

**Does Water Resources Management in  
the Snake River Basin Matter for the  
Lower Columbia River?  
Or  
Is the Snake River Part of Another  
Watershed?**

**John C. Tracy, Director  
Idaho Water Resources Research Institute  
University of Idaho**

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# Purpose

To understand the role that management of the Snake River watershed has on the delivery of river system services to the Lower Columbia River, and how these services may be altered due to changes in future conditions in the Snake River.

# Outline

- The Democracy of Water Management in the Western United States
- Water Management in the Snake River Basin
- The Impact of Snake River Management on CRT Objectives
- Potential Issues and Opportunities with Snake River Management

# The Democracy of Water Management

## Who Controls Water in the West?

It depends on what service the water is providing:

- Any economic benefit?
- Power production?
- Flood protection?
- Sustaining species and ecological systems?

# The Democracy of Water Management

## Control of Water for Economic Benefit

### Entities that control water through infrastructure:

- Federal Government - Reclamation, Corps, etc.
- Private Entities – Utilities, Irrigation Districts, etc.
- Local Governments – Cities, Counties, etc.

### Entity that controls water by regulatory authority:

- State Water Divisions

# **The Democracy of Water Management**

## **Control of Water for Power Production**

**Entities that control power production through infrastructure:**

- **Federal Government - Reclamation, Corps, etc.**
- **Private Entities – Utilities, Irrigation Districts, etc.**
- **Local Governments – Cities, Counties, etc.**

**Entity that controls power production by regulatory authority:**

- **Federal Government through FERC**

# **The Democracy of Water Management**

## **Control of Water for Flood Management**

**Entities that control flood risk through infrastructure:**

- **Federal Government - Reclamation, Corps, etc.**
- **Private Entities – Utilities, Irrigation Districts, etc.**
- **Local Governments – Cities, Counties, etc.**

**Entity that controls flood management by regulatory authority:**

- **Federal Government through Army Corps**

# **The Democracy of Water Management**

## **Control of Water for Species Protection**

**Entities that manage infrastructure for sustaining species and ecosystems:**

- **Federal Government - Reclamation, Corps, etc.**
- **Private Entities – Utilities, etc.**
- **Local Governments – Cities, Counties, etc.**

**Entities that use regulatory authority for sustaining species and ecosystems:**

- **Federal Government through NOAA, USFWS and EPA**
- **State Governments through State EPA units**



