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Low Flows, High Stakes: Lessons from Fisheries Management on Mill, Deer, and Antelope Creeks During California's Historic Drought

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Introduction

From fall 2011 through fall 2015, the state of California suffered through a severe drought—that four-year period was the driest in California's history since record keeping began in 1895¹—resulting in impacts on water right holders and species alike, and creating complex management problems for the State Water Resources Control Board, the state agency tasked with allocating waters to achieve the optimum balance of beneficial uses. For example, Deer, Mill, and Antelope Creeks are eastside tributaries of the Sacramento River that provide critical migration, spawning, and rearing habitat for wild California Central Valley steelhead (*Oncorhynchus mykiss*) populations and for the last remaining naturally-produced Central Valley spring-run Chinook salmon (*Oncorhynchus tshawytscha*) populations.² These fish species are federally listed as threatened under the Endangered Species Act because of substantial declines in their populations resulting in part from the

1. Ellen Hanak et al., *Just the Facts: California's Latest Drought*, PUB. POL. INST. CAL. (Jul. 2016), http://www.ppic.org/main/publication_show.asp?i=1087.

2. NAT'L MARINE FISHERIES SERV. & CAL. DEP'T OF FISH AND WILDLIFE, CALIFORNIA VOLUNTARY DROUGHT INITIATIVE 3 (2014) [hereinafter VOLUNTARY INITIATIVE], http://www.westcoast.fisheries.noaa.gov/publications/protected_species/salmon_steelhead/drought_2014/voluntary_drought_initiative_051414.pdf.

effects of streamflow diversion, such as impaired migration, excessively high stream temperatures, and entrainment.³ The habitat in Mill, Deer, and Antelope Creeks has been designated by the National Marine Fisheries Service as critical to assisting recovery of these fish populations, but the extreme drought in California in recent years threatened to cause stream flows in those creeks to drop below minimum levels necessary for fish passage and migration, which threatened severe harm to the species.⁴

In response, the State Water Resources Control Board (“State Board”) in 2014 and 2015 adopted emergency regulations that set minimum flow requirements for Mill, Deer, and Antelope Creeks, and required water users to curtail their diversions as necessary to meet those flow targets.⁵ The California Department of Fish and Wildlife and the National Marine Fisheries Service also negotiated voluntary water conservation and instream flow agreements with water users, which the emergency regulations recognized as an alternative method of compliance.⁶ These measures were both groundbreaking and drastic—Mill, Deer, and Antelope Creeks are the only watersheds in California for which the State Board imposed curtailments to regulate flows for fish. Particularly given their novelty, and in light of a broader struggle throughout the state to balance the demands of water users with flows necessary to protect the environment and ensure survival of threatened species, the actions taken to protect fish on Mill, Deer, and Antelope Creeks merit analysis.

This essay seeks to provide that analysis in the form of a case study that analyzes the implementation and effectiveness of the State Board’s emergency regulations and the voluntary agreements used as an alternative method to comply with those regulations. The case study unfolds in three Parts. Part I presents a snapshot of each of the three creeks studied and provides information about the State Board’s emergency regulations—their requirements, environmental basis, and legal justification—as well as the Voluntary Drought Initiative. Part II analyzes the implementation and effectiveness of the State Board’s emergency regulations and the voluntary

3. *Id.*; see also Enumeration of threatened marine and anadromous species, 50 C.F.R. § 223.102 (2016); U.S. Fish & Wildlife Serv., *Chinook salmon (Oncorhynchus tshawytscha)*, ENVTL. CONSERVATION ONLINE SYS., <https://ecos.fws.gov/ecp0/profile/speciesProfile?spcode=E06D> (last visited Mar. 12, 2017); U.S. Fish & Wildlife Serv., *steelhead (Oncorhynchus (=salmo) mykiss)*, ENVTL. CONSERVATION ONLINE SYS., <https://ecos.fws.gov/ecp0/profile/speciesProfile?spcode=E08D> (last visited Mar. 12, 2017).

4. State Water Resources Control Bd. Res. No. 2014-0023, To Adopt Emergency Regulations for Curtailment of Diversion Due to Insufficient Flow for Specific Fisheries 1-2 (May 21, 2014), http://www.waterboards.ca.gov/board_decisions//adopted_orders/resolutions/2014/rs2014_0023_corrected_with%20regs.pdf.

5. *Id.* at 4; State Water Resources Control Bd. Res. No. 2015-0014, To Update and Readopt A Drought-Related Emergency Regulation for Curtailment of Diversions Due to Insufficient Flow for Specific Fisheries 6 (Mar. 17, 2015), http://www.waterboards.ca.gov/board_decisions/adopted_orders/resolutions/2015/rs2015_0014.pdf.

6. Cal. Code Regs., tit. 23, § 878.2 (2015).

agreements used as an alternative method to comply with those regulations. It also identifies some benefits and challenges of the mechanisms utilized and offers insights from stakeholders. Finally, Part III distills several lessons learned in an effort to inform future drought management policies. Among other things, this case study makes evident that voluntary agreements to protect fish can be effective and may be engendered by a history of cooperation between government agencies and water users, the threat of curtailment orders, tools and programs that limit the impacts on local stakeholders of having to provide minimum instream flows, and the presence of a conservation NGO at the negotiating table.

I. Managing Instream Flows

This Part provides background information about Antelope, Deer, and Mill Creeks and the regulations put in place to manage instream flows in those creeks. Each of these small creeks provides habitat and spawning grounds for fish species listed as threatened under the federal Endangered Species Act and the California Endangered Species Act.⁷ As a result, the State Board enacted emergency regulations during the drought to ensure minimum instream flows needed for fish migration during spring and fall in these three creeks.⁸ The details of these regulations, as well as their environmental and legal bases, are discussed below. This Part also introduces the Voluntary Drought Initiative, under which stakeholders could negotiate voluntary agreements with the California Department of Fish and Wildlife (“the Department”) and the National Marine Fisheries Service (“Fisheries Service”) to provide minimum instream flows as an alternative method of compliance with the emergency regulations.⁹

A. Mill, Deer, and Antelope Creek Watersheds

Mill Creek, Deer Creek, and Antelope Creek are important eastside tributaries to the Sacramento River that rise on the south side of Lassen Volcanic National Park and provide vital habitat for several threatened steelhead and salmon species.

7. VOLUNTARY INITIATIVE, *supra* note 2, at 3.

8. State Water Resources Control Bd. Res. No. 2014-0023, *supra* note 4; State Water Resources Control Bd. Res. No.2015-0014, *supra* note 5.

9. VOLUNTARY INITIATIVE, *supra* note 2.

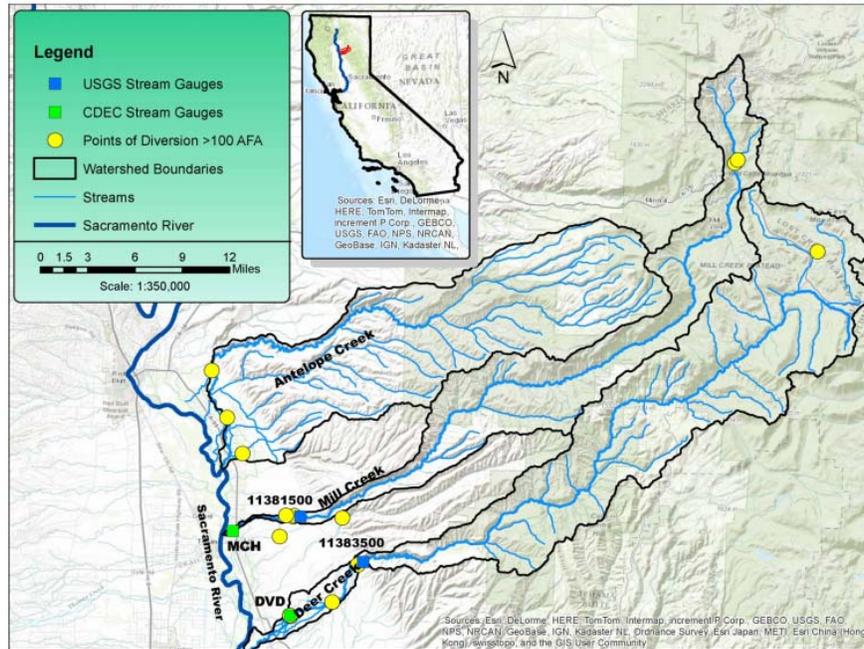


Figure 1: Map of Mill Creek, Deer Creek, and Antelope Creek Watersheds¹⁰

1. Mill Creek

Mill Creek originates on the southern slopes of Lassen Peak and flows generally to the southwest for approximately 60 miles to its confluence with the Sacramento River.¹¹ It occupies a narrow, mountainous watershed of roughly 134 square miles and has a consistent, cold base flow from numerous springs that are products of the area's volcanic geology.¹² U.S. Geological Survey discharge records collected since 1928 on Mill Creek at a location 5.5 miles upstream of the Sacramento River confluence show that Mill Creek's average annual discharge is 215,000 acre feet and that its annual average daily flow is approximately 400 cubic feet per second (cfs).¹³ Flows tend to be

10. State Water Resources Control Board Meeting Session – Division of Water Rights: Item 12, at 46 (May 20, 2014), http://www.waterboards.ca.gov/board_info/agendas/2014/may/052014_12.pdf.

