



2. PLANNING CONTEXT

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2.1 Introduction to Planning Context

Chapter 2 provides background on the context in which this HCP was prepared. It describes current standards and conditions that apply, existing plans, applicable constraints on the City, and planning objectives for the HCP. This information can be used to develop benchmarks with which to understand and compare the proposed conservation and mitigation strategies presented in Chapter 4.

Chapter 2 provides several kinds of information. Background information is given on City responsibilities and activities in terms of supplying water and electricity from facilities on the Cedar River; regulating stream flows in the Cedar River through water diversion and dam operation; and managing the municipal watershed. Information is given on current water supply yield, water supply planning, water conservation, and Seattle Public Utilities' (SPU's) customer base. Some historical information is given on managing river flows and the municipal watershed.

The Endangered Species Act and related federal, state, and local laws are described in the context of the City's broad planning objectives for the HCP, which are described at the end of this chapter. Related laws include state laws pertaining to blockages in streams that prevent fish passage, the Safe Drinking Water Act, the State Forest Practices Act, and City ordinances pertaining to watershed management and anadromous fish.

Existing City initiatives related to fish and wildlife, as well as related regional initiatives, are described to provide context for the HCP. The HCP builds upon these efforts, some of which were initiated more than a decade ago.

2.2 Responsibilities of the City of Seattle

2.2.1 Introduction

The City of Seattle is responsible for providing a safe and adequate supply of water to the homes and businesses in the City and, through supply contracts with other jurisdictions, to most of the metropolitan area. This responsibility is accompanied by very high standards of water quality for protection of public health and reliability in meeting a wide range of basic needs, including fire protection and many residential and commercial uses. The City is also responsible for providing reliable electric service to residents and businesses in Seattle and adjoining areas. The City is obligated to provide these basic services at a fair and affordable cost. In addition, because of the actual and potential impacts that its water supply and hydroelectric generation facilities and operations have on the environment, the City is required by laws and established policy to minimize such impacts through very high standards of environmental protection, restoration, and other mitigation.

To meet its water supply responsibilities, the City owns and operates a complex system of water storage, treatment, transmission, and distribution facilities. In addition to its first and largest source of supply on the Cedar River, the City has added other sources and water system facilities to meet growing needs in the metropolitan area. In the early 1960s, a second major surface water source was constructed on the South Fork Tolt

River, and in 1987 the Highline Well Field went into service to provide additional capacity for seasonal peaking and emergencies. The City provides retail water service through an 1800-mile distribution pipe network to approximately 595,000 residents as well as businesses within the city limits and certain adjacent areas. In addition, the City provides wholesale water service under long-term contracts to 26 neighboring cities, towns, and special districts. These individual water utilities together distribute water to approximately 690,000 residents as well as businesses within their service areas.

To meet its electric service responsibilities, the City generates hydroelectric power from its own facilities and purchases power generated elsewhere. In this overall supply context, the City's Cedar Falls hydroelectric plant in the Cedar River Municipal Watershed generates about 1 percent of the electricity in the City's system. Because this plant is small, and because its storage facilities are used jointly for water supply purposes and are operated primarily to meet water system and stream flow needs, most of the discussion in this section and the HCP in general relates to the water supply system. In those cases where facilities used solely for hydroelectric power generation (the tunnel and penstocks from the dam and the power plant itself) constitute potential or actual impacts on habitat conditions, those facilities and their operations and impacts are discussed.

To meet its responsibilities for environmental protection, the City strives to integrate its strong environmental values into all aspects of its activities, including facility construction and operation, through specific policies and programs. In 1989, following a major public planning process, the City adopted management policies for the Cedar River Municipal Watershed that preserve the remaining old-growth forest, lead to significant restoration of streams and upland areas damaged by historical logging practices, and greatly expand then-existing research, monitoring, and environmental education programs (Section 2.3.10). In addition, the City has implemented an aggressive water conservation program that includes a combination of investments in water saving improvements (e.g., low volume toilets), water system improvements that reduce losses, rate design changes that increase incentives to conserve, and public education initiatives on both the importance of conservation and methods to achieve it (see Appendix 9). Between 1990 and 1995, conservation programs reduced water demand by about 8 percent, and conservation savings are expected to exceed 20 percent by 2005 (Appendix 9). The remainder of this section describes in further detail how the City's responsibilities for water supply and environmental protection come together to form the context for this HCP.

2.2.2 Ownership and Management of the Cedar River Municipal Watershed

The City of Seattle began diverting water from the Cedar River in 1901 to meet its municipal and industrial water supply needs. This water source was attractive to the emerging city because it provided a gravity water supply, especially important following the Great Seattle Fire of 1889, and because its then-remote location on the western slopes of the Cascades provided a very high quality source of water. From the outset, the City pursued available opportunities to protect the watershed and source water quality and to minimize water treatment requirements and costs. Such early measures included sanitary restrictions through land acquisitions and agreements with other land owners,

fire control programs, and municipal reforestation programs. The Cedar River Municipal Watershed was essentially closed to unsupervised access in about 1917, and the last inhabitants who were not City employees left the watershed in 1946. Throughout this period and beyond, the City continued to acquire fee ownership of watershed properties from homesteaders, private timber companies, and other governments. In 1996, through a large land exchange with the U. S. Forest Service (USFS), the City increased its watershed ownership to over 90,500 acres, or essentially all of the land within the hydrographic boundary upstream of its water supply intake, as well as additional land outside the hydrographic boundary needed for overall watershed protection.

Today, the watershed remains closed to unsupervised access. The entire perimeter is posted against trespass and patrolled by a staff of watershed inspectors, and all points of road entry are gated and locked. Those portions of the boundary located near residential development and public roads are fenced. A permit system, with strict sanitary and other protective requirements, is used to administer access under policies based on state and federal drinking water protection requirements and the City's watershed management policies. As a result, and particularly with unrelenting eastward development of the metropolitan area, the watershed has become an important forest refuge for many species of fish and wildlife, and the Cedar River that flows from it provides high quality water for fish populations downstream.

2.2.3 Water Supply and Hydroelectric Power Generation Facilities

The original configuration of the Cedar River supply system included a diversion dam (1900) at Landsburg, 21.8 miles upstream from the present outlet of the river into Lake Washington, and a timber crib dam (1902) located immediately downstream of the natural outlet of Cedar Lake, later renamed Chester Morse Lake (Figure 1.2-2; Map 2). In 1914, Masonry Dam was completed approximately 2 miles downstream of the crib dam. Major elements of the diversion dam were reconstructed during the 1930s, and the timber crib dam was replaced in 1988 by a structure of more modern construction, now known as the Overflow Dike. In 1987, a large emergency spillway was constructed in this 215-ft high Masonry Dam.

Since its original construction in 1900, the Landsburg Diversion Dam has blocked upstream passage of anadromous fish. The Masonry Dam and the Overflow Dike are both located upstream of natural barriers to fish passage (lower and upper Cedar Falls; Figure 1.2-2).

The diversion dam at Landsburg is operated in a run-of-river mode, passing all flows over the dam in excess of water supply needs. During periods of high turbidity in the river, or during facility maintenance, diversion may cease altogether. The dam is too small to provide significant storage. However, operators at the facility can manipulate the gates and intake valves to achieve some flow re-regulation, such as dampening peaks or mitigating downramping events that could strand young fish on gravel bars.

The reservoir formed behind Masonry Dam is called Masonry Pool. Water levels in Masonry Pool can fluctuate between elevations 1500 and 1570 ft. The pool is at its lowest during late summer and early fall, especially during drought conditions, and may approach 1570 ft during severe storm and runoff events in the fall and winter. At water

levels above elevation 1546 ft, which is the elevation of the spillway crest of the Overflow Dike, Masonry Pool and Morse Lake form a single body of water. When 4-ft high flashboards are in place in the spillway of the Overflow Dike, the two reservoirs can be separated up to elevation 1550 ft. Separation of the two reservoirs retains more water in the Cedar River system by reducing the amount of seepage from Masonry Pool (see below). These reservoirs provide the significant storage needed to provide reliable year-round supply for instream and out-of-stream uses. In addition to the water readily available through gravity flow from these reservoirs, Chester Morse Lake contains a significant amount of water below the level of its outlet (approximately elevation 1,532 ft). In severe droughts or system emergencies, this water can be tapped using temporary pumps mounted on barges anchored near the Overflow Dike.

Facilities used specifically for the hydroelectric power generation project include a powerhouse and the means to convey water to it from the Masonry Dam. The powerhouse contains two 20,000 horsepower turbines and two generators that, together, have a peak capacity of 30 megawatts. The maximum flow through each unit is 350 cfs. Each unit is also equipped with an emergency bypass gripper, which provides flow continuation under most emergency shutdown situations. Under the powerhouse, each turbine returns flow to the river through a concrete walled tailrace. Water is conveyed to the powerhouse from the Masonry Dam first through a gate house at the dam, and then through an 11-ft diameter concrete-lined tunnel and two 7,500-ft long, 78-inch diameter steel penstocks (Figure 1.2-2).

The hydroelectric power plant operations are generally subject to the needs of water supply, instream flows, and flood control. When the turbines are operated, they run in a flow-stable mode and do not follow electrical loads. During periods of low flows, the Cedar Falls Powerhouse is shut down.

Impacts from prior construction and current operation of the hydroelectric project include changes to the river channel downstream of Masonry Dam (because of an altered flow regime and loss of gravel recruitment), fish entrainment into the project intake at Masonry Pool, lower flows and reduced aquatic habitat in the bypass reach (between the powerhouse and Masonry Dam), and injury to upstream migrants at the powerhouse tailrace. The HCP contains measures that reduce or mitigate for these potential impacts on fish habitat.

Water can be released from the upstream reservoirs in various ways. Most commonly, releases are made through the hydroelectric power plant. When the need arises to release more than the flow capacity of the hydroelectric plant, a 48-inch diameter Howell-Bunger valve located at the base of Masonry Dam can be operated. During flood events, still higher flows can be released through the service spillway or emergency spillway gates at Masonry Dam. Water stored in Masonry Pool also seeps into a natural moraine aquifer at rates that are dependent on water levels in the reservoir. The majority of this seepage flow eventually finds its way back to the Cedar River, but some is lost to the Snoqualmie River Basin.

2.2.4 Management of the Reservoir

Reservoir operating levels follow an annual cycle, which is presented in its most simplified form here. For clarity, this discussion describes Masonry Pool and Chester Morse Lake as a single reservoir.

The water year begins on October 1st, when the reservoir is typically near its lowest elevation (Figure 2.2-1). Releases from the reservoir are made to provide adequate instream flows and water supply. With the return of the fall rains, typically in November, the reservoir level rebounds, and the management of the reservoir is driven more by flood risk. Throughout the winter, reservoir levels are intentionally held up to about 17 ft below the summer target refill level to maintain a volume capacity, or flood pocket, to be able to absorb storm runoff. The volume of the actual flood pocket varies by year and date. The flood pocket that is maintained at any given time depends on a variety of factors, including recent and expected hydrological conditions, such as storms; current snowpack; projected water supply conditions; downstream water and flow needs; and other meteorological, hydrological, and system conditions.

The spring refill period occurs between March and June, and is dependent on catching the spring snow water runoff from the mountains. Ideally, summer begins with a full reservoir. The reservoir is considered full if the elevation of the lake on or around June 1 is between 1560 and 1563 ft. Because of concerns over leakage and stability of the moraine, higher lake elevations are maintained only during relatively short flood events. As the summer progresses, reduced natural inflow to the reservoir and increased water consumption cause the reservoir level to drop. By fall, chinook and sockeye salmon spawning require increased streamflows, often necessitating significant releases from storage.

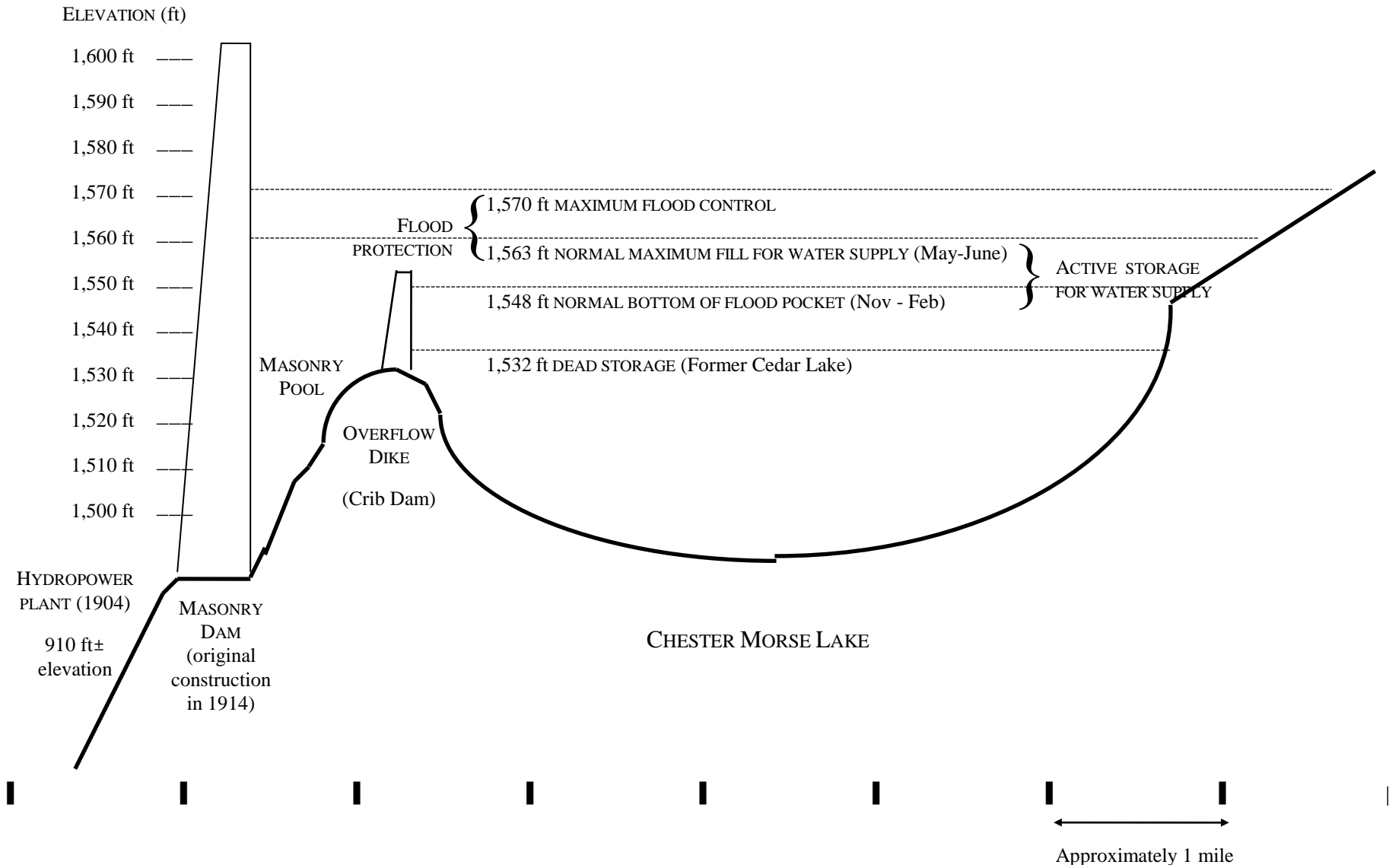
Management of the reservoir involves a continuous process of determining the amount of water to be released and the reservoir level to be attained. The decision-making process involves the recognition of the multiple objectives that the project strives to meet. The City operates these facilities primarily not only as a water supply source but also as a hydroelectric power supply project. Another operating objective is to maintain target instream flow levels to benefit downstream fish populations, even when water releases from storage must be employed to serve this purpose. Fish and wildlife species resident in the reservoir are also considered, as reservoir levels and fluctuations can affect them. Flow into Lake Washington and its water control facilities at the Ballard Locks are other key considerations. Finally, although the dams were not financed or built for flood control purposes, dam management strategies include flood control operations to benefit the lives of people and their property, as well as fisheries resources, downstream of the dams. These multiple objectives result in competing purposes for the limited amount of water storage behind the City's dams during any given season. Reservoir and river operations form the backbone of managing the region's water supply. These operations are particularly challenging because of three defining aspects of Seattle's supply system: (1) the system must be operated to meet multiple objectives, not just water supply; (2) there is a tremendous amount of hydrologic uncertainty that must be managed; and (3) the system, and people and animals dependent on it, have significant vulnerability to adverse conditions resulting from natural events or failures in managing the system well.

