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Damian Park*

CALIFORNIA WATER REALLOCATION: WHERE'D YOU GET THAT?

ABSTRACT

When thirsty, Californians often avoid going to the market for more water. Instead, they might borrow some from their rich neighbors, they might sue them or more commonly, they simply take more from users without much of a voice (e.g. the fish or future generations). These alternatives are often superior to using markets. Within markets, a surprising detail emerges – it is uncommon for farmers to fallow fields in order to sell water to another user. Rather, many water transfers are structured so sellers can have their cake and eat it too. While some of these transfers rightly bring about jealousy and criticism, they likely do facilitate efficient water use. In discussing these points, I provide a more holistic description of how water users reallocate water as well as a richer understanding of how California's water market actually works.

INTRODUCTION

California's exploding population—quintupling since the late 1940s—led economists to call for water transfers from agriculture to urban uses as a preferable way to accommodate the increased growth compared to costly new water supply projects. The calls fell on stubborn ears. During the 1950s, the state engaged in an elaborate planning exercise to engineer a massive expansion in the state's water supply, including both the creation of a new State Water Project (SWP) and a significant expansion of the federal Central Valley Project (CVP). Today, agriculture still uses close to 80% of the developed water supply,¹ representing a potential, albeit controversial, source of supply for accommodating new demand. Although water transfers were essentially invisible from the water policy arena until well into the 1980s, they have become more prevalent since the mid-1990s.²

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1. CAL. DEP'T OF WATER RES., CALIFORNIA WATER PLAN UPDATE 2009, http://www.water.ca.gov/waterplan/docs/technical/cwpu2013/PA_13_year_balances_2-12-15.xlsm [<https://perma.cc/JCC5-JP7H>]. The state-wide average net water use for 1998–2010 for total urban use was 6.3 million acre-feet while the state-wide average net water use for total agricultural use was 25.9 million acre feet. *See id.*

2. *See* ELLEN HANAK, WHO SHOULD BE ALLOWED TO SELL WATER IN CALIFORNIA? vi (2003).

To appreciate California's historical and present water transfer system, it is useful to understand how users reallocate water outside of markets. In addition, the institutional background adds context to the reallocation story and also helps explain the types of trading that have occurred in California as well as those transfers that failed.

It is tempting to focus solely on water market data to understand water trading. But water is not a commodity like pork bellies—rather, each acre-foot traded differs in water quality, relevant habitat concerns, delivery schedule, etc. Water trading can be more like an act of diplomacy than a simple purchase. Thus condensing a transaction into its length, quantity of water, and trader identities leaves out important information. In addition, because of the fluidity of reallocation methods, even defining a transfer is imprecise. Therefore, market data alone will provide an incomplete and biased picture.

For the transfers that do occur, identifying the opportunity cost of transferred water provides fascinating insight. In other words, if users have water to transfer, who would use the water if it weren't sold? The answer to this question is surprising, and illustrates what I will call the Rule of Fallowed Fields: there may be many reasons why a particular field is fallow, but water markets aren't one. It remains quite difficult to permanently fallow productive land in order to free up water.

My contribution to the literature is a holistic description of how water users reallocate water as well as a richer understanding of how Californians actually facilitate water transfers. Put simply, if someone acquires new water, it's quite useful to ask, "Where'd you get that?"

I. WHAT IS A TRANSFER?

Defining a "water transfer" is a necessary first step for discussing water reallocation. According to a more formal definition, "a water transfer involves a change in the place of use, point of diversion, or purpose of use to a new location either within or outside the watershed."³ According to a less formal definition, "a water transfer is a change in the way water is usually allocated among water users."⁴ These definitions are a good starting point, but more precision is useful because some reallocations that fit this definition are not typically considered transfers. Irrigation district annexations and increased water withdrawals are examples, and I discuss these common non-market methods of reallocation first.

3. CAL. DEP'T OF WATER RES., WATER TRANSFERS AND THE DELTA PLAN 2 (2015), http://www.water.ca.gov/watertransfers/docs/Water_Transfers_Report_to_DSC.pdf [<https://perma.cc/CN5L-YHNJ>].

4. CAL. STATE WATER RES. CONTROL BD., A GUIDE TO WATER TRANSFERS 1-1 (1999), http://www.waterboards.ca.gov/waterrights/water_issues/programs/water_transfers/docs/watertransferguide.pdf [<https://perma.cc/D85Y-JGSY>].

A. Nonmarket Methods of Reallocation and Acquisition

1. Just Take It

In California, landowners may extract groundwater for use on their land almost without limit.⁵ This fact, when coupled with the loosely regulated surface water rights system,⁶ discourages formal water acquisition from other users. Without groundwater rights that limit extraction, a growing city reliant on groundwater may simply take more groundwater from existing wells, or they may buy new land that has a better groundwater supply, as the town of Pixley (between Fresno and Bakersfield) is considering.⁷

Urban users reliant on surface water rights often simply take more water as well. For post-1914 appropriative water rights, the State Water Resources Control Board (SWRCB) grants applicants at least ten years to fully use the amount specified in the water right application and can grant additional extensions.⁸ East Bay Municipal Utility District (EBMUD) (the urban Berkeley/Oakland provider), for example, applied for permit 10478 in 1956 to store water from the Mokelumne River in the Pardee and Camanche Rivers. They were given until 2000 to beneficially use the amount of water specified in the application. However, in late 2000, EBMUD filed for a 40-year extension,⁹ and the SWRCB waited until 2007 to publicize EBMUD's petition for extension and has not actually acted upon it as of this writing.¹⁰ Therefore, EBMUD has a significant amount of surface water

5. See JOSEPH L. SAX, STATE WATER RES. CONTROL BOARD REVIEW OF THE LAWS ESTABLISHING THE SWRCB'S PERMITTING AUTHORITY OVER APPROPRIATIONS OF GROUNDWATER CLASSIFIED AS SUBTERRANEAN STREAMS AND THE SWRCB'S IMPLEMENTATION OF THOSE LAWS 36–37 (2002) (noting Representative Short's legal argument for Assembly Bill No. 642 made no assertion that there was a regulatory authority over non-overlying issues of groundwater). http://www.waterboards.ca.gov/waterrights/water_issues/programs/hearings/groundwater_classification/docs/substreamrpt2002jan20.pdf [https://perma.cc/HYE9-TW8T].

6. See MICHAEL HANEMANN ET AL., CLIMATE VULNERABILITY AND ADAPTATION STUDY FOR CALIFORNIA: LEGAL ANALYSIS OF BARRIERS TO ADAPTATION FOR CALIFORNIA'S WATER SECTOR 2 (2012). California recognizes both riparian and appropriative rights to surface water. Appropriative rights acquired before 1914 are outside of the regulatory scope of the State Water Resources Control Board, the governing body that manages the post-1914 system. Groundwater rights are correlative except for those in adjudicated basins. The SWP and CVP are very large junior appropriators, and thus there is typically plenty of water for non-CVP and non-SWP users. Therefore, the state does not need to enforce water right priorities, which means that water rights are not really quantified. The looseness of the system is compounded by pre-1914 water rights that are not controlled by the SWRCB and correlative groundwater and riparian water rights.

7. Brian Maxey, *Pixley Looks Toward Tulare School-Owned Land for Water*, VISALIA TIMES-DELTA, Nov. 20, 2012, at C1, <http://pqasb.pqarchiver.com/visaliatimesdelta/access/2819615981.html?FMT=ABS&date=Nov+20%2C+2012> [https://perma.cc/DX4S-LELU].

8. CAL. STATE WATER RES. CONTROL BD., DIVISION OF WATER RIGHTS—PERMIT TEAERMS 6 (2001), http://www.waterboards.ca.gov/waterrights/water_issues/programs/permits/terms/license/license_allterms.pdf [https://perma.cc/SZE2-JRMX].

9. Petition for Extension of Time at 2, East Bay Mun. Util. Dist., Cal. Div. of Water Rights, Application No. 013156, (Nov. 27, 2000) (Permit No. 10478), http://www.waterboards.ca.gov/water_rights/water_issues/programs/applications/petitions/2007/13156_petition.pdf [https://perma.cc/Y3W6-9W5T].

10. Notice of Petition for Time Extension at 2, East Bay Mun. Util. Dist., Cal. Div. of Water Rights, Application No. 013156, (Jan. 10, 2007) (Permit 10478), <http://www.waterboards.ca.gov/water>

flexibility built into its “quantified” water right, and has little need to purchase additional water rights to accommodate growth.¹¹ This example is not unique.

Urban users reliant on pre-1914 appropriative surface water rights also have flexibility. San Francisco has pre-1914 water rights for the Hetch-Hetchy Reservoir on the Tuolumne River, and although the city uses at most 300 million gallons per day (mgd), they claim a right to 400 mgd despite having no current ability or need to divert that much water. Although disputed, the SWRCB appears to agree with them.¹² Loosely quantified rights contributes to a murky water right system, and without a binding cap on diversions, market reallocation is less likely.

2. Annexation

Agricultural users acquire and reallocate water with similar methods, obviating the need to execute a formal transfer. Rather than sell water rights, many agricultural districts sell water directly to adjacent farmers if excess water is available.¹³ Over time, some of these districts expand their infrastructure and annex adjacent land into the district. Stockton-East Water District, for example, started with 114,500 acres,¹⁴ and now serves close to 143,300 acres after expansions in 1971, 2004, and 2008.¹⁵ Agricultural districts also annex urban land, which is especially helpful to the city if the new surface supply augments contaminated urban groundwater. Stockton-East Water District is a prime example here as well, annexing the rest of the city of Stockton in 1971.¹⁶ If agricultural districts have large flexible water rights capable of serving new users, this will discourage adjacent users from seeking water transfers.

Placer County Water Agency (PCWA) provides an interesting example. Their sale to Sacramento Suburban Water District (SSWD) (formerly Northridge Water District) looks like a water transfer, and it shows up in datasets on water marketing, but only because PCWA did not annex SSWD. PCWA did, however,

rights/water_issues/programs/applications/petitions/2007/13156_notice.pdf [https://perma.cc/2PAT-GMHT]. Telephone Interview with Kate Gaffney of the Permitting Section, State Water Res. Control Bd (2012) (mentioning the petition got lost in the shuffle, and regardless, is controversial and currently going through the CEQA process).

11. This is further evidence of the loosely regulated surface water rights.

12. See CAL. CIV. CODE § 1416 (2011) (providing that cities do not have to build diversion works for future need, only immediate need).

13. See, e.g., OAKDALE IRRIGATION DIST. RULES AND REGULATIONS, § 5 (2016), <http://www.oakdaleirrigation.com/sections/waterops/agwater/rules/5#o> [https://perma.cc/N332-5423]; NEV. IRRIGATION DISTRICT, WATER SERVICE REGULATIONS: FORMS, FORM 5-E & FORM 5-G (2014), <http://nidwater.com/wp-content/uploads/2014/03/Water-Service-Rules-Regs.pdf> [https://perma.cc/B7PS-4VVW].

14. Order Revoking Permit to Appropriate Water, Stockton E. Water Dist., No. WR 80-17, at 2 (State Water Res. Control Bd. Sept. 18, 1980) http://www.waterboards.ca.gov/waterrights/board_decisions/adopted_orders/orders/1980/wro80-17.pdf [https://perma.cc/V3P4-T3YU].

15. STOCKTON E. WATER DIST., TIMELINE OF THE STOCKTON EAST WATER DISTRICT, at 2, 5, 6 (2014), <http://sewd.net/wp-content/uploads/2014/12/Timeline2014.pdf> [https://perma.cc/96TQ-2Y4B]. Other districts are similar. Oakdale Irrigation District is currently considering a 7,500 acre expansion to serve almond orchards. See John Holland, *Oakdale Irrigation District Sets Talks on Water Sale Plan*, MODESTO BEE, Aug. 26, 2012.

16. See *History*, STOCKTON E. WATER DIST., <http://www.sewd.net/history> [https://perma.cc/7ANU-5JXA].

expand the place of use of their water right to include SSWD,¹⁷ and so calling this a water transfer while not calling many other neighborly annexations or surplus water sales transfers is confusing.

3. CVP Contracts

The Central Valley Project, the largest water wholesaler in the state, created incentives to avoid market reallocation as well. Why acquire water through a transfer when a district could contract for reliable, subsidized water through the CVP instead? Agricultural regions sought contracts to deal with their groundwater overdraft,¹⁸ in effect acquiring unappropriated water from Northern California rather than reallocating from other users.¹⁹ This happened in the 1930s, the 1950s, and then again in the 1976–77 drought. New Melones Reservoir, the last CVP reservoir, was completed in 1978, and Stockton-East Water District and Central San Joaquin Water Conservation District only signed contracts in 1983. Not until the CVP stopped building did users begin to consider alternative sources of new supply.²⁰

4. Court Reallocations

California courts provide additional non-transfer methods of reallocating water. In some cases, society accommodated new water users through the courts' power to ensure existing water uses were reasonable and beneficial, a requirement for all water uses at the root of western water law.²¹ This concept is vague, and the courts can gradually restrict what they (and society) view as a reasonable or beneficial use so that water is used in the most productive way.²² Although California's constitution was amended in 1928 to mandate reasonableness in all water uses, the idea was not new. It was evident in the famous 1855 decision which confirmed appropriation.²³

There are many examples of court reallocation, typically motivated by new users trying to convince courts or the legislature that older uses were

17. Telephone Interview with Robert Roscoe, General Manager, Sacramento Suburban Water Dist. (2010); See Order Approving Change in the Place of Use, and Amending the Permit, Placer Cty. Water Agency, No. Pet-Ord-Per (8-99) (State Water Res. Control Bd. May 24, 2000) (order approving change in the place of use), <http://swrcb2.waterboards.ca.gov/ewrims/wrims-permits/p013856.pdf> [<https://perma.cc/RG8Y-H28Q>].

18. See Barbara T. Andrews & Sally K. Fairfax, *Groundwater and Intergovernmental Relations in the Southern San Joaquin Valley of California*, 55 U. COLO. L. REV. 145, 150 (1983).

19. Farmers adjacent to contracting districts sometimes experienced improved groundwater levels as a result, and thus happily supported importation.

20. The construction of new dams may only be on hold—many users want an enlarged San Luis and Shasta Dam as well as construction of Sites and Temperance Flat Reservoirs.