11. CAL. DEP'T OF FISH AND WILDLIFE, STUDY PLAN: PASSAGE ASSESSMENT FOR ADULT AND JUVENILE CHINOOK SALMON AND STEELHEAD TROUT IN MILL CREEK, TEHAMA COUNTY 5 (2014) [hereinafter MILL CREEK STUDY PLAN], <https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=87590>.

12. *Id.*

13. SCOTT ARMENTROUT ET AL., WATERSHED ANALYSIS FOR MILL, DEER, AND ANTELOPE CREEKS app. H at H-1, H-4 (1998), http://www.krisweb.com/biblio/ccv_usdafs_armen_troutetal_1998.pdf.

highest in the stormy winter months of December to March and the snow melt period from April through June; the largest peak runoff event on record was 36,400 cfs in December 1937.¹⁴ Much of the flow in Mill Creek comes from melting glaciated slopes on Mount Lassen, which often gives the creek a 'milky' appearance during spring and summer.¹⁵

Diversions for irrigation water from Mill Creek include the Upper and Lower Diversions operated by Los Molinos Mutual Water Company and the privately owned Clough Diversion.¹⁶ The state fully adjudicated water rights on Mill Creek in the 1920s, and flow records show that authorized diversions in lower Mill Creek, which total 203 cfs, have the potential to completely dewater the stream during the low flow period coinciding with summer irrigation season.¹⁷ As a result, water diverters on the creek have entered into cooperative agreements with government agencies to provide adequate flows for salmon migration and spawning when feasible.

Mill Creek supports one of only three remaining self-sustaining populations of Central Valley spring-run Chinook salmon, which has been listed as threatened at both the state and federal level.¹⁸ Mill Creek is also acknowledged as a critical refuge for the federally threatened Central Valley steelhead as well as the fall and late fall-run Chinook salmon, a State Species of Special Concern.¹⁹ The upper watershed offers largely pristine spawning and rearing grounds, because there are no storage dams on Mill Creek to alter the flow regime or block fish access to the upper watershed.²⁰ In fact, at an elevation of about 5,300 feet, the upper reaches of Mill Creek constitute the highest elevation of spawning spring-run Chinook salmon in California.²¹

The 2014 Central Valley Salmon and Steelhead Recovery Plan prepared by the National Marine Fisheries Service ("Fisheries Service") identified Mill Creek as a Core 1 Population for Central Valley spring-run Chinook salmon and steelhead.²² Core 1 populations occur in watersheds that possess the

14. *Id.* at H-3, H-4.

15. MILL CREEK STUDY PLAN, *supra* note 11, at 5.

16. ARMENTROUT ET AL., *supra* note 13, app. H at H-7.

17. *Id.*

18. MILL CREEK STUDY PLAN, *supra* note 11, at 5.

19. *Id.*

20 State Water Resources Control Bd. Res. No. 2014-0023, *supra* note 4, at 2; State Water Resources Control Bd. Emergency Regulations Digest, Curtailment of Diversions Due to Insufficient Flow for Specific Fisheries 21 (May 22, 2014), http://www.waterboards.ca.gov/waterrights/water_issues/programs/drought/docs/mill_deer_antelope_creeks/doc3_final_tributary_emergency_regpackage4.pdf.

21. MILL CREEK STUDY PLAN, *supra* note 11, at 5.

22. NAT'L MARINE FISHERIES SERV., RECOVERY PLAN: FOR THE EVOLUTIONARILY SIGNIFICANT UNITS OF SACRAMENTO RIVER WINTER-RUN CHINOOK SALMON AND CENTRAL VALLEY SPRING-RUN CHINOOK SALMON AND THE DISTINCT POPULATION SEGMENT OF CALIFORNIA CENTRAL VALLEY STEELHEAD 76 tbl.3-2, 77 tbl.3-3 (2014) [hereinafter RECOVERY PLAN], http://www.westcoast.fisheries.noaa.gov/publications/recovery_planning/salmon_steelhead/domains/california_central_valley/final_recovery_plan_07-11-2014.pdf.

known ability or potential to support a viable population and are thus a priority for recovery efforts.²³ Priority I Recovery Actions specified for Mill Creek include modifying Ward Dam, Upper Dam, and the Cemetery Ditch Siphon in order to provide unimpeded fish passage and minimize entrainment, and increasing instream flows in the lower portion of the Creek by way of agreements with water rights holders.²⁴ The removal of passage limitations at both Ward and Upper Diversion Dams is funded and in process, including the improvement of the fish ladders and screens at both facilities. The Cemetery Ditch Siphon has been judged to be a lower priority, relative to improving flows. At this point, increasing instream flows is clearly the most significant salmonid recovery issue to be addressed within the Mill Creek watershed.

Fortunately, there is a long history of cooperation including the local water purveyor, Los Molinos Mutual Water Company (“Los Molinos Mutual”), other local water right holders, resources agencies, the Mill Creek Conservancy and other conservation organizations to address instream flows. The California Department of Fish and Wildlife (“the Department”) and Department of Water Resources (“Water Resources”) coordinate with Los Molinos Mutual to operate two conjunctive use wells that supplement instream flow pursuant to a 1990 agreement.²⁵ A 2007 agreement established a Long-term Cooperative Management Plan for Mill Creek that is overseen by the Mill Creek Management Committee (composed of Los Molinos Mutual, the Department, Water Resources, and Mill Creek Conservancy).²⁶ This agreement establishes a framework for further instream flow improvements. In 2015, Los Molinos Mutual entered into a water exchange agreement with The Nature Conservancy (“the Conservancy”) that resulted in approximately 31 to 42 cubic feet per second of additional, assured instream flow when it is required for fish passage.²⁷

2. Deer Creek

The Deer Creek watershed drains a roughly 200 square mile area and the creek flows for about 60 miles in a southwesterly direction from its mountainous headwaters in eastern Tehama County to its confluence with

23. *Id.* at 74.

24. *Id.* at 212-16 tbl.5-14.

25. Agreement Between the State of California and Los Molinos Mutual Water Company for Construction, Operation, and Maintenance of a Fisheries Restoration Project On Mill Creek In Tehama County, Contract No. B-58268, May 1, 1990 [hereinafter Wells Agreement] (on file with author).

26. Agreement for the Implementation of a Long-Term Cooperative Management Plan for Mill Creek (2007) [hereinafter Cooperative Plan] (on file with author).

27. See *Voluntary Agreement Benefits Fish and Farmers*, THE NATURE CONSERVANCY, <http://www.casalmon.org/Mill-Creek-Water-Exchange-Agreement> (last visited Mar. 13, 2017).

the Sacramento River near the town of Vina.²⁸ Flow records show that Deer Creek's annual average discharge is approximately 228,700 acre feet, much of which comes as spring snowmelt as a result of 40 percent of the watershed being located at elevations higher than 4,000 feet.²⁹ The upper watershed contains both public lands managed by Lassen National Forest and some private lands used for timber production, while large private cattle ranches characterize the middle and lower elevation areas and irrigated agricultural lands cover the valley floor.³⁰ Like Mill Creek, Deer Creek supports one of three remaining self-sustaining populations of threatened Central Valley spring-run Chinook salmon and is considered to be essential to the recovery of California Central Valley steelhead.³¹ Except for three small diversion dams and four diversion ditches along the lower 10 miles of Deer Creek, the watershed is undammed and provides about 42 miles of critical habitat for anadromous fish, including about 25 miles of adult spawning and holding habitat.³²

Pursuant to a 1923 court adjudication, the rights to divert water from Deer Creek are split between Stanford Vina Ranch Irrigation Company, which receives 65% of natural flows, and Deer Creek Irrigation District, which receives the other 35% of flows.³³ These rights total approximately 48,000 acre-feet per year in diversions and result in an estimated combined maximum diversion rate of about 115 cfs.³⁴ One study found that during the irrigation period, typically from May through October, these diversions can reduce flow in the lower five miles of Deer Creek to less than 5 cfs at times of intensive irrigation, effectively dewatering the stream and impeding fish passage.³⁵ In critically dry years, these diversions and resulting low flows may occur even earlier in the year, especially if the irrigation season starts earlier.³⁶

28. State Water Resources Control Bd. Emergency Regulations Digest, *supra* note 20, at 22; CAL. DEP'T OF FISH AND WILDLIFE, STUDY PLAN: PASSAGE ASSESSMENT FOR ADULT AND JUVENILE SALMONIDS IN LOWER DEER CREEK, TEHAMA COUNTY 6 (2014) [hereinafter DEER CREEK STUDY PLAN], <https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=85545>.

