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# Defining Hydrocommons Governance along the Border of the Californias: A Case Study of Transbasin Diversions and Water Quality in the Tijuana–San Diego Metropolitan Region

## ABSTRACT

*The geography of water resources along the border between California and Baja California represents a network of manmade aqueduct and storage facilities utilized for water transfers. This network of water transport and storage facilities, known as a hydrocommons, delivers Colorado River water for agricultural uses in the eastern part of the Californias' border region and to western urban centers on the Pacific Coast. As with other urban regions in Baja California and Southern California, the Tijuana–San Diego metropolitan region depends upon water imports for the region's rapidly growing economic and residential needs. Today, water agencies in San Diego and Tijuana are investigating the possibility of constructing a binational aqueduct to import greater amounts of Colorado River water. This article defines the hydrocommons that connects the Tijuana–San Diego metropolitan region to the Colorado River and the consequent border water quality and ecosystem degradation problems caused by Colorado River transbasin diversions. After a review of the environmental problems caused by the border hydrocommons, the article turns to an analysis of hydrocommons based governance. In Northern California, a hydrocommons based governance program is evolving to address the water quality and wetlands ecosystem degradation associated with transbasin diversions from Northern California's Bay-Delta estuary region. This hydrocommons project, known as the CALFED process, links the politics and management of water supply, water quality, and wetlands restoration for Northern California's Bay-Delta estuary. Governance lessons learned from the CALFED process are detailed. Hydrocommons governance along the border of the Californias could be utilized to not only restore the Colorado River Delta but also to protect river, estuarine, and coastal water quality in the Tijuana–San Diego metropolitan region.<sup>1</sup>*

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1. The article is based upon the author's dissertation research of water quality politics in the Tijuana–San Diego metropolitan region. The author spent three years using participant observation, document analysis, and intensive interviews for collecting data. Due to the

## INTRODUCTION

Within the past decade, water resources scholars, government agencies, and water supply agencies have started to examine the links between long distance transbasin water transfers, water quality, and watershed ecosystem degradation. Water resources policy makers and scholars who stress the connections between water quality and watershed ecosystem health with transbasin diversions support a hydrocommons based approach.<sup>2</sup> Hydrocommons based water quality management is a regional approach towards water quality management and governance.<sup>3</sup> What differentiates the hydrocommons approach from watershed based approaches to water quality management is that hydrocommons governance recognizes the environmental links between the region that sends or exports water and the region that receives water imports.<sup>4</sup> In addition, a hydrocommons approach recognizes the environmental links between water transfers, water pollution of surface and ground waters, and aquatic ecosystems degradation.<sup>5</sup>

In California and Baja California, two major transbasin diversions from the Sacramento and Colorado Rivers provide water to the Tijuana-San Diego metropolitan region. San Diego imports between 75 to 90 percent of its water supply from the Sacramento River Basin, 600 miles north of San Diego, and from the Colorado River, which is approximately 240 miles east of San Diego.<sup>6</sup> The City is negotiating to increase its current supply of water through agriculture to urban transbasin water transfers from Imperial Valley, California. During times of drought, Tijuana imports up to 90 percent of its water supply from the Colorado River and is seeking to

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political sensitivity of the topic and the human subjects requirements of the University of Colorado, Boulder (the university granting the Ph.D. degree), the author cannot reveal the identity of informants in this research. The author apprised all informants of the research project contents and the risks associated with the research participation. A copy of the informant consent form for interviews is provided at the end of the article.

2. See generally Gary D. Weatherford, *From Basin to "Hydrocommons": Integrated Water Management without Regional Governance 1* (Western Water Policy Project Discussion Series Paper No. 5, 1990) (unpublished paper, on file with Natural Resources Law Center, University of Colorado School of Law).

3. See *id.*

4. See *id.*

5. See Suzanne M. Michel, *Place, Politics and Water Pollution in the Californias: A Geographical Analysis of Water Quality Politics in the Tijuana-San Diego Metropolitan Region* 285 (2000) (unpublished Ph.D. Dissertation, University of Colorado (Boulder)) (on file at University of Colorado (Boulder) Library).

6. See *id.* at 287.

increase its allocation of Colorado River water.<sup>7</sup> At present, both cities are working together to investigate the possibility of constructing a binational aqueduct to transport increasing amounts of Colorado River water to the Tijuana–San Diego Metropolitan region.<sup>8</sup>

This article delineates the hydrocommons that connects the Tijuana–San Diego metropolitan region to the Colorado River and the consequent border water quality and ecosystem degradation problems caused in part by Colorado River transbasin diversions. After a review of environmental problems caused by these transbasin diversions, the article turns to an analysis of hydrocommons based governance and the applicability of such governance to improve water quality and supply problems caused in part by Colorado River transbasin diversions. In California, a hydrocommons based governance program is underway to address the water quality degradation associated with transbasin diversions from Northern California's Bay-Delta estuary region. This hydrocommons project, known as the CALFED process, links governance of water supply, water quality, and restoration of the Bay-Delta estuary ecosystem.

A hydrocommons based governance entity connecting the lower Colorado River Basin with expanding urban regions in Southern California and Tijuana has not been implemented, but certain organizations have initiated work groups and conferences to examine this governance option. For these organizations, hydrocommons based management makes sense because in this western part of the U.S.–Mexico border region, the primary waterways are not large river basins (such as the Río Grande in the eastern borderlands). Instead, Southern California's and Northern Baja California's primary waterways are a network of manmade canals and aqueducts that divert Colorado River water to agricultural fields in the Mexicali and Imperial Valleys, and west to expanding urban regions such as Los Angeles, Tijuana, and San Diego.

### WHAT IS A HYDROCOMMONS?

Before discussing the hydrocommons that exists along the border between California and Baja California, it is important to understand water transfers. Water transfers are defined in the United States as the process of moving water supplies through a complex of water storage and distribution systems from areas of lesser need to areas of greater need.<sup>9</sup> Water transfers may occur either within a watershed (intrabasin), or beyond the natural

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7. *See id.*

8. *See id.*

9. *See* WATER EDUCATION FOUNDATION, LAYPERSON'S GUIDE TO WATER MARKETING & TRANSFERS 1-4 (1996).

watershed boundaries (transbasin diversions).<sup>10</sup> Water transfers can occur between agricultural interests or firms, or between agricultural and urban users. Water supply agencies and politicians in Tijuana and San Diego cite transbasin water transfers as advantageous because the transfers assure a long term, reliable water supply that meets the demands of the growing urban binational economy and population.<sup>11</sup>

According to Gary D. Weatherford, once a transbasin water diversion or transfer is made, the sending and receiving basins/watersheds are linked.<sup>12</sup> This linkage, made via the transfer, erases the natural boundaries of both sending and receiving basins.<sup>13</sup> When transbasin water transfers are established by conveyance systems such as storage reservoirs and aqueducts, the receiving basin becomes dependent upon the sending basin for water.<sup>14</sup> In addition, the sending basin is no longer self-contained because water is diverted beyond its natural basin boundaries. Areas downstream of the diversion now receive less water. Consequently, the sending region's water quality and aquatic ecosystems downstream of the diversion are altered.<sup>15</sup> In essence, transbasin diversions "cause hydrologic basins to be reshaped, breached and bonded by hydraulics resulting in hybrid basins."<sup>16</sup> These hybrid basins, which are tied together by man-made plumbing, are known as hydrocommons.<sup>17</sup> What is important to understand is that the creation of the hydrocommons results in altered hydrology, water quality, ecosystems, economies, and even land use patterns in both the sending and receiving watersheds/basins.<sup>18</sup> Consequently, in regions that rely on transbasin diversions such as the Tijuana-San Diego metropolitan region, Weatherford and other hydrocommons proponents argue that watershed or river basin management should be viewed actually as hydrocommons management.<sup>19</sup>

Figure One details the hydrocommons that provides water to urban regions in Southern California and Northern Baja California. The total amount of Colorado River transbasin diversions for Southern California and Northern Baja California (agriculture and urban) range between six to eight million acre-feet each year.<sup>20</sup> These transbasin diversions, along with

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10. See *id.* at 4-5.

11. See Michel, *supra* note 5, at 286.

12. See Weatherford, *supra* note 2, at 5-6.

13. See *id.*

14. See *id.*

15. See Michel, *supra* note 5, at 287-88.

16. See Weatherford, *supra* note 2, at 3.

17. See *id.*

18. See Michel, *supra* note 5, at 288.

19. See *id.*

20. See *id.* at 290.

other diversions from the Colorado River Basin, are the primary cause of numerous water and land based environmental degradation problems along the California and Baja California border.<sup>21</sup> Currently, laws and governmental organizations in the United States do not adequately address the links between transbasin diversions, water quality, and habitat destruction. In Mexico, government water resources organizations at the federal and state levels govern water supply in conjunction with water quality. Laws and infrastructure planning, however, rarely address the connections between transbasin diversions, water quality, and wetlands habitat destruction.

### ESTABLISHING HYDROCOMMONS CONNECTIONS BETWEEN THE LOWER COLORADO RIVER BASIN AND THE TIJUANA-SAN DIEGO METROPOLITAN REGION

#### Colorado River Transbasin Diversions for San Diego

As shown in figure one, San Diego's source of Colorado River water comes from the Colorado River aqueduct, an aqueduct owned and operated by Metropolitan Water District of Southern California (MWD).<sup>22</sup> <sup>23</sup> San Diego County Water Authority is the water supply organization that buys water from MWD, and subsequently sells this imported water to various water districts and cities in the San Diego region.<sup>24</sup> In 1998, San Diego County Water Authority imported 490,000 acre-feet of water from MWD.<sup>25</sup> This imported water is a blend of State Water Project water from the Northern California Bay-Delta estuary and the Colorado River. According to the City of San Diego Manager's Report, dated March 24, 1999, the city of San Diego has received several unsolicited offers for water transfers from Central Valley, Northern California, and the Colorado River basin.<sup>26</sup> One

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21. *See id.*

22. *See id.* at 330.

23. Metropolitan Water District of Southern California (MWD) was formed in 1928, pursuant to California's Metropolitan Water District Act. *See* CAL. WATER CODE (APP.) §§ 109-1 to 109-551 (West 1995). MWD represents 240 cities and unincorporated areas and serves 17 million people in six counties of Southern California. *See* ARTHUR L. LITTLEWORTH & ERIC L. GARNER, CALIFORNIA WATER 13-15 (1995); Metropolitan Water District of Southern California, *Fact Sheet* (visited Oct. 20, 2000) <<http://www.mwd.dst.ca.us/Docs/AboutMWD/FactSheet/factsheet.htm>>.

24. *See* Michel, *supra* note 5, at 331.

25. *See id.*

26. *See id.*



main issue for San Diego is conveyance of imported water supplies. How can San Diego transport and store the imported water? How will conveyance be financed?

