

# Do Dams Need to be Breached to Recover Salmon?

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# Topics of Discussion

- History of salmon decline in the Pacific Northwest
- Focus on the Lower Snake River Project
- Current state of affairs as relates to salmon recovery and dam breaching

# History of Salmon Decline

- Public perception of “conservation”
- Four primary contributors to salmon decline
- Environmental Movement

# 4-H's - Harvest

“It was clear that too many fisherman were chasing too few fish.”

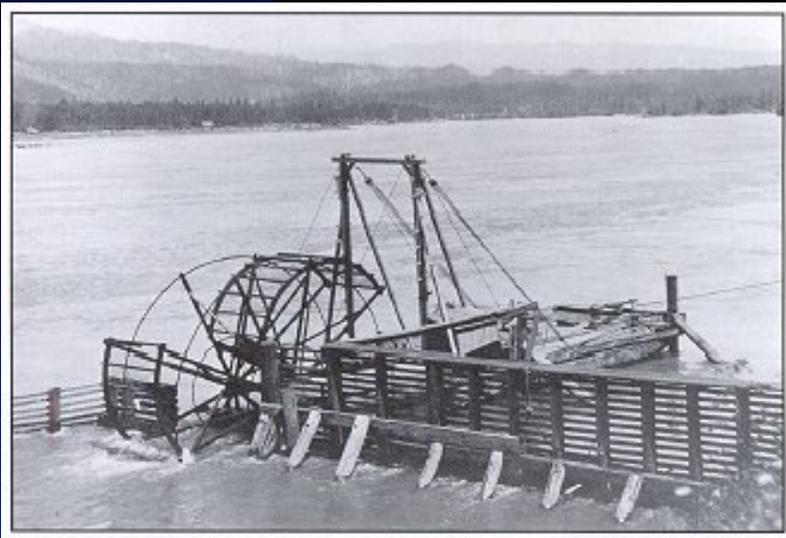
Anthony Netboy, *The Columbia River Salmon Steelhead Trout*, 1980

# Harvest – Tribal Fishery



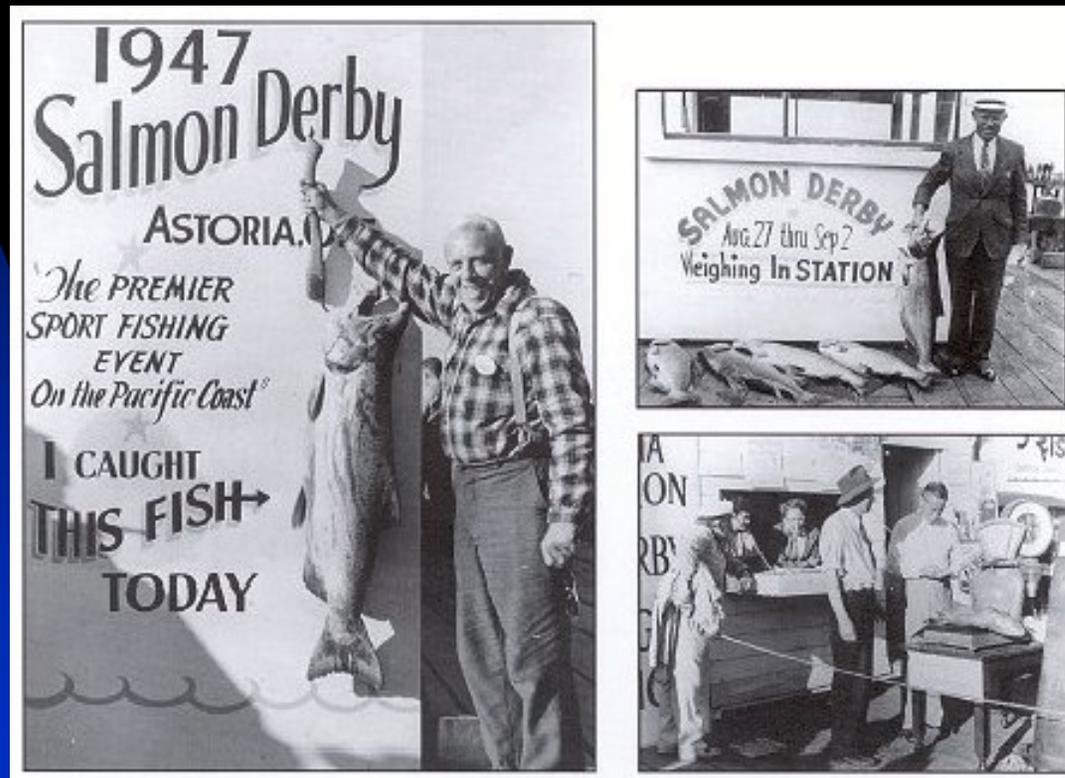
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# Harvest –Commercial Fishery



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# Harvest – Sport Fishing



## 4-H's - Habitat

“Garbage was always a problem around the cannery and the mess house...All the garbage from the mess house was tossed over the fence into the creek. Twice a year the creek in flood or high water from the Columbia would sweep away all the debris.”

-Francis Seufert

# Influences on Habitat

- Mining
- Logging
- Farming
- Grazing
- Urbanization
- Industrial Pollution
- Dam Building

# 4-H's - Hatcheries

“In my mind, the use of hatcheries is going to be a necessity...There's been too much degradation of habitat for wild runs, particularly in the main Columbia.”

Bill Herschberger, Fish Geneticist,  
University of Washington

# Hatcheries



**Central Salmon Hatchery in August 1921, showing ponds, buildings, and incubation building.**



# 4-H's - Hydropower

“Your power is turning our darkness  
to dawn, So roll on, Columbia, roll  
on.”