It is because all three of these defining aspects are present that management of the system is as challenging as it is. If any one of these three aspects did not exist, water

supply management would require much less balancing of competing needs, less precise operation, less reliance on forecasting skill, and less tightly linked planning, policy, and operations. For example, if the sole objective of the system were to provide drinking water supply, rather than the actual multiple objectives, even the challenges presented by hydrologic uncertainty and the vulnerabilities of the sole beneficiaries (the water supply customers) could be largely mitigated by operating the system to optimize for the single purpose. In another example, if the water system had greater capacity and flexibility (e.g., enormous reservoirs, supply well in excess of demand), and its beneficiaries and downstream fisheries were less vulnerable, then the existence of multiple objectives and uncertain hydrology would not matter as much. In reality, the storage capacity of the reservoir is relatively small in comparison to the size of the contributing watershed.

Finally, if the hydrology affecting the system were perfectly predictable, the system could, in turn, be operated with certainty. In this imaginary world of hydrologic certainty, the tension between competing uses, as well as the vulnerabilities of users and fisheries to adverse conditions, would be much less an issue because operations planning would not have to accommodate possible but unlikely extreme events like droughts, floods, and poor snowpack. Water availability could be maximized (increased), therefore water allocation would be less contentious, and risk would be reduced.

Figure 2.2-1. Reservoir levels.



Reservoir management, then, is an ongoing process of balancing multiple objectives under changing and uncertain conditions. The HCP contains many commitments by the City that impose more systematic ground rules and safeguards in this ongoing process.

2.2.5 The City's Water Claim and its Relationship to Instream Flows

When the City first began to divert water from the Cedar River in 1901, Washington State was still 16 years away from adopting its first statutory water code. Thus, at the time Seattle's Cedar River water rights were first established, the common law doctrine of prior appropriation governed water rights matters. Eventually the state established both a permit process for granting new water rights, and an adjudication process for resolving disputes concerning such attributes of water rights as quantities and priority dates. In accordance with a new claim registration statute enacted in 1967, the City documented its water claim on the Cedar River in 1974, indicating a priority date of 1888 and a right to divert an annual average of up to 300 million gallons per day (mgd) for municipal and industrial use, with daily diversions that could exceed 300 mgd at certain times of the year. However, like most water right claims in Washington state, the City's claim has not gone through an adjudication process, which is a legal proceeding where the court determines if a water right is valid and vested.

A statute enacted in 1969 first authorized the state water management authority (now the Department of Ecology) to establish minimum water flows to protect fish. Such flows are established through promulgation of regulations, but the legislature stated that they "shall in no way affect existing water and storage rights and the use thereof." (RCW 90.22.030.)

In 1979, the WDOE established by rule an instream flow regime for the Cedar River (WAC 173-508-060). Despite its position that its water right is, by virtue of its seniority, superior to the minimum flow established by WDOE in 1979, the City is committed to ensuring that Cedar fisheries are protected. As indicated elsewhere in this HCP (see sections 2.3.9 and 3.3.2), the City has been working for the last decade with federal and state resource agencies, and the Muckleshoot Indian Tribe, to develop a technically based instream flow regime for the Cedar River. The City and other parties to the Instream Flow Agreement that is part of this HCP (Appendix 27) wish to resolve remaining technical differences about what flows are appropriate, and to establish long term certainty for purposes of both resource protection and water supply planning. While attempting to reach agreement on long-term flow regime, the City has, in recent years, attempted to follow the 1979 WDOE flow regime, both as a water supply planning assumption and as an operating target.

Sections 2.3.9 and 3.3.2 provide more detailed discussions on past instream flow studies and regulations.

2.2.6 Firm Yield

One of the City's objectives for this HCP is to develop an instream flow regime that improves habitat conditions in the Cedar River and, at the same time, protects the City's existing water supply capacity on the Cedar River and enables the City to continue

meeting its municipal and industrial water supply responsibilities. The City, like other water suppliers, most typically measures its source capacity in terms of “average annual firm yield.” This intentionally conservative measure is used as a planning tool to represent the volume of water that would be reliably available under all but the very most adverse circumstances from a given source or network of sources (when conjunctive use of multiple sources is possible). The average annual firm yield is the amount of water that can be firmly counted upon for availability when doing source development planning. Comprehensive water system planning also seeks to make efficient use of non-firm supply capacity, which is available at a lower standard of reliability, and can be used, in some circumstances, for backup and emergency sources, as well as for occasional uses, such as groundwater recharge.

Average annual firm yield is, more precisely, the average daily quantity of water *reliably* available throughout the year for water supply purposes under defined system operations and constraints. “Reliably available” means that it would have been available on a continuous basis in 98 percent of the years for which we have hydrologic and meteorologic records (about 64 years), and thus can be projected to be available in the future with the same frequency, assuming that the variability of future weather and hydrologic conditions matches past conditions. A minimum streamflow requirement would be one of the operational constraints that is factored into the firm yield calculation, because it places constraints on a utility’s ability to divert water. Such streamflow requirements are typically expressed as river flows that must be met in the river at a specified location, or measurement point.

The minimum amounts, and the frequency of years over the long term at which specified amounts must be present at those locations, can vary among different flow agreements depending on the specifics of how the flow requirements are established. In some recent minimum flow regimes, including the 1979 WDOE rule for the Cedar River described above, dual sets of flow requirements are established. One set of streamflows applies in “normal” years – i.e., under the hydrologic conditions which can be expected to occur in 90 percent of years -- and another set applies for “critical” years – i.e., for the remaining 10 percent of years when the most adverse conditions prevail. The flow regime proposed for the Cedar in this HCP reflects this normal/critical approach, as well as other features to benefit fish that capitalize on hydrologic variability.

It is important to note what average annual firm yield as a planning tool is *not*.

- It is *not* a predictor of the total amount of water that would be available in any one year. Additional water, above the amount of average annual firm yield, would always be available except in a worst-case year, and that is an important feature of this measure as a planning tool.
- It is *not* a predictor of real time operations. This concept is a planning tool that is the product of a computerized model that benefits from perfect hindsight of 65 years of weather. It therefore does not represent the real-time operating uncertainty resulting from the unpredictability of such things as when fall rains will come, what the winter snowpack will be like, or whether a larger or smaller flood pocket will be needed.
- It is *not* a predictor of how often water use restrictions will be needed. Firm yield based on a 98 percent reliability standard might be thought to imply that

such restrictions will only be used in the 2 percent worst case years. However, minimum instream flow regimes require that significant water use restrictions be imposed prior to switching from normal flows to critical flows (as noted above, this can be expected to occur in 10 percent of years). The City's Water Shortage Contingency Plan (Appendix 10) anticipates the need for water use reductions on a more frequent basis and provides specific methods to fit the circumstances. Finally, it has been the City's practice in most years to publicly urge special care during the summer high-demand period and during the fall period, when draw down of storage in the reservoir, the need to elevate flows for spawning salmon, and residual dry season water use all occur together as water resource managers await the unpredictable start of fall rains.

Water suppliers need a conservative planning tool like average annual firm yield because of the long lead times required to plan and develop new water sources, and because of the limited options suppliers usually have during drought conditions. Less conservative measures, such as average amounts of water diverted from the supply source, do not adequately represent the system's baseline capacity.

Existing annual average firm yield from the Cedar River can be estimated by modeling the effect of the instream flow regime established by WDOE in 1979 and adjusting for its non-binding effect on the City. The flow regime is referred to as the Instream Resource Protection Program (IRPP) flows, reflecting the state program under which it was established. If the IRPP flow regime were strictly applied and followed by the City, the resulting average annual firm yield would be 92 MGD. The City has not always met these flow targets. The non-binding effect of these flows is difficult to quantify. Modeling done as part of development of this HCP, based on actual flows since 1979, places the firm yield at 5 MGD higher than would be the case under strict adherence to the IRPP flow regime, thus about 97 MGD.

Using a different methodology, the City's 1992 Water Supply Plan estimated, for planning purposes and in lieu of a negotiated instream flow regime, a 10 MGD allowance above the yield resulting from strict adherence to the IRPP flow curves. If this effect is estimated at 5-10 MGD, then the City's current baseline firm yield from the Cedar River is between 97 and 102 MGD (92 MGD plus 5 and 10 MGD, respectively).

The instream flow regime proposed in this HCP (Section 4.4), which would be implemented by the City as a binding commitment, would provide an average annual firm yield of 97 MGD from the Cedar River.

SPU has recently developed a computer model that can calculate the firm yield of the combined Cedar River, South Fork Tolt River, and Highline Well Field supply sources. This new model accounts for the *conjunctive use* benefits of the combined system. The conjunctive use model indicates that the system-wide firm yield, based on facilities existing or in place by year 2000, is 171 MGD under either the HCP or the IRPP instream flow curves. Thus, this more comprehensive methodology also indicates that the flow regime proposed in this HCP would result in no change in average annual firm yield under the HCP with reference to current operating conditions.

2.2.7 Long Range Water Supply Planning

Long-range water supply planning is an ongoing activity that adapts to changes in the way the region addresses issues of environment, governance, and the well-being of the community. It is a complex process, incorporating demand and supply forecasting, reliability standards, economics, and political and regulatory issues. Comprehensive, up-to-date presentations of the state of water supply planning are periodically developed by water utilities. In the City's case, comprehensive water supply plans, addressing both local and regional water planning needs, were adopted by the City Council in 1980, 1986, and, most recently, in 1993. The next water supply plan is due for submittal to Washington State Department of Health (WDOH) for approval in 2001. WDOH has statutory authority to oversee the process to ensure that there will be a safe and adequate supply of drinking water available to the public. WDOE has statutory authority regarding water rights, establishment of minimum instream flows, and protection of the quality of surface water and groundwater.

It should be noted that comprehensive water supply planning is even more important now than it was several decades ago, because of the substantial amount of population growth projected for the region. Despite the aggressive programs for water conservation described below, it is clear that meeting this growth will require both additional supplies and the most efficient use of existing supplies (see the City's Long Range Water Conservation Plan, Appendix 9, and the Conservation Potential Assessment, Appendix 31). Meeting this demand will certainly require application of a coordinated, cooperative, conjunctive use model, preserving all options for flexible management of supplies, and creative approaches, such as use of "recycled" water. In the effort to meet regional water needs, Seattle's role is significant but complex.

For over 100 years, the City has had a dominant role in planning for the water needs of the region. Today, Seattle's role as a regional water provider and decision-maker may be changing. New and complex utility relationships are forming to assume responsibility for meeting future growth in regional water demand. The City is presently working with existing purveyors and the Cascade Water Alliance (CWA), a group made up largely of jurisdictions that are currently served by the City under the terms of a wholesale water purveyor contract, to craft a new approach to resource management and governance of the Seattle water system. However the governance discussions evolve, Seattle's customer base and its ongoing water rights and ownership of the Cedar River, Tolt River, and Highline Well Field supply systems, will ensure its continued participation in regional water supply planning.

Even larger than the Seattle/CWA planning area is the three-county area. In some significant ways, regional water supply planning transcends county boundaries and recognizes the interplay that needs to occur between major urban water systems located in adjacent watersheds. Many planners envision a future where the Seattle, Tacoma, and Everett water supply systems are interconnected and operated in a coordinated fashion to assure an ability to deliver water efficiently and to more effectively meet environmental responsibilities. Seattle, the CWA, Tacoma, and the South King County Regional Water Association are working towards making the Tacoma-Seattle Intertie (TSI) and cost-effective water conservation the next major regional water supply increments. Before finalizing the configuration of the TSI, both project-specific and programmatic environmental impact statements will be prepared, ensuring full SEPA compliance.

Making more efficient use of existing water resources through conservation and reuse has proven to be an economical and environmentally responsible way to meet the region's growing demand for water. Over the past decade, conservation measures and education has reduced regional water demand by over 15 percent, without customer sacrifice or hardship. These demand reductions have allowed SPU greater operational flexibility to increase and fine tune the timing of instream flows during sensitive spawning and fry-emergence times in the Tolt and Cedar rivers.