San Diego actively supports an increase in water supplies because local government officials cite that San Diego's population will increase from 2.8 million in 1999 to 3.6 million in 2015.<sup>27</sup> In addition, water supplies

27. See *id.*

need to be long term and reliable to support San Diego's 87 billion dollar economy.<sup>28</sup> By 2015, San Diego County Water Authority officials estimate that San Diego's growing economy and population will nearly double the region's demand for water supplies to 868,700 acre-feet per year.<sup>29</sup> One key provision of San Diego's plan to increase its water supply is for Imperial Irrigation District (IID) to transfer or sell Colorado River water directly to the San Diego County Water Authority.<sup>30</sup> <sup>31</sup> This water transfer agreement was approved by the San Diego County Water Authority Board of Directors in 1998. The agreement proposes to transfer 200,000 acre-feet per year for an initial term of 45 years.<sup>32</sup> San Diego County Water Authority may increase the water transfer amounts to a total of 300,000 acre-feet, and renew the water transfer agreement for an additional 30 years.<sup>33</sup>

The San Diego County Water Authority–Imperial Irrigation District water transfer represents San Diego's move to obtain its own water imports in addition to those it now receives from Metropolitan Water District of Southern California (MWD).<sup>34</sup> At present, all of San Diego's imported water is supplied by MWD.<sup>35</sup> By 2015, San Diego County Water Authority proposes to reduce MWD imports by 25 percent.<sup>36</sup> However, even with its own water supplies from IID, San Diego is still dependent upon MWD to transport the water from the Colorado River.<sup>37</sup> At present, the only way for San Diego County Water Authority to transport IID water is through the

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28. See *id.*

29. San Diego County Water Authority, Presentation: Future Water Supply Reliability for San Diego County, at the Smart Growth Water Resources Specialty Group, San Diego, Cal. (Mar. 31, 1999) (copies of slides on file with author).

30. *Id.*

31. The California legislature supported this transfer by setting aside \$235 million for use on a number of farm water conservation measures in IID. These measures should save agricultural water so that IID may transfer or sell conserved water to the San Diego County Water Authority. See Michel, *supra* note 5, at 332.

32. See *id.*

33. See San Diego County Water Authority, *supra* note 29.

34. Critics cite that San Diego's need for independence from MWD is resulting in water transfer deals that force San Diego county water users to pay more for water. The IID water transfers indeed support this assertion. IID pays the U.S. Bureau of Reclamation \$12.50 per acre-foot of Colorado River water. If the IID–San Diego County Water Authority transfers are approved, IID will sell water to San Diego County Water Authority for \$200 per acre-foot of water, which may increase to around \$306 per acre-foot of water. Based upon other agriculture to urban water transfers in California (Central Valley Project water, for example), critics state that San Diego should pay between \$165 to \$185 per acre-foot of water. One critic estimates that for the initial 45 year, 200,000 acre-foot contract, San Diego ratepayers will spend \$1.1 billion more than they should be paying for water. See Steven P. Erie, *San Diego/Imperial Valley Water Deal: Who Stands to Gain? Who to Lose?*, METRO INVESTMENT REPORT, June 1997, at 1, 1-2.

35. See Michel, *supra* note 5, at 333.

36. San Diego County Water Authority, *supra* note 29.

37. See Michel, *supra* note 5, at 334.



Colorado River aqueduct, an aqueduct owned and operated by MWD.<sup>38</sup> Negotiations for the wheeling rate (transport fees) of IID water with MWD have been problematic at best. San Diego wants to keep costs down on the transportation fees and claims that MWD's wheeling rate is yet another example of MWD overcharging their customers.<sup>39</sup> On the other hand, MWD, which has built, financed, and continues to maintain the aqueduct and water treatment facilities, asserts that San Diego should pay for these services in the wheeling or transportation rates. As a result of these tense negotiations concerning the use of MWD's aqueduct, San Diego is looking to the south to work with Tijuana to build a second aqueduct. This aqueduct would transport IID water transfers and Tijuana's increasing Colorado River water allocations to the San Diego-Tijuana metropolitan region.<sup>40</sup>

### Colorado River Transbasin Diversions for Baja California and Tijuana

According to water laws throughout the United States, individual states are empowered to appropriate water. In Mexico, however, all waters are owned and appropriated by the nation.<sup>41</sup> States, irrigation districts, and municipalities cannot own water and appropriation cannot be done without federal government supervision and approval.<sup>42</sup> In addition, Mexican water law and appropriation decisions encompass not only water supply but water quality, including regulation of diverted waters once they are utilized and discharged.<sup>43</sup> The federal organization that has jurisdiction over planning, permitting, and enforcement of water resources (quality and quantity) is the *Comisión Nacional del Agua* (CNA), or the National Water Commission.<sup>44</sup>

Tijuana's current allocation of Colorado River water is 2,537 liters per second.<sup>45</sup> This water is delivered by the Río Colorado-Tijuana Aqueduct, an aqueduct operated and maintained by the State Water Service Commission or the *Comisión de Servicios de Agua del Estado* (COSAE).<sup>46</sup> The

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38. See *id.*

39. See *id.*

40. See *id.*

41. See *id.* at 336.

42. See *id.*

43. See *id.* Given the recent election of opposition party Vicente Fox (PAN) as Mexico's president, however, administration of water rights may change.

44. See *id.*

45. Comisión Nacional del Agua, Presentation: Panorámica de los Recursos Hídricos en Baja California, at the Border of the Californias Water Recycling Plan Workshop, International and Boundary Water Commission, San Diego, Cal. (Aug. 12, 1999) (handout on file with author).

46. See Michel, *supra* note 5, at 339.

water organization that delivers water to Tijuana's water users (imported and locally developed water supplies) is a state agency, the *Comisión Estatal de Servicios Públicos de Tijuana* (CESPT). This agency provides both water and wastewater services to Tijuana and Rosarito Beach, a community approximately 16 miles south of Tijuana.<sup>47</sup> Table one<sup>48</sup> provides a breakdown of sources of potable water for Tijuana as of July 1999.

TABLE ONE: Water Production in Tijuana, July 1999

Source of Water Supply	Liters per Second	Acre-feet per year
Surface Water: Presa Rodriguez (Rodriguez Dam)	2,250	56,612
Surface Water: Presa Carrizo (Carrizo Dam)	789	19,852
Tijuana-Alamar River Aquifer	40 (capacity: 200)	1,006 (capacity 5032)
Colorado River-Tijuana Aqueduct*	0 (capacity: 4000)	0 (capacity: 100,645)
Water Supplies Sent to Rosarito Beach	- 144	- 3,623
<b>Total</b>	<b>2, 935</b>	<b>73,847</b>

\*Tijuana's allocation of Colorado River Water is 2,537 liters per second or 63,834 AF/year

As shown in table one, during the month of July 1999, Tijuana did not use its allocation of transbasin diversions from the Colorado River. CESPT can obtain water from the Colorado River Aqueduct, but the state agency in charge of the aqueduct, COSAE, does not operate the aqueduct until Tijuana runs out of local surface and groundwater supplies, usually in years with drought conditions.<sup>49</sup> This action saves the state from paying high energy costs to pump water over the mountains between Tijuana and the Colorado River.<sup>50</sup> In addition, the current aqueduct is in poor structural condition, and there is significant water loss as water is delivered from the Colorado River to Tijuana.<sup>51</sup>

Like San Diego, Tijuana seeks to increase its water supplies to support a growing economy and population.<sup>52</sup> By 1999, Tijuana's popula-

47. See *id.*

48. See *id.*

49. See *id.* at 340.

50. See *id.*

51. See *id.*

52. See *id.*

tion was 1.2 million people, and by 2010 the *Comisión Estatal del Agua* (CEA) estimates the population will be well over two million.<sup>53</sup> Tijuana's rapid population growth rate poses for CESPT a tremendous challenge to provide potable water for all city residents. This is an especially difficult task since state and municipal agencies receive little or no financial income from the federal government.<sup>54</sup> It is estimated that by 2004 water rationing will start for Tijuana.<sup>55</sup> According to a local newspaper, Tijuana has four options to solve its water shortage problem.<sup>56</sup> First, Tijuana may retrofit and modernize the existing aqueduct.<sup>57</sup> Second, the city may construct a second aqueduct.<sup>58</sup> Third, it may construct desalinization plants, and fourth the city may use wastewater reclamation as a supplemental source of water.<sup>59</sup>

### The Tijuana–San Diego Binational Aqueduct

The government-sponsored proposal to build a binational aqueduct for the Tijuana–San Diego metropolitan region has its roots in the Border Water Council. The Border Water Council was formed in 1998 and was designed as a forum for water agencies in Tijuana and San Diego to discuss binational solutions to water resources management in the Tijuana–San Diego metropolitan region.<sup>60</sup> As of May 2000, the primary mission of the Border Water Council is to investigate the possibility of constructing a binational aqueduct to deliver water from the Colorado River to the Tijuana–San Diego metropolitan region.<sup>61</sup> During the summer of 1999, Border Water Council representatives completed a technical report and submitted a draft memorandum of agreement (MOU) to the International Boundary and Water Commission (IBWC).<sup>62</sup> On October 14, 1999, IBWC signed Minute 301.<sup>63</sup> The Minute established the scope, the plan and

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53. Comisión Estatal del Agua, Presentation: Baja California–Programa de Infraestructura Hidráulica para el Saneamiento Ambiental y Suministro de Agua Potable in Tijuana, B.C., Mex. (Aug. 5, 1999) (handout on file with author).

54. See Michel, *supra* note 5, at 340.

55. See *Cross-Border Proposal Aims at Region's Water Shortage*, SAN DIEGO DIALOGUE, Aug. 1999, at 1, 8-9.

56. See Héctor Javier González Delgado, 2004: *Sin Agua*, ZETA, Aug. 13-19, 1999, at 16A.

57. See *id.*

58. See *id.*

59. See *id.*

60. See Michel, *supra* note 5, at 342.

61. See *id.*

62. See *id.*

63. *Joint Colorado River Water Conveyance Planning Level Study For The San Diego, California –Tijuana, Baja California Region*, IBWC Minute 301 (Oct. 14, 1999), available at <<http://www.ibwc.state.gov/FORAFFAI/MINUTES/min301.htm>>.

responsibilities of the binational aqueduct investigation.<sup>64</sup> Funding for this investigation is \$3 million.<sup>65</sup> San Diego County Water Authority will provide \$500 thousand and the California Department of Water Resources will provide \$2.5 million.<sup>66</sup>

There is a second, private proposal by two Mexican businessmen for a Tijuana-San Diego binational aqueduct. Francisco Molina, director of the Mexican development company EMTEC, and Gastón Luken Aguilar, chairman of the board of Proxima Gas, propose building a binational aqueduct and power plant in Mexico.<sup>67</sup> This aqueduct would have a capacity of 525,230 acre-feet per year, with up to 300,000 acre-feet of IID water for San Diego, and 225,230 acre-feet of water for Tijuana.<sup>68</sup> The total cost of the aqueduct power plant project is estimated at \$800 million.<sup>69</sup>

Despite the two proposals, a binational aqueduct faces political and legal challenges in both Mexico and the United States. On the U.S. side, the funding source will determine what laws will apply to such a project.<sup>70</sup> If federal funding is provided, then the National Environmental Policy Act (NEPA)<sup>71</sup> requires an Environmental Impact Study (EIS). In addition, if project funding is drawn from the North American Development Bank (NADBank),<sup>72</sup> the project must receive certification from the Border Environmental Cooperation Commission (BECC).<sup>73</sup> Both the NEPA EIS and BECC certification processes entail extensive public review and participation. In addition to federal legal requirements, it is unclear as to how other Colorado River Basin states will react to yet another aqueduct or "straw" that will draw water from an already over-allocated Colorado River.<sup>74</sup> At the 1997 Public Officials for Water and Environmental Reform Conference on California Water Policy, the "second" aqueduct for Southern California question was posed to water agency representatives from Nevada and Arizona. Both representatives stated an emphatic "no" to a second aqueduct.<sup>75</sup>

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64. See *id.*

65. See Steve La Rue, *U.S., Mexico Set Aqueduct Study*, SAN DIEGO UNION-TRIB., Sept. 7, 1999, at B1.

66. See *id.*

67. See *Cross-Border Proposal Aims at Region's Water Shortage*, *supra* note 55, at 1, 8-9.

68. See *id.*

69. See *id.*

70. See Michel, *supra* note 5, at 344.

71. 42 U.S.C. §§ 4321- 4370 (1994).