29. DEER CREEK STUDY PLAN, *supra* note 28, at 6; ARMENTROUT ET AL., *supra* note 13, app. H at H-4.

30. DEER CREEK STUDY PLAN, *supra* note 28, at 6.

31. State Water Resources Control Bd. Emergency Regulations Digest, *supra* note 20, at 22; *see also* RECOVERY PLAN, *supra* note 22, at 76 tbl.3-2, 77 tbl.3-3 (identifying Deer Creek as having Core 1 populations of steelhead and spring-run Chinook salmon).

32. State Water Resources Control Bd. Emergency Regulations Digest, *supra* note 20, at 22.

33. *Id.*; DEER CREEK STUDY PLAN, *supra* note 28, at 6.

34. State Water Resources Control Bd. Emergency Regulations Digest, *supra* note 20, at 23; DEER CREEK STUDY PLAN, *supra* note 28, at 6.

35. State Water Resources Control Bd. Emergency Regulations Digest, *supra* note 20, at 23; DEER CREEK STUDY PLAN, *supra* note 28, at 6.

36. State Water Resources Control Bd. Emergency Regulations Digest, *supra* note 20, at 23.

3. Antelope Creek

Antelope Creek originates at an elevation of around 6,800 feet and flows southwest from the Cascade Mountains into the Sacramento River just southeast of the town of Red Bluff.³⁷ The Antelope Creek drainage encompasses approximately 123 square miles and provided an annual mean flow rate of 151 cfs for the period of record, 1941-1982, resulting in total average annual discharge of about 110,000 acre feet.³⁸ Antelope Creek provides approximately 30 miles of anadromous fish habitat from its confluence with the Sacramento River, approximately 15 miles of which has been designated critical spawning and over-summer holding habitat for adult spring-run Chinook salmon, but high water temperatures and low water levels threaten to render this historically ideal salmon spawning habitat inadequate.³⁹

Like Mill and Deer Creeks, Antelope Creek has historically been home to significant populations of spring-run Chinook salmon and steelhead trout, but the populations of both these species have declined in the past decade. To address these issues, the Fisheries Service's Recovery Plan identifies Antelope Creek as having a Core 1 steelhead population and a Core 2 spring-run Chinook salmon population and lists potential actions to restore and protect those populations.⁴⁰ Actions with highest priority include restoring instream flows during fish migration periods through water exchange agreements with diverters and restoring connectivity of the fish migration corridor by implementing fish passage and entrainment improvement projects.⁴¹

Two water rights holders divert water out of Antelope Creek, primarily for agricultural purposes, at the Edwards Diversion Dam.⁴² Los Molinos Mutual may divert a maximum of 80 cfs, while the Edwards Ranch claim allows a maximum diversion of another 50 cfs.⁴³ If instream flows fall below the combined 130 cfs allocation, available flow is split 50/50 between diverters.⁴⁴ In 2010, Los Molinos Mutual reported diverting a total of 7,144 acre feet from Antelope Creek, and Edwards Ranch reported diverting 12,237

37. *Id.*

38. ARMENTROUT ET AL., *supra* note 13, app. H at H-4; STILLWATER SCIENCES & RESOURCE CONSERVATION DIST. OF TEHAMA CTY., FISH PASSAGE IN LOWER ANTELOPE CREEK 5 (2015), <https://www.fws.gov/redbluff/PDF/AFRP/Fish%20Passage%20in%20Lower%20Antelope%20Creek-January%202015.pdf>.

39. State Water Resources Control Bd. Emergency Regulations Digest, *supra* note 20, at 23.

40. RECOVERY PLAN, *supra* note 22, at 76 tbl.3-2, 77 tbl.3-3, 206-11 tbl.5-13.

41. *Id.* at 206 tbl.5-13.

42. STILLWATER SCIENCES & RESOURCE CONSERVATION DIST. OF TEHAMA CTY., *supra* note 38, at 5.

43. *Id.*

44. *Id.*

acre feet cumulatively over the year.⁴⁵ Flow records show these diversions in lower Antelope Creek have the potential to completely dewater the stream during the irrigation season, which spans April through October, impacting adult and juvenile spring-run Chinook salmon and juvenile steelhead migrations.⁴⁶

B. State Board Emergency Curtailment Regulations

On May 21, 2014, the State Water Resources Control Board (“State Board”) adopted drought emergency regulations for curtailment of diversions due to insufficient flows for specific fisheries on Mill, Deer, and Antelope Creeks.⁴⁷ The regulations aimed to protect threatened species of anadromous fish on the three creeks by stipulating minimum instream flow requirements, which are minimum amounts of water that must be left in the creek rather than diverted. The emergency regulations provided that diversions from Mill Creek, Deer Creek, or Antelope Creek were wasteful and unreasonable under California law if those diversions would cause flows to drop below the minimum flows specified in the regulations.⁴⁸ To achieve and maintain those minimum flows, the regulations empowered the Deputy Director of the State Board’s Division of Water Rights to issue curtailment orders directing diverters to cease or reduce their diversions as necessary, with the exception of diversions necessary for minimum health and safety needs.⁴⁹ The emergency regulations went into effect on June 2, 2014, following approval by the Office of Administrative Law, and expired on February 28, 2015.

On March 17, 2015, the State Board again adopted emergency regulations for Curtailment of Diversions due to Insufficient Flow for Specific Fisheries for Mill, Deer, and Antelope Creeks.⁵⁰ The drought emergency minimum flow requirements in the 2015 drought-related emergency regulations were largely similar to those adopted in 2014; the only differences stemmed from several clarifications and edits to the regulations as well as minor adjustments to the minimum flows and flow periods based on an

45. *Id.*

46. ARMENTROUT ET AL., *supra* note 13, app. H at H-7; *see also* State Water Resources Control Bd. Emergency Regulations Digest, *supra* note 20, at 24.

47. State Water Resources Control Bd. Res. No. 2014-0023, *supra* note 4; *see also* Cal. Code Regs., tit. 23, §§ 877-879.2 (2014). For more documents and information related to these emergency regulations, *see State Water Board Drought Year Water Actions: Curtailment of Diversions Due to Insufficient Flow for Specific Fisheries*, STATE WATER RES. CONTROL BD., http://www.waterboards.ca.gov/waterrights/water_issues/programs/drought/mill_deer_antelope_creeks.shtml (last updated Nov. 2, 2015).

48. Cal. Code Regs., tit. 23, § 877 (2014).

49. *Id.* §§ 877(b), 878.1.

50. State Water Resources Control Bd. Res. No. 2015-0014, *supra* note 5; *see also* Cal. Code Regs., tit. 23, §§ 877-879.21 (2015). For more documents and information related to these emergency regulations, *see State Water Board Drought Year Water Actions: Curtailment of Diversions Due to Insufficient Flow for Specific Fisheries*, *supra* note 47.

assessment of the previous year's implementation of the regulations.⁵¹ The minimum flow requirements on Mill and Deer Creeks were not changed, and the minimum baseflow requirements for juvenile spring-run Chinook salmon and steelhead were lowered for Antelope Creek in the 2015 regulations. With the exception of the flow period for juvenile Spring-run Chinook and steelhead in Mill and Deer Creeks, which was altered to begin on October 15th rather than November 1st, the flow periods required under the 2015 regulations were shorter than the flow periods required in the 2014 regulations. The Office of Administrative Law reviewed and approved the 2015 regulations on March 30, 2015. The emergency regulations expired on December 29, 2015, and have not been renewed.

On March 14, 2016, the California Department of Fish and Wildlife ("the Department") submitted a memorandum to the State Board requesting the State Board to "suspend re-adoption of emergency regulations on Mill, Deer, and Antelope Creeks based on hydrologic conditions."⁵² The memorandum stated that, given the hydrologic conditions and snow accumulations at the time, the Department did not anticipate the need for re-adoption of the emergency regulations. However, the Department also declared that it "strongly supports the backstop of emergency regulations in the future, if necessary, to protect listed fish species on these creeks due to the ongoing impacts of multiple years of drought."⁵³ Thus, while these emergency regulations are no longer in effect, the Department clearly views them as a useful tool for protecting fish in future droughts. This suggests both that the regulations were effective and that they may be utilized again in the future, which make these regulations worth studying.

1. Environmental Basis for Emergency Regulations

As mentioned previously, Mill Creek, Deer Creek, and Antelope Creek provide important habitat for two listed fish species: Central Valley spring-run Chinook salmon (CV SR Salmon), which are listed as threatened under the state and federal Endangered Species Acts, and California Central Valley steelhead (CCV Steelhead), which are listed as threatened under the federal Endangered Species Act.⁵⁴ In adopting the emergency regulations for Mill, Deer, and Antelope Creeks, the State Board found that "[b]ecause of the fragile nature of the fisheries in these watersheds, regulatory action to protect

51. Compare State Water Resources Control Bd. Res. No. 2014-0023, *supra* note 4, with State Water Resources Control Bd. Res. No. 2015-0014, *supra* note 5.