The regional long-range water conservation plan, completed in 1995, is a commitment by SPU to pursue conservation, both as a stewardship responsibility and as the most readily available and least costly utility source of supply for the next several years (Appendix 9). No matter which long term-water supply project is selected, conservation will continue to be a key component of our long-term water supply strategies. The City has conducted a Conservation Potential Assessment (Appendix 31), which profiles the range of water conservation opportunities available to the City's retail and wholesale customers at differing levels of investments and over differing time periods. As a result of that Assessment, the City has created a long-term water conservation program that it will implement in both its direct retail and wholesale service areas. The goal of the program is to reduce average per capita consumption by 10% within a ten-year time frame. From an administrative standpoint the program will consist of expansion of current conservation programs and development of new conservation programs to achieve the desired savings.

Future supply projects may or may not be operated conjunctively, or in concert, with existing water sources such as the Cedar and Tolt rivers. In either case, the potential impacts to these resources would be carefully evaluated and disclosed. While the TSI and parallel cost-effective water conservation are the leading candidates for the next incremental supply for the region, other potential projects include: Cedar Permanent Dead Storage (described in sections 4.4 and 4.5.6), Lake Youngs Drawdown, Additional South Fork Tolt Reservoir Drawdown, the Snoqualmie Aquifer, Lake Washington Reuse, North Fork Tolt Diversion, and more aggressive conservation and water reuse projects.

The Cedar River Watershed HCP, when implemented, would define a portion of the baseline for all future water supply planning efforts. The HCP contains a set of commitments, including instream flows, to protect fish in the Cedar River, regardless of the direction that long-range water supply planning takes. The HCP resolves several long-standing issues that have complicated long-range water supply planning. Mitigation for the anadromous fish blockage at Landsburg Dam will be resolved through a set of fish passage, supplementation, and other mitigation commitments. The instream flow requirements for the Cedar River have long been a source of uncertainty for the City and other agencies in planning for the future (Section 2.2.6). In particular, the ACOE has wanted instream flow assurances for their planning efforts surrounding their responsibilities with the Lake Washington Ship Canal Project, in view of the fact that the discharge from the Cedar River constitutes about half the water entering Lake Washington.

Even with the best long-range water planning, the potential always exists for a water shortage. A shortage situation could be the result of a drought, flood, or other system emergency. A Water Shortage Contingency Plan, which is intended to guide the department in the event of a likely or actual water shortage, is updated by SPU as part of the Water Supply Plan process. The Water Shortage Contingency Plan (Appendix 10) is

based on a multi-phased approach to reduce water usage, with Advisory, Voluntary, Mandatory, and Rationing stages. Specific actions are suggested for each phase, although implementation is intended to be flexible, as appropriate to the specific situation for which it is invoked. In addition to the formation of an internal water shortage management team to advise the director of SPU in the event of a shortage, the plan also includes establishing an advisory committee on which a variety of key interests would be represented.

2.3 Related Laws, Requirements, and Planning Programs

2.3.1 Introduction

The following sections describe the applicable laws and regulations that apply, or may apply, to the HCP planning effort, as well as various municipal and regional planning efforts related to fish and wildlife. The HCP also addresses some issues under state law as well as the Endangered Species Act, builds upon some of the City's prior environmental initiatives, and complements important regional planning efforts focused on anadromous fish.

The City's HCP is being prepared under the Endangered Species Act (ESA), and is subject to the National Environmental Policy Act (NEPA) and the State Environmental Policy Act (SEPA). Of particular importance to Seattle Public Utilities is the need to ensure that the HCP does not impair the City's ability to comply with the federal Safe Drinking Water Act.

In addition to these laws and their implementing regulations, a variety of other federal, state, and local laws may also pertain to the HCP. Some of these laws, such as the state law regarding blockages to fish passage, are addressed in the legal agreements other than the HCP Implementation Agreement (see sections 1.1 and 5.1, and appendices 27 and 28). The City must also comply with provisions of the Washington Forest Practices Act (Section 2.3.12), which establishes standards for protection of natural resources.

At the federal level, a Draft Recovery Plan for the Northern Spotted Owl (USDI 1992b) and a Final Recovery Plan for the Threatened Marbled Murrelet (*Brachyramphus marmoratus*) in Washington, Oregon, and California (USDI 1997a) have been prepared (Section 2.3.4). At the state level, the Washington Department of Fish and Wildlife (WDFW) adopted a Wild Salmonid Policy (Section 2.3.6) in late 1997 that sets new directions for protection and recovery of salmonid fishes in the state.

In mid-1997, the Cedar River Basin Nonpoint Pollution Action Plan was completed. This plan was developed with participation of many agencies, including King County, the City, the Muckleshoot Indian Tribe, the City of Renton, the Boeing Company, the ACOE, and many other agencies and interested parties. The basin plan is an important planning document for the Cedar River Basin that established significant goals for habitat protection and restoration for salmonids on the Cedar River below Landsburg (King County 1998).

King County, the City, the Muckleshoot Indian Tribe, and many other agencies and interested parties have also begun cooperating in an important effort to determine the cause of decline of sockeye salmon in Lake Washington. These Lake Washington ecological studies could be expanded to other salmonid species in the future, which are also at depressed levels in the basin, and could lead to additional efforts to recover sockeye and other salmonid species that would complement the City's HCP. Most recently, King County, adjacent counties, and local municipalities have joined in efforts to prepare a plan that will deal with the NMFS's March 24, 1999, listing of Puget Sound chinook salmon as threatened under the Endangered Species Act (Fed. Reg., Vol. 64, No. 56, pp. 14307 –14328).

The City's HCP builds on three of the City's own environmental initiatives that were ongoing before the development of this HCP began. First, technical studies and multiagency negotiations to develop a technically sound instream flow regime for fish in the Cedar River began in 1986. Second, following several years of work with the state, the Muckleshoot Indian Tribe, and fishing interests, the Seattle City Council passed Ordinance #115204 in 1990 that directed a comprehensive mitigation settlement regarding the blockage to anadromous fish posed by the Landsburg Diversion Dam. Third, in 1989, the Seattle City Council passed Ordinance #114632, establishing new directions for managing the Cedar River Municipal Watershed, including an emphasis on protection and restoration of fish and wildlife habitats, and threatened or endangered species.

2.3.2 Endangered Species Act

The federal Endangered Species Act (ESA; 16 U.S.C. 1531 *et seq.*) was passed by Congress in 1973. The stated purposes of the ESA are “to provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved, to provide a program for the conservation of such endangered species and threatened species” (16 U.S.C. 1531(b)), and to act on specified relevant treaties and conventions.

The Secretary of the Interior, with the USFWS acting on the Secretary's behalf, oversees administration of the Endangered Species Act. The Secretary of Commerce, acting through NMFS, is the listing authority for marine mammals and most anadromous fish. The ESA lists several factors that individually can be the basis for listing a species as endangered or threatened, including “the present or threatened destruction, modification, or curtailment of its habitat or range; . . . the inadequacy of existing regulatory mechanisms; [and] other natural or manmade factors affecting its continued existence” (16 U.S.C. 1533(a)(1)(A), (D), (E)).

Once either Secretary has listed a species of fish or wildlife as endangered, the ESA lists several activities that are prohibited, including the “take of any such species” (16 U.S.C. 1538(a)(1)(B)). “The term ‘take’ means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct” (16 U.S.C. 1532(18)). The USFWS has further defined “harm” to mean “an act which actually kills or injures wildlife. Such acts may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering” (50 C.F.R. 17.3). Under Section 4 of the ESA (16 U.S.C. 1533(d)), the listing Secretary may apply, and usually has applied,

the same prohibitions of activities to threatened species as those regarding endangered species.

If a plant is listed as endangered, activities that are prohibited on nonfederal lands include to “remove, cut, dig up, or damage or destroy any such species on any [nonfederal] area in knowing violation of any law or regulation of any state” (16 U.S.C. 1538(a)(2)(B)).

In 1982, Congress amended the Endangered Species Act to allow taking of listed species “if such taking is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity” (16 U.S.C. 1539(a)(1)(B)). A nonfederal landowner may apply for an Incidental Take Permit. The applicant is required to submit a conservation plan (now commonly called an HCP) to the Secretary as part of the application. The Act uses the terms “conserve” and “conservation” to mean “to use and the use of all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to this Act are no longer necessary” (16 U.S.C. 1532(3)).

According to the Habitat Conservation Planning Handbook (USDI 1996e, pg. 3-5), “Under the Endangered Species Act [Section 10(a)(2)(A)] and Federal regulation [50 CFR 17.22(b), 17.32(b)(1), and 222.22], a conservation plan submitted in support of an incidental take permit application must detail the following information.

- Impacts likely to result from the proposed taking of the species for which permit coverage is requested;
- Measures the applicant will undertake to monitor, minimize, and mitigate such impacts; the funding that will be made available to undertake such measures; and the procedures to deal with unforeseen circumstances;
- Alternative actions the applicant considered that would not result in take, and the reasons why such alternatives are not being utilized; and,
- Additional measures FWS or NMFS may require as necessary or appropriate for purposes of the plan.”

According to the Handbook (USDI 1996e, pp. 7-2 through 7-6), the incidental take permit must be issued by the Services if the HCP and supporting information are statutorily complete and the following criteria are met:

- The taking will be incidental;
- The applicant will, to the maximum extent practicable, minimize and mitigate the impacts of the taking;
- The applicant will ensure that adequate funding for the HCP and procedures to deal with unforeseen circumstances will be provided;
- The taking will not appreciably reduce the likelihood of survival and recovery of the species in the wild;
- The applicant will ensure that other measures that the Services may require as being necessary or appropriate will be provided; and

- The Services have received such other assurances as may be required that the HCP will be implemented.

Because granting an Incidental Take Permit is a federal action, a conservation plan is subject to a biological assessment and jeopardy analysis, as set forth in Section 7 of the ESA (16 U.S.C. 1536(c) and (a)).

The USFWS, acting on behalf of the Secretary of the Interior, has listed as threatened three species known to occur on City land in the Cedar River Municipal Watershed covered by this HCP: the northern spotted owl, the marbled murrelet, and the bald eagle. Several other listed species may occur, but are not known to occur, in the municipal watershed, including the peregrine falcon (endangered), gray wolf (endangered), and grizzly bear (threatened).

In the 1982 amendments to the Endangered Species Act that created Section 10, Congress also expressed its intention for a broad use of conservation plans (H.R. Rep. No. 835, 97th Cong., 2d Sess. 29 (1982)). Congress intended that conservation plans be used to “provide long-term commitments regarding conservation of [multiple] listed as well as unlisted species and long-term assurances” to applicants, and that provisions for imposing “further mitigation requirements” be specified in the plan. Congress also intended that, should an unlisted species become listed during the term of an HCP, “no further mitigation requirements should be imposed if the [habitat] conservation plan addressed the conservation of the species and its habitats as if the species were listed.” Realizing that circumstances and information might change over time, Congress also expected that any plan approved for a long-term permit would contain a procedure by which the parties would deal with unforeseen circumstances.

On February 23, 1998, the USFWS and NMFS (the Services) jointly published a final rule for the No Surprises Policy for HCPs (Fed. Reg. Vol. 63, No. 35, Pp. 8859-8873), in part to implement the above stated intent of Congress when it passed the 1982 amendments to the Endangered Species Act. The final No Surprises Policy provides regulatory assurances to the holder of an Incidental Take Permit issued under section 10 of the ESA that no additional mitigation will be required of the permit holder with respect to species adequately addressed by the plan, unless “unforeseen circumstances” arise after the permit is issued indicating that additional mitigation is needed for a given species covered by a permit.

The final rule also requires that HCPs identify potential “changed circumstances” that may arise during plan implementation and include measures to respond to those changed circumstances. As defined in the final rule, “Changed circumstances means changes in circumstances affecting a species or geographic area covered by a conservation plan that can reasonably be anticipated by plan developers and the [USFWS *or* NMFS] and that can be planned for (e.g., the listing of new species, or a fire or other natural catastrophic event in areas prone to such events).”

Unforeseen circumstances are defined under the final rule as “changes in circumstances affecting a species or geographic area covered by a conservation plan that could not reasonably have been anticipated by plan developers and the Service at the time of the conservation plan’s negotiation and development, and that result in a substantial and adverse change in the status of the covered species.” If unforeseen circumstances do occur during the term of the HCP, the final rule states that the Services “will not require

the commitment of additional land, water, or financial compensation or additional restrictions on the use of land, water, or other natural resources beyond the level otherwise agreed upon for the species covered by the conservation plan without the consent of the permittee.”

The rule also states that if additional conservation and mitigation measures are deemed necessary to respond to unforeseen circumstances, the Services “. . . may require additional measures of the permittee where the conservation plan is being properly implemented, but only if such measures are limited to modifications within conserved habitat areas, if any, or to the conservation plan’s operating conservation program for the affected species, and maintain the original terms of the conservation plan to the maximum extent possible.” The rule also states that “Additional conservation and mitigation measures will not involve the commitment of additional land, water or financial compensation or additional restrictions on the use of land, water, or other natural resources otherwise available for development or use under the original terms of the conservation plan without the consent of the permittee.”

The Services have the burden of demonstrating that unforeseen circumstances exist, using the best scientific and commercial data available. If additional mitigation measures are subsequently deemed necessary to provide for the conservation of a species that was otherwise adequately covered under the terms of a properly functioning HCP, the obligation for such measures does not rest with the HCP permittee, except as described above. Changes to the HCP could be accomplished by reallocation of resources within the HCP, or mitigation could be provided by the Services.

More recently (March 9, 1999), the Services published a Notice of Availability for a “Draft Addendum to the Final Handbook for Habitat Conservation Planning and Incidental Take Permitting Process” (Fed. Reg., Vol. 64, No. 45, pp. 11485-11490), which provides additional guidance for HCPs and incidental take permits. The draft addendum emphasizes five points for the preparation of HCPs, including the need for:

- Adequate monitoring, based on measurable biological goals, to obtain the information necessary to ensure compliance with the HCP, properly assess the impacts from an HCP, verify that the biological goals of the HCP are being reached, and provide information for adaptive management.
- Incorporation of adaptive management to allow for changes in mitigation strategies that may be necessary to reach the long-term biological goals of the HCP and to ensure that conservation strategies are producing the desired results, particularly where there are significant biological data gaps.
- Development of measurable biological goals, which can be based on habitat or species, as a framework for monitoring and adaptive management.
- Appropriate terms for the duration of HCPs that take into account both the biological impacts resulting from the proposed activity and the nature or scope of the actions addressed in the HCP.
- Increased public participation in the process to develop HCPs, and a minimum 60-day public comment period for most HCPs.