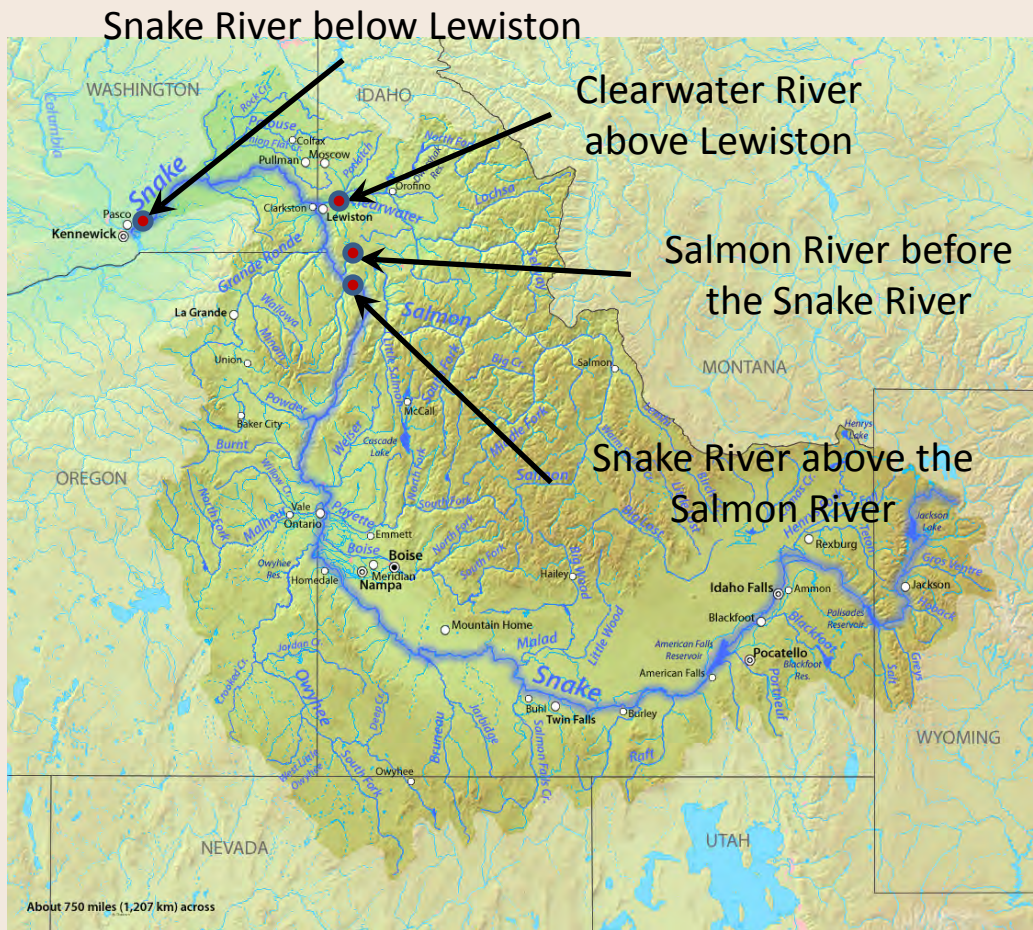
# The Democracy of Water Management

Agency	Flood Control	Hydro-power	Species Protection	Consumptive Diversion	Transport
Federal					
US ACOE	I, R	I	I		I, R
USBR	I	I	I	I	
USEPA			R		
USFWS/NOAA			R		
FERC		R			
State					
EPA			R		
WR	R	R	R	R	R
F&G			I		
Local	I	I	I	I	I
Private	I	I	I	I	I



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# The Snake River Basin



## Snake River Basin Statistics

Area – 107,510 sq mi