21. See SAMUEL C. WIEL, *WATER RIGHTS IN THE WESTERN STATES: THE LAW OF PRIOR APPROPRIATION OF WATER* 504 (3rd ed. 1911).

22. Samantha K. Olson & Erin K.L. Mahaney, *Searching for Certainty in a State of Flux: How Administrative Procedures Help Provide Stability in Water Rights Law*, 36 MCGEORGE L. REV. 73, 87 (2005).

23. See Brian E. Gray, *"In search of Bigfoot": The Common Law Origins of Article X, Section 2 of the California Constitution*, 17 HASTINGS CONST. L.Q. 225, 241 (1989) (discussing *Irwin v. Phillips*, 5 Cal. 140 (Cal. 1855)).

anachronistic or wasteful.²⁴ For example, before 1884, it was reasonable to blast water at hillsides to mine gold until farmers with flooded fields became angry enough to sue to stop the practice.²⁵ This ruling was not made with the intent to reallocate water, but the decision essentially ended the practice of hydraulic mining,²⁶ making water supplies available to others. Similarly, before 1935, farmers would irrigate in the winter to kill gophers, but in 1935, the California Supreme Court ruled that “It seems quite clear to us that in such an area of need as the Kaweah delta the use of an appreciable quantity of water for such a purpose (drowning and freezing squirrels and gophers) cannot be held to be a reasonable beneficial use.”²⁷ In other words, when water is abundant, pest control was acceptable, but if other farmers need irrigation water, they are more deserving.

Increasing environmental awareness also spurs reallocation. In 1940, the SWRCB approved, with reservation, Los Angeles’ initial diversions from the Mono Basin. But later, as a result of a lawsuit pursued by the National Audubon Society, the SWRCB deemed the diversions contrary to the public trust based on degradation of Mono Lake.²⁸ The Los Angeles Department of Water and Power (LADWP) was then forced to reduce its diversions from the Owens Valley to accommodate this “new” environmental use. Before the 1987–92 drought, LADWP diverted close to 500,000 acre-feet per year from Owens Valley, but since the 1994 ruling stipulating that they must decrease pumping to restore Mono Lake’s surface elevation, their average diversions have been closer to 300,000 acre-feet.²⁹ Therefore, the National Audubon Society achieved their environmental reallocation goal not through the market but through the courts.

Environmental lawsuit-led reallocation occurs frequently, most recently in 2013 when Klamath Riverkeeper and the Karuk Tribe sued and settled with a dam operator on the Shasta River, garnering additional dry-year flows in an effort to help endangered Coho Salmon.³⁰ In 1980, Salton Sea flooding caused by excess irrigation runoff in the Imperial Irrigation District sparked a lawsuit that eventually led to a water reallocation to Metropolitan Water District in 1987.³¹ Imperial’s

24. Acquiring water by prescription in California is difficult. See Teresa. K. Lippert, *People v. Shirokow: Abolishing Prescriptive Water Rights Against the State*, 69 CAL. L. REV. 1204, 1204 (1981).

25. See Woodruff v. N. Bloomfield Gravel Mining Co., 18 F. 753 (C.C.D. Cal. 1884)

26. NORRIS HUNDLEY, JR., *THE GREAT THIRST: CALIFORNIANS AND WATER* 79 (rev. ed. 2001).

27. *Tulare Dist. v. Lindsay–Strathmore Irrigation Dist.*, 3 Cal.2d 489, 568, 45 P.2d 972 (Cal. 1935).

28. *Nat’l Audubon Soc’y v. Superior Court*, 658 P.2d 709, 711–12 (Cal. 1983).

29. See L.A. DEP’T WATER & POWER, *ANNUAL OWENS VALLEY REPORT* 2–32 (2010).

30. Dan Bacher, *Karuk Tribe and Klamath Riverkeeper Settle ESA Suit with Montague Water Conservation District*, DAILY KOS (Dec. 23, 2013, 11:41 AM MST), <http://www.dailykos.com/story/2013/12/23/1264899/-Karuk-Tribe-and-Klamath-Riverkeeper-Settle-ESA-Suit-with-Montague-Water-Conservation-District> [<https://perma.cc/JZA7-XPS3>]; David Smith, *Riverkeeper and Karuk Tribe Settle Suit Against Montague Water Conservation District*, SISKIYOU DAILY NEWS, YREKA, (Dec. 24, 2013, 8:42 AM), <http://www.siskiyoudaily.com/article/20131224/NEWS/131229928/-1/obituaries>.

31. The original complaint was from a landowner on the shore of the Sea. See *Elmore v. Imperial Irrigation Dist.*, 159 Cal. App. 3d 185 (Cal. App. Dep’t Super. Ct. 1984). For a description of the transfer, see BRENT. M. HADDAD, *RIVERS OF GOLD: DESIGNING MARKETS TO ALLOCATE WATER IN CALIFORNIA* 74 (2000); HUNDLEY, *supra* note 26, at 470; COMM. ON WESTERN WATER MGMT., NAT’L RES. COUNCIL, *WATER TRANSFERS IN THE WEST EFFICIENCY, EQUITY, AND THE ENVIRONMENT* 234 (1992).

transfer was the first large agricultural to urban transfer, but it was more akin to a shotgun marriage than one of voluntary reallocation.³²

It is difficult to attach numbers to the methods described above,³³ but such methods are common and occasionally reallocate a lot of water. Furthermore, because they are common, users are aware that the market may not be the best way to procure new water supplies.³⁴

B. Market Reallocation – Water Transfers

Buying and selling water in markets can also be an attractive way to reallocate water. Water markets typically get more attention in the economic literature, so I spend some time discussing water market data and what we can learn from it. I also return to the institutional factors that shape the market, and discuss a surprising fact about how Californians reallocate water through the market.

1. Water Market Data

No single entity tracks and records water transfer data. In addition, the difficulty of tracking and recording water transfer data is exacerbated because transfers occur in “a bewildering variety of ways.”³⁵ Notwithstanding these obstacles, most significant transfers are recorded and published. First, the State Water Resources Control Board monitors all changes in surface water rights granted after 1914, and publishes data on any transfers under those rights. Second, the two large government water projects, CVP and SWP, control key infrastructure that is often used to facilitate a transfer, and their decision to use that infrastructure triggers California Environmental Quality Act and the National Environmental Policy Act (CEQA/NEPA) compliance and the associated written documentation.³⁶ Finally, although pre-1914 water right transfers are exempt from SWRCB jurisdiction, transfers are “projects” carried out by local government agencies, and

32. HADDAD, *supra* note 31, at 63.

33. See CENTER FOR IRRIGATION TECHNOLOGY, AGRICULTURAL WATER USE IN CALIFORNIA 2011 UPDATE 33 (2011) (attempting to quantify these environmental reallocations during the 1994–2009 period), http://www.waterboards.ca.gov/waterrights/water_issues/programs/hearings/cachuma/exbhts_2012feir/cachuma_feir_mu289.pdf [<https://perma.cc/5QL4-HSMQ>]. See also *Water Transfer Facilitation Act of 2009: Hearing on S-1759 Before the Subcomm. on Water and Power of the S. Comm. Energy and Natural Resources*, 111th Cong. (2009) (testimony of Martin McIntyre, General Manager, San Luis Water on the Central Valley Project), http://www.energy.senate.gov/public/index.cfm/files/serve?File_id=c5eb36eb-c21c-2bbf-2d04-ffde227fd3d0 [<https://perma.cc/W58A-WY4Q>].

34. Especially if the courts force the defendant to pay plaintiff attorney fees, which happened in the Shasta River—Klamath Riverkeeper—Karuk Tribe case. See Smith, *supra* note 30.

35. Morris Israel & Jay R. Lund, *Recent California Water Transfers: Implications for Water Management*, 35 NAT. RESOURCES. J. 1, 17 (1995).

36. NEPA compliance requires an Environmental Impact Statement (EIS) or, if the action is not likely to cause significant environmental impact, a Finding of No Significant Impact (FONSI). CEQA requires an Environmental Impact Report (EIR) or, if impacts are not significant, a Negative Declaration of significant impact. See U.S. Environmental Protection Agency, National Environmental Policy Act Review Process (2016) <https://www.epa.gov/nepa/national-environmental-policy-act-review-process> [<https://perma.cc/995K-B3DL>].

hence also trigger compliance with CEQA and generate a written record.³⁷ Smaller internal markets³⁸ and intra-district transfers are not recorded with regularity, and while important,³⁹ many agricultural water districts do not even grant their farmers transferable rights.⁴⁰ To summarize, if a user transfers water to another user in another water district, a record likely exists.

Many empirical California water market papers used data collected from the *Water Strategist*, a discontinued trade publication that recorded many western water transfers from 1987 until 2010.⁴¹ The publication called itself “the premier publication on water marketing and water policy issues in the 17 western states.”⁴² This led some to justify its use on grounds that it was “the only source of published information on water transactions in the West,”⁴³ or because “it is the only comprehensive source of water trade information.”⁴⁴ But the *Water Strategist* was not comprehensive.⁴⁵ The data it collected missed certain transactions and was

37. For more on CEQA and NEPA, see OFF. OF NEPA POL’Y AND COMPLIANCE, DEP’T OF ENERGY, NEPA AND CEQA: INTEGRATING FEDERAL AND STATE ENVIRONMENTAL REVIEWS (2014), http://www.energy.gov/sites/prod/files/2014/03/19/NEPA_CEQA_FinalHandbook_February2014_0.pdf [<https://perma.cc/9JPG-M9LW>].

38. Solano County Water Agency is one prime example of missing data.

39. Just as a parent allocates food to children without resorting to prices and markets, a general manager may have enough knowledge to allocate water based on different member needs without resorting to markets. Many districts have methods to spread water around to their less fortunate users (typically meaning those without (good) groundwater), although they refrain from using a market. The benefits of markets are that they reveal information and bring buyers and sellers together, facilitating mutually beneficial trades. However, within small districts, where the general manager is familiar with crop needs and his members’ alternative water supplies, he likely can achieve some of the efficiency gains that an internal market reallocation would produce without using price incentives. This may be somewhat unique to water provision, where sharing in times of scarcity rather than selling for a market price still prevails in many areas. In these cases, a district may encourage (financially or otherwise) a user with good groundwater to pump all his supply and release that surface water for other users, spreading the pain around. This is crucial because while many users have groundwater, not all do (close to 60% of irrigated farms in CA have access to groundwater).

40. There are a few districts that stand out with active internal markets (Westlands WD, Arvin-Edison WSD, Berrenda Mesa WD), but others I talked to also allow internal marketing.

41. Mariella Czetwertynski, *The Sale and Leasing of Water Rights in Western States: An Overview for The Period 1990–2001*, at 2 (Andrew Young School of Pol’y Studies, Water Pol’y Working Paper 2002–002, 2002); Jedidiah Brewer et al., *Water Markets and Legal Change in California, 1987–2005*, 26 WASH. UNIV. J. LAW POL’Y 183 (2008), http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1079685 [<https://perma.cc/P8DD-DD2L>]; J. Brewer et al., *Law and the New Institutional Economics: Water Markets in the West: Prices, Trading, and Contractual Forms*, 46 ECON. INQUIRY 91–112 (2008); J. Brewer et al., *2006 Presidential Address Transferring Water in the American West: 1987–2005*, 40 U. MICH. J.L. REFORM 1021 (2007); Thomas C. Brown, *Trends in Water Market Activity and Price in the Western United States*, 42 WATER RES. RES. 9402 (2006); HANAK, *supra* note 2; Richard Howitt & Kristiana Hansen, *The Evolving Western Water Markets*, 20 CHOICES 1, 59 (2005) (note that Hanak does not solely rely on their data).

42. *What Happened to Water Strategist?* STRATECON, <http://www.stratwater.com/what-happened-to-water-strategist/> [<https://perma.cc/JZ5H-R8PP>].

43. J. Brewer et al., *Transferring Water in the American West: 1987–2005*, 40 U. MICH. J.L. REFORM 1021 (2007) (citing *Water Strategist*).

44. Howitt & Hansen, *supra* note 41, at 61.

45. The *Water Strategist* never claimed to be comprehensive either—a current goal in their new publication, the *Journal of Water*, is to provide “extensive discussion and analysis of groundbreaking transactions that are unusually significant or conducted in circumstances that offer important lessons in

inconsistent across time. Some papers that use the publication gather the data from its summaries, but do not go back to check on actual delivered quantities or start dates. Thus, the datasets used often contain inaccurate quantities. Listed below are frequently found problems with the data.

- Missing transactions:
 - Some published transactions in Colorado and along the Rio Grande⁴⁶
 - Many intra-CVP/SWP transactions
 - All intra-district and adjacent landowner water sales
- Inconsistent coverage
 - Adjudicated groundwater transfers appear consistently after 2000 or so, but these deals occurred with regularity before then.⁴⁷
- Inaccurate quantities
 - Rusty Areias' deal with MWD was included in the dataset, but it never happened.⁴⁸
 - The IID-SDCWA transfer proposal occurred in 1996, but water did not flow until 2003.
 - Environmental transfers among the San Joaquin River Group Authority have occasionally been much smaller than actually planned.

Not all academic papers are subject to these problems. Hanak does a fantastic job fixing many of these problems⁴⁹ and creating a more comprehensive dataset for California. The following table summarizes the different water transfer types that are possible—the shaded boxes are the focus of her work:

understanding the trading of water.” See STRATECON INC., JOURNAL OF WATER, <http://journalofwater.com/jow/trading-water/> [https://perma.cc/LS55-YKXF].

46. Brown, *supra* note 41.

47. HADDAD, *supra* note 31, at 50; CAL. DEP’T. WATER RES., THE 1976–1977 CALIFORNIA DROUGHT: A REVIEW 116 (1978), http://www.water.ca.gov/watertransfers/docs/9_drought-1976-77.pdf.

48. Rodney Smith, *First Long-Term CVPIA Water Transfer Approved*, WATER INTELLIGENCE MONTHLY, Dec. 1995, at 4.

49. HANAK, *supra* note 2; ELLEN HANAK & ELIZABETH STRYJEWSKI, CALIFORNIA’S WATER MARKET, BY THE NUMBERS: UPDATE 2012 (Public Policy Inst. Calif. ed., 2012), http://www.ppic.org/content/pubs/report/R_1112EHR.pdf [https://perma.cc/UV8J-NRN4].

Table 1. Summary of water transfer types in California.