2.3.3 Environmental Review of the HCP

Environmental review of the Cedar River Watershed Habitat Conservation Plan is regulated by three pieces of legislation, including NEPA (42 U.S.C. 4321 *et seq.*), SEPA (RCW 43.21C), and City of Seattle’s SEPA Ordinance, Environmental Policies and Procedures (Seattle Municipal Code Chapter 25.05).

NEPA requires full public disclosure and analysis of the potential environmental impacts of proposed federal actions that significantly affect the quality of the human environment. The ESA also requires opportunity for public comment on proposed federal actions. Public disclosure fulfills dual purposes by educating the public regarding activities of the federal government while simultaneously ensuring federal officials make informed decisions on environmental actions. NEPA achieves these goals by requiring the preparation and publication of an environmental review document which compares the effects of the proposed federal action against those effects that might occur under the No Action Alternative and other alternatives to the proposed action.

Issuance of an Incidental Take Permit under Section 10 of the Endangered Species Act for this HCP constitutes a federal action subject to NEPA compliance. This federal action involves both the USFWS on behalf of the Secretary of the Interior and NMFS on behalf of the Secretary of Commerce. As lead agencies under NEPA, the Services have determined that an Environmental Assessment (EA) is the appropriate type of document to disclose and analyze the potential environmental effects of issuing an Incidental Take Permit based on the terms of this HCP.

It is important to distinguish between the requirements for an Incidental Take Permit as set forth under the ESA and the detailed analysis required under NEPA. To comply with the requirements of the Incidental Take Permit, this HCP must explain the potential impacts of City operations on the species addressed in the HCP, the planned measures to minimize and mitigate to the maximum extent practicable those impacts where the impacts cannot be avoided, and other measures as necessary. The HCP under the ESA must also describe alternatives to the proposed taking and explain why those alternatives are not considered feasible (see Chapter 6 of the HCP). In contrast, NEPA requires a broader analysis that examines additional environmental impacts of the proposal beyond just the effects to the species addressed. In addition, NEPA requires consideration of reasonable alternatives, including a No Action Alternative which represents no change from current practices. In this case, the NEPA analysis of the No Action Alternative would compare the effect of issuing an Incidental Take Permit based on an approved HCP to what would occur without the permit, and therefore without implementation of the HCP.

Once the environmental review document has been prepared, in this case an EA, NEPA requires that the document be published and made available for public review and comment. The Services must consider and respond to public comment that is within the scope of the proposed action before making a decision on whether or not to issue an Incidental Take Permit. The Services have the option of either responding to comments in writing or in changes to the EA where appropriate. In certain instances, responding to public comment may require the Services to consider new information not considered in the EA.

Ultimately, under NEPA, the Services must consider whether, on a net basis, the effects of issuing the Incidental Take Permit are significant. If the Services conclude that effects are not significant or that the HCP appropriately addresses (mitigates) potentially significant effects, then the Services prepare a decision document called a Finding of No Significant Impact. If the Services determine through the environmental review process that the effects are significant, then the Services must prepare an Environmental Impact Statement (EIS).

SEPA sets forth requirements for state and local government actions that are similar to those of NEPA for federal actions. These include an analysis of environmental impacts of the proposal and consideration of reasonable alternatives along with a public disclosure process. Under SEPA, the lead agency for this HCP is the City of Seattle. The City of Seattle SEPA Ordinance found under Seattle Municipal Code Chapter 25.05 spells out the City's local processes for meeting SEPA requirements. Entering into the legally binding Implementation Agreement (Appendix 1) constitutes the local government action under SEPA. As lead agency, the City of Seattle has determined that the preparation of an EIS is the appropriate document for meeting requirements for environmental review pursuant to SEPA. It is the City's intent to comply with SEPA through preparation of a draft EIS, a thorough public review effort that includes a public hearing as required by State Municipal Code Chapter 25.05, and a Final EIS.

There is a great deal of overlap between NEPA and SEPA. Additionally, both acts allow state agencies and local governments to jointly prepare one environmental review document and conduct one public process with the lead federal agencies. In fulfillment of NEPA requirements (40 C.F.R. 1500-1508) this document will represent an EA, and under SEPA rules (WAC 197-11) the document will fulfill the requirements for an EIS. Federal NEPA regulations state that “[f]ederal, [s]tate, or local agencies, including at least one federal agency, may act as joint lead agencies” to prepare required environmental review documents (40 C.F.R. 1501.5 (b)). SEPA rules also allow for the combination of documents where appropriate to comply with both SEPA and NEPA as specified in Washington Administrative Code 197-11-640. As a result, the USFWS, NMFS, and the City of Seattle agreed to serve as joint lead agencies to prepare one environmental review document, an NEPA Environmental Assessment (EA)/Draft SEPA Environmental Impact Statement (EIS), followed by a revised EA/Final EIS, to fully evaluate the City's HCP for the Cedar River Watershed.

To satisfy both federal and state requirements for public disclosure, a joint scoping process was held for the preparation of the EA/Draft EIS. The results of the scoping process are described in the EA/Draft EIS. A complete record of scoping comments received from federal, state, and local agencies, the Muckleshoot Indian Tribe, and members of the public can be found in the full scoping report (Seattle Public Utilities 1997). Following review of public comments on the EA/draft EIS, the Services determined that a Finding of No Significant Impacts (FONSI) was appropriate and that no NEPA EIS was required.

2.3.4 Federal and State Plans and Rules for Recovery of the Northern Spotted Owl and Marbled Murrelet

The HCP design and strategies were influenced by federal and state plans and rules for the recovery of the northern spotted owl and marbled murrelet. Much of the discussion that follows is excerpted from a review of these plans and rules included in the Habitat Conservation Plan for the Washington State Department of Natural Resources (WDNR 1997).

Since the listings of the northern spotted owl and the marbled murrelet, the federal government has published a draft recovery plan for the northern spotted owl (USDI 1992b) and a final recovery plan for the marbled murrelet (USDI 1997a) that target conditions on federal and nonfederal lands for recovery of the listed species. In addition, the Secretary of the Interior can issue regulations (called Special 4(d) rules) regarding conservation of listed species on nonfederal lands. Such a rule has been proposed for the northern spotted owl, and because it would affect land within the Cedar River Municipal Watershed, a brief discussion of that draft 4(d) rule is also included.

The Endangered Species Act requires the Department of the Interior to prepare and implement recovery plans for all listed species, unless the Secretary of the Interior determines that the preparation of a recovery plan would not benefit a species (16 U.S.C. 1533(f)). Recovery plans generally establish target conditions on federal and nonfederal land for the species or populations in question that would constitute ecological recovery of that species (Rohlf 1989, p. 87). Regulations implementing the ESA's requirements for a biological assessment and jeopardy analysis define recovery as "improvement in the status of a listed species to the point at which listing is no longer required under the criteria set out in Section 4(a)(1) of the Act" (50 C.F.R. 402.02). In order to achieve such conditions, not only would the population need to be of satisfactory size, but the factors that led to the species' listing would need to be reduced to the point where they no longer posed a threat to the species (Rohlf 1989, p. 101).

DRAFT RECOVERY PLAN FOR THE NORTHERN SPOTTED OWL

A Draft Recovery Plan for the Northern Spotted Owl was issued in 1992 (USDI 1992b) and revised following the public comment period, but it has not yet received final approval. As of this time, the Department of the Interior has not published any further discussion of the Recovery Plan, nor has the plan's official status been resolved.

Included in the Draft Recovery Plan is an extensive discussion of management recommendations for nonfederal landowners. These recommendations, developed by the federal Northern Spotted Owl Recovery Team, are based on an analysis of where habitat on federal lands alone would be insufficient to achieve recovery objectives for the spotted owl (USDI 1992b).

Additionally, pursuant to the ESA, Critical Habitat for the northern spotted owl was designated in 1992 by the USFWS.

Specific Critical Habitat Units (CHUs) were designated, but only on federal land. The municipal watershed contained federal lands at that time, and CHU WA-33 incorporated

some of those federal lands, as well as land outside the watershed. As described in Section 2.3.11, the City acquired all federal land in the watershed through a Congressionally directed land exchange that was completed in 1996. Deed restrictions were established by the Cedar River Land Exchange Act of 1992 that prohibit the City from harvesting timber on the former federal lands within the CHU, with some very limited exceptions relating to protection of water quality and development of habitat in previously harvested stands.

Section 4.2.2 in this HCP contains a discussion of conservation strategies for the northern spotted owl, based on the federal recovery team's recommendations, that the City considered in developing this HCP.

NORTHWEST FOREST PLAN

In response to the controversy surrounding the management of federal forest lands in the Pacific Northwest, the federal government developed the "Forest Plan for a Sustainable Economy and a Sustainable Environment," once known as the "President's Forest Plan," and now referred to as the "Northwest Forest Plan." The main issue leading to the development of the Northwest Forest Plan was the future of existing old-growth forests. Because the City's mitigation for incidental take of spotted owls is designed to complement recovery activities on federal land, a discussion of the Northwest Forest Plan is included here.

Since 1989, numerous lawsuits and several court injunctions have severely restricted new and existing timber sales on lands managed by the USFS and the Bureau of Land Management (USDA 1994). Federal district courts have ruled that these agencies failed to comply with federal law. In particular, separate court decisions have stated that the USFS failed to comply with the National Forest Management Act, the Endangered Species Act, and the National Environmental Policy Act, and that the Bureau of Land Management did not meet its obligations under the National Environmental Policy Act (Thomas et al. 1993; FEMAT 1993).

In western Washington, the USFS has jurisdiction over federal lands available for timber harvest. Since 1960, federal legislation has repeatedly directed the USFS to manage its lands in a manner conducive to healthy populations of fish and wildlife. And, since 1991, several separate rulings in federal courts have reaffirmed this directive.

In April 1993, President Clinton convened the President's Northwest Forest Conference in Portland, Oregon, in order to resolve the conflicting ecological, social, and economic issues surrounding forest management on federal forest lands in Washington, Oregon, and northern California (USDA 1994). As a result of the conference, the Forest Ecosystem Management Assessment Team, commonly known as FEMAT, was organized by the federal government to develop a range of options for a management plan for federal lands within the range of the northern spotted owl. FEMAT was asked to identify management alternatives that would attain the greatest economic and social contributions from the forests and also meet the requirements of the applicable laws and regulations, including the Endangered Species Act, the National Forest Management Act, and the National Environmental Policy Act. FEMAT was also instructed to develop alternatives for long-term management that would maintain or restore the following:

- (1) Habitat conditions for the northern spotted owl and marbled murrelet that would provide for the viability of each species;
- (2) Habitat conditions to support viable populations, well distributed across their current range, of species known to be associated with old-growth forests;
- (3) Rearing habitat on USFS, Bureau of Land Management, National Park Service, and other federal lands to support the recovery and maintenance of viable populations of anadromous fish species and other fish species considered “sensitive” or “at risk”; and
- (4) A connected old-growth forest ecosystem on federal lands within the region under consideration (FEMAT 1993).

The options that were considered varied in four main respects: (1) the quantity and location of land placed in some form of reserve; (2) the activities permitted in reserve areas; (3) the delineation of areas outside of reserves; and (4) the activities permitted outside of reserves.

Based on the FEMAT report, a new EIS was developed that identified Option 9 from FEMAT as the preferred alternative, which became Alternative 9 in the EIS. The Record of Decision for the Final Supplemental EIS on Management of Habitat for Late-Successional and Old-Growth Forest Related Species within the Range of the Northern Spotted Owl (i.e., the Northwest Forest Plan) was issued on April 13, 1994, and took effect 30 days after publication in the Federal Register.

The plan was challenged immediately by both environmental groups and the timber industry. On December 21, 1994, U.S. District Court Judge William Dwyer ruled that the federal agencies responsible for the plan acted within the bounds of the law and that the Northwest Forest Plan was lawful (*Seattle Audubon Society v. Lyons* 871 F. Supp. 1291, W.D. Wash. 1994). Judge Dwyer’s decision was upheld on appeal in the Ninth Circuit Court to Appeals, but as of fall 1998 litigation was still pending the District of Columbia District Court.

DRAFT 4(D) RULE FOR THE NORTHERN SPOTTED OWL

The Department of the Interior initiated the preparation of a 4(d) rule for conservation of the northern spotted owl on nonfederal lands when it proposed FEMAT’s Option 9 as the basis for the Northwest Forest Plan for federal forest lands (Holthausen et al. 1994a). The premise on which the proposed rule is based is that federal lands would bear most of the burden for recovery of the spotted owl and that only a few key contributions from nonfederal lands would be needed. Therefore, relief from prohibitions on incidental take could be granted in some portions of the spotted owl’s range (Fed. Reg. Vol. 60, No. 33, Pp.9484-9485). However, the USFWS has proposed that in particular portions of the spotted owl’s range, supplemental support from nonfederal lands is still “necessary and advisable” for conservation of the species (Fed. Reg. Vol. 60, No. 33, Pp. 9484-9486).

On February 17, 1995, the USFWS published a draft 4(d) rule for the northern spotted owl that defines where incidental take restrictions would apply in Washington and California (USDI 1995a). The public comment period for the proposed rule ended June 3, 1996 (USDI 1996b). Until this rule is finalized, incidental take remains prohibited

throughout Washington absent an approved (habitat) conservation plan and Incidental Take Permit issued under section 10 of the ESA.

The proposed 4(d) rule would establish six northern spotted owl Special Emphasis Areas (SEAs) in Washington in which incidental take prohibitions would continue to apply. These areas are designed primarily to protect northern spotted owl habitat on non-federal lands. In addition to the lands within the SEAs, any nonfederal lands that fall within a spotted owl circle (Section 3.4.1) surrounding a site center located on federal reserves established by the Northwest Forest Plan (USDA 1994) would also be subject to take restrictions for 2 years following adoption of the rule. After 2 years, the USFWS would examine the need to maintain habitat on nonfederal lands within federally sited owl circles. All owners of land outside of SEAs and federal owl circles would be required to maintain only 70-acre cores of suitable habitat around spotted owl site centers. Under the proposed 4(d) rule, the Cedar River Municipal Watershed contains 48,877 acres of the I-90 Corridor SEA. With exceptions, this land would not gain relief from current incidental take prohibitions.

