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Why Waste Water? A Bifurcated Proposal for Managing, Utilizing, and Profiting from Coalbed Methane Discharged Water

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WHY WASTE WATER? A BIFURCATED PROPOSAL FOR MANAGING, UTILIZING, AND PROFITING FROM COALBED METHANE DISCHARGED WATER

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The Coalbed Methane ("CBM") industry is booming throughout the Rocky Mountain West, creating a relatively clean energy alternative, much needed jobs in the region, and a deluge of water pumped from the ground in connection with CBM capture. In order to free the valuable natural gas, companies must first pump out substantial quantities of subsurface water holding the pressurized gas in place. This water varies in quality, from perfectly useful, potable water to poor-quality water with the potential to destroy the surrounding environment. Correspondingly, disposal of the pumped water varies from simply releasing it into streams surrounding the CBM pads to reinjecting it back into subterranean aquifers. Most importantly, aside from the imprecise, general protections of the Clean Water Act, no current legal system covers this sizeable new source of water.

This Comment advocates using the framework of the Clean Water Act to distinguish between poor- and high-quality water, with an emphasis on creating a comprehensive regional system to maximize the utility and profitability of the high-quality water. More specifically, the Comment uses the Powder River Basin of Wyoming as a case-study to argue that states should implement a water bank or water storage system that collects high-quality water discharged from CBM wells and sells it on an open market. Profits from such water sales would first go towards paying infrastructure and operating costs, followed by a significant portion towards environmental restitution of the areas impacted by the CBM industry. The remaining profits would be returned to the CBM companies, providing an incentive to participate in the program and even clean some of the poor-quality water pre-

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viously reinjected in order to make that water eligible for the program. By establishing such a program, all parties involved in the CBM process stand to benefit, including the state, the energy companies, the environmentalists, and the residents forced to endure the negative externalities of CBM mining.

INTRODUCTION

With oil prices fluctuating wildly, increasing uncertainty over foreign energy supplies, and climate change turning national focus towards clean energy, domestic demand for natural gas has skyrocketed.[1] Nowhere is this nationally revived focus on natural gas more evident than in the expansion of Coalbed Methane ("CBM") wells throughout the Rocky Mountain West.[2] CBM gas represents the natural byproduct gas created during solid coal formation; it is trapped subsurface along with the hard coal, waiting for withdrawal and utilization as efficient natural gas energy.[3] But, for all its positives, CBM mining is not without its costs; CBM mining creates regional inequities because residents neighboring mines must deal with the negative externalities of mining while far distant consumers benefit.[4] This current alignment of disproportionate burdens is entirely unnecessary, however, and transforming these negative

1. The Energy Information Administration predicts continued increases in natural gas production and price. ENERGY INFO. ADMIN., U.S. DEP'T OF ENERGY, ANNUAL ENERGY OUTLOOK 2007 at 89–94 (2007), *available at* http://www.eia.doe.gov/oiaf/archive/aeo07/pdf/0383(2007).pdf.

2. Dry natural gas production in Colorado, Utah, and Wyoming increased fifty-seven percent from 2000 to 2006. ENERGY INFO. ADMIN., U.S. DEP'T OF ENERGY, SHORT-TERM ENERGY OUTLOOK SUPPLEMENT: NATURAL GAS IN THE ROCKY MOUNTAINS: DEVELOPING INFRASTRUCTURE 1 (2007), *available at* http://www.eia.doe.gov/emeu/steo/pub/special/Rockies_NatGas_2007.pdf. The Rocky Mountains provide eighty percent of the nation's CBM. Gary Bryner, *Coalbed Methane Development in the Intermountain West: Producing Energy and Protecting Water*, 4 WYO. L. REV. 541, 542 (2004).

3. *See* Kim McGuire, *Gift or Curse: "No One is Neutral" in Water Fight*, DENVER POST, Aug. 12, 2007, at A1, *available at* http://www.denverpost.com/search/ci_6603026 [hereinafter McGuire, *No One is Neutral*].

4. *See* Kim McGuire, *Gift or Curse: Liquid Friction: Battle Shaping Up over Water Quality*, DENVER POST, Aug. 14, 2007, at A1, *available at* http://www.denverpost.com/search/ci_6616176 [hereinafter McGuire, *Water Quality*]. For example, properties in the La Plata region of Colorado with wells on them lost twenty-two percent of value. BBC Research & Consulting, Measuring the Impact of Coalbed Methane Wells on Property Values 1 (Greystone Environmental Consultants, Inc., Nov. 12, 2001), (working paper, *available at* http://co.laplata.co.us/pdf/plan_doc/final_impactrpt/final_ir_appb.pdf).

externalities into regional assets for those in mining-intensive areas is quite possible.

Specifically, inequities result from the massive amounts of water that must be withdrawn to reduce the subsurface pressure holding the methane in place, thereby freeing the valuable natural gas for pumping to the surface.[5] As will be discussed in greater depth to follow, the byproduct water of CBM mines creates considerable environmental consequences, despite its relatively good quality in many areas.[6] Currently, states vary in their management of CBM water, but no state has found a tenable solution that satisfies all parties.[7] Ranchers maintain that the discharged water ruins their land and resources, conservationists lament the unnecessary depletion of aquifers, and CBM producers tire of unpredictable regulations and wasteful discharge of potable, and therefore profitable, water. [8] Indeed, as Bureau of Land Management Deputy Assistant Secretary Tom Fulton observed in a statement to Congress, the different parties and interests "must work together to find innovative solutions to address the surface water issues and the potential impacts to the entire land and water system."[9]

A bifurcated approach that distinguishes between low-quality, unusable water and high-quality, usable water offers just such a solution. This proposal advocates turning to the Clean Water Act ("CWA") to both define and then manage water that is high in pollutants.[10] The CWA has addressed and fixed many water pollution crises since its inception,[11] but its current application to CBM discharged water has not solved

5. *See* McGuire, *No One is Neutral, supra* note 3.

6. Pennaco Energy, Inc. v. U.S. Dep't of Interior, 377 F.3d 1147, 1158 (10th Cir. 2004).

7. *Id.*

8. *Id.*; *see* McGuire, *Water Quality, supra* note 4.

9. *Pennaco Energy, Inc.*, 377 F.3d at 1158 (quoting *Hearing Before the H. Resources Comm. Subcomm. on Energy and Mineral Resources on Coalbed Methane Development*, 107th Cong. (2001) (statement of Tom Fulton, Deputy Assistant Secretary, Bureau of Land & Minerals Mgmt., Dep't of Interior)).

10. Clean Water Act, 33 U.S.C. §§ 1251–1387 (2000).

11. CLAUDIA COPELAND, CONGRESSIONAL RESEARCH SERV., ISSUE BRIEF 10069, CLEAN WATER ACT ISSUES IN THE 107TH CONGRESS 2 (Nov. 25, 2002), *available at* http://assets.opencrs.com/rpts/IB10069_20021125.pdf. "The Act has been viewed as one of the most successful environmental laws in terms of achieving its statutory goals, which have been widely supported by interest groups and the public, but lately some have questioned whether actions to achieve further benefits are worth the costs." *Id.*

the myriad of existing, CBM-specific problems.[12] Without going into depth yet, this Comment does not propose using the CWA to manage all CBM water; instead, it advocates using the CWA's established pollution criteria to distinguish between polluted water and good, clean water. Indeed, the CWA would continue to govern poor-quality water, but the innovative aspect of this Comment lies in its treatment of the high-quality water, the large majority of which is simply being wasted under current management. High-quality water from CBM mines would join a state or federally operated water bank, which would then sell water in an open market. Proceeds would first cover system operating costs, with the remainder reimbursing mining companies for their participation and aiding areas adversely affected by CBM production.

Establishing a comprehensive regional management regime can become profitable and internalize the aforementioned mining externalities. A bifurcated system that distinguishes between poor- and high-quality water could effectively limit the negative consequences of byproduct mining water and promote efficient water use, benefiting regional economies and the people dependant on them. A strategically positioned water bank would both minimize the adverse consequences of discharged water, such as aggregated salt, sodium, or unnatural downstream flows, and generate revenues for the local economy through water sales.

This Comment first presents a background of modern CBM mining, focusing on the Powder River Basin because of its relatively good-quality water and high current rate of development.[13] After introducing the bifurcated system that separates poor-quality water from usable water, it examines treatment under the CWA. The Comment concludes by proposing a water bank to manage high-quality discharge. It first discusses transportation to the reservoir, then management of the water, including profit sharing with mining companies, conservation set-asides, and market potential. It concludes with an examination of some potential problems with this proposal.

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12. *See, e.g.*, Wyo. Outdoor Council v. U.S. Army Corps of Eng'rs, 351 F. Supp. 2d 1232, 1246–47 (D. Wyo. 2005) (holding the Corps' decision to issue drilling permits in the Powder River Basin was arbitrary and capricious because it did not adequately reflect the record).

13. *See* U.S. GEOLOGICAL SURVEY, U.S. DEP'T INTERIOR, FACT SHEET 2006-3137, COALBED METHANE EXTRACTION AND SOIL SUITABILITY CONCERNS IN THE POWDER RIVER BASIN, MONTANA AND WYOMING 1 (2006), *available at* http://pubs.usgs.gov/fs/2006/3137/pdf/fs06-3137_508.pdf [hereinafter USGS SOIL].

