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Carol D. Angel

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and property—which neither makes sense to the living systems of which they are all part, nor to the people who live in them.

DAVID M. GILLILAN AND THOMAS C. BROWN, INSTREAM FLOW PROTECTION: SEEKING A BALANCE IN WESTERN WATER USE, Island Press, Washington D.C. & Covelo, California (1997); 417pp.; \$30.00; ISBN 1-55963-524-X, softcover.

REVIEWED BY CAROL D. ANGEL²

The authors tell us that they intended, in writing this book, "to provide readers with a comprehensive understanding of the many issues surrounding instream flow, and to shed new light on a poorly understood but very important natural resource topic."³ This is a lofty and laudable goal: instream flows are certainly at the heart of many water use issues in the West today. A comprehensive, balanced analysis would be useful to a broad range of interested parties, from local, state and federal officials, to private water users, to environmental organizations, to the public at large. This book is a start, but unfortunately not a finish.

In many areas, the authors have indeed been comprehensive, painstakingly cataloging the full range of state and federal approaches to protection of instream flows. This volume pulls together a wide range of information in one accessible format, which is helpful as an introduction to the subject of instream flows. Because the book's thorough approach inexplicably vanishes in several key areas, however, it cannot offer a comprehensive understanding of the issues. Specifically, the book fails by refusing to look squarely at opposition to instream flow protection; and by glossing over the uncertainties in the science supporting the need for and quantification of instream flows, which has been the crux of several recent instream flow controversies.

The book's first two chapters are promising. After a brief introduction, the authors provide a clear, concise, and balanced summary of the development of water law and water use in the western United States. The discussion is simplified enough to provide a reader coming to the subject cold with a basic understanding of western water law,

2. Senior Assistant Attorney General, Federal and Interstate Water Unit, Colorado Attorney General's Office. The reviewer represented the State of Colorado in opposing federal claims for National Forest instream flow reserved rights in Colorado Water Division 1 (the South Platte basin) and is now representing Colorado in ongoing settlement negotiations for similar claims in Water Divisions 2, 3 & 7 (the Arkansas, Rio Grande, and San Juan basin). The opinions expressed in this review, however, are solely those of the reviewer and do not represent any official position of the Attorney General's Office.

3. DAVID M. GILLILAN & THOMAS C. BROWN, *INSTREAM FLOW PROTECTION: SEEKING A BALANCE IN WESTERN WATER USE* 4 (1st ed. 1997).

yet well-documented so that details can be explored through use of the references. Even though the chapter is titled, "The Loss of Instream Flows," it commendably avoids condemning the 19th century with 20th-century hindsight, and instead explains the aridity of the West and the social, economic, and political climate that created both the prior appropriation doctrine and diminished instream flows. Only toward the end of the chapter does one of the book's besetting sins surface for a moment—broad factual statements without support or reference. Statements in this chapter (and sprinkled throughout the rest of the book) refer to dry and nearly dry rivers throughout the West.⁴ One statement goes so far as to list specific major rivers that are "dry or virtually dry,"⁵ yet the only reference provided is for *one* of the half-dozen examples. In all probability, the authors' factual assertions are correct, but it is inappropriate simply to have to take their word for it.

This lack of precision and documentation detracts from the book's credibility, and increases lamentably in Chapter Three. After describing the historical water development that has depleted instream flows, the authors turn to describing the different functions served by instream flows. The chapter is divided into two parts, first qualitatively describing general instream flow purposes, and then discussing quantification of flows for the various purposes. This is a useful effort, and appears to be an exhaustive list of possible instream flow needs. But the descriptions are maddeningly general and poorly documented. Entire paragraphs of assertions concerning the relationship of flow to fish food sources, dissolved oxygen, or spawning beds roll by without any references. Not only must we again take the authors' word that they know what they are talking about, but also the reader is left with no idea where to start looking for more detailed information to supplement a one-page summary of a complex scientific issue.

