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March 5, 2024

### MEMORANDUM

**TO:** Fish and Wildlife Committee Members

**FROM:** Windy Schoby, Fish and Wildlife Policy Analyst- Idaho

**SUBJECT:** Loss Assessment of Spring/Summer Chinook in the Upper Snake Basin

### BACKGROUND:

**Presenter:** Dennis Daw, Upper Snake River Tribes (USRT) Foundation - Fish and Wildlife Program Director  
Scott Hauser, USRT- Executive Director  
Steve Seville, Parametrix- Director of Salmon Recovery

**Summary:** The Fish and Wildlife Committee will hear from the Upper Snake River Tribes Foundation on their [Loss Assessment of Spring/Summer Chinook in the Upper Snake River Basin.](#)

The USRT<sup>1</sup> has completed a [Loss Assessment of Spring/Summer Chinook in the Upper Snake River Basin.](#) The USRT requested and was granted a review of the scientific elements of the document by the Independent Scientific Advisory Board ([ISAB](#)) to ensure it follows the principles established by the Council for blocked area mitigation and to determine if

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<sup>1</sup> The Upper Snake River Tribes (USRT) Foundation is composed of four Indian tribes of the Upper Snake River region in Idaho, Nevada, and Oregon: the Burns Paiute Tribe, Fort McDermitt Paiute-Shoshone Tribe, Shoshone-Bannock Tribes of the Fort Hall Reservation, and Shoshone-Paiute Tribes of the Duck Valley Reservation.

there are additional issues that warrant consideration for this assessment. The ISAB will conduct the review over the next several months.

Relevance:

The Council adopted a [loss assessment](#) for salmon and steelhead losses in the Columbia River Basin [attributable to the development and operation of the hydrosystem](#) in 1987. The USRT have developed a refined Loss Assessment of Spring/Summer Chinook in the Upper Snake River Basin which will help with understanding where these stocks were distributed in the Upper Snake River. This work is relevant to the Fish and Wildlife Program strategy on anadromous fish mitigation in blocked areas.

Background:

It is difficult to say how many salmon spawned historically in the Snake River and its tributaries upstream of [Hells Canyon](#). The impacts from the construction and operation of the Hells Canyon Complex (HCC) compounded existing impacts associated with other hydroelectric, water storage, and water diversion projects constructed by the U.S. government in the subbasin. These impacts led to the complete blockage and elimination of anadromous fish populations from many of the watersheds in the middle and upper Snake River. Several attempts have been made to estimate historic run sizes. According to [Chapman and Chandler \(2003\)](#), pre-1860, an estimated 1 to 1.7 million adult Pacific salmon and steelhead passed the area now blocked by the construction of the HCC in the 1950s to 1960s.

For the USRT Loss Assessment, several approaches were considered for quantifying the historic run sizes of anadromous salmonids that originated in the study area before European settlement. In general terms, these included estimates based on previously reported values in the literature, development and application of a habitat-based model, development and application of a life-cycle model, and hybrid multiple approaches depending on scale and other factors. Each approach has advantages, challenges, and limitations, especially when attempting to characterize conditions for historical periods for which limited data are available.

Ultimately, they developed a hybrid approach. First, they adopted an estimate of total historic run sizes for the Middle and Upper Snake River basins based on prior work reported in the literature. Then they distributed that number geographically across all stream miles accessible to anadromous salmonids. In general, salmon run sizes are known to correlate with the amount of accessible stream habitat within a watershed. Further refinements to this conceptual model were made based on an index of relative habitat quality as defined by an intrinsic potential habitat model. Results were summarized according to the watershed area upstream of