I. COALBED METHANE EXTRACTION

This Part describes the modern state of CBM mining and the context into which this proposal must fit. It begins by outlining the CBM formation and the extraction process, focusing on the role of water throughout. Because the Powder River Basin serves as such an excellent case study for this proposal writ large, the Part focuses in its second half on the specific land characteristics, ownership outlay, and governance of the region. Governance is especially important and informative here as the massive coal seam underlying the Basin traverses the Wyoming-Montana border, and those two states manage CBM in vastly different ways, with Wyoming employing a significantly more laissez-faire, industry-centered approach.[14]

A. Mining Techniques and Issues

CBM gas is a natural byproduct of the formation of coal, both of which are concurrently generated over millennia by decomposing organic matter.[15] This gas attaches to the considerable internal surface area of the solid coal and remains there, held in place by water pressure from subsurface aquifers that permeate the beds.[16] Given that these coal seams are already well documented and relatively shallow and inexpensive to mine, CBM represents a simple and extremely lucrative energy option.[17]

The logistics of mining the CBM gas are also fairly straightforward, but the practical realities of the mines are often complex. To release the pressure holding the gas in place, mines must drain the water permeating the bed.[18] Wells pump out considerable quantities of water to relieve the pressure on the gas molecules, allowing them to join the water in the ascent up the mine shaft.[19] The gas is collected and piped away, leav-

14. *See* discussion *infra* Part I.B.1.

15. *See, e.g.*, Amoco Prod. Co. v. S. Ute Indian Tribe, 526 U.S. 865, 872–73 (1999); U.S. GEOLOGICAL SURVEY, U.S. DEP'T INTERIOR, FACT SHEET 123-00, COAL-BED METHANE: POTENTIAL AND CONCERNS 1 (2000), *available at* http://pubs.usgs.gov/fs/fs123-00/fs123-00.pdf [hereinafter POTENTIAL AND CONCERNS].

16. *Amoco Prod. Co.*, 526 U.S. at 872–73; POTENTIAL AND CONCERNS, *supra* note 15, at 1.

17. POTENTIAL AND CONCERNS, *supra* note 15, at 1.

18. *Id.*

19. *Id.* (including a basic diagram of a CBM well and the methods for separating water and gas).

ing byproduct water at the surface along with the correlating questions regarding disposal options.[20]

The rate of water discharged from the well decreases considerably after the first few years of operation, but the amount of water produced throughout the entire lifetime of the well is truly astounding. For example, each well in the Powder River Basin, discussed in detail below, produces between 100 to 200 barrels, or up to 8400 gallons, of water per day.[21] "CBM wells in the Wyoming portion of the Powder River Basin are estimated at only 7–10 years [of production potential], while the Montana portion of the same basin was estimated at 10–20 years," but the Basin is nowhere near fully drilled.[22] The Rocky Mountain region, including Utah, New Mexico, Colorado, Montana, and Wyoming produced over a billion barrels of water in 2005, enough to satisfy the needs of Denver and its 1.1 million citizens for about five months.[23] A transfer to thirsty municipalities offers an obvious solution, but the variable quality of the discharged water significantly complicates any resolution.

So much water emanating from a single point unnaturally inundates local streams and floods surrounding areas, requiring miners make at least some effort to manage the water to avoid nuisance claims.[24] Focusing first on current disposal methods,

> [c]ommon water management strategies include discharge into drainages, stock ponds, evaporation ponds, or infiltration ponds; treatment to remove sodium; or application of the water directly on the land surface via irrigation equipment or atomizers. Re-injecting the co-produced water back into the ground is a less common water management strategy because it requires locating a geologic unit with enough

20. For a comprehensive discussion of the impacts of mining through its different stages, see W. ORG. OF RES. COUNCILS, FILLING THE GAPS: HOW TO IMPROVE OIL AND GAS RECLAMATION AND REDUCE TAXPAYER LIABILITY 6–7 (2007), *available at* http://www.worc.org/userfiles/file/Filling%20the%20Gaps.pdf [hereinafter FILLING THE GAPS].

21. ALL CONSULTING & MONTANA BOARD OF OIL AND GAS CONSERVATION, COAL BED METHANE PRIMER: NEW SOURCE OF NATURAL GAS—ENVIRONMENTAL IMPLICATIONS 17 (2004).

22. *Id.* (citations omitted).

23. McGuire, *No One is Neutral*, *supra* note 3.

24. *Id.*; Pennaco Energy, Inc. v. U.S. Dep't of Interior, 377 F.3d 1147, 1158 (10th Cir. 2004).

capacity to store the water.[25]

Some of these disposal techniques, like evaporation ponds and surface application, pose adverse consequences for the land around mines, especially given the concentration of mines over profitable seams.[26]

While ponds and surface application might be an eyesore to surrounding land owners, the larger problem lies in the quality of water. The general rule throughout the Rocky Mountain West for CBM effluent is that water quality decreases the deeper and farther south in the Rockies the coal formation lies.[27] Moreover, water quality is not uniform within basins or even between adjacent wells; general, basin-wide appraisals of water quality are inaccurate and testing must be individualized to each well.[28] Mine regulators must test CBM discharged water for, among other things, high total dissolved solids ("TDS"), sodium, potassium, magnesium, calcium, chlorine, trace amounts of hard metals, and unhealthy pH levels and temperatures.[29]

In addition to the instant problems posed by concentrated releases of these pollutants, even good-quality water released in large amounts has adverse impacts.[30] Water pumped from aquifers with above average TDS can be potable and fit for

25. USGS SOIL, *supra* note 13 (citation omitted). Currently, disposal methods vary by basin and specific well, and states do not mandate any method. For example, the use of re-injection varies by basin. Much of the water from southern and western formations is found quite deep, meaning high salinity, and cannot be left at the surface. Mining companies in the Raton Basin in Colorado re-inject only a third of their co-produced water, while ninety-nine percent of water in the larger San Juan region must be re-injected. Kim McGuire, *Gift or Curse: Uncharted Waters: No Precedent for Rights to Abundant Coal-Bed Methane Runoff*, DENVER POST, Aug. 13, 2007, at A1, *available at* http://www.denverpost.com/search/ci_6608638 [hereinafter McGuire, *Uncharted Waters*]; *see also* Bryner, *supra* note 2, at 544–45.

26. On average, a well immediately disturbs about .2 to 1 acre with actual operational equipment. "Wells are frequently drilled on a grid pattern, with anywhere from 20 to 160 acres per well." FILLING THE GAPS, *supra* note 20, at 6.

27. Bryner, *supra* note 2, at 545 (listing the percentage of re-injected water from the major CBM producing basin). High levels of re-injection correlate with poor water quality, and the figures expressed demonstrate a trend whereby re-injection, and thus poor water quality, increases the further south and west the basin lies. *Id.* at 544–45.

28. *See, e.g.*, USGS SOIL, *supra* note 13, at 1 (describing how water quality changes by well location within the Powder River Basin).

29. Bryner, *supra* note 2, at 544.

30. Of course, extremely poor water cannot remain at the surface. Testing and treatment options for seriously polluted water will be discussed *infra* in relation to the CWA.

municipal or livestock use.[31] This same water, if applied liberally over a concentrated area, can kill vegetation and cause severe damage to soil as high levels of dissolved solids build.[32] However, not all water is especially saline; it can be above average in other elements like sodium or calcium.[33]

B. The Powder River Basin

The Powder River Basin, straddling the Wyoming-Montana border east of the Big Horn Mountains, serves as an excellent case study for this proposal because it is a large basin, has few significant property ownership issues, and produces relatively high-quality water.[34] The Basin serves as a microcosm for the issues present in different potential and developing CBM seams throughout the Rocky Mountain West. It straddles the state border, providing a window into two different state management strategies.[35] All the prime players—property owners, ranchers, farmers, environmentalists, mining companies, and interest groups—have made their voices heard

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31. *See, e.g.*, USGS SOIL, *supra* note 13, at 1 ("Lab testing indicates that Powder River Basin co-produced water is potable but is high in sodium and other salts, especially in the western and northern parts of the Powder River Basin.").

32. *See* POWDER RIVER BASIN RES. COUNCIL, SOIL CONDITION AND TRANSPLANT STUDIES IN BURGER DRAW 5–8 (2001), *available at* http://powderriverbasin.org/Attch_Cats/CBMsoildamage.pdf. The study goes into more depth:

> The main effect of soluble salts on plants is osmotic, since high salt levels make it difficult for the plant to obtain water for growth. The plant root contains a semipermeable membrane permitting water to pass but rejecting most of the salt. Thus, water is osmotically more difficult to extract from increasingly saline solutions. Plants growing on saline media can somewhat increase their internal osmotic concentrations by production of organic acids or uptake of salts. This process is called osmotic adjustment. The effect of salinity on the plant appears primarily to be energy diversion from growth processes in order to maintain the osmotic differential.

Id. at 7; *see also* USGS SOIL, *supra* note 13.

