Dams: The Multi-Use Conundrum

By: Donald C. Jackson
Professor of History
Lafayette College

Dams are often controversial because they interfere with the natural flow of water and affect (or destroy) natural riparian ecologies. Dams can also be politically divisive because specific structures are almost always designed to serve the interests of specific sub-groups within the political economy of a watershed or region. In the latter context, they can engender controversy because, to paraphrase environmental historian Donald Worster's perspective on Hoover Dam, they serve the desires of “some men” rather than “Man” in a larger abstract sense.1 And even when dams are promoted as providing “multi-use,” they can foster conflict over which of the multiple uses should be considered most important.

Thus, when dams impound water they can provide flood protection to down-stream landowners, while at the same time requiring the inundation of valuable upstream bottomlands. And once boaters and recreation enthusiasts come to demand that reservoirs operate close to filled, this in turn reduces the dam’s capacity to provide flood protection at times when upstream watersheds are drenched with intense, sustained rainfall. When a dam releases water through turbine/generator units, the hydroelectric power produced can do wondrous things to keep consumers happy and allow a stressed power system to meet peak demand load; however, releases designed to maximize power production can work to the detriment of farmers seeking to control reservoir drawdowns for maximum crop production. Other major uses of dams (e.g. municipal water supply or the support of river navigation) can also foster distinctive storage-release-diversion protocols. Consequently, although multiple purpose dams may appear to foster win/win (and even more win) conflict resolutions, they often fall well short of such idealized goals simply because various uses are, in fact, antithetical.

Promotion of large-scale dam building to serve multiple purposes took flight in the early twentieth century, as progressive conservationists sought to maximize use of water resources for a larger national good. As much a political initiative as an effort to advance engineering efficiency, the advocacy of “multiple purpose dams” was often aligned with a desire to wrest control of water resources development away from private (or “investor-owned”) enterprise in favor of government control. As water historian Donald Pisani recently observed, opposition to the multi-use ethos has often times been characterized as reactionary or anti-conservation when, in fact, it might simply reflect an understanding of the conundrums and difficulties posed by trying to operate reservoirs to serve a multitude of purposes.2 (continued on page 3)
In 1914, when California dam engineer and hydroelectric power pioneer John S. Eastwood spoke at a meeting convened to promote waterway development of the Sacramento River, he castigated the notion of using scarce water resources for river navigation and counseled his audience that “The California slogan e’re should be, that ‘tis a crime to let our rivers reach the sea.” To avid navigation proponents this likely smacked of heresy, an affront to multi-use conservation ideals. But to Eastwood, real conservation lay in making choices about which uses were most important to a society (in his eyes, water resources in the arid West were best used to maximize hydroelectric power generation, irrigation development, and municipal growth; encouragement of navigation on the Sacramento represented a foolish misuse of water supplies). To Eastwood, the question was not simply a championing of water conservation as a broad ideology, but rather involved making choices about which uses deserved to be privileged in order to make the best use of limited resources.

To the public at large, the notion of multi-purpose dams held great allure during much of the twentieth century and became a mainstay of how dams were promoted politically during the New Deal and the post-World War II era. For many years the idea of allowing water to stay in a streambed was denied standing as an acceptable “use” for water development projects. Perhaps the greatest change wrought by the environmental movement that flowered in the 1970s and 1980s involved legal acceptance of “in-stream” use as a valid purpose within the framework of water allocation planning. So, for example, today the City of Los Angeles releases water back into the Owens River (and the bed of long-dry Owens Lake) to mitigate environmental impacts resulting from long-term operation of the Los Angeles Aqueduct. And peak load power generation at the Glen Canyon Dam is severely curtailed to protect downstream riparian habitats in Grand Canyon National Park that suffer when releases from the dam rapidly fluctuate and water levels in the park change several feet in the course of a few hours.

The promise of multi-purpose dams has not faded from public consciousness. But contemporary environmental objections to dams are often couched in the same rhetorical framework that spawned dam-building during much of the twentieth century. In essence, this involves letting dams be judged by the uses to which they are put, and allowing “in-stream” use to get fair consideration as a purpose worthy of support. In ways that engineers such as John Eastwood would likely never have anticipated, the multi-use concept first brought to public attention a century ago retains social and political meaning; but today it is just as often invoked in opposition to dams as it is employed to celebrate their contribution to modern society.