72. The 1994 NAFTA Environmental Accord created NADBank to assist communities and potential buyers in the financial design and structure of environmental infrastructure projects.

73. See Michel, *supra* note 5, at 344.

74. See *id.*

75. See *id.*

Concerning the IID water transfers, San Diego County Water Authority faces two legal hurdles. The first is the completion of an Environmental Impact Report and public review process, as required by the California Environmental Quality Act.<sup>76</sup> In addition, the transfers must be approved by the State Water Resources Control Board (SWRCB).<sup>77</sup> For this approval, the SWRCB will examine the type of transfer or the mechanism used to free up water for the transfer (fallowing, crop shifting, substitution of ground water for surface irrigation, or conserved water, for example).<sup>78</sup> Also, the State Board must examine third-party impacts or economic consequences to rural communities sending water to San Diego.<sup>79</sup> Farmers and other local business owners in Imperial Valley fear that the IID water transfers could result in fallowing of farmlands and a subsequent decline of Imperial County's local economy, which is dependent upon agriculture.<sup>80</sup> Finally, California prohibits water transfers that would unreasonably affect fish and wildlife.<sup>81</sup> The SWRCB will evaluate environmental impacts, and if significant environmental impacts are determined, the SWRCB may require an environmental water allocation, or a transfer tax to fund environmental water transfers.<sup>82 83</sup>

Concerning agricultural to urban water transfers from the Mexicali Valley to Tijuana, it is unclear if and how these transfers will occur. Since water use in the Mexicali Valley accounts for 81 percent of Mexico's Colorado River water supplies, the CNA plans to examine techniques that may increase agriculture water use efficiency in the irrigation districts.<sup>84</sup> These techniques include more precise measurement of consumptive water

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76. CAL. PUB. RES. CODE §§ 21000-21178.1 (West 1996).

77. *See id.*

78. *See id.* at 345.

79. *See id.*

80. *See* WATER EDUCATION FOUNDATION, *supra* note 9, at 2-3, 18.

81. *See* Michel, *supra* note 5, at 345.

82. *See id.*

83. The IID-San Diego water transfers also incur a possible international water conflict. One method to free up water for the transfer is to line the All-American Canal in Imperial Valley. This conservation method has been approved by IBWC and is funded by the state of California. The lining will save IID an estimated 100,000 acre-feet per year. However, water from the All-American Canal has seeped into an aquifer, and most of this aquifer is located in Mexico. For decades, farmers in the Mexicali Valley have used this groundwater for irrigation agriculture. The lining will reduce a significant amount of recharge for the aquifer, an estimated 80,000 acre-feet each year. Farmers in the Mexicali Valley strongly oppose this lining and continue to bring up the topic in binational forums and conferences. *See* Roman J. Calleros, *The Impact on Mexico of the Lining of the All-American Canal*, 31 NAT. RESOURCES J. 829, 829-38 (1991); Douglas L. Hayes, *The All-American Canal Lining Project: A Catalyst for Rational and Comprehensive Groundwater Management on the United States-Mexican Border* 31 NAT. RESOURCES J. 803, 803-27 (1991).

84. Mexicali Valley is one of Mexico's most productive agricultural regions. *See* Hayes, *supra* note 83, at 803.

use, water conservation, and water reclamation, resulting in more Colorado River water for Tijuana.<sup>85</sup> CNA, however, does not support water transfers from Mexicali Valley as the only source of water to fulfill Tijuana's growing water demands.<sup>86</sup> CNA plans to examine the feasibility of desalinization plants to supply water for the expanding urban regions on the west coast of Baja California.<sup>87</sup>

At the state level, the State Water Commission (CEA) and the State Commission of Water Services (COSAE) are the two state agencies that are the strongest supporters of a second aqueduct for Tijuana.<sup>88</sup> According to the COSAE State Hydraulic Plan, the 1992 National Water Law allows for the sale of irrigation water rights.<sup>89</sup> The water rights' acquisitions may occur in three ways. First, Tijuana or the State could rent agricultural land in Mexicali and thus obtain water rights attached to the land.<sup>90</sup> Second, the land and the water rights could be sold to Tijuana or the state.<sup>91</sup> In these two cases it seems that the agricultural land may be fallowed for the water transfers. The third strategy is to substitute reclaimed water for irrigation uses in the Mexicali Valley.<sup>92</sup> The unused Colorado River water would then be transported to Tijuana.<sup>93</sup> In COSAE's discussion of water transfers neither third party nor environmental impacts are addressed.<sup>94</sup> CEA officials, however, support the water transfers but remain quiet on how the transfers will occur.<sup>95</sup>

In this section, the status of Colorado River transbasin diversions and the status of the binational aqueduct proposal have been detailed. In the next section, environmental consequences of increased diversions from the Colorado River to the Tijuana-San Diego metropolitan region will be discussed. Since this study is focused upon water quality in the Tijuana-San Diego metropolitan region, this section will focus upon the environmental impacts of increased Colorado River transbasin diversions to the receiving region of the hydrocommons, the Tijuana-San Diego metropolitan region. Environmental consequences of transbasin diversions in receiving regions are an aspect of hydrocommons governance ignored by most water resources policy makers and scholars.

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85. See Michel, *supra* note 5, at 346.

86. See *id.*

87. See *id.* at 347.

88. See *id.*

89. COMISIÓN DE SERVICIOS DE AGUA DEL ESTADO (COSAE), PLAN ESTATAL HIDRÁULICO 1994-2015, at 77-78 (1994).

90. See *id.*

91. See *id.*

92. See *id.*

93. See *id.*

94. See Michel, *supra* note 5, at 347.

95. See *id.*

## COLORADO RIVER HYDROCOMMONS CONNECTIONS AND ENVIRONMENTAL CONSEQUENCES

### The Sending Region: The Colorado River Delta and Upper Gulf of California

According to Professor Daniel W. Anderson, Professor of Wildlife Biology at the University of California, Davis, four linked areas in Baja California and California need immediate wetland restoration attention. These are the Klamath Basin, the San Francisco Bay-Delta estuary, the San Joaquin Valley, and the Río Colorado (Colorado River) Delta region.<sup>96</sup> The latter delta, often referred to as California's "Other" Delta (the preeminent delta being the San Francisco Bay-Delta estuary), is a wetland ecosystem that, to date, has largely been ignored by policy makers in California and Baja California. Like the Bay-Delta estuary, the Río Colorado Delta has been dramatically altered by transbasin diversions from the Colorado River.<sup>97</sup>

At the turn of the century, the Río Colorado Delta was the largest and most diverse desert wetland system in North America.<sup>98</sup> This delta spanned an enormous area, more than 150 miles long and 100 miles across.<sup>99</sup> The Delta supported between 200-400 plant species in various habitats from forests, to grasslands, to tidal wetland marshes and estuaries.<sup>100</sup> Aldo Leopold, a highly esteemed U.S. environmentalist, described the region as one of hundreds of green lagoons, awesome jungles, and lovely groves.<sup>101</sup> In addition, nutrients, sediment loads, and fresh water from the Colorado River supported not only the Delta wetland habitat but also the diverse and productive Upper Gulf of California marine ecosystem.<sup>102</sup> Mexico's Upper Gulf of California, also known as the Sea of Cortez, was once a place of biological richness and a seemingly limitless source of fish for food, for commerce, and for sport.<sup>103</sup> In this marine

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96. See Daniel W. Anderson, *Saving More than the Salton Sea*, UC MEXUS NEWS, Summer 1999, at 2, 2-3.

97. See JASON I. MORRISON ET AL., *SUSTAINABLE USE OF WATER IN THE LOWER COLORADO RIVER BASIN* 21-26 (1996).

98. See *id.*

99. See SARAH F. BATES ET AL., *SEARCHING OUT THE HEADWATERS: CHANGE AND REDISCOVERY IN WESTERN WATER POLICY* 115 (1993).

100. See MORRISON ET AL., *supra* note 97, at 21-26.

101. See BATES ET AL., *supra* note 99, at 115.

102. See Michel, *supra* note 5, at 350.

103. See Kathryn Vincent, *Science and Policy in "The Hollow of God's Hand,"* UC MEXUS NEWS, Summer 1999, at 1, 4-5.

ecosystem, a gulf shrimp fishery and commercial sports fishing industry once thrived.<sup>104</sup>

In 1999, Colorado River transbasin diversions in the United States and Mexico dramatically reduced the natural flow of water, silt, and nutrients to the Colorado River Delta and the Upper Gulf of California.<sup>105</sup> Except for rare high flood years (for example, 1983 and 1998), the entire flow of the river is diverted and used.<sup>106</sup> The reduced Colorado River flow has desiccated the Delta and the Upper Gulf estuaries. Today, wetland habitat exists but only where agriculture drainage water is discharged or where there is groundwater flow.<sup>107</sup> Estuary habitat in the Upper Gulf of California is probably the most endangered habitat because the estuaries no longer contain adequate amounts of freshwater flow to support estuary ecosystems.<sup>108</sup>

Due to the amount of wetland habitat that has been lost, a number of species that depend upon the Colorado River Delta and the Upper Gulf ecosystem are threatened or endangered. One group of threatened species is migratory birds (brown pelicans, white pelicans, Virginia rails, least bitterns, white-face ibis, green-backed heron, and black-crowned heron) that use the Delta wetlands and the Sea of Cortez as a place for resting and breeding within the Pacific Flyway system.<sup>109</sup> In addition, marine ecosystems in the Upper Gulf of California have degraded due to diminished Colorado River flows.<sup>110</sup> Local fishermen and biologists in the Gulf of California area assert that the decline in Gulf shrimp and commercial fish catches such as the totoaba is due to the lack of nutrient-rich water inflow from the Colorado River into the Gulf of California.<sup>111 112</sup>

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104. See Michel, *supra* note 5, at 350. See generally M.F. Lavin & Salvador Sánchez, *On How the Colorado River Affected the Hydrography of the Upper Gulf of California*, 19 CONTINENTAL SHELF RES. 1545, 1545-47 (1999) (describing how the marine ecosystem was before alteration of the Colorado River by dams).

105. See Michel, *supra* note 5, at 350.

106. See MORRISON ET AL., *supra* note 97, at 22; Edward P. Glenn et al., *Effects of Water Management of the Wetlands of the Colorado River Delta*, 10 CONSERVATION BIOLOGY 1175, 1175-86 (1996).

107. See Glenn et al., *supra* note 106, at 1175-86.

108. See *id.*

109. See Anderson, *supra* note 96, at 2. The Pacific Flyway system consists of wetlands that host migrating waterfowl as they travel north or south along the west coast of North and South America.

110. See Michel, *supra* note 5, at 353.

111. See *id.*; Manuel S. Galindo-Bect et al., *Analysis of the Penaeid Shrimp Catch in the Northern Gulf of California in Relation to Colorado River Discharges* (n.d.) (unpublished manuscript, on file with author).