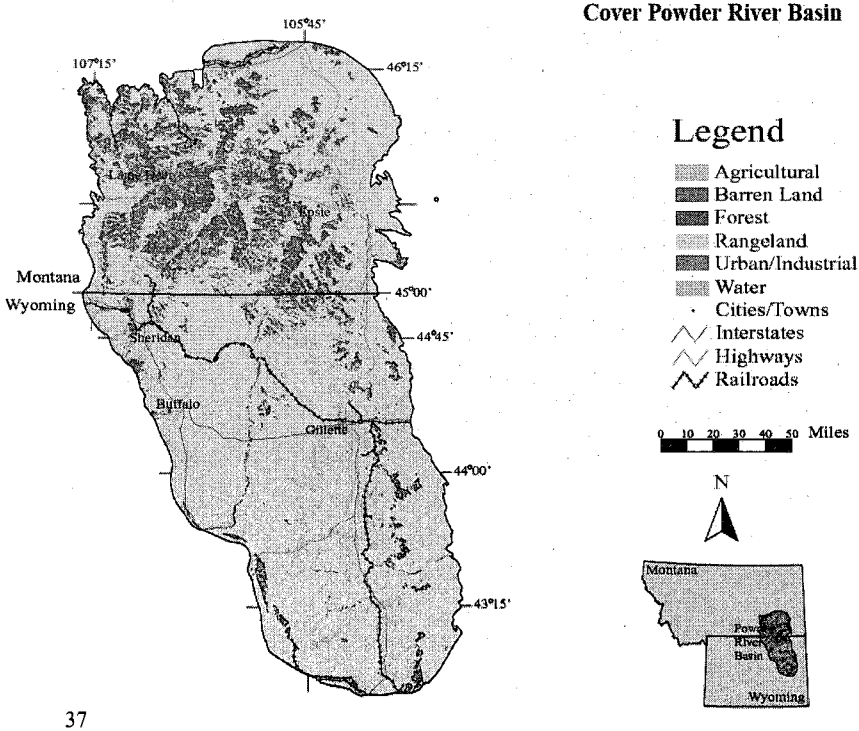
33. Bryner, *supra* note 2, at 545.

34. For a map of the basin, see U.S. GEOLOGICAL SURVEY, U.S. DEP'T INTERIOR, FACT SHEET 2006-3132, U.S. GEOLOGICAL SURVEY AND BUREAU OF LAND MANAGEMENT COOPERATIVE COALBED METHANE PROJECT IN THE POWDER RIVER BASIN, WYOMING 1 (2006) [hereinafter USGS SURVEY], *available at* http://pubs.usgs.gov/fs/2006/3132/pdf/fs06-3132_508.pdf.

35. T.T. Taber & S.A. Kinney, *Land Use and Ownership, Powder River Basin*, *in* 1999 RESOURCE ASSESSMENT OF SELECTED TERTIARY COAL BEDS AND ZONES IN THE NORTHERN ROCKY MOUNTAIN AND GREAT PLAINS REGION fig.PM-1 (U.S. Geological Survey Professional Paper 1625-A, 1999), *available at* http://pubs.usgs.gov/pp/p1625a/Chapters/PM.pdf (including other maps of surface and subsurface ownership throughout the basin).

in the current debate over management.[36] Moreover, the Basin's current state of development is ideal for study, as the primary issues and problems are now clear, but it is still early enough to effectuate major change. Thus, this Comment uses the Powder River Basin to demonstrate how the bifurcated management proposal offered here would work in a practical setting.

Figure PM-1. Land Use/Land Cover Powder River Basin



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The Basin encompasses about 55,000 square kilometers, underlain with many shallow coal seams.[38] As the seams tend to be shallow, they are both inexpensive to mine and produce relatively good water.[39] Conversely, the Basin soil consists

36. *See* Keith G. Bauerle, *Reaping the Whirlwind: Federal Oil and Gas Development on Private Lands in the Rocky Mountain West*, 83 DENV. U. L. REV. 1083, 1088–89 (2006).

37. Taber & Kinney, *supra* note 35, at fig.PM-1.

38. USGS SOIL, *supra* note 13, at 1.

39. *Id.*

mainly of clays, a volatile, fragile soil that does not respond well to sodic or saline water.[40] Therefore, although pumped water passes most potability tests, direct application over a concentrated area quickly damages the surrounding environment.[41]

The federal government owns two-thirds of the region's mineral rights, meaning mining companies bear fewer transaction costs when negotiating drilling sites.[42] Assessing ownership can sometimes be difficult in the Basin, however, because "split-estates" are quite common.[43] In such split estates, one party, the federal government in this case, owns and controls the subsurface mineral rights while private parties, most often ranchers, exclusively own the surface rights.[44] While this dual ownership might seem a serious impediment to extractive resource development, the Hardrock Mining Act of 1872, along with the Stock Raising Homestead Act of 1916, provide considerable power to mineral surveyors, allowing them, after notification, to enter private surface estates to search and file mining claims.[45] Overall, the vast quantities of subsurface federal ownership facilitate mineral development, and the overwhelming amount of private surface land precipitates conflict between mining companies and landowners.[46]

The primary water contaminants in the Basin are sodium and TDS, which affect adjacent land and regional waterways.[47] Both grow more prevalent in the discharged water from the Basin as one moves north and west of the town of Gillette,

40. *Id.* at 2.

41. *See id.*

42. Robert J. Duffy, *Political Mobilization, Venue Change, and the Coal Bed Methane Conflict in Montana and Wyoming*, 45 NAT. RESOURCES J. 409, 433 (2005). Transaction costs are lower because only one general application with a single Environmental Impact Statement covering the entire region is necessary. Moreover, negotiations with the federal government are predictable and commonplace for the national companies engaged in CBM drilling. *Id.*

43. *See* Taber & Kinney, *supra* note 35, at fig.PM-1 (showing land divisions through the Basin).

44. The prevalence of split-estates is a legacy of the Stock Raising Homestead Act of 1916. *See* 43 U.S.C. § 299 (2000). *See generally* Amoco Prod. Co. v. S. Ute Indian Tribe, 526 U.S. 865, 872–73 (1999) (describing the evolution of land ownership in the west vis-à-vis mineral estates and CBM).

45. General Mining Act (Hardrock Act) of 1872, 30 U.S.C. §§ 22–45 (2000); Stock Raising Homestead Act of 1916, 43 U.S.C. § 299 (imposing notice requirements that must be satisfied prior to entry).

46. *See generally* Taber & Kinney, *supra* note 35.

47. USGS SOIL, *supra* note 13, at 1.

Wyoming.[48] As noted above, sodium and salt levels vary by specific mines; thus, management and regulation cannot rely on region- or basin-wide generalizations and must, instead, test individual mines. This individualized testing is also necessary to assess the larger environmental ramifications in the region's rivers and streams.[49] Water quality in the Basin is often worse than that naturally occurring in the Tongue and Powder Rivers, the principal drainages for the Basin, but it is comparable to water already in the Belle Fouche, the Cheyenne Rivers, and Caballo Creek.[50] Again, variations in effluent quality and receiving water bodies make broad management exceedingly difficult.

Currently, Wyoming and Montana manage CBM water in a variety of ways, but neither state has yet found a tenable solution that satisfies all the various interests. Different regulatory burdens in each state combined with more accessible coal seams have created disparity between the states.[51] Unlike with the mines themselves, however, the impacts of mining cannot be divided along the border line, as the affected waterways, coal seams, and aquifers run through both states.[52] Therefore, although the remainder of this Section focuses on the regulatory regimes of each state, the cumulative, interstate effects of CBM mining cannot be forgotten.

1. Wyoming

Looking first at Wyoming, the state exemplifies laissez-faire regulation—it complies with basic mining permitting standards but employs a permissive system focused on maximizing royalties from extractive industries.[53] CBM mining companies must procure permits from the Wyoming Oil and Gas Conservation Commission ("WOGCC"), the Wyoming Department of Environmental Quality ("WDEQ"), and the Wyoming State Engineer ("WSE"). Not only has the WOGCC approved every one of its 14,000 permit applications, it also

48. USGS SURVEY, *supra* note 34, at 3 fig.7 (including tbl.1, comparing the composition of water from the two main geologic formations in the basin to national drinking water standards).

49. *Id.*; USGS SOIL, *supra* note 13, at 3.

50. Bryner, *supra* note 2, at 545–46.

51. *See* McGuire, *No One is Neutral*, *supra* note 3.

52. *Id.*

53. In 2001, CBM royalties contributed $26 million to the state. Duffy, *supra* note 42, at 430.

allows miners to space wells tightly throughout the Basin, making it extremely difficult to diffuse adverse impacts from each mine.[54]

The WDEQ is responsible for enforcing Wyoming's obligations under the federal CWA, including issuing National Pollutant Discharge Elimination System ("NPDES") permits.[55] Both local environmental groups and the Federal Environmental Protection Agency ("EPA") have consistently objected to WDEQ permitting practices and decisions over the past decade.[56] Citing failure to "fully review and consider scientific data and criteria and to comply with key provisions of the CWA," the groups have forced some slight tightening of the regulations, but the WDEQ is practically limited by insufficient funding and widespread understaffing from comprehensive enforcement anyway.[57]

Lastly, the WSE treats CBM discharged water as groundwater requiring a permit under the prior appropriation doctrine. Wyoming state statute holds that applications "shall be granted as a matter of course, if the proposed use is beneficial and, if the state engineer finds that the proposed means of diversion and construction are adequate."[58] Indeed, the WSE's Office reads this already permissive language as liberally as possible, defining mining as the beneficial use for permit purposes and never adjudicating the right.[59]

Overall, none of the three agencies demand any significant environmental consideration from the mining companies, who

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54. *Id.* at 435–36.

55. The technicalities of the CWA will be discussed *infra*; this Section focuses on the CWA only in relation to state enforcement.

56. *See* Sharon Buccino & Steve Jones, *Controlling Water Pollution from Coalbed Methane Drilling: An Analysis of Discharge Permit Requirements*, 4 WYO. L. REV. 559, 568–70, 575 n.105 (2004) (including a description of the WDEQ permitting procedure and the public means to challenge it).