-Woody Guthrie

# Hydropower



Dworshak Dam & Reservoir

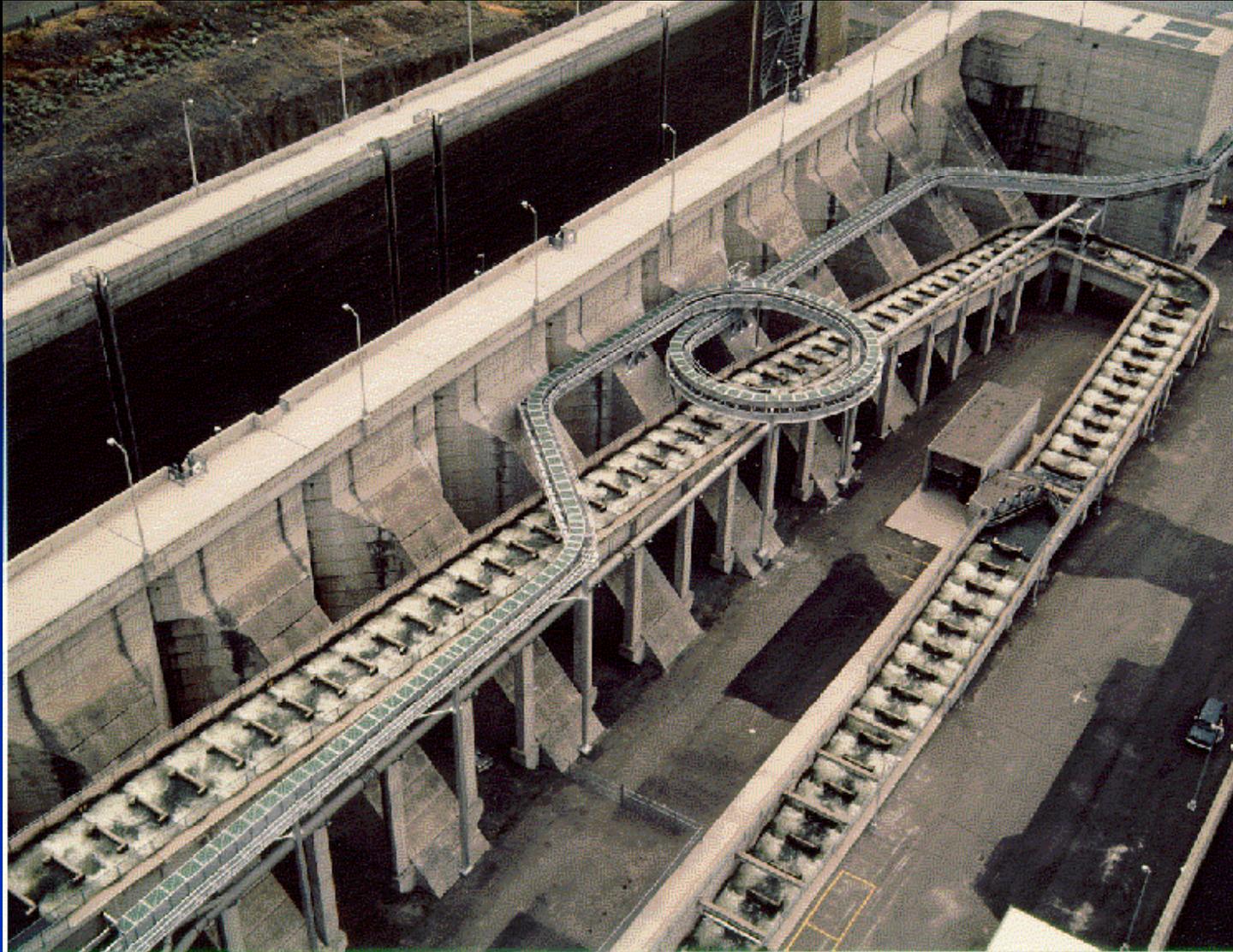


Lower Granite Lock & Dam



Bennington Lake

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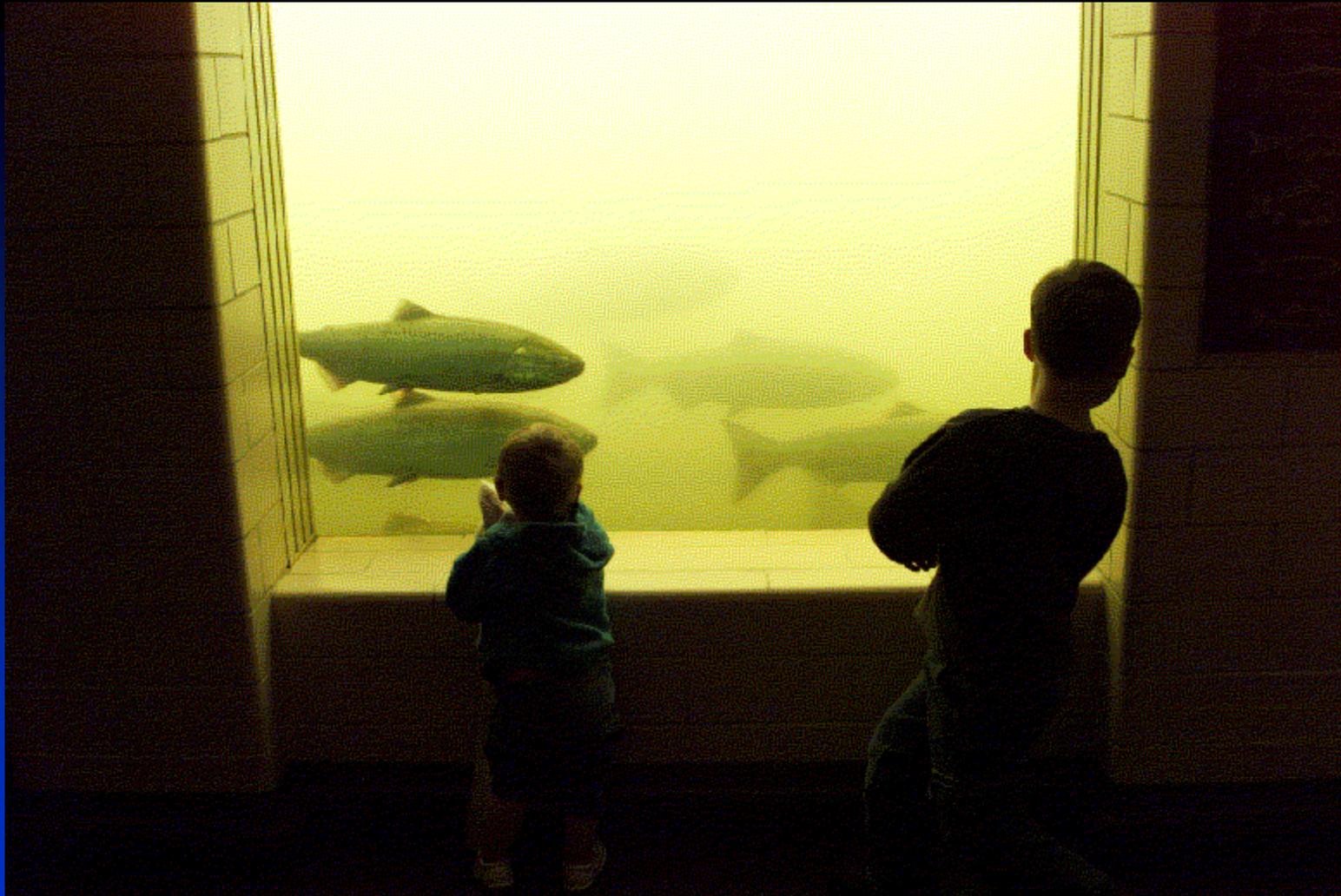


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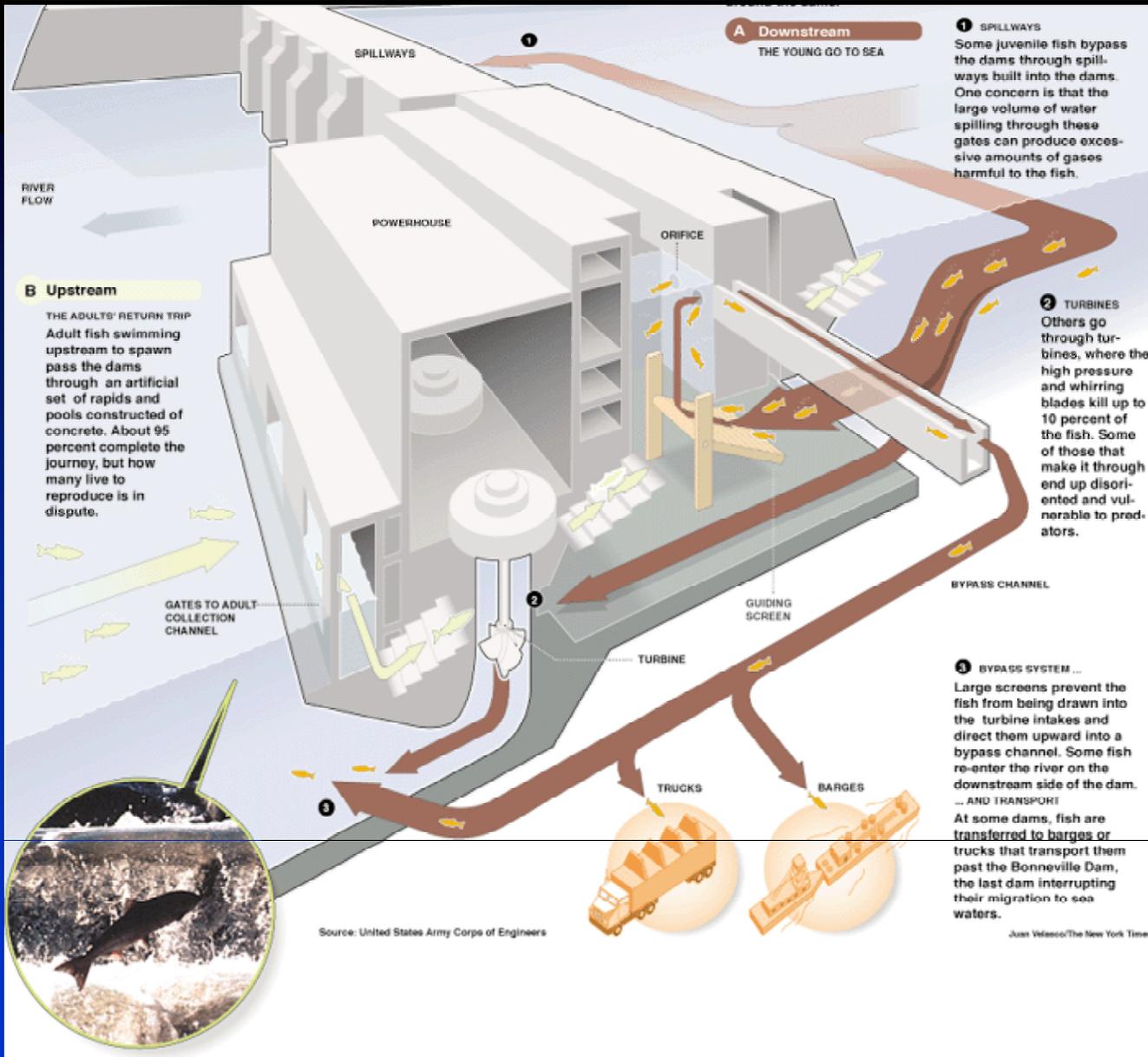
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An alternative to the current system would be the removal of the earthen portions of the dams, restoring the river's natural flow.

