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COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAI'I

PETITION TO AMEND INTERIM INSTREAM FLOW STANDARDS FOR HONOPOU, HUELO (PUOLUA), HANEHOI, WAIKAMOI, ALO, WAHINEPEE, PUOHOKAMOA, HAIPUAENA, PUNALAU/KOLEA, HONOMANU, NUAAILUA, PIINAAU, PALAUHULU, 'ŌHI'A (WAIANU), WAIOKAMILO, KUALANI, WAILUANUI, WEST WAILUAIKI, EAST WAILUAIKI, KOPILIULA, PUAKAA, WAIOHUE, PAAKEA, WAIAAKA, KAPAULA, HANAWI and MAKAPIPI STREAMS	CASE NO. CCH-MA13-01 NĀ MOKU AUPUNI O KO`OLAU HUI, LURLYN SCOTT, SANFORD KEKAHUNA'S AND MAUI TOMORROW FOUNDATION, INC.'S **JOINT** PROPOSED FINDINGS OF FACT, CONCLUSIONS OF LAW, DECISION & ORDER; CERTIFICATE OF SERVICE

NĀ MOKU AUPUNI O KO`OLAU HUI, LURLYN SCOTT, SANFORD KEKAHUNA'S AND MAUI TOMORROW FOUNDATION, INC.'S JOINT FINDINGS OF FACT, CONCLUSIONS OF LAW, DECISION & ORDER

The hearing officer makes the following findings of fact ("FOF"), conclusions of law ("COL"), and decision and order ("D&O"), based on the records maintained by the Department of Land and Natural Resources ("DLNR"), Commission on Water Resources Management

("CWRM") on Petitions to Amend Interim Instream Flow Standards for Honopou, Huelo (Puolua), Hanehoi, Waikamoi, Alo, Wahinepee, Puohokamoa, Haipuaena, Punalau/Kolea, Honomanu, Nuaailua, Piinaau, Palauhulu, ʻŌhiʻa (Waianu), Waiokamilo, Kualani, Wailuanui, West Wailuaiki, East Wailuaiki, Kopiliula, Puakaa, Waiohue, Paakea, Waiaaka, Kapaula, Hanawi and Makapipi Streams, and all pleadings, orders, witness testimonies, and exhibits presented and accepted into evidence for these contested case proceedings.

If any statement denominated as a FOF is more properly considered a COL, then it should be treated as a COL; and, conversely, if any statement denominated as a COL is more properly considered a FOF, then it should be treated as a FOF.

PROPOSED FINDINGS OF FACT

I. The East Maui Landscape

1. The 27 East Maui streams (and their surface water hydrologic units) which are the subject of Nā Moku Aupuni o Koʻolau Hui, Marjorie Wallet, and Beatrice Kekahuna's 27 Petitions to Amend the IIFS span two of the twelve moku (districts) on Maui Island: Hāmākua Loa and Ko'olau, which are situated between the moku of Hāmākua poko and Hana. Written Testimony of Ty Kawika Tengan at ¶18. CWRM Submittal (9/24/08) at 1-2; CWRM Submittal (5/25/10) at 1-2.

2. Eight of the petitioned streams feed directly into loʻi and auwai systems located in the historic taro-growing areas of Honopou, Hanehoi, and Keʻanae-Wailuanui, which by the CWRM's estimates once boasted approximately 496-acres of taro nourished by Honopou, Hanehoi, Puolua, Pi`ina`au, Palauhulu, Waiokamilo, Kualani, and East and West Wailuanui Streams. Written Testimony of Davianna McGregor (12/23/14), Exh. A at 3.

3. The other streams and areas support variegated instream uses that include small loʻi terraces, fishing, traditional cultural gathering practices, and recreational activities. *Id.*

4. Early historical observations from 1778-1850 of the water valleyed environments of Hāmākua-Ko`olau provide evidence of numerous and extensive human settlements - "permanent residences which centered near the shore and spread along the valley floors" - reliant on this interdependent relationship. *Wai O Ke Ola: A Collection of Native Traditions and Historical Accounts of the Lands of Hāmākua Poko, Hāmākua Loa and Ko'olau, Maui Hikina (East Maui), Island of Maui* (December 1, 2001) ("*Wai O Ke Ola*") at 70.

5. Regarding the Hāmākua-Ko'olau region, Kepa Maly reported:

> For generations following initial settlement, communities were clustered along the watered, windward (ko`olau) shores of the Hawaiian Islands. Along the ko`olau slopes, streams flowed and rainfall was abundant, and agricultural production became established. The ko`olau region also offered sheltered bays from which deep sea fisheries could be easily accessed, and near shore fisheries, enriched by nutrients carried in the fresh water, could be maintained in fishponds and coastal fisheries. It was around these bays that clusters of houses where families lived, could be found, and in these early times, the residents generally engaged in subsistence practices in the forms of agriculture and fishing.

Tengan WT at ¶25. The two moku are both included in the larger region known as known as Maui Hikina, East Maui, each having unique characteristics. *Id.* at ¶16. Separating the two moku is 'O'opuola gulch. *Id.* at ¶23.

6. For centuries, East Maui's verdant valleys have supported Hawaiians who tilled the land, grew taro and other food crops, and fished the near shore ocean seas to as far as eleven miles offshore. Written Testimony of Davianna McGregor WT (12/23/14), Exh. A at 6.

7. Testimony of native tenants from the Māhele proceedings in the mid-1800s "reveal locations, boundaries, land usages, place names, length of occupancy - all indicating complex relationships to the land." *Kalo Kanu o Ka `Āina* at 25.

8. Central to all aspects of Hawaiian life and culture is *wai* (water). In traditional Hawaiian culture, water is inexorably linked with life (*ola*), land (*`āina*) and wealth (*waiwai*):

> ... The life of taro was dependent upon water. In his role as life-giver, Kane the procreator was addressed as Kane-of-the-water-of-life (Kane-ka-wai-ola). Water (wai) was so associated with the idea of bounty that the word for wealth was waiwai. And water rights were the basic form of law, the Hawaiian word for which was kana-wai, meaning "relative to water..." [1972:19]
> ...Fresh water as a life-giver was not to the Hawaiians merely a physical element; it had a spiritual connotation. In prayers of thanks and invocations used in offering fruits of the land, and in prayers changed when planting, and in prayers for rain, the "Water of Life of Kane" is referred to over and over again...[1972:64]

Wai O Ke Ola, Vol. 1 at 21, CWRM Compilation of Data Submissions (May 2010) at 267 (PDF) (citing Handy, Handy, and Pukui).

9. Even today, preserving the ancient, interdependent relationship between water, land, and the Hawaiian people continues to be "integral to the well-being of the Hawaiian families of the land." *Id.* at 15.

A. Hāmākualoa

10. Three of the 27 subject streams cover two hydrologic units and fall within the Hāmākua Loa district: HONOPOU (6034); HANEHOI (6037): Hanehoi and Puolua (Huelo) Streams. Tengan WT at ¶18. See CWRM Submittal (9/24/08) at 1-2; CWRM Submittal (5/25/10) at 1-2.

11. Hamakualoa is characterized by numerous minute ahupua'a which indicate a dense population once settled there. Tengan WT at ¶19 (citing Handy (1940:109).

12. Hāmākualoa is described as follows by firsthand accounts during the 1930s-1950s after the water diversions were in place:

> Two kama'āina at Ke'anae said that there were small lo'i developments watered by Ho'olawa, Waipi'o, Hanehoi, Hoalua, Kailua, and Nā'ili'ilihaele Streams, all of which flow in deep gulches. Stream taro was probably planted along the watercourses well up into the higher Kula land and forest taro throughout the lower forest zone. The number of very narrow ahupua'a thus utilized along the whole of the Hāmākua coast indicates there must have been a very considerable population. This would be despite the fact that it is an area of only moderate precipitation because of being too low to draw rain out of trade winds flowing down the coast from the rugged and wet northeast Ko`olau area that lies beyond. It was probably a favorable region for breadfruit, banana, sugar cane, arrowroot; and for yams and `awa in the interior. The slopes between gulches were covered with good soil, excellent for sweet potato planting. The low coast is indented by a number of small bays offering good opportunity for fishing.

Id. at ¶19. Native testimony indicates "there are many lo'i [in Honopou]." *Id.* at ¶20.

B. Ko'olau

13. The remaining 24 of the 27 petitioned streams span 19 hydrologic units and fall within the Ko'olau moku, beginning with Waikamō`ī and ending in Nahiku at Makapipi Stream. *Id.* at ¶23.1

14. The Ko'olau region of Maui has been described as the "wettest coastal region in all the islands." *Id.* at ¶22. Wailuanui and Ke'anae are described as follows:

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[1] PIINAAU (6053): Pi`ina`au and Palauhulu Streams; WAIOKAMILO (6055): Waiokamilo and Kualani Streams; WAILUANUI (6056): East/West Wailuanui Streams and Waikani Waterfall; WAIKAMŌ`Ī (6047): Waikamō`ī, Alo, and Wahinepee Streams; PUOHOKAMOA (6048); HAIPUAENA (6049); PUNALAU (6050): Punalau/Kolea Stream; HONOMANU (6051); NUAAILUA (6052); OHIA (6054): Ohia (Waianu) Stream; WEST WAILUAIKI (6057); EAST WAILUAIKI (6058); KOPILIULA (6059): Kopiliula and Puakaa Streams; WAIOHUE (6060); PAAKEA (6061); WAIAAKA(6062); KAPAULA (6063); HANAWI (6064); and MAKAPIPI (6065). *See* CWRM Submittal (9/24/08) at 1-2; CWRM Submittal (5/25/10) at 1-2.

> On the northeast flank of the great volcanic dome of Haleakalā...the two adjacent areas of Ke'anae and Wailua-nui comprise the fourth of the main Maui centers and the chief center on this rugged eastern coast. It supported intensive and extensive wet-taro cultivation. Further eastward and southward along this windward coast line is the district of Hana, the fifth great center[.]

Tengan WT at ¶24.

15. Waikamō'ī, Puohokamoa, and Haipuaena watered small lo'i areas. *See Id.* 26. "Honomanu, a large stream with a broad deep valley at its seaward end and a good beach for fishing canoes and gear, facing its broad bay. Anciently, Honomanu supported a large population. Old terraces run back into the valley as far as the level land goes[.]" *Id.* at ¶27." Just beyond Honomanu is Nu'uailua [Nua'ailua], flat bottomed like Honomanu but smaller. Terraces cover the flatlands and much taro was formerly raised, watered by an ample stream; but the valley has long been uninhabited." *Id.* at ¶28.

16. Ke'anae "is a unique wet-taro growing ahupua'a." *Id.* at ¶29. "It is on the broad flat peninsula of lava extending for about a half a mile into the sea from the western line of the valley that Ke'anae's famed taro patches are spread out -- striking evidence of old Hawaii's ingenuity." *Id.*

17. Beyond Ke'anae "is a sizable bay formed by erosion where three streams flow into the ocean. . . . About half the gently sloping land seaward of the cliff was terraced with lo'i which were watered by Wailuanui (Big Wailua) Stream, the larger of the three that flow into the bay." *Id.* "Wailua has been notable for its continued occupancy and cultivation by Hawaiian families." *Id.* at ¶32.

18. Beyond Wailuanui "there are a succession of small deep gulches, each one having a few lo'i: East Wailuaiki and West Wailuaiki (Little Wailua), Kapili'ula [Kopili'ula], Waiohue, Pa'akea, Kapa'ula, Hanawi. Then comes Nahiku, a settlement spread over gently rising ground above the shore, with a number of groups of lo'i watered from Makapipi Stream." *Id.* at ¶33.

19. Nā Moku depends directly upon the same East Maui stream waters for their traditional subsistence gathering, fishing, and agricultural needs in Hāmākualoa and Ko`olau, which are themselves historic population centers well-known for supporting intensive and extensive wet-taro cultivation. *See Id.* at ¶24; Exh. A-1 (*Chart Re: Declarants' T&C Practices By Stream*).

C. The Traditional and Customary Practices Unique to East Maui

20. Davianna McGregor, Ph.D., testified on behalf of Nā Moku as an expert in the history of the Pacific with a focus on the continuity of Native Hawaiian cultural and traditional practices. Dr. McGregor is a professor of ethnic studies at the University of Hawai'i-Manoa who studied the Ko'olau area extensively. McGregor, Tr. 3/3/15, p. 133, ll. 15-22.

21. "The area of Ke'anae-Wailuanui is very important, not only to the Island of Maui but to kanaka Hawai'i throughout the islands because the continuity of Hawaiian cultural custom and belief and practices," such that "areas as these were important in the whole revival and renaissance of our Hawaiian language and culture." McGregor, Tr. 3/3/15, p. 135, l. 7-17.

22. The Ke 'anae-Wailuanui region is a "cultural kīpuka," defined as "places where Hawaiians have maintained a close relationship to the land through their livelihoods and customs - that play a vital role in the survival of Hawaiian culture as a whole." McGregor WT (12/23/15), Exh. A2 at 3-5, 17; McGregor, Tr. 3/3/15, p. 139, ll. 8-25.

23. According to Dr. McGregor,

> ... the land use patterns of the Ke'anae-Wailuanui region have been shaped by Hawaiian cultural mores and practices. The `ohana values and practices of the community stress conservation of the natural resources for the benefit of present and future generations. Rules of behavior are based on respect of the 'aina, the virtue of sharing, and a holistic perspective of organisms and ecosystems that emphasize balance and coexistence. The Hawaiian outlook which shapes these customs and practices is lokahi or maintaining spiritual, cultural, and physical balance with nature. In the course of their travels throughout the various 'ili of the traditional cultural practices region, practitioners of Ke'anae and Wailuanui are able to renew their knowledge and understanding of the landscape, the place names, names of the winds and the rains, traditional legends, wahi pana, historical cultural sites, and the locations of various plants and animals. The region is thus experienced as part of their 'ohana, necessitating the same care as would a member of their family.

McGregor WT, Exh. A at 11.

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[2] "Exh. A" to the Written Testimony of Davianna McGregor is a copy of her direct expert testimony filed in the contested case hearing docket DLNR File No. 01-05-MA. As such, it has been incorporated into her written testimony and is excluded from Nā Moku's Exhibit List.

24. Anthropologist Ty P. Kawika Tengan, Ph.D., who was similarly qualified as an expert in traditional history and contemporary Hawaiian practices, also provided uncontroverted testimony of the Hāmākua-Ko'olau region's deep, historic connections to traditional Hawaiian spiritual tenets and practices sustained by an abundance of freshwater. Tengan, Tr. 3/4/15, p.112, ll. 2-17; Tengan WT at ¶13-38.

25. "The famous Alaloa or alanui that circled the island was created by the high chief Kiha-a-Pi`ilani (or Kihapi`ilani) after securing his rule over Maui." Tengan WT at ¶21. Dr. Tengan describes the significance of the alanui as follows:

> In *Ka Nupepa Kuokoa*, August 23, 1884, Moses Manu related that after paving sections of the trail in different parts of the island, Kihapi'ilani "began the paving in the forest of 'O'opuloa [i.e., 'O'opuola], at Ko'olau, extending from Kawahinepe'e to Kaloa, then on to Pāpa'a'ea, and on to Ka'ohekanu at Hāmākua Loa" (translation and emphasis by Maly in *Wai O Ke Ola*, Volume 1 at 27). Abraham Fornander (1996:206) also noted that Kihapi'ilani "kept peace and order in the country, encouraged agriculture, and improved and caused to be paved the difficult and often dangerous roads over the Palis of Kaupo, Hana, and Koolau—a stupendous work for those times, the remains of which may still be seen in many places, and are pointed out as the "Kipapa of Kihapiilani" (cited in Maly, *Wai O Ke Ola*, Volume 1 at 28). The trail was significant because it created an interconnected cultural and historical landscape where customary practices of gathering, farming, exchange, and travel could be conducted from Hāmākua Loa to Ko'olau and beyond.

Id. (Emphases added).

26. Dr. Tengan also recounts the legendary story of Lauka'ie'ie who travels from Nahiku to Ho`olawa (adjacent to Honopou) remarking on the diverse and expansive landscape in a manner that "provides an abundance of rich cultural information about the Ko`olau-Hāmākua region and its traditional and customary practices." Tengan WT at ¶35.

27. He notes that, "what emerges from [Lauka'ie'ie's] journey is the significance of pathways, those on land or sea, through caves or streams, for connecting the gods, land, and people in an integrated cultural landscape. At the core of this, free flowing water is central for creating abundance, life, and growth in the region." *Id.*

28. Fresh spring water "is an important element in Hawaiian spirituality" and, as such, is found in legends of the first inhabitants who are "remembered as akua 'gods' for their capacity to endow nature with cultural features and 'create' society." Tengan WT at ¶13.

29. The uplands of Ke`anae, for example, are one area in which the gods Kāne and Kanaloa establish a spring of water.[3] Group 70 International, Inc., et al., *Kalo Kanu o Ka `Āina, A Cultural Landscape Study of Ke`anae and Wailuanui*, Island of Maui (July 1995) ("*Kalo Kanu O Ka `Āina*") at 21.

30. One such spring was created in Waianu at Ōhi'a to irrigate lo'i, Tengan WT at ¶30. Kumu hula, educator, and cultural practitioner Kaui Kanakaole, who has ancestral ties to Kīpahulu in East Maui through her great grandmother Kahele, confirmed that this spring was indeed "special, sacred, kapu (taboo) and only to be used in unique circumstances." Written Testimony of Kaui Kanakaole at ¶¶19, 39-40.

31. Other legends include stories of sharks and shark-men which "speak of reciprocity -- the exchange of foodstuffs between Ke`anae folk working the land and the sea -- necessary for the maintenance of life in the *ahupuaa* and of the consequences when the exchange relationship is not respected." *Kalo Kanu o Ka `Āina* at 22; *see also* Kanakaole WT at ¶¶20, 26-27.

32. These oral histories and legends document the cultural and spiritual significance of these life-giving springs and underscore that even in ancient times, Native Hawaiians recognized the interdependent relationship between *wai*, *ola*, and *'āina*.

33. In January 1994, in response to a legislative mandate, the DLNR Cultural Landscape Task Force (the "Task Force") spearheaded the important charge of cultural landscape preservation. McGregor WT (12/23/14) at ¶ 3 at Exh. A at 3.

34. The Task Force defined cultural landscapes as geographic areas, clearly demarcated by the settlement or use of the land, water, and/or living systems (plants and animals) over a long period of time, as well as cultural values, norms, and attitudes toward the land, water and/or living systems. *Id.* at 3-4.

35. The Task Force supported a cultural landscape study of Ke`anae and Wailuanui in particular to inventory and assess the resources there in recognition of this area's taro-growing heritage, enduring continuity of use, and local support for preservation of its resources and the traditional lifestyle those resources perpetuate. *Id.;* McGregor, Tr. 3/3/15, p. 136, l. 23 to p. 137, l. 10.

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[3] Dr. Tengan notes the importance of the akua as follows, "Kāne and Kanaloa were two of the four primary akua in the Hawaiian pantheon; Kāne was associated with fresh water and taro, and Kanaloa with the ocean and fishing." Tengan WT at ¶¶15.

36. Indeed, the relative isolation of this cultural landscape enabled it and its residents to avoid or resist intensive modern land developments and retain many of the ancient traditions passed down through the generations of Hawaiians who resided in this area. *Id.*

37. In July 1994, Maui County adopted a Maui County General Plan, which included the Hana Community Plan and its express land use objective to protect the Ke`anae-Wailuanui communities:

> To preserve for present and future generations existing geographic, cultural and traditional community lifestyles by limiting and managing growth through environmentally sensitive and effective use of land in accordance with the individual character of the various communities and regions of the County.

Id.; McGregor, Tr. 3/3/15, p.136, l. 23 to p.137, l. 10.

38. To implement this plan, the Maui County Planning Department formally commenced the Ke`anae-Wailuanui Cultural Landscape study and hired a research team that included Dr. McGregor to describe and quantify conditions and traditions that shaped the Ke`anae-Wailuanui area and its land use patterns, from ancient times through the present. McGregor WT (12/23/14) at ¶3; *Id.*, Exh. A at 5; McGregor, Tr. 3/3/15, p. 137, ll. 11-19.

39. Dr. McGregor's research confirmed that *wai* defined the cultural landscape as the essential resource for not only traditional taro cultivation but other resources on which the community's subsistence lifestyle relies: from the gathering of aquatic marine life, the hihiwai, the 'opae, the o'opu in and along the streams, and extending to marine resources that depend upon freshwater flows into the bays, especially during fish spawning. McGregor, Tr. 3/3/15, p. 137, l. 23 to p. 138, l. 9.

40. The boundaries of the Ke'anae-Wailuanui core Cultural Landscape are identified in Figure 3 of the report and includes the main taro lo'i complex. Specifically, the area encompasses the Ke'anae peninsula and runs southeast along the coast to the southeast ridge of Wailuanui Valley. On the west, it is bounded by the Ke'anae YMCA, Ke`anae Arboretum and the Palauhulu stream. Inland it extends 600 feet mauka of the Hana Highway, stretching from the YMCA camp to the ridge on the east side of Waikani Falls. The Cultural Landscape area also includes a traditional cultural practices area that extends beyond the bounds of the lo'i complex for fishing, hunting and gathering. As depicted in Figure 4 of the report, this area extends from Makapipi Stream and forest access road in the east, to Honomanu and the Kaumahina ridge on the west and mauka to Pohaku Palaha on the northern rim of the Haleakala Crater. McGregor WT (12/23/14), Exh. A at 6.

41. Dr. McGregor concluded that, while all cultural landscapes have unique features that exemplify their respective communities, the traditions and customs she recorded - particularly surrounding the cultivation and use of taro - have persisted in Ke`anae-Wailuanui to a much greater extent than most other parts of Hawai`i. *Id.* at 6-7.

D. Agricultural History of East Maui

42. Historically, the two adjacent areas of Ke`anae and Wailua-nui flanked the great volcanic dome of Haleakala, comprised the fourth of the main Maui centers and the chief center on this rugged eastern coast, and supported intensive and extensive wet-taro cultivation. *Kalo Kanu o Ka `Āina* at 25.

43. Indeed, the primary form of agriculture supported by these watered valleys for those who resided there was "irrigated and drainage taro farming field systems on the valley floors and slopes." *Id.*

44. In ancient times, taro was the primary subsistence crop cultivated by Hawaiians employing methods and customs that spanned several centuries. *Wai O Ke Ola*, Vol. 1 at 16.

45. "Wetland taro cultivation is the most important single component of the cultural landscape of Ke`anae-Wailuanui." McGregor WT, Exh. A at 7. According to Dr. McGregor's research:

> There are five major locations of active taro cultivation – Ke`anae peninsula, Wailuanui, Ke`anae Arboretum, Waianu Valley, and Lakini. An additional small area of cultivation exists at Waiokamilo Stream just Makai of its crossing of Wailuanui Road. There are small lo'i on both sides of the stream. In addition, throughout the district old taro terraces can be found and taro still grows in the wild in the valleys, along streams. Informants speak of going out and gathering lu`au leaves from the wild taro because it has a good flavor, distinct from the cultivated varieties. Some of the areas for the gathering of wild lu`au include Pi`ina`au, Nua`ailua, Kupa`u, Waipi`o, Pohole and Pāhoa.

McGregor WT, Exh. A at 8.

46. The ancient Hawaiians who designed this landscape were limited in the degree to which they could alter the natural topography. They dealt with this constraint by flexibility of design. Seen as a whole, the taro landscape appears as a simple network of inter-connected rectangles defined by banks, which hold in water. Upon closer inspection, it is apparent that field design, water flow, and water delivery are a response to subtle variations in the natural landscape. McGregor WT, Exh. A at 11.

47. Today, large-scale taro cultivation is confined to isolated areas in Hawai`i: Hanalei/Waioli, Hanapepe and Waimea on Kaua'i; Waikane/Waiahole on O`'ahu; Onokohau, Waihe`e, Ke`anae-Wailuanui on Maui; and Waipi`o Valley on the island of Hawai`I, precisely because they have managed to maintain historic and cultural integrity, traditional lifestyles, and social continuity. The taro landscape of Ke`anae-Wailuanui in particular has managed to do so to an equal or greater extent than any of the other taro growing landscapes in Hawai`i. *Id.*

E. Land Tenure History

48. In pre-Western contact, all land and natural resources were held in trust by the high chiefs (*ali`i `ai ahupua`a*, or *ali`i `ai moku*). *Wai O Ke Ola,* Vol. 1 at 80.

49. The *ali`i*, or their land agents (*konohiki*) permitted use of the lands and resources by the hoa'aina. *Id.*

50. On December 10, 1845, Kauikeaouli, Kamehameha III signed into law and established and outlined the responsibilities of the Board of Commissioners to Quiet Land Titles, otherwise known as the Land Commission. *Id.*

51. The new law charged the Land Commission with the duties to investigate and thereafter confirm or reject all claims to land arising prior to the date of enactment and authorize the issuance of patents in fee simple to those entitled. *Id.* at 81.

52. On August 6, 1850, the Kingdom enacted the Kuleana Act authorizing the Land Commission to grant fee simple title to native tenants, or hoa`āina, who occupy and improve any portion of the lands held by the Government, King or konohiki, together with various water and access rights. *Id.* At 83. These lands became known as the kuleana lands. *Id.*

53. For a variety of demographic, financial, and practical reasons, the Land Commission ultimately awarded 28,658 acres, less than 1% of the lands available in the islands to hoa`āina. *Id.* at 85.

54. From the Hāmākua Poko boundary to the Ko`olau-Hana boundary alone, the Land Commission awarded 276 *kuleana* of the 453 claims filed during the Māhele. *Id.* at 85.

55. In Ke`anae and Wailuanui specifically, tenants claimed a total of 490 lo'i of various sizes. *Kalo Kanu o Ka Aina* at 25.

56. Numerous faults and omissions contained in official records maintained by the Land Commission, however, belie a complete picture of the actual uses of those lands, such that "the

total number of *lo'i* and dry land planting features used at the time of the Māhele was likely much greater than the numbers reported herein indicate." *Wai O Ke Ola*, Vol. 1 at 86-88.

57. After the Māhele, Royal Patent grants expanded the land ownership in the areas, primarily held collectively as *hui* lands. *Id.* at 26.

58. Just prior to the turn of the century, the Land Act of 1895 created an opportunity for even more residents to create homestead parcels from government lands in Ke`anae and Wailuanui to include one wetland lot and one house lot each subject to the requirement that the land be cultivated. Act of August 14, 1895, §§ 235, 237.[4] These homestead grants often designated the wetland portion as a "taro lot." Written Testimony of Teresa "Teri" Gomes (12/30/14) at ¶¶25, 35, 37, 49, 51, 55, 59, 71, 73, 132, 134, 136, 140, 142, 168, 191, 207, 231, 233, 235, 237, 239, 241, 248.

59. This land tenure history forms the basis for current calculations of taro farming acreage in these areas. *See* Gomes WT (12/30/14) at ¶¶74, 120, 173, 252, 272, 280, 285, Exhs. A-2 – A-136. *See also Kalo Kanu o Ka `Āina* at 25; *Wai O Ke Ola*, Vol. 1 at 85-90.

F. East Maui Stream Diversion Works

1. The Maui DWS Ditches/Diversion Works

60. The Maui Department of Water Supply (DWS) operates two diversion works to treat water at its water treatment plants at Olinda and Pi`iholo. Written Testimony of David Taylor at ¶¶9-10.

61. DWS also takes additional water from East Maui Irrigation Company, Ltd. (EMI) from (a) the Wailoa Ditch for its Kamole Weir Water Treatment Plant ("WTP"); and (b) the Hamakua Ditch for nonpotable water use at the County's Kula Agricultural Park. Taylor WT at ¶13.

a. The Maui DWS Waikamoi Upper Flume

62. The Upper Kula system is situated at the highest elevation (about 4,200 feet). It begins as a flume (also known as the Waikamoi Upper Flume), capturing surface water from Haipuaena Stream, the middle and west branch of Puohokamoa Stream, and Waikamoi Stream. The flume is connected to a 36-inch transmission line at Waikamoi and then captures additional water from Kailua Stream. The transmission line passes through the Waikamoi Reservoirs (two, 15 million

4 The Land Act of 1895, enacted August 14, 1895, was the short title for an act that amended several laws that formally merged Crown Lands with Government Lands and declared that the "Public Lands" would be alienable. Jon M. Van Dyke, Who Owns the Crown *Lands?* (2008) at 192.

gallons reservoirs) and the Kahakapao Reservoirs (two, 50 million gallons reservoirs) before reaching the Olinda Water Treatment Facility. Exh. E-63, Instream Flow Standard Assessment Report ("IFSAR"), Island of Maui, Hydrologic Unit 6051 Honomanu (December 2009) at 138-139.

b. The Maui DWS Lower Kula System

63. The Lower Kula system (also known as the Waikamoi Lower Pipeline) is situated at the 2,900 feet altitude and captures surface water primarily from Honomanu Stream, Haipuaena Stream, all branches of Puohokamoa Stream, and the east and west branch of Waikamoi Stream. Water from this system is treated at the Piiholo WTF and provides for domestic and agricultural uses in the Lower Kula region. Other than the 50 million gallon reservoir at the WTF, there are no other major reservoirs along the Lower Kula System. *Id.* at 139.

2. The EMI Ditches/Diversion Works

64. With a series of improvements beginning in the 1870's and culminating in 1923 with the completion of the Wailoa Ditch, see, Garret Hew Written Testimony (Opening) at ¶ 5,5 EMI vastly improved the complexity and total diversion capacity of its East Maui Ditch System. *Id.*

65. EMI, a subsidiary of Alexander & Baldwin (A&B), operates a system of diversion, intakes, ditches, and tunnels that for over one hundred years stripped the Hāmākua-Ko`olau region of their natural streamflows. Exh. A-144 (EMI's East Maui Ditch System Map from Nahiku to Maliko).

66. As of 2005, EMI's collection system consists of 388 separate intakes, 24 miles of ditches, and 50 miles of tunnels, as well as numerous small dams, intakes, pipes, and flumes. Exh. E-92.

67. The source of diverted water is a watershed with an area of about 50,000 acres, of which 33,000 acres are former Crown Lands held in trust by the State and managed by the State Department of Land and Natural Resources (DLNR). Hew WT (12/30/14) at ¶4.

68. EMI currently has four parallel ditches running from east to west across the East Maui mountains. From mauka to makai, they are the Wailoa, New Hamakua, Lowrie and New Haiku ditches. *See* Exh. C-1.

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[5] "Major milestone completion dates of the current system include the Koolau (sic) Ditch in 1904, the Kauhikoa Ditch in 1915, and the Wailoa Ditch in 1923." Declaration of Garret Hew (12/30/14).

69. Between 1927-2013, the EMI Ditch System's average daily water delivery under median weather conditions is 165 mgd, Exh. C-125, although deliveries have been recorded as high as 445 mgd. *Id.*; Exh. E-92 at 120.

70. A&B/EMI presently diverts an average of 46 billion gallons of water per year from these four license areas. Hew, Tr. 3/18/15, p. 255, l. 15 to p. 256, l. 11; Exh. C-18; Exh. C-125.

71. Currently only four (4) metered locations with telemetry stations operate along Honopou Stream at different ditch elevations (Wailoa, New Hamakua, Lowrie, and Haiku) to record the total combined flow of water diverted from all the license areas. These recordings are reported to the CWRM monthly. Hew, Tr. 3/18/15, p. 121, l. 15-25 to p. 122, l. 1.

72. The streams EMI has diverted for over a century have no records of pre-diversion or undiverted streamflow conditions. Gingerich, Tr. 3/3/15, p. 57, l. 15-18.

73. Accordingly, the CWRM has no longitudinal record of EMI's diversions of individual streams that can be compared to/against associated IIFS stream readings on any given day.

a. The (Old) Hamakua Ditch

74. The (Old) Hamakua Ditch was constructed in 1878 by Baldwin and Alexander of the Haiku Ditch Company. This 17 mile long ditch had an estimated average flow of 4 mgd and cost $80,000 to construct. It intercepted Kailua, Hoalua, Huelo, Hoolawa and Honopou streams. Exh. E-92 at 61, 66.

b. The (Old) Haiku (Spreckels) Ditch

75. Claus Spreckels constructed the (Old) Haiku Ditch in 1879. The Old Haiku Ditch was abandoned between 1912 and 1929. Exh. E-92 at 66.

c. The Lowrie Ditch

76. The Lowrie Ditch was constructed in 1900. The Lowrie Ditch starts in the rain forest in Kailua. The first source was a reservoir at Papaaea. The second source was the Kailua Stream where it intercepted the older Old Haiku Ditch and ran parallel to it. The original cost of this Ditch was $271,141. EMI alleges that the average flow in this 22 mile long ditch is 37 mgd. The Ditch, however, has a capacity of 60 mgd and is capable of irrigating 6,000 acres of sugar lands. Exh. E-92 at 66, 114, 115.

77. The Lowrie runs at a considerably lower elevation than the Wailoa, taking advantage of groundwater development between the two. Exh. E-92 at 121.

d. The New Hamakua Ditch

78. The New Hamakua Ditch was constructed in 1904. EMI alleges an average daily flow of 84 mgd. Exh. E-92 at 66.

e. The Koolau Ditch

79. When the Koolau Ditch was completed in 1923, it extended EMI's water collection system another 10 miles towards Hana. It cost $511,330 to construct. EMI alleges that the Koolau Ditch has an average flow of 116 mgd. Exh. E-92 at 66, 116.

f. The New Haiku Ditch

80. The New Haiku Ditch was constructed in 1914 by HC&S and EMI. EMI alleges that the New Haiku Ditch has an average flow of 25 mgd and the capacity to carry 100 mgd. Exh. E-92 at 66, 117.

g. The Kauhikoa Ditch

81. The Kauhikoa Ditch was constructed in 1914. EMI alleges that the Kauhikoa Ditch has an average flow of 22 mgd and the capacity to carry 110 mgd. Exh. E-92 at 66.

h. The Wailoa Ditch

82. The Wailoa Ditch was constructed in 1923 and has a reported average flow of 170 mgd, although it has the capacity to transmit up to 195 mgd. Exh. E-92 at 66, 117.

83. The State Water Code allows for the consolidated regulation of a single diversion works such as is present here. *In re Waiahole Ditch Combined Contested Case Hr'g*, 94 Hawai'i 97, 9 P.3d 409 (2000); 94 H. 97, 9 P.3d 409.

II. Procedural History

84. For more than a century, EMI has operated surface water diversion systems to transport water from the wet, northeastern part of Maui, Hawaii, to the drier, central part of the island, mainly for large-scale sugarcane cultivation on the Hawaiian Commercial and Sugar (HC&S) plantation. *See,* Gingerich, S.B., 2005, *Median and Low-Flow Characteristics for Streams under Natural and Diverted Conditions, Northeast Maui, Hawaii:* Honolulu, HI, U.S. Geological Survey, Scientific Investigations Report 2004-5262 (hereafter "Gingerich, 2004-5262") at 1.

85. In 1876, the Kingdom of Hawai`i issued the first lease of Crown Lands to the A&B's predecessor to commence construction of the system of ditches and tunnels to take water from East Maui streams for private commercial use in central Maui. Exh. C-2, Kingdom Lease to Hāmākua Ditch Company (9/13/1876).

86. At the time, the Royal government conditioned the construction of this ditch system upon non-interference with the water and other rights of East Maui downstream landowners. *Id.*

87. In 1881, East Maui residents petitioned the Commissioners of Crown Lands to prevent the transfer of *pono wai* (water rights) in Honomanu, Ke`anae, and Wailua to Claus Spreckels. CWRM Staff Submittal (9/24/08) at 7.

88. In 1902, residents filed another petition, this time opposing an auction of land and the diversion of East Maui water to other districts. *Id.*

89. In 1938, the Territory of Hawai`i and EMI entered into the East Maui Water Agreement, which established four (4) license areas identified as Honomanu, Huelo, Ke'anae, and Nahiku and provided for their disposition at public auction to the highest bidder. Exh. C-3, Agreement (3/18/1938).

90. The original lease term for these four areas was set at 21 years and staggered over four- to six-year intervals. *Id.*

91. The four licenses expired as follows: June 30, 1971 for the Ke'anae license (Exh. C-8); June 30, 1977 for the Nahiku license (Exh. C-10); June 30, 1982 for the Huelo license (Exh. C-4); and June 30, 1986 for the Honomanu license (Exh. C-6).

92. Upon the expiration of each of the four water licenses, the BLNR issued Revocable Permits, each of which was annually renewed through 2002 to A&B/EMI. Exh. C-5, C-7, C-9, and C-1:

License Area	**Acres**	**License Number (Expiration Date)**	**Revocable Permit No.**
Honomanū	3,381	S-3695 (6/30/86) *Exh C-6*	S-7263 (*Exh C-5*)
Huelo	8,753	3578 (6/30/81) *Exh C-8*	S-7264 (*Exh C-7*)
Nahiku	10,111	3505 (6/30/76) *Exh C-12*	S-7266 (*Exh C-11*)
Ke`anae	10,768	3349 (6/30/71) *Exh C-10*	S-7265 (*Exh C-9*)

93. In 1987, the State of Hawai`i enacted the State Water Code, HRS chapter 174C, which included a stream protection program requiring the establishment of interim instream flow standards (IIFS) for all Hawai`i streams by July 1, 1988. Chapter 174C, Hawai'i Revised Statutes.

94. To meet this deadline, the CWRM established IIFS for each of the streams at status quo levels, leaving then-existing EMI diversions undisturbed. Hawai'i Administrative Rules (HAR) § 13-169-44.

A. The 2001 Petitions to Amend 27 East Maui Streams

95. On May 24, 2001, the Native Hawaiian Legal Corporation (NHLC), on behalf of Nā Moku Aupuni O Koolau Hui, Beatrice Kepani Kekahuna, Marjorie Wallett, and Elizabeth Lehua Lapenia challenged the reissuance of a 30-year lease and/or revocable permits to A&B or EMI that would allow either to continue to divert massive amounts of water from former Crown Lands located in East Maui. Exhs. C-80, 81, 83.

96. On the same day the same parties filed 27 Petitions to Amend the Interim Instream Flow Standards (Interim IFS) for 27 East Maui streams with the CWRM. CWRM Staff Submittal (8/28/08) at 1; *see*, 27 petitions at the CWRM East Maui webpage.[6]

97. The CWRM formally accepted their petitions on July 13, 2001. CWRM Staff Submittal (8/1/08).

98. By letter dated July 26, 2001, NHLC requested that the CWRM initially focus its efforts to restore streamflow to Honopou, Hanehoi, Waiokamilo, Kualani, Piinau, Palauhulu, and Wailuanui streams. CWRM Staff Submittal (8/28/08) at 1.

B. The Stream and Habitat Studies

99. On March 20 2002, the CWRM agreed to enter into a cooperative agreement with the USGS to generate information to establish instream flow standards. CWRM Minutes (3/20/02) at 2.

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6 This webpage, identified may be found at the Commission's website by following the hyperlinks for "Surface Water," "Instream Flow Standards," and "East Maui" at: http://dlnr.hawaii.gov/cwrm/surfacewater/ifs/eastmauiiifs1/ (hereafter, "CWRM East Maui webpage"). Unless explicitly designated by exhibit numbers assigned to the parties and admitted in the contested case hearing in March - April 2015, all cited documents can be found at this webpage. By order of the hearing officer, these documents are part of the administrative record in this proceeding. Minute Order No. 4 (4/21/14) at 2 ("6. Documents and materials on file with the Commission including the entire record in this case are incorporated in this proceeding by reference. Parties may make reference to such evidence.")

100. The study focused on a range of streams that spanned Kolea Stream to the West and Makapipi Stream to the East because of their "gaining" character. *Id.* Kolea Stream is East of Honopou, Hanehoi, and Huelo Streams and just West of Waikamoi Stream. Exh. C-1.

101. The study's main objective was to develop an integrated model of the area's hydrology and ecology. *Id.* at 3.

102. Study results were reported in 2005. *See* Gingerich, SB., 2005, *Median and Low-Flow Characteristics for Streams under Natural and Diverted Conditions, Northeast Maui, Hawaii*: Honolulu, HI, U.S. Geological Survey, Scientific Investigations Report 2004-5262(hereafter, "USGS Rpt. 2005-5262"), and Gingerich, S.B. and Wolff, R.H., 2005, *Effects of surface-water diversions on habitat availability for native macrofauna, northeast Maui, Hawaii*: U.S. Geological Survey Scientific Investigations Report 2005-5213 (hereafter, "USGS Rpt. 2005-5213").

103. For the next three years, the CWRM took no action on the 27 petitions, even as its sister agency, the DLNR Division of Aquatic Resources ("DAR"), conducted stream surveys in five (5) streams during 2007-08 to prepare for possible amendments to IIFS for the affected streams. CWRM Minutes (5/21/08) at 2; CWRM Minutes (9/2/09) at 2. The DAR surveys focused at that time on Honopou, Hanehoi, Pi'ina'au, Waiokamilo, and Wailuanui hydrologic units. DAR Stream Survey briefing (9/07) at 1, 5.

104. On June 27, 2008, DAR submitted survey reports for each of the five (5) streams to the CWRM. *See,* DAR, Report on Pi`ina`au Stream (6/08); Report on Honopou Stream (6/08); Report on Waiokamilo Stream (6/08); Report on Hanehoi Stream (6/08); Report on Wailuanui Stream (6/08) on CWRM East Maui webpage.

105. The CWRM finally took action on September 2-3, 2008, approving and conducting a series of limited meetings in the field to view various diversion sites at Honopou, Hali`imaile, Waiokamilo, and Wailuanui streams. CWRM Staff Submittal (8/28/08); CWRM Minutes (8/28/09) at 4; CWRM Minutes (9/2/09); CWRM Minutes (9/3/09).

CWRM's Integrated Approach to IIFS Amendments

106. In 2008, the CWRM decided to address the 27 pending IIFS petitions in two phases. CWRM Minutes (9/24/08) at 30-31.

107. First, the CWRM identified five (5) hydrologic units involving eight (8) streams/tributaries affected by EMI diversions and potentially supplying irrigation water to East Maui taro farmers requesting the restoration of stream flows to Wailuanui, Waiokamilo, Pi`ina`au,

Hanehoi, and Honopou. CWRM Minutes (9/24/08); Compilation of Public Review Comments (9/08).

108. The CWRM subsequently addressed the remaining 19 streams covering 16 hydrologic units. CWRM Staff Submittal (5/25/10) at 5.

In Phase I, the Commission Rejected HC&S' Objections to Following A Phased Integrated Approach to Amending IIFS.

109. At the outset, the CWRM staff acknowledged that the IIFS values adopted by the Commission for East Maui streams "did not appear to consider any ecological, social, or economic values." CWRM Staff Submittal (9/24/08) at 3-4.

110. CWRM staff sought to remedy this omission by recommending the setting of measureable IIFS for the first five hydrologic units employing a phased but integrated adaptive management approach that "assess[ed] and balance[d] all competing needs of instream and noninstream uses." *Id.* at 4.

111. HC&S disagreed with the phased approach and moved for IIFS decision on all 27 streams simultaneously; not separately. *Id.* The CWRM ultimately denied HC&S' motion to consolidate all 27 petitions to amend IIFS and instead opted to proceed as recommended by its staff: in phases, beginning with the first five hydrologic units, and informed by a set of adaptive management strategies allowing the CWRM the flexibility to revise and revisit initial IIFS decisions "until a sound management decision is reached." *Id.* at 4-5, 6-9.

a. The 2008 CWRM Action on the Initial Phase Involving Eight (8) Streams

112. In determining the appropriate IIFS for these eight (8) streams, the CWRM staff recommended starting with ground water contribution to total flow in a stream (also known as base flow) or the total flow present in the stream 70-90% of the time (Q70 - Q90). CWRM Staff Submittal (9/24/08) at 14.

