surfaces reduced; percentages of tree canopy maintained or created; maintenance or reduction of stream temperatures; amount of sediment, nutrient, and pollutant loading to water reduced; and the minimization of runoff volumes.

Funding

Protecting and restoring fish and wildlife habitat costs money, with either a non-regulatory focus, regulatory approach, or a combination of the two. All non-regulatory programs would require some type of funding, either to purchase land, restore habitat, provide grants for habitat-friendly development, or to retain staff to develop a technical assistance or stewardship recognition program. Nor are regulations without cost. Staff time (regional and local) is used to develop ordinances and implement new laws and changes in development capacity may result in a reduced property tax base for local partners.

Funding for habitat protection programs could be provided by a non-specific mechanism such as a bond measure or Metro's excise tax on solid waste, or a funding source could be tied to

specific activities that impact fish and wildlife habitat. Below are several ideas for raising funds for protecting and restoring fish and wildlife habitat that could be implemented at the regional or local level.

Increase Metro's excise tax

Metro collects an excise tax on each ton of solid waste produced within the region. An additional per ton fee could be added that would be dedicated to funding the protection and restoration of fish and wildlife habitat. Such a decision would require an action of the Metro Council.

Urban area inclusion fee

Metro manages the region's urban growth boundary (UGB), expanding it according to development needs as the region grows. Land outside the UGB is not allowed to develop at urban capacities. When the boundary expands the new lands increase in value due to the increased ability to develop. An urban area inclusion fee would capture a portion of this increase in the value of property due to inclusion within the UGB. Funds raised could be used to purchase or restore habitat land within Metro's jurisdiction. It could be targeted to lands in the expansion areas as they are developed.

The *Incentives Report* included substantial review of this tool. Based on that study, a partition fee seemed to have the best potential for successful implementation as a method of collecting revenue. A partition fee could be imposed as a flat fee uniformly applied across all land parcels on a per lot or per acre basis. Since the fee would be collected when land is partitioned (typically a one-time event), it would not be assessed multiple times on the same property. Revenue would depend on the amount of developable land brought inside the UGB, the pace of development in the expansion areas, and the proposed fee rate.

Systems development charge (SDC) program

Local jurisdictions, typically municipalities, across the state regularly apply SDCs to new development in an attempt to pay for the cost of new infrastructure. SDCs can only be charged for specified purposes, *water supply, treatment and distribution, drainage and flood control*, and *parks and recreation* all could be construed to relate to the protection and restoration of fish and wildlife habitat. SDCs are a major cost for new development, and the imposition of any additional charge is likely to be challenged in a court of law.

An SDC could be collected to fund mitigation of the environmental impacts of development on fish and wildlife habitat. Fees would be collected by the permitting agency. However, fees generated through an SDC must be used on "capacity increasing capital improvements " that "increase the level of performance or service provided by existing facilities or provides new facilities" (ORS § 223.307(2)). It may be difficult to tie protection or restoration of habitat to a capacity increasing improvement. A more legally viable argument could be made if a regional SDC was collected for stormwater management.

Stormwater management fee

Water providers (e.g., Clean Water Services, Portland Bureau of Environmental Services) collect fees for stormwater management purposes. Some of these funds are currently used for restoration activities, but Metro could encourage these agencies to devote more dollars to habitat protection and restoration. Metro could also impose a regional fee to be used for restoration and protection of significant fish and wildlife habitat to be collected by the water providers.

Bond measure

Metro could put forth a regional bond measure to raise funds to purchase or restore habitat lands from willing sellers. The 1995 Parks and Openspaces bond measure was very successful and allowed the creation of a system of regional parks and trails that will be appreciated for generations. A similar approach could be taken focused on Metro's fish and wildlife habitat inventory. The voters would need to pass a bond measure, and polling has shown that a targeted approach is most likely to be successful. Fish and wildlife habitat targets could include purchasing and restoring Habitats of Concern and floodplains. Funds could also be used to purchase properties that are significantly affected by new regulations.

Funds from outside sources

There are funds to protect fish and wildlife habitat that could be raised from other sources such as national non-profits and federal agencies. Land conservancy organizations could be contacted to encourage the purchase of targeted habitat types (e.g., Nature Conservancy, Trust for Public Land). The US Fish and Wildlife Service has funds available for restoration in urban areas, and has worked in partnership with Metro's Parks Department to provide grants to property owners and organizations to conduct restoration activities. The city of Portland received a grant from the Federal Emergency Management Agency (FEMA) to acquire lands in the Johnson Creek floodplain after the floods of 1996. Additional partnerships with federal agencies could be pursued. Such an effort would require staff time to develop and implement programs for protection or restoration.

Next steps

The Metro Council is scheduled to consider a program direction, including non-regulatory and regulatory components, in May 2004 after a rigorous review process during which the public, local partners, and interested stakeholder groups will have the opportunity to provide input on the best approach for protecting fish and wildlife habitat in the region. Metro will then develop a program to protect fish and wildlife habitat to be considered by the Council in December 2004. Metro's program would include a standard ordinance and may include provisions for a riparian or wildlife district plan as a means of substantial compliance.

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EXHIBIT F – ORDINANCE NO. 05-1077
ATTACHMENT 5. SEPTEMBER 2004 HABITAT INVENTORY UPDATE

Habitat Class & Habitat Conservation Area (HCA)	Developed			Parks			Total Devel. & Park Habitat	Vacant				Total Vacant Habitat	Total Devel., Park & Vacant Habitat
								Constrained			Uncon-strained Outside Title 3		
	Inside Title 3 WQRA	Inside Title 3 FMA	Outside WQRA/ FMA	Inside Title 3 WQRA	Inside Title 3 FMA	Outside WQRA/ FMA		Inside Title 3 WQRA	Inside Title 3 FMA	Other Con-straints			
Class I riparian corridors													
High HCA	1,499	624	1,654	5,041	3,729	3,509	16,056	4,425	1,517	1,002	4,127	11,070	27,126
Moderate HCA	227	85	81	123	168	22	707	687	537	227	1,796	3,247	3,953
Low HCA	0	0	0	0	0	0	0	0	0	0	0	0	0
Allow	3	4	2	0	0	0	9	1	2	0	1	4	13
Total acres	*1,729*	*713*	*1,737*	*5,164*	*3,897*	*3,532*	*16,772*	*5,113*	*2,056*	*1,229*	*5,923*	*14,321*	*31,092*
Class II riparian corridors													
High HCA	2	1	2	1	1	4	11	1	1	0	1	4	14
Moderate HCA	742	163	1,121	350	667	602	3,645	778	480	253	1,742	3,254	6,899
Low HCA	303	142	325	7	17	5	799	312	378	162	795	1,646	2,445
Allow	2	7	7	0	0	1	17	0	4	1	2	7	24
Total acres	*1,049*	*312*	*1,455*	*359*	*685*	*612*	*4,471*	*1,092*	*862*	*416*	*2,540*	*4,910*	*9,382*
Class III riparian corridors													
High HCA	0	0	0	0	0	0	0	0	0	0	0	0	0
Moderate HCA	0	0	0	0	0	0	0	0	0	0	0	0	0
Low HCA	0	0	0	0	0	0	0	0	0	0	0	0	0
Allow	157	2,172	1,003	7	62	134	3,533	23	61	99	482	665	4,198
Total acres	*157*	*2,172*	*1,003*	*7*	*62*	*134*	*3,533*	*23*	*61*	*99*	*482*	*665*	*4,199*
Class A wildlife habitat													
High HCA	0	0	0	0	0	0	0	0	0	0	0	0	0
Moderate HCA	0	0	0	0	0	0	0	0	0	0	0	0	0
Low HCA	0	0	0	0	0	0	0	0	0	0	0	0	0
Allow	63	34	2,537	107	51	6,858	9,649	201	32	891	6,254	7,379	17,028
Total acres	*63*	*34*	*2,537*	*107*	*51*	*6,858*	*9,649*	*201*	*32*	*891*	*6,254*	*7,379*	*17,028*
Class B wildlife habitat													
High HCA	0	0	0	0	0	0	0	0	0	0	0	0	0
Moderate HCA	0	0	0	0	0	0	0	0	0	0	0	0	0
Low HCA	0	0	0	0	0	0	0	0	0	0	0	0	0
Allow	27	7	3,343	16	8	1,323	4,724	97	25	716	7,312	8,150	12,874
Total acres	*27*	*7*	*3,343*	*16*	*8*	*1,323*	*4,724*	*97*	*25*	*716*	*7,312*	*8,150*	*12,874*
Class C wildlife habitat													
High HCA	0	0	0	0	0	0	0	0	0	0	0	0	0
Moderate HCA	0	0	0	0	0	0	0	0	0	0	0	0	0
Low HCA	0	0	0	0	0	0	0	0	0	0	0	0	0
Allow	14	16	1,901	16	13	805	2,766	81	70	459	3,776	4,386	7,152
Total acres	14	17	1,901	16	13	805	2,766	81	70	459	3,776	4,386	7,152
Total Habitat	*3,039*	*3,255*	*11,975*	*5,668*	*4,715*	*13,263*	*41,916*	*6,607*	*3,105*	*3,810*	*26,288*	*39,811*	*81,727*