	Water Right Type	Common Example	Written Record?
Surface Water	Appropriative (post-1914)	Yuba County Water Agency to Contra Costa WD (2003)	SWRCB publishes records of all post-1914 water right transfers
	Appropriative (pre-1914)	Oakdale ID to Stockton-East WD (1999)	CEQA and the EIR process often create a written record
	Riparian	Riparians in the Delta abstained from exercising their rights, “transferring” them to others during the 1991 Drought Bank	Requires state coordination CEQA and the EIR process create a written record
	District Contract	Pixley to Westland WD (2007)	Yes, if wholesaler is large (CVP, SWP)
	Individual Contract	Ongoing internal Westlands WD transfers	UC Berkeley study captured mid-1990s transfers ^a ; Arvin-Edison WSD and others may record ^b
Groundwater	Adjudicated	Ongoing San Gabriel Basin transfers ^c	Annual watermaster reports often record this information
	Correlative	Panoche WD to Eagle Field WD (1991) ^d	Groundwater transfer agreements require canals, and if government owned, triggers an EIR/EIS

Sources: ELLEN HANAK, WHO SHOULD BE ALLOWED TO SELL WATER IN CALIFORNIA? (2003), ELLEN HANAK & ELIZABETH STRYJEWSKI, CALIFORNIA'S WATER MARKET, BY THE NUMBERS: UPDATE 2012 (Public Policy Inst. Calif. ed., 2012) (shaded boxes).

^a N. Brozovic, J. M. Carey & D. L. Sunding, *Trading Activity in an Informal Agricultural Water Market: An Example From California*, 121 WATER RESOURCES UPDATE 3–16 (2002).

^b R.W. Wahl, *Market Transfers of Water in California*, 1 WEST-NORTHWEST 49, 138 (1994).

^c MAIN SAN GABRIEL BASIN WATERMASTER, MAIN SAN GABRIEL BASIN: ANNUAL REPORT 89 (2014), http://media.wix.com/ugd/af1ff8_1d30b7f8d78e4e74878789c229b343e9.pdf [https://perma.cc/48ZP-M3Q2].

^d Rodney Smith, *First Long-Term CVPIA Water Transfer Approved*, WATER INTELLIGENCE MONTHLY, Nov. 1991.

With this dataset in hand,⁵⁰ I present some transaction trends, although unlike the table above, I break transfers down into their ease and length.

2. Transfer Categories

There is an important distinction between the right to divert surface water from a stream or river versus the right to receive water that a user might have as a member of an irrigation district, for example, or as a contractor with the CVP or the SWP.⁵¹ The former is a water right, and the latter a water contract. Both are

50. The dataset was also supplemented with more historical CVP data from Bob Fournier (Bureau of Reclamation, Mid-Pacific Region) and Bulletin 132 for more SWP data available at http://www.water.ca.gov/swpao/bulletin_home.cfm [https://perma.cc/5MQ5-ZDE3].

51. Groundwater transfers in adjudicated basins have been common since the 1960s but are not the focus of this paper. See HADDAD, *supra* note 31, at 50.

transferable, and much of California's transfer activity occurs among contractors that use water under the same large water right,⁵² as the following discussion about transfer categories shows.

Most analysts distinguish between short-term and long-term/permanent transfers, but in California, the diversity of types of short-term leases necessitates more categories. The common view of short-term transfers (often called leases or spot market transfers) is that they occur because of opposition to long-term deals, or because buyers do not need the water every year. In other words, temporary transfers are common because:

[t]emporary transfers of one year or less face significantly fewer environmental regulations, the costs of defining rights sufficiently to sell them permanently are often prohibitive, and the presence of sufficient supply in wet years makes permanent transfers unnecessary and costly in many cases.⁵³

In reality, there are many factors that lead to a either short-term or long-term transfer, but identifying them as such is practically impossible without asking each water user. Still, progress may be made by adding more meaningful categories to the data. First, recurring short-term transfers that likely substitute for a long-term transfer should be identified. These deals show up as short-term transfers, but occur practically every year and thus are not dependent on annual conditions. There is still a large diversity within the remaining short-term transfers, so I split them by their location—those that occur within the same water right and network are swaps, and the rest are simply short-term transfers.⁵⁴ I explain each category in more detail next.

a. Short-Term

Transfers for one year or less are considered short-term transfers. For example, Metropolitan Water District in 2003 solidified an option agreement with Sacramento Valley rice growers. It received approval from the SWRCB for temporary rice-fallowing transfers of up to 80,000 acre-feet from eight Sacramento districts.⁵⁵ These transfers typically involve a market price for water.

52. Although individuals use water, my unit of analysis is the *water district*. I use the term loosely to mean “any district or other political subdivision, other than a city or county, a primary function of which is the irrigation, reclamation, or drainage of land or the diversion, storage, management, or distribution of water primarily for domestic, municipal, agricultural, industrial, recreation, fish and wildlife enhancement, flood control, or power production purposes.” See CALIFORNIA WATER CODE, § 20200 (2007).

53. Howitt & Hansen, *supra* note 41, at 62.

54. Storage capacity constraints may encourage transfers to avoid losses. In addition, landowners that own land in two different districts may “transfer” water from one district to another, but in reality there is only one using party. Furthermore, users often exchange water to smooth out supply, but may do so in ways which the Bureau of Reclamation doesn't classify as an exchange because of differences in timing. All of these deals occur within a user's network, and are classified as a swap.

55. MWD exercised its options on February 15th, but by April, the SWP Allocation had increased to 90%, making it impossible to deliver the water because their Table A deliveries took priority. The water was partially lost into the Pacific Ocean, and the remaining 47,124 acre-feet was stored in Shasta, where it remains until the unlikely possibility that the stars align and conditions allow fulfillment of the

b. Short-Term—Swaps

Swaps are a subset of short-term transfers that take place within the same water right or network and are possible to transact without substantive third-party review.⁵⁶ Like borrowing sugar from your neighbor, where the neighbor typically never asks to be compensated for the market value of the sugar, water districts swapping water often do the same. This category is primarily comprised of CVP-internal and SWP-internal transfers. The vast majority of these trades occur between agricultural users. For example, in 1999, Madera Irrigation District purchased 1,100 acre-feet from three nearby irrigation districts. All were CVP contractors connected to Millerton Lake on the San Joaquin River. The irrigation districts sold the water left over from the previous year because of the threat that their reservoir would spill their water.⁵⁷

c. Long-Term/Permanent

This category includes long-term leases (over five years) and permanent water right sales and contract assignments. In California, this category is primarily contract assignments within the CVP and SWP (e.g., Broadview WD selling its 27,000 acre-feet CVP contract to Westlands WD in 2006). Except in unique circumstances,⁵⁸ these trades probably occur at market prices.

d. Long-Term/Substitute

Short-term transfers that do not actually serve a short-term purpose necessitate a fourth category. Some districts trade frequently with the same buyers, in effect consummating a long-term transfer through a series of short-term deals. For example, Glide WD frequently purchases about 2,300 acre-feet per year from nearby Kanawha WD in northern California. In addition, until recently, the California Department of Water Resources and the Bureau of Reclamation purchased environmental water on an annual basis, usually from the same sellers. Although there are now long-term deals in place, I classify the temporary precursors to these deals as well as ongoing repeated short-term deals as long-term substitute transfers.

3. Data Trends

The following charts show three decades of average total transfer quantities (in acre-feet) in California, by category:

IOU. Email with Steve Hirsch, Program Manager, Water Transfers and Exchanges, MWD (2010) (on file with author).

56. Environmental leases in the short-term category are included as they usually require some review and are often done for a market price.

57. *Transactions*, WATER STRATEGIST, July/Aug 1999, at 2 <https://app.box.com/s/vmomssweb20j125ggy2g2rsyo2nuh2wj>.

58. In 2002, as part of the Quantification Settlement Agreement (QSA), MWD transferred 100,000 acre-feet of its SWP entitlement to Desert WA and Coachella Valley WD. The recipients did not pay a premium for the water, but this transfer was unique and part of the broader QSA settlement. See HUNDLEY, *supra* note 26, at 299.

Chart 1

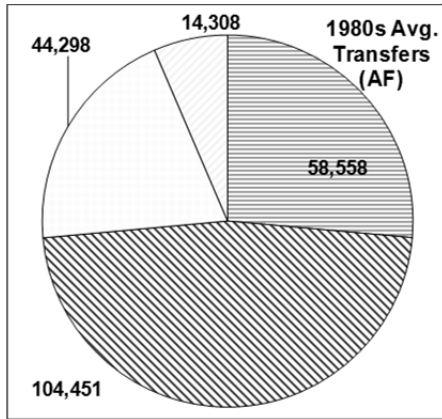


Chart 2

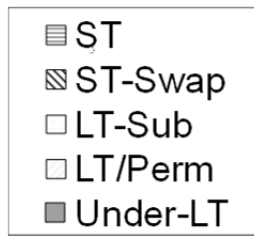
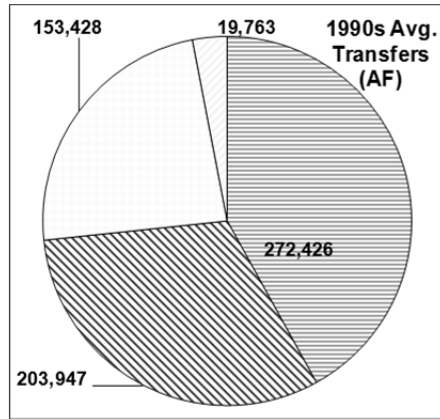


Chart 3

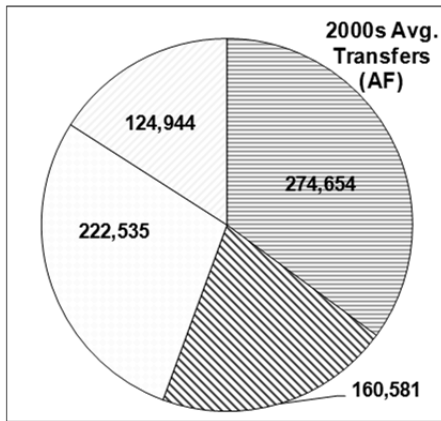
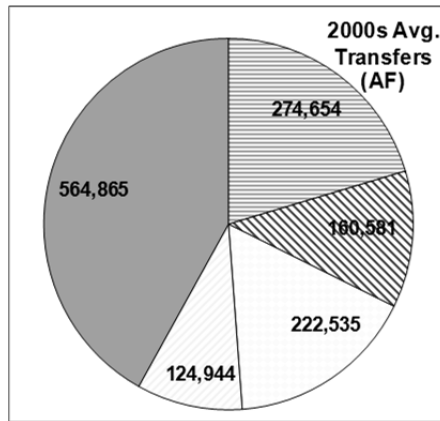


Chart 4



The quantity of water transferred on short-term basis climbs from about 58,000 acre-feet in the 1980s to around 270,000 over the next two decades. The amount of water swapped short-term increases as well, climbing from 104,000 in the 1980s to 160,000 in the 2000s. Despite the increase, the short-term swap category is far less important today, accounting for only 22% compared to 43% in the 1980s and 31% in the 1990s. Long-term substitutes have increased over time too, from 20% to 29% of the market total. Long-term/permanent transfers have also grown in volume, accounting for 7% in the 1980s but 16% today.

These charts only show annual averages for trades consummated in the periods listed. Long-term leases and permanent sales, however, imply obligations into the future. For example, because Metropolitan Water District signed a 35-year agreement with Imperial Irrigation District in 1988,⁵⁹ the transfer only shows up in the long-term data in the 1980s, but IID transferred over 105,000 acre-feet to MWD in 2015.⁶⁰ In the chart 4, I replicate chart 3 but also include water committed previously under a long-term agreement or from a permanent sale (the “Under-LT” segment).⁶¹

By 2009, close to 700,000 acre-feet were delivered to users as a result of permanent contracts since the late 1970s. This figure represents an estimate of the amounts *delivered* under these contracts and leases. Closer to 1,400,000 acre-feet of water contract entitlements have actually been reallocated on paper since then, but annual fluctuations in supply dampen this figure. For the 2000s, these previous reallocations averaged 564,865 acre-feet, compared to 657,770 acre-feet transferred each year temporarily and 124,944 acre-feet in new long-term transfers.⁶² Between 1998 and 2019, Californians used an average of 41,200,000 acre-feet of water, including 25,300,000 from surface supplies and 15,900,000 from groundwater. Agriculture used close to 80%. Therefore, using data from the 2000s, and including water transferred under previous deals, users transfer about 5% of surface water annually (1,347,579 acre-feet surface water transferred, 25,600,000 acre-feet total surface water use). More interesting than pure data trends are the stories behind the data, and the next section investigates where the marketed water actually comes from.

II. WHERE'D YOU GET THAT WATER

In almost every market, an owner must give up enjoyment of a good in order to sell it. Surprisingly, however, when it comes to water sales in California, *this is actually rare*.

The water marketing literature typically mentions the benefits of reallocation, i.e., that water markets would:

59. The 35-year period actually begins in 1998 when MWD takes 106,110 acre-feet. See HADDAD, *supra* note 31, at 87.

60. IID/MWD Conservation, IMPERIAL IRRIGATION DISTRICT, <http://www.iid.com/water/water-conservation/iid-mwd-conservation> [https://perma.cc/2SFE-2ZWB].

61. I had to assume amounts delivered under permanent CVP or SWP reallocations were equal to the contract amounts adjusted by the yearly Reclamation and DWR allocation percentages.

62. The numbers since 2009 are not much different. See HANAK & STRYJEWSKI, *supra* note 49, at 19; Ellen Hanak & Jelena Jezdimirovic, *California's Water Market*, PUB. POL'Y INST. OF CALIFORNIA (2012), http://www.ppic.org/main/publication_show.asp?i=1177 [https://perma.cc/BHB5-LH75].