Length– 1,078 miles

Average Discharge – 54,830 cfs

Major Tributaries

- River above Joseph

Ave Flow = 18,800 cfs

- Clearwater River

Ave Flow = 14,300 cfs

- Salmon River

Ave Flow = 11,100 cfs

Max Elevation – 8,927 ft

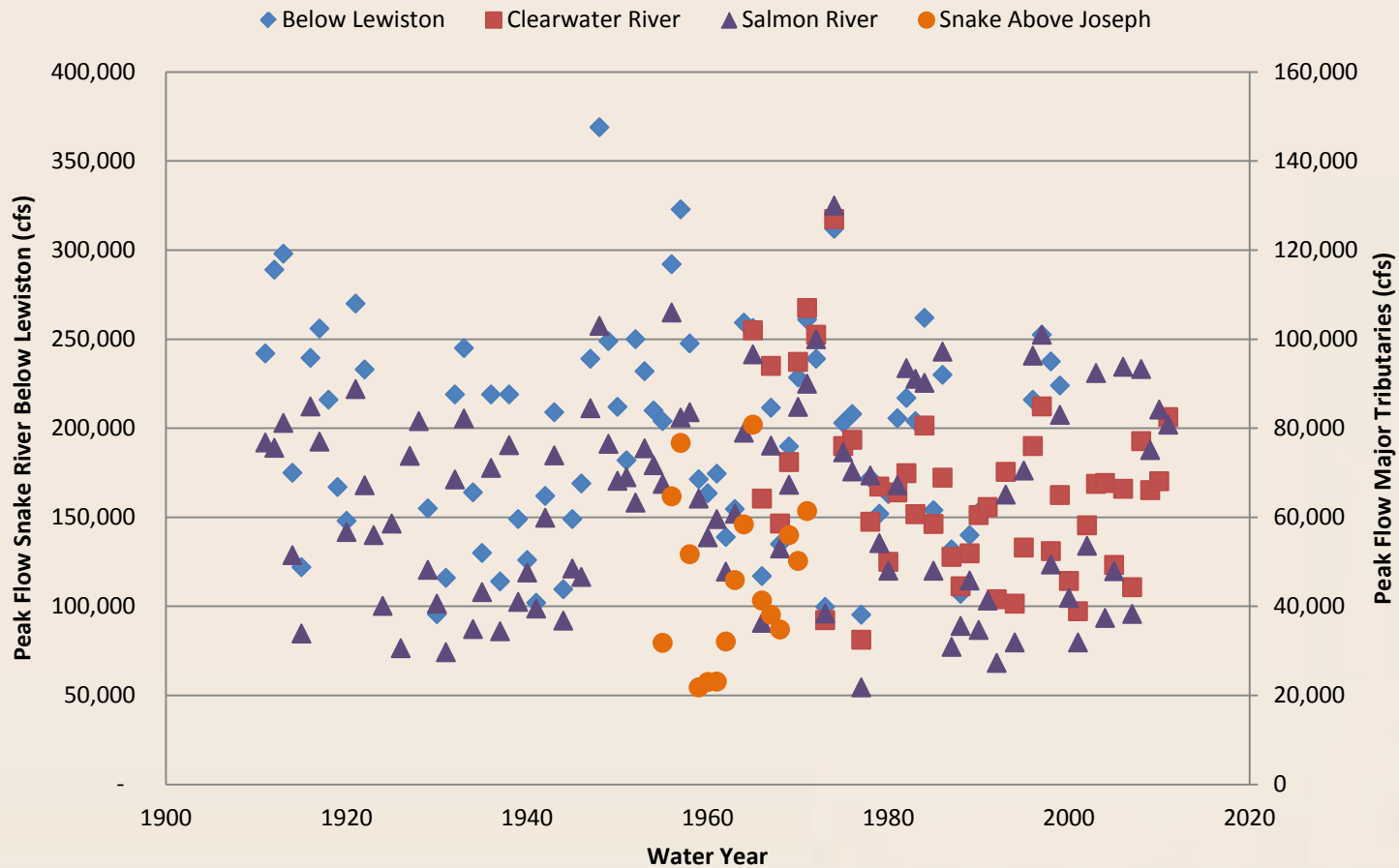
Min Elevation – 358 ft

\*Average discharges are from different periods of record

Image From Wikipedia ([http://en.wikipedia.org/wiki/Snake\\_River](http://en.wikipedia.org/wiki/Snake_River))

