M E M O R A N D U M

MWH
MONTGOMERY WATSON HARZA

TECHNICAL MEMORANDUM: BIOLOGICAL BASIS FOR FISH PASSAGE AT SCOGGINS DAM

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PURPOSE

As part of the Tualatin Basin Water Supply Feasibility Study, Clean Water Services and its Partners are considering several alternatives to increase the water storage capacity in Henry Hagg Lake, including two alternatives that would raise Scoggins Dam. Changes to the height of the dam would trigger a fish passage review by the Oregon Department of Fish and Wildlife (ODFW). This review would begin with a determination of whether native migratory fishes are, or historically have been, present in Scoggins Creek (OAR 635-412-0020 [Fish Passage Approval]). At Project agency meetings, aquatic resource discussions have centered around the current distribution of fishes in the Project area and the current habitat condition in Scoggins Creek. Based on these discussions, there is uncertainty whether fish passage at Scoggins Dam would provide a net benefit to anadromous fishes. Thus, the goal of this document is to review available information and assess the biological need for fish passage at Scoggins Dam.

BACKGROUND

Historic survey records indicate that several anadromous salmonids, including chinook salmon, coho salmon, and steelhead, utilized habitats in Scoggins, Sain, and Tanner creeks (Parkhurst *et al.* 1950, Thompson *et al.* 1960). Of these three species, only steelhead were thought to be native to the Tualatin River Subbasin. Although the surveys were incomplete and not all species were counted, Parkhurst *et al.* (1960) reported that the lower seven miles of Scoggins creek had sufficient spawning habitat to accommodate large numbers of salmon. In contrast, data from the upper portion of Scoggins Creek and its tributaries documented only small numbers of salmon and steelhead (Thompson *et al.* 1960). These authors suggested that there was good potential for salmon and steelhead production but that low summer flows likely limited production.

In 1975, the completion of Scoggins Dam resulted in a passage barrier for fish migrating to upper Scoggins Creek. Currently, anadromous salmonids have access to only the lower section of Scoggins

Creek below the dam. In lower Scoggins Creek, the habitat has been described as limiting or restricting successful salmonid reproduction (White 2002a). Recent anecdotal reports suggested some steelhead spawning has occurred in lower Scoggins Creek (personal communication from Rob Burkhart, Oregon Department of Environmental Quality, February 20, 2003). In addition to salmonids, anadromous Pacific lamprey have the potential to be present in lower Scoggins Creek. During recent redd surveys, steelhead redds were not observed in Scoggins Creek downstream of Scoggins Dam between Stimson Mainline Bridge and the gaging station (White 2003a). One lamprey ammocete was observed during the redd survey in Scoggins Creek below the dam (White 2003a).

FISH SPECIES OF CONCERN

Four anadromous fish species have the potential to occur in the Tualatin River Subbasin. These species include steelhead, non-native coho salmon, non-native chinook salmon, and Pacific lamprey. Of these, only steelhead and Pacific lamprey are naturally occurring in this subbasin. Coho and chinook salmon were introduced to the Tualatin River early in the 1900s. A fifth species, cutthroat trout, has migratory life forms and is native to the Tualatin River; however, only resident cutthroat trout are found in this subbasin (ODFW 1992). Based on the available evidence, cutthroat trout, coho salmon, and spring and fall runs of chinook salmon will not be considered as target species for fish passage at Scoggins Dam.

Steelhead and Pacific lamprey are native to the upper Tualatin River and current distributions include lower Scoggins Creek. Tualatin River steelhead are part of the Lower Willamette Evolutionary Significant Unit (ESU) and are currently listed as threatened under the Federal Endangered Species Act (ESA). Pacific lamprey have been petitioned for listing under Federal ESA (Klamath-Siskiyou Wildlands Center *et al*. 2003) (Table 1). Given their current status and distributions, steelhead and Pacific lamprey would be appropriate target species to consider when evaluating fish passage at Scoggins Dam.

Table 1. Status of Fish Species under the Federal ESA in the Tualatin River Subbasin, Oregon.

