

MOVING WATER IN A HIGHLY ALTERED LAND: CALIFORNIA'S WATER INFRASTRUCTURE AND ENVIRONMENTAL DEGRADATION

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“We have acted upon the western landscape with the force of a geological agent” –
Wallace Stegner, *Where the bluebird sings to the lemonade springs: living and writing
in the West*

INTRODUCTION

California was once a state defined by massive free-flowing rivers—the mighty Sacramento, the meandering San Joaquin, and the vast Colorado—to name only a few. California’s Central Valley was filled with millions of acres of wetlands and grasslands. Huge salmon runs flooded the rivers, and the skies were darkened by millions of migratory birds. Today, California has been called the most hydrologically altered landmass on the planet, and that characterization is true.² As word of California’s abundant resources spread and settlers arrived, the state’s free-flowing rivers, marshes, and even arid lands gave way to farmland, cities, and infrastructure including massive dams, reservoirs, and hundreds of miles of levees. That infrastructure became California’s water system, which now supports thirty-nine million people, irrigates an average of 9.6 million acres of farmland per year, and powers the seventh largest economy in the world.³

Today, the most challenging prospect for the state is providing

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1. Wallace Stegner, *Where The Bluebird Sings To The Lemonade Springs: Living And Writing In The West* 47 (1992).

2. Water Education Foundation, *California Water Basics*, <http://www.watereducation.org/photo-gallery/california-water-basics> (last visited Apr. 5, 2016).

3. *Population estimates, July 1, 2015, (V2015), QuickFacts, California* <http://quickfacts.census.gov/> (last visited Apr. 5, 2016); *Agricultural Water Use, California Department of Water Resources*, <http://www.water.ca.gov/wateruseefficiency/agricultural/> (last visited Apr. 5, 2016); Michael B. Marois & Shin Pei, *Brown’s California Overtakes Brazil With Companies Leading World* (2015), <http://www.bloomberg.com/news/articles/2015-01-16/brown-s-california-overtakes-brazil-with-companies-leading-world> (last visited Apr. 5, 2016).

sufficient water to areas where humans need it most. California's climate and hydrology, which differ from any other state in the U.S., make this a difficult task. The average precipitation for the state is about two-hundred million acre-feet per year.⁴ However, the actual precipitation can vary anywhere from one-hundred million acre-feet to three-hundred million acre-feet, depending on whether the year is wet, dry, or something in between.⁵ Besides this large variance, precipitation normally fails to occur *when* and *where* water is needed most.⁶ Though the highest demand for water occurs in the hot and dry summer and fall, most of the precipitation occurs between November and April.⁷ In addition, most of the precipitation falls in the mountains in the middle to northern half of the state, far from the major urban and agricultural centers that demand the most water.⁸ While parts of Northern California receive one-hundred inches or more of precipitation per year, the state's southern, drier areas receive much less, and the desert regions receive just a few inches.⁹ Consequently, seventy-five percent of California's available water is in the northern third of the state (north of Sacramento), while eighty percent of the urban and agricultural water demands are in the southern two-thirds of the state.¹⁰

Besides surface water, groundwater is a key part of California's water supply, comprising about 33% of water used in an average year and even more in a drought, or in areas in which there is little or no surface water.¹¹ From a hydrological perspective, groundwater is conceptually inseparable from surface water. Precipitation soaks into the ground and becomes groundwater or later resurfaces as a spring, or in spring-fed streams or lakes.¹² Approximately thirty-eight to

4. See California State Water Project Water Supply, <http://www.water.ca.gov/swp/watersupply.cfm> (last visited Apr. 5, 2016) (explaining that an acre-foot of water equals about 326,000 gallons, or enough water to cover an acre of land (the size of a football field) 1 foot deep, and that one acre-foot is enough water to meet the annual indoor and outdoor needs of two households).

5. California's Water Systems, <http://mavensnotebook.com/the-notebook-file-cabinet/californias-water-systems/> (last visited Apr. 5, 2016).

6. *Id.*

7. *Id.*

8. *Id.*

9. *Id.*

10. Water Education Foundation, *California Water Basics*, <http://www.watereducation.org/photo-gallery/california-water-basics> (last visited Apr. 5, 2016).

11. Ellen Hanak & Elizabeth Stryjewski, *Public Policy Institute of California, California's Water Market, By the Numbers: Update 2012* at 9 (Nov. 2012).

12. *Summary of the Water Cycle*, <http://water.usgs.gov/edu/watercyclesummary.html> (last

forty-six percent of the California's surface water comes from groundwater.¹³

To address its many water challenges and fuel its economy, California built an immense water conveyance infrastructure to move water from where it originates to where it is demanded.¹⁴ Everywhere that infrastructure reached, farms and cities followed.¹⁵ Unfortunately, the development of this infrastructure has had devastating impacts on the environment. Fish populations have dropped,¹⁶ wetlands have been drained,¹⁷ and invasive plants and species are changing ecosystems and altering native habitats across the state.¹⁸ The consequence is that California's once thriving fish and wildlife populations, such as the mighty salmon runs, have declined precipitously, resulting in more than 300 species of plants and animals on the endangered species list and a substantial decline in migratory bird populations.¹⁹

Today, many species are hanging on by a thread, while attempting to adapt to a highly altered landscape. Some species, such as giant garter snake, burrowing owl, and Swainson's hawk, have lost most if not all of their natural habitat and now exist mainly on agricultural lands as a last resort.²⁰

visited Apr. 5, 2016).

13. *Groundwater Information Center, California Department of Water Resources*, <http://www.water.ca.gov/groundwater/> (last visited Apr. 5, 2016).

14. *California's Water: California Water Systems*, <http://www.acwa.com/content/california-water-series/californias-water-california-water-systems> (last visited Apr. 5, 2016).

15. *Id.*

16. *California Water Fix, History of Water Project Conveyance in the Delta*, https://s3.amazonaws.com/californiawater/pdfs/83my6_FIX_FS_ConveyanceHistory.pdf (last visited Apr. 5, 2016).

17. *Loss of Wetlands in the Southwestern United States*, <http://geochange.er.usgs.gov/sw/impacts/hydrology/wetlands/> (last visited Apr. 5, 2016).

18. *California Invasive Plant Council, The Impact of Invasive Plants*, <http://www.cal-ipc.org/ip/definitions/impact.php> (last visited Apr. 5, 2016).

19. See Cal. Dep't Of Fish & Wildlife, State And Federally Listed Endangered, Threatened And Rare Plants Of California (Jan. 2016) (explaining that according to the California Natural Diversity Database, California has 80 animal species and 218 plant species listed as threatened and endangered species under the California Endangered Species Act; and 132 animal species and 187 plant species listed as threatened or endangered under the Federal Endangered Species Act).

20. See Sacramento Fish And Wildlife Office, U.S. Fish And Wildlife Service, 5-Year Review Summary And Evaluation: Giant Garter Snake (*Thamnophis Gigas*) (Sep. 2006); D.S. Klute et al., Status Assessment And Conservation Plan For The Western Burrowing Owl In The United States, U.S. Department Of Interior, Fish And Wildlife Service, Biological Technical Publication (2003); B. Woodbridge, Swainson's Hawk (*Buteo Swainsoni*) In The Riparian Bird Conservation Plan: A Strategy For Reversing The Decline Of Riparian-Associated Birds In California (1998).

One possible solution to California's water problems is water transfers. Water transfers involve a change in the place of the use of water, from the water's historic point of diversion and use, to a new location either within or outside of the watershed of origin. A water transfer can be temporary (up to one year), long-term (more than one year) or permanent. Water may be transferred from one use to another for a variety of purposes, including agriculture, municipal or development uses or to augment stream-flow or deliver water to wildlife refuges.