### Rerouting Nature's Flow

Dams in the lower Snake and Columbia Rivers interrupt the natural migrations of Pacific salmon and are believed to be a major factor in their declining numbers. Officials are considering alternatives to the present system for routing the fish around the dams.



#### B Upstream

**THE ADULTS' RETURN TRIP**  
Adult fish swimming upstream to spawn pass the dams through an artificial set of rapids and pools constructed of concrete. About 95 percent complete the journey, but how many live to reproduce is in dispute.

GATES TO ADULT COLLECTION CHANNEL

#### A Downstream

THE YOUNG GO TO SEA

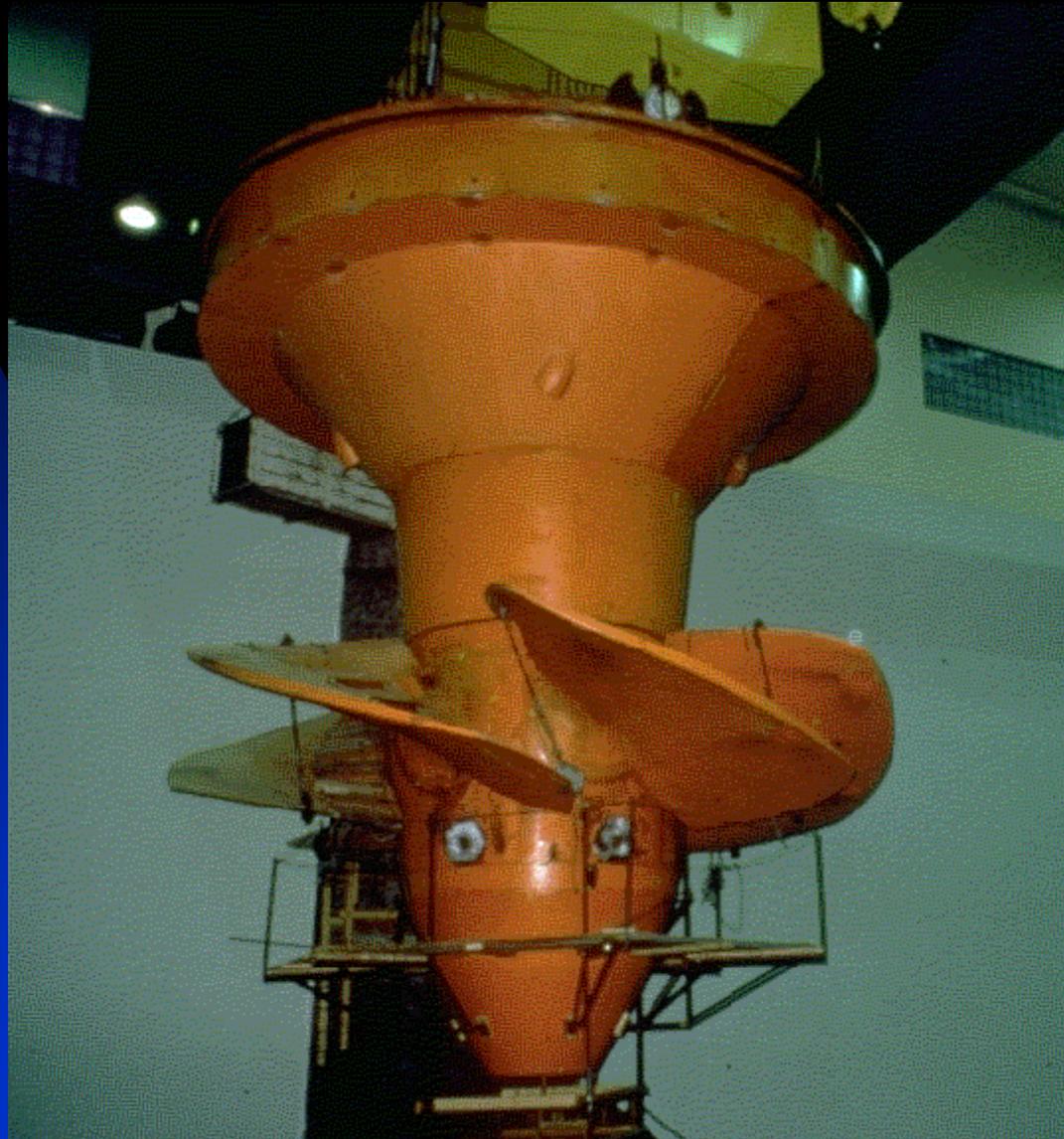
**1 SPILLWAYS**  
Some juvenile fish bypass the dams through spillways built into the dams. One concern is that the large volume of water spilling through these gates can produce excessive amounts of gases harmful to the fish.

**2 TURBINES**  
Others go through turbines, where the high pressure and whirling blades kill up to 10 percent of the fish. Some of those that make it through end up disoriented and vulnerable to predators.

**3 BYPASS SYSTEM ...**  
Large screens prevent the fish from being drawn into the turbine intakes and direct them upward into a bypass channel. Some fish re-enter the river on the downstream side of the dam. ... AND TRANSPORT  
At some dams, fish are transferred to barges or trucks that transport them past the Bonneville Dam, the last dam interrupting their migration to sea waters.

