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ESSAYS

FROM ASKHABAD, TO WELLTON-MOHAWK, TO LOS ANGELES: THE DROUGHT IN WATER POLICY

DAVID H. GETCHES*

INTRODUCTION

Water policy in the United States is typically little more than a description of legal systems in which a few interests control historically imbedded rights. Policies in other areas express goals for society; laws are then shaped to achieve them. Thus, criminal laws attempt to preserve order, deter misconduct, remove dangerous people from society, treat victims fairly, and so on. The goals of water policy tend to be confined to respecting existing rights and rewarding development. Western states are lately realizing that economic stability, human health, ecological balance, and survival of urban and rural communities all have a nexus in water. Widening public concerns over the untoward effects of "lawful" water uses have led to some modest reforms in water laws. The response, however, falls short of a comprehensive water policy.

This essay looks at three examples of the failure to consider the policy implications of water decisions, producing results that range from absurd to tragic. The three stories are dramatically different in geography, cultural settings, and consequences. Each has in common the absence of a comprehensive water policy. Water decisions have charted the direction of land use, social relations, economics, and the ecological character of areas throughout the world, especially those in arid regions. In each case, a consciously developed water policy would have been a context for looking comprehensively at the aspirations of society.

With the advent of the Soviet Union following the Bolshevik Revolution came the mandate to the Central Asian republics to

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produce cotton on a massive scale. When the necessary water was turned to the task no one dared to ask about the consequences or paused to develop a policy that defined what the whole society wanted or needed from the region's water. Today, the misery of millions of people and the destruction of the productive capacity and ecological integrity of an entire region are attributable to the failure to confront water policy.

The Wellton-Mohawk District in Southern Arizona became the object of Bureau of Reclamation beneficence without anyone asking whether its irrigation project made sense physically, economically, or politically. The project's infeasibility was repeatedly proved, and its environmental effects even caused an international conflict. Still, fundamental questions about the project and the wisdom or effects of continued commitments of water to it were avoided.

Southern California's monstrous problems of traffic, pollution, crime, and infrastructure all relate to water availability. Growth and sprawl have proceeded apace, and water managers understand that it is their duty to serve up water wherever and whenever it is demanded. A decision has implicitly been made that water policy will not be the touchstone for dealing with broader issues.

In each case, political and legal institutions enabled decisions to be made to effect short-term, single-purpose objectives. Only the narrow concerns of a few people were admitted in the process. Thus, far-reaching consequences, many of them easily predictable, could be disregarded by isolating the decisions and insulating the decisionmakers from accountability.

I argue that water policy should comprehend fully society's goals and the role of water allocation and development in achieving them. It should consider all the ramifications of devoting water to particular purposes. Comprehensive water policies demand wide participation, with processes open to the people, communities, and affected interests. Water decisions must be integrated with commitments to use or conserve other natural resources, with decisions that guide the destiny of communities and economies, and with efforts to secure the well being and sustainability of society generally.

I. THE ARAL BASIN, CENTRAL ASIA

Central Asia is desert. Uzbekistan, Turkmenistan, Kirgyzstan, Tadjikistan, Kazakhstan, all formerly republics of the Soviet Union, are now members of the Commonwealth of Independent States.¹

1. The Commonwealth of Independent States was formed on December 21, 1991 to

Virtually everyone is an ethnic Muslim,² descended from the tribes that aboriginally occupied the region and that continue to have influence.³ The region was eventually conquered by the Russians and became part of the Soviet Union in the 1920s.⁴ The main industry is irrigated cotton farming, and it is in decline.⁵ Two north-flowing rivers of Central Asia, the Amu Darya and the Syr Darya, drain the mountains to the south that are shared with Afghanistan and Iran, and then spill into the Aral Sea. At least they did so historically.

Canals lay wide the desert's sands, losing more water than they deliver. The city of Ashkabad, capital of Turkmenistan needs 150 wells just to eject the groundwater that rises into yards, buildings, and the root zones of plants.⁶ Farmlands are rendered unproductive as soils become saline and waterlogged, their nutrients leached out by repeated flooding with irrigation water.⁷ Virtually all of the water destined for the Aral Sea is now devoted to irrigation.⁸

The Aral has been called a dying sea,⁹ surely an understatement. By most measures, the Aral Sea is already dead. It has shrunk in volume by over 60% since 1960; its water is about 3% salt; twenty of its twenty-four indigenous species of fish are extinct; 135 animal

include eleven of the twelve former Soviet republics. David Remnick, *In New Commonwealth of 'Equals,' Russia Remains the Dominant Force: Historical Status, Space-Age Arms Ensure Regional Primacy*, WASH. POST, Dec. 22, 1991, at A39.

2. In Uzbekistan and Turkmenistan, only about eight percent of the people are Russians. *Soviet Central Asia: The Next Islamic Revolution*, ECONOMIST, Sept. 21, 1991, at 58.

3. IVAR SPECTOR, AN INTRODUCTION TO RUSSIAN HISTORY AND CULTURE 139-40 (5th ed. 1969). Even after 70 years of Soviet rule, Turkmenistan was described as "more a tribal confederation than a modern nation." Annette Bohr, *Turkmenistan Under Perestroika: An Overview*, REP. ON U.S.S.R., Mar. 23, 1990, at 20, 21.

4. RICHARD A. PIERCE, *RUSSIAN CENTRAL ASIA 1867-1917*, at 1-5 (1960).

5. Boris Rumer, *Central Asia's Cotton: The Picture Now*, CENT. ASIAN SURV., 1987 (No. 4), at 75; Gregory Gleason, *Marketization and Migration: The Politics of Cotton in Central Asia*, J. SOVIET NATIONALITIES, Summer 1990, at 66.

6. Norman Precoda, *Requiem for the Aral Sea*, AMBIO, May, 1991, at 109, 112; D.J. Peterson, *The State of the Environment: The Water*, REP. ON U.S.S.R., Mar. 16, 1990, at 14, 15.

7. Precoda, *supra* note 6, at 111, 113. It is estimated that irrigation projects and poor practices account for the loss of one million hectares (2.47 million acres) of irrigable lands. N.F. Glazovsky, *The Aral Crisis: The Source, The Current Situation, and the Ways to Solving It* 4 (unpublished paper presented to United Nations Environment Programme Meeting on "Assistance for Preparation of Action Plan for Conservation of the Aral Sea," Sept. 16 - Oct. 3, 1990).

8. Peterson, *supra* note 6, at 15. For a description of the ecological disaster, see William S. Ellis, *The Aral: A Soviet Sea Lies Dying*, NAT'L GEOGRAPHIC, Feb. 1990, at 73, 84.

9. Ellis, *supra* note 8, at 73.

species and half of all the bird species are gone.¹⁰ But the Aral is only one festering symptom of much greater ills: There are sick and dying people. Some are victims of a 500% increase in throat cancer¹¹ from inhaling the dust and toxic salts that swirl up when winds lash across the exposed lake bed.¹² This dust settles as far away as the Arctic Ocean¹³ and has raised the level of particulates in the Earth's atmosphere a full five percent.¹⁴ Moreover, the loss of the sea has markedly changed climate patterns in the region.¹⁵

Infant mortality in the region rivals the worst rates in third world countries.¹⁶ Food fish are harvested directly from pesticide-laced irrigation canals.¹⁷ The economy is in shambles.¹⁸ Once-thriving seafront fishing villages are stranded amidst desert salt flats, miles from the sea.¹⁹ Fishing and fish processing, industries that once employed sixty thousand people, have been destroyed following the sea's precipitous decline.²⁰ And the problems are even deeper and more endemic.

Once the fourth largest inland waterbody in the world,²¹ the sea is a casualty of a misconceived Soviet political-economic system that created the worst collection of environmental calamities in the

10. Philip P. Micklin, *Desiccation of the Aral Sea: A Water Management Disaster in the Soviet Union*, 241 SCIENCE 1170, 1171-73 (1988); see also V.M. Kotlyakov, *The Aral Sea Basin: A Critical Environmental Zone*, ENV'T, Jan./Feb. 1991, at 4, 6-7.

11. Ellis, *supra* note 8, at 90; see also Kotlyakov, *supra* note 10, at 8 (describing other health consequences). Typhoid has increased 30-fold and hepatitis 7-fold in the last 15 years. *Id.*

12. Micklin, *supra* note 10, at 1172.

13. *Id.*

14. Douglas Stanglin, *Toxic Wasteland*, U.S. NEWS & WORLD REP., Apr. 13, 1992, at 40, 43.

15. Precoda, *supra* note 6, at 111. The sea formerly served as a barrier against cold north winds. Its depletion therefore removed the barrier, exposing the region to the drying and erosive effects of winds and contributing to more severe temperature extremes. See Kotlyakov, *supra* note 10, at 6.

16. The infant mortality rate exceeds 50 per 1000 births. Kotlyakov, *supra* note 10, at 8. Estimates for some areas of Uzbekistan and Turkmenistan range as high as 73 per 1000. Patricia M. Carley, *The Price of the Plan: Perceptions of Cotton and Health in Uzbekistan and Turkmenistan*, CENT. ASIAN SURV., 1989 (No. 4), at 1, 2. 1989 rates for other nations are: Brazil, 67 per 1000; Kenya, 70 per 1000; Honduras, 60 per 1000; India, 91 per 1000; Libya, 70 per 1000; USSR, 25.2 per 1000; U.S., 10 per 1000; Canada, 7.3 per 1000. WORLD ALMANAC 734-821, 939 (1992).