Habitat Class & Habitat Conservation Area	Developed			Parks			Total Devel. & Park Habitat	Vacant				Total Vacant Habitat	Total Devel., Park & Vacant Habitat
								Constrained			Uncon-strained Outside Title 3		
	Inside Title 3 WQRA	Inside Title 3 FMA	Outside WQRA/ FMA	Inside Title 3 WQRA	Inside Title 3 FMA	Outside WQRA/ FMA		Inside Title 3 WQRA	Inside Title 3 FMA	Other Con-straints			
Impact Areas													
High HCA	0	0	0	0	0	0	0	0	0	0	0	0	0
Moderate HCA	0	0	2	0	0	0	2	0	0	0	0	0	2
Low HCA	0	0	0	0	0	0	0	0	0	0	0	0	0
Allow	763	361	9,809	131	166	968	12,197	326	103	608	3,327	4,364	16,561
Total acres	763	361	9,811	131	166	968	12,200	327	103	608	3,327	4,365	16,564
Grand Total	*3,802*	*3,616*	*21,786*	*5,799*	*4,882*	*14,231*	*54,116*	*6,934*	*3,208*	*4,419*	*29,615*	*44,175*	*98,291*

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STAFF REPORT

IN CONSIDERATION OF ORDINANCE NO. 05-1077 AMENDING THE REGIONAL FRAMEWORK PLAN AND THE URBAN GROWTH MANAGEMENT FUNCTIONAL PLAN RELATING TO NATURE IN NEIGHBORHOODS.

Date: April 14, 2005 Prepared by: Andy Cotugno and Chris Deffebach

Residents of the Metro region value having nature near where they live, work, and play and have expressed the desire to keep nature in neighborhoods as a legacy to future generations. The Metro Council has expressed, as one of four central goals for the region, the aspiration that "(t)he region's wildlife and people thrive in a healthy urban ecosystem." Nature in Neighborhoods is a regional habitat protection, restoration and greenspaces initiative that inspires, strengthens, coordinates, and focuses the activities of individuals and organizations that share an interest in the region's fish and wildlife habitat, natural beauty, clean air and water, and outdoor recreation. Metro plays a leadership role in Nature in Neighborhoods, but recognizes that the protection and restoration of fish and wildlife habitat and the integration of greenspaces into the urban environment is a task of scope and magnitude beyond the reach of any one organization; it will take the coordinated and strategic action of many. This Ordinance addresses one component of the Nature in Neighborhoods initiative, establishing a consistent regional standard for fish and wildlife habitat protection that provides additional support for improving water quality.

CONTEXT AND BACKGROUND

Metro's authority to plan for fish and wildlife habitat protection in the region derives from State Land Use Planning Goal 5: Natural Resources, Scenic and Historic Areas, and Open Spaces. The Goal 5 administrative rule (OAR 660-023) recognizes Metro's unique planning role and gives Metro the option to develop a functional plan to protect regionally significant fish and wildlife habitat (OAR 660-023-080(3)). In 1996 the Metro Council voted to recognize the regional significance of fish and wildlife habitat and include protection in the functional plan.

The region's 2040 Growth Concept and other policies call for protection of natural areas while managing housing and employment growth. In 1998 the Metro Council adopted Title 3 of the Urban Growth Management Functional Plan to protect water quality and for flood management. Title 3 also included a commitment to develop a regional fish and wildlife habitat protection plan. As defined in a Vision Statement (Attachment 1) that was developed in cooperation with local governments through the Metro Policy Advisory Committee (MPAC) in 2000, the overall goal of the protection program is: "...to conserve, protect and restore a continuous ecologically viable streamside corridor... that is integrated with the urban environment." The Vision Statement also refers to the importance that "...stream and river corridors maintain connections with adjacent upland habitats, form an interconnected mosaic of urban forest and other fish and wildlife habitat..."

Metro's program is part of an agency-wide effort called "Nature in Neighborhoods," which is described in Metro Resolution No. 05-3574. The Nature in Neighborhoods initiative includes

voluntary, incentive-based components that complement the development standards proposed in this ordinance.

The development standards proposed in this ordinance are consistent with one of the goals described in the Vision Statement to ensure contribution towards compliance with the federal Clean Water Act (CWA) and Endangered Species Act (ESA). Despite the adoption of Title 3 in 1998, the region's waterways are nevertheless still not in compliance with the water quality requirements of the CWA, and are soon to be the subject of a Total Maximum Daily Load rule promulgated by the Oregon Department of Environmental Quality. More needs to be done to improve the quality of the region's waterways and prevent future listings of species as threatened or endangered, and this program will take additional steps toward doing so.

Metro has completed development of a program to protect and restore fish and wildlife habitat, following the 3-step process established by the State Land Use Planning Goal 5 administrative rule (OAR 660-023). In the first step, Metro conducted a scientific analysis and inventory of the following Goal 5 resources: riparian corridors, associated wetlands, and wildlife habitat. A regional approach to inventorying natural resources required a consistent level of data and analysis across the entire Metro region. Metro's Fish and Wildlife Habitat Inventory is based on the best available information that can be applied consistently at a regional scale. Metro took an ecological functions approach to define and identify riparian corridors and wildlife habitat, based on its extensive scientific literature review. This approach combined geographic information system (GIS) mapping technology, scientific recommendations, and fieldwork. The methodology assigned values to resource features that allowed comparison of their cumulative importance. The upland wildlife habitat was evaluated separately from the riparian wildlife habitat areas. In 2002, after review by independent committees, local governments and residents, Metro Council endorsed the inventory of regionally significant fish and wildlife habitat lands (Resolution No. 02-3176 – riparian corridors, Resolution No. 02-3177A – upland habitat). The inventory includes about 80,000 acres of habitat land inside Metro's jurisdictional boundary. The habitat inventory is included in Exhibit F of this ordinance.

Upon completion of the habitat inventory, staff reviewed the habitat protection in each city and county within Metro's jurisdiction. The *Local Plan Analysis* (approved by Metro Council in Resolution No. 02-3218A, available in Metro Council office and on the internet at http://www.metro-region.org/article.cfm?ArticleID=1047) concluded that the standards to protect habitat varied from city to city, and that the most regionally consistent standards were those adopted by cities and counties to comply with Metro's water quality standards. The Metro Council directed staff to complete the second step of the Goal 5 planning process based on the conclusion that, while some cities and counties may provide adequate protection to regionally significant habitat, the level of protection varied substantially.

As described in Metro's *Local Plan Analysis*, cities and counties in the region currently have varying levels of protection for fish and wildlife habitat. As a result, cities and counties approach similar quality streams or upland areas in different parts of the region with inconsistent levels of protection. In addition, one ecological watershed can cross several different political jurisdictions – each with different approaches to habitat protection. With the adoption of the regional habitat protection program, cities and counties will adjust their protection levels to

establish a consistent minimum level of habitat protection. For some, this will mean minor modifications to their plans, for others more substantive changes will be necessary.

The second step of the Goal 5 review process is to evaluate the Economic, Social, Environmental and Energy (ESEE) consequences of a decision to allow, limit or prohibit conflicting uses on these regionally significant habitat lands and on impact areas adjacent to the habitat areas. As defined in the ESEE process, the impact areas added about 16,000 acres to the inventory. For the ESEE analysis, Metro classified fish and wildlife habitat based on the ecological function scores into six classes, under two main categories: Riparian/wildlife and Upland wildlife. Each class covers a geographically discrete portion of the inventory, and may include riparian and/or wildlife functions and also may be a Habitat of Concern. Class I Riparian/wildlife and Class A Upland wildlife are the highest value habitat. Metro Council endorsed combining the inventories for the ESEE analysis in Resolution No. 02-3218A. The September 2004 update of the fish and wildlife habitat inventory by habitat class and development status provides the most current acreage information on the habitat inventory (Exhibit F, Attachment 5).