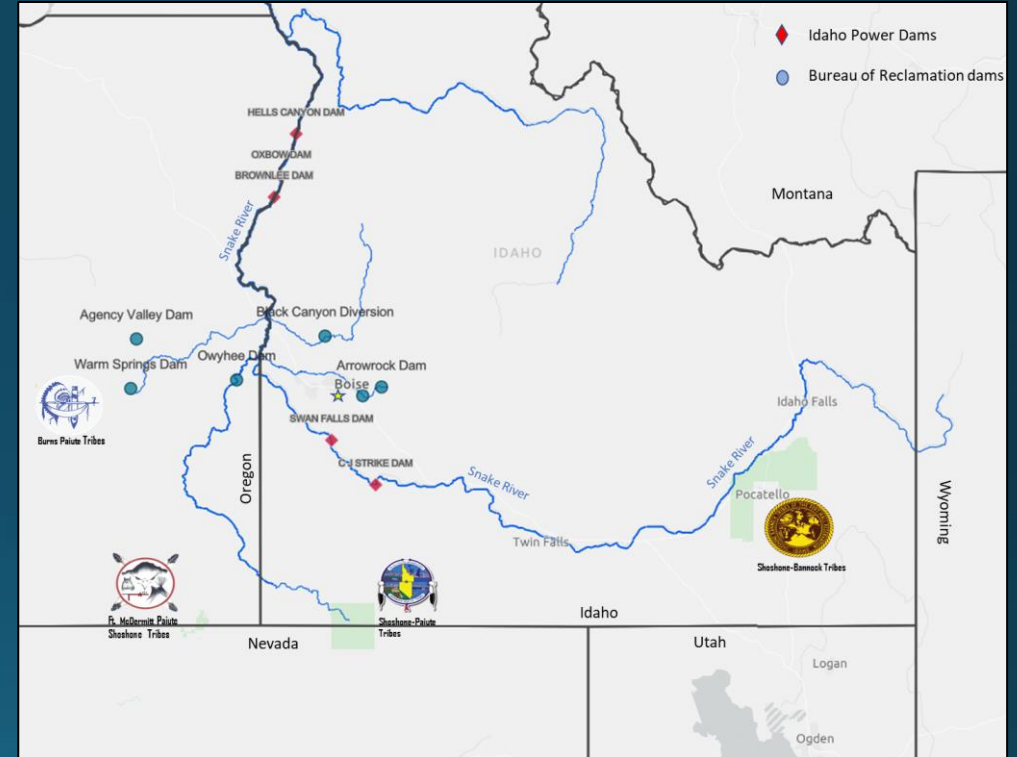
each access-blocking dam. The habitat quality values summarized were used to assign a value to the total number of Chinook salmon potentially supported by each watershed. Finally, these results were presented in both tabular form and as an interactive [GIS Story Map](#).

The Loss Assessment of Spring/Summer Chinook Salmon in the Upper Snake Basin distributes the estimated 1.4 million Spring/Summer Chinook salmon throughout the tributaries of the Upper Snake Basin. The Loss Assessment is an important element to understanding the anadromous fisheries resources lost in select tributaries of the Upper Snake Basin; with a particular emphasis on river systems that connect to member tribes' reservations or those near existing fisheries in the Salmon River Basin. The ISAB review will provide a timely evaluation of the strengths, uncertainties, and limitations of the overall approach and identify and provide input to how they may be addressed.

# Loss Assessment of Spring/Summer Chinook in the Upper Snake River Basin



Dennis Daw (USRT)  
Scott Hauser (USRT)  
Steve Seville (Parametrix)  
Tad Schwager (Parametrix)  
Jessemine Fung (Parametrix)  
Mike Hall (Parametrix)