This article provides a brief explanation of California's water system and the effect of that system on environmental resources. In addition, it offers an examination of water transfers—one of the tools of water management—with a view toward ensuring that this potential solution to California's water problems does not undermine further environmental resources. Water transfers have been touted as a “flexible” way to ensure that water is delivered to where it is needed most.²¹ Indeed, in the face of California's current drought, the topic of water transfers has resurfaced in political discussions.²² Water transfers or water markets have been hailed as a key strategy to build resiliency to climate change and to increase efficiency in the market for the benefit of many people as well as the environment.²³ However, an examination of two large water transfers—the 2003 Imperial Irrigation District (“IID”)/San Diego County Water Authority (“SDCWA”) transfer and the U.S. Bureau of Reclamation Central Valley Project (“CVP”) Long Term Water Transfers (2015-2024) (“CVP Long Term Transfers”)—demonstrates that this solution is not so simple when operating in such a highly altered environment. Moving large amounts of water from one watershed to another can have profound external effects that must be addressed if water transfers are to become a solution that benefits communities, the economy, *and* the environment.

21. *California Water Impact Network, Water Transfers: Upending California's Water Rights System*, <https://www.c-win.org/water-transfers.html> (last visited Apr. 5, 2016).

22. *The Future of Water Transfers After the 2014 Drought*, MAVEN'S NOTEBOOK (Jan. 4, 2016), <http://mavensnotebook.com/2015/01/14/the-future-of-water-transfer-after-the-2014-drought>.

23. NPR, *Why Water Markets Might Work in California*, <http://www.npr.org/2015/04/18/400573611/a-water-markets-might-work-in-california> (last visited Apr. 5, 2016).

I. FACTUAL BACKGROUND

A. *The Decline of California's Fish and Wildlife*

The construction of its water systems, the conversion of its land to farms and cities, and the influx of millions of people, have altered California's natural environment significantly and, in many places, irrevocably. These changes have rendered California one of the four most ecologically degraded states in the country.²⁴ California has lost ninety-nine percent of its vernal pool and native grasslands, more than ninety percent of its wetlands and riparian areas, and eighty-five percent of its iconic redwood forests. All in all, approximately a mere one-quarter of California's original vegetation remains in more or less pristine condition.²⁵ Even worse, all or part of the nation's eight most threatened ecosystems—beach and coastal strand, southern California coastal sage scrub, large streams and rivers, California riparian forests and wetlands, California native grasslands, old-growth ponderosa pine forests, cave and karst systems, and the ancient forests of the Pacific Northwest, which include the coastal redwoods—have suffered from environmental degradation.²⁶

California's fish and wildlife populations have suffered as well. In fact, some commenters have suggested that the changes in California's wildlife in the second half of the nineteenth century rival those associated with the extinction of the Pleistocene era.²⁷ Unsurprisingly, California's water infrastructure has been identified as probably having the single largest negative impact on wildlife.²⁸

California's extensive system of dams and canals combined with environmental pollution from mining and land conversion devastated the massive salmon runs that once filled the rivers of the Central Valley and coast.²⁹ The dams prevented access to the Salmon's historic spawning grounds and in some cases dried out rivers

24. *The Encyclopedia of Earth, Biological Diversity in the California Floristic Province*, <http://www.eoearth.org/view/article/150634/> (last visited Apr. 5, 2016).

25. *Hastings Natural History Reservation, Landowners Guide to Natural Grass Enhancement and Restoration*, <http://www.hastingsreserve.org/nativegrass/NatGrasBackgrnd.html> (last visited Apr. 5, 2016).

26. *The Encyclopedia of Earth, Biological Diversity in the California Floristic Province*, <http://www.eoearth.org/view/article/150634/> (last visited Apr. 5, 2016).

27. Thomas E. Kucera & Reginald H. Barrett, *Displaced by agriculture, urban growth: California wildlife faces uncertain future*, 49 *Cal Ag California Agriculture*, 23–27 (1995).

28. *Id.*

29. See Los Angeles Times, *The Drought's Hidden Victim: California's Native Fish*, <http://www.latimes.com/local/california/la-me-drought-fish-20150824-story.html> (last visited Apr. 5, 2016).

entirely.³⁰ Salmon vanished entirely from the San Joaquin.³¹ In the Sacramento and its tributaries, populations have survived but mostly because of artificial propagation in hatcheries.³² In addition, the alteration of hydrology and the effects of other human activities have devastated the Bay Delta, the largest freshwater estuary in the lower 48 states, resulting in the decline of numerous fish species, including the threatened Delta Smelt.³³

Besides fish, the changes in landscape and waterways throughout California have significantly affected migratory birds and other wetland and riparian species. By 1980, Central Valley bird populations had declined to fifteen percent of their historic numbers.³⁴ Moreover, wetland dependent species, such as the giant garter snake, Western pond turtle, and tri-colored blackbird, have declined to such an extent that they only exist in small remnant populations.³⁵

With its depleted fishery to its remnant bird and wildlife populations, California's water infrastructure has had a devastating effect on the state's ecosystem.

B. The State of Drought

While it is no stranger to drought, California is currently experiencing the worst water crisis in the state's modern history after

30. *See id.*

31. *Environment360, For California Salmon, Drought And Warm Water Mean Trouble*, http://e360.yale.edu/feature/for_california_salmon_drought_and_warm_water_mean_trouble/2834/ (last visited Apr. 5, 2016).

32. *Id.*

33. *See* P.B. Moyle et al., *Fish Species of Special Concern in California. Sacramento: California Department of Fish and Wildlife*, <https://californiawaterblog.com/2015/10/22/an-update-on-california-fishes-of-special-concern/> (Explaining that a report by University of California at Davis and California Department of Fish and Wildlife researchers has found that three-fourths of California's native fishes are now officially designated as being in trouble, or potentially so with the delta smelt and winter-run chinook salmon on the verge of extinction).

34. Central Valley Joint Venture, *Saving California's Last Wetlands* (2015), http://www.centralvalleyjointventure.org/assets/pdf/tnc_CentralValley_bro_v4.pdf (last visited Apr. 5, 2016).

35. U.S. Fish And Wildlife Service, *Giant Garter Snake Recovery Plan Questions And Answers* (Nov. 2013), http://www.fws.gov/sacramento/outreach/2015/12-22/docs/Q&A_GG_SdraftRP_2015dec9.docx (last visited Apr. 5, 2016); California Department of Fish and Wildlife, *Increase in Turtle Rescues Prompt CDFW Reminder: If You Care, Leave them There* (May 12, 2015), <https://cdfgnews.wordpress.com/tag/species-of-special-concern/> (last visited June 6, 2016); California Department of Fish and Wildlife, *Evaluation of the Petition From The Center For Biological Diversity to List Tricolored Blackbird (Agelaius tricolor) As Endangered Under the California Endangered Species Act* (March 2015), http://www.fgc.ca.gov/meetings/2015/Apr/Exhibits/33_1_TRBL_petition_evaluation.pdf (last visited June 6, 2016).

four consecutive years of extremely dry weather.³⁶ Despite the relief provided by the recent El Niño, California still has a long road to recovery.

What does this drought mean for California? For people generally, it means less water for its cities, industry and agriculture. Thousands of people, mainly in California's Central Valley, are at risk of running out of water.³⁷ For some ranchers, it has meant the loss of their livelihoods, as some family ranches have had to sell some or all of their herds because they do not have the means to feed them due to the lack of forage and the high cost of hay.³⁸

For California's fish and wildlife, the drought has been deadly. Migratory birds, which fly between South America and Canada and Alaska, now have even fewer wet places to stop over to rest and feed.³⁹ Last year, U.S. Fish and Wildlife Service biologists speculated that the federal and state wildlife refuges would receive less than 40% of their normal water supply.⁴⁰ For these birds, the drought will likely result in a decrease in breeding due to food shortages and poor health and an increase in disease and death as birds crowd together in the remnant wetlands.⁴¹

For fish, the drought has been even more deadly.⁴² In 2015, for the first time, California's Fish and Game Commission, the agency in charge of setting fishing regulations, closed a number of rivers and

36. Dennis Dimick, *5 Things You Should Know About California's Water Crisis*, NATIONAL GEOGRAPHIC, <http://news.nationalgeographic.com/2015/04/150406-california-drought-snowpack-map-water-science/> (last visited Apr. 5, 2016).

