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1 **1. Executive Summary**

2
3 **Tacoma Water's Green River Habitat Conservation Plan**



Tacoma has relied on the Green River as its primary source of water supply since 1913. It is contemplated that this reliance on the Green River will not only continue into the foreseeable future, but will also be increased with the construction of Tacoma's Second Supply

9 Project, a major regional water supply project. The supply of water to 300,000 people
10 places a strain on the natural environment associated with the Green River source of
11 water supply. A forecast of continued growth in this region further complicates water
12 supply versus natural resource protection issues. The Tacoma Water utility has listened
13 and does care about the costs, negative effects, and hardships that our efforts to meet our
14 responsibilities for water supply may cause in relation to natural resource preservation.
15 This Habitat Conservation Plan puts forth the best program that Tacoma could develop to
16 satisfy both water supply concerns and to protect the natural resources of the Green River
17 system in the future.

18
19 Tacoma has pursued a number of projects, now known collectively as the Second Supply
20 Project, because it involves the second supply pipeline from the Green River to Tacoma,
21 for more than 20 years. Efforts by Tacoma to design and permit this project have
22 recognized the importance of associated environmental considerations. The recent listing
23 of Puget Sound chinook salmon and bull trout as threatened under the Endangered
24 Species Act adds further weight to the environmental concerns associated with water
25 supply operations. Tacoma Water and its project partners, whose primary mission is to
26 protect public health and provide for the water supply needs of an expanding population
27 in the Puget Sound area, now find themselves in a position where both future water
28 supply and environmental protection must be considered in their actions.

29
30 Tacoma Water has taken the lead in the development of the Second Supply Project since
31 its inception. As the largest utility in Pierce County, with both direct and wholesale
32 services outside of the city limits of Tacoma and outside of Pierce County, Tacoma
33 Water is an appropriate agency to lead the development of the Second Supply Project.
34 Given Tacoma's mission to provide for future water supply for its existing and future
35 customers, it would be irresponsible for Tacoma Water not to address these water supply
36 and environmental preservation issues.

37



1 The growth projections for Pierce and South King Counties indicate that existing water
2 utilities in those counties will be unable to meet future water demands with the current
3 sources of supply available to them. This water supply shortage situation is most critical
4 for the City of Kent, Lakehaven Utility District and Covington Water District. In
5 addition, outlying communities served by the City of Seattle need additional water and
6 the City of Tacoma and potential wholesale customers of Tacoma in Pierce County will
7 require additional water in the future.

8
9 Throughout its efforts to design and permit the various elements of the Second Supply
10 Project, Tacoma has attempted to address environmental issues associated with water
11 supply development. The listings of Puget Sound chinook salmon and bull trout raised
12 this recognition of environmental issues to a high level and resulted in the decision by
13 Tacoma to implement a Habitat Conservation Plan for all Green River operations of its
14 utility. It is believed that the development of a Habitat Conservation Plan superimposed
15 upon the other permitting processes that Tacoma has participated in while resolving the
16 issues associated with its operations on the Green River, provides a reasonable, sensible
17 and responsible approach to addressing the dual responsibilities of water supply and
18 environmental protection.

19
20 When Tacoma Water began diverting water from the Green River in 1913, its sole
21 objective was to provide pure, clean, potable water to the citizens of Tacoma. At that
22 time the City took early steps to protect water quality in the interest of protecting the
23 public health of the citizens it served. These steps included limiting human access to
24 portions of the watershed and acquiring land adjacent to the Green River and its major
25 tributaries. At the time Tacoma also thought it necessary to limit fish access to the upper
26 watershed to protect public health. This action reduced fish production in the basin, but
27 at the same time attempts were made to make up the loss with the best tools available at
28 the time – fish production from hatcheries. In retrospect, it is unfortunate that protection
29 of public health and water quality also resulted in blocking access to up to 66 linear miles
30 of quality stream habitat in the Upper Green River watershed.

31
32 Since 1974, Tacoma has been required to comply with the provisions of the federal Safe
33 Drinking Water Act. The Act requires that unfiltered water systems, such as Tacoma's,
34 develop a Watershed Management Plan to protect water quality by controlling access to
35 the watershed. This has the added benefit of protecting the watershed from human
36 activities. Under this program, the City has developed agreements with landowners in
37 the watershed upstream of Tacoma's diversion dam to protect water quality. Tacoma has
38 developed a Forest Land Management Program, which emphasizes the protection of
39 water quality and natural systems. Although these efforts significantly improved the



1 protection of the watershed and water quality in the interest of protecting public health,
2 access to the upper watershed by anadromous fish remains blocked at the diversion dam.