52. California Dep't of Fish & Wildlife Memorandum to State Water Resources Control Bd., Request to Suspend Re-Adoption of Emergency Regulations on Mill, Deer, and Antelope Creeks Based on Hydrologic Conditions (March 14, 2016), http://www.waterboards.ca.gov/waterrights/water_issues/programs/drought/docs/mill_deer_antelope_creeks/20160314_cdfw_memo_suspreadoptmda.pdf.

53. *Id.*

54. The Endangered Species Act is codified at 16 U.S.C. § 1531 et seq. (2016).

this public trust resource is warranted.”⁵⁵ Thus, the purpose of the emergency regulations was to protect listed fish species during the extreme drought by maintaining minimum streamflow for adult salmonid passage at critical migration periods, providing pulses of flow at times to ensure successful migration, and maintaining minimum streamflow for out-migrating juvenile fish.

The State Board targeted Mill, Deer, and Antelope Creeks in particular because they are especially important streams for the survival and recovery of salmon and steelhead in the Central Valley. In fact, the Fisheries Service, in conversation with the Department and the United States Fish and Wildlife Service, identified these three creeks as priority watersheds for sustaining the CV SR Salmon and the CCV Steelhead, because the creeks contain migration, spawning, and rearing habitat for some of the last remaining naturally produced populations of those species.⁵⁶ The watersheds have been rated as having high “biotic integrity,” which is defined as the ability to support and maintain a balanced, integrated, adaptive community of organisms having a species composition, diversity, and functional organization comparable to that of the natural habitat of the region.⁵⁷ In its Central Valley Salmon and Steelhead Recovery Plan, the Fisheries Service identified Mill and Deer Creeks as Core 1 populations for CV SR Salmon and CCV Steelhead, and Antelope Creek as a Core 1 population for CCV Steelhead and a Core 2 population for CV SR Salmon.⁵⁸ Core 1 populations are considered to have the greatest potential to support independent viable populations and, as a result, preserving and restoring those populations is the foundation of the recovery strategy.⁵⁹ Core 2 populations are assumed to have the potential to meet the moderate risk of extinction criteria and protecting these populations is also a priority of the recovery plan.⁶⁰

Yet while Mill, Deer, and Antelope Creeks provide extremely important habitat for naturally produced populations of CV SR Salmon and CCV Steelhead, they have no upstream water storage facilities that can be managed to buffer the effects of drought on streamflow and water temperature requirements for these fish species.⁶¹ Thus, ensuring CV SR Salmon and CCV Steelhead would be able to migrate upstream to spawning habitat and downstream to the Sacramento River required managing

55. State Water Resources Control Bd Res. No. 2014-0023, *supra* note 4, at 1; State Water Resources Control Bd. Res. No.2015-0014, *supra* note 5, at 2.

56. For a detailed discussion of the history of these species, the threats they face, and the efforts to protect them, see State Water Resources Control Bd. Emergency Regulations Digest, *supra* note 20, at 19-20.

57. *Id.*

58. RECOVERY PLAN, *supra* note 22, at 76 tbl.3-3, 77 tbl.3-4.

59. *Id.* at 74, 78-79.

60. *Id.*

61. State Water Resources Control Bd. Res. No. 2014-0023, *supra* note 4, at 2.

diversions on these creeks. To that end, the Fisheries Service sent the State Board a memorandum on May 7, 2014, recommending minimum instream flows in Mill, Deer, and Antelope Creeks to address drought impacts on listed fish species in those creeks.⁶² The State Board found that the minimum flows recommended by the Fisheries Service accorded with other studies and information regarding fishery needs, and thus used them as a basis for setting minimum flow requirements in the emergency regulations.

2. Legal Basis for Emergency Regulations

The State Board enacted regulations on Mill, Deer, and Antelope Creeks pursuant to California Water Code section 1058.5, which pertains to emergency regulations during certain drought years. In particular, Water Code section 1058.5 grants the State Board the authority to adopt emergency regulations “to prevent the waste, unreasonable use, unreasonable method of use, or unreasonable method of diversion, of water . . .” in response to conditions “in a critically dry year immediately preceded by two or more consecutive below normal, dry, or critically dry years or during a period for which the Governor has issued a proclamation of a state of emergency under the California Emergency Services Act . . . based on drought conditions.”⁶³ Emergency regulations adopted under this section may remain in effect for up to 270 days and be renewed if the emergency drought conditions persist, which explains the expiration of the 2014 emergency regulations and their re-adoption in 2015.⁶⁴

In adopting the emergency regulations in both 2014 and 2015, the State Board relied on several sources of authority, including the governor’s proclamation of emergency, a finding of emergency and extreme drought conditions, its duty to protect public trust resources, and its authority to prevent unreasonable use of water. First, the State Board pointed to Governor Edmund G. Brown Jr.’s proclamation on January 17, 2014, declaring a drought State of Emergency to exist in California due to severe drought conditions.⁶⁵

62. State Water Resources Control Bd. Emergency Regulations Digest, *supra* note 20, at 58. The memorandum supports minimum instream flows of 50 cfs in Mill Creek and Deer Creek and 35 cfs in Antelope Creek for the protection of adult Chinook salmon migration April 1 through June 30 and October 1 through November 30, and for the protection of steelhead migration October 1 through March 30. In addition, for Mill Creek, Deer Creek, and Antelope Creek, the memorandum provides evidence supporting 20 cfs for juvenile fish outmigration October 1 through June 30th, and pulse flows in addition to base flow of up to 50 cfs or full natural flow in Mill Creek and Deer Creek and pulse flow of up to 35 cfs or full natural flow in Antelope Creek for a minimum duration of 24 hours every 2 weeks from April 15 through June 30. *Id.* at 59-61.

63. Cal. Wat. Code § 1058.5(a).

64. Cal. Wat. Code § 1058.5(c).

65. Governor’s Proclamation No. 1-17-2014, A Proclamation of a State of Emergency (Jan. 17, 2014), <https://www.gov.ca.gov/news.php?id=18379>; *see also* State

The proclamation found that drought conditions presented urgent problems for drinking water supplies, crop cultivation, and endangered species. These problems were again recognized in the Governor's April 25, 2014, Proclamation of a Continued State of Emergency and accompanying Executive Order, which sought to strengthen the state's ability to manage water and habitat effectively during the drought, in part by suspending review under the California Environmental Quality Act for drought emergency regulations and other actions.⁶⁶ These Proclamations thus both gave the State Board the authority to act under Water Code section 1058.5 and made it easier to do so.

In addition, the State Board itself found that an emergency existed due to severe drought conditions.⁶⁷ It declared that extreme drought conditions would cause some streams that provide habitat for listed species to fall below the minimum flows needed for the species to survive unless water diverters curtailed their use.⁶⁸ Furthermore, the State Board found that the drought emergency necessitated immediate action to "prevent the waste and unreasonable use of water diverted from priority water bodies that provide habitat for threatened and endangered species."⁶⁹ It declared that curtailments would be necessary when natural flows decreased to ensure water would be available for senior water right users, minimum health and safety needs, and "public trust needs for minimum flows for migration of state and federally listed fish" on Mill Creek, Deer Creek, and Antelope Creek.⁷⁰ If a state agency makes a finding that the adoption of a regulation is necessary to address an emergency, the regulation may be adopted as an emergency

Water Resources Control Bd. Res. No. 2014-0023, *supra* note 4, at 1; State Water Resources Control Bd. Res. No.2015-0014, *supra* note 5, at 1.

66. Governor's Proclamation No. 4-25-2014, A Proclamation of a Continued State of Emergency (Apr. 25, 2014), <https://www.gov.ca.gov/news.php?id=18496>. The Governor extended the suspension of CEQA review for drought related emergency regulations and actions through May 31, 2016 in Executive Order B-28-14, *available at* <https://www.gov.ca.gov/news.php?id=18815>.

67. State Water Resources Control Bd. Emergency Regulations Digest, *supra* note 20, at 15. The State Board declared that it provides, in the Emergency Regulations Digest, "the necessary specific facts demonstrating: the existence of an emergency and the need for immediate action to prevent serious harm to the general welfare of the citizens of California, pursuant to Government Code section 11346.1, subdivision (b)(2); that the emergency regulation is being adopted to prevent the waste, unreasonable use, unreasonable method of use, or unreasonable method of diversion, of water; and that the emergency regulation is being adopted in response to conditions which exist, or are threatened, during a period for which the Governor has issued a proclamation of a state of emergency under the California Emergency Services Act based on drought conditions." *Id.*

68. State Water Resources Control Bd. Res. No. 2014-0023, *supra* note 4, at 1; State Water Resources Control Bd. Res. No.2015-0014, *supra* note 5, at 1.