# Upper Snake River Tribes (USRT) Foundation

Shoshone- Bannock  
Tribes of the Fort Hall  
Reservation



Fort McDermitt Paiute  
and Shoshone Tribe



Shoshone-Paiute Tribes  
of the Duck Valley  
Reservation



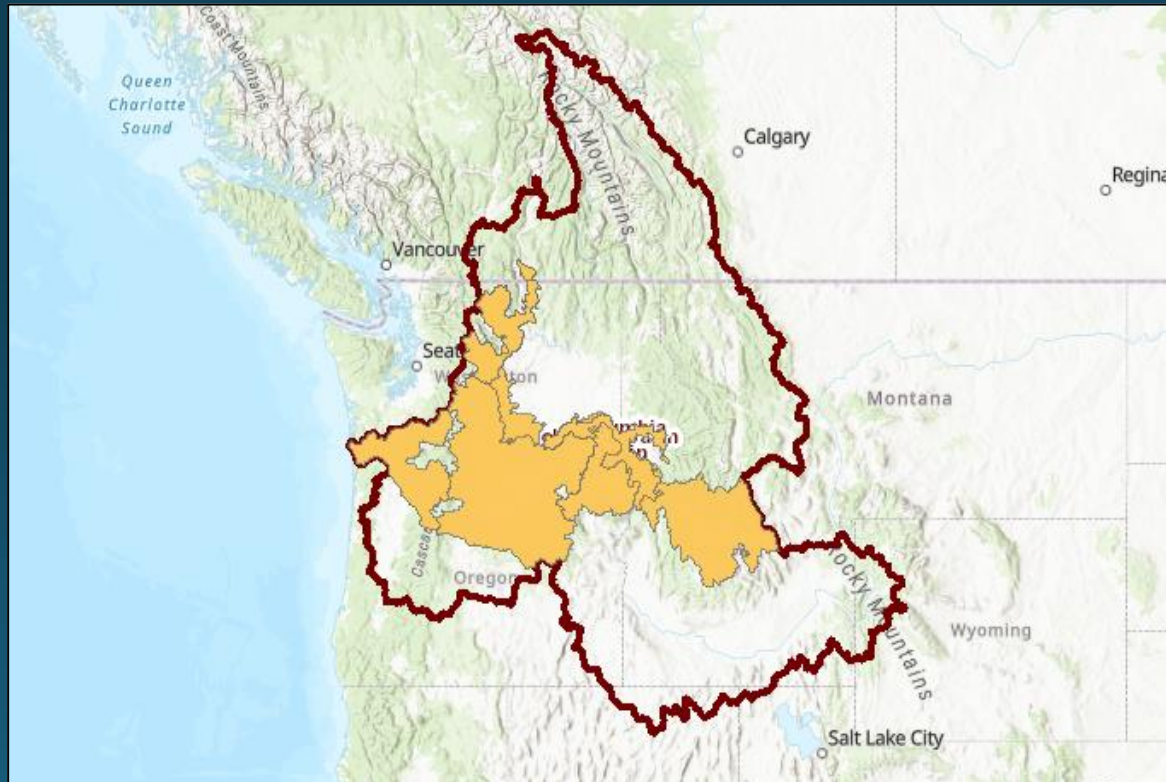
Burns Paiute Tribe

## USRT Overview

- ❖ Formed in 1998 by USRT member tribes
- ❖ 501(c)(3) Non-Profit (2007)
- ❖ USRT Charter objectives:
  - Land, Water, and Air
  - Fish & Wildlife
  - Cultural Resources
  - Ensuring Federal Trust Responsibility
- ❖ USRT was formed primarily to address salmon/steelhead losses due to Hells Canyon Complex
- ❖ In the past decade, USRT has expanded its work to include climate resilience, youth education, and community outreach

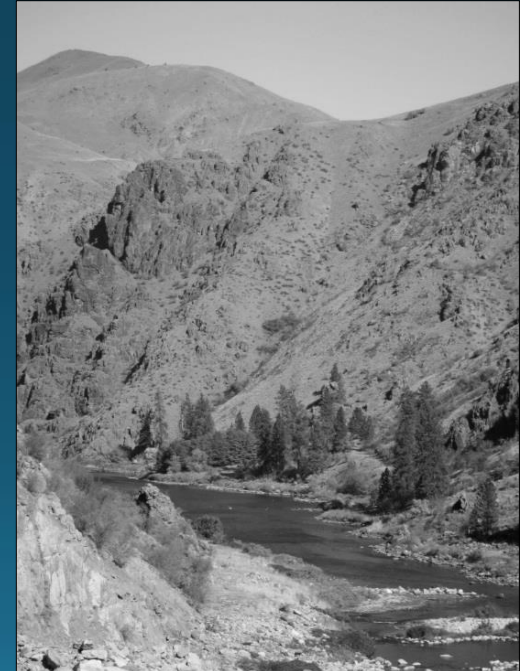
Historically, an estimated 10-16 million anadromous fish returned to the Columbia River Basin, with 1.7 million of those bound for the Snake River, upriver of what is now the Hells Canyon Dam Complex (Complex)

Due to dam construction, habitat destruction, overfishing, and other impacts the current 10-year average of Chinook salmon passing Bonneville Dam has plummeted to 729, 485 adults, with ZERO of those bound for the Snake River upriver of the Complex.



