A HALF CENTURY IN DEEP WATER

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I got into the water field in 1962 because Resources For the Future (RFF) wanted a new gun to perform a systems analysis of the Army Corps of Engineers latest plan for developing the water resources of the Potomac Basin. Irving Fox was the perpetrator of the scheme to critique the Corps' work and Gilbert White's work on the range of choice in floodplain management was to be the guiding theme for the study. John Krutilla at RFF and Otto Eckstein at Harvard were my intellectual mentors, and Allen Kneese gave of his leadership so it should come as no surprise that I soon became steeped in the minutiae of benefit-cost (B/C) analysis.

Thus my career in water resources began. The career has not yet terminated nor have I, although I have found myself on opposite sides of issues from some powerful potential enemies. I never intended to have a career in water resources but once having wet my feet, I found the issues too fascinating to be ignored.

In 1962 I thought that our insights about the powerful advantages of making choices from a broad range of options and the vast importance of adequate project evaluation were so overwhelmingly clear that by the end of my career, the world would have fallen into line with our faith and we would go on to greater progress. This, of course, was the Progressive Vision, the Gospel of Efficiency, that had pervaded my education as a conservationist and as an economist. It was a vision that was found throughout Washington in the 1960s. Science and Government and right-minded public officials would make the world a safe and beneficent place.

The 1960s were a part of the period Marion Clawson has called the era of management on the public lands. In water resources it was the beginning of the end of the big projects. In no small part this was because, as Walter Langbein has pointed out, the nation had run out of the most efficient dam sites. This meant that if there ever had been an economically efficient water resource development project, it had already been built, perhaps in the preceding century. We were left with the dogs which were amazingly easy to tear apart with a competent economic analysis.

That was why we at Resources for the Future were able to show through systems analysis that there were many superior alternatives to the Corps of Engineers plan for many dams in the Potomac basin, if costs alone were the criterion and maintenance of dissolved oxygen in the estuary was the objective of planning. Later, Steve Hanke and I were able to show that given the ability to price water seasonally at its marginal costs, the water storage projects were an unneeded solution for the Washington, D.C. water supply problems. Daniel Sheer, an independent consultant, and Bob McGarry, the head of the Washington Suburban Sanitary Commission, were able in the 1980s by involving all of the players and some sharp analysts, to put into place a water supply plan for the Washington, D.C. area that depended heavily on systems analysis, pricing, and a minimum of water storage and emergency water treatment. Occasionally the progressive vision works.

By the 1970s environmentalists had caught on to the economists tricks and were using a combination of economics and environmental analysis to oppose water resources projects. The Environmental Defense Fund and the Natural Resource Defense Council were probably the most diligent users of this tactic. They successfully delayed a number of projects or forced them to be revised. We all learned from these experiences that water resources projects are seldom killed outright but only delayed indefinitely.

When I was a student at Ohio State University in the postwar '40s, our textbooks on conservation generally celebrated the visions of water resources engineers. The pinnacle of vision was the North American Water and Power Alliance (NAWAPA) plan for diverting waters of the Yukon. By the time I arrived in Washington in the 1960s, NAWAPA was slowly being killed, but before I left Washington in the 1980s it had flickered back to life. Perhaps someday we will be panicked into believing that we should bring water from the Yukon to the Southwest and the upper Midwest as NAWAPA envisioned.

I have learned that we are slow to pick up innovative ideas if those ideas represent a change in the way we think

about problems and if they require changes in behavioral patterns of the institutions that manage water resources. The water users may be much more responsive to new ideas than are the managers, perhaps because the managers operate secure monopolies. It should be indisputable that the solution adopted for Washington, D.C.'s water supply problems was light years ahead of traditional solutions. While I was teaching at the Ohio State University about ten years ago I gave an invited public lecture on water supply management in which I extolled the virtues of the Washington, D.C. water supply plan. At this time the Columbus, Ohio, water department was fighting strenuously for more water storage to meet projected demands, and vehemently resisting all suggestions for adjusting water rates to reflect marginal costs for projecting demands with realistic sensitivity to prices or for drought emergency planning and water conservation measures. It was a sobering experience.

At the beginning of the 1970s and again at the end of the decade the Principles and Standards (P&S) were revised. Both revisions were under the auspices of the Water Resources Council. In 1970 and 1971, the revisions were driven by advances in benefit-cost techniques coming out of the work of Eckstein, Krutilla, McKean, and other critics of the procedures in and out of government. Those revisions were a major improvement but they left certain outside economists, primarily the efficiency advocates, dissatisfied and still critical. On the other side, one could find those who emphasized income redistribution and multiobjective analysis being critical of the efficiency advocates. The environmental interests were quick to criticize the generosity of the new rules in certain respects and began an attack on water resources development that culminated in a further revision and tightening of the P&S at the end of the Carter administration. Once again, a prominent group of economists, this time under the imprimatur of two national environmental organizations, found the new procedures short on rigor, albeit improved.