113. The staff then compiled the best available information for each surface water hydrologic unit in the form of a prepared Instream Flow Standard Assessment Report (IFSAR). See, PR-2008-01 IFSAR 6034 Honopou; PR-2008-02 IFSAR 6037 Hanehoi; PR-2008-03 IFSAR 6053 Piinaau; PR-2008-04 IFSAR 6055 Waiokamilo; and PR-2008-05 IFSAR 6056 Wailuanui.

114. On the basis of these reports and its analysis, the CWRM staff recommended amended IIFSs for six (Honopou, Hanehoi, Huelo (Puolua), Palauhulu, Waiokamilo, and Wailuanui) of the eight streams (the remainder being Kualani, Pi`ina`au) under consideration in Phase I. See,

also, CWRM Compilation of Public Review Comments (Sep. 2008); CWRM Compilation of Public Testimony (Sep. 2008).

115. On September 25, 2008, the CWRM heeded its staff's recommendation and voted to amend the IIFS for six streams, some involving multiple IIFS:

Stream	IIFS (CFS)	IIFS (MGD)
Wailuanui Hydrologic Unit		
• Wailuanui @ 620' elevation	3.05	1.97
Waiokamilo Hydrologic Unit		
• Waiokamilo - IIFS A	4.90	3.17
• Kulani - IIFS B	status quo	status quo
Pi`ina`au Hydrologic Unit		
• Pi`ina`au - IIFS A	status quo	status quo
• Palauhulu - IIFS B at 80' elevation	5.50	3.36
Hanehoi Hydrologic Unit		
• IIFS A - Lower reach of Huelo (Puolua) downstream of Haiku Ditch @ 420' elevation	0.89	0.57
• IIFS B - lower reach of Hanehoi downstream of Haiku Ditch @ 420' elevation	0.63	0.41
• IIFS C - upstream of Lowrie Ditch	1.15	0.74
Honopou Hydrologic Unit		
• IIFS A @ 383' elevation	2.00	1.29
• IIFS B @ 80' elevation	0.72	0.47

CWRM Minutes (9/24/08) at 30-31; *See,* CWRM Staff Submittal (9/24/08) at 60-62.

116. The CWRM intended for amended IIFS to reflect the minimum flow left in a particular stream or an amount "that must remain in that stream in any point and time." CWRM Minutes (9/24/15) at 12, 26.

117. The 2008 CWRM decision represented the first step in a phased, integrated approach to resolving the IIFS for all 27 streams. CWRM Minutes (9/24/08) at 30.

b. The Integrated Commission Approach Relied on the Implementation of Adaptive Management Strategies (AMS)

118. In prudent observance of the *Waiahole* decision, the CWRM staff urged adoption of the following adaptive management tenets:

119. Staff believes that the Commission should move forward in amending the interim IFS for the five hydrologic units and will be proposing that the Commission adopt interim decisions that will be subject to adaptive management strategies. The basic tenets of adaptive management are to: 1) Establish management objectives; 2) Implement management decisions; 3) Monitor effectiveness of decisions; 4) Evaluate results of management; and 5) Revise management decisions as necessary. Should initial management decisions need further amendment, the decisions can then be revised and the process repeated. This is a learning process that can be revisited until a sound management decision is reached.

CWRM Minutes (9/24/08) at 4-5.

120. The CWRM ultimately adopted IIFS subject to adaptive management strategies (AMS) to facilitate their implementation, monitoring, and evaluation; and to allow for IIFS adjustments as responsive to periodic staff monitoring of streamflows, biological surveys monitoring the amended IIFS' impact on stream biota, and complaints about adverse impacts. *Id.* at 18-19; 28-29; 38-39; 50-51; 58-59; 63-64; CWRM Minutes (9/24/08) at 30-31.

121. To better ensure compliance with the amended IIFS downstream of diversions, the CWRM mandated:

122. Staff shall coordinate with EMI to identify and determine appropriate actions with regard to attaining the proposed interim IFS values downstream of existing diversion structures.

123. *Id.*; CWRM Staff Submittal (9/24/08) at 18, 28, 38, 50, 58, 63.

124. In addition, the Commission adopted another specific monitoring strategy under the AMS to assure protection of stream biota:

125. Periodic biological surveys shall be conducted, subject to available funding, to monitor the response of stream biota to post-interim IFS implementation.

126. *Id.* at 18, 28, 38, 50, 58, 63; CWRM Minutes (9/24/08) at 30-31.

127. Finally, the Commission adopted another set of specific monitoring strategies under the AMS to assure protection of those harmed by its IIFS amendments;

- Any party claiming to be negatively impacted as a result of the adopted interim IFS shall monitor and document, in cooperation with staff, the impact upon instream or noninstream uses, including economic impacts. Data shall be provided to staff to substantiate any claims.
- Likewise, any party claiming that negative impacts are a direct result of actions (i.e., diverting too much water, violating the interim IFS) caused by another party, shall monitor and document the impact upon instream or noninstream uses, including economic impacts. Data shall be provided to staff to substantiate any claims.
- All claimants shall cooperate with staff in conducting appropriate investigations and studies, particularly with regard to granting access to stream channels and private property related to such investigations, subject to the provisions of the State Water Code, Chapter 174C, HRS.

Id.; CWRM Staff Submittal (9/24/08) at 18-19, 28-29, 38-39, 50, 58-59, 63.

2. The Phase II May 25, 2010 CWRM Decision Focused on the Remaining 19 Streams

128. In October 2009, DAR submitted to the CWRM 15 stream survey reports covering the 19 remaining streams subject to possible amendment of their IIFS. *See,* Report on Waikamō`ī Stream 6047 (August 2009); Report on Puohokamoa Stream 6048 (August 2009); Report on Haipuaena Stream 6049 (August 2009); Report on Punalau Stream 6050 (August 2009); Report on Honomanu Stream 6051 (August 2009); Report on Nuaailua Stream 6052 (August 2009); Report on Ohia Stream 6054 (August 2009); Report on West Wailuaiki Stream 6057 (August 2009); Report on East Wailuaiki Stream 6058 (August 2009); Report on Kopiliula Stream 6059 (August 2009); Report on Waiohue Stream 6060 (August 2009); Report on Paakea Stream 6061 (August 2009); Report on Waiaaka Stream 6062 (August 2009); Report on Kapaula Stream 6063 (August 2009); Report on Hanawi Stream 6064 (August 2009); and Report on Makapipi Stream 6065 (August 2009).

129. As completed for Phase I, the CWRM staff compiled the best available information for each of the 16 hydrologic units remaining, covering 19 streams. *See,* PR-2009-01

IFSAR 6047 Waikamō`ī; PR-2009-02 IFSAR 6048 Puohokamoa; PR-2009-03 IFSAR 6049 Haipuaena; PR-2009-04 IFSAR 6050 Punalau; PR-2009-05 IFSAR 6051 Honomanu; PR2009-06 IFSAR 6052 Nuaailua; PR-2009-07 IFSAR 6054 Ohia; PR-2009-08 IFSAR 6057 West Wailuaiki;PR-2009-09 IFSAR 6058 East Wailuaiki; PR-2009-10 IFSAR 6059 Kopiliula; PR-2009-11 IFSAR 6060 Waiohue; PR-2009-12 IFSAR 6061 Paakea; PR-2009-13 IFSAR 6062 Waiaaka; PR-2009-14 IFSAR 6063 Kapaula; PR-2009-15 IFSAR 6064 Hanawi; and PR-2009-16 IFSAR 6065 Makapipi).

130. In December 2009, the CWRM staff's recommendation for restoration was far more limited than the recommendations of the DLNR's Division of Aquatic Resources (DAR). *Compare,* Letter from D. Polhemus to CWRM (12/15/09) and CWRM Staff Submittal (12/16/09) at 48-54.

131. Initially, the CWRM staff recommended that only *one* of the 19 streams considered in the second phase of CWRM deliberations be partially restored. *Id.* .

132. Acknowledging the inevitable compromises of the ideal resolution of 100% restoration, the DAR sought a modest partial restoration:

> While the return of 100% of the diverted water and elimination of diversion structures would be the most desirable IIFS for protection and management of native stream animals, the DAR recognizes that this position is not compatible with the on-going needs for water by the people of Maui. Although the DAR understands that some water will continue to be diverted from East Maui streams to meet such needs, the DAR feels that the continuance of the status quo for all but one of the stream diversions, as proposed in the current CWRM petition, is unacceptable and therefore has provided recommendations for additional restoration actions

Letter from D. Polhemus to CWRM (12/15/09) at 1.

133. The DAR in effect recommended "actions that support restoration of native species habitat, migratory pathways for upstream recruiting individuals and downstream drifting larvae, and overall pollution structure for eight native fish and macroinvertebrate species inhabiting East Maui streams." *Id.*

134. To accommodate offstream commercial use, DAR recommended partial restoration to just eight (8) of the 19 Phase II streams.[7] *Id.* at 2.

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[7] The DAR counted eight (8) streams covered in its initial recommendations, treating Puaka`a Stream as a tributary of Kōpili`ula Stream.

135. DAR calculated the flow necessary to maintain minimum viable habitat for stream animals (Hmin) in the wet season, and minimum flow necessary to create a "wetted pathway" or "connectivity" for animals to survive in the dry season (C_{min}). CWRM Staff Submittal (5/25/10) at 9. These calculations supported a **seasonal** approach to restoration. CWRM Staff Submittal (5/25/10) at 11.

136. In so doing, the DAR proposed to restore water flows sufficient to restore 90% of the stream habitat (H_{90}) in those 8 streams by applying 64% of the base flow measurement to each of the below eight (8) restored to those streams, as established with the prior USGS studies:

Stream	**H_{90} (cfs)**	**C_{min} (cfs)**
East Wailuaiki	3.7	1.2
West Wailuaiki	3.8	1.2
Puohokamoa	7.4	2.3
Waikamō`ī	4.3	1.3
Kopili`ula	4.2/5.8	1.3/2.9
Puaka`a	No change	1.2
Haipuaena	3.3	0.9
Waiohue	3.2	1.0
Hanawi	No change	0.1

Id. at 18 (the two values for Kopili`ula reflect the proposed IIFS proposed for the lower and middle reaches of the stream, respectively).

137. The Dar's modest seasonal recommendation, would have affected, on average, only 8.8% of EMI's total diversons during the wet season, and 0.5% of its total diversions during the dry season. CWRM Staff Submittal (5/25/10) at 18.

138. The DAR's seasonal recommendation would in turn restore 45.8 km of the 67.3 km native species Habitat Units then impacted by EMI stream diversions. *Id.* at 4.

139. The DAR openly criticized the CWRM staff's recommendation to restore just **one** of the 19 streams, deeming it as "unacceptable" from a biological perspective. *Id.*

140. The CWRM staff conceded that the 64% minimum baseflow restoration would be impactful on the streams it determined had the greatest potential for habitat restoration restoration:

> The maintenance and restoration of stream habitat would benefit from continuous streamflow. Streams in east Maui are recognized as important habitats for native Hawaiian stream animals. The dry reaches that are often found immediately downstream from the diversions can inhibit species migration. With a few exceptions, the diversions capture almost all base flow and an unknown amount of total streamflow in each stream, decreasing flow downstream of the diversion and sometimes causing streams to go dry. This prevents the upstream migration of native stream animals, restricts surviving adult animals to the disconnected deep pools, and causes postlarvae recruits to be stranded at the stream mouth.

CWRM Staff Submittal (12/16/09) at 10.

141. The CWRM held a meeting on December 16-17, 2009 to consider the flow standards for the remaining 19 streams, primarily responding to calls from the community members seeking to restore habitat areas to support gathering and fishing in and along East Maui Streams and coastlines. CWRM Minutes (12/16/09); *see also* CWRM Compilation of Public Testimony (Dec. 2009); CWRM Compilation of Public Review Comments (Nov. 2009).

142. Disappointed with the CWRM staff's recommendations to amending one solitary IIFS, the CWRM deferred action until additional information was obtained from its staff and interested parties. *Id.,* CWRM Minutes (12/17/09).

143. After a fact-finding period during which the parties submitted additional data, the Commission again met on May 25, 2010 to set IIFS for the remaining 19 streams. CWRM Compilation of Data Submissions, Part II (May 2010).

144. The CWRM staff determined from rainfall data for East Maui that there was little seasonal variation in rainfall in that region, unlike central Maui. CWRM Staff Submittal (5/25/10) at 9.

145. Specifically, the CWRM staff found that the evidence revealed a "lack of a seasonal flow pattern" in the pertinent streams, noting that this pattern "is not of a well-defined seasonal trend, but one that varies throughout the year." *Id.* at 9.

146. In contrast, the staff found that "rainfall ***in central Maui*** where a majority of the end water use is located, exhibit a strong seasonal pattern of wet winters and dry summers." *Id.* (emphasis added).

147. High rainfall occurs throughout the year in East Maui and does not follow the typical wet winter - dry summer trend of central Maui. *Id.* at 10; *See*, Fig. 3.

148. This pattern is not of a well-defined seasonal trend but one that varies throughout the year. *Id.* at 9; *See*, Fig. 4 at 10.

149. Based on this observation, from a strictly biological perspective, the CWRM staff concluded that the annual approach would restore more and healthier habitat by more closely following natural streamflow patterns characteristic of east Maui streams for the full year. *Id.*

150. Accordingly, while it ultimately urged adoption of an annual approach for only Makapipi Stream, "due to the potential for taro cultivation and other instream uses expressed in this community," its comparative analysis clearly recognized that the annual approach was superior to the seasonal approach to protecting other traditional and customary Hawaiian practices affected by streamflow. CWRM Staff Submittal (5/25/10) at 17.

151. The staff pointedly acknowledged that, if the CWRM adopted the seasonal approach, the CWRM would be accommodating *only* offstream commercial use.

> The annual interim IFS approach would result in greater stream habitat restoration for building a healthy stream animal population, improving overall stream health, and increasing opportunities for traditional gathering. The seasonal interim IFS approach would provide biological benefit, mandate noninstream users to restore streamflow and increase system efficiency during the wet season, and provide for noninstream uses during the dry seasons.

CWRM Staff Submittal (5/25/10) at 16-17, ROA Doc. 127 at 5590-91.

152. In addition, the Staff found enhanced prospects for protecting traditional and customary practices:

153. The annual interim IFS approach would result in greater stream habitat restoration for building a healthy stream animal population, improving overall stream health, and increasing opportunities for traditional gathering.

154. *Id.* at 16-17; *See, also*, *Id.* at 14 (chart comparing seasonal and annual approaches).

155. Most significantly, the seasonal approach allows almost no water to remain in these streams during the dry season, when EMI would be allowed to take virtually all the water in the streams for its diversions. CWRM Staff Submittal (5/25/10) at 17.

156. Conceptually, during the dry season at H_{20}, there would be "dry stretches" of stream bed that would only be "wetted" to allow for connectivity and recruitment of stream species only "when it rains." *Id.* at 42.

157. Such low flow would not "have much biological meaning," leaving only enough water to wet the streambed. *Id.* at 8.

158. Such low flow would not assure the stream species the ability "to feed reproduce, and grow." *Id.* at 9.

159. Moreover, the CWRM staff noted that HC&S had operated for 26 years at 85% of its claimed need for water, relying on groundwater pumping to make up the difference. *Id.* at 16-17.

160. Ultimately, despite this determination of excessive water use by HC&S, in its phase II decision, the CWRM staff recommended amendments of the IIFS for only 5 of the 9 streams originally targeted for only partial restoration by the DAR.[8] CWRM Submittal (5/25/10) at 18-20.

161. In formulating its recommendations, the CWRM staff recommended:

- unlike the DAR recommendation, including Makapipi Stream on its list of recommendations for restoration, because the Nahiku community relies heavily on the stream for cultural practices, recreation, and other instream uses.' *Id.* at 19-20;
- omitting 3 streams (Puohokamoa, Haipuaena, and Kopili'ula) on the DAR list of streams to partially restore because EMI allegedly used each of those streams to convey upper level ditch water already diverted from other streams east into a segment of each stream to lower elevation diversion ditches. *Id.* at 20;
- eliminating Puaka`a Stream because only a short (300 meter) stretch of stream bed would benefit from restoration, relative to the costs of modifying the applicable stream diversion structures. *Id.* at 20;

162. like the DAR, no restoration for Alo, Wahinepee, Punalau, Honomanu, Nuaailua, Ohia, Paakea, Waiaaka, and Kapaula Streams, because it would not result in significant biological retoration from the introduction of additional flow. *Id.*

163. The CWRM staff advised the Commission that "DAR has also provided the minimum amount of median baseflow that is needed to maintain 50-percent (H50) and 70-percent

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[8] The Commission noted that DAR's recommendation for the dry season stream flow standards was based on calculations from a measuring point below the IIFS points ultimately identified by the CWRM staff. CWRM Minutes (5/25/10) at 8. As such, the DAR recommended stream flow levels were lower than the CWRM staff's recommendations for the seasonal flow levels. *Id.*

(H70) of the habitat, **but does not believe that these flow rates are viable flow rates for the protection of native aquatic biota.**" (emphasis added). CWRM Staff Submittal (5/25/10) at 17.

164. Instead of basing its decision on the hard science, as reflected in the minimum recommendation of DAR, the CWRM unilaterally decided to allow for amendments to the IIFS that differentiated between the wet and dry seasons. CWRM Minutes (5/25/10) at 49-50.

165. On May 25, 2010, the Commission voted to adopt its staff wet season recommendations, and the lower DAR recommended flow levels for the dry season, for West Wailuaiki, East Wailuaiki, and Waiohue Streams:

Stream	Wet Season (cfs)	Dry Season (cfs)
West Wailuaiki	3.5	1.4
East Wailuaiki	4.5	1.4
Waiohue	4.4	1.3

CWRM Minutes (5/25/10) at 49.

166. The CWRM adopted the staff's recommendations for the wet and DAR recommendation, i.e., the H_{90} level, for the dry season for Waikamō`ī Stream. *Id.* at 49-50.

167. The CWRM adopted a conditional 0.93 cfs, or 0.6 mgd, IIFS at the 935-foot elevation for Makapipi Stream on an annual basis, subject to determining its "sustainability," i.e., that the standard could be met past a losing stretch of the stream. *Id.* at 14-15, 47.

168. The CWRM adopted an annual IIFS of 0.1 cfs, or 0.06 mgd, at the 1,300-foot elevation for Hanawi Stream to create a wetted pathway that would provide connectivity for stream biota below the EMI diversion. *Id.* at 14, 47-48.

169. The CWRM also deferred action on the remaining 13 streams, leaving them in their diverted status quo state. *Id.* at. 50.

170. Finally, the CWRM accepted the staff's general recommendations on implementation (short-term, mid-term, and long-term actions), monitoring, evaluation, and reporting, as part of a continuing AMS. *Id.*; *see, also,* Table 4, *Id.* at 18.

171. In accommodating HC&S, the CWRM acted without ever placing the burden on A&B/HC&S/EMI of proving that no harm would come to Nā Moku, et al. as a result of its diversions.

172. This accommodation reflected a total disregard for CWRM's own staff's acknowledgement of the greater benefit of an annual IIFS to the long-term restoration and health of instream habitats for `o`opu, `ōpae, and hīhīwai in the 19 streams and to traditional gathering. *Compare*, CWRM Staff Submittal (5/25/10) at 16, with CWRM Minutes (5/25/10) at 49.

173. As with its September 2008 vote, the Commission did not issue any written decision signed by its members, only voting to accept staff recommendations on implementation (short-term, mid-term, and long-term actions, including to implement the AMS), monitoring, evaluation, and reporting. *Id.* at 50.

174. Following the Commission's decision, and prior to the close of the Commission meeting, NHLC requested, on behalf of its clients, a contested case hearing to challenge the decision. *Id.*

175. On June 4, 2010, pursuant to the Commission's administrative rules, Nā Moku `Aupuni O Ko`olau Hui filed its written Petition for a Contested Case Hearing Before the Commission on Water Resource Management ("Petition"). Hawai`i Administrative Rules, Subtitle 7 (Water Resources), Chapter 167 (Rules Of Practice And Procedure for the Commission on Water Resource Management) Subchapter 4 (Contested Case Proceedings), HAR §13-167-52.

176. The CWRM met on October 18, 2010 to consider Nā Moku's Petition. At that hearing, the CWRM unanimously voted to deny the Petition. CWRM Minutes (10/18/10).

C. Appeal and Remand

177. On November 17, 2010, Nā Moku filed a timely Notice of Appeal from the Commission's denial of the contested case hearing request. In Re Petition to Amend Interim Instream Flow Standard for Waikamoi, etc., 128 Haw. 497; 291 P.3d 395 (2012)

178. On August 31, 2011, the Intermediate Court of Appeals ("ICA") dismissed the appeal for lack of jurisdiction. In Re Petition to Amend Interim Instream Flow Standard for Waikamoi, etc., 2011 Haw. App. LEXIS 954 (Haw. Ct. App. Aug. 31, 2011).

179. Nā Moku appealed the ICA's dismissal to the Hawaii Supreme Court which reversed and remanded the case to the ICA. In Re Petition to Amend Interim Instream Flow Standard for Waikamoi, etc., 2012 Haw. LEXIS 9 (Haw., Jan. 11, 2012).

180. On November 30, 2012, the Intermediate Court of Appeals ("ICA") issued an opinion a) vacating the Commission's May 25, 2010 decision; and b) remanding the matter back to the Commission with instructions to 1) grant Nā Moku's Petition for Hearing and 2) to conduct a contested case hearing pursuant to HRS chapter 91 and in accordance with state law. In Re Petition to Amend Interim Instream Flow Standard for Waikamoi, etc., 128 Hawaii 497, 291 P.3d 395 (2012).

181. The Commission authorized the appointment of a qualified Hearing Officer to conduct a Contested Case Hearing on Petitions to Amend Interim Instream Flow Standards for Waikamoi, Puohokamoa, Haipuaena, Punalau/Kolea, Honomanu, West Wailuaiki, East Wailuaiki, Kopiliula, Puakaa, Waiohue, Paakea, Kapaula and Hanawi Streams. CWRM Minutes (7/17/13) at 15.

D. March 2015 Contested Case Hearing

182. On May 30, 2014, the Commission-appointed Hearings Officer Lawrence Miike issued an order notifying the parties of his intent to address all 27 streams in the contested case hearing and setting a briefing and hearing schedule on the matter. Minute Order 7.

183. By Order dated September 9, 2014, the Hearings Officer notified the parties that the Commission had affirmed his ruling to expand the scope of the hearing to adopt an integrated approach that would include all 27 streams in his recommended decision. Minute Order 9.

184. On April 21, 2014, the Hearings Officer granted standing to the following parties: Nā Moku, Maui Tomorrow, County of Maui, Department of Water Supply, Alexander & Baldwin, Inc./East Maui Irrigation Co.; and Hawaii Farm Bureau Federation. Minute Order 2.

185. On December 4, 2014, Jeffrey Paisner was granted standing as a party, while John Blumer-Buell and Mr. Nikhilananda were not granted standing but were permitted to present testimony and evidence as witnesses called by the Hearings Officer. Minute Order 11.

186. The Contested Case hearing began on Maui on March 2, 2015 and concluded on April 2, 2015.

187. At the start of the contested case hearing, the parties stipulated to admit the declarations and/or testimonies of Aja Akuna, Emily Akiona Wendt, Solomon Ka'auamo, Earl Smith, Sr., Steven Ho'okano, Gladys Kanoa, Ire Kimokeo, Healoha Carmichael, Harry Hueu, Jonah Hueu, Darrell Aquino, Lezley Jacintho, Juliana Jacintho, Jonah Jacintho and Sanford Kekahuna without the need for cross examination upon Nā Moku's admission that all named individuals except

Sanford Kekahuna rely on domestic water supplied by MDWS. See Stipulation to Waive Cross Examination of Certain Witnesses filed March 20, 2015.

188. A total of 38 witnesses testified over 15 days of hearings. Tr. 3/2/15; Tr. 3/3/15; Tr. 3/4/15; Tr. 3/5/15; Tr. 3/9/15; Tr. 3/10/15; Tr. 3/11/15; Tr. 3/13/15; Tr. 3/16/15; Tr. 3/17/15; Tr. 3/18/15; Tr. 3/23/15; Tr. 3/30/15; Tr. 4/1/15; Tr. 4/2/15. F. Failure to Enforce the Amended IIFS and Implement the AMS

189. The Commission's IIFS standard is a daily minimum flow requirement; not an average or mean flow measurement. Hew, Tr. 3/18/15, p. 6, l. 16-19; Uyeno, Tr. 3/5/15, p. 72, ll. 13-23.

189. Following the initial 2008 Phase I IIFS Amendments and the Phase II Amendments, the Commission staff nonetheless failed to confirm IIFS compliance on a daily basis at the various IIFS measuring sites. UyenoTr. 3/5/15, p. 73, l. 24 to p. 74, l. 15.

190. In March 2009, the Commission authorized its staff to enter into a cooperative agreement with the USGS to install gages for continuous, real-time streamflow monitoring. Gauges were to be installed at 5 sites on those streams the CWRM amended the IIFS in 2008, and additional gages at up to 10 new stream sites after Phase II actions on the remaining 19 streams. CWRM Staff Submittal (3/18/09) at 4; CWRM Staff Report (12/18/14) at 6.

191. While its cooperative agreement with the USGS was pending, the CWRM Staff conducted periodic field visits to take point-in-time streamflow measurements and coordinated a series of modifications to the EMI diversion works to implement the 2008 IIFS amendments. *See, Id.* at 8, 11, 22, 28.

192. The CWRM Staff generated field investigation reports for each of its East Maui field site visits and periodically posted the reports on its website. Uyeno, Tr. 3/3/15, p. 223, ll. 1-11.

193. After the September 2009 disclosure of the compilation of streamflow measurements for East Maui, the Commission staff did not produce nor publicly disclose any continuous flow recordings of streamflow measurements for the first 8 streams until December 2014, when it produced the hydrographs from transducer data collected for the prior 5 years. CWRM Staff Report (12/18/14).

194. On August 31, 2010, CWRM Staff met with representatives of the Native Hawaiian Legal Corporation (NHLC), Office of Hawaiian Affairs (OHA), and U.S. Geological

Survey (USGS) to discuss streamflow gaging and water temperature issues related to the setting of interim instream flow standards (interim IFS) in east Maui. CWRM Staff Quarterly Update (11/17/10) at 1 (PDF).

195. CWRM Staff then took interest in monitoring stations located in Honopou that the DLNR's Land Division was funding to monitor streamflow into the Wallett/Kekahuna 'auwai at Honopou Stream below the 'auwai intake, and three of four temperature probes (USGS was funding one probe) in the auwai/loi system. *Id.*

196. In November 2010, CWRM Staff committed to continue working with the parties to identify and address issues related to the implementation actions for Honopou and other east Maui streams. *Id.*

197. At that time, CWRM Staff noted that it had received a Complaint/Dispute Resolution Filing Form on March 22, 2010, from Alan Murakami (NHLC) citing insufficient water for taro growing and other cultural practices; inability to monitor interim IFS; and the failure of EMI to meet the IIFS-A for Honopou Stream through a temporary bypass that it installed one year earlier. *Id.* (Exh. 1 attached to Quarterly Update Submitted by Uyeno).

198. Between October 2010 and February 2011, CWRM staff installed barometric pressure transducers at IIFS sites on Wailuanui (10/14/10), West Wailuaiki (12/7/10), Hanehoi (12/8/10), Waikamoi (12/8/10), Honopou (2/16/11), East Wailuaiki (2/16/11), Palauhulu (2/16/11),and Waiohue (2/16/11) Streams. CWRM Staff only periodically downloaded data from those transducers. CWRM Staff Report (12/18/14) at 9, 11, 14-15, 23, 29, 31-32, 34-35, 38-39.

199. The CWRM Staff's failure to record nonconforming IIFS streamflows thwarted its obligation under the AMS to: (a) monitor and evaluate the effectiveness of its amended IIFS; (b) evaluate the consequences of its IIFS amendments on downstream users; and (c) revise its IIFS amendments as necessary. CWRM Minutes (9/24/08) at 4.

200. The CWRM's failure to monitor streamflows on a continuous, real-time basis or to emply IIFS gauges linked by satellite to provide instantaneous meter readings deprived it of the ability to determine IIFS compliance, i.e. IIFS station flow, flows upstream, and diversions occurring mauka of any particular IIFS station and exercise effective enforcement of the same. Uyeno, Tr. 3/5/15, p. 73, l. 5 to p. 74, l. 15.

201. Without the timely taking and reporting of continuous, real-time streamflow measurements, no one could have been effectively monitoring and evaluating whether EMI was

complying with the 2008 IIFS amendments between September 2008 and October 2010 (when the first of several transducers were installed in Wailuanui Stream), pursuant to the adopted AMS calling for both functions. *See* CWRM Staff Submittal (9/24/08) at 4-5, 18-19; 28-29, 38-39, 50-51, 58-59, 63-64; CWRM Minutes (9/24/08) at 30-31.

202. Without timely access to this flow data, the CWRM could not effectively implement the AMS it touted to protect instream uses dependent on achieving levels of the amended IIFS by evaluating their effectiveness in protecting taro farmers who were suffering from insufficient flows after the September 25, 2008 amendments to the IIFS.

203. Another key element of the adopted AMS was for CWRM staff to assess the implementation of the AMS and its impacts on instream and noninstream uses, including any recommended revisions to management decisions including the IIFS levels. CWRM Staff Submittal (9/24/08) at 5, 19.

204. In March 2011, CWRM Staff asserted it would be assessing the interim IFS with regard to current streamflow conditions and actions taken thus far by EMI. CWRM Staff Quarterly Update (3/16/11) at 3 (PDF).

205. Based on this assessment, staff would prepare any recommendations for future actions to be brought before the Commission. *Id.*

206. Based on the hydrographs and gage data CWRM staff produced, EMI, without justification, has failed repeatedly to assure that it left a minimum[9] streamflow in at least 4 of the 6 streams for which this commission amended IIFS on September 25, 2008. CWRM Staff Report (12/18/14) at 10 (Honopou), 13 (Hanehoi), 24 (Palauhulu), 30 (Wailuanui).[10]

207. Moreover, despite the clear evidence of these IIFS violations, CWRM Staff Report (12/18/14) at 10, 13, 24, 30, as well as the reported elevated temperatures of irrigation water available under the IIFS that had been amended in 2008 for Honopou, neither the Commission nor its staff sought adjustments to the appropriate IIFS to rectify any of the reported negative effects of the Commission's 2008 IIFS determinations.

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[9] EMI understands that in order to comply with the IIFS level for any particular stream, it must assure that the *minimum* flow in the stream must be at or above that flow standards. Hew, Tr. 3/18/15, p. 6, l. 16-19.

[10] On the other hand, EMI succeeded in nearly always complying with the 4.9 cfs IIFS amendment for Waiokamilo Stream by releasing all water previously diverted from those streams, except for whatever naturally enters the tunnel through which the Ko`olau Ditch flows in the Waiokamilo hydrologic unit. Id. at 77.

208. As of March 3, 2015, the CWRM staff does not believe it has any basis to reset the openings in sluice gates and other modifications initially set to achieve the amended in 2008. Tr. 3/3/15, p. 236, l. 22-15 to p. 237, l. 1-6; see also, Tr. Tr. 3/3/15, p. 239, l. 11-25 to 2401-18 (hearing officer summarizing testimony on absence of Commission adjustments to diversion works modifications intended, but failing, to achieve flow levels reflecting 2008 amendments to IIFS).

G. Violations of IIFS

1. Honopou Stream

209. By September 2009, for example, the Commission staff had taken just 7 isolated streamflow measurements for Honopou Stream to determine whether EMI had been complying with the amended IIFS during the first year of implementation. Exh. 146 at 20.

210. EMI violated the 1.22 cfs IIFS for Honopou Stream on 5 of those 7 sporadic instances in the first year of IIFS implementation. *Id.*

211. The CWRM staff continued to sporadically collect raw transducer data from the Honopou IIFS site, sometimes 6-12 months apart. CWRM Staff Report (12/18/14) at 8-10.

212. The powerpoint file prepared for a staff briefing of the Commission at its September 2009 meeting reflected the first public compilation of the 5 recordings of flow measurements taken by CWRM staff at the IIFS-A site on Honopou. Exh. A-145 at 20.

213. However, the CWRM staff did not calculate actual flow measurements converted from the downloaded transducer data until the compilation it produced on December 18, 2014 (6 years after amending the IIFS for each of them). *Id.*; Tr. 3/3/15, p. 218, l. 12-25.

214. While undiverted natural flow in a stream could have been below the IIFS on certain occasions, the CWRM data, at least for Honopou, which is a gaining stream, appears to show that there were numerous instances when available water in a particular stream was being diverted while EMI had simultaneously failed to assure a minimum amount of streamflow to meet the amended IIFS. CWRM Staff Report (12/18/14) at 10.

215. For example, despite a generally higher level of recorded flow at a USGS gaging station (16587000) between June through September 23, 2014 at a higher elevation undiverted stretch of Honopou Stream, readings at the IIFS A station on that stream during the same period showed a flow rate that was frequently below the IIFS A (2.0 cfs). *Id.*

216. In other periods of the report, there is a clear pattern of a gaining stream, where the measurements taken at the IIFS-A point located below the Haiku Ditch exceeded the recorded flows at the USGS gaging station (16587000) located above Wailoa Ditch, the highest elevation EMI ditch. *Id.* (e.g., during the period between 3/23/14 and 6/1/14).

217. For Honopou, the Commission had based its IIFS determination on an AMS that was designed "to ensure that an adequate amount of water reaches the downstream diversions, which are primarily for domestic use and taro cultivation." CWRM Staff Submittal (9/24/08) at 18.

218. For Honopou Stream, CWRM staff agreed with EMI's calculations of the presumed releases of water upstream of the Haiku Ditch that would occur through the bypass mechanisms devised to allow water past the ditch to achieve the IIFS (2.0 cfs) for that stream, i.e., the three 4-inch PVC pipes already installed and metal flume that was installed on March 23, 2009, over the massive Haiku diversion structure that would normally take all water from the stream for transport to Central Maui. Field investigation Report FI2009032301.

219. In one of its 2010 quarterly updates on implementing the IIFS, CWRM staff reported that, beginning in 2009, its sister division, the DLNR's Land Division, had been funded the monitoring of streamflow into the Wallett/Kekahuna auwai, Honopou Stream below the auwai intake, and three of four temperature probes[11] (USGS was funding one probe) within the Wallett/Kekahuna auwai/loi system. CWRM Staff Quarterly Update (11/17/10) at 1.

220. The temperature gauge labeled Diversion 2, loi (sic) outlet, Honopou Stream, Maui, HI12 is located near the lowest elevation in the Kekahuna/Wallet lo'i. Exhs. A-158; A-159.

221. This gauge revealed that irrigation water in the lo'i being farmed at the time by Beatrice Kekahuna reached daily temperatures exceeding 85-90 degrees at that location during the summer and early fall months, late June through October, of 2009. Exh A-157.

222. The same pattern in temperature readings repeated itself the following year but beginning in February through September of 2010, at one point reaching a maximum temperature of 100 degrees in mid-July. *Id.*

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[11] Upon CWRM staff's recommendation, BLNR's Land Division discontinued funding for all but one of the temperature probes by November 2010. CWRM Staff Quarterly Update (11/17/10) at 1.

[12] The USGS assigned the station number 205549156143602 to this gauge location. A-157.

223. The temperatures recorded at the USGS station labeled "Diversion 1, loi (sic) outlet, Honopou, Maui, HI," located just slightly higher in elevation than the aforementioned station, see, Exhs. A-158 and A-159, were slightly lower, but achieved potentially harmful maximum daily temperatures during the months June through September in both 2009 and 2010. Exh. A-156.

224. The USGS station labeled "Diversion Ditch at outlet, nr honopou Str., Maui, Hi." recorded temperatures of that same water on a continuous basis as it entered the same lo'i complex at its highest elevation point. Exh. A-158.

225. That station registered already elevated (compared to winter months), though lower, temperature readings (mid-70's) as the water passed through during the June through September time period in 2009, with a similar pattern emerging in 2010. Exh. A-155.

226. The Land Division funded one remaining temperature probe and two streams gages through September 2011. CWRM Staff Quarterly Update (11/17/10) at 1.

227. On March 22, 2010, the Commission received a Complaint/Dispute Resolution Filing Form from Beatrice Kekahuna and Marjorie Wallett, citing insufficient water for taro growing and other cultural practices, inability to monitor interim IFS, and insufficiency of the temporary bypass that EMI had installed over the Haiku Ditch diversion work in an attempt to implement the 2008 IIFS for Honopou Stream. CWRM Staff Quarterly Update (11/17/10), Exh. 1.

2. Wailuanui Stream

228. For Wailuanui Stream, CWRM staff agreed with an EMI calculation for the height and width of the openings of the sluice gates on its East and West tributaries that they believed would deliver sufficient water to the IIFS A point downstream to achieve the flow level of 3.05 cfs. Field investigation Reports FI2008121002 and FI2008121003.

3. Hanehoi Stream

a. Site A 2008 IIFS

229. The CWRM adopted an amended Interim Instream Flow Standard ("IIFS") for Puolua Stream in September 2008. CWRM adopted a flow standard of five-hundred and seventy-thousand gallons per day (570,000 gpd) on Puolua stream below the New Haiku Ditch to provide

water for Ernest Schupp's kalo cultivation on TMK No. (II) 2-9-08:14 along Puolua stream. Exh. E-7, p. 26; Written Testimony of Ernest Schupp.

230. In spite of this action, there currently are very limited flows in Puolua Stream downstream of the New Haiku Ditch diversion works. Written Testimony of Neola Caveny.

231. The IIFS for Puolua Stream is shown on a diagram of Hanehoi Unit IIFS from the September 2008 CWRM staff submittal as "Site A." Exh. E-7, p. 26. The same diagram estimates the "total Flow value" of Puolua stream to be around one (1) mgd. Exh. E-7 at 26.

232. No IIFS was set for Puolua Stream at the Lowrie Ditch Diversion. This has contributed to the lack of adequate flow available on Puolua Stream below the Haiku Ditch. This in turn affects Hanehoi Stream, since the flow of Puolua stream contributes water to downstream users of Hanehoi Stream. Schupp WT.

233. The CWRM 2008 Staff submittal discusses the relationship between Puolua and Hanehoi stream, noting:

234. The interim IFS for Huelo (Puolua) Stream is set at a higher flow to allow water to be available for the downstream surface water users, both in Huelo (Puolua) Stream and below its confluence with Hanehoi Stream. E-7 at 26.

235. While the CWRM staff noted the importance of having greater flows from Puolua stream to Hanehoi stream, they did not take the most logical action, which was to require far less water to be diverted from Puolua Stream at the upper Lowrie Ditch. Schupp WT.

b. Site A: Water Not Supplied to Meet Standard

236. The agreement finalized by the CWRM in 2008 included a requirement for regular monitoring and "adaptive management" of the Instream Flow Standards. The CWRM Staff Submittal included the following statement which was part of the CWRM's final adopted decision:

> Staff shall monitor streamflow by taking periodic flow measurements, subject to available funding, at the proposed interim IFS locations, as weather permits. These will be point-in-time measurements; however, the installation of stream gaging stations remains an option for long-term management.

Exh. E-7, p. 18.

237. Although ongoing monitoring and "adaptive management" of Puolua Stream were required as part of the IIFS agreements, the only monitoring of the adequacy of flows on Puolua stream that happened was in the first year after the IIFS was set. Schupp WT.

238. In September 24, 2009 (one year after the IIFS was set for Hanehoi and Puolua streams) a report was made to CWRM by their staff. Exh. E-10.

239. The CWRM staff reported results of limited testing stream flow testing of Puolua at the release point above Mr. Schupp's kalo lo'i at New Haiku Ditch. Five measurements were done over three days in October 2008. Exh. E-10 at 36.

240. One measurement was taken in November 2008 and one measurement was taken in February 2009. This is the release site that was supposed to provide water for Mr. Schupp's kalo patches, but the testing showed not one day of flows had met the IIFS standard of .89 cfs or .57 mgd. Exh. E-10 at 36.

241. The slide of the same staff report summarized the findings: IIFS was not achieved at any of the 3 Hanehoi-Puolua sites. The water simply had not returned. Exh. E-10, p. 46; Schupp WT.

242. The Figure reported for the release point nearest Mr. Schupp's kuleana, which was labelled "Site A" on the Diagram, also known as Puolua stream at New Haiku ditch, the highest flow seen was only .38 cfs. This is less than half of the proposed IIFS of .89 cfs or .57 mgd. That flow level was only present one day of the seven tested. Most of the days tested, Puolua flow levels past the New Haiku Diversion were around 30,000 gallons per day. These types of flow levels cannot support more than a few small patches of kalo, and even that is risky. This piecemeal approach to stream restoration does not seem to be working on Puolua. Exh. E-10, p. 46; Schupp WT.

243. Mr Schupp was not notified of any further monitoring after early 2009. Schupp WT.

244. As a consequence of lack of further monitoring by CWRM, the Puolua Stream is still significantly dewatered by the New Haiku Ditch diversion works. Water is supposed to be returned to Puolua Stream to achieve the IIFS by way of an EMI sluice gate. The gate is opened a certain amount to allow the water impounded by the diversion to flow back into the stream. There are two very deteriorated four inch (4") pipes within the New Haiku Ditch diversion works that had allowed some water to flow in Puolua Stream after the New Haiku Ditch diversion works. These pipes now rarely function to bypass the New Haiku Ditch diversion works. Exh. E-5, p. 43; Schupp WT.

245. Current flow levels in Puolua stream, even after the 2008 IIFS decision, still do not provide a volume of water that is consistently cool enough to support healthy kalo. Mr. Schupp therefore does not now have enough water available in Puolua Stream to grow healthy kalo on his kuleana. Schupp WT.

c. Site B 2008 IIFS

190. The CWRM also adopted a flow standard of four hundred and ten-thousand gallons per day (410,000 gpd) on Hanehoi stream below the New Haiku Ditch diversion works to provide water for downstream users, such as Ms. Caveny, and for the stream. Both of these recommended restoration flow levels were adopted by the CWRM. A diagram of the release points described above is shown on Exh. E-7, p. 26.

d. Site B: Water Not Supplied to Meet Standard

191. In spite of this action, there currently is rarely any water in Hanehoi Stream downstream of the New Haiku Ditch diversion works. Caveny WT.

192. No monitoring of the stream flows on Hanehoi stream below the New Haiku Ditch, has taken place since 2009 when a report was made to the Commission which concluded that the IIFS that affects Ms. Caveny's property was not being met. Exh. 10, pp. 36 and 46; Caveny WT.

e. Site C 2008 IIFS

193. The CWRM adopted an amended interim instream flow standard ("IIFS") for Hanehoi stream in September 2008. CWRM adopted a flow standard of .74 mgd seven-hundred and forty-thousand gallons per day (740,000 gpd) on East Hanehoi stream at the pool on Hanehoi Stream above the Lowrie ditch to provide water for the Huelo community water pipe, the stream itself and downstream users. Caveny WT; Written Testimony of Christa A. Morf; Written Testimony of Michael D'Addario.

f. Site C: Water Not Supplied to Meet Standard

194. In spite of this action, there currently is rarely any water in Hanehoi Stream downstream of the Lowrie Ditch diversion works. Caveny WT.

195. The most recent Water Commission East Maui stream monitoring report that Mr. D'addario was able to find online that mentioned Hanehoi stream was dated September 2009. Exh. E-10, pp. 36 and 46. The amount of flow set to serve our community pipe never came even near to being met. D'Addario WT.

196. We do not believe that stream flow level has been fully implemented on Hanehoi Stream, because the water volume available for the Huelo community pipe did not increase, but rather seemed to diminish over the past several years, except in times of heavy rains. Morf WT.

197. Hale Akua does not believe that stream flow level has been fully implemented on East Hanehoi Stream, because the water volume available in the pool for the Huelo community pipe did not increase, but rather seemed to remain low, or diminish over the past several years, except in times of heavy rains. D'Addario WT.

198. Because Hanehoi Stream is totally dewatered, there is not enough water in the East Hanehoi Stream pool above Lowrie ditch diversion to serve all the homes who have traditionally depended upon the Huelo community water pipe and there does not appear to be enough water for the stream itself to survive. D'Addario WT.