Source: United States Army Corps of Engineers

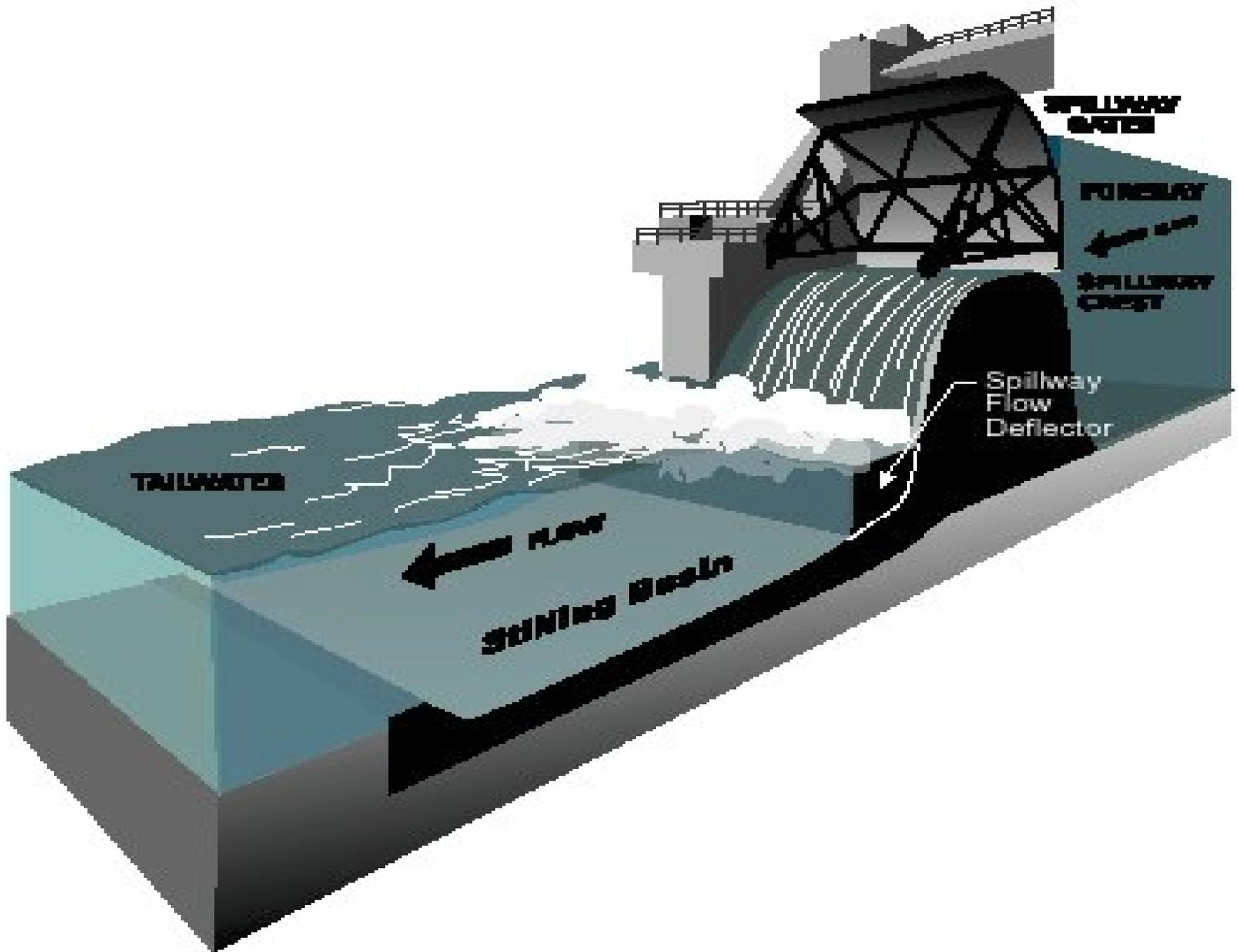
Juan Velasco/The New York Times



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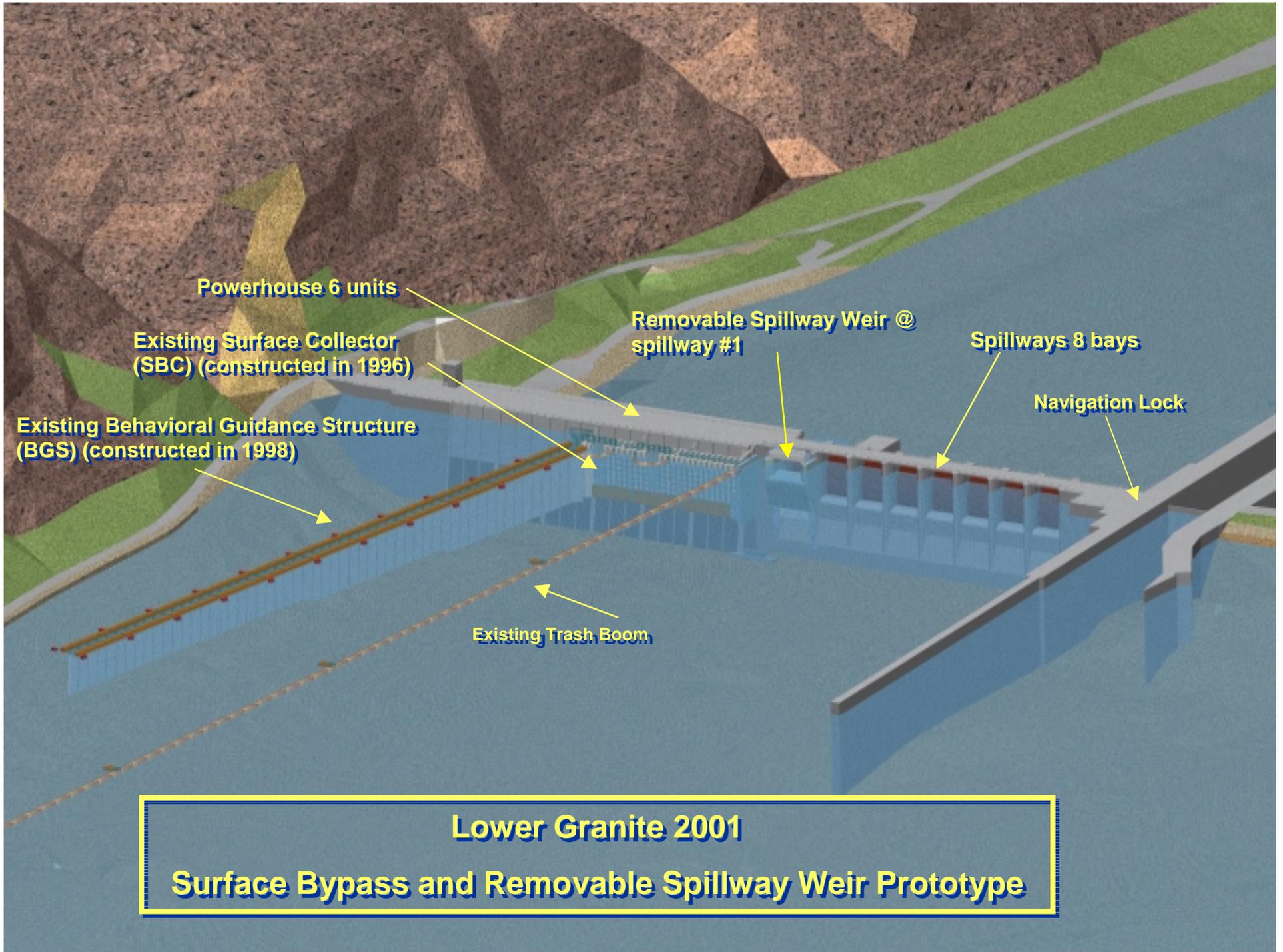












Powerhouse 6 units

Existing Surface Collector (SBC) (constructed in 1996)

Existing Behavioral Guidance Structure (BGS) (constructed in 1998)