The trend continues in the second half of the chapter, concerning quantification methods. Many factual assertions are made without support, and methods are sketchily described⁶ and uncritically presented. The authors are quite capable of providing proper documentation, as shown by their meticulously footnoted discussions of aesthetics⁷ and hydropower.⁸ This chapter's overall lack of adequate supporting authorities and critical review does not provide readers with "the best available information" on this complex subject, even though the authors acknowledge that such information is necessary.⁹ More important, these topics are some of the most disputed issues in instream flow protection. The adequacy of the scientific basis for the need for particular instream flows and the accuracy of the determination of quantities of instream flows needed are often at the heart of in-

4. *E.g., id.* at 32, 40, 50.

5. *Id.* at 40.

6. *Id.* at 83 (discussion of riparian vegetation).

7. *Id.* at 58-60.

8. *Id.* at 64-70.

9. *Id.* at 306.

stream flow controversies.¹⁰ In my experience, the current issues concerning instream flows tend to focus more on proof, quantities, and locations, rather than on philosophical objections to the concept. By failing to understand these controversies and the resultant need for complete and accurate information on the scientific basis for instream flows, Gillilan and Brown fail to provide the reader with the promised "comprehensive understanding of the issues" surrounding instream flows.

Sprinkled throughout this generally frustrating chapter are some thoughtful discussions of complex issues. As mentioned, the discussion of possible instream flow needs is wide-ranging, including such often-overlooked uses (in the West, at least) as navigation. The authors provide a short but clear explanation of the difference between natural instream flows and regulated instream flows, and a balanced discussion of the use of regulated flows from dams to provide instream flow benefits.¹¹ Several times they acknowledge potential conflicts between different instream flow purposes.¹² Yet the authors do not seem to recognize their own inconsistencies, such as the confusing and contradictory discussions of the *benefit* of vegetation within or adjacent to the channel for fish "cover,"¹³ the *beneficial*, erosion-reducing effect of riparian vegetation on the flood plain or in the stream channel,¹⁴ the need for high flows to clear banks of vegetation for easy fishing access,¹⁵ and the channel maintenance *detriment* of encroaching vegetation which reduces erosion in stream channels.¹⁶ Further, because all the above discussions are without any supporting references, there is no place to go for clarification.

In several segments of Chapter Three, the authors also begin to discuss the economic value of instream flows, leading into Chapter Four. That chapter is entitled, "How Much Water Should Be Left In Streams?" The question is never clearly answered, as the chapter degenerates into a muddle of economic jargon and graphs.¹⁷ On the way to the chapter's inconclusive conclusion, there are some basic, understandable points. Instream flows have value, and may be more valuable than current off-stream uses of water. Instream flows (and indeed, all water uses) have both negative externalities (costs or losses suffered by people who are not parties to and do not control water use decisions) and positive externalities (benefits enjoyed by people who

10. Examples include controversies about water needs of Columbia River salmon, *id.* at 244-48, endangered fish in the Colorado River, *id.* at 275-76, whooping cranes in Nebraska, *id.* at 276-77, and stream channels in the national forests, *id.* at 190-93.

11. *Id.* at 63-64.

12. *Id.* at 51, 57, 69-70.

13. *Id.* at 46.

14. *Id.* at 54.

15. *Id.* at 58.

16. *Id.* at 74.

17. Unless the answer is, "the point at which the net benefit of instream flow is maximized, signified by Q_{opt} [on the accompanying graph]." *Id.* at 109. This less than helpful statement is literally the last clause of the last sentence of this chapter.

are not parties to and do not control water use decisions, and who are hard to track down and make pay for the benefit). Water use is complex and there are high transaction costs in transferring water from one use to another. These points seem well-supported, although the comparison of instream flow and off-stream use values would be more convincing if there were comparisons to higher-value municipal and industrial uses instead of just agriculture, since instream flows have been asserted against such uses.¹⁸ These economic considerations provide a useful context for determining the need for, and methods of, instream flow protection.