199. The September 2008 CWRM decision specified .74 mgd of instream flow to accommodate the Huelo pipe and its community users. That level has not been reached with the present diversions and it is likely that it would not prove adequate for both the domestic and kuleana users and the needs of the stream ecology itself. D'Addario WT.

200. As a consequence, Mr. D'Addario and around 15 other households who have customarily had access to domestic water from Hanehoi stream the Huelo community water pipe, and have historically depended upon the water from the Huelo community pipe, have not been able to do so for a number of years, since there simply is not enough water to go around. D'Addario WT.

201. While the CWRM staff noted the importance of having greater flows from Puolua stream to Hanehoi stream, they did not take the most logical action, which was to require far less water to be diverted from Puolua Stream at the upper Lowrie Ditch. Schupp WT.

202. Although ongoing monitoring and "adaptive management" of Puolua Stream were required as part of the IIFS agreements, the only monitoring of the adequacy of flows on Puolua stream that happened was in the first year after the IIFS was set. Schupp WT.

203. In 2008 the CWRM determined that 1.79 mgd of water should be returned to Hanehoi AND Puolua Streams at certain locations. According to the CWRM staff recommendation of September 24, 2008, which was adopted by the Commission, an Interim Instream Flow Standard (IIFS) was set for .41 mgd for Hanehoi Stream below Haiku Ditch. Exh. E -7, p. 26; Written Testimony of Solomon Lee, Jr.

204. This stream flow should have served to provide water for Mr. Lee's kuleana lands: TMK (2) 2-9-0008:007 (1.04 ac. of kalo lo'i) and (2) 2-9-0008:035 (.31 ac. of kalo lo'i) both of which are a short distance downstream (makai) of the New Haiku Ditch where the flow was supposed to be restored. The Lee family saw no real return of water to the stream after this decision was made. The Lee family was not contacted to participate in any review of the monitoring of stream conditions that was promised and required by the September 2008 CWRM IIFS decision, even though the Lees had registered their uses with the CWRM in 1989 and were the nearest kuleana parcels to the proposed IIFS release. Lee, Jr WT.

205. The proposed IIFS measures, if indeed they were ever implemented, are not sufficient for Solomon Lee, Jr.'s family to have access to enough water to grow kalo on the three acres of land Solomon Lee, Jr.'s kupuna cultivated for years. Lee, Jr WT.

III. PUBLIC TRUST INSTREAM USES OF EAST MAUI STREAM WATER

206. The water uses of East Maui streams support a variety of important instream uses consistent with the historic cultural uses of the resources of the East Maui region.

A. Maintenance of Aquatic Life and Wildlife Habitats

207. The maintenance of aquatic life and habitats is an essential instream use of stream water.

208. Native amphidromous animals in Hawaiian streams share similar life history traits. In general the animals have an oceanic larval phase where they develop in the open ocean for up to six months. This is followed by recruitment to stream as the larvae metamorphose to postlarvae. The postlarvae then migrate upstream to suitable habitat and complete their development into juvenile animals. The newly hatched larvae drift downstream back to the ocean to undergo their oceanic larval phase. As a general model, the important phases can be separated into (1) oceanic larval phase, (2) recruitment, (3) upstream migration, (4) instream habitat, and (5) downstream migration and drift. HSHEP Report (2009) attached to Parham WT at p. 5 (HSHEP Report).

209. When considering instream flow quantities to support stream animals, it is axiomatic that 100% flow restoration to natural undiverted flow would be best for native stream animals. Parham, Tr. 3/16/15, p. 95, l. 1-4.

210. From a system optimization perspective, enhancing passage, avoiding entrainment, and restoring habitat should all be maximized together to achieve the best "ecological impact" for the smallest "restriction of use" of the water. Parham WT at ¶ 14.

211. Stream diversions influence instream habitat in several ways including the physical structure that replaces the local instream habitat as well as the decrease in habitat area as a result of the removal of water from the downstream channel. HSHEP Report at p. 14.

212. Stream diversions result in two separate mechanisms to prevent or reduce downstream migration and drift. Stream diversion may result in the dewatering of a section of stream. The dewatered stream section is a disruption of the physical connection of upstream sections with downstream sections preventing the passage of adults moving downstream or newly hatched larvae drifting into the ocean. HSHEP Report at 17.

213. Stream diversions also may, depending on the design of the diversion structure, entrain both adult and larval animals and remove them from the stream population. Many diversion structures on Hawaiian streams divert water through a grate into a diversion ditch. Typical stream diversion structures divert 100% of the water at low to moderate flows. Under these conditions, 100% of downstream moving individuals would be entrained by the diversion. As stream flows overtop the diversion, a portion of the animals would likely pass the diversion and continue downstream. HSHEP Report at 18.

1. The USGS Reports estimate flow requirements for thriving stream habitats for aquatic species

214. The hearings officer called a representative of the the United States Geological Service ("USGS") to testify on behalf of the Commission on stream restoration to support amphidromous species. Minute Order No. 9 (9/9/14).

215. Dr. Stephen B. Gingerich submitted written testimony to the Commission as the representative for USGS on November 3, 2014 and testified orally on March 3, 2015. Gingerich, WT (11/3/14); Gingerich, Tr. 3/3/15, p. 49-132.

216. Dr. Gingerich is a research hydrologist at the USGS who studied East Maui streams since 1997. Gingerich WT p. 1; Gingerich, Tr. 3/3/15, p. 49, l. 12-14; p. 50 l. 14

217. The two USGS reports published in 2005, one on low flow characteristics of streams in East Maui and the effects of surface water diversions on native habitat for native species, provided USGS' main written testimony. Gingerich, Tr. 3/3/15, p. 49, l. 16-23; See, *supra*, USGS Rpt. 2005-5262, USGS Rpt. 2005-5213.

a. The Streamflow Study

218. The first study was intended to use field measurements and existing stream gage data from historic measurements to get an estimate of current low flow conditions in the streams and then to use existing data to come up with what USGS projected would be the normal conditions without diversion. Gingerich, Tr. 3/3/15, p. 57, l. 6-14.

219. USGS Rpt. 2005-5262 details flow conditions, using field measurements and existing stream gage data from historic measurements to estimate current low flow conditions in the streams, i.e., to project normal conditions, i.e, without diversion. Gingerich, Tr. 3/3/15 at p. 57, ll. 5-14, 19-20.

220. During the design of the stream study, EMI's stream scientists suggested that the "best way" to conduct the study would be for the USGS researchers to take measurements of the actual observed effects on changes to habitat availability resulting from controlled releases by EMI of diverted stream water back into the study area. *Id.* at p. 54, ll. 10-16.

221. However, when USGS researchers attempted to follow that recommendation, they were unable to secure EMI agreement to deliver the controlled release of water for actual measurement by USGS researchers of the associated effects on habitat availability because EMI refused for alleged safety and cost reasons. *Id.* (17-21).

222. The USGS researchers could have enhanced the certainty of, and had more confidence in, the predicted amount of habitat area restored due to any given restoration of streamflow had they been able to take actual measurements of the observed effects on changes to habitat availability if EMI conducted controlled releases of diverted stream water as requested. *Id.* at p. 56, ll. 14-20.

223. Because the diversions had been in place for over a century, USGS had no records as to what undiverted conditions would be like so the first report documented USGS' estimates of current versus undiverted conditions. Gingerich, Tr. 3/3/15, p. 57 at 15-20.

224. In the absence of controlled releases, USGS began its study by using records of daily mean flows to determine flo-duration, low flow frequency, and base flow statistics for continuous-record stream-gaging stations in the study area following USGS established standard methods. Duration discharges of 50- and 95- percent were determined from total-flow and base-flow data for each continuous record. Gingerich WT at 1.

225. In order to compare streamflow records to each other, records were adjusted to concurrent periods, so that differences between the records were due to differences in climatic or drainage-basin characteristics and not to the fact that the records cover different times. Gingerich WT at 1.

226. The index-station method was used to adjust all of the streamflow records to a common period with the gaging station on West Wailuaiki Stream, which was chosen as the index station because of its record length (1914-2003) and favorable geographic location near the middle of the study area. Gingerich WT at 1.

227. For the drainage basin of each continuous-record gaged site and selected ungaged sites, morphometric, geologic, soil, and rainfall characteristics were quantified using GIS techniques. Gingerich WT at 2.

228. Regression equations relating the streamflow statistics to basin characteristics of the gaged basins were developed using ordinary-least-squares regression analyses. Gingerich WT at 2.

229. Rainfall rate, maximum basin elevation, and the elongation ratio of the basin were the basin characteristics used in the final regression equations for 50-percent duration total flow and base flow. Gingerich WT at 2.

230. Rainfall rate and maximum basin elevation were used in the final regression equations for the 95-percent duration total flow and base flow. The proportion of the variation in the dependent variable that is explained by the independent variables (R^2) ranged from 94.9 to 75.3 percent, with the highest flows having the highest R^2. *Id.*

231. Standard errors of prediction ranged from 20.9-56.5 percent, with the highest flows having the lowest errors. The relative errors between observed and estimated flows ranged from 11 to 20 percent for the 50-percent duration total flow and from 29-56 percent for the 95-percent duration total flow and base flow. *Id.*

232. The regression equations developed for the USGS study were used to determine the 50-percent duration total flow, 50-percent duration base flow, 95-percent duration total flow, and 95-percent duration base flow at selected ungaged sites within the study area and at three gaging stations west of the study area using the appropriate basin characteristics. Estimated streamflow, prediction intervals, and standard errors were determined for 47 ungaged sites for which observed values of 95-percent duration discharge of total flow were available. *Id.*

233. Overall, East of Ke'anae Valley, the 95-percent duration discharge equation generally underestimated flow, and within and west of Ke'anae Valley, the equation generally overestimated flow. *Id.*

234. Most-reliable estimates of natural (undiverted) and diverted streamflow flow-duration statistics and gaged and ungaged sites on 21 of the 27 streams in the study area were made using a combination of continuous-record gaging-station data, low-flow measurements, and values determined from the regression equations developed as part of the USGS study. *Id.*

235. Average reduction in the low flow of streams due to diversions ranged from 55 to 60 percent. Gingerich WT at 2.

236. Controlled releases of the study streams would have allowed the USGS to observe actual undiverted flows rather than rely on estimates. Gingerich, Tr. 3/3/15, p. 56, ll. 14-25.

b. The Habitat Study

237. The second USGS study applied a habitat selection model for fish, the Physical Habitat Simulation System (PHABSIM) to simulate habitat/discharge relations for various species and life stages and to provide for quantitative habitat comparisons at different streamflows of interest. Gingerich WT at 2.

238. Habitat selection models are widely used to evaluate habitat quality and predict effects of habitat alteration on animal populations. Gingerich WT at 2.

239. The PHABSIM has been a basis for management decisions at hundreds of water projects in many countries, and similar approaches are widely used for managing terrestrial wildlife habitat. *Id.*

240. The PHABSIM model incorporates hydrology, stream morphology and microhabitat preferences to create relations between streamflow and habitat availability. *Id.*

241. For its study, the USGS selected three elevations in five of the 27 streams (Waikamō`ī, Honomanu, Wailuanui, Kopiliula, and Hanawi Streams) as representative streams and reaches for intensive study on the basis of several factors, including the amount of flow downstream of major surface-water diversions, stream terminus, impacts from human activities, existing hydrologic and biologic data, geographic location, and access. The five streams represented most of the range of hydrologic conditions encountered in the study area. Gingerich, Tr. 3/3/15, p. 57, l. 21 to p. 58, l. 7; Gingerich WT at 2.

242. On each of the five selected streams, representative reaches were selected: one above the main diversion at Koolau/Wailoa Ditch, one at a medium elevation of about 500-feet, and one at the coast near the mouth of the streams. Gingerich, Tr. 3/3/15, p. 58, ll. 4-7; Gingerich WT at 2.

243. The study focused on some of the native fish, snails, and shrimp species found in Hawaiian streams. Three of the five native fish species were observed in sufficient abundance for consideration in the study, namely the endemic gobies 'alamo'o, and nōpili, and the indigenous goby nākea. The 'akupa was not observed in abundances large enough to consider and the teardrop goby was not observed in the study. The hīhīwai and 'ōpae abundances were sufficient to study. Gingerich WT at 2.

244. The study involved 300- to 500-ft lengths of channel at each of the intensively studied reaches on the five intensively studied streams to collect data that could be used for habitat modeling of the reaches. The USGS set up transects and measured native species and then measured the habitat, speed and velocity of the water, and the depth of the water that they lived in. Gingerich WT (10/31/15) at 2-3; Gingerich, Tr. 3/3/15, p. 58 l. 8-11.

245. The USGS' intensive study and subsequent habitat modeling was limited to five reference streams. The effects of streamflow on habitat in other streams was estimated using information gathered using field reconnaissance, aerial digital photography of the streams, and geographic information systems (GIS) analysis of stream and stream-basin characteristics. Gingerich WT (10/31/15) at 3.

246. The availability of aquatic habitat for the different reaches was estimated for diverted and undiverted conditions at the intensively studied stream sites using PHABSIM. Hydrologic data, collected over a range of low-flow discharges, was used to calibrate hydraulic models of selected transects across the streams. *Id.*

247. The models were then used to predict water depth and velocity (expressed as a Froude number, a combination of depth and velocity) over a range of discharges up to estimates of natural median streamflow. *Id.*

248. The biological importance of the stream hydraulic attributes was then assessed with the sustainability criteria for each native species and life stage (adult and juvenile 'alamo'o, adult and juvenile nopili, adult nakea, hīhīwai, and opae) developed as part of the study to produce a relation between discharge and habitat availability. *Id.*

249. The results of the PHABSIM modeling were presented in plots showing the area of estimated usable bed habitat over a range of streamflow that included the diverted and natural base-flow estimates. The results were also presented as habitat relative to natural conditions with 100 percent of natural habitat at natural median base flow and 0 percent of habitat at 0 streamflow. *Id.*

250. In general, the plots show a decrease in habitat for all species as streamflow is decreased from natural conditions. *Id.*

251. Habitat-duration curves show the percentage of time that indicated habitat conditions would be equaled or exceeded and are based on the available estimates of flow duration at each stream reach developed earlier in the study for Q50 and Q95 of total flow and base flow. Gingerich WT at 4.

252. The PHABSIM modeling results from the intensively studied streams were normalized to develop relations between the relative base flow in a stream at diverted conditions and the resulting amount of habitat available in the stream. The relations can be used to estimate relative habitat for diverted streams in the study area that were not intensively studied. The relations are valid for streams that are not dry. *Id.*

253. The PHABSIM model results indicate that the addition of even a small amount of water to a dry stream has a significant effect on the amount of habitat available. *Id.*

254. The effects of streamflow on habitat in non-intensively studied streams was estimated using information gathered using a variety of techniques, including the use of the relation between streamflow diversion and habitat change and the field reconnaissance, aerial digital photography of the streams, and GIS analysis of stream and stream-basin characteristics. *Id.*

255. Dry stream reaches are "bottlenecks" to any species migration, and changes in habitat in upstream reaches are not relevant if the species cannot migrate upstream to inhabit these reaches. *Id.*

256. Many factors that affect the presence of native aquatic species in northeast Maui were beyond the scope of the USGS study and were not addressed, including:

- What is the effect of alien species on the migration and living condition of the native species?
- What is the fate of animals upon reaching a dry stream reach during upstream migration?

- At what rate and at what locations will native species population return to natural levels if diversions were removed?
- Why were opae seen in abundance above the major diversions but alamoo were not observed at all?
- To what extent to native and alien species use the diversion ditches and tunnels for migration between streams?
- What is the effect of taro loi on the migration and life cycle of native species?
- what are the effects of stream diversions on native aquatic insect species?

Gingerich WT at 4.

257. The USGS' study was not designed to address other considerations for instream flow standards such as offstream uses, taro cultivation, or aesthetics. Gingerich WT at 5.

258. The USGS' study results and modeling for various levels of natural median base flow concluded that, for East Maui streams, 64-percent of the natural median base flow (BFQ50) was required to provide 90-percent of the natural habitat. The flow requirements for each stream reach were provided by the USGS in terms of cubic feet per second for all petitioned streams except for Piinaau, Honopou, Hanehoi. Gingerich WT at 6-8 (summary table).

2. DAR's Parham-Higashi Study

259. The hearings officer called a Department of Aquatic Resources representative to testify at the contested case hearing. Minute Order No. 9 (9/9/14).

260. DAR is the primary steward for all living freshwater, estuarine and marine resources in the State of Hawaii Hawaii. DAR Stream Survey briefing (9/07) at 2.

261. Biologists at DAR have had a history of collaboration with researchers at various universities, agencies, museums, and private companies in an attempt to understand the different aspects of the ecology and management of amphidromous stream animals in Hawai`i. Parham, Higashi, et al., The Use of Hawaiian Stream Habitat Evaluation Procedure to Provide Biological Resource Assessment in Support of Instream Flow Standards for East Maui Streams (11/20/09) at 1.

262. Glenn Higashi, the DAR representative, has been an aquatic biologist with the DLNR's DAR for 29 years provided written testimony and testified orally at the proceedings. Written Testimony of Glenn Higashi at ¶1.

263. Higashi worked on freshwater systems for 24 years on Hawaiian streams and coordinated multiple stream-related databases for DAR. Higashi serves as the State representative

on Instream Flow Council and is a steering committee member for the Hawaii Fish Habitat Partnership. Higashi WT at ¶1.

264. Dr. James E. Parham is a research hydrologist and aquatic biologist with the Hawaii Biological Survey at Bishop Museum since 2005 and testified as a joint representative of DAR. Written Testimony of Dr. James Parham at ¶1.

265. Dr. Parham has a Ph.D. and M.S. in Biology and a B.S. in Fisheries Management. He is a Certified Fisheries Scientist and serves as the Past President of the Tennessee Chapter of the American Fisheries Society. *Id.* at ¶2.

266. Dr. Parham is the lead developer of the Hawaiian Stream Habitat Evaluation Procedure (HSHEP) model that is used to quantify impacts to native amphidromous stream animal habitat. *Id.* at ¶3.

267. DAR in collaboration with the Bishop Museum co-authored an assessment report pertaining to the quantification of the impacts of water diversions in East Maui streams on native stream animal habitat using the Hawaiian Stream Habitat Evaluation Procedure. Parham, Higashi, et al., The Use of Hawaiian Stream Habitat Evaluation Procedure to Provide Biological Resource Assessment in Support of Instream Flow Standards for East Maui Streams (November 20, 2009) (hereafter, "East Maui Streams HSHEP Report"); Higashi WT at ¶2; Higashi WT Appendix A; Parham WT at ¶5.

268. Dr. Parham served as the lead author of the East Maui Streams HSHEP Report. *Id.* at ¶6.

269. The general purpose of the HSHEP report was to:

- explain the influence of stream diversion on the distribution and habitat availability of native stream animals;
- provide documentation for the HSHEP model's design, underlying data structure, and application;
- show changes in habitat availability for native amphidromous animals on a stream by stream basis; and,
- prioritize habitat and passage restoration actions among the streams of concern in East Maui.

Higashi WT, Appendix A at 3; Parham WT at ¶8.

270. Dr. Parham provided guidance in modeling and analysis for DAR, however, DAR made the ultimate recommendations for actions to the Commission. Parham, Tr. 3/16/15, p. 38, l. 2-21.

271. The DAR's 2009 report addressed only the 19 streams considered by the Commission in 2009 and 2010 for which taro cultivation was not a concern even though modeling runs included all 27 streams at the direction of CWRM. Higashi WT at ¶19; Parham WT at ¶7.

272. The East Maui Streams HSHEP Report addressed three broad areas associated with impacts on native stream animals' habitat resulting from the water diversion projects: loss of habitat as a result of water diversion, barriers to animal movement and migration resulting from the diversion structures, and entrainment of animals in the diversion ditches. Parham WT at ¶9.

273. The HSHEP model used information contained in the DAR Aquatic Surveys Database to describe the probability of a species' occurrence at the watershed, reach, and site scales. Observations from over 8,000 sites across the state were used to describe suitable habitat for native stream animals. Parham WT at ¶10.

274. The HSHEP model results predict that restoration of stream flows to the East Maui Streams will have varying impacts on the of stream animal habitat with respect to each species and all species combined into an overall native species group. Some streams would have little habitat gains while others would have substantial gains in Habitat Units. Parham WT at ¶11.

275. The HSHEP results reflects that not all species are expected to occur in all sites within a stream, that suitable habitat varied among species within different streams and that extent of flow diversion was different among streams. Parham WT at ¶11.

276. The model predicted that, of the 19 studied streams, Honomanu, Puohokamoa, and East Wailua Iki streams had the greatest potential for restoration of native species in habitat units. *Id.* at ¶12.

277. The model results demonstrated the need for both habitat and passage to achieve suitable habitat for native amphidromous animals in East Maui Streams. Parham WT at ¶13.

278. Parham and DAR recommended modification of all existing diversions on the streams it selected to recommend for restoration to increase suitable instream habitat, minimize the entrainment of larvae, and to allow for animal passage for recruiting post-larvae. Higashi WT at ¶8; Parham WT at ¶13.

279. DAR concluded that flow improvement would likely increase recruitment. Higashi WT at ¶15.

280. DAR determined that many of the diversions utilize a grate that extends across the width of the streambed. As the water comes down, the total flow goes into the grate and no water passes over the diversion, so that all the water is taken into the diversion and then moved off laterally. Those structures in particular are the types of structures that result in nearly 100% entrainment. This means that, even if the organisms are recruited, the benefits would not be realized because they would be lost. Higashi WT at ¶ 18.

281. DAR concluded that a partial bypass of the grate was needed so that a certain amount of water could flow over a portion of it to provide a fish and animal passage corridor so that some proportion of the species could make it back downstream. Higashi WT at ¶ 18.

282. DAR concluded that, based on USGS study results, 64- percent of natural BFQ50 is necessary to provide enough water in the stream for the animals to make a difference in habitat, connectivity, and biota. Higashi WT at ¶ 32.

283. Certain streams area used by EMI to convey ditch water from one ditch to another. In that portion of the stream used for conveyance, stream water and ditch water are commingled. CWRM Staff Submittal (5/25/10) at 20; Higashi, Tr. 3/16/15, p. 168, l. 24 to p. 169, l. 2.

284. DAR considered commingling as a factor in determining streams to recommend for restoration and, contrary to the CWRM staff's rejection of those streams for restoration, DAR recommended restoration. Higashi, Tr. 3/16/15, p. 168, l. 24 to p. 169, l. 2.

285. In doing so, DAR recommended methods to modify the diversions to address the biological concerns about introducing alien species from one stream to another. When the CWRM recommended no restoration to Kopiliula Stream, Haipuaena Stream and Puohokamoa Stream based on their use for conveyance in 2010, it did not consult with DAR to determine whether any concerns of commingling could be addressed with modifications to the system. Higashi, Tr. 3/16/15, p. 171, ll. 13-24.

286. Accordingly, the use of a stream for conveyance of ditch water is not a basis to avoid restoration to conveyance stream.

287. Losing reaches are areas in a stream in which water goes underground, making that area of the stream reach unavailable to stream species for habitat. Parham, Tr. 3/16/15, p. 118, l. 7-15.

288. The DAR considered losing reaches in streams including Honomanu and changed its recommendations for restoration to certain streams based on that information. Higashi, Tr. 3/16/15, p. 162, l. 17 to p. 163, l. 20.

289. After hearing that a diverted stream with a losing stretch such as Honomanu Stream may recover and become continuous after restoration over a period of time, the DAR experts agreed that such information would lead them to reconsider their recommendations. Parham, Tr. 3/16/15, p. 86, l. 12 to p. 87, l. 21; Higashi, Tr. 3/16/15, p. 163, ll. 12-25.

290. Accordingly, a losing stretch in a diverted stream is not a basis to avoid restoration to that stream.

291. The HSHEP Report provided DAR's results for 19 of the 27 streams and determined that restoration of streamflows would increase local habitat and improve fish passage that would improve stream conditions for native species for all 16 streams covered by its report except Ohia Stream which is not diverted. Parham, Tr. 3/16/15, p. 83, l. 15 to p. 93, l. 2.

292. For the remaining 8 streams used to irrigate taro, Dr. Parham expected similar results: that restoration of flow to the remaining 8 streams will increase local habitat and improve fish passage that would improve stream conditions for native species. Parham, Tr. 3/16/15, p. 93, l. 3 to p. 94, l. 18.

293. Applying the USGS' estimate flows 64 percent of base flows to support 90 percent of instream habitat recovery is a reasonable starting point for the Commission's analysis in setting amended IIFS. See Nā Wai Eha, 128 Haw. 228, 252; 287 P.3d 129, 153 (2012) (holding that it was not error for the Commission to use USGS proposed flows for controlled releases as a starting point for its analysis in setting amended IIFS).

294. The Commission finds that the SWCA White Paper entitled, "Status of Native Hawaiian Microfauna in East Maui Streams and Biological Considerations for the Amendment of Interim Instream Flow Standards in Selected Streams (IIFS), by John Ford, Steven Carothers, and Robert Kinzie dated June 2009 submitted as Exh. C-66 by A&B/EMI to support status quo IIFS levels in East Maui streams is unpersuasive.

3. Instream Habitat of Petitioned Streams

a. Honopou Hydrologic Unit

295. The Honopou hydrologic unit lies with in the Honopou aquifer system that has an area of 17.8 square miles. Instream Flow Assessment Report ("IFSAR"), Island of Maui, Hydrologic Unit 6034, Honopou (March 2008) ("hereinafter referred to as IFSAR Honopou (2008)") at 17. The baseflows of the stream especially at the lower reaches are currently unknown. Exh. HO-1.

296. The USGS operates four continuous record stations on Honopou Stream, only one of which was still taking active measuresments as of 2008 (station 16587000). IFSAR Honopou (2008) at 29. Using a regression equation analysis, the USGS calculated that median base flows (BFQ50) at the middle reach of Honopou (595 feet in elevation) to be 6.51 cfs and at the lower reach near the coast at 12.63 cfs. *Id.* at 32.

297. To meet the 64 percent minimum habitat requirements, the IIFS for Honopou at its middle and lower reach, according to the USGS information, must be **no less than 4.1664 cfs at the middle reach and 8.08 cfs at the lower reach.**

298. Two IIFS locations were set for Honopou Stream at Site A and B for the following amounts:

Site A (located downstream of Ha'iku Ditch – **2.00 cfs/1.29** mgd

Site B (located near 40 feet elevation) – **0.72 cfs/0.47** mgd

Exh. HO-1. The Commission's table states that the baseflows are uknown and that the minimum flow for H90 is also unknown. *Id.*

299. The Honopou watershed supports some native species including one species of the endangered damselfly *Megalalgrion pacificum*. DAR determined that "Honopou has the potential to sustain much larger populations of native species than are currently observed" in its June 2008 report prepared for the CWRM. It also concluded that "[t]he amount and availability of suitable habitat for adult amphidromous animals may be enhanced by increased flows and increased stream connectivity." DAR Report on Honopou Stream, Maui, Hawai'i (June 2008) at 1-3.

b. Hanehoi

300. The Division of Aquatic Resources (DAR) report on Hanehoi Stream prepared for the CWRM in June 2008 factually sets out the problem and the solutions facing Hanehoi. Hanehoi Hydrological Unit is a small watershed of one-and-a-half square miles (1.5 sq miles,). It has been dewatered so much, by so many EMI diversions, for so long, that it has become an **artificially intermittent stream.** Exh. E-5, p. 2.

301. The DAR Hanehoi Watershed Report (June 2008) commented on the extremely dewatered condition of the stream. These stream experts observed:

> ...diversions resulted in an increased frequency of dry or shallow sites as compared to streams statewide.

and:

> the stream was shallower downstream of diversions then would be expected in a normal stream

and concluded:

> the stream is now nearly permanently intermittent as a result of water diversions....The intermittent nature of this stream currently reduces habitat and restricts instream migration for the native animals. A more consistent flow would reconnect habitats and allow for upstream migration of native species. (Emphasis added)

Exh. E–5, pp. 2-3.

302. Repeated Hanehoi diversions at various elevations have resulted in a very shallow stream habitat, creating abnormal stream conditions where it is difficult or impossible for native stream life to survive. Exh. E-5.

303. The DAR report states:

> The diversions resulted in an increase frequency of dry or shallow sites as compared to streams statewide. The distribution of depths in comparison to elevation showed that the stream was shallower downstream of diversions than would be expected in a normal stream. This is likely restricting habitat for climbing native amphidromous animals.

Exh. E-5.

304. The Department of Aquatic Resources ("DAR") staff photographed this arrangement during their 2008 field survey and used the pictures in of their "Report on Hanehoi Stream Maui, Hawai'i" from June 2008, prepared for CWRM/ DLNR. Exh. E-5, at 42-43; Written Testimony of Ernest Schupp.

305. The 2008 DAR Hanehoi Stream Report specifically pointed to this problem at the Puolua stream pipe at Lowrie ditch. The photo caption under a photo of the Puolua pipe states that such pipe overpasses:

> make it difficult or impossible for upstream migration of native animals except at flood flows when the diversion is completely overtopped by the stream flow.

Exh. E-5 at 42.

306. The 2008 DAR Hanehoi Stream Report specifically pointed to this problem at the Puolua stream pipe at Lowrie ditch. The photo caption under a photo of the Puolua pipe states that such pipe overpasses:

> make it difficult or impossible for upstream migration of native animals except at flood flows when the diversion is completely overtopped by the stream flow.

Exh. E-5 at 42.

307. Pipes, such as those found on Puolua Stream at Lowrie Ditch, should not be used for bypass of stream diversions since they prevent migration of native streamlife. Schupp WT.

308. Mr. Schupp recommended that a "trough style" low flow bypass be installed at any diversion on Puolua stream, rather than pipes. Such a bypass was installed at the Haiku Ditch diversion on Honopou stream and is shown in the photos in Exh. E-6, A and B; Schupp WT.

309. Wildlife experts have recommended that the **two four inch (4") pipes in the Lowrie Ditch diversion works** at **Hanehoi Stream** be replaced by a more natural channel for water to bypass the diversion and return to the stream. Such a structure was added to Honopou stream at EMI's Haiku Ditch. Exh. E-6, A & B. But this has not been implemented on Hanehoi or Puolua streams. Neola Caveny Written Testimony.

310. Above the highest diversions on Hanehoi stream, DAR found a completely different stream with a rich variety of native insects, including the endangered *Megalagrion pacificum* damselfly. Written Testimony of Lucienne de Naie. Exh. E-6.

311. Since a stream flow pathway to the undiverted reaches of the stream does not exist most of the time, native stream life has no way to reach these upper reaches of the stream where they may survive. De Naie WT.

312. The Sierra Club is concerned that the endangered native Hawaiian damselfly Megalagrion Pacificum, which has been found above the diversions on Hanehoi stream, is being deprived of the vitally needed opportunity to expand its habitat range along the other nearby reaches of the stream, due to the extreme dewatering of HANEHOI below the upper diversions. De Naie WT.

313. If this rare damselfly had adequate natural habitat areas provided to allow it to survive at lower elevations, it would greatly enhance our opportunities for nature study and environmental education. De Naie WT.

c. Waikamoi Hydrologic Unit

314. The hydrologic unit of Waikamoi includes Waikamoi as well as **Alo** and **Wahinepe'e** Streams and is a small, narrow watershed that DAR rates "high" in comparison to other watersheds both on Maui and Statewide. DAR Report on Waikamoi Stream (August 2009) at 2. At the time of its 2009 study, the diversions were removing 100 percent of the stream flow. *Id.*

315. In general, for Waikamoi Stream, almost all habitats for native species (97-99%) were predicted to be lost, with approximately 30% to 60% of that loss due to diversions and the rest due to entrainment issues. Higashi WT, Appendix A (HSHEP Report 11/20/09) at 69 (pdf p. 89).[13]

316. DAR concluded in its study that improvements to the diversion structure to increase upstream and downstream passage would enhance overall productivity of Waikamoi Stream. *Id.* at 3. DAR recommended restoration at the Wailoa Ditch intake (W-2), the Spreckles Ditch Intake (S-10), and the Center Ditch Intake (C-1).

317. The estimated natural flow for Waikamoi Stream is **6.60 cfs/4.26 mgd**. USGS estimates for 64% of base flows required to support 90% habitat is **4.20 cfs/2.71 mgd**. The current IIFS for Waikamoi is set at **2.80 cfs/1.81 mgd**, too low to support even the basic minimum requirements for instream habitat to support aquatic species. Exh. HO-1 as revised on 3/31/15.

d. Puohokamoa Hyrdologic Unit

318. Puohokamoa is a small watershed that has been surveyed numerous times in different ways beginning in 1962 to the present. DAR's 2009 study concluded that Puohokamoa had "good potential stream habitat in the middle and upper reach for 5 native fish and invertebrate species" but that "the majority of native species habitat was lost to water withdrawals." DAR, Report on Puohokamoa Stream Maui, Hawai'i (August 2009) at 6.

319. The estimated natural flow for Puohokamoa Stream is **8.40 cfs/5.43** mgd. Exh. HO-1. USGS estimates for 64% of base flows required to support 90% habitat is 5.40 cfs/3.49 mgd directly downstream of the second diversion. Gingerich WT at 7.

320. The current IIFS for Puohokamoa Stream is set at **0.40 cfs/0.26** mgd. Exh. HO-1 as revised on 3/31/15.

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[13] Appendix A attached to the Testimony of Glenn Higashi is the report entitled, "The Use of Hawaiian Stream Habitat Evaluation Procedure to Provide Biological Resource Assessment in Support of Instream Flow Standards for East Maui Streams" by James Parham, Ph.D. Glenn Higashi, et. al. for DAR dated November 20, 2009. The Report does not show page numbers, therefore the page number listed is the actual page of the report and the pdf page number is the page in the pdf for the testimony of Glenn Higashi for ease of reference.

321. Puohokamoa Stream has 4 major and 3 minor diversions by EMI and 4 major and 9 minor diversions by Maui County, serving the Upper and Lower Kula Pipelines. CWRM Staff Submittal (5/25/10), Exh. 1 at 1-5. Where surveyed by DAR, the diversions removed 100 percent of the flow. Higashi WT, Appendix A (HSHEP Report) at 70 (pdf p. 90).

322. DAR recommended restoration to Puohokamoa Stream in 2010, concluding that restoration would improve continuity of the stream and "substantially increase the availability of habitat for native species." *Id.* at 7. DAR recommended restoration at the Ko'olau Ditch intake (K-33), the Spreckles Ditch Intake, and the Manuel Luis Ditch Intake (ML-3). CWRM Staff Submittal (5/25/10), Exh. 1 at 1-5.

e. Haipuaena Hydrologic Unit

323. Haipuaena is a small watershed mostly zoned for conservation that has 2 major and 7 minor diversions and 2 major and 9 minor diversions by Maui County, and one by the State Parks. CWRM Staff Submittal (5/25/10), Exh. 1 at 1-7. For Haipuaena Stream, in general 55 to 90% of the habitat for listed species was predicted to be lost with about 40% of that loss due to flow diversion and the rest due to entrainment issues. Higashi WT, Appendix A at 70 (pdf p. 90).

324. The estimated natural flow for Haipuaena Stream is **4.30 cfs/2.78 mgd**. Exh. HO-1; Gingerich WT at 7. USGS estimates for 64% of base flows required to support 90% habitat is **2.80 cfs/1.81** mgd. *Id.* The current IIFS for Haipuaena Stream is set at **0.10 cfs/0.06 mgd**, below the amount necessary support even the basic minimum requirements for instream habitat to support aquatic species. Exh. HO-1 as revised on 3/31/15.

325. DAR experts agree that restoration of flow to increase local habitat and improve fish passage would benefit the stream by increasing habitat for native species. Parham, Tr. 3/16/15, p. 85, l. 9-22; Higashi, Tr. 3/16/15, p. 143, l. 14-19.

326. DAR recommended restoration to Haipuaena in 2010 at the Spreckles Ditch intake (S-8) and the Manuel Luis intake (ML-2). *Id.*

327. The CWRM did not vote to restore Haipuaena Stream because it is used to convey ditch water. *Id.*

f. Punalau

328. For Punalau/Kolea Stream in general 60-95% of the habitat instream aquatic species were predicted to be lost in the range of 2.5% for one species to 43.9% of another species of

that loss is due to flow diversion and the rest to entrainment issues. Higashi WT, Appendix A at 71 (pdf p. 91).

329. The estimated natural flow for Punalau Stream is **3.90 cfs/2.52 mgd**. USGS estimates for 64% of base flows required to support 90% habitat is **2.50 cfs/1.62 mgd**. HO-1; Gingerich WT at 7.

330. The IIFS was never amended for Punalau Stream and currently under diverted conditions, the flows are completely diverted directly downstream of the diversion and at **0.60 cfs** at the lower reach.

331. DAR experts agreed that restoration of flow to increase local habitat and improve fish passages would benefit the stream by increasing habitat for native species. Parham, Tr. 3/16/15, p. 85, l. 23-25 to p. 86, l. 1-10. ; Higashi, Tr. 3/16/15, p. 143, l. 14-19.

g. Honomanu

332. Honomanu Stream is noted for its sizeable estuary larger than most of the others in East maui. The watershed rates "high" in comparison to others but it has limited instream habitat for stream animals due to diversions. DAR Report on Honomanu Stream, Maui, Hawai'i (August 2009) at 6-7.

333. The estimated natural flow for Honomanu Stream is **2.80 cfs/1.81 mgd** in its upper reach and all flow is diverted at the Spreckles Ditch intake. CWRM Staff Submittal (5/25/10), Exh. 1 at 1-9.

334. USGS estimates for 64% of base flows required to support 90% habitat is 1.80 cfs/1.16 mgd for the upper reach as shown in CWRM's Exh. HO-1. However, downstream of the diversion at the middle reach, undiverted flow is estimated at 6.7 cfs of which 64 percent is 4.30 cfs, while at the lower reach it is estimated at 9 cfs. Gingerich WT (10/31/14) at 7.

335. Despite the modeling predictions that indicated Honomonu was a prime stream for restoration, after consultation with USGS, DAR ultimately recommended no restoration for Honomanu Stream be left status quo, largely because it believed that the stream was a losing stream with no base flow (dry) at its lowest reach. CWRM Staff Submittal (5/25/10) at 41; Tr. 3/5/15 at 11 (15-25) to 12 (1-20).

336. Yet, despite this staff finding, the USGS estimated that Honomanu would have a base flow of 9 cfs at its lowest reach. *Id.* at 13 (1-6); Gingerich WT at 7 (See Chart p. 2).

337. Confronted with this apparent contradiction, Mr. Uyeno could not be certain where the USGS was measuring the 9 cfs flow. Uyeno, Tr. 3/5/15, p. 13, ll. 1-23.

338. With that uncertainty, he could not rule out the possibility that if current diversions were removed, the stream would have connectivity from the sea to its headwaters from natural base flow. *Id.*

339. The CWRM 2010 East Maui stream IIFS decision stipulated that NO water would be returned to the heavily diverted Honomanu Stream. The May 25, 2010 CWRM staff submittal report makes the following statement:

> Honomanu Stream: The interim IFS below all EMI diversions and just above Hana Highway, near an altitude of 20 feet, shall remain as designated on October 8, 1988. This is equivalent to an estimated flow of 0 based on USGS estimates of total flow at Q95 (TFQ95.)

See Exh. E-50, p. 21.

340. No flow levels were set for any of the four diverted tributaries of the Honomanu Stream above the Honomanu Valley, to restore the scenic grandeur of the upper waterfalls. De Naie WT.

341. The restoration potential of Honomanu Stream is high. The HSHEP offered the following analyses of the restoration potential of Honomanu Stream, ranking Honomanu as the highest candidate for restoration out of the twenty-four streams analyzed:

> From a ranking perspective, Honomanū Stream ranked as the second stream for the amount of potential suitable habitat for native species in comparison with the other streams in this analysis. Overall, the results of the HSHEP model predicted approximately 13.5 km of habitat for all species combined in Honomanü Stream with 99.8% of this lost due to the combined effects of the stream diversion. There is the potential to recover over 13.4 km of habitat units in this stream and it ranked first among all streams in this report for its potential for restoration.

Exh. E-67, pp 71-72 from the November 2009 HSHEP study completed for DAR and Bishop Museum by Parham et al.

342. The USGS report estimates that in the lower reaches of Honomanu restoration of fifty-percent (50%) of base flow or 2.36 mgd would restore the majority (ninety-percent) of habitat in that portion of the stream. From an "on the ground" perspective, this once mighty stream has been so dewatered in its upper reaches that restoring hydrological capacity in the lower section may not respond to a minimal formulaeic approach. Restoration of 3 mgd, or 64% of base flows would seem

the prudent first step to take to return this public trust resource to the public benefits it once provided. De Naie WT.

h. Nua'ailua

343. For **Nua'ailua Stream**, although it is minimally diverted, restoration would decrease entrainment of drifting larvae for native species. Higashi WT, Appendix A at 72 (pdf p. 92).

i. Pi'ina'au

344. The **Pi'ina'au** hydrologic unit includes Piinaau Stream and Palauhulu Stream. Piinaau Stream is dry immediately downstream of Koolau Ditch and actual measurements for the stream are unknown due to its complex geomorphology and a 2001 landslide. CWRM Staff Submittal (9/24/2008) at 30.

345. Piinaau Stream has a rich native species diversity and feeds Waialohe Pond, which provides habitat for estuarine animals. Partial restoration and streamflow and increased continuity in flow would likely increase habitat availability for native animals. CWRM Staff Submittal (9/24/2008) at 30.

346. The estimated natural flow for Piinaau Stream is unknown due to a landslide. Exh. HO-1; Gingerich WT at 7. Minimum flows necessary to support instream habitat are undetermined. *Id.*

347. The estimated natural flow for **Palauhulu Stream** is **3.40 cfs/2.20 mgd** directly downstream of the diversion. Gingerich WT at 7. USGS estimates for 64% of base flows required to support 90% habitat is **2.20 cfs/1.42 mgd**. The current IIFS for Palauhulu Stream is set at **5.50 cfs/3.56 mgd**. Exh. HO-1 as revised on 3/31/15; Gingerich WT at 7.

j. Waiokamilo

348. For **Waiokamilo Stream**, natural flows are estimated **at 4.70 cfs/3.04 mgd**, requiring a minimum of **3.90 cfs/2.52 mgd**, requiring a minimum of **2.50 cfs/1.62 mgd** to support minimum levels of instream habitat for aquatic species. Interim IIFS was set at **4.9 cfs/ 3.17 mgd** in 2008. Exh. HO-1; Gingerich WT at 7.

349. For **Kualani** Stream, the CWRM has limited data on the stream flows. CWRM has previously been unable to determine a flow value as an interim IFS proposal for Kualani Stream.

Apparently, CWRM is also not certain as to Kualani Stream's location. CWRM Staff Submittal (9/24/2008) at 44-46.

k. Wailuanui

350. For **Wailuanui** Stream, is a gaining stream diverted by Ko'olau Ditch. Prior to the amended IIFS set in 2008, the diversion was estimated to reduce natural total flow by 84%. CWRM Staff Submittal (9/24/08) at 51.

351. Natural flow in Wailuanui Stream is estimated at **4.50 cfs/2.91 mgd** by CWRM, *see* Exh. HO-1, while USGS estimates the natural flow at the middle reach to be 6.1 cfs. Gingerich WT at 7. Minimum flows to support 90 percent habitat restoration is estimated at **2.90 cfs/1.87 mgd by CWRM** and **3.9 cfs** by USGS. *Compare* HO-1 to Gingerich WT at 7. CWRM notes that the IIFS is located below the confluence of East and West Wailuanui Streams and that the flow estimate of 4.50 cfs combines the natural streamflow of West and East Wailuanui Streams directly downstream of the Ko'olau ditch diversions. Exh. HO-1.