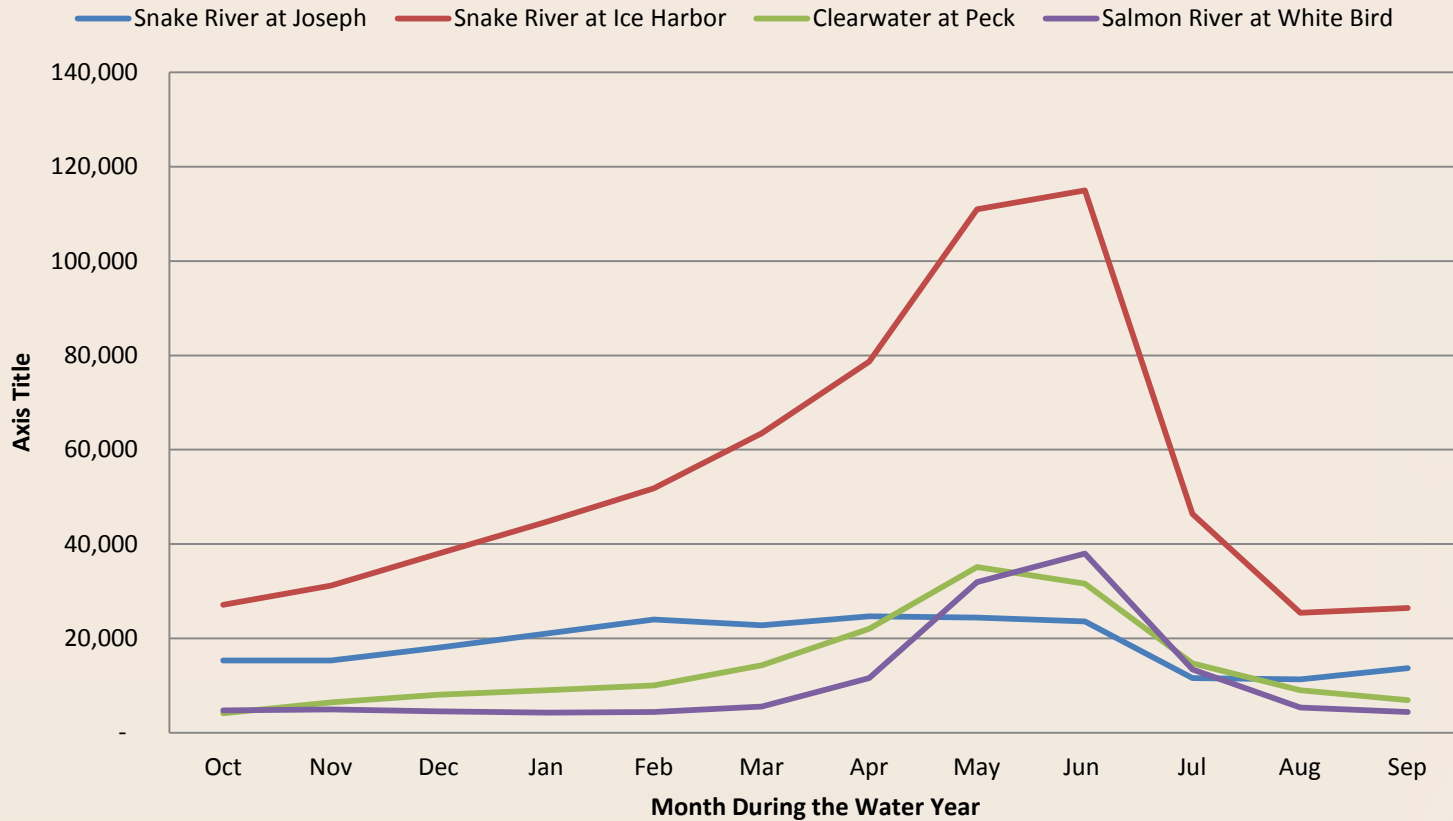
# The Snake River Basin

## Yearly Peak Flows for Snake River Drainages



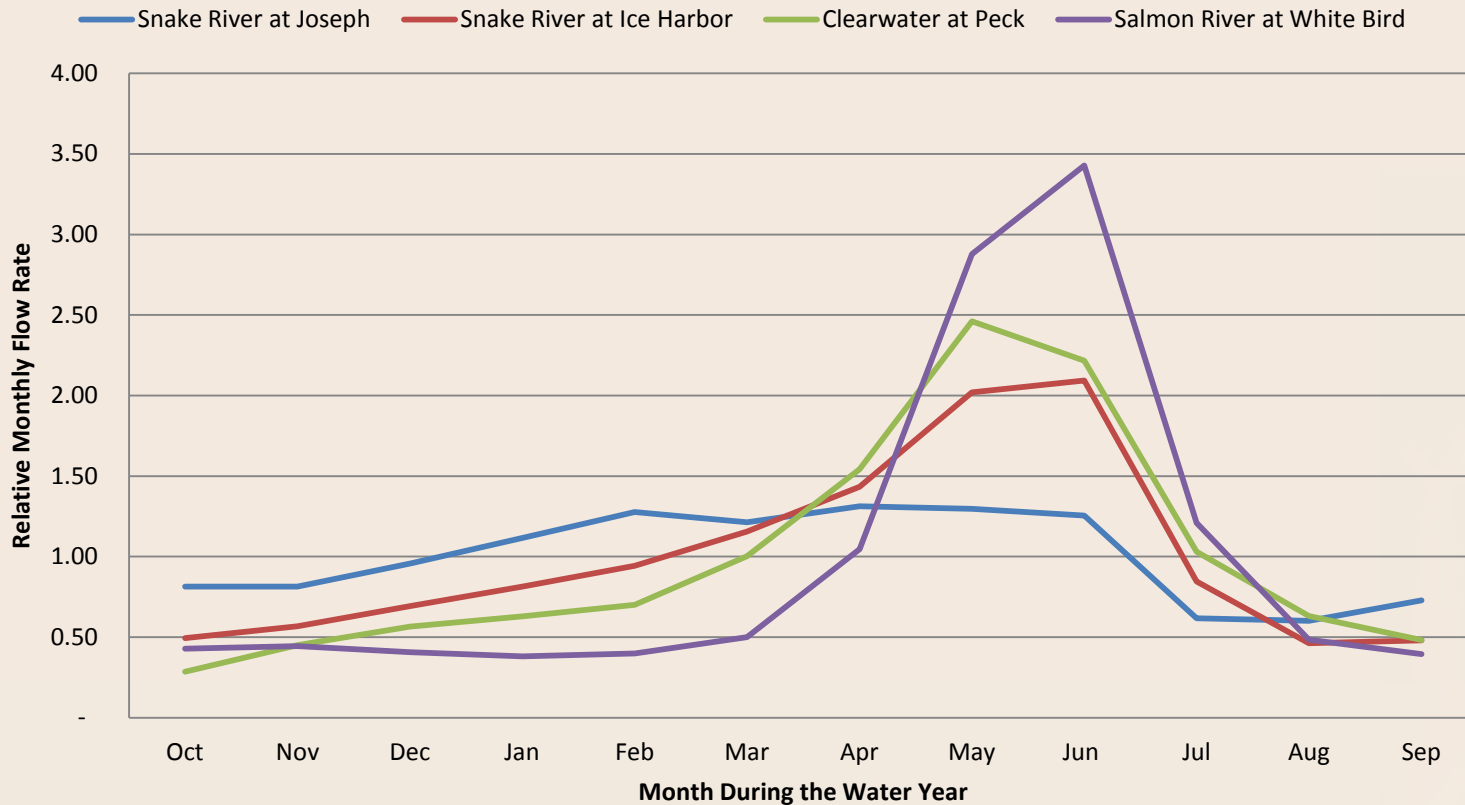
# The Snake River Basin

## Monthly Average Flows for Major Snake Drainages



# The Snake River Basin

## Relatively Monthly Flow for Major Snake Drainages



# Water Management in the Snake Basin



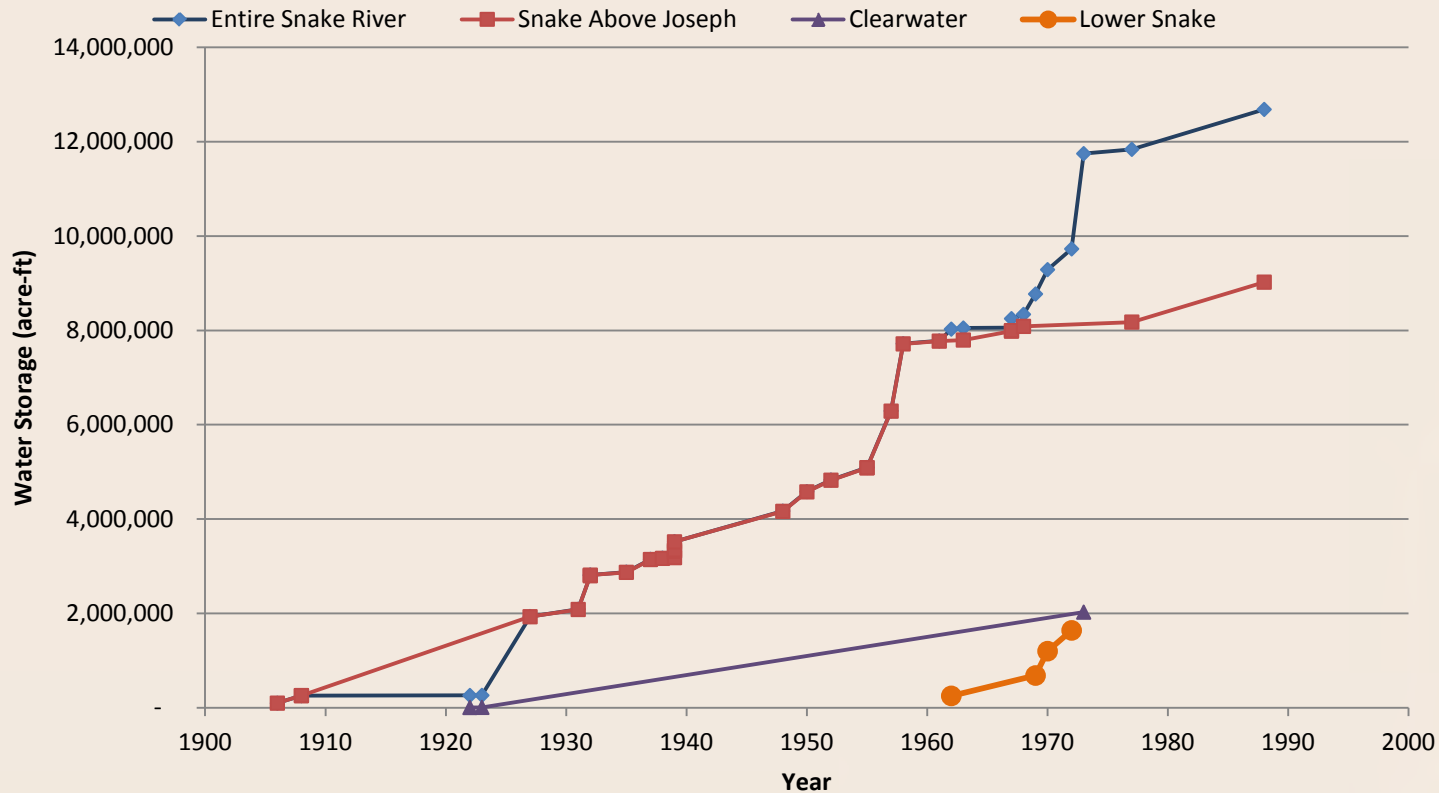
Total Reservoir Storage - 12.69 MAF  
 Above Joseph - 9.02 MAF  
 Clearwater River - 2.03 MAF  
 Salmon River - 0 MAF

Hydropower Capacity - 5,060 MW  
 Above Joseph - 1,627 MW  
 Clearwater River - 400 MW  
 Salmon River - 0 MW

Image From Wikipedia ([http://en.wikipedia.org/wiki/Snake\\_River](http://en.wikipedia.org/wiki/Snake_River))