Common Name	**Scientific Name**	**Evolutionary Significant Unit (ESU)**	**ESA Listing Status**	**Listing Decision Date**
Steelhead	*Oncorhynchus mykiss*	Upper Willamette River[1]	Threatened	March 1999 (Federal Register, Volume 64, No. 147. August 2, 1999)
Pacific Lamprey	*Lampetra tridentatus*	Not defined at this time	Petitioned for Federal Listing on January 2003	Pending
Spring chinook salmon	*Oncorhynchus tshawytsca*	Upper Willamette River[1]	Threatened	August 1999 (Federal Register, Volume 64, No. 147. August 2, 1999)

[1] Critical habitat designation withdrawn on April 30, 2002

JUSTIFICATION FOR FISH SPECIES ELIMINATED FROM FISH PASSAGE ANALYSIS

Cutthroat Trout Only resident cutthroat trout are found in the tributaries and mainstem of Scoggins Creek and other tributaries of the Tualatin River. These resident trout do not have obligatory migrations that would require volitional passage into and out of Scoggins Creek. Anadromous cutthroat trout are not known to occur in the Tualatin River (ODFW 1992).

Coho Salmon Coho salmon are not believed to be native to the Tualatin River Subbasin historically. Stocking of coho salmon by ODFW in the early 1900s and the construction of a fish ladder at Willamette Falls has resulted in some natural production of coho salmon in this Subbasin (BLM 2000). Coho salmon also were stocked into the Tualatin River watershed between 1962 and 1999 (BLM 2000). Some natural production of coho salmon occurs in Gales Creek and other tributaries in the Tualatin River (White 2002a). Since coho salmon are not native to the upper Willamette River and its tributaries, they would not be considered a target species for fish passage in Scoggins Creek.

Fall chinook Salmon Fall chinook salmon are not native to the Tualatin River or Scoggins Creek. A small population of fall chinook salmon persists in the Willamette River upstream of Willamette Falls from stocking that took place during 1964-1994. Fall chinook salmon are generally found in the lowest reaches of the Tualatin River (ORIS 1994). However, fall chinook salmon were found in Scoggins Creek in the 1970s (ODFW 1992; personal communication from R. Carver, ODFW, April 2003). None have been documented there in recent years. Currently, the Tualatin River Subbasin is not considered to include chinook salmon spawning habitat (personal communication from ODFW District Biologist, 1999; cited from ODEQ 2001, Appendix F). Any possible chinook salmon habitat in the subbasin would have moved in for rearing (personal communication from ODFW District Biologist, 1999; cited from ODEQ 2001, Appendix F).

Spring chinook Salmon ODFW historic survey data indicates that spring chinook salmon were present in the upper Tualatin River Subbasin (Parkhurst *et al.*1950; Thompson *et al.*1960). This run of chinook salmon was documented in the middle section of Gales Creek in low numbers (Parkhurst *et al.* 1950). The mouth of Gales Creek is approximately 500 meters downstream of the Scoggins Creek confluence with the Tualatin River. Since that time, chinook salmon have been observed rarely and in low numbers in the Tualatin River Subbasin (BLM 2000). Similar to fall chinook salmon, the Tualatin River Subbasin is not considered to include spring chinook salmon spawning habitat.

FISH POPULATION AND DISTRIBUTION FOR TARGET SPECIES

HISTORIC POPULATION AND DISTRIBUTION OF STEELHEAD

Early ODFW surveys in the Tualatin River suggest that although steelhead were present in the system they were not likely abundant. Surveys conducted in the mid 1900s documented the presence of steelhead in Scoggins Creek (Parkhurst *et al.*1950; Thompson *et al.*1960). These surveys were not conducted specifically to assess steelhead populations and thus did not generate steelhead counts or population estimates. Parkhurst *et al.* (1950) also commented that "few" steelhead enter the Tualatin River, and suggested that the river was never an important salmon producer. Anecdotal reports corroborate that small numbers of steelhead were observed by local residents to enter Scoggins Creek during the late fall rains (Parkhurst *et al.*1950). However, in 1960, Thompson *et al.* characterized

Scoggins Creek and its tributaries as important habitat for steelhead, but noted that low summer flows probably limited significant production.