352. The IIFS as set in 2008 for Wailuanui Stream is **3.05 cfs/1.97 MGD**. Exh. HO-1 (as revised 3/31/2015).

l. West Wailuaiki

353. For **West Wailuaiki Stream**, in general, flow diversion eliminated about 50% of the habitat for the middle reach species. Higashi WT, Appendix A at 73 (pdf p. 93). Entrainment issues associated with the diversions had a large influence on other species. A range of native species was in the stream although substantial loss of habitat was reported below the diversions. *Id.*

354. The estimated natural flow for West Wailuaiki Stream is 6.00 cfs/3.88 mgd. Exh. HO-1; Gingerich WT at 6. USGS estimates for 64% of base flows required to support 90% habitat is **3.80 cfs/2.46 mgd**. *Id.* The current IIFS for West Wailuaiki Stream is set at **3.80 cfs/2.46 mgd** in the wet season, and **at 0.40 cfs/0.26 mgd** in the dry season. The wet season IIFS is set exactly at the USGS calculation for minimum flows sufficient to support 90% habitat restoration. Exh. HO-1 as revised on 3/31/15.

355. Restoration of flow to increase local habitat and fish passages would benefit West Wailuaiki Stream species by increasing habitat for native species. Parham, Tr. 3/16/15, p. 88, l. 18-p. 89, l. 9; Higashi, Tr. 3/16/15, p. 143, l. 14-19.

m. East Wailuaiki

356. For **East Wailuaiki Stream**, in general, the loss of instream habitat was due to water diversion which resulted in about 45% loss of habitat. Lower and middle reach species in East Wailuaiki Stream were mostly affected by entrainment issues. Restoration of flow to increase local habitat and fish passages would benefit the stream species by increasing habitat for native species. Stream restoration would benefit East Wailuaiki Stream and the species within it. Parham, Tr. 3/16/15, p. 89, l. 12 to p. 90, l. 3; Higashi, Tr. 3/16/15, p. 143, l. 14-19.

357. The estimated natural flow for East Wailuaiki Stream is **5.80 cfs/3.75** mgd. Exh. HO-1; Gingerich WT at 6. USGS estimates for 64% of base flows required to support 90% habitat is **3.70 cfs/2.39 mgd**. *Id.* The current IIFS for East Wailuaiki Stream is set at **3.70 cfs/2.39 mgd** in the wet season **and 0.26 cfs/0.13 mgd** in the dry season. Exh. HO-1 (as revised 3/31/15). The wet season IIFS is set at the minimum flow necessary to support instream aquatic habitat. *Id.*

358. East Wailuaiki Stream is **the last location in the world** where the endangered flying earwig Hawaiian damselfly *Megalagrion nesiotes* was found in a 2002 survey below the Ko'olau diversion, near Hana Highway. USFWS Researchers reported that:

> Additional colonies could be present at intermediate elevations [on the same stream] , but these may have escaped detection because the topography of the area makes sampling difficult, as does the tendency of adults to fly low into tangled undergrowth when disturbed.

This information was presented in a USFWS Federal Register report (2007) to support listing the Earwig Damselfly as an endangered species. Exh. E-53; De Naie WT.

359. Hawaii's Comprehensive Wildlife Conservation Strategy Report issued in October 1, 2005 names **East Wailuaiki** as a "key habitat" for the extremely endangered species of damselfly. Exh. E-54.

360. This potential habitat includes areas of the stream that are subject to the EMI diversion structures, where the stream bed habitat needed by the endangered damsel flies can be virtually dry a great deal of the time. The damselflies are aquatic insects and depend upon flowing sections of the stream in their immature stages to survive. De Naie WT.

n. Kopiliula

361. For **Kopiliula Stream**, loss of instream habitats due to diversion resulted in about 20 to 45% loss of habitat with two species mostly affected by entrainments issues. Higashi WT, Appendix A at 74 (pdf p. 94).

362. Notwithstanding the use of Kopiliula Stream as a conveyance stream in which ditch water and stream water are commingled, DAR recommended Kopiliula for restoration of streamflows. DAR addressed the commingling issue by recommending a fix which involved a box flume from the upstream area of Kopiliula bypassing the area of commingling of the ditch and stream water and downstream of the diversion wall. Higashi, Tr. 3/16/15, p. 170, l. 24 to p. 171, l. 12.

363. The estimated natural flow for Kopiliula Stream is **5.00 cfs/3.23 mgd.** Exh. HO-1; Gingerich WT at 6. USGS estimates for 64% of base flows required to support 90% habitat is **3.20 cfs/2.07 mgd**. *Id.* The current IIFS for Kopiliula Stream is set at **0.50 cfs/0.32 mgd**. Exh. HO-1.

o. Puakaa

364. Estimated streamflow for **Puakaa Stream** is **1.10 cfs/0.71 mgd**, requiring a minimum of **0.70 cfs/0.45 mgd** to support aquatic species (64 percent of BFQ50). Exh. HO-1; Gingerich WT at 6. Current levels under diverted conditions suggest EMI is diverting all flows from Puakaa Stream.

365. The current IIFS is status quo as of 1988 for Puakaa Stream and, under diverted conditions, the flow is estimated to be at **0.6 cfs/0.39 mgd**. Exh. HO-1.

366. Restoration of flow to increase local habitat and improve fish passages would improve stream conditions for native species in Kopiliula Stream. Parham, Tr. 3/16/15, p. 90, l. 5-18.

p. Waiohue

367. For **Waiohue** Stream, in general, the loss of instream habitat due to diversions resulted in about 40% loss of instream habitat for some species, while other species were affected more by entrainment issues. Higashi WT, Appendix A at 74 (pdf p. 94).

368. The estimated natural flow for Waiohue Stream is **5.00 cfs/3.23 mgd**. Exh. HO-1; Gingerich WT at 6. USGS estimates for 64% of base flows required to support 90% habitat is **3.20 cfs/2.07 mgd**. *Id.* The current IIFS for Waiohue Stream is set at **3.20 cfs/2.07 mgd** in the wet season and **0.10 cfs/0.06 mgd** in the dry season. Exh. HO-1 as revised on 3/31/15.

369. According to the DLNR Division of Aquatic Resources (DAR) studies referred to in the 2009 Waiohue CWRM IFSAR, the dewatering of Waiohue Stream also impacts habitat availability for the large array of native species found in the stream. The Assessment offers an analysis of stream life habitat conditions for Waiohue Stream based upon USGS studies and concluded: Overall, less than 50 percent of the natural habitat for all species in Waiohue Stream was maintained below Koolau Ditch under diverted conditions. Exh. E-57, p.43 of the December 2009 CWRM Waiohue IFSAR.

370. Since Waiohue Stream already has a great diversity of native stream animals under diverted conditions, it has the potential to carry a full compliment of native stream fauna if allowed continous (sic) mauka to makai flow. Exh. E-57, p. 46 of the December 2009 CWRM Waiohue IFSAR.

371. Sierra Club was concerned and disappointed that the CWRM 2010 East Maui stream IIFS decision stipulated to a very small amount of water to be released during the dry season in the Waiohue Stream and left status quo for the "wet season," by simply assuming that around 2 mgd of flow would be available and sufficient. CWRM minutes show an entirely inadequate "dry season" IFS of 0.06 mgd (60,000 gpd) was adopted. Exh. E-60, p. 52, CWRM Minutes, May 25, 2010.

372. Sierra Club could find no monitoring reports, or biological studies of how the native stream life were responding to the IIFS decision made four years ago. With such minimal restoration, continued monitoring is imperative. The CWRM did set a goal of regular monitoring as well as updated biological studies as part of the IIFS process in 2010. A pipe was installed on the diversion to provide a wetter path for stream life migration on the main branch of Waiohue Stream. All efforts should be made to actively monitor conditions in this stream. De Naie WT.

373. Restoration of flow to increase local habitat and improve fish passage would improve stream conditions for native species in Waiohue Stream. Parham, Tr. 3/16/15, p. 90, l. 19 to p. 91, l. 7; Higashi, Tr. 3/16/15, p. 143, l. 14-19.

q. Pa`akea

374. For **Paakea Stream** the loss of instream habitats due to diversions resulted in 3% loss of habitat. Higashi WT, Appendix A at 75 (pdf p. 95).

375. Although Paakea is minimally diverted, DAR experts agreed that restoration of flow to improve fish passage would improve stream conditions for native species in Paakea Stream. Parham, Tr. 3/16/15, p. 91, l. 9-22; Higashi, Tr. 3/16/15, p. 143, l. 14-19.

r. Kapaula

376. For **Kapaula** Stream the combined effects of stream diversion result in a 50.4% loss of instream habitat. Higashi WT, Appendix A at 75 (pdf p. 95).

377. The estimated natural flow for Kapaula Stream is **2.80 cfs/1.81 mgd**. Exh. HO-1; Gingerich WT at 6. USGS estimates for 64% of base flows required to support 90% habitat is **1.80 cfs/1.16 mgd**. *Id.* The IIFS is set at status quo for Kapaula Stream, and under diverted conditions, flows are at **0.20 cfs/0.13 mgd**. Exh. HO-1.

378. Restoration of flow to improve fish passage at upstream sites would improve stream conditions for native species in Kapaula Stream. Parham, 3/16/15, p. 91, l. 24 to p. 92, l. 8.

s. Hanawī

379. For **Hanawi** Stream, diversion results in a 45.6% of habitat loss due to entrainment. Higashi WT, Appendix A at 76 (pdf p. 96).

380. The estimated natural flow for Hanawi Stream is 4.60 cfs/2.97 mgd. USGS estimates for 64% of base flows required to support 90% habitat is 2.90 cfs/1.87 mgd. The current IIFS for Haipuaena Stream is set at 0.10 cfs/0.06 mgd to restore connectivity as Hanawi is a gaining stream below the diversion. Exh. HO-1 as revised on 3/31/15.

381. Restoration of flow to improve fish passages would improve stream conditions for native species. Parham, Tr. 3/16/15, l. 9-18; Higashi, Tr. 3/16/15, p. 143, l. 14-19.

t. Makapipi

382. For **Makapipi** Stream, the combined effects of stream diversion result in a 54.6% of the loss of habitat.

383. The aquatic resources in Makapipi are "outstanding" according to stream experts.

384. The upper reaches of **Makapipi** stream are critical habitat for the rare endangered *Megalagrion pacificum* damselfly. Exh. E-68, p. 61, Fig 6-4 of the CWRM Makapipi IFSAR; E-69; Exh. E-138-A the USFWS Recovery Outline for Two Hawaiian Damselflies, dated March 2011; Exh. E-138-B, the listing of the Damselfly as an Endangered Species, Federal Register, Vol. 75, No.121, Tuesday, June 24, 2010.

385. The estimated natural flow for Makapipi Stream is **1.30 cfs/0.84 mgd**. Exh. HO-1; Gingerich WT at 6. USGS estimates for 64% of base flows required to support 90% habitat is **0.83 cfs/0.54 mgd**. *Id.* The current IIFS for Makapipi Stream is set at 0.93 cfs/0.60 mgd as a test flow. *Id.*

386. Restoration of flow will increase local habitat and improve fish passage that would improve stream conditions for native species in Makapipi Stream. Parham, Tr. 3/16/15, p. 92, l. 19 to p. 93, l. 2; Higashi, Tr. 3/16/15, p. 143, l. 14-19.

B. Outdoor Recreational Activities and Aesthetic values such as waterfalls and scenic waterways

387. When they are not working in the lo`i, streams, or ocean to feed their families, Nā Moku members enjoy the streams for recreation and for their beauty. *See* Exh. A-1.

388. Miranda Camp is a Sierra Club Member and a supporter of Maui Tomorrow. Written Testimony of Miranda Camp.

389. The Sierra Club Maui Group, a branch of Sierra Club Hawaii Chapter, was formed on Maui in 1976. At that time, a Sierra Club Maui Group Outings Committee was also formed, whose purpose was to provide recreational and educational nature hikes on public and private lands with lawful permission. Sierra Club Hawaii Chapter and Sierra Club Maui Group are both part of the Sierra Club, a California non-profit organization founded in 1892, whose headquarters is located at 85 Second St, 2nd Floor, San Francisco, CA 94105. Camp WT.

390. The Sierra Club Maui Group Outings Committee has been leading recreational and educational nature hikes to East Maui streams, pools and waterfalls for over thirty years. Many of these streams, pools and waterfalls are the subject of the current East Maui Stream contested case. All hikes and accesses have been conducted after securing permission from and providing participant waivers to East Maui Irrigation Co. (EMI) or other appropriate landowners. Camp WT.

391. As Chair and Vice-Chair of the Sierra Club Maui Group Outings Committee, Ms. Camp and Ms. De Naie have personally led hikes along the EMI ditch trail system that visited, crossed or followed many east Maui streams over the past 10 years. The streams included in the East Maui Stream contested case that Ms. Camp and Ms. De Naie have visited on these hikes include: Hanehoi, Puolua, Waikamoi/Alo, Wahinepee, Puohakamoa, Honomanu, Pi'ina'au, Palauhulu, West Wailuaiki, East Wailuaiki and West Wailuanui, Waiokamilo, Puaka'a, Waiohue, Pa'akea, Waia'aka, Kapaula, Hanawi, Makapipi. Camp WT; De Naie WT.

392. In general, Ms. Camp has observed conditions in these streams below the EMI diversions to be very dry and unnatural during all but heavy rain events, while nearby EMI diversion ditches are carrying the stream water away. The lack of stream flows in many reaches of the streams **limits** recreational enjoyment, nature study opportunities, and could lead to unhealthful conditions for those who seek to enjoy recreational use of the waters. Camp WT.

393. In general, Ms. De Naie observed conditions in these streams below the EMI diversions to be very dry and unnatural during all but heavy rain events, while nearby EMI diversion ditches are carrying the stream water away. The ditches themselves have deteriorated over the nearly two decades she has walked these trails and they appear to be leaking and wasting water. She has observed ditch walls cracked by tree roots, ditches and intakes blocked by fallen trees and branches and ditches filled with debris. De Naie WT.

394. Sierra Club Maui has offered extensive comments over the years on conditions in various East Maui streams which are the subject of this contested case. Camp WT; De Naie WT.

1. Waikamoi

395. Specific remarks regarding the Waikamoi Stream area were incorporated into the final drafts of the Instream Flow Standard Assessment Reports "(IFSAR") produced by the CWRM in December 2009. Exh. E-48, p. 60 and 66. Camp WT; De Naie WT.

396. On Sierra Club hikes hikers have visited stream, pool and waterfall areas along Waikamoi Stream on state and EMI land at the approximately 900 ft elevation and the 4,000 elevation, as shown on Exhibits E-61 and E-61-A. Hikers have also observed these areas being accessed by local families and visitors for recreation and aesthetic enjoyment. Camp WT.

397. Sierra Club hiking groups have visited stream, pool and waterfall areas along Waikamoi Stream for educational and recreational hikes for many years, both before and after the 2010 Commission on Water Resource Management (CWRM) decision to set amended Interim Instream Flow Standards (IIFS). The stream areas often have long dry stretches caused by the lack of sufficient flows making it past the diversions. The lower stretches of the stream between the EMI's Manuel Luis ditch and New Hamakua/Wailoa Ditch are often overgrown by water hungry invasive species of noxious weeds such as pole bamboo, various ficus species, Coix lacryma-jobi (Job's Tears), Clidemia hirta, Hedychium flavescens (yellow ginger), Tibouchina herbacea, and Ardisia elliptica (Inkberry). It does not appear that any maintenance of the stream beds is ongoing by either EMI or the State. Camp WT.

398. The CWRM 2009 IFSAR report for Waikamoi referred to these same overgrown conditions.

399. Another factor that affects the distribution of native species is the condition of the streambed. Stream channels are often overgrown with alien grasses and shrubs. Vegetation along the stream bank has exposed roots that take up large amounts of water when sufficient flow is in the stream. Thus, during a high flow event, streams that are normally dry become only partially wetted because invasive plants and water thirst roots eventually absorb much of the water. In addition, fallen trees and other debris are found to block sections of the stream, which may reduce streamflow and even divert flow away from the main stream channel in the long term. Without proper maintenance of the streambed, restored streamflow in the upper elevations may not reach the ocean. **Plans to rebuild healthy streambeds** should be considered to help maximize the flow in the stream. Exh. E -48, p. 45.

400. Many fallen trees and bushes block sections of the stream bed where hikes take place. It does not appear there is any effort to maintain a clear path for whatever flows there are in the Waikamoi Stream. Camp WT.

401. The Sierra Club has found no documents on the CWRM website indicating that consistent monitoring has been done to determine the effectiveness of even the minimal proposed IIFS for Waikamoi Stream on habitat maintenance or survival rates of stream life, in either the wet or dry season. Camp WT.

402. Recent stream flow reports released by CWRM appear to indicate that some individual days in Waikamoi Stream have substantial flows (likely due to rain storm events) and others have only a few hundred thousand gallons, even in the so-called "wet season." Some "dry season" months like July, August and September also appear to have substantial flows over a few days, and then minimal flows. If they are averaged, the very minimum wet season flow level for Waikamoi, could be said to have been met, however, the actual habitat conditions these flow levels create for stream life could be a very different matter. Exh. E-52; Camp WT.

403. Monitoring of both the stream flow levels and the response of stream biota was promised during the CWRM's May 2010 adoption of IIFS. Without this information it does not seem that the CWRM, as the trustee of the these public trust resources, can determine if the current IIFS is adequate to support the full potential of this stream to provide healthy habitat for native

freshwater aquatic species and support recreational activities like nature study, swimming and traditional fishing and gathering. Camp WT.

404. Sierra Club hike leaders want to offer educational presentations and nature study opportunities for hike participants about native stream flora and fauna in Waikamoi Stream, but the flows in many lower portions of Waikamoi Stream are inadequate to support an abundance of native stream biota, limiting educational opportunities much of the year. Camp WT.

405. A popular website on Maui Waterfalls and streams http://mauiguidebook.com/road-to-hana-maui/waikamoi-stream-waterfalls/ has this description of Waikamoi Streamand waterfalls:

> A drive-up stop, one waterfall and pool are right next to the road. The second, larger waterfall and pool just upstream are impressively beautiful....A popular, user-friendly (but frequently under-rated) stop on the Road to Hana. The reason this is so underrated by the other guidebooks is that they came to see it on the wrong day. The water source is heavily tapped and diverted above and these falls can be essentially "turned off" by EMI to feed thirsty sugar plantations. You can tell if this is worth a stop by looking at the waterfall closest to the road. If it is flowing, then you're in for a treat.

Exh. E-71; Camp WT.

406. This report reflects the fact that the aesthetic and recreational resource provided by the Waikamoi Stream adjacent to Waikamoi Ridge Trail on state land, is not available to the public due to inadequate year round flows being restored to the stream. As a Sierra Club hike leader Ms. Camp has noted the same conditions in other pools below the diversions on Waikamoi Stream. It is clear that flows in Waikamoi Stream are not meeting the standards put forward in the Water Code to support public trust purposes of ecosystem maintenance and recreational and aesthetic use. Camp WT.

407. The Waikamoi Stream originates in one of Maui's most pristine native forest areas: Waikamoi Preserve, managed by the Nature Conservancy. The riparian resources of Waikamoi Stream were classified as "substantial" by the Hawaiian Stream Assessment. Exh. E-58, p. 265; Camp WT.

408. The CWRM decision in 2010 allowed much of Waikamoi Stream to be left in a degraded, dewatered condition. In contrast to this, the CWRM's stream assessment report notes that: The proportion of a stream course flowing through native forest provides an indication of the potential "naturalness" of the quality of a stream's watershed; the greater the percentage of a stream

flowing through native forest most of which is protected in forest reserves **the more significant the resource.** Exh. E-48, Waikamoi IFSAR, p. 64, Fig 6-1.

409. The CWRM Waikamoi Stream assessment also concludes that: Based upon the current designations, the Waikamoi hydrologic unit contains critical habitat areas for ten plant species (Table 6-6). While critical plant habitats are more promenint [sic} above the 1,300 feet altitude, the area around 600 feet elevation and along the Wahinepe'e Trail has a good representation of native endemic plants. Exh. E-48, Waikamoi IFSAR, p. 67, Table 6-7.

410. Almost 85% of the Waikamoi hydrologic unit has a high concentration of threatened or endangered species. Exh. E-48.

411. Since 30% of Waikamoi Stream originates and travels through one of Maui's most notable and protected native forests, Waikamoi Preserve, the entire steam below the EMI diversions is a prime candidate for stream flow restoration, however the CWRM decision of May 2010 did not support any additional restoration of flow. This decision continues to limit recreational, aesthetic and ecological uses of this major East Maui stream by native stream life, Sierra Club members, native Hawaiian practitioners and the general public. Camp WT.

412. Sierra Club Maui and its members are harmed because the activities they hope to enjoy when visiting Waikamoi Stream and its tributaries, an area of noted ecological value, are greatly limited due to the highly dewatered conditions of the streams. The "status quo" IIFS proposed by the CWRM in May 2010 did not provide enough flow for Waikamoi Stream to ensure that the protected instream uses of this waterways could be enjoyed by Sierra Club Maui members, native stream life, local residents and cultural practitioners or the general public. Camp WT.

413. As an organization who seeks to regularly offer safe, recreational access and opportunities for nature study to these streams and watersheds, Sierra Club Maui is entitled to have public trust stream resources assets be available in a healthy state that provides adequate water quality habitat for native stream species and the general public, adequate water levels to maintain natural ecosystems and allow for nature study, aesthetic enjoyment of streams, waterfalls and pools and recreational opportunities, in accordance with the laws of the State of Hawaii. Camp WT.

2. Honopou Stream

414. Lurlyn Scott's children and grandchildren learned to swim at Honopou, and she swims, cliff dives, and enjoys the tranquility at Honopou, Honomanu, Hanawi, and Makapipi. Scott WT at ¶¶ 24-25.

415. Healoha Carmichael, for example, enjoys swimming at Ching's Pond at Pi`ina`au. H. Carmichael WT at ¶13.

416. Juliana Jacintho swims and relaxes near Honopou, enjoys strolling around the stream area, and appreciates the stream as a place where her children are able "to play and run freely, camp, gather, talk, and remember the past." Written Testimony of Juliana P. Allen Jacintho at ¶ 9.

417. Sanford Kekahuna enjoys the rainfall, the sound of the stream [(Honopou)] by [his] house, the wind, the smell of flowers, and the sound of birds -- they talk." Kekahuna WT at ¶16.

3. Hanehoi, Huelo and Puolua Streams

418. Maui Tomorrow prepared and presented a map of the traditional ponds in Huelo. Exhs. E-24 and E-24-A.

419. Sierra Club hikers have visited natural stream and pool areas along Hanehoi Stream and Puolua Stream on state and private land in the general locations shown on Exh. E-24.

420. These natural pools and stream areas have been used by Huelo community members for recreation for many generations. De Naie WT.

421. Sierra Club hiking groups have visited stream, pool and waterfall areas along Hanehoi and Puolua Streams for educational and recreational hikes for many years, both before and after the 2008 CWRM decision to set amended IIFS. Sierra Club hiking groups have observed these areas at times, over the past ten years with insufficient water levels, slow moving stream flow, completely dry sections of stream and waterfalls reduced to a trickle. De Naie WT.

422. An area of Hanehoi stream a little upstream of Ms. Caveny's property adjacent to another Lukela family kuleana parcel, designated as TMK No. (II) 2-9-008:31, is referred to as "Mary's Pond or Pool." Exh. E-24; Written Testimony of Neola Caveny.

423. According to Huelo kama'aina families, this pond area in the Puolua stream was a favorite swimming area for many generations and there was water available in the pond and the stream year round. Any lack of stream flow in these areas now is due to a century of extreme dewatering of Hanehoi and Puolua streams and their tributaries by the EMI diversion works and the insufficient amount of water restored to these streams by the September 2008 CWRM IIFS decision. If adequate streamflow were restored to Hanehoi and/or Puolua Streams, the great majority of that streamflow would pass down the streams to Ms. Caveny's property. Caveny WT.

424. A traditional trail to Moke's Ponds is located adjacent to Hanehoi stream just before Ms. Caveny's property. The health of the ponds is dependent on the flows in the stream. Exh. E-24; Caveny WT.

425. Above the New Haiku Ditch and the Lowrie Ditch diversion works on Hanehoi Stream, a waterfall falls into a pond. A two-inch (2") pipe diverts water from this pond and is the beginning of the community water system that serves many Huelo residents. Caveny WT.

426. The Hale Akua property overlooks Hanehoi stream and the 200 ft high "Hanehoi" waterfall was photographed when this waterfall had water. Exh. E-39; Written Testimony of Michael D'Addario.

427. A traditional trail leads along the pali (cliff) on state land below the Hale Akua farm to a series of several smaller pools and waterfalls on Hanehoi stream below the Hale Akua property and above the big Hanehoi falls. These are known in the neighborhood as "Moke's Pond," named for one of Hale Akua's neighbors, Moses Kahiamoe, Sr. Exh. E-24; D'Addario WT.

428. These pools have been used by generations of families in the Huelo neighborhood, especially in the summer months. Unfortunately, Hanehoi stream is so severely dewatered by the nine EMI diversions on the main branch of the stream and its four tributaries (East and West Huelo stream, Puolua stream and West Hanehoi stream), that summer water levels and flows in the pools often do not permit this traditional use to be safe or healthful. When the pools on Hanehoi stream become stagnant from lack of stream flows, they may present a health hazard to those who may access them. D'Addario WT.

429. It has been six years (September 2008) since the Hanehoi and Puolua Streams were granted partial restored flows, but those flow levels promised either were not delivered or do not appear to be adequate to ensure a healthy stream flow and clean, moving waters. De Naie WT.

430. Under current severely diverted conditions, Sierra Club members who join the hikes to streams like Hanehoi and Puolua are deprived of a full aesthetic and recreational experience, due to inadequate stream flows that limit water levels in some pools, reduce waterfall volume and deprive the stream of native stream life for nature study. De Naie WT.

4. Waiokamilo, Kualani, and Wailuanui Streams

431. Norman "Bush" Martin appreciates the "views, the sounds, and the smells of nature" that he experiences while gathering in the Wailuanui area. Martin WT at ¶15. "Seeing water in the stream is beauty to me." *Id.*

432. Ed Wendt appreciates viewing and visiting Honomanu, Nuaailua, Pi`ina`au, Palauhulu, `Ohi`a/Waianu, Waiokamilo, Kualani, Wailua, Waikani (Wailuanui), West Wailuaiki, and East Wailuaiki. Ed Wendt WT at ¶13.

433. He and his wife walk up to Waikani (Wailuanui) waterfall every morning "to enjoy the view and experience the beauty of this area." *Id.*

5. East and West Wailuaiki Streams

434. East and West Wailuaiki Streams have their flows diverted by EMI diversion works at the Wailoa/Ko'olau ditch. De Naie WT.

435. Sierra Club hikes have visited stream, pool and waterfall areas along East and West Wailuaiki Streams on State and EMI land in the general locations shown on Exh. E-49. Sierra Club hikers have observed these areas being accessed by many local families and visitors for recreation and aesthetic enjoyment. Sierra Club hiking groups have visited stream, pool and waterfall areas along East and West Wailuaiki Streams for educational and recreational hikes for many years, both before and after the 2010 CWRM decision to set amended IIFS. The stream areas often have long mostly dry stretches below diversions, which the IIFS have not addressed, caused by the lack of sufficient flows bypassing the diversions. De Naie WT.

436. A small amount of water was set for the streams. An IIFS of two-hundred and sixty-thousand gallons a day (260,000 gpd) in East Wailuaiki Stream and one-hundred and-thirty thousand gallons per day (130,000 gpd) in West Wailuaiki Stream was stipulated to be released during the dry season in each stream in 2010. A small "splash path" for native stream life appears to have been installed on East Wailuaiki Stream at the Ko'olau ditch intake. These amounts are found in the Water Commission's May 24, 2010 Staff submittal that was adopted by the CWRM at its May 24 meeting. Exh. E-50.

437. Photographs taken in March, 2012, show the splash path and the barely wetted surface and isolated pools below the EMI diversion on East Wailuaiki Stream. Exh. E-51, A-E. These are the conditions that recreational users find below the EMI diversions, even in the winter season. It is Sierra Club's position that the lack of a natural mauka-makai stream flow impacts the recreational experience the streams could offer. Although the CWRM specified that regular monitoring of conditions would occur, and adaptive strategies would be employed, they have not posted reports on their website on whether studies have been done to determine if the IIFS is effective for East or West Wailuaiki Streams. Recently released CWRM Monitoring reports

covering 2011 to 2014 have no flow data for East Wailuaiki and very erratic data for West Wailuaiki, with widely varying flow levels from day to day. It appears the flow levels are more connected with rain events rather than any released flows from diversions. Exh. E-52; De Naie WT.

438. Sierra Club hike leaders want to offer educational presentations and nature study opportunities for hike participants about native stream flora and fauna in the Wailuaiki Streams, but the lack of continuous lows in portions of the East and West Wailuaiki Streams are inadequate to support an abundance of native stream biota, limiting educational opportunities. De Naie WT.

439. Increased year round stream flows in East and West Wailuaiki Streams could extend habitat range for the endangered earwig Hawaiian damselfly and provide the public with the recreational and educational enjoyment of the streams that the State Water Code protects. Declaration of De Naie WT.

6. Waiohue Stream

440. Sierra Club hiking groups have visited stream, pool and waterfall areas along Waiohue Stream for educational and recreational hikes for many years, both before and after the 2010 CWRM decision to set amended IIFS. Sierra Club hiking groups access Waiohue Stream as part of their hikes along the Makapipi Trail in Ko'olau District. The approximate location of these hikes is shown on a USGS map of the area. Exh. E-56. Virtually all of Waiohue Stream is located on publicly owned land, from the mountains to the sea. Sierra Club hikers value the scenic and recreational attributes of Waiohue Stream. De Naie WT.

441. Waiohue Stream flow is diverted by EMI diversion works on both its East and West branches and the water directed into EMI's Ko'olau Ditch. Maps in the CWRM 2009 IFSAR for Waiohue hydrological unit do not show that the stream has two branches, both diverted. Exh. E-57, De Naie WT.

442. Ms. De Naie has led Sierra Club hikes along the Ko'olau Ditch Trail which crosses Waiohue Stream since 1996, and she has observed the diversions on both branches of the stream, and many other small EMI diversions in the general area as well. De Naie WT.

443. Sierra Club educational hikes follow the EMI's Ko'olau ditch trail, which crosses both branches of Waiohue Stream. Sierra Club hikers have observed that the stream beds are virtually dewatered below the ditch by two major and five minor diversions that all drain into EMI's Ko'olau ditch. This affects water levels in the Pua'a Ka'a Park ponds and waterfalls as is noted by visitors. De Naie WT.

444. The December 2009 CWRM Waiohue IFSAR map shows the location of diversions on two branches of Waiohue Stream. Exh. E-57, p. 36, Figure 3.3. This IFSAR discusses these diversions. See Exh. E-57, pp. 95-96.

445. Multiple tributaries of Waiohue Stream are being diverted and under natural conditions, all of these flows would be contributing to the exceptional native stream life habitat struggling to survive in this stream. De Naie WT.

446. Many of Waiohue stream's other smaller tributaries and nearby springs are also captured by cement troughs or pipes and diverted away from the stream and aquifer and into the EMI ditch. See pictures of the numerous "minor diversions." Exh. E-57, pp. 97-99 of the 2009 CWRM Waiohue IFSAR (PR-2009-11).

447. As a result of this thorough and systematic dewatering, Waiohue Stream bed below the Ko'olau ditch is often very dry under normal rainfall conditions, limiting opportunities for recreational use, scenic enjoyment and nature study for Sierra Club members and the general public. De Naie WT.

448. Waiohue Stream has been rated as having "Outstanding" recreational and aquatic stream life characteristics by the Hawaii Stream Assessment ("HSA"). Exh. E-58, pp. xxv and 265 of the CWRM/NPS, 1990 study.

449. Waiohue Stream was more recently rated in USGS and Hawaii DAR stream studies as having a high variety of native stream life. The HSA identified opportunities for camping, hiking, fishing, swimming, parks, and scenic views related to Waiohue. Exh. E-57, p. 52, Table 5-1 of the 2009 CWRM Waiohue IFSAR.

450. Waiohue Stream passes through the very popular Pua'a Ka'a State Wayside Park along the Hana Highway. There are natural pools and waterfalls on Waiohue Stream in Pua'a Ka'a Park that are easily and safely accessible. The pools are overlooked by the public picnic areas in the park, providing the potential for scenic enjoyment. This is practically the only natural pool that is visible, and easily and legally accessible to the public along the entire forty mile drive from Pa'ia to Hana. Since there are also comfort stations located at Pua'a Ka'a State Park, thousands of residents and visitors stop there every day. De Naie WT.

451. Water from Waiohue Stream is also diverted, by means of a pipe in the stream, to a tank that provides non-potable water to the comfort stations. Exh. E-57, p. 96 of the Waiohue IFSAR.

452. Sierra Club hike participants use the pools in Pua'a Ka'a park for swimming when water levels permit and enjoy the scenic views of the pool and waterfall in the park when the waterfall has flows. The Sierra Club has observed the ponds in Pua'a Ka'a park being accessed by many local families and visitors for recreation and aesthetic enjoyment when water levels permit. The numerous diversions dewatering Waiohue Stream and its tributaries limit the opportunities for recreational use of this stream. De Naie WT.

453. The popular pond areas on Waiohue Stream are also described and "rated" on several internet sites. See Exh. E-59. Visitors comment on the lack of water in the pool during the "dry season." A comment from the website "Trip Advisor" is typical:

> This is our favorite stop along the Hana Highway for a picnic lunch, to take in the beauty of the rainforest with an opportunity to swim in the small natural pool under the waterfall although there was not enough water in the pool during our recent visit during the dry season.

http://www.tripadvisor.com/Attraction_Review-g29220-d1020424-Reviews-Pua_a_Ka_a_State_Park-Maui_Hawaii.html.

454. A similar comment was posted on http://www.world-of-waterfalls.com/hawaii-puaa-kaa-falls.html:

> Puaa Kaa Falls (or Pua'a Ka'a Falls; rolling pig) resides in the Pua'a Ka'a State Wayside Park, which made it one of the rare waterfalls on the Hana Highway where public access was welcome. There are two waterfalls in the park. It looked like it would've been a real nice place for a picnic, but I believe the water diversion from EMI ditches further upstream tends to keep the water flow low unless it has raining like it was during our visit.

455. The state expends public funds to promote visitors coming to Maui and seeking places of natural beauty, such as Waiohue Stream, yet the state guardians of the public trust did not allow enough water in the stream for those same visitors to enjoy what they came to find. De Naie WT.

456. At the ocean is Waiohue Bay, where the Waiohue Stream discharges. It is accessible by a narrow fishing trail from Wailuanui, labeled on maps as the "old Government makai road." Two other streams (Puakea and Paakea) discharge into Waiohue Bay and there is a small but productive estuary there for native stream life. De Naie WT.The area is used by local residents for traditional fishing and gathering practices. Exh. E-57, p. 55, Fig 5-2 of the December 2009 CWRM Waiohue IFSAR.

7. Honomanu Stream

457. Sierra Club hiking groups have visited stream, pool and waterfall areas along Honomanu Stream for educational and recreational hikes for many years, both before and after the 2010 CWRM decision to review the IIFS for this stream. Sierra Club hiking groups access Honomanu Stream as part of their hikes along the Wahinepe'e trail in Ko'olau District, as well as in the coastal portion of the stream. Exhs. E-61 and E-61-A; De Naie WT.

458. Around half of the extensive length of Honomanu Stream is located on publicly owned land, while portions flow through land owned by Haleakala Ranch and Alexander and Baldwin. Sierra Club hikers value the scenic and recreational attributes of Honomanu Stream and are concerned that these are being limited due to lack of adequate flow in the stream. De Naie WT.

459. Honomanu Stream has been rated as having "Outstanding" recreational and riparian characteristics by the Hawaii Stream Assessment (HSA). The HSA identified opportunities for "camping, hiking, fishing, hunting, swimming and scenic views related to Honomanu." Exh. E-58, p. 265, Chart in the CWRM/NPS, 1990.

460. Honomanu Stream was recently the subject of a 2007 Stream and Estuary study published in the Bishop Museum Bulletin in Cultural and Environmental Studies. The study concluded that the presence of coastal ground water springs and a coastal estuary "results in significantly higher hīhīwai counts and allows recruits to grow to larger sizes (>20 mm)." The same study however, concludes that: "Most hīhīwai will not survive beyond the estuary because of dry stream beds and the lack of consistent stream flow." Exh. E-62.

461. Honomanu Stream flow is diverted five (5) times by EMI's Spreckels (529 m. elevation) and Ko'olau (400 m. elevation) diversion works and once by the County Department of Water Supply's (DWS) Lower Kula Pipeline (936 m). Haleakala Ranch also has two small diversions at higher elevations. Exh. E-63, p. 148, Fig. 13-19 of the December 2009, Honomanu IFSAR.

462. Honomanu Stream has four separate tributaries affected by EMI diversion works. EMI's Spreckels Ditch has 4 intakes on various branches of HONOMANU STREAM and EMI's Ko'olau Ditch has one. All EMI diversions are located on State owned public trust lands in the Honomanu water lease area as shown on the land ownership map. Exh. E-63, p. 100, Fig 12-3 of the 2009 Honomanu IFSAR.

463. Honomanu Stream's other smaller tributaries and nearby springs are also captured by cement troughs or pipes and diverted away from the stream and aquifer into EMI's Spreckels ditch. Exh. E-63, pp 111, Fig 13-2 of the 2009 Honomanu IFSAR.

464. As a result, Honomanu Stream bed below the Ko'olau and Spreckels Diversions all the way to the ocean is usually very dry under normal rainfall conditions, limiting opportunities for recreational use, scenic enjoyment and nature study for Sierra Club members and the general public. De Naie WT.

465. The upper areas of Honomanu stream along the Spreckels ditch are of particular interest to Sierra Club for nature study. This region has many varieties of native forest plants that are easy to view from the trail and are used as part of the nature study opportunities offered on Sierra Club hikes. Higher elevations of the stream, above the diversions, also have excellent native plant density, according to the HSA, and habitat for several endangered species. Severe dewatering of the steam has an overall negative effect on the surrounding native plant habitat. De Naie WT.

466. One of the greatest losses resulting from this dewatering are the once magnificent waterfalls that are found near the 500 m. elevation of the stream, below the Spreckels and Ko'olau Ditch diversions. Sierra Club has lead hikes to this area for almost twenty (20) years and it has become increasingly difficult to find any water visible in these waterfalls, since it is all taken by the EMI diversions. These falls, on public land, are now dry except during heavy rain events when access to the area is not safe. This means that the public is denied the opportunity to enjoy the beauty of a public trust resource located on public land. Sierra Club presented photographs of one of the smaller upper waterfalls. Exh. 64-A-D; De Naie WT.

467. Honomanu Stream meets the ocean below Hana Highway and forms a large estuary. The area is accessible to local residents and is a popular recreation area well used for camping, swimming, surfing, kayaking, fishing, hiking and family picnics. Local residents report long time use of Honomanu stream for traditional gathering of native stream life and ocean species. Exh. E-63, p. 59, Fig. 5.2 in the 2009 Honomanu IFSAR; De Naie WT.

468. Lack of sufficient flows to overcome the so-called "losing" stretches of Honomanu Stream in Honomanu Valley, limits the recreational use of the makai area of the stream by Sierra Club Members and the general public as well as severely limiting its habitat potential for native stream species. De Naie WT.

469. Honomanu Valley had numerous Land Commission Awards that are depicted on traditional maps, such as Reg. Map 2467. Exhibits E-65 and E-65-A. Sierra Club uses these types of maps on educational hikes to let participants connect with the history of the area. Map 2467 makes it clear that kalo was being cultivated in Honomanu as of 1909, around the time EMI's Wailoa Ditch was built.

470. As such, Honomanu Stream had continuous stream flow to the ocean under natural conditions and the lack of this continuous flow in present times is harmful to those who wish to enjoy the beauty of the stream and waterfalls and engage in recreation, nature study or traditional practices. De Naie WT.

471. Participants in classes and gatherings held at nearby Camp Ke'anae also access Honomanu Bay and stream for recreational and educational activities. Sierra Club itself used these facilities to hold a youth eco-camp in the past, which included a visit to Honomanu with the youth. This stream and estuary have tremendous potential for public education and appreciation of our natural resources as well as traditional gathering, but the lack of stream flows is a major impediment to those public trust purposes being realized. De Naie WT.

472. Sierra Club members and the public go on Sierra Club hikes to enjoy the natural watershed beauty, recreational opportunities and to learn about native ecosystems. The recreational and nature study resources of Honomanu Stream are potentially outstanding, and have been recognized as such by state studies. The Honomanu Stream also has the potential to provide outstanding habitat for the native hīhīwai and other stream species and to perpetuate traditional gathering practices for local residents, which is something the Sierra Club strongly supports. Sierra Club is concerned that these protected uses of public trust resources cannot be fully enjoyed by Sierra Club members, local residents and the public under the present highly diverted conditions of Honomanu Stream. De Naie WT.

8. Makapipi Stream

473. Sierra Club hiking groups have visited stream, pool and waterfall areas along Makapipi Stream for educational and recreational hikes for many years, both before and after the 2010 CWRM decision to review the IIFS for this stream. Sierra Club hiking groups access Makapipi Stream for part of our hikes along the Makapipi trail in Ko'olau District, as well as visiting the makai portion of the stream in the Lower Nahiku Community. Exh. E-56. Around half of the extensive length of Makapipi Stream is located on publicly owned land, while lower portions flow

through land owned by EMI/Alexander and Baldwin. Sierra Club hikers value the scenic and recreational attributes of Makapipi Stream and are concerned that these are being limited due to lack of adequate flow in the stream. De Naie WT.

474. Makapipi Stream flow is diverted by EMI diversion works on both its East and West branches and the water directed into EMI's Ko'olau Ditch. During hikes, Sierra Club hikers observe the stream areas below the diversions are usually completely dry. This limits the public's ability to enjoy the beauty of views of downstream waterfalls and stream courses. De Naie WT.

475. CWRM's 2009 Instream Flow Assessment Report ("IFSAR") for Makapipi Stream states that "Makapipi Stream is dry in the 0.7 mile reach between the Koolau Ditch to the stream gaging station (station 16507000)" and characterizes this section as "not perennial." Exh. E-68, p. 31 of CWRM's 2009 Instream Flow Assessment Report ("IFSAR") for Makapipi Stream.

476. Ms. De Naie has seen tunnels and other diversion structures that tap water and bring it to the Ko'olau ditch. It is possible that these have intercepted water that was once captured by the Makapipi stream and interfered with the stream's natural recharge system below the diversion. De Naie WT.

477. Makapipi stream area is a favorite place to take new Sierra Club hike leaders to show them many varieties of native plants that live in East Maui. The Sierra Club plans hikes on this trail to coincide with the blooming of the 'ōhi'a trees to enjoy the different colors. The native 'ie'ie plants, Hapu'u ferns, 'Olapa and Koa trees, and many other varieties of native ferns, trees and plants are all found in this lush location.

478. Makapipi is a place of nearly fifty percent (50%) native forests. Exh. E-68, p. 16, Table 2-5 of the CWRM Makapipi IFSAR.

479. Rare and endangered plants are found extensively in the Makapipi stream basin. Exh. E-68, p. 61, Fig 6-4 of the CWRM Makapipi IFSAR.

480. The upper reaches of the Makapipi Stream are located within the pristine Hanawi Natural Area Reserve System ("NARS".) Exh. E-68, p. 61, Fig 6-4 of the CWRM Makapipi IFSAR.

481. The upper reaches of Makapipi stream are critical habitat for rare and endangered native plants, birds and the rare endangered Megalagrion pacificum damselfly also lives there. Many native aquatic species have been observed in studies. Exh. E-68, p. 61, Fig 6-4 of the CWRM Makapipi IFSAR.

482. The 1990 HSA classified the aquatic resources as "outstanding." Exh. E-58.

483. The CWRM Makapipi IFSAR concluded:

> Since Makapipi Stream already has a diversity of native stream animals under diverted conditions, it has the potential to carry a full compliment of native stream fauna if allowed continous {sic} mauka to makai flow.