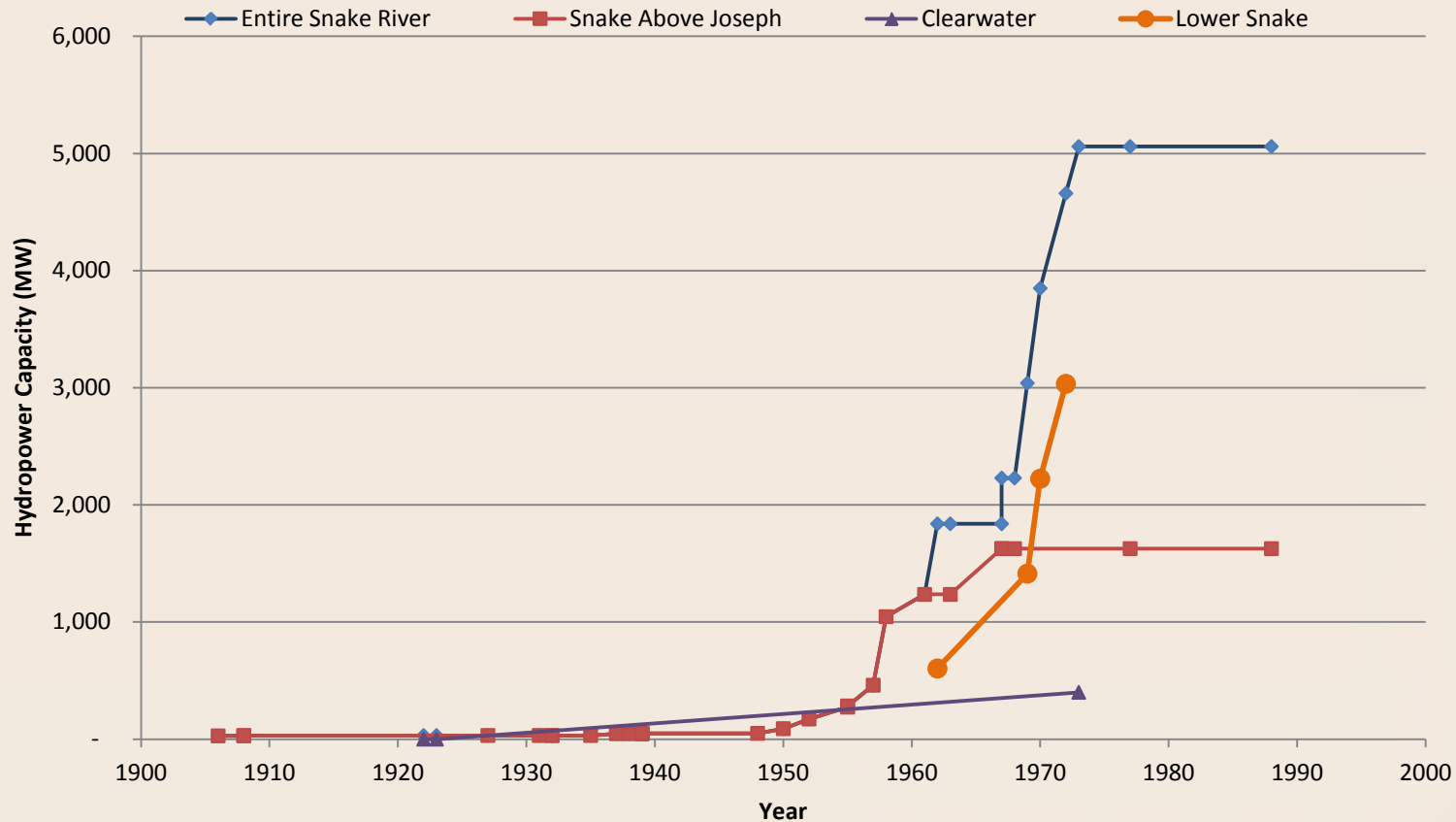
# Water Management in the Snake Basin

## Snake River Storage versus Time



# Water Management in the Snake Basin

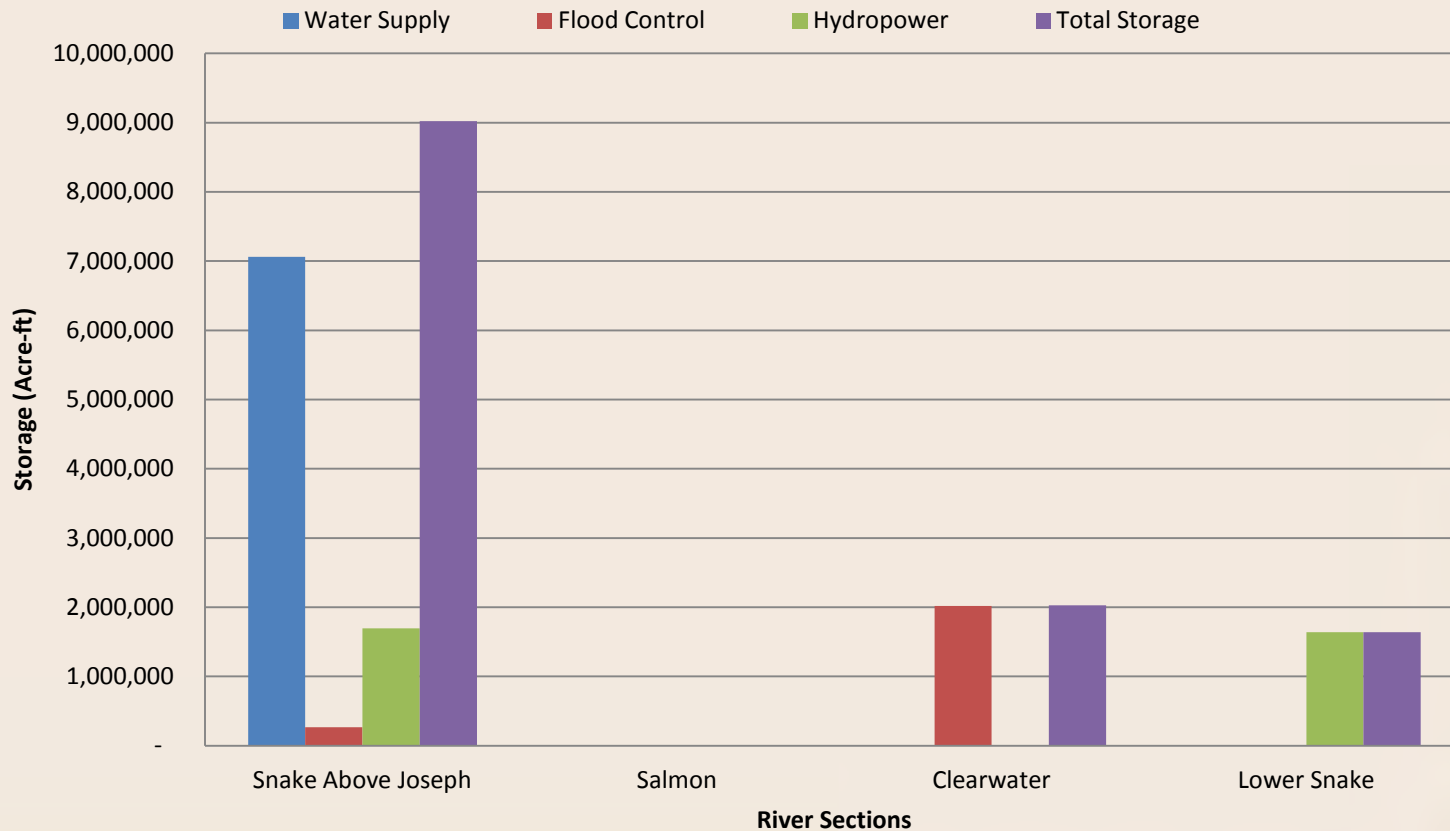
## Snake River Hydropower versus Time





# Water Management in the Snake Basin

## Water Storage by Primary Purpose for Primary Drainages

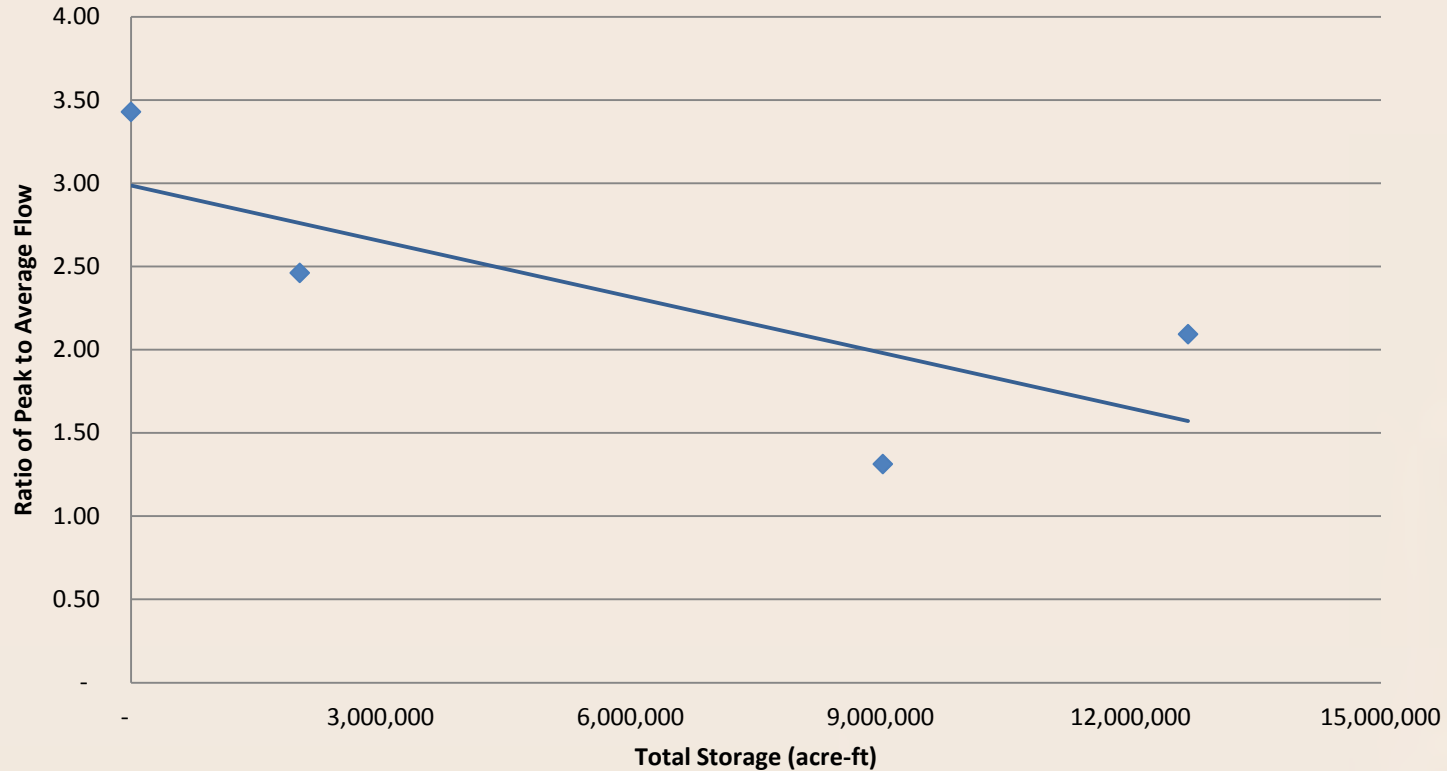


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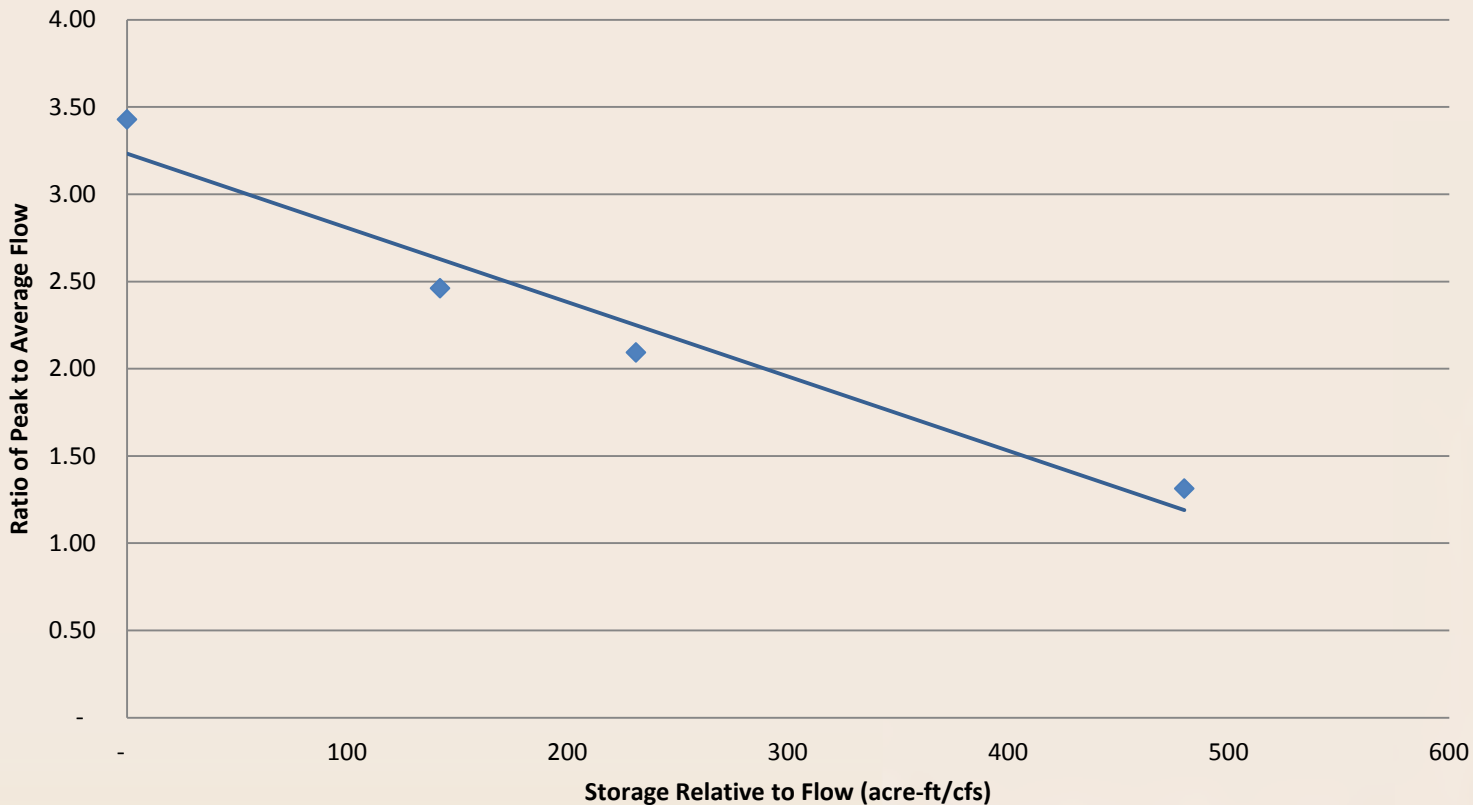
# The Snake River and the CRT Goals

Ratio of Peak Monthly Flow to Average Flow versus Watershed Storage



# The Snake River and the CRT Goals

Ratio of Peak Monthly Flow to Average Flow versus  
Watershed Storage Relative to Flow



# The Snake River and the CRT Goals

## So what does this tell us?

- So far, water supply storage and flood protection storage are non-rival uses (synergies exist)