3
4 During the 1980s and 1990s, a greater knowledge of disease transmission potential from
5 fish began to reduce concerns regarding the public health impact of fish above Tacoma's
6 diversion. In addition, a greater knowledge of fishery needs and requirements brought to
7 the forefront the value of the contribution upper watershed habitat provides the Green
8 River. Extensive scientific studies during the 1980s and 1990s, conducted by the City in
9 pursuit of the Second Supply Project and the Additional Water Storage Project at Howard
10 Hanson Dam, and an agreement with the Muckleshoot Indian Tribe, further
11 supplemented the formidable body of data regarding Green River fisheries and potential
12 approaches to its restoration and enhancement.

13
14 Since 1913, Tacoma has been the beneficiary of water from the Green River, both from
15 the standpoint of protecting the health of the citizens of Tacoma and from the economic
16 benefit which use of the water has brought to the City. Now the City is required by the
17 Endangered Species Act and by the expectations of its customers to make a major
18 commitment to contributing to the effort to reverse the trend of Puget Sound salmon
19 stocks toward extinction by minimizing the effects of its actions on the ecosystem.
20 Tacoma Water has a substantial arsenal of resources and knowledge at its disposal in
21 making this contribution to fish and wildlife species.

- 22
- 23 • Tacoma owns approximately 10 percent of the Upper Green River watershed
24 upstream of its diversion, with the ownership located in the valley floor and
25 adjacent uplands around the mainstem and its major tributaries.
 - 26 • The City has a substantial knowledge base of conditions in the Green River
27 watershed as a result of studies pertaining to the Second Supply Project and the
28 Howard Hanson Dam Additional Water Storage Project.
 - 29 • Development of an agreement with the Muckleshoot Indian Tribe enhanced
30 knowledge of the Green River fisheries and included major commitments by
31 Tacoma to protection of that resource.
 - 32 • Tacoma's Forest Land Management Plan emphasizes the protection of water
33 quality and natural systems in the upper watershed.
 - 34 • Agreements with landowners upstream of Tacoma's diversion provide
35 supplemental protection to water quality in addition to that required by state law
36 and regulations.
- 37



1 As a result of Tacoma's history on the Green River, as well as its plans for future use and
2 its commitment to future protection of the upper watershed, Tacoma made the decision to
3 pursue a Habitat Conservation Plan for its Green River operations. This Habitat
4 Conservation Plan is a significant commitment to the restoration and rehabilitation of
5 Green River fisheries. It is recognized that the use of the Green River for public water
6 supply comes at a cost. It is the goal of this Habitat Conservation Plan to avoid adverse
7 impacts where possible and to minimize and mitigate them where avoidance is not
8 possible.

9
10 Tacoma's Habitat Conservation Plan was very difficult to develop because it required
11 careful coordination between two major operating entities. The U.S. Army Corps of
12 Engineers' facility at Howard Hanson Dam and Tacoma's diversion create fisheries
13 impacts that can be addressed effectively only by working in a coordinated manner. This
14 situation is further complicated by Endangered Species Act requirements that differ for
15 Tacoma's and the U.S. Army Corps of Engineers' facilities. As a non-federal entity,
16 Tacoma developed its Habitat Conservation Plan under the provisions of Section 10 of
17 the Endangered Species Act. As a federal agency, the U.S. Army Corps of Engineers
18 entered consultation with the National Marine Fisheries Service and the U.S. Fish and
19 Wildlife Service (Services) under Section 7 of the Act. Sections 7 and 10 have differing
20 requirements, time horizons, and expectations for those who operate under their
21 provisions. Resolution of coordination issues has been and will remain one of the major
22 challenges to implementing the Endangered Species Act in the upper Green River basin.

23
24 The Plan relies on well-coordinated actions by Tacoma and the U.S. Army Corps of
25 Engineers to address major fisheries issues. In addition, a number of habitat conservation
26 measures also address potential impacts of Tacoma's land management operations on
27 terrestrial species in the Upper Green River basin. Although not the primary focus of this
28 habitat conservation planning effort, listed terrestrial species either are or may become
29 present in the Upper Green River basin. Potential impacts to these species have been
30 addressed separate from water storage and withdrawal.

31
32 As stated previously, the central aspect of this Habitat Conservation Plan is a coordinated
33 effort, which relies on actions by Tacoma and U.S. Army Corps of Engineers to address
34 major fisheries issues. Key issues include:

- 35
36 • Upstream fish passage around Tacoma's water diversion and U.S. Army Corps of
37 Engineer's Howard Hanson Dam.