# Purpose of This Work

- The Hells Canyon Fisheries Resource Plan that USRT member tribes and federal partners drafted in 2018.
- Following a similar path as the Upper Columbia United Tribes
- The NPCC Fish and Wildlife Program and 2020 Addendum



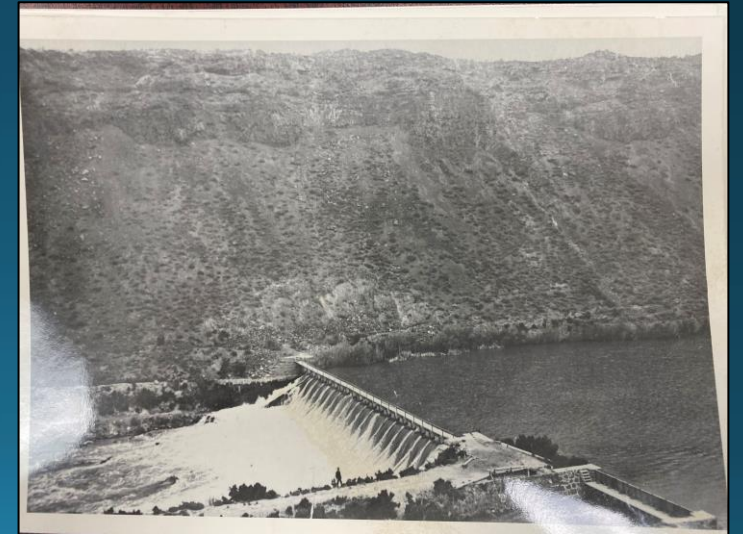
# Northwest Power Act of 1980

- The Act directs the Council to develop and adopt a program to protect, mitigate, and enhance fish and wildlife, including related spawning grounds and habitat, on the Columbia River and its tributaries.
- The 2014 Fish and Wildlife Program has the goal to advance efforts to complete remaining loss assessments.
- The Act requires equitable treatment of power production and fish and wildlife [839b(h)(11)(A)(i)]
- The Upper Snake River Tribes Foundation, Burns Paiute Tribe, Fort McDermitt Paiute and Shoshone Tribes, Shoshone-Bannock Tribes of Fort Hall, Shoshone-Paiute Tribes of Duck Valley, and Parametrix collaborated on the Loss Assessment for spring/summer Chinook in the Upper Snake River



# Disclaimer

This assessment acknowledges that the study area has been considerably altered from its historic condition, both before and after the construction of hydroelectric dams. The information in the assessment attempts only to estimate the potential distribution of spring/summer Chinook salmon, assuming that habitats were undisturbed, highly productive, and capable of their historic functions at the time that historic populations existed. Any future efforts to increase Chinook salmon populations in the study area are expected to be more successful when coupled with habitat restoration, conservation, and preservation efforts to support the greatest current potential for ecological capacity of the target habitats.



# Data and Methods

- The Watershed Boundary Dataset coupled with Modeled stream network from the Columbia Basin Historical Ecology Project allowed us to nest the data to summarize or divide our results at the damshed level, HUC 8 level, and HUC 12 level.
- This nested, hierarchical system gives our analysis the ability to determine the potential fish loss attributed by erecting a dam at the mouth of the damshed.