37. See *California Drought Update*, CALIFORNIA DROUGHT, Mar. 2, 2016, at 4, available at [http://drought.ca.gov/pdf/archive/DroughtUpdate\(03-02-16\).pdf](http://drought.ca.gov/pdf/archive/DroughtUpdate(03-02-16).pdf) (explaining as of February 24, 2016, approximately 2,591 wells statewide have been identified as critical or dry, affecting an estimated 12,955 residents, and that the California Office of Emergency Services reported that 2,371 of the 2,591 dry wells are concentrated in the inland regions within the Central Valley).

38. See Louis Sahagun, *In Central Coast Cattle Region Drought Continues to Shrink Herds*, LOS ANGELES TIMES, (May 26, 2015, 4:00 AM), <http://www.latimes.com/science/la-me-ranches-20150526-story.html>.

39. See Sharon Bernstein, *California Drought Shrinks Winter Digs for Migratory Birds*, YAHOO NEWS, (Nov. 7, 2015), <https://www.yahoo.com/news/california-drought-shrinks-winter-digs-migratory-birds-132801041.html>.

40. Chris Clarke, *Wildlife Refuges To Get 40 Percent of Usual Water*, KCET, (Feb. 21, 2014), <https://www.kcet.org/redefine/wildlife-refuges-to-get-40-percent-of-usual-water>.

41. Darryl Fears, *Wild Animals In Drought-Stricken Western States Are Dying For A Drink*, THE WASHINGTON POST, (May 6, 2015), https://www.washingtonpost.com/national/health-science/animals-in-the-wild-are-dying-for-a-drink-in-the-drought-stricken-west/2015/05/06/260312aa-eac6-11e4-9767-6276fc9b0ada_story.html.

42. Kim Delfino, *California Drought Legislation Must Strike a Balance to Protect Fish and Wildlife, Too*, DEFENDERS OF WILDLIFE BLOG, (Feb. 25, 2014), <http://www.defendersblog.org/2014/02/california-drought-legislation-must-strike-balance/>.

streams to fishing in order to give beleaguered salmon and steelhead populations a chance to survive.⁴³ California's fish have endured tremendous adversity over the last one-hundred years due to dam construction, stream diversion, pollution, invasive species, and many other anthropogenic problems. The drought has particularly impacted the Bay-Delta region. The state diverts so much water from the Bay-Delta each year that the system is in perpetual drought even in a normal rain year.⁴⁴ The stress on that system has only been further compounded by the unprecedented dry conditions.

California's storied salmon runs are also at risk. According to the California Department of Fish and Wildlife, Central Coast coho salmon face extinction south of the Golden Gate.⁴⁵ Last year, every creek between the Golden Gate and Monterey Bay was blocked by sandbars because of a lack of rain - making it impossible for salmon to get to their native streams and breed.⁴⁶ The new year has not brought any better news for fisherman. In May 2016, the Pacific Fishery Management Council reduced the time and locations for salmon fishing by more than half of what was available in 2015 due to grim fall-run salmon counts as well as problems with the winter salmon run in the Sacramento River.⁴⁷ The possible collapse of salmon fishing is bad news for salmon fishermen and North Coast communities. The salmon industry is valued at \$1.4 billion annually in California and at about half that much in Oregon⁴⁸ and employs tens of thousands of people from Santa Barbara to northern Oregon.⁴⁹

43. California Fish And Game Commission, *Press Release: CDFW Puts Closures In Effect On Some Rivers, Recommends Further Changes To The Fish And Game Commission*, (Jan. 29, 2014), <https://cdfgnews.wordpress.com/2014/01/29/cdfw-puts-closures-in-effect-on-some-rivers-recommends-further-changes-to-the-fish-and-game-commission/>.

44. Testimony Of Jonathan Rosenfield, Ph.D., The Bay Institute, Before The State Water Resources Control Board Regarding Flow Criteria For The Bay-Delta, Phase Ii – Low Salinity Zone, Prepared For American Rivers, Natural Resources Defense Council, And Pacific Coast Federation Of Fishermens Associations (Nov. 16, 2012), http://www.waterboards.ca.gov/water_rights/water_issues/programs/bay_delta/docs/wrkshp1/jrosenfield.pdf.

45. CA Dept. of Fish and Wildlife, *Coho Salmon Recovery*, <http://www.dfg.ca.gov/fish/Resources/Coho/CohoRecovery.asp> (last visited April 8, 2016).

46. Peter Fimrite, *California Drought Threatens Coho Salmon with Extinction*, SFGATE NEWS . (Apr. 8, 2016, 9:10 AM), <http://www.sfgate.com/science/article/California-drought-threat-ens-coho-salmon-with-5175736.php>.

47. Kurtis Alexander, *Salmon Season's Opening: Low Hopes As Many Fishers Stick With Crab*, SAN FRANCISCO CHRONICLE (May 12, 2016, 8:11 PM), http://www.sfchronicle.com/bay_area/article/Salmon-season-s-opening-Low-hopes-as-many-7465895.php.

48. Bill Briggs, *25 Million California Salmon Hitch a Ride to the Ocean Due to Drought*, NBC NEWS (April 27, 2014, 5:23 AM), <http://www.nbcnews.com/storyline/california-drought/30-million-california-salmon-hitch-ride-ocean-due-drought-n88851>.

49. *Id.*

In response to the drought, California Governor Jerry Brown released a State Water Action Plan in January 2014. In this plan and 2016 update to the plan, the governor, called for the implementation of short-term and long-term solutions for California's water woes, including proposed state funding for increased water conservation, water recycling, storm water reuse, and other programs that reduce demand by both urban and agricultural users.⁵⁰ Demand reduction proposals enjoy wide support among environmental organizations.⁵¹ However, water transfers have support due to concerns that shifting water may have negative environmental effects on the place where the water is drawn. In order to build greater support for water transfers as a solution, transfers must be structured to address the negative effects of moving water from one place of use to another. Though water transfers may be required to address water and environmental issues, challenges still remain for large, long-term water transfers due the complexities of California's highly altered landscape.

II. LEGAL BACKGROUND

A. California's Hybrid Water Rights System

In a comment about California's dual system of surface water rights, Barton "Buzz" Thompson, a Stanford University law professor and director of the Woods Institute for the Environment said, "If you were to start out today to develop a system for allocating water during periods of shortage, you would under no circumstances come up with the system that California has adopted. It is largely an accident of history. It might have worked well in the mid-19th century, but it is not a system designed for the early 21st century."⁵²

Unlike most states, California has a dual system of surface water rights, which recognizes both riparian and appropriative rights.⁵³ The doctrine of riparian rights, which originates in English common law, holds that water-use rights belong to land owners whose property abuts a pond, lake, river, or stream. In a drought, those "riparian"

50. California Natural Resources Agency, California Water Action Plan (2014); California Natural Resources Agency, California Water Action Plan (2016).

51. *Id.*

52. Debra Kahn, *Calif.'s Quirky Water Rights System Is Showing Its Age*, GREENWIRE, (June 25, 2015, 9:41 AM), <http://www.eenews.net/stories/1060020893>.

53. *The Water Rights Process*, California Environmental Protection Agency, State Water Resources Control Board, http://www.waterboards.ca.gov/waterrights/board_info/water_rights_process.shtml (last visited April 8, 2016).

users enjoy the highest priority—meaning they are last to face curtailments (requirements that they reduce water use).⁵⁴ In contrast, the doctrine of prior appropriation holds that water-use rights are acquired by putting surface water to a beneficial use (known as “appropriation”). Appropriative rights are not tied to lands adjacent to the water source but instead, associated with the place of appropriation.⁵⁵ The two key principles of the appropriative doctrine are “first in time, first in right” and “do no harm.” The “first in time, first in right” principle dictates that, even in times of drought, earlier appropriators are entitled to use available water first to satisfy their established use, while later appropriators have to wait their turn.⁵⁶ The “do no harm” principle protects only those parties who hold water rights.⁵⁷ When California began issuing permits for “appropriative” rights in 1914, it left its pre-existing riparian water rights system intact.⁵⁸ Consequently, water users whose rights pre-date 1914 are governed differently than those water rights holders who came later but draw water from the same source.⁵⁹

After California adopted the appropriative rights system, individuals and private companies moved first to establish the earliest appropriative rights.⁶⁰ Today, most surface rights are held by local public agencies.⁶¹ Some of these agencies hold long-term “contract entitlements” rather than “rights” to surface water.⁶² “Contract entitlements” are contracts with federal or state agencies that run large water projects and hold the associated water rights.⁶³ Indeed, the federal and state governments are the largest water rights holders in California mostly because of the Bureau of Reclamation’s (“Reclamation”) ownership of the massive Central Valley Project (“CVP”) and the California Department of Water Resource’s (“DWR”) ownership of the State Water Project.⁶⁴

54. *Id.*

55. *Coffin v. Left Hand Ditch Co.*, 6 Colo. 443,449 (1882).