The draft 4(d) rule proposes several types of landowner exemptions and opportunities for other agreements. As a landowner with holdings of more than 5,000 acres of forest land in a SEA, the City could adopt a Habitat Conservation Plan authorized under Section 10 of the Endangered Species Act (16 U.S.C. 1539(a)(1)(B)) and receive a permit for incidental take from the USFWS. Should the draft rule be adopted as a final rule without change, the City would still be required to maintain the rules regarding restrictions within 70-acre cores.

STATE RULES AND REGULATIONS FOR THE NORTHERN SPOTTED OWL

In 1993 the State of Washington began work to develop rules to address the impacts of state forest practices on the northern spotted owl. The primary purpose of these rules is to define critical wildlife habitat within the state for the northern spotted owl. Class IV-Special designation under the Forest Practices Act requires that certain forest practices proposed to occur in these habitat areas be evaluated relative to their potential to have substantial impacts on the environment. The effect of this requirement is the need to identify which forest practices are classified as Class IV-Special with respect to the northern spotted owl. On May 10, 1996, the State Forest Practices Board submitted a proposal to the federal government requesting that a proposed state northern spotted owl rule be considered as an alternative to the federal proposed 4(d) rule (USDI 1996b).

The proposed state rule was adopted as a final rule by the State of Washington on May 22, 1996 (WAC 222). The rule defines ten spotted owl special emphasis areas (SOSEAs), which contain critical wildlife habitat. The habitat goals of demographic support or dispersal support, or both, are identified for each SOSEA. With the exception of the Olympic Peninsula, state SOSEA boundaries are the same as the proposed federal SEA boundaries. The municipal watershed contains 48,877 acres of the state I-90 West SOSEA. This includes 25,501 acres identified for demographic support, and 23,376 acres identified for dispersal support for the northern spotted owl. The relationship of the SOSEA and the CHU related to the Cedar River Municipal Watershed is shown in Figure 3.5-2 in Chapter 3.

Because the state rule classifies forest practices within SOSEAs as Class IV-Special, certain forest practices proposed to occur in these areas must be evaluated relative to their potential to have substantial impacts to the environment. Such forest practices may include timber harvesting, road construction, and aerial spraying of pesticides, and are subject to environmental review under SEPA.

A review under SEPA involves a detailed analysis of a proposed action to determine if it will have a significant impact on the environment. Should a finding of significance be made, then an EIS must be prepared (Section 2.3.3). The state rule provides several exemptions to the SEPA trigger within the SOSEAs, including a Habitat Conservation Plan approved by the Secretary of the Interior under Section 10 of the ESA. The rule also includes disturbance restrictions inside SOSEAs during the nesting season that apply within 0.25 mile of a site center between March 1 and August 31, unless affected owls are not actively nesting.

Habitat and species conservation strategies developed for northern spotted owls in the municipal watershed are discussed in Section 4.2.2. These strategies incorporate the Forest Practices Board's rules and recommendations regarding the northern spotted owl.

FINAL FEDERAL RECOVERY PLAN FOR THE MARBLED MURRELET

On September 24, 1997, the USFWS announced the availability of the federal Final Recovery Plan (USDI 1997a) and a final designation of critical habitat for the marbled murrelet in Washington, Oregon, and California was made in 1996 (USDI 1996c).

Recovery plans are required by Section 4 of the Endangered Species Act (16 U.S.C. 1533(f)) to recommend actions considered necessary to protect or recover species listed by the federal government as threatened or endangered. The Recovery Plan for the marbled murrelet (USDI 1997a) was developed by a scientific team established in February 1993, with expertise in seabird ecology, conservation biology, and forest ecology. Assisting the core team were representatives of the affected states and other federal agencies. The plan includes information on (1) the biology, including habitat needs, of the species; (2) reasons for population decline and current threats; (3) current management; and (4) recommendations for recovery efforts for Washington, Oregon, and California.

The objectives identified in the Recovery Plan are “(1) to stabilize, then increase population size, changing the current downward trend to an upward (improving) trend throughout the listed range; (2) to provide conditions in the future that allow for a reasonable likelihood of continuing existence of viable populations; and (3) to gather the necessary information necessary to develop criteria for delisting the species” (USDI 1997a).

The cornerstone of the strategy included in the Recovery Plan is the Northwest Forest Plan, which specifically addresses marbled murrelets and their habitat on federal lands. The Northwest Forest Plan identifies for protection large reserve areas that should provide increased habitat for the murrelet over the next 50-100 years. Protection is also provided outside of the reserve areas around sites known to be occupied by marbled murrelets. The Recovery Plan also includes areas such as nonfederal lands that were not, or could not be, considered in the Northwest Forest Plan.

Actions identified as necessary to address the recovery objectives of the plan include:

- Establishing six Marbled Murrelet Conservation Zones (Zones) and develop landscape-level management strategies for each Zone.
- Identifying and protecting habitat in each Zone, including the marine environment, through implementation of the [Northwest] Forest Plan, designation of critical habitat, better use of existing laws, or other methods (e.g., HCPs), and developing management plans for these areas.
- Monitoring populations and habitat, and surveying potential breeding habitat to identify potential nesting areas (e.g., occupied sites).
- Implementing short-term actions to stabilize and increase the population that include maintaining potential suitable habitat in large contiguous blocks and buffer areas; maintaining habitat distribution and quality; decreasing risk of fire and windthrow; decreasing adult and juvenile mortality; reducing nest predation; increasing recruitment and initiating research to determine impacts of disturbance in both marine and terrestrial environments.
- Implementing long-term actions to stop population decline and increase population growth by increasing the amount, quality and distribution of suitable nesting habitat, decreasing fragmentation, protecting “recruitment” habitat, providing replacement habitat through silvicultural techniques, and improving marine habitat quality.
- Initiating research to develop and refine survey and monitoring protocols, refine population estimates, examine limiting factors, evaluate disturbance effects, and obtain additional life history data.
- Establishing a Regional Coordination body for the marbled murrelet research efforts, including data storage and retrieval in the databases and archives . . .” (USDI 1997a)

DESIGNATION OF CRITICAL HABITAT FOR THE MARBLED MURRELET

The USFWS designates as critical habitat those areas that have the physical and biological features necessary for the conservation of a listed species and that require special management. A final rule for designating critical habitat for the marbled murrelet was published May 24, 1996 (USDI 1996c).

There are approximately 3.9 million acres of land identified in the final rule in Washington, Oregon, and California, of which 78 percent (3.0 million acres) are federal lands included in the Northwest Forest Plan. In areas where federal lands alone were thought to be insufficient to support a well distributed population, an additional approximately 870,000 acres of state (812,200 acres), county (9,100 acres), city (1,000 acres), and private (48,000 acres) lands are identified. The final rule does not include areas such as critical habitat units which are covered by a legally operative Incidental Take Permit for marbled murrelets issued under Section 10(a) of the ESA. Although no identified critical habitat units are located within the watershed, the final rule states that

some areas outside of the designated critical habitat units may contain elements important to the recovery of the species.

STATE RULES AND REGULATIONS FOR THE MARBLED MURRELET

In 1993, the State of Washington began work to develop rules to address the impacts of state forest practices on the marbled murrelet. The primary purpose of these rules is to define critical wildlife habitat for the marbled murrelet. The effect is to identify which forest practices are classified as Class IV-Special because of their potential for substantial impact on the marbled murrelet. The rules also establish SEPA policies, address survey protocols, create a cooperative habitat enhancement agreement process, and establish disturbance avoidance standards for marbled murrelets. On July 10, 1997, the state adopted the Marbled Murrelet Rule (WAC 222-10-042).

The main items in the rule include:

- (1) Protection for all occupied marbled murrelet sites;
- (2) Required surveys for landowners with both known occupied sites and suitable marbled murrelet habitat;
- (3) Establishment of detection areas – the square-mile section of land in which a marbled murrelet is detected plus the surrounding eight sections;
- (4) A list of five SEPA triggers that would put a forest practice into the Class IV-Special classification which would require further environmental review;
- (5) Provisions for cost sharing of surveys between the landowner and the WDFW; and
- (6) SEPA guidance to assist Washington Department of Natural Resources (WDNR).

Habitat and species conservation strategies developed for the marbled murrelet in the watershed are discussed in Section 4.2.2. These strategies incorporate the Forest Practices Board's rules and recommendations regarding the marbled murrelet.

2.3.5 Other Wildlife Statutes and Regulations

Other laws and regulations pertaining to wildlife may be relevant to this HCP, such as the federal Migratory Birds Treaty Act, the federal Bald and Golden Eagle Protection Act, the federal Clean Air Act, the federal Clean Water Act, and the state Shorelines Management Act. In addition, the state has statutes and regulations governing pollution and wildlife. The WDFW oversees state listings of endangered and threatened wildlife, and WDNR's Natural Heritage Program oversees state listings of plants. The Forest Practices Board issues regulations regarding forest practices involving critical wildlife habitat of state-listed species (Section 2.3.12).

If the WDFW determines that an animal species is seriously threatened with extinction in the State of Washington, then the agency director may request the State Fish and Wildlife Commission to designate that species as endangered (RCW 77.12.020(6)). The

same authority is granted for designating animal species as threatened or sensitive (RCW 77.12.020 (5)). Species designated as endangered are listed under WAC 232-12-014, and protected species designated as threatened or sensitive are listed under WAC 232-12-011. As of the drafting of this HCP, 24 fish and wildlife species were listed as endangered in Washington State, 9 species were listed as threatened, and 2 species as sensitive. The complete regulations governing the state listing, delisting, and management of animal species are given in WAC 232-12-297. The WDFW is charged with writing recovery plans for endangered and threatened species that include target population objectives and an implementation plan for attaining the objectives. The agency has written no such plans that affect this HCP.

Revised Code of Washington (RCW) 79.70.030 authorizes WDNR to establish and maintain a natural heritage program that “shall maintain a classification of natural heritage resources,” which, as defined in RCW 79.70.020, includes special plant species. The Natural Heritage Program assigns endangered, threatened, or sensitive status to plants that face varying risks of extinction. The most current list of vascular plants can be found in a report titled Endangered, Threatened & Sensitive Vascular Plants of Washington (WDNR 1994). A plant listed by the Natural Heritage Program is not protected through regulations, although the Natural Heritage Program does work with landowners to encourage voluntary protection. No plant species that can be expected to occur in the Cedar River Municipal Watershed are on the Natural Heritage Program list.

2.3.6 Management of Fisheries Resources

In the State of Washington, fisheries resources are co-managed by the WDFW and the Western Washington Treaty Tribes. The Lake Washington Basin is the usual and accustomed fishing grounds for the Muckleshoot Indian Tribe, which is the signatory Tribe that co-manages these fisheries resources. Components of managing fisheries resources includes stock assessment, harvest, production, and habitat management. The fish species most intensively managed by the state and Tribe in the Lake Washington Basin and Cedar River Basin are the anadromous salmonids. In the Lake Washington Basin these are most commonly represented by steelhead trout and chinook, coho, and sockeye salmon.

All four of these salmonid species spawn in the Cedar River below the Landsburg Diversion Dam (Sections 3.5.8 - 3.5.11). The HCP includes measures to allow steelhead trout and chinook and coho salmon to spawn above the Landsburg diversion (Section 4.3). Mitigation for the sockeye salmon spawning migration barrier at the Landsburg diversion is also discussed in Section 4.3.

WILD SALMONID POLICY

The remainder of this section discusses the Wild Salmonid Policy, which provides guidance to the state and Tribe regarding management of the salmonid resources in the Cedar River Basin and Lake Washington Basin. This HCP’s mitigation and conservation strategies for the fisheries resources in both the municipal watershed (Section 4.2) and in the Cedar River downstream of the Landsburg Dam (sections 4.3 and 4.4) are consistent with this new policy.

The Wild Salmonid Policy was adopted by the Washington Fish and Wildlife Commission on December 5, 1997, to direct and guide efforts to rebuild and sustain wild salmonids. Two documents make up the policy: (1) the Policy of WDFW and Western Washington Treaty Tribes Concerning Wild Salmonids and (2) the Additional Policy Guidance on Deferred Issues Concerning Wild Salmonid Policy (Washington Fish and Wildlife Commission 1997). Bern Shanks, the former director of WDFW, asserted that, for its part, the State of Washington would use both documents to manage fisheries resources ((Shanks 1997).

The joint policy was adopted by the Western Washington Treaty Tribes and the WDFW, whereas the additional policy guidance was adopted only by the WDFW. The joint policy adopted by both the state and the Tribes contains agreed-upon policy statements, performance standards, and action strategies that are needed for the protection and recovery of salmon and the needs and goals of the Tribes and other citizens. The additional guidance clarifies WDFW's policy direction and efforts regarding wild salmonids.

The Wild Salmonid Policy defines a wild fish stock as a stock that is sustained by natural spawning and rearing in the natural habitat, regardless of parentage (whether or not the parent stock was native to the river or region). This is the same definition that is used throughout the City's HCP for wild salmonid stocks. (The only species addressed in this HCP that is represented by a stock not native to the Cedar River is the sockeye salmon (*Oncorhynchus nerka*), which is native to and present in the Lake Washington Basin. Introduced from Baker Lake in Washington, the current stock in the Cedar River is now reproducing in the wild (Section 3.5.8). Because the Cedar River sockeye stock is introduced, NMFS has determined that it does not constitute an Evolutionarily Significant Unit (ESU) under the ESA, and thus is not eligible for listing as threatened or endangered (Fed. Reg., Vol. 63, No. 46, pp. 11749-11771; Waples, 1998).)

The joint policy adopted by both the state and the Tribes contains guidelines developed to protect, restore, and enhance wild salmonids and their ecosystems, and to sustain a variety of consumptive and non-consumptive uses, including ceremonial, subsistence, commercial, and recreational fisheries, and cultural and ecological values. The policy contains fourteen management principles that will be implemented by the Tribes and the WDFW in consultation with affected stakeholders.

