

SALMON AND STEELHEAD RUNS, 1900 TO 1950

INTRODUCTION

The resilience of the Sandy River's salmon and steelhead runs was further tested in the early 1900s. Fishing pressure remained steady on the Columbia River and grew on the ocean and Sandy River. Inside the basin, habitat degradation in the Sandy and many lower tributary drainages escalated as timber harvest, road building, agricultural production, hydroelectric development, and other activities increased in the lower basin and slowly spread upriver. Brood stock collection for hatchery production also continued to reduce natural salmonid production. Egg-taking for hatchery production often blocked migration of chinook and coho salmon and steelhead to the upper Salmon and Sandy rivers. The building and operating of several dams in the basin during the early 1900s also seriously affected the runs.

Naturally occurring changes in watershed conditions may have also impacted fish production. According to fire history maps, at the turn of the century approximately half of Clackamas County south of the Bull Run area — including the upper Sandy area — was classified as burned (USFS 1996). Several other fires occurred in the early- and mid-1900s, burning large sections of the upper Sandy, Salmon, Zigzag and Bull Run drainages. While detailed information on the fires is not available, they would have created large openings in the forest canopy. This change may have increased peak streamflows, since exposed snow would melt more quickly. It may have also increased water temperatures in the uncovered streams. Further, the forest fires would have removed forest understory vegetation leaving soils more exposed to erosion and increasing water turbidity.

Climatic changes also occurred. As discussed previously, the area experienced cool temperatures in 1892 to 1920 and warmer temperatures in 1921 to 1946. Such large-scale climatic changes may have affected the quality of fish habitat in both freshwater and marine environments during 1900-1940 (Lichatowich and Mobrand 1995). These changes — in concert with losses due to municipal water supply development, hydroelectric power operations, hatchery egg-takes, timber harvest and agricultural uses during the early 1900s — likely contributed to a decline in fish productivity.

FISH PRODUCTION

While below historic levels, large runs of salmon and steelhead continued to ascend the Sandy River in the early 1900s. According to several people who were familiar with the river before the construction of Marmot Dam, spring chinook were quite abundant in the main river and in the Salmon and Zigzag rivers

before the dam (Mattson 1955). Estimates by Mattson (1955) suggest that spring chinook spawning runs to the mainstem ranged between 3,000 and 5,000 fish per year, though no reliable data existed to calculate actual run sizes. Past residents also observed runs of at least 900 adult coho salmon and several hundred fall chinook during some years at the Salmon River Hatchery weir before construction of Marmot Dam (Mattson 1955).

Hatchery records also suggest that many salmon and steelhead returned to the basin in the early 1900s. After the turn of the century, operators of the Salmon River Hatchery experienced some of their best years. In 1903, they collected 3,551,000 spring chinook eggs, a record number at the hatchery (ODFW 1997). The next year, 1904, they collected about 1,745,000 chinook, 1,327,300 coho, and 175,200 steelhead eggs. This was the largest collection of coho eggs at the station. In 1905, their collections reached 1,230,000 chinook, 1,066,300 steelhead and 300,000 coho eggs (Mattson 1955).

Hatchery operators during this time continued to experience mixed success in their attempts at fish production. Fish culture remained more art than science, and the operators learned by experimenting with different techniques and adapting them based on their successes and failures. They encountered problems finding the right foods for the growing fish and struggled with disease outbreaks.

Fish production in the basin declined temporarily around 1904 after floodwaters deposited large amounts of sediment and debris near the Sandy's mouth. As explained in the 1913 Biennial Report of the Department of Fisheries to the 27th Oregon Legislature, *"during the flood of 1904 a great mass of sediment and drift lodged at the mouth of the Sandy, causing it to form a new channel that emptied into the Columbia in an upstream direction, making it difficult for the fish to find."*

When fish returns remained low in 1911, residents along the Sandy appealed to the Oregon Department of Fisheries for assistance in restoring the stream to its old channel. They received 500 pounds of blasting powder from the Master Fish Warden and used it to reopen the channel. The fish returned to the Sandy River in 1912 after the barrier to migration was removed (Oregon Department of Fisheries 1913).

Egg-take records reflect the decline in salmon migration. In 1911, after low adult returns for several years, hatchery operators decided to stop using the Salmon River Hatchery. They resumed operations in 1912 after fish migration was restored and spawners again ascended the river. That year, according to a Master Fish Warden report, *" . . . the take of eggs (chinook) proved a record-breaker over that of several*

years past, having secured 2,009,000 of the early variety and 417,550 spawn of the later run of chinooks.” The eggs were shipped to other hatcheries. None were planted in the Salmon River that year.

Construction and operation of several dams after 1910 created new problems for fish. On the Little Sandy River, salmon and steelhead lost access to about 6.5 miles of spawning and rearing habitat after construction of a diversion dam on the Little Sandy River (RM 1.7) in 1912. The Little Sandy River system is believed to have once supported runs of spring chinook, coho and steelhead (Mattson 1955). More fish habitat was lost in 1922 when Headworks Dam was built on the Bull Run River (RM 6) for City of Portland municipal water. The dam, 20 feet high with no fish passage facilities, blocked salmon and steelhead from about 37 miles of habitat in the upper Bull Run drainage. Flow diversions at both dams also restricted fish production in the lower river sections.