56. *Appropriative Rights*, California Water Impact Network, <http://www.c-win.org/appropriative-rights.html> (last visited April 8, 2016).

57. Brent M. Haddad, *Rivers of Gold Designing Markets to Allocate Water in California* page, (Island Press ed., 2000).

58. *Id.*

59. *Id.*

60. *Id.*

61. *Id.*

62. *Id.*

63. Ellen Hanak & Elizabeth Stryjewski, Public Policy Institute of California, *California’s Water Market, By the Numbers: Update 2012 9* (2012).

64. *Id.*

The CVP, one of the largest water developments in California, extends from the Cascade Range in the north to the Kern River in the south.⁶⁵ It serves farms, homes, and industry in the Central Valley and major urban centers in the San Francisco Bay Area.⁶⁶ CVP facilities include reservoirs on the Trinity, Sacramento, American, Stanislaus, and San Joaquin Rivers.⁶⁷ The CVP stores and re-regulates water from the Trinity River in Clair Engle Lake, Lewiston Lake, and Whiskeytown Reservoir, and then diverts the water through a system of tunnels and power plants into the Sacramento River for the Central Valley.⁶⁸ The CVP also stores and reregulates water in Shasta Lake and Folsom Lake.⁶⁹ The CVP sends water down the Sacramento River through the Bay Delta and to the Tracy Pumping Plant at the southern end of the Delta, where it is lifted into the Delta Mendota Canal.⁷⁰ This canal delivers water to CVP contractors and exchange contractors on the San Joaquin River and water rights contractors on the Medota Pool.⁷¹ The CVP also conveys to the San Luis Reservoir for deliveries to CVP contractors through the San Luis Canal.⁷² The CVP also delivers water to its contractors in Santa Clara and San Benito counties.⁷³ On the San Joaquin River, the CVP built Friant Dam and delivers water to its contractors located near the Madera and Friant-Kern canals.⁷⁴

The State Water Project (“SWP”) built the Oroville Dam on the Feather River.⁷⁵ The SWP contractors and SWP water rights settlement contractors divert water from the Feather River and Sacramento River.⁷⁶ The SWP moves water through the Sacramento River to the Delta where the water is exported from the Delta at the Harvey O. Banks Pumping Plant.⁷⁷ The Banks Pumping Plant lifts the

65. *Reclamation: Managing Water in the West*, U.S. Dept. of the Interior, Bureau of Reclamation, http://www.usbr.gov/projects/Project.jsp?proj_Name=Central+Valley+Project (last visited April 8, 2016) (hereinafter *Bureau of Reclamation*).

66. *Id.*

67. *Id.*

68. *Id.*

69. *Id.*

70. *Id.*

71. *Id.*

72. *Id.*

73. *Id.*

74. *Id.*

75. *Oroville Facilities Overview*, Cal. Dep’t. of Water Res., <http://water.ca.gov/swp/facilities/Oroville/index.cfm> (last visited April 8, 2016).

76. *Bureau of Reclamation*, *supra* note 65.

77. *Id.*

water into the California Aqueduct, which delivers water to SWP contractors and the San Luis Reservoir.⁷⁸ SWP contractors are located in the southern San Joaquin Valley, Central Coastal area, and Southern California.⁷⁹

While the CVP and SWP move a large amount of water from Northern to Southern California, the largest supply of water to Southern California is provided by the Colorado River, of which California has the right to use 4.4 million acre feet.⁸⁰ For many years, California used up to 5.2 million acre feet of Colorado River water. However, in 2002, California agreed to reduce its use in the Quantification Settlement Agreement.⁸¹ As discussed later in this article, the lynchpin of California's agreement to reduce its use of Colorado River water was the Imperial Irrigation District/San Diego County Water Authority ("IID/SDCWA") water transfer.⁸²

According to a 2013 University of California study, California's excessive over-allocation of water rights has led to the over-allocation of its surface water by more than five times in an average year.⁸³ In fact, this study found that some rivers are more than 10 times over-allocated.⁸⁴ While over-allocation is generally not a problem for the most senior water rights holders because of the "first in line, first in right" principle, it poses a significant problem for junior water rights holders and the environment, particularly in situations of chronic drought, because junior water rights holders and the environment will only receive water if there is remaining water after the senior water rights holders have used what they need.⁸⁵

B. A Brief Primer on Water Transfers in California

Water transfers involve the voluntary sale of water by an entity that forgoes its right to use that water. Water transfers between willing sellers and willing buyers can help stretch water supplies in dry times and move water to places of critical need. Each year hundreds

78. *Id.*

79. *Id.*

80. State of California, State Water Resources Control Board Order WRO 2002-0013, at 16 (2002).

81. *Id.* at 18.

82. *Id.* at 22.

83. Theodore E. Grantham & Joshua H. Viers, *100 Years of California's Water Rights System: Patterns, Trends and Uncertainty*, 9 ENVTL. RESEARCH LETTERS 1, 6 (2014).

84. *Id.* at 6-7.

85. *Id.* at 8.

of water transfers occur in California.⁸⁶ The majority of these transfers are between agricultural water users in the same basin.⁸⁷

To participate in a water transfer, there must be a seller—an entity with rights to use the water throughout the term of the proposed transfer—and the seller must actually have “wet” water to sell. In other words, the water rights holder must demonstrate that the water they are selling is water that they would have used otherwise in that season or the water is legally stored for later use.⁸⁸

Water transfers can be temporary (up to one year), long-term (more than one year), or permanent⁸⁹ and can allow for the movement of the place where the water is used to a new location either within or outside of the watershed of origin.⁹⁰ They occur for a variety of reasons, including agricultural purposes, municipal and industrial uses, and environmental purposes, such as in-stream flow augmentation or wildlife refuge supply.⁹¹

Generally, there are three kinds of water transfers. First, “groundwater substitution” transfers make surface water available for transfer by reducing surface water diversions and replacing that water with groundwater pumping.⁹² The rationale is that surface water demands are reduced because a like amount of groundwater is used to meet the demands. The resulting increase in available surface water supplies can be transferred to other users. Second, “cropland idling” (or fallowing) transfers involves the idling of land that would have been planted during the transfer period in the absence of the transfer.⁹³ Third, “crop shifting” is the shifting from higher-water-intensive crops to lower-water-using crops.⁹⁴ Cropland idling transfers do not include land fallowed as part of normal farm operations, which

86. *Water Transfers*, Cal. Dep’t. of Water Res., http://www.water.ca.gov/water_transfers/ (last visited April 8, 2016).

87. *Id.*

88. Hanak & Stryjewski, *supra* note 11, at 10 (explaining that given the issue of over-allocation of water rights, the requirement to demonstrate the presence of “wet water” is necessary as some water rights holders only hold “paper water” rights in which they are not using that water right and the water is being used by someone else).

89. *Id.* at 7.

90. *Id.* at 8.

91. Cal. Dep’t of Water Res. & State Water Res. Control Bd., *Background and Recent History of Water Transfers in California 1* (2015), http://www.water.ca.gov/watertransfers/docs/Background_and_Recent_History_of_Water_Transfers.pdf.