- 1 • Downstream fish passage through Howard Hanson Dam and past Tacoma's
- 2 water diversion.
- 3 • Reintroduction of large woody debris downstream of Tacoma's diversion.
- 4 • Reintroduction of spawning gravels below Howard Hanson Dam.
- 5 • Fish habitat restoration both above Howard Hanson Dam and below Tacoma's
- 6 diversion.
- 7 • Wildlife habitat conservation measures on Tacoma's lands in the upper
- 8 watershed.
- 9 • Flow issues including minimum instream flows, storage of water for fisheries
- 10 releases, and increased regulation of Tacoma's diversion for fisheries protection.

11
 12 Upstream fish passage issues will be addressed by the development of a trap-and-haul
 13 facility at Tacoma's diversion dam. Some may argue that laddering the diversion dam
 14 and Howard Hanson Dam is a more natural method for providing upstream fish passage.
 15 However, the extreme difficulty of laddering Howard Hanson Dam has caused federal,
 16 state, and Tribal fisheries representatives to agree that the trap-and-haul facility is the best
 17 approach to restoring anadromy in the upper Green River watershed.

18
 19 The facility itself will include water-to-water transfer of fish from a trap at the top of the
 20 diversion dam to transport trucks for release into the Green River upstream of Howard
 21 Hanson Dam. Fish sorting and laboratory facilities will be provided to support fish
 22 passage and transport activities.

23
 24 The downstream fish passage facility at Howard Hanson Dam will be the single most
 25 expensive improvement to Green River fisheries associated with this Habitat
 26 Conservation Plan. Major problems with downstream fish passage at many dams include
 27 intake structures for fish that are located deeper than fish are accustomed to sounding, or
 28 too little water spilled over the top where fish tend to migrate. Hydroelectric dams have
 29 the additional problem of entraining fish into turbines. Howard Hanson Dam does not
 30 have turbines because it is not a hydroelectric dam; however, it currently traps fish
 31 behind the dam in the spring as water is stored for augmenting low river flows during the
 32 summer.

33
 34 The downstream fish passage facility at Howard Hanson Dam is designed to collect fish
 35 near the surface of the water at all pool elevations by passing half or more of the water
 36 through a surface outlet designed to attract and pass fish. Downstream fish passage at



1 Tacoma's diversion will be assisted by the installation of fish screens and other
2 improvements to the diversion dam itself.

3
4 The absence of large woody debris downstream of Howard Hanson Dam is a concern
5 from two standpoints. First, woody debris provides cover to fish in the river. Second, the
6 decay of woody debris provides nutrients and shelter for insects and lower-order animals,
7 which serve as food for various fish species. Under this Habitat Conservation Plan,
8 woody debris from the upper watershed will be collected in the reservoir and transported
9 around Howard Hanson Dam and Tacoma's diversion, and either released into the river
10 to find its own resting place, or anchored at desired locations.

11
12 Since its construction, Howard Hanson Dam has blocked the normal downstream
13 movement of gravel from the upper Green River into the river below the dam. This has
14 resulted in a gradual armoring of the riverbed that has worked its way downstream from
15 Howard Hanson Dam as high winter flows carry gravels originating downstream of
16 Howard Hanson Dam even farther downstream. This has reduced the areas available to
17 salmon for spawning. Under the Habitat Conservation Plan, gravel will be placed within
18 the floodplain during low flow conditions so that high winter flows can transport the
19 gravel into the river to take the place of the gravels trapped behind Howard Hanson Dam.
20 This effort should help arrest the loss of spawning gravels and begin to replace gravel in
21 areas suitable for spawning.

22
23 Fish habitat restoration projects in the Green River watershed will be implemented in
24 collaboration with the U.S. Army Corps of Engineers. One of the most valuable efforts
25 may be the restoration of side channel habitats in the middle river to provide juvenile
26 rearing areas during periods of high flow. Two areas have been identified where
27 historical side channels can be reconnected with the river. In addition, Tacoma and the
28 U.S. Army Corps of Engineers have conducted multiple years of studies of side-channel
29 reaction to variations in flow and the use of side channels by salmonid species. This
30 information will be used to identify the most productive side-channel habitat
31 reconnection projects. In addition, habitat improvements will be implemented in the river
32 itself both above Howard Hanson Dam and in the vicinity of Tacoma's diversion pool.
33 These improvements primarily include placement of large woody debris and boulders.