See Exh. E-68, 2009 Makapipi IFSAR, pp 42-43.

484. The local residents Sierra Club hikers meet while hiking in the Makapipi Stream area agree that the stream resources were naturally abundant, but have diminished over the years due to persistent lack of adequate streams flows. They speak of traveling further and further upstream to find any traditional foods to gather. De Naie WT.

485. On the latest Sierra Club hike to this area, during a rainy period in August of this year (2014), Makapipi stream makai of Hana Highway hikers saw a few stagnant ponds and no real flows. Some hikers wonder if the promised flows of over half a million gallons a day set in May of 2010 were ever fully released. Sierra Club hikers did not find evidence of additional flows below the Ko'olau diversion. De Naie WT.

486. The Sierra Club was concerned about the extreme dewatering of Makapipi and the surrounding streams and springs. Sierra Club was also concerned that the watershed itself, mostly public lands, was not being well managed along the ditch systems. Sierra Club hikers have seen the intrusion of more and more alien invasive plants, every year. The care and management of of watersheds does not appear to be anyone's responsibility in Makapipi-Hanawi stream areas. De Naie WT.

487. Photographs of Makapipi stream and surrounding areas from 2003-2011 Sierra Club hikes were presented as Exh. E-70, A-R. They illustrate the dewatered stream bed below the Ko'olau diversion; the numerous small diversion along the Koolau ditch draining the water away, the native plants found along the trail to the diversion and the invasive plants that are being allowed to overtake the lands immediately surrounding the Ko'olau ditch. De Naie WT.

488. Makapipi Stream and the surrounding lands have outstanding recreational resources. Many Nahiku families live along the stream and play and gather food there. The coastal areas where Makapipi Stream discharges are popular community areas for fishing and gathering and the area is rich in cultural and historical resources. These were rated as "Outstanding" in the 1990 Hawaii Stream Assessment ("HSA"). Exh. E-68, p. 50, Table 5-1 of the Makapipi IFSAR.

489. Aesthetic points of interest along Makipipi Stream were noted in of the Makapipi IFSAR. Exh. E-68, p. 63, Fig 7.1 of the Makapipi IFSAR.

490. Sierra Club Members, the general public and local residents all appreciate the presence of the panoramic views, the historic Nahiku landing area and ocean vistas. The only detracting point in this picture is the usually dry state of Makapipi stream bed below the EMI diversion, except for a few disconnected pool areas. De Naie WT.

491. Ms. De Naie has observed many ancient kalo lo'i on lands along the Makapipi stream below Hana Highway. This stream once had the flows to support the growing of food to nourish the community. The upper stream areas still showcase native watershed plants and birds and are valuable for nature study as well as hunting, gathering and hiking. De Naie WT.

492. Sierra Club members are being harmed by the current policies that allow an extreme and unsustainable amount of water to be removed from the twenty-seven (27) East Maui streams that are the subject of this contested case.

493. Sierra Club members have been harmed because the activities they hope to enjoy when visiting Hanehoi, Puolua, Waikamoi, Honomanu, East and West Wailuaiki, Waiohue and Makapipi Streams and their tributaries are greatly limited due to the highly dewatered conditions of these streams. The IIFS levels proposed by the Commission in May of 2010 did not provide enough flow for these streams to ensure that the protected instream uses of these waterways could be enjoyed by Sierra Club Maui members, native stream life, local residents or the general public.

494. As an organization that seeks to regularly offer safe, recreational access and opportunities for nature study to these streams and watersheds, Sierra Club is entitled to have public trust stream resources assets be available in a healthy state that provides for public trust uses protected under our State Water Code. This would include adequate water quality habitat for native stream species and the general public; adequate water levels to maintain natural ecosystems and allow for nature study; adequate stream flows to allow aesthetic enjoyment of streams, waterfalls and pools; and adequate streamflows to allow the healthy enjoyment of recreational opportunities; all in accordance with the laws of the State of Hawaii.

495. Sierra Club recommends that the Lowrie ditch diversion works on Hanehoi, Huelo and Puolua streams and their tributaries and the New Haiku ditch diversion works on Hanehoi and Puolua streams; the Spreckels and Ko'olau ditch diversion works on Honomanu stream and its tributaries; the Koolau ditch diversion works on East and West Wailuaiki streams; and the Ko'olau

ditch diversion works on East and West Waiohue Stream and Makapipi Sttream, must be modified to allow a more adequate flow of these streams to traverse mauka-makai and fully and adequately support the numerous public trust uses that Sierra Club Maui and the public are entitled to enjoy under Hawaii State laws.

C. Maintenance of Water Quality

496. Water Quality is an important protected use under the State Water Code. In the September 24, 2008 Staff Submittal regarding the East Maui IIFS Petition, CWRM Staff acknowledges this stating:

> Public health.
>
> Stagnant water in the streams results in increased mosquitoes, which may lead to increased risk in dengue fever or other mosquito-borne illnesses. Stagnant water may also increase the risk of skin disease from the water.

Exh. E-7, p. 6.

497. Because the EMI ditches capture virtually all of the upstream flows, lack of water in many reaches of the streams could lead to unhealthful conditions for those who seek to enjoy recreational use of the waters. De Naie WT.

498. Lack of sufficient stream flows impacts water quality in the Honomanu estuary and could put the public at risk. The ocean waters of Honomanu Bay have not attained federal standards for enterococcus levels, and are therefore, impaired. Exh. E-66, p. 82 of the 2014 State of Hawaii Water Quality Monitoring Assessment Report.

499. Honomanu Stream and other East Maui streams surrounding it have never even been tested for pollutants harmful to human health. Increased stream flows would be a part of restoring a natural, healthy system in Honomanu Bay. Exh. E-66, p. 79 of the 2014 State of Hawaii Water Quality Monitoring Assessment Report; De Naie WT.

500. Dr. Lorrin Pang testified as an expert witness on behalf of Maui Tomorrow. He is a medical doctor employed as the Maui health officer by the Hawaii State Department of Health. Pang, Tr. 3/3/15, p. 179, l. 12 – 17.

501. Dr. Pang was qualified as an expert in Public Health. Pang, Tr. 3/3/15, p. 181, l. 24 – 25; p. 182, l. 1.

502. As a physician and public health official, Dr. Pang is concerned about the public health threats caused by streams with diverted flows. He is especially concerned now because new germs have arisen and control of these germs requires better hygiene, especially in people who live in these regions who do not have access regularly to water. Pang, Tr. 3/3/15, p. 181, l. 16 – 23.

503. Dr. Pang was concerned about slow flow or stagnant water in East Maui streams because stagnant water increases leptospirosis, a germ in the water that pierces your skin or your mucus membranes. Pang, Tr. 3/3/15, p. 183.

504. Standing water is a breeding site for mosquitoes. Mosquitoes can carry Dengue. There is also a new disease coming out all over the world called chikungunya. They call it chik. Mosquitoes can transmit chik. Pang, Tr. 3/3/15, p. 184.

505. The streams were flushed during the Dengue epidemic because it takes eight days for the mosquitoes to develop from wiggler to adult. Pang, Tr. 3/3/15, p. 185.

506. Dr. Pang testified regarding the health problems involved with intermittent flows in streams. Pang, Tr. 3/3/15, p. 185. Intermittent water means sometimes you have it and sometimes you do not. Pang, Tr. 3/3/15, p. 186.

507. Those affected by intermittent flows are the communities that are served by some of these streams that have no other water source other than the stream and campers who use flowing water to wash. Pang, Tr. 3/3/15, p. 188.

508. Intermittent flows in streams causes diseases of hygiene involving bathing and hand washing. Pang, Tr. 3/3/15, p. 186 – 187.

509. Rinsing off produce is also a problem. Department of Health rules state that you must wash with sterile water, certified water. Pang, Tr. 3/3/15, p. 189

510. The Sierra Club concurs that insufficient stream flows can create unhealthful conditions in the diverted streams of East Maui, encouraging mosquito breeding, and potentially puts residents and visitors at risk. De Naie WT.

511. The healthful conditions of East Maui streams are a public concern to Sierra Club and to the general public. De Naie WT.

512. From a public health perspective, and particularly with regard to East Maui communities that do not have any source of water other than these streams, there needs to be continuous flow in these streams during the wet season and the dry season. Pang, Tr. 3/3/15, p. 190.

D. Protection of Traditional and Customary Rights

1. Flows must be sufficient to support gathering practices

513. Flowing water in Honopou, Hanehoi and Puolua (Huelo), Piinaau, Palauhulu, Waiokamilo, Kualani, Wailuanui, Waikamoi, Alo, Wahinepee, Puohokamoa, Haipuaena, Punalau/Kolea, Honomanu, Nuaailua, Ohia, West Wailuaiki, East Wailuaiki, Kopiliula, Puakaa, Waiohue, Paakea, Waiaaka, Kapaula, Hanawi, and Makapipi Streams is essential for Native Hawaiians to continue exercising traditional and customary rights.

514. Cultural experts and community witnesses provided uncontroverted testimony regarding limitations on Native Hawaiians' ability to exercise traditional and customary rights and practices in the Hāmākua Loa and Ko'olau moku due to the lack of freshwater flowing in these East Maui streams or into their nearshore marine waters. Written Testimony of Aja Akuna at ¶¶15-18; Written Testimony of 'Awapuhi Carmichael at ¶19; Written Testimony of Carl Wendt at ¶13; Written Testimony of Charles Barclay at ¶8; Written Testimony of Darrell Aquino at ¶19-20; Written Testimony of Edward Wendt (9/10/14) at ¶14-15; Written Testimony of Jerome Kekiwi, Jr. at ¶18-19; Written Testimony of Joseph Kimo Day at ¶16-17; Written Testimony of Norman Bush Martin at ¶16-20.

515. As discussed *supra* at FOFs 40-41, East Maui community members utilize a traditional cultural practices region - extending from Makapipi Stream and forest access road in the east, to Honomanu and the Kaumahina - for fishing, hunting and gathering. *See* Figure 4 of Ke'anae-Wailuanui Cultural Landscape Study Report; McGregor WT (12/23/14), Exh. A at 14; Exh. A-1.

516. Dr. McGregor's cultural landscape study confirmed that ""[t]he additional areas used by residents of Ke'anae-Wailuanui depend[] on where their family ancestors originated and established subsistence practices. The location and distribution of water is the primary determinant of the distribution of natural resources. For example, some families fish and gather as far as Kaupo or as far west as Honopou and mauka to Waikamoi. Traditional land use boundaries were defined in relation to the amount and location of water." *Id.*

517. Petitioners carry on these traditional customary practices throughout the Hamakua-Ko'olau Region, including gathering `opae, 'o'opu, and hīhīwai, in the various streams from Honopou to Makapipi and the streams in between. *See* Exh. A-1.

518. Both Ms. Scott and Mr. Kekahuna seek to continue their use of Honopou Stream to support the gathering and fishing practices in which their ancestors once engaged when

streamflow was sufficient to support the growth of opae, `o`opu, hīhīwai, and coastal fish. Scott WT (12/16/14) at ¶¶9-11; 15, 20-22; Kekahuna WT at ¶¶5-6, 9-11.

519. Sanford Kekahuna,[14] the son of the late Beatrice Kekahuna, gathers ʻoʻopu, prawns, and small baby fish at the edge of Honopou. Kekahuna WT at ¶11.

520. Lurlyn Scott,[15] the daughter of the late Marjorie Wallett, gathers and fishes "to perpetuate [her] cultural food and traditions so [her] grandchildren will be able to live off the land like our kupuna did." Scott WT (12/16/14) at ¶22.

521. Awapuhi Carmichael, a kupuna from Keʻanae, gathers ʻōpae, limu, and opihi in or near the mouths of Pi`ina`au, Palauhulu, ʻŌhiʻa/Waianu, Waiokamilo, Kualani, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopiliula, Puakaa, Paakea, Waiaaka, Kapaula, Hanawi, Waiohue, and Makapipi. Awapuhi Carmichael WT at ¶13.

522. Kai Akuna has been gathering along the coastline in and along Waikamoi, Alo, Wahinepee, Puohokamoa, Haipuaena, Punalau/Kolea, Honomanu, Nuaailua, Piinaau, Palauhulu, Ohia/Waianu, Waiokamilo, Kualani, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopiliula, Puakaa, Paakea, Waiaaka, Kapaula, Makapipi, and Waiohue ever since he can remember to catch moi, ahole, oopu, pigs, pepeiao, hīhīwai and other foods. For him and his family, these areas were their "icebox". Terrance Akuna Written Testimony (12/26/14) at ¶¶11-12; Akuna, Tr. 3/10/15, p. 33, l. 20 to p. 35, l. 16.

523. Kai, who learned to gather and fish from his kupuna, continues the tradition in order to feed his family and to "teach younger generations how we live in such an isolated place without stores. Our streams are our iceboxes." Akuna WT (12/26/14) at ¶13.

524. Jerome Kekiwi, Jr. and his ohana gather from Makapipi to Makaiwa these days, but recalls that during earlier times, when "everything was much cleaner and more flowing," his ohana "used to go from Honopou all the way around to Kaupo" to "go look for frogs, go look for `opae, hīhīwai in the river, maybe go check the ocean, maybe might have fish, you know, all kind, whatever" food source was in abundance. Kekiwi, Jr., Tr. 3/9/15, p. 212, l. 11 to p. 213, l. 21.

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[14] Beatrice Kekahuna, one of the original petitioners to amend the IIFS for Honopou, passed away on March 6, 2013. Stipulation for Substitution of Parties (12/19/14). The parties stipulated to substituting her son Sanford Kekahuna for his deceased mother. *Id.*

[15] Marjorie Wallett, one of the original petitioners to amend the IIFS for Honopou, passed away on April 3, 2010. *Id.* The parties stipulated to substituting her daughter Lurlyn Scott, for her deceased mother. *Id.*

525. Over the years, Mr. Kekiwi has seen a "big decline" in the conditions and food source supplies once conducive for gathering. *Id.* at p. 213, ll. 14-25. Long gone are the days of backyard bounties found just upstream; instead, gathering has become an arduous task that now takes hours and miles to complete. *Id.* at p. 214, ll. 1-16; p. 215, l. 25 to p. 216, l. 14. As a result, gathering is a less frequent pastime and all of its culturally significant accoutrements - particularly the transmission, from one generation to the next, of traditional values such as malama aina and malama kahawai (e.g., cleaning as you gather and refraining from "over-raking" or "deplet[ing] the resource") - suffer as a consequence. *Id.*

526. Joseph "Jojo" Young, who has been gathering "[f]rom Makaiwa Bay all the way to Makapipi" since the age of six, echoes a similar sentiment when comparing what was once fertile streambeds and estuaries ideal for catching `opae, hīhīwai, opihi, and fish in large quantities, to the conditions that exists today: no water, no seaweed down in the ocean, no fish. Young, Tr. 3/9/15, p. 236, l. 15 to p. 238, l. 13. As a result, gatherers "have to go a long way to pick" food sources, and "now there ain't no water in [these areas] so . . . there's nothing that you can catch where you can teach your grandchildren or your kids about it." *Id.* at p. 238, l. 14 to p. 239, l. 18.

527. Nā Moku fishermen also rely on the entire range of petitioned streams for their fishing practices. *See* Exh. A-1. For example: (1) Jerome "Junior" Kekiwi fishes for moi, aholehole, anae, papio, and enenue in the ocean fronting his Wailua valley home, which is fed by Honomanu, Nuaailua, Wailua, Waikani (Wailuanui), West Wailuaiki, and East Wailuaiki streams. Written Testimony of Jerome K. Kekiwi, Jr. at ¶11; (2) Darrell Aquino throws net and dives for lobsters, kumu, uhu, kala, palani, aholehole, and moi in or near the mouths of Punalau/Kolea, Honomanu, Nuaailua, Pi`ina`au, Palauhulu, ʻŌhiʻa/Waianu, Waiokamilo, Kualani, Wailua, Waikani (Wailuanui), West Wailuaiki, East Wailuaiki, Kopiliula, Puakaa, Paakea, Waiaaka, Kapaula, Hanawi, Waiohue, and Makapipi. Darrell Aquino Written Testimony at ¶ 15; and (3) Jonah Jacintho fishes for enenue, ulua, uhu, haukiuki, opihi, poopaa, omilu, aholehole, lae, aweoweo, and paananui near the mouth of Honopou. Written Testimony of Jonah Jacintho at ¶11.

528. According to Norman "Bush" Martin, "[f]ish are dependent on brackish water to spawn." Written Testimony of Norman "Bush" Martin at ¶18. "With twenty-seven streams, there are twenty-seven nurseries." *Id.*

529. Nā Moku additionally engages in the native Hawaiian traditional and customary practice of mālama ʻāina and mālama kahawai to maintain and "care for" the land and waters from which they gather, fish, recreate, and are nourished. *See* Exh. A-1.

530. Its members take care of the resource by clearing the streams, cutting the grass, and removing hau bush, *see* Kekiwi WT at ¶12; gathering according to the seasons of the moon and in different places to avoid over harvesting *see* Written Testimony of Healoha Carmichael at ¶12; and only taking enough of any one resource to meet their current needs. *See* Written Testimony of Joseph "Jojo" Young at ¶12.

531. Isaac Kanoa actively engages in mālama ʻaina at Piʻinaʻau, Palauhulu, and Waiokamilo by cleaning the ditches and streams and closing some of his patches during droughts to ensure that more water goes to the people below. *See* I. Kanoa WT at ¶13.

532. The gathering practices of Nā Moku witnesses are consistent with prior witness accounts of traditional and customary gathering practices in the region from Makapipi to Honomanu in order to maintain the resources. McGregor WT (12/23/15) at ¶¶10-11.

2. Flows Must be Sufficient to Support kuleana, appurtenant, and riparian rights

1. Historic Cultivable Acreage

533. Teri Gomes, an expert title searcher employed by NHLC, conducted detailed research of a number of parcels contained within the ahupuaʻa of Wailuanui, to confirm whether and to what extent taro cultivation occurred on these designated parcels. That research resulted in the spreadsheet designated as Exh. A-173. Written Testimony of Teresa Gomes (12/30/14) at ¶¶ 1-5; Gomes, Tr. 3/4/15, p. 5, ll. 6-13.

534. Ms. Gomes examined the public records of the State Survey Division, Department of Land and Natural Resources, the old and new tax maps made available to the general public, and the records of the Land Commissioners to Quiet Land Titles, the Native Register, Foreign Testimony, Native Testimony, and LCA records, at the Hawai'i State Archives to substantiate her research and records of the City and County of Honolulu's Tax Assessment Office. Gomes WT (12/30/15) at ¶¶ 2-5.

535. She examined each *kuleana* land claim as documented in Exh. A-173. Exh. A-173 is the spreadsheet which identifies: (1) total acreage of each TMK, (2) the stream along which the parcel is located or fed by based on its location by TMK; (3) the type of land award (Land Commission, Royal Patent, or Government Grant); (4) the type or use of the parcel as identified in

the grant and/or government records; (5) the acreage in taro if specified; (6) the acreage in other agriculture, if any; (7) the acreage claimed by Nā Moku as requiring water for irrigation; (8) the additional source of any information if used to identify the type/use of the property of each TMK; and (9) the farmer or cultivator of the parcel if known. Exh. A-173.

536. Lands that were awarded by the Board of Land Commissioners at the time of the Māhele were required to be actively cultivated, occupied and maintained in order to be awarded. Gomes Tr. 4/2/15, p. 16, l. 24 to p. 17, l. 3.

537. Lo'i that were abandoned at the time of the Māhele had a specific term for it and when that label was used by the testifier, the Board of Land Commissioners would not award that parcel. Gomes, Tr. 4/2/15, p. 18, l. 18 to p. 19, l. 12.

538. The predominant crop at the time of the māhele was taro, and rice usually replaced taro. Therefore, areas cultivated in rice in 1922 were presumably cultivated in taro at the time of the Māhele. Gomes, Tr. 4/1/15, p. 64, l. 9 to p. 65, l. 3

539. Exact acreage of land in cultivation was determined when possible by the land records where metes and bounds descriptions were provided as shown in Exh. A-173, columns titled "Taro" and "Other Ag". Exh. A-173; Gomes, Tr. 4/1/15, p. 17, l. 8-21.

540. Where land records did not identify the particular agricultural use for a parcel, its acreage was identified in the "other ag" category. Gomes, Tr. 4/1/15, p. 4-14.

541. Where government records identified a specific land use that excluded taro, that use was recorded in the type/use category in Exh. A-173; Gomes, Tr. 4/2/15, p. 33, l. 4-10.

542. Taro cultivation cannot be excluded as a use of land during the time of the mahele by the designation of a parcel in mahele records as an 'ili or mo'o. Gomes, Tr. 4/2/15, p. 31, l. 23 to p. 32 l. 14.

b. Water Required for Taro Irrigation

543. Paul Reppun has actively farmed both wetland and dryland kalo for over 41 years and has extensive experience in kalo cultivation, including the amount of water necessary to grow healthy wetland kalo. Mr. Reppun has visited every major kalo growing area in Hawai`i that is still in production, and meets and works with kalo farmers throughout the islands on the restoration of ancient lo'i kalo and `auwai. *See* Reppun, Tr. 3/4/15, p. 14, l. 1 to p. 15, l. 6; Reppun WT (12/2014), Exh. A, attached at p. 1-2.

544. On March 4, 2015, Paul Reppun was qualified as an expert witness in kalo farming. Mr Reppun's testimony regarding kalo water use is based on the amount of water needed to provide throughflow and temperatures adequate to maintain healthy wetland taro growth. Reppun, Tr. 3/4/15, p. 15, ll. 21-25.

545. "The amount of water taro needs varies a lot depending on a lot of different factors but the important thing is that when it does need the most water...the crop can be severely damaged if it doesn't get that." Reppun, Tr. 3/4/15, p. 19, ll. 2-6.

546. Flowing water is necessary to keep kalo cool by carrying heat away from the lo'i. But, as water passes through and cools lo'i kalo, that water heats up and increases in temperature. Thus, downstream kalo growers, whether taking water from an `auwai or the stream itself, will need more water than upstream farmers to keep their lo'i kalo sufficiently cool. *See* Reppun WT (12/2014), Exh. A at 5 (acknowledging that "[m]ore water in the stream means lower temperatures").

547. Taro rot begins to accelerate when the water irrigating it reaches 77°F (27°C) - "the temperature that everyone seems to agree is the critical temperature needed in growing taro" to avoid pythium rot - and other variables affecting taro farming (*e.g.,* "percolation rates, weather, season, location on the stream relative to other diversions, initial water temperature, and rate of dilution of used water"). *Id.* at 5-6 (noting importantly "that there are times when the taro farmer must use the maximum amount and that needs to be taken into account when determining how much water is required").

548. Undoubtedly, problems from taro rot become more severe as the water gets warmer. Thus, "water quantity and quality in terms of temperature" -- conditions eroded by the diversions -- are absolutely critical to perpetuate wetland taro farming practices in this historic taro-growing area. *See Id.* at 2.

549. An average wetland taro complex requires between 100,000 to 300,000 gallons per acre per day ("gad") of water to maintain water temperatures at or below 77°F (27°C) and therefore prevent crop failure due to rot and pests. *See* Reppun WT, Exh. A[16] at 5-6, 11 (explaining that the gad range presumes "new" water or "water that has not been warmed up by previous use").

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[16] "Exh. A" to the Written Testimony of Paul Reppun is a copy of his direct expert testimony filed in the contested case hearing docket DLNR File No. 01-05-MA. As such, it has been incorporated into his declaration as testimony and is excluded from Nā Moku's Exh. List.

550. Water requirements within the 100,000 to 300,000 gad range depends on various factors. More water is needed if: (1) the stream or `auwai has a lower flow (and therefore warmer water), (2) the lo'i kalo complexes are large with more kalo in actual cultivation, and (3) the weather is warmer. *See Id.*

551. A 100,000 to 300,000 gad range is consistent with East Maui kalo farmers' reasonable water needs estimates.

552. Taro crops may fail for a number of reasons, but the primary reason is the lack of water flow, which results in higher water temperatures in a taro lo'i. *Id.* at 2.

553. As Nā Moku members recognize, "[y]ou gotta have water to raise taro." Written Testimony of Harry Hueu at ¶23.

IV. WATER REQUIRED TO SATISFY WATER NEEDS OF EAST MAUI RESIDENTS

A. Honopou

554. The acreage of the parcels that must be accommodated for taro cultivation for Honopou is 6.170 acres, and an additional 17.820 acres in cultivable agricultural acreage for a total of 23.99 acres. Exh. A-173, Tr. 4/1/15, p. 9, l. 12 to p. 10, l. 19.

555. Exh. A-173 and the testimony of Teresa Gomes confirm that an estimated 23.99 acres of ancient taro *lo'i* within Honopou Valley was in taro cultivation at the time of the Māhele; and that these 22.99 acres have either appurtenant or traditional and customary native Hawaiian rights to a sufficient amount of stream water to irrigate the taro *lo`i* contained within this acreage. *Id.*

556. In particular, Exh. A-173 and the exhibits referenced therein prove that approximately 23.99 acres are fed by Honopou Stream. Exh. A-173.

1. The Rights Of Lurlyn "Lyn" Moana Scott Must Be Satisfied

557. Lurlyn Scott is the daughter of the late taro farmer Marjorie Wallet of Honopou Valley, one of the original petitioners in these proceedings and the niece of another late petitioner Beatrice Kekahuna. Scott, Tr. 3/4/15, p. 168 l. 23 to p. 169, l. 10.

558. Ms. Scott's 'ohana owns properties identified as TMK 2-9-1 parcels 14, 23, and 25 where she farms approximately two acres of taro. Scott, Tr. 3/4/15, p. 169, l. 24 to p. 171, l. 18. Parcel 14 is comprised of a kuleana parcel and three government grants. The Kuleana parcel was issued to Kepaa by LCA 5495-E, RP 3242 in the 'ili of Kunananiho upon which taro was cultivated

at the time of the māhele. Exh. A-132 at 5-6. Grants 1082 and 1918:1 (containing 2 po'alima) were Royal Patent Grants issued to Kaimi, Grant 3101:2 was issued to Kepani. Exh. A-132 at 17-19. Parcel 23 is a Royal Patent Grant 1903 issued to Hi'ilawe (containing 1 po'alima). Parcel 25 is a kuleana award issued to Hiilawe by LCA 5516, RP 3237 containing taro and kula lands. All parcels are fed by Honopou Stream.

559. In addition, her `ohana also owns interests in two other parcels in Honopou fed by Ho'olawa Stream, designated by TMK No. 2-9-14-13, a kuleana parcel fed by Ho'olawa Stream and also a part of the award issued to Kepaa by LCA 5595-E:2, RP 3242 and TMK 2-9-14-23, LCA 5516:1 (0.17 ac.), designated by TMK No. 2-9-14-17, which are also kuleana once farmed in kalo. Scott, Tr. 3/4/15, p. 171, l. 25 to p. 172, l. 13.

560. Ms. Scott farms kalo in Honopou previously tended to by her mother, Majorie Wallett, and other members of her family. Scott WT at ¶¶15, 17. See Exh. A-138 (Honopou Lo 'i: TMK (2) 2-9-01, A-139 (Honopou TMK (2) 2-9-14).

561. Given their location along Honopou Stream, Ms. Scott and and her ohana will likely require more water than other wetland kalo areas to grow healthy taro free of pythium rot.

562. Ms. Scott and her ohana continue to use Honopou Stream water to irrigate and grow taro in ways approximating those of their Hawaiian ancestors. Exh. A-146; Exh. B-10(a) and (b); Direct Testimony of Beatrice Kekahuna; Declaration of Lurlyn Scott ¶¶15, 17. *See* Exh. A-138 (Honopou Lo'i: TMK (2) 2-9-01), A-139 (Honopou Lo'i: TMK (2) 2-9-14).

563. Ms. Scott's family kuleana lands have kuleana water rights, pursuant to HRS ¶7-1 and appurtenant water rights. The kuleana lands are not located in a water management area. HRS § 7-1 provides that owners of kuleana lands including Ms. Scott are entitled to running water.

564. Siblings Lezley and Jonah Jacintho, Ms. Scott's cousins, are Native Hawaiians whose family has lived in Honopou for many generations, both of whom learned to farm from Beatrice Kekahuna and Lyn Scott. Written Testimony of Lezley Jacintho (12/13/14) at ¶¶2-6; Jonah Jacintho Written Testimony (12/13/14) at ¶¶2-5.

565. Lezley has experienced taro rot due to insufficient stream flow and needs more water to feed lo'i she and her 'ohana are opening. L. Jacintho WT (12/13/14) at ¶¶16-17.

566. If there were more water in the streams, Jonah would farm more kalo. J. Jacintho WT (12/13/14) at ¶17.

567. The Scott and Kekahuna ʻohana seek the return of water to Honopou Stream to support healthy stream and ocean life. If there was enough water to support stream and ocean life, the Scott and Kekahuna ʻohana would gather limu and Fish and native stream life from the river for subsistence, in addition to using water directly from the stream for their subsistence kalo cultivation.

568. Nā Moku's estimate of 6.170 acres of current and potential kalo cultivation, and an additional 17.82 acres in cultivable agricultural lands for a total of 23.99 acres in cultivable agricultural acreage is a reasonable estimate given the extensive history of taro cultivation in Honopou and in comparison to the Commission's own prior estimate of taro acreage in Honopou of 34.55 acres. IFSAR, Island of Maui, Hydrologic Unit 6034, Honopou (March 2008) at 66.

569. Based on the current and potential taro acreage, the IIFS for Honopou Stream must be set high enough to accommodate taro cultivation, which requires at a minimum 300,000 gad for 6.17 acres, for a total of 1.85 MGD over and above the minimum amount necessary to remain in the stream to support intream habitat and other values.

B. Keʻanae

570. As discussed *supra* at FOF 45, Dr. McGregor's cultural landscape study confirmed that "[w]etland taro cultivation is the most important single component of the cultural landscape of Ke'anae-Wailuanui," notwithstanding the significant reduction in taro production from the 1800's to the time of her study. McGregor WT (12/23/15), Exh. A at 7.

571. The acreage of the parcels for which Nā Moku estimates must be accommodated for taro cultivation for Keʻanae is 24.595 acres, and an additional 2.6 acres in cultivable acreage for a total of 27.195 acres. Exh. A-173, Tr. 4/1/15, p. 7, l. 7-16. The parcels are from Plat 1-1-03 and include parcels 11, 15, 16, 17, 18, 22, 23, 24, 25, 29, 31, 34, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 48, 49, 50, 53, 57, 65, 75, 76, 81, 82, 83, and 89. Exh. A-173 at 1-2.

572. Exh. A-173 and the testimony of Teresa Gomes confirm that an estimated 24.595 acres of ancient taro *loʻi* within Keʻanae Valley that was in taro cultivation at the time of the Māhele and that these 24.595 acres and the farmers who cultivate taro on them have either appurtenant or traditional and customary native Hawaiian rights to a sufficient amount of stream water to irrigate the taro *loʻi* contained within this acreage. *Id.*

573. In particular, Exh. A-173 indicates that approximately 24.595 acres are fed by Palauhulu Stream. Exh. A-173.

1. The Rights of Pualani Kimokeo And Other Ke'Anae Taro Farmers Must Be Satisfied

574. Awapuhi Carmichael and Pualani Kimokeo are sisters who are Native Hawaiian and grew up in the Wailua-Ke'anae region, learning from and farming taro with their parents and grandparents. Their parents had between 9 and 11 lo'i kalo that was grown for home consumption. Carmichael, Tr. 3/10/15, p. 44, l. 23 to p. 45, l. 20; Kimokeo, Tr. 3/10/15, p.

575. Currently, at the age of 71, Pualani farms the same lands farmed by her parents in Ke'anae on patches fed by Palauhulu Stream. Kimokeo, Tr. 3/10/15, p. 62, l. 13, p. 66, l. 14-24. Three of her six children continue taro farming and passing on the tradition of farming to her grandchildren. Kimokeo, Tr. 3/10/15, p. 84, l. 21 to p. 86, l. 2.

576. Pualani farms taro on TMK 1-1-03-16, which is a kuleana parcel granted at the time of the Mahele identified as an ili comprising 0.87 acres awarded to Kuluhiwa as LCA No. 4853-L:1, and RP No. 3268. *See* Exh. A-4; Kimokeo, Tr. 3/10/15, p. 73, l. 6-8.

577. Pualani is familiar with other farmers in Ke'anae because she helps them farm and is familiar with which farmers have come and gone in Ke'anae. Kimokeo, Tr. 3/10/15, p. 68, l. 20 to p. 69, l. 14.

578. Scott Martin, married to Pualani's niece, farms taro on land that was traditionally farmed by Pualani's family on TMK 1-1-03-29 as well as on parcels -18 and -49, amounting to 0.989 acres. Exh. A-173 at 1; Kimokeo, Tr. 3/10/15, p. 68, l. 10-17, p. 69, l. 15-16, p. 69, l. 24 to p. 70, l. 10; p. 70, l. 21 to p. 71, l. 6. At the time of the Mahele, the parcels Mr. Martin currently farms included kuleana lands granted to Kulihiwa by LCA 4848:2, RP 3655 (parcel 18), identified in the native testimony as having 9 lo'i kalo, and to Kaihu by LCA 4856, RP 3357 (parcel 49). *See* Exhibits A-6 and A-25. Testimony in support of the CLA claims indicates that parcels 18 and 49 were in kalo at the time of the mahele. Exh. A-173; Exh. A-6 at 4, 5; Exh. A-25 at 6, 7.

579. Parcel 29 farmed by Scott Martin is a Land Patent Grant No. S-13698 issued by the Territory of Hawaii to William Ikaika Kuluhiwa as a taro lot in 1950. Exh. A-11 at 5-9.

580. Max Pachay, Pualani's nephew in his 30's, farms taro for lu'au (leaves) on parcels 15 and 82, on nearly 3.5 acres of land. Exh. A-173 at 1-2; Kimokeo, Tr. 3/10/15, p. 71, l. 15 to p. 72 l. 13; Clark, Tr. 3/10/15, p. 111, l. 3 to p. 112, l. 8. At the time of the mahele, both parcels were awarded as kuleana's; parcel 15 was issued to Maewaewa I by LCA No. 4848-F, RP 3332 and parcel 82 was issued to Kaihu by LCA 4856: 1, RP 3357. Exh. A-3; Exh. A-33. Testimony

submitted in support of the kuleana awards indicate that parcels 15 and 82 were in taro at the time of the mahele. Exh. A-3 at 5-6; Exh. A-33 at 5-7.

581. Wade Latham grows taro on parcels 25 and 53, comprising a little over 3 acres. Kimokeo, Tr. 3/10/15, p. 74, l. 1-7; p. 78, l. 17-24. At the time of the mahele, parcel 25 is a kuleana awards issued to Mamaikawaha by LCA No. 4854, RP No. 3270 for which the Native testimony in support of the award indicates that it was used for taro at the time of the mahele. Exh. A-10 at 5-6. Parcel 53 is a kuleana parcel issued to Kaohilae by LCA No. 5066-B, RP 3254 for which the testimony in support of the parcel indicates that it was an ili on which later plat map 1013-RM-2238 indicates was used for lo'i as far back as 1903. Exh. A-175.

582. Parcels 22 and 23, comprising 1.710 acres are fallow right now due to lack of water. Kimokeo, Tr. 3/10/15, p. 73, l. 9-22. Both parcels are kuleana awards issued to Maewaewa II by LCA 4848-E, RP 3272 and to Mu by LCA 4848-G, RP 3346. Exh. A-7, A-8. Both parcels were issued as 'ili, with later plat maps indicating their use for lo'i. Exh.A-175 (Plat 1013, RM 2238).

583. Parcel 38 belonging to the Kaluhiwa 'ohana is also fallow. Kimokeo, Tr. 3/10/15, p. 74, l. 10-24. The Kaluhiwa 'ohana's land was issued as a Land Patent Grant S-13698 to William Ikaaka Kuluhiwa by the Territory of Hawaii as a taro lot in 1950. Exh. A-16 at 5, 7.

584. Parcel 37 belonging to the State of Hawaii and leased as a homestead lease is also fallow although historic evidence indicates that this parcel was used for taro. Kimokeo, Tr. 3/10/15, p. 75, l. 11-19. Exh. A-15; Exh. A-175 (Plat 1013-RM 2238).

585. Parcel 42 belonging to Harold Sexton used to be in taro but is now fallow. Kimokeo, Tr. 3/10/15, p. 78, l. 7-16. Parcel 42 is a kuleana award issued to Makea by LCA No. 4847, RP 3656 and identified in the survey accompanying the award as having 2 irrigated lo'i. Exh. A-20 at 2-3.

586. Parcels 43 and 44 are parcels owned by the State and permitted to individuals that have taro growing currently and are shown to have been in taro as of 1903. Kimokeo, Tr. 3/10/15, p. 77, l. 13-22; Exh. A-173 at 1; Exh. A-21, A-22; Exh. A-175.

587. By "fallow", Pualani referred to lots that were farmed in taro at one time but today are full of grass. Kimokeo, Tr. 3/10/15, p. 74, l. 25 to p. 75, l. 10;

588. Today, Pualani farms lo'i at the end of the 'auwai system where she has "very, very little water and the water is always warm." Kimokeo, Tr. 3/10/15, p. 64, l. 25 to p. 65, l. 4.

589. Pualani receives water through a flume off of Palauhulu Stream but suffers from not having enough water in part due to increased plant growth and narrowing of the stream. "So there's a lot of growth when we don't have enough water," because "it's not constantly running so that you have all these guava trees and Kukui nut trees," which "makes the stream a lot [narrower] because there's not flowing water." Kimokeo, Tr. 3/10/15, p. 90, l. 14 to p. 91, l. 1.

590. With lower flow to her patches, she now has "a lot of taro rot around the huli," as well as "guava seed in the taro." Kimokeo, Tr. 3/10/15, p. 92, l. 2-10.

591. Following the Commission's decision in 2008 setting amended IIFS for 6 taro growing streams, Pualani experienced no change in water flow to her patches and did not see any change in Palauhulu's streamflow. Pualani was unaware that the Commission's data showed that the IIFS had not been met on numerous occasions but that information was consistent with her experience of the water flow during the period following 2008 to 2014. Kimokeo, Tr. 3/10/15, p. 92, l. 14 to p. 95, l. 4.

592. Pulani Kimokeo has traditional and customary and kuleana rights to water to support her taro cultivation. Ms. Kimokeo seeks the the return of water to Palauhulu Stream to support healthy stream and ocean life.

2. THE RIGHTS OF ISAAC KANOA MUST BE SATISFIED

593. Isaac Kanoa farms approximately four acres in kalo and luau in Ke'anae on land that his grandmother's family passed down to him as well as on land owned by other individuals, the State of Hawaii and East Maui Irrigation. Mr. Kanoa's lo'i are all irrigated by Palauhulu Stream. I. Kanoa WT at ¶5.

594. Mr. Kanoa is Hawaiian. I. Kanoa WT at ¶ 2.

595. Mr. Kanoa also farms about 5 acres of land in Waianu Valley, located between Wailuanui and Ke'anae that are irrigated by water from Waiokamilo Stream. I. Kanoa WT at ¶6.

596. The water irrigating Mr. Kanoa's Ke'anae patches is "warm" even though they are located "right near the flume." His patches further down are "much warmer." If more water were available, Isaac would open more patches and he would be more confident that his family could continue farming their family lands. Kanoa WT at ¶¶16, 17, & 19.

3. THE RIGHTS OF DAN CLARK MUST BE SATISFIED

597. Dan Clark has farmed taro for the last 15 years in Ke'anae where he lives near Pualani Kimokeo, who taught him to farm. Clark, Tr. 3/10/15, p. 107, l. 9-20. Mr. Clark began

farming taro on parcels 16 and 15 that he eventually turned over to Pualani's family in 2014. Clark, Tr. 3/10/15, p. 111, l. 3 to p. 112, l. 8.

598. Mr. Clark currently farms taro on two lo'i on parcel 75 that he leases from Phyllis Kalapoa. Clark, Tr. 3/10/15, p. 111, l. 16-25. Parcel 75 is a kuleana parcel issued to Kaihu by LCA No. 4856-1, RP 3357 containing 4 lo'i kalo.. Exh. A-173 at 1; Exh. A-30 at 7.

599. In addition to the parcels identified by Ms. Kimokeo and Mr. Clark, 5 other parcels (11, 17, 24, 40, and 81) totaling just over 4 acres are kuleana awards that were in taro at the time of the māhele. Exh. A-173 at 1-2; Exh. A-2, kuleana award issued to Ehu by LCA 4665-G, RP 3341 (containing 6 lo'i po'alima); Exh. A-5, kuleana award issued to Maewaewa II by LCA 4848-E, RP 3272 (containing 1 lo'i); Exh. A-9, kuleana award issued to Malailua by LCA 4847, RP 3266 (containing 8 lo'i); Exh. A-18, kuleana award issued to Kailio by LCA 4848-H, RP 3271 (containing 5 lo'i); and Exh. A-32, kuleana award issued to Kaea by LCA 2442, RP 2017 (containing 6 lo'i).

600. Parcels 38, 39, 45, 48, 50, 57, 83, and 89 comprising nearly 4 acres are all Land Patent Grants issued by the Territory of Hawai'i as taro lots. Exh. A-173; Gomes WT at ¶¶ 34-37, 48-51, 54-55, 58-59, 70-73; Exh. A-16, Grant S-13698 to William Ikaaka Kaluhiwa; Exh. A-17, Grant S-14821 to Harry Kahuhu, Jr.; Exh. A-23, Grant S-14818 to Samuel Ah Ling Ah Koi; Exh. A-24, A-26, and A-34, Grant 13164 to Margaret Pahukoa Hueu; Exh. A-28, Grant S-14783 to Joseph Young Hu; Exh. A-35, Grant S-13208 to Maryann Aima Pahukoa.

601. Parcels 34 and 36, comprising 1.560 acres are lands that are shown to have some taro kuauna or walls indicated on Exh. A-175 as of 1903. Parcel 34 is a kuleana award issued to Ehu by LCA 4665-G, RP 3341 identified only as an 'ili without further specificity, while parcel 36 is a Land Patent Grant No. S-14514 issued to Kalehua Kahookele Kanoa and owned today by Isaac Kanoa. Gomes WT at ¶¶28-31; Exhibits A-13 and 14.

602. Nā Moku's estimate of **24.595** acres in cultivable taro acreage today is a conservative estimate given the extensive history of taro cultivation in Ke'anae and in comparison to the Commission's own prior estimate of taro acreage in Ke'anae of 105.85 acres. IFSAR, Island of Maui, Hydrologic Unit 6053, Piinaau (March 2008) at 72.

603. Based on the cultivable taro acreage, the water needs for lands fed by Palauhulu Stream amount to 24.595 acres multiplied by the maximum 300,000 gad for a total of 7.38 MGD over and above the minimum amount necessary to support instream habitat and other instream values.

C. WAILUANUI

604. The acreage of the parcels for which Nā Moku estimates must be accommodated for taro cultivation for Wailuanui is 66.922 acres, and an additional 18.073 in cultivable acreage for a total of 84.995 acres. Exh. A-173, Tr. 4/1/15, p. 8, l. 1-15.

605. Exh. A-173 and the testimony of Teresa Gomes confirm that an estimated 66.922 acres of ancient taro *lo'i* within Wailuanui Valley was in taro cultivation at the time of the Māhele and that these lands and the farmers that cultivate taro on them have either appurtenant or traditional and customary native Hawaiian rights to a sufficient amount of stream water to irrigate the taro *lo'i* contained within this acreage. *Id.*

606. In particular, Exh. A-173 indicates that approximately 44.474 acres in taro and an additional 16.293 acres in cultivable agriculture for a total of 60.767 acres are fed by Waiokamilo and Kualani Streams exclusively, while approximately 22.448 of cultivable taro acreage are fed by Wailuanui and Kualani Streams. Exh. A-173.

