Sediment Management in Reservoirs of Afghanistan

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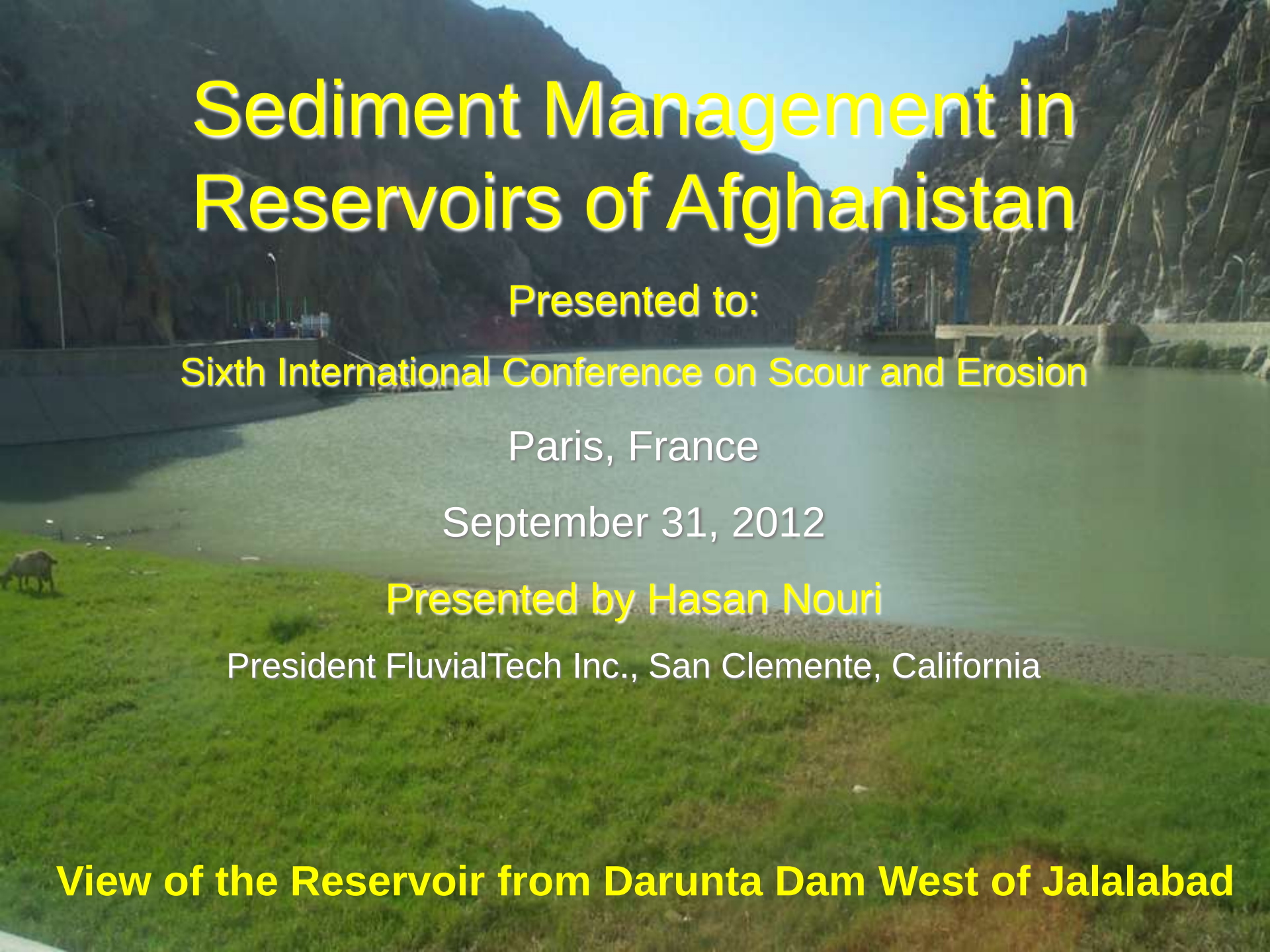
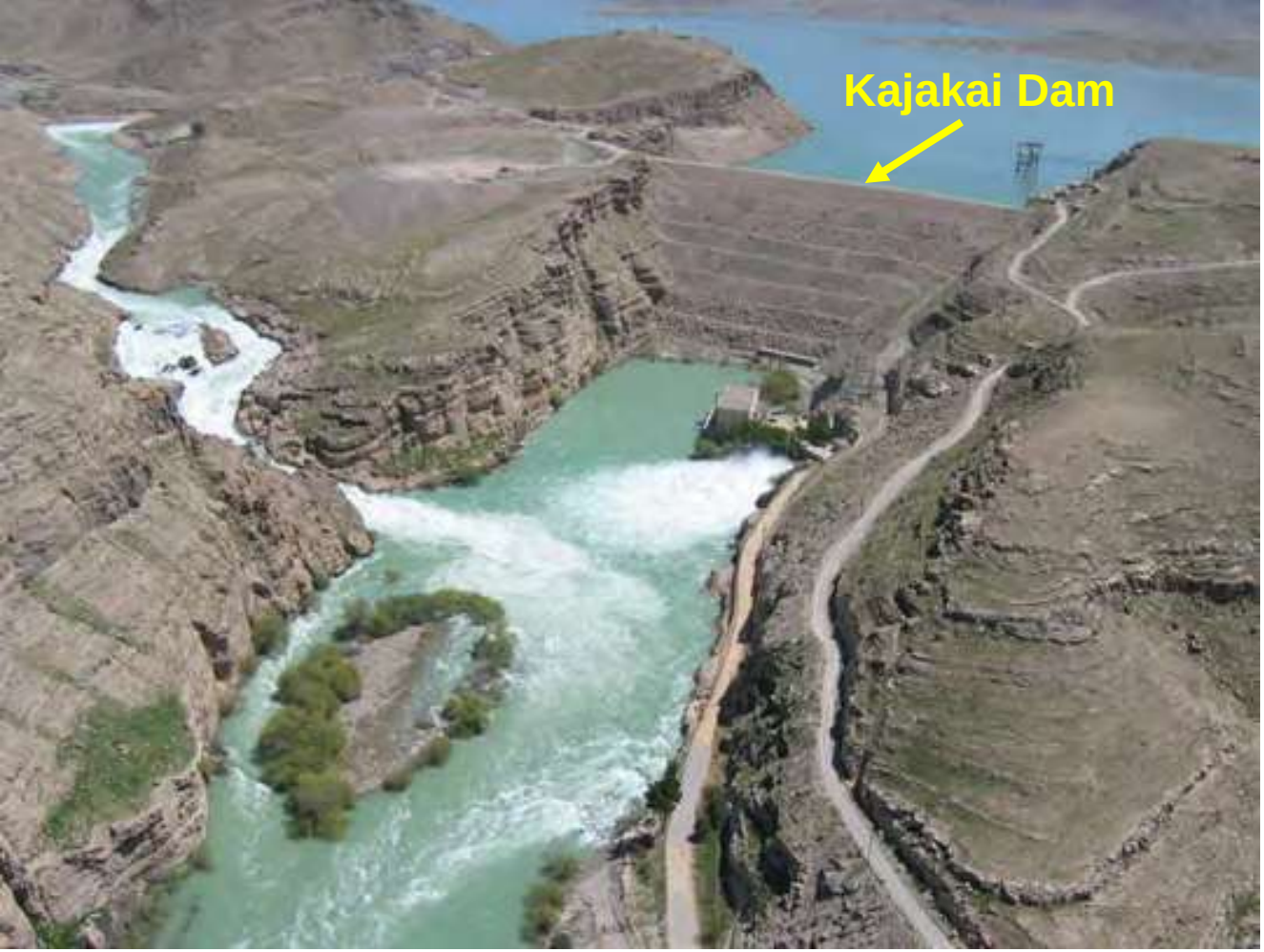