57. Duffy, *supra* note 42, at 434–35; *see* W. ORG. OF RES. COUNCILS, LAW AND ORDER IN THE OIL AND GAS FIELDS (2005), *available at* http://www.worc.org/userfiles/file/Law-&-Order-report.pdf.

58. WYO. STAT. ANN. § 41-3-931 (2007).

59. Interview with Patrick Tyrrell, State Eng'r, Wyo. State Eng'rs Office, in Cheyenne, Wyo. (July 21, 2007). Because CBM withdrawals cease within a decade or two, the WSE can avoid the more in-depth and protracted—and therefore costly—adjudication process. This situation offers yet another example of the state's technical adherence to official procedure, but its unwillingness to include any real substance as it hides behind the guise of procedural diligence. Moreover, a viable claim could be made that, without adjudication, the state is failing in its duty to monitor and protect the state's water resources, as the WSE does not assess or provide data on aquifer depletion. Similarly, at the time of publication, a suit is pending.

have taken full advantage of the relatively unregulated market to quickly expand operations throughout the Wyoming part of the Basin. All three agencies follow procedure, but it is little more than a façade. They all demonstrate a common unwillingness to include much substance beyond the guise of procedural diligence, resulting in vociferous complaints from groups representing local interests.[60] As discussed above, Wyoming regulatory agencies' permissive approaches towards CBM expansion all demonstrate the state's general industry-friendly attitude.[61] The residents are left fighting the concentrated negative externalities of mining like pollution and wildlife disturbance, while the benefits are awarded to the capital city Cheyenne and the rest of the state and country. The laissez-faire approach to regulation enriches the state and mining companies, but it leaves regional interests, including ranchers, farmers, and local municipalities, to shoulder an inequitable share of the burden, with consequences that will remain long after the wells run dry.

2. Montana

Montana has been more proactive in regulating the CBM boom, which has slowed development of mines and utilization of Montana's natural gas resources. If a laissez-faire theme embodies the Wyoming approach, then widespread uncertainty for all interested parties represents Montana's. While much of the reason for slow development in the state must be attributed to the more limited nature and availability of CBM in the area, the high transaction costs resulting from a prolonged and un-

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60. The Powder River Basin Resource Council is the primary interest group fighting for the regions' residents. Its website can be found at http://www.powderriverbasin.org. The group's composition is quite unique, as it rallies ranchers, farmers, and environmentalists with its cries for land conservation.

> Given the magnitude of the threats, it is obvious why the interests of the [ranchers, farmers, and environmentalists] have aligned, but it is also important to realize that this alliance is more than a marriage of convenience... [T]he rancher/green alliance catalyzed by oil and gas development in the west is one of old west agrarian interests joining with new west conservationist interests against a common, old west extractive foe.

Bauerle, *supra* note 36, at 1088–89.

61. The federal government's approach is quite similar, as the BLM has asked Congress for additional funding to facilitate more efficient permitting of CBM wells throughout the area. *See* Robert Stepans, *A Case for Rancher-Environmentalist Coalitions in Coal Bed Methane Litigation: Preservation of Unique Values in an Evolving Landscape*, 8 WYO. L. REV. 449, 463–64 (2008).

predictable regulatory framework make it difficult for all interested parties to make informed decisions.[62]

As in Wyoming, there are three Montana agencies in charge of regulating CBM production: the Montana Department of Environmental Quality ("MDEQ") administers the CWA, issues NPDES permits, and sets water quality standards;[63] the Department of Natural Resource Conservation ("DNRC") oversees water rights according to the prior appropriation system;[64] and the Montana Board of Oil and Gas Conservation ("MBOGC") "regulates CBM wells for spacing, density, construction, and safety issues and is the agency responsible for permitting CBM wells."[65] The breakdown of responsibilities is similar to that described above for Wyoming, but Montana's agencies are more constrained—both in terms of groundwater depletion and CBM extraction—by comprehensive state statutes and intra-agency rulemaking.[66]

Focusing first on CBM specific law, the Coal Bed Methane Production Offset Act of 2001 attempted to avoid the pitfalls—such as property damage from water disposal, CWA conflicts, and unclear property rights—evident in other states at the time.[67] The Act has not lived up to its potential for positive change, however. Instead, it has inspired a slew of legal questions for the courts.[68] Further, it has retarded growth and landowner complaints continue.[69] The Act provides four options for managing groundwater: use it for a beneficial purpose, re-inject it, discharge it in accordance with the CWA, or "manage it through other methods allowed by law."[70] In addition to

62. In fact, the potential for CBM development is considerable, as the Bureau of Land Management estimated a potential 14,000 to 39,000 CBM wells before 2010. N. PLAINS RES. COUNCIL, DOING IT RIGHT: A BLUEPRINT FOR RESPONSIBLE COAL BED METHANE DEVELOPMENT IN MONTANA 1 (2001), *available at* http://www.northernplains.org/files/Doing_It_Right.pdf.

63. Duffy, *supra* note 42, at 419–20.

64. *Id.* at 420.

65. *Id.* As in Wyoming, the MBOGC has never refused an application based on environmental concerns. *Id.* The MBOGC is part of the DNRC.

66. *See generally id.* at 419–30.

67. MONT. CODE. ANN. § 76-15-902 (2007) (describing the legislative findings and declaration of purpose).

68. Duffy, *supra* note 42, at 421–29; *see also, e.g.*, N. Plains Res. Council v. Fid. Exploration & Dev. Co., 325 F.3d 1155 (9th Cir. 2003).

69. *See, e.g.*, McGuire, *No One is Neutral*, *supra* note 3.

70. MONT. CODE. ANN. § 82-11-175(2) (2007). In addition, § 82-11-175(2)(c) implicates Montana's version of NEPA, imposing another layer of regulation that includes preparing an Environmental Impact Statement or an Environmental Assessment. *See* MONT. CODE. ANN. §§ 75-1-101 to 75-25-103 (2007). For examples of the detail needed to meet statutory requirements, see Dep't of Natural Res. &

the uncertainty posed by this last factor, mining companies have had a difficult time obtaining permits to put discharged, or "co-produced," water to beneficial use, as per option one.[71]

Indeed, Montana imposes stringent requirements for groundwater appropriations greater than 4000 acre-feet of water per year and 5.5 or more cubic feet per second, covering most CBM mines.[72] The statute imposes a "reasonableness" requirement, which the DNRC determines according to six statutory factors.[73] Specifically, the applicant must prove that:

> (i) the existing demands on the state water supply, as well as projected demands, such as reservations of water for future beneficial purposes, including municipal water supplies, irrigation systems, and minimum streamflows for the protection of existing water rights and aquatic life;
>
> (ii) the benefits to the applicant and the state;
>
> (iii) the effects on the quantity and quality of water for existing beneficial uses in the source of supply;
>
> (iv) the availability and feasibility of using low-quality water for the purpose for which application has been made;
>
> (v) the effects on private property rights by any creation of or contribution to saline seep; and
>
> (vi) the probable significant adverse environmental impacts of the proposed use of water as determined by the department pursuant to Title 75, chapter 1, or Title 75, chapter 20 [Montana's version of NEPA].[74]

Conservation, Montana Board of Oil and Gas Coal Bed Methane Information, http://bogc.dnrc.mt.gov/CoalBedMeth.asp (last visited Nov. 15, 2008). For a specific example of the necessary reports, see MONT. BD. OF OIL AND GAS CONSERVATION, ENVIRONMENTAL ASSESSMENT FOR FIDELITY EXPLORATION & PRODUCTION COMPANY 1 (2006), *available at* http://bogc.dnrc.mt.gov/PDF/Fidelity%20DeckerMine.pdf.

71. McGuire, *Uncharted Waters*, *supra* note 25 (addressing beneficial use concerns in Colorado, but the law of prior appropriation is quite similar in Montana and throughout the West).

72. MONT. CODE ANN. § 85-2-311(3) (2007).

73. *Id.* § 85-2-311(3)(b)(i)–(vi).

74. *Id.*

Moreover, the Basin lies in a Conservation District, which imposes yet another layer of red tape for the producers.[75] As the Montana Attorney General found:

> A Conservation District has authority under Mont. Code Ann. § 76-15-706 (2003) to implement land use regulations, following a referendum by the voters, in order to implement reasonable measures to conserve the soils, protect the soil structure from coal bed methane water, and conserve the water resources of the district.[76]

Although this opinion logically interprets the existing laws and properly applies them to the CBM mining, it adds even more administrative transaction costs to a CBM producer simply looking to put the water towards a socially beneficial purpose.

Last among the regulatory impediments, the Montana DEQ adopted relatively stringent effluent standards under the authority delegated to it by the federal CWA.[77] In addition to imposing its version of the NPDES permit, Montana also instituted Total Maximum Daily Load ("TMDL") restrictions for rivers in the Upper Tongue watershed.[78] TMDLs like this further highlight the interstate differences in management strategies, as Montana's downstream limits expressly curtail discharges upstream in Wyoming, to the chagrin of Wyoming's CBM producers.[79] These cross-border disputes spread uncertainty and high transaction costs throughout the Basin, making bargaining between the parties to address the problems and internalize the negative externalities unlikely.[80]

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75. Montana's Association of Conservation Districts describe their mission as: "Montana's 58 conservation districts (CDs) utilize locally-led and largely non-regulatory approaches to successfully address general natural resource issues." Montana Conservation Districts, http://www.macdnet.org (last visited Sept. 12, 2008). In terms of organization, "Montana's [Conservation Districts] are political subdivisions of the state and are governed by a board of five supervisors elected by local voters in a general election." Montana Conservation Districts: District Operations, http://www.macdnet.org/operate.htm (last visited Sept. 12, 2008).