As Metro began its work on the ESEE analysis, several local governments and special districts in the Tualatin Basin approached Metro with a proposal to conduct their own separate ESEE analysis and develop their own habitat protection program using Metro's habitat inventory. In January 2002 Metro entered into an intergovernmental agreement ("IGA") with these local governments and special districts in the Tualatin Basin setting forth a cooperative planning process to address regional fish and wildlife habitat within the basin. The IGA provided that the Tualatin Basin partners would submit their program and analysis to Metro for review and, if it met standards for habitat protection described in the IGA, then Metro would include it as part of the regional habitat protection program. Approximately 16,650 acres of Metro's habitat inventory are located within the jurisdiction of the local governments participating in the Tualatin Basin partnership and within the Metro boundary. Thus, as Metro began its ESEE analysis, the Tualatin Basin partners began their own analysis on a separate track, but closely coordinated with Metro's work.

Metro conducted the ESEE analysis in two phases. The first phase was to evaluate the ESEE consequences at a regional level. This work was completed and endorsed by the Metro Council in October 2003 (Resolution No. 03-3376B). The resolution directed staff to evaluate six regulatory program options and non-regulatory tools for fish and wildlife habitat protection in Phase II of the ESEE analysis.

The Phase II ESEE analysis, endorsed by Metro Resolution No. 04-3440A in May 2004, evaluated the ESEE consequences of possible protection and restoration options that included a mix of regulatory and non-regulatory components. Five potential regulatory treatments were applied in each of the six regulatory options, ranging from allowing conflicting uses to prohibiting conflicting uses in habitat and impact areas. The consequences identified the effects on key ESEE issues identified in the Phase I analysis, including:

- Economic implications of urban development and ecosystem values;
- Environmental effects including ecological function loss, fragmentation and connectivity;

- Social values ranging from property owner concerns about limitations on development to concerns about loss of aesthetic and cultural values; and
- Energy trade-offs such as temperature moderating effects of tree canopy and potential fuel use associated with different urban forms.

In addition, the analysis considered how well the six regulatory options would assist in meeting the requirements of the federal Endangered Species Act and the Clean Water Act. Phases I and II of the ESEE Analysis are as attachments to Exhibit F of this ordinance.

The third and final step of the Goal 5 review process is to develop a program that implements the habitat protection plan by ordinance through Metro's Urban Growth Management Functional Plan (UGMFP or Functional Plan) and Regional Framework Plan policies. After acknowledgment by the State Land Conservation and Development Commission, cities and counties within the Metro jurisdiction will be required to amend their comprehensive plans to be in compliance with the regional habitat protection program.

To develop a program that includes the development standards proposed in this ordinance, Metro reviewed local plans that protect fish and wildlife habitat, researched innovative habitat protection approaches in the Pacific Northwest and throughout the country, and consulted with local practitioners. This research, contained in the *Habitat Protection Tools Summary* (Attachment 3), informed the proposed development standards in the Functional Plan and the Model Ordinance.

Based on the Metro Council's review and consideration of the ESEE analysis and public comment, the Council further informed the direction of the habitat protection program. In August 2004, Council clarified that the regulatory program would not restrict currently allowed uses of residential properties in Resolution No. 04-3489A. In December 2004, the Metro Council approved Resolution No. 04-3506A, which directed staff to develop a fish and wildlife habitat protection program to reflect the following principles:

- Focus the regulatory element of the program on the most valuable Class I and II Riparian Habitat. This significantly reduced the area subject to new regulations. Thirty-six percent of the Class I and II habitat is covered by Title 3 Water Quality Resource Area standards, 21 percent is covered by Title 3 Flood Management Area balanced cut and fill requirements;
- Develop a strong voluntary, incentive-based approach to protect and restore regionally significant habitat, including Class III Riparian, and Class A and B upland habitat (described in *Nature in Neighborhoods Initiative*, Resolution No. 05-3574); and
- Apply regulations to limit development in Class III Riparian, and Class A and B upland habitat in future urban growth boundary expansion areas.

The Tualatin Basin partners completed their ESEE analysis and approved a program proposal on April 4, 2005, and forwarded it to the Metro Council for consideration (Resolution No. 05-3577). If approved by the Metro Council, the Tualatin Basin's final program will be incorporated into this ordinance. About 9,600 acres of Class I and II Riparian habitat on Metro's inventory are located within the Tualatin Basin partner jurisdictions and within the Metro boundary.

Current Action
Based on substantial committee review and outreach to stakeholders, Ordinance No. 05-1077 presents the staff recommendation for public comment and Metro Council consideration on an important component of the Nature in Neighborhoods program, the development standards for Class I and II riparian fish and wildlife habitat within the urban growth boundary, with the inclusion of additional protection for Class A and B upland habitats in future urban growth boundary expansion areas. These recommendations and the key issues for Council consideration are highlighted below.

REVIEW PROCESS

Public comment
The development standards in the proposed new Title 13 of the Urban Growth Management Functional Plan, Model Ordinance, and amendments to the Regional Framework Plan policies are being proposed for public review. It is intended that the public will review this proposal in late April and May, with more opportunity for public comment in late summer/early fall 2005 prior to final consideration by the Metro Council. A summary of public comments will be provided prior to final Council consideration.

Staff has met with numerous stakeholder groups on an on-demand basis throughout the program development phase.

Policy Review
The Metro Policy Advisory Committee reviewed the items proposed in this ordinance at several meetings. MPAC comments on larger policy issues have been incorporated into the proposal. Additionally, staff met with city and county councils upon request to provide further information on the proposal as it was developed.

The Water Resources Policy Advisory Committee (WRPAC) reviewed the development standards proposed in Title 13. Policy comments to date have been conveyed to the Metro Council and have been incorporated into the current proposal.

Technical Review
Several committees reviewed Metro's proposed amendments to the Functional Plan, and many of their comments and suggestions have been included in the proposal.

- The Fish and Wildlife Habitat Program Implementation Work Group was charged with providing advice to staff on the workability of proposed requirements to be included in the Functional Plan or a Model Ordinance. Members included developers, property owners, and local government planners who shared experiences and tools with staff as the program was developed.
- The Metro Technical Advisory Committee reviewed the Functional Plan and Model Ordinance.
- The Goal 5 Technical Advisory Committee reviewed the Functional Plan.

1. RECOMMENDATION ON DEVELOPMENT STANDARDS FOR CLASS I AND II RIPARIAN HABITAT AND CLASS A AND B UPLAND HABITAT IN NEW URBAN AREAS

Resolution No. 04-3506A, adopted by the Metro Council, supports developing flexible development standards that will protect streamside habitat (Class I and II Riparian) within the urban growth boundary and within the current Metro jurisdictional boundary, as well as upland habitat (Class A and B) in future urban growth boundary expansion areas. Of the 80,000 acres in Metro's regionally significant habitat inventory, about 44,000 are in Class I and II riparian habitats that are designated as Habitat Conservation Areas. Streamside habitat areas have the highest functional values in Metro's habitat inventory. Key facts about the streamside habitat areas include:

- ***Much of the area is covered by some standards.*** 36% of Class I and II is covered by Title 3 WQRA (subject to avoid-minimize-mitigate standard), an additional 21% is covered by FMA balanced cut and fill standard, for a total 57% covered by existing regional standards.
- ***Impact on vacant unconstrained land.*** 8,460 acres of vacant unconstrained land, most of which is located in the unincorporated portions of Clackamas, Multnomah and Washington counties and the City of Portland.
- ***Much of the Class I and II habitats are in parks.*** 35% of Class I and II habitat is in park use.

Expectations for urban-style development are different in areas that are brought inside the urban growth boundary in the future. Resolution No. 04-3506A supports protecting more types of habitat in these areas where it is easier to plan for a system of natural habitats integrated with the built environment. The proposed amendments to the Functional Plan and Framework Plan will guide how to plan for growth in new urban areas to account for the most valuable streamside (Class I and II) and upland (Class A and B) habitats.

The development standards included in proposed Title 13 of the Functional Plan would require changes in the way development occurs within Habitat Conservation Areas (HCAs) to ensure that impacts on fish and wildlife habitat are minimized while allowing urban-style development to occur. As proposed, Title 13 includes the following elements:

- Expansion of the water quality protection approach currently in place to encompass all of the most valuable streamside habitats (Class I and II Riparian) identified in Metro's inventory. The approach includes a requirement to first try to avoid habitat, then to minimize development impacts, and last to mitigate for lost habitat function. Metro includes a clear and objective approach (in the Model Ordinance – Exhibit E) and discretionary approach (in Model Ordinance – Exhibit E, and Functional Plan – Exhibit C), consistent with the Goal 5 rule.
- Under Title 3, certain geographic areas were exempted from the requirements to establish Water Quality Resource Areas and Flood Management Areas. These areas include portions of lower Willamette River (Portland Harbor), portions of the Rivergate industrial area in the Columbia Corridor, downtown Beaverton and Tualatin, and other areas determined to support water-dependent industrial uses. The Title 3 exemptions were given for a variety of reasons, a central one being to account

for the economic issues on these sites. Title 3 was carried out for flood management and water quality protection, and did not address fish and wildlife habitat protection. Additionally, Title 3 did not include an examination of the ESEE tradeoffs for fish and wildlife habitat. Substantial consideration to the economic concerns and unique role marine terminals play was included in Metro's ESEE analysis for this program. Therefore, the Title 3 exemptions have not been carried forward in Title 13.