69. State Water Resources Control Bd. Emergency Regulations Digest, *supra* note 20, at 15.

70. *Id.*

regulation.⁷¹ Thus, the State Board used its finding of emergency, and its finding of the need to address problems engendered by the emergency, to support its emergency rulemaking under Water Code section 1058.5 and Government Code section 11346.1.

Next, the State Board pointed to its “duty to protect, where feasible, the state’s public trust resources, including fisheries, to the extent reasonable.”⁷² In addition, the State Board claimed authority under Article X, Section 2 of the California Constitution and Water Code Section 100 to “prevent the waste or unreasonable use, unreasonable method of use, or the unreasonable method of diversion of all waters of the State.” This is known as the reasonable use doctrine, which applies to diversions and use of both groundwater and surface water. Citing *Environmental Defense Fund, Inc. v. East Bay Municipal Utility District*, 26 Cal.3d 183, 194 (1980), the State Board noted that “[w]hat constitutes reasonable water use is dependent upon not only the entire circumstances presented but varies as the current situation changes.”⁷³ To this point, the State Board commented that “[a]pplication of the reasonable use doctrine under these circumstances requires particularized consideration of the benefits of diverting water for current uses from the identified water bodies and the potential for harm to the protected species from such diversions under the current drought conditions.”⁷⁴

Thus, based on the notion that the extreme drought changed what constituted a reasonable use of water, the State Board found that, “during the current drought conditions, curtailment of diversions that would cause flows in [Mill, Deer, and Antelope] creeks to drop below [] minimum [fish] passage levels is necessary to prevent the waste, unreasonable use, unreasonable method of use and unreasonable method of diversion, of water.”⁷⁵ The State Board supported this finding with the determination, based on the best available information, that certain minimum flows were necessary in Mill, Deer, and Antelope Creeks to prevent serious harm and endangerment to the fish species in those watersheds.⁷⁶ It recognized that the drought emergency minimum flow targets would not provide optimal—only minimal—passage conditions for CV SR Salmon and CCV Steelhead and clarified that the finding was “narrowly targeted only to diversions of water, under the current

71. Cal. Gov. Code § 11346.1(b)(1).

72. State Water Resources Control Bd. Res. No. 2014-0023, *supra* note 4, at 2 (citing *National Audubon Society v. Superior Court*, 33 Cal.3d 419 (1983)); State Water Resources Control Bd. Res. No.2015-0014, *supra* note 5, at 2.

73. State Water Resources Control Bd. Res. No. 2014-0023, *supra* note 4, at 2; State Water Resources Control Bd. Res. No.2015-0014, *supra* note 5, at 3.

74. State Water Resources Control Bd. Res. No. 2014-0023, *supra* note 4, at 3; State Water Resources Control Bd. Res. No.2015-0014, *supra* note 5, at 3.

75. State Water Resources Control Bd. Res. No. 2014-0023, *supra* note 4, at 3; State Water Resources Control Bd. Res. No.2015-0014, *supra* note 5, at 3.

76. State Water Resources Control Bd. Res. No. 2014-0023, *supra* note 4, at 2-3; State Water Resources Control Bd. Res. No.2015-0014, *supra* note 5, at 2-3.

extraordinary drought conditions, needed to afford minimal protection to migrating CV SR Salmon and CCV Steelhead, and should not be construed as a finding concerning the reasonableness of these diversions in general.”⁷⁷

In sum, the State Board adopted the emergency regulations because of the emergency drought conditions, the need for immediate action to respond to problems created by the drought, and the unique attributes—providing critical habitat for some of the last remaining naturally produced populations of CV SR Salmon and CCV Steelhead but lacking upstream storage which could be used to manage flows during the drought—of Mill, Deer, and Antelope Creeks. It rooted its actions in statutory, constitutional, and common law authority pertaining to the reasonable use doctrine, emergency regulations, extreme drought conditions, and duty to protect public trust resources. Ultimately, the State Board determined that the “vehicle of adopting an emergency regulation to identify a minimum flow requirement for fisheries protection and health and safety needs” was “an appropriate approach in these limited circumstances.”⁷⁸ Nevertheless, the State Board claimed that this approach was not its preferred alternative to identify, balance, and implement instream flow requirements—its preference is to undertake adjudicative water right proceedings to assign responsibility for meeting instream flows.⁷⁹

C. National Marine Fisheries Service and California Department of Fish and Wildlife Voluntary Drought Initiative

On May 13, 2014, the National Marine Fisheries Service and the California Department of Fish and Wildlife unveiled the California Voluntary Drought Initiative, in which they expressed their intention to work with water users in high priority watersheds throughout California “to reduce the negative effects of the drought on salmon and steelhead, and to provide improved regulatory certainty” for those who participated in the initiative during the drought.⁸⁰ The initiative provided the opportunity for willing landowners and water users to enter into written Voluntary Drought Initiative Agreements with the Department and the Fisheries Service to secure instream flows and take other actions to protect fish while federal and state drought declarations were in effect.⁸¹

In particular, the Department and the Fisheries Service identified minimum instream baseflows, periodic pulse flows, and focused monitoring

77. State Water Resources Control Bd. Res. No. 2014-0023, *supra* note 4, at 3; State Water Resources Control Bd. Res. No.2015-0014, *supra* note 5, at 3.

78. State Water Resources Control Bd. Res. No. 2014-0023, *supra* note 4, at 4; State Water Resources Control Bd. Res. No.2015-0014, *supra* note 5, at 5.

79. State Water Resources Control Bd. Res. No. 2014-0023, *supra* note 4, at 4.

80. VOLUNTARY INITIATIVE, *supra* note 2, at 1.

81. *Id.*

and evaluation at critical passage locations as possible Voluntary Drought Initiative actions on Mill, Deer, and Antelope Creeks.⁸² In return for water users' participation in the Voluntary Drought Initiative, the Fisheries Service promised to consider such participation an important mitigating factor if the water user, while withdrawing water, unintentionally took—a legal term of art that includes harming or causing death to—a fish species listed under the Endangered Species Act.⁸³ That is, if the participant followed all the terms stipulated in any voluntary agreement made but still caused harm to protected fish as a result of water diversions, the Fisheries Service would consider that cooperation when making decisions about taking enforcement actions. Similarly, the Department promised to “rank participation in the Drought Initiative as an important element when evaluating all the facts regarding the possible take of [fish species listed under the California Endangered Species Act] while withdrawing water”⁸⁴

As mentioned above, these voluntary agreements could serve as an alternate method of complying with the State Board's emergency regulations by obviating the need for curtailment orders.⁸⁵ On Mill and Antelope Creeks, enough water users entered into voluntary agreements that State Board-issued curtailments to enforce the minimum flow requirements were not needed, but this was not the case on Deer Creek.

II. Implementation and Effectiveness of Curtailments and Voluntary Agreements (2014-15)

This Part discusses the voluntary agreements made and curtailment orders imposed pursuant to the emergency regulations described above on Antelope, Deer, and Mill Creeks. It analyzes what factors might engender cooperation and voluntary agreements, finding that California Endangered Species Act protections, the threat of regulation, and especially a history of cooperation may play an important role. Next, I compare voluntary agreements and curtailments and conclude that while they were both largely effective in providing for minimum needed fish flows, voluntary agreements provide an added benefit of information exchange as part of the negotiation process. However, some issues with the voluntary agreements still arose relating to stakeholder buy-in, transaction costs, and protecting fish across a larger scale, all of which I discuss below.

82. *Id.* at 3.

83. *Id.* at 7.

84. *Id.* at 8.

85. *See id.* at 7.

A. Barriers To and Drivers Of Adopting Voluntary Agreements

While the water rights holders on Mill and Antelope Creeks signed voluntary agreements that obviated the need for curtailment orders, Deer Creek was subject to curtailment orders pursuant to the emergency regulations passed by the State Board, because one of the two major water rights holders was uninterested in negotiating a voluntary agreement.⁸⁶ Deer Creek has two water purveyors that, in the words of one observer, “can’t get along.”⁸⁷ The upper diversion is managed by Deer Creek Irrigation District, which signed a voluntary agreement.⁸⁸ Stanford Vina Ranch Irrigation Company (“Stanford Vina Company”) elected not to sign a voluntary agreement, thus subjecting itself to curtailment regulations. Furthermore, Stanford Vina Company brought suit against the State Board over the curtailment regulations, although it did ultimately comply with them.⁸⁹ Together, Deer Creek Irrigation District and Stanford Vina Company account for 99% of the water allocated on Deer Creek.⁹⁰

Antelope Creek similarly has two rights holders, local rancher Jim Edwards (Edwards Ranch) and the Los Molinos Mutual Water Company (“Los Molinos Mutual”), but they both opted to sign voluntary agreements.⁹¹ Mill Creek is actually the most complex of the three watersheds in terms of diversity of rights holders, but there, too, the rights holders chose to enter into voluntary agreements, avoiding the State Board’s curtailment orders.⁹² On Mill Creek, Los Molinos Mutual has been assigned the role of water master, meaning it manages the water for all water right owners.⁹³ In addition,

86. For links to all the voluntary agreements (under subheadings ‘Voluntary Agreements’) signed by water users on Mill, Deer, and Antelope Creeks in both 2014 and 2015 with both the Department and the Fisheries Service, see *State Water Board Drought Year Water Actions: Curtailment of Diversions Due to Insufficient Flow for Specific Fisheries in Mill, Deer, and Antelope Creeks*, STATE WATER RESOURCES CONTROL Bd., http://www.waterboards.ca.gov/waterrights/water_issues/programs/drought/milldeerantelope.shtml (last updated May 23, 2016).