Removable Spillway Weir @ spillway #1

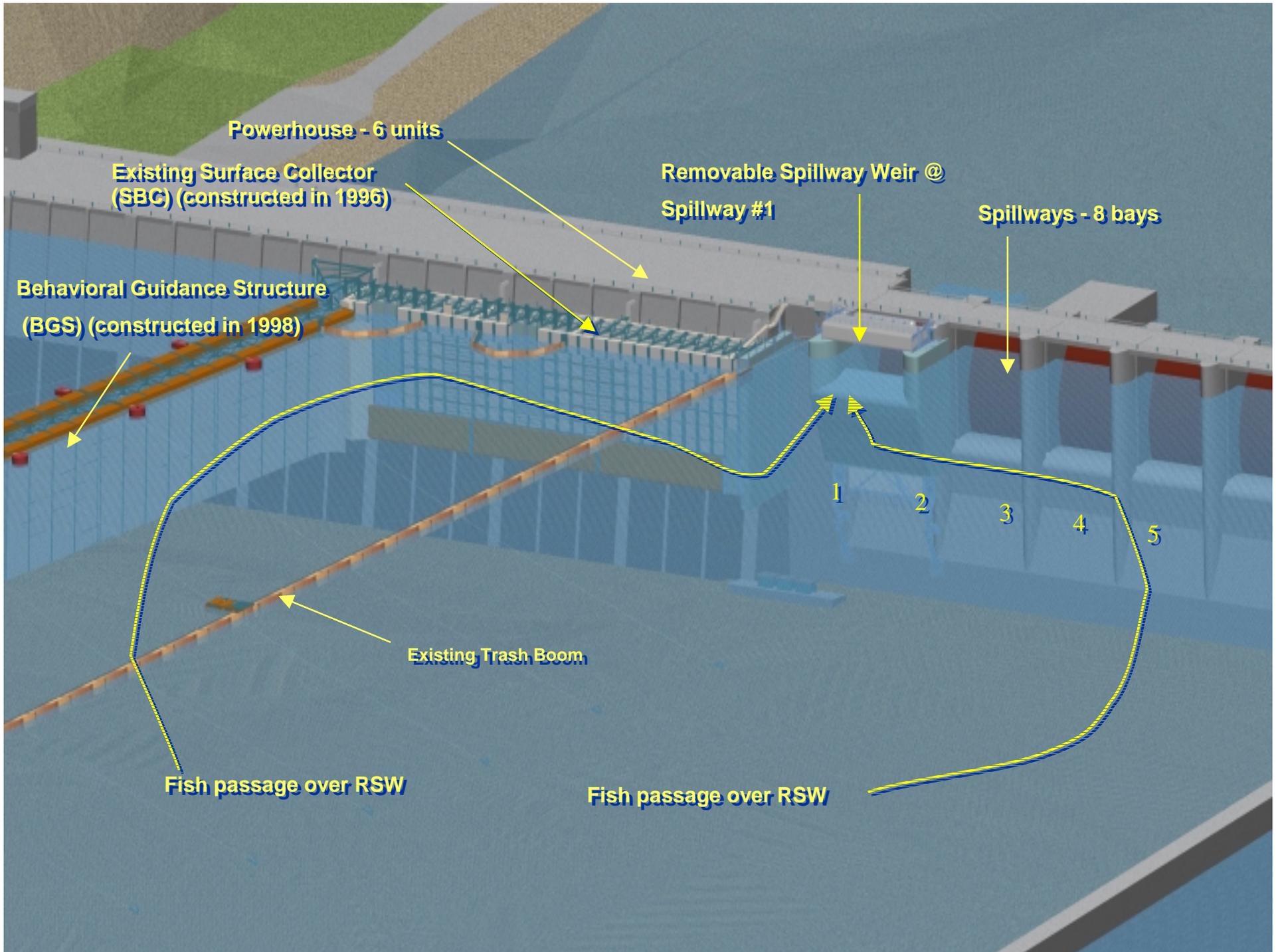
Spillways 8 bays

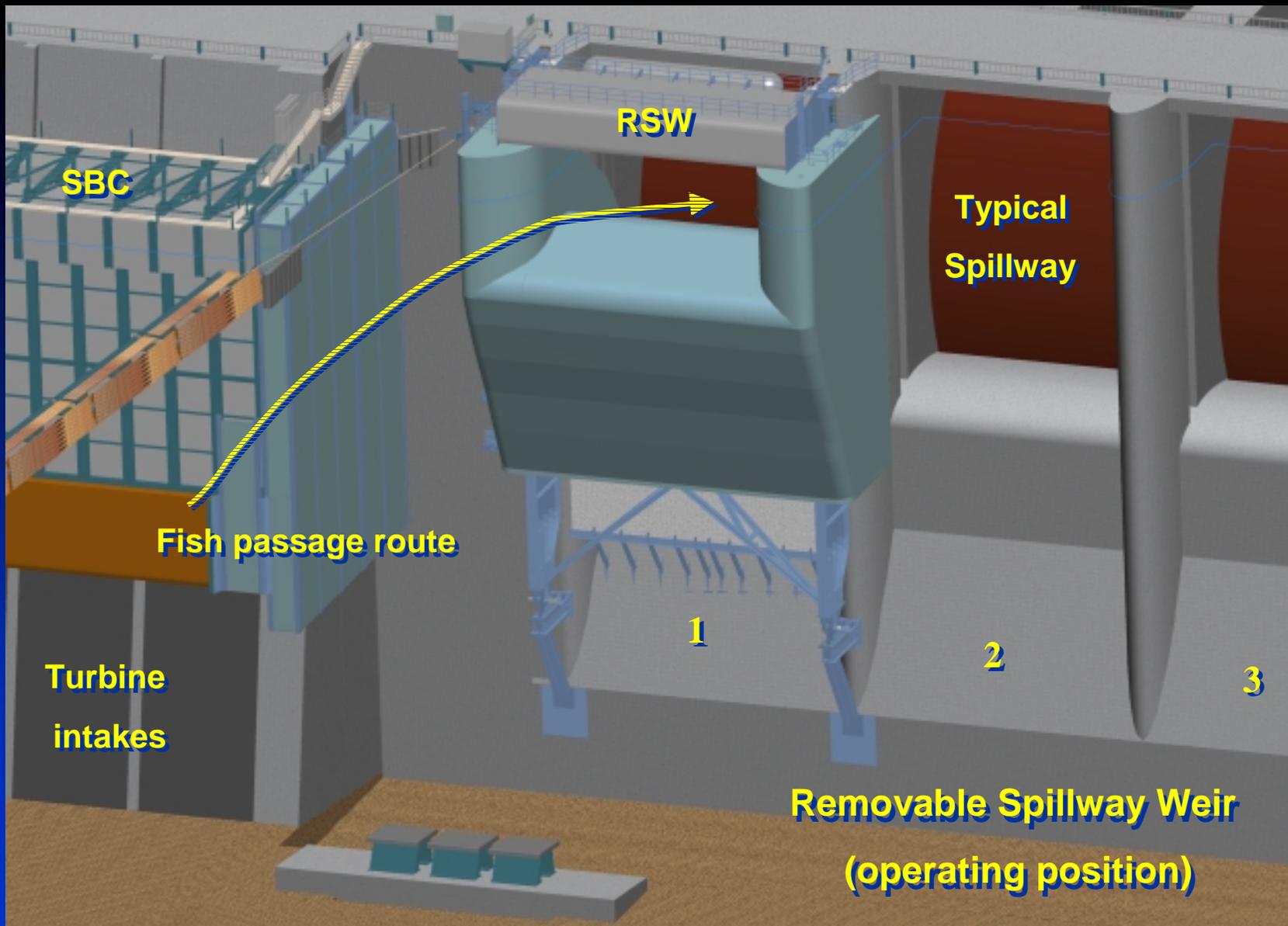
Navigation Lock