- Habitat-friendly development practices such as clustering, density relaxation, and on-site stormwater management would be required where technically feasible in Habitat Conservation Areas.
- Development standards for Class A and B Upland Habitat in addition to streamside habitats in urban growth boundary expansion areas.
- Several options for city and county compliance, providing flexibility, but also development of a ready-to-implement Model Ordinance. Many cities could use or expand on existing programs to meet regional standards.
- Monitoring and reporting on regional progress.

Each section of Title 13 is described briefly below.

Section 1. Intent.

This section describes that the purpose of the program is two-fold, to achieve the goals described in the Vision Statement and to maintain and improve water quality. It states that the program will include an integrated approach combining voluntary, incentive-based and regulatory tools.

Section 2. Inventory and Habitat Conservation Areas.

This section describes the maps that form the basis of Metro's fish and wildlife habitat protection program. The maps include the inventory map and the Habitat Conservation Area (HCA) map. The HCA map identifies the areas subject to regulatory protection.

A limited few properties that would otherwise have been mapped as HCAs do not appear on the map, as they have been identified as so unique that their economic importance outweighed their fish and wildlife habitat values. Four properties are listed (International Terminal and Port of Portland Marine Terminals 4, 5 and 6), and the following criteria are included for the identification of other, similarly situated sites:

- Property is developed for use as an international marine terminal capable of mooring ocean-going ships, and
- The property is without substantial vegetative cover.

This section also provides that, for properties outside the Metro urban growth boundary but inside the Metro jurisdictional boundary, agricultural and forest activities may continue without new restrictions.

Section 3. Implementation Alternatives for Cities and Counties.

Consistent with Metro's goal of providing regional consistency and local opportunity for flexibility when implementing regional policies, Title 13 as proposed includes several options for a city or county to comply. Compliance with regional habitat protection requirements will also satisfy state requirements, reducing duplicative efforts. A Model Ordinance is included that

serves as one example of how cities and counties could comply with the Functional Plan. Options for compliance include:

- Adopt Metro's Model Code and habitat maps;
- Describe how an existing plan substantially complies with the provisions of the Functional Plan;
- Develop an innovative combination of regulatory and incentive-based programs that meet the habitat protection and restoration objectives; or
- Conduct a special planning process for an area (district) that comprises unique circumstances or challenges for a portion of a city or county (and apply one of the approaches in the previous three items across the rest of the city or county).

Metro's Intergovernmental Agreement with the cities, counties and special districts in the Tualatin Basin is recognized in this section. The Tualatin Basin Partners include Washington County, the cities of Beaverton, Cornelius, Durham, Forest Grove, Hillsboro, King City, Sherwood, Tigard, and Tualatin, as well as Clean Water Services and the Tualatin Hills Parks and Recreation Department. Cities and counties who have partaken in this agreement must amend their comprehensive plans and implementing ordinances to be in compliance with the provisions of the Tualatin Basin approach, which is under consideration by the Metro Council (Resolution No. 05-3577).

This section also includes additional items cities and counties must comply with, including:

- Providing a clear and objective standard as well as a discretionary option for property owners, consistent with the Goal 5 rule.
- Removing barriers in comprehensive plans and implementing ordinances to habitat-friendly development practices in all regionally significant fish and wildlife habitat areas.
- Including a reasonable, timely, and fair process for property owners to verify the location of habitat.
- Provisions to allow for the reduction of density requirements to protect all regionally fish and wildlife significant habitat.

Section 4. Performance Standards and Best Management Practices for Habitat Conservation Areas.

This section describes the performance standards and best management practices that allow development to occur in Habitat Conservation Areas while protecting habitat. Several general standards include:

- Title 3 Water Quality Resource Areas and Flood Management Areas standards still apply.
- Any activity on a property with a single-family home constructed prior to the effective date of the ordinance that would not have required a building, grading, or tree removal permit would be exempt from these standards. If a permit were required the standards would apply.
- Habitat-friendly development practices are required where technically feasible and appropriate to reduce the impacts on the habitat and water quality.

- Publicly-owned parks and open spaces that have been designated as natural areas must be provided with extra protection and special management practices to maintain habitat functions and values.
- Planting of native vegetation is encouraged, planting of invasive non-native species is prohibited, and removal of invasive non-native species is allowed.
- Routine repair, maintenance and replacement of existing structures, roads, utilities and other development are allowed, consistent with other applicable rules.
- Intensification of uses and/or upzoning on sites with HCAs is conditioned upon the restoration of habitat on the site.
- *Federal Aviation Administration Wildlife Hazard Management Plan.* Any activity that is undertaken on Port of Portland property within 10,000 feet of an Aircraft Operating Area that is necessary to comply with the Wildlife Hazard Management Plan is exempt from the requirements to avoid if practicable and to minimize intrusion into a Habitat Conservation Area. Any such intrusion must be mitigated, and the mitigation may occur off-site anywhere within the Metro region.
- *Multnomah County Drainage District No. 1, Peninsula Drainage Districts 1 & 2, and the area managed by the Sandy Drainage Improvement Company.* All of the activities undertaken to manage these flood areas are exempt from the development standards, subject to other applicable laws and the requirement to maintain native vegetation where practicable.

City and county comprehensive plans and implementing ordinances must contain development review standards that include a clear and objective approach and a discretionary approach. Metro has provided an example of a clear and objective approach in the Title 13 Model Ordinance (Exhibit E). The discretionary approval standards include a requirement for all development to first avoid the Habitat Conservation Areas, if practicable, then to minimize intrusion into them, and finally to mitigate to restore the habitat functions and values that were impacted. When implementing the avoid, minimize, and mitigate standard cities and counties are directed to consider the level of Habitat Conservation Area (high, medium, or low) to determine the "practicability" of avoiding habitat and the level of mitigation required. High Habitat Conservation Areas have high habitat value and medium or low urban development value, while Low Habitat Conservation Areas have lower-valued habitat and higher urban development value.

This section also describes the requirements to administer the Habitat Conservation Areas Map and provides a method for site-level verification of the habitat. The city or county is responsible for administering the Habitat Conservation Areas map, or a map that has been deemed by Metro to be in substantial compliance. A process for site-level verification must be included that is consistent with general requirements described in Title 13. The process described includes:

- Locating the habitat boundaries based on site-specific information and Metro's maps.
- Determining the urban development value. There are two ways for the urban development value to change: 1) a change in the 2040 design type designation and 2) the property is owned by a regionally significant educational or medical facility.
- Cross-referencing the habitat class with the urban development value to determine the location of the high, moderate and low Habitat Conservation Areas on a property.

Section 5. Program Objectives, Monitoring, and Reporting.
As part of the Nature in Neighborhoods Initiative, Metro will lead the monitoring of the region's progress towards regional habitat objectives and also coordinate data collection throughout the region. As part of the monitoring and reporting element, Metro will track progress in habitat acquisition and restoration efforts and will continue to map the streams, wetlands, floodplains, vegetation and habitats of concern to monitor habitat quality and quantity by watershed. By coordinating with other agencies and jurisdictions that track stream and upland health Metro will present a regional scorecard of progress in achieving performance objectives. Keeping track of regional progress towards the objectives and targets for habitat protection and restoration will enable policy makers to evaluate the effectiveness of the Nature in Neighborhoods Program and consider altering course if necessary. This section describes the responsibilities of Metro, cities, counties, and special districts in regional data coordination and inventory maintenance, monitoring, reporting, and program evaluation.

Four performance objectives are established to measure the quantity and quality of the region's fish and wildlife habitat. Aspirational targets are included for a ten-year timeframe that are based on existing conditions, a successful protection and restoration commitment, and public ownership patterns. Two implementation objectives are included that help describe the actions to look for as the region moves towards achieving the habitat performance objectives. These include efforts made to increase and allow habitat-friendly development practices and increase restoration and mitigation efforts.

2. POLICY ISSUES

Since January, staff has been soliciting comments on draft versions of proposed Title 13 Functional Plan amendments from the Metro Council, Program Working Group, MTAC, MPAC, Goal 5/WRPAC, private business representatives, non-profit groups, and city and county commissioners throughout the region. These discussions helped to refine the proposal from a technical and policy perspective. Below is a summary of the main policy issues, including potential choices and the direction taken in the proposed Title 13.