34
35 Wildlife habitat conservation measures in the upper Green River watershed address
36 several areas of concern – upland forest management, riparian management, road
37 construction and maintenance, and specific wildlife habitat management. The Plan sets
38 aside 39 percent of Tacoma's ownership in a natural reserve lying closest to the Green
39 River where no active forest management will take place. Another 35 percent is



1 designated to accelerate development of late seral forest habitat, and 26 percent is
2 dedicated to sustainable timber production. In addition to the natural reserve, riparian
3 buffers will be left in a natural state along all streams to maintain water quality and
4 provide habitat. Road construction and maintenance measures are designed to minimize
5 their impact on the environment and to keep the miles of roads on Tacoma's land at a
6 minimum. The Plan seeks coverage of 32 fish and wildlife species for their incidental
7 take during Tacoma's covered activities for 50 years. The Plan spells out 24 measures to
8 protect 14 specific wildlife species' dens, nests, and foraging areas.

9
10 Tacoma Water's mission as a public water supply utility causes stream flow issues to be
11 the most significant aspect of this Habitat Conservation Plan. Tacoma will voluntarily
12 reduce its First Diversion Water Right claim from the 400-cfs claim established in 1912
13 to the currently developed water withdrawal of 113 cfs. Tacoma will also amend its
14 water rights to incorporate the higher instream flows previously agreed to with the
15 Muckleshoot Indian Tribe in a 1995 settlement agreement. Tacoma will provide funding
16 support for a project at Howard Hanson Dam to store 5,000 acre-feet of water for stream
17 flow augmentation during summer months. Tacoma will contract with the U.S. Army
18 Corps of Engineers to support augmented flow releases from Howard Hanson Dam
19 during low flow periods by reducing Tacoma's use of surface water during years when
20 fall rains do not arrive when normally expected. This battery of actions is the result of
21 more than 15 years of discussions with federal, state and local resource agencies, and the
22 Muckleshoot Indian Tribe, to determine how Tacoma's operations on the Green River
23 could best be carried out with minimal adverse impact on Green River fisheries.

24
25 Monitoring all of the habitat conservation measures to assure the Services and public that
26 Tacoma is fulfilling its commitments is another important component of this Habitat
27 Conservation Plan. Monitoring will be carried out most intensively during the first 10
28 years of the Plan, but will continue throughout the full 50-year duration of the Habitat
29 Conservation Plan.

30
31 Tacoma Water's Habitat Conservation Plan will be funded primarily by revenues from
32 water users. Existing ratepayers, future ratepayers, and Tacoma's partners in the Second
33 Supply Project will all pay a share of the cost of implementing the Plan. Tacoma will
34 seek federal participation at a substantial level based upon the U.S. Army Corps of
35 Engineers' responsibilities under the Endangered Species Act that result from
36 construction and operation of Howard Hanson Dam. Other grants or sources of revenue
37 will be pursued as available in an attempt to lessen the impact of this effort on ratepayers.

38



1 Tacoma has assembled a package of habitat conservation measures that takes advantage
2 of the shared reliance both the water utility and fish have on high quality water and
3 watershed protection. In addition, Tacoma seeks to offset the impacts of water diversion.
4 Tacoma has attempted to respond to concerns expressed by the federal Services, the
5 Muckleshoot Indian Tribe, state resource agencies, and the public in the preparation of
6 this Habitat Conservation Plan. It is recognized that not everyone will be completely
7 satisfied by the package provided here. Consequently, Tacoma will continue to identify
8 the costs, impacts and hardships that the operation of the utility may cause on other
9 groups and interests. It will seek to resolve issues as they arise throughout
10 implementation of the plan.

11

12 Tacoma Water relies on the conjunctive use of surface and groundwater supplies to meet
13 the current water demands of its customers. A diversion on the Green River supplies
14 approximately 85 percent of Tacoma Water's annual demand, and groundwater sources
15 supply the remaining 15 percent. Over two decades ago, Tacoma Water recognized that a
16 municipal water shortage would eventually impact the people who live and work in the
17 City of Tacoma, Pierce County, and South King County. The utility responded by
18 developing a long-range plan to acquire the additional water supplies it believed would
19 be needed to meet the forecasted water demands of the region's expanding population.

20

21 After studying a range of surface and groundwater source alternatives, including water
22 conservation and reuse, Tacoma Water concluded that the two most feasible options for
23 future additional water supplies were the Second Supply Pipeline and the Howard
24 Hanson Additional Water Storage Project.

25

26 Tacoma Water's Habitat Conservation Plan was developed to describe to the National
27 Marine Fisheries Service and U.S. Fish and Wildlife Service how the water utility
28 proposes to operate its Green River municipal water supply system in a manner that is
29 consistent with the requirements of the federal Endangered Species Act. The Plan
30 discusses the operation of the existing Headworks facility, as well as the proposed
31 Second Supply and Additional Water Storage Projects.