76. 50 Op. Mont. Att'y Gen. 9 (2004), *available at* http://www.doj.mt.gov/resources/opinions2004/50-009.pdf.

77. The logistics of the CWA are discussed in Part II, *infra*.

78. Environmental Protection Agency, *Section 303(d) List Fact Sheet for Watershed Upper Tongue*, http://iaspub.epa.gov/tmdl/huc_rept.control?p_huc=10090101&p_huc_desc=UPPER%20TONGUE&p_cycle=2004 (last visited Nov. 15, 2007); *see also*, 40 C.F.R. § 130.7 (2008); Environmental Protection Agency, Overview of Impaired Waters and Total Maximum Daily Loads Program, http://www.epa.gov/owow/tmdl/intro.html (last visited Nov. 14, 2008).

79. Buccino & Jones, *supra* note 56, at 570.

80. *See infra* Part II.C.

All of these restrictions add to the transaction costs mining companies must internalize if they wish to maximize mine profits. An abundance of administrative concerns prevents an efficient market from ever forming, to the detriment of all parties, including environmentalists.[81] While such heightened scrutiny of water appropriation may limit adverse environmental impacts in the immediate area, it also greatly limits the mining companies, who seek to mine "clean" natural gas and put the resultant water towards a beneficial use. Indeed, as argued below, it is unnecessary to so severely restrict the mining companies. In any case, such a complicated regulatory regime and the corollary transaction costs make it difficult for interested parties to efficiently conduct business.

Overall, current management strategies on both sides of the state line are ineffective and inefficient. Clearly, the present system is not working. Producers butt heads with regulators, wasting money and time jumping through regulatory hoops. Ranchers either have too much water, flooding fields and choking out vegetation, or too little water and no stable, legal market in which to purchase it from CBM producers. States either fund a cumbersome and inefficient regulatory scheme, as in Montana, or sanction an unjust transfer of wealth out of the impacted area, as in Wyoming. Environmentalists lament the loss of land, soil, aquifers, and watersheds. Therefore, a new management system is necessary, and the remainder of this Comment addresses that need.

II. REGULATING POOR-QUALITY WATER UNDER THE CLEAN WATER ACT

The Clean Water Act offers a viable, proven solution for regulating low-quality CBM water.[82] Although not without its problems, the CWA has made great strides towards cleaning the nation's rivers and offers a tested, understandable process

81. A market in this case refers to a mining company that wishes to sell. This transaction by no means excludes environmental concerns, as the more CBM water a rancher uses, the less the rancher must take from other sources like streams or shallow aquifers. Environmentalists could also join the market by purchasing water and putting it towards their desired use—although this option could run afoul of many state laws that prohibit private parties from holding instream flows.

82. Clean Water Act, 33 U.S.C. §§ 1251–1387 (2000).

for regulating pollution.[83] By utilizing the established management framework of the CWA, states can both protect surrounding landowners and ecosystems and provide predictability for gas companies looking for stability regarding their investments. Of course, the CWA already applies to every state, but this Comment proposes creating CBM-specific provisions and facilitating interstate communication and management strategies.

A. An Overview of the Clean Water Act

Congress passed the CWA "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters."[84] To achieve this far-reaching goal while simultaneously limiting federal bureaucracy and promoting flexibility, Congress employed the tool of cooperative federalism, providing minimum federal water quality standards, but allowing states to set more aggressive controls and determine enforcement strategy.[85] Should states fail to set adequate standards or sufficiently enforce them, the EPA has a nondiscretionary duty to step in and administer the provisions of the Act.[86]

To achieve the statute's goal of perfect water integrity, the CWA treats general water quality and point source discharges differently.[87] Focusing first on general water quality, Total Maximum Daily Load provisions, which either states or the EPA can define according to cooperative federalism, protect the overall health of waters.[88] "A TMDL sets the maximum amount of pollutants a water body can receive daily without violating the state's water quality standards," which includes estimates of pollution from sources like CBM well discharge.[89]

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83. *The Clean Water Act at 25 is Clearly a Success*, U.S. WATER NEWS ONLINE, Nov. 1997, http://www.uswaternews.com/archives/arcpolicy/7clewat11.html.

84. 33 U.S.C. § 1251 (2000).

85. 33 U.S.C. § 1313(c) (2000).

86. Sierra Club v. Hankinson, 939 F. Supp. 865, 867–68 (N.D. Ga. 1996). EPA administration represents a very real possibility in Wyoming, as problems continue to occur due to the Wyoming DEQ's lax CBM permitting procedure. *See* Buccino & Jones, *supra* note 56, at 574–83.

87. ROGER W. FINDLEY & DANIEL A. FARBER, ENVIRONMENTAL LAW IN A NUTSHELL 119 (5th ed. 2000); *see also* 33 U.S.C. § 1313(d) (2000) (describing the treatment of water in which effluent limitations are not stringent enough for particular and "total maximum daily loads"); 33 U.S.C.A. § 1362 (West, Westlaw through 2008) (defining the key terms of the CWA, including "point sources").

88. 33 U.S.C. § 1313(d).

89. *Sierra Club*, 939 F. Supp. at 867.

TMDLs can be a very valuable tool for controlling amassed pollutants accumulated in downstream stretches of water. For instance, Montana has employed this strategy to regulate the Tongue River after it brings CBM water and the associated pollutants downstream over the state line from Wyoming.[90]

Congress also addressed point source pollution, intending the CWA to prohibit any discharge of pollution from point sources without an NPDES permit. A point source is defined as, "any discernible, confined and discrete conveyance . . . from which pollutants are or may be discharged."[91] To release pollution from such a point source into "navigable waters," dischargers must apply for a Section 402 National Pollutant Discharge Elimination System ("NPDES") permit.[92] This permit is supposed to ensure water quality while allowing some pollution associated with economically important activity. Indeed, "[p]ermits must incorporate applicable effluent limitations established under §§ 301, 302, 306, and 307, including enforceable schedules of compliance to meet the 1977 and 1983 statutory deadlines."[93] Again, states usually set their own NPDES permitting procedure, which is then ratified by the EPA.[94]

B. The Authority to Regulate CBM Water

States have the authority to regulate CBM discharged water and the flexibility to ratchet up protection beyond the federal minimums.[95] Both of these powers are essential for establishing the comprehensive management regime necessary to address the problems CBM discharge poses. Flexibility is necessary in order to tailor specific permitting procedures that

90. Montana's system serves as a good, if fairly complicated, example of a state authored TMDL program. *See* Jack R. Tuholske, *A Litigator's Perspective: The Montana TMDL Litigation*, 22 PUB. LAND & RESOURCES L. REV. 3, 3 (2001).

91. 33 U.S.C. § 1362(14).

92. 33 U.S.C.A. § 1342 (West, Westlaw through 2008).

93. FINDLEY & FARBER, *supra* note 87, at 120. Section 301 describes effluent limitations for point sources, including standard setting procedures for the EPA. Section 302 concerns ambient water quality standards. Section 306 lays out the provisions governing "new" sources and the Best Available Technology controls. Section 307 deals with toxic substances. *See generally id.* at 116–32.

94. 33 U.S.C. § 1313(c) (2000). For a discussion of the NPDES procedure in Wyoming, see Buccino & Jones, *supra* note 56, at 574–83. Montana also drafted its own version of the NPDES permit called the Montana Pollutant Discharge Elimination System, codified in MONT. CODE ANN. § 75-5-401 (2007).

95. 33 U.S.C. § 1342(b) (2000). *See generally* N. Plains Res. Council v. Fid. Exploration & Dev. Co., 325 F.3d 1155 (9th Cir., 2003); Buccino & Jones, *supra* note 56, at 560–83.

work for CBM's unique characteristics, and the freedom to increase protection beyond federal minimums is required to protect landowners from the unique characteristics of CBM water such as the incredible quantity of discharged water.

TMDLs may be necessary to account for the amalgamation of TDS common in primary, downstream sections such as the Tongue River in Montana.[96] By establishing TMDLs in particular waters, the CWA provides states with the power to limit accumulated pollutants like TDS, even when no particular point source is exceeding its limit as defined in the NPDES permit.[97] Indeed, states can set these TMDLs above any nationally or EPA recognized minimum level, which is necessary in this case to curtail the massive quantities of CBM discharged water and to protect waterways and the vegetation that depends on them.[98]

Turning to state authority and responsibility to regulate CBM water, the Ninth Circuit in *Northern Plains Resource Council v. Fidelity Exploration and Development Co.* struck down a Montana law exempting CBM water from CWA discharge permit requirements.[99] In *Fidelity*, the MDEQ excused the defendant's CBM water from the CWA and said that no permit was required to discharge the water in local waterways.[100] More specifically, the Montana Code stipulated that the discharge of unaltered extracted groundwater did not require a permit, and the MDEQ simply followed the state statute.[101] The Ninth Circuit found that the MDEQ shirked is federal responsibility to enforce the CWA, and that the exempting state statute violated the United States Constitution's Supremacy Clause by weakening the federal baseline water quality standards.[102]

Specifically, the Ninth Circuit held that, "CBM water discharged . . . is a pollutant within the plain meaning of the CWA and is subject to NPDES permitting requirements."[103] It noted that, although no chemicals are added in the extraction of the water, CBM discharged water still falls under the Act's defini-

96. Tuholske, *supra* note 90, at 3.
97. FINDLEY & FARBER, *supra* note 87, at 120–21.
98. 33 U.S.C. § 1313(c).
99. 325 F.3d at 1165.
100. *Id.* at 1157.
101. MONT. CODE ANN. § 75-5-401(1)(b) (2007); *Fid. Exploration*, 325 F.3d at 1157.
102. *Fid. Exploration*, 325 F.3d at 1164–65; *see also* U.S. CONST. art. VI, cl. 2.
103. *Fid. Exploration*, 325 F.3d at 1161.

tion of "industrial waste."[104] The court reasoned that water extracted in the course of freeing methane gas constitutes "produced water" subject to the Act and falling outside any statutory exemption.[105] Lastly, discharging the water into natural waterways such as the Tongue River violates the Act's "antidegradation policy," which requires states adopt standards to prevent further polluting of the country's water.[106] Thus, CBM water in the Ninth Circuit falls within the auspices of the CWA.[107]

Perhaps more importantly, *Fidelity* also held that states have an affirmative duty to manage CBM wastewater according to CWA minimums. In other words, the *Fidelity* holding goes beyond merely applying the CWA to CBM discharge; it requires states exercise their delegated CWA power and actively manage CBM water.[108] Such a proactive rule is crucial to this Comment's proposal because it means states already have a responsibility to manage the discharged water, creating the initiative or momentum within state bureaucracies to find a

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104. *Id.* at 1160.