- “facilitate the movement of water from low-value activities to higher-value ones, thus resulting in a more efficient deployment of the resource”⁶³;
- “redistribute water to higher-valued uses”⁶⁴;
- encourage water to flow “to the highest bidders and ostensibly to ‘higher-value uses’: specialty crops, industries, cities”⁶⁵; and that
- “[d]isparities of value in the use of a resource beckon calls for the reallocation of water from lower-value to higher-value activities through water marketing.”⁶⁶

While these quotes may describe water markets in some states, they do not accurately describe California’s water market. Most of California’s market activity is short-term in nature, not a permanent reallocation from one user to another. The majority of these short-term trades occur between agricultural districts within the CVP, and *the vast majority of these transfers take place without one farmer using less so another can use more*. The rest of the short-term market has a surprisingly similar characteristic—users temporarily buy water, but the water only occasionally *leaves* agriculture to support a higher valued use. And perhaps even more surprising, even long-term transfers in California frequently have this characteristic. Thus, water users get paid to transfer water without making much of a sacrifice. Instead, although districts expend effort to make water available, frequently this effort is not directed at making the farmers use less. Thus water markets—originally conceived as a way to move water away from low-value uses like desert alfalfa irrigation and into cities like Los Angeles—work instead by transferring water away from future wet years or from current environmental flows. Environmental groups see these transfers as a way of profiting off of public resources.⁶⁷ As an economist, I see the benefits of these transactions, but the environmental groups have a point. The next four sections explain this through examples of each transfer category.

A. Opportunity Cost of Short-Term Transfers

1. Easy Short-Term Transfers (Swaps)

“Easy” short-term transfers (swaps) are prevalent and useful, but they typically have very little impact on the selling district because the water made available implicitly comes from the ground. Most swaps occur within the Central Valley Project as transfers among contractors within the same geographic division.⁶⁸ They occurred at least as far back as the 1970s,⁶⁹ and these transfers do

63. Robert Glennon, *Water Scarcity, Marketing, and Privatization*, 83 TEX. LAW REV. 1873, 1884 (2005).

64. HADDAD, *supra* note 31, at xviii.

65. HUNDLEY, *supra* note 26, at 466.

66. Brewer et al., *supra* note 41, at 1022.

67. The California Water Impact Network is perhaps the most notable in crying foul.

68. There are also swaps within the State Water Project which have similar characteristics to what is described here.

not require individual environmental review.⁷⁰ Instead, the Bureau of Reclamation (Reclamation) now publishes an Accelerated Water Transfer Program for each region granting five-year approval to all intra-division transfers that meet certain criteria. These environmental documents are revealing. They state that the land use changes from transferring are minimal because “[i]t is highly unlikely that a district would allow the transference of water out of their service area that could be put to the highest beneficial and economic use within the district.”⁷¹ In other words, districts are not transferring water that their farmers need, and the environmental documents confirm that “the Proposed Action *would not result in any impacts to source districts*, as the transfers and exchanges would be in response to climatic conditions, crop requirements, economics, or water delivery timing issues.”⁷² Other non-swap CVP transfers are similar.⁷³ Therefore, if a CVP district sells water, it is likely that the district has more than it currently needs.⁷⁴

69. GALE HEFFLER-SCOTT, HISTORICAL POLICIES GOVERNING THE TRANSFER OF CVP WATER (2007). For 1977 transfer volume, see U.S. BUREAU OF RECLAMATION, WATER OPERATIONS IN 1977—THE SECOND DRY YEAR AND PRELIMINARY PLANS FOR 1978, at 22 (1977), <http://cdm16658.contentdm.oclc.org/utills/getfile/collection/p267501ccp2/id/3858/filename/3859.pdf> [<https://perma.cc/W256-JDEM>]. David Yardas claims these transfers have gone on between farmers “forever.” See THOMAS J. GRAFF, MALCA CHALL & DAVID R. YARDAS, THE PASSAGE OF THE CENTRAL VALLEY PROJECT IMPROVEMENT ACT, 1991–1992: ENVIRONMENTAL DEFENSE FUND PERSPECTIVE 63 (1996).

70. U.S. BUREAU OF RECLAMATION, FINAL CVPIA ADMINISTRATIVE PROPOSAL ON WATER TRANSFERS (1998), http://www.usbr.gov/mp/cvpia/3405a/docs/ltr_final_proposal_water_trans_04-16-98.pdf [<https://perma.cc/VD48-T57J>].

71. U.S. BUREAU OF RECLAMATION, FINAL EA, ACCELERATED WATER TRANSFERS AND EXCHANGES, CENTRAL VALLEY PROJECT, SOUTH OF DELTA CONTRACTORS YEARS 2011–2015, at 16 (2011) (emphasis added), http://www.usbr.gov/mp/nepa/documentShow.cfm?Doc_ID=7999 [<https://perma.cc/9QHG-EFLC>].

72. *Id.* at 17, 19.

73. A cursory glance at the Bureau’s environmental documents for recent transfers confirms this. For example, Clear Creek CSD seeks to transfer water whenever it can do so as long as its customers are not impacted. See CLEAR CREEK CMTY. SERV. DIST., CLEAR CREEK COMMUNITY SERVICES DISTRICT DROUGHT PLANNING AND WATER SHORTAGE POLICY 10 (2008), <https://www.dropbox.com/s/jkz5mubimys99c/CCCSD%20-%20transfer%20discussion%20no%20impacts.pdf?dl=0> [<https://perma.cc/EVE2-57DN>]. See also U.S. BUREAU OF RECLAMATION, MADERA ID ONE-YEAR TRANSFER TO NORTH KERN WATER STORAGE DISTRICT (2011), http://www.usbr.gov/mp/nepa/documentShow.cfm?Doc_ID=8318 [<https://perma.cc/Z7QV-SPWW>]; U.S. BUREAU OF RECLAMATION, MERCY SPRINGS WATER DISTRICT AND FRESNO SLOUGH WATER DISTRICT MULTI-YEAR TRANSFERS TO ANGIOLA WATER DISTRICT—DRAFT FINDING OF NO SIGNIFICANT IMPACT (2012), http://www.usbr.gov/mp/nepa/documentShow.cfm?Doc_ID=10210 [<https://perma.cc/TN2C-FCWD>]; U.S. BUREAU OF RECLAMATION, FINAL EA, TRANSFER OF CVP WATER FROM CENTRAL CALIFORNIA IRRIGATION DISTRICT OR FIREBAUGH CANAL WATER DISTRICT TO SAN LUIS, PANOCHÉ, DEL PUERTO, AND/OR WESTLANDS WATER DISTRICTS 11, 29–30 (2012), http://www.usbr.gov/mp/nepa/documentShow.cfm?Doc_ID=10555 [<https://perma.cc/99GJ-KP4E>]; U.S. BUREAU OF RECLAMATION, FINAL EA, MAIN DOCUMENT AND APPENDIX A; ROOT CREEK WATER DISTRICT TRANSFER, EXCHANGE, AND TEMPORARY WATER SERVICE CONTRACT 11 (2011), http://www.usbr.gov/mp/nepa/documentShow.cfm?Doc_ID=9042 [<https://perma.cc/XB3D-WDEJ>].

74. Many of these sales are not profit-making deals but rather efforts to comply with CVP scheduling rules and other contract provisions, and the hassle of the transfer can sometimes make the deal unattractive. Still, as D. Coxe of Bella Vista Water District told me, this option is better than relinquishing it to the USBR for redistribution. CVPIA eliminated the take-or-pay provision of contracts so Contractors only pay for water they receive. Thus it may seem easier to avoid the hassle of transferring it by relinquishing the water to Reclamation, but Coxe wanted to keep the water within the

Many of these sales are not profit-making deals, and the hassle of the transfer can sometimes make the deal unattractive. Because the Central Valley Project Improvement Act eliminated the “take-or-pay” provision of contracts so that contractors now only pay for water they receive,⁷⁵ districts might be expected to simply relinquish their water that year and avoid the hassle of transferring it. But, there is a strong desire to keep the water “within the CVP family” and put it to beneficial use. This is chiefly because if it is not, the Bureau of Reclamation may cut a district’s contract amount upon contract renewal.⁷⁶

Reclamation’s contracting history is also relevant in understanding how districts are able to sell water. Reclamation originally intended that the CVP would supplement groundwater supplies for 2,000,000 acres, provide extra dry-year supply to 400,000 acres, and irrigate an additional 3,000,000 acres of new land.⁷⁷ Instead, the 5,400,000-acre projection turned out to be wildly optimistic. Today, the CVP irrigates about 3,000,000 acres, most of which were already irrigated.⁷⁸ Therefore, many farmers can survive (temporarily) with less surface water because they can turn to alternative sources.

These facts provide insight into the opportunity cost of transferred water, i.e., what would have happened in the absence of the transfer. If a district does relinquish the water, rather than transfer it to another user, the Bureau of Reclamation can add it to the total supply available for other contractors. Because many districts have at least some farmers with groundwater supplies, increased Reclamation-contracted quantities mean less groundwater pumping, so transfers likely cause a slight increase in groundwater pumping. In other words, a district with excess water to sell actually sources that water from the aquifers of everyone else. If the aquifers recharge in wet years, then the opportunity cost to Californians of the transferred water is quite low—slightly less groundwater flows into rivers during wet periods. So no one gives up anything of value.

2. Surface Storage Transfers

The more difficult short-term transfers often take place without reallocation away from farmers as well. Instead, the water comes at the expense of Delta outflow in wet years. For example, in the summer of 2009, Oakdale and South San Joaquin Irrigation Districts (SSJID) sold 45,000 acre-feet of water to the San Luis and Delta Mendota Water Authority (mostly Westside CVP users) that was “surplus to the needs of their . . . water users” as a result of “changes in land

CVP family and put it to beneficial use—if not, Reclamation may cut their contract amount upon contract renewal, or at least that is the worry. Telephone Interview with David Coxey, General Manager, Bella Vista Water District (2013).

75. CENTRAL VALLEY PROJECT IMPROVEMENT ACT OF 1992, Pub. L. 102-575, § 3405(d)(4), 106 Stat. 4706.

76. Telephone Interview with David Coxey, *supra* note 74.

77. Paul S. Taylor, *Central Valley Project: Water and Land*, 2 WEST. POLIT. Q. 228–53, 232 (1949).

78. U.S. BUREAU OF RECLAMATION, 2012 REPORT OF ACCOMPLISHMENTS, MID-PACIFIC REGION HIGHLIGHTS (2012), http://www.usbr.gov/mp/2012_accomp_rpt/mpr_highlights.html [<https://perma.cc/927Y-JWJP>]. This of course calls into question the original value of the Reclamation Program and lends support to those who think it a massive giveaway to landowners at the time the projects were built.

use patterns, ongoing conservation measures, facility improvements, and other measures.”⁷⁹ In other words, the farmers within the transferring districts did not alter their behavior to make this water available. The two districts have quantified rights to the Stanislaus River and are able to transfer excess. If Oakdale/SSJID did not transfer water, the water would remain behind New Melones dam in 2009 until it eventually spilled in a wet year, when the Delta would already be inundated with water.⁸⁰ Thus, the opportunity cost of transferred water is once again very low.

Merced Irrigation District (Merced) provides another example. In 2013, Merced transferred water to a wildlife refuge from its storage in Lake McClure on the Merced River. The order approving the transfer provides that “Merced will continue the same surface water deliveries to its existing customers with or without the proposed temporary water transfer.”⁸¹ In 2012, Merced transferred water to Westlands Water District, and as before, no one inside the district actually sacrificed any water.⁸² When Merced and others with storage replenish their reservoir in the future, transfer agreements stipulate refill criteria to prevent injury to the SWP and CVP, the parties largely responsible for Delta health.⁸³ Therefore, the opportunity cost of transferred water is the value of additional water when Merced refills its reservoir, which occurs when water is relatively abundant. Thus, more efficient water use occurs as users with storage can more fully use their water rights and borrow and save across time.

Yuba County Water Agency (YCWA) provides another major example of transfer without farmer sacrifice. YCWA built New Bullards Bar Reservoir in 1970, capable of serving a much higher demand than existed within Yuba County at the time. Between 1987 and 2005, YCWA transferred 1,228,585 acre-feet from their new storage, the most from any single transferor over that time period.⁸⁴ YCWA continues transferring water under the Lower Yuba River Accord, a stakeholder agreement and guideline for the management of the Yuba river with

79. OAKDALE IRRIGATION DIST., WATER TRANSFER AGREEMENT BY AND BETWEEN OAKDALE IRRIGATION DISTRICT, SOUTH SAN JOAQUIN IRRIGATION DISTRICT AND THE SAN LUIS & DELTA MENDOTA WATER AUTHORITY (2009).

80. New Melones spilled water at least once in 4 of the past 13 years. CAL. DEP’T. OF WATER RES., *New Melones Reservoir*, CALIFORNIA DATA EXCHANGE CENTER (2011), http://cdec.water.ca.gov/jspplot/jspPlotServlet.jsp?sensor_no=9177&end=02%2F01%2F2017+10%3A11&geom=huge&interval=5000&cookies=CDEC01 [https://perma.cc/2DH9-D6NG].

81. License 2685 (Application 1224) of Merced Irrigation District Petition for Temporary Change Involving the Transfer of 1,500 Acre-Feet of Water (Cal. Div. of Water Rights, 2013), http://www.waterboards.ca.gov/waterrights/water_issues/programs/applications/transfers_tu_orders/docs/a1224tempnlwr.pdf [https://perma.cc/ZPB5-88AF].

82. U.S. BUREAU OF RECLAMATION, WARREN ACT CONTRACT FOR MERCED IRRIGATION DISTRICT TRANSFER OF UP TO 10,000 ACRE-FEET TO WESTLANDS WATER DISTRICT FINDING OF NO SIGNIFICANT IMPACT, FONSI-11-073, at section 3.7 (2012), http://www.usbr.gov/mp/nepa/documentShow.cfm?Doc_ID=11390 [https://perma.cc/7WYB-3UVP].

83. In The Matter of License 2685 (Application 1224) of Merced Irrigation District (Cal. Div. of Water Rights, 2012), http://www.waterboards.ca.gov/waterrights/water_issues/programs/applications/transfers_tu_orders/docs/mid_a001224_temp_order_oct2012.pdf [https://perma.cc/2J5A-C4EJ].

84. Imperial Irrigation District comes close, agreeing to transfer 110,000 acre-feet every year for 35 years to urban Los Angeles. DAMIAN BICKETT, WATER TRANSFER DATA SET, 1976–2010 (2010) (on file with author).

regard to fish, power, and irrigation/municipal use.⁸⁵ The environmental documentation for the agreement specifically points out that past surface transfers are only carried out when deliveries to member units are almost sure to be 100%,⁸⁶ and that continued transfers are unlikely to trigger any significant land use change in agricultural acreage or substantial shift in crop patterns.⁸⁷ Just like the other districts using storage, the transferred water has a very low opportunity cost—the Delta, in wet years, likely receives a little less when YCWA refills New Bullards Bar Reservoir.