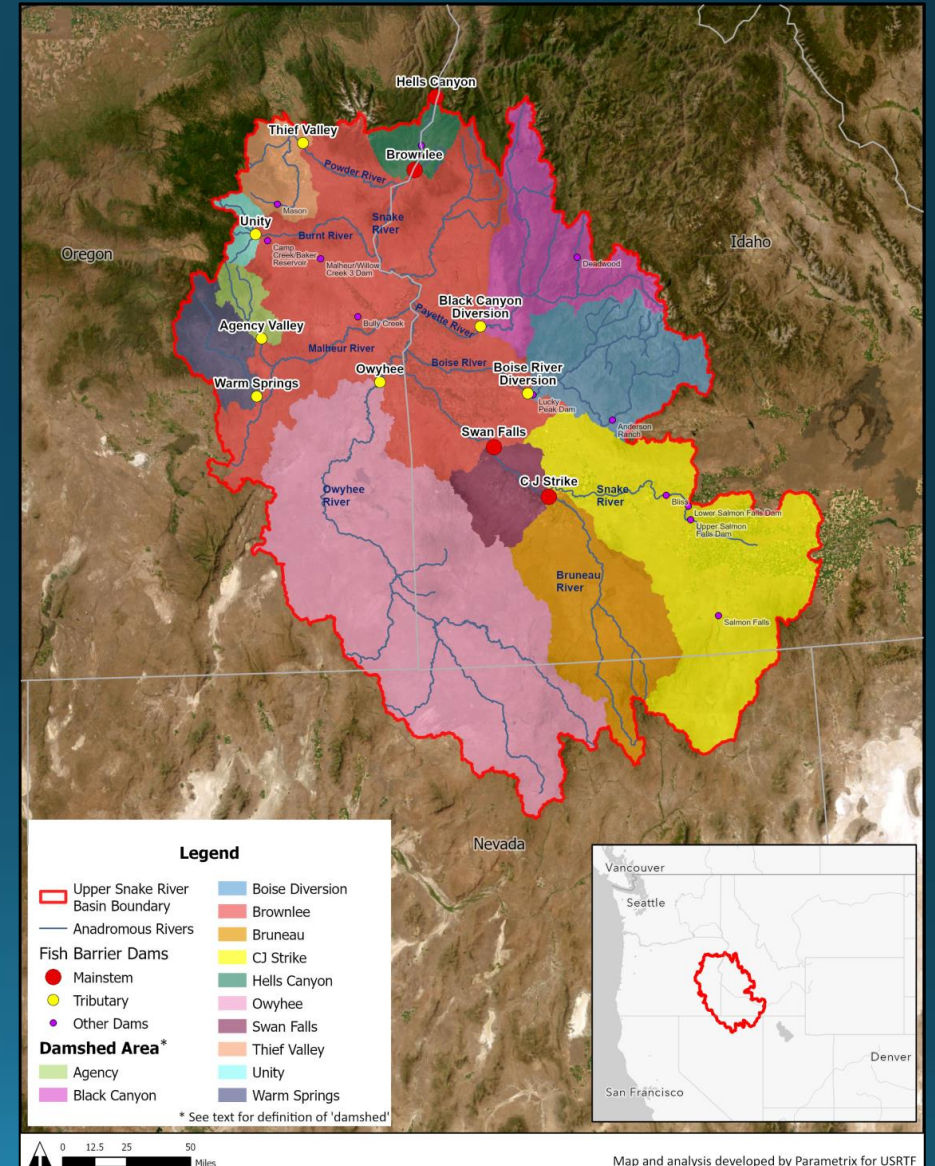


# Damsheds: The Watershed Upstream of a Dam

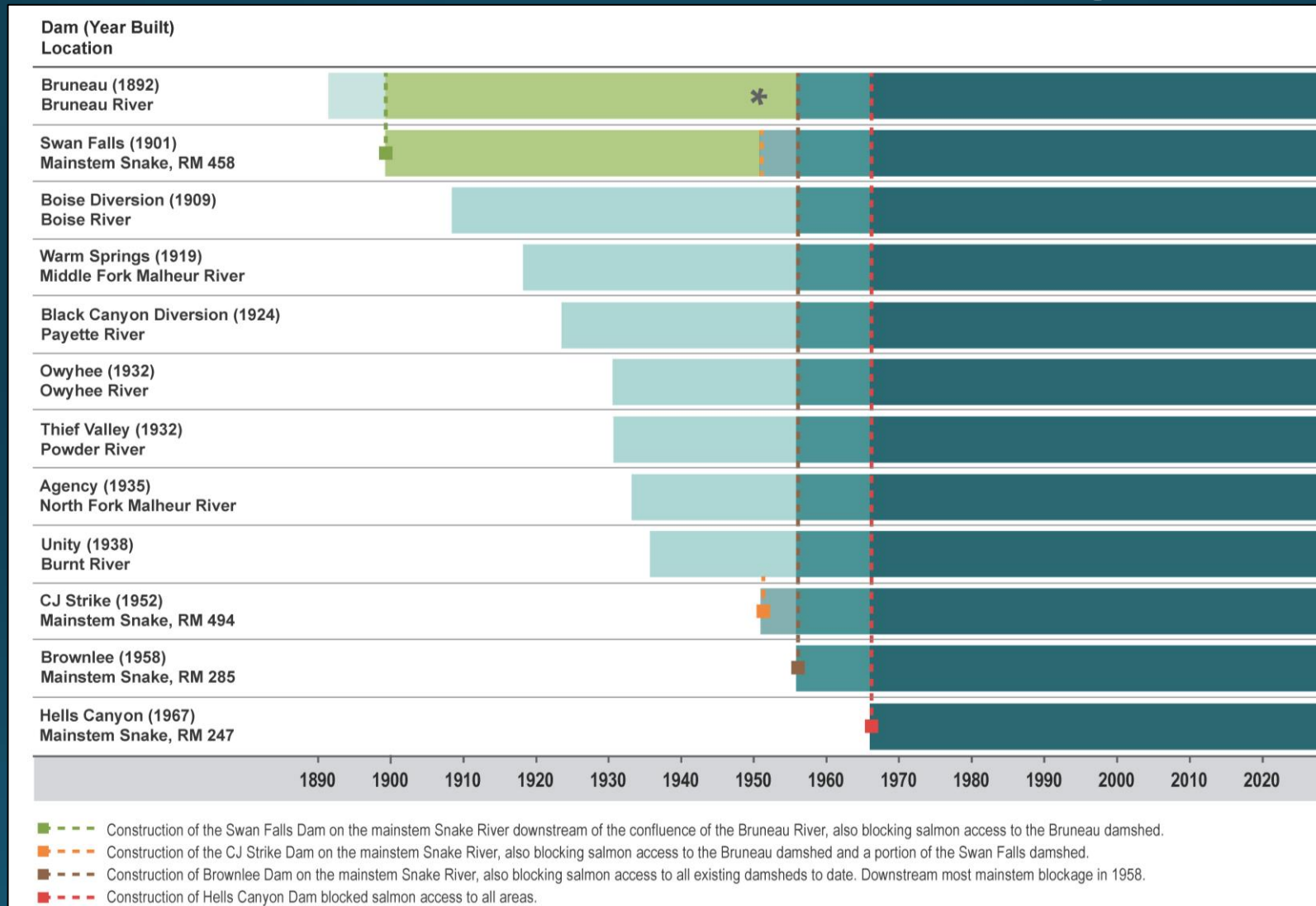
Mainstem dams found along the mainstem Snake River, and include Hells Canyon Dam, Brownlee Dam, CJ Strike Dam, and Swan Falls Dam (red dots). All Owned and operated by Idaho Power Company

Tributary dams are Thief Valley Dam, Unity Dam, Agency Dam, Warm Springs Dam, Black Canyon Diversion Dam, Owyhee Dam, Boise Diversion Dam, and Bruneau Dam (Yellow dots). Except for the Bruneau Dam, all others are owned by the Bureau of Reclamation

This is not a comprehensive list of blockages. It is simply the first major dam in a watershed or a secondary major blockage



# Timeline of Blockage



\* Bruneau Dam washed out and was rebuilt several times after it was first constructed. The last time it washed out may have been in the 1940s.

# Methods

To estimate the amount of stream habitat that was historically available to anadromous fish, we used the National Hydrography Dataset stream network (1:24,000 scale), in which all waterbodies were parsed into 200-meter-long reaches with the elevations at the upstream and downstream ends provided as attributes (Beechie and Imaki 2014; Bond et al. 2019).