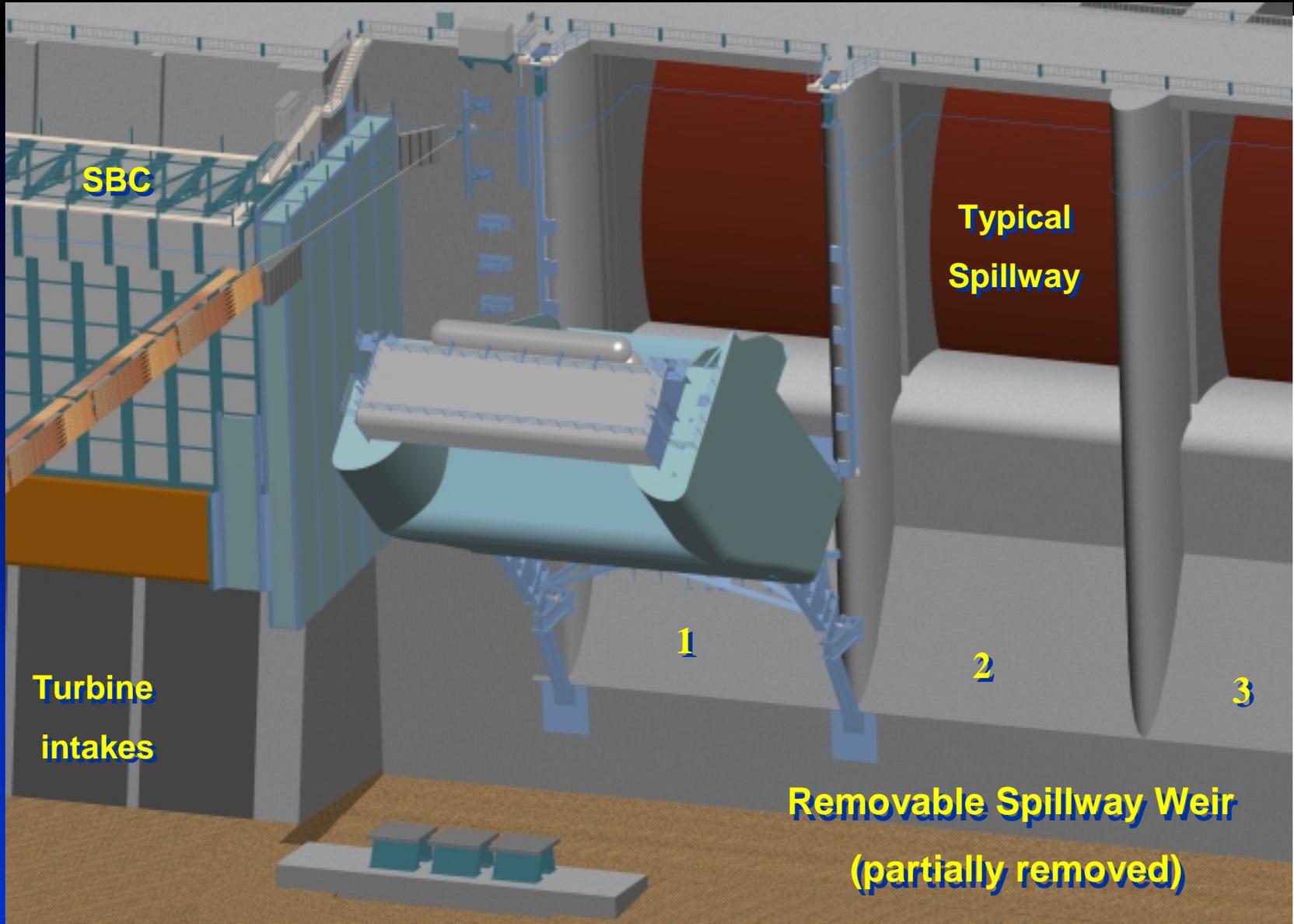
Existing Trash Boom

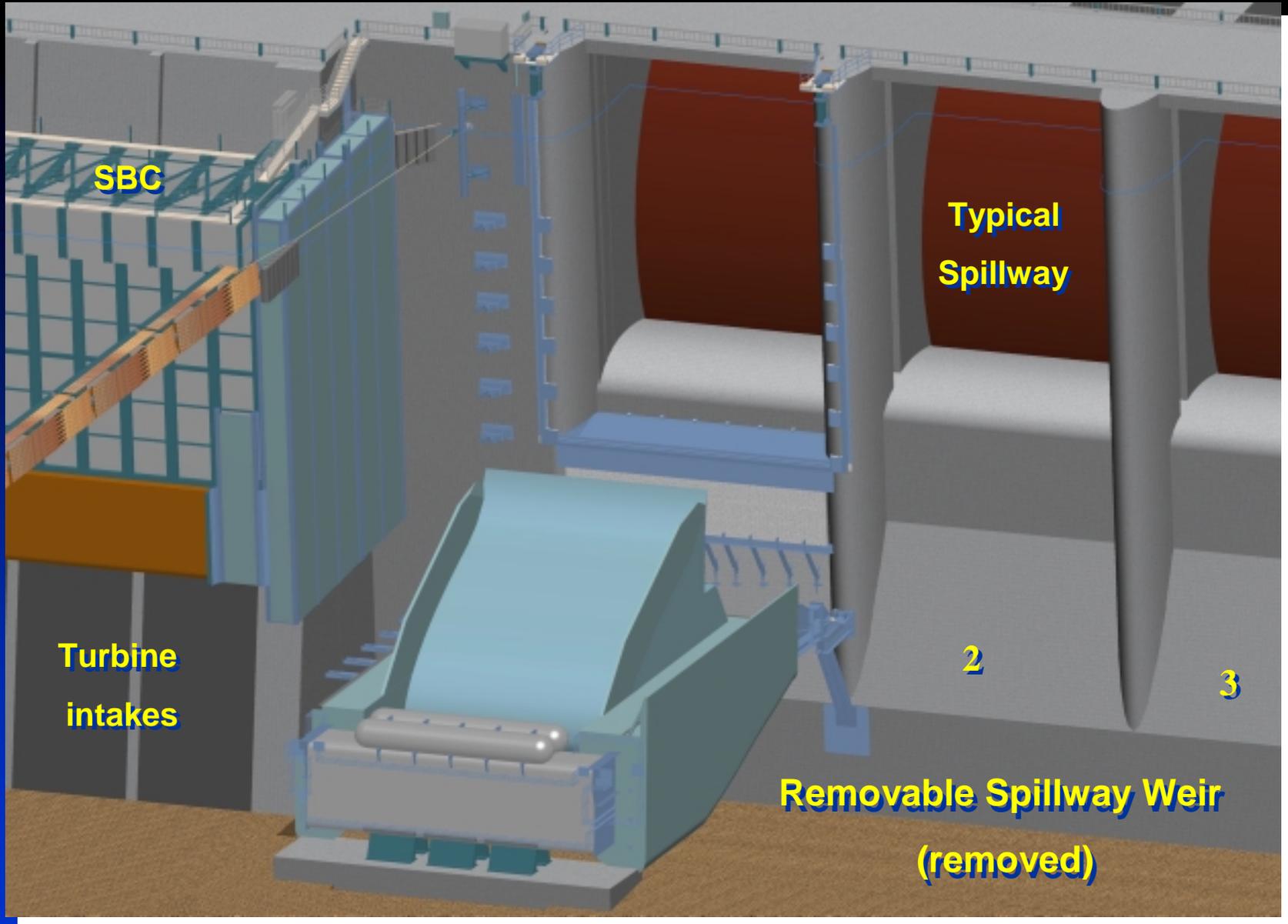
**Lower Granite 2001**  
**Surface Bypass and Removable Spillway Weir Prototype**