3. Groundwater Substitution

The four districts mentioned above (Oakdale, SSJID, Merced, and YCWA) are illustrative of how water-rich districts with surface storage generate transfer water, but those with ample and resilient groundwater also may transfer surface water through groundwater substitution. These transfers require users to pump groundwater instead of using their normal surface supplies, in effect leaving more surface water in the system. For example, Glenn-Colusa Irrigation District (GCID) sold 4,400 acre-feet in 2013 through groundwater substitution to a consortium of users south of the Delta. GCID chose the wells involved in this transfer “such that the stream flow losses resulting from groundwater recharge peak during the wet season, when losses to stream flow should not affect other legal users of water.”⁸⁸ YCWA also uses groundwater substitution transfers, transferring a total of 227,261 acre-feet in 1991, 1994, 2001, and 2002.⁸⁹ YCWA’s groundwater levels rebounded quickly⁹⁰ with limited impact on river flow.⁹¹ Thus, in both cases, the aquifer recharges when it rains, perhaps reducing river flow at that time, but recharge occurs in the winter, and thus the opportunity cost of the transferred water is once again very low.

In the methods described so far, the Rule of Fallowed Fields applies: water transfers are not drying up California fields. It doesn’t always apply, as I show in the next section, but the evidence also shows that fallowing is becoming increasingly difficult to use to free up water.

85. YUBA CTY. WATER AGENCY, LOWER YUBA RIVER ACCORD - DOCUMENTS (2007), <http://www.yubaaccordrmt.com/Yuba%20Accord%20Documents/Forms/AllItems.aspx> [<https://perma.cc/ZVB6-V6GD>].

86. U.S. BUREAU OF RECLAMATION ET AL., DRAFT ENVIRONMENTAL IMPACT REPORT/ ENVIRONMENTAL IMPACT STATEMENT FOR THE PROPOSED LOWER YUBA RIVER ACCORD 5-9 (2007), <http://www.yubaaccordrmt.com/Yuba%20Accord%20Documents/Draft%20EIR-EIS%20for%20the%20Proposed%20Lower%20Yuba%20River%20Accord/Chapters/Chapter%2005-Surface%20Water%20Supply%20and%20Management.pdf> [<https://perma.cc/G2SN-LQHP>].

87. *Id.* at 16–10.

88. GLENN-COLUSA IRRIGATION. DIST., INITIAL STUDY AND PROPOSED NEGATIVE DECLARATION: GLENN-COLUSA IRRIGATION DISTRICT 2013 WATER TRANSFER TO SAN LUIS & DELTA-MENDOTA WATER AUTHORITY ch. 2, at 4 (2013) (on file with author).

89. U.S. BUREAU OF RECLAMATION ET AL., *supra* note 86, at § 5.1.3.5.

90. *Id.* at § 6.1.1.6, at 16.

91. *Id.* at § 6.2.6, at 71.

4. *Fallowing*

Fallowing to free up transfer water occurs, but current DWR and Reclamation policy discourages the practice. Reservoir releases are preferred, followed by groundwater substitution, then crop substitution, and finally, crop idling.⁹² This is partly to avoid the social impacts of fallowing land and the environmental impacts on species that rely on watered fields. More importantly, the policy attempts to prevent giving transferors credit for making water available when they actually did not, creating a “paper water” transfer.⁹³ California does not have a strong water use monitoring or water rights enforcement system in place,⁹⁴ which means that administrators lack precise knowledge about water consumption. Short-term transferors (non-swaps) typically sell water to thirstier southern buyers using SWP or CVP pumps in the Delta to move the water. If the CVP and SWP pump out additional water to facilitate a transfer and the transferor did not actually add additional water to the Sacramento River watershed, then, as noted before, SWP and CVP contractors bear this cost in future years while the transferor profits today. This is chiefly because SWP and CVP are responsible for the Delta’s water quality. Thus, the CVP and SWP have a strong incentive to eliminate paper water transfers.

Although SWP and CVP set the rules for water transfer and potential transferors must acquiesce to their guidelines, currently, the rules disallow fallowing of pasture, grasses, and alfalfa grown in the Delta or in the foothills or mountain areas, orchard and vineyard crops, as well as other situations where estimating what would have happened in the absence of the transfer is too difficult.⁹⁵ Even if allowed, the risk of a failed transfer is large.⁹⁶ The SWP and CVP set the rules, and they err conservatively, much to the frustration of some users.⁹⁷

The effects of this evolving policy are evident in the history of DWR-facilitated north-south water transfers. DWR operated water banks⁹⁸ in the early 1990s and dry-year purchase programs in 2001–2004 and 2009. In the 1991 Water Bank, 130,000 acres⁹⁹ were fallowed, in sharp contrast to the less than 10,000 acres fallowed for the 1992 Water Bank.¹⁰⁰ During the 2001–2003 dry-year purchase

92. U.S. BUREAU OF RECLAMATION & CAL. DEP’T. OF WATER RES., ENVIRONMENTAL WATER ACCOUNT—DRAFT ENVIRONMENTAL IMPACT STATEMENT/ENVIRONMENTAL IMPACT REPORT, at 22-5 (2003), <http://www.usbr.gov/mp/EWA/DraftEIS-EIR.html> [<https://perma.cc/8CD9-RSXH>].

93. U.S. BUREAU OF RECLAMATION & CAL. DEP’T. OF WATER RES., DRAFT TECHNICAL INFORMATION FOR PREPARING WATER TRANSFER PROPOSALS (2013), http://www.water.ca.gov/water_transfers/docs/DTIWT_2014_Final_Draft.pdf [<https://perma.cc/NW3B-8E3S>].

94. HANEMANN, ET AL., *supra* note 6, at 2.

95. U.S. BUREAU OF RECLAMATION & CAL. DEP’T. OF WATER RES., *supra* note 93, at 17.

96. *Id.* at 4.

97. See MacArthur Ranch discussion *infra* pp. 34–35, 37–38.

98. A water bank is simply a state-run temporary transfer market where DWR acts as the middle man.

99. An additional 30,000 to 40,000 were denied irrigation after being planted. See GERALD L BOLES, CAL. DEP’T. OF WATER RES., DRAFT PROGRAM ENVIRONMENTAL IMPACT REPORT: STATE DROUGHT WATER BANK 6 (1993), http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/wq_control_plans/1995wqcp/admin_records/part05/323.pdf [<https://perma.cc/7JQM-HSRN>].

100. *Id.* at 7.

programs, DWR bought 172,211 acre-feet¹⁰¹, of which 28,109¹⁰² came from fallowing.¹⁰³ In the 2009 Bank, 74,102 acre-feet were transferred, and at most 21,000 came from fallowing or crop shifting.¹⁰⁴ In addition, 200,000 additional acre-feet were transferred privately from north to south in 2009,¹⁰⁵ the vast majority from storage releases. Fallowing does occur despite the bias against it, although it is temporary.

There are three main areas in California that generate water from fallowing land: northern California rice farmers near the Sacramento River (e.g. Glenn-Colusa Irrigation District) and the Feather River (e.g. Western Canal Water District), San Joaquin River Exchange contractor¹⁰⁶ (SJREC) land in Central California and Southern California alfalfa and hay farmers in the Palo Verde Irrigation District (PVID) along the Colorado River.¹⁰⁷ The rice-growing districts have fallowed land occasionally since the first Drought Water Bank in 1991. The SJREC started fallowing some land in the early 2000s and will continue fallowing after solidifying a 2014–38 water transfer environmental analysis.¹⁰⁸ PVID implemented a two-year land fallowing program in 1992, and then in 2004 signed a

101. WASH. STATE DEP'T OF ECOLOGY & WESTWATER RESEARCH LLC, ANALYSIS OF WATER BANKS IN THE WESTERN STATES 46, <https://fortress.wa.gov/ecy/publications/publications/0411011.pdf> [<https://perma.cc/ACC2-R23F>].

102. The Western Canal WD and Butte WD fallowed 28,109 acre-feet collectively. *See* 2 W. CANAL WATER DIST., FEATHER RIVER REGIONAL AGRICULTURAL WATER MANAGEMENT PLAN 2015 UPDATE, 7–43,

<http://www.water.ca.gov/wateruseefficiency/sb7/docs/Western%20Canal%20WD%202015%20AWMP.pdf> [<https://perma.cc/RL77-5JCY>]; see also *Transactions*, WATER STRATEGIST, at June 2003.

103. U.S. BUREAU OF RECLAMATION & CAL. DEP'T. OF WATER RES., *supra* note 92, ch. 6, at 82; WASH. ST. DEP'T OF ECOLOGY & WESTWATER RESEARCH LLC, *supra* note 101, at 46; WATER STRATEGIST, Nov. 2001, at 5.

104. *See* Heather Hacking, *Few Sellers Lining up for Drought Water Bank*, OROVILLEMR NEWS, Mar. 14, 2009, http://www.oroVILLEmr.com/ci_11915996 [<https://perma.cc/M4WU-PWRZ>]; CAL. STATE WATER RES. CONTROL BD., WATER RIGHT ORDERS 2009, Order Nos. 2009-0040–20090048, 2009-0058 (2009), http://www.waterboards.ca.gov/waterrights/board_decisions/adopted_orders/orders/wro2009.shtml [<https://perma.cc/9SZ5-JDVH>]; DAMIAN BICKETT, WATER TRANSFER DATA SET, 1976–2010 (2010).

105. U.S. BUREAU OF RECLAMATION & CAL. DEP'T. OF WATER RES., 2010 WATER TRANSFERS PROGRAM SUMMARY (2010), <http://www.water.ca.gov/watertransfers/docs/2010WaterTransfersProgram.pdf> [<https://perma.cc/HTA7-WP3S>]. Most of this came from Yuba County Water Agency transfers under the Yuba Accord.

106. Four districts are included: Central California Irrigation District, Columbia Canal Company, San Luis Canal Company, and Firebaugh Canal Water District.

107. In addition to the areas mentioned, in 2016, Oakdale Irrigation District proposed a one-year, 3,000-acre fallowing program to generate money for farm conservation projects and compliance with SB x7-7. The land would return to production the next year. *See* OAKDALE IRRIGATION DIST., CEQA INITIAL STUDY AND NOTICE OF INTENT TO ADOPT NEGATIVE DECLARATION (2016), ch.1, at 1, www.oakdaleirrigation.com/files/OID%20CEQA%20Initial%20Study%20OnFarmConsProgram.pdf [<https://perma.cc/2EVP-G9SL>]. A dispute has the current program on hold.

108. U.S. BUREAU OF RECLAMATION & SAN JOAQUIN RIVER EXCH. CONTRACTORS WATER AUTH., WATER TRANSFER PROGRAM FOR THE SAN JOAQUIN RIVER EXCHANGE CONTRACTORS WATER AUTH., 2014–2038 FINAL ENVIRONMENTAL IMPACT STATEMENT/ENVIRONMENTAL IMPACT REPORT, NO. 2011061057, ES-2 (2013), http://www.usbr.gov/mp/nepa/documentShow.cfm?Doc_ID=12130 [<https://perma.cc/ZVM4-WCZP>]. The author of the Environmental Impact Report uses the terms 'settlement contractor' and 'exchange contractors' interchangeably.

35-year deal that fallows land every year, which is unique. I provide more details on these following programs in what follows.

The San Joaquin River Exchange contractors (Exchange Contractors) own fantastic water rights. They exchanged their water rights along the San Joaquin River for replacement water from the Delta so the Bureau of Reclamation could complete the Friant Project upstream. The Exchange Contractors receive 840,000 acre-feet each year to irrigate approximately 244,620 acres.¹⁰⁹ They typically receive a 100% allocation, although in critical years (based on inflow into Lake Shasta), Reclamation may reduce their supply to 650,000 acre-feet. This has happened only six times since 1975, most recently in the consecutive years of 2014 and 2015, when they actually received reduced allocations 65% and 75%, respectively.¹¹⁰ Because of the tremendous reliability, their water is valuable and they are active in the water transfer market, although fallowing has been rare. From 2014–38, they are permitted to fallow up to 20,000 acres, as they were during the previous ten years. The most ever fallowed between 2005 and 2010, however, was 3,342 acres, freeing up 8,132 acre-feet of water, with an average of 1,327 acres.¹¹¹ Their purpose of fallowing is also partly to address issues of poor quality groundwater in the region;¹¹² but in general, despite the alfalfa and other low-value crops grown by the Exchange Contractors, removing productive land to free up transfer water is still rare and only done temporarily.

In Northern California, many districts grow rice using water rights with a reliability similar to the rights of the Exchange Contractors. Both the CVP and SWP settled with the original farmers in the Sacramento Valley before they built their large dams on the Sacramento and Feather Rivers, respectively. These Settlement Contractors have secure and bountiful water rights, and many grow rice, a thirsty crop with an accepted evapotranspiration rate of 3.3 acre-feet per acre.¹¹³ Farmers have fallowed rice fields with the intention of transferring the water saved since the 1991 Drought Water Bank, although the 130,000 acres fallowed is atypical. In 2014 and 2015, 146,145 and 132,042 acre-feet were made available from crop idling from roughly 44,000 and 40,000 acres, respectively. In 2014, the top six rice-growing counties harvested 411,200 acres with 2015 acreage just

109. U.S. BUREAU OF RECLAMATION, SECOND AMENDED CONTRACT FOR EXCHANGE OF WATERS 11, 15 (1967).

110. WESTLANDS WATER DIST., HISTORICAL CVP ALLOCATION (2016) http://www.usbr.gov/mp/cvo/vungvari/water_allocations_historical.pdf [<https://perma.cc/W8GB-KNZX>].

111. U.S. BUREAU OF RECLAMATION & SAN JOAQUIN RIVER EXCH. CONTRACTORS WATER AUTH., No. 2003101106, FINAL EIS/EIR WATER TRANSFER PROGRAM FOR THE SAN JOAQUIN RIVER EXCHANGE CONTRACTORS WATER AUTHORITY 2005–2014, ES-6 (2004); U.S. BUREAU OF RECLAMATION & SAN JOAQUIN RIVER EXCH. CONTRACTORS WATER AUTH., SAN JOAQUIN RIVER EXCHANGE CONTRACTORS WATER AUTHORITY, 25 YEAR WATER TRANSFER PROGRAM WATER RES. ANALYSIS, app. b, at 27 (2012), https://www.usbr.gov/mp/nepa/documentShow.cfm?Doc_ID=9629 [<https://perma.cc/S6LE-PNT3>].

