Spokane Falls Aesthetic Flows

"The channel restoration, using weirs shaped and colored to look like the bedrock throughout the river, spread water more evenly through the two channels and has now functioned successfully through two entire spill seasons. Combined, they produce an aesthetically pleasing flow over the falls that viewers can enjoy throughout the year." (Fitzhugh 2015)

Key Features: Improved water connectivity, aesthetic flows, and rocky outcrop restoration.
Location: Riverfront Park, Spokane, Washington
Lead entity: Avista Utilities Corporation
Status: Complete
Cost: $1.4 million (Fitzhugh 2015)

Figure 1, View of the Spokane River north channel after construction

1.1 BACKGROUND

The Avista Upper Falls Hydroelectric Development is located in downtown Spokane on the Spokane River. This development consists of two dams located on either side of Havermale Island. The Upper Falls Control Works Dam is located north of Havermale Island and controls flows in the north and middle channels. The dam, head gate, and powerhouse are located on the south channel. Historically, most water flows through the middle channel with as little as 30cfs flowing in the north channel during low summer flows. This water flowed through man made vertical channels in the bedrock that had been created for mill races and sewer lines (Sierra Club 2015). Reduced flow and

trenching left the falls completely dry during the summer, creating an unappealing aesthetic and decreasing habitat for native red band trout (Fitzhugh 2015).

The Upper Falls Hydroelectric Development was up for relicensing in the early 2000s. Stakeholders requested an aesthetics study for the Upper Falls Development as part of relicensing to identify when river flows provided aesthetic views for the public. Avista worked with stakeholders including the City of Spokane, Friends of the Falls, Spokane Canoe and Kayak Club, the Friends of the Centennial Trail, and The Sierra Club to explore alternatives to increase aesthetics in the north channel (Richards 2012). Installing weirs in the channel was the agreed upon solution to divert more water to the north channel and spread it out more evenly.

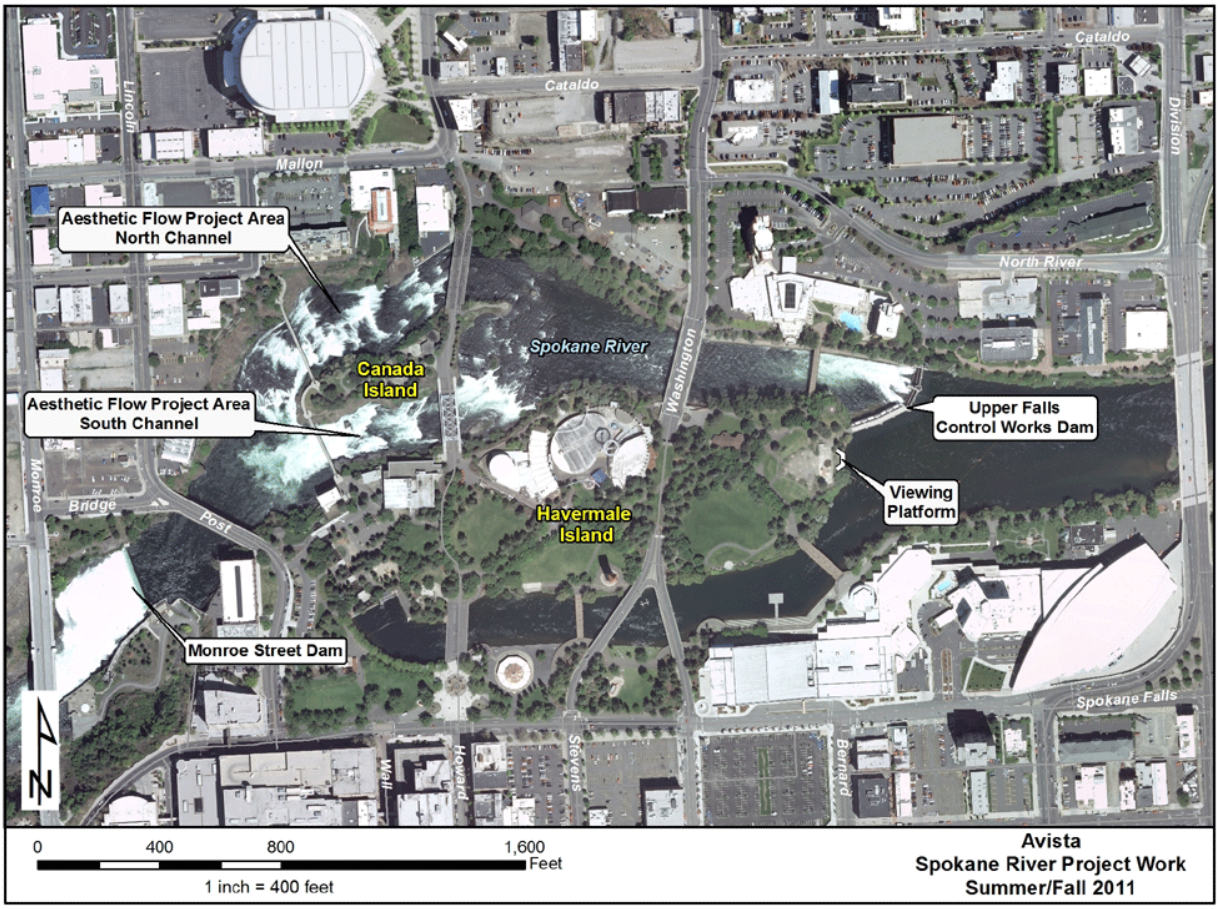

Figure 2, Map of the aesthetic flows project area.

1.2 CONSTRUCTION

A pilot test was conducted in 2010 to experiment with different weir materials. Ecology blocks and bags of sand, gravel, and rock were temporarily placed in the vertical channels, while 300cfs (the agreed upon minimum daytime flow) was diverted to the north channel. Stakeholders on site evaluated the aesthetics achieved by each material. WDFW was also consulted at this time to assess risk of fish stranding during the minimum nighttime flow of 100cfs (Fitzhugh 2015).

Construction was carried out in the summer of 2012. A total of 9 weirs were installed; one large weir upstream of Canada Island to divert more water into the north channel, and 8 additional weirs in the north channel to spread flow. Weirs were constructed of reinforced concrete sprayed over a metal framework anchored into bedrock. Concrete was hand sculpted to achieve a bedrock-like texture and blend into the basalt (Figure 4).

Figure 4, Construction workers sculpting concrete over a metal framework.

These weirs increased flow in the north channel and diverted water away from the man made cut where the river flows along the downstream tip of Canada Island (figure 3). Where water used to flow through a notch in the north channel, it is now spread over the entire face of the bedrock providing improved fish habitat and aesthetics for viewers (Fitzhugh 2015).

Figure 3, North channel before (top at 500cfs) and after (bottom at 300cfs) construction.

References

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Figure References

Figure 1: Fitzhugh, Speed. *Spokane River*. Digital Image. Avista Utilities Corporation. March 3, 2015 Web. November 6, 2015. <http://www.hydroworld.com/articles/hr/print/volume-34/issue-2/articles/restoring-aesthetics-in-the-spokane-river-below-the-upper-falls-project.html>.

Figure 2: Avista Utilities Corporation. *Spokane River Project Work*. Digital Image. Avista Utilities Corporation. Web. November 6, 2015. <https://www.avistautilities.com/community/blog/Lists/Photos/SpoRiver_DTL.gif>.

Figure 3: Land Expressions LLC. *Concrete weir sculpting.* Digital Image. Land Expressions. 2015. Web. November 6, 2015. < http://landexpressions.com/portfolio/commercial-projects/avista-north-river-channel/>.

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