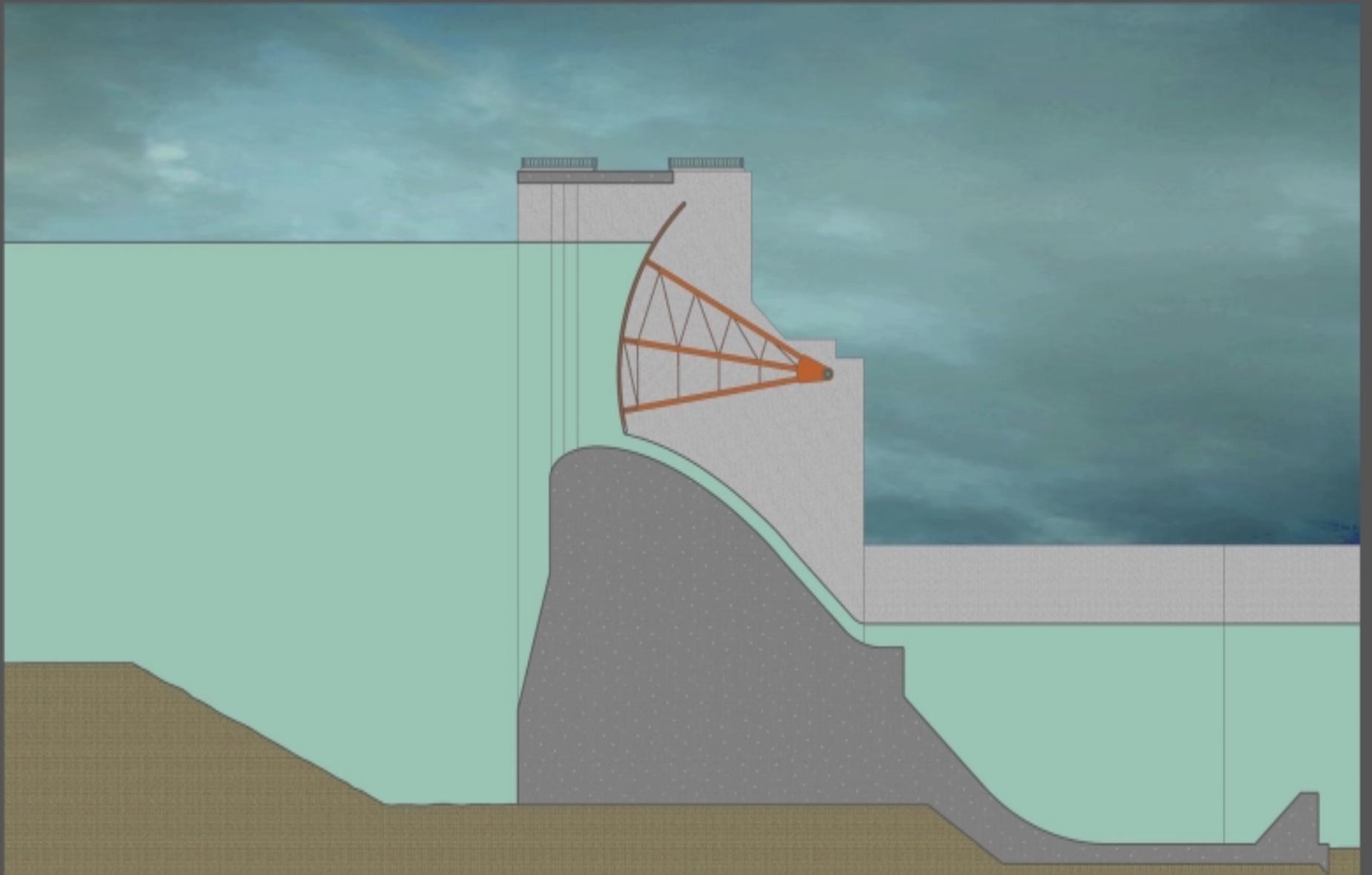




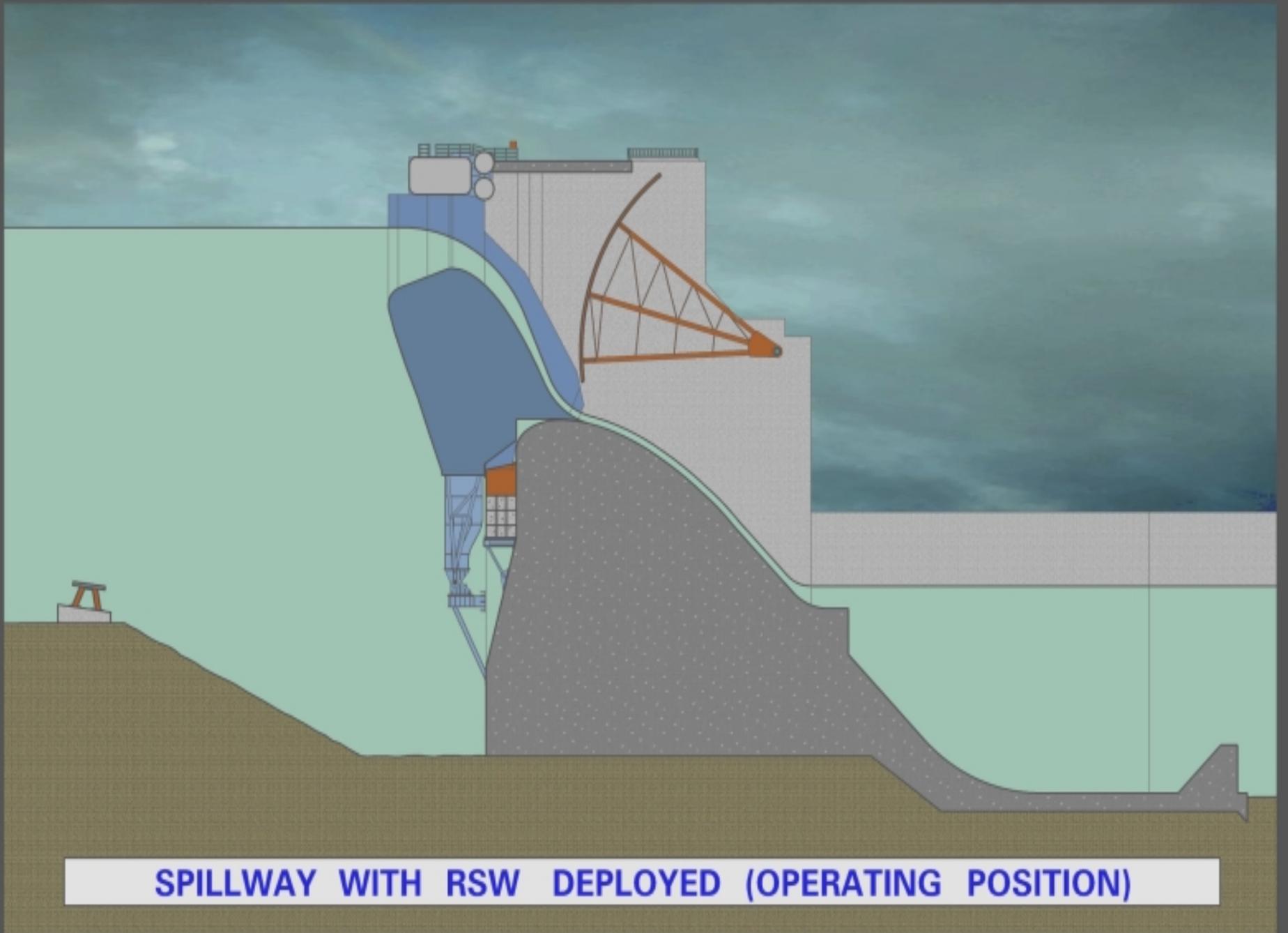




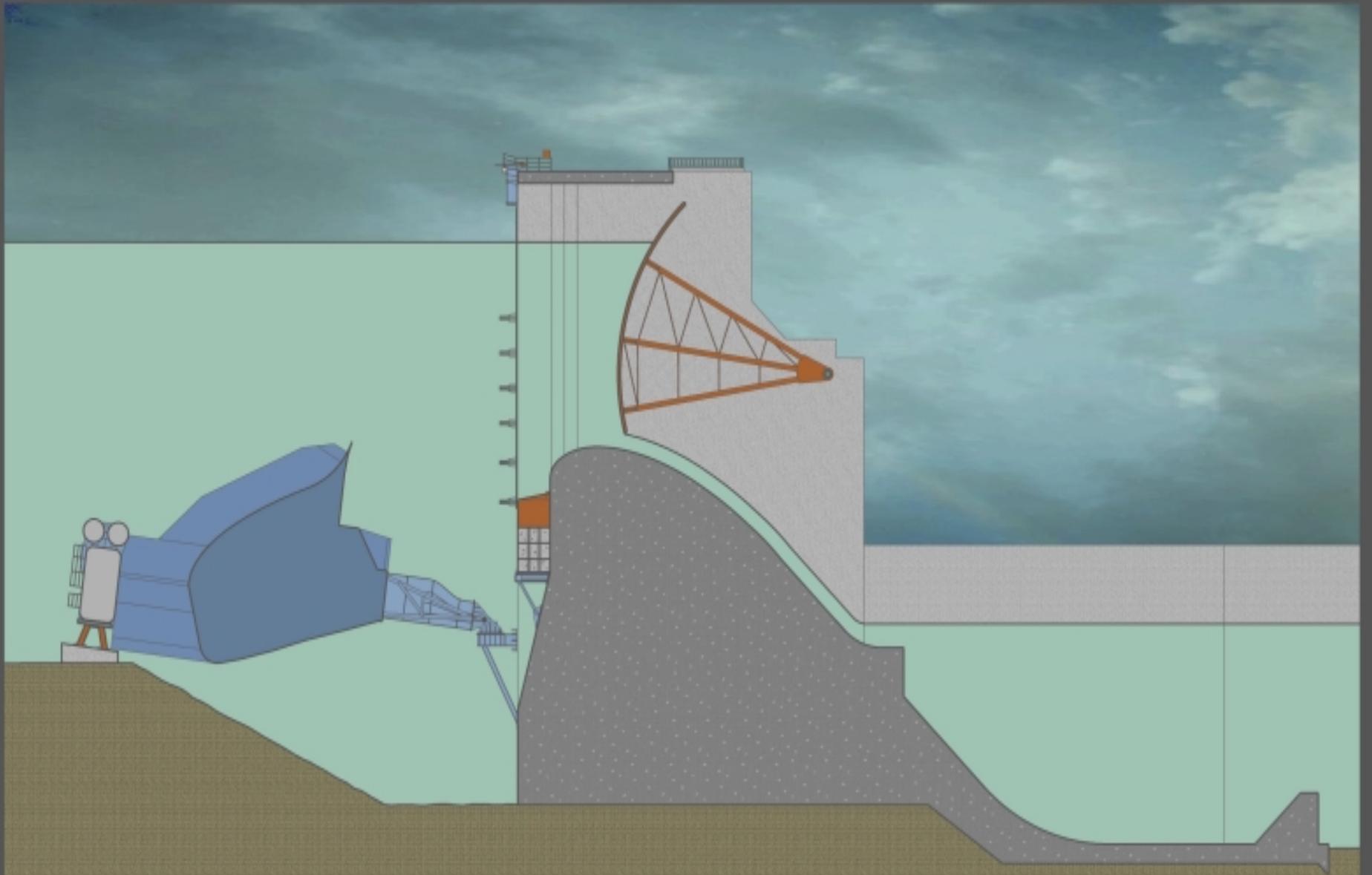




**SPILLWAY WITHOUT RSW (TYPICAL SPILLWAY OPERATION)**



**SPILLWAY WITH RSW DEPLOYED (OPERATING POSITION)**



**SPILLWAY WITH RSW REMOVED (FLOOD CONDITION)**

An aerial photograph of a large concrete dam on the Snake River. The dam features several spillways with water cascading over them, creating white rapids. The river flows from the background towards the foreground. The surrounding landscape consists of rolling hills and mountains, some with sparse vegetation. The sky is clear and blue.