View of the Reservoir from Darunta Dam West of Jalalabad


Kajakai
Dam
Helmand
River

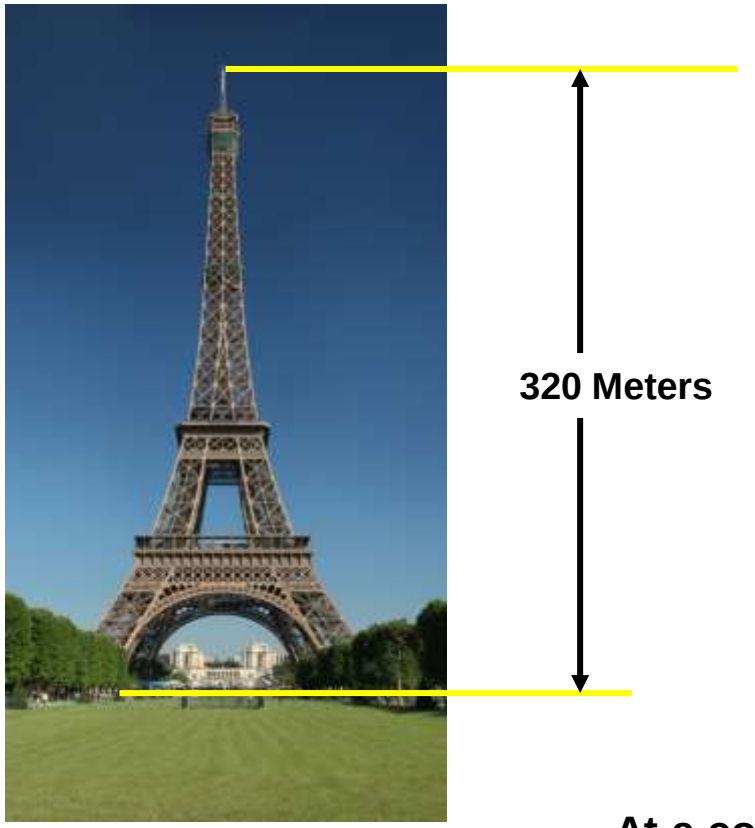


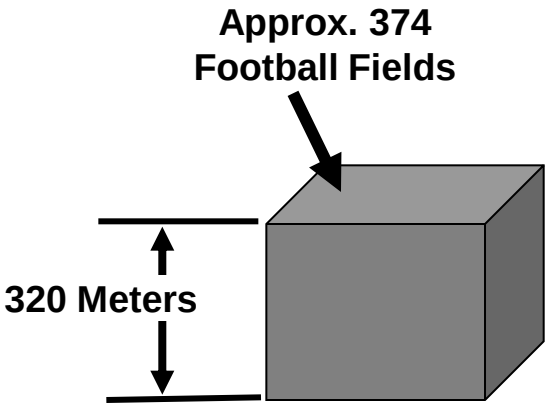
1844-1360 =

484 million cubic meters

Sediment deposition has occurred in Kajakai Reservoir since the reservoir was formed in 1952. A topographic survey in 1953 indicated Kajakai Reservoir had an original volume of about 1,844 million cubic meters at the current spillway elevation of 1,033.5 meters (Perkins and Culbertson, 1970). In 1968, a sedimentation survey indicated the reservoir had lost about 7 percent of its volume to about 1,715 million cubic meters (Perkins and Culbertson, 1970). By 2005, sedimentation had likely reduced the reservoir volume by about 26 percent to an estimated 1,360 million cubic meters at the current spillway elevation (Whitney, 2006).

