American Water Resources Association
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Wednesday, Nov. 11
10:30 AM – 12:00 Noon
SESSION 43: Infrastructure Track

The Three Gorges Project - The World's Largest Hydropower Plant: Part I - Song-kai Yan, Shaw Environmental and Infrastructure, Inc, Baton Rouge, LA

The World's largest hydropower plant - The Three Gorges Project in China is near completion. This project, located in the middle reach of Yangtze River at Shangdouping in the Xilingxia Gorge consists of the left and right power plants with a total installed capacity of 18,500 MW, a five-tier two-way ship lock, and a 175-m high main dam with 23 upper spillway openings, 22 bottom outlets. A 3000-ton capacity ship lift and an underground power station that would add another 4,000 MW to the total installed capacity are still under construction and will be completed in 2011. The author has visited the dam site five times: twice as a member of the Chinese counterpart and interpreter to receive two US delegations to study the Three Gorges Project; twice invited by the Yangtze River Commission during the construction of the project; and once with a group of US scholars and officials attended Sino-US Hydrologic Extremes Conference to visit the site. With the personal experience and knowledge about the project, the author will present some insight stories about the history of realization such a mammoth project, including the involvement of US in the 1940s and 1980s, the initiatives of Chinese leaders from both the Kuomintang and the communist parties, the Russian comprehensive plan, and even the Japanese ambitious Otani plan. Contributions to this project from US Bureau of Reclamation and US Army Corps of Engineers will also be acknowledged. The main objective of constructing this project has been described by many to be power generation. With abundant evidences the author would show that flood control is the No. 1 objective, otherwise the Chinese People's Congress would not have passed the resolution to build this dam. This was proven by the fact that one third of the votes was against or abstained, a phenomenon never been experienced before. The author will also address not only the huge benefits gained from this project but also some of the most controversial issues raised and still debated among professionals, politicians, and media, both domestic and foreign countries alike.

The Three Gorges Project - The World's Largest Hydropower Plant: Part II- Song-kai Yan, Shaw Environmental and Infrastructure, Inc, Baton Rouge, LA

See description above.

Changes to Hydrologic Ecosystems Services Following Dam Removal: a Case Study of Marmot Dam on the Sandy River - Terrance Anthony, Portland State Univ, Portland, OR

Using Marmot Dam on the Sandy River as a case study, we examined the impacts of dam removal on hydrologic ecosystem services. Data from stream transects upstream and downstream of the dam site were compared with expected impacts distilled from the literature. We present results in the form of maps and matrices to facilitate detection of patterns and the processes behind them. We conclude that overall, dam removal affects hydrologic ecosystem services primarily through relatively slow geomorphological changes. However, specific changes in areas such as flow regimes and recreational opportunities, though highly variable in type, direction, timing and location, may produce more acute impacts. Rapid recovery of pre-dam functions appears quite possible, especially for aquatic communities. Moreover, the ecosystem services approach and interpretive methods used in this study have potential for improving the effectiveness of communications regarding potential outcomes of complex ecosystem interventions, to lay audiences as well as decision-makers.

Ochoa Foods Dam Failure Analysis and Design of Secondary Containment Berm - Felix Kristanovich, Anchor QEA, Kirkland, WA (co-authors: Stewart Hilmes, Robert Montgomery)

This study evaluated downstream mitigation due to the construction of the Ochoa Food (OB-3) processing water storage lagoon near Warden, Washington. An evaluation of dam breach and catastrophic flooding downstream of the breach was necessary in order to satisfy Washington State Department of Ecology Dam Safety Office (DSO) guidelines. It was determined that catastrophic flooding would overtop the Bureau of Reclamation East Low Canal, one of Eastern Washington's largest irrigation canals. To mitigate for this catastrophic flooding, a secondary containment berm was proposed just downstream of the OB-3 dam that would contain this catastrophic flood. This containment berm had to be designed to satisfy all the DSO safety requirements, including minimized flooding downstream of the berm, as well as the Adams County and FEMA standards for Flood Hazard Reduction, including no-impact flooding upstream of the berm. Designing this containment berm was a balancing act because it was necessary to satisfy the requirements of three agencies: the Ecology DSO Office, Bureau of Reclamation, FEMA, and Adams County. This presentation will chronicle how the design was modified in order to satisfy these regulatory agencies. The presentation will detail hydrologic and hydraulic modeling used, design approach for an emergency spillway on the dam and on the containment berm, and iterative procedure used to design an emergency bypass canal on the containment berm. This study was very unique, as the DSO acknowledged that this was the only study on their record where the series of two consecutive dams (the OB-3 dam and the downstream containment berm) had to be evaluated and designed for catastrophic failure.