(Endnotes)

“Marking the Trail:” Early Highway Signs

James Martin
Director of Public Works (ret.)
Fresno, California

It was only a bit over 80 years ago (1925) that the federal government established the first United States highway numbering system and began the move to uniform traffic signs, replacing a wide variety of privately-installed signs. That was about 25 years after the increasing capability of automobiles sparked the motoring “craze,” when for the first time, people could easily travel in their personal conveyances considerable distances, hundreds or even thousands of miles, for both business and pleasure.

Starting in the early 1900s, various private associations sponsored and selected routes which they then promoted and usually posted with (often quite colorful) markers to guide travelers. A 1924 Rand McNally map of the United States shows such named highways covering the country. Several of these ran from coast to coast, while others crossed the country north and south. In some states, especially in the Midwest, shorter, mostly local, named routes proliferated. Besides signs, postings included painting on rocks and sides of buildings, as well as on utility poles.

Best known, of course, was the Lincoln Highway, which ran from New York City to San Francisco. The Theodore Roosevelt International Highway connected the two Portlands, in Maine and Oregon, through the northern U.S. To the south, the Old Spanish Trail extended from Jacksonville to San Diego. North to south, there was a Pacific Highway, a Mississippi Valley Highway, and an Atlantic Highway. Each of these later became the routing of one or more federal numbered roads.

Some routes were focused on scenic travel, such as the National Park-to-Park Highway which looped from Denver to Yellowstone, Glacier, Mt. Rainier, Crater Lake, Mt. Lassen, Yosemite, General Grant, and Sequoia National Parks before returning to Denver via Zion, Grand Canyon, and Mesa Verde. (Grant was later absorbed by Kings Canyon N.P.) The Yellow-
stone Trail was transcontinental, running from Boston to Seattle. The name selections for these private routes were almost as varied as their locations. Some described the termini and intermediate cities (Kansas-Oklahoma-Texas-Gulf). Many were named for individuals (Daniel Webster, Jefferson Davis). An implication of easy, fast travel appeared with Bee Line, Cannon Ball, and Florida Short Route. Historical locations were represented (Custer Battlefield, Keystone). Others were symbolic (Arrowhead, Buffalo, and Rainbow). And some even appear whimsical (Woodpecker).

In some cases, highway interest and advocacy groups continue today, especially the Lincoln Highway Association, which publish newsletters, hold conventions, and preserve artifacts (such as a bridge on which the railing supports spell out “Lincoln.”

Having a signed highway was one thing, but having a suitable road to drive on was something else. Many of the roads had little actual pavement, and fords were often necessary to cross streams. Topography and other engineering challenges often made for circuitous alignments. Local and state agencies gradually paved some sections and made other improve-

ments, but these treatments were far from uniform.

Paralleling the era of the privately named highways was the advent of speed, warning, mileage, and other regulatory and informational signs which became necessary because of traffic growth and public demand. These, too, were mostly initiated by private automobile interest groups, rather than public agencies, although in this case local and state agencies later assisted in funding, but only for the signs themselves. These signs were often of high quality such as porcelain enamel on steel, but the designs varied widely because there was no uniform style system until 1925.

Among the first were two California automobile associations, the California State Automobile Association and the Automobile Club of Southern California. CSA worked in Northern California and Nevada and beyond. ACSC did Southern California plus other states as far as the Midwest, and even parts of Mexico. It may surprise many people to know that California, the “auto state,” did not fully take over signing on its own system until 1947, and both associations continued to provide service for cities and counties until the 1960s. Signs with the CSA and ACSC logos can still be found today, a high tribute to their quality. Private auto associations provided an early, critical, public service, pioneering effective road signing everywhere they worked.

Our modern uniform, well-designed, highway signing provides motorists with a great deal of convenience, comfort and safety, but the early signs were definitely more colorful and interesting to behold.
The 5th International Water History Association Conference

Martin V. Melosi, Ph.D.
University of Houston

The 5th International Water History Association Conference met in Tampere, Finland, June 13–17, 2007, with participants from more than 20 countries.

The idea to develop the association grew out of the “Water in History: Global Perspectives” conference at Aberystwyth, Wales, in the Summer 1999. The association was formally founded at the IWHA conference, “The Role of Water in History and Development” in Bergen, Norway, in August 2001. Subsequent meetings were held in Cairo, Egypt, and Paris, France.