105. *Id.* at 1161 (referring to 33 U.S.C. § 1362(6)(B) of the CWA). This section of the United States Code defines pollutant and issues a sizable list of examples. 33 U.S.C. § 1362(6) (2000). It continues in subsection (B), however, to specifically exempt:

> water, gas, or other material which is injected into a well to facilitate production of oil or gas, or water derived in association with oil or gas production and disposed of in a well, if the well used either to facilitate production or for disposal purposes is approved by authority of the State in which the well is located, and if such State determines that such injection or disposal will not result in the degradation of ground or surface water resources.

Id. The key, and somewhat illogical, holding in *Fidelity* is that this language in subsection (B) does not include CBM water, meaning the discharge must, by default, be a pollutant. *See* Laura L. Mays, *Drinkable Water is a Pollutant?:* Northern Plains Resource Council v. Fidelity Exploration, 20 J. NAT. RESOURCES & ENVTL. L. 151, 159 (2006).

106. *Fid. Exploration*, 325 F.3d at 1162 (quoting PUD No. 1 of Jefferson County v. Wash. Dep't of Ecology, 511 U.S. 700, 705 (1994)); *see also* 33 U.S.C. § 1313(d)(4)(B) (2000) (containing the exact provisions of the "antidegradation policy").

107. For a more in-depth discussion of *Fidelity* and its implications on CWA management, see generally Allan Ingelson & Jason Gray, *The Regulation of Produced Water from Coalbed Methane Development under the Clean Water Act:* Northern Plains Resource Council v. Fidelity Exploration & Development Company, 8 U. DENV. WATER L. REV. 200 (2004); Mays, *supra* note 105. There is no specific case law in the Tenth Circuit adopting the *Fidelity* holding or reasoning, but, given the lack of industry appeals and time since the decision, it is reasonable to conclude that the rule applies to water in the PRB as well.

108. States' obligation to regulate CBM companies is evident in Montana's response to the *Fidelity* ruling. *See* Ingelson, *supra* note 107, at 211–12.

workable, long-term solution to the discharge problem. If states were not responsible for regulating CBM water under the CWA, it would be exceedingly difficult to convince state governments to initiate and oversee the bifurcated program discussed in detail below. Indeed, the *Fidelity* rule means states must manage CBM water pursuant to their responsibilities under the CWA, which provides both an established and relatively effective mechanism for preventing environmental damage from poor-quality water and the impetus to find a lasting system to handle all the excess water.

C. *Applying the Clean Water Act to the Powder River Basin*

For CBM water, the federal baselines of the CWA provide uniformity in management that stretch across state lines.[109] As the TMDL example discussed earlier illustrates, however, comprehensive management remains a significant problem because states can choose how aggressively to exercise the power vested by the CWA and confirmed in *Fidelity*.[110] Each state's unique application of the CWA represents a major problem in managing CBM because it generates unpredictability for all players, especially the gas companies looking to invest in CBM extraction. The problem is not fatal, however, and the CWA still represents the best solution to managing poor-quality water for three reasons.

First, the CWA is an established regime derived from over three decades of implementation.[111] The deadweight loss associated with creation and enforcement of a new management regime would help none of the concerned parties. To borrow a sports analogy, any reasonable coach in a pressure situation would put in a proven veteran, despite some holes in his game, before using an untested rookie in his first game. Here, where the implications of a management misstep pose long-term environmental consequences for the region, it is foolish to try a new management technique on harmful water.[112]

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109. *See* Taber & Kinney, *supra* note 35, at fig.PM-1.

110. FINDLEY & FARBER, *supra* note 87, at 100–10.

111. *The Clean Water Act at 25 is Clearly a Success*, *supra* note 83.

112. This logic does *not* apply to good quality water that poses no permanent environmental problems if management problems arise, especially when most of the water is already wasted. *See infra* Part III.

Second, the flexibility that the Act affords to states to create standards allows CBM-specific management strategies. The problems associated with CBM discharge are unique. In this situation, the CWA employs a proven framework, but the built-in state discretion makes the framework malleable enough to accommodate the peculiarities of CBM water.[113] Generally, states should exercise the freedom afforded by the act to draw discharge standards that require treatment or reinjection of all water that would damage the environment if simply released.[114] Specific modifications to the CWA to account for unique CBM characteristics are outside the scope of this Comment, but such adaptability serves as an important argument to continue to employ the CWA to govern CBM water.[115]

Lastly, the CWA is a technology-forcing law that demands companies treat water according to the best known methods before discharge.[116] The CWA demands that the NPDES permitting agency set its effluent limitation for point sources according to the Best Available Technology ("BAT") standard.[117] "The BAT standard reflects the intention of Congress to use the latest scientific research and technology in setting effluent limits, pushing industries toward the goal of zero discharge as quickly as possible."[118] By setting such a high bar for allowable discharges, the BAT standard forces companies to investigate better disposal and treatment methods.[119] In the case of CBM, the standard incentivizes gas companies to seek out more efficient treatment methods that could eventually clean poor-quality

113. 33 U.S.C. § 1313(c) (2000).

114. The specific standards for TDS, sodium, and so on would be left to the respective DEQs to define through agency rulemaking, but the guideline should hinge on whether the discharge is potable or useful for agriculture.

115. An example of such a modification lies in the NPDES permitting procedure. Because no two wells produce the same water but water quality does vary according to regional trends, the NPDES permit procedure could be streamlined to reflect such variations. By crafting a rule that officially sanctioned the use of such regional indications, the DEQ—or whatever the permitting agency may be—could save its resources and better investigate other problems like policing existing wells. *See* Buccino & Jones, *supra* note 56, at 575–76.

116. 33 U.S.C. § 1314(b) (2000). For a comprehensive analysis of CBM and the CWA's BAT standard, see Julie Murphy, Note, *Coal Bed Methane Wastewater: Establishing a Best Available Technology Standard for Disposal Under the Clean Water Act*, 14 SOUTHEASTERN ENVTL. L.J. 333, 349–50 (2006).

117. 40 C.F.R. § 125.3(a)(2)(v)(B) (2008).

118. Kennecott v. EPA, 780 F.2d 445, 448 (4th Cir. 1985).

119. *Id.*

water of TDS or other pollutants, making the water useful so that it could join the program described below in Part III.[120]

In conclusion, because the CWA is proven, flexible, and incentivizes companies to find a mutually beneficial solution to the problem, it represents the best option for managing the poor-quality water discharged from CBM wells. While there are significant shortcomings in current implementation of the Act that have precipitated many of the problems discussed above in Part I, internal agency reform can address all of these issues—primarily by increasing resources for the respective states' DEQs.[121] The CWA should be revamped and retooled with regard to poor-quality CBM water, but it offers the best possible management regime to address the pressing problems existing today.[122]

III. MANAGING HIGH-QUALITY WATER WITH REGIONAL, STATE-RUN WATER BANKS

Given that the CWA can effectively manage poor-quality water, the question of how to maximize the utility of good water remains. Current use of good water is more often than not inefficient, wasteful, and based on tenuous legal foundations.[123] All parties agree that the present system could be improved, so, in an extremely general sense, proposals for change would not clash with existing and entrenched interests.[124] This Part posits a novel solution to this problem; it argues for a state-operated water bank that collects all high-quality water from across each watershed and sells it on the open market.

120. *Compare* 33 U.S.C. § 1314(b)(2)(B) (directing the EPA to costs as an independent factor when setting a BAT) *with* 33 U.S.C. § 1314(b)(1)(B) (directing the EPA to consider "the total cost of application of technology *in relation to* the effluent reduction benefits to be achieved from such application" when setting a Best Practicable Technology Standard, which is the precursor to a BAT) (emphasis added). Thus, BAT standards can be set very aggressively to demand pollution abatement and force companies to improve technology.

121. For a more detailed discussion of the problems and solutions regarding CWA management in Wyoming, see generally Buccino & Jones, *supra* note 56.

122. Another persuasive argument for using the CWA to regulate CBM production lies in Murphy, *supra* note 116. Although this Comment argues that it is impractical and inefficient to include high quality water within the auspices of the CWA, Murphy's piece posits a strong argument for applying the CWA to all CBM water.