A. Measure 37

Voters passed Ballot Measure 37 in November 2004, which required governments to either provide compensation or waive regulations that reduced the fair market value (FMV) of properties. The measure includes exemptions for regulations intended to address public health and safety concerns and that are required to meet federal laws, such as the Clean Water Act and the Endangered Species Act. In response to M37's passage, Council directed staff in their December 2004 resolution (No. 03-3506A) to ensure that the habitat protection program did not result in reductions in FMV of properties unless it provided a source of funds for compensation.

Alternatives staff considered for addressing M37 were:

- Include an explicit statement that the program goal would be to increase fair market value of each property affected (by using flexible development approaches such as clustered development; reducing density requirements, etc.)
- Provide a procedure to allow a property owner to obtain a variance if the rules resulted in a loss in FMV of a property; process is a land use decision (i.e. appeals to

LUBA—bringing these claims "within" the land use system, unlike M37 claims); only minimum variance necessary may be granted; includes waiver of future M37 claims based on functional plan; one incentive for property owners to use the variance procedure is that the variance could be transferred to future property owner (unlike M37 waiver).

Some of the main reasons for not recommending this approach include:

- The intent to increase fair market value went beyond Measure 37's requirements to compensate for losses in fair market values;
- Forcing jurisdictions to establish a separate variance procedure parallel to the Measure 37 procedure and separate from the jurisdictions' other variance procedures would be unnecessarily duplicative, and having the variance process "within" the land use decision arena (i.e. decisions can be appealed to LUBA, unlike Measure 37 decisions) could result in confusing and inequitable results for property owners;
- Early drafts of Title 13 would institutionalize Measure 37 and did not take into account the possibility that the measure could be amended in the future; and
- The approach did not seek to take advantage of any of the exceptions provided in Measure 37, such as an argument that these new rules are necessary to implement the soon to be finalized TMDL rule issued pursuant to the federal Clean Water Act.

Staff has addressed the issue of whether this ordinance will create additional M37 claims by including provisions that give local governments discretion to implement the program in a way that will not result in the reduction in fair market value of any property.

It is also important to note that the flexible development standards in the functional plan will not prevent development on any property, but will simply require a change in the way development occurs within Habitat Conservation Areas. In some cases, a requirement for cities and counties to remove barriers to habitat-friendly development practices may, in fact, increase property values by allowing more innovation and a potential reduction in storm water impact fees.

B. Appropriate level of regional requirements

Title 13 establishes a set of development standards to provide regional consistency for conserving habitat in Class I and II Riparian areas. The primary issue that has been raised is whether the avoid-minimize-mitigate standard (required in Title 3 Water Quality Resource Areas, which covers about 36% of the HCAs) should be applied to development in High, Moderate, and Low Habitat Conservation Areas.

Council's December 2004 Resolution (No. 04-3506A) directed staff to vary the level of protection in accordance with the ESEE analysis. Accordingly, staff considered applying avoid-minimize-mitigate to High HCAs, minimize and mitigate to Moderate HCAs, and only mitigate in Low HCAs. The different levels of protection carried out the intent of the ESEE decision to apply less restrictive standards in 2040 mixed-use areas and regionally significant industrial areas.

However, further discussion among a number of review groups led to reconsideration of the application of the avoid-minimize-mitigate standard. The avoid test as defined in Title 3

includes a "practicability" requirement. The definition of practicable includes an economic test, in effect accounting for the need to apply different levels of protection to High, Moderate, and Low HCAs. Generally, the economic practicability of protecting more habitat in a Low HCA with high urban development value would be greater, resulting in less protection.

Therefore, the proposed development standards in Title 13 apply the avoid-minimize-mitigate standard to all three types of HCA. When implementing the "avoid if practicable" test and mitigate requirements, cities and counties are directed to consider the type of HCA. For example, High Habitat Conservation Areas have been designated as such because they have lower urban development value and the highest value habitat, while Low Habitat Conservation Areas have higher urban development value and lower-valued habitat. In addition, this ordinance would refine the definition of "practicable" for purposes of Title 13 requirements to include a provision that any requirement that would result in a decrease in the fair market value of a property would not be considered practicable. This is how the program is designed to avoid the creation of new M37 claims.

The application of avoid-minimize-mitigate requires discretion. The Goal 5 rule requires a city or county to include a clear and objective approach in its land use ordinances, and the option of adopting a discretionary approach. The proposed ordinance would pass this requirement through to the cities and counties upon implementation, providing the Title 13 Model Ordinance as an option to meet the Goal 5 rule requirements.

C. Habitat-friendly development practices

Using habitat-friendly development practices, or low impact development (LID), can help a community better protect its streams, fish and wildlife habitat, wetlands, and drinking water supplies as it grows. Several cities in the region are already encouraging the use of these practices, and some developers are making a point of reducing the impacts of the built environment by meeting environmental standards.

The use of these habitat-friendly practices can serve to increase the value of developments both at the outset and over time. Studies have shown that residential and commercial uses near open space and water features are more valuable and desirable. Additionally, innovative storm water management practices that use natural processes to retain and detain storm water runoff on-site may be less expensive to construct and maintain.

The difficulties in using these habitat friendly practices today range from concerns about capital and maintenance cost, barriers in local codes that make the practices difficult to apply, and lack of up to date familiarity or knowledge on the part of all parties involved on how to apply the quickly evolving technologies. The advantages of using these practices are their benefits to water quality and channel conditions as well as opportunities to retain green infrastructure on the site.

Title 13 would require revision of city and county codes to require the use of these practices in Habitat Conservation Areas. Since there is not a set menu of practices that can be consistently required, the requirements would apply only when technically feasible and appropriate. Cities and counties would also be required to remove barriers to these practices in all other regionally

significant habitat areas. Alternatives considered included requiring cities and counties to remove barriers in all areas and not requiring habitat-friendly development practices in Habitat Conservation Areas.

D. New UGB expansion areas

Council direction in the December 2004 resolution (No. 04-3506A) was to extend the regulatory requirements that would apply inside the urban growth boundary (UGB) to Class I and II Riparian Habitat to Class III Riparian, Class A and B Upland Habitat in future UGB expansion areas.

The proposed Title 13 requirements, and associated amendments to other Functional Plan, Framework Plan, and Metro Code amendments related to new urban area planning, would extend regulatory protection to the four highest value habitat classes, Class I and II Riparian and Class A and B Upland Habitat. Class III Riparian encompasses areas providing two habitat functions. First, developed floodplains are included that are providing the water storage function. Second, forest canopy within 780 feet of a stream is included that is providing microclimate to reduce stream temperatures. The large search area for the microclimate habitat function is important when considering ecological values for the habitat inventory, but the arbitrary cutoff at 780 feet results in slivers of forest patches falling within the riparian inventory. Staff has concluded that developing map verification and program elements for these slivers of habitat would be too burdensome and costly for local governments and citizens as compared with the benefits of protecting such habitat. For this reason staff has recommended not including Class III habitat in the HCAs for new urban areas.

The same avoid-minimize-mitigate standard developed for riparian areas inside the current UGB would be applied to upland areas in new urban areas. However, new urban areas also offer opportunities to avoid the habitat in the initial concept planning in ways not possible inside the UGB. Several tools may be more useful in new urban areas prior to upzoning, such as transfer of development rights to address equity concerns of "windfalls and wipeouts." This is addressed by including the following policy statements in the Regional Framework Plan Chapter 1 and Titles 10 and 11 of the Functional Plan:

- Explicitly stating the intent to protect habitat and limit development in new urban areas;
- Metro will assume lower housing and employment capacity and capture rates for habitat areas when calculating the size of future UGB expansions; and
- Future UGB expansions will be conditioned in such a way to ensure that habitat areas are protected without giving rise to Measure 37 claims.

E. Residential densities

Metro Council has indicated, in multiple Resolutions, its intent to reduce density targets for residential capacity if necessary to protect natural resources. Title 8 allows a process for a city or county to apply to Metro, in March of each year, for approval of a density requirement reduction to support protection of natural resource areas. To date, no local jurisdiction has made a request under these provisions.

Title 13 proposes a process that would not require further approval by Metro. Approval would occur automatically if the decision was documented as necessary to protect regionally significant

habitat from development and offered permanent protection of the habitat. The loss of housing units would be taken into consideration when sizing the next UGB expansion. Cities and counties are encouraged to consider transferring development rights to minimize the effect on land supply.

This ability to reduce density would apply only to areas on Metro's Habitat Inventory Map and to local Goal 5 inventories if they were on a map prior to the adoption of Metro's program. This would apply to all habitat areas, both upland and riparian.