112. Today, due to transbasin diversions, wetlands exist in California that are part of the Delta wetland ecosystem. The largest and most biodiverse wetland/marine ecosystem is the Salton Sea, a terminal saline lake located 35 miles north of the U.S.-Mexico border and 90 miles



Given that the United States is diverting most of the Colorado River water (15 million or more acre feet) and the 1944 treaty<sup>113</sup> grants Mexico only 1.5 million acre-feet of Colorado River water, Mexican responses to save the Río Colorado Delta and Upper Gulf ecosystem are localized and limited at best.<sup>114</sup> One response by universities in Baja California is to document the hydrological and geomorphological (i.e., sediment flows) effects of reduced Colorado River flows in the Upper Gulf of California.<sup>115</sup> In addition, university researchers have created artificial fisheries for the endangered totoaba, which needs Delta estuary habitat for spawning.<sup>116</sup> In 1993, the Mexican government set aside 2.3 million acres of water and land within the Delta and the Upper Gulf as a United Nations Biosphere Reserve.<sup>117</sup> Over 400,000 acres are designated as a core zone, limiting activities to research, small-scale shell harvesting, and limited ecotourism.<sup>118</sup> For the manager of the Delta Biosphere Reserve and wetlands advocates in the United States and Mexico, the major goal of the reserve is obtaining fresh water flows from the Colorado River.<sup>119</sup>

## COLORADO RIVER HYDROCOMMONS CONNECTIONS AND ENVIRONMENTAL IMPACTS

### The Receiving Region—The Tijuana–San Diego Metropolitan Region

A San Diego–Baja aqueduct study is a good idea. But dare we hope that the worthies studying the idea will plan what to do

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east of San Diego. Ironically, the Salton Sea receives agricultural wastewater (IID water diverted from the Colorado River), which in turn creates wetland habitat, while the Colorado River Delta wetlands are drying up due to lack of water. The Salton Sea now supports a rich aquatic ecosystem and high levels of avian biodiversity. This ecosystem, however, is experiencing increasingly largescale mortality events for both fish and waterfowl species. IID–San Diego County Water Authority water transfers could endanger this ecosystem because less water inflow into the Salton Sea will increase salinity and pollutant levels. For a detailed study of the Salton Sea and its links to the Colorado River Delta, see MICHAEL J. COHEN ET AL., *PACIFIC INSTITUTE, HAVEN OR HAZARD: THE ECOLOGY AND FUTURE OF THE SALTON SEA* (1999).

113. Treaty Regarding the Utilization of Waters of Colorado and Tijuana Rivers and of the Rio Grande, Feb. 3, 1944, U.S.–Mex., 59 Stat. 1219.

114. See Michel, *supra* note 5, at 354.

115. See *id.* at 355.

116. See *id.*

117. See Vincent, *supra* note 103, at 4; Water Education Foundation, *Deciding About the Colorado River Delta*, RIVER REPORT, Spring 1999, at 4.

118. See Vincent, *supra* note 103, at 4; Water Education Foundation, *supra* note 117, at 4.

119. See *id.* at 4–5. How much flow is the question. Because the Delta is located within an arid desert region with intermittent precipitation and hence river flow patterns, Dr. Edward Glenn from the University of Arizona asserts that around 500,000 acre-feet every three to four years would support riparian habitat in the Delta. However, the amount needed for marine and estuary ecosystem restoration has not been determined.

with the water after it has been flushed into Baja's sewers? And ours too, for that matter. This year for the first time in decades, I have not needed medical attention for infected sinuses and ears. Because this year, for the first time in decades, I have not gone into our ocean. Cleaning up the water we already have should be of first importance.<sup>120</sup>

The above editorial sums up a concern not thought of in the construction and management of hydrocommons. What are the land use and subsequent water quality impacts of the diversion to the region that receives the transbasin diversions? In addition, if there are environmental impacts in the receiving region caused in part by transbasin diversions, should not these impacts in the receiving region be a consideration in proposals that seek to increase water imports from the Colorado River?

As demonstrated by the above editorial, an increase in water imports and water quality is directly proportional to increases in water supply and wastewater flows.<sup>121</sup> In Mexico, because state and federal level hydraulic plans evaluate both water supply use and wastewater discharges, the correlation between developed water supply and wastewater discharges is easy to plot. Saul Guzman reviewed the water supply and wastewater discharge data in CNA and CEA hydraulic plans.<sup>122</sup> His analysis revealed that between 1984 and 1999 Tijuana's developed water supply has nearly doubled.<sup>123</sup> The increase of water supply resulted in a threefold increase in wastewater discharges and a threefold increase in uncontained wastewater flows.<sup>124</sup> What is not evident from Guzman's analysis of the state and federal documents is an analysis of the quality of wastewater effluent.

In San Diego, there is much discussion as to the cumulative amount of water imported to the city. Unlike Mexican agencies, which integrate water and wastewater management and regulation, there is little discussion by California's wastewater and water agencies concerning the cumulative loads of wastewater discharged into Southern California's coastal waters. In 1998, the Southern California Coastal Water Research Project (SCCWRP) completed an analysis of the four largest municipal wastewater treatment

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120. See John Herman, Letter to Editor, *The Second-Pipe Plan is Just a Pipe Dream*, SAN DIEGO UNION-TRIB., Sept. 17, 1999, at B11.

121. See EDWARD R. OSANN & JOHN E. YOUNG, *SAVING WATER SAVING DOLLARS: EFFICIENT PLUMBING PRODUCTS AND THE PROTECTION OF AMERICA'S WATERS* 13 (1998). See generally Charles Gunnarson, *Costs of Water Supply and Wastewater Disposal: Forging the Missing Link*, in *WATER AND THE CITY: THE NEXT CENTURY* 185 (Howard Rosen & Ann Durkin Keating ed., 1991).

122. See Saul Guzman Garcia, *La Contaminación del Acuífero del Río Tijuana* 99-100 (Aug. 25, 1998) (unpublished Masters thesis, El Colegio de La Frontera Norte) (on file with author).

123. See *id.*

124. See *id.*

facilities discharging effluent into Southern California's coastal waters. One noticeable trend is the 99 percent wastewater flow increase for San Diego's Point Loma Wastewater Treatment Plant between 1971 and 1995.<sup>125</sup> The study cites that population growth patterns, regional industry types and numbers, presence or absence of water reclamation programs, and inland discharge sources account for the differences among the plants.<sup>126</sup> In addition, the study states that even though wastewater flow volumes have increased in Southern California, the amount of certain pollutants discharged has decreased.<sup>127</sup> For example, in 1971 the four plants discharged nearly 600 metric tons each of copper and chromium.<sup>128</sup> By 1996, approximately 6.5 metric tons of chromium and 49 metric tons of copper were discharged by the plants.<sup>129</sup> Between 1971 and 1996, oil and grease discharges decreased by 76 percent.<sup>130</sup> However, this and other wastewater discharge studies have not analyzed trends in bacterial and viral pathogen discharges because scientific research has yet to produce cost effective and accurate tests to monitor these biological contaminants.

An increase of wastewater flows entails a need for more and larger pipelines to collect and convey the wastewater to municipal wastewater treatment plants.<sup>131</sup> Given the increased water supply and urban population growth in the San Diego-Tijuana metropolitan region, environmentalists in San Diego and Tijuana claim that the city planning process does not address the resultant need to increase daily sewage capacity and sewage maintenance.<sup>132</sup> In essence, more pipelines entail more inspections, cleaning, and replacement of pipes. In addition, environmentalists assert that both cities fail to address sewage spills before they occur.<sup>133</sup> Instead, elected officials

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125. See Valerie Raco-Rands, *Characteristics of Effluents from Large Municipal Wastewater Treatment Facilities in 1996* (visited Oct. 20, 2000) <<http://www.sccwrp.org/pubs/annrpt/97/ar01.htm>>. The Orange County Sanitation District wastewater flow increased 82 percent and the Hyperion Treatment Plant, 7 percent. However, the Joint Water Pollution Control Plant volumes decreased by 11 percent. According to the 1998 NPDES permit, Point Loma discharged an average of 194 million gallons per day of advance primary treated effluent. See Michel, *supra* note 5, at 370.

126. The study did not cite an increase in developed water supply as a possible cause of increased wastewater discharges. In 1972, San Diego County Water Authority imported 339,852 acre-feet; in 1998 imported water amounts totaled to 433,490 acre-feet. See Michel, *supra* note 5, at 370.

127. See Raco-Rands, *supra* note 125.

128. See *id.*

129. See *id.*

130. See *id.*

131. See Michel, *supra* note 5, at 371.

132. See *id.*

133. See *id.*

spend money on an emergency basis to fix sewage spills.<sup>134</sup> According to the lead water quality activist Donna Frye,

You can only fit so much stuff into a pipe. San Diego is building projects and adding users. Where you had a single family home, you now have a twelve unit condo building; where you had a mom and pop store, you now have a mini-mall. We are dealing with the problems after the fact. When looking at a pipe that is 50 years old, the answer to the question: Should we have repaired our pipes earlier? is self evident.<sup>135</sup>

The problems surrounding wastewater infrastructure and urban growth lead us to a controversial yet necessary topic that must be addressed before considering the cumulative impacts of nonpoint source pollution to California's and Baja California's watersheds and coastal waters. In essence, what is the relationship between imported water and urban growth? According to water resources scholars Mark Reisner, Bob Gottlieb, and Donald Worster, from a historical perspective, Los Angeles' and San Diego's urban population numbers could not increase without an increase of imported water.<sup>136</sup> Tijuana's rapid population growth rate (5.8 percent per year) also has been accompanied by a two-fold increase of developed water supplies between 1984 and 1999.<sup>137</sup> However, Southern California Metropolitan Water District cites that its aggressive conservation measures have resulted in the District's population increasing by 2.8 million between 1987 and 1997, without an increase of water supplies.<sup>138</sup>

Given these conflicting points of view on the links between imported water and urban growth, probably the more appropriate question is whether an increase of water imports encourages expansion of urbanized land use. In both cities, urban centers are not only growing in population numbers but also in square miles of urbanized region. The amount of urban expansion, however, does differ. According to Lina Ojeda's historical analysis of native habitat acreage in the Tijuana River watershed, in 1938, Tijuana, which occupies the lower part of the watershed, covered less than

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134. See *id.*

135. Bradley Weaver, *Road Congestion in the Pipeline for Point Loma*, THE PENINSULA BEACON, July 22, 1999, at 1.

136. See generally MARK REISNER, CADILLAC DESERT: THE AMERICAN WEST AND ITS DISAPPEARING WATER (1986); ROBERT GOTTLIEB, A LIFE OF IT'S OWN: THE POLITICS AND POWER OF WATER (1988); DONALD WORSTER, RIVERS OF EMPIRE: WATER, ARIDITY AND THE GROWTH OF THE AMERICAN WEST (1985).

137. See Michel, *supra* note 5, at 373.

138. Interviews with Annette Hubbell, Senior Government Relations Representative, Southern California Metropolitan Water District, in San Diego, Cal. (Jan.-June 1999).

one percent of the watershed, or 17.35 square miles.<sup>139</sup> By 1994, Tijuana's urbanized region had extended to over seven percent of the watershed or 121.45 square miles for 1,035,415 residents.<sup>140</sup> San Diego's urbanized region can best be estimated by the total square miles of urban services, such as sewerage service, that are provided.<sup>141</sup> San Diego's Metropolitan Wastewater Department's (MWW) sewerage service area, which encompasses the city of San Diego and 15 cities and districts, is 450 square miles.<sup>142</sup> Within this service area, MWW serves approximately 2,000,000 residents. Given these numbers, Tijuana's urban population density is approximately 8,500 persons per square mile, and San Diego's is 4,444 persons per square mile.