Boasting members from approximately 80 countries throughout the world, the multi-disciplinary IWHA has several purposes:

- to encourage, promote, and foster historical understanding of, and research in, the relationship between water and humankind,
- to foster a stronger relationship between those engaged in water history and water administrators, engineers, scientists, planners and other practitioners,
- to foster public awareness of the role of water in world history and to promote public participation in resolving water resource issues,
- to take other actions deemed by the Association to be supportive of its purposes.

The meeting in Tampere, co-organized and hosted by the University of Tampere (UT), Department of History, and by Tampere University of Technology (TUT), Institute of Environmental Engineering and Biotechnology, was a lively affair with panels focusing on a wide range of topics from rivers and waterways to water and transportation systems, from water and culture to water and health. Several sessions raised some important international and trans-boundary questions on “water, conflict and resolution” in places like the Middle East. Conference sessions also spanned time with several panels discussing contemporary issues, and others illuminating our understanding of ancient water structures and systems. A large majority of the sessions spoke to issues directly related to the interests of our members in the Public Works Historical Society. Many sessions took a regional, as well as a continental perspective not only from Europe and North America, but also from Africa, Asia, the Middle East, and South America. This was truly a global experience.

Set in the heart of Finland, the meeting was particularly valuable in attracting scholars from Eastern Europe, who don’t always have an opportunity to interact with colleagues in other parts of the world. There were three keynote addresses, one for each day of the conference. Martin Melosi, University of Houston, opened the first day with his talk, “Privatization of Water: the Worldwide Implications.” On the second day, Jose Esteban Castro, Newcastle University, discussed “Water and Citizenship: Long-Term Social Change in Sociological Perspective.” On the final day, Esko Kuusisto, Finnish Environmental Institute, spoke on “Adaptation to Climate Change: Will Historical Lessons be Valid in the Future?”

The conference was followed several days later by a workshop at Tampere University of Technology for Ph.D. students from several countries. Tapio Katko from TUT, and Petri Juuti from UT, hosted both the conference and the workshop, which focused on water management issues. Twenty-five students from several disciplines participated in this innovative program.

The next meeting of the IWHA will convene in conjunction with the World Environmental History Conference to be held in Copenhagen, Denmark, in August 2009. For further information on IWHA, visit http://www.iwha.net/ on line.

The Great Society Subway: A History of the Washington Metro

Zachary M. Schrag
Baltimore: The Johns Hopkins University Press, 2006

Reviewed by Bob Moorhead, P.E.
Project Engineer, Transportation Improvement Board, Olympia, WA.
Member, Public Works Historical Society
2006 Abel Wolman Award Committee
Member

The nation’s capital area now has one of the most modern and heavily used subway systems in the country. It also has one of the most unusual, in that the District of Columbia is the seat of the federal government. Until the late twentieth century, the government of the District was dependent upon the United States Congress for virtually all of its funding.

Zachary M. Schrag begins this history of the Washington Metro with a look back to the founding of Washington and its long-time existence as a sleepy, humid, uncomfortable government town. It was not until the eras of World War I and World War II that the community straddling the line between the Northeast and the Deep South had need of a public transit system. Several private bus companies provided service to the District and the nearby communities in Virginia and Maryland. Even the early Interstate Highway System brought plans to carry traffic around the city, but not really into it.
When the options for the Interstates were being developed, some realized that four- or six- or eight-lane freeways might get commuters and visitors into the central city, but there was precious little area available to park all those cars. The concept for a subway system came late to the capital area, which brought both opportunities and challenges—even more so than San Francisco and Atlanta, which were beginning the BART and MARTA systems respectively, the Washington “Metro” was dependent on the largess of the federal government.

Rather than follow a strict chronological format, Mr. Schrag breaks the history down into several major chapters along the lines of The City, The Plan, The Stations, The Region, The Builders, The Money, and The Riders. Other issues explored in detail include the influences of Congress, the various Capital Area commissions dealing with transportation, and the arts. Even the role of the General Services Administration in selecting sites for new government offices played a major role. And, not all the players (outlying cities and counties, and the States of Maryland and Virginia) had or have a common view of the short-term or long-term goals for the undertaking. While we now generally accept the barrel-roofed underground stations of architect Harry Weese as unique to the system, the costs and the uniformity of the designs were not easily achieved.

In the era of great freeway expansion, and during the Nixon Administration, the Washington Metro broke ground in December 1969, and opened its first routes in March 1976. The original concept is just now reaching its initial system map, with expansions to Dulles Airport and other destinations underway. Some of the original concepts were lacking, in terms of access to the Georgetown area and accessibility for the disabled. Political pressures delayed and influenced several major decisions and non-decisions. And the need for coordination among the District, two states, several counties, many cities, and the federal purse strings remains elusive, even today.