92. Hanak & Stryjewski, *supra* note 11, at 11.

93. *Id.*

94. *Id.*

does not make water available for transfer.⁹⁵ Cropland idling or crop shifting water transfers make water available by reducing the consumptive use of surface water applied for irrigation.⁹⁶ Finally, “reservoir reoperation” makes water available for transfer by reservoir release when the reservoir operators release water in excess of what would be released annually under normal operations.⁹⁷ The water must also be released at a time when it can be captured and/or diverted downstream.⁹⁸

The approval process for water transfers varies based on the nature of the water right, the source of the water, and the various government regulators that must be consulted. Post-1914 water rights must be approved by the State Water Resources Control Board (“SWRCB” or “Board”).⁹⁹ Pre-1914 water rights or groundwater transfers do not require Board approval because the Board does not have jurisdiction over those water rights.¹⁰⁰ Groundwater related transfers may require a county permit which requires the applicant to demonstrate that there will be no injury to local groundwater users.¹⁰¹ Surface water transfers among CVP and SWP contractors generally do not require SWRCB approval, but do require the approval of Reclamation or DWR respectively.¹⁰² Likewise, if the transfer involves federal or state conveyance facilities (e.g., Harvey O. Banks Pumping Plant), then the transfer will require federal or state approval.¹⁰³ Finally, if transfers trigger state approval, they must comply with the California Environmental Quality Act (“CEQA”), and if they involve federal approval they must comply with the National Environmental Policy Act (“NEPA”).¹⁰⁴ However, to address the current drought, California Governor Jerry Brown suspended the application of CEQA by state agencies for water

95. *Id.* at 17.

96. *Id.* at 11.

97. Cal. Dep’t of Water Res. & State Water Res. Control Bd., *supra* note 91, at 3.

98. *Id.* at 3.

99. *Id.* at 5.

100. While there is no administrative process for groundwater transfers, except in the few adjudicated basins, the California Legislature passed the Sustainable Groundwater Management Act (“SGMA”) in 2014. This newly enacted statute requires local agencies to adopt groundwater management plans. As these programs are developed, the hope is that they will provide better oversight of groundwater activities, including transfers. *Id.* at 10.

101. *See id.* at 9 (List of County Ordinances Related to Groundwater Transfers).

102. *Id.* at 7–8.

103. *Id.* at 12.

104. Ellen Hanak, Who Should Be Allowed to Sell Water in California? Third-Party Issues and the Water Market 29 (2003).

transfers.¹⁰⁵

There are two important rules related to water transfers designed to protect water users, including fish and wildlife, from adverse impacts. First, the “no injury” rule applies to any proposed change in the historic exercise of a water right regardless of the priority date of the right.¹⁰⁶ The “no injury” rule is codified in various sections of the California Water Code, including Sections 1702, 1706, and 1810.¹⁰⁷ Second, there is a rule prohibiting unreasonable effects on fish and wildlife. California Water Code Section 1810 requires the DWR to make a finding that the water transfer does not unreasonably impact fish, wildlife, or any other in-stream beneficial use.¹⁰⁸ While this rule appears to provide protections to natural resources from water transfers, there is some debate within DWR on how stringently this rule should be applied.¹⁰⁹

There are also two important doctrines in California water law that directly affect water transfers. First, the reasonable and beneficial use doctrine (found in the California Constitution, Article X, Section 2) requires that all water uses are reasonable and beneficial and that every use is evaluated for wastefulness.¹¹⁰ This doctrine has defined water use in California for several decades.¹¹¹ Through a few seminal cases, the courts expanded the doctrine to the point where current public interests in water use may be considered more important than established property rights in water use disputes.¹¹² Second is the public trust doctrine, which can be traced to the 1983 California Supreme Court decision *National Audubon Society v. Superior Court of Alpine County*.¹¹³ The public trust doctrine requires California to serve as the trustee of the navigable waters and underlying beds within its boundaries.¹¹⁴ The state may only grant usufructory rights, and its trustee obligation is ongoing.¹¹⁵ In addition, the state has an

105. MAVEN’S NOTEBOOK, *supra* note 22.

106. *Id.*

107. Cal. Dep’t of Water Res. & the State Water Res. Control Bd., *supra* note 91, at 5; MAVEN’S NOTEBOOK, *supra* note 22.

108. Cal. Dep’t of Water Resources and the State Water Resources Control Board, *supra* note 91, at 12.

109. MAVEN’S NOTEBOOK, *supra* note 22.

110. *Id.*

111. *Id.*

112. For a detailed discussion of the reasonable and beneficial use doctrine, see Brian E. Gray, *The Modern Era in California Water Law*, 45 HASTINGS L.J. 249 (1994).

113. 658 P.2d 709, 718.

114. *Id.*

115. *Id.* at 719–20.

affirmative duty to take the public trust into account in planning and allocating water resources.¹¹⁶

III. ANALYSIS

A. Current Issues for Water Transfers in California

In the 1970s and early 1980s, California instituted policies and statutes to facilitate a water market to address a severe drought.¹¹⁷ In 1986, California passed a law that required DWR to establish a program to facilitate water transfers and coordinate its activities with other agencies.¹¹⁸ Despite the government's encouragement, the 1980's saw few water transfers.¹¹⁹

The early 1990's signaled a shift in the water transfers following another severe drought. In 1992, Congress passed the Central Valley Project Improvement Act ("CVPIA") in response to findings that the CVP has severely impacted fish and wildlife in the San Francisco-Bay Delta estuary.¹²⁰ CVPIA mandated that the CVP return 800,000 acre-feet of CVP water to instream uses to benefit salmon runs and allocate another 400,000 acre-feet of water to wildlife refuges.¹²¹ The Act also included provisions to facilitate water transfers and provided a mechanism for the CVP to purchase additional water for environmental purposes.¹²² In the late 1990s, the Secretary of the Interior directed California to create a plan to reduce its use of Colorado River water from 5.3 million acre feet to its allocated amount of 4.4 million acre feet within 15 years.¹²³ The resulting "4.4 Plan" incentivized water transfers from IID, an agricultural water district that holds 3.85 million acre feet of Colorado River water

116. *Id.* at 721.

117. See Josh Newcom & Elizabeth McCarthy, Water Educ. Foundation, *The Layperson's Guide to Water Marketing* (2000) (providing a detailed accounting of the timeline of state actions taken to facilitate water transfers); see also BRENT M. HADDAD, RIVERS OF GOLD: DESIGNING MARKETS TO ALLOCATE WATER IN CALIFORNIA 3-4 (2000).

118. Newcom & McCarthy, *supra* note 117.

119. Hanak & Stryjewski, *supra* note 11, at 15.

120. *Id.* at 3.

121. *Id.* at 117.

122. *Id.* at 117-18.

123. The Colorado River is managed and operated under numerous compacts, federal laws, court decisions and decrees, contracts, and regulatory guidelines collectively known as the "Law of the River." This collection of documents apportions the water and regulates the use and management of the Colorado River among the seven basin states and Mexico. U.S. Bureau of Reclamation, Lower Colorado Region, The Law of the River, <http://www.usbr.gov/lc/region/g1000/lawofrvr.html> (last visited June 6, 2016).

rights, to the thirsty urban water districts in Southern California.¹²⁴

The number of water transfers has increased in California over the past three decades. By the early 2000s, the annual volume of water committed for sale or lease was more than two million acre-feet. Today, water transfers account for approximately five percent of all water used.¹²⁵ However, during the last decade, the number of water transfers has stayed relatively flat.¹²⁶ During California's latest drought, most water transfers have been between agricultural users or from agricultural users to the environment.¹²⁷ Surprisingly, few transfers have been from agricultural users to urban users.¹²⁸ Most water transfers have been short-term with only a few large, long-term transfers.¹²⁹

Water transfers have failed to become more prevalent for a number of reasons. First, the water transfer process is complex and characterized by a lack of data and transparency.¹³⁰ In addition, the movement of water from one area to another has prompted concerns about local effects such as a decrease in groundwater, impacts on fish and wildlife, the loss of jobs, and other economic impacts from the fallowing of agricultural lands.¹³¹ These external effects pose significant barriers to future water transfers, particularly large, long-term transfers, especially if existing large transfers collapse because they failed to address these effects. Third, California's altered hydrology and environment pose a significant challenge to high volume water transfers because the areas that the water is transferred from have been so degraded from previous management and land use decisions that any removal of water from the area creates significant environmental impacts and produces additional pressures on already overused rivers, streams and groundwater aquifers, regardless of whether or not the transfer is from agriculture to agriculture or

124. *Id.* at 73.