1. The Rights of Edward Wendt Must Be Satisfied

607. Nā Moku president Edward Wendt is a sixth generation Wailuanui resident of Native Hawaiian ancestry, who lives in the home once lived in by his grandmother and farms wetland kalo on lands that have been in his family since the Mahele. Written Testimony of Edward Wendt (9/10/2014) at ¶5; Wendt WT (12/26/15) at ¶ 2; Exh. A-142 (Wailua Lo'i: TMK (2) 1-1-04, -05, -06); Wendt, Tr. 3/9/15, p. 8. ll.3-5.

608. From a very young age through his early adulthood, Mr. Wendt's grandparents transmitted to him, "the knowledge of the ancient ways of growing taro in the valley" because it was then, as it is today, "our [ohana's] food source." Wendt, Tr. 3/9/15, p. 7. l. 19 to p. 8, l. 19; p.13, ll.21-25.

609. Mr. Wendt has "never changed and altered [his ohana's] way of farming" which "follow[s] the manner in which the ancient Hawaiians once farmed this valley." *Id.* at p. 83, ll. 4-9.

610. Mr. Wendt's kalo farming proficiency eventually won him the title of the Maui JC's "Taro Farmer of the Year." He continues to farm and lease the same wetland taro patches that won him that honor back in 1977. Wendt, Tr. 3/9/15, p. 14, ll. 16-19.

611. Beginning in the 1960s and through the '70s and '80s, Mr. Wendt and other Wailua community residents began noticing diminished streamflows as a result of HC&S/EMI's diversions. Their adverse impact on the Wailuanui taro farming community caused "devastation,"

"great hardship," "confusion," "unrest," and "mistrust of government": "the huli was dying" and "diseased" because of "warm water or lack of water," and "[o]ur young people, the people who were interested in farming could not sustain this type of life" and therefore moved away "to make ends meet." Wendt, Tr. 3/9/15, p. 19, l. 20 to p. 21, ll.12. "[B]y doing this, it depleted our farmers, a whole generation [of them]." *Id.* at p. 21, ll. 13-14.

612. Mr. Wendt's description of present-day taro farming conditions is in stark contrast to conditions Mr. Wendt experienced as a young man: "[I]t was amazing. If you didn't know where you were going, the beauty of the lo'i growing, I used to get lost. I didn't know where I was because all I saw was taro plants. I saw this place flourishing with taro." *Id.* at p. 72, l. 24 to p. 73, l. 4.

613. Given his role as president of Nā Moku and his ohana's extensive history in Wailuanui Valley, Mr. Wendt is knowledgeable about the historic and current extent of wetland taro cultivation in that valley, and taro farmers' expressed intentions to expand cultivation once more water is released from HC&S/EMI's diversions and to restore the ancient lo'i kalo that once flourished there. *Id.* at p. 50, l. 24 to p., 51 to l. 20.

614. Mr. Wendt's 'ohana farms taro on the parcel identified as TMK 1-1-06-23 and is "one of the last [parcels] to receive water on th[e] line" fed by Auwai 1. *Id.* at p. 71, l. 3 to p. 72, l. 3. Because parcel 23 is situated furthest from the head of the water and at a lower elevation, the water automatically warms as it travels from patch to patch before reaching his lo'i. *See Id.*

615. Parcel 23 is a kuleana award issued to Kaniho by LCA No. 10828-B, RP 2802. Exh. A-92. Parcel 23 was awarded as a mo'o parcel in the 'ili of Palolena at Wailua. Exh. A-92 at 5.

616. Parcel 25 which abuts Wailuanui Stream has been fallow and covered with vegetation for many years - as taro farmers grew weary of inconsistent and inadequate streamflows, they moved away and discontinued farming. *Id.* at p. 72, ll. 4-21. Indeed, "the lack of water played a big role" in "the lands laying fallow [and] now under vegetation . . . those sections along the Wailuanui Stream." *Id.* at p. 73, l. 17 to p.74, l. 7 (noting that the "particular belt along the Wailuanui Stream is [currently] under that kind of intense foliage" because of the "dewatering" of the stream). "If the [water] resources are put back in its proper amount [and] quality, [all of those lo'i] will come back." *Id.* at p. 74, ll. 17-18; see also *Id.* at p. 72, ll. 21-22.

617. Parcel 25 is a kuleana lot issued to Moo II by LCA 4729, RP 2801 for which the testimony submitted in support indicates that it was in taro at the time of the mahele. Exh. A-94 at 2-3, 5.

618. Mr. Wendt's testimony that Wailuanui taro farmers "depend on surface water" and seek their full restoration is resolute and unswerving, not only because "poi is a daily diet, taro is a daily diet," (*Id.* at p. 83, ll. 1-3), but because unlike HC&S, EMI, or the MDWS, East Maui farmers have no other alternative water source to service their kalo lo'i. *Id.* at p. 80, l. 18 to p. 81, l. 11. Besides, Wailuanui taro farmers "shouldn't be drilling wells" even if they had the authority or monetary resources to do so - which they do not - when the "[w]ater is originating in [their] ahapua`a." *Id.*

619. In describing the devastating consequence of the lack of water to the health of Wailuani Valley, (*Id.* at. p. 82, l. 3 to p. 83, l. 3), Mr. Wendt explains, "We're wetland taro farmers. Without the wai, we cannot perpetuate that way of life." *Id.* at p. 76, ll. 3-5. And for the young men and women of this valley who express an interest in farming and ask "where [is] the wai," the opportunity to farm kalo is lost to the dewatering of the streams until they are once again restored. *Id.* at p. 76, ll. 5-19.

620. Notably, Mr. Wendt also attests to the leasing of a State-controlled parcel, TMK 1-1-08-05, a portion of the 'ili of Kupa'u by Hawaiian lessees. Wendt (12/26/15) at ¶ 5; Exh. A-143 (Wailuanui Lo'i: TMK (2) 1-1-08). The parcels evidence ancient taro lo' i within their borders. Because the State currently manages it, however, Nā Moku has NOT included its acreage in its calculation of cultivable acres in taro.

2. The Rights of Terrance "Kai" Akuna, Jr. Must Be Satisfied

621. Terrance "Kai" Akuna is a sixth generation taro farmer in Wailuanui who has been farming wetland kalo in Wailuanui for over 20 years. He learned to farm taro from his family members including his dad, grandfather, uncles, and aunties and now teaches his nine year old son to grow kalo. Akuna, Tr. 3/10/15, p. 17, l. 9 to p. 19, l. 9.

622. At various times in his life, Kai has been a full-time taro farmer and he currently farms about 1 ½ to 2 acres of land with his wife Aja in Wailuanui on lands identified as plat 1-1-04, parcels 11 and 12 which are fed by Waiokamilo and Kualani Streams. Akuna, Tr. 3/10/15, p. 20, l. 16-20, p. 21, l. 13 to p. 22, l. 16; Aja Akuna Written Testimony (12/26/14) at ¶ 5. Parcel 11 is a kuleana award issued to Kaumauma by LCA 11043-B, RP 2786 and is identified as a mo'o parcel in the supporting testimony. Exh. A-40. Parcel 12 is a kuleana parcel issued to Kauiki by LCA 5068, RP 7025 and identified in supporting testimony as having 24 lo 'i. Exh. 41 at 3-4.

623. Kai's family has taro patches lower down in Wailuanui valley on parcel 46 that he "can't open any more because the water is too hot, too warm and ha[s] to run through too many channel[s]" to be irrigated. If more water was flowing, he would expand his farming practices to reopen those lo'i once farmed by his family, including parcels 46, 29, and 21 off of Wailua Stream. Although Parcel 46 was sold, the landowner would allow Kai to farm if he had water. Akuna, Tr. 3/10/15, p. 30, l. 18 to p. 33, l. 15. Parcel 21 is a kuleana award issued to Kuheleaumoku by LCA 4853-G, RP 3255 as a mo'o parcel. Exh. A-49. Parcel 46 is a Land Patent Grant S-14978 issued to Maggie Akuna Aiu as a taro lot. Exh. A-82.

3. THE RIGHTS OF NORMAN "BUSH" MARTIN, JR. MUST BE SATISFIED

624. Norman "Bush" Martin, Jr. is a Native Hawaiian descendant from Wailuanui. Mr. Martin's grandparents, Inez and Samuel Akina, were his most influential elders and from whom he learned traditional practices which sustain and inform his way of life in Wailuanui Valley today: wetland taro farming; mālama 'āina; fishing; gathering 'opae, 'opihi, and other food sources. Martin, Tr. 3/9/15, p.113, ll. 2-20; p.114, ll. 3-13.

625. Beginning in his early childhood through 1996, Mr. Martin helped plant and maintain his grandparents' lo'i kalo: pulling taro, weed-eating, and lawn mowing. *Id.* at p. 144, ll. 21-24.

626. From 1996 through 2002, however, he farmed taro full-time, completely taking over his grandparents' farm upon his grandmother's passing in 2002. *Id.* at p. 115, ll. 7 to p.116, ll. 20. During this time, Mr. Martin was farming parcels 18, 32, 34, 36, 40, 41, 43, and 45 amounting to nearly 9 acres of taro.

627. Parcels 18, 36, and 40 are kuleana awards. See Exh. A-61, LCA 5059, RP 3258 issued to Kukui (identified as a mo'o parcel in the māhele testimony and shown to have lo'i taro in Exh. A-174; Exh. A-105, LCA 5049:1, RP 3257 issued to Kaiwa (identified as a mo'o parcel in the māhele testimony and shown on Exh. A-174 as having taro); Exh. A-109, LCA 4733-B:2, RP 3261 issued to Nakihei (identified as having 1 lo'i in the Native Testimony in support of the award).

628. By 2002, Mr. Martin had observed a noticeable decline in the streamflows irrigating his lo'i kalo since the 1980s. *Id.* at p. 116, l. 19 to p. 117, l. 7. Half of his farm - those taro patches previously irrigated by top-ditch waters sourced from Waiokamilo and Kualani Streams - received flows inadequate to support a healthy, full-cycle taro crop; and his attempts "to push water from Wailua Stream to farm [those dry patches] of the farm" were futile. *Id.* at p. 117, ll. 10-18.

629. The limited amount of water flowing into Mr. Martin's taro lo'i downstream of HC&S/EMI's diversions restricts his kalo cultivation to parcels 35, 40, 41, and 42. *Id.* at 118, ll. 10-24. Indeed, flow reductions caused Mr. Martin "to cut back half" of the acreage he and his ohana previously farmed. *Id.* at p. 133, l. 8 to p. 134, l. 14.

630. The low flows and limited water supply also accelerate weed growth in and along the lo'i patches and promotes taro rot. *Id.* at 129, ll. 22-25. Mr. Martin estimates that insufficient flow has caused him to lose over 20,000 huli to taro rot; a loss from which it will take Mr. Martin a few years to recover. *Id.* at 130, 1. 1 to p. 133, l. 7.

631. Similarly, numerous lots "ready" or "open" for growing kalo are nonetheless without plants right now because "not enough water [is] coming down from Wailua River"or because the water is "too hot" to support or sustain a full patch with a healthy, full-cycle, taro crop: parcels 34, 35, 37, 40, 41, 42, 43, and 45. *Id.* at p. 119, l. 1 to p. 120, l. 7.

632. If more water was flowing down into his lo'i patches, Mr. Martin would clear and open parcels 18, 24, and 32 to expand his kalo cultivation practices. *Id.* at p. 121, l. 12 to p. 122, l. 25 (confirming that he owns or has authority to farm those parcels). Parcels 24 and 32 are both Land Patent Grants issued as taro lots. Exh. A-93, Grant S-13173 issued to Mary Ah Hun Akina (0.800 acres); Exh. A-101, Grant S-14781 issued to Libby Kekiwi Akina (0.700 acres).

633. The lo'i patches Mr. Martin farms or intends to farm rely on two sources of auwai water: the Waiokamilo/Kualani auwai system, which is fed by Lakini (also known as the "top ditch" or "ditch no. 2"), irrigates parcels, 37, 40, 41, 42, 43, 45, and 46 when adequate flows permit; and the auwai system fed by Wailua Stream irrigates Lots 24 and 69 when flows permit. *Id.* at p. 123, l.25 to p. 128, l. 18.

4. THE RIGHTS OF JEROME "JUNIOR" KEKIWI, JR. MUST BE SATISIFED

634. Jerome Kekiwi is a 32 year old Native Hawaiian who has been farming wetland taro in Wailuanui "from when [he] was a baby," age four or five. He and his ohana have been carrying on this taro farming tradition on various parcels in Wailuanui and Ke'anae Valley for generations. *Id* at p. 195, ll. 4-22; p. 213, ll. 9-15.

635. Mr. Kekiwi farms wetland taro using an auwai and lo'i patch system that his ancestors have used since the time of the Mahele. *Id.* at p. 202, ll. 4-14. Before he passed away, Mr. Kekiwi's father spent ten years teaching his son what he knew about the water system that Mr. Kekiwi today relies on to irrigate his 'ohana's kalo patches. *Id.* at p. 203, ll. 1-4. Over the years, Mr.

Kekiwi picked up additional knowledge from other farmers in his ohana - including his mother and siblings who mostly taught him "how to maintain and manage your water source so that you're not affecting the farmers below you or above you," underscoring that, "[y]ou know, everybody got to work together on this." *Id.* at p. 202, ll. 15-25.

636. Mr. Kekiwi presently cultivates wetland taro on plat 1-1-05 parcels 29, 30, 31, 42, and Plat 1-1-06 parcels 49, and 54 - "[b]y the blessing of [his] kupunas and aunties and uncles, they let [him] farm their aina" in the same manner ancient Hawaiians once cultivated kalo in this valley. *Id.* at p. 196, l. 7 to p. 198, l. 5. Parcels 29, 30, 31 are kuleana parcels issued Kaulia by LCA 5058, RP 3256, to Kalawaia by LCA 5060, RP 3259, and to Wahinemaikai by LCA 4561, RP 3281. Exh. A-72, A-73, A-74. Supporting testimony for these parcels indicates that they were used for taro at the time of the mahele. Exh. A-72 at 5 (indicating 22 lo'i in the ili of Waieli); Exh. A-73 at 5 (indicating 10 lo'i in a mo'o in Wailua, in the 'ili of Waieli); Exh. A-74 at 9 (1 patch, kihapai). Parcel 42 is a mo'o awarded as a kuleana to Kukui by LCA 5059, RP 3258. Exh. A-79. Parcel 49 is a Land Patent Grant No. S-1391 issued to his kupuna Mary Kapono Kalalani Kekiwi as a taro lot. Exh. A-117.

637. Indeed, his lo'i patches draw water from the same traditional 'auwai system, specifically auwai no. 2 and 7, which are fed primarily but not exclusively by the bottom ditch originating from the Lakini box, which is itself sourced from Waiokamilo and Kualani Streams. *Id.* at p. 198, l. 10 to p. 200, l. 22.

638. According to Mr. Kekiwi, all of these parcels are "all ready, we ready for open [them]. But with inconsistent water flow, you cannot," because "you going be farming [just] grass." *Id.* at p. 197, ll. 23-25. For example, Lot 49 is "all bush" as a result of the limited amount of water flowing into Mr. Kekiwi's taro lo'i downstream of HC&S/EMI's diversions. *Id.* at p. 197, l. 25 to p. 198, l. 2.

639. Mr. Kekiwi knows from experience that streamflow temperature, consistency, and volume are "what will keep the kalo at its best form and shape" and will prevent opala or crop loss. *Id.* at 201, l. 9 to p. 202, l. 3. "[I]f we no more water, we no more taro." *Id.* Nor can wetland taro farmers farm with hot water. *Id.*

640. Water supplies currently sourced from Waiokamilo to feed Mr. Kekiwi's taro lo'i, however, have created unfavorable conditions that are not conducive to growing or harvesting

healthy taro. Mr Kekiwi complains that when "no more consistent push of the water, when I reach down to my bottom patches, [the water from the auwai is] hot already." *Id.* at p. 205, ll. 13-18.

641. Less water also means less productivity: in comparison to the early 1990s, Mr. Kekiwi has seen a three quarter reduction in his taro harvest. For example, taro that used to be the size of "missiles" or "big bombs" and capable of generating fifteen pounds of poi are now sized to "fit in the palm of my hand now" and generally produce less than a pound, "maybe less than half a pound" of poi. *Id.* at p. 206, l. 20 to p. 208, l. 13.

642. Expanding cultivation with the limited water available is not even an option presently: "By the time the [water] get halfway through the valley, I not going to get nothing. All this will be dry, bone dry. All this. . . . Nothing." *Id.* at 210, ll. 17-24. If, however, sufficient stream flows were made available, Mr. Kekiwi would "open up this whole valley" since the current auwai system can support such an expansion. *Id.* at p. 211, ll. 5 to p. 212, l. 10.

643. Mr. Kekiwi laments that "if they keep diverting and we gonna get nothing, then I not going to be able for teach my son, my daughter and future generations anything about this, anything about the culture, the lifestyle, you know, the habitat of Wailuanui or Ke'anae, you know." *Id.* at p. 209, ll. 3-8. He forewarns: "[T]hat's the only way we going to be able to pass on this tradition and this culture and our heritage is with the wai. Because with the wai, you get kalo. With the kalo, you feed your opus. . . . And with the kalo -- goes on and on. . . . Without the water what we going teach? . . . That's what we need for provide and for protect our knowledge, our mana'o, so we can pass them onto the next generation." *Id.* at p. 217, l. 18 to p. 218, l. 15.

5. The Rights of Joseph "Jojo" Young Must Be Satisfied

644. Joseph "JoJo" Young is descended from a rich taro farming tradition that originates in Wailuanui Valley. For over forty years, Mr. Young has been cultivating wetland kalo following the traditions passed down to him by his father and namesake, Joseph K. M. Young, who himself farmed lands descended from his father, Aima. *Id.* at p. 222. l. 11 to p. 223, l. 16. Mr. Young was "about six years old [when he] was raising taro already" and instructed by his father on "how to plant the taro, when to fertilize it, when to harvest." *Id.* at p. 229, ll. 8-20.

645. At the height of productivity - when Joseph "Sr." served as Wailua's taro business agent and farmed full-time - the Young ohana "had about 15 acres of [ten to fifteen] taro patches." *Id.* at p. 222, l. 22 to p. 223, l. 9. Today, Joseph "Jr." is "the only one [in his ohana] right now farming taro from [his] dad," *Id.* at p. 224, ll. 3-4. Of the 15 acres the Young ohana once farmed,

Joseph "Jr." presently farms 3 acres of wetland taro patches located on plat 1-1-05 parcels 17, 41, 45 and irrigated by Auwai No. 3 and No. 4, whose waters originate from Waiokamilo and Kualani Streams. *Id.* at p. 224, l. 5 to p. 226, l. 18. The parcels are all government owned lands under lease or permit. Exh. A-62, A-78, A-81. This auwai system is the same that his ancestors have used - and that "everybody does all over the place" - since the time of the Mahele. *Id.* at p. 228, l. 25 to p. 229, l. 7.

646. Joseph "Jr." explains that when streamflows are adequate, his three acre lot can yield "almost five bags, five to seven bags [of taro] a week." *Id.* at p. 228, ll. 17- 20. In Low flows typical during the summer months or rainfall shortages, however, dramatically reduce those yields by "half or even less than that." *Id.* at p. 228, ll. 17-24.

647. Mr. Young recalls a time when, before the 1980s and when his dad was farming kalo, "he had a lot of water coming down in that auwai" which is fed by the same stream that now feeds his three acre parcel. *Id.* at p. 231, l. 22 to p. 232, l. 2.

648. For Mr. Young, the quantity, volume, and temperature of streamflows are critical to "the quality and quantity" of his taro crop. *Id.* at p. 228, ll. 10-14. "[Water] is a vital thing [and p]lanting taro without water, you can't plant taro." *Id.* at p. 232, ll. 23-24. Instead, all you can see are "the weeds all over the place that nobody is opening up taro patches because there is no water." *Id.* at p. 235, ll. 1-7.

649. Indeed, if Mr. Young could be assured of a reliable water source and the resources to expand the number of taro patches in cultivation, he would do so on plat 1-1-05 parcels 25, 30, 31, and 34, and on plat 1-1-6, parcels 72 and 74; patches that haven't been open since the 1980s and that would instantly quadruple his taro harvest. *Id.* at p. 232, l. 25 to p. 234, l. 14.

650. Parcels identified as TMKs 1-1-05-30 and -31 comprising 4.215 acres are kuleana awards issued to Kalawaia by LCA 5060, RP 3259 (containing 10 lo'i) and to Wahinemaikai by LCA 4561, RP 3281 (containing 1 lo'i). Native testimony in support of the kuleana award indicates that they were used for taro at the time of the māhele. Exh. A-173; Exhs. A-73, A-74.

651. Just as Mr. Young's grandfather and father imparted their taro farming traditions to him, "So one day [he] hope[s] to teach [his] grandchildren." *Id.* at p. 229, ll. 21-22. But the reality is that the lack of a reliable water source, the only water source flowing through auwai downstream of EMI and HC&S diversions, (*Id.* at p. 234, ll. 15-21), makes it "hard to tell your children come in here and try grow taro if they cannot even grow the taro and make a living. Because to raise a family

now, need big bucks to raise a family. And just taro, harvest taro, harvest taro two, three bags a week won't do it." *Id.* at p., 235 to l. 18 to p., 236, l. 3.

6. The Rights of James F. Ka'a'a Must Be Satisfied

652. Jame F. Ka'a'a farmed wetland taro parcels in Wailua and Ke'anae Valleys sporadically between 1986 and 1993 by helping Ke'anae resident and taro farmer, Wade Latham. At that time, "[t]here was a lot of taro," "a lot of farmers," and Mr. Kaaa "was amazed at this place . . . [which] was just beyond." *Id.* at p. 244, l. 12 to 247, l. 6.

653. Mr. Ka'a'a returned to Ke'anae in 1999; he acquired plat 1-1-05 parcel 16 in Wailuanui in May 2011 comprising 2.33 acres. *Id.* at p. 247, l. 11 to p. 248, l. 8. Exh. A-173 at 3; Exh. A-61. In 2011, Mr. Ka'a'a's "object[ive] was to open taro patches," and so he did just that, helping Norman "Bush" Martin, Jr. open all those taro patches identified [on the Map and labeled "Bush"]. *Id.* at p. 249, l. 20 to p. 250, l. 10.

654. Eventually, however, "the water started going down, and [Mr. Kaaa] started losing water" originally sourced from Wailua and Hamau, the waterfall above, "[s]o all this [taro] ended up going dry." *Id.* at p. 250, ll. 17-25. In an attempt to save his taro crop, Mr. Kaaa obtained Jackie Columbo's permission to cultivate taro on Lot 16, but it too ___ed the same fate: after all the patches were opened, the Lakini Box served by the Waiokamilo and Kualani Streams ceased to flow into auwai irrigating his lo'i and left him with dying seed. *Id.* at p. 251, l. 1 to p. 253, l. 13. At that point, two different water sources failed to provide his lo'i kalo with adequate streamflow. *Id.* at p. 253, ll. 10-13.

655. Mr. Ka'a'a made one final attempt to save the huli, even if the taro itself was beyond rescue, by transferring the taro originally planted in Mr. Martin's patches into his own property until the flows return. *Id.* at p. 251, l. 19 to p. 252, l. 25.

656. Mr. Ka'a'a's enthusiasm for wetland taro cultivation remains undeterred, even though the lack of stream flow foiled his plans to open twelve taro patches. Indeed, he is adamant that in the event the Commission orders that more water flow below HC&S/EMI's diversions and through the auwai system that feeds the Wailuanui taro complex, he is "going to open everything [he] can open." *Id.* at 255, ll. 5-19.

657. Nā Moku's estimate of taro acreage is conservative given the extensive history of taro cultivation in Wailua Valley, the current continued taro use under diverted conditions considering the Commission's own prior estimate of taro acreage in Wailua of 353.32 acres. CWRM

IFSAR, Island of Maui, Hydrologic Unit 6056, Wailuanui (March 2008) at 72; IFSAR, Island of Maui, Hydrologic Unit 6055, Waiokamilo (March 2008) at 66-67.

658. Taro farmers relying on waters from the Waiokamilo hydrologic unit (including Kualani Stream) are entitled to a minimum of 13.342 MGD (44.474 acres * 300,000 gad) to support their taro growing in addition to the water that must be left in the stream to support other instream values. Due to the additional agricultural acreage that is also entitled to rely on stream water in this hydrologic unit and that the needs well exceed the base flow of 3.90 cfs/2.52 mgd and that the base flows of Kualani Stream are unknown, the full streamflows in this unit should be made available to the farmers. Exh. HO-1 as revised (3/31/15).

659. Taro farmers relying on water in the Wailuanui hydrologic unit must also be accommodated. For the 22.48 acres in cultivable taro, farmers are entitled to a minimum of 6.74 MGD (22.48 acres * 300,000 gad) above and beyond the amount necessary to remain in the stream to support other instream values.

D. HANEHOI & HUELO

1. EMI Must Release Sufficient Water to Satisfy Domestic Water Needs in Accordance With the Huelo License

660. The conveyance of water for irrigation and domestic use is a protected public trust instream use of stream water.

661. There is no public water supply available in the Huelo area. De Naie WT.

662. The Hanehoi Hydrologic Unit serves the Huelo community. The Huelo community includes those with kuleana, riparian and appurtenant rights. It includes two active churches and a number of active farms, an agricultural education center and an eco-education center. De Naie WT.

663. The population of the area served by Hanehoi and Puolua streams is over 200 people. All of these people depend upon the streams, springs or groundwater as well as the rain for their water supply. Many enjoy the streams for recreation. *Id.*

664. Ms. de Naie has lived on TMK No. (II) 2-9-007:48 ("her property") since 1985 and has been the co-owner of this land since 1989. Her property is located in the ahupua'a of Puolua, being a portion of Royal Patent Grant 2079, Apana 3 to Samuel Kaiewe. Its location is represented in TMK Map No. (II) 2-9-007, Exhibits E-42 and E-42-A.

665. Ms. de Naie claims the right to an adequate supply of domestic water would be available for her property from the Puolua or Hanehoi streams, since there is no public water supply available in Huelo and these streams are diverted by EMI, based upon the Huelo License Agreement of 1960 with the State which obligates EMI to allow enough water in the streams for the downstream domestic users in the Huelo Water License area. See Exh. E-96. De Naie WT.

666. As downstream residents of an area where State water leases and licenses are granted, the farm, Hale Akua, is entitled to adequate stream water to supply domestic use as part of those license agreements. Michael D'Addario Written Testimony.

667. EMI has an obligation under the Huelo License Agreement of 1960 with the State to allow enough water in the streams for the downstream domestic users in the Huelo Water License area. Exh. E-96; De Naie WT.

2. Huelo Community Pipeline

668. A 2 inch pipeline, known as the Huelo community pipe, serves some of the water needs of members of the Huelo community. Christa A. Morf Written Testimony.

669. Huelo is a traditional community of several hundred households which has no public supply of domestic water. Many families depend on stream water from the Huelo community pipe that receives water from East Hanehoi Stream. Morf WT.

670. This pipe initially diverts water from a small pool above the Lowrie Ditch diversion on East Hanehoi Stream ("Hanehoi Stream."). Morf WT.

671. The Huelo community pipe water works or diversion of water is registered with the State of Hawaii as Registered Stream Diversion 538.6 on TMK (II) -2-9-014:009 ("Huelo community pipe"). Morf WT.

672. This pipeline then travels to the Huelo community providing water to members of the Huelo community. Morf WT.

673. At least 30 Huelo residences, such as Ms. Morf's, depended upon the waters of the Hanehoi stream for all their basic domestic needs and to irrigate their farms and gardens and to water their animals. Morf WT.

674. The widespread community use of the Huelo Community pipe is noted in the CWRM's September 2008 staff submittal addressing the various uses of Hanehoi stream water. Exh. E-7, p.21; Morf WT.

675. The predecessor in title of Ms. Morf, Robert Polster, regularly filled the water storage tank on the property with stream water from the East Hanehoi stream that had been transported through the Huelo community pipe and Ms. Morf followed suit when she became an owner of the property. Morf WT.

676. In September 2008, a stream flow level of .74 mgd (740,000 gallons/day) was set for the pool on Hanehoi Stream that serves the Huelo community water pipe. Morf WT.

677. That stream flow level has not been fully implemented on Hanehoi Stream, because the water volume available for the Huelo community pipe did not increase, but rather seemed to diminish over the past several years, except in times of heavy rains. Morf WT.

678. Ms. Morf's property adjoins the Kaulanapueo Church and cemetery, built in 1853 on TMK No. (II) 2-9-07:12 (1.54 ac) also known as the "Huelo Church." The Huelo Church and its congregation also depends upon water from the Huelo Community pipe and Hanehoi stream, as does nearby Huelo Door of Faith Church and Bible school on TMK No. (II) 2-9-07:32 (.933 ac.). Morf WT.

679. As a consequence, the household of Christa Morf and around 15 other households who have the right to have some source of domestic water from the major stream in the area, which is Hanehoi stream, and have historically depended upon the water from the Huelo community pipe, have not been able to do so for a number of years. There simply is not enough water to go around under current conditions. Morf WT.

680. Ms. Morf's household, and all of these other households have been impacted by the lack of adequate water in Hanehoi stream to serve the needs of the Huelo community, which is entitled to domestic use of the stream water. Morf WT.

681. Ms. Morf expressed gratitude that the CWRM recognized the domestic water needs of the Huelo community and of the Hanehoi stream itself when it approved nearly three-quarters of a million gallons (.74 mgd) of instream flow to accommodate the Huelo pipe and the other downstream kuleanas. This flow has not been implemented and Ms. Morf has no way of knowing if it will be adequate. By the dry look of Hanehoi stream in Huelo, the full natural flow of the stream would be needed. Morf WT.

682. Ms. Morf recommended that the New Hamakua Ditch diversion works and the Wailoa ditch diversion works on Hanehoi Stream must be modified to allow an adequate flow of

Hanehoi Stream to meet the domestic needs of the Huelo community as well as the needs of the stream and kuleana users. Morf WT.

3. Christa A. Morf

683. Christa A. Morf is a resident of Huelo, Maui, Hawaii and a supporter of Maui Tomorrow.

684. Ms. Morf and her husband are the owners of Lot 2-C, a portion of Lot 2 of "Vision Hawaii Subdivision" being a portion of Grant 2079 Apana 3 to Kaiewe and Grant 3214 to Papaikea, 2.011 acres in size, designated as TMK No. (II) 2-9-7:64, which they purchased by Warranty Deed dated March 21, 1997, recorded in the Bureau of Conveyances, State of Hawaii on May 2, 1997 ("the property"). Exh. E–41-A and E-41-B.

685. The property has extensive agricultural plantings.

686. The property possesses domestic water rights to surface water from Hanehoi stream. As a part of Royal Patent Grants 2079 and 3214 Ms. Morf and her husband are entitled to have access to stream water, although the property does not directly border any stream in Huelo.

687. Their "pipe rights", namely the rights to receive water through a pipe either from a stream or from an EMI ditch are secured through a Deed dated May 23, 1927, recorded in the Bureau of Conveyances, State of Hawaii in Liber 898, at Page 265. Exh. E-152.

688. A map of Huelo Hui Partition Lots 9 and 10, to which pipe rights attach, partially comprising the Morf property, is attached as Exh. E-158.

689. As a practical way of implementing this right, the property, and those that surrounded it, received water for many years from State of Hawaii Registered Stream Diversion 538.6 on TMK (II) -2-9-014:009 ("Huelo community pipe") that is located in a small pool above the Lowrie Ditch diversion on East Hanehoi Stream ("Hanehoi Stream.")

690. The predecessor in title of Ms. Morf and her husband, Robert Polster, regularly filled the water storage tank on the property with stream water from the East Hanehoi stream that had been transported through the Huelo community pipe and they followed suit when they became owners of the property.

691. Because Hanehoi Stream is totally dewatered and there is not enough water in East Hanehoi Stream to serve all the homes who have traditionally depended upon the Huelo community water pipe, Ms. Morf and her husband have been forced to expend thousands of dollars maintaining and repairing a private water system with a very large tank. Ms. Morf and her husband

would not have been required to spend this amount of money and would not be required to continue to spend money on supplying water to this private water system if their water rights were not being violated by EMI. In spite of the size of their storage tank, they still face water shortages at times.

692. Ms. Morf and her husband have created an organic permaculture farm on over 1 acre of our agricultural property, with numerous varieties of bearing fruit trees; herb and vegetable gardens; pineapple beds and many varieties of ornamental plants. Ms. Morf and her husband also grow specific blooming floral plants that are used as part of the religious gatherings they host on their land during the holiday seasons.

693. Ms. Morf and her husband exchange food crops with friends and neighbors and sustain themselves from the fruit of the land, but they are limited in the amount of plants and crops they can grow since losing access to Hanehoi Stream water from the Huelo community pipe.

694. Ms. Morf and her husband have discussed expanding their fruit orchards and gardens, but there is not currently a reliable supply of water available to them from Hanehoi Stream to support such an expansion.

695. Ms. Morf and her husband have been harmed by the violation of right to use Hanehoi Stream water for their domestic use because (1) They are forced to pay more for water than they otherwise would in order to farm on their land; (2) They cannot expand their farm in the manner they wish to and produce crops that require more water; and they are therefore being deprived of their ability to conduct the sort of farming that they should be able to conduct on their property if their rights to receive water from the Huelo community pipe were not being violated.

696. The property of Ms. Morf and her husband is not located in a water management area.

697. As owners of a parcel of land with domestic water rights, Ms. Morf and her husband are entitled to the adequate flows of Hanehoi Stream to serve the Huelo Community pipe, the only practical source for us to access a domestic water supply.

698. The New Hamakua Ditch diversion works and the Wailoa ditch diversion works on Hanehoi Stream must be modified to allow an adequate flow of Hanehoi Stream to meet the domestic needs of the Huelo community as well as the needs of the stream and kuleana users.

4. Michael D'addario

699. Michael D'Addario is a resident of Huelo, Maui, Hawaii and a supporter of Maui Tomorrow. Written Testimony of Michael D'Addario.

700. Mr. D'Addario is the land manager of Hale Akua Garden Farm and Agricultural Education Center ("Hale Akua" or "the Farm"), which is owned by Lorraine L. Grace. Mr. D'Addario represents the activities of the farm and center with the full acknowledgement and permission of Ms. Grace. Exh. E-37; D'Addario WT.

701. The Farm owns lots 1-B, 1-C and 2-A in the "Kahiamoe-Pitt Subdivison" in the ahupua'a of Huelo being a portion of LCA 520:1 granted to J.D. I'i as konohiki of Huelo and also a portion of Lot 9 of the Huelo Hui Partition, recorded in Liber 765, pp 349-389. Exh. E-28-A. The three parcels farmed ("the property") are designated as TMK No. (II) 2-9-7:53 (2.782 ac); TMK No. (II) 2-9-7:56 (2.27 ac); and TMK No. (II) 2-9-7:57 (2.60 ac), which were purchased by Warranty Deeds. Exh. E-38, A-C; D'Addario WT.

702. The property totals 7.6 acres, of which over three and one half acres (3.5 acres) is in active farming. Farm products are sold to Maui restaurants and health food stores, value-added food and beverage producers and a regular farmer's market booth is operated in Upcountry Maui. A neighborhood produce stand is operated on the property. D'Addario WT.

703. In addition, interns are trained in agricultural skills and offer ongoing classes on basic farm practices like composting, grafting, beekeeping, soil nutrient testing and vegetable growing as well as specialty classes with guest presenters. A permit was granted by the County of Maui to allow short term visitor stays as part of our classes. D'Addario WT.

704. As described below, the property has extensive agricultural plantings. D'Addario WT.

705. The property possesses appurtenant rights to surface water from Hanehoi stream. As a part of Land Commission Award 520:1 the property is entitled to have access to stream water, although the property does not directly boarder Hanehoi stream, but is located on a pali or cliff above the stream. Exh. E-28-A; D'Addario WT.

706. The "pipe rights" attached to the property, namely the rights to receive water through a pipe either from a stream or from an EMI ditch are secured through a Deed dated February 6, 1925, recorded in the Bureau of Conveyances, State of Hawaii in Liber 765, at Page 349. Exh. E-153.

707. A map of Huelo Hui Partition Lots 9 and 10, to which pipe rights attach, partially comprising the Hale Akua property, is attached as Exh. E-158.

708. As a practical way of implementing this right, Hale Akua has received water for many years from State of Hawaii Registered Stream Diversion 538.6 on TMK (II) -2-9-014:009 ("Huelo community pipe") that is located in a small pool above the Lowrie Ditch diversion on East Hanehoi Stream ("Hanehoi Stream.") D'Addario WT.

709. The predecessor in title of Ms. Grace, Mr. John Kahiamoe, provided a pipeline from the community water storage tank on his former property (TMK No. (II) 2-9-7:11) which carried stream water to storage tanks constructed on the property from the East Hanehoi stream. This water was conveyed to the community storage tank through the Huelo community pipe. The farm was able to help financially in the upkeep of the Huelo community pipeline over the last decade. D'Addario WT.

710. The farm is also a portion of a Land Commission Award (LCA) 520 granted to J. D. I'i during the Mahele. Exh. E-154. Witness Ua testified in Native Testimony that I'i had "cultivated and held uninterrupted possession of the land" in Huelo. Exh. E -3, p. 240, *Wai O Ke Ola*. See the Foreign Testimony for this Award in Exh. E-154. D'Addario WT.

711. Since Hanehoi is the only stream that passes through LCA 520:1 in Huelo, the stream water was likely used in Kingdom days to provide for the cultivation of Mr. I'i's LCA 520:1 lands. Exh. E-28-A. Based upon this likely prior use, and the fact that lands directly along Hanehoi stream have extensive kalo lo'i, indicating water freely flowed in the stream prior to diversions, in LCA 520:1, Mr. D'addario alleges that the property should have appurtenant rights to have an adequate supply of water available from Hanehoi stream and its tributaries. D'Addario WT.

712. Huelo, where the farm and agricultural education center is located, is a traditional community of several hundred households which has no public supply of domestic water. Mr. D'Addario and many other families and farms depend on stream water from the Huelo community pipe that goes to East Hanehoi Stream. D'Addario WT.

713. The farm and agricultural education center especially needs regular access to the stream water to expand the agricultural production onsite from seven (7) to ten (10) garden plots. The additional area would help develop test plots to experiment with planting methods that promote soil remediation and improvement. This would put close to (four) 4 acres of the property under some sort of cultivation or agricultural research regime. D'Addario WT.

714. In general, Hale Akua's agricultural operations are very careful and limited with water use, but yields would increase if more water was available. To reach full agricultural potential

Mr. D'addario estimates that the farm would need an average of around ten thousand (10,000) gallons of water per day. D'Addario WT.

715. A former partner in the property still holds the lease for TMK No. (II) 2-9-7:3, the eleven acres of state Conservation land that borders Hanehoi stream below the farm. D'Addario WT.

716. A traditional trail leads along the pali (cliff) on state land below the farm to a series of several smaller pools and waterfalls on Hanehoi stream below the property and above the big Hanehoi falls. These are known in the neighborhood as "Moke's Pond," named for one of Mr. D'Addario's neighbors, Moses Kahiamoe, Sr. Exh. E-24; D'Addario WT.

717. All three of the farm parcels were once part of the 26 acre homestead of Mrs Abigaila Kahiamoe, Moke Sr.'s great grandmother and her family. The agricultural interns, staff, ag workshop guests and many neighbors use the traditional trail to access the smaller pools and waterfalls when water conditions in the pond permit. D'Addario WT.

718. These pools have been used by generations of families in our neighborhood, especially in the summer months. Unfortunately, Hanehoi stream is so severely dewatered by the nine EMI diversions on the main branch of the stream and its four tributaries (East and West Huelo stream, Puolua stream and West Hanehoi stream), that summer water levels and flows in the pools often do not permit this traditional use to be safe or healthful. When the pools on Hanehoi stream become stagnant from lack of stream flows, there are concerns that they can present a health hazard to those who may access them. D'Addario WT.

719. Hale Akua Garden farm also would like to incorporate the Hanehoi and Puolua streams into its educational offerings to the public. The farm would like to have classes on traditional kalo growing taught by local kalo growers in the neighborhood who are located along the streams. D'Addario WT.

720. Part of the mission as a farm is to help support the continued existence of Huelo as a traditional Hawaiian agricultural area. The farm is committed to seeing the community work towards a mauka-makai ahupua'a based watershed management system that is supported by the return of mauka-makai stream flows. D'Addario WT.

721. Through the Agricultural Education Center and crop distribution networks, Hale Akua Garden Farms wants to provide more opportunities for Native Hawaiian families in the area who are interested, to grow and sell traditional crops and sustain a viable agricultural economy on

their own lands. This cannot happen unless stream flows are returned and kuleana landowners have a hope of adequate water. D'Addario WT.

722. The farm would like to partner with local presenters to offer classes on stream ecology to local schools and youth groups and have students help clean alien plants out of the streams while learning about the important habitat the streams provide. These types of activities are not possible when the stream beds are dry a great deal of the time because Hanehoi and Puolua streams have been so dewatered. D'Addario WT.

723. The 2008 CWRM decision to release a limited amount of water back into the streams at a few limited locations has not had a measurable affect on stream flows and does not reflect either traditional management principles or sound biological decisions. D'Addario WT.

724. State water laws protect and encourage hands-on educational activities in watersheds, but Hanehoi stream and its tributaries appear to be more severely dewatered than most streams in Hawaii, depriving local residents and students of the enjoyment of nature study and traditional cultural experiences. D'Addario WT.

725. The farm has been forced to expend thousands of dollars installing a well (State well 6-5411) as well as maintaining and repairing a private water system with several very large storage tanks. The farm would not have been required to spend this amount of money and would not be required to continue to spend money on supplying water to this private water system if our water rights were not being violated by EMI. D'Addario WT.

726. The farm has created a Certified Organic permaculture farm of over three and a half (3.5) acres on the agricultural property, with numerous varieties of bearing fruit trees; bees, and beds of commercially grown greens, vegetables and herbs. The farm also grows Pohole fern and other edible and medicinal plants and shrubs and has three (3) aquaculture ponds that produce fish. The farm has a growing demand for the produce cultivated on the farm, but is limited in the amount of well water that can be pumped for irrigation. The farm has found that higher pumping demands lower the quality of the well water the farm depends upon for drinking water. D'Addario WT.

727. The farm is much more limited in the amount of plants and crops it can grow, and the soil and plant science tests it can pursue, since losing access to Hanehoi Stream water from the Huelo community pipe. The farm cannot consider expanding its crop area, its aquaculture, or many of its educational activities until there is a reliable supply of water available to it from Hanehoi Stream to support such an expansion. D'Addario WT.

728. The farm has been harmed by the violation of its right to use Hanehoi Stream water for our domestic and agricultural use because (1) It is forced to pay more for water than it otherwise would in order to farm on its agriculturally zoned land; (2) the farm cannot expand the farm in the manner it wishes to and produce crops that require more water; and the farm is therefore being deprived of its ability to conduct the sort of farming and educational activities that it should be able to conduct on its property and the ability to bring in additional income, if its rights to receive water from the Huelo stream via the Huelo community pipe were not being violated. D'Addario WT.

729. The farm is not located in a water management area. As the owners of a parcel of productive agricultural land with domestic water rights, and as part of a community which enjoys the recreational and aesthetic use of the local streams, pools and waterfalls, the farm is entitled to the adequate flows of Hanehoi Stream. D'Addario WT.

730. The New Hamakua Ditch diversion works and the Wailoa ditch diversion works on Hanehoi Stream must be modified to allow an adequate flow of over one million gallons a day (1 mgd) in Hanehoi Stream to reach the pond above the Lowrie diversion and satisfy the demands of both the stream ecology and the Huelo community through the duly registered Huelo community pipeline. D'Addario WT.

5. TARO

731. Ernest Schupp is a resident of the County of Maui and the State of Hawaii. Written Testimony of Ernest Schupp.

732. Mr. Schupp is a founding member and acting president of Teaching and Restoring Opportunity ("TARO") Hawaii. TARO is a Hawaii non-profit organization founded in February of 2005, whose mission is to reestablish the knowledge of the history, culture and importance of Taro ("kalo") to the Hawaiian culture and way of life. Exh. E-13; Schupp WT.