123. *See* McGuire, *Uncharted Waters*, *supra* note 25.

124. McGuire, *No One is Neutral*, *supra* note 3.

A. The Logistics of the System

First, this Part concerns only high-quality water—that which does not merit treatment under the CWA. The DEQ must test the discharged water and determine whether it joins this water banking program or falls under the CWA regulations.[125] The accuracy of this determination is extremely important to protect landowners, prevent any environmental damage, and ensure the success of the bifurcated approach.[126]

In addition, the regional implementation of the program and reservoir program will dilute water that might be a little higher in TDS or other contaminants than "fresh water" but still passes the CWA's baseline standards.[127] For example, combining water produced from one well with somewhat higher levels of sodium with water from another well higher in calcium will mitigate the effects of both pollutants when eventually withdrawn from the well.[128] This dilution will make all the CBM-produced water higher in quality and limit the amalgamated effects that farmers and ranchers commonly experience after years of using slightly polluted water.[129]

Next, the usufructuary right to the high-quality, non-CWA water will be transferred to the state at the moment that water reaches the surface. In order to avoid confusion caused by the ownership rules in the varied groundwater management doctrines that states employ, it might be necessary to classify CBM water as byproduct water.[130] Colorado currently does this, and extending such a classification system to other states would avoid complications under state water laws.[131] In addition to providing a clear, bright line rule about water ownership, this rule facilitates the comprehensive management and economies of scale necessary to make this proposal practically and financially feasible. In addition, most prior appropriation

125. Clean Water Act, 33 U.S.C. §§ 1251–1387 (2000).

126. While there is no data as of yet on exactly how much water is of high enough quality to escape CWA management, there is a general consensus that a considerable amount of good water is being wasted. *See* McGuire, *No One is Neutral*, *supra* note 3; USGS SOIL, *supra* note 13.

127. FINDLEY & FARBER, *supra* note 87, at 108; *see* 33 U.S.C. § 1362(14) (2000).

128. The state agency responsible for administering the program could monitor water quality to ensure contaminants are being diluted, but this should not pose a problem because all water entering the reservoir already must pass CWA standards.

129. *See, e.g.*, McGuire, *No One is Neutral*, *supra* note 3.

130. McGuire, *Water Quality*, *supra* note 4.

131. *Id.*

states impose strict prohibitions on private parties holding water in hopes of selling it in the future.[132] However, the state is not subject to the same aggressive application of these anti-speculation laws, so state control avoids the substantial retooling of state law that would be necessary under private management.[133]

Absolute state control from the point of inception offers flexibility and unencumbered decision-making.[134] If mining companies own the water and are responsible for transporting it to holding reservoirs, major problems can result from failure to participate in the program.[135] In addition, the government can exercise its power of eminent domain to economically acquire transportation routes, whereas private companies lack the legal authority to transport their water across others' private property.[136] Should the mining companies need the water around the mine itself, they would purchase it from the state.[137] It should be noted at this point that the mining companies will receive no immediate compensation for the water

132. *See, e.g.*, High Plains A & M, LLC v. Se. Colo. Water Conservancy Dist., 120 P.3d 710 (Colo. 2005) (striking down a proposed transfer of the Arkansas River in Colorado due to speculation concerns). For historical perspective and the policy behind these speculation laws, see ELWOOD MEAD, IRRIGATION INSTITUTIONS 264, 365–66 (1903).

133. The state ownership section of the authorizing law for this program could be crafted to replicate the state's instream flow laws. *See, e.g.*, Gordon W. Fassett, *Wyoming's Instream Flow Law*, *in* INSTREAM FLOW PROTECTION IN THE WEST 21-1, 21-1 to 21-2 (Lawrence J. MacDonnell & Teresa A. Rice eds., 1993) (discussing the genesis and evolution of Wyoming's instream flow law).

134. This control raises concerns about excessive government size and power, but the precepts of administrative law protect against excesses or mismanagement. Conversely—and more importantly—constrictive statutes like the Administrative Procedure Act, the National Environmental Policy Act, and the Montana Environmental Policy Act, MONT. CODE ANN. §§ 75-1-1 to 75-25-103 (2007), could hamstring the program by making the transaction costs associated with any decision or action prohibitively high. This is a serious concern, especially in Montana and on federal BLM land, and may require categorical exemptions or other statutory amendments.

135. Because this Comment proposes such an ambitious system with considerable startup costs, it is unlikely that private industry would be willing to invest in necessary infrastructure without guarantees of success. Similarly, the economies of scale necessary to efficiently build and operate this system would not be possible in the fragmented, competitive private sector.

136. 11 McQuillan Mun. Corp. §32.63 (2008); *see, e.g.*, City of Cheyenne v. Edwards, 143 P. 356, 360–62 (Wyo. 1914).

137. This aspect of the proposal might raise the hackles of some of the mining companies, but such reluctance to repurchase the same water that was originally theirs should be tempered by the fact that the companies are also profiting from all the water they add to the system. Indeed, the companies would essentially just buy back the same water they sell to the state. *See infra* Part III.C.

when ownership transfers to the state, although the profit sharing described in Part III.C would, in large part, eventually reimburse the companies.[138]

Due to economies of scale and the large scope of this project, the state can best effectuate this type of broad program. First, only the state can finance a program of this size involving dissimilar private entities such as mining companies, infrastructure builders, and personal water users.[139] Moreover, profitability requires comprehensive management across a region to accommodate drought or surplus years, coordinate and fulfill orders for the water, and internalize the burdens of periods of low demand. While large semi-public entities like power companies could realize the same benefits as the state, the limited duration of water makes this option untenable.[140]

B. Building Public Infrastructure in the Face of Private Rights

The state, through an agency or a special department, will be responsible for building the infrastructure to transport, store, and distribute the water. While it is futile to go into the finite details of the plan in the Powder River Basin, the general scheme merits discussion. The responsible agency must assess

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138. This scheme that divests the private companies of their work product without compensation may instigate a takings claim, but a *Penn Central* balancing analysis would find little negative effect on the companies' reasonable investment-backed expectations, as the companies eventually would be compensated as part of the profit sharing program. *See* Penn Cent. Transp. Co. v. New York City, 438 U.S. 104 (1978). Another approach to this problem could argue that the public owns all water, and appropriations are only usufructuary rights granted by the state. More specifically, the Wyoming Constitution held that "[n]o appropriation shall be denied except when such denial is demanded by the public interests." WYO. CONST. art. VIII, § 3. So long as the authorizing law defines this program to be in the public interest, the state will have the necessary discretion to control appropriations.

139. WYO. STAT. ANN. § 41-2-121(a)(ii)(E)(II) (2008) states that "[s]torage projects may be financed by grants for the full cost of the storage capacity but not to exceed public benefits . . . ." This provision simultaneously provides additional funding options while requiring an assessment of the public benefit from this project.

140. The limited duration of water production in the basin is a concern, but analysts see continued expansion in the region, and the reservoirs will store water beyond field exhaustion. USGS SURVEY, *supra* note 34. If nothing else, the pressing nature of the current management problems and the plan's potential to positively affect the region outweigh concerns about duration. Still, construction and infrastructure decisions must maintain an eye for the inherently temporary nature of CBM development.

the characteristics of the land and formulate a reasonable plan for placing storage reservoirs throughout the region. The goal is to focus on creating a system of collection reservoirs that utilize the natural features of the land to facilitate transportation and mitigate costs.[141]

In the Powder River Basin, the prevalence of split estates creates a significant problem for developing infrastructure. Because over half the mineral rights are federally owned, companies have developed leases without the considerable transaction costs associated with bilateral monopoly and two party private negotiations.[142] But, because most of the surface rights are privately held, the same ease of access is not possible for transporting the water to the regional reservoirs.[143] It should be noted that the state owns many smaller plots consistently spaced throughout the Basin, providing flexibility for the actual reservoir locations.[144]

Hence, the state, specifically the agency in charge of the reservoir system, must be able to either negotiate or, through its powers of eminent domain, condemn easements across private surface estates to transport the CBM discharged water.[145] First, because the state will operate the system, the power of eminent domain ensures that holdouts will not be a problem.[146] But it is unlikely that negotiations would require an exercise of eminent domain, as most private surface owners want a comprehensive management system for the discharged CBM water.[147] Moreover, the surface owners would benefit from the reservoir system, as they could purchase and use the water under the codified legal framework proposed in this Comment.[148] Although the water that surface owners would be purchasing technically comes from beneath their land—meaning they

141. While this reservoir system would eventually be self-funding, the start-up costs are significant and the infrastructure's design should account for such financial limitations. See *supra* Part I.C for a more in-depth discussion of funding.

142. *See* Taber & Kinney, *supra* note 35, at fig.PM-2.

143. *Id.* at figs.PM-2 & PM-3.

144. *Id.*

145. Exercising the Fifth Amendment power of eminent domain would be constitutional in this circumstance. The easement permitting water to flow across private property mirrors the statutory provisions dating back over a century that allowed private parties to condemn easements for transporting water to nonriparian tracts. *See* 94 C.J.S. *Waters* § 863 (2007).

146. *Id.*

147. Duffy, *supra* note 42, at 417–18.

148. It is important to note that these private users could purchase and use the water before it reaches the reservoir, and the state must have the power to negotiate these purchases as well.

could pump the water for themselves without paying for it from a reservoir—the CBM water comes from deep enough below ground that it is impractical and implausible for surface owners to pump it to the surface for their own use.[149] In any case, these two reasons—stability in CBM management and opportunity to benefit from the reservoir system—should translate into little political opposition to the plan and relatively uncomplicated construction of system infrastructure.