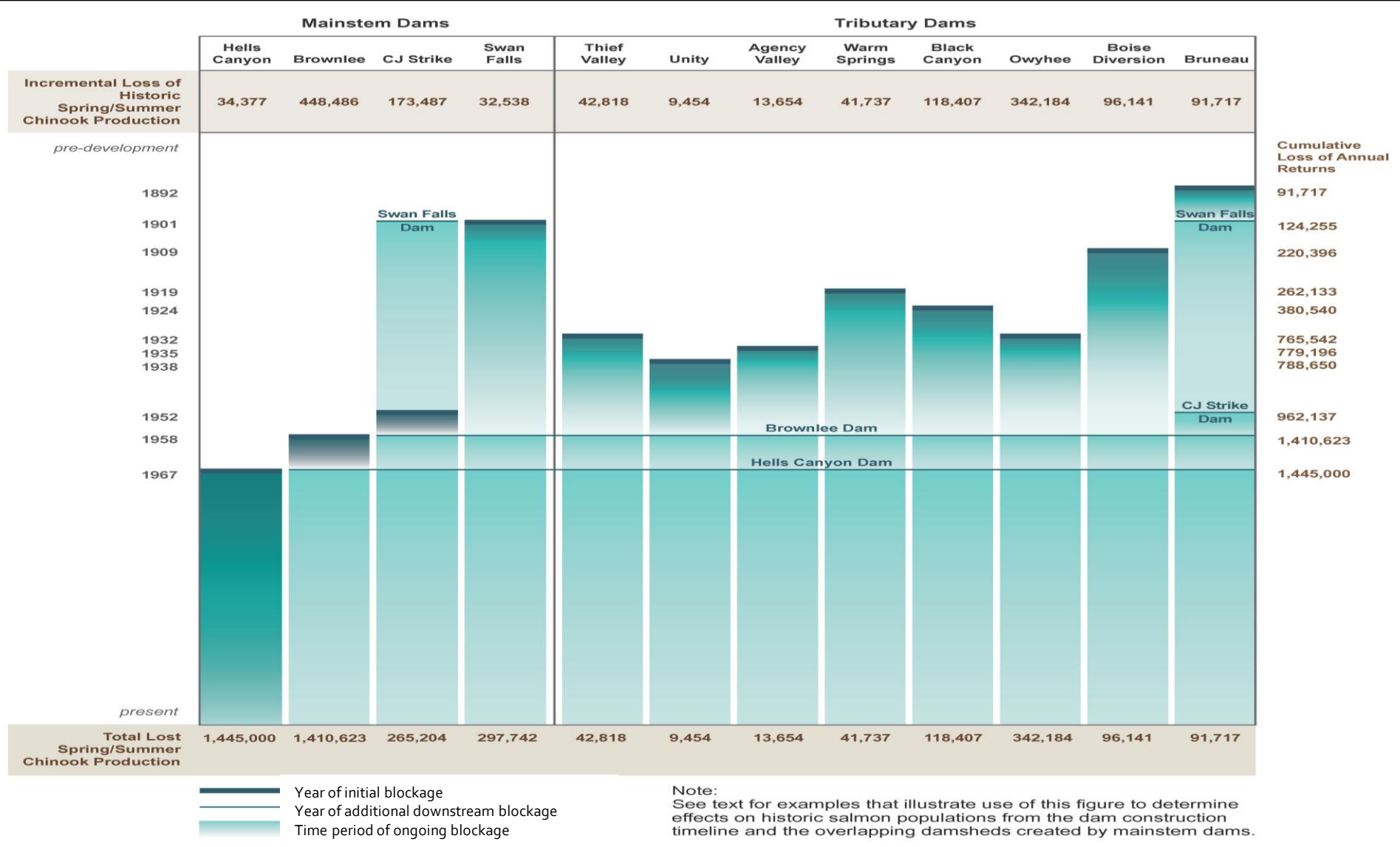
- Bankfull width, Stream gradient, and Valley width ratio were used to create an index for habitat.
- These habitat categories were assigned a conversion factor on a scale of 0-10. 10 being high habitat and poor habitat being 0.
- The numeric index of 0 to 10 for each reach was then multiplied by each reach length (m). Giving the number of stream miles within each damshed and score of the habitat quality
- All stream mileage was summed, and a percentage was calculated for each damshed. That percentage was then applied to the estimated number of s/s Chinook above the Complex.

