

Off-Channel Reservoirs Fact Sheet

March 1, 2023

Introduction and Purpose

As part of analyses of the Skookumchuck Dam for the Office of Chehalis Basin, questions have arisen regarding potential for an off-channel reservoir in the Skookumchuck River basin as a potential alternative to maintaining the existing reservoir. The purpose of this fact sheet is to provide information on off-channel reservoirs that have been recently constructed or designed as a point of reference for decision-makers on Skookumchuck Dam options.

What Is an Off-Channel Reservoir and How Do They Operate?

Off-channel reservoirs are artificial impoundments that are constructed in a natural valley or excavated depression, typically near a river or stream. Water supplied to the reservoir is diverted from a river and pumped into the reservoir. Diversions are timed to occur during higher flows to minimize impacts to instream flow. In the Skookumchuck River basin, that could potentially occur from November to March. Water is released from the reservoir when needed for instream flow improvement or water supply. The warming of water stored in an off-channel reservoir may prevent its use for instream flow improvement in late summer when needed most for fish.

Three off-channel reservoir projects in Washington State are described in the following sections and provide a range of potential costs. Many other examples are available but there are very few with storage volumes in the range described below.

Roza Irrigation District Reregulating Reservoir

Roza Irrigation District constructed an off-channel reservoir along their irrigation canal system near Sunnyside, Washington, in 2017. The reservoir covers 35 acres, is 70 feet deep, and holds 1,600 acre-feet of water. Water is pumped from their irrigation canal into the reservoir and released back into the canal when needed to allow the district to operate the canal more efficiently and provide water during drought periods. The construction cost was \$31 million with a cost per acre-foot of \$19,375 in 2017.

Dungeness Off-Channel Reservoir Project

The Dungeness Off-Channel Reservoir Project (Dungeness Project) is a proposed 1,600-acre-foot storage reservoir located south of Sequim in Clallam County, Washington. The reservoir will be excavated into a large, gently sloping upland parcel (above the floodplain) owned by DNR that was recently logged. The reservoir will be up to 50 feet deep and 42 acres in area with inflow and outflow capacities of 25 cubic feet per second (cfs). Water will be diverted from the Dungeness River about 2 miles upstream of the reservoir and conveyed by gravity flow via pipe to the reservoir. Diversions

will occur in winter, spring, and early summer, with the water stored in the reservoir and released for irrigation use via gravity flow into an existing irrigation system in the late summer.

The estimated construction cost ranges from \$36.1 million to \$37.6 million, not including design, permitting, land acquisition, legal, or administrative costs. Annual long-term operating and replacement costs are estimated to be \$41,200 for operation and maintenance and it is recommended that an additional \$148,400 be set aside annually for a long-term fund for replacement of facilities. The estimated cost per acre-foot is about \$23,500 in 2023.

Switzler Reservoir

Switzler Reservoir is a proposed off-channel reservoir that would provide 44,000 acre-feet of storage in the Horse Heaven Hills region south of Kennewick in Benton County, Washington. The reservoir site is in Switzler Canyon, a natural valley with a seasonal stream. A dam would be constructed across the canyon to impound water. The reservoir would be 300 feet deep and 415 acres in area. The reservoir would be supplied with 200 cfs of water pumped from the Columbia River during times of availability (typically September, October, and December to June). Water would be released back at a rate of 280 cfs to the Columbia River during the irrigation season to offset water use nearby.

The opinion of cost for Switzler Reservoir was developed in 2012 and was estimated to be \$280.5 million. Excluding design, permitting, land acquisition, and administration costs, the cost was estimated to be \$243.5 million. Annual operations and maintenance costs were estimated to be \$3,081,000 and annual power costs for the pumping required to fill the reservoir were estimated to be \$1.4 million. The cost per acre-foot was estimated to be \$6,400 in 2012.

Summary of Projects

Table 1 provides a summary of the off-channel reservoir projects described in this fact sheet, including a brief description, storage volume, and construction costs. Note that these costs do not include design, permitting, land acquisition, and administration costs. For the Skookumchuck, an estimated volume of storage that may be needed could be approximately 5 months of use of the 51.6 cfs water bank water right (June through October) – approximately 15,000 acre-feet.

Table 1
Off-Channel Reservoir Project Summary

Project	Description	Storage Volume (acre-feet)	Cost Per Acre-Foot/Year
Roza Reregulating Reservoir	Natural valley, pump in/gravity out	1,600	\$19,375/2017
Dungeness Project	Excavated lake, gravity in/gravity out	1,600	\$23,500/2022
Switzler Reservoir	Natural valley, pump in/gravity out	44,000	\$ 6,400/2012