484 million cubic meters is equivalent to the cube shown below

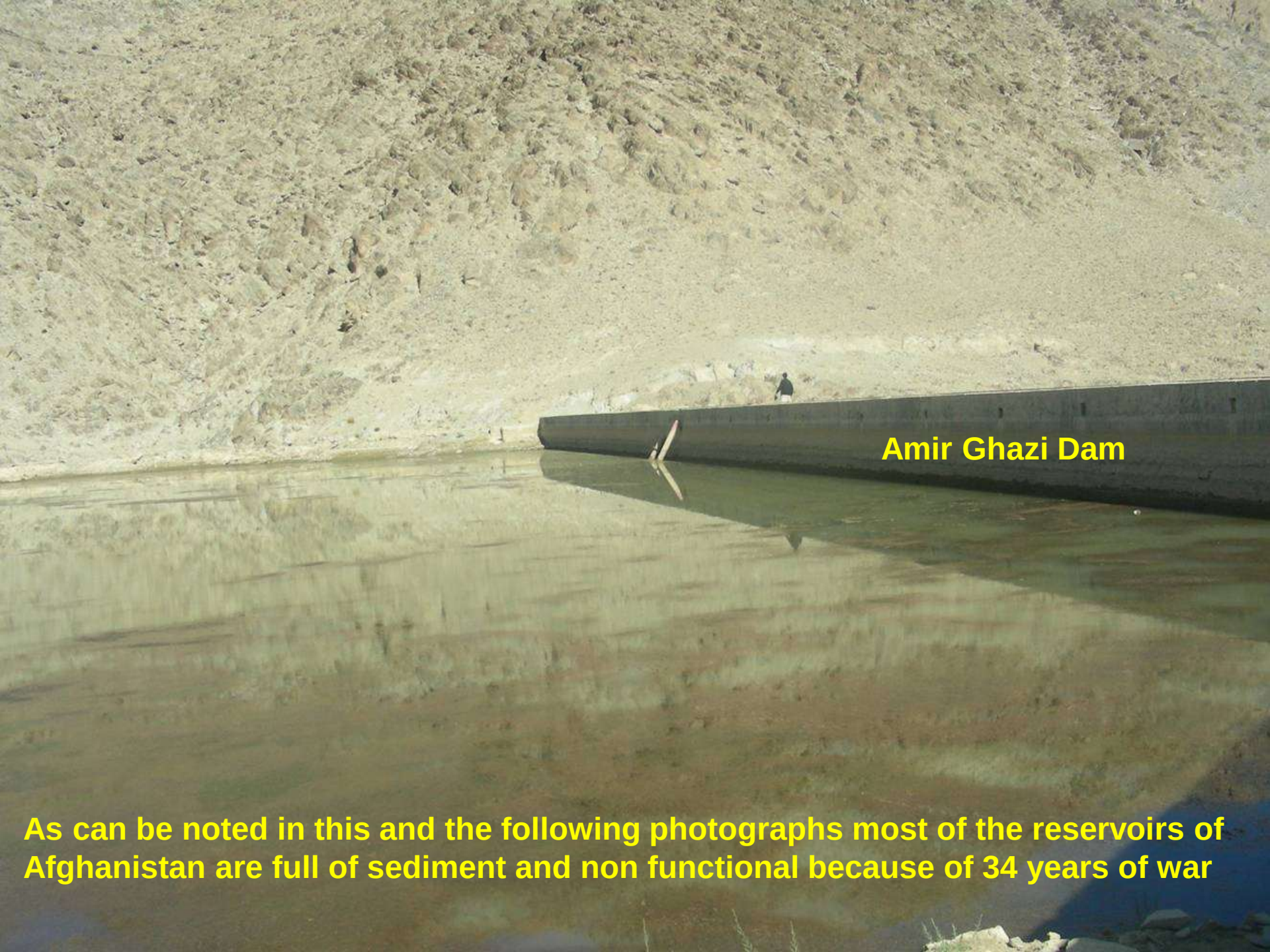




At a cost of $3.00 per cubic meter of removing sediment from the reservoir that translates to $ 1.5 billion.


Hindu Kush Mountains


Kabul River



As can be noted in this and the following photographs most of the reservoirs of Afghanistan are full of sediment and non functional because of 34 years of war


Amir Ghazi Reservoir


Amir Ghazi Dam


Darunta Dam
11 5 2009

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Formation of deltas and islands in the Darunta Reservoir


Darunta Reservoir
11 5 2009


Darunta Reservoir
11 5 2009


Darunta Reservoir
FluvialTech
11 5 2009

Beavers have built dams for thousands of years. However, beavers design their dams such that they would wash off during major storms and sediment will not be trapped