The joint policy adopted by both the state and the Tribes addresses two specific guidelines regarding hatchery production of fish that are relevant to the implementation of this HCP. The first guideline, Spawner Escapement Policy, states that, "where hatchery fish are cultured to augment the naturally produced population in a stream, spawning of hatchery origin adults beyond what is needed for broodstock will be evaluated through a case by case analysis of the effects on the naturally spawning stock characteristics. However, the goals would be to develop harvest strategies that focus on harvest of fish produced in hatcheries, and to develop hatchery production strategies that protect naturally spawning populations."

The second guideline, Cultured Production/Hatcheries Policy, states that naturally spawning populations will be protected, rehabilitated, and reestablished using "integrated principles of genetic conservation, ecology, hatchery production, and fish management." This will be accomplished by using "programs of stable, cost-effective artificial production to provide significant fishery benefits while having no significant adverse

impacts on the long-term productivity of naturally spawning salmon and their ecosystems.” In addition, each hatchery program will be required to operate in accordance with a plan that describes the specific operation components, production goals, measures to control risk, monitoring and evaluation, and performance audits.

In the City’s HCP, the mitigation and conservation strategies developed for anadromous fish (sections 4.2.2, 4.3, and 4.5) are consistent with the goals and policies of the Wild Salmonid Policy.

MANAGEMENT OF FLOWS

The relationship of the City’s water claim to the state’s authority to establish instream flows is discussed in Section 2.2.5.

2.3.7 State Law Concerning the Blockage of Fish Passage

Washington State law contains several statutes that apply to structures that impede fish passage. Collectively, these statutes prohibit human-made obstructions to fish passage, and regulate the repair of and mitigation for these obstructions.

An obstruction is defined by the state as “a dam or other obstacle in or across a waterway that denies free passage of fish at any time,” which includes “(a) the inability of fish to expeditiously discover the entrance to a fishway or other device installed to assist their passage; (b) the inability of fish to freely pass through a fishway or other device provided to assist their passage; or (c) the absence of a fishway or other device to assist the passage of fish” (WAC 220.120.030).

The installation of bridges and other crossing structures over streams and rivers, which may be obstructions to fish passage, is regulated by the State Hydraulic Code Rule (WAC 220.110.070). The purpose of this statute is to “ensure free and unimpeded fish passage for adult and juvenile fishes and [to] preserve spawning and rearing habitat.” The code contains criteria for the upper limits of water velocities, flow depth, and hydraulic drops with which a structure should be designed so that it will not obstruct migrating trout and salmon. A provision is also included in the code that requires the owner of a bridge or crossing structure to make repairs if it becomes a hindrance to fish passage.

In addition, two other state statutes restrict fish passage impedance by obstructions other than crossing structures. Under RCW 77.16.210, the owner or manager of an obstruction is required to provide passage of game fish around the structure. Passage can be provided by a fishway (fish ladder) or a fish protective device that allows the free passage of fish around the obstruction.

RCW 75.20.060, which also mandates the remediation of fish obstructions, states that the fishway must be approved by the director of WDFW. Further, the approved fishway needs to be maintained in an effective condition and continuously supplied with sufficient water to freely pass fish. A provision within this same title contains a statute governing mitigation if fish passage around the obstruction cannot be provided (RCW

75.20.090). This statute allows a hatchery or fish cultural facility to be provided if fish passage is impractical, and also requires approval by the director of WDFW.

The statutes discussed here are relevant to the HCP Watershed management conservation strategies and anadromous fish conservation strategies. The watershed management mitigation and conservation strategies (Section 4.2) include a commitment by the City to upgrade, replace, or remove culverts which block fish passage. The anadromous fish conservation strategies (Section 4.3) include several elements to mitigate the fish obstructions created by the diversion dam on the Cedar River at Landsburg.

REGIONAL AND LOCAL ANADROMOUS FISH CONSERVATION PLANNING EFFORTS

Anadromous fish and their habitats in the Lake Washington Basin (of which the Cedar River is a part) are currently receiving considerable attention from state, Tribal, and local governments, as well as concerned citizens throughout the region. A number of projects designed to protect and restore fish populations and habitat are in various stages of development and implementation. These projects range from the headwater areas to the outlet of Lake Washington at the Ballard Locks. The City's Cedar River HCP has been designed to link with and complement these efforts.

KING COUNTY BASIN PLANNING INITIATIVES

King County has sponsored substantial planning initiatives in a number of the important subbasins of the Lake Washington Basin in an effort to protect water quality and fish habitat. The first step in this process is a comprehensive, landscape-scale assessment of current physical and biological features and conditions in each subbasin. This information is used to develop land-use prescriptions and habitat restoration recommendations that target the protection of water quality and fish habitat while attempting to manage the effects of flooding on human facilities and activities. The assessments and recommendations are compiled in a basin plan for each subbasin. Implementation of the plan is guided, at least in part, by basin councils comprised of interested citizens, state and Tribal fish resource managers, and local government officials. Substantial resources have been directed toward public education and outreach during plan development and implementation. Consequently, the basin planning process provides an excellent vehicle for including the public in habitat protection and restoration efforts.

Basin plans have been completed for the Cedar River, Issaquah Creek, Bear Creek, and the East Lake Sammamish Plateau. The Cedar River Basin Plan is of particular interest in relationship to the City's HCP. This plan describes conditions and makes recommendations for the lower one-third of the Cedar River subbasin, which is the portion of the basin downstream of the City's ownership boundary. The plan recommends a comprehensive set of land use and surface water management prescriptions and has identified over 80 fish habitat protection and restoration opportunities throughout the lower basin (King County 1993, 1998). Several key habitat acquisitions and restoration projects have already been completed. Additional projects are contingent upon securing funding and the cooperation of property owners, and conducting further feasibility analyses.

The City plays a significant role in the Cedar River Basin in managing its water and electric utilities, and the Cedar River Municipal Watershed, which constitute about two-third of the area of the basin. Thus, this HCP has an important relationship with the Cedar River Basin Plan. The HCP includes provisions for instream flows to protect fish habitat, including funding for habitat restoration projects in the lower basin (Section 4.4); funding for anadromous fish mitigation, including funding for habitat restoration projects in the lower basin (Section 4.3); measures to protect and restore habitats in the municipal watershed (Section 4.2), and relevant research and monitoring (Section 4.5).

MUNICIPAL INITIATIVES

A large number of municipal governments occur within the Lake Washington Basin. Many of these governments support surface water management utilities and other entities that strive to protect water quality and aquatic habitat within the boundaries of their respective jurisdictions. In an effort to better coordinate these activities, King County recently sponsored a process that brings these entities together in a cooperative regional initiative that is tackling the challenges of protecting and restoring water quality and fish habitat while improving flood management practices.

Two separate forums have been created in the Lake Washington Basin as a result of this process: The Cedar River/Lake Washington Forum and the Lake Sammamish Forum. Each forum is focused on issues within its respective subbasin; however, both forums recognize the intimate linkage between the subbasins and are making efforts to coordinate their activities within the Lake Washington Basin as a whole. The forums have identified key habitat protection and restoration activities throughout the Lake Washington Basin and are presently attempting to reach agreement on project priorities and funding mechanisms.

ADDITIONAL COLLABORATIVE FISH CONSERVATION EFFORTS

In 1989, the Washington State Legislature passed Senate Bill 5156 (SB 5156) to create a vehicle for resolving a long-standing dispute between the City of Seattle and the State of Washington over the effects of the migration barrier created by the Landsburg Diversion Dam on Cedar River sockeye salmon. According to the provisions of SB 5156, as codified in RCW 75.52.110, the state will consider that the City has, at a minimum, compensated for the lost sockeye salmon spawning habitat upstream of the Landsburg diversion if the City funds the planning, design, construction and operation of a spawning channel capable of producing "...at a minimum, fry comparable in quality to those produced in the Cedar River and equal in number to what could be produced naturally by the estimated 262,000 adults that could have spawned upstream of the Landsburg diversion" (RCW 75.52.120).

The legislation also established interagency technical and policy committees to oversee the planning, design, and construction of the project. Subsequent work by these committees, with support from James M. Montgomery Consulting Engineers Inc., established that the proposed mitigation facility must have an annual production capacity of 34 million fry to adequately compensate for the lost productive capacity upstream of Landsburg Dam (James M. Montgomery, Inc. 1990).

According to the provisions of SB 5156, the mitigation facility was to have been constructed in 1991. Although a comprehensive siting report (James M. Montgomery, Inc. 1990) and final EIS (Parametrix 1991) were completed prior to the legislative deadline, construction of a proposed spawning channel and hatchery were postponed as a result of emerging concerns over declines in the sockeye population and poor survival of juvenile sockeye in Lake Washington. Land use conflicts at the preferred location for the spawning channel also contributed to the delay in construction.

In response to this situation, the policy committee established by the legislation initiated a two-element program to improve their understanding of the factors controlling the survival of juvenile sockeye in Lake Washington, while attempting to maintain the population at a level from which it might readily recover. One element of the program was the construction and operation of an interim sockeye hatchery applying new fish culture techniques recently developed in Alaska to produce high quality, disease-free sockeye salmon fry (McDaniel et al. 1994). The interim hatchery is funded by the City of Seattle and operated by the WDFW. The program has three primary objectives which are: (1) to test the efficacy of the new Alaskan fish culture techniques with Cedar River sockeye; (2) to reduce the rate of decline in the population by increasing fry recruitment; and (3) to provide marked fry in support of the second element of the recovery program, the Lake Washington Ecological Studies.

The hatchery program has gradually expanded since 1991 and has been successful in consistently producing high-quality, disease-free fry for release into the Cedar River. Production peaked in 1997 with the release of over 14 million fry. Otolith samples of sockeye fry and adults have been collected to evaluate survival of fry released by the hatchery relative to fry produced through natural spawning. Samples have been collected since 1997, and otolith sampling is expected to continue. Samples are currently being analyzed by WDFW.

The Lake Washington Ecological Studies program is a suite of six major study components that are being implemented over a 5-year period to better understand the factors contributing to poor survival of juvenile sockeye salmon during their 14-month residence period in the lake. Technical leadership for the studies is provided by staff of WDFW with support from participating researchers and funders at the University of Washington, the Muckleshoot Indian Tribe, the City of Seattle, the City of Bellevue, King County, and the ACOE. In 1997, fundraising, administration, and coordination responsibilities for this program were placed in the hands of the Lake Washington/Cedar River Forum discussed above. At this time, the studies were expanded to address the factors influencing the survival of juvenile salmonids as they migrate through the Ballard Locks and to begin testing methods to improve downstream passage conditions. The data collection for the studies is scheduled to be completed in 1998, with final reports expected in 1999.

TRI-COUNTY EFFORT TO ADDRESS LISTING OF CHINOOK SALMON

Following the March 1998 proposal to list Puget Sound chinook salmon as threatened under the ESA, the County Executives of Pierce, Snohomish and King County assembled a collaborative effort among the local, state, federal, and Tribal governments to create a recovery plan for central Puget Sound. This response is one of several within the range

of Puget Sound chinook, which includes 12 counties in the Puget Sound region. Puget Sound chinook were listed March 24, 1999, as threatened under the ESA.

While the Tri-county effort have been purely voluntary on the part of the participating governments, the Governor's salmon recovery team and NMFS have focused attention on the Tri-county effort as critical to the strategy for assembling the necessary recovery actions for chinook salmon if NMFS should issue a final rule under section 4(d) of the ESA prohibiting take of chinook salmon. The governments participating in the Tri-county effort, including the City of Seattle, are focused on developing watershed-based plans, strengthening land use controls to protect habitat, and coordinating government activities with regard to various technical, scientific, funding, and legal issues.

2.3.8 Safe Drinking Water Act and the Surface Water Treatment Rule

INTRODUCTION

Public water systems are required to comply with the provisions of the federal Safe Drinking Water Act (SDWA, 42 U.S.C. sec. 300f *et seq.*) and its associated regulations, as developed and implemented by the United States Environmental Protection Agency (EPA) and the Washington Department of Health (WDOH). The SDWA was originally enacted by Congress in 1974, and it was reauthorized and amended in 1986 and 1996.

The most significant regulatory efforts from the SDWA and its amendments that have a direct bearing on the City's HCP are the existing Surface Water Treatment Rule (SWTR) and the future Enhanced Surface Water Treatment Rule. Because the Cedar River water supply is a surface water supply, the City must meet certain regulatory standards at its raw water intake at Landsburg that were developed to protect public health. The City's obligations under the SDWA and, more generally, to protect public health have been major constraints on developing this HCP. Of particular concern is the issue of passage of thousand of anadromous fish above the raw water intake at Landsburg. Upstream passage of anadromous salmon and trout has been effectively blocked since the Landsburg Diversion Dam was first constructed in 1901.

Because salmon die after spawning, the concern with passing these fish above the intake is explicitly related to the potential presence of thousands of fish carcasses in the river upstream of the Landsburg water intake. Because of this concern, the City conducted a risk assessment to serve as the basis for the decision as to whether to allow anadromous fish above Landsburg, and, if passage were to be allowed, whether to limit the number of fish to be passed (see Section 3.2.5 and Appendix 5).

It is important to note at the outset that this is not a simple issue of the cost of water treatment to deal with salmon carcasses. Even with expensive treatment, the risks to public health posed by hundreds of thousands of carcasses would be significant, and it is unlikely that the regulatory agencies would approve any plan that would create such risks.

Also of concern for compliance with the SDWA and protection of public health are decisions regarding municipal watershed management. The remainder of this section provides general background that is intended to help the reader of this HCP appreciate

the public health issues that bear on how decisions in developing the HCP were made with respect to both watershed management and anadromous fish passage at Landsburg.

SURFACE WATER TREATMENT RULE AND THE CEDAR SYSTEM

The SWTR was promulgated in June 1989. It focuses on ensuring that adequate microbial protection via disinfection and filtration is provided to protect consumers of surface water sources from the effects of *Giardia* (a protozoan parasite) and viruses. It requires systems with surface water sources to install filtration treatment, unless 11 filtration avoidance criteria can be met. Meeting the 11 criteria demonstrates that the source water is of a high quality, that existing disinfection treatment is adequate to reliably and consistently kill *Giardia* and viruses, and that the quality of the water within the distribution system is maintained.