Lower Snake River  
Juvenile Salmon Migration  
Feasibility Report & EIS



Ice Harbor - 1961



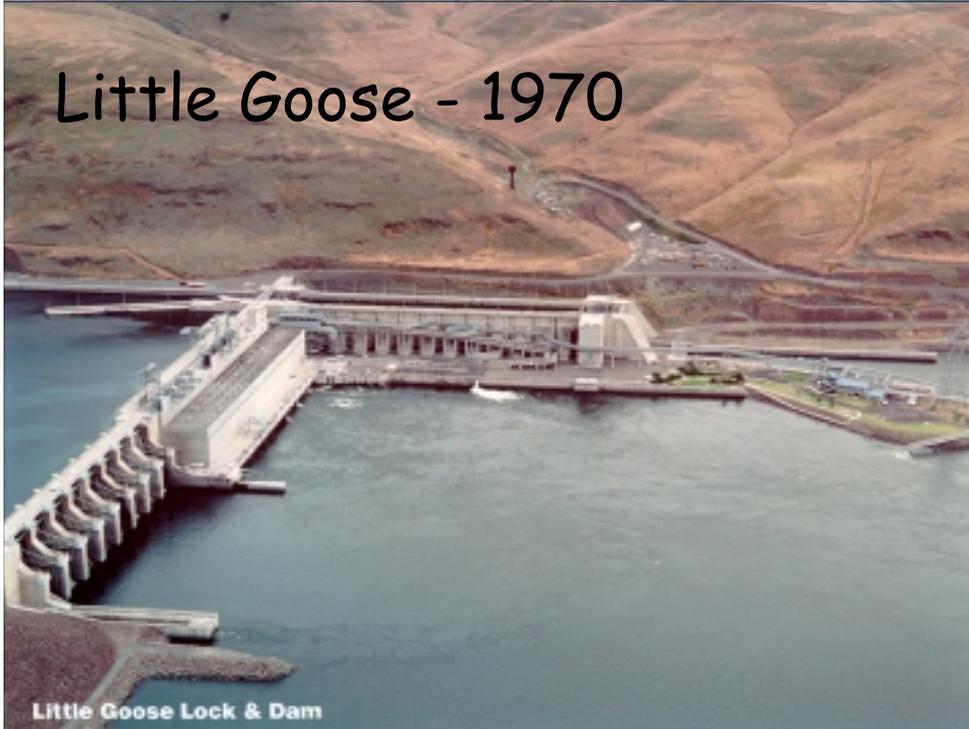
Ice Harbor Lock & Dam

Lower Monumental - 1969



Lower Monumental Lock & Dam

Little Goose - 1970



Little Goose Lock & Dam

Lower Granite - 1975



Lower Granite Lock & Dam

# Recommended Plan

- Major System Improvements also known as “Adaptive Migration”
- Combines a series of structural and operational measures
- Provides maximum operational flexibility for juvenile fish passage
- Allows for optimized combined passage when necessary for spread-the-risk operation or need to conduct research
- Reduce direct mortality, reduce stress, reduce total dissolved gas, improve operational reliability

# Key Factors

- High current juvenile and adult salmon and steelhead survival rates through the Lower Snake river Project
- Optimizes both in-river conditions and transport conditions
- Lesser magnitude of uncertainty in current biological information
- Minimal economic impacts to users
- Compatible with NMFS and USFWS 2000 Biological Opinions
- Minimal effects to other environmental resources

# NMFS 2000 Biological Opinion

- Concluded dam breaching on the Lower Snake River project not necessary at this time
- Did not take dam breaching off the table
- Supports the Basin-wide Salmon Recovery Strategy
- The Reasonable and Prudent Alternative (RPA) includes 199 actions
- RPA calls for major progress reports in 2003, 2005, and 2008.
- The 2008 report will make the final call on breaching necessity based on the efforts to meet the performance standards

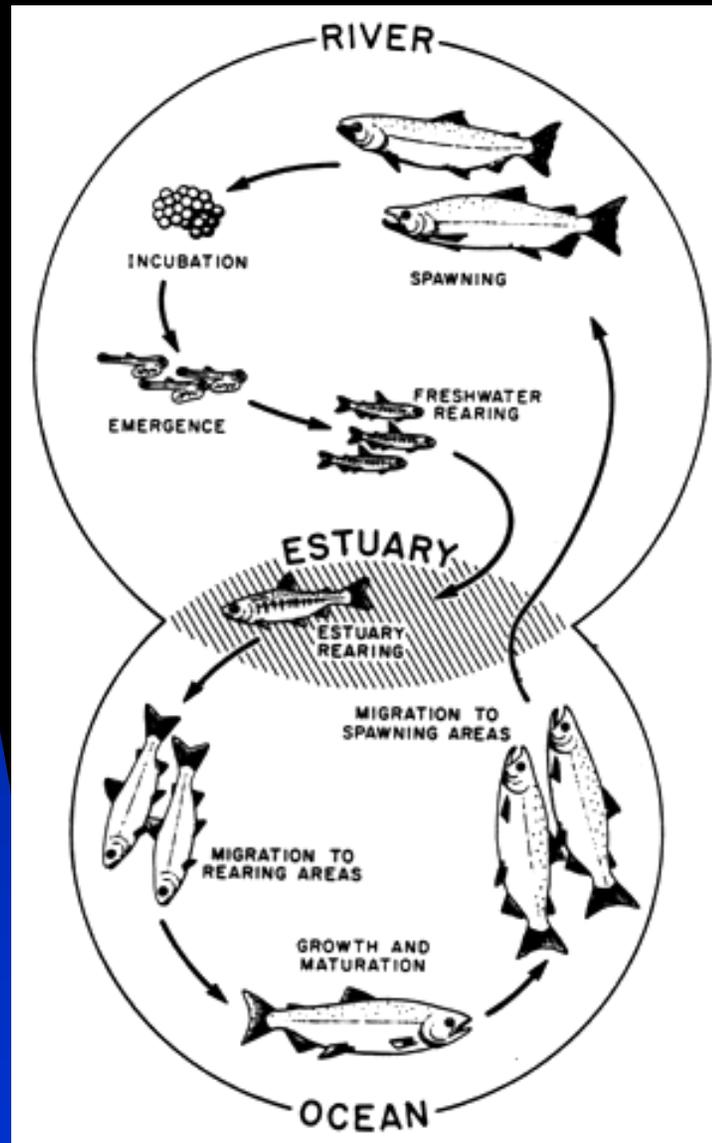
# Columbia River Basin



# Do Dams Need to Be Breached to Recover Salmon?

- Nationwide – Over 76,000 dams
- Northwest
  - ◆ Washington – 676 dams
  - ◆ Oregon – 812 dams
  - ◆ Idaho – 404 dams

# Salmon Life Cycle



# Fish Passing Snake River Dams

Turbine Passage ▶ 90-95% entering a turbine survive past the that dam

Spillway Passage ▶ 98% passing through spillway survive past that dam

Bypass ▶ 98-99% of transported fish survive to point of release below Bonneville Dam

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# *Alternative 3*

## *Major System Improvements*