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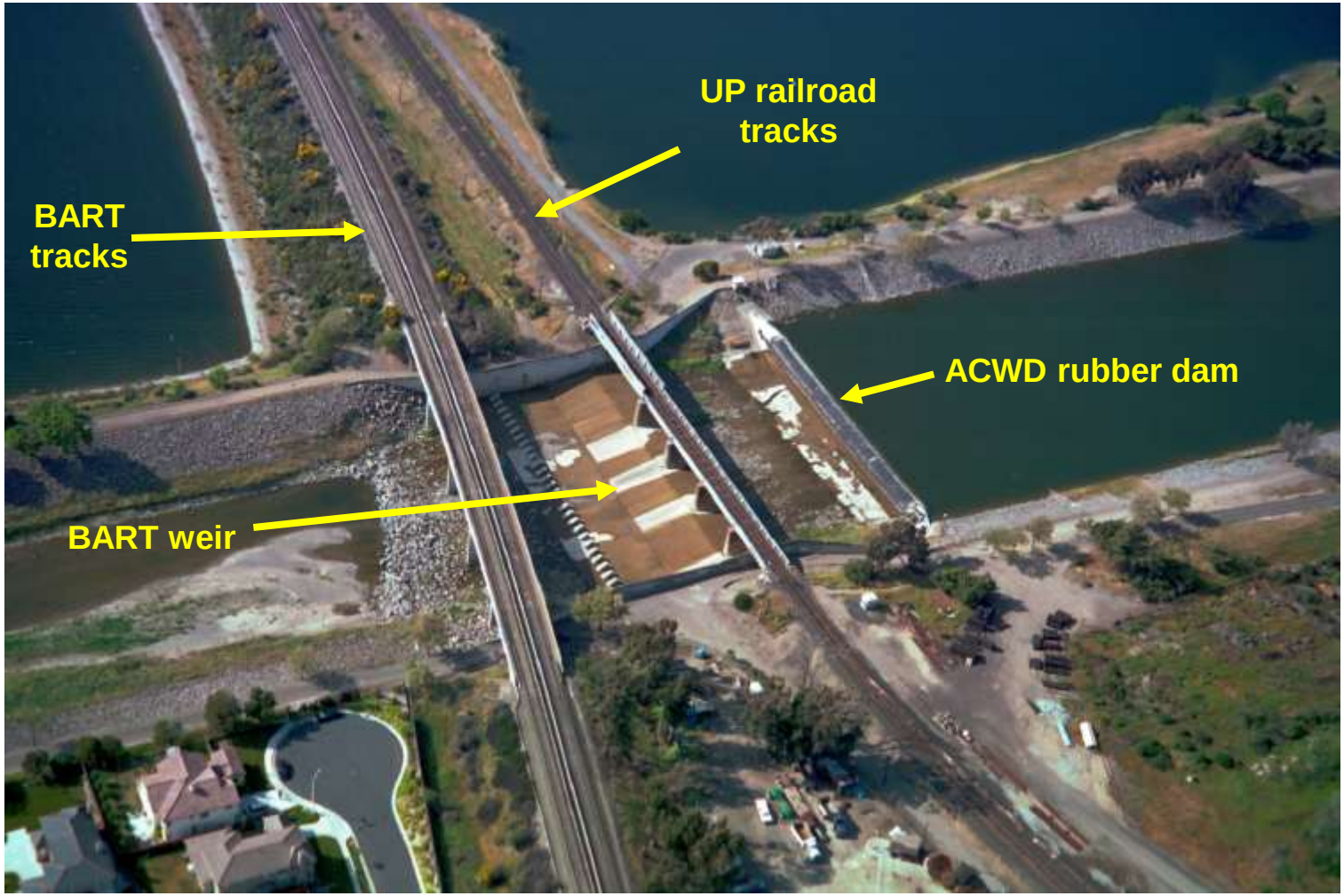
15 feet high 275 feet long Beaver Dam

Rubber Dams can function similar to Beaver Dams

Granite Reef Diversion Dam

The purpose of the Granite Reef Diversion Dam is to divert water from the river into the canals north and south of the river for delivery to water users within the Project. Although Granite Reef Diversion Dam is a concrete dam only 29 feet high the same objective can be accomplished by a rubber dam.