733. This goal will be accomplished through creating one or more taro growing areas in East Maui and offering educational activities to students and providing education and information to community volunteers and visitors. Schupp WT.

734. Between 2009 and 2011 TARO volunteers partnered with Maui Tomorrow Foundation ("Maui Tomorrow") on the "Malama Hamakua Action Project" which sponsored a variety of activities and efforts to better understand and manage the watershed areas surrounding Hanehoi, Huelo and Puolua Streams, in Huelo. This project, which was supported by grants from several local foundations, convened scores of community members for educational watershed

planning meetings; collection of oral histories; reconnaissance field visits with botanists, stream biologists and cultural practitioners; and mapping of biological and cultural resources. Schupp WT.

735. In April 2011 Maui Tomorrow requested and was granted a Right of Entry by the State Land Agent for Maui County for land belonging to the State of Hawaii, TMK No. (II) 2-9-06:08, ("the state parcel"). Exh. E – 14; Schupp WT.

736. Under that Right of Entry Maui Tomorrow partnered with TARO to reopen the access road on the state parcel and remove the extremely invasive African tulip trees that were just beginning to colonize the area. The Right of Entry was extended for several months which allowed Maui Tomorrow and TARO representatives to remove alien plants and map numerous pre-contact kalo lo'i along Puolua stream just mauka of Hana Highway. These extensive lo'i systems are located on land belonging to the State of Hawaii, TMK No. (II) 2-9-06:08, 5.79 acres and the Ernstberg family, TMK No. (II) 2-9-06:09, 5.81 acres (being LCA 5459-Y, LCA 5392-B:1 and Grant 2630 in Puolua). Exh. E -15; Exh. E-15-A; TMK No. (II) 2-9-06. The Ernstberg family heirs also gave verbal permission for TARO and Maui Tomorrow volunteers and contractors to access and care for their lands along Puolua stream. Exhibits E-15 and E-15-A; Schupp WT.

737. As a TARO board member, Mr. Schupp helped plan and guide the educational activities for the Malama Hamakua Action watershed project and worked as part of a team to clear and map the kalo lo'i and other cultural resources along the Puolua Stream on land belonging to the State of Hawaii, TMK No. (II) 2-9-06:08 and the Ernstberg family, TMK No. (II) 2-9-06:09. Exhibits E-15 and E-15-A; Schupp WT.

738. In March of 2011, TARO submitted an Application and Qualification Questionnaire to the Maui State land agent proposing to lease the state land along the east and west banks of Puolua stream, TMK No. (II) 2-9-06:08 and 07 for an educational kalo growing and native plant restoration project. Exhibits E-15 and E-15-A. This state land, lying between Hana Highway and the EMI Lowrie Diversion ditch, had been leased for cattle grazing for many years, but the leases had expired. Schupp WT.

739. The Ernstberg family members also indicated to Mr. Schupp that they were willing to work with TARO towards restoration of family kalo lands along Puolua stream they had only heard about in stories from their grandparents.

740. The Ernstberg lands, TMK No. (II) 2-9-06:09, are comprised of LCA 5459-Y (Keahi), LCA 5392-B:1 (Kawahine) and Grant 2630 (Keahi) in Puolua. According to Native

testimony in the Mahele Award Book, all these kuleana parcels were used for wetland and dryland kalo and, likely, other traditional crops. They lie along Puolua stream between the two state parcels. The stream and the lo'i walls occur on both the state parcels and the Ernstberg land.

741. During the Mahele, LCA 5459-Y was described by witness Kailiwale: "I have seen his parcel of land at Puulahakole, in the Ahupuaa of Puolua. It is a kalo and kula land, gotten from Kaiewe in 1844... The boundary on the Wailuku side is the Kahawai of Puolua."

742. Witness Kolea described LCA 5392-B:1: " Parcel 1, kalo land at Kaiwa; There is a Poalima in Parcel 1..." Exh. E-156-A and Exh. E-156-B.

743. The map for and description of LCA 5392-B:1 is attached as Exh. E-157-B. The Foreign Testimony supporting the Award of LCA 5392-B:1 as kalo land is attached as Exh. E-157-A.

744. Grant 2630 was described as "2 lo'i" in the Book of Royal Patents and there was a reference to the traditional fibre plant, 'olonā, being grown on LCA 5459-Y. Exh. E-3, pp. 123, 201, 206, 207 and 329; *Wai O Ke Ola.*

745. The TARO Lease Application proposed to repair the fences around the two state parcels to exclude cattle and pigs, remove alien species, restore native species, such as 'olonā, and re-open and re-plant kalo in the wetland kalo lo'i that lined the stream. A budget of anticipated costs for these activities was submitted along with the Application and Qualification Questionnaire to the State. Exh. E-16.

746. TARO has not moved forward to finalize the lease request with the state, because there is not sufficient water in the Puolua stream to support this educational project that would improve the watershed lands. The educational project and lease request is still pending and could be activated, if water is available. Schupp WT.

747. The maps of cultural features along Puoloa stream made by Mr. Schupp after the Malama Hamakua Action project participants had cleared away overgrowth, showed around half of the lo'i kalo features and associated auwai along this five-acre section of the Puolua stream between Hana Highway and the EMI Lowrie ditch diversion works. Exh. E -8; Schupp WT.

748. The clearing work also discovered several well built poalima lo'i (taro lo'i used to grow crops for the exclusive use of the Konokiki or Ali'i.) These poalima were also indicated in Mahele records for the LCA where it was located. Exh. E-3, p. 207.

749. Along the stream banks TARO volunteers found evidence of habitation areas on state parcels TMK No. (II) 2-9-06:08 such as a hala tree grove and remains of a traditional house site, and on TMK No. (II) 2-9-06:07, a grove of ulu trees and an unrecorded well-built stone enclosure that local kupuna told TARO volunteers was a heiau, located in a grove of guava trees. In June of 2011, Mr. Schupp created a preliminary map of this site. Exh. E -17; Schupp WT.

750. TARO, through Maui Tomorrow, contacted a local archaeologist with UHMC, who visited the sites with Mr. Schupp and concurred that they were more than likely of the protohistoric period (A.D. 1650-1775); with some lo'i dating earlier to the Expansion Period (AD 1100-1650.) Schupp WT.

751. The evidence of extensive lo'i in this area of Puolua stream, including a potential ceremonial site, a poalima, and Mahele era claims for kalo cultivation indicate that Puolua stream had robust flows before it was dewatered by EMI diversions. Schupp WT. See photographs of a few of these sites along or near Puolua Stream. Exh. E-18, A-G.

752. Large well-built lo'is also line the Puolua and Hanehoi Stream beds makai of Hana Highway as well as mauka of the Lowrie ditch diversion. This area is a good fit for an educational restoration project to promote understanding of traditional kalo cultivation and its connection to Hawaiian culture, in keeping with the mission of TARO. Schupp WT.

753. The Ernstberg ohana, descendants of the original Mahele claimant Keahi, would like to grow kalo and 'olonā again on their kuleana land as part of the overall TARO project. The historical record shows both crops having been grown here in the past. The TARO organization is willing to work with this local family to plant and grow kalo in the kuleana lo'i, 'olonā along the stream banks, and improve the overall watershed area on both the state land and Ernstberg family lands along Puolua Stream with native plantings appropriate to the area. Schupp WT.

754. This educational project area is located a short walk from Hana Highway and could be accessible for participation to the residents of the Huelo area as well as visiting groups of students and cultural practitioners. The TARO educational and restoration would only be possible if the Commission would follow the law and return adequate waters to Puolua Stream. Sufficient flow is needed to provide for the re-establishment phase of native plantings on the stream banks and to irrigate at least 3 acres of wetland kalo and adjacent 'olonā. Schupp WT.

755. Without restoration of adequate flows from the Lowrie Diversion works, Puolua stream will remain overgrown with alien weeds. This condition will impede stream flows to kalo lo'i

below that are legally required to adequate stream waters to maintain the proper temperature for kalo growing. Without adequate flows of Puolua stream below Lowrie Ditch the Ernstberg 'ohana will be prevented from exercising their legal right to use their kuleana lands for traditional and customary cultural purposes, such as cultivation of kalo and olona. Schupp WT.

756. All the kuleana parcels described above, have kuleana water rights, pursuant to HRS § 7-1, and the state parcels have riparian water rights and appurtenant water rights. The kuleana are not located in a water management area. HRS § 7-1 provides that the owners of kuleanas are entitled to running water. Schupp WT.

757. The kuleanas and state lands all abut Puolua Stream and therefore possess riparian water rights. Exh. E-14. The full flow of Puolua Stream must therefore pass by these kuleanas and state lands to allow TARO to complete its lease with the state for native plant restoration and TARO volunteers and the Ernstberg family to cultivate kalo and other traditional crops on these lands. Schupp WT.

758. Kalo has been grown on these kuleanas in the 20th century as well as in the 19th century according to local kupuna who participated in the Malalama Hamakua Watershed Project. Schupp WT.

759. Puolua Stream is diverted at least two times by EMI diversion works, once upstream of the proposed TARO Educational Project area and once below. Puolua Stream is almost totally dewatered by the Lowrie Ditch diversion works above the proposed TARO project. The full flow of the Puolua Stream flows from above the Lowrie Ditch downstream towards the Lowrie Ditch. There are two four inch (4") pipes in the Lowrie Ditch diversion works which are thereafter joined to a short length of eight inch (8") pipe to allow some water to flow downstream of the Lowrie Ditch. While the 8" pipe has a much greater capacity than the two 4" pipes (about 50% more), this greater capacity is useless because the amount of water that is allowed to pass through the Lowrie Ditch diversion works is limited by the capacity of the two 4" pipes. The only streamflow below the Lowrie Ditch diversion works until the next diversion works is what passes through these two 4' pipes and runoff from the land and roads, except during extreme storm events. Schupp WT.

760. TARO volunteers during their work removing alien African Tulip trees in 2011 also found that Puolua stream immediately below the Lowrie Diversion works had been choked with debris of tree logs and branches. These appeared to have been cut with saws, perhaps as part of the maintenance of the EMI ditch road along the Lowrie ditch. The cleared debris was disposed of by

being allowed to drop off the steep edge of the EMI road and into the Puolua stream bed on lands belonging to EMI and also lands belonging to the Ernstberg family. This debris also impeded any flows the 8" pipe was able to deliver from the upper to lower portion of the stream. Exh. E-12, photographs A-D; Schupp WT.

761. The organization TARO is being harmed by the present stream diversions, in summary, because restricted flows in Puolua Stream above Hana Highway do not allow owners of kuleana lands along the stream, who wish to partner with TARO to restore kalo cultivation and provide educational opportunities to promote traditional Hawaiian cultural knowledge, to move forward with a state lease and begin the project. Schupp WT.

762. To grow healthy taro on one acre of land, requires 300,000 gallons per day of water available on a regular basis to be diverted from the stream, into an auwai and into the kalo lo'i in order to have water temperature cool enough for healthy kalo. Schupp WT.

763. A portion of water diverted from Puolua Stream after it passes through the kalo lo'i, would then be returned back into Puolua Stream, enhancing the overall stream ecology. However, sufficient water from Lowrie ditch diversion needs to be released to support both the kalo lo'i and other protected instream uses such as traditional gathering, recreation and domestic users downstream on Puolua and Hanehoi stream.

764. As a non-profit educational organization whose mission is to restore kalo lo'i and offer hands-on opportunities for the public to learn about traditional Hawaiian kalo growing TARO seeks to partner with the state and the Ernstberg family to utilize, for educational purposes, lands that possess kuleana, riparian and appurtenant rights. TARO is entitled to the full flow of Puolua Stream through the state and kuleana lands named above, according to the law in the State of Hawaii. The Lowrie Ditch diversion works on Puolua Stream must be modified to allow the full flow of Puolua Stream through these public and kuleana lands and to allow the amount of water to flow to the kuleana lands that is necessary to grow healthy taro on three acres of land.

6. The Rights Of Mr. Schupp Must Be Satisfied

765. Ernest Schupp is a resident of Huelo, Maui County in the State of Hawaii and a supporter of Maui Tomorrow. Schupp WT.

766. Mr. Schupp has leased, since September 4, 1998, a kuleana, Land Commission Award No. 3717-B, Apana 1, approximately 1.0 acres in size, designated as TMK No. (II) 2-9-08:14 ("the kuleana"). This kuleana is owned by George Keala and Mary Keala. This property also

includes the right to use a poalima owned by the John P. Mattson Estate, Grant 1261, .15 acres in size, designated as TMK No. (II) 2-9-08:15. Mr. Schupp has a lease with the owners of this kuleana that requires him to continue to develop its farming potential, among other matters. Exh. E-1.

767. The kuleana has kuleana water rights, pursuant to HRS § 7-1, riparian water rights and appurtenant water rights. The kuleana is not located in a water management area. HRS § 7-1 provides that the owners of kuleanas are entitled to running water.

768. The kuleana abuts Puolua Stream and therefore possesses riparian water rights. Exh. E-2. The full flow of Puolua Stream must therefore pass by this kuleana.

769. Kalo has always been grown on this kuleana. Native testimony from the Mahele describes LCA 3717-B Apana 1 as growing Kalo. This testimony is has been translated by Kepa Maly of Kumu Pono Associates, in *Wai O Ke Ola,* p. 225, along with a copy of the Land Commission Award map and description for this kuleana in original Hawaiian: LCA 3717-B to Kanui dated June 15, 1852 found in the Mahele Award Book, Vol .3 p. 450. Exh. E-3, A and B; Exh. E-3-(c).

770. Lehua Lapenia, a kama'aina resident of Huelo, grew kalo on this kuleana from the 1950's on. See her 1989 CWRM Declaration of Water Use of for TMK No. (II) 2-9-08:14. Exh. E-4.

771. Mr. Schupp provided photographs of his kalo lo'i. Exh. E-12, A-H; Exh. E-12-(f) and (g).

772. There is an auwai, in good condition, leading from Puolua Stream, to the taro lo'i. There are now four (4) taro lo'i in various stages of cultivation, due to lack of flows and predation by pigs. There are an additional ten (10) taro lo'i that are waiting to be placed into cultivation as soon as Mr. Schupp is able to secure sufficient, cool water. Mr. Schupp has fencing to install to protect the kalo from pigs, once there is sufficient stream flow to replant more lo'i. There are a total of fourteen (14) kalo lo'i on one (1) acre of land. The kuleana therefore is entitled to kuleana, riparian and appurtenant water rights.

773. Due to the limited stream flows, Mr. Schupp was eventually forced to dig up his kalo huli (starts) and move them to kalo growing areas on other's lands where water was available. That was better than seeing them succumb to rot. Schupp WT.

774. Mr. Schupp is also facing a seasonal invasion of wild pigs on his leased kuleana. He had fencing donated to him to try to "pig-proof" the lo'i, and replant, but until the water situation is more stable, it does not make much sense to do so. Schupp WT.

775. There is not enough water available in Puolua Stream at the point of Mr. Schupp's auwai to divert into his auwai system to supply to his kalo lo'i to grow healthy kalo. The water which does enter his auwai is not all available to use to irrigate his kalo lo'i. Schupp WT.

776. The CWRM Staff Submittal admits that water released at Haiku Ditch needs to be of sufficient volume to meet Mr. Schupp's needs and as well as those of downstream users. Exh. E-7, p. 27.

777. In order to meet Mr. Schupp's needs in growing taro, approximately half of the water released at the Haiku Ditch intake needs to pass through his auwai unused, clear of the soil that is found in the kalo ponds, and be returned to the Puolua stream to support stream ecology. Exh. E-7, p. 27.

778. A portion of the water diverted from Puolua Stream into Mr. Schupp's auwai, which then passes through his kalo lo'i to irrigate the plants, is eventually returned back into Puolua Stream, after it passes through his taro lo'i, but the stream requires an additional volume of water each day to meet the needs of stream ecology and downstream users. This amount of water simply is not present under the existing IIFS implementation. Schupp WT.

779. Shortly before the IIFS was set for Puolua stream, the water temperature in Mr, Schupp's lo'i was measured by EMI, in places, at 89 degrees, and at the furthest downstream lo'i, at 92 degrees. Healthy kalo will not grow unless there is enough water to move fast enough to supply cooler water that is no higher than 77 degrees. When the water is too warm in the lo'i cray fish appear and harm the kalo. Schupp WT.

780. Mr. Schupp estimated that if current releases at New Haiku Ditch and Puolua Stream could reach 570,000 gpd, he would need the amount to be significantly greater than that to have sufficient volume to irrigate all 14 kalo lo'i on his kuleana with cool water and provide adequate water on top of that to support stream life in Puoloa stream and the riparian needs of downstream users. Schupp WT.

781. Downstream users such as Mr. Solomon Lee Jr. and Neola Caveny have lands on Hanehoi stream, just below (makai) of the junction of Puolua Stream and Hanehoi Stream, and, as such, Puolua stream is a major tributary of the flows available to them in Hanehoi Stream. Water

flows from Puolua stream, then passes through EMI land on TMK (II) 2-9-08:012, and joins Hanehoi stream. These flows can help satisfy their riparian rights. Exh. E-11; Schupp WT.

782. Mr. Schupp estimated that the continuous mauka-makai water flow needed in Puolua Stream, past New Haiku Ditch diversion, would be one-million gallons per day (1,000,000 gpd). This would be based on having 300,000 gpd for 1-acre of healthy kalo and another 700,000 gpd to restore stream flows and convey domestic water to downstream users. Schupp WT.

783. CWRM estimates that the entire high flow of Puolua stream is around 1 mgd. Exh. E-7, p. 47.

784. This is why Mr. Schupp recommends that the entire Puolua stream should be bypassed by the EMI diversion system and allowed to keep its natural flows. Schupp WT.

785. Mr. Schupp possesses kalo land along Puolua Stream in Huelo that has been in kalo cultivation for many years and was claimed as kalo land during Kingdom days. He is harmed, by the current dewatered conditions of Puolua Stream due to the EMI diversions at Lowrie Ditch and New Haiku Ditch on Puolua Stream, which take the majority of water in the stream. Schupp WT.

786. Mr. Schupp is harmed because EMI's Lowrie ditch, located considerably upstream of Mr. Schupp's kuleana, is constructed to divert the entirety of Puolua stream flow unless large storm surges carry stream waters over the top of the diversion, because EMI only provides two small antiquated and inadequately sized pipes to let a small amount of water bypass the Lowrie diversion and travel downstream towards his kuleana and kalo lo'i, because the small amount of water that does pass the Lowrie ditch in the pipe must make its way through a stream bed that is not regularly maintained by EMI and is overgrown with ginger and other water thirsty plants as well as debris that EMI workers dispose of in the Puolua stream bed. All of these factors impact the volume, temperature and quality of water that travels to Mr. Schupp's kuleana and kalo lo'i, a half-mile below Lowrie ditch. Schupp WT.

787. Mr. Schupp is harmed because his lease with the owners of this kuleana requires him to maximize the farming potential of this kuleana which he cannot so long as there is not enough water in Puolua Stream. He is also harmed because he cannot put all of his kalo lo'i into production so long as such a significant amount of the natural flow of the water is being diverted from Puolua Stream and the water temperatures are too warm for healthy kalo. He is harmed because he is unable to grow healthy kalo on the kuleana and this harms his economic interests. The kalo needs to be

healthy to sell so that Mr. Schupp can make a living. So long as the kalo is not healthy, there is less available to sell which harms Mr. Schupp's economic interests. Schupp WT.

788. To grow healthy kalo on one acre of land, Mr. Schupp must have 300,000 gallons per day of water available on a regular basis to be diverted into his auwai and into his taro lo'i, as well as at least an equivalent amount to return to the stream unused, through his auwai. The release of 570,000 gpd at the New Haiku Ditch, if indeed that has occurred, does not provide for that required volume of water to reach his kalo lo'i through his auwai and also maintain the Puolua stream. Schupp WT.

789. As the possessor of a parcel of land with riparian rights with the duty to maximize its farming potential, Mr. Schupp is entitled to the full flow of Puolua Stream through his kuleana, according to the law in the State of Hawaii.

790. Mr. Schupp recommended that the CWRM should insist that this modification occurs, or more ideally, that the Lowrie and New Haiku Ditch diversion structures at Puolua stream be decommissioned and the Puoloa stream be allowed to flow naturally and support native stream life habitat, riparian rights and Hanehoi stream.

791. The Lowrie Ditch diversion works and the New Haiku ditch diversion works on Puolua Stream must be modified to allow the full flow of Puolua Stream through Mr. Schupp's kuleana and to allow the amount of water to flow to his kuleana that is necessary to grow healthy taro on one acre of land and provide for the continuing health of Puolua Stream and the rights of downstream users.

7. The Water Rights Of Neola Caveny Must Be Satisfied

792. Neola Caveny is a resident of Huelo, Maui County in the State of Hawaii and a supporter of Maui Tomorrow. Written Testimony of Neola Caveny.

793. Ms. Caveny is the owner of Lot 1 of Hanehoi Gardens, being a portion of Royal Patent Grant 2784 to Kaiewe. Exh. E-148. Her parcel is 2.219 acres in size, designated as TMK No. (II) 2-9-11:14, which she purchased by Warranty Deed dated April 27, 2001, recorded in the Bureau of Conveyances, State of Hawaii on May 4, 2001. Exh. E-19; Caveny WT.

794. Ms. Caveny's property possesses riparian water rights. Hanehoi Stream passes right through her property. Her property abuts Hanehoi Stream on two sides. See TMK No. (II) 2-9-11. Exh. E-20.

795. Ms. Caveny's predecessor in title, Stanley E. Rushworth, registered the water rights of her property with the CWRM in 1989. Exh. E-21.

796. Mr. Rushworth noted the prior use of Ms. Caveny's property for taro cultivation. He sought restoration of 100,000 gallons of water per day delivered in Hanehoi Stream to her property. Exh. E-21.

797. Ms. Caveny has been concerned about the lack of water available in Hanehoi stream for over a decade. Through a letter dated March 15, 2004 she contacted the CWRM to ask their assistance in claiming her riparian rights.

798. Currently, Hanehoi Stream is almost completely dewatered as it passes through Ms. Caveny's property, except during and shortly after large storm events. The streambed is often dusty and devastated as it passes through Ms. Caveny's property. Caveny WT.

799. Ms. Caveny understands that representatives of EMI have alleged that there is some sort of sump upstream of her property and below the juncture of Hanehoi and Puolua Streams such that when water flows to the sump it disappears into the ground and does not or would not flow below the sump area to her property. Caveny WT.

800. There is no such sump area which functions as described above. Below this sump area there is a pond known as Mary's Pond, a recreational area enjoyed by Huelo residents. Caveny WT.

801. Ms. Caveny is one of the many who is not receiving domestic water from the community pipeline or the stream, even though she possesses riparian rights. Because the amount of flow and the manner of flow restored to Hanehoi stream is not adequate, there is not enough streamflow to satisfy the multiple uses protected under the State Water Code, such as kuleana, riparian and appurtenant rights of downstream users; recreational use; habitat for native stream life; and domestic use by community members who have no available public water source. Caveny WT.

802. Because Ms.Caveny was not and is not on the Huelo Community water system and because Hanehoi Stream is still inadequately supplied with water, even under the current IIFS set in September 2008, there is not enough water in Hanehoi Stream to satisfy her riparian rights and other protected uses, Ms. Caveny has been forced to expend thousands of dollars constructing, maintaining and operating a private catchment water system with a very large tank. She would not have been required to spend this amount of money and would not be required to continue to spend

money on this private water system if her riparian water rights were not being violated by EMI. Caveny WT.

803. Ms. Caveny has a commercial tropical flower farm on her property called "Pualana Farms." See Exh. E-25. Kalo lo'i existed on her property. Thus, she also possess appurtenant water rights. She would like to partner with other community members to grow kalo on the land in the future. As such, she is entitled to have in Hanehoi Stream at her property, available for her use, the amount of water that it would take to grow healthy taro on one acre of land. Caveny WT.

804. Ms. Caveny has recently begun the cultivation of wauke (*Broussonetia papyrifera*) on her land. This the plant used for making kapa bark cloth. She wishes to expand her cultivation area for this very culturally important and sought after plant, that was traditionally grown alongside streams and kalo lo'i. If she had a sufficient supply of water in Hanehoi Stream, she would grow wetland taro bordered by wauke. Caveny WT.

805. Ms. Caveny also has a large vegetable garden on her property. There is not enough streamflow in Hanehoi Stream to supply water for her farm, in its present form. She cannot expand her farm along the stream, as she would like to because there is not a sufficient supply of water in Hanehoi Stream to support such an expansion. Caveny WT.

806. Hanehoi and Puolua streams need to have mauka-makai flows to support the various kuleana rights, instream health and Public Trust uses protected in the State Water Code. The IIFS total of one million-seventy two hundred thousand gallons per day (1,720,000 gpd) for both streams combined, set in 2008, is too low to meet all of these protected uses. Caveny WT.

807. Ms. Caveny has been harmed by the violation of her riparian and appurtenant water rights because (1) she is forced to pay more for water than she otherwise would in order to operate her commercial farm; (2) She cannot expand her commercial farm in the manners she wishes to and therefore cannot make the profits she otherwise would derive from her business; and (3) She cannot grow some of the sorts of crops that she wants to grow that are more water intensive as part of her commercial farm and is therefore being deprived of her ability to conduct the sort of farming that she should be able to conduct on her property if her riparian and appurtenant water rights were not being violated. Caveny WT.

808. Ms. Caveny's property is not located in a water management area. As the owner of a parcel of land with riparian rights, she is entitled to the full flow of Hanehoi Stream through her

property, according to the law in the State of Hawaii. The Lowrie Ditch diversion works and the New Haiku ditch diversion works on Hanehoi Stream and/or on Puolua Stream must be modified to allow the full flow of Hanehoi Stream through my property and to allow the amount of water to flow to my property that is necessary to grow healthy taro on one acre of land and sufficient water for other agricultural and domestic use, as well as sufficient flow to remain in the stream past my property to provide for the natural ponds used by the community. Caveny WT.

809. Ms. Caveny estimates the amount of flow needed in the stream at her property to be at least three-hundred and fifty-thousand gallons per day (350,000 gpd.) This would provide for her needs and allow enough water to remain in the stream to satisfy other instream uses like the natural pools, popular with community residents. Caveny WT.

810. Since Ms. Caveny's property is downstream from others who have riparian, kuleana and appurtenant rights and from the intake for the Huelo community water pipe, it is not enough for Hanehoi and Puolua stream to only have flows sufficient to address her needs. Unless there is a significant increase in the amount of overall flow of both streams, which Ms. Caveny estimated would need to be more than double the IIFS promised in 2008, there will not be sufficient water in the stream by the time it reaches her property to satisfy her riparian and other rights. Caveny WT.

8. The Water Rights Of Solomon Lee, Jr Must Be Satisfied

811. Solomon Lee Jr. is a resident of Pukalani, Maui County in the State of Hawaii and a supporter of Maui Tomorrow. Written Testimony of Solomon Lee, Jr.

812. Solomon Lee Jr. is the owner of family lands, TMK No. (2) 2-9-008:034; TMK No. (2) 2-9-008:035 and TMK No. (2) 2-9-008:007 in Huelo. (collectively "kuleana lands"). Exhibits E-26, E-31 and E-31-A; Lee, Jr. WT.

813. Hanehoi Stream flows through each of Mr. Lee's three parcels. Exh. E-27.

814. Two of the three family kuleana parcels were granted to Solomon Lee Jr.'s kupuna as Land Commission Awards during the Mahele. Parcel -035 (.31 ac) is LCA 5459-A:1 and parcel -007 (1.04 ac.) is LCA 5459-A:2. LCA 5459-A was awarded to Naaeae (AKA "Kaaeae") during the Mahele. The Original LCA is Exh. E-149. The Foreign Testimony supporting the Award is Exh. E-150; The Royal Patent issued is Exh. E-151; Exh. E-28, p.115; Exh. E-28-A.

815. Both LCA were described as having kalo and kula lands in Mahele era native testimony. Exh. E-3, p. 236 of *Wai o ke Ola.*

816. Parcel -034 (15.2 ac.) was awarded as Royal Patent Grant 1080 to John Puha in 1853. Puha and his wife transferred their interests in the fifteen acres to Samuel Kaiewe II in May of 1877. Solomon Lee Jr.'s grandmother, Kaili Kaea Lee was given parcel -034 when she was eight years old, in 1894, by Samuel Kaiewe II, who owned many acres in the Huelo area. Exh. E-29. Solomon Lee Jr.'s family has resided in Huelo and farmed this land since the time of the Great Mahele. Lee, Jr. WT.

817. Solomon Lee Jr.'s kuleana lands have kuleana water rights, pursuant to HRS § 7-1, riparian water rights and appurtenant water rights. The kuleana lands are not located in a water management area. HRS § 7-1 provides that the owners of kuleanas are entitled to running water.

818. Solomon Lee Jr.'s grandmother, Elizabeth Kaili Kaea Lee, (died 1955) lived on the largest parcel of the family's land, TMK (2) 2-9-0008:034 (Grant 1080), which at that time also included land that is shown as Grant 1079 on modern tax maps. The Kaea family home was located on the Grant 1079 parcel. Solomon Lee Jr.'s grandmother was one of 15 Kaea children who grew up on this land. She cultivated wetland kalo on the lo'i on all three of these parcels, as did other family members. Lee, Jr. WT.

819. All three of the family's kuleana lands in Huelo have riparian rights because they incorporate Hanehoi Stream into their boundaries. All three of these family kuleana lands in Huelo have kuleana rights because Solomon Lee, Jr.'s family are descendants of native tenants who claimed the lands in the Mahele. All three of these family kuleana lands in Huelo have appurtenant rights because these water rights are connected with the land through Land Commission Awards and Royal Patents granted to Solomon Lee, Jr.'s kupuna who claimed the lands in the Mahele. Lee, Jr. WT.

820. Solomon Lee, Jr. wants to cultivate wetland kalo, fruit trees, vegetables, plants and livestock on each of the three kuleana parcels, with a total acreage for kalo approximating three acres. Healthy taro will not grow unless there is enough water to move fast enough to supply cooler water that is no higher than 77 degrees. To grow healthy taro on one acre of land, Solomon Lee, Jr. must have 300,000 gallons per day of water available on a regular basis to be available for our kalo lo'i. The IIFS for Hanehoi Stream below the New Haiku Ditch would need to be set at .9 mgd to meet Solomon Lee, Jr.'s needs alone, plus additional flows to sustain the stream itself, not .41 mgd as was determined in 2008. Lee, Jr. WT.

821. Solomon Lee, Jr.'s family has struggled to have the water they are legally entitled to under their kuleana, riparian and appurtenant rights for many years. In the Territorial days his grandmother, Kaili Kaea Lee was very concerned about the lack of water in Hanehoi Stream and the effect it was having on her kalo patches along the stream. She wrote to the chairperson of the Maui Board of Supervisors, Eddie Tam, and asked for his help. Mr. Lee does not believe that Mr. Tam was able to intervene, and Mr. Lee's grandmother was eventually obliged to leave the land and move to Pu'unene because she could not grow enough food on her family land and earn enough income from her kalo sales to make a living. Lee, Jr. WT.

822. By the late 1950's Mr. Lee's family was able to convince EMI that their water rights needed to be met in some way and they were able to construct an auwai (ditch) that started near where the East branch of the Hanehoi Stream meets EMI's New Haiku Ditch diversion. This auwai passed by their most mauka parcel, TMK (2) 2-9-0008:007 (LCA 5459-A:2):, which is very near the New Haiku Ditch and continued on all the way to their furthest makai parcel: TMK (2) 2-9-0008:034. Exhibits E-31 and E-31-A.

823. This auwai diversion is described as the "Pancho Intake" in the CWRM September 2008 Hanehoi Stream Instream Flow Standard Assessment Report ("IFSAR)"). Exh. E-32, p. 86, Table 13-1. The auwai from that time crossed EMI lands as well as the Lee's, and is now too overgrown on those EMI lands to carry any water effectively. Lee, Jr. WT.

824. This was different in the past. The Hanehoi IFSAR notes: an abandoned ditch above the diversion was once used to transport water to a down stream user (user known) for the cultivation of taro. Exh. E-32, p. 86, Table 13-1.

825. Mr. Lee's family lands were the "down stream users" referred to in the Hanehoi IFSAR. Pancho Narciso, who the "Pancho Intake" was named for, was a family friend who was the caretaker of the Lee's family land. Pancho lived in Mr. Lee's grandmother's old house and grew kalo, antheriums and Easter lilies on the land during the 1940's, until he became too elderly in the 1990's. Lee, Jr. WT.

826. The Lee's land is good land. It has been in use for agricultural purposes for over 100 years. In the 1920's Mr. Lee's family leased the 15 acre parcel (Grant 1080) for a 10 year period, to Haiku Fruit & Packing Company, Ltd. for pineapple planting. Exh. E-33; Lee, Jr. WT.

827. Mr. Lee has had cattle grazing the land from the 1940's until 2003, since there was not always enough regular water supply for crops, even with the "Pancho intake" auwai. Mr.

Lee's last attempt at larger scale agriculture, planting a grove of mountain apple trees in the last ten years, was not successful, as the young trees died during a period of limited rainfall. Lee, Jr. WT.

828. On May 24, 1989 Mr. Lee's late father, Rev. Solomon Lee Sr., filed State form 8810-2 to register his family's use of Hanehoi Stream waters for all three parcels with the CWRM. Exh. E-34, A-C.

829. Mr. Lee's father read an announcement in the paper that requested users of ground or stream waters across the state to send in the form. He noted on the form that the land had both riparian and appurtenant rights, the stream water had been used for these parcels since the 1850's and that the main crop had been kalo. Lee, Jr. WT.

830. The Supplemental Declaration attached to the form 8810-2 notes the problems in securing adequate stream flow being encountered by the Lees:

> During the years 1928 to 1940 plus we used water for the taro patches. There was some problem with East Maui Irrigation Co. where my mother's water was not fully received...she claims she had 3" of water rights.

Exh. E -34, A-C.

831. A few years later (1993) Tanaka Engineering sent a person to measure the stream flow in Hanehoi Stream. Mr. Lee met with the Tanaka staff person, Eric Yoshida, in November of 1993 and he took measurements of Hanehoi Stream from the bridge that crosses the stream near the Old Government Road. Lee, Jr. WT.

832. Yoshida's measurements showed the stream was eight feet wide and one foot deep. Mr Yoshida did not measure the stream where it passed along the Lee property. He did not measure the stream at any other time of the year, except November, when there had been recent rains. Mr. Lee was not given a copy of Mr. Yoshida's report to the Water Commission. Lee, Jr. WT.

833. The portion of Hanehoi Stream that borders Mr. Lee's family's three kuleana has been so dewatered by the diversions at EMI's New Haiku Ditch, Lowrie Ditch, New Hamakua Ditch and Wailoa Ditch that it rarely has flow unless there are large storm events. Lee, Jr. WT.

834. This lack of flow was not the case prior to the construction of the EMI ditch system. Mr. Lee's kupuna, Naaeae (also spelled" Kaaeae", and later known as "Kaea"), claimed these lands during the Great Mahele because they were already growing kalo there. Mr. Lee's family's kuleana lands and those of other families all listed their LCA/ kuleana parcels as having kalo growing. The translated testimonies for Mr. Lee's kuleana lands mention the lands being used for kalo. Exh. E -3, p. 236, Foreign Testimonies, Book 8 p. 104, *Wai o Ke Ola.*

835. In 2009 Mr. Lee took a picture of the overgrown conditions of Hanehoi Stream and sent it with a letter to the Maui County Tax collection office asking the tax assessors to come to see the dry stream for themselves so they would understand why our family was unable to utilize the three parcels for active agriculture. Exh. E-35. This was one year after the stream restoration was announced. In spite of their kuleana water rights, there was no water for their land in the stream. Lee, Jr. WT.

836. In 2011, Lee family members expressed an interest in reopening the kalo lo'i on their kuleana lands. Mr. Lee tried to find out what happened to the information from the registration with the state and to get a copy of the 1993 Tanaka Engineering report. Mr. Lee called Tanaka Engineering in late 2011 and they referred me to the Water Commission. Mr. Lee wrote to the Water Commission in January of 2012 to ask for a copy of this report and they provided me with a copy of the report. Exh. E-36.

837. In recent years the tax assessments on these three family kuleana parcels have been raised from a few hundred dollars a year to over a thousand dollars a year. Exh. E-26.

838. This is because the Lees do not have enough water to qualify for dedicated agricultural use tax rates for kalo growing and other crops. The Lee family would like avoid the hardship of paying this higher rate of taxation and return their lands to general agricultural use, growing kalo, and bringing livestock back on the land, but without sufficient waters from Hanehoi Stream this is impossible. Lee, Jr. WT.

839. Mr. Lee has been communicating with the CWRM for a number of years regarding lack of stream flow for his kuleana lands. His family registered traditional use of the stream water with the CWRM in 1987 and desires to have water to use again for kalo. The Lees have three parcels that either border Hanehoi Stream or have the streams running through them, all with traditional use for kalo growing and other crops. The State and Territory leases public lands mauka of my land to EMI to harvest stream and spring water subject to the needs of kuleana land owners downstream being undisturbed. Mr. Lee requests that the CWRM restore the waters to Hanehoi and Puolua Streams that are due to kuleana, riparian and appurtenant users under HRS § 7-1. He also requests to be contacted as part of any of the proposed ongoing monitoring of stream conditions in Hanehoi Stream. Lee, Jr. WT.

840. Solomon Lee, Jr.'s family is the possessor of three parcels of kuleana land which they desire to use for traditional kalo cultivation and other agricultural crops. Since their kuleana

lands have kuleana, riparian and appurtenant rights, they are entitled to the full flow of Hanehoi Stream through their kuleana, according to the law in the State of Hawaii. The Lowrie Ditch diversion works and the New Haiku ditch diversion works on Hanehoi Stream must be modified to allow the full flow of Hanehoi Stream through the Lee's kuleana and to allow the amount of water to flow to their kuleana lands that is necessary to grow healthy taro on three acres of land.

V. OFFSTREAM USES OF EAST MAUI SURFACE WATER

841. The two major users of water from East Maui streams are Hawaiian Commercial and Sugar Company (HC&S) and the County of Maui Department of Water Supply (DWS), both of whom receive water from the diversions of those streams by East Maui Irrigation Company, Ltd (EMI), although DWS separately diverts certain streams.

842. Both HC&S and EMI are subsidiary divisions of Alexander and Baldwin, Inc. (A&B). Exh. C-62 at 4, 8 (PDF).[17]

A. County of Maui Allocation of Water

843. The DWS operates a domestic water supply system consisting of both surface water and groundwater to meet its Upcountry customer needs. Exh B-6 at 6-9.

844. The DWS relies on three surface water sources, which are delivered by (a) EMI through its Wailoa Ditch; and (b) two DWS-owned higher elevation aqueducts maintained by EMI that transport water to Olinda and Kula, under a contractual agreement originated under the 1937 East Maui Water Agreement and subsequent agreements. Exhs. B-5; B-6, B-7; C-3.

WTP	Elevation	Conveyance System	Production Capacity (MGD)	Reliable Capacity (MGD)
Kamole-Weir	1,120 feet	Wailoa Ditch	6.0	3.6
Pi`iholo	2,900 feet	Upper Kula Flume	5.0	2.5
Olinda	4,200 feet	Lower Kula Pipeline	2.0	1.6

Taylor WT (12/30/14) at ¶9; Exh. B-16 at 6-7.

845. The Wailoa Ditch supplies water diverted from Honopou, Hanehoi, Huelo (Puolua), Alo, Waikamoi, Puohokamoa, Haipuaena, Kolea, Punalau, Honomanu, Nuaailua, Pi`ina`au, Palauhulu, Wailuanui, West Wailuaiki, East Wailuaiki, Kopiliula, Puaka`a, Waiohue, Pa`akea, Waia`aka, Kapaula, Hanawi, and Makapipi Streams to the Kamole Weir WTP with no intermediate reservoir to supply water to the Kamole Weir Water Treatment Plant ("WTP"). Exhs. E-130 at 4; B-16 at 6; Taylor WT (12/30/14) at ¶9.

[17] (PDF) is inserted to identify the page from the PDF file of the document being cited.

846. The Lower Kula Ditch supplies water diverted from Waikamō`ī, Puohokamoa, and Haipuaena Streams to the 50 mg Pi'iholo reservoir, which ultimately supplies water to the Pi`iholo WTP. *Id.* at ¶10.

847. The Upper Kula Ditch delivers surface water diverted from Waikamō`ī, Puohokamoa, and Haipuaena Streams to the 30 mg Waikamō`ī and 100 mg Kahakapao reservoirs, which ultimately supplies water to the Olinda WTP. *Id.* at ¶11.

848. DWS must have both surface and ground sources for adequate source water available for its three WTPs to operate at their production capacities. Exh. B-16 at 9.

849. The current groundwater production capacity available (3.4 MGD) is insufficient to replace the surface water portion of the current 7.9 MGD average Upcountry demand. *Id.* at 3, 8.

850. DWS operates the Po`okela, Kaupakalua, Ha`ikū , and Hamakuapoko wells

Well	Production Capacity (MGD)
Ha`ikū	0.5
Po`okela	1.3
Kaupakalua	1.6
Total production capacity	3.4
Reliable production capacity	2.1
Emergency source: Hamakuapoko	1.5
Total production capacity in emergencies	4.9
Reliable production capacity in emergencies	3.4
Ha`ikū	0.5

Exh. B-16 at 8.

851. Curiously, contrary to the Lekven report of "reliable production capacity" of DWS wells for Upcountry above (3.4 MGD), DWS had earlier declared to this Commission in 2010 that the Po`okela Well is the ***sole*** back-up source (1.3 MGD) for the Upcountry Maui water system during times of drought conditions or in the event of an operational emergency. *Compare*, *Id.* and Letter from J. Eng to K. Kawahara (5/13/10) in CWRM Compilation of Data Submissions, Part II (May 2010) (3/18/10) at 494 (PDF).

852. The Po`okela well has operated only intermittently since it was brought on-line in May 2007. *Id.*

853. The cost of electricity to operate the Po'okela well is the most significant expense associated with its operation. *Id.*

854. The average electricity cost since May 2007 to the present is $1.75 per one thousand gallons pumped. *Id.*

855. This well is the department's most expensive well to operate. *Id.*

856. In February 2010, this Commission requested information from DWS to "describe how they plan to begin the process of shifting the balance in the upcountry area from 85% reliance on surface water to a more even balance and the timetable and cost for implementing that process." *See,* Introduction, CWRM Compilation of Data Submissions, Part II (May 2010).

857. Specifically, this Commission had requested from DWS:

> A plan to begin shifting water use in Upcountry Maui from 85 percent reliance in surface water to a more even balance between surface and ground water (sic). Include timeline, estimated costs, and possible funding sources for implementation of such plan.

See, Letter from K. Kawahara to J. Eng (2/18/10) in CWRM Compilation of Data Submissions, Part II (May 2010) (3/18/10) at 98 (PDF).

858. Treated surface water constitutes the majority of water delivered to DWS' Upcountry customers through the 3 WTPs, ranging from 80-90% of the total between 2004-13. *Id.* at 9; Taylor WT (12/30/14) at ¶7; Exh. B-2 at 3.

859. Tapping these surface and groundwater sources, the DWS operates four separate water systems in the Upcountry District, three of which are potable: Upper Kula, Lower Kula, Makawao, and the Kula Agricultural Park (nonpotable). *Id.*; Taylor WT (12/30/14) at ¶7; Exh B-4 (Kula Agricultural Park); *but see,* Exh. B-3 at 6 (identifying additional subsystems at Ha'ikū - Kokomo and Opana/Awalu).

860. Between 1961 and 2000, DWS entered into a series of contractual agreements with A&B to take water from the EMI ditch system. Exh B-5 (1961); Exh. B-6 (1973); Exh. B-7 (1992); Exh. B-8 (1994); Exh. B-9 (Jan. 1996); Exh. B-10 (Dec. 1996); Exh. B-11 (Jan. 1998); Exh. B-12 (Dec. 1998); Exh. B-13 (1999); Exh. B-14 (Mar. 2000); Exh B-15.