17. Micklin, *supra* note 10, at 1172.

18. See Asal Azamova, *The Prohibitive Cost of Dictatorship*, MOSCOW NEWS, Sept. 30, 1992 (describing an economy on the brink of ruin).

19. Philip Micklin, *Touring the Aral: Visit to an Ecologic Disaster Zone*, SOVIET GEOGRAPHY, Feb. 1991, at 90, 92-95.

20. Micklin, *supra* note 10, at 1172.

21. *Id.* at 1170. Today it has shrunk in area to sixth among the world's lakes. *Id.*

history of the world. The Soviets committed "ecocide,"²² squandering their natural wealth in a desperate attempt to maintain economic power.

Last September, just after the failed coup,²³ I stepped off a cumbersome and worn Aeroflot jet in Ashkabad, capital of the Republic of Turkmenistan. I was still dressed for the chilly drizzle of a fall day in perpetually gray Moscow. Here there were Turkmen in their loose, colorful tribal costumes, hunkering in the shade of palms. Warm breezes whipped up dust and blotted the bright sky. I went to Central Asia as part of a National Academy of Sciences delegation investigating how to help the newly independent governments develop new laws and institutions adequate to revamp and revive their ailing system. They asked about "privatization" and hoped for an American formula that would solve their problems. After a rigorous trip, studying the situation further, and consulting with others, I concluded that the demise of Soviet Communism was not enough to revive the Aral, and furthermore, that our own system of water decisionmaking is not exempt from the kind of failings suffered in Central Asia.

What went wrong in Central Asia? What caused the Aral Sea disaster? After the Bolshevik Revolution, a decision was made in Moscow to dedicate lands colonized by the Tsars in Central Asia to cotton production for the entire Union. The capacity to grow cotton in the region had been shown in Tsarist times, and indeed the crop was cultivated aboriginally using practices of crop diversity and rotation.²⁴ Obsessed with becoming independent of other nations in cotton production, political leaders in Moscow declared pursuit of that goal to be the "patriotic duty" of all Central Asians;²⁵ by 1937, the USSR was exporting cotton.²⁶

The preoccupation with cotton caused Soviet leaders to disregard accumulated wisdom concerning irrigated agriculture in arid regions as well as expert advice from within. They launched a massive irrigation scheme to drain the basin's rivers and irrigate

22. MURRAY FESHBACH & ALFRED FRIENDLY, JR., *ECOCIDE IN THE U.S.S.R: HEALTH AND NATURE UNDER SEIGE* (1992).

23. On August 19, 1991, several opponents of Mikhail Gorbachev detained him in an attempt to oust him from leadership. The coup was aborted, however. *Soviet Turmoil: The Soviet Coup and Its Aftermath: A Recap*, N.Y. TIMES, Aug. 25, 1991, at 16.

24. Rumer, *supra* note 5, at 84.

25. Ellis, *supra* note 8, at 76; Gleason, *supra* note 5, at 68; Gregory Gleason, *The Pakhta Programme: The Politics of Sowing Cotton in Uzbekistan*, CENT. ASIAN SURV., 1983, at 109, 111; Carley, *supra* note 16, at 18.

26. Ellis, *supra* note 8, at 76.

wide expanses of desert. The project began operations in 1956.²⁷ It was a foreseeable disaster, destined to rank among the world's greatest irrigation-induced ecological collapses.

The hazards of major trans-basin diversions of water and excessive irrigation practices in arid societies had been demonstrated for millennia, but were ignored.²⁸ Ancient civilizations from the Sumerians to the Maya faded away because of their excessive use of land and water.²⁹ Soviet scientists predicted the dire consequences for the Aral Sea and its ecosystem if the Amu Darya and Syr Darya were exploited as planned; their advice was rejected.³⁰

Sacrificing the region to a cotton monoculture succeeded in making the Soviet Union a major exporter, but it was done by deferring huge economic and social costs to the Republics. A former Uzbek First Secretary said the cotton policy had been carried to "monstrous proportions."³¹ Local political leaders blamed the government's single-minded policy for economic distress, political corruption, mass unemployment, low wages and environmental destruction.³² According to a 1987 article: "By being transformed into virtually one great cotton plantation, Uzbekistan embarked on a long tragic experiment—to determine the capacity of a monoculture to corrode not only agriculture, but also industry, education, health, and finally public morality."³³

Ill-considered water policy traces to the core of the Soviet system: single-purpose, central decisionmaking, the subservient position of the Republics, and a refusal to consider the consequences of pursuing a set goal. Poor water-use practices—indeed, most of Central Asia's ills—are the product of mandates requiring the south-

27. *Id.* at 81. The central feature of the project is the Karakum Canal that takes the water of the Amu Darya in an earthen channel across the desert. At 850 miles in length, the Karakum is the world's longest canal. There is no return to the river. *Id.*

28. Consider two well-known examples—one ancient, one contemporary—that the Soviets ignored: 1) The great transverse canals built after the Muslim conquest between the Tigris and Euphrates rivers destroyed the productive capacity of that area by 1500. McGuire Gibson, *Violation of Fallow and Engineered Disaster in Mesopotamian Civilization, in IRRIGATION'S IMPACT ON SOCIETY* 7, 15 (Theodore E. Downing & McGuire Gibson eds., 1974); 2) The Indus Valley in Pakistan was losing an estimated 50,000 acres of farm lands per year by 1960, due to salinity and waterlogging from poor irrigation practices. ALOYS A. MICHEL, *THE INDUS RIVERS: A STUDY OF THE EFFECTS OF PARTITION* 483 (1967).

29. CLIVE PONTING, *A GREEN HISTORY OF THE WORLD* 72, 82-83 (1992).

30. Micklin, *supra* note 10, at 1172.

31. Gregory Gleason, "Birlik" and the Cotton Question, REP. ON U.S.S.R., June 15, 1990, at 19, 21.

32. *Id.* See also Gleason, *supra* note 5, at 68.

33. LITERATURNAYA GAZETA, Feb. 11, 1987, at 12, quoted in Rumer, *supra* note 5, at 82.

ern republics to devote their respective resources to a cotton monoculture.³⁴ Those practices, in turn, have caused or exacerbated virtually all of Central Asia's serious economic, environmental, and health problems. Water thus links the most critical problems of the area to policy choices that perhaps for the first time in seventy years can now be reconsidered.

Experts in the Turkmen water development agency told us of their solution. Their dream is to carve another canal through the desert, up into the heartland of Siberia, damming and diverting the Ob and Irtysh Rivers before their waters pour into the Arctic.³⁵ These virgin rivers could be drained and their waters transported 1,400 miles to Central Asia. A new water supply could open more lands to cultivation to replace those depleted and destroyed by salinity. The proposal would also add a token share of the water to the Aral.

The Siberian project is fraught with problems including enormous cost and a host of unknown environmental consequences.³⁶ It reprises the root cause of Central Asia's problems, attempting to solve one water problem by pouring more water on it, without concern for the consequences. Nevertheless, any argument for building the massive canal from Siberia to Central Asia is probably moot. The billions of dollars it would cost are surely not available in the individual states (republics), and absent a functional central government, the only possible source is bilateral or multilateral investment. Given the egregious problems of the Commonwealth, an elaborate water project is not likely to be a high priority for foreign aid.

More feasible options exist for returning more water to the Aral, perhaps stabilizing the level, and controlling some of the pollution problems. They include lining ditches and canals so that they will not leak, improving irrigation methods so not as much water will be used, installing drainage systems, retiring some agri-

34. See Rumer, *supra* note 5, at 81-85. The situation has some remarkable similarities to the power relationships described by theorists who argue that in an "irrigation society" political institutions tend toward strong centralized control and exploitation of people and resources. An elite is empowered through controlling water, allocating capital for water development, administering construction of huge water works, and running the system. The elite then dominates the resulting economic surpluses. The theory of the "irrigation society" or "hydraulic society" is developed by KARL A. WITTFOGEL, *ORIENTAL DESPOTISM: A COMPARATIVE STUDY OF TOTAL POWER* (1957).

35. Philip P. Micklin, *The Fate of "Sibara": Soviet Water Politics in the Gorbachev Era*, *CENT. ASIAN SURV.*, 1987 (No. 2), at 67, 70-75.

36. *Id.* at 80-81.

cultural lands, and reducing chemical use.³⁷ Surely there would be some benefits felt in the Aral basin. But not enough of those benefits would accrue to the people of the individual state that would have to sacrifice its water or money; they would have to do it for the sake of the Aral. While discussing these options a stern water official in Ashkabad, pounding his fist on the table, insisted that if his government invests in a better irrigation system, "not a drop of saved water would go into the Aral; all of it will go to new farms in Turkmenistan."³⁸ For him, water that flows into the Aral is wasted. As a Turkmen, he is unmoved by the problem of polluted water flowing out of Turkmenistan and into Uzbekistan.