The reduction in residential density offers the ability to build larger lots at a lower density than currently allowed within the UGB. Minimum density requirements would be calculated after subtracting out the regionally significant habitat that would be protected. There are about 11,730 acres of vacant unconstrained residential regionally significant habitat (including all habitat classes) land inside the UGB to which this density relaxation could apply. This density reduction would not apply to land brought in the UGB after January 2002, such as the area that is now the City of Damascus, since these areas have not yet been upzoned and there are more opportunities to plan around the habitat.

F. Restoration requirements upon redevelopment

Past development practices have had a significant detrimental impact on fish and wildlife habitat and water quality in this region, adversely affecting the habitat of several fish and wildlife species listed as threatened or endangered. While existing development is not affected by the development standards described in Title 13, over time many of the properties near and next to streams and wetlands may be redeveloped. Upon redevelopment, some mitigation can be conducted to help restore habitat functions and values. For example, the intensive redevelopment that is underway in the South Waterfront area of Portland is including habitat restoration and improvement, and the redevelopment will likely result in significantly increased property values in that area.

The developed areas in which restoration opportunities may exist include both areas that have been mapped as Class I and II riparian habitat, as well as some areas identified as Class III riparian habitat and riparian impact areas. This includes:

- Developed areas that have been mapped as Class I and II resources, such as fully developed areas near streams and underneath tree canopy and all areas within 50 feet of streams (with or without vegetation);
- Developed floodplains (3,460 acres), which are included within Class III riparian areas; and
- Riparian impact areas—those areas within 150 ft. of the stream that would have qualified as riparian habitat but for the fact that they are developed.

The proposed functional plan addresses only those areas that are identified as Habitat Conservation Areas through regulations, leaving cities and counties the option of working with developers in Class III and Riparian Impact Areas to restore habitat function to those areas upon redevelopment. In Habitat Conservation Areas, the following standards are described for redevelopment:

- All redevelopment would be allowed provided that it does not encroach further into undeveloped habitat areas or closer to the relevant water feature. If it would encroach into such areas, then the program's general development rules would apply (e.g. avoid-minimize-mitigate standard). Title 3 currently applies the avoid-minimize-mitigate standard to redevelopment within the WQRA (typically within 50 feet of streams).
- Mitigation would be required upon redevelopment that required upzoning or significantly increased the intensity of the development on a site. For example, if a site had heavy industrial use and was redeveloped as mixed-use residential it would require mitigation to reflect the new, additional impacts that the new development would have on the habitat areas.

G. Similarly situated sites to receive an "allow" decision

Council, in Resolution No. 04-3440A, adopted May 20, 2004, determined that the economic importance of the International Terminal Site on the Willamette Harbor outweighed the identified habitat values and directed staff to identify any other "similarly situated" sites that would be subject to an "allow" decision in the ESEE analysis. The "allow" decision means no further requirements under Metro's Goal 5 program. Since then, staff has worked with several stakeholder groups to identify other sites that might qualify as similarly situated.

Title 13 addresses these unique facilities and the sites where they are located by allowing all conflicting uses, unless a change of zoning occurs (i.e., heavy industrial to mixed-use residential). The functional plan names four sites by name (the International Terminal site, and Port of Portland Marine Terminals 4, 5 and 6) and includes criteria to identify future sites that are similarly situated. The criteria state that a site must be in use as an international marine terminal and must be substantially without vegetative cover.

H. Adjustment in Urban Development Value for Regionally Significant Educational and Medical Facilities

The economic model Metro used to determine urban development value underwent significant peer review, and was developed with the guidance of an Economic Technical Advisory Committee. The model incorporated potential job density, land value (except for residential land), and 2040 design types to determine the urban development value of land within the UGB. Generally, the model worked well, but it did not account for certain unique circumstances. Regionally significant educational and medical facilities typically locate in residential areas to better serve their users. This frequently results in their location in a low-priority 2040 design type, inner and outer neighborhoods, potentially undervaluing the economic importance of these facilities. In May 2004, Council directed staff (Resolution No. 04-3440A) to develop a proposal to consider the urban development value of regionally significant major institutions.

One of the major reasons for this adjustment process was the inclusion of upland habitats in the proposed regulatory treatments under Council Resolutions Nos. 03-3376B and 04-3440. Some medical and educational facilities may have Class A and B upland habitat areas on their campuses that are also identified as future facility expansion areas. Since the Council is applying a regulatory approach for Class I and II riparian areas only, and not upland habitat areas, this lowers the degree of conflict between habitat protection and facility expansion plans.

Title 13 includes the following approach to recognize the economic importance of regionally significant educational and medical facilities:

- Identifies by name ten existing regionally significant educational and medical facilities that have Class I and II Habitat on their properties.
- Adjusts the urban development value for these facilities to high, resulting in either moderate or low Habitat Conservation Areas depending on the habitat value.
- Describes criteria to identify future regionally significant educational and medical facilities to be determined by the Metro Council (not at the city or county level).

I. Program objectives, monitoring and reporting

Resolution No. 04-3506A, adopted by the Metro Council on December 9, 2004, directed staff to develop regional outcome measures to evaluate the region's progress toward meeting the vision of conserving, protecting, and restoring fish and wildlife habitat in the region. The resolution also called for an annual assessment of progress including, but not limited to, an evaluation of the habitat inventory. Title 13 proposes to assess progress every two years, since more frequent reporting is unlikely to detect measurable changes, and to tie it to Metro's overall Performance Measures Report.

As part of the monitoring and reporting element, the functional plan proposes to track progress in habitat acquisition and restoration efforts and changes in streams, wetlands, floodplains, vegetation and habitats of concern to monitor habitat quality and quantity by watershed. This will require substantial coordination with cities, counties, agencies, and special districts, which are required to update Metro with new data when it is available. Keeping track of regional progress towards the objectives and targets for habitat protection and restoration will enable policy makers to evaluate the effectiveness of the Nature in Neighborhoods initiative and consider altering course if necessary.

Title 13 includes four performance objectives to measure the quantity and quality of the region's fish and wildlife habitat. The aspirational targets for each of the performance objectives are included as part of the monitoring section, and are not tied to any city or county compliance alternative. These targets, 2004 baseline, considerations that played a role in determining the targets, and a numeric description of what it would require to meet the target within a ten-year period is included in Table 1 below.

Table 1. Targets, 2004 Baseline, and Considerations in setting targets.

Targets	2004 Baseline and Targeted Condition	Considerations in setting the target
1a. *10% increase in forest and other vegetated acres within 50 feet* of streams (on each side) and wetlands in each subwatershed over the next 10 years (2015).	**1a. 2004 Baseline Condition (regional data):** • 64% vegetated • 14,000 vegetated acres **10% increase:** • 70% vegetated • 1,400 acre increase in vegetation over 10 years	• Most local and regional riparian regulatory programs are focused within the first 50 feet of streams and wetlands. • Mitigation, enhancement and restoration projects typically occur in this area. • A higher target for increasing vegetation cover within 50 feet of streams and wetlands will help achieve DEQ established Total Maximum Daily loads for stream temperature. • As redevelopment occurs, habitat within 50 of streams and wetlands can be restored.
1b. *5% increase in forest and other vegetated acres within 50 to 150 feet of streams* (on each side) and wetlands in each subwatershed over the next 10 years (2015).	**1b. 2004 Baseline Condition (regional data):** • 59% vegetated • 15,250 vegetated acres **5% increase:** • 62% vegetated • 760 acre increase in vegetation over 10 years	• Some local regulatory programs protect land between 50 and 150 of streams and wetlands, especially in steep slope areas. • The 150-foot distance includes the outer distance of all primary (most important) ecological functions for riparian areas (with the exception of large undeveloped floodplains). • Reducing regional residential capacity requirements can help to preserve habitat within 150 feet of streams inside the 2002 UGB. • As redevelopment occurs, habitat within 150 of streams and wetlands can be restored
1c. *No more than 20% increase in developed floodplain acreage* in each subwatershed over the next 10 years (2015).	**1c. 2004 Baseline Condition (regional data):** • 10% of all floodplain acres are developed • 3,450 acres of developed floodplains **20% increase:** • 4,200 acres of developed floodplains	• Applying the "avoid, minimize, and mitigate" tests to undeveloped floodplains would increase protection levels compared to existing Title 3 "cut and fill" requirements. • Loss of undeveloped floodplains in industrial and mixed-use areas is expected to continue to occur but at reduced amounts compared to current trends.
2a. *Preserve 75% of vacant Class A and B* upland wildlife habitat in each subwatershed over the next 10 years (2015).	**2a. 2004 Baseline Condition:** • 15,500 acres of vacant Class A and B upland **75% retention:** • 11,600 acres of vacant Class A and B upland remaining	• Vacant Class A and B upland wildlife habitat within the UGB is most vulnerable to loss over time compared to other upland wildlife habitat located in developed areas or in parks. • Regional development standards focused on Riparian Class I and II habitats will place development pressure on upland habitats. • Acquisition programs and habitat friendly development practices can help preserve some upland wildlife habitat. • Reforestation programs can help restore upland wildlife habitat. • Reducing regional residential capacity requirements can help preserve upland habitat. • New urban area planning (e.g., Damascus area) offers opportunities to better protect upland habitat. • Council's decision to protect Class A and B habitats in future UGB annexations will increase retention of upland habitats.
2b. Of the upland habitat preserved, *retain 80% of the number of patches 30 acres or larger* in each subwatershed over the next 10 years (2015).	**2b. 2004 Baseline Condition:** • 23,400 acres of upland habitat in 133 patches that contain 30 acres or more of upland wildlife habitat **80% retention:** • 106 upland habitat patches that contain 30 acres or more of upland habitat	