Zachary Schrag addresses all of these issues in a very readable and interesting history of one of the major regional public works projects of the last forty years. It is well worth the modest price and the enjoyable hours you'll spend with it.

The Big Dig—The Saga Continues

Carla M. Curtis
University of Houston

Boston’s Central Artery/Tunnel Project, also known as the Big Dig, is considered the largest and most expensive public works infrastructure built within the United States.

The Boston Transportation Planning Review originally conceived of this project in the 1970s; the project officially began in 1982, with the environmental impact studies beginning in 1983. Then in 1991, ground was broken to begin construction, and the final ramp was opened in January of 2006. This project not only took fifteen years to complete, but has been riddled with innuendos of fraud, mismanagement, misappropriation of funds and criminal activity. Rumors have abounded concerning the oversight of the government, the private firms that designed and built these massive connection of tunnels, and the construction companies that provided materials for this project. The saga of the Big Dig continues with indictments, lawsuits and the death of a motorist due to construction failure.

One of the areas where substandard concrete was applied is the same area that authorities closed in September 2004 due to massive leaking.

(continued on page 7)
The Big Dig
(continued from page 6)

This substandard concrete was used to build the walls and ceilings on various parts of the tunnels. Leaks continue to plague the Big Dig and repairs to stop this leakage is ongoing.

On August 11, 2005, the Massachusetts State Police searched the offices of the concrete supplier, Aggregate Industries NE, Inc. Faked records were found that hid the poor quality of concrete delivered for the project. It is not, however, believed that the low-quality concrete is connected to the leaks discovered in the tunnels.

On May 4, 2006, a Federal Grand Jury brought back a 135-count indictment against six individuals employed by Aggregate Industries NE, Inc. According to the Justice Department indictments, these employees were charged with “conspiring to defraud the United States by generating and submitting false records to the Central Artery Project, and mailing fraudulent invoices to general contractors on this government-funded highway project.” The indictment further alleges that the defendants recycled “leftover concrete,” mixing the leftover concrete with Big Dig project concrete and delivered this altered concrete to the project. This inferior concrete was used in tunnels, ramps and roadways.

Former State Attorney General Thomas F. Reilly stated that specialists are concerned the substandard concrete will pose a “long-term maintenance issue.”

On July 10, 2006, four sections of ceiling tiles collapsed on eastbound I-90 in a section of tunnel that leads to the Ted Williams Tunnel in South Boston. The cement tiles, each weighing approximately three tons, fell onto an automobile instantly killing the passenger and injuring the driver. The National Transportation Safety Board’s report states that the bolts came loose from the ceiling, in turn bringing down the slabs of concrete. A fast-set epoxy, as opposed to a standard-drying epoxy, was used on these bolts with no stabilizing redundancy. According to federal investigators, the ceiling that collapsed was designed with a smaller margin of safety than that of other tunnels constructed within the United States.

There were no beams attached from the ceiling of the tunnel to the walls, and the use of bolts was limited. Epoxy samples taken from sections of the tunnels away from the accident showed dark brown discoloration. This, according to experts, is a sign that the epoxy is weakening in its strength. The NTSB preliminary report describes lapses on the part of state government and private companies involved in this project. They continue their investigation.

The Boston Globe reported in July of 2007 that 2 million gallons of water has been flowing monthly through the Tomas P. O’Neill Jr. Tunnel, which was a substantial increase over last year. It further reported that the Turnpike Authority spends almost $5 million annually to repair leaks. An independent engineering firm has been asked by the Chairman of the Turnpike Authority to conduct a complete safety review of the Big Dig, which will include the leakage problems and the water-filtration system.

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The beginning of August 8, 2007, brought about an indictment of Powers Fasteners on a charge of involuntary manslaughter. This company is charged with supplying the wrong type of epoxy for use on the ceiling bolts. State officials have stated that there may be more indictments in the future depending on the final reports. State and federal officials are negotiating with Bechtel/Parson Brinckerhoff to pay as much as $1 billion to settle claims for substandard work. This settlement would guarantee the companies would not face criminal charges in the tunnel collapse and would be released from civil liability from the state and federal governments. No decision has been forthcoming.