Since both cities import water supplies and urbanized regions are increasing, it seems that for this binational region water imports encourage urban consumption of land. However, one can clarify the imported water-urban expansion link controversy by asking a simple question: What is the intended use of the imported water? If the use of the imported water is to build more residential and industrial units in regions that were previously not urbanized, then imported water supports urban consumption of land. For the Tijuana-San Diego metropolitan region, local politicians' and water agencies' rhetoric supports increasing imported water supplies to build more homes and high tech and tourism based economies.<sup>143</sup> In terms of the Imperial Irrigation District-San Diego County Water Authority transfers, a staff member of the State Water Resources Control Board believes that San Diego's developers intend to use the IID water to build new homes. This use of water is problematic to this staff member as she/he asks, "What happens after the transfer contract expires in 75 years, and IID decides to sell this water to another water user?"<sup>144</sup> In

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139. See Lina Ojeda Rivah, *Land Use and the Conservation of Natural Resources in the Tijuana River Basin*, in *SHARED SPACE: RETHINKING THE U.S.-MEXICO BORDER ENVIRONMENT* 211, 227 (Lawrence A. Herzog ed., 1999).

140. See *id.* See also Paul Ganster, *Sustainable Development in the San Diego Tijuana Region: A View from San Diego* 6 (May 15, 1998) (unpublished discussion paper prepared for the University of California, San Diego, Center for U.S. Mexican Studies Binational Community Forum) (on file with author).

141. See Michel, *supra* note 5, at 374. The extent of sewerage and piped water service can be considered the urban limit line for the San Diego region. Environmentalists in the region assert that this urban limit line is constantly being extended, and never enforced.

142. See *id.* MWW does not service urban regions in the north part of San Diego County, a region that is rapidly growing in terms of urban growth and sprawl, especially for cities such as Oceanside.

143. See *id.* at 375.

144. Representative of the State Water Resources Control Board, Comment at the Public Officials for Water And Environmental Reform Conference in Los Angeles, Cal. (Oct. 14-15, 1999).

Tijuana, land use planners are also preparing for tremendous growth along major highways between Tijuana and Tecate to the east, and Tijuana and Rosarito Beach to the south.<sup>145</sup> One planner in Tijuana relayed to me that he would like to see more centralized urban development.<sup>146</sup> However, landowners along these highway corridors are lobbying local politicians to allow for Tijuana's urban expansion.<sup>147</sup>

Urban growth and expansion are critical in terms of the region's water quality. The U.S. Environmental Protection Agency, coastal water pollution non-governmental organizations such as the American Oceans Campaign, Heal the Bay, and San Diego BayKeeper, and other experts assert that urban growth and its consequent land cover change are the primary cause of the ever-increasing amounts of nonpoint source pollution present in Southern California's and Baja California's coastal waters.<sup>148</sup> A recent Los Angeles Times report articulates how polluted runoff travels and enters coastal waters:

A drop of rain plunks onto a sidewalk in downtown Los Angeles. Spilling over the curb, it whirls down the drain. Five hours later, after coursing 18 miles through the heart of the city, the storm water—carrying every germ and chemical it encountered along the way—splashes into the ocean at Playa del Rey.

Everyday rain or shine, enormous quantities of potentially toxic wastes, from human sewage to garden pesticides to metals that flake off roofs and car brake pads, are washed from streets and yards onto the beaches Southern Californians cherish.<sup>149</sup>

Urban expansion and increasing population growth exacerbate urban polluted runoff in two ways. First, increasing populations generate more contaminants.<sup>150</sup> Second, when regions urbanize there is an increase

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145. See Michel, *supra* note 5, at 375.

146. Anonymous interview. See *supra* note 1.

147. Interview with Carlos B. Graizbord, Director of Instituto Municipal de Planeación, in Tijuana, B.C., Mex. (Aug. 19, 1999).

148. See Michel, *supra* note 5, at 376. See also Ted Morton, American Oceans Campaign, *Draining to the Ocean: The Effects of Storm Water Pollution on Coastal Waters* (visited Oct. 20, 2000) <<http://www.americanoseans.org/runoff/draining.htm>>. Nonpoint source pollution does not originate from a single source. Instead, it is human/animal waste, chemicals, oil, and other substances that have collected on the ground, are washed off by water flows, and eventually enter and pollute watersheds and coastal waters. Nonpoint source pollution includes urban polluted runoff and storm water runoff as well as pollution from other diffuse sources. See Michel, *supra* note 5, at 376.

149. Marla Cone, *Runoff Remedies Will Be Complex, Costly*, L.A. TIMES, Sept. 6, 1999, at A1.

150. See Morton, *supra* note 148.

of impervious surface area.<sup>151</sup> These impervious surfaces do not allow rainwater to be absorbed by vegetation or soils, and, hence, storm water runoff flows in greater velocities and volumes to surface waters.<sup>152</sup> Pollutants such as oil, copper, fertilizers, bacteria, and viruses are picked up by runoff and discharged untreated into surface waters via the storm water conveyance system. Furthermore, impervious areas such as asphalt or concrete greatly impede the natural pollutant filtration system that allows rainwater to percolate into the soil or accumulate in wetland regions.<sup>153</sup>

In essence, as the surface area of impervious surfaces expands, there will be a concomitant increase of urban runoff flows.<sup>154</sup> As urban populations grow there is a greater concentration of nonpoint source contaminants that enter urbanized regions' storm drains, rivers, and coastal waters.<sup>155</sup> Between 1972 and 1995 Southern California's urban runoff and its toxic compounds have increased over 1100 percent.<sup>156</sup> In 1995, almost 800 billion gallons of polluted runoff flowed into the 13 largest rivers between Ventura County and the U.S.-Mexico border.<sup>157</sup> Table two<sup>158</sup> summarizes

**TABLE TWO: Southern California Runoff Pollutants  
Historical Increases**

Pollutant (in metric tons)	1972	1995	% Change
Copper	18	88	+389
Zinc	101	316	+213
Lead	90	39	-57
Nitrate	980	8,800	+798
Phosphorous	410	2,900	+607
<b>Total Runoff (gallons)</b>	<b>63.9 billion</b>	<b>771 billion</b>	<b>+1,106%</b>

151. See *id.*; Michel, *supra* note 5, at 376.

152. See Morton, *supra* note 148; Michel, *supra* note 5, at 376-78.

153. See Morton, *supra* note 148; Michel, *supra* note 5, at 376-78.

154. See Michel, *supra* note 5, at 378; Bay Steven & Kenneth Schiff, *Impacts of Stormwater Discharges on the Nearshore Environment of the Santa Monica Bay* (visited Oct. 20, 2000) <<http://www.sccwrp.org/pubs/annrpt/96/ar-11.htm>>.

155. See Morton, *supra* note 148.

156. See Cone, *supra* note 149.

157. See *id.* The amount of polluted runoff reflects urban runoff flows that occur during the region's wet season (November through April), and the region's dry season (May through October). Due to water imports to the region, rivers (including the Tijuana River) that should be dry during the region's dry season, now flow year round.

158. See Cone, *supra* note 149 (source: Southern California Coastal Water Research Project).

the major pollutants found in Southern California's polluted runoff and the amounts in metric tons deposited in coastal waters.<sup>159</sup>

Along with the increase of urban polluted runoff, for the past 30 years Southern California's surfing community and Baja California's beach community residents have noticed an increase in infections and illnesses in swimmers and surfers who spend long periods of time in ocean water—especially after a storm event. This concern for the health consequences of urban-based water pollution is reflected in the quote from the San Diego Union Tribune editorial at the beginning of this section. Viral and bacterial pathogens are present in polluted runoff.<sup>160</sup>

Pathogens can afflict swimmers and surfers when polluted ocean water enters their ears, nose, or mouth.<sup>161</sup> Surfers exposed to pathogens risk contracting gastroenteritis, hepatitis, ear nose and throat infections, respiratory ailments, diarrhea, rashes, and other illnesses.<sup>162</sup> In 1995, the Santa Monica Bay Restoration Project and University of Southern California researchers conducted an epidemiological study to examine the health effects of swimming near storm drain outfalls in the Santa Monica Bay. The study

compar[ed] individuals swimming at the outfall location with those swimming 400 yards away, [and] found substantial increases in experiencing fever, chills, ear discharges, vomiting, coughing with phlegm, respiratory diseases and gastrointestinal illness among those swimming directly in front of the outfalls.<sup>163</sup>

The study confirmed what surfers had been claiming for decades. There is an increased risk of illness associated with swimming near storm drain outfalls (the discharge outlets for polluted runoff).<sup>164</sup>

Given the above discussed environmental impacts in both the sending and receiving regions of the hydrocommons serving Southern California and Baja California, certain organizations are calling for hydrocommons governance along the border of the Californias.<sup>165</sup> These

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159. See *id.* For the San Diego-Tijuana region, urban runoff is identified as a primary source of pollution for semi-enclosed water bodies such as the San Diego Bay, Mission Bay, and the Tijuana River Estuary.

160. See Morton, *supra* note 148, at ch.3.

161. See *id.*

162. See *id.*

163. See *id.*

164. See *id.*

165. See generally MORRISON ET AL., *supra* note 97. Organizations such as the Southwest Center for Biodiversity and the Southern California Watershed Alliance work to protect migratory waterfowl and aquatic habitat in the Salton Sea and the Lower Colorado River Basin.



organizations support hydrocommons based management because Southern California and Northern Baja California's primary waterways are not large river basins but a web of manmade canals and aqueducts, a hydrocommons that facilitates Colorado River transbasin diversions. In California, a hydrocommons based management program known as CALFED is currently underway to address water quality and wetlands degradation of Northern California's Bay-Delta estuary.

### **CALFED: LINKING WATER RESOURCES GOVERNANCE FOR NORTHERN AND SOUTHERN CALIFORNIA**

#### **The Scope of Hydrocommons Governance**

According to the California Department of Water Resources, Northern California's San Francisco Bay/Sacramento/San Joaquin River Delta-Estuary is a "unique and valuable resource, and an integral part of California's water system."<sup>166</sup> Like the Río Colorado Delta, Northern California's Bay-Delta region supports a vast estuary (the largest on the west coasts of North and South America), and its blend of fresh and salt water supports a wide diversity of plant and animal life, including chinook salmon, steelhead trout, and Pacific herring.<sup>167</sup> Transbasin diversions from the Bay-Delta estuary establish probably the most wide ranging and complex hydrocommons in North America. The Bay-Delta estuary provides water to California's two largest transbasin water transfer projects: the California Department of Water Resources State Water Project (SWP) and the U.S. Bureau of Reclamation Central Valley Project (CVP). Water from these projects supports agriculture in the San Joaquin Valley.<sup>168</sup> In addition, Bay-Delta estuary hydrocommons provides water to cities in Northern California and to over 22 million people in Central and Southern California, including San Diego.<sup>169</sup>

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166. See CAL. DEP'T OF WATER RESOURCES, SACRAMENTO-SAN JOAQUIN DELTA ATLAS 1 (1995).

167. See CALFED, CALIFORNIA'S BAY-DELTA: THE PROBLEM, THE PROCESS AND THE POTENTIAL 3 (1998); WATER EDUCATION FOUNDATION, LAYPERSON'S GUIDE TO THE DELTA 10 (1998).