CURRENT POPULATION AND DISTRIBUTION OF STEELHEAD

The mainstem Tualatin River does not currently support spawning habitat for steelhead (ODEQ 2001). Steelhead may ascend the Tualatin River during their spawning migrations and during the rearing phase of their life cycle. Steelhead run timing at Scoggins Dam can be estimated from passage counts at Willamette Falls. Adult steelhead migrate past Willamette Falls during November-May, with peak migrations in March (PGE and BHPC 2002). Juvenile steelhead migrate past the Falls during March-July (PGE and BHPC 2002). In the mainstem Tualatin River, winter steelhead were estimated to use 46% of the stream habitat between miles 7.5-44.6 for migration, 22% of stream habitat between miles 44.6-62.5 primarily for rearing and migration, and 15% of stream habitat between miles 62.5-74.9 primarily for spawning and rearing (StreamNet query on April 28, 2003, Troy Baker, MWH). While the mainstem Tualatin River does not support steelhead spawning, the lower reach of Scoggins Creek and other tributaries provide critical spawning habitat (ODEQ 2001). Recent accounts in lower Scoggins Creek include observation of a steelhead redd in the creek below Scoggins Dam (personal communication from Rob Burkhart, Oregon Department of Environmental Quality, February 20, 2003). Steelhead are not currently found upstream of Scoggins Dam (personal communication from Kim Jones, Oregon Department of Fish and Wildlife, April 28, 2003).

During 1976-1984, ODFW operated the Scoggins Creek Trap to improve fish passage at Scoggins Dam. Adult disposition and spawning reports obtained from ODFW indicated a small number of steelhead captured during trapping operations (personal communication of ODFW trap & haul records from Ron Carver, ODFW, April 24, 2003). Although somewhat variable, these data suggest levels of steelhead escapement were low during the period following dam construction. In the 1977-78 return year, 163 steelhead were recorded as having returned to the fish trap by February (BLM 2000). ODFW records from the next five seasons do not indicate that steelhead were captured in trapping operations during those years (personal communication of ODFW trap & haul records from Ron Carver, ODFW, April 24, 2003). However, during the last season in operation (1983-84), seven adult steelhead had returned to the trap by March (personal communication of ODFW trap & haul records from Ron Carver, ODFW, April 24, 2003).

In January, February, and April 2003, field surveys of lower Scoggins Creek and an unnamed tributary to lower Scoggins Creek were conducted to determine whether steelhead were spawning. Neither steelhead nor their redds were observed in Scoggins Creek downstream of Scoggins Dam between Stimson Mainline Bridge and the gaging station (White 2003a). Scoggins Creek was given a subjective rating of "Poor" to "Poor to Fair" based on the limiting factors for salmonids in Scoggins Creek (White 2003a). These factors included spawning area, pool and riffle abundance, presence of undercut banks, aquatic invertebrate production, bank cover, and instream structure. Low availability of suitable rearing or spawning habitat for steelhead is supported by information in Oregon's StreamNet database. In lower Scoggins Creek, winter steelhead were estimated to use only 28% of stream habitat for spawning and rearing (StreamNet query on April 28, 2003, Troy Baker, MWH). The current number of steelhead that use lower Scoggins Creek is unknown, but is presumed to be very small.

HISTORIC POPULATION AND DISTRIBUTION OF LAMPREY

The overall abundance and distribution of Pacific lamprey in the Tualatin River Subbasin is not known. Until recently, fisheries work in the Tualatin River Subbasin focused on salmonids, thus data on lamprey

distribution and abundance is extremely limited. In recent years, increased attention has focused on lamprey populations in the Columbia River Basin because of the widespread perception that Pacific lamprey populations are declining.

CURRENT POPULATION AND DISTRIBUTION OF LAMPREY

Recent inventories of fish communities in Washington County streams suggest lamprey species are present throughout the Tualatin River Subbasin. During ODFW sampling in 1999-2000, Pacific lamprey were captured in Fanno Creek (RM 15.0). Fanno Creek is located within the Urban Growth Boundary (UGB) for Washington County, Oregon (Hughes and Leader 2000). Pacific lamprey also were captured in the lower reach of Chicken Creek (RM 25.9), which is located outside of the UGB (Hughes and Leader 2000). In other streams located outside the UGB, Western brook lamprey were the most abundant lamprey species, and Pacific lamprey were not noted (Leader and Hughes 2000). Unidentified lamprey species were found in the middle and upper reaches of Gales Creek (Leader and Hughes 2000); it is uncertain whether these specimens were Pacific lamprey or Western brook lamprey. Limited data is available to evaluate lamprey presence/absence in Scoggins Creek. During recent field surveys of lower Scoggins Creek and an unnamed tributary to lower Scoggins Creek, a single lamprey ammocete was documented (White 2003a). It is not known whether this ammocete was an anadromous Pacific lamprey or the resident Western brook lamprey. To date, lamprey species have not been documented upstream of Scoggins Dam. Given that lamprey species are widely distributed throughout the Tualatin River Subbasin (Friesen and Ward 1996), there is not reason to exclude Pacific lamprey as a target species for fish passage in Scoggins Creek.