Construction of Marmot Dam on the main Sandy River (RM 30) in 1913 also influenced salmon and steelhead. The dam’s wooden fish ladder was routinely used as a trap to obtain brood stock for hatchery production. Periodic damage from flood waters further restricted fish migration while the damaged ladder was being repaired. Dam operations also affected fish production in the Sandy River below the dam. During low flow periods, diversions at the dam left as little as 30 cfs in the lower river. For many years after 1913, low flows in the 11-mile reach of the Sandy between Marmot Dam and the mouth of the Bull Run River (where the water diverted at Marmot Dam was returned to the Sandy River) kept many spring chinook and other species from migrating upstream from early summer through early fall. The low flows also reduced habitat quality and availability to support fall chinook and other lower river fish populations. In addition, the diversions affected downstream migrants. Until the diversion was screened in 1951, many downstream migrants were swept into the canal and carried to Roslyn Lake, which had no outlet but through penstocks and turbines.

Operations associated with the Bull Run Powerhouse, which used water diverted from the Little Sandy and Sandy rivers, initially had little or no effect on fish production or migration in the lower Bull Run River. The volume of water released into the lower Bull Run River at the powerhouse was small compared to the much larger flow already in the Bull Run River. However, with the completion, and subsequent operation of Headworks Dam, the City of Portland began diverting large quantities of Bull Run River water at the Headworks Dam. Releases of Little Sandy and Sandy River water below the Bull Run Powerhouse then made up most of the streamflow in the lower Bull Run River during the migration season. These flows falsely attracted some salmon and steelhead into the Bull Run and delayed their migration to upriver habitat in the Sandy River.

Once Marmot Dam was completed, hatchery operators abandoned the Salmon River facility and moved to the Sandy River below the dam. That year, in 1913, fish propagators built a rack spanning the Sandy River below the dam to trap spring chinook, coho and winter steelhead. They collected chinook salmon eggs at the site in many years from 1913 to 1955. The number of spring chinook eggs collected varied from a low of 10,280 eggs in 1955 to a high of about 2.7 million eggs in 1913 (ODFW 1997). Steelhead and coho eggs were also collected between 1913 and 1946 (USFS 1996).

From 1913 to 1925, spring and fall chinook salmon were also raised at several other locations on the Sandy River. While dates and locations are unclear, records show activities at “Lower Sandy River Hatchery”, “Big Sandy River Hatchery”, and the “Bull Run Feeding Ponds” from 1913 to 1918. Records from 1919 to 1925 refer to the “Sandy River Hatchery” with no mention as to the location (Wallis 1962). A lack of records for the period between 1925 and 1933 suggests that possibly no hatchery production occurred on the Sandy River for 11 years after operations at the facility below Marmot Dam ended in 1925 (ODFW 1997). From 1933 through 1936, salmon fry produced at Bonneville Hatchery were released into the Sandy, Bull Run and Salmon rivers.

Table 2. Salmon and Steelhead Egg Collection in the Sandy River Basin, 1900-1950 (ODFW 1997)

Site	Year	Spring Chinook ⁵	Fall Chinook	Steelhead	Coho
Salmon River Hatchery, Boulder Cr.	1896	2,600,000			
	1897	1,216,000			
	1898	745,200		22,000	
	1899	600,000			
	1900	1,260,000		250,000	
	1901	1,742,000		409,000	
	1902	1,586,600		205,000	1,327,300
	1903	3,551,000	100,000	410,100	300,000
	1904	1,745,000		175,200	412,000
	1905	1,230,000	(F+S mixed)	1,066,300	
	1906	875,000	(F+S mixed)	447,000	
	1907	565,000	(F+S mixed)	508,000	76,500
	1908	553,340			
	1909	500,936	180,400	595,091	
	1910	269,140	120,570		
	1911				
	1912	2,009,000	417,550	493,000	
Marmot Dam	1913	2,782,258	(1,430,716)	966,100	
	1914		Sandy River	449,500	
	--		3 RM above		
	1921	1,637,000	Troutdale		330,600
	1922	461,900		634,000	
	1923			832,600	
	1924	1,823,918	2,595,820		
	1925				
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	1938	10,904			583,324
	1939	1,614,451		827,634	485,900
	1940	604,800		858,500	238,900
	1941			1,378,000	297,400
	1942	238,000		1,176,690	39,000
1943	12,000		299,370	49,000	
1944			175,000	10,000	
1945	435,200			14,400	
1946	1,067,387		238,532		
1947	43,550				
1948	441,000				
1949					

In 1938, fish managers began operating a small hatchery, the Sandy River Station, immediately below Marmot Dam. They produced salmon and steelhead at the station until 1948 with water supplied by

⁵ Some mixing of fall and spring chinook eggs is possible.

gravity from the power canal. The station's success prompted staff with the Oregon Fish Commission to send Portland General Electric the following report in November 1939:

“During the year there were collected 583,324 silver salmon eggs, 1,514,451 chinook and 827,634 steelhead eggs. The resulting fingerlings are being released into the river below the dam, where they apparently find, in the reduced flow of water in the river's channel, ideal nursery conditions. It is now felt that the migratory fishes will be preserved, and I trust the numbers increased through uninterrupted operation of the hatchery. Further, there will be nothing gained by screening the diversion above the dam, now that fishes of a migratory nature are not permitted to proceed to the upper reaches of the Sandy River.”