112. U.S. BUREAU OF RECLAMATION & SAN JOAQUIN RIVER EXCH. CONTRACTORS WATER AUTH., GROUNDWATER CONDITIONS AND WATER TRANSFERS IN THE EXCHANGE CONTRACTOR'S SERVICE AREA WEST OF THE SAN JOAQUIN RIVER, app. d, https://www.usbr.gov/mp/nepa/documentShow.cfm?Doc_ID=9631 [<https://perma.cc/Y26N-SKL9>].

113. U.S. BUREAU OF RECLAMATION & CAL. DEP'T. OF WATER RES., *supra* note 93, at 15.

slightly lower.¹¹⁴ Thus, in recent years, about ten percent of the rice fields generate water from fallowing.

In addition to the usual antipathy towards fallowing, two endangered species make fallowing transfers even more difficult. The endangered giant garter snake likes artificial wetlands like rice fields. As a result, environmental restrictions now limit fallowing to maintain wetland habitat for the snake.¹¹⁵ Endangered salmon also make fallowing costlier. Lake Shasta must release water in the spring for the fish, limiting farmers' ability to store their water in Shasta in the event of a fallowing deal. Coupled with restrictions on Delta pumping, the window to move transfer water becomes increasingly short.¹¹⁶

B. Opportunity Cost of Long-Term Transfers

Long-term transfers, like short-term transfers, source their water typically without farmer sacrifice. East of Los Angeles in the Sonoran Desert, farmers in the Imperial Valley used up to one-fifth of the flow of the Colorado River.¹¹⁷ Economists saw gains from trade – there had to be a better use of water than growing hay in the desert using water priced at \$20 per acre-foot. Some called for transfers of up to a million acre-feet from Imperial to Los Angeles,¹¹⁸ but instead, in 1988, Imperial Irrigation District (IID) agreed to sell 100,000 acre-feet every year to Metropolitan Water District (MWD) for 35 years, a deal which was “exceedingly difficult to make happen.”¹¹⁹ Surprisingly, despite the attractiveness of moving water out of desert agriculture, Imperial farmers didn't sacrifice water—instead, MWD paid for conservation improvements to make Colorado River water available.¹²⁰ In this case, the opportunity cost is less groundwater percolation and

114. See CAL. DEP'T. OF FOOD AND AGRIC., CALIFORNIA AGRICULTURAL STATISTICS REVIEW 2014–2015, at 47 (2015) (the top six counties account for more than 90% of the total rice grown-in 2013, there were 528,900 acres), <https://www.cdfa.ca.gov/statistics/PDFs/2015Report.pdf> [<https://perma.cc/P5LX-K972>]; U.S. DEP'T OF AGRIC., CROP PRODUCTION: 2015 SUMMARY 26 (2016) (for 2015 acres), <http://www.usda.gov/nass/PUBS/TODAYRPT/cropan16.pdf> [<https://perma.cc/T4NE-5U7M>]; U.S. BUREAU OF RECLAMATION & SAN LUIS & DELTA-MENDOTA WATER AUTH., DRAFT ENVIRONMENTAL ASSESSMENT/INITIAL STUDY: 2014 SAN LUIS & DELTA MENDOTA WATER AUTHORITY WATER TRANSFERS, ch. 3, at 14 (2014) (for earlier acres planted), http://www.usbr.gov/mp/nepa/document>Show.cfm?Doc_ID=16824 [<https://perma.cc/R72B-YDVQ>].

115. HANAK & STRYJEWSKI, *supra* note 49, at 18; U.S. BUREAU OF RECLAMATION & CAL. DEP'T. OF WATER RES., *supra* note 93, at 22.

116. HANAK & STRYJEWSKI, *supra* note 49, at 24.

117. RICHARD W. WAHL, MARKETS FOR FEDERAL WATER: SUBSIDIES, PROPERTY RIGHTS, AND THE BUREAU OF RECLAMATION 142 (1989), https://books.google.com/books?hl=en&lr=&id=_V-OAQAQBAJ&oi=fnd&pg=PP1&dq=wahl+markets+for+deferal+water&ots=G2d-K64GtD&sig=DDsmKA811_hb8j67pRCPTqqAkml [<https://perma.cc/ZHB2-QLZN>].

118. See generally H. J. Vaux Jr. & Richard E. Howitt, *Managing Water Scarcity: An Evaluation of Interregional Transfers*, 20 WATER RES. RES. 785 (1984); James C Dehaven & Jack Hirschleifer, *Feather River Water for Southern California*, 33 LAND ECON. 198, 204 (1957); R.N. STAVINS & ENVL. DEF. FUND, TRADING CONSERVATION INVESTMENTS FOR WATER: A PROPOSAL FOR THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA TO OBTAIN ADDITIONAL COLORADO RIVER WATER BY FINANCING WATER CONSERVATION INVESTMENTS FOR THE IMPERIAL IRRIGATION DISTRICT (1983).

119. HADDAD, *supra* note 31, at 63, 79.

120. *Id.* at 88.

reduced runoff into the Salton Sea.¹²¹ Most of the groundwater in the Imperial Valley is not usable without treatment.¹²² Furthermore, excess surface runoff into the Salton Sea causes flooding (flooding being the original impetus for this transfer). Therefore, the opportunity cost of transferred water is likely quite low.

Although some recent long-term transfers have been outgrowths of short-term transfers, and thus have similar inconsequential effects on farmers,¹²³ there have been long-term transfers and permanent contract reallocations within the SWP and CVP where farmers seem to actually give up water. In each case, the underlying water right is quantified, not in dispute, and the local groundwater is not a concern for neighbors. However, even in these cases, the water for sale is typically marketed *after farming has stopped* or is in the *process of stopping*. It remains difficult to transfer water by removing quality land from production.

1. Permanent Contract Sales—SWP

Although State Water Project Contractors (SWP Contractors) have some flexibility in disposing of excess supplies, they were mostly limited in their ability to move water amongst each other before 1994 because no clear guidelines existed and all transfers required DWR approval.¹²⁴ The lack of a transfer policy, however, did not seem to upset the SWP Contractors, primarily because in the early decades of the project, most users were in their ramp-up phase. The contracts for these users were written with a steadily increasing allocation until they reached their maximum contract quantity. In addition, SWP contracts are “take-or-pay,” so the Contractor pays the fixed costs regardless of delivery amount.¹²⁵ Because pumping water over the Tehachapi Mountains or to the Santa Barbara coast was expensive, urban users commonly refused portions of their entitlement even though they still paid the fixed cost associated with that water.¹²⁶ Rather than using the cheap surface water to substitute for groundwater, farmers instead expanded acreage into new areas, thus growing dependent on this temporary surplus supply.¹²⁷ As Metropolitan Water

121. STAVINS & ENVL DEF. FUND, *supra* note 118, at 124.

122. See OMAR J. LOELTZ ET AL., GEOHYDROLOGIC RECONNAISSANCE OF THE IMPERIAL VALLEY, CALIFORNIA K2 (1975) (for groundwater quality details), <https://pubs.er.usgs.gov/publication/pp486K> [<https://perma.cc/HUN6-7APX>]; CAL. DEP’T OF WATER RES., CALIFORNIA’S GROUNDWATER—BULLETIN 118, UPDATE 2003, 28 (2003).

123. See, e.g., *supra* text accompanying notes 85, 106 (regarding environmental transfers from the San Joaquin Exchange Contractors and the Yuba River Accord).

124. See Madalene Mary Curie, *A Distinct Policy Which Forms a Market Within the California State Water Project*, 21 WATER RES. RES. 1718 (1985) (for a description of DWR’s transfer policy). DWR is still reticent to approve temporary transfers and instead presses for exchanges.

125. CAL. DEP’T OF WATER RES., DRAFT ENVIRONMENTAL IMPACT REPORT MONTEREY PLUS 3–2 (2007), http://www.water.ca.gov/environmentalservices/docs/mntry_plus/DEIR%20-%20Volume%20/03%20History%20Background.pdf [<https://perma.cc/V9YW-68JM>]. See article 33 and 21 or the original contracts.

126. MICHAEL STORPER & RICHARD WALKER, THE PRICE OF WATER: SURPLUS AND SUBSIDY IN THE CALIFORNIA STATE WATER PROJECT 21–22 (1984), http://geography.berkeley.edu/wp-content/uploads/2016/01/Walker_35.pdf [<https://perma.cc/6YUL-9AWG>].

127. *Id.* at 11; HUNDLEY, *supra* note 26, at 297; MICHAEL STORPER & RICHARD WALKER, THE EXPANDING CALIFORNIA WATER SYSTEM, IN SAN FRANCISCO BAY, USE AND PROTECTION 181 (William J. Kockelman ed. 1982), http://geography.berkeley.edu/wp-content/uploads/2016/01/Walker_25.pdf [<https://perma.cc/2QCN-GN7Y>].

District gradually increased their deliveries, the surplus dried up and was mostly gone after 1988.¹²⁸

The take-or-pay provisions also caused problems for agricultural users. The original contracts allowed for cuts of up to 50% for agricultural users before one drop was removed from an urban district.¹²⁹ In the 1976–77 drought, SWP allocations to agricultural districts were reduced to 60%.¹³⁰ In 1976, the SWP delivered close to 881,400 acre-feet to Kern County Water Agency (KCWA), the large wholesaler to the individual districts.¹³¹ In 1977, this number fell to 432,837 acre-feet.¹³² Districts without groundwater were hit especially hard.¹³³ KCWA’s Assistant General Manager described the situation as an imminent “economic death spiral.”¹³⁴

The farmers had difficulty making payments, and some chose to give up their land and let their SWP repayment obligations fall to their district. The most notable example occurred in Berrenda Mesa Water District (BMWD). In 1986, BMWD foreclosed on 6,500 acres and assumed the obligations for the land, prompting them to seek buyers for this extra SWP entitlement.¹³⁵ Eventually, under the 1994 Monterey Agreement, SWP Contractors (including BMWD) were granted the right to sell 130,000 acre-feet of entitlement to urban agencies, and most consummated deals within the next decade.¹³⁶ While these lands did lose their water supply, the Rule of Fallowed Fields still applies: the transfer itself was not the cause of the loss.¹³⁷

128. HUNDLEY, *supra* note 26, at 299.

129. I. Fischhendler & D. Zilberman, *Packaging Policies to Reform the Water Sector: The Case of the Central Valley Project Improvement Act*, 41 WATER RES. RES. W07024, 1 (2005).

130. CAL. DEP’T OF WATER RES., *supra* note 47, at 61.

131. CAL. DEP’T OF WATER RES., THE CALIFORNIA STATE WATER PROJECT—1976 ACTIVITIES AND FUTURE MANAGEMENT PLANS, BULLETIN 132–77, at 52-3, (1977).

132. CAL. DEP’T OF WATER RES., THE CALIFORNIA STATE WATER PROJECT—1977 ACTIVITIES AND FUTURE MANAGEMENT PLANS, BULLETIN 132–78, at 60-1 (1978).

133. This area includes some of Lost Hills WD and Wheeler Ridge-Maricopa WSD and most of Belridge WSD and Berrenda Mesa WD—a rough rule is everything to the west of the California Aqueduct. CAL. STATE WATER RES. CONTROL BD., PHASE I OF THE BAY-DELTA ESTUARY HEARING August 13, 1987 9AM (1987), http://www.swrcb.ca.gov/waterrights/water_issues/programs/bay_delta/decision_1641/transcripts/bd_transcripts.shtml [https://perma.cc/NRF9-CCYJ].

134. Transcript of Record at 17, *Planning and Conservation League v. Dep’t. of Water Res.*, No. 200301118 (Cal. Dep’t of Water Res. February 3–13, 2003), http://www.water.ca.gov/environmental_services/mplus_transcript.cfm [https://perma.cc/S99E-VY6H].

135. CAL. DEP’T OF WATER RES., *supra* note 47, at 61; U.S. NAT’L RESEARCH COUNCIL, *supra* note 31, at 225.

136. See CAL. DEP’T OF WATER RES., MANAGEMENT OF THE CALIFORNIA STATE WATER PROJECT, BULLETIN 132–96, 114–15 (1997) (for more details); CASTAIC LAKE WATER AGENCY, DRAFT ENVIRONMENTAL IMPACT REPORT: SUPPLEMENTAL WATER PROJECT TRANSFER OF 41,000 ACRE-FEET OF STATE WATER PROJECT TABLE A AMOUNT 6–9 (2004), http://filecenter.santa-clarita.com/Planning/HenryMayoAppendixDAppendices/Appendix%20D_Appendix%20q%20CLWA%20Supplemental%20Water%20Transfer%20EIR.pdf [https://perma.cc/T35P-8WYM].

137. Permanent water transfers, typically rare, occurred because districts within the SWP have quantified contracts, because after 1994 and the Monterey Agreement, Kern County Water Agency—the wholesaler—agreed that Berrenda Mesa and others had the right to sell, and because these west side districts didn’t use groundwater, a shared resource with correlative rights that often hinders surface transfers.

2. *Permanent Contract Sales—CVP*

The Central Valley Project provides subsidized water to a diverse group of farmers, some of whom grow low-value crops and suffer from drainage problems. In the hopes of using water more efficiently and preventing new supply infrastructure, some began calling for allowing transfers of CVP water to non-CVP users. Among some proponents, the ideal transfer was to “put a farmer out of business on the west side and take his water supply.”¹³⁸ In 1992, Congress enacted the Central Valley Project Improvement Act (CVPIA), a major reorganization of the CVP with an emphasis on facilitating water transfers from farmers and districts.¹³⁹ Prior to the reorganization, CVP Contractors in the same division traded ample quantities of water on a short-term basis as that was the only available method of transfer for them at the time. But the CVPIA allowed transfers across divisions.¹⁴⁰ More importantly, it allowed transfers to non-CVP Contractors and also granted individual farmers a limited right to transfer water without district approval, a “monumental change.”¹⁴¹ While a breakthrough on paper, actual behavior did not change much. No farmer was put out of business as a result of a water buyout, and of the few permanent transfers that have occurred, most have not led to fallowing productive land, but rather are a result of finding a home for water that is no longer needed.