Seattle's Cedar River source met these 11 criteria in 1991, 1993, 1994, 1995, 1996, and 1997. In 1992, the Cedar did not meet 1 of the 11 filtration avoidance criteria. The exceeded criterion was for levels of fecal coliform in the raw water prior to treatment. The criterion requires that at least 90 percent of samples collected at least daily during any 6-month period must contain less than 20 fecal coliforms per 100 milliliters. The purpose of this criterion is to monitor the ongoing quality of the source water to validate that disinfection alone is sufficient to kill bacteria at these relatively low levels and other possibly associated pathogens or viruses of concern.

As a likely result of drought conditions during 1992 and an associated increase in wild animal activity in or near the mainstem of the Cedar River (because many of the tributaries had lower flows than normal, and some were dry), increased fecal coliform concentrations were detected in the source water. Treated water, as delivered to customers, continued to meet water quality regulations during this period.

As a result of this exceedance, an Agreed Order was executed between the City of Seattle and WDOH in 1994. The Agreed Order required Seattle to evaluate options for complying with the SWTR, and to provide a recommendation based on the evaluations, for WDOH's approval. Subsequently, detailed work plans were developed to implement the strategy.

The City of Seattle ultimately recommended the development of an ozonation facility to treat Cedar River water, with facilities master-planned to include particle removal (filtration) technologies at some time in the future if deemed appropriate and necessary. With input from the EPA, WDOH approved the facility. The details of the technical evaluations leading to this recommendation can be found in the Cedar River Surface Water Treatment Rule Compliance Study.

Ozonation is a disinfection technology that has been found to be very effective in killing both *Giardia* and *Cryptosporidium*, another protozoan parasite. *Cryptosporidium* is of particular concern to immune deficient individuals, such as the elderly. Ozonation technology has been used extensively in Europe for many years, but not as extensively in the United States until recently.

The SWTR does not specifically provide the option of remaining unfiltered following an exceedance of the fecal coliform criterion in the source water, although it does with some of the other criteria if unusual or unpredictable circumstances existed. Based on

the City's extensive commitments to watershed ownership, protection, and management, and the unusual nature of the circumstances in 1992, WDOH and EPA agreed that it was appropriate to allow Seattle to investigate non-filtration options in addition to filtration options for complying with the SWTR.

PLANNED OZONE TREATMENT

Within the 1996 SDWA reauthorization, specific legislative language was included to allow states to consider alternatives to filtration for water systems with protected watersheds meeting several criteria. Section 106 of the SDWA contains the reference legislative language. This language provides the legal basis for WDOH to review and approve Seattle's recommendation of ozone disinfection for the Cedar River supply. The EPA must also concur with the approval, and there are significant ongoing requirements for source water protection, monitoring, and reporting with which Seattle will have to continue to comply.

During the development of the recommendation, various options were evaluated. These included the recommended option (ozone master-planned for future filtration and particle removal) and a filtration and particle removal facility built at the same time. The latter option still presumed the current high quality of raw water based on the continuation of the existing levels of watershed protection and control, including no significant change in anadromous fish passage above Landsburg that could degrade raw water quality. The capital and operations and maintenance (O&M) costs associated with these two options are identified in Table 2.2-1.

Table 2.2-1. Capital and operations and maintenance cost ranges for 275 MGD facility options.

	Capital Cost (\$M)	Annual O&M (\$M)
Ozone master-planned for future filtration	\$101-\$128	\$3.3-\$3.8
Filtration, including ozone	\$208-\$235	\$6.8-\$7.3

Based on the current schedule, the ozonation facilities on the Cedar River supply are anticipated to be on line in 2003 or 2004. No specific commitments have been made regarding the construction of particle removal technologies. Decisions related to the appropriateness and timing of such facilities would be based on the effectiveness of the City's efforts to protect and enhance the quality of the source, and on the effectiveness of the ozone and related treatment facilities to meet current and future source treatment and distribution system water quality regulations and goals.

2.3.9 History of Cedar River Fisheries Instream Flow Negotiations Prior to 1994

The modern conflict over instream flows for fish in the Cedar River originated in the late 1960s. During this period, runs of sockeye salmon into the river began to increase dramatically. Sockeye escapements grew from less than 25,000 fish per year in the early 1960s to over 200,000 fish per year in the latter part of that decade (Washington Department of Fisheries data in Stober and Hamalainen 1980). As a result of this

spectacular increase in the numbers of fish, the Washington State Department of Fisheries (WDF) partially funded and cooperated with the U.S. Geological Survey (USGS) to complete the first instream flow study done on the Cedar River (Collings et al. 1970).

The regulation of instream flows affects habitat for anadromous fish in several ways that are often included in modern studies and negotiations regarding establishment of flow regimes on regulated rivers. Water velocity, water depth, substrate type (i.e., the type of bottom, such as gravel, cobbles, boulders, or mud), and cover for fish (such as streambanks, logs, or large boulders) are four important factors that all affect the quality of habitat. For example, species in which the adults are relatively small, such as sockeye, generally choose shallower, slower water than larger species, such as chinook. Fry and juveniles, because of their smaller size and weaker swimming ability, obviously require slower water than adults.

Water released from dams can affect all four of the factors listed above. The amount of water released obviously affects velocity and depth, and depth and velocity in turn can determine what substrates and cover are available.

Different species, and different life stages within species, choose sites in a flowing river for different functions, such as feeding, resting, hiding, and spawning. Fisheries biologists often aggregate these functions by life stage into *rearing* for juveniles, and *holding* and *spawning* for adults. The studies described below, including the USGS study in 1970, considered some or all of these factors for the different salmonid species of interest in the river.

In 1971, the WDOE used WDF's recommendations from the 1970 study to establish minimum instream flows in the Cedar River. These new flows were to be measured at the USGS gage in Renton. A key part of WDOE's new standards was the requirement of 480 cfs at certain times of year as the single discharge rate (level of flow) that provided maximum sockeye salmon spawning habitat.

The City of Seattle disagreed with the scientific basis of the results of the USGS's instream flow study and with WDOE's new minimum instream flows. Because of the disagreement, the City funded the Fisheries Research Institute (FRI) at the University of Washington to conduct a second Cedar River instream flow study (Stober and Graybill 1974) to develop a better technical basis for an instream flow regime. This new study used a methodology basically similar to the one used in the USGS study.

However, for the FRI study, one key difference was that sockeye spawning criteria were custom-developed for Cedar River fish by measuring depths and velocities in the Cedar River at 1,239 redds (nests). This procedure had not been done in the earlier USGS study. Instead, the USGS study used depths and velocities from the scientific literature that were recommended as design criteria for sockeye spawning channels (Clay 1961); these recommendations had been based upon field work performed in tributaries of the upper Columbia River (Chambers et al. 1955).

The primary result of the FRI study was a new recommendation of 250 cfs as the single flow, when measured at Renton, that provided the most sockeye salmon spawning habitat. WDFW disagreed with the results of this new study. Finally, in 1979, WDOE published its Instream Resources Protection Program (IRPP) and adopted new minimum flows for the Cedar River (WDOE 1979; WAC 173-508-060).

Previously, the highest flow in the 1971 minimum flow regime was 480 cfs. In the new IRPP minimum flow standard, this number was reduced to 370 cfs. For the first time, the concept of a critical minimum instream flow was also introduced. A critical flow regime is a lower minimum instream flow standard for use in very dry years. It is typically designed to be implemented about once every 10 years. While the fisheries agencies and Muckleshoot Indian Tribe were not completely satisfied with these new IRPP flows, which they viewed as a compromise, they were much more satisfied than the City.

The City strongly disagreed with these new IRPP minimum instream flows at the time, because, in the City's view, the flows were not based on adequate and convincing technical data and arguments. The City reasserted its position that, in view of the circumstances summarized in Section 2.2.5, the state's new flow rule would not be binding on the City.

The City's Law Department has repeatedly asserted that the City's water claim (Section 2.2.5 and Appendix 11) predates and is superior to the state's authority to establish instream flows binding upon the City in a manner that could affect its water right. On the other hand, the City recognizes that it has important environmental responsibilities as a manager of water resources on the Cedar River. Because of this recognition, the City has recently attempted to follow the IRPP flow regime as a planning assumption and an operating target.

In an attempt to resolve the dispute over minimum flows, the Cedar River Instream Flow Committee was formed in 1986. It was comprised of representatives from the City, WDF, Washington Department of Wildlife (WDW), WDOE, USFWS, NMFS, the Muckleshoot Indian Tribe, and the ACOE. The group decided to conduct a third Cedar River instream flow study using the relatively new Instream Flow Incremental Methodology (IFIM) (Section 3.3.2). The City funded this new study, and the agency and Tribal biologists were thoroughly involved in it. Their involvement included participation in consultant selection, study design, study implementation, and review of study results.

Cascades Environmental Services, a consulting firm, was selected to conduct the investigation. In addition to the standard IFIM study, Cascades Environmental Services was asked to investigate three additional topics: (1) gravel scour during high flows and the flows at which eggs in the gravel might be affected by scour (risk zone analysis); (2) the exact relationship between spawning flows and subsequent flows needed for successful egg incubation (effective spawning habitat analysis); and (3) an examination of how sockeye spawning habitat could be maximized by manipulating flow levels during the spawning season (cumulative spawning habitat analysis). Cascades Environmental Services completed all studies in 1990 and published their results in 1991 (Cascades Environmental Services 1991). Informal discussions and follow-up work ensued, and more formal negotiations between the City and the other parties began in 1994 in the context of this HCP. The results of these cooperative studies, with subsequent modeling, analysis, and negotiations, formed the basis for development of the instream flow regime proposed in this HCP (Section 4.4).

2.3.10 Municipal Watershed Management

BACKGROUND

When the City of Seattle decided to use the upper part of the Cedar River Basin for its municipal water supply in 1889, the area was owned by private individuals, companies, the State of Washington, and the federal government. The City's leaders soon adopted a strategy of complete ownership as the best means to protect the source of the region's water, and the City began acquiring ownership of the watershed in the 1890s.

As it gradually acquired ownership through purchase, exchange, and condemnation, the City entered into a series of agreements with other landowners, both formal and informal. The purpose of these agreements was to effect increasing control over human activities in the watershed to protect the raw water supply. Upon completion of a land exchange with the USFS in 1996, the City had acquired ownership of virtually the entire 90,500-acre Cedar River Municipal Watershed

The municipal watershed has been considered closed to the public since about World War I, and access has generally been by permit or with supervision. The parks operated by the City at Landsburg and Rattlesnake Lake are outside the hydrographic boundary for the drinking water supply, and are open to the public during daylight hours. As discussed in Section 2.2.2, all points of entry by road into the closed portion of the watershed now have locked gates, and the watershed boundary is posted against trespass. Watershed inspectors, aided by other watershed staff, patrol the boundaries and interior of the watershed, looking for trespassers and any problems that might pose a risk to the drinking water supply.

Closure of the watershed and the surveillance program are key parts of the program to protect this unfiltered, surface water source (Section 2.3.8). All activities within the closed portion of the watershed now either require a permit or must be supervised. In addition to water supply and hydroelectric operations, current activities allowed in the watershed include scientific research; public education; limited recreation at several sites outside the hydrographic boundary of the municipal watershed; management of cultural resources – both sites and artifacts; and limited timber harvest (with approval of the Seattle City Council).

HISTORY OF TIMBER HARVEST THROUGH 1985

Logging in the watershed began in the 1880s, and proceeded from the western lowlands to the crest of the Cascade Mountains, and from low elevation to high elevation as logging shifted from railroad-based to truck-based in the 1930s. Prior to 1900, little timber was harvested, but harvest in the early twentieth century was intensive. Records of early timber harvest in the watershed are poor, but estimates through 1985 are given in Table 2.2-2 below.

Table 2.2-2. Estimates of timber harvest in the Cedar River Municipal Watershed through 1985.

Period	# of Years	Acres	Volume (mmbf*)	Area/year (Ac/year)	Vol./year (mmbf/year)
Prior to 1900	–	2,479	–	–	–
1900-1923	24	29,684	2,800	1,237	116.6
1924-1943	20	13,405	1,000	670	50.0
1944-1961	18	9,055	544	503	30.2
1962-1985	24	16,628	788	693	32.8
TOTAL		** 68,772	** 5,132	800	59.7

* mmbf = million board feet (a standard unit of wood volume)

** Excludes harvest prior to 1900

Over the course of the past century, the City was responsible for harvesting roughly 10 percent of the total timber volume removed from the watershed. Net revenues from timber harvest averaged about \$1 million per year during the 1960s and 1970s, and the revenues were used to fund a variety of water utility activities, effectively subsidizing water rates.

Until recently, virtually all harvest was of old-growth forest. Clearcutting was the normal harvesting method, and any snags or defective trees left at initial harvest were later removed as fire hazards. Landowners relied on natural regeneration until about 1924, when the City established a nursery and began reforesting areas that had burned or had failed to naturally regenerate as a result of severe site conditions.

Beginning in 1945, with the first cooperative agreement among landowners, the Cedar River Logging Agreement, the annual rate of harvest was set at 35 million board feet. In 1962, the City, the USFS, and remaining private landowners entered into a cooperative agreement for managing timber and protecting the watershed. In the agreement, annual cuts were again limited to 35 million board feet, based on a 100-year harvest rotation for sustained production. From 1962 through 1985, an average of about 690 acres per year – about 33 million board feet of timber – was harvested in the watershed. About 57 percent of this total was harvested by private timber companies, 33 percent by the USFS, and 10 percent by the City. Virtually all timber harvested was from old-growth forest.

SECONDARY USE ORDINANCE (1989)

In part because of public concern about continued harvest of old-growth forests in the watershed, in 1985 the Seattle City Council declared a moratorium on City timber harvest and initiated a comprehensive public review of municipal watershed management policies. The review was based on the assumption that the *primary* purpose of the watershed was the production of high quality drinking water. The review focused on *secondary* uses of the watershed that would be compatible with that primary purpose. A broad-based, 17-member advisory committee conducted the review. After 3 years and over 30 meetings, the committee made recommendations to the Seattle City Council in 1988.