In the rest of Chapter Four, however, the authors launch into an argument that "special measures" are necessary to protect instream flows. It is nowhere clear what "special measures" means. Their discussion of this topic is the first appearance of the second, and most striking, flaw in their approach—the failure to address real, as opposed to speculative, criticisms of instream flow protection. They start out by purporting to address "three arguments that have been made against special protection measures."¹⁹ These arguments are not attributed to anyone or any source, and are apparently straw men created by the authors. Somewhere in the West there may very well still be people asserting that all instream flows are waste; that no instream flow protections are needed because the existing water use regime of senior rights will guarantee that water is always in streams; or that free water markets will solve all instream flow needs. If so, they should be identified, and their arguments presented in their own words. In any case, the authors' rebuttal of these points does not clearly connect with their argument that special protective measures are justified. Their final point—that markets may not work, is the most easily understandable, and has some merit. But it is inconsistent with their later criticism of states' refusal to create unlimited private instream flow rights or a free market in instream flow rights.

Chapters Five and Six are relatively straightforward, discussing the various methods adopted by the western states to address instream flow protection. They essentially update, and cite heavily to, the 1993 survey of instream flow protection from the Natural Resources Law Center.²⁰ This provides a comprehensive and useful summary, but not without the usual flaws—some discussions without support,²¹ and a failure to understand all facets of the issues. For example, federal interests are reported without editorializing, while state concerns are placed in unattributed quotation marks to indicate disagreement.²²

18. *E.g., id.* at 152-53, 304 (Mono Lake case) and *id.* at 209-12 (Cache la Poudre bypass flows controversy).

19. *Id.* at 97.

20. LAWRENCE J. MACDONNELL & TERESA A. RICE, EDS., *INSTREAM FLOW PROTECTION IN THE WEST* (revised edition, Natural Resources Law Center, University of Colorado School of Law, Boulder, 1993).

21. *E.g.,* GILLILAN & BROWN, *supra* note 3, at 119 (Colorado instream flow law), and *id.* at 125-26 (Colorado Water Conservation Board Instream Flow Donation Program).

22. *Id.* at 128.

Chapter Seven is without question the worst chapter in the book, purporting to analyze the effect of instream flows on other water uses. The first problem is the placement of the analysis. The book discusses *all* instream flow protection methods, from state-created water rights, to federal reserved water rights, to public trust conditions, to a wide range of federally-imposed regulatory water use controls. Yet this key analysis, purporting to show that instream flows have no potential for harming senior water uses and little potential for harming junior uses, is placed after the discussion of state-created instream flow protection, but *before* the three chapters describing the many federal methods of instream flow protection. It speaks only of instream flow "rights" and does not discuss at all the instream flow demands made through antedated federal rights or regulatory authorities against *senior*, established water uses. Contrast this with the authors' frank discussion in their concluding chapter, where instream flow protection methods are set out in a table and characterized by whether they can be "imposed on unwilling parties,"²³ and where the authors expressly acknowledge that they are advocating reallocation of existing water rights and water uses to instream flows.²⁴

The flaws in this analysis are compounded by the failure to consider the geographic extent of various instream flow protection methods. First, the analytical framework is inaccurate. The effect of instream flow rights is analyzed in a series of tables, describing effects on upstream senior and junior rights; and downstream senior and junior rights. But instream flow rights cover *reaches* of streams, so there should be a third category, describing effects on those rights diverting within the instream flow reach. This category is the hardest-hit, because even off-stream uses that are minimally consumptive (domestic use, for example, or storage in a reservoir for releases to be used far downstream) may be limited or eliminated entirely if located within a designated instream flow reach.

Second, the analysis is not grounded in reality. Throughout Chapter Seven, the authors emphasize that instream flows are non-consumptive, resulting in "the absolute loss of water for consumptive purposes only where the instream right is located so far downstream that diversion below the instream reach is not possible, as when an instream flow right is located just above a river's outlet to the sea."²⁵ This statement is true in the abstract. Instream flow reaches, however, can be long or short, and instream flow demands can be made downstream of hundreds, if not thousands, of established water uses, particularly when federal regulatory requirements are considered.²⁶ A review of the possible instream flow purposes listed in Chapter Three gives the

23. *Id.* at 298-99.

24. *Id.* at 304-05.

25. *Id.* at 167.