168. See CALFED, *supra* note 167 at 3; WATER EDUCATION FOUNDATION, *supra* note 167 at 2.

169. See CALFED, *supra* note 167 at 3; WATER EDUCATION FOUNDATION, *supra* note 167 at 2.

As with the Río Colorado Delta, interbasin transfers have altered the Bay-Delta estuary's water quality and wetland ecosystems.<sup>170</sup> In addition, regions receiving water from the Bay-Delta are now dependent upon these imported water supplies for agriculture and burgeoning urban populations. In certain cases such as San Diego, politicians from the Bay-Delta estuary hydrocommons receiving regions are lobbying for increased Bay-Delta water diversions.<sup>171</sup> After years of conflict between federal agencies, state agencies, and Bay-Delta water users, in May 1995 Governor Pete Wilson established CALFED as a consortium of 15 state and federal agencies.<sup>172</sup> CALFED is a regional water organization whose primary goal is to develop a consensus based hydrocommons governance with the purpose of restoring the Bay-Delta estuary.<sup>173</sup>

According to water resources scholar and practitioner Elizabeth Rieke, before any solutions can be determined by CALFED, the scope of this new regional water organization must be defined.<sup>174</sup> Elizabeth Rieke's definition of the scope of a regional water organization encompasses three dimensions: substantive, geographic, and temporal.<sup>175</sup> Substantive scope entails what resource problems will be integrated and hence addressed by a new regional water governance entity. In California, numerous water organizations confine their scope to a single resource sector integration (such as water supply or wastewater treatment only).<sup>176</sup> However, CALFED's substantive scope has moved beyond focusing on a single resource sector. The substantive scope of CALFED integrates four general resource areas—ecosystem restoration, water quality, water supply reliability, and levee system integrity.<sup>177</sup> In addition, CALFED differentiates itself from previous basin management projects because it recognizes that

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170. See Michel, *supra* note 5, at 297-300. Bay-Delta estuary water quality is not only important for Delta wildlife, but for California residents who use the water for drinking water purposes. According to water supply agencies, as water travels through the Delta the water quality degrades as it mixes with drainage water from cities and farms and with seawater intrusion from the San Francisco Bay. In addition, as detailed above, transbasin diversions also result in higher concentrations of salts and pollutants in Bay-Delta water downstream of the diversions. See *id.*

171. See *id.* at 293.

172. See CALFED, *supra* note 167, at 4.

173. See *id.*

174. See ELIZABETH RIEKE, DESIGN OF A NEW REGIONAL CALFED ENVIRONMENTAL RESTORATION IMPLEMENTATION ORGANIZATION: PRELIMINARY CONSIDERATIONS 12 (1998).

175. See *id.*

176. See *id.* at 12-13. The exception to this generalization would be certain U.S. watershed organizations, such as the Los Angeles & San Gabriel Rivers Watershed Council and Mexico's national watershed council (*consejo de cuenca*) program. See generally Michel, *supra* note 5, at 205-84.

177. See Michel, *supra* note 5, at 307.

problems in one resource area (such as ecosystem restoration) cannot be solved effectively without addressing problems in all four areas at once.<sup>178</sup>

There are numerous ways to define the geographic scope of a regional water organization. Some regional water resources entities are defined spatially by the boundaries of political regions (nations, states or municipalities), while others are defined by natural boundaries such as a watershed.<sup>179</sup> Yet, the Bay-Delta estuary hydrocommons does not adhere to political nor natural boundaries. Figure Two demonstrates CALFED's geographic scope. Its scope divides the hydrocommons into two regions. The first is the problem region, which is defined as the region experiencing degrading levels of water quality and subsequent aquatic/land based habitat destruction.<sup>180</sup> According to CALFED, the problem region is defined as the Bay-Delta estuary area.<sup>181</sup> Since the hydrocommons involves transbasin diversions, the geographic scope for developing solutions includes a much broader area. The second region, the solution region, encompasses the regions or places within and beyond the boundaries of the problem region that may contribute to identified resource problems, and thus be integral to solving resource problems.<sup>182</sup>

The third component of Rieke's scope for regional water organizations, temporal scope, defines whether the entity will resolve short or long term solution. CALFED was formed to provide a long-term 30-year plan or solution.<sup>183</sup> CALFED's timeline is divided into three phases. The first phase is an identification of the appropriate range of solution alternatives.<sup>184</sup> During the second phase, CALFED will develop an environmental assessment of solution alternatives.<sup>185</sup> The third phase is project implementation and governance.<sup>186</sup> On July 27, 2000, CALFED released its final environmental impact statement/environmental impact report for public review. It is believed that CALFED will enter the third phase of project implementation and governance within the following year.<sup>187</sup>

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178. See CALFED, CALFED BAY-DELTA PROGRAM: PROGRAM SUMMARY 6 (1999).

179. See Michel, *supra* note 5, at 307.

180. See *id.*

181. See *id.* at 310.

182. See *id.* In addition to the hydrocommons geographic scope, CALFED incorporates a problemshed geographic scope. A problemshed geographic scope is defined by problem and solution regions.

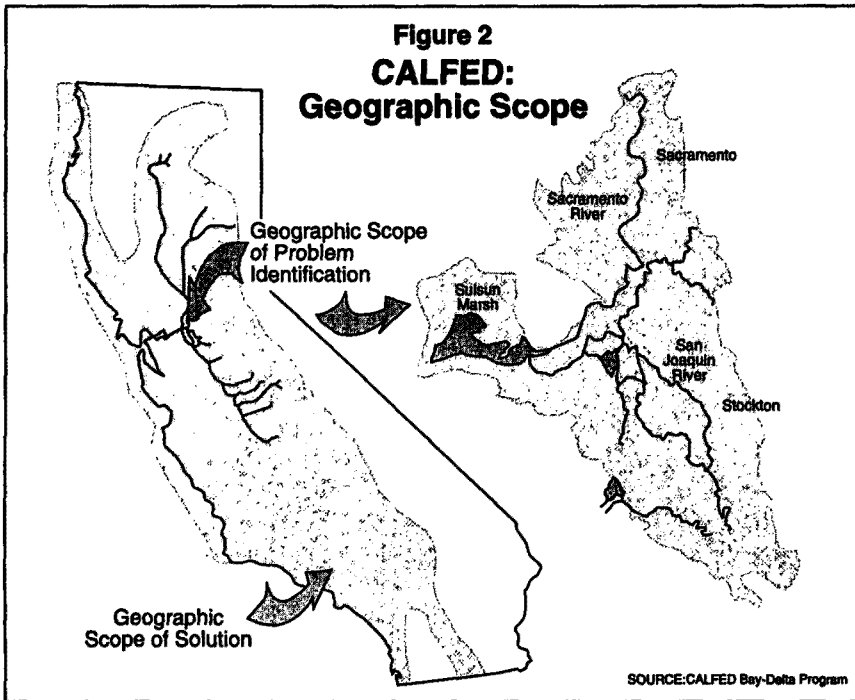
183. See *id.*

184. See *id.*

185. See *id.*

186. See *id.*

187. Interview with Francis Spivey-Weber, Executive Director, Policy Mono Lake Committee, in Los Angeles, Cal. (July 28, 2000).



There are two reasons why CALFED participants cite CALFED's substantive and geographic scope as advantageous. First, CALFED's defined scope, which integrates the four resource areas and the geographic range of the hydrocommons, has resulted in an expanded range of choice among technical solutions to resource problems within the Bay-Delta estuary.<sup>188</sup> Such an integration recognizes that problems in one resource area can create problems in the other three resource areas. For example, degraded water quality in the Bay-Delta estuary can result in aquatic species mortality events.<sup>189</sup> Subsequently, the range of choice among

188. See generally Michel, *supra* note 5, at 285-413. The concept "range of choice" is one formulated by geographer Gilbert White. According to White the range of choice principle is significant because unwise water resources decisions often result from misperception or unawareness of potentially good alternatives. Essentially, the range of choice principle is similar to the alternatives analysis required by the National Environmental Policy Act (NEPA) or the California Environmental Quality Act (CEQA). See James L. Wescoat Jr., *The 'Practical Range of Choice' in Water Resources Geography* 11 *PROGRESS HUM. GEOGRAPHY* 41, 41-59 (1987). See generally Michel, *supra* note 5, at 1-46 & 285-413.

189. See Michel, *supra* note 5, at 297.

solutions for CALFED is expanded from one resource area to four. In addition, the resource problems in the Delta are not limited to the geographic boundary of the Bay-Delta estuary itself or to its watershed but to the entire hydrocommons. Hence, CALFED's expanded substantive and geographic scope allows for solutions that improve "not just the part that seems to be the problem [the Bay-Delta estuary in this case] but all parts of the system that contains it."<sup>190</sup>

Second, CALFED's broad substantive and geographic scope is perceived as advantageous because, in part, it corrects "existing institutional deficiencies associated with an inappropriately narrow or fragmented management regime."<sup>191</sup> In the United States, resource management organizations usually are limited to one sector resource management. Such a fragmented resource management strategy does not recognize the relationships between various resource areas (such as water supply and quality, for example). Moreover, the fragmentation could limit the range of choice among solutions available to decision makers. Finally, agency fragmentation creates barriers for public and/or stakeholder participation in the water quality governance process, as explained by a Southern California Metropolitan Water District official and CALFED participant:

CALFED brings all the players under one regional authority. Before, everything was so fragmented. You would go to many meetings, have your ten minutes in the spotlight then move on to the next meeting. It was time consuming and it took up too much energy. Now you can concentrate all your energy on one project with the main stakeholders.<sup>192</sup>

**TABLE THREE: Scope of Regional Water Organization—CALFED**

Substantive: What Resource Problems Integrated?	Geographic: Geographic Range of Defined Problem and Solutions	Temporal: Short or Long term	Scope of Conflict: Expanded or Limited
Ecosystem Restoration, Water Quality, Water Supply Reliability, Levee System Integrity	Hydrocommons Problemshed	Short term: Complete EIR/EIS Long term: 30 year management plan	Expanded via: Public Participation, Bay Delta Advisory Committee, Work groups

190. PAUL HAWKEN ET AL., *NATURAL CAPITALISM: CREATING THE NEXT INDUSTRIAL REVOLUTION* 123 (1995).

191. See RIEKE, *supra* note 174, at 13.

192. Anonymous Author interview of CALFED participant. See *supra* note 1.

Hence, according to this water district official, CALFED's broad substantive and geographic scope essentially makes the participation in the water governance process easier. The question remains, what is CALFED's governance structure? A brief summary of this topic is provided below.

### CALFED Governance

In July 2000, CALFED's federal/state agency representatives and consultants completed the final draft of the environmental impact statement (EIS)/environmental impact report (EIR) as required by the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA). The EIS/EIR identifies the range of general resource management strategies to address the four resource problems. The general resource management strategies are ecosystem restoration; a longterm levee protection plan; water quality improvement; water use efficiency; water transfers, storage, and conveyance; and watershed management.<sup>193</sup> In addition to a delineation of strategies, both the EIS and EIR analyze three alternative solutions with the recommendation of a preferred alternative.<sup>194</sup> However, state and federal agency generation of the EIS/EIR is one part of CALFED's governance. Besides defining the substantive, geographic, and temporal scope, CALFED has devoted time and resources to define or restate the scope of conflict and to identify those government agencies and other stakeholders that potentially merit formal representation during the CALFED decision making process.<sup>195</sup> The "scope" of an environmental conflict is defined as the extent to which the audience (the public and other stakeholders) is involved in the conflict. According to this theory, powerful organizations assert their power by limiting the scope (such as limiting public or outside participation) of a conflict.<sup>196</sup> Conversely, weaker organizations hope to change the balance of power by expanding the scope (i.e. inviting public or outside participation) of an environmental conflict.<sup>197</sup> The defined scope of conflict could be added as a fourth element of Rieke's defined scope, as portrayed in table three. As stated in a CALFED information booklet, "Ultimately, it is the active participation of the entire public that will help fix the Bay-Delta."<sup>198</sup>

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193. Interview with Francis Spivey-Weber, *supra* note 187.

194. *Id.*

195. See generally E.E. SCHATTSCHEIDER, *THE SEMISOVEREIGN PEOPLE: A REALIST'S VIEW OF DEMOCRACY IN AMERICA* (1960).

196. See generally *id.*

197. See generally *id.*

198. See CALFED, *Commonly Asked Questions About the CALFED Bay-Delta Program*, (visited Oct. 20, 2000) <[http://calfed.ca.gov/general/new\\_q&a.html](http://calfed.ca.gov/general/new_q&a.html)>.

