

Perspectives on Flow Augmentation:
Past and present exploration of water diversions from the Similkameen River

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Water Right work in the Okanogan River Basin since 1968.

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The Okanogan River Basin

Viewed from a Washington State Perspective

The Okanogan River Basin has a total drainage of 8,340 square miles (sm) and average annual yield (Qa) of about 2.2 million Acre Feet (MAF) (3,035 cfs). This basin enters the Columbia River 533.5 miles from the Pacific Ocean and includes three transboundary rivers (the Similkameen, Ashnola and Pasayten Rivers) and the trans-boundary Osoyoos Lake. The Similkameen River has a basin area of 3,590 sm and a yield of 1.66 MAF (2,290 cfs ~ 75% of the average flow of the Okanogan River Basin).

In 1846 this basin was bifurcated by the boundary settlement between the US and Great Britain. In Washington this basin saw both the first State Adjudication (Similkameen River) and the first State Reservoir Permit (Palmer Lake), both shortly after our 1917 Water Code became effective. Both the existing Enloe Dam (RM 8.8) and the natural storage in Palmer Lake has provided flow modification to attenuate high flows to a minor degree. The IJC has recognized Washington's prior downstream Water Rights covering diversions as requiring deference by upstream junior diversions.

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Okanogan Basin focus

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Okanogan Basin Data:

- ~ Total drainage area of 8,340 square miles (100%)
- ~ Enters the Columbia River at Col. RM 533.5 and elevation 783' +/-
- ~ The Okanogan River leaves Lake Osoyoos at Ok. RM 79; El. 911' +/-
- ~ Flow information;

Q max. = 45,600 cfs (6/3/72)
Q an. av. = 3,035 cfs (2.2 MAF)
Q 90% ex = 648 cfs
Q min. = 126 cfs (9/5/31 – Tonasket)
- ~ Use information; Irrigation -- 77,000 acres (22,000 US; 55,000 Can.)
 - Domestic/Industrial – partially non-consumptive
- ~ The major tributary is the Similkameen with a basin area of 3,590 sm (43% of the Okanogan River Basin) and a Q an. av. =

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Okanagan Basin focus

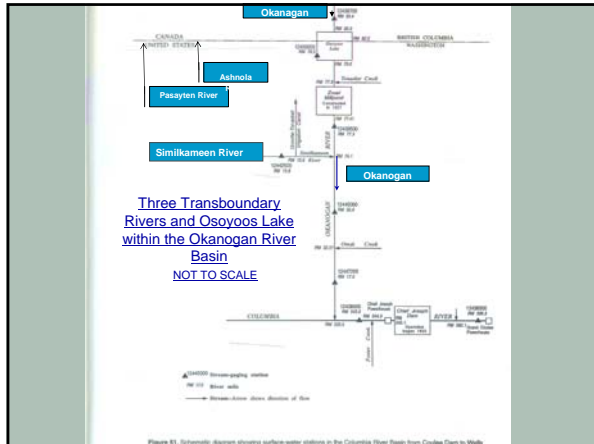
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Okanagan Basin Data:

- ~ Total drainage area of 3,150 square miles (38%)
- ~ The Okanogan enters Osoyoos Lake at River Mile 90.0 and elevation 912 +/-
 (the International Boundary through Osoyoos Lake is at RM 82.5)
- ~ Flow information;

Q max. = 3,700 cfs (6/11/90)
Q an. av. = 650 cfs (0.47 MAF or 21%)
Q 90% ex = 196 cfs
Q min. = 56 cfs (1/30/63)
- ~ Use information; Irrigation – 55,000 acres reported as of 2006 by USGS.
- ~ The head of Okanogan Lake and mouth of Deep Creek at RM 194.5 plus the upper Deep Creek bridge at mile 14.6 for furthest RM at 209 for over 127 stream miles in Canada.
- ~ The Okanogan River basin area of 3,150 sm is 38% of the Okanogan Basin and provides 21% of the average annual flow (650 cfs).

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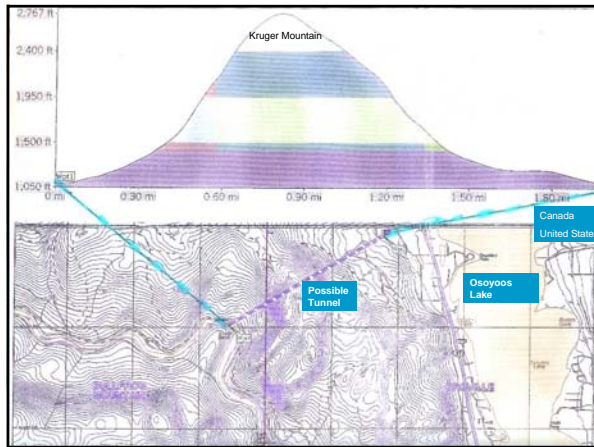
Augmentation Features and Proposals

- Natural augmentation features:
 - Snow pack storage (US Pasayten Wilderness and BC)
 - Lake storage throughout the basin (Palmer Lake et al)
 - Bank and basin groundwater storage
 - Other
- Project augmentation existing and considered in the past and/or present:
 - Okanogan Basin (discussion by Brian Symonds, P. Eng., BC)
 - Similkameen Basin (discussion by Doug Johnson, P. E., WA State)
 - Intrabasin project potential (Kruger Mountain Drift example)

The Kruger Mountain Drift Conceptual Recognition Schematic proposal: (see next slide)

Other (as available)

An analysis at a conceptual level indicated that it was physically and economically feasible to tunnel for about two miles under Kruger Mountain to transfer the example amount (200 cfs or 5.66 cms) within the Okanogan basin at, or upstream of, Shanker's Bend to an area near the US-Canadian Border 150' or more above Osoyoos Lake level for uses that may include supplemental water to free up Okanogan River water for instream flow, irrigation and power or other purposes. This type of project could be a component of additional storage opportunities on the Similkameen River in WA and/or BC. This concept was put forth in 2000 with an expectation that any possible action would be in the 2020 to 2060 timeframe. An assumption was focused on 20,000 acres of the estimated 27,000 acres currently irrigated in the Okanogan Basin in the WA & BC.



QUESTIONS:

- What happened in 1846 that directly impacted the Okanogan Basin?
- How about 1853, 1894; 1909; 1917-20; 1946; 1948; 1983 & 1986; and, 2013?
- Should the major single tributary of the Okanogan River remain in a largely undeveloped status?
- and ?
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