State fish managers decided to change their program in the late 1940s when production at the facility began to fall. Records show that the number of coho eggs collected at the facility dropped steadily from 500,000 eggs in 1939 to less than 15,000 eggs in 1945 (ODFW 1997). The records do not indicate whether a decline in the coho run triggered the drop in egg collections or if some coho were allowed to continue upstream to spawn (ODFW 1997). Faced with recurring problems, in 1947 staff with the fish commission reported:

“The water supply at the Sandy River Station is not considered satisfactory. There are also detrimental features which make the operation of this station difficult and uncertain. Studies are being conducted on other sites, and it is expected that the present location will be abandoned for one more favorable to fish culture operations.”

By 1948, the state was operating the station strictly for egg collection. Fish propagators gathered about 441,000 spring chinook eggs at the station in 1948 and shipped them to Bonneville Hatchery. They collected nearly 600,000 eggs at the site in 1950 and transferred them to Bonneville as well.

SUMMARY

By the late 1940s, Sandy River salmon and steelhead had lost access to several once important habitat areas and the remaining runs had declined significantly. Spring chinook escapement to the main Sandy River and tributaries was estimated at the time to have fallen to no more than 1,500 adults. Coho salmon runs had declined to about 2,000-3,000 adult fish, and winter steelhead escapement to areas above Marmot Dam had dropped to about 2,200 fish (Mattson 1955). Fall chinook production had also declined significantly.

In many ways, the decline of these runs was linked to the region's growth in population and to a subsequent demand for more timber, power, water, salmon and other resources. Habitat changes generated by fires in the upper watershed and by a shift in climate conditions may have added to the decline. Key events that shaped conditions in the Sandy River Basin during this time are recapped below.

Key Events and Developments From 1900 to 1950

- 1903 About 3,551,000 spring chinook eggs collected at Salmon River Hatchery.
- 1904 Floodwaters deposit material at Sandy River mouth, hindering fish passage.
- 1904 About 1,327,300 coho eggs spawned at Salmon River Hatchery.
- 1905 More than 1 million steelhead eggs spawned at Salmon River Hatchery.
- 1906 Hydropower development on the Sandy and Little Sandy rivers begins.
- 1907 Many sawmills operate in the lower Sandy River Basin, logging escalates.
- 1908 Operator of Sandy River Hatchery reports that “there is so much logging on the Sandy River that I am sure the salmon are kept out of the stream.”
- 1908 Forest fires burn much of the upper watershed from late 1800s to 1920.
- 1911 Salmon River Hatchery operations stop.
- 1911 Railroad operates 20-mile line from Montavilla to Bull Run powerhouse.
- 1911 Residents of Sandy restore lower river channel and reopen fish passage.
- 1912 Anadromous fish runs return to river after barrier near mouth is removed.
- 1912 Operations at Salmon River Hatchery resume. About 2,009,000 spring chinook eggs and 417,550 fall chinook eggs taken at station. Hatchery is abandoned after the season, operations are moved below Marmot Dam.
- 1912 Marmot Dam completed. Facility includes fish ladder, but flood damage and egg-take operations at the ladder hinder fish passage to upper basin.
- 1912 Little Sandy diversion dam completed. Dam blocks fish passage to areas above dam and water diversions affect production below the dam.
- 1913 About 2.7 million spring chinook eggs collected below Marmot Dam.
- 1913 Railroad line electrified from Montavilla to Ruby Junction. Logging companies expand line, building spurs into headwaters of Cedar Creek.
- 1915 City of Portland builds 10-foot high structure at outlet of Bull Run Lake.
- 1918 Ladder at Marmot Dam rebuilt and improved after repeated flood damage.
- 1918 Trolley line brings many visitors from Portland to areas along Sandy River, including Dodge Park at confluence of Sandy and Bull Run rivers.
- 1920 Construction under way on Mt. Hood Loop Highway.
- 1922 City of Portland builds Headworks Dam, 22 feet high, creates fish barrier.
- 1926 Ladder at Marmot Dam improved and new pools installed.
- 1927 Rail line to Bull Run Park abandoned as people travel more by auto.
- 1929 City of Portland builds Ben Morrow Dam (Bull Run Dam No. 1) on Bull Run.
- 1930 Several campgrounds and trails constructed in watershed.
- 1938 Small hatchery (Sandy River Station) built immediately below Marmot Dam.
- 1939 Egg-takes at station include 583,324 coho eggs, 1,514,451 chinook eggs, and 827,634 steelhead eggs. Fingerlings are released in river below dam.
- 1940 Production at Sandy River Station begins to decline.
- 1948 Sandy River Station operated strictly for egg collection.