Between 2003 and 2006, a few small CVP districts sold their contracts to Westlands Water District and other nearby users. Westlands is a large agricultural district in constant need of additional water. Its selling districts had poor quality groundwater (like the SWP sellers above) and drainage problems and therefore were either in the process of curtailing irrigation or had done so already.¹⁴² Although it’s hard to precisely identify the opportunity cost of the water, by the time they sold, the CVP districts were routinely temporarily transferring their supplies. And if instead left unused, Reclamation would reallocate these sellers’ water among the other contractors. Given that most CVP Contractors use groundwater to make up for deficiencies during dry periods, the marginal value of this water is likely very close to the capitalized value of reduced pumping costs resulting from leaving more water in the ground. As before, the Rule of Fallowed Fields applies: land removed from production is not the result of the transfer.

The city of Tracy, a growing urban area surrounded by farmland, provides another example of a permanent CVP contract assignment without farmer sacrifice. The West Side Irrigation District (TWSID) and Banta-Carbona Irrigation District

138. CARL BORONKAY ET AL., THE PASSAGE OF THE CENTRAL VALLEY PROJECT IMPROVEMENT ACT, 1991–1992: THE METROPOLITAN WATER DISTRICT PERSPECTIVE 134 (1997), <http://www.archive.org/details/passagecentral00boronich> (last visited Feb. 12, 2017).

139. D. E. Noll, *Analysis of Central Valley Project Improvement Act*, 3 SAN JOAQUIN AGRIC. L. REV. 3 (1993).

140. CENTRAL VALLEY PROJECT IMPROVEMENT ACT OF 1992, § 3405 (a)(1)(M).

141. *Id.* at § 3405 (a)(1).; GRAFF, CHALL, & YARDAS, *supra* note 69, at 63. Similar state legislation granting this right to all California farmers failed earlier. Congress was able to pass this provision despite agricultural user objections. *See* Fischhendler & Zilberman, *supra* note 129, at 5.

142. *Transactions*, WATER STRATEGIST, March 2005, at 2–3; U.S. BUREAU OF RECLAMATION, LONG-TERM CONTRACT RENEWAL- CENTRAL VALLEY PROJECT. DELTA MENDOTA CANAL UNIT (2005), https://www.usbr.gov/mp/cvpia/3404c/env_docs/final_ea_fonsi/dmc/ [<https://perma.cc/UWG8-A4LG>].

(BCID) sandwich the city of Tracy. In 2001, Tracy negotiated the assignment of 10,000 acre-feet of TWSID's contract and 5,000 acre-feet of BCID's contract. Urban encroachment and other changes made water available (TWSID only irrigates 6,000 acres now compared to 10,800 in years past),¹⁴³ and thus the transfer occurred after the land use changed.¹⁴⁴ The Rule of Fallowed Fields therefore applies here as well—despite wishes to the contrary, farmers are not permanently retiring farmland to sell their water.

3. Colorado River – Sacrifice in the Desert

Besides the MWD–IID transfer in 1987, two other transfers on the Colorado River are worth noting because they actually do involve farmer sacrifice. These are examples of some of the few transfers where the Rule of Fallowed Fields does *not* apply—the opportunity cost of transferred water is the farmer's net benefit of using the water.

In 1986, MWD began negotiating a fallowing transfer with Palo Verde Irrigation District (PVID), one of the oldest water users along the Colorado River.¹⁴⁵ PVID is unique in California because, as MWD chief negotiator Tim Quinn said,

More than probably any other place in California, the farmers out in the Palo Verde Irrigation District were willing to look at this as a business transaction. Generally water marketing . . . has got very strong emotional and social issues tied to it. Those didn't tend to be attached to the issue as far as Palo Verde Irrigation District was concerned. They were willing to approach it as a business transaction.¹⁴⁶

Although interested in a 35-year deal, in 1992, they agreed to a two-year test transfer where farmers fallowed 20,215 acres, freeing up 4.6 acre-feet of water per acre of land for a two-year total of 185,978 acre-feet.¹⁴⁷ Even though MWD stored this water in Lake Mead only to see it spill in 1993,¹⁴⁸ it was successful enough to consummate a 35-year deal in 2004. Under this new deal, MWD may request that PVID farmers fallow up to 29% of the district's acres per year, thus

143. U.S. BUREAU OF RECLAMATION, ENVIRONMENTAL ASSESSMENT LONG-TERM CONTRACT RENEWAL, ch. 3 at 3–22 (2005).

144. *Sierra Club v. W. Side Irrigation Dist.*, 128 Cal.App.4th 690, 5–6 (Cal. App. Ct. 3rd 2005).

145. The transfer was an outgrowth of earlier negotiations in 1986–87 which stalled because of disagreements over price—MWD offered \$135 per acre-foot, and PVID sought \$300. *See BORONKAY, ET AL.*, *supra* note 138, at 50–51.

146. *Id.* at 50.

147. METRO. WATER DIST., PALO VERDE TEST LAND FALLOWING PROGRAM, AUGUST 1, 1992–JULY 31, 1994: FINAL REPORT i (1995), http://www.waterboards.ca.gov/waterrights/water_issues/programs/hearings/iid_sdcwa/pcl/exhibits/pcl_32.pdf [<https://perma.cc/JW2M-VMDN>].

148. Interview with Gerald Davison, General Manager of Palo Verde Irrigation District, in Blythe, Cal., 11 (Feb. 26, 2007), <http://www.crwua.org/AboutUs/OralHistory.aspx> [<https://perma.cc/JC8Q-K3YZ>]; HADDAD, *supra* note 31, at 112.

making available to MWD up to 111,300 acre-feet.¹⁴⁹ From 2005–10, Metropolitan bought 616,875 acre-feet of water that cost nearly \$172 million.¹⁵⁰

Similar water right properties make this long-term transfer possible, as they have for the other permanent trades discussed. Palo Verde has very strong, undisputed rights to the Colorado River. The district can take as much as it needs to irrigate its 104,500 valley acres, and “no one’s rights are more generous or better positioned.”¹⁵¹ Individual rights are not quantified, but the Bureau of Reclamation tracks diversions and return flows, and thus tracks any difference in PVID’s consumptive use. And like the other permanent transfers, additional groundwater use does not cause jealousy. In PVID, groundwater in the district is ten feet from the surface, and is hydrologically connected and functionally no different than the Colorado River.¹⁵² Thus, groundwater and surface water are treated legally as the same source, a holistic approach absent in the rest of California.

San Diego County Water Agency, a member of Metropolitan Water District, along with Coachella Valley Water District, also negotiated a 45-year transfer with Imperial Irrigation District that involves fallowing. Starting in 2003, IID would implement farm and other efficiency projects to make water available, but they would also allow fallowing, desirable because fallowing-generated water has less of an impact on the Salton Sea.¹⁵³ The Imperial Board, however, was “fundamentally opposed to fallowing,”¹⁵⁴ and although it compromised to make this deal happen, after 2017, the agreement eliminated fallowing as an option to make water available.¹⁵⁵ Thus, once again, the district will return to the Rule of Fallowed Fields—after 2017, there may be empty fields, but they won’t be fallow

149. METRO. WATER DIST. & PALO VERDE IRRIGATION DIST., FORBEARANCE AND FALLOWING PROGRAM AGREEMENT 3.2.2.1 (2004), www.usbr.gov/lc/region/g4000/4200Rpts/DecreeRpt/2005/Agreements/MWDPVIDFallow.pdf [<https://perma.cc/TV4B-L3SL>]; *Transactions*, WATER STRATEGIST, July/Aug 2001, at 3.

150. METRO. WATER DIST., BOARD REPORT: 2008-2010 WATER TRANSFER AND EXCHANGE TRANSACTIONS Attachment 4, at 2 (2011), http://www.mwdh2o.com/PDFWWA2016Postings/2008_2010%20Water%20Transfer%20and%20Exchange%20Transactions.pdf [<https://perma.cc/W6FE-JZFG>]. Note: This amount does not include the additional 56,382 acre-feet requested during the dry years of 2009–2010 under a separate agreement.

151. HADDAD, *supra* note 31 at 72.

152. The only difference is the pumping cost, which makes it more expensive. As a result, only two farmers currently use groundwater—one grows 10 acres of peaches at the south end of the district on land not adjacent to a canal, and the other grows 31 acres of dates in the north end on land too high above his adjacent canal. Phone Conversation with Richard Gilmore, Assistant General Manager of Palo Verde Irrigation District (2016).

153. CAL. STATE WATER RES. CONTROL BD., IMPERIAL IRRIGATION DISTRICT’S (IID) AND SAN DIEGO COUNTY WATER AUTHORITY’S (SDCWA) AMENDED JOINT PETITION FOR APPROVAL OF A LONG-TERM TRANSFER OF CONSERVED WATER FROM IID TO SDCWA AND TO CHANGE THE POINT OF DIVERSION, PLACE OF USE, AND PURPOSE OF USE UNDER PERMIT 7643 ISSUED ON APPLICATION 7482 OF IMPERIAL IRRIGATION DISTRICT 28 (2002), http://www.waterboards.ca.gov/waterrights/board_decisions/adopted_orders/orders/2002/wro2002-13revised.pdf [<https://perma.cc/H8JF-MVYC>].

154. IMPERIAL IRRIGATION DIST., FALLOWING PROGRAMS IMPERIAL IRRIGATION DISTRICT: FALLOWING, <http://www.iid.com/water/water-conservation/fallowing> [<https://perma.cc/PNK3-LNDG>].

155. IMPERIAL IRRIGATION DIST. ET AL., QUANTIFICATION SETTLEMENT AGREEMENT 36 (2003), http://www.sdcwa.org/sites/default/files/files/QSA_final.pdf [<https://perma.cc/GT4B-P62U>].

as a result of water transfers. Fallowing remains “the f-word in California water marketing.”¹⁵⁶

III. WHY DOESN'T EVERYONE PARTICIPATE?

Given that most transfers occur without farmer sacrifice, we should expect more users to take advantage of what appears to be a free lunch. However, not everyone can. In what follows, I focus on the dogs that didn't bark,¹⁵⁷ providing insight into how difficult water transfer reallocation can be as a result of vague water rights.

A. McArthur Ranch

Located north of Lake Shasta along the Fall River, George McArthur of McArthur Ranch proposed to sell a portion of his 60,000 acre-feet, pre-1914 direct-diversion water right to San Joaquin Valley agricultural users. McArthur proposed to transfer water made available by fallowing irrigated pasture—he had no storage. Reclamation staff had concerns over the right's validity as well as the quantity that McArthur was entitled to.¹⁵⁸ Although he was able to sell during the 1991 Drought Water Bank, he has not been able to sell since then despite his strong desire to do so.¹⁵⁹ Because the right is pre-1914, the SWRCB has no jurisdiction over the transfer, but the Reclamation and DWR fill the regulatory void because they are responsible for Delta water quality standards and have a strong interest in eliminating paper water transfers. Besides generally discouraging small transfers,¹⁶⁰ they make it very difficult to transfer water from irrigated pasture and alfalfa because of the difficulty in calculating evapotranspiration.¹⁶¹ In some cases, pasture may still grow without surface irrigation because it can acquire groundwater, thus making the calculation of evapotranspiration very difficult.

156. BORONKAY ET AL., *supra* note 138 at 52.

157. These districts were unable to transfer and thus remained “silent.” But the reasons why help explain transfer hindrances.

158. CAL. DEP'T OF WATER RES., A CATALOG OF WATER TRANSFER PROPOSALS: DRAFT 12 (1986).

159. Interviews with George McArthur, Owner of McArthur Ranch (2011). The following description is based on my phone call with him as well.

160. U.S. BUREAU OF RECLAMATION & CAL. DEP'T. OF WATER RES., DRAFT TECHNICAL INFORMATION FOR WATER TRANSFERS IN 2011, at 11 (2011), <http://www.water.ca.gov/water-transfers/docs/TechInfoDoc-WaterTransfers-2011.pdf> [<https://perma.cc/MN3S-LKLY>].

161. U.S. BUREAU OF RECLAMATION & CAL. DEP'T. OF WATER RES., INFORMATION AVAILABLE TO PARTIES INTERESTED IN MAKING WATER AVAILABLE FOR WATER TRANSFERS (2013); U.S. BUREAU OF RECLAMATION, 2010-2011 WATER TRANSFER PROGRAM—FINAL ENVIRONMENTAL ASSESSMENT 2-9, 2-10 (2010), https://www.usbr.gov/mp/nepa/documentShow.cfm?Doc_ID=5223 [<https://perma.cc/LMC6-JWCK>]. This report from the USBR states “Only alfalfa grown north of the American River will be allowed in the 2010-2011 Water Transfer Program but fields must be completely disked under, or prior to, July 1 of transfer year. Alfalfa is not allowed if it is grown in the foothills, in the Delta, in areas with high water tables, or land irrigated with water that does not come from the Sacramento or Feather Rivers or their tributaries.” *Id.* According to George McArthur, this position results from their impression of the 1991 Drought Water Bank in that they paid Delta users to fallow irrigated pasture when the water availability in the ground likely meant that they did not get as much as they paid for. Interviews with George McArthur, *supra* note 159.

Pasture land is also typically marginal quality land, and may not be irrigated every year, making it difficult for the irrigator to prove to Reclamation and DWR that the land would be irrigated in the absence of the transfer. DWR and other state agencies are directed to “encourage voluntary transfers of water and water rights,”¹⁶² but they currently still prevent transfers from irrigated pasture and alfalfa even though those crops account for close to 432,000 acres in the Sacramento hydrologic region.¹⁶³ For these and other reasons, McArthur remains frustrated.¹⁶⁴ And while his frustration towards bureaucrats may be justified, his water right deserves blame too. It specifies a diversion season and an amount, in cubic feet per second, which he may divert; however, the right is silent on how much consumptive use he is entitled to. In addition, the amount of water he actually diverts has never been measured (although he does submit self-reported data as all water rights holders do). Further, because groundwater is not regulated, his ability to drill a well should he sell his surface right also complicates the situation. Thus, it is quite difficult to precisely say how much water McArthur uses and how much he would make available if he fallowed his pasture.