- Water Management in the Snake River basin is providing flood protection services to the Lower Columbia system (i.e. Portland)
- The vast majority of these services were provided prior to the signing of the CRT and the development of the treaty reservoirs

# **The Snake River, the CRT, the Future**

## **Three reasons why the Lower Columbia community should care about Water Management in the Snake River**

- Climate change is forcing flood control storage and water supply storage to become rival services
- Increasing demands on water storage for ecological flow enhancements in the lower Snake and Columbia systems
- Increasing demand for water supply storage in the Snake River above Joseph

# The Snake River, the CRT, the Future

## What are the potential impacts?

### Downstream looking up perspective:

- Estimated increase in peak flood flow rate (approx 100 year flood) from Snake River above Joseph is about 15,000 cfs per 1 MAF of storage reduction

### Upstream looking down perspective:

- Allowing increase in allowable flood flows at the Dalles through flood plain management in the Lower Columbia could free up substantial reservoir space for future water supplies in the Snake River

# The Snake River, the CRT, the Future

## What are the potential opportunities?

Use the CRT to initiate an Integrated Water Resource Management (IWRM) analysis for the entire drainage:

- Explore cost effectiveness of flood plain management in the Lower Columbia River in comparison to continued or increased river regulation;
- Include river management alternatives for all of the tributaries in the Columbia drainage;
- Explore the development of alternative water storage mechanisms for water supplies in the Columbia Tributaries (i.e. intensive/extensive groundwater recharge systems);
- Link the beneficiaries of river management services to payment for those services.