26. For example, demands for water under the Endangered Species Act for habitat hundreds of miles downstream in Nebraska have been asserted against water uses in the Colorado Front Range. *Id.* at 211, 276-77.

clear impression that instream flow claims under various state or federal authorities can be made for substantial quantities of water on virtually every stream mile in the West. The potential for "absolute loss of water for consumptive use purposes" is real. Further, water uses are not fungible. If the City of Greeley has to forego water to satisfy a Forest Service or Fish and Wildlife Service instream flow requirement, it is no help to Greeley residents if that water is still available to a city in Wyoming or Nebraska.

Thus, because they do not address all of the possible methods of instream flow protection or the potential geographic scope of instream flows, the authors' cheery reassurance that "the existence of an instream flow right is not likely to have any adverse impact on most other water users,"²⁷ is either naive or disingenuous. This is all the more frustrating because the latter half of Chapter Seven, explaining the effect of instream flows on limiting the flexibility of water use by preventing water rights transfers, is clearly and fairly explained.

The next three chapters deal with federal instream flow rights and other federal regulatory authorities or activities affecting instream flows. In general, they present a thorough and comprehensive summary, hitting all the major points. Again, the references and authorities could be much more complete and consistent. These chapters could also have used a tough editor to restore professionalism and eliminate bias. Federal interests and motives are explained with sympathy, even to the point of telling us, for example, what a federal agency "understood"²⁸ or that it was "surprised" at the outcome of litigation.²⁹ In contrast, objections to federal actions are reported brusquely, often placed in sarcastic quotation marks to indicate how foolish the authors think they are.³⁰ Reams of law review articles have been written on the *United States v. New Mexico*³¹ case, from a wide spectrum of viewpoints, yet the authors chose to cite only one, criticizing the decision. Nevertheless, these chapters do the job they set out to do.

The concluding chapter, however, sets us back to square one. It is primarily a recap of the need for instream flows, combined with the authors' puzzled speculations about why anyone would oppose such a laudable goal. Ultimately, they attribute opposition to fear and ignorance, opining that it is "easy to fear, reject or ignore that which is not known."³² This would have been a far better book if the authors had considered the application of this statement to themselves. The vast majority of the book's discussions of opposition to instream flows are completely without references or attribution. Yet volumes have been written from all perspectives (including some that are highly critical)

27. *Id.* at 167.

28. *Id.* at 189.

29. *Id.* at 191.

30. *E.g., id.* at 210, 284.

31. *United States v. New Mexico*, 438 U.S. 696 (1978).

32. GILLILAN & BROWN, *supra* note 3, at 302.

about federal instream flow reserved rights, federal "non-reserved rights," the public trust, and the interaction of federal regulatory statutes and water uses.³³ If the authors had trouble finding written materials, they could have done what they did so effectively to flesh out their discussions of state and federal instream flow programs—pick up the phone and talk to someone. Without an exploration of real as opposed to imagined problems with specific methods of instream flow protection, this book is incomplete. The neophyte who relies on it as a blueprint for analyzing instream flow protection will be blindsided by real water users with real, practical concerns about the effects of instream flows. The experienced practitioner will find it a thorough catalogue of flow protection methodologies and needs, but one which adds little to understanding the overall issues.

This review should not be read as opposing instream flows. As mentioned above, I think the current issues concerning instream flows are more a matter of *how*, and *how much*, rather than whether they can or should be protected at all. This review results mostly from dashed expectations. The authors obviously put a great deal of work into this book, and it had great potential to be a useful, authoritative introduction, informing the continuing debate on this subject. The path necessary to redeem the book's flaws seems basic and obvious, and it is disappointing that it was not taken.

33. E.g., Bennett W. Raley, *Chaos in the Making: The Consequences of Failure to Integrate Federal Environmental Statutes with McCarran Amendment Water Adjudications*, 41 ROCKY MTN. MIN. L. INST. 12-1 (1995); Wendy Weiss, *The Federal Government's Pursuit of Instream Flow Water Rights*, 1 U. DENV. WATER L. REV. 151 (1998).