SUMMARY OF CURRENT HABITAT CONDITIONS IN SCOGGINS, SAIN, AND TANNER CREEKS

Salmonids use a variety of habitats seasonally and thus require structurally diverse stream channels for the maintenance of healthy populations. In Scoggins, Sain, and Tanner Creeks, seasonal low flows, lack of spawning gravel, temperature sensitivity, low flow periods, degraded water quality, and barriers to fish passage have been listed as limiting factors that affect fisheries resources (White 2002a).

CURRENT HABITAT CONDITIONS ABOVE HENRY HAGG LAKE

In Scoggins Creek above the dam, reconnaissance surveys of habitat types in three representative reaches indicated the stream contains approximately 20% pool , 47% riffle, and 33% glide habitat types (White 2002b). Habitat is considered sufficient for cutthroat trout, rainbow trout, sculpin species, and Western brook lamprey. According to ODFW benchmarks, almost the entire surveyed length of Scoggins Creek has undesirable conditions for large woody debris (LWD) volume (BLM 2000). Lack of habitat diversity (i.e., limited pools, instream structure, and LWD) and low summer flows were considered limiting habitat factors for steelhead in Scoggins Creek above the dam (White 2002b).

Limited fish surveys that have been conducted in habitats above Scoggins Dam indicate these small systems support primarily cutthroat trout and sculpin species. In 1998 and 2000, surveys conducted by Oregon Department of Forestry (ODF) and ODFW found cutthroat trout and sculpin species in Wall Creek, Scoggins, and Tanner Creek systems (ODF/ODFW unpublished data from M. Cafferata, ODF, June 11, 2003 (includes Ecosystems Northwest (2000)). Several unnamed tributary streams in Scoggins and Tanner Creek systems did not appear to support populations. More recent data suggests that Sain and Tanner Creeks upstream of Scoggins Dam provide sufficient habitat for cutthroat trout, rainbow trout, sculpin species, and Western brook lamprey (White 2002b). Reconnaissance surveys conducted in

August 2002 provided descriptions of the existing environment and focused on quantifying habitat types (White 2002a). Habitat types were delineated in three reaches of Sain Creek and five reaches of Tanner Creek. In Sain Creek, riffles (~48%) and glides (~47%) were the predominant habitat type, with only occasional pools (~5%) present (White 2002b). According to ODFW benchmarks, Sain creek below 600 feet elevation has undesirable conditions for LWD volume (BLM 2000). In Tanner Creek, habitat is composed of pools (~23%), riffles (~27%), and glides (~50%) (White 2002b). Surveys of Tanner Creek during the development of the Upper Tualatin-Scoggins Watershed Analysis (BLM 2000) indicated that two culverts were considered potential barriers to migration of anadromous and/or resident fish. Lack of habitat diversity (i.e., limited pools, instream structure, and LWD) and low summer flows also were considered limiting habitat factors for steelhead in Sain and Tanner Creeks (White 2002b).

A recent environmental document assessing actions in the Sain Creek subbasin provides additional supporting evidence that the habitat above Scoggins Dam is no longer suitable for anadromous salmonids. In 2001, the U.S. Bureau of Land Management (BLM) evaluated the temporary and cumulative effects of timber harvest, road management, watershed restoration and wildlife projects in the east and main forks of Sain Creek and portions of Lee Creek (USBR 2001). A Finding Of No Significant Impact (FONSI) was issued for the Scoggins Creek Density Management Thinning and Watershed Restoration Project on June 6, 2002 (BLM 2002). This FONSI was based on "No effect" on steelhead and chinook populations and designated critical habitat for both of these species and "No Adverse Impact" to coho salmon and chinook salmon Essential Fish Habitat (EFH) (BLM 2002). BLM (2001) noted that destruction and modification of habitat, overutilization for recreational purposes, and natural and human-made factors had caused the decline of fish resources from historical levels in the Tualatin River watershed. As further justification for their conclusion of "No effect", BLM (2001) noted that salmonid spawning habitat was generally limited in the Tualatin River watershed and that past land management activities have degraded water quality in the Tualatin Mountain portions of the drainage.