B. AndCo

During the 1977 drought, Anderson Farms Company (AndCo), an 11,335 acre farming operation in Yolo County,¹⁶⁵ desired to transfer its water to Berrenda Mesa Water District, an agricultural district in Kern County reliant on SWP water. Berrenda Mesa has poor quality or non-existent groundwater, and had 28,000 acres of permanent crops¹⁶⁶ that were threatened by severe drought. AndCo had both riparian rights and groundwater rights, and it proposed to pump groundwater continuously and discharge it into Toe Drain, a tributary of the Delta and the source of their riparian surface water right. The SWP would pump additional water from the Delta to deliver it to Berrenda Mesa. For their own crops during the growing season, AndCo proposed to use groundwater, forgoing their normal riparian right diversions. Two main problems, however, characterized their proposed transfer. First, it would very likely be a paper water transfer. Second, its pumping would create a large cone of depression, sucking water from the hydrologically connected

162. CALIFORNIA WATER CODE, § 20200 (2007). Rice growers also have an incentive to prevent competition in the water transfer market, an important point according to McArthur. Interviews with George McArthur, *supra* note 159.

163. CAL. DEP'T. OF WATER RES., IRRIGATED CROP ACRES AND WATER USE—HYDROLOGIC REGION (2001), http://www.water.ca.gov/landwateruse/docs/annualdata/2001/Ag_HR_2001.xls. This number is for reference—not all of this is off-limits.

164. Frustrated is a nice term. He claims the folks in the Bureau of Reclamation and DWR he dealt with are “lazy middle management bureaucrats that don’t want to do any more than they have to” because they won’t make the effort to figure out how much water he is entitled to. Interviews with George McArthur, *supra* note 159. In addition, some of his water rights are in the adjudicated Cow Creek system. Because the decree does not make it clear if these rights may be transferred out of the area, DWR asked McArthur to get a judge’s opinion, but apparently, this has not happened yet.

165. Review of Proposed Groundwater Transfer Plan, Anderson Farms Co. v. County Of Yolo, Decision 1474, at 2 (Cal. State Water Res. Control Bd., 1977), http://www.waterboards.ca.gov/water_rights/board_decisions/adopted_orders/decisions/d1450_d1499/wrd1474.pdf [<https://perma.cc/83TU-CMNP>].

166. *Id.* at 3.

Sacramento River, and therefore not add additional water to the system.¹⁶⁷ In addition, AndCo's riparian surface water right, which it would refrain from using to free up additional transfer water, likely would not have had nearly as much water available during the drought season.¹⁶⁸

The hydrologic connection with groundwater and the lack of quantification for both surface and groundwater rights thwarted this proposal. AndCo had two correlative rights—a shared riparian surface water right and a shared groundwater right—that were potentially transferable, but not without some effort on the farm's part to estimate how much it was entitled to. AndCo's riparian right might have had fresh water available during the 1977 season, but *ex ante*, there was no good way to tell, especially because the CVP and SWP release water to maintain Delta water quality standards. AndCo also did not have priority over other users sharing their water sources. It was permitted to use a correlative share of groundwater on their overlying land, but could only take surplus water to give to Berrenda Mesa. Again, calculating surplus water availability was practically impossible without a complete adjudication, which would be further hampered by the interconnectedness of the Sacramento River and the Yolo groundwater basin.

C. Areias Dairy Farms

The Central Valley Project Improvement Act granted individual farmers the right to transfer water without district approval. In 1993, Areias Dairy Farms, operated by Assemblyman Rusty Areias, first attempted to sell water to MWD to the south. The 2,800 acre farm was within Central California Irrigation District (CCID), one of the four San Joaquin River Exchange Contractors.¹⁶⁹ MWD specifically targeted the San Joaquin Exchange Contractors because the water was reliable.¹⁷⁰ Only four times in the past 36 years has it received less than a 100% allocation, and in those drought years, it still received 75%.¹⁷¹ The two parties agreed to a fifteen-year transfer where MWD would take Areias' entire allotment in at least seven of the fifteen years.¹⁷²

Local farmers, irrigation district board members, and farming groups all denounced the deal, motivated in part by Areias' hypocrisy, as he was formerly an

167. *Id.* at 7.

168. *Id.*

169. The Exchange Contractors exchanged their riparian and pre-1914 water rights to the San Joaquin River for supplies from the Delta. The USBR could then capture and export their old water supplies for use in the Friant-Kern Canal.

170. The water was also likely cheaper than from any regular CVP contractor. The CVPIA required transferors under certain circumstances to pay the full cost rate on the amount transferred. MWD would argue that this part of the act did not apply because the water was technically not Reclamation water but rather water diverted from the Exchange Contractors' original rights on the San Joaquin River. Otherwise, USBR would require MWD to pay an additional \$42 per acre-foot subsidy payback. See J.A. Savage, *The Selling of Water*, CALIFORNIA J., June 1, 1994. For subsidy repayment provisions. See M. Weinberg, *Assessing a Policy Grab Bag: Federal Water Policy Reform*, AM. J. AGRIC. ECON. 541–56 (2002).

171. WESTLANDS WATER DIST., *supra* note 110.

172. SMITH, *supra* note 48, at Oct. 93.

“arch-foe of water marketing” as a California legislator.¹⁷³ Local meetings in August of 1994 drew standing room only crowds, with almost all present voicing opposition to the deal.¹⁷⁴ Emotions ran very high—many gave arguments of a domino effect that if Areias sold, others would follow, creating a barren area with tumbleweeds just so Los Angeles residents could fill their swimming pools.¹⁷⁵ Neighboring farmers were worried about increased groundwater pumping, and despite assuring other farmers that no additional groundwater would be pumped and that the transfer money will be immediately invested in his struggling dairy,¹⁷⁶ the “overwhelming grassroots political opposition” never backed down.¹⁷⁷

These transfers are three prime examples of failed transfers.¹⁷⁸ Besides physical constraints, three key points help explain why transfers are scuttled or hindered. First, quantified consumptive use is a prerequisite to transfer water. AndCo and MacArthur Ranch had no evidence on this front and this makes calculating transfer volumes impossible. Second, groundwater may be hydrologically connected to surface water. In this case, because California doesn’t regulate groundwater, transferring surface water may stoke fears of paper water transfers as it did with Rusty Areias’ deal with MWD. Third, economic concerns and jealousy matter, especially if a single farmer rather than a district proposes to sell water. Neighbors often worry about lost economic activity and the domino effect of many users selling. In addition, if a single farmer proposes a transfer, profits can make neighbors jealous. District-led transfers can at least spread the wealth around to ensure greater acceptance. Had Rusty Areias sold through his district instead, he may have been able to assuage neighbor fears by stating that no more than X % of district water would be sold. Metropolitan Water District, in working with Palo Verde Irrigation District, does exactly that.¹⁷⁹ Instead, without district control, it seemed to neighboring farmers that anyone and everyone could sell if Areias was able to.

While some of these fears are likely overblown, it may be rational to oppose transfers. Because farmers use so much more water than urban areas do, there is no threat of completely destroying irrigated agriculture. However, while urban water users are willing to pay high prices on the margin, a few consummated transfers could drive the price down significantly, thus lowering the value of the farmers’ water rights and perhaps making borrowing more costly. Thus, farmers

173. BORONKAY, ET AL., *supra* note 138, at 123; Elliot Diringer, *San Jose Assemblyman to Profit From Law He Fought*, SAN FRANCISCO CHRONICLE, Sept. 23, 1993. Areias assumed that his political connections would help, rather than hurt, facilitate the process.

174. Garth Stapley, “Farmer” Areias Takes a Dunking, MODESTO BEE, Aug. 24, 1994, at 1.

175. Mark Grossi, *Areias Farms’ Water Deal for L.A. on Tap*, FRESNO BEE, June 30, 1994.

176. Stapley, *supra* note 174.

177. BORONKAY, ET AL., *supra* note 138, at 124.

178. MWD partially failed in its bid to implement a banking arrangement with Arvin-Edison Water Storage District. *See id.* at 132. San Francisco PUC failed in its recent bid to buy water from Modesto Irrigation District, although Oakdale has stepped in to try and make a deal work. *See John Holland, San Francisco Water Sale Deal with Oakdale is Off*, THE MODESTO BEE, Dec. 11, 2012, <http://www.modbee.com/news/local/oakdale/article3148227.html> [<https://perma.cc/Q4WF-LDZ7>].

179. METRO. WATER DIST. & PALO VERDE IRRIGATION DIST., *supra* note 149.

either want to be the first to sell, or they want to prevent their neighbors from selling.¹⁸⁰

In summary, in some cases water rights include the ability to sever water from the land; and because of the lack of quantification, the unregulated nature of groundwater pumping, and the political/economic transfer fears, too often farmers only have the ability to use water locally.

IV. THE FUTURE

It is difficult to forecast how water markets will look in the coming decades. However, it is clear that the desire for new supplies will not disappear—the only question is where they will come from. North–South transfers will remain valuable, and East Bay MUD’s new Sacramento water supply infrastructure will enable north–south transfers that bypass DWR and Reclamation pumps, potentially easing transfers between the Bay Area and Northern California users. Although EBMUD did not include water transfers as a supply option in its 2005 Urban Water Management Plan,¹⁸¹ it did envision getting up to 13,000 acre-feet in their 2010 Plan,¹⁸² evidence that it see the benefits too. In addition, EBMUD is pursuing a pilot transfer between Placer County WA and/or Yuba County WA to better understand the difficulty and cost.¹⁸³

The San Joaquin Exchange Contractors, as well as the other districts with lots of water in Central California, will continue to pursue transfers as well. Many have all been active in short-term markets, and some (including Oakdale and SSJID) have transferred long-term as well. California may have the “use it or lose it” doctrine on paper, but in reality, water users do not lose their water from a lack of use. They do, however, attract attention from other thirsty users who use the courts, and so it seems likely that these users will transfer more of their excess water to nearby thirsty areas to prevent mandated reallocation.¹⁸⁴

Water banking is likely to remain popular, as it allows managers more control than water marketing. Water banking allows users to smooth out consumption by renting space in non-adjacent groundwater aquifers, storing wet year water and then withdrawing that water in dry years. Water banking has grown markedly in recent years.¹⁸⁵

I also anticipate more joint action. Although there are hundreds of water districts, many have common interests and may band together to achieve common goals. For example, many agricultural districts band together based on common infrastructure (e.g., San Luis & Delta Mendota Water Authority). Bay Area urban

180. HADDAD, *supra* note 31, at 177.

181. EAST BAY MUN. UTIL. DIST., 2005 WATER MANAGEMENT PLAN (2005).

182. EAST BAY MUN. UTIL. DIST., 2010 WATER MANAGEMENT PLAN 2 (2011).

183. BAY AREA WATER SUPPLY & CONSERVATION AGENCY & EAST BAY MUN. UTIL. DIST., SHORT-TERM PILOT WATER TRANSFER PLAN (2013), http://bawsca.org/docs/BAWSCA-EBMUD%20Water%20Transfer%20Plan_Final%20Sept.pdf [<https://perma.cc/T8VU-2UWB>].

184. For a discussion about environmentalists going after agricultural water, see BORONKAY ET AL., *supra* note 138, at 134. *See also* OAKDALE IRRIGATION DIST., MANY POSSIBILITIES, BUT FEW REGIONAL BUYERS FOR OI D’S SURPLUS WATER (2015), <http://www.oakdaleirrigation.com/files/OID%20board%20meeting%20release%208-18-15.pdf> [<https://perma.cc/CT3F-S9CP>].

185. HANAK & STRYJEWSKI, *supra* note 49, at 36.

districts, dependent on Yosemite water, formed the Bay Area Water Supply & Conservation Agency (BAWSCA) in 2003. EBMUD and Contra Costa Water District, the large East Bay districts, have incentives to share supplies, and EBMUD and BAWSCA joined together to pursue the pilot water transfer noted above. In the face of supply pressure, I suspect water managers will unite to share supplies. This could mean more joint water transfer proposals, and it also may mean more joint supply projects (e.g., desalination plants).

CONCLUSION

Are transfers described here good for California? Many of them involve users profiting from water that they have a right—but not a need—to use, and this seems unfair. But, the existence of trade means that both parties are benefiting, and although there are external costs, they are borne primarily by the Delta or groundwater aquifers in wet years when the opportunity cost of less water is very low. Thus, trading is likely to be efficient. Although most suppliers aren't asking their customers to use any less, they are expending effort to make more water available as the price increases, and that is a good thing.

On a more pessimistic note, legislation has unintended consequences, and we shouldn't expect that water transfer legislation would be any different. Water users will game the system. Throughout the 1980s and 1990s, legislators passed laws¹⁸⁶ with the intention of more efficient water use, and while that may have occurred, users then wanted to claim credit for stuff they already were doing. They began to line canals, killing ditch phreatophytes, and switching irrigation methods, all in the name of conservation.¹⁸⁷ These activities, however, hurt wildlife dependent on runoff. Thus, a consequence of transfer policy is environmentally costly water conservation.

What to do then? It is tempting to conclude that policy makers should not worry so much about improving water marketing. This is chiefly because of the transaction costs inherent in water transfers, the antipathy in most of the state towards actually retiring land from agriculture to free up water, and the potential environmental damage from using water more efficiently. If a transfer truly represents a gain from trade from society's perspective, it will happen eventually, as happened most notably with Palo Verde Irrigation District and MWD. However, this conclusion ignores the murky water right system at fault. Appropriative water rights in California are not quantified to a degree which allows administration during droughts. Correlative groundwater and riparian rights, as well as uncertain environmental constraints, further complicate the system.¹⁸⁸

Therefore, a more sensible approach might be to develop a better accounting system that takes into account the needs of the environment, and then allows users to trade once property rights are clear. California may get there, but

186. HADDAD, *supra* note 31, at App.

187. Licenses 1050, 2814, 3109, 3110, 9794, and 9989 (Cal. State Water Res. Control Bd., 1999), http://www.waterboards.ca.gov/waterrights/board_decisions/adopted_orders/orders/1999/wro99-12.pdf [<https://perma.cc/8AL8-Z34Q>].

188. For more detail, see M. Hanemann et al, *California's Flawed Surface Water Rights*, in SUSTAINABLE WATER: CHALLENGES AND SOLUTIONS FROM CALIFORNIA (Allison Lassiter ed. 2015).

until it does, given the prevalence of alternative and often easier methods of reallocating water, we should not expect markets to play a significant role in reallocating water away from agriculture.