Many people in Central Asia attribute the problem to the Soviets' forcing the Central Asian republics to grow cotton to the exclusion of everything else, including scarce food crops. Now they are in charge of their own destiny. They can simply diversify to grow scarce food crops and, while they are at it, rotate plantings to give the ravaged soils a chance to rebuild. But will they? Cotton commands a market return many times that of most food crops and it is an exportable commodity, producing desperately needed foreign exchange.³⁹ It will be a tough choice for struggling, impoverished new nations.

Rivalries among the republics compound the economic motives for competition and frustrate efforts toward cooperation. In June, 1990, 300 people were killed and 1,000 injured when Uzbeks rioted against Kirgyzians who had reassigned land and water rights near Osh.⁴⁰ We know Central Asians are capable of violence against their neighbors. There is no prior history of cooperation, mutual problem-solving, and regional statesmanship that is needed to solve the Aral Sea problem. The people of the region have been left out of decisions on their own fate for generations. A group of decisionmakers was trying to satisfy a central government goal of economic growth. They were not accountable to anyone but central economic planners; there was no need to placate environmentalists and local residents

37. Cf. Micklin, *supra* note 10, at 1174-75; Kotlyakov, *supra* note 10, at 9, 36-38. A host of committees and international working groups are addressing these issues. Professor Peter Rogers notes that in 1990 alone, 106 conferences were held on the Aral Sea disaster. Peter Rogers, Commentary, *The Aral Sea*, *Env't*, Jan./Feb. 1991, at 2, 3.

38. Interview with Moses M. Sarkisov, Director of Project Research Institute, Department of Water Design, in Ashkabad, Turkmenistan (Sept. 16, 1991).

39. See Rumer, *supra* note 5, at 76-77. Cotton exports declined 25% from 1980 to 1985. *Id.*

40. Gleason, *supra* note 5, at 91.

under their system. The old Soviet political system, then, explains how the Aral Sea disaster was set in motion.

II. WELLTON-MOHAWK DISTRICT, ARIZONA

Now, to illustrate that there is more than one way to make bad decisions, consider the case of the Wellton-Mohawk Project. Farmers in this southwest Arizona district were suffering from salt build-up in their irrigated soils, an inevitable result of flooding saline soils repeatedly to produce crops. In this case, farmers used and reused water pumped from wells near the bed of the dry Gila River. The return flows seeped back to the groundwater, making it saltier and saltier after each use. When crops declined, they sought federal assistance and got it.⁴¹

First, the federal Bureau of Reclamation built eighty-six miles of canals to bring them supplemental water from the Colorado River so they could irrigate and flush out the soils. This worked for about six years. The land, as everyone knew, lay over a closed groundwater basin. Once water seeped beneath the ground it accumulated in a bowl-like formation of bedrock and, predictably, the "bowl" filled. Eventually, salty groundwater rose into the root zone of crops and began to kill them.

The Bureau of Reclamation again came to the rescue. This time, it installed deep wells to pump down the salty groundwater and a pipeline to carry it away and dump it into the Colorado River, upstream of where farmers in Mexico divert water.⁴² The Mexicans are guaranteed water by a 1944 treaty with the United States.⁴³ The only water flowing at that point in the river is the trickle left after users in the United States are finished with it. Upriver in Colorado, Wyoming and Utah, farmers take water out and send their return flows back to the river. Cities pump some of it over mountain ranges, leaving less and less water that becomes saltier with each successive use. Others take water out of the main stem, some for use along the river; much more is drawn out by the behemoth diversions for users in Los Angeles, the Imperial Valley, and Arizona cities. By the time the share of water promised to

41. Joseph Friedkin, *The International Problem with Mexico Over the Salinity of the Lower Colorado River*, in *WATER AND THE AMERICAN WEST: ESSAYS IN HONOR OF RAPHAEL J. MOSES* 31, 46-47 (David H. Getches ed., 1988). For a discussion of issues surrounding the Yuma Desalination Plant, see MARC REISNER, *CADILLAC DESERT* 481-82 (1986).

42. Friedkin, *supra* note 41, at 46.

43. Treaty for the Utilization of Waters of the Colorado, Tijuana and Rio Grande Rivers, Feb. 13, 1944, U.S.-Mex., art. 10, 59 Stat. 1219.

Mexico reaches the Mexican intake, it is already very salty.⁴⁴ Add to it the brine being pumped out of the Wellton-Mohawk wells and it is a crop-killing brew.

In 1961, the year Wellton-Mohawk discharges started, Glen Canyon Dam upstream at the Arizona-Utah border was on the verge of completion.⁴⁵ The government would soon need every drop of water not promised to Mexico to fill Lake Powell. The salty discharges from Wellton-Mohawk polluted the river so badly that it was useless for farming. Not surprisingly, the Mexican government formally protested the U.S. action.⁴⁶ At first, the United States took the position that the Mexican Treaty guaranteed only water, not necessarily *usable* water. After unpleasant publicity and intensive negotiations, including meetings between President Kennedy and President Mateos of Mexico, the government established maximum levels of salinity for future water deliveries from the U.S.⁴⁷

A few years later, the two governments finally settled on a plan that created more work for the Bureau of Reclamation: construction of an extension of the Wellton-Mohawk discharge canal below the Mexican intake and even more wells to rid the district of salty groundwater.⁴⁸ This was controversial in the U.S. because it meant that the U.S. did not get credit for delivering an amount of water to Mexico under the treaty equivalent to the discharges below the Mexican intake. Consequently, users in the U.S. might have to curtail their water use. Even with the plan, the water reaching Mexico remained too salty to use much of the time.

Originally, the simplest solution would have been to stop the source of most of the salt: drainage from Wellton-Mohawk. But it would have been unthinkable for the Bureau of Reclamation to close down the project and admit that it had been impracticable and ill-conceived from the start. Changing much of the Wellton-Mohawk District to non-irrigated agriculture would have been (and remains) unpopular. At one time, all of the project's 120 full-time

44. For a comprehensive analysis, see TAYLOR O. MILLER ET AL., *THE SALTY COLORADO* (1986).

45. *Id.* at 24. The dam was closed in 1963, and the filling of Glen Canyon would continue until 1980. COMMITTEE TO REVIEW THE GLEN CANYON ENVIRONMENTAL STUDIES, RIVER AND DAM MANAGEMENT: A REVIEW OF THE BUREAU OF RECLAMATION'S GLEN CANYON ENVIRONMENTAL STUDIES 19 (1987).

46. Friedkin, *supra* note 41, at 31-34.

47. *Id.* See also REMI A. NADEAU, *THE WATER SEEKERS* 243-44 (1974).

48. Recommendations on the Colorado River Salinity Problem, Mar. 22, 1965; U.S.-Mex., Minute No. 218, 21 U.S.T. 2481.

farms could have been purchased outright by the government for a fraction of the cost of the massive rescue projects.⁴⁹

In 1974, after twelve years of machinations, a final agreement was reached.⁵⁰ It depended on legislation to fund bigger and more expensive Reclamation rescue projects. In addition to pipelines, the Bureau was to build a number of unprecedented salinity control projects. The centerpiece was to be the world's largest desalination plant.⁵¹

Eighteen years later, the Yuma desalination plant is ready to begin operations, having been completed at a cost of almost a quarter of a billion dollars, many times the original authorization. And it will cost over \$20 million a year to operate.⁵² In addition, Congress has spent hundreds of millions of public dollars to reduce salinity through other projects built along the Colorado River by the Bureau of Reclamation and the Department of Agriculture.⁵³

The Wellton-Mohawk story is a hideous debacle. The consequences—destruction of water quality, threats to international relations, environmental damage, costly bailouts—were all predictable. As with the series of decisions that laid the foundation for the Aral Sea disaster, decisionmakers were accountable for few consequences of their decisions beyond their narrow mission. For the Bureau of Reclamation, this meant serving the interests of the district's farmers.

Why did the Bureau of Reclamation and Congress persist in their support of the Wellton-Mohawk Project, a ludicrously expensive, Rube Goldberg machine for polluting water? Like the Soviets, they were charged with putting water to work to achieve a single purpose. In this case it was to irrigate a salt-laden valley. They were able to disregard the costs and consequences; indeed, it was uncomfortable and politically unpopular to ask whether the enterprise made sense at all. Problems were "solved" a piece at a time. Each new solution, a combination of money and water, grew a new crop

49. REISNER, *supra* note 41, at 482; *see also* BUREAU OF RECLAMATION, OFFICIAL REPORT ON WELLTON-MOHAWK, CROP PRODUCTION AND WATER UTILIZATION DATA FOR 1991, Sheet 1 of 5.

50. Agreement Confirming Minute No. 242 of the International Boundary and Water Commission, Aug. 30, 1973, U.S.-Mex., 24 U.S.T. 1968.

51. Friedkin, *supra* note 41, at 38-41.

52. RICHARD W. WAHL, MARKETS FOR FEDERAL WATER: SUBSIDIES, PROPERTY RIGHTS, AND THE BUREAU OF RECLAMATION 258-62 (1989) The plant will cost at least \$234 million and its operation and maintenance costs will amount to a projected \$22.4 million per year. All told, the estimated average cost of desalting water will be \$583 per acre-foot. *Id.* at 261-62.