The Big Dig’s saga continues and the problems continue to compound. Lawsuits, indictments, criminal charges, allegations of fraud, and conspiracy surround this infrastructure, which has become infamous for its cost overruns and the length of time it has taken to complete. Many wonder if this saga will end anytime soon.
2007 Congress Review

Recently the APWA International Public Works Congress and Exposition took place in San Antonio, Texas. As in the past, the Public Works Historical Society sponsored several events that were held in conjunction with Congress.

Late afternoon on Sunday, September 9, featured the workshop session “History Is Now: Passing Along the Public Works Legacy.” Dr. Martin V. Melosi, Distinguished University Professor from the University of Houston, pointed out that we’re all historians to some degree. We’re looking at the history of the process when we make statements such as, “We’ve always done it that way” or “We used to do it that way and now it’s done this way.” He provided several examples of how we learn from history in our every day lives.

Dr. Melosi reminded participants that it is not only important to record the history of an agency/organization/program for posterity’s sake but also as a tool in litigation support. The importance of planning and recording of those steps is vital. He cited the Chicago blue bag recycling program as an example. An individual claimed he had patented the process when in fact the patent was to take a blue bag, fill it with recyclables and then dump it. Knowledge of how the Chicago program came about and the details of the process were important to the resolution of the issue.

Monday’s PWHS-related activities began with the Chapter Historians Meeting. A number of issues were discussed with the majority of dialogue focusing on preservation and storage of chapter information (print, photo and recorded data). Participants left the meeting with many suggestions and ideas that can be used in their own chapters.

The PWHS Luncheon featured a presentation from John Williams with the Lower Colorado River Authority (LCRA), headquartered in Austin, Texas. The construction of the High-Lake dams and their impact on the Central Texas Hill Country region was the subject of the presentation which included several historical photos showing construction of the dams and early-day electrical operations and recreational marketing. Also part of the luncheon program was announcement of the new PWHS Board of Trustee members and the recipient of the Abel Wolman Award (see following notices for details).

Monday concluded with the Public Works Historical Society’s Board of Trustee’s Meeting. The Board discussion included continuation of current projects, a new member recruitment campaign and plans for the 2008 Congress programs.

Results of 2007 Ballot announced during PWHS Luncheon

Newly-elected members of the Public Works Historical Board of Trustees were announced during the PWHS luncheon on September 11 in San Antonio. Charles Jacobson (Morgan Angel & Associates) was elected President of the Society. Former Trustee Richard Ridings (HNTB Corporation) was chosen as the President-elect. Joining them will be new members Lawrence E. Lux (Lux Advisors, Ltd) and Ann Durkin Keating (North Central College). APWA Past-President Bill Verkest will serve as the liaison to the APWA Board of Directors.

Following the announcement and “passing of the gavel” President Jacobson thanked Past-President Kenneth Eyre (Greeley & Hansen) for his leadership and expressed appreciation to him and retiring trustees Matt Peary (US Army Corps of Engineers) and Howard Rosen (University of Wisconsin) for their commitment, time and input.

2007 Abel Wolman Award Recipient Announced

Dr. Jason Scott Smith was selected as this year’s recipient of the Abel Wolman Award for his book Building New Deal Liberalism: The Political Economy of Public Works, 1933–1956. In accepting the award, Dr. Smith remarked, “Given the present difficulties that our country faces in maintaining its infrastructure, I am especially pleased that the Public Works Historical Society has chosen to recognize my work with the Abel Wolman Award. I wrote this book because I wanted readers to know about the rich history of New Deal public policy regarding the building of public works projects.

This is a side of the New Deal that historians have neglected, and my hope is that by recovering this story my book can help us think more clearly about how the authority of the federal government can be used to transform and improve the nation’s landscape, economy, and politics. I want to thank the selection committee and the members of the PWHS, again, for this wonderful honor.”

Announcements

October 18–21, 2007
The Society for the History of Technology (SHOT) will hold its annual meeting in Washington, D.C. This is part of SHOT’s two-year fiftieth anniversary celebration and will launch its second half-century around the theme “Looking Back, Looking Beyond.” For further information please go to http://www.historyoftechnology.org.

January 3–6, 2008
The American Historical Association Annual Meeting will be held in Washington, D.C. For more information contact Sharon K. Tune at http://www.historians.org/annual.

April 10–13, 2008
The National Council on Public History will hold its annual meeting in Louisville, Kentucky. The theme will be Public Histories of Union and Disunion. For further information please see http://ncph.org/2008annualmtg.html or email ncph@iupui.edu.
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