In 2007 the Alameda County Flood Control District (ACFCD) and Alameda County Water District (ACWD) signed an agreement to design a fish ladder that will allow the steelhead to bypass the BART weir and adjacent inflatable water supply dam. This shows how we can solve our problems in America. In Afghanistan we can use rubber dams to divert water into canals and irrigate dry land adjacent to rivers for growing crops and fruits. We should make it clear to the landowners and villagers that we will remove the rubber dams if they use the land for the growth of narcotics.

Sediment Management Options in a Reservoir

- Hydraulic Dredging
- Hydro-Suction Removal System (HSRS)
- Dry Excavation (Trucking)
- Flushing
- Upstream Sediment Trap Basins
- **Bypass System (Subject of next Presentation)**

Reservoir Sedimentation Management at the Asahi Dam, Japan

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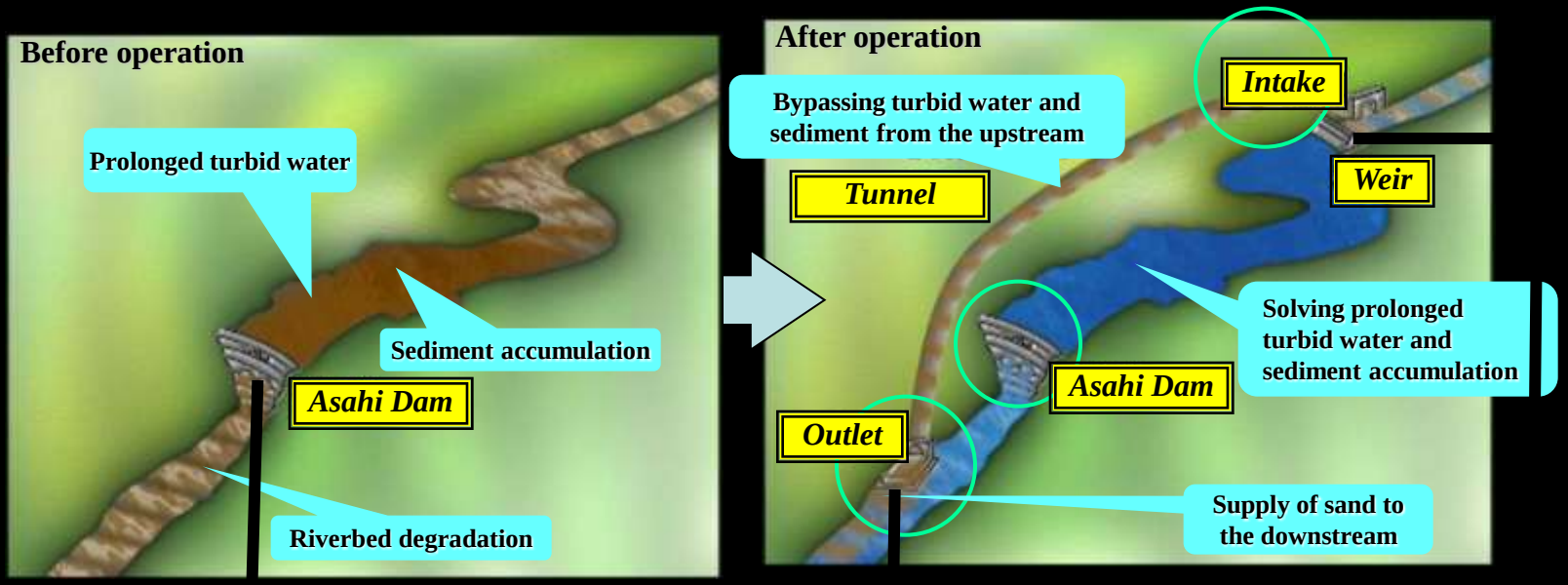
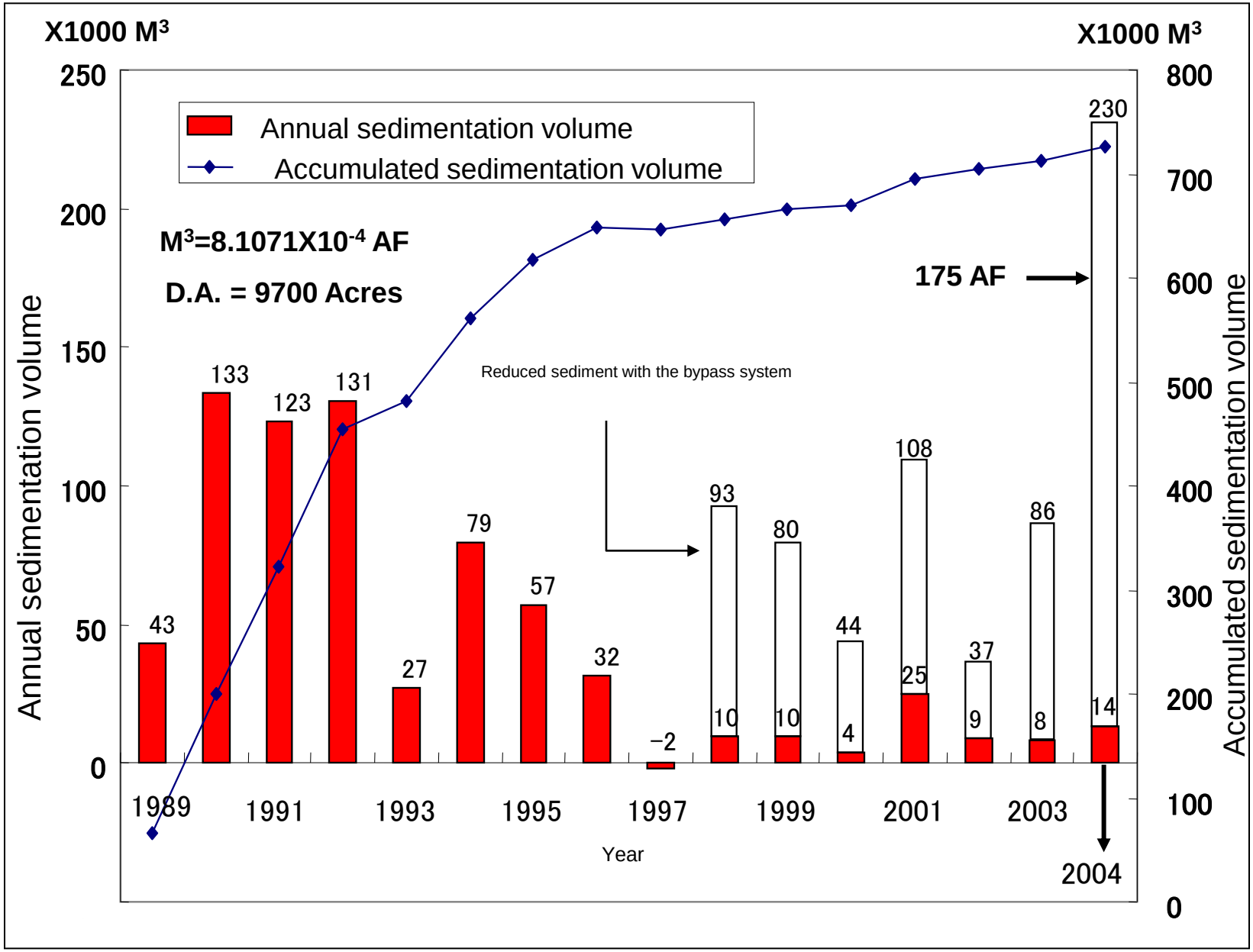
Sediment Bypass System



RIVERTECH INC


X1000 M3
X1000 M3
Annual sedimentation volume
Accumulated sedimentation volume
M3=8.1071X10-4 AF
D.A. = 9700 Acres
175 AF
Reduced sediment with the bypass system
Annual sedimentation volume
Accumulated sedimentation volume
Year
250
200
150
100
50
0
800
700
600
500
400
300
200
100
0
1989
1991
1993
1995
1997
1999
2001
2003
2004
43
133
123
131
27
79
57
32
−2
93
10
80
10
44
4
108
25
37
9
86
8
230
14

The sediment bypass system was awarded the technical award of JSCE(Japan Society of Civil Engineers) 1999 for its high technology.

- Questions and Answers