53. MILLER ET AL., *supra* note 44, at 37-45 (1989); DAVID H. GETCHES ET AL., CONTROLLING WATER USE: THE UNFINISHED BUSINESS OF WATER QUALITY PROTECTION 77-78 (1991).

of bigger and tougher problems. The results were predictable and avoidable, but no one had overall responsibility for the effects on the river's water quality, on the environment, and on foreign relations. And money was no object.

Both Wellton-Mohawk and the Aral Sea are public policy disasters created by government officials determined to accomplish a single-minded goal. They pursued only their mission of making the desert bloom. They assumed that water could be manipulated to accomplish that goal. Water was supposed to be a willing slave for whom no task was too great, who would ask nothing and never rebel. The more heroic the task asked of the water, the more difficult the engineering, the more setbacks encountered, the clearer it should have been that the schemes were risky and that the consequences could be severe.

Central Asia is in ruins. Fortunately, the costs of our Wellton-Mohawk blunder are mostly economic, perhaps less than a billion dollars. And it may be salvageable if the government is willing to write-off the sunk costs. Retiring the least economic farmlands, thus ending irrigation of the fields that produce hay and other low-valued crops, would probably let the Bureau mothball the desalination plant before it even opens, still fulfilling the treaty obligation to Mexico, and leaving more water to use in the United States.⁵⁴

III. LOS ANGELES

Los Angeles is the driving force in western water affairs. Figuratively, this is undeniable. L.A. stands for the pull of urban economic power on water now used for irrigation or flowing naturally in streams. But it is true literally, too. Los Angeles—the city and its Southern California neighbors—influences nearly every water decision in the West.

54. MILLER, ET AL., *supra* note 44, at 72-73; GETCHES, ET AL., *supra* note 53, at 78. See also WAHL, *supra* note 52, at 262-68 (discussing other alternatives).

In 1991, more than half of the districts' 65,000 irrigated acres produced low-valued crops (cereals, hay, and seed) at an average yield per acre of about \$550. If retiring this acreage reduced Wellton-Mohawk divisions by one third (assuming the higher valued crops on the other lands use twice as much water per acre) another 137,000 acre-feet of water would remain in the river, largely supplanting the need for the 72,000 acre-feet of de-salted water to dilute Wellton-Mohawk return flows. Looked at another way, the annual operation and maintenance costs of the Yuma desalination plant are \$22.4 million compared to the \$18 million gross value of crops produced on the least productive half of the district's acreage. By this calculus, it would be cheaper for the government to pay the farmers of those lands an amount equivalent to their profits not to irrigate these lands and simply mothball the new desalination plant. BUREAU OF RECLAMATION, WELLTON-MOHAWK IRRIGATION AND DAMAGE DIST., CROP PRODUCTION AND WATER UTILIZATION DATA FOR 1991 (1992).

I arrived in L.A. in 1951. It was a pretty place with real palm trees. But one of the most exciting things about it for a wide-eyed boy, fresh from the drabness of rural upstate New York, was the electric sense of growth and change. The first freeway was in use; the trolley lines were being torn out. Subdivisions were being laid out in orange groves, walnut orchards, and in the fields of truck farmers. Schools could not be built fast enough to keep pace with the growth—I went to fourth grade in a bus garage. Though schools were in short supply, there was plenty of water. Thirty years before, someone made sure that the water supply would accommodate tremendous growth.

The story of L.A.'s raid on the Owens Valley's water, exaggerated only slightly in the movie *Chinatown*, is legendary.⁵⁵ Early in the century, the city surreptitiously bought up most of the distant valley. L.A. also holds the best rights to the huge State Water Project, drawing from rivers at the top of the state.⁵⁶ In shortages like those of the past few years, irrigators are cut off so that the water can flow to L.A.

Perhaps the most intricate and elaborate plumbing system ever designed ties California to six other states who share the Colorado River either physically or legally. The biggest and best claim to the river, however, belongs to Southern California.⁵⁷ The seven Colorado River basin states (California, Arizona, Nevada, Colorado, Utah, Wyoming, and New Mexico) share other rivers they touch with another seventeen states.⁵⁸ Thus, if Southern California puts a heavy draft on the Colorado River, the other states, like Colorado, must draw on another water source to meet their demands, creating a ripple effect across the West's waters.

Very early, L.A. sought water from far away. A miraculous artesian fount⁵⁹ gushing up in the middle of L.A. dwindled as more wells sucked at the source. Towns spread out to cheap lands where the wells still produced plenty of water. Once the wells were in

55. For a detailed description of the conflict, see WILLIAM L. KAHRL, *WATER AND POWER: THE CONFLICT OVER LOS ANGELES' WATER SUPPLY IN THE OWENS VALLEY* (1982).

56. DAVID H. GETCHES, *WATER ALLOCATION DURING DROUGHT IN ARIZONA AND CALIFORNIA: LEGAL AND INSTITUTIONAL RESPONSES* 43 (Natural Resources Law Center, University of Colorado Law School, 1991).

57. On the law allocating the Colorado River, see David H. Getches, *Competing Demands for the Colorado River*, 56 U. COLO. L. REV. 413 (1985).

58. Oregon, Washington, Idaho, Montana, North Dakota, South Dakota, Nebraska, Kansas, Oklahoma, Texas, Missouri, Arkansas, Louisiana, Mississippi, Tennessee, Kentucky, Illinois.

59. See, e.g. Reisner, *supra* note 41, at 64; Kahrl, *supra* note 55, at 25.

pitched competition with one another, it was clear that water might become an impediment to growth. The area has scant rainfall and almost no surface streams. L.A.'s ambitious city fathers looked afar for new sources. They dreamed beyond the imaginations of most mortals and tied up the best rights to water from rivers hundreds of miles away, rights that now dominate little valleys strung north along the Sierra Nevadas.

Los Angeles also controls a plumbing system capable of draining the Central Valley of its native flows, drawing the water away from big farms there, and of tapping into rivers of the far north of the state that extend almost to Oregon. It can insist that people in Colorado, Wyoming and Utah leave water in the Colorado River for them.⁶⁰ And it has the pumps and pipes to distribute that water almost anywhere in Southern California that anyone chooses to plant a subdivision or green up a golf course.

If the existing influence of California's thirst were not significant enough, Congressman Roybal of California proposed a bill to study the feasibility of laying a 1700-mile pipeline under the Pacific Ocean to bring water from Alaska.⁶¹ And in 1992, a Santa Barbara company applied for rights to 350,000 acre-feet of Alaskan water it planned to ship to Southern California using surplus single-hull tankers (idled since the Valdez oil spill).⁶² These plans may sound far-fetched as federal projects, but California is better equipped than most states to get political support to solve its problems. The state now has fifty-four members of Congress,⁶³ more than ten percent of the House of Representatives, as many as fourteen other states combined.

Colorado water decisions respond to California's actual or perceived water demands. Negotiations are proceeding over a California proposal to set up an escrow account and water bank that would provide money payments when California uses more than its share of Colorado River water.⁶⁴ With no established policy on interstate water sharing beyond adhering to the hard formality of

60. Colorado River Compact, Article III(e), *reprinted in* COLO. REV. STAT. § 37-61-101 (1990); *see generally* Getches, *supra* note 57.

61. H.R. 1600, 102d Cong., 1st Sess. (1991).

62. WESTERN STATES WATER (No. 924), Jan. 31, 1992.

63. WORLD ALMANAC AND BOOK OF FACTS 106 (1993).

64. *See* Conceptual Approach for Reaching Basin States Agreement on Interim Operation of Colorado River System Reservoirs, California's Use of Colorado River Water Above Its Basic Apportionment, and Implementation of an Interstate Water Bank, prepared by the State of California for the Colorado River Basin States Meeting (Aug. 28, 1991) (on file with the *University of Colorado Law Review*).

several interstate water compacts, Colorado necessarily has had to negotiate in the glare of public scrutiny, and without the kind of vigorous public debate and give-and-take that would accompany a tax or education proposal. So sensitive is the process that comments outside the negotiations were partly responsible for the discharge of the State Engineer.⁶⁵

Should Denver conserve water? Will Colorado's instream flow protection law⁶⁶ be used to keep rivers full of fish that satisfy anglers and attract tourists? The answer may have less to do with Colorado's benefits than with California's. Westerners have disparaged water conservation as a "brick-in-the-toilet mentality" that simply does not apply to them.⁶⁷ They oppose maintaining streamflows even when Coloradans benefit because, unlike water taken out of the stream, the flowing water could also be used in a downstream state. For years Colorado's substitute for a water policy was a mindless commitment to "develop our compact apportionment" of water, as if building great reservoirs to hold and evaporate all the water Colorado is legally entitled to use were an end in itself.⁶⁸

Some of the water projects Colorado earnestly sought from the United States government would not have achieved goals of producing more crops, getting richer, having a more beautiful state, or making the state a better place for our children to live. They would only have perfected a physical claim on the state's share of water. Among the federal projects authorized by Congress at the behest of Colorado's twelve-term Congressman, Wayne Aspinall, were some that would flood more acreage than they would irrigate and cost as much as \$1.2 million per farm in order to grow hay in high altitude meadows.⁶⁹ It was like a beer drinking contest with a giant. California was consuming its share and we Coloradans would choke ours down even if it killed us. Mercifully, the worst of the projects will not be built.