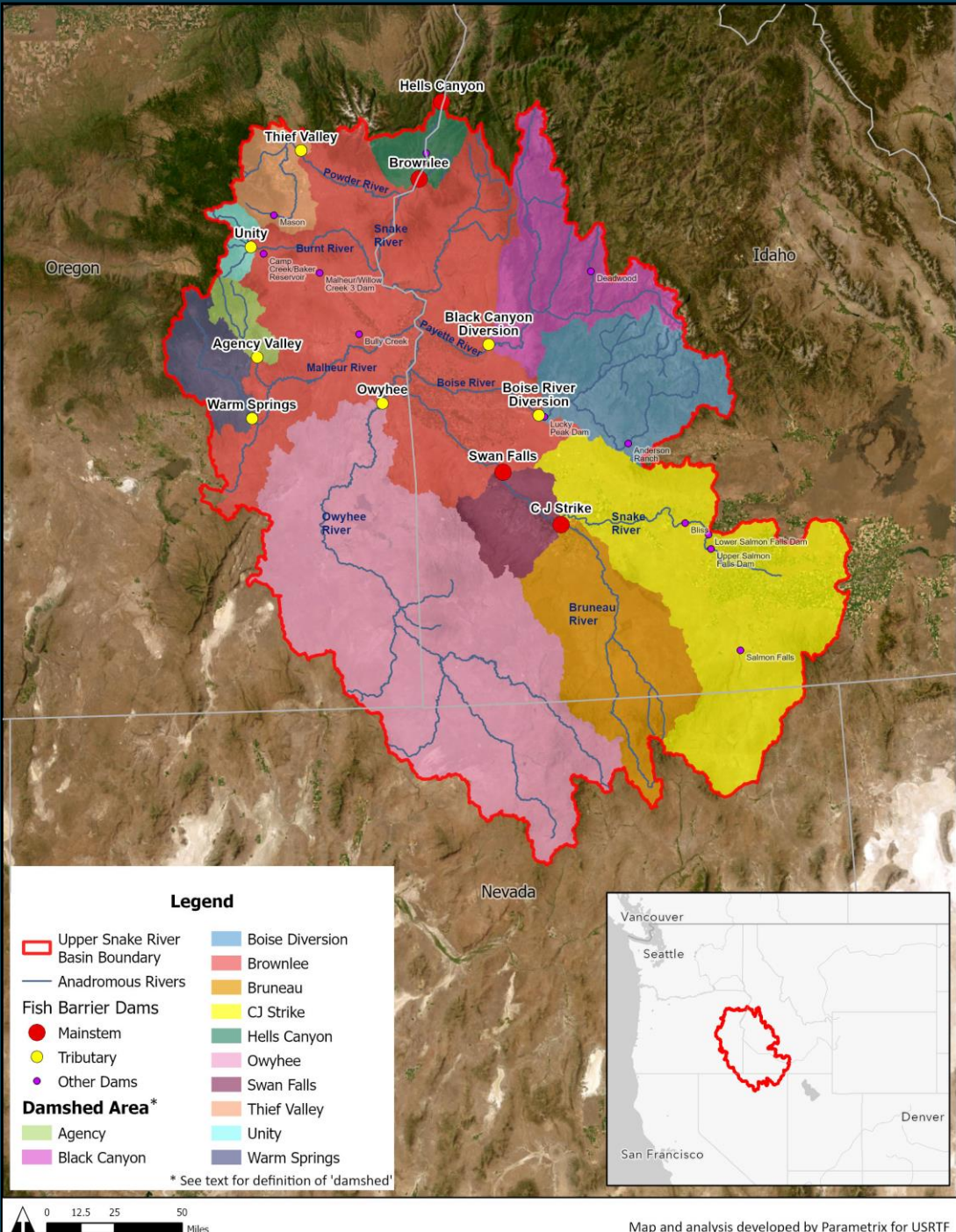
# Results

## Distribution of Historic Spring/Summer Chinook Salmon Habitat and Populations above Dams

Damshed	Sum of Weighted Habitat Index	Proportion of Total Weighted	
		Habitat	Historic Chinook
Bruneau	73,229,702	6.35%	91,717
Swan Falls	25,979,072	2.25%	32,538
Boise Diversion	76,762,071	6.65%	96,141
Warm Springs	33,324,009	2.89%	41,737
Black Canyon	94,540,389	8.19%	118,407
Owyhee	273,211,603	23.68%	342,184
Thief Valley	34,187,661	2.96%	42,818
Agency	10,901,839	0.94%	13,654
Unity	7,548,195	0.65%	9,454
CJ Strike	138,517,686	12.01%	173,487
Brownlee	358,086,524	31.04%	448,486
Hells Canyon	27,448,680	2.38%	34,378
Grand Total	1,153,737,432	100%	1,445,000

# Timeline with Results





Losses of s/s Chinook can be attributed to each damsheded.

Recognizing a variety of impacts led to declines in populations, but dams ultimately caused extirpation in the watershed upstream.



# Next Steps

ISAB has approved our request for review, with a review likely in April or early May

Model the intrinsic potential of current habitat conditions in the Upper Snake for suitability for anadromous fish.

Finish the loss assessment for all other anadromous fish species: coho, fall Chinook, steelhead, and sockeye.



# Questions