32

33 The Plan contains both aquatic and terrestrial habitat conservation measures. It attempts
34 to balance the habitat needs of the fish and wildlife species affected by Tacoma's water
35 supply operations with the municipal water needs of the human population in Tacoma,
36 Pierce County, and South King County.

37

38 The Plan is organized into eleven chapters and six appendices. Chapters 1 and 2 contain
39 the Executive Summary and Introduction, respectively. Chapter 3 discusses the



1 Endangered Species Act with an emphasis on how it pertains to Tacoma Water's
2 municipal water supply operations in the Green River watershed. This chapter also
3 discusses Habitat Conservation Plans, the Incidental Take Permit, and other federal and
4 state regulations addressed in the Habitat Conservation Plan.

5

6 The existing physical and biological conditions of the Green River basin are discussed in
7 Chapter 4, along with the engineered infrastructure and operations, such as Howard
8 Hanson Dam, that affects or is affected by Tacoma Water's Plan.

9

10 The 64 habitat conservation measures that Tacoma Water is committing to implement
11 over the 50-year duration of its Habitat Conservation Plan are described in Chapter 5.
12 Each commitment is inscribed within a box to indicate that it is a commitment.
13 Immediately following each conservation measure, the rationale and ecosystem benefits
14 of the measure are provided to explain to the reader why the measure is in the Plan, and
15 how it will be funded.

16

17 Chapter 6 describes how Tacoma Water will monitor its commitment to implement each
18 of the 64 habitat conservation measures described in Chapter 5. The monitoring program
19 is divided into compliance and effectiveness monitoring, and a research effort that will
20 provide funding to investigate downstream fish passage through Howard Hanson
21 Reservoir, the fish outmigration passage facility, flow management, and the distribution
22 and abundance of sediment and woody debris in the middle Green River.

23

24 The combined impacts of Tacoma Water's First Diversion Water Right claim, Second
25 Diversion Water Right, and the Howard Hanson Additional Water Storage Project on the
26 fish and wildlife species covered by this Habitat Conservation Plan are analyzed in
27 Chapter 7. Discussion of the impacts on fish is organized by species, life stage, and
28 lower, middle and upper watershed.

29

30 Chapter 8 discusses how Tacoma Water intends to fund implementation of the Habitat
31 Conservation Plan. It provides estimated costs for the habitat conservation measures, as
32 well as costs for the monitoring and research components. It also identifies the
33 separation of funding responsibilities between Tacoma Water and the U.S. Army Corps
34 of Engineers for those measures in the Plan that are components of the Howard Hanson
35 Additional Water Storage Project.

36

37 Alternatives to both water withdrawal and management of Tacoma's lands in the upper
38 Green River watershed are discussed in Chapter 9. The water withdrawal alternatives
39 includes one that would divert most of Tacoma's water right from the Green River in the



1 vicinity of Auburn (River Mile 29.2) rather than from the existing diversion at Palmer
2 (River Mile 61.0). Another would remove the existing diversion dam altogether; three
3 reduced-withdrawal alternatives examine limiting sales of water to Tacoma Water's
4 wholesale customers. Under the alternatives that examine Tacoma Water's proposed
5 land management in the upper watershed are a "no timber harvest" alternative and an
6 alternative that would allow timber harvesting only for the purpose of creating or
7 enhancing fish and wildlife habitat.

8
9 Following Chapters 10 (Literature Cited) and 11 (HCP Document Preparers) are six
10 appendices: the life histories of the fish and wildlife species discussed in the Plan;
11 excerpts from the 1995 agreement between the Muckleshoot Indian Tribe and City of
12 Tacoma; excerpts from Tacoma's 1998 draft comprehensive water plan update; road
13 surface erosion and hydrology prescriptions from the Lester Watershed Analysis; a memo
14 describing Tacoma's response to six principles of project operation requested by natural
15 resource agencies; and the legal description of lands owned by Tacoma and proposed for
16 coverage under the Incidental Take Permit.

17
18 The elements contained within this Habitat Conservation Plan are the product of more
19 than two decades of intense discussions with federal, state, and local resource agencies,
20 as well as a decade of discussions with the Muckleshoot Indian Tribe. Diligent water
21 resource planning, and numerous fisheries and habitat studies in the Green River basin
22 were conducted with the intent of designing a municipal water supply project that
23 addresses important natural resource needs as well as the water supply needs of a
24 growing population.