87. Telephone Interview with Anonymous Subject 1 (2016).

88. See Memorandum Of Understanding By and Between Deer Creek Irrigation Dist. And Cal. Dep’t of Fish & Wildlife (2014), http://www.westcoast.fisheries.noaa.gov/publications/protected_species/salmon_steelhead/drought_2014/mou_deer_creek_dcid_cdfw_061214.pdf.

89. Telephone Interview with Anonymous Subjects 3 & 4 (2016).

90. State Water Resources Control Bd. Emergency Regulations Digest, *supra* note 20, at 22; DEER CREEK STUDY PLAN, *supra* note 28, at 6.

91. See Nat’l Marine Fisheries Serv., Voluntary Drought Agreement: Antelope Creek (2014), http://www.westcoast.fisheries.noaa.gov/publications/protected_species/salmon_steelhead/drought_2014/antelope_creek_drought_agrmt_noaa_052014.pdf

92. See, e.g., Nat’l Marine Fisheries Serv., Voluntary Drought Agreement: Mill Creek (2014), http://www.westcoast.fisheries.noaa.gov/publications/protected_species/salmon_steelhead/drought_2014/mill_creek_drought_agrmt_noaa_051914.pdf.

93. State Water Resources Control Bd. Emergency Regulations Digest, *supra* note

Los Molinos Mutual owns and operates a distribution system, including two diversions that account for approximately 68% of the 203 cfs of allocated water rights held on the creek.⁹⁴ The remaining water is divided among an additional seven water right holders. The Nature Conservancy owns two rights, totaling approximately 9% of the total flow, and the next largest owner owns about 5%.⁹⁵

These contrasting experiences on Deer Creek and Mill and Antelope Creeks are likely driven by several factors. First, one commentator pointed out that, in contrast to Los Molinos Mutual or Deer Creek Irrigation District, Stanford Vina Company does not itself hold ownership of the water it diverts—rather, the individuals that are served by the company own the water rights.⁹⁶ This may impede the company’s ability to negotiate deals, because no single decision maker exists that can choose to enter the entire company into a voluntary agreement. Instead, Stanford Vina Company operates by majority vote of the individual rights holders.⁹⁷ While this decentralized decision-making structure does not preclude entering into agreements—a majority could vote to do so—it may present an additional barrier.

Still, this structural obstacle cannot fully explain why Stanford Vina Company voted to sue the State Board rather than sign a voluntary agreement—and why others undertook the process of negotiating and signing voluntary agreements rather than simply choosing to follow curtailment orders the State Board planned to impose. Conversations with stakeholders revealed that three main factors largely drove the decision of most water rights holders on Mill, Deer, and Antelope Creeks to enter into voluntary cooperative agreements: the hammer of curtailments orders, the carrot of California Endangered Species Act protections, and a history of cooperation to provide fish flows. First, stakeholders commented that the voluntary agreements weren’t really “voluntary,” because refusing to sign such an agreement would mean being subjected to curtailment orders that would mandate the same fish flows anyway.⁹⁸ Thus, refusing to participate in the voluntary initiative wouldn’t buy a water rights holder much—except maybe the opportunity to sue. In addition, voluntary agreements came with legal protections to the take provisions of the California Endangered Species Act (CESA) that some stakeholders found appealing, although another commented that those protections were a bit of a paper tiger because no enforcement actions pursuant to CESA’s take provisions have ever been brought on Mill, Deer, and Antelope Creeks.⁹⁹ Nevertheless, these

20, at 22.

94. Telephone Interview with Anonymous Subject 1 (2016).

95. *Id.*

96. *Id.*

97. Telephone Interview with Anonymous Subjects 3 & 4 (2016).

98. Telephone Interview with Anonymous Subject 2 (2016).

99. *Id.*; *see also* VOLUNTARY INITIATIVE, *supra* note 2, at 8.

protections were viewed as providing a positive incentive to enter into voluntary agreements.

Still, these incentives were insufficient to bring Stanford Vina Company to the negotiating table. Of course, since Stanford Vina Company wanted to sue the State Board, the tradeoff they were really facing was signing a voluntary agreement and foregoing a lawsuit, or refusing to sign such an agreement and instead subjecting themselves to curtailment orders so that a suit could be brought. This suggests the existence of an even more important factor underlying the decision not only to positively enter into a voluntary agreement, but also the first order decision to sue or cooperate. Indeed, in contrast to Stanford Vina Company, Los Molinos Mutual framed their decision-making process as “what to do and not sue.”¹⁰⁰ Conversations with stakeholders suggest that a history of cooperation and developing relationships was a vital factor in informing the approach taken by a water rights holder, including the decision to work toward cooperative local solutions via a voluntary agreement.

One stakeholder commented that on Mill Creek, and to a lesser extent Deer and Antelope Creeks, there is a history of, and a fairly institutionalized system for, providing water for fish.¹⁰¹ In particular, Los Molinos Mutual has a long history of cooperation, and has been working with agencies on providing water for fish flows for many years.¹⁰² This cooperative posture is both described in and exemplified by a 2007 agreement that established a Long-term Cooperative Management Plan for Mill Creek that is overseen by a Management Committee composed of representatives from Los Molinos Mutual, Water Resources, the Department, and the Mill Creek Conservancy.¹⁰³

Moreover, this long history of cooperation led to the development of tools that seek to provide flows for fish in a manner that minimizes harm to irrigators while maximizing benefits for fish. For example, a 1990 agreement between the Department, Water Resources, and Los Molinos Mutual established a system for calling for fish flows in the fall and spring.¹⁰⁴ Pursuant to the agreement, two conjunctive use wells with an instantaneous capacity of about 10 cfs were built in order to allow Los Molinos Mutual to pump groundwater into its canals in exchange for reducing diversions from Mill Creek as needed to improve instream flows for fish.¹⁰⁵ Under the contract, the Department may request that Los Molinos Mutual reduce its diversions from Mill Creek when needed to ensure adequate flows in Mill Creek for fish migration, which usually occurs during late spring months (May 1st through

100. Telephone Interview with Anonymous Subject 2 (2016).

101. *Id.*

102. Telephone Interview with Anonymous Subject 1 (2016).

103. See Cooperative Plan, *supra* note 26.

104. See Wells Agreement, *supra* note 25.

105. See *id.*; THE NATURE CONSERVANCY, MILL CREEK INSTREAM FLOWS STRATEGY 2 (2015).

June 15th) and fall (October 15th through November 30th). Los Molinos Mutual must then leave instream an amount of water equal to the instantaneous capacity of the two wells (about 10 cfs), but may then pump that same amount of ground water from the two wells.¹⁰⁶

Furthermore, the agreement provides that Los Molinos Mutual has the discretion, if requested by the Department, to leave additional water instream beyond the required 10 cfs of instantaneous well capacity.¹⁰⁷ If Los Molinos Mutual chooses to provide such additional water, the company receives well credits for that amount of additional water, which it may redeem by pumping from the two wells at any time within the following three years.¹⁰⁸ The fact that the well credits may be used at any time during the year creates a strong incentive for Los Molinos Mutual to reduce its diversions by more than 10 cfs when requested by the Department, because at the end of the summer irrigators often need more water than is available; Los Molinos Mutual tends to cash in its well credits at that time of the year.¹⁰⁹ This agreement has been in place for nearly thirty years and provides a useful tool for increasing instream flows for fish migration while limiting the impacts on irrigators of doing so.

Another useful tool for protecting fish migration without detrimentally impacting irrigation water supply was developed by The Nature Conservancy (“the Conservancy”) and Los Molinos Mutual in 2015. The Conservancy had, in 2006 and 2008, purchased water rights on Mill Creek totaling 17.9 cfs, which is almost 10% of Mill Creek’s base flow. In 2015, Los Molinos Mutual and the Conservancy made an exchange agreement under which Los Molinos Mutual may use the Conservancy’s 17.9 cfs of water for irrigation from July 1st to October 14th, when lower Mill Creek is too warm for salmonids anyway.¹¹⁰ The remainder of the year (October 15th to June 30th), the Conservancy will leave its allocated water instream for ecological purposes, including for aiding fish migration in Mill Creek. In return for the summer use of the Conservancy’s water, Los Molinos Mutual agreed to provide an additional flow of 24 cfs when calls are made by the Department for fish passage flows.¹¹¹ Those flows will entail two to three day pulse flows in the spring and continuous flows in the fall.