There are two mechanisms in CALFED that support an expanded scope of conflict. The first is done via a public citizen outreach participation process.<sup>199</sup> The second is the Bay-Delta Advisory Council (BDAC).<sup>200</sup> BDAC is a federally chartered advisory council of more than thirty representatives from the Native American tribes and the state's leading urban, agricultural, business, environmental and fisheries interests.<sup>201</sup> BDAC's primary function is to review documents and/or presentations of work groups sponsored by CALFED and make policy recommendations during the EIR/EIS process.<sup>202</sup> CALFED created the work groups to evaluate and obtain consensus on solutions for particular resource problems. Membership in work groups is open to anyone who attends work group sessions. There are numerous work groups addressing resource challenges. One work group addresses ecosystem restoration, for example, and within the past year a watershed work group was formed. Every two months, BDAC meets and reviews documents and/or presentations produced by the workgroups. Below are reflections of one BDAC representative interviewed. Although this representative viewed the BDAC process as one with flaws, this person believes that public participation via BDAC and the work group process has expanded the range of choice among water resources management solutions in the CALFED decision making process.

*What is BDAC and what are its functions?*

BDAC is an advisory body and it does give opinions pretty freely; it doesn't reach consensus. It is not like a watershed group that targets those things on which it can agree and leaves those things on which it can't agree on the side. BDAC goes straight to those things on which it can't agree and it stays there.

BDAC meets about every two months for a day, day and a half. For example, they get a presentation from the ecosystem restoration work group for two hours, and they comment on it. BDAC representatives comment from their own perspective, which often has more to do with fear of what might happen rather than a real understanding of what is happening. Overall I would say the comments are not taken very seriously. The biggest problem with BDAC is that it is not taken very seriously because the people in BDAC are more political than technical. They say what they are ex-

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199. See Michel, *supra* note 5, at 316.

200. See *id.*

201. See *id.*

202. See *id.*

pected to say, or what their group sponsor would like to say. If your group is not appointed to BDAC, that perspective is not represented. That is true of inner city groups and U.S.-Mexico border groups. Only one indigenous representative is appointed to BDAC.<sup>203</sup>

*If there are problems with BDAC, then why are you an advocate of expanding stakeholder and citizen participation in the CALFED process?*

There were CALFED staff members [government agency staff] who were absolutely confident they knew how to fix the Bay-Delta—add a peripheral canal,<sup>204</sup> and add more storage, which meant building dams. It was the old 1950s way of water resources management. They were sure they were doing it right. By opening it up to the public via BDAC and the work groups, numerous other alternatives came in—doing watershed management in the Sierra Nevadas and Southern California; doing more with conservation; [and] bringing groundwater management agencies in on the process. That's what has come from public participation: looking at a much broader menu of alternatives. It is messier, but it is more likely to be useful in the future. The messiness of public participation has resulted in having CALFED's options enlarged.<sup>205</sup>

One alternative or critique that has entered into the CALFED process via public participation is a rethinking of the geographic range of problems and solutions, or the geographic scope of the CALFED organization. Two broad coalitions, watershed groups in the Sierra Nevadas and urban watershed groups in northern and southern California, assert that CALFED's geographic scope of problem identification needs to be expanded.<sup>206</sup> Watershed groups in the Sierra Nevadas, a region where snowpack provides most of the water to the Bay-Delta estuary, believe that CALFED-proposed solutions (especially the proposals supporting building

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203. How does one get appointed to BDAC? The author does not know for all stakeholders, but for environmental representation CALFED asked the Environmental Water Caucus to choose BDAC representatives. The Environmental Water Caucus is the largest coalition of environmental organizations working on California's water problems.

204. The peripheral canal is labeled as the open channel isolated facility in CALFED documents. The peripheral canal is not a new concept, it was proposed in the 1960s and signed into law by California governor Jerry Brown in 1980. In 1982, a successful petition drive to recall Governor Brown's decision put the peripheral canal on the ballot for a vote. In June 1982, California voters repealed Brown's peripheral canal legislation. See generally NORRIS HUNDLEY, JR., *THE GREAT THIRST: CALIFORNIANS AND WATER, 1770s-1990s*, at 299-349 (1992).

205. Anonymous author interview. See *supra* note 1.

206. See Michel, *supra* note 5, at 319.



a peripheral canal and dams) would take water away from the mountain watersheds, thus causing resource problems such as the destruction of montane meadow ecosystems in the Sierra Nevadas.<sup>207</sup>

Urban-based watershed groups argue that the geographic scope of problem definition should be expanded because, as argued above for the San Diego-Tijuana metropolitan region, increased amounts of transbasin diversions result in expanding urbanized regions, which in turn exacerbate the problem of nonpoint source pollution or polluted runoff in urban regions that receive the water.<sup>208</sup> Subsequently, watershed movements involved in the CALFED process call for watershed protection in not only the sending region of the hydrocommons, but also for the receiving region as demonstrated by the statement below taken from a letter to CALFED from urban watershed/environmental justice groups:

Water management decisions (especially those made without a connection to land use) can promote sprawl and can result in increased infrastructure costs to urban residents as well as increased concentrations of non-point source pollution in urban streams and waterways....Our communities already suffer from deteriorating infrastructure and polluting industries, and we want to ensure that CALFED programs do not add to these burdens.<sup>209</sup>

In essence, both the Sierra Nevada and urban watershed groups claim that the Bay-Delta estuary is not the only problem region in the Bay-Delta hydrocommons. These mountain and urban watershed groups view transbasin diversions as causing problems in mountain (sending regions) and urban watersheds (receiving regions) of the Bay-Delta estuary hydrocommons.<sup>210</sup> The narrative below details the evolution of watershed activism within the CALFED hydrocommons governance and new governance ideas presented by the Sierra Nevada-urban watershed group alliance:

When the watershed work group got set up in CALFED, they started meeting monthly. In June 1999, the Draft EIR/EIS was released and there was finally a document to show saying, here is a document that will be managing water and will affect your watershed. We wanted to ask watershed groups throughout California, where are you in this document? So a community development organization in the Sierra Nevada got funding to hire a consultant to go and work with

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207. *See id.* at 319-20.

208. *See id.* at 320.

209. *See id.* at 397.

210. *See id.*

Southern California watershed groups. The goal was to develop statements in the response to the EIR/EIS. The consultant found fifty-seven groups organized in Southern California. Some are quite large, like the Los Angeles and San Gabriel Rivers Watershed Council; some are quite small and organized around a lagoon. These groups have been identified; some have been spoken to; some are commenting. Where we will go next is to create more of a sense of identity among watershed groups in Southern and Northern California.

During the summer of 1999, a presentation was made by the CALFED watershed work group to the BDAC. What we saw were very professional, very knowledgeable people who had organized their local areas. They knew the players; they knew the experts and the political powers; they knew the problems. They had already sorted through issues that would be very hard to work on, and issues which would be easy to work on. What they were saying to CALFED, if you will work with and through us at the local level—we are not trying to replace you at the state level—but if you will use us as your outlet at the local level, we will be able make sure that the various programs you are trying to put together are integrated. That was the key message, if you want to integrate these large CALFED programs, and they have to be integrated to work, and be cost effective, work through the watershed groups and where you don't have watershed groups, then you should be trying to get one organized.

If I were setting up a new BDAC, I would make sure that watershed representatives were at the core of the BDAC. Because they can see the connection between the issues of ecosystem restoration, water quality, and various issues dealt with. They can see the connection between the big CALFED issues and local implementation. Watershed groups are not going to cover everything that needs to be covered, but it would give a much stronger basis of practical discussion.<sup>211</sup>

Critics of CALFED cite that CALFED has spent so much time listening to numerous stakeholders and trying to accommodate all stakeholders that a decision will never be made.<sup>212</sup> In Spring 2000, California Governor Gray Davis' administration and the Department of Interior stopped the dialogue and put together a draft record of decision. It is not

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211. Anonymous author interview. *See supra* note 1.

212. Interview with Francis Spivey-Weber, *supra* note 187.

clear if CALFED's decision will be the best option to restore the Bay-Delta estuary ecosystem, and there is a possibility that certain stakeholders who do not agree with the conclusions of the draft EIR/EIS may stall the CALFED process even further by filing a lawsuit.<sup>213</sup>

This analysis demonstrates that CALFED, although problematic, is a success story in terms of advancing democracy in water resources governance in California. CALFED is the first attempt to recognize the geographic range of hydrocommons-caused resource problems. In addition, CALFED's commitment to public participation or an expanded scope of conflict has resulted in an expanded range of choice among alternatives not only for dealing with resource problems in the Bay-Delta estuary, but resource problems in mountain watersheds and receiving regions such as urban watersheds in Southern California as well. Finally, as demonstrated by the above narrative on the watershed work group, CALFED participants are experimenting with multi-scale integration and governance of hydrocommons. In other words, besides an overall hydrocommons governance structure, CALFED could implement its broad substantive and geographic scope solutions at the local level via community based watershed organizations.<sup>214</sup>

## LINKING CALFED AND THE COLORADO RIVER

### Hydrocommons Along the Border of the Californias

As indicated above, the watershed groups participating in CALFED are concerned with not only environmental impacts in the sending region, but also with the problem of urban expansion, urban polluted runoff, and subsequent degraded surface and ground water quality of urban regions that receive water imports. Subsequently, in Southern California, watershed groups recognize the importance of the north-south hydrocommons alliances and discussions fostered by CALFED governance. Yet, what about the Colorado River hydrocommons, or, to restate, the east-west connections

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213. *Id.*

214. However, CALFED's governance advances towards democracy in water must continue throughout the implementation phase that will follow the EIR/EIS process. All stakeholders interviewed agreed that CALFED needs to make difficult decisions—decisions that will not please all stakeholders. Moreover, CALFED must be committed to long term Bay-Delta estuary restoration. In essence, it must provide regulatory, financial, and personnel resources that will effectively restore the Bay-Delta estuary ecosystem. Yet, the actual governance of CALFED's implementation is unclear as the governance is one facet of CALFED the public has to review and comment upon. As demonstrated by the above narrative, CALFED's watershed work group and BDAC are discussing governance alternatives. However, it is unclear if the CALFED staff is listening to these discussions.

along the border of California-Baja California that need to be made? Unfortunately for the Colorado River hydrocommons along the border of the Californias, there is neither CALFED nor hydrocommons governance, and, hence, little to no forum to inform the general public of the environmental impacts of transbasin diversions. Furthermore, there is little opportunity for watershed groups to work with government officials to expand the range of choice among alternatives to include watershed protection of both sending and receiving regions of the hydrocommons.

At present, in negotiations for Baja California and California's Colorado River allocations, watershed advocates and numerous stakeholders are excluded from Colorado River negotiations of water transfers and allocations.<sup>215</sup> In addition, the Tijuana-San Diego Border Water Council negotiations concerning the Binational Aqueduct involve only water supply agency staff members from the Tijuana-San Diego region, representatives from the International Boundary and Water Commission, and water resources staff members from the states of California and Baja California.<sup>216</sup> In fact, the general public has not been invited to any Border Water Council meetings with the exception of one meeting in January 1998.<sup>217</sup> San Diego County Water Authority, the lead agency for the Border Water Council, states that Border Water Council meetings and focus groups are kept small at the request of the Mexican government.<sup>218</sup> Additionally, county water authority representatives assert that keeping focus groups small has allowed the groups to obtain consensus and formulate recommendations without much delay. Public input will be asked once recommendations are formulated. Because meetings are closed to the public, critics of the Council are concerned that water users and voters will be unable to hold government entities such as the Border Water Council accountable for their actions.<sup>219</sup> Or more specifically, should not the public be involved in the decision to investigate a binational aqueduct? Should not the public be informed of environmental consequences of increased water imports?