3a. *Preserve 90% of forested wildlife habitat acres located within 300 feet of surface streams* in each subwatershed over the next 10 years (2015).	**3a. 2004 Baseline Condition:** • 28,300 acres within 1,453 patches of forested wildlife habitat located within 300 feet of surface streams **90% retention:** • 25,500 acres of forested wildlife habitat located within 300 feet of surface streams	• Vacant upland wildlife habitat is vulnerable to loss, and connectivity between riparian corridors and adjacent upland wildlife habitat can be expected to decline, especially within the 2002 UGB. • Non-forested wildlife habitat within 300 feet of surface streams is more vulnerable to loss compared to forested habitat. • Forested wildlife habitat located within parks and developed residential areas is more stable and will support higher connectivity for wildlife between riparian corridors and upland wildlife habitat. • Acquisition and habitat friendly development practices (cluster development, on and off site density transfers) can help slow the loss of habitat connectivity. • Reducing regional residential capacity requirements can help preserve connectivity between riparian corridors and upland wildlife habitat.
3b. *Preserve 80% of non-forested wildlife habitat acres located within 300 feet of surface streams* in each subwatershed over the next 10 years (2015).	**3b. 2004 Baseline Condition:** • 14,400 acres within 1,633 patches of non-forested wildlife habitat located within 300 feet of surface streams **80% retention:** • 11,500 acres of non-forested wildlife habitat located within 300 feet of surface streams	
4a. *Preserve 95% of habitats of concern acres* in each subwatershed over the next 10 years (2015).	**4a. 2004 Baseline Condition:** • 33% of all habitat designated as HOCs • 26,700 total acres of HOCs **95% retention:** • 25,400 total acres of HOCs	• Habitats of concern are located in Class I riparian areas and Class A upland wildlife habitat, a majority of which are located in parks, riverine islands and deltas, wetlands, floodplains, and riparian corridors. These areas are less vulnerable to loss due to development constraints and public park ownership. • Acquisition, habitat friendly development practices, and reducing regional residential capacity requirements can help slow the loss of Habitats of Concern.

Two implementation objectives are included that help describe the actions to look for as the region moves towards achieving the habitat performance objectives. These would measure how well cities and counties are allowing and encouraging habitat-friendly development practices and the number of mitigation and restoration projects conducted.

J. Tree protection and vegetative clearing

Tree canopy located in vacant Class I and II riparian habitat areas (19,230 acres including constrained and unconstrained) is vulnerable to loss outside the development review process. For example, a landowner could remove trees on a vacant parcel unless doing so required a tree removal permit from the city or county. Some cities and counties already have tree protection ordinances in place while others do not. Including language in the Functional Plan to protect trees would help address this situation. The tree protection would apply to forested land within Class A and B upland habitats coming into the UGB.

Policy options include:

- Establish mandatory tree protection requirements in the functional plan to address tree removal outside the development process;

- Rely on regional education efforts to increase awareness of the value of trees and to inform property owners about the new regulations in a way that reduces interest in cutting trees before applying for a development permit.
- Expand existing Title 3 approach to development, which is defined to include "removal of more than 10 percent of the vegetation on the lot," to Habitat Conservation Areas.

The proposed Title 13 extends the current Title 3 approach to vegetation removal and tree protection beyond the WQRA to include all HCAs. Removal of more than 10% of the vegetation within an HCA is considered development, and will thereby be subject to the requirements established pursuant to Title 13 (except for excepted activities as noted above, such as for currently developed residential properties).

3. TITLE 13 MODEL ORDINANCE

Metro's Title 13 Model Ordinance serves two purposes: as an example for cities and counties to guide substantial compliance and as an alternative for cities and counties to adopt and be in substantial compliance without further efforts. The model ordinance is written to be consistent with the Goal 5 rule, including a clear and objective standards approach and a discretionary review approach. The main components of the model ordinance are described below.

A. Section 3. Applicability and map administration

This section describes when the ordinance applies, upon development and redevelopment, and includes a site-specific habitat verification process. There are three basic approaches for verification:

1. Basic approach, property owner must use clear and objective development standards
   - Property owner believes map is accurate,
   - Lot lines do not match with HCA boundaries, or
   - Property was developed before Title 13 came into effect
2. Intermediate approach, property owner must use clear and objective development standards
   - HCA map is inaccurate due to incorrect location of a landscape feature
3. Detailed approach, required for all property owners using the discretionary review standards
   - Application must be completed by qualified professional
   - Detailed criteria must be completed

B. Section 4. Uses and activities that are exempt

This section carries forward the activities that were identified in Title 13 and adds to the list other items that can be exempted from further review in this ordinance. Emergency procedures, routine maintenance and repair, existing developed residential properties, replacement to structures within the existing building footprint, and minor expansions to structures are included. Other key exemptions include:

- Development on a site that will remain at least 100 feet away from the boundary of the HCA (i.e. sufficient distance to ensure habitat protection even if there were any mapping errors).

- Sites with a phased development plan, once they have followed the procedures for the initial permit and site plan, are exempt from further review so long as building sites and coverages remain consistent with the original permit.
- Removal of nuisance plants and planting of native plants.
- Restoration projects that are part of an approved plan.
- Low-impact outdoor recreation facilities outside of Title 3 WQRAs, so long as they contain less than 500 sq. ft. of new impervious surface.

C. Section 5. Uses Allowed Under Prescribed Conditions

In this section two specific areas are called out for special attention.

- The Port of Portland has developed a Wildlife Hazard Management Plan to minimize the wildlife hazards, primarily from birds, to jets arriving and departing from international airports in the region. Port of Portland activities required to comply with a Federal Aviation Administration wildlife hazard management plan are exempted from all standards except mitigation, and mitigation is allowed off-site anywhere within the region.
- Within Multnomah County Drainage District No. 1, Peninsula Drainage District No. 1, Peninsula Drainage District No. 2, and the area managed by the Sandy Drainage Improvement Company, activities required to maintain the managed floodplain are allowed so long as native vegetation is maintained or enhanced, further disturbance to the waterways is minimized, and all applicable laws are followed.

D. Section 7. Development Standards

This section describes the clear and objective development standards, if an applicant proposes development that complies with these standards then there is no additional process required. The intent of Title 13, which directs all development within Habitat Conservation Areas to follow the avoid-minimize-mitigate standard, is carried out in this section through incentives for avoiding habitat, disturbance area limitations for High and Moderate HCAs, and mitigation requirements for all development within an HCA.

Flexible development standards are a critical component of this section, providing incentives to avoid and minimize Habitat Conservation Areas. Flexible development standards include:

- *Building setback flexibility*, reducing or eliminating front, side, and back-yard setbacks to allow placement of the building site as far from the HCA as possible.
- *Flexible landscaping requirements* to allow these to be met by preserving the HCA in a natural condition, and allowing certain on-site stormwater management facilities in the HCA. This incentive may be particularly helpful for commercial and industrial developments.
- *Flexible site design, or clustering,* to allow smaller lot sizes and creative configurations to cluster development away from or to minimize disturbance within the HCA.
- *Density bonus for habitat protection,* specifically for multi-family zones.
- *Density reduction for habitat protection,* which allows all habitat that will be permanently protected to be subtracted from calculations to determine minimum density.

- *Transfer of development rights,* an optional provision to transfer density from sites with over 50% in an HCA to 2040 mixed-use areas.

When development does occur within the Habitat Conservation Area there are certain standards that apply.

- *Disturbance area limitations,* to minimize impact to High and Moderate HCAs. There is one calculation method for single-family and another for all other zones.
- *Construction standards* to protect habitat during site development.
- *Utility standards* to minimize disturbance of habitat for utility connections.
- *Subdivision standards* that require new subdivision plats to show a percentage of the High and Moderate HCA as a separate non-buildable tract.