Together, these tools and the Conservancy’s dedication of its water rights to instream flows during times of fish migration already provide for fish flows of anywhere from 50 to 75 cfs of water total: the mandatory 10 cfs from

106. See Wells Agreement, *supra* note 25, at ¶ 5.

107. *Id.* at ¶ 6.

108. *Id.*

109. Telephone Interview with Anonymous Subject 2 (2016).

110. See *Voluntary Agreement Benefits Fish and Farmers*, *supra* note 27.

111. *Id.* The 24 cfs figure was “projected to result in a long-term, average balance in the water exchanged” between Los Molinos Mutual and the Conservancy, and was “based on historical analysis of irrigation and fish passage needs on Mill Creek.” *Id.*

the Wells Agreement, plus voluntary additional reductions for well credits, plus the Conservancy's 17.9 cfs at full flow (although in spring it usually ranges from 12 to 17.9 cfs and in fall from about 7 to 10 cfs), plus 24 cfs from Los Molinos Mutual pursuant to its exchange agreement with the Conservancy. The main sources of variability in the total amount already provided by the existing tools are thus the amount available under the Conservancy's rights and the amount of water Los Molinos Mutual voluntarily contributes for well credits. In any case, these existing tools already provided a significant amount of water for fish passage flows even before the emergency regulations and voluntary agreements examined in this essay were put in place. One commentator noted that while irrigators on all three creeks were similarly impacted because the fish flows required were similar, the tools on Mill Creek certainly "softened the blow."¹¹² Thus, cooperation over time can develop relationships, trust, and tools that can be a vital driving force toward approaching future efforts to protect fish in a cooperative manner even when disagreements or displeasure with the regulatory mechanisms used exists.

B. Comparing Curtailments and Voluntary Agreements

The flows required by the emergency curtailment regulations and the voluntary agreements that were used instead of the curtailments were very comparable, making state regulators somewhat indifferent between the two options. For example, the curtailment regulations and central voluntary agreement with Los Molinos Mutual on Mill Creek provided for the following flows:

2015 Emergency Regulations for Mill Creek	2015 Voluntary Agreement for Mill Creek
April 1 to June 15 (if adult CV SR Salmon are present): Base Flows of 50 cfs, Pulse Flows of 100 cfs (minimum of 24 hrs to maximum of 72 hrs)	March 15 to June 15: Base Flows of 50 cfs. Can be relaxed if extended water temp of 75+ °F April 1 to June 15: Pulse flows of 100 cfs up to once every two weeks. Maximum of 60 hrs, but 100 cfs for first 36 hrs and then declining ramping flow schedule. Los Molinos Mutual decides ramping schedule but each adjustment in flow will not exceed 10 cfs, with a minimum 3-hour period between adjustments. CDFW will make its best effort to provide preliminary fish counts
June 1 up to June 15 (if juvenile CV SR Salmon or juvenile CCV Steelhead are present): Pulse flows of 100 cfs (minimum of 24 hrs to maximum of 48 hrs)	June 16 to June 30: Base flows of 20 cfs for juvenile salmonid passage
October 15 to June 30 (if juvenile CV SR Salmon or Juvenile CCV Steelhead are present): Base flows of 20 cfs	October 15 through December 31: Base flows of 50 cfs for salmonid passage
October 15 to March 31 (if Adult CCV Steelhead are present): base flows of 50 cfs	

112. Telephone Interview with Anonymous Subject 2 (2016).

Despite similar flow outcomes, the negotiating process entailed in drawing up voluntary agreements distinguish such agreements from curtailments in important ways. In particular, that negotiating process can impose significant transaction costs at the front end, but can also lead to important knowledge sharing and cooperation. With respect to the negotiating costs, one stakeholder commented that he “got negotiated to death,” but that part of the problem with negotiating was the urgency with which it was forced to occur, at least in the first year of the voluntary initiative (2014); because the initiative was implemented in reaction to worsening drought conditions rather than planned years in advance, negotiators only had about a month to come to an agreement in 2014.¹¹³ Furthermore, the process is tedious due to the constant back-and-forth and need for attorney review every step of the way, and a stakeholder noted that it took a long time before everyone was happy with the agreement. Nevertheless, a stakeholder identified the opportunity for discussion and the ability to share local knowledge as a key benefit of the voluntary agreements.¹¹⁴ He felt that the California Department of Fish and Wildlife learned new information through their discussions with water rights holders during the negotiating process.¹¹⁵ Moreover, since the negotiating process is iterative—agreements are generally only year-long and then must be renegotiated—the voluntary agreements mechanism engenders not only knowledge sharing at the outset, but also knowledge sharing about lessons learned throughout the process, which could help improve adaptive management.

C. Effectiveness of Curtailments and Voluntary Agreements

Overall, both the curtailment regulations and voluntary agreements seemed effective in garnering compliance and thus providing flows for fish. There were some early compliance issues on Deer Creek at the beginning of the curtailment regulations in 2014, when flow requirements were not being met because Stanford Vina had not yet held its meeting to determine whether they would comply.¹¹⁶ However, after these initial problems, water rights holders on Deer Creek largely complied with curtailment orders issued by the

113. *Id.*

114. *Id.*

115. *Id.*

116. In particular, the State Board declared, “A curtailment order was issued to water right holders in Deer Creek on June 5, 2014, for the period of June 5 through June 24, 2014, to provide for the required minimum flows for CV SR Salmon and CCV Steelhead. Gauge data shows that the minimum flows were not met in Deer Creek until June 11, 2014. Fish passage data provided by the California Department of Fish and Wildlife suggests the instream flows in Deer Creek during this time period were inadequate and did not provide for successful fish passage.” State Water Resources Control Bd. Res. No.2015-0014, *supra* note5, at 4.

State Board pursuant to the emergency regulations.¹¹⁷ Thus, the curtailment orders were for the most part effective in securing minimum instream flows, and data suggests that these flows provided for successful fish passage.¹¹⁸ For example, the Department estimated that a total of 268 Central Valley spring run Chinook salmon entered Deer Creek between February 21st and June 4th in 2015.¹¹⁹

Similarly, the voluntary agreements on Mill and Antelope Creeks also seemed to be effective in terms of achieving successful fish passage as a result of maintaining minimum instream flows during times of fish migration. For example, the State Board noted instream flows required during May and June 2014 and from October 15 through December 31, 2014, under the voluntary agreements provided for successful fish passage.¹²⁰ And data from the Department show that between October 26, 2015, and December 15, 2015, an estimated total of 971 fall-run Chinook salmon and 56 fall-entry steelhead were recorded passing Ward Dam on Mill Creek, and that an estimated 89 additional salmon entered Mill Creek and spawned downstream of Ward Dam.¹²¹ A commentator said that the voluntary agreements resulted in more water for fish—in terms of higher volume of flow for both pulse and base flows at various times—than what had been achieved in the past through existing agreements, and that these flows were certainly beneficial for fish during the drought.¹²²

Yet the flows achieved by curtailments and voluntary agreements are not the only measure of those tools' effectiveness; stakeholders' views of those instruments—whether they bought in, and where they saw problems—matter as well, especially when thinking about how best to move forward with efforts to protect fish on Deer, Antelope, and Mill Creeks in the future, and even around California more broadly. Unfortunately, any success with respect to protecting fish on Mill, Deer, and Antelope Creeks in 2014 and 2015 did not necessarily translate to the main stem of the Sacramento River.¹²³ Already feeling singled out as a result of Mill, Deer, and Antelope Creeks being the

117. See, e.g., *id.* (noting that instream flows required by a curtailment order on Deer Creek from October 15, 2014, through February 28, 2015, were met).

118. See *id.*

119. Matt Johnson, Cal. Dept. Fish & Wildlife, Memorandum: Deer Creek (Tehama Co.) Spring Run Chinook Salmon Counts Obtained at the Stanford-Vina Irrigation Company Dam Video Station for the Period of February 20, 2015 Through June 8, 2015 (Jul. 15, 2016).

120. State Water Resources Control Bd. Res. No.2015-0014, *supra* note5, at 3.

121. Matt Johnson, Cal. Dept. Fish & Wildlife, Memorandum: Final Mill Creek Video Station Chinook Salmon and Steelhead Counts October 23, 2015 Through December 15, 2015 (Feb. 19, 2016).