125. *Id.* at 129.

126. *Id.* at 132.

127. *Id.* at 133.

128. *Id.*

129. *Id.* at 132.

130. *Id.* at 36.

131. *California Water Impact Network Water Transfers: Upending California's Water Rights System*, *supra* note 21; *see also* Association of California Water Agencies Groundwater Banking, *Water Transfers Need Help in California, Study Says* (Feb. 29, 2016), <http://www.acwa.com/news/water-supply-challenges/groundwater-banking-water-transfers-need-help-california-study-says>; Hanak, *supra* note 121.

agriculture to urban.¹³²

The two water transfers discussed in the next section, the 2003 IID-SDCWA water transfer and the CVP Long-Term Transfer, illustrate these complexities. Both transfers are ongoing and therefore, depending on their outcomes, could serve as examples of success or failure. Their likelihood of success depends largely on the ability of transfer participants to address the significant environmental impacts created by these transfers in a highly altered landscape.

B. “There ain’t no such thing as a free lunch:” The Costs of Water Transfers

The common aphorism, “there ain’t no such thing as a free lunch,” means that even if something appears to be free, there is always a cost to the person or to society as a whole, although it may be hidden or an externality. While existing law requires the examination of the effects of projects and the avoidance of unreasonable negative effects in terms of the environment, the environmental effects of an action may be seriously underestimated or misunderstood. The following examples of long-term water transfers demonstrate these problems. Both transfers suffer from currently unaddressed externalities that could threaten to undermine each of them. These transfers are particularly complicated because the surrounding environment has been so highly altered and the environmental burden of the transfers cannot be absorbed somewhere else or mitigated easily. For example, as discussed more fully below, the wildlife impacted by these transfers cannot be easily moved because there are few if any alternative locations to which these species can relocate.

1. The 2003 IID-SDCWA water transfer

In 2003, the SWRCB and California Legislature approved the largest agriculture-to-urban water transfer in the country.¹³³ At its peak, the water transfer would move more than 300,000 acre-feet of Colorado River water from farmland in the Imperial Valley to coastal

132. *California Water Impact Network Water Transfers: Upending California’s Water Rights System*, *supra* note 21.

133. White Paper: Quantification Settlement Agreement, San Diego County Water Authority, <http://www.sdcwa.org/white-paper-quantification-settlement-agreement> (last visited Apr. 6, 2016).

urban areas in Southern California each year.¹³⁴ At the time, environmental organizations, including Defenders of Wildlife, the Pacific Institute, Sierra Club, and Audubon California, argued that any water transfer, which diverted water out of the Imperial Valley, had to address the environmental consequences of that diversion to the Salton Sea.¹³⁵ While the transfer was necessary to provide a reliable water supply to the residents of San Diego and Palm Springs without taking that water from the fragile Bay Delta, it was understood that the transfer would have an enormous effect on the Salton Sea that could not be ignored.¹³⁶

The Salton Sea is fed primarily by the runoff from nearby agricultural fields.¹³⁷ The amount of water that flows into the Sea in any given year depends on how much water is used to irrigate the farm fields.¹³⁸ The transfer reduces the water to the fields by more than 300,000 acre-feet of water each year.¹³⁹ The SWRCB was warned that as the water level in the Sea lowered, it could expose up to 50,000 acres of dusty and dry sea bed by 2045 and accelerate the path of the Salton Sea habitat toward biological collapse.¹⁴⁰

The Salton Sea provides habitat for more than 400 species of birds – approximately two-thirds of all bird species in the continental U.S.¹⁴¹ As a critical stopover on the Pacific Flyway, it is one of the most important locales for migratory birds in the western United States.¹⁴² The Sea has become even more critical because of the loss of more than 90% of wetlands in California and the dewatering of the Colorado River Delta from the operations on the Colorado River.¹⁴³

When the water transfer is operating at full capacity, these species will pay the price. The Sea's remaining fish population will crash, eliminating food for birds – both local and migratory. In addition, the shallow waters around the southern and northern ends

134. SWRCB Order WRO 2002-0013, 10 (Oct. 28, 2002) http://www.waterboards.ca.gov/waterrights/board_decisions/adopted_orders/orders/2002/wro2002-13.pdf.

135. *Id.* at 14.

136. *Id.* at 40–45.

137. *Id.* at 2.

138. *Id.*

139. *Id.* at 83.

140. Closing Argument/Legal Brief of Defenders of Wildlife and Planning and Conservation League at 24, IID/SDCWA Water Transfer Hearing (July 11, 2002), http://www.waterboards.ca.gov/waterrights/water_issues/programs/hearings/iid_sdcwa/pcl/pcl_closebrief.pdf.

141. *Id.* at 6.

142. *Id.*

143. *Id.*

of the Sea, which are important feeding and resting areas for migrating shorebirds, will disappear. If these important habitats are destroyed, migratory birds will have few options to rest and feed during their migration up and down the Pacific Flyway.¹⁴⁴

Less water flowing to the Salton Sea would also cause severe health issues for residents of this region. The lack of water would expose more than 150 square miles of lakebed to the wind, creating horrific dust storms for a region already plagued by the highest rates of childhood asthma in California.¹⁴⁵ The wind over the exposed lakebed would not only pick up dust but also chemicals carried to the lake from agricultural run off. That wind would expose more than 650,000 people in the Imperial and Coachella Valleys to fine dust filled with pesticides, heavy metals and other toxic pollutants.¹⁴⁶ A 2015 Pacific Institute report found that the combined impacts to wildlife habitat and public health could cost California as much as \$70 billion over the next 30 years.¹⁴⁷

Recognizing these very real issues, California came up with a deal to buy everyone some time. As part of its authority to regulate changes in the point of diversion and protect state waters, the SWRCB required IID to send additional water to the Sea for 15 years to keep it from receding.¹⁴⁸ In the meantime, the State of California promised to take the lead in coming up with a plan for a more sustainable Sea.¹⁴⁹ More importantly, California agreed to ensure that the effects of the water transfer were mitigated in the event that the mitigation funds provided by the regional water agencies were insufficient to fully address the effects of the water transfer.¹⁵⁰ With

144. *Id.* at 12.

145. Michael Cohen, Hazard's Toll: The Costs of Inaction at the Salton Sea, 1 (2014), http://pacinst.org/wp-content/uploads/sites/21/2014/09/PI_HazardsToll_ExSum.pdf.

146. *Id.* at 4.

147. *Id.*

148. SWRCB Order, *supra* note 151, at 69.

149. The California Legislative Analyst's Office, Restoring the Salton Sea (January 24, 2008), at 7, http://www.lao.ca.gov/2008/rsrc/salton_sea/salton_sea_01-24-08.pdf.

150. In 2003, the California Legislature approved a trio of bills (Senate Bill ("SB") 277 (Senator Denise Ducheny – San Diego), SB 317 (Senator Sheila Kuehl – Santa Monica) and SB 654 (Senator Mike Machado – Linden)) intended to protect the Salton Sea for 15 years by requiring that IID provide mitigation water to the Sea so that there was no material increase in salinity at the Sea during that time. Another critical part of this deal was the commitment by the state of California to assume full liability for impacts at the Sea if a restoration plan fails and in the event the cost of the impacts from the transfer exceeded the \$133 million cap on liability costs in the Quantification Settlement Agreement ("QSA"). SB 277 (Ducheny) created the Salton Sea Restoration Act that states that the restoration shall be based on a preferred alternative developed by a restoration study. (Fish and Game Code § 2931(b)). SB 317 (Kuehl)

those commitments in place, the water transfer went forward, and the clock started counting down toward the end of supplied water in 2017.