Decisions in Arizona also are driven by California's demands. A growing Arizona city may buy out a ranch so the underlying groundwater can be mined to support urban expansion. The decision

65. Lori Potter & Andrew Caputo, *Romer's Response to Dissenters: Fire Them*, DENVER POST, Mar. 14, 1992, at 7B; Ken Salazar, *Compact Guards Colorado's Water Rights*, *id.*

66. COLO. REV. STAT. § 37-92-102(3) (1990).

67. RICHARD D. LAMM & MICHAEL MCCARTHY, *THE ANGRY WEST* 190 (1982) (quoting former Utah Gov. Scott Matheson).

68. See D. Monte Pascoe, *Plans and Studies: The Recent Quest for a Utopia in the Utilization of Colorado's Water Resources*, 55 U. COLO. L. REV. 391 (1984).

69. Getches, *supra* note 57, at 450; Colorado River Basin Project Act of 1968, Pub. L. No. 90-537, 82 Stat. 885 (1968) (codified in scattered sections of 43 U.S.C.).

to pump Arizona groundwater may be a result of California's demand for Colorado River water that in turn makes less water available in Arizona.

Agriculture is likely to be the source of water to slake Southern California's burgeoning demand. Whose agriculture will it be? As the nation's largest producer of farm goods, California could choose to remove water from the Central Valley or Imperial Valley or to negotiate with other states (like Colorado) to secure water from irrigators there, trading agriculture for urban growth.

Southern California—more than 34,000 square miles of semiarid desert lands—is rapidly becoming one big megalopolis. Some 4200 square miles are counted within the highly developed metropolitan area.⁷⁰ Over fourteen million people live there.⁷¹ Seventy-eight percent of the water for these people must be imported from afar.⁷² Yet they use it as if it comes from a limitless source. The prescribed lifestyle includes a grass lawn, exotic plantings, and a swimming pool.

Some politicians and editorialists have criticized Southern California's water establishment for inadequately preparing for the recent six-year drought.⁷³ In reality, water officials have succeeded mightily at what they were charged with doing.

Criticism is better directed at the charge that was given, not the result that was achieved. Water officials were never asked to account for the consequences of pretending that water was no object, and that its development was costless. It would have been logical to ask what tradeoffs were involved in perpetuating a myth of abundant water, but no one wanted to hear the harsh truth. Before undertaking unprecedented engineering feats, before sacrificing an established agricultural economy like that in the Owens Valley, it would have been reasonable to ask where these decisions were leading and what the alternatives might be. Before financing and building thousands of miles of aqueducts, did anyone ask where they would lead?

Suppose some visionary decisionmaker in Los Angeles had asked for the "truth," the full story concerning the consequences

70. STATISTICAL ABSTRACT OF THE UNITED STATES 35-37 (1992).

71. *Id.* at 31.

72. GETCHES, *supra* note 56, at 48.

73. See, e.g., Jenifer Warren & Virginia Ellis, *Water Deliveries to Farmers Cut to Aid Fish Conservation: Plan is Designed to Save Threatened Salmon in Sacramento River*, L.A. TIMES, Feb. 14, 1992, at A3. At the time of publication, California's drought was showing signs of abatement, with several massive snowfalls in the Sierra Nevada. Nevertheless, the drought is not "over" until reservoirs refill.

of ordering a virtually unlimited supply of water to be on tap for Los Angeles. Suppose the decisionmaker had grasped the impact of spreading a megalopolis along the dry foothills from San Fernando down to Riverside, west to the cliffs of the Pacific Coast, from the wilds of the Santa Monica Mountains south to the sweltering desert below San Diego. This knowledge could have influenced and altered decisions, perhaps giving Southern California a very different face and feel.

Suppose someone had asked: "Should we keep bringing in an unlimited supply of water to wherever developers may want it? We may find the water, but can we tolerate what goes with it: the transportation problems, loss of the unspoiled coast and mountains, pollution, and the great exposure of people and property to natural disasters?" If concerns like this had been aired it may have led to a development plan that provided housing and transportation and jobs and public services for millions of people, all designed to avoid problems. Of course, that is not the way we think about decisions, now or then, but it is fun to speculate on "the Southern California that might have been."

The Southern California that might have been could include several concentrated urban areas, planned communities with clusters of buildings containing workplaces and homes, tightly developed around a core area. Between those cities might be open spaces, unspoiled valleys and rolling hills where people could hike, bicycle, picnic, and watch and hunt wildlife. There would be some ranches and resorts, but population density would remain sparse outside core cities. The mountains would begin in foothills that today are crammed with residential development where residents now risk periodic flooding and fires. The coastline would be a place of natural beauty and recreation. There would be great vistas instead of the phalanxes of houses that now block passage to—and even a glimpse of—the Pacific.

The sprawl that characterizes the L.A. area gives it a relatively low population density for a major city of the world.⁷⁴ But because everything is spread out without a central core, it has the nation's highest ratio of cars to people, as well as the worst air pollution.⁷⁵

74. WORLD ALMANAC AND BOOK OF FACTS 818 (1993). At 9120 people per square mile, L.A.'s population density ranks 76th among the largest cities in the world and but a fraction of Hong Kong's 247,500, Bombay's 127,000, and Mexico City's 40,000 people per square mile. *Id.*

75. 1989 EPA data showed that Los Angeles had the highest levels of ozone and carbon monoxide in the nation. *Air Pollution: Ozone Standard Violated in 96 Areas; 41 Fail on Carbon Monoxide*, EPA Says, 21 ENV'T REP. (BNA) 815 (1990).

It is an area where passage, and almost every aspect of life, depends on a vast network of six, eight, and even ten lane "freeways," where lines of cars (usually with only a driver inside) crawl along in an eternal traffic jam. One study shows that two-thirds of the urban land is dedicated to transportation.⁷⁶

The people making the earliest decisions about water—people like William Mulholland, Fred Eaton, and Harry Chandler—had a personal stake. They gained hundreds of millions of dollars and considerable power in land speculation.⁷⁷ And they set in motion the growth frenzy that has characterized Southern California for most of this century. Why would they worry about the good of the community and the consequences for other areas?

Once the rapacious developer-politicians took their profits, more rational decisions might have taken hold had it not been for the political fragmentation of the area. "Los Angeles" became not a single city but a jigsaw puzzle of wall-to-wall cities vying for a tax base. Today there are 160 separate cities in Southern California,⁷⁸ but it is impossible to tell where one stops and the next begins. Like the early developers' greed, the cities' independent and competitive spirits have discouraged discussions of long-range consequences and alternatives. When it comes to water, they are interested only in making sure there is enough to support the most lucrative growth that can be squeezed into their boundaries.

IV. LESSONS AND SOLUTIONS

It is too late to have the Southern California that might have been, had water development been delayed long enough for people to reflect on the probable consequences. But it is not too late to take control of future growth and water allocation.

The issue is not a lack of water. Ample water is available to support enough growth to crowd even the most zealous booster. A solution would be to retire some of California's croplands from irrigation. There would be enough water for another seventy million

76. See Sierra Club report entitled, *GREEN STATE OF THE STATE, described in Traffic Endangers State's Future, Two Groups Warn*, L.A. TIMES, Feb. 2, 1990, at A1.

77. REISNER, *supra* note 41, at 63-80; KAHRL, *supra* note 55, at 180-203. Although these men were constantly accused of conflict-of-interest in their water dealings, they were never formally charged.

78. *A Survey of California: Success and Excess*, ECONOMIST, Oct. 13, 1990, at Survey p.16 (appearing as an appendix).

people.⁷⁹ There is also water available for purchase from Colorado, from Indian tribes, and others. The problem is not a shortage of water, it is a shortage of sound policy, a failure to consider comprehensively what will be done with the water and the consequences of doing it.

Southern California must decide whether to trade off more population growth against its lifestyle. More subdivisions with backyards and lawns are possible but available land is far from most jobs. If the land is to be developed to clone more of the towns with invisible boundaries that characterize Southern California, the state will have to sacrifice some of its agriculture to get enough water. There will also be environmental problems and ripple effects felt hundreds of miles and several states away. There will be more freeways to take people from far-flung housing developments to jobs hours from home. Already tens of thousands of people in Southern California commute over 70 miles to work. With this comes a plethora of other consequences, like health-damaging air pollution and even erosion of the communities and families that sacrifice people to hours of commuting.

Alternatively, cities in Southern California might continue accepting more people without spreading out. If so, existing communities must be redesigned and rebuilt. This can be done with no more water, by building more condominiums and cluster developments to replace ranch-style homes. Needs for outdoor recreation can be met with more parks to replace the backyards lost. It is not impossible; Seattle has built some parks over its freeways. The least popular and least likely course for Southern California is to exercise the political will needed to manage and contain future growth. It simply is not consistent with the image of Southern California lifestyle. But plainly, more people cannot fit in the presently developed space without measurable changes in lifestyle. The image is impossible to sustain.