CURRENT HABITAT CONDITIONS BELOW HENRY HAGG LAKE

Scoggins Creek downstream of the dam may exhibit temperature increases high enough to limit or restrict successful salmonid reproduction, especially during summer when lower flows occur (White 2002a). Lack of habitat diversity (limited pools, instream large woody debris, instream structure, entrenched U-shape channel, disconnected from floodplain, water quality) also has been noted as a potentially limiting factor (White 2002b). Habitat reconnaissance surveys conducted in August 2002 indicate that Scoggins Creek below the dam has a U-shaped channel composed almost entirely of glide habitat (White 2002b). In 2003, further habitat surveys in an unnamed tributary to lower Scoggins Creek indicated that the stream lacked suitable salmonid spawning habitat, was deficient in large woody debris, and lacked habitat diversity (White 2003b). The tributary extended from the confluence of Scoggins Creek upstream to approximately 1,420 feet above the Scoggins Valley Road crossing. Recent field surveys indicate that habitat in Scoggins Creek below the dam is limited for salmonid reproduction (White 2002a, White 2003a, White2003b).

RISKS ASSOCIATED WITH FISH PASSAGE AT SCOGGINS DAM

Henry Hagg Lake supports a healthy warmwater fishery consisting of introduced species, including bluegill, yellow perch, pumpkinseed, brown and yellow bullhead, largemouth bass, and smallmouth bass (ODFW 1992; ODFW/USA 1995). With the exception of brown and yellow bullhead, smallmouth bass, and pumpkinseed, most of the warmwater species common to Henry Hagg Lake (ODFW 1992; ODFW/USA 1995) were listed as inhabitants in the Upper Tualatin-Scoggins Watershed Analysis (BLM 2000). Pumpkinseed and brown bullhead were not listed as known fish inhabitants in the Upper Tualatin-

Scoggins watershed, but these species have been documented in the Tualatin River Subbasin during ODFW stream inventories in 1999 (Hughes and Leader 2000). Smallmouth bass and yellow bullhead have been documented in the Willamette River and thus are considered already downstream of Scoggins Dam (PGE and BHPC 2002).

Providing passage at Scoggins Dam would allow salmon and steelhead that successfully migrated to lower Scoggins Creek access to tributaries upstream of Hagg Lake that were available historically. Although providing access to habitats upstream of passage barriers would be considered a benefit to anadromous species in many systems, recent surveys of Scoggins, Sain, and Tanner Creeks upstream of Hagg Lake indicate that seasonal low flows, limited habitat diversity, lack of spawning habitat, degraded water quality, and unsuitable temperatures would be limiting factors for salmon and steelhead survival and reproduction. Since past land management activities have degraded water quality and habitat conditions to the point that habitat above Scoggins Dam (and the Tualatin Basin in general) is considered unsuitable for anadromous salmonids (BLM 2001), potential benefits to anadromous species from providing passage at Scoggins Dam would be minimal.

Although most species in Henry Hagg Lake are similar to species found in the Tualatin River Subbasin and the Willamette River, there is a risk associated with providing fish passage at Scoggins Dam because an increased number of non-native, warmwater fishes have the potential to pass downstream from the lake into Scoggins Creek and adversely affect steelhead or lamprey populations. An additional risk associated with fish passage at Scoggins Dam could be the degradation of the robust and popular fishery in Henry Hagg Lake. Currently, Henry Hagg Lake provides more than 600,000 user-days annually for fishing, swimming, and boating. While the specific effects of passage on the current Hagg Lake fishery are unknown, changes in the distribution and production of warmwater fishes in the lake resulting from passage of anadromous species is likely. Finally, the presence of an existing successful warmwater fishery can be expected to dramatically affect the success of a salmonid passage effort, through juvenile predation and competition.

CONCLUSIONS

Available biological evidence does not support that providing fish passage will provide a net benefit for anadromous fish species. As described previously, fish habitat upstream of Henry Hagg Lake is no longer (or perhaps never was) conducive to steelhead and lamprey because of low summer flows and lack of habitat diversity. Additional supporting information on potential impacts to listed fish was found in the FONSI for the environmental assessment on management thinning and watershed restoration in Sain and Lee Creeks. The potential risks to anadromous species downstream of Scoggins Dam and the warmwater fishery in Hagg Lake by providing passage at Scoggins Dam would likely outweigh the potential benefits. A bigger benefit for anadromous fish populations from a biological perspective might be achieved by restoring habitat elsewhere in the basin, where data indicate that habitat may be suitable for increasing populations of target species.

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