For more than a decade, the Salton Sea issue made little progress. The California Natural Resources Agency released an \$8.9 billion plan in 2007 that proposed massive infrastructure and expensive solutions which were unrealistic and eventually became a barrier to any activity occurring at the Sea.¹⁵¹ Indeed, such a large and expensive plan fell flat at the Legislature and served as a roadblock for moving forward expeditiously to address the inevitable impacts of the water transfer on the Sea.¹⁵²

With less than three years left before the mitigation water that supplies the Sea stops flowing, IID has launched an offensive to get the state of California to pay more attention to the looming disaster at the Sea. On November 18, 2014, IID, with the support of many environmental organizations, filed a petition with the Water Board, requesting that the Water Board initiate a collaborative dialogue among the various stakeholders to build a consensus around a restoration and funding plan that can be implemented immediately.¹⁵³ More importantly, IID asked the Water Board to modify its original order requiring the state to fulfill its obligations to the Sea.¹⁵⁴

The Brown Administration took notice of IID's petition and the looming deadline and launched a Salton Sea Task Force in 2015 composed of lead staffers from the Natural Resources Agency, Department of Fish and Wildlife, Department of Water Resources, Energy Commission, CalEPA, California Air Resources Board, and the Water Board.¹⁵⁵ The Task Force released a set of recommendations related to projects, deadlines and governance.¹⁵⁶

set forth the restoration study process. The California Secretary of Resources, in consultation with the California Department of Fish and Wildlife ("DFW"), DWR, Salton Sea Authority ("SSA"), appropriate air quality districts, and the Salton Sea Advisory Committee ("SSAC"), shall undertake a restoration plan to determine a preferred alternative for the restoration of the Salton Sea ecosystem and the protection of wildlife dependent on that ecosystem. (Fish and Game Code § 2081.7(e)). DWR was the lead agency in the restoration effort on the behalf of the Secretary. SB 654 made certain findings regarding how this transfer satisfied California Water Code, and it set forth the various funding schemes for funding the restoration of the Sea.

151. Little Hoover Commission, *Averting Disaster: Action Now for the Salton Sea* 10–11 (Sept. 2015) <http://www.lhc.ca.gov/studies/228/Report228.pdf>.

152. *Id.*

153. *See generally* Petition of Imperial Irrigation District for Modification of Revised Water Rights Order 2002-0013 (Nov. 18, 2014) <http://www.iid.com/home/showdocument?id=9257>.

154. *Id.* at 50.

155. Natural Resources, [http://www.ebudget.ca.gov/2015-16/pdf/Revised/Budget Summary/NaturalResources.pdf](http://www.ebudget.ca.gov/2015-16/pdf/Revised/Budget%20Summary/NaturalResources.pdf) (last visited Apr. 6, 2016).

156. *See generally California Natural Resources Agency and California Environmental*

The Task Force recommendations resulted in the hiring of Bruce Wilcox as the Assistant Secretary for Salton Sea policy within the Natural Resources Agency in September 2015.¹⁵⁷ No stranger to the Salton Sea, Assistant Secretary Wilcox worked for several years for IID as their lead on the Salton Sea, worked extensively with the Salton Sea Authority, and is respected by stakeholders as a knowledgeable advocate for the Sea.¹⁵⁸ Wilcox has been tasked with the daunting responsibility of bringing together the various stakeholders to arrive at a solution for the Sea before it is too late.

The IID water transfer is a prime example of how the massive alteration of our water system in the West and California have made it more difficult to move water from one basin to another. Though the water transfer was approved, the mitigation of its effects remains an open question. The parties deferred addressing the transfer's adverse effects in the hope that 15 years would produce a solution that eluded the parties at the time the transfer was approved.¹⁵⁹ With less than three years left before the mitigation water ceases, time is running out for the Sea and the water transfer. Therefore, while some have touted the IID transfer as an example of how large, long-term water transfers can succeed, such declarations of success should be delayed until after 2017.

2. CVP Long Term Transfers

On May 1, 2015, the U.S. Bureau of Reclamation approved the CVP Long Term Transfers, which provide for the transfer of more than half a million acre-feet of water from north of the Sacramento-San Joaquin Delta to CVP contractors south and west of the Delta and to another entity west of the Delta over a ten-year period.¹⁶⁰ The

Protection Agency, SALTON SEA TASK FORCE AGENCY ACTIONS, http://resources.ca.gov/docs/salton_sea/Task_Force_Actions-151007.pdf (last visited Apr. 6, 2016) (The Task Force recommendations included a directive to develop a Salton Sea Management Plan, the creation of a science advisory committee, a short term goal of 9,000-12,000 acres of habitat creation and dust suppression projects at the Sea by 2020, a medium term goal of 18,000 – 25,000 acres of habitat creation and dust suppression projects at the Sea starting in 2020, and oversight by specific regulatory agencies.); see also GOVERNOR BROWN SIGNS LEGISLATION, ANNOUNCES NEW ACTIONS TO PROTECT SALTON SEA (October 9, 2015), <https://www.gov.ca.gov/news.php?id=19161>.

157. Sammy Roth, *Jerry Brown appoints Bruce Wilcox to lead Salton Sea policy*, THE DESERT SUN (Sept. 4, 2015) <http://www.desertsun.com/story/news/environment/2015/09/02/brown-appoints-bruce-wilcox-lead-salton-sea-policy/71619726/>.

158. *Id.*

159. SWRCB Order, *supra* note 134, at 69.

160. Mid-Pacific Region, Bureau of Reclamation, U.S. Dep't of the Interior, *Record of Decision: Long-Term Water Transfers* (May 2015), <http://www.usbr.gov/mp/nepa/document>

water transfers would largely be supplied by the fallowing of agricultural fields, mainly rice fields, in the Northern Sacramento Valley to provide water to agricultural users in the Southern San Joaquin Valley.¹⁶¹ There are number of pressing concerns about the effects of these long term transfers, including: concerns about effects on local communities and streams from the pumping of groundwater used for irrigation as a substitution for transferred surface water, impacts on Delta fish from a potential decrease in flows to the Sacramento River, and effects on giant garter snakes.¹⁶²

The Central Valley is a highly altered landscape with few wetlands and riparian areas remaining. Wildlife has had to adapt to this altered landscape to survive. Migratory birds rely both on the federal and state wildlife refuges as well as the rice fields for wetland habitat.¹⁶³ In the fall and winter, millions of birds migrating along the Pacific Flyway stop in the Central Valley feed and rest on the flooded rice fields.¹⁶⁴ Because so little natural wetland habitat remains, these flooded rice fields are critical to ensure that there is enough nutrition to support the pintails, long-billed curlews, and other water birds making their epic annual journeys¹⁶⁵ The giant garter snake has also adapted to take advantage of some of the agricultural fields that have replaced their preferred wetlands.¹⁶⁶ The giant garter snake has managed to make a home in the shallow and tadpole-filled rice fields that thrive in the northern part of the Central Valley.¹⁶⁷ While giant garter snake populations have declined precipitously elsewhere in the state, the snake populations that rely on rice fields are in better

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161. Justin Fox, *Rice Gets a Bath Amid California's Drought*, BLOOMBERG VIEW (May 15, 2015) <http://www.bloombergview.com/articles/2015-05-15/california-floods-fields-to-grow-rice-in-a-drought>.

162. Mid-Pacific Region, *supra* note 160, at 6–7; *see also* Complaint for Declaratory and Injunctive Relief; Petition for Writ of Mandate, *AquaAlliance v. U.S. Bureau of Reclamation*, Case No. 2:15-cv-01023-MCE-CMK (E.D. Cal. 2015) <http://mavensnotebook.com/wp-content/uploads/2015/05/AquaAlliance-et-al-v-BOR-SLDMWA-FILED.pdf>.

163. *California: Migratory Birds*, THE NATURE CONSERVANCY, <http://www.nature.org/ourinitiatives/regions/northamerica/unitedstates/california/howwework/california-migratory-birds.xml> (last visited Apr. 7, 2016).

164. *Waterbird Habitat Enhancement Program*, BIRD-FRIENDLY FARMING IN CALIFORNIA RICE FIELDS 3 (Nov. 2014), http://calrice.org/pdf/waterbird_habitatbro_web.pdf.