All disturbance within the Habitat Conservation Area must be mitigated. The amount of mitigation is calculated based on the size and number of trees removed or the area disturbed, whichever results in more vegetation planting.

E. Section 8. Discretionary Review

The discretionary review approach closely follows the performance standards and best management practices described in Title 13. An applicant who cannot or chooses not to meet the clear and objective standards may use this approach for development on a site with a Habitat Conservation Area.

All applications for development using these standards must conduct an impact evaluation that includes identification of the ecological functional values on the site, an evaluation of alternative locations, designs, or methods of development to minimize negative impacts, and determination of the development alternative that best meets the approval criteria. The approval criteria include:

- *Avoid.* Applicant must first avoid intrusion into the HCA to the extent practicable. The economic considerations are greater in a Low HCA than in a High HCA. Again, any requirement that would result in a decrease in the fair market value of a property is considered not practicable.
- *Minimize.* All development must minimize, to the extent practicable, detrimental impacts to ecological functions.
- *Mitigate.* An applicant must mitigate for adverse impacts to the HCA. Mitigation must occur on-site to the extent possible, second within the subwatershed, and outside the subwatershed only when the purpose can be better provided elsewhere. Two mitigation options are included; both include requirements to use habitat-friendly development practices. Option 1 allows the applicant to choose from a menu of habitat-friendly development practices and use a set mitigation ratio. Option 2 allows the applicant to reduce the mitigation ratio by achieving a lower percentage of effective impervious area through habitat-friendly development practices.

The other sections of the model ordinance are standard to address:

- Section 1. Intent
- Section 2. Relationship to Water Quality Resource Area and Flood Management Area, Consistency with Other Regulations

- Section 5. Prohibitions – nuisance plants, unauthorized clearing or grading
- Section 9. Variances
- Section 10. Severability
- Section 11. Definitions

4. REGIONAL FRAMEWORK PLAN AMENDMENTS

Several of the policies identified by the Council to implement a fish and wildlife habitat protection program as part of the Nature in Neighborhoods Initiative would be implemented through amendments to the Regional Framework Plan. These amendments are described below.

A. Summary of Growth Concept

This section would be amended to more accurately describe the functional plan requirements related to fish and wildlife habitat.

B. Chapter 1 – Land Use

A new section would be added, 1.9.4 "Protection of Regionally Significant Fish and Wildlife Habitat," to describe the Council's policies to protect habitat in new urban growth boundary expansion areas. It includes direction to conduct an inventory and provides direction to limit future conflicts between habitat protection and urbanization.

C. Chapter 3

The Council is currently considering Resolution No. 05-3574 that would direct the regional fish and wildlife protection, restoration and greenspaces initiative to be named "Nature In Neighborhoods." Chapter 3 of the Regional Framework Plan is currently entitled "Parks, Natural Areas, Open Spaces and Recreational Facilities," yet describes most of the programs that are proposed to be included within the Nature in Neighborhoods Initiative. Based on this, a key proposed amendment is to change the title of Chapter 3 to "Nature in Neighborhoods." Other amendments to this chapter include:

- Section 3.2.2 – states that the fish and wildlife habitat program shall be developed to achieve four performance objectives and two implementation objectives
- Several sections through the chapter – minor wording changes to incorporate references to fish and wildlife habitat and Nature in Neighborhoods Initiative

D. Chapter 4

This chapter focuses on water quality issues, but also specifically relates to fish and wildlife habitat protection. The chapter is currently named "Water Management," but is proposed to be renamed "Watershed Health and Water Quality" to more aptly describe the policies in the chapter. Section 4.18 would be renamed "Water Quality and Riparian Fish and Wildlife Habitat Corridors" and would describe how healthy fish and wildlife habitat and water quality are related. This language explicitly acknowledges as a matter of RFP policy the link between water quality and fish and wildlife habitat, enhancing future ties between Title 13 and federal water quality requirements.

E. RFP Policies and Implementation Recommendations or Requirements Table

Amendments to this table simply reference the appropriate Titles in the Functional Plan, and are purely technical in nature.

5. AMENDMENTS TO TITLES 3, 8, 10 AND 11 OF THE URBAN GROWTH MANAGEMENT FUNCTIONAL PLAN

Implementing Title 13 of the Functional Plan has a cascading effect of simple amendments that are required to several other titles. These amendments are described below.

A. Title 3 – Water Quality and Flood Management

Title 3 addresses water quality and flood management, but also included direction to Metro to conduct planning that would protect fish and wildlife habitat. All references to fish and wildlife habitat have been removed, since these requirements are now placed in Title 13 of the Functional Plan. Two other amendments to Title 3 are included:

- Change to Section B(2)(d) requiring native vegetation to be planted in the Water Quality Resource Area. This amendment loosens the restriction by continuing to allow the removal of non-native or noxious vegetation but removing the requirement to replace it with native vegetation. The amendment encourages the planting of native vegetation but only requires replacement if native vegetation is removed.
- Repeal the variances section, since it applied only to fish and wildlife habitat areas and those provisions are now in Title 13.

B. Title 8 – Compliance with the Functional Plan

Title 8 describes how cities and counties must comply with the Functional Plan. Cities and counties will have to have amended their comprehensive plans and land use regulations to comply with Title 13 within two years of its acknowledgement by LCDC, and will have to make land use decisions compliant with Title 13 at that time (rather than one year after acknowledgement, with is the limit of Metro's authority under state law). In addition, beginning one year after acknowledgement, any other amendments that cities and counties make to other parts of their comprehensive plans or other land use regulations will have to be consistent with Title 13.

C. Title 10 – Definitions

This title provides the definitions critical for effective implementation of the Functional Plan. Several definitions have been added to further clarify the intent of Title 13. The most important changes, already discussed above, are to the definitions of "Development," and "Practicable."

D. Title 11 – Planning for New Urban Areas

This title describes the key items to consider when developing plans for new urban areas. It has been amended to consider Habitat Conservation Areas when developing such plans, and to make efforts to minimize conflicts between protecting Habitat Conservation Areas and urban development of new urban areas.

ANALYSIS/INFORMATION

1. **Known Opposition.** No known opposition to the specific elements in the proposed ordinance, however there has been a substantial public process throughout the course of this project. It is projected that there will be opposition from both sides of the spectrum during the public comment period for this ordinance. Some parties are likely to assert the difficulty of introducing new regulations after the passage of Measure 37, stating the uncertain legal climate and general political environment leading to the measure's success. Other parties will likely convey disappointment in a regulatory program that does not completely protect any regionally significant habitat and has been reduced in geographic scope by half from the time the Council made a preliminary ESEE determination in May 2004.

2. **Legal Antecedents.** Statewide Planning Goal 5, OAR 660-015-0000(5), and the Goal 5 Rule, OAR 660-023, and specifically OAR 660-023-0080. ORS chapter 197, and specifically ORS 197.274. ORS chapter 268, and specifically ORS 268.380, ORS 268.390, and ORS 268.393. The Metro Charter, Regional Framework Plan, and Metro Code sections 3.07.310 to 3.07.370. Metro Resolutions Nos. 02-3176, 02-3177A, 02-3195, 02-3218A, 03-3332, 03-3376B, 04-3440A, 04-3488, 04-3489A, 04-3506A, 05-3574 and 05-3577.

3. **Anticipated Effects.** Approval of this ordinance will allow Metro to complete the three-step process for complying with Statewide Land Use Planning Goal 5 by amending portions of the Regional Framework Plan and Urban Growth Management Functional Plan. This allows Metro to submit a complete package to the Department of Land Conservation and Development for acknowledgement review pursuant to ORS 197.274. Cities and counties would then be required to bring comprehensive plans and implementing ordinances in compliance with Metro's Functional Plan within two years.

4. **Budget Impacts.** Adoption of this ordinance commits Metro to the long-term monitoring and reporting of regional progress in habitat protection and restoration. It also commits staff resources to providing technical assistance to cities and counties in the review of codes for barriers to habitat-friendly development practices. Staff resources will also be necessary to review city and county compliance reports after acknowledgement by DLCD. The Council President's proposed budget for FY 05-06 includes 2 FTE for monitoring and technical assistance.

RECOMMENDED ACTION

Staff requests that Metro Council adopt the proposed amendments to the Regional Framework Plan and Urban Growth Management Functional Plan to implement new development standards in regionally significant fish and wildlife habitat areas identified as Habitat Conservation Areas.

ATTACHMENTS TO THE STAFF REPORT

Attachment 1. Vision Statement.
Attachment 2. Habitat Protection Tools Summary.

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