Any acceptable solution for L.A. must come from regional governance and cooperation, an alien concept in the region.⁸⁰ The last time interests in Southern California came together and solidly cooperated was during the first quarter of the century, when they

79. MARC REISNER & SARAH BATES, *OVERTAPPED OASIS: REFORM OR REVOLUTION FOR WESTERN WATER* 33 (1990). Retiring pasture, alfalfa, rice and cotton crops would reduce agricultural income by only 15% and the overall state income by only 0.25%. *Id.*

80. Charles Lockwood & Christopher D. Leinberger, *Los Angeles Comes of Age*, *ATLANTIC MONTHLY*, Jan. 1988, at 31, 54-56.

unified to import Colorado River water.⁸¹ Of course, they were committed to achieving a particular end, not to exploring the wisdom of that end.

No single approach is right for all places and all people. The choice of economies, land use patterns, lifestyles, and the water uses that support them demands a complex consideration of factors, beginning with a deep concern for the nature of the lands and cultures who are subject to the decisions. Water policy disasters are the result of systems that disregard these factors.

Central planners in the former Soviet Union were insensitive to historical experiences of the people of Central Asia who had been growing irrigated crops there for millennia. Huge canals had diverted the Amu Darya's waters by 1000 B.C. Abundant crops were grown in oases and in desert valleys where irrigation was practical. Control of water facilities was a focal point of early political organization.⁸² Some ecological harm had been experienced, especially when wars destroyed irrigation systems and changed run-off patterns.⁸³ The limits of the region's capacity for irrigation also were exposed occasionally by crop failures and depleted soils. Yet the tribal people of the region produced their crops without materially depleting or damaging the Aral Sea, which maintained a thriving fishing industry. People were using land and water and living on the available natural resources without destroying the sea or destabilizing the natural environment until a central decision was made to depart from these successful patterns of resource use.⁸⁴

Is it too late to save the Aral Basin? Some say it is. Just to stabilize the sea at its present level and prevent further destruction would require a fifty-percent reduction in irrigated acreage,⁸⁵ an impossible scenario in an area suffering severe economic distress. But converting farms to food crops with more benign effects on the soil, retiring some lands, rehabilitating irrigation systems, revitalizing small subsistence farms, and attracting industry that does not depend on water are all alternatives to the present course. These measures could relieve the crisis.

Wherever I went in Central Asia, officials and academics assumed that our answer would be "privatization." Market mechan-

81. NADEAU, *supra* note 47, at 192-94.

82. Gregory Gleason, *The Struggle for Control over Water in Central Asia: Republican Sovereignty and Collective Action*, REP. ON U.S.S.R., June 21, 1991, at 11.

83. Glazovsky, *supra* note 7, at 1-2.

84. *Id.* at 2-4; Ellis, *supra* note 8, at 76; Micklin, *supra* note 10, at 1171.

85. Ellis, *supra* note 8, at 92.

isms are being urged as solutions to the American West's water problems.⁸⁶ A New York Times editorial recently opined that the "real" water problem in California "is the failure to allow markets, rather than politicians and planners, to decide who gets what."⁸⁷

Surely, restraints on water transfers and disincentives to economic behavior are to blame for many of the West's water problems; injecting market principles and pricing are essential. Farmers should pay something closer to the true costs of developing and delivering the water. If they can enjoy some profit from transferring water to more efficient uses, there is an opportunity for them and others to prosper.

Solving—or avoiding—problems like Wellton-Mohawk or the Aral Sea could benefit tremendously from free market tools. Central Asians might have achieved some kind of balance between food and fiber production and between agriculture and fisheries, not to mention a balance between lifestyle and production. Farmers in the Wellton-Mohawk District might have been bought out long ago because their farming uses produce a value far less than the costs that were necessarily incurred to keep them irrigating a saline, closed basin. But in both cases the politics of single-purpose decisions prevailed. Intensive agricultural use of water was favored in one case to sustain the symbolism of the Reclamation program and in the other to prove a nation's capacity to produce an exportable surplus. Nevertheless, there was no place in the systems of decisionmaking for the people and interests that were affected.

Simplification of water law to allow the use of economics to solve western water problems was proposed in 1991 by a conservative congressman who introduced a bill for the "Abundant Water Act" to put western water firmly in the free market.⁸⁸ The Act would have overridden all water laws in eleven western states to the extent necessary to subject water and water rights to private ownership and to make it tradeable without government restriction.

86. Professor Terry Anderson advocates changing from supply management to demand management. He suggests that allowing an "open market" that reflects the true price of water is the only way to meet demand. TERRY L. ANDERSON, *Introduction: The Water Crisis and the New Resource Economics*, in *WATER RIGHTS: SCARCE RESOURCE ALLOCATION, BUREAUCRACY, AND THE ENVIRONMENT* 1 (Terry L. Anderson ed., 1983). See also Kenneth D. Frederick, *Overview*, in *SCARCE WATER AND INSTITUTIONAL CHANGE* 1 (Kenneth D. Frederick ed., 1986); THE CONSERVATION FOUNDATION, *AMERICA'S WATER: CURRENT TRENDS AND EMERGING ISSUES* 54 (1984).

87. Peter Passell, *Soaking Lawns, Not Taxpayers*, N.Y. TIMES, Feb. 5, 1992, at D2.

88. H.R. 2687, 102d Cong., 1st Sess. (1991) (sponsored by Rep. William D. Danne-meyer).

To be sure, our system of western water law is imperfect, but all the flaws cannot be fixed simply by declaring a free market in water. It does not follow that changing the system to create an unfettered market in water will make the world or the West a better place. A system based on market economics would improve rationality of water decisions and would anticipate economic consequences to entities involved in a transaction. But it would not necessarily make the system fairer or the outcome better for those not directly involved.⁸⁹ The system needs more pervasive attention in order to consider all of the effects related to water decisions.

V. THE WEST'S QUAIN WATER LAW IN FLUX

An obsession with gold led to the accidental creation of the prior appropriation water law that predominates in the West.⁹⁰ Early California miners embraced a simple first come, first served rule to resolve their disputes. The rule spread across the West. Its convenience, order, and certainty made it a ready-to-wear garment suited for the farmers who followed. When this simple, first-in-time method of allocating rights failed to be a sufficient incentive for investments in irrigation systems, the government stepped in with federal aid to make use of privately held water rights that had been carved out of the western public lands. The Reclamation Act of 1902⁹¹ superimposed a massive subsidy program over arrays of water rights.

Cities were able to use the water rights system to their advantage. Laws embodying the "use it or lose it" ideal were bent to allow cities to plan ahead many years, appropriating water for future populations.⁹² What was denied to mere private parties as

89. An essential problem with water transfers in the West is the failure to consider and account for the interests of third parties. See NATIONAL RESEARCH COUNCIL, NATIONAL ACADEMY OF SCIENCE, *WATER TRANSFERS IN THE WEST: EFFICIENCY, EQUITY, AND THE ENVIRONMENT* 249 (1992); Lawrence J. MacDonnell, *Transferring Water Uses in the West*, 43 OKLA. L. REV. 119 (1990).

90. The basic notion of "first in time, first in right," which controls much of prior appropriation law, was developed by miners in the early West mimicking their own rules for preventing mining claim disputes. 1 WELLS A. HUTCHINS, *WATER RIGHTS LAWS IN THE NINETEEN WESTERN STATES* 159-75 (1971). California, in the case of *Irwin v. Phillips*, 5 Cal. 140 (1855), was the first state to recognize the doctrine of prior appropriation.

91. Ch. 1093, 32 Stat. 388 (1902) (codified in scattered sections of 43 U.S.C. beginning at § 372).

92. *E.g.*, in *City & County of Denver v. Sheriff*, 96 P.2d 836 (Colo. 1939), the court held that a statutory provision gave cities with a population of 200,000 and over the right to appropriate water not only for immediate use, but for an adequate supply to meet reasonable future needs. In *City and County of Denver v. Northern Colo. Water Conservancy Dist.*, 276 P.2d 992, 997 (Colo. 1954), the court stated that "when appropriations are sought by a growing city, regard should be given to its reasonably anticipated requirements."

impermissible speculation was allowed to "great and growing cities" as an exercise in prudence. Agriculture was the rallying cause for construction and public funding of Reclamation projects, but the largest segment of economic value derived from these projects today has come from electrical power generated and water used in cities.⁹³

Though private rights stand out in practice, western state constitutions and laws all recite that water is a public resource.⁹⁴ Usually the same or the next sentence in the law provides that the public resource can be reduced to private possession to the extent it is put to "beneficial use."⁹⁵ In the utilitarian zeal of the nineteenth century the importance of creating private rights eclipsed the importance of preserving public uses. Furthermore, it was in the public interest to give loft to the fledgling economy, and private water rights did just that.

So the inherently public character of water was subordinated to the dominant purpose of expanding mining, farming, and cities. That is changing now. There is a strong reform movement. The mission of water law reform is neither as narrow as boosting the vitality of the market nor as radical as uprooting the present system.

Charles Wilkinson captured the imaginations of western readers in 1991 with his clever eulogy in the *High Country News* for "Prior Appropriation," personified as the grand old man of western water.⁹⁶ His symbolic rites for Prior Appropriation made the point that we are evolving into an entirely new regime for dealing with water. But there is a long way to go.