During the mid 1970s I began a ten year odyssey in the Office of the Secretary of the Interior that acquainted me with both the comedy and the tragedy of the U.S. Bureau of Reclamation water storage and irrigation projects in the western states. My introduction to comedy came in a dispute with the Bureau's economists over the correct treatment of the opportunity costs of farm labor. We in the Secretary's office wanted to include them in the national accounts as an efficiency cost when calculating the net benefits of irrigation agriculture. To exclude them would inflate benefits unrealistically, we supposed. The Bureau's economists took the opposite tack. To include the opportunity costs of farm family labor would unnecessarily diminish the benefits of the project.

We thought it appropriate to omit the opportunity costs of family labor in the ability to pay calculations which the Bureau goes through on each project because they were not out of pocket costs affecting the farmer's budget. The Bureau economists disagreed, arguing that not to include those opportunity costs would unfairly inflate the farmer's repayment requirements. After this the Bureau's economists considered us to be enemies of reclamation. We concluded they were the enemies of reason and were never again surprised at anything they did.

Marc Reisner's *Cadillac Desert* (1986) exposed the underbelly of the Reclamation program. His book popularized the work of economists who had spent, or in some cases terminated, careers critiquing Bureau of Reclamation projects. We had our own opportunity to examine the Reclamation Program about ten years before Reisner's book. In the early days of the Carter administration the Interior Department, at the instigation of the Solicitor's Office, published draft regulations enforcing the 160 acre limitation with residency requirements on federal irrigation projects. Interior's failure to enforce the limitation had been whipped into a scandal by Ralph Nader's group. Carter's appointees to Interior had not forgotten the Nader study and chose this issue for one of their first actions.

The California growers, who were particularly vulnerable to enforcement of the 160 acre limitation and the residency requirement, promptly hit the Department with a National Environmental Protection Act (NEPA) suit requiring an environmental impact statement on the proposed regulations. Because the regulations were more economic than environmental, the study of their impacts would have to be an economic study. Economists were suddenly in demand. Our economic staff teamed up with economists from the Agricultural Research Service to launch a major study of the economics of federal reclamation projects. This study occupied the last three of the Carter years and was issued as a draft environmental impact statement by the Secretary of the Interior, Cecil Andrus, on the eve of his departure. The acreage limitation became the problem of the Reagan administration.

One of James Watt's first actions as Reagan's Secretary of the Interior was to submit a bill, thoughtfully drafted by the California agricultural interests, to enlarge the acreage limitation to 960 acres. Much of the remainder of Reagan's first term, upon passage of the bill, was spent refining regulations to impose the 960 acre limitation with artfully crafted loopholes that would keep the large, extended family farms, some of whom were corporations, intact. And so, from Nader to Carter to Reagan, the 160 acre limitation was replaced by the 960 acre limitation

which, like its predecessor, was not meant to amount to much when it counted. To the populists in the Carter administration, the 160 acre limitation was meant to keep project farmers in equitable poverty. In the Reagan Administration market forces were meant to determine the scale of project agriculture.

The study of Reclamation projects prompted by the attempt to impose acreage limitations on project farmers revealed some of the tragedy in the Reclamation program. In the 19th century movement that brought on the 1902 Reclamation Act, sentiment and inspiration had long since replaced rigorous logic and a record of solid accomplishment in irrigation projects. Speaker Cannon's only comment on Rep. Newlands' Bill was that "the cost of reclamation would ultimately be met from the Treasury." The Progressive and positive view of the state supported the Reclamation program for most of the twentieth century with now and then a grumble from fiscal conservatives. Now, looking back, it appears that a negative view of the state, wherein free riders are able to force others to pay for their free rides, is more in tune with history.

Stanley Roland Davison, who must have grown up on a reclamation project, perhaps in Montana where he earned B.S. and M.S. degrees, wrote a remarkable thesis at Berkeley in 1951 on "The Leadership of the Reclamation Movements" (published in 1979 by Arno Press). He observed that the gainers of the program were a few hundred farmers "and their reward was to be poverty and hardship for a generation." Our acreage limitation study revealed that 90 percent of the ownerships and 75 percent of the farm operations were at 160 acres or less in 18 districts selected as representative case studies. About half the districts were into low and medium value crops like forage and cereals and the rest had liberal amounts of higher value crops, cotton, vegetables, and fruits. Existing farms at the 160 acre scale were paying around $10,000 annually to family labor, management, and equity in districts with low value crops and up to $20,000 in districts with medium value crops. Only in districts with specialty crops did residual returns rise much above $25,000 on the smaller farms. Beginning farmers required two to five times the 160 acre limit to approach breakeven in all types of districts except where the specialty crops were grown.

The dismal economics of the projects were driven home by an analysis of repayment. It is now widely understood that districts are held responsible only for their share of project costs without interest. This subsidy amounted to 97 percent of the full cost of irrigation in the worst case and 57 percent of the full cost in the best case for the 18 districts. The poorest districts have not even been able to meet their payment schedules on these generous terms. We discovered that in Montana, a state with short growing seasons and remote markets, the districts have been excused by Congress from any repayment requirement except to pay what they can each year.

