Table 1. General information on hatcheries and their local estuary.

Hatchery	Main freshwater system	Estuary	Distance to estuary (km)	Area of estuary (km^2)	Fish growth and estuary prey*	Fish·m^{-2}
Northern Washington						
Skookum Creek	Nooksack River	Nooksack	77.3	7.9		0.95
Kendall Creek	Nooksack River	Nooksack	74.1			
Samish	Samish River	Samish Bay	18.5	17.5		0.23
North Puget Sound						
Bernie Gobin	Tulalip River	Tulalip Bay	0.25	1.36		1.84
Harvey Creek	Stillaguamish River	Stillaguamish	27.8	25.2	BA high (10)	0.01
Whitehorse Ponds	Stillaguamish River	Stillaguamish	47.5			
Wallace River	Skykomish River	Snohomish	63.4	12.5	High % SF (1)	0.09
Mid-Puget Sound						
Grovers Creek	Grovers Creek	Miller Bay	1.9	1.65		0.26
Issaquah	Lakes Washington and Sammamish	Shilshole Bay	52	0.54	BA high (5)	4.7
Portage Bay	Ship Canal	Shilshole Bay	8.5			
Puyallup Tribal	Clarks Creek, Puyallup River	Puyallup	15.5	5.9	>3% body mass·day^{-1} (2); BA high (8, 11)	0.51
Voights Creek	Puyallup River	Puyallup	35.7			
Soos Creek	Green River	Duwamish	55.7	2.6	>2%–3% body mass·day^{-1} (3, 4, 7); BA adequate to high (12, 13)	2.2
Keta Creek	Green River	Duwamish	66.0			
Crisp Creek	Green River	Duwamish	64.4			
Gorst Creek	Gorst Creek	Sinclair Inlet	0.6	2.7	1.3%–4.1% body mass·day^{-1} (14); high % SF (14), BA high (11)	0.74
South Puget Sound						
Capitol Lake	Capitol Lake	Budd Inlet	0.8	5.0	Adequate (zooplankton + benthos) (9, 11)	2.1
Tumwater Falls	Deschutes River	Budd Inlet	3.2			
Garrison	Chambers Creek	Chambers Bay	1.6	0.28		3.0
Minter Creek	Minter Creek	Henderson Bay	1.6	0.44		7.3
Clear Creek	Nisqually River	Nisqually	10.1	7.5	≈2.5% body mass·day^{-1} (6)	0.81
Kalama Creek	Nisqually River	Nisqually	14.8			

Note: Area of local estuary includes the intertidal and subtidal area of the river outlet and immediate nearshore habitat. If available, stomach fullness (SF) and growth rate (% body mass·day^{-1}) are listed for juvenile Chinook. Prey availability based on intertidal or subtidal benthic abundance (BA) is considered low, adequate, or high, and is based on data for density and biomass (see online Supplementary data[1]). Fish·m^{-2} was determined with the number of outmigrating ocean-type Chinook and coho for each system.

*Citations are shown in parentheses next to data: (1) Cordell et al. (2001*b*); (2) Shreffler et al. (1990); (3) Meador et al. (2010); (4) Cordell et al. (2011); (5) Simenstad (2003); (6) Ellings and Hodgson (2007); (7) Nelson et al. (2004); (8) Meyer and Vogel (1978); (9) Giles and Cordell (1998); (10) Heatwole (2006); (11) Puget Sound Ambient Monitoring Program (1994); (12) Cordell et al. (2001*a*); (13) Windward Environmental (2010); (14) Fresh et al. (2006).

survival among these tag code groups for a given year was very low, and release masses and dates were usually identical among groups. For example, the Soos Creek hatchery released 56 qualifying Chinook tag code groups over all years (11 single and 18 multiple releases), and the mean coefficient of variation (CV) for the 18 multiple SAR values was very low at 18.4%. Over the time period of this study, 390 tag code groups for Chinook, and 476 tag code groups of coho qualified for inclusion in this analysis. For coho, all hatcheries with Chinook data were included. Also, coho data from two additional hatcheries were included (Crisp Creek and Keta Creek) to increase the number of replicates. Coho and Chinook releases overlapped for 10 hatcheries, and the most recent release year for each species was 2008.

The specific criteria for Chinook included release masses ranging from 3 to 12 g, release dates between 15 April and 30 June, and only fall or summer run ocean-type fish that were released at age year 0+. Only fish released from a given hatchery or nearby stream were considered, and those that were released in another watershed or netpen were excluded. For coho, tag code groups were included for fish released between 23 March and 30 June, and fish ranged from 15 to 40 g. All coho were released at age 1+ years. Very few (<5%) tag code groups were excluded for either species based on the above criteria. The McAllister Creek hatchery SAR values for Chinook were not used (n = 3, 1992, 1999, and 2001), because this facility was closed in 2000 as a result of severe problems with parasites (Hatchery Scientific Review Group 2002).

The final dataset for Chinook consisted of releases from 20 hatcheries into 14 different local estuaries over 37 years (Fig. 1). For hatchery–year combinations, there were eight hatcheries releasing fish into contaminated estuaries (80 mean SAR values) and 12 hatcheries for uncontaminated estuaries (164 mean SAR values). These are mean values for hatchery–year combinations, hence the total releases (tag code groups) were much higher. For coho, data were available for releases from 12 hatcheries into eight estuaries. Overall for coho there were 226 releases, 106 to contaminated estuaries and 120 to uncontaminated estuaries, when based on mean values for hatchery–year combinations.

The SAR values for coho from the Kalama Creek (mean SAR = 1.4%) and Clear Creek (mean SAR = 0.56%) hatcheries were from 5 to 10 times lower than values for all other coho hatcheries in this study. Based on the anomalous values, these hatcheries were excluded from the analysis for coho. SAR values for Chinook from these two hatcheries, which pass through the Nisqually estuary, were generally as high as or higher than the mean value for all other uncontaminated estuaries when examined by release year. The low coho SAR values may have resulted from poor water quality or pathogens due to extended time spent in freshwater. It is unknown whether hatchery practices contributed to these