As a result of its history, what is conspicuously absent in western water policy is a holistic, integrating perspective. Instead of bringing vision to issues, institutions are reductionist, isolating and simplifying water decisions. In the West, our laws make water

93. See, e.g., WAHL, *supra* note 52, at 11-46.

94. See DAVID H. GETCHES, *WATER LAW IN A NUTSHELL* 82 (2d ed. 1990).

95. Many states have provided broad statutory definitions of "beneficial use." In Colorado, for example,

"[b]eneficial use" is that amount of water that is reasonable and appropriate under reasonably efficient practices to accomplish without waste the purpose for which the appropriation is lawfully made and, without limiting the generality of the foregoing, includes the impoundment of water for recreational purposes, including fishery or wildlife.

COLO. REV. STAT. § 37-92-103(4) (1990). Some other state legislatures have not provided statutory definitions, leaving the courts to interpret the term's meaning. See, e.g., *Idaho Dept. of Parks v. Idaho Dept. of Water Admin.*, 530 P.2d 924 (Idaho 1974). For a survey of what different states include in their definitions of "beneficial use," see GETCHES, *supra* note 94, at 98.

96. Charles F. Wilkinson, *West's Grand Old Water Doctrine Dies*, *HIGH COUNTRY NEWS*, Aug. 12, 1991, at 1.

allocation an essentially local or private concern. We follow the consequences of a commitment of water only so far as the next water user. If no other private users are affected, that is the end of the matter. Traditionally, water users—power companies, cities, irrigation districts—have been able to pursue their single-minded goals without thought of what the trade-offs or consequences might be. Los Angeles violates no law, even at the height of a drought, when it keeps golf courses green, slathers cars with suds in automated car washes, or spreads new ranch-style subdivisions with big lawns over the former haunts of the desert tortoise. L.A. need not turn down its taps, because it has great “legal rights” and a magnificent plumbing system; not even when people in Northern California bathe from buckets; not even when farmers in the Central Valley turn to wells that pump so hard the valley floor sinks and aquifers become saltier; not even when people in Colorado, New Mexico, and Utah must curtail water uses to let water flow to California; not even when the result is to destroy recreational uses or to draw river flows so low that fish die.

If the failing of water policy from Ashkabad, to Wellton-Mohawk, to Los Angeles has been a single-minded pursuit of specific goals, the solution is to broaden the interests and the issues that can and must be considered in water decisions. That certainly means major changes in the way decisions are made to build dams, but it goes much farther. Water decisions cannot be merely a private or local concern. There must be a way to bring everyone who has a stake into the decision and to make the decision with as much information, vision, and wisdom as possible. The West needs to build a comprehensive policy, and to make a commitment to general principles in advance of particular decisions. This means suffering the debate and differences of opinion that are inevitably involved.

Throughout the West, we are moving in this direction. Most states require broad considerations of the public interest when new rights are granted and when old rights are put to new uses.⁹⁷ A few states, like Kansas, Montana, and Oregon, have instituted thoroughgoing policy planning processes that ask the tough questions and

97. *E.g.*, the Utah Code provides that the state engineer is directed to reject or limit any application to appropriate unappropriated waters where the approval of the application would prove detrimental to the public welfare. UTAH CODE ANN. § 73-3-8 (1989). Washington has a similar requirement. WASH. REV. CODE ANN. § 90.03.290 (West 1992). Nebraska provides that “the right to divert unappropriated waters of every natural stream for beneficial use shall never be denied except when such denial is demanded by the public interest.” NEB. REV. STAT. § 53 (1988).

address where the state should be going with its future water use.⁹⁸ How much water should be kept flowing? What is the state's position on filling in wetlands? How will transfers of water from one watershed to another be handled? Issues touch the future of agriculture, industry, recreation, wildlife, urban land use, the future of rural communities, and more. They are all part of a water policy and belong in a planning process.

Environmental laws have revolutionized the way water decisions are made.⁹⁹ But federal environmental laws can take decisions away from people who are the most affected, avoiding putting them face-to-face with others who propose to commit water to some new purpose. The water-use decision and the environmental protection decision are separated. Consider the decision on Denver's controversial Two Forks Dam. Water suppliers had a specific mission and they pursued it. The state lacks a process for reviewing the consequences of water projects. Under state law, anyone with a water right can proceed to dam or divert or dry up a stream so long as no other person with water rights complains.¹⁰⁰ But after years of preparation, the Two Forks project was thwarted when its consequences were subjected to review under a federal law that protects wetlands—section 404 of the Clean Water Act.¹⁰¹

Regulations under section 404 opened up a review of the "public interest" in the project and a look at the alternatives.¹⁰² That someone in Washington had to find that Two Forks did not pass muster was distasteful even to Coloradans who agreed with the outcome. Yet Colorado has no way to involve a wide community

98. The Kansas planning process charges the State Water Office with formulating a state water plan which must consider programs and projects emphasizing efficient use, multipurpose reservoir sites, and safeguards for human and animal health through water quality management, existing water rights, groundwater, instream flow protection, habitat protection, and cooperation among different levels of government. KAN. STAT. ANN. § 82a-907 (1989). For a review of water planning, see David H. Getches, *Water Planning: Untapped Opportunity for the Western States*, 9 J. ENERGY L. & POL'Y 1 (1988).

99. E.g., § 404 of the Clean Water Act, 33 U.S.C. § 1344 (1988); Endangered Species Act, 16 U.S.C. §§ 1531-44 (1988 & Supp. III 1991); Wild and Scenic Rivers Act of 1968, 16 U.S.C. §§ 1281-87 (1988); 42 U.S.C. §§ 4321-4370(b) (1988), all discussed in CHARLES J. MEYERS, ET AL., *WATER RESOURCE MANAGEMENT* (3d ed. 1988).

100. In *Irwin v. Phillips*, 5 Cal. 140, 147 (1855), the court held that if a miner chooses to locate on a stream where the waters were already appropriated, "he has no right to complain, no right to interfere with the prior occupation of his neighbor, and must abide the disadvantages of his own selection."

101. 33 U.S.C. § 1344 (1988).

102. The decision to issue a permit is based on an evaluation of the probable impacts, including cumulative impacts, of the proposed activity and its intended use on the public interest. General Policies for Evaluating Permit Applications, 33 C.F.R. § 320.4 (1992).

of interests in a probing analysis of the objectives and consequences of creating demand for water on the Front Range. There is no forum to ask what kind of lifestyle people want, what the decision means for land use, transportation, recreation, agriculture, tourism, education, wildlife, and more. Like L.A., Colorado will not ask the hard questions.

Surely there are encouraging signs. Market-oriented approaches, environmental laws, and reforms in western water law all force a more comprehensive consideration of the consequences of water decisions. The seventy-year water development binge that gave us Wellton-Mohawk and its brethren is over. But the improvements that are underway fall short of the kind of policy quest that I am advocating. They fail to force us to seek out the broad communities of interest that are affected by major water commitments and to press us for tough decisions.

There are strong pressures for improving the capacity of water law to come to grips with alternatives and consequences of water use. So-called water policy reformers¹⁰³ are focused on modest trimming and repair work on the system. They tend to be fixed on palliatives: adding incentives to make water use more efficient, building in some public interest review criteria into water decisions, considering third-party effects of water transfers, and merging water quality control with water allocation. They urge changing reclamation law to improve efficiency and to make project water more easily transferable.

All these so-called reforms are making a difference, and they are tremendously important. But they are neither new nor enough. Reasonable "reforms" have been pressed for years. Nearly all can be traced to the early, landmark work of Gilbert White¹⁰⁴ and others;¹⁰⁵ many are found in the National Water Commission's 1973 report.¹⁰⁶ The ideas are, at last, in the mainstream of western policy, with the central issue being how best to package and incorporate

103. See Greg Hobbs, *Water Use Justifies Non-Injurious Water Quality Alteration: A Response to David Getches, Larry MacDonnell and Teresa Rice*, WATER CT. REP., Summer 1991, at 3 (listing Marc Reisner, Charles Wilkinson, David Getches, and Bruce Driver as "water reformers").

104. See Gilbert White, *A Perspective of River Basin Development*, 22 LAW & CONTEMP. PROBS. 157-84 (1957).

105. See, e.g., GEORGE P. MARSH, *THE EARTH AS MODIFIED BY HUMAN ACTION—A LAST REVISION OF "MAN AND NATURE"* 472-74 (1898); W. J. McGee, *The Flood Plains of Rivers*, 11 FORUM 221-34 (1891) (both of which first recognizing the need for comprehensive river basin management).

106. E.g., U.S. NATIONAL WATER COMMISSION, *WATER POLICIES FOR THE FUTURE*, Recommendation 10-14, at 394 (1973).

them in the existing legal system. But governments still have not confronted the root cause of water problems: the absence of a comprehensive water policy. Such a policy admits that major commitments of water usually commit people and places to extraordinary consequences and it integrates these water decisions with broader social and resource decisions.

VI. TOWARD COMPREHENSIVE WATER POLICIES

Water allocation and water development are pivotal policy decisions. They mark the point at which society can pause to reflect on the alternatives and the consequences of investing a public resource. Introducing market-driven efficiencies, environmental safeguards, and public interest reviews will help cushion the consequences, but may just delay the day of reckoning when we ask why we have let things get so bad. Six years of drought has caused some in L.A. to question the present course. Still, no one is pressing the big questions: "What do we really want for the region? How do we accomplish it? Do we really need more water?"