122. Telephone Interview with Anonymous Subject 1 (2016).

123. See, e.g., Bettina Boxall, *The drought's hidden victim: California's native fish*, L.A. TIMES (Aug. 24, 2015, 03:00 AM), <http://www.latimes.com/local/california/la-me-drought-fish-20150824-story.html>.

only three creeks in the state subject to the emergency curtailment regulations to provide minimum fish flows, stakeholders were frustrated and disheartened by the fact that the fish they protected through significant sacrifice and effort never made it out of the Sacramento River into the Pacific Ocean, because of problems on the main stem.¹²⁴ They feel that stakeholders on Mill, Deer, and Antelope Creeks are forced to bear the brunt of the burden despite the fact that they are only a small part of a much broader, complex problem when it comes to fish survival. While “getting fish in and out of Mill Creek is an important part of the puzzle, it’s certainly not the entire puzzle.”¹²⁵

In addition, members of the irrigator community on Mill Creek were aggrieved to be faced with such strong regulatory action in the form of curtailment orders when they felt existing tools and agreements stemming from their history of cooperation could have been utilized to achieve the requested flows. Los Molinos Mutual reluctantly agreed to participate in the voluntary initiative, but was disappointed that fish protection could not be secured through existing tools that were “less regulatory.”¹²⁶ They felt that the State Board’s curtailment regulations “put a cloud over the whole thing,” and commented that the further away people are located from Mill Creek, the less they know about the creek.¹²⁷ Since irrigators view local knowledge and “a local understanding of what needs to be done and what’s equitable” as critical to continued efforts to protect fish, they were particularly distraught by the threat of unilateral curtailments from State Board regulators “150 miles away in Sacramento.”¹²⁸

This tension over incorporating local knowledge also arose in disagreements about necessary flow levels and concerns that the California Department of Fish and Wildlife took a “cookie cutter” approach to the voluntary agreements on the three creeks, thus ignoring the unique features of, and differences between, the three watersheds. Some stakeholders felt that better tailoring the voluntary agreements to the needs of each individual watershed could have more effectively maximized the benefits for fish while minimizing the impacts on irrigators.¹²⁹ These stakeholder concerns should be carefully considered, because theorists focused on governance of common resources (like fish) have identified tailoring to local conditions and creating collective choice arrangements that give all stakeholders a voice to be

124. Telephone Interview with Anonymous Subject 2 (2016). The State Board said it targeted these three creeks because of their importance to spring-run Chinook Salmon. Besides Butte Creek, Mill, Deer, and Antelope Creeks are the three last natural streams, and they have been identified as the highest priority in the basin. State Water Resources Control Bd. Emergency Regulations Digest, *supra* note 20, at 20-21.

125. Telephone Interview with Anonymous Subject 2 (2016).

126. *Id.*

127. *Id.*

128. *Id.*

129. *Id.*

important design principles of successful, long-enduring common property resource management institutions.¹³⁰ Thus, incorporating local knowledge and stakeholder perspectives can help ensure the long-term effectiveness of fisheries management, and voluntary agreements—as opposed to top-down curtailments—may be a good way to facilitate doing so.

III. Lessons Learned

This Part attempts to draw several lessons from the events that occurred on Antelope, Deer, and Mill Creeks during the drought in California in order to inform policymakers' thinking about how to best manage water resources to provide adequate instream flows for endangered fish species.

1. The carrot of California Endangered Species Act protections, and especially the stick of curtailment orders, can help drive adoption of voluntary agreements. Even when no CESA enforcement actions have previously been taken in a watershed, legal protections under CESA's take provisions can help make voluntary agreements appealing. The threat of mandatory curtailments are likely an even stronger force driving the adoption of voluntary agreements—at least for those who don't plan to sue—but that threat can sacrifice good will and political capital by making voluntary agreements effectively involuntary, setting a negative tone for future cooperation.

2. Developing tools like those on Mill Creek that provide instream flows while limiting impacts on local stakeholders, culture, and economy, enhances cooperation and should be an important part of agencies' future efforts to protect fish across the state. In other words, government investments in infrastructure like conjunctive use wells and fish restoration projects can engender cooperation and lay the groundwork for better protection of threatened species. Purchasing water rights (rather than limiting diversions through curtailments orders) and dedicating them to instream flow is another useful approach, and creating water exchange agreements like the one between the Conservancy and Los Molinos Mutual can prove beneficial for both fish and irrigators. The point is that these tools can ensure adequate instream flows without unduly jeopardizing the local irrigation economy—such initiatives are win-win and should be pursued aggressively.

3. Both for the sake of adequately protecting fish and for the sake of fairness, state agencies should take a comprehensive approach to fish protection that better addresses the full suite of threats to species' survival. Of course, the State Board and other agencies cannot solve every

130. See, e.g., ELINOR OSTROM, GOVERNING THE COMMONS: THE EVOLUTION OF INSTITUTIONS FOR COLLECTIVE ACTION 90-94 (2015).

problem at once, and unresolved issues on the main stem of the Sacramento do not mean that efforts to protect fish on vital tributaries should not be undertaken. However, stakeholder buy-in and cooperation would likely be enhanced if stakeholders felt that state agencies were taking a more well-rounded approach that more equitably distributed the burden of protecting fish; that is, many stakeholders are in fact interested in protecting fish—as evinced by a history of cooperation—but they would like everyone in the state to share the sacrifice.

4. Robust data collection and long-term planning—before a drought hits—are vital for effective implementation of instream flow programs.

The State Board was able to impose minimum flow requirements on Mill, Deer, and Antelope Creeks only because California Department of Fish and Wildlife possessed existing data on which to base those requirements. In other watersheds, the State Board lacked adequate data, which meant that it lacked a basis for prescribing flow requirements even though it desired to require such instream flows for fish. State agencies should thus develop ongoing data collection programs, because once a drought hits it's too late. In addition, programs like the voluntary initiative should be developed and implemented in a forward-looking manner in anticipation of future droughts, so that, for example, the negotiating process need not be squeezed into an urgent one month period, which imposes significant transaction costs.

5. Voluntary agreements provide cooperative and knowledge-sharing benefits, but may be only be feasible in smaller watersheds.

The experience of Stanford Vina Company suggests that negotiating voluntary agreements with a larger, diverse group of water rights holders may prove difficult, which has implications for applying the voluntary initiative model to larger watersheds. The State Board itself recognizes that coordinating all the various diverters in larger watersheds will be a challenge. Still, voluntary agreements provide a forum for discussion and sharing of knowledge that can enhance cooperation. The State Board should consider the value of, and incorporate, these features when formulating other regulatory programs.

6. The provisions for adopting emergency regulations in times of extreme drought worked well—they allowed the State Board to quickly respond to the emergency and take unprecedented action to prevent serious harm to listed fish species.

The multiple possible sources of authority for State Board action listed in the provisions for adopting emergency regulations were clear and provided a sound legal basis for agency action. As a result, the State Board should think about how it can effectively use such emergency regulations, if necessary, in other watersheds during times of extreme drought.

7. Having water rights that are specifically dedicated to instream flows, and a NGO that is actively seeking to build cooperation to protect fish, can be extremely important because it makes the environment an equal partner at the negotiating table.

The Nature Conservancy's presence on Mill Creek added a voice and seemed to help spur action in favor of

protecting fish. Environmental NGOs can work together with stakeholders to come up with creative tools, like conjunctive use wells, to provide for instream flows, and they can advocate for strong environmental protection when it comes times to negotiate agreements with and among stakeholders.

8. Creating open channels of communication and mechanisms for coordination are important for an effective drought response. Staff at the State Board commented that during this drought, they learned the importance of ongoing stakeholder outreach. Establishing continuing channels of communication with various stakeholders even before a drought would better enable government agencies to notify stakeholders of what to expect and how to comply with any new regulations. In addition, stakeholders such as local irrigators believe that local knowledge is extremely important and that agreements and regulations should be tailored to each watershed's unique attributes—open communication would better facilitate that.

Conclusion

The severe drought in California in recent years created a serious water resources management problem for the state government: without intervention, many streams and rivers around the state would not maintain instream flow levels adequate for the migration of endangered and threatened species of fish. In response, the State Water Board took the drastic step of passing emergency regulations that would allow for curtailments orders to protect fish passage on Antelope, Deer, and Mill Creeks, which all provide crucial, pristine habitat and spawning grounds for endangered salmon and steelhead species. The Department and the Fisheries Service offered to enter into voluntary agreements with water rights holders on the three creeks as an alternative method of compliance with the emergency regulations. While state agencies were able to establish the minimum required stream flows for fish passage on all three creeks using a combination of these two methods, Mill Creek stood out as a shining example of how to engender cooperation between stakeholders and brunt the blow of regulation on water rights holders. This case study detailed how existing tools, such as a system of conjunctive use wells and well credits, developed over the last several decades on Mill Creek already provided for some instream flows for fish in a manner that limited adverse impacts on water users. Such existing tools and management procedures created a culture of cooperation and open communication between stakeholders that proved beneficial in the recent drought, emphasizing the need for developing management tools, cooperative relationships, and long-term plans well before any drought so that the mechanisms for providing adequate flows for fish passage are already in place and, ideally, no additional unilateral regulation is necessary.