Critics perceive limiting the scope of conflict in the Border Water Council negotiations and the creation of IBWC Minute 301 as a strategy being utilized by San Diego and Tijuana's political leaders to assert their power over other water agencies and stakeholders who seek to use

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215. See Michael Gardner, *Colorado River Water Deal Sealed*, SAN DIEGO UNION-TRIB., Oct. 19, 1999, at A1. (addressing negotiation proceedings for limiting California's allocation of Colorado River to 4.4 million acre-feet (4.4 plan), and noting that many stakeholders, including environmentalists, were locked out of the negotiations).

216. See Michel, *supra* note 5, at 398.

217. See Michel, *supra* note 5, at 402-03.

218. Anonymous author interview. See *supra* note 1.

219. *Id.*

Colorado River water. One San Diego water official stated that the primary reason for Border Water Council's "closed focus group meetings" is that San Diego County Water Authority does not desire participation of other Colorado River water users, especially Metropolitan Water District. In essence, the perception is that MWD's participation would slow the Minute process down, or, worse even, prevent any progress on a binational aqueduct.<sup>220</sup> If San Diego and Tijuana are not successful in constructing the binational aqueduct, San Diego remains dependent upon MWD to transport IID water through MWD's Colorado River aqueduct. Hence, San Diego will not be able to secure its own water imports from IID without the approval or cooperation of MWD. Indeed, it seems that the Border Water Council's limited scope of conflict mentality is one that may very well be rooted in the assertion of power over other Colorado River water users such as MWD. In addition, Border Water Council's limited scope of conflict has resulted in the exclusion of numerous stakeholders, including those who cannot afford expensive water imports, those who wish to restore the Colorado River Delta, and those who desire to protect water quality of the region's coastal watersheds and the Pacific Ocean.

#### **CONCLUSION: HYDROCOMMONS GOVERNANCE ALONG THE BORDER OF THE CALIFORNIAS**

The geography of water resources along the border between California and Baja California demonstrates a network of manmade aqueducts and storage facilities utilized for water transfers. This hydrocommons transports Colorado River water for agricultural uses in the eastern part of the Californias border region, and ultimately west to urban centers on the Pacific Coast. As with other urban regions in Baja California and Southern California, the Tijuana-San Diego metropolitan region is dependent upon water imports for the region's rapidly growing industrial and residential needs. Both San Diego and Tijuana seek to increase Colorado River water imports, and both cities are investigating the possibility of constructing a binational aqueduct to transport imported Colorado River water.

The hydrocommons that supplies water to the Tijuana-San Diego metropolitan region, along with other transbasin diversions within the Colorado River Basin, has resulted in greatly diminished fresh water flows entering the Río Colorado Delta. The diminished freshwater flows have desiccated wetlands in the Delta and threatened migratory waterfowl populations that visit the Delta to breed and rest. In addition, marine

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220. See Michel, *supra* note 5, at 403.

species in the Upper Gulf of California (Gulf shrimp, vaquita, and totoaba) are endangered, in part, by diminished Colorado River flows.

However, transbasin diversions not only adversely impact sending regions such as the Delta, but receiving regions also. In the Tijuana–San Diego metropolitan region, a region which imports up to 90 percent of its water supply, water imports contribute to increasing urban populations and urban consumption of land. This urban expansion results in more contaminants, and an increase of paved surfaces. As with any urbanized region, polluted runoff flows pick up chemicals and germs and then discharge concentrated amounts of bacterial and chemical pollutants into rivers and coastal waters. In both Tijuana and San Diego, polluted runoff is the primary public health risk for surfers and swimmers in the region's surface waters.

Given these environmental impacts in both sending and receiving regions of the hydrocommons that supports Southern California and Baja California, organizations are calling for hydrocommons governance along the border of the Californias. CALFED, a hydrocommons based water quality management program, is currently underway to address the water quality and wetland ecosystem degradation in Northern California's Bay-Delta estuary. The CALFED process has resulted in a restructuring of the scope of regional water resources governance. CALFED's substantive scope integrates four general resource areas—ecosystem restoration, water quality, water supply reliability, and levee system integrity. This expanded substantive scope is significant because CALFED has recognized that problems in one resource sector may cause problems in other resource sectors. Subsequently, the range of choice among solutions is now expanded from one resource sector to four. In addition, even though the Bay-Delta estuary is defined as the problem region, CALFED's geographic scope is expanded beyond the Bay-Delta estuary watershed. Under CALFED, the entire Bay-Delta hydrocommons, including San Diego, is defined as the region in which solutions for the Bay-Delta estuary restoration may be found.

Finally, CALFED has expanded the scope of conflict resulting in an extended public participation process, including open work groups that redefine Bay-Delta hydrocommons problems and propose new solutions. The expanded substantive scope, geographic scope, and scope of conflict have resulted in an expansion of the range of choice among alternatives that not only improve water quality in the Bay-Delta estuary but also CALFED's governance. One innovative suggestion provided by urban watershed groups is that receiving regions must also be considered problem regions because water imports do result in increased wastewater discharges and polluted runoff that contaminates local rivers, estuaries, coastal waters, even local water supplies.

CALFED negotiations, as problematic as they are, have fostered discussion within watershed-based environmental groups in Southern California and Baja California that addresses environmental problems within the Colorado River hydrocommons. Certain water resources scholars and groups would like to apply CALFED as a template to implement hydrocommons based governance for hydrocommons problem regions, such as the Río Colorado Delta and the Salton Sea.<sup>221</sup> In addition, as indicated by the above section on water quality problems in the Tijuana-San Diego metropolitan region, Border Water Council's negotiations to increase water imports and to construct a binational aqueduct have resulted in a public discussion on the links between water imports, urban growth, and coastal water quality. Essentially, at the true end of the pipeline—the ocean outfalls that discharge municipal wastewater and the storm drain outlets that drain onto Southern California and Baja California beaches—another problem, coastal water contamination, is emerging due to increased water transfers along the border of Baja California and California.

By way of conclusion, I suggest that along with a feasibility study of a binational aqueduct for the Tijuana-San Diego metropolitan region (IBWC Minute 301), IBWC should conduct a second feasibility study and learn from the CALFED experience. IBWC and border water resources stakeholders could learn from CALFED's failures and successes and consider the possibility of creating a hydrocommons based binational water council for the Californias border region. This council, as CALFED attempts to do, should be committed to extensive public participation and conduct work groups on hydrocommons problem and solution definitions associated with increased Colorado River water transfers to the Tijuana-San Diego metropolitan region.<sup>222</sup> As evidenced by CALFED's watershed work groups and BDAC, expanded public participation by all stakeholders in hydrocommons governance could result in an expanded range of choice

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221. See generally DALE PONTIUS, COLORADO RIVER BASIN STUDY: REPORT TO THE WESTERN WATER POLICY REVIEW ADVISORY 101 (1996); MORRISON ET AL., *supra* note 97, at 77; COHEN ET AL., *supra* note 112, at 48; Anderson, *supra* note 96, at 3.

222. The author understands that the entire Colorado River hydrocommons is quite large and complex, including water resources management of upper basin states and municipalities such as Denver, Colorado. Certain water resources scholars have asked for a council to manage and govern the entire Colorado River Basin or hydrocommons. See PONTIUS, *supra* note 221, at 101. To address the problems within the entire Colorado River Basin is beyond the scope of this article. This paper provides evidence that a binational council for the U.S.-Mexico Border Colorado River hydrocommons should be considered, especially given the binational aqueduct negotiations. The International Boundary and Water Commission is one agency that has the legal international authority to be the lead agency for this Council. For more details concerning the governance of this proposed binational council, see generally Michel, *supra* note 5, at 285-413.

among technical and governance solutions for the numerous water quality and supply problems caused by transbasin diversions along the California-Baja California border.



**Introduction Letter**  
**(Prepared in English and Spanish)**

Dear Sir or Madam,

Thank you so much for taking some time out to assist me in my research on the water quality governance process within the Tijuana-San Diego metropolitan region. I believe the study will assist all participants in the water quality political process in better understanding the complex, and often confusing process of water quality governance.

Part of my research methodology entails interviewing governmental and non-governmental representatives involved in improving the region's water quality. You will participate in one interview that should last between 45-60 minutes. You may choose any site for your interview—home, office, restaurant etc. Please understand that your participation is voluntary, and you have the right to withdraw your consent or discontinue participation at any time.

I have enclosed an interviewee information form and a listing of my four place based case studies. These enclosures should answer most questions you may have about our interview. Once again many thanks, and if you have any questions, you may reach me by email at:XXXX. I look forward to our interview in the near future.

Sincerely,

Suzanne M. Michel

## **HUMAN SUBJECTS CONSENT FORM**

### **Tijuana-San Diego Water Quality Governance Study Interviewee Information Form (Prepared in English and Spanish)**

You are invited to participate in a study of water quality governance within the Tijuana-San Diego metropolitan region. The research is being conducted by Suzanne M. Michel, Doctorate Degree Candidate in the University of Colorado, Boulder Department of Geography, Boulder CO 80309-0260. Local phone: (619)534-6042. The project is under direction of Professor James Wescoat, Department of Geography, University of Colorado, Boulder, Campus Box 260, Boulder, CO 80309-0260. Phone #: (303) 492-4877. We believe the study will yield new insights concerning water quality governance and citizen participation. These insights will assist all participants involved in improving the region's water quality, and in better understanding the complex, often confusing process of water quality governance.

If you decide to participate, you will be asked to provide information about your participation concerning the region's water quality. You will participate in one interview that should last between 45-60 minutes, and you may be asked to participate in a follow up interview. The topics covered will be your own perception of the water quality, your opinions of current policies/programs concerning water quality within the region, and binational cooperation in water quality management. A benefit from your participation in this study is that you will have access to information concerning your organization's and other organization's participation in water quality politics. The information will be available upon completion of the dissertation, and includes a listing of organizations involved in water quality politics, and an analysis of different place -based approaches of water quality governance (point source vs. watershed approaches for example).

You may choose any site for your interview -- home, office, restaurant etc. Please understand that your participation is voluntary, and you have the right to withdraw your consent or discontinue participation at any time. You have the right to refuse to answer any question(s) for any reason.

One risk concerning your participation could be an untimely release of information. However, we are taking the following precautions to prevent any release of information. All your responses will be kept confidential. Your identity, organizational affiliation will be kept confidential. No information will be shared with other individuals and organizations until completion of the dissertation. Your interview will be identified by code number and the data (including tape recordings) will be available only to the myself and my faculty advisor, Dr. James Wescoat. If anecdotal data is recorded, all identifying material will be modified to maintain confidentiality. All interview tapes and files will remain locked and secure in my home in Santee, California, USA. Upon request, I will destroy interview tapes and files associated with your interview, five years after completion of the study.

If you have any questions regarding your rights as a subject, any concerns regarding this project or any dissatisfaction with any aspect of this study, you may report them—confidentially, if you wish—to the Executive Secretary, Human Research Committee, Graduate School, Campus Box 26, Regent 308, University of Colorado, Boulder, Boulder CO 80309-0026, USA or by telephone: (303) 492-7401. Copies of the University of Colorado Assurance of Compliance to the federal government regarding human subject research are available upon request from the Graduate School address listed above.

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Signature of the Investigator