Another problem concerns private parties who currently use and depend on CBM discharged water. Although there is no technical legal recourse for these users because the law is in flux and thus there are no guaranteed usage rights, it is important to accommodate parties that have grown dependant upon discharge. Upon deeper examination, this potential problem actually represents another positive feature of the proposed program, as discharge users will be able to legally purchase the water from the state. While the price of water may be an issue, the stability of the program and the investment potential should overshadow the price for the small minority of discharge users who do not already pay for water. In enacting the program, the state should make it clear that these dependant users will have the water they need and that the price they pay will ensure a legally protected usage right.[150]

C. *The Potential Water Market, Financing the System, and Profit Sharing*

A key feature of this proposal is its ability to merge an environmental solution with profitability and sound economic sense. The state would be responsible for selling the water on an open market. It would determine prices according to the usual market factors, and pricing would not favor or disallow any specific interests or uses. [151] The market for purchasing

149. Although it would be possible for surface owners to pump solely water out of these coal seams, it makes no economic sense because, while the seams are shallow by oil and gas standards, they are still much deeper than the subsurface water personal wells tap into. POTENTIAL AND CONCERNS, *supra* note 15; *see also* United States Geological Survey, Ground Water: Wells, http://ga.water.usgs.gov/edu/earthgwwells.html (last visited September 15, 2008) (and links therein).

150. *See, e.g.*, McGuire, *Uncharted Waters*, *supra* note 25 (describing the plight of a willing buyer and seller of CBM water who have had trouble reaching any agreement due to the tenuous legal framework).

151. In this sense, the proposed water market completely ignores the established prior appropriation tradition of beneficial use. Allowing private ownership

water in the Powder River Basin is difficult to predict; the land is primarily arid ranch land, so the potential for a widespread transition to more consumptive agricultural use is unclear.[152] Still, a general appraisal of western history shows that, where water is available, productive uses follow.[153] Moreover, in times of drought, the stored water would both increase in value and protect existing water users. Given the changing circumstances in the West precipitated by climate change, prudent storage and use of water will become even more important than in the past.[154]

Federal management and operation of the system is an alternative, but a state controlled system represents a superior option. The major benefit of federal control is that, like the CBM basins themselves, arbitrary state borders do not affect federal control.[155] For example, the cross-border problems such as TMDLs that are evident throughout the Powder River Basin would be eliminated as the entire basin would be subject to federal jurisdiction. Also, federal management offers a single system that would provide predictability, and hence lower transaction costs, for all parties and especially production companies.

However, federal control raises a myriad of problems. One problem is that the CWA already delegates authority to the states, so the Act would need to be rewritten to give the EPA sole authority over CBM discharged water.[156] Carving out this exception to the CWA through national legislation is unlikely in these tempestuous times on Capital Hill, especially for an issue relatively unique to the Rocky Mountain West. More importantly, however, state law has and will more than likely continue to govern water. Changing this tradition would mean both federal conflict with states and a dearth of applicable federal law. Imposing national management over only CBM water would be fragmented and difficult—to say nothing of the complications raised by later selling the water and thus reincorpo-

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of instream flows, at least with respect to purchased CBM water, would be an important change to existing water law necessary to realize this aspect of the plan.

152. Interview with John Bloomquist, Shareholder, Doney, Crowley, Bloomquist, Payne & Uda P.C., in Helena, Mont. (Nov. 11, 2007).

153. *See generally* CHARLES F. WILKINSON, CROSSING THE NEXT MERIDIAN: LAND, WATER, AND THE FUTURE OF THE WEST 219–92 (1992).

154. *See* Jon Gertner, *The Future is Drying Up*, N.Y. TIMES MAGAZINE, Oct. 21, 2007, at 70.

155. 33 U.S.C. §§ 1253, 1370 (2000).

156. *Id.*

rating it into the state water system. Hence, the onus lies on each state to independently consider these problems, fashion solutions within its laws, and ultimately implement this proposal.

In terms of the stored water itself, concerned parties have already proposed a pipeline that would carry the discharged water from the Powder River Basin to the North Platte River near Douglas, Wyoming.[157] If the water reaches the North Platte, there is no question that a sufficient market exists to make this program profitable.[158] Of course, if the state then used the North Platte to transport the water to downstream buyers, the Wyoming legislature would have to modify its water law accordingly.[159] Also, such a proposal implicates the transbasin diversion restriction in the Wyoming Water Code, which holds that, "[a] project involving transbasin diversion shall address the impact of the diversion and recommend measures to mitigate any adverse impact identified in the basin of origin."[160] If the current state of the Powder River Basin represents the baseline, any change that could confer benefits on the local land owners would pass such a test.

In turn, money from the sale of the CBM discharged water would first go to covering the state's implementation costs, with the remainder going back to the CBM producers. Maintenance, operation costs, and bond or start-up loan repayment would be the top priority for money earned. These expenditures must trump any other uses for the revenue in order to limit state risk and ensure important long-term viability of the program.

Next, the CBM producers would get a share of the program's profits proportional to the amount of water they con-

157. For a more detailed discussion of the pipeline proposal, see Brian Jeffries, Executive Director, Wyoming Pipeline Authority, Powerpoint Presentation (June 22, 2007), *available at* http://www.wyopipeline.com/information/presentations/2007/June/IPAMS%20Summer%2007%20Jeffries.ppt#1. This facet of the proposal applies only to the Powder River Basin case study, but that is not saying that similar pipelines to areas desperately craving water would not be possible. This is a site-specific determination that should be investigated for other CBM rich regions.

158. *See* Nebraska v. Wyoming, 515 U.S. 1 (1995) (describing scarcity issues in the region in an equitable apportionment case between the two states).

159. Modern law concerning plans of augmentation could serve as an excellent example of a successful change along these lines.

160. WYO. STAT. ANN. 41-2-121(a)(ii)(E)(VIII) (2008).

tribute.[161] Returning a share of the profits to the producers is important for two reasons: it ensures political support and participation in the program, and it creates an incentive for producers to treat, not reinject, the poor-quality water below CWA standards in order to "sell" it to the state. Both of these factors are extremely important for the viability of the program, and thus it is crucial to determine a reasonable share of the revenue in excess of expenditures to return to the mining companies. As an aside, a cap on the profits any individual well-operator could receive may be necessary to mitigate an obstructive incentive to unnecessarily drain underground aquifers to profit from surface water sales.

Finally, this proposal also offers an excellent opportunity to impose a conservation or environmental requirement for the water, which could be accomplished in many ways. A predetermined percentage or amount of the water could be set aside, outside the sellable supply of water and destined instead to become an instream flow.[162] Similarly, a percentage of water not sold could be taken from storage each year, but such a directive could impair prudent management of the storage reservoirs. Another option would set the potential payments to producers at a level low enough to ensure surplus profits. These profits would be placed in an account earmarked for environmental purposes, which could include purchasing water from the program itself for environmental use.[163] This last alternative represents the most practical option, as it pursues environmental improvements while maintaining the market motivations that underlie the proposed program. In any case, these conservation measures are important because they address the regional inequities caused by CBM production in its current state—they confer a benefit back to those whose land CBM drilling had harmed.

161. Although returns to CBM producers could be tied to the distance and cost of transporting the water to the holding area, it would be far simpler to ignore these differences in cost and divide profits solely according to contributed water.

162. Again, the law would have to treat this added CBM water as separate and distinct from already existing water subject to the well-established priority system, otherwise junior users could claim the excess.

163. The fund could also be used to purchase instream flow rights beyond the PRB or immediate region.

CONCLUSION

Because CBM gas represents a viable answer to this nation's energy problems, states desperately need a solution to the many problems posed by CBM development and growth. The bifurcated approach advocated in this Comment accounts for the varied interests by using the established and proven CWA to govern water that poses significant risks to the region while positing a novel plan to maximize the positive potential for high-quality water. In this sense, the bifurcated approach refuses to experiment with the potentially dangerous water, but it uses the high-quality water as a test case for a progressive water management regime. Although the water banking system flies in the face of over a century of established prior appropriation rules, the plan is not so revolutionary that the prior appropriation doctrine would have to be discarded or substantially rewritten. Instead, the proposed system draws on the momentum of modern instream flow laws and simply employs surface water already available.

Interestingly, the current questions over how to deal with the nuisance created by CBM byproduct water are analogous to the problems raised decades ago by CBM gas vented from coal seams.[164] Because companies myopically focused on extracting solid coal without concern for maximizing byproduct utility, it took many years and considerable waste before people began to capitalize on the useful and profitable CBM gas.[165] There is no reason to make the same mistake with extracted water today; now is the time to start realizing profits from this valuable byproduct.

Indeed, because CBM growth means more of this water will be brought to the surface regardless of the management of the water, there is an unprecedented opportunity to implement a progressive regime that shirks ill-fitting and antiquated water law for a communally beneficial, profitable solution. Climate change only exacerbates the issue—the need for clean energy likely will grow in significance, and intelligent water storage and usage stand to become paramount concerns in the West. In sum, the important players in the issue are set, the

164. *See* McGuire, *Water Quality*, *supra* note 4.

165. *Id.*; *see also* Robert McCurdy, Coal Bed Methane (CBM) and Coal Mine Methane (CMM) in North America Where and Why? 1 (2001), *available at* http://ipec.utulsa.edu/Conf2001/mccurdy_85.pdf.

resources are much needed, and the water will not be around forever, making now the time for comprehensive action.