165. *Central Valley Joint Venture*, SAVING CALIFORNIA'S LAST WETLANDS 2 (2015), http://www.centralvalleyjointventure.org/assets/pdf/tnc_CentralValley_bro_v4.pdf

166. Rachel Zwillinger, *Where Water, Farms and Wildlife Collide*, DEFENDERS OF WILDLIFE BLOG (Aug. 11, 2015) <http://www.defendersblog.org/2015/08/where-water-farms-and-wildlife-collide/>.

167. *Id.*

condition and helping to ensure that the imperiled species does not become extinct.¹⁶⁸

The timing of the water transfers in the midst of the severe drought will likely exacerbate an already difficult situation for these wildlife species. Most Central Valley wildlife refuges only received 65% of their Level 2 (“L2”) water supply in 2014,¹⁶⁹ and L2 water allocations were similar in 2015.¹⁷⁰ In addition, Incremental Level 4 (“IL4”) supplies have been severely limited over the last several years as the drought and below-normal agricultural deliveries have made it impossible for Reclamation’s Refuge Water Supply Program to compete with agriculture for water due to the severely limited water supply available for transfer and their very limited budget for water acquisition.

The effect of this habitat loss to birds migrating along the Pacific Flyway and to other wetland-dependent species is likely to be profound.¹⁷¹ For example, reduced food-supply availability could send birds back to their spring breeding grounds in poor condition,

168. The U.S. Fish and Wildlife Service (“FWS”) listed the giant garter snake as a threatened species under the ESA on October 20, 1993. 58 Fed. Reg. 54053 (Oct. 20, 1993) (codified at 50 C.F.R. § 17.11). According to FWS’ 2006 Five-Year Status Review, good Snake habitat consists of areas which provide ample water during the Snake’s active season, emergent herbaceous wetland vegetation for escape and foraging habitat, grassy banks and openings in waterside vegetation for basking, and higher elevation upland habitat for cover and refuge during flooding. Sacramento Fish & Wildlife Office, U.S. Fish & Wildlife Serv., *Giant Garter Snake (Thamnophis gigas) 5-Year Review: Summary and Evaluation* 3 (Sept. 2006) <http://www.fws.gov/sacramento/es/Five-Year-Reviews/Documents/giant%20garter%20snake%205-year%20review.FINAL.pdf>. The giant garter snake is threatened by the loss of such habitat. When FWS listed the giant garter snake under the ESA in 1993, it identified 13 existing populations. 58 Fed. Reg. 54053, 54054 (Oct. 20, 1993). Today, however, two of these 13 original populations (located in the Burrell/Lanare and Liberty Farms areas of the Yolo Basin), have most likely been extirpated, and several other populations are at risk of extirpation. U.S. Fish & Wildlife Serv., *Revised Draft Recovery Plan for Giant Garter Snake (Thamnophis gigas) I-10* (2015), <http://www.fws.gov/sacramento/outreach/2015/12-22/docs/GGSrevisedDraftRecoveryPlan2015.pdf>. The giant garter snake remains threatened by habitat destruction and modification, particularly from urbanization, flood control and canal maintenance, grazing and agricultural practices, wetland management for waterfowl, and the introduction and eradication of invasive non-native plants. See 80 Fed. Reg. 79606, 79607 (Dec. 15, 2015).

169. Under the CVPIA, L2 water is the minimal level of water necessary for the lowest level of protection of wildlife refuges. CVPIA § 3406(d)(1), <http://www.usbr.gov/mp/cvpia/3406d/3406d.html#3406d>.

170. Bettina Boxall and David Pierson, *Most Central Valley farmers unlikely to get federal water, again*, LOS ANGELES TIMES (Feb. 27, 2015), <http://www.latimes.com/local/la-me-la-water-allocation-20150228-story.html>.

171. Jane Kay, *Birds Are Dying As Drought Ravages Avian Highways*, NAT’L GEOGRAPHIC (July 15, 2015), <http://news.nationalgeographic.com/2015/07/1579-birds-snowpack-drought-flyway-wetlands-California/>.

which would greatly reduce breeding success.¹⁷² In addition, the significant reduction in habitat could cause overcrowding, which has exacerbated outbreaks of avian diseases such as cholera and botulism in the past.¹⁷³ Such conditions could affect bird populations for years to come.¹⁷⁴ The water transfers could also have devastating impacts for the federal and state threatened giant garter snake.,¹⁷⁵

While the effects of crop idling water transfers can not be completely avoided, conservation organizations and a prominent giant garter snake expert proposed a number of simple conservation measures that the Bureau of Reclamation could require transferring parties to implement to reduce the worst of these effects. These measures include: (1) requiring landowners who idle rice fields to cultivate or retain non-irrigated cover crops or natural vegetation to provide habitat and forage for birds; (2) delivering a portion of the transferred water to Central Valley wildlife refuges to mitigate for the loss of flooded agricultural habitat; and (3) avoiding unnecessary impacts to giant garter snakes by implementing protections like those included in the U.S. Fish and Wildlife Service's biological opinions for the Bureau of Reclamation's 2009 and 2010 water transfer programs, including limiting the size of idled parcels to 320 acres with no more than 20 percent of rice fields idled cumulatively in each county and prohibiting fallowing of fields for more than two irrigation seasons in a row.¹⁷⁶ Unfortunately, the water transfers were finalized without incorporating the recommended measures and provided only minimal measures to mitigate for the adverse impacts on migratory birds, shorebirds, and giant garter snakes.¹⁷⁷

The CVP Long-Term Transfers have run for one year. Litigation has already ensued with a complaint filed by AquaAlliance, California Sportfishing Alliance, Central Delta Water Agency, South

172. *Id.*

173. *Id.*

174. *Id.*

175. Letter from Eric C. Hansen, Consulting Environmental Biologist, to Jennifer Norris & Kenneth Sanchez, U.S. Fish & Wildlife Serv., Brad Hubbard & Russell Grimes, U.S. Bureau of Reclamation (Apr. 15, 2015).

176. Letter from Rachel Zwilling, Cal. Water Policy Advisor, Defenders of Wildlife, to Brad Hubbard, U.S. Bureau of Reclamation (Dec. 1, 2014); Letter from Eric C. Hansen, Consulting Environmental Biologist, to Jennifer Norris & Kenneth Sanchez, U.S. Fish & Wildlife Serv., Brad Hubbard & Russell Grimes, U.S. Bureau of Reclamation (Apr. 15, 2015); and Letter from Kim Delfino et al., Cal. Program Dir., Defenders of Wildlife, to Ren Lohofener et al., Pac. Southwest Regional Dir., U.S. Fish & Wildlife Serv. (Apr. 23, 2015).

177. Mid-Pacific Region, *supra* note 160.

Delta Water Agency, and Local Agencies of the North Delta.¹⁷⁸ Other conservation organizations are monitoring the compliance reports filed by the Bureau of Reclamation to determine the effects on the threatened giant garter snake. It is likely that further controversy will follow this transfer and additional litigation due to the failure of Reclamation to adequately address the impacts of the transfers.

CONCLUSION

If done correctly, water transfers can increase the efficient use of water, build flexibility and resiliency in the water system, promote groundwater recharge, and provide water for environmental benefits. However, if water transfers—particularly the large, long-term transfers—underestimate or ignore the effects of moving water in an altered landscape, particularly on the environment, they will eventually fail or create a backlash against further transfers.

Much has been written about possible solutions for expanding the use of water transfers, but most of those solutions are directed at improving efficiency, streamlining the process, addressing the economic and social effects, and improving groundwater management.¹⁷⁹ More attention should be paid to the environmental effects that result from moving large amounts of water in California's highly altered landscape, with its already tenuous fish and wildlife populations. Water transfers must be analyzed carefully, and their effects must be mitigated fully without delay. As illustrated by the two water transfers discussed in this article, ignoring, minimizing, or delaying critical actions necessary to prevent serious harm to the environment jeopardizes these transfers today and in the future.

178. Complaint for Declaratory and Injunctive Relief, *supra* note 162.

179. Brent M. Haddad, *Rivers of Gold Designing Markets to Allocate Water in California* (Island Press ed., 2000); Hanak, *supra* note 104; Hanak & Stryjewski, *supra* note 11.