One needs to digest these findings in order to appreciate the observation that Reclamation consigned families to a generation of hardship and poverty. Hardship and poverty prevail today in the more northerly districts where the operators give the appearance of being trapped because there are no buyers for their equity. It may be that all this misses the point that was made to me by Jimmy Carter's Commissioner of Reclamation, an Idahoan, who told me that the real purpose of the projects is to provide a decent place to raise a family. Perhaps growing up in poverty and hardship makes the American character.

In addition to the acreage limitation, the Carter administration launched two other major initiatives in water resources. One was the "hit list" in which 19 water resource projects were exposed as wanting in economic and environmental justification. The other initiative, as mentioned earlier, was once again to revise the P&S. Both actions reflected the adoption by environmental activists in the White House of lessons learned from using economic logic to shoot down water resources projects.

The hit list was inspired by an accumulation of economic critiques from the '60s and '70s of authorized water projects which were inherited by Carter. The environmentalists in the White House struck early and secretly. Cecil Andrus, Carter's newly appointed Secretary of the Interior was hit with the hit list as he debarked from an airplane on a western trip. He had trouble defending the White House. On that trip he was also to learn of the disastrous effect the hit list would have on the Administration's political standing in the West. Carter commented later on how this disaster tied his hands in water politics for the rest of his administration and affected his campaign for reelection.

The revision of the P&S at the end of Carter administration reflected the cumulative identification of weaknesses in the rigor of the 1972 P&S. The executive order directing the revision identified specific shortcomings in the procedures and directed they be fixed. In a fit of excessive zeal, the new P&S were to be issued as regulations, effectively making performance of agencies under the P&S litigable. The weaknesses were mostly fixed and the Reagan administration retained the new P&S as rules, not as regulations.

In the 20 years that have passed since 1979 much has happened to benefit-cost analysis. The Corps of

Engineers has moved into ecosystem restoration and is asking how such projects are to be evaluated. There is a strong inclination by ecosystem scientists to evaluate a restoration by the qualitative state of the ecosystem restored rather than by the flow of services created with and without the restoration. Clearly the quantitative flow of services is needed by the utilitarian B/C analysts, while the ideology of conservation biology is qualitative.

Another trend observable in Corps of Engineers practice is "stakeholder" involvement or "shared vision" processes, the development of which Leonard Shabman has contributed to in his work for the Corps. How does one evaluate the outcome of the shared vision planning process? Shared vision is stakeholder driven and not expert driven as are the traditional planning process and benefit-cost analysis but shared vision does depend upon software which facilitates the process. The software is setup by experts and contains externally generated information.

Traditional benefit-cost analysis has rivals not only in multiobjective analysis, but also in environmental quality analysis and the shared vision analysis. An economic efficiency advocate is inclined to think that there are a set of criteria that would rank these approaches but such a set of criteria would have to be derived from one or another of the competing ideologies and this runs into the trap of circularity. Lacking independent performance criteria and lacking canonical law, we evaluate what we do by what we do, as Wildavsky said, because we do not know how to evaluate what we produce.

The Corps of Engineers chooses to muddle along using a bit of each methodological idea, neither completely satisfying nor completely alienating its supporters and critics. And, of course, it continues to finance generous quantities of methodological studies by academics and contractors. The idea that efficiency gains from a public water resource investment should be counted in a national income account is not dead, but the economists who have taken the efficiency advocate's position (that a utilitarian B/C analysis should be applied to public expenditures) appear to be putting fingers in the dike in hopes of preventing the inevitable deluge. It is a losing effort.

Efficiency advocates have another choice. They can advocate greater cost sharing and a larger role for private investment. The drive for greater and more consistent cost sharing, which Carter initiated, gathered steam in the Reagan administration and hit the same wall that stymies utilitarian benefit-cost: the pressure of rent seekers or free riders.

A greater role for private investment has yet to be given a fair shot but perhaps conditions are becoming more favorable. Consider the situation in 1907 when William Howard Taft could say with reference to the Grand Valley project in Colorado that "there are a good many enterprises that involve the outlay of capital so large or require so much risk that it is better that, associated with private enterprise, the government help, too . . . ." In fact, private enterprise had tried and failed to bring water to the Valley. The government project ended up costing far more than was estimated because of the same engineering difficulties that had defeated the private efforts.

Now consider whether a President could make such a claim today about water resource projects when there are many firms of a size that can and do take on large and risky projects, if there is a positive expected payout. As evidence, there are reports that Enron is approaching cities along the Rio Grande offering to manage regional water plans and provide water supplies without taking irrigated land out of production. What Taft should have said, perhaps, and which would surely be echoed today, is that "there are a good many enterprises so bad that only government is willing to undertake them." As an efficiency advocate, I would prefer to see private firms take a much larger hand in dealing with our water resource problems. None of the classic rationale for public involvement holds much water any longer. I once heard Abel Wolman tell a group of engineers and planners that if they ever got a chance to build a dam, do it! I now think better advice would be that, if there is ever an opportunity to privatize a public water function, do it!