In 1989, new policies were adopted by the City Council in Ordinance #114632 that largely reflected the recommendations of the advisory committee. The policies reaffirmed the primacy of protecting the major source of the region’s drinking water by continuing the policy of closing the watershed to unsupervised activities. However, the

policies included some new directions in management of the watershed, including an increased focus on fish and wildlife habitat protection, public education, and scientific research. Some significant elements of the policies relevant to this HCP include direction to:

- Establish a large ecological reserve that includes all old-growth forest and between 50 and 65 percent of the land owned by the City in 1989, in which only commercial thinning might be allowed;
- Manage the reserve to develop old-growth forest communities;
- Pursue acquisition of remaining land and valuable old-growth habitat in the City's two watersheds, including the national forest land in the Cedar River Municipal Watershed as a first priority;
- Conduct a long-term timber harvest program in second-growth forest outside the ecological reserve, using best management practices, to fund the land and habitat acquisition until completed;
- Conduct timber salvage operations to protect water quality;
- Continue to avoid use of herbicides and to prevent and suppress forest fires, in order to protect water quality;
- Protect threatened and endangered species, including the northern spotted owl;
- Identify opportunities for protecting and restoring fish and wildlife habitats;
- Encourage appropriate scientific research;
- Expand the public education program in the watershed and construct an interpretive center at Cedar Falls; and
- Prohibit public access for general recreation, for fishing, except in those areas open to the public, and for hunting.

Subsequent to the passage of Ordinance #114632, and after years of negotiations between the City and the USFS, Congress in 1992 directed that the USFS exchange its remaining land in the watershed for land the City had acquired in several national forests in Washington (Cedar River Watershed Land Exchange Act of 1992, Public Law 102-453, enacted October 23, 1992). In 1996, the deeds were finalized for this exchange, which gave the City the approximately 17,000 acres of remaining federal land in the watershed. The deeds, pursuant to the Cedar River Watershed Land Exchange Act of 1992, specify that no old-growth forest be harvested and that no harvest be conducted in the Northern Spotted Owl Critical Habitat Unit WA-33 in east end of the watershed, except for highly limited reasons. The deed restrictions also prohibit subsequent disposal of the federal land by the City, and the building of new roads on the federal land within the spotted owl Critical Habitat Unit (CHU).

CITY TIMBER HARVEST IN THE CEDAR RIVER MUNICIPAL WATERSHED SINCE 1985

During the period 1986-1999, less than 500 acres of second-growth timber has been harvested on City land in the watershed. All such harvest was authorized by Seattle City Council ordinances. Nearly all of this timber was harvested expressly to save old-growth forest, through sales to raise revenue for acquisitions, agreements to defer old-growth harvest on federal land, or timber exchanges to acquire old-growth from private landowners. All logging was in previously harvested, second-growth forest on flat terrain away from any streams. For these harvest units, the City attempted to implement the concepts of New Forestry, developed as an alternative to tree farming (Franklin 1989). In this approach, live trees and snags, as well as other biological legacies of the original native forest, were retained during harvest. The purpose of these harvest unit designs was to create structure in the regenerating stands similar to stands regenerated by natural disturbances, such as fire.

During the same period, about 2,300 acres was harvested by the USFS and about 1,300 acres by private timber companies. The last private harvest was in 1992, and the last USFS harvest was in 1994.

REMAINING OLD-GROWTH FOREST

After about a century of logging in the watershed, a little less than 14,000 acres of original, native forest remains. Some, though not all, of this forest would meet the ecological definition of old-growth forest (Franklin and Spies 1983). All of this native forest is more than 190 years old, and some approaches 800 years old. Most of this original native forest was generated by large-scale forest fires that occurred in the region about 350 and 700 years ago.

DRINKING WATER QUALITY AND WATERSHED MANAGEMENT

During the early part of the century, there were serious problems with the quality of the drinking water from the watershed. These problems – specifically the risk of human diseases such as typhoid – were largely related to human presence and activities in the watershed. Human activities primarily were associated with logging camps, sawmills, and towns, all of which lacked adequate sanitation. The first report recommending strict control over sanitation in the watershed was issued in 1912.

While timber harvest and construction of roads for a century have clearly produced negative impacts on surface waters and aquatic habitats in the watershed, the current quality of the raw water from the Cedar River Municipal Watershed is some of the best among the major municipal water supplies in the United States. The primary impact of logging on drinking water quality is an increase in turbidity, a measure of the amount of particulate matter (mostly soil) in the water. Turbidity levels in recent years have on the whole been low relative to regulatory standards.

A high level of turbidity is a concern largely because it interferes with the chlorine disinfection process, which is the primary means Seattle Public Utilities uses to inactivate bacteria of concern to human health. Virtually all of the recent concerns for turbidity levels at the raw water intake have been the result of storm events, which naturally cause increases in turbidity from stream bank erosion and, less frequently, landslides.

The two causes of recent turbidity increases at the Landsburg Dam water intake have apparently been natural soil conditions in the Taylor Creek subbasin in the lower watershed, which has very fine soils at the stream margins, and the failure of beaver dams in the lower watershed, which typically trap sediment. High turbidity loading to the reservoir is generally not a drinking water issue because particulate matter is diluted and settles out in the reservoir. However, during the 1990 “100-year” storm event, reservoir turbidity levels did become a concern.

It is likely that turbidity loading to the reservoir has been increased over natural conditions by the presence of poorly designed forest roads on steep slopes, some of which fail during storms, and high levels of sediment in tributaries to the reservoir as a result of past road problems and removal of streamside vegetation during timber harvest. Despite these effects, the rate of reservoir in-filling by sedimentation has been very low.

2.3.11 State Forest Practices Act

The Washington Forest Practices Act (RCW 76.09) and Forest Practices Rules and Regulations (WAC 222-08) are the principal means of state regulation of activities on the City’s forest lands. Administered and enforced by the WDNR, the Forest Practices Rules and Regulations set standards that address many issues including reforestation, clearcut size, road design standards (including culvert sizes and spacing), watershed analysis procedures, riparian area buffers, wetland protection, and rules for threatened and endangered species. Provisions within the Forest Practices Rules and Regulations ultimately influence fish and wildlife habitat by regulating how and when certain activities may take place on forest lands. The City’s Forest Management Guidelines (Appendix 13) usually exceed the requirements of the State Forest Practice Rules (Section 4.2).

The Forest Practice Rules have a special relationship to Habitat Conservation Plans regarding critical habitats. When applications for proposed forest practices are submitted to the WDNR, they are assigned to one of four classes established by the Forest Practices Board. Certain forest practices in “critical wildlife habitats” (state terminology) and “critical habitat” (federal terminology) of threatened and endangered species require the most sensitive designation, Class IV-Special (WAC 222-16-080). Forest practices classified as Class IV-Special are subject to environmental review under SEPA, Chapter 43.21 RCW. However, if the forest practices are “consistent” with a USFWS-approved conservation plan (HCP) and Incidental Take Permit for a particular species, they are not classified as a Class IV-Special practice because of their location in critical wildlife habitat, and no additional environmental review under SEPA is required.

2.3.12 Forest Management Plan

After the final HCP is approved, the City may prepare a companion Forest Management Plan for the Cedar River Municipal Watershed that is consistent with the final HCP. If prepared, the Forest Management Plan would reflect the objectives, constraints, and guidelines of the final HCP. It would also reflect any amendments made to City Ordinance #114632, which specifies goals for watershed management, including timber harvest, and prescribes use of timber revenues. Consistent with the foregoing purposes, the Forest Management Plan would be a regularly updated document with more detail on

implementation for: (1) forest inventory, timber stand projections, and harvest scheduling (if appropriate); (2) protection of cultural resources during timber harvest; (3) the silvicultural program, including reforestation and thinning to restore and improve habitat; (4) harvest monitoring (if appropriate); and (5) program costs.

2.4 HCP Planning Objectives

In preparing its HCP, the City developed a number of specific objectives related to the Endangered Species Act, other laws and regulations, constraints resulting from its public utility obligations, environmental stewardship, prior city initiatives, and sustainable management. Additionally, in response to recent attention to HCPs by the public and scientists, the City has modified some of the original objectives and incorporated others to address some of the key issues raised.

2.4.1 Overall Goal of the HCP

The overall goal of the HCP is to implement conservation strategies designed to protect and restore habitats of all species of concern that may be affected by the facilities and operations of the City of Seattle on the Cedar River, while allowing the City to continue to provide high quality drinking water and reasonably priced electricity to the region.

2.4.2 Objectives Related to the Endangered Species Act

The objectives of this Habitat Conservation Plan that are related to the Endangered Species Act include the following:

- Meet all requirements of the Endangered Species Act with respect to water supply operations, hydroelectric operations, and land management by the City in the Covered Area (as defined in the Implementation Agreement, Appendix 1);
- Meet all legal requirements for an Incidental Take Permit for species addressed in the HCP;
- Make an appropriate contribution to the conservation of unlisted species covered by the HCP and treat them as if they were listed, with the intent of reducing the likelihood that listing may become necessary for some species;
- Provide a net benefit, compared to current conditions, for both listed and unlisted species covered by the plan, contributing to the recovery of any species that is now or, in the future, may be listed as threatened or endangered;
- Obtain agreement that no additional commitment of resources would be required of the City should unlisted species covered by the HCP become listed during the term of the HCP;

- Develop scientifically sound conservation strategies for at-risk species and their habitats, and provide adequate monitoring to ensure the HCP is working as intended during its implementation; and
- Recognize uncertainty, and develop and implement an HCP that can be adaptive enough to (1) respond to changes in regulations or conditions, (2) incorporate and make use of the discovery of new scientific information, and (3) address contingencies, yet at the same time provide an improved degree of certainty for purposes of water supply planning.

2.4.3 Objectives Related to Instream Flows

The objectives of this Habitat Conservation Plan that are related to the Instream Flows include the following:

- Implement a beneficial instream flow regime, based on the best current scientific information, that will help provide high quality fish habitat throughout the potential range of anadromous fish in the Cedar River from Lake Washington to the natural migration barrier formed by lower Cedar Falls;
- Reduce the risks of stranding juvenile salmonids and dewatering salmonid redds to levels that will help promote the full recovery and persistence of anadromous salmonid populations in the Cedar River;
- Provide an instream flow regime that significantly improves existing habitat conditions for all four species of anadromous salmonids in the Cedar River over existing conditions; and
- Help support measures that will contribute to improving downstream migration conditions for juvenile salmonids at the Hiram Chittenden (Ballard) Locks.

2.4.4 Objectives Related to City Public Utility Functions and Constraints

Objectives of this Habitat Conservation Plan that are related to public utility functions and constraints include the following:

- Ensure the ability of the City to provide a reliable water supply of high quality drinking water to local residents, commercial and industrial users, and wholesale water customers in the region, and to provide reasonably priced electricity to customers;
- Maintain the existing water supply capacity from the Cedar River Municipal Watershed, as measured by average annual firm yield, and preserve the operational flexibility necessary to water supply operations;
- Develop and implement a program for managing instream flows that is consistent with the City of Seattle Water Shortage Contingency Plan (Appendix 10);

- Protect and improve the quality of the raw drinking water supplied from the City’s Cedar River Municipal Watershed;
- Preserve flexibility to meet water needs for people and fish that may be identified in the future;
- Develop cost-effective conservation strategies that control overall costs of the HCP, yet accomplish its fundamental purposes; and

2.4.5 Objectives Related to Prior City Initiatives

Objectives of this Habitat Conservation Plan that are related to prior City initiatives include the following:

- Develop and implement an HCP that builds upon existing City of Seattle laws, regulations, policies, and initiatives, including but not limited to: (1) Ordinance #114632 (Appendix 12), which established specific policies for managing the Cedar River Municipal Watershed (Appendix 12); (2) Ordinance #115204, which directed negotiation of a comprehensive settlement for the blockage to anadromous fish at Landsburg Diversion Dam; and (3) development of a technically sound, multi-agency agreement on instream flows based on cooperative studies begun in 1986

2.4.6 Objectives Related to Mitigation for Fish Blockage at Landsburg Dam

Objectives of this Habitat Conservation Plan that are related to mitigation for fish blockage at Landsburg Diversion Dam include the following:

- Allow passage of selected species of anadromous fish upstream of the Landsburg Diversion Dam and water supply intake to the extent possible without jeopardizing the quality of the City’s drinking water supply;
- Implement biologically sound, short- and long-term solutions that help provide for the recovery and persistence of healthy, harvestable runs of sockeye, coho, and chinook salmon and steelhead trout in the Cedar River in a manner that maximizes the reproductive fitness of these fish populations while minimizing genetic, ecological, and demographic risks to wild salmonid populations in the Lake Washington Basin; and
- Develop and implement anadromous fish restoration measures that fully mitigate for future impacts of the anadromous fish migration barrier created by the Landsburg Diversion Dam.

2.4.7 Objectives Related to Public and Scientific Concerns about HCPs

Objectives of this Habitat Conservation Plan that are related to public and scientific concerns about HCPs include the following:

- Involve the public, scientists, and other agencies in implementation of the HCP, including monitoring the effectiveness of the HCP;
- Address public concerns about such issues as protection of water quality and aquatic habitats, and contribute to the long-term survival and recovery of at-risk species;
- Use the best scientific information available to develop the HCP, conduct key studies where important information is lacking, and, where feasible, develop conservative strategies in cases for which risk is high;
- Use scientific and other technical information effectively in developing and implementing the HCP;
- Develop an HCP that provides a net benefit for species covered by the HCP and contributes to recovery of threatened and endangered species; and
- Provide adequate monitoring, based on measurable biological objectives, to ensure compliance with the plan; determine effectiveness of mitigation; track trends in habitats and key species populations; verify that the biological goals of the HCP are being met; and provide for flexible, adaptive management of conservation strategies.

2.4.8 Objectives Related to Sustainable Management

Objectives of this Habitat Conservation Plan that are related to sustainable management include the following:

- Develop an HCP that supports sustainable management of the watershed as a source of high quality drinking water and an adequate supply of municipal and industrial water;
- Develop an ecosystem-based HCP that provides for human use of natural resources, particularly for water supply, but sustains natural processes that create and maintain habitats for at-risk species; sustains small- to moderate-scale processes and disturbances important to a healthy watershed; maintains biological diversity with respect to species and communities; protects native species; and does not reduce the adaptive potential of species; and
- Incorporate an approach to watershed management that, as practicable, helps avoid catastrophic events such as forest fires that would jeopardize drinking water or habitats for at-risk species.