A. *New Institutions*

Realization of a comprehensive, integrated approach to water policy requires new institutions that respond to wide communities of interest. Regional and international bodies must be formed with the mandate of integrating water decisions and their consequences with the aspirations of society in the area affected by the decision. The boundaries of watersheds should be the presumptive starting point, and we should look outward from there.

Throughout the West, problems cry out for multi-interest solutions. Regular institutions are needed that span jurisdictions and include more interests. For instance, the Colorado River basin must have a forum or authority that brings together all the parties affected by commitments of the river.¹⁰⁷ States, tribes, environmentalists, recreational users, electrical power interests, irrigators, and others should struggle together to craft long term, sustainable policies.

Basinwide, multi-interest decisionmaking is difficult but not impossible. The Columbia River basin has the Pacific Northwest

107. See David H. Getches, *A Colorado River Basin Authority: Opportunity for Sharing River Basin Management and Resources*, in *BOUNDARIES AND WATER: ALLOCATION AND USE OF A SHARED RESOURCE* 24 (Natural Resources Law Center, University of Colorado Law School, 1989).

Electric Power Planning and Conservation Act.¹⁰⁸ A governing council tries to deal with problems of hydroelectric power created by the great dams on the river system: Indian fishing rights, endangered salmon, and energy conservation. They are beginning to confront the problems of pollution from logging and farming and of irrigation diversions. It is a start toward comprehensive, multi-jurisdictional policymaking and implementation.¹⁰⁹

Indian water settlements have gotten parties to set aside old animosities and fears and catalyzed a process to deal with multiple issues even without setting up permanent institutions.¹¹⁰ The most significant example is the historic Pyramid Lake Paiute settlement on the Truckee River.¹¹¹ The Truckee was the victim of a century of ad hoc decisions and unsolved problems: appropriations of water under state law; a notoriously wasteful Reclamation project; a wildlife refuge formed by wastewater from irrigation; a huge desert lake shrinking away and becoming saline; two endangered species of fish; dozens of lawsuits over Indian water rights; an interstate dispute; and great uncertainty over the future availability of water for municipal growth. So the diverse stakeholders gave up on "the system" and crafted their own solution. Two states, two tribes, growing cities, federal agencies, environmentalists, a power company, and a variety of water users all had a stake in the allocation of Truckee River waters. With the tenacity and leadership of the Pyramid Lake Paiute Tribe and its attorney, they negotiated hard and came away with something.¹¹² They worked out a sensible way to confront the future.

How inclusive should institutions be? City water departments, irrigation districts, and the Bureau of Reclamation all have mandates too narrow to leave them with ultimate authority over any major water decision. A plan or project or major allocation of water has broad public importance and should involve all those who are affected. It should ideally include the entire community of interest influenced by a plan or policy.

108. 16 U.S.C. § 839b (1988).

109. John M. Volkman & Kai N. Lee, *Within the Hundredth Meridian: Western States and Their River Basins in a Time of Transition*, 59 U. COLO. L. REV. 551, 562-65 (1988).

110. John A. Folk-Williams, *The Use of Negotiated Agreements to Resolve Water Disputes Involving Indian Rights*, 28 NAT. RESOURCES J. 63 (1988).

111. Fallon-Paiute Shoshone Indian Water Rights Settlement Act of 1990, Pub. L. No. 101-618, 104 Stat. 3289 (1990) (codified at 16 U.S.C. § 668d & note; 43 U.S.C. § 614 note).

112. Bonnie Colby et al., *Mitigating Environmental Externalities Through Voluntary and Involuntary Water Reallocation: Nevada's Truckee-Carson River Basin*, 31 NAT. RESOURCES J. 757 (1991).

The consequences of Los Angeles's decisions—the many overlapping communities of interest—reach as far as the headwaters of the river systems that feed it, and beyond to the other communities who depend on or compete for the same waters in half the states in the lower forty-eight. The communities may include a farmer growing crops in the Central Valley, a Las Vegas casino buying electricity, a family floating through the Grand Canyon, a fisherman on the Gunnison River, skiers at Keystone, and an Indian tribe seeking drinking water for its Colorado reservation.

“Communities” also include wily trout and endangered squawfish, noble salmon, and lowly brine shrimp. They include eagles and whooping cranes and ducks. The networks of dependence on Los Angeles's water decisions extend from the melting snows on mountaintops to ancient lakes, to deltas and estuaries never seen by L.A. residents. Those networks connect with other cities and farms taking water from the same sources. The networks of dependence follow people who use or only visit these areas. And they follow the migratory patterns of birds and fish that range to the Northwest and the Southwest, to Canada and Mexico, to Alaska, Japan and to the Commonwealth of Independent States.

B. *Long Range Goals*

“Policy” should be stated in terms of broad, long-term goals. A water policy, thus, should not be “to preserve and protect existing rights,” but should be in terms of society's goals. Those goals should be more inclusive than “to promote agriculture,” or “to accommodate urban expansion.” Imagine an economic policy or foreign policy or air quality goal so simplistic and narrow. Plainly, there are multiple effects to be assessed, and there must be multiple objectives to be coordinated within any water policy. A comprehensive policy seeks to achieve ends like economic security and stability, ecological integrity, and a satisfying quality of human life.

Emerging governments in Ashkabad, Tashkent, and the capitals of other Central Asian states should not go ahead with plans for a project to irrigate new farmlands or to rescue their ailing cotton industry without looking at the alternatives and consequences, or considering some far-reaching questions. They must ask what they ultimately want from a new irrigation project. The answer should not be simply “more irrigated land” or “more farm products.” It ought to be something like “adequate resources to support our people sustainably.” They must ask whether food crops make better sense than cotton, whether agriculture should be phased down in

favor of, say, mining and industrial expansion, what the effects will be on nonrenewable resources, and whether a population control program will be necessary in any event.

Every major decision is an opportunity to ask what we are trying to accomplish with water, and whether the goal could be properly accomplished in other ways. The epitome of this approach is the 1968 report of a National Academy of Sciences panel¹¹³ suggesting that education might be a wiser investment of public money in Arizona's economic expansion than the behemoth Central Arizona Project (CAP). Of course, such an alternative was never seriously considered; the finishing touches are now being put on the CAP.

C. *Alternatives and Consequences*

Major water commitments should trigger a thorough examination of alternatives and consequences. As water development becomes more difficult and expensive we should pause longer and think harder about its consequences. Water policy should not simply be the handmaiden of the proponents of growth and development. It should search and account for the consequences of each new decision that gives information back to decisionmakers who are politically responsible to the public.

Los Angeles, forced by the cyclical reduction in water supply that they call a drought,¹¹⁴ should use the occasion to think beyond desalination plants, rate increases, and schemes to lease farmers' water rights. Before heroic efforts are made to change existing economies or alter even further the natural order, the ostensible "water problem" could be an occasion to ask questions the Mulhollands and Chandlers would not ask: What kind of lifestyle do we want in twenty or fifty years? Where should the undeveloped lands—mountains and beaches—begin? Will our grandchildren have a chance to see condors? How many more people can live here?

113. NAT'L ACADEMY OF SCIENCES, PUB. NO. 1689, WATER AND CHOICE IN THE COLORADO BASIN 59-62 (1968).

114. In fact, data based on tree-ring studies show that far more frequent and more severe drought events are typical of the region than the flow regimes experienced in the decades since most population growth occurred. The average virgin flow spanning more than 400 years is only 13.5 million acre-feet while recorded flows since 1922 have averaged 14.4 million acre-feet. See GETCHES, *supra* note 56, at 5, 13 n.5. Furthermore, in 11 of the last 60 years, there have been lower flows than the 10.3 million acre-feet of average flow during the four-year drought from 1988-1991. FORTY-THIRD ANNUAL REPORT OF THE UPPER COLORADO RIVER COMMISSION 22-23 (1991).

This principle requires that the laws and policies being written by the emerging states of Central Asia grapple with the major issues that are implicated by water use and development: land tenure, water allocation, economic policy, health, environmental quality, and international relations. A discussion of how to manage the Amu Darya opens up fundamental policy issues for these new nations. It will require regional cooperation, across state (formerly republic) lines and across international boundaries with Afghanistan and Iran.

CONCLUSION

Los Angeles is only a metaphor, one that stands for sprawling metropolises throughout the West. Phoenix, Tucson, Las Vegas, Salt Lake City, Albuquerque, and Denver all are guilty of committing water to undisciplined growth, without hesitating to ask why and what they really aspire to be. They pursue more and more water to support thousands of square miles of houses surrounded by Kentucky bluegrass, which in turn must be linked by highways to shopping malls and distant workplaces, which in turn are traveled by hundreds of thousands of pollution-belching cars, and so on. And the water itself, the water that makes all this possible, is taken away from streams that once teemed with fish, from farms that have turned to dust, from Indian reservations that never got a chance to develop water for their own uses, and from small towns that had viable economies until the cities drew away their water.

Political leaders and members of the public alike assume that water matters are surrounded with difficult technical issues requiring special knowledge. Citizens and officials have abdicated responsibility for major water decisions to cliques of "water experts." This effectively promulgates a policy by default. Because the consequences of water decisions can pervade economies and lifestyles across entire regions and generations, water policy should belong to everyone and reflect a conscious choice. From Ashkabad, to Well-ton-Mohawk, to Los Angeles, water policy should no longer be made by default.