861. The 2000 agreement authorizes the County to take up to 16 MGD, if available, from the Wailoa Ditch, although it is entitled to a minimum 8.2 MGD until the Wailoa Ditch drops below 16.4 MGD, below which HC&S and DWS share equally. *See also* Taylor WT (12/30/14) at ¶15.

862. The most recent memorandum of understanding between DWS and EMI/HC&S, which extended terms of its agreement until 2025, requires DWS to pursue:

a. "the implementation of additional raw water storage in the Lower Kula System." Exh. B-15 ¶ 1(o).

b. "ground water development for Upcountry Maui to mitigate drought effects. For example, [DWS] shall pursue exploratory wells (i.e., Lower Kula and Pulehu) to supplement the domestic water sources for Upcountry... "

c. "with HC&S's cooperation, establishing supplemental water sources to maintain the viability of the Kula Ag park."

863. DWS estimates that 60% of water consumption in Upcountry is for residential, commercial and institutional uses, while 40% is used for agriculture. Taylor WT (12/30/14) at ¶17.

864. Of the meters issued in this area (Makawao) as of June 30, 2013, only 433 5/8th inch meters have been issued for "agricultural service" and 8,686 5/8th inch meters have been issued for "regular service." Exh. E-118.

865. DWS charges its customers throughout its Maui system uniform prices regardless of a resident's location, even though it has "much higher operational and delivery costs" for Upcountry customers. WT Taylor WT (12/30/14) at ¶18.

866. DWS retained Paul Brewbaker to estimate the economic consequences for DWS if its use of surface water from the 27 streams at issue in this contested case were restricted. Brewbaker WT (12/30/14) at ¶10.

867. Brewbaker concluded that the reduction of surface water delivery to DWS would impact the County as follows:

Reduction in Delivery	% of Times Water Shut Off	Economic Impact ($ millions)
10%	18%	$770,000
20%	24%%	$1.027,000
30%	30	$1.283,000

Brewbaker WT (12/30/14) at ¶3.

868. However, Brewbaker was completely unaware that in 2009 the County studied mitigation measures that it could take if there were 10-20 percent reductions in water in Wailoa Ditch, and he did not take into account those measures in estimating the economic impacts of reducing flow to the DWS water treatment plants in Upcountry. Brewbaker, Tr. 3/17/15 p. 26, l. 9-13; p. 27, l. 14-16.

869. Brewbaker was also unaware of a County policy formally supporting protection of "baseline stream flows for perennial streams, and ... policies that ensure adequate streamflow to

support Native Hawaiian aquatic species, traditional kalo cultivation and self-sustaining ahupua'a." *Id.* at p. 28, l. 19 to 29, l. 5.

870. Brewbaker did not consider, nor factor in, any economic benefits from stream restoration in his impact analysis, merely focusing on negative economic consequences. Brewbaker, Tr. 3/17/15, p. 27, l. 5-13; p. 28, l. 7-18.

871. Brewbaker was also unaware of the 2009 study that Carl Freedman conducted on behalf of the DWS, concluding that a 100-million gallon, or a 200-million gallon, reservoir at Kamole Weir could fully mitigate either a 10 percent, or 20 percent, respectively, reduction in surface water flow to the DWS Kamole Weir WTP. Brewbaker, Tr. 3/17/15, p. 30, l. 5 to p. 31, l. 1.

872. The Commission finds that the testimony of Brewbaker is not credible.

1. The Failure to Update and Implement the Maui WDUP Has Led to Water Restrictions on Future Growth in Upcountry Maui.

873. In 1990, DWS submitted its first Water Use and Development Plan ("WUDP"). Exh. E-147 at 11.

874. The Commission adopted that 1990 WUDP and incorporated into the Hawaii State Water Plan. *Id.*

875. In the process of updating the 1990 WUDP, DWS submitted a 1992 draft update to the 1990 WUDP for Commission approval. *Id.*

876. Because the Commission applied more rigorous standards in its review, it did not approve the proposed 1992 DWS update. *Id.*

877. In 2000, the Commission adopted a "Statewide Framework for Updating the Hawaii Water Plan" to guide those counties preparing an update to a WUDP. *Id.*

878. The framework requires use of an "integrated resource planning" approach to identify planning objectives, determine future water needs, identify all feasible means to meet future water needs and determine the best strategy to meet the planning objectives and future needs. *Id.* at 9.

879. Following this framework, The Maui Department of Water Supply ("MDWS") prepared, through Ha`ikū Design & Analysis (Carl Freedman), the Maui County Water Use and

Development Plan, Upcountry District, Final Strategies Report (Draft) dated July 27, 2009 (hereafter "Upcountry Draft WUDP").[18] Exhs. E-123; E-130, and E-147.

880. The Upcountry Draft WUDP included identification of a broad range of considerations including water service availability, reliability, quality, cost and broader considerations including protection of streams, water resources, cultural resources, sustainability, equity, viability, and conformance with general and community plans. Exh. E-147 at 5.

881. The Upcountry Draft WUDP analyzed and recommended the most promising candidate strategies (final candidate strategies):

A. Incremental Basal Well Development

B. Expansion of Raw Water Storage Capacity

C. "Drought-Proof" Full Basal Well Backup

D. Improved Kamole Water Treatment Plant Capacity

E. Limited Growth With Extensive Conservation Measures

Id.

882. The Upcountry Draft WUDP also evaluated strategies to meet future water needs with respect to each of the planning objectives. *Id.*

883. The Upcountry Draft WUDP identified and considered a wide range of possible "resource options" including various options to provide new sources of water, options to conserve and use water more efficiently and options to protect stream and groundwater resources. *Id.*

884. It then examined the most promising resource options in detail using an integrated capacity expansion and production cost simulation model. *Id.*

885. This analysis tool evaluates various combinations of resources (candidate strategies) in the context of operation of the overall Upcountry District water system. *Id.*

886. The study then investigated, characterized and analyzed the most promising candidate strategies (final candidate strategies) in greater detail. *Id.*

887. Three of its recommendations are to:

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[18] The full Upcountry WUDP is at:

http://www.co.maui.hi.us/DocumentCenter/Home/View/10817.

- Support appropriate amendment of interim and/or permanent instream flow standards by CWRM,
- Support programs to protect and restore streams.
- Consider impacts on reliance on water from streams in county land use determinations.

Id. at 7; Exh. E-123 at p. 116 (printed page no. in excerpt).

888. DWS supports stream restoration:

> Stream restoration measures are consistent with any of the candidate strategies and may be an integral component of some of the surface water treatment strategies. The county has supported the establishment of appropriate amended interim instream flow standards and endorsed the concept of "mauka to makai" flow for Maui's streams.

Id. at p. 22 (printed page no. in excerpt).

889. The Upcountry WUDP acknowledges that "....recent and anticipated further amendments to the IIFS for the East Maui streams will result in decreased base flows in the Koolau/Wailoa ditch system...." Exhs. E-123 and E-147 at 46.

890. In 1993, the DWS determined that the Upcountry water systems had insufficient supply for fire protection, domestic, and irrigation purposes to take on new or additional services without detriment to the existing customers. Exh B-16 at 3.

891. In 1994 the DWS initiated a water meter priority list for landowners who had applied for water service in the Upcountry service area. *Id.*

892. The moratorium on issuing water meters has limited new development in the service area for the next 20 years. *Id.*

893. In 2012 there were 1,312 applications for Upcountry water service on the priority list. *Id.*

894. DWS determined that if they issued water meters to all who were on the list at that time, the average demand for water in Upcountry would increase by 3.5 MGD. *Id.*

895. As of June 30, 2014 the list had grown to 1,852 applicants, for a total demand increase of 7.5 MGD, or a 95% increase over current demand. *Id.* at 3, 5.

896. DWS has determined that, despite the restriction on new water meters, 1.75 MGD of demand could be added to the service area without decreasing the level of service to existing customers if the DWS increased water sources by;

- using the Hamakuapoko wells for emergency backup purposes;

- increasing booster pumping from the lower elevation systems to the higher elevation systems; and
- implementing systems to allow water transfer from the Makawao and lower Kula Systems to the upper Kula System without having to change the Upper Kula disinfectant.

Id. at 11.

897. DWS is anticipating that approximately 50 percent of all customers who are offered new water meters will decline the water service due to the high costs to install connector lines to their properties. *Id.*

898. In May 2014, DWS began offering new water meters to customers on the priority list conditioned on paying to extend water lines to service their property. *Id.* at 3.

899. This accommodation to the projected 50% of current existing Upcountry water demand (1.75 MGD) would exceed the projected water demand increase for all of Maui due to anticipated population growth in Upcountry neighborhoods for 2030, i.e., 1.65 MGD. Compare, *Id.* at 3, 5.

900. If it were possible, accommodating all of the water demands for the 1,852 applicants for water meters would require an additional 7.5 MGD. *Id.* at 5.

901. DWS has no water use and development plan to account for how it will meet current water demand reflected in the Upcountry Water Meter Priority List, which already exceeds existing County water projections for 2030. Exh. E-147 at 5; Exh B-16 at 20 (PDF).

902. Moreover, DWS admits:

> The future needs analysis provided by DWS is, by its very nature, entirely speculative and outside of the control of DWS." ... Actual growth depends on a large variety of factors, including water availability and large projects typically do not receive approvals through the Planning Department unless they can demonstrate that they will have adequate water. *Id.* at ¶¶ 4, 5. ***Nowhere has DWS either demanded that the exact projections it offers actually be accommodated by the IIFS, or challenged the ability of CWRM to make determinations that fail to fully accommodate those projections.*** The numbers provided, and the analysis of future needs based thereon, are merely to inform CWRM of what DWS projects its future needs to be.

County Rebuttal Br. 6 (emphasis added).

903. However, it sees a distinction in the role it plays to provide its "public service," which apparently excludes the needs of Hawaiian cultural practitioners.

> ... it is in favor of an IIFS that protects the public trust purposes championed by Na Moku and MT while still allowing DWS to fulfill its mandate to provide water to its 35,251 upcountry customers. [citations omitted] ... This support, however, does not extend so far that DWS feels the need to make Na Moku and MT's case for them. DWS' has a responsibility to assure that it can continue to provide a valuable public service as cost effectively as possible to thousands of citizens, businesses, schools, and native Hawaiian institutions residing in upcountry Maui. DWS' duty in this proceeding, as set forth by the Hawaii Supreme Court in the Waiahole I, and Na Wai Eha decisions, is to establish its needs and discuss the feasibility of meeting those needs with alternative water sources. ... *Na Moku and MT are responsible for establishing their own case regarding the stream flow needs for their promoted public trust purposes.*

County Rebuttal Br. 6 (emphasis added).

2. Wasteful Use of County Water

904. The Waikamō`ī Upper Flume was originally constructed in 1930s. Exh. E-114 at 8.

905. The 1.1-mile flume transports surface water from intakes at Haipuaena, Puohokamoa, and Waikamō`ī Streams over otherwise impassable terrain to the Olinda Water Treatment Facility ("WTF") of the DWS system. Exh. B-54 at 4, 8, 11; Taylor, Tr. 3/11/15, p. 55, ll. 25 to p. 56, ll. 1-24; CWRM Staff Submittal (5/25/10) at 6.

906. The Waikamō`ī Flume is located within an easement that was granted to the County by EMI in 1945 and lands underlying the access road to the Flume are owned by the State and A&B. Exh. E-114 at 4, 8.

907. Over the years, the Waikamō`ī Flume became so leaky that it lost as much as 40% of its total flow by DWS' own estimate. *Id.*; Exh. B-54 at 27-29.

908. DWS has estimated that "during peak flows, approximately 40% of the water conveyed by the flume is lost through various cracks and holes along its length." Exh. E-114 at 8.

909. If the production capacity of the Olinda WTP is the reported 2.0 MGD, Exh. B-16 at 6, then the flume could have wasted as much as 800,000 gpd at that level of operation.

910. If the reliable capacity of the Olinda WTP is the reported 1.6 MGD, *Id.,* then the flume could have wasted as much as 640,000 gpd at that level of operation.

911. In contrast, DWS asserts that the exact amount of water loss from the old Waikamō`ī Flume before it was recently renovated is unknowable, as DWS does not have intake nor

discharge measures that could actually quantify the amount of water lost. Taylor WT (1/3/15) at ¶¶5-6.

912. Since at least 1996, the DWS was contractually bound to repair the Waikamō`ī Flume. Exh. E-116 at 2-3.

913. Despite prior County budgeting to repair the Flume in 1996-97, and a second 2000 agreement with EMI "to implement a long-term plan for permanent improvements" to the flume, E-105, the DWS did not begin actual repair work on the Flume until 2014. Exh. E-117 at 1.

914. By 2010, the flume had fallen into such "major disrepair" that there was concern "it may fail." CWRM Staff Submittal (5/25/10) at 25; Exhs. E-50 and B-54 at 12, 13.

915. Faced with this chronic waste of water, until this Commission's 2010 action, the DWS continued to operate the leaky flume, despite the contractual obligations to repair it since 1996. Exh. E-116 at 2-3, Exh. E-105.

916. Because the Commission viewed the rehabilitation of the Waikamō`ī Flume was of "utmost importance," in 2010, it required DWS to rehabilitate it as the least expensive alternative water source for DWS in order to reduce waste and system loss, or reduce its stream diversion due to waste. CWRM Staff Submittal (5/25/10) at 25.

917. The DWS spent $11.2 million to fund the improvement of the flume. Exh. B-54 at 44.

918. DWS claims the renovated Waikamō`ī Flume is now "almost complete," but "fully functional." Tr. 3/11/15 at 58 (18-25); *but see*, Exh. B-54 at 44 (representing that as of November 19, 2014, the DWS projects it still faced at least 2 more years to complete the renovation).

919. Water savings from any repair of the chronic leakage from the old Waikamō`ī Flume is an alternative source of water for the DWS.

920. The DWS had no mechanisms for quantifying water levels either at the intake or discharge sites of the Waikamō`ī Flume to accurately measure system losses, despite DWS' apparent 2000 agreement with A&B to monitor stream flows. Taylor WT (1/3/15) at ¶5.

921. Any loss to the DWS due to stream restoration can and should be partially offset by the gain of the forty percent of the water it has been previously losing for over twenty (20) years.

922. As it is, the County DWS charges its Upcountry water subscribers less than the cost to treat and deliver water to its customers. Mayer, Tr. 3/30/15, p. 115, ll. 5-17.

923. This pricing of water is inefficient, and only promotes waste. Tr. (Mayer)

3. Alternatives

924. The Commission, the USGS, and the DWS have all relied on the Upcountry Draft WUDP in their own East Maui water resource studies. *See, e.g.,* Exh. E-63, IFSAR for Honomanu (Sept. 2008); USGS Rpt. 2005-5262; USGS Rpt. 2005-5213.

925. One primary purpose of the Upcountry Draft WUDP is to analyze and recommend the most cost/beneficial actions that MDWS can take to supply water in view of these inevitable decreases in base flows resulting from MDWS's support for stream restoration. Exhs. E-123; E-147 at 6.

926. The Upcountry Draft WUDP studied a number of candidate strategies, representing several alternatives to surface water as a source for new upcountry water needs:

a. Incremental Basal Well Development (by non-governmental entities);
b. Expansion of Raw Water Storage Capacity
c. "Drought-Proof" Full Basal Well Backup (a new well field)
d. Improved Kamole WTP Capacity
e. Limited Growth With Extensive Conservation Measures

Exhs. E-123 at 47; E-130; E-147 at 5.

927. The analysis presented in the Upcountry Draft WUDP report indicates that the most economic and sustainable strategy may be to provide raw water storage for the Upcountry system instead of relying on extensive additions of basal groundwater wells which require high long term energy expenditures. Exhs. E-123 and E-147 at 38.

928. Additional raw water storage reservoirs are capital intensive whereas groundwater production sources have substantial long term operating costs, primarily for electrical energy for pumping. Exhs. E-123 and E-147 at 40.

929. As shown in analyses presented below, a reservoir at the Kamole WTP site is a cost effective strategy to mitigate anticipated Wailoa Ditch base flow reductions. Exhs. E-123 and E-147 at p. 44.

930. Considering substantially reduced base flows in the Ko'olau/Wailoa ditch system, however, raw water storage reservoir capacity becomes necessary to provide reliable capacity in dry or drought periods. Exhs. E-123 and E-147 at 44.

931. The analysis shows that raw water storage at the Kamole WTP is more cost effective than providing backup capacity exclusively by addition of basal wells. Exhs. E-123 and E-147, Upcountry WUDP at 48.

932. Considering the economics of developing basal wells raw water storage reservoirs, including the need to mitigate anticipated reductions in Wailoa Ditch base flows, strategies that include the addition of reservoir capacity for the Kamole WTP are most cost effective. Exhs. E-123 and E-147, Upcountry WUDP at 49.

933. The reliable potable water production capacity of the Wailoa Ditch in dry months or drought periods is limited by: (a) the amount of water in the Wailoa Ditch, and (b) implementation of contractual terms of a memorandum of understanding (MOU) dated April 13, 2000 between DWS and A&B; and (c) the physical characteristics of the Kamole Weir WTP intake structure. Exh. E-130 at 4.

934. Based on a long-term historical record of Wailoa Ditch flow recorded at Honopou Stream between 1922 and 1987, water flow in the ditch exceed 40 MGD 90% of the time and 20 MGD 99% of the time. Exh. E-130 at 4, 5.

935. Under the 2000 memorandum of understanding between A&B and DWS ("2000 MOU"), DWS is allotted up to 12 MGD from the Wailoa Ditch with an option for an additional 4 MGD. *Id.*

936. Above 16.4 MGD, the 2000 MOU assures DWS a minimum of up to 8.2 MGD. *Id.*

937. When ditch flow drops below 16.4 MGD, DWS and A&B would split the available water under the MOU. *Id.*

938. Should an amended IIFS affect water sources that feed into the Wailoa Ditch, the Upcountry Draft WUDP identifies raw water storage at Kamole Weir as the prime alternative water source. *Id.* at 6.

939. Budgeting for the large initial capital expenditures for reservoir construction has not been determined or committed. E-147 at 111.

940. This Commission's staff has found:

> The study [Upcountry WUDP] estimates an expenditure of $15 to 30 million in building a 100 million gallon reservoir, and $30 to 60 million for a 200 million gallon reservoir. The cost of providing new basal ground water wells to replace the existing drought period reliable capacity of 4.5 million gallons per day would

be about 32 million, or $8 million for every 1 million gallons per day of additional Kamole Weir WTF's drought period reliable capacity. While specific plans to improve the WTF intake structures have not been examined, it can be assumed that these improvements would be more cost-effective than drilling basal wells.

Exh. E-63, IFSAR for Honomanu (Sept. 2008) at 138.

941. Since at least 1996, the County BWS has been contractually bound to construct a reservoir at Kamole Weir. Exhs. E-115 at 4; Exh. E-116 at 3.

942. The analysis in the Upcountry Draft WUDP is based on a model developed to generate reliability statistics for the Kamole Weir WTP, accounting for various factors related to the Wailoa ditch system water collection, and projected amendments to IIFS related to streams feeding the ditch. Exh. E-130 at 6.

943. The the model predicts the following effects on the current drought period reliable capacity (3.6 MGD) of the Kamole WTP of different levels of Wailoa Ditch base flow reduction due to potential amendments to the IIFS of streams diverted by the ditch:

Effect on Kamole WTP Drought Reliable Yield

Due to Different Levels of Reduction in Wailoa Ditch Base Flow

Reservoir capacity	**20 MGD Reduction (MGD)**	**30 MGD Reduction (MGD)**
no reservoir	0	0
100 mg	4.6	0
200 mg	7.1	4.7

Id. at 10, 15.

944. The Review Draft of the Maui WUDP Upcountry Final Strategies Report established two criteria which must be met to meet a drought period reliable capacity for a water treatment plant: (a) the percentage of time that water is not sufficient (below 20 MGD) is less than

1.8 days per year; and (b) the maximum consecutive number of days that water is not sufficient is less than or equal to 30. Exh. E-130 at 6.

945. The analysis performed shows that, even with a 20 MGD reduction in Wailoa Ditch base flow, the drought period reliable yield for the Kamole Weir WTP, *if supported with a 100 mg reservoir*, would remain approximately the same as the yield for the current WTP without a 20 MGD reduction (4.5 MGD). *Id.*; E-147 at 5, 47, 66.

946. With a 200 mg reservoir, the drought period reliable yield of the Kamole Wier WTP would increase to 7.1 MGD, even with a 20 MGD reduction in ditch base flow. *Id.*; Exh. E-130 at 10.

947. With reductions in base flows exceeding 30 MGD it would be more cost effective to provide drought period reliable capacity by additional basal wells than by adding reservoir capacity for the Kamole WTP. Exh. E-147 at 111.

948. Thus, constructing a reservoir at the Kamole WTP site when faced with less than a 30 MGD reduction in Wailoa base flow **is** a cost effective strategy to mitigate anticipated Wailoa Ditch base flow reductions from amended IIFS. Exh. E-123 at 44, 47.

949. Reservoirs mitigate fluctuations in both streamflow and consumer demand. Taylor WT (1/3/15) at ¶10.

950. These mitigations of fluctuations in streamflow allow more of it to be used *at the proper time*, i.e., during drier times when it is needed for irrigation, by making more water available without simultaneously taking directly from the water source being protected. Mayer WT (2/4/15) at ¶13-14.

951. These mitigations constitute an alternative source of water, contrary to the DWS' legal position. *Compare* Mayer WT (2/4/15) at ¶10 and DWS Responsive Brief 5.

952. Raw water storage at the Kamole WTP is more cost effective than providing backup capacity exclusively by the addition of basal wells. Exh. E-147 at 48.

953. The most economic and sustainable strategy for up to a 30 MGD loss to base flow in the Wailoa Ditch is to provide raw water storage for the Upcountry system, instead of relying on extensive additions of basal groundwater wells which require high long term energy expenditures. Exh. E-147 at 38.

954. Raw water storage at the Kamole WTP is more cost effective than providing backup capacity exclusively by addition of basal wells. Exh. E-147 at 48.

955. Moreover, this cost/effectiveness is reduced "... if basal wells would be provided by DWS or acquired from private developers as interim measures prior to commissioning a reservoir [.]" Exh. E-147 at 47.

956. The County has allocated approximately $25,250,000 primarily for the design and construction of the Kamole storage reservoir at Kamole in its FY 2015 Budget. See Exh. E-124; Taylor, Tr. 3/11/15 at 88 (15-25) to 89 (1-13).

957. Since a reservoir at Kamole has been commissioned before basal wells have been provided, the raw water storage reservoir at Kamole remains the most cost/effective alternative for dealing with anticipated decreases in lower ditch flows at Kamole for the stream restoration purposes the MDWS supports.

958. Mr. Lekven is not an economist and did not perform a cost-benefit analysis for the alternatives he considered. Exh. B-16; Lekven, Tr. 3/12/15, p. 33, l. 7-15.

959. Mr. Lekven's principal professional experience is in the area of wastewater and recycled water management, rather than well construction and development. *Id.* at p. 34, l. 1-18.

960. Mr. Lekven also has never designed a raw water storage reservoir. *Id.* at p. 35, l. 1-4.

961. Mr. Lekven relied on the Upcountry Draft WUDP for its data and rigorous cost-benefit analysis. Lekven, Tr. 3/12/15, p. 36, l. 5-25 to p. 37, l. 1-21.

Wastewater is Reasonably Available to Irrigate Sugar Cane

962. Recycled wastewater, amounting to approximately 4.5 mgd, is reasonably available and constitutes a viable alternative for the irrigation of HC&S sugar cane. Exhs. E-88, E-88-A and E-126.

963. Central Maui currently injects 4 mgd of treated wastewater via injection wells. Exhs. E-88, E-88-A and E-126.

964. This treated wastewater migrates into Kahului Bay, contributing to algae blooms and the degradation of our near shore waters.[19] Exhs. E-128, E-129.

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[19] There is ample anecdotal evidence from those who enjoy the ocean for recreational purposes in the vicinity of the Kahului WTF injection wells concerning staph and MSRA infections. If this were not enough, there is a body of reputable scientific evidence that this wastewater is making its way into Kahului Bay and that it contributes to algae blooms and degradation of our nearshore waters. Until dye tests are conducted at the Kahului WTF, as they were at the Lahaina WTF, it is the brave, absolute denials by the MDWS that lack any scientific support. See the Supplemental Declaration of Irene Bowie and the referenced Exhibits.

965. There are also health concerns regarding an increase in staph and MRSA infections in ocean recreation users at Kahului Bay. *Id.*; Exhs. E-128 and E-129.

966. This Study states that wastewater flows to the Kahului Wastewater Reclamation Facility will increase over time as more development takes place in Central Maui. *Id.*; Exhibits E-88, E-88-A and E-126.

967. During the May 25, 2010 meeting of the Commission on Water Resource Management (CWRM), Chair Thielen and County Water Director Eng discussed recycling Central Maui's wastewater as an alternative to the amount of stream flow diverted by HC&S for irrigation. CWRM Minutes (5/25/10); Exh. E-60.

968. During the Commission's discussion, Chair Thielen stated:

> There was some testimony about injection wells and instead using reclaimed water for agricultural purposes. Since Maui DWS gets a percentage out of the EMI ditch system, would the County be interested in working with HC&S on coordinating some alternative water being used for irrigation in exchange for increase in the percentage of stream water that goes to the County vs. for irrigation purposes in the fields? Are these things something the County would be interested in pursuing and if so, how can the Commission assist that with some guidance.

Id. at 38.

969. County Water Director Eng and Mayor Tavares both agreed that the County would be interested in coordinating the use of wastewater with HC&S and the Commission as an alternative source of water. *Id.* at pp. 38-39; Exhibit E-60.

970. This discussion took place over four years ago and no effort has been made by the County and HC&S to work together to use this valuable resource - wastewater from the Central Maui treatment plant. Bowie 12/30/14 WT ¶ 18.

971. The CWRM addressed the use of wastewater for sugar cane irrigation in its own 2013 Update of the Hawaii Water Reuse Survey and Report. Exhibit E-89; 2013 Update of the Hawaii Water Reuse Survey and Report prepared for DLNR/CWRM ("2013 Update of HWRSR").

972. The 2013 Update of HWRSR supports increased use of wastewater in Central Maui.

973. The Central Maui Recycled Water Verification Study also finds that wastewater would be suitable for sugar cane irrigation. Exh. E-88; Central Maui Recycled Water Verification Study.

974. Funds in the County budget have been set aside for an R-1 upgrade and transmission lines at the Kahului plant. What remains to be decided is where these lines would be placed.

975. Option 2 on page 8 of the Central Maui Recycled Water Verification Study proposes a distribution system from the Kahului WWRF to Kanahā Beach Park and Kahului Airport that could be extended to HC&S fields north of the airport. Exhs. E-88, E-88-A and E-126.

976. Funding for the distribution system could come jointly from Hawaii Department of Transportation, Airports Division, HC&S and others. Bowie WT (12/30/14) at ¶14.

977. Option 3A of the Recycled Water Study is entitled "Develop a Dedicated Distribution System to HC&S." This option would need only enough R-1 pipe line along Kaahumanu Avenue to reach existing ML&P pipe lines. *Id.* at ¶15.

978. R-1 water would be pumped from the Kahului WWRF directly to the HC&S reservoir and once the reservoir was full, the pumps would shut down. *Id.*; Exhs. E-88, E-88-A and E-126.

979. Recycled water from this line could be used to irrigate seed cane in HC&S fields near Maui Lani. Bowie WT (12/30/14) at ¶15.

980. Developing these recycled water use options would help to serve HC&S's agricultural irrigation needs while requiring less water to be taken from Maui's streams. *Id.* at ¶16.

981. It would also prevent the current 4 mgd of treated wastewater from entering Kahului Bay and the future 6 mgd, after the upgrade to the plant's capacity. *Id.*

982. The addition of a third ultra violet channel could increase the R-1 capacity to 7.9 mgd. Maui County wastewater will increase as the island's population grows. *Id.*

983. HC&S commissioned a study from Austin Tsutsumi for the Nā Wai 'Ehā case on supplying wastewater to the western plantation fields served by the Nā Wai 'Ehā in West Maui. *See,* Exh. C-119.

984. HC&S recites the costs estimated to deliver R-2 wastewater to the "Nā Wai 'Ehā" fields that are not the subject of this proceeding. HC&S ignores the Central Maui Recycled Water Verification Study. Exhs. E-88, E-88-A and E-126.

985. From Maui Tomorrow's perspective, it would be far better environmentally to use this wastewater on the sugarcane fields than to inject it in a manner whereby, the evidence indicates, some, at a minimum, will end up in our ocean waters. This wastewater can be a resource for

agricultural irrigation rather than "wasted" water which may cause harm to our marine environment. *See* Bowie WT (12/30/14) at ¶16 and the referenced Exhibits.

986. Plants, wildlife, and fish depend on sufficient water flows to their habitats to live and reproduce. The lack of adequate flow in Maui's streams, as a result of diversions for agricultural purposes, has caused deterioration of Maui's stream and aquifer water quality and ecosystem health. Bowie WT (12/30/14) at ¶17.

987. Recycled R-1 water can supplement agricultural demands by providing a reliable source of irrigation water that is less dependent on seasonal weather variations than stream water. *Id.*

988. Over time, investment in R-1 water delivery systems could allow considerable amounts of stream water to remain in our watersheds, supporting increased stream flows and vital ecosystem functions like East Maui aquifer recharge. *Id.*

B. HC&S' Offstream Water Uses

989. Excluding abandoned ditches and stream conveyances, the USGS has identified and verified about 63 miles[20] of the EMI diversion system. Cheng, C.L., 2012, Measurements of seepage losses and gains, East Maui Irrigation diversion system, Maui, Hawai`i: U.S. Geological Survey Open-File Report 2012-1115 (hereafter, "USGS Rpt 2012-1115") at 6, 19, Figures 1 and 2; *see, also,* Abstract (not paginated).

990. The USGS identified about 46 miles (73 percent) of the surveyed diversion system are tunnels and 17 miles[21] are open ditches—in which 11 miles (65%) are unlined, 3.5 miles (21%) are lined, and 2.5 miles (14%) are partially lined. *Id.*

991. During the 73-year period 1925–97, the total combined flow for the four primary ditches of the EMI diversion system measured at Honopou Stream averaged about 163 million gallons per day (MGD). *Id.* at 4.

992. During 1924–87, average flows measured at Honopou Stream were 110 MGD for Wailoa Ditch, 23 MGD for New Hamakua and Lowrie Ditches, and 15 MGD for Ha`ikū Ditch. *Id., see, also,* Abstract (not paginated).

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[20] EMI claimed that the length of its ditches was 75 miles. Compilation of Data Submissions, Part II (May 2010) at 27 (PDF).

[21] HC&S/EMI claimed that the total system length is 25 miles. Compilation of Data Submissions, Part II (May 2010) at 27 (PDF).

993. HC&S claims that while the average of 163 MGD between 1925 to 2014 is accurate, Exh. E-83 at 2, over more recent years, it is receiving less water per year than this historic average, i.e., an average of 127 MGD between 1998 and 2014. Exh. C-124; Hew WT (12/30/14) at ¶30 (noting 126 MGD for 2004 through 2013).

994. In truth, using HC&S' own figures for water transported from EMI, the average water use for the period 2008-13 is closer to 135.1 MGD. Exh. C-125.

995. EMI collects surface runoff from a watershed area of 57,000 acres, of which 38,000 acres are state-owned and 19,000 acres are owned by EMI. Exh. E-83 at 2.

996. The EMI system of four major ditches operate in parallel to collect water from approximately 100 streams located between Nahiku and Ha'ikū. *Id.*

997. HC&S can supplement its irrigation water supply with pumped groundwater from 15 brackish water wells with a total pumping capacity of 228 MGD, which may be used to supplement surface water supply. Exh. E-76 at 3 (PDF).

1. Actual Need for Water

998. HC&S defines its "minimum needs" as "the amount of water needed to sustain a viable sugar plantation at HC&S." Volner WT (12/30/15) at ¶ 55.

999. Mr. Volner testified that "[sugar] yields are one, if not the single most determinate, one of the most determinate things to economic viability for HC&S" and informs HC&S' water needs calculation for its sugar crop. Volner, Tr. 3/23/15, p. 48, ll. 16-25.

1000. HC&S' plantation has a gross area of 43,000 acres of which approximately 35,500 acres[22] are farmed. Once a field goes into ripening or drying, it's no longer under active irrigation. Exh. C-137; Volner, Tr. 3/23/15, p. 27, ll. 2-25.

1001. The amount and type of land the HC&S is cultivating or seeks to cultivate in sugarcane also raises serious questions about its economic viability as a plantation.

1002. HC&S claims that between 2008 and 2013, 28,941 "pure crop" acres were actively irrigated with East Maui surface water. Exh. C-137; Volner, Tr. 3/23/15, p. 27, l. 18 to p. 28 l. 24.

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[22] But, *see* Exh. E-83, where A&B/HC&S asserts that it cultivates sugarcane on 35,800 acres.

1003. However, HC&S has designated only 27,133 of these acres as "important agricultural lands," (IAL) a designation that relies on a definition that identifies these lands as those for which water is available. Exh. E-76; Mayer WT (12/30/14) at ¶55.

1004. In its IAL petition, HC&S claimed that *only 23,577 acres* of its 35,100 acres was in sugarcane cultivation, and 1,626 acres were in cultivation for seed corn, pineapple, or grazing. *Id.*; Exh E-76.

1005. These 35,000 acres have steadily diminished in number, as portions of the plantation have been put by A&B to more lucrative non-agricultural uses.

1006. As of 2014, significantly less than 35,000 acres are in actual cultivation by HC&S, after A&B proposed 13 new development projects on a total of more than 4,000 acres of lands it designates as plantation lands on its maps. Exhibits E-75; E-81; E-81-A; E-145; E-146.

1007. In 2013, HC&S reported to shareholders that it had harvested only 15,400 acres of sugarcane, down from 15,900 acres in 2012. Exh. E-62 at 4 (PDF).

1008. Yet, despite the lower acreage harvested in 2013, HC&S had a crop yield of 12.4 tons per acre, with 54,800 tons of molasses, when its yield was just 11.3 tons per acre, with 50,500 tons of molasses, in 2012. *Id.*

1009. Hence, with 29% less irrigation water, and 3.1% less harvested acreage, HC&S realized a crop yield boost of 9.7% between 2012 and 2013.[23]

1010. Surprisingly, over that same two-year period, HC&S water diversions decreased from 50,219 MG in 2012 to 35,696 MG in 2013, a 29% reduction.[24] Exh. C-125 at 3, 4 (PDF).

1011. Unfortunately for HC&S, in what would have been a great year for expected revenues with higher yield, sugar prices dropped from 32.53 in 2012 to 21.0 cents in 2013. Exh. C-64.

1012. As a result, primarily due to the price drop, HC&S revenues fell by $36.2 million, and profit by 10.1 million, despite a 7% increase in actual sugar production due to higher crop yield, over the same period. Exh. C-64 at 13.

1013. The Commission concludes that, with all the various factors at play affecting HC&S revenues and profitability, including improvements in water use efficiency as reflected in the above example, HC&S is in no position to justify its claim of its supposed "minimum needs" as "the

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[23] 1.1 ÷ 11.3

[24] 14.6 ÷ 50.2

amount of water needed to sustain a viable sugar plantation at HC&S." Volner WT 12/30/14 at ¶ 55, since the facts indicate that many more critical factors are at play than HC&S has argued.

1014. This Commission also finds that HC&S reported varying rates of water use to irrigate its sugar crop in 2005, 2008 and 2015, clouding its veracity about what constitutes its actual use of surface water for irrigation of its plantation.

1015. In 2005, HC&S irrigation manager Lee Jakeway provided sworn testimony on HC&S' irrigation water use for its sugar plantation during the contested case hearing on Nā Moku's challenge to the BLNR's proposed lease of 33,000 acres of ceded lands to A&B/EMI. Exh. C-132; BLNR Tr. 11/15/05 p. 147, l. 18-21.

1016. In that 2005 testimony, Jakeway grudgingly conceded on cross examination to HC&S' apparent use of 18,000 gad in the wet winter months and 37,000 gad in the hot summer months. *Id. at* 167, l. 22 to p. 170, l. 13 (indicating his acceptance of the math involved in accounting for a per acre use of water by HC&S). Exh. C-132; BLNR Tr. 11/15/05 p. 167, l. 22 to p. 170, l. 13.

1017. In that testimony, he described the irrigation protocol of HC&S in which the plantation irrigates 7,560 acres of its lands at a time each day, for two days, then moving to another area of the same size on a continuous rotational basis. *Id.* p. 164, l. 3 to p. 167, l. 3.

1018. On May 29, 2008, Nā Moku filed a formal with this Commission about this wasteful use of water, based on the cross examination of Jakeway. CWRM Complaint/Dispute Resolution Form (5/29/08), which can be found on the Commission's website at: http://files.hawaii.gov/dlnr/cwrm/activity/iifsmaui1/20080529a.pdf.

1019. In September 2008, in response to this complaint, the Commission determined what level of water use HC&S should be reasonably using to irrigate its sugar plantation (1,400 gad in winter months and 6,000 gad in summer months), which it estimated utilizing its IWREDSS model. CWRM Staff Submittal (9/24/08) at 9.

1020. In contrast, HC&S then admitted to using between 5,064 gallons per acre per day (gad) in the wet season and 10,128 gad in the dry season. *Id.*

1021. Even if this Commission were to accept HC&S' 2008 admission of water use as accurate, Commission staff has formally declared this level of use as being "high." CWRM Staff Submittal (9/24/08) at 9.

1022. HC&S has never reconciled its "high" use, compared to the IWREDSS model benchmarks. *Id.*

1023. At the lower range of irrigation, HC&S' water use exceeds the 1,400 gad benchmark by over three and a half times. *Id.* (relying on the Irrigation Water Requirement Estimation Decision Support System (IWREDSS) model to calculate HC&S' average irrigation need for sugarcane); CWRM Minutes (9/24/08 – 9/25/08) at 11-12.[25]

1024. By the CWRM staff determination, HC&S should be using an average of 72 MGD -- less than half of the reported 163 MGD use calculated by the USGS based on historic data from 1927-87.

1025. The difference between HC&S' "high" use and what the Commission determined reasonable is 94 MGD.[26]

1026. This "high" water use ranges from 69% more in summer months to 262% more in winter months than what this Commission's application of its IWREDDS model calculates as reasonable use of water for sugarcane depending on the season.

1027. Finally, during the 2015 contested case hearing, HC&S now contends that its calculated use rates for its eastern fields, based on 2008-13 actual use of COMBINED *surface water deliveries and groundwater pumpage*, is between 4,000 and 5,000 plus GAD. Exh. C-137; Volner, Tr. 3/23/15, p. 154, l. 3-21.

1028. If one were to accept this level of irrigation, and factoring in Jakeway's 2005 description of rotating amongst fields approximately 7,560 acres at a time, HC&S should be using no more than 37.8 MGD[27] at the high end.

1029. In short, HC&S' own numbers do not add up to what EMI is diverting on its behalf, even taking into account the relatively other uses for:

Use	MG per year	MGD

[25] Although the CWRM noted the admission by HC&S, it merely noted HC&S' *post hoc* rationalization without fully resolving the difference in interpretation.

[26] By comparison, A&B/EMI's delivery of **8.2 MGD** of its diverted East Maui water to the County of Maui for its Upcountry domestic consumers, farmers, and ranchers. *See CWRM Submittal* (9/24/08) at 12. Thus, its ditch system delivers to the County less than **one-tenth** the amount HC&S wastes daily and, like Nā Moku, constitutes a mere fraction of what A&B/EMI diverts from all East Maui streams, not merely the 27 petitioned streams. Nā Moku has never contested A&B/EMI's delivery of an amount of water sufficient to meet the County's ***actual*** water needs, and the refrain that the ditch system is in service of Maui County is hollow, post hoc justification for A&B/EMI's commercial diversion of public trust resources.

[27] 7,650 ac. X 5,000 gad.

County	1,034	2.84
industrial uses	2,283	6.27
other	150	0.41
seepage/evaporation	15,206	41.75
Total	**18,673**	**51.26**

1030. Under this scenario, HC&S should be using no more than 89.06 MGD, at its highest claimed rate of irrigation, for its various uses and obligations.

1031. Based on the 1922-87 (66 years) USGS historic flow records for Wailoa Ditch, total ditch flow would dip below 44 cfs (the total flow level when all 23 listed streams would have a minimum flow of BFQ_{64}) an average of 10 days per year. Gingerich WT (10/31/14) at 8 (PDF).

1032. In 2014, Alexander & Baldwin's agribusiness unit lost a total of $11.8 million, of which HC&S constituted a very large portion. 2014 was the lowest total sugar production on record since 2009 which was due mainly to challenging harvesting conditions caused by wet conditions or more rainfall than normal. Volner, Tr. 3/23/15, p. 9 l6-21; Exh. C-150.

1033. HC&S' wells serving East Maui fields have an installed capacity of about 215 MGD. HC&S claims that its "true instantaneous pumping" capacity is roughly 115 to 120 million gallons, the amount which can be pumped daily over a five day period. This means that if there were a five-day critical period, HC&S may be able to pump and sustain 120 million gallons each day before sump and salinity levels would require HC&S' mechanical equipment to cease operating to allow those levels to normalize again. Volner, Tr. 3/23/15, p. 17, l. 3-7; p. 19, l.18 to p. 20, l.4; Exh. C-75.

1034. In addition to irrigating cane, HC&S uses a combination of pumped well water and diverted East Maui surface water for industrial purposes including "factory, power plant, fertilizer, solutionizing, [and] anything to support the farming and factory operations." HC&S' harvesting method requires a significant amount of industrial use water for cane cleaning. Additionally, industrial use water is utilized in the factory for moving material, cooling purposes, and lubrication; on the farm, such water is used to solutionize fertilizers and herbicides to be applied to the crop. Volner, Tr. 3/23/15, p. 23, l. 19 to p. 24, l. 15.

1035. About 2 MGD of HC&S' industrial water use is devoted to its power plant boiler make-up water (used to make steam) and served exclusively by diverted East Maui surface water,

because the mineral content of surface water is lower than pumped groundwater. Volner, Tr. 3/23/15 at p. 25, l. 13-25.

1036. HC&S claims that it needs to produce 12 to 14 tons of sugar per acre (TSA) per crop cycle, which amounts to approximately 200,000 tons of sugar per year, to remain economically viable and profitable. Volner, Tr. 3/23/15, p. 56, ll. 6-13 (asserting that "with normal sugar pricing, no other challenges with our other revenue basis, managing incurred cost, it is definitely possible to achieve a profit.") *Id.* at p. 58, ll. 6-21 ("[HC&S] would like to be able to sustainably achieve 200,000 tons every year").

1037. However, HC&S met that level of production *only once* between 2003 and 2013, when in 2003 it generated 205,700 tons of sugar well *before* the Commission implemented IIFSs that curtailed the amount of East Maui surface water delivered to HC&S. Exh. C-77; Volner, Tr. 3/23/15, p. 59, l. 10-16.

1038. In the following two years, HC&S generated yields that came close to but did not meet its "economically viable" 200,000 benchmark level. *Id.* (199,000 tons of sugar in 2004 and 192,600 tons of sugar in 2005).

1039. HC&S' yield numbers dropped significantly between 2006 and 2012 until it rebounded in 2013. Although by that time, the Commission's 2008 and 2010 IIFS amendments had been in effect for a number of years and East Maui surface water deliveries were at their lowest, HC&S nevertheless generated 191,000 tons of sugar that year -- the closest HC&S had come to reaching its "economically viable" production level since 2005. Exh. C-77; Volner, Tr. 3/23/15, p. 60, l. 4-15.

1040. Volner testified that HC&S nevertheless generated 191,000 tons of sugar that year – the closest HC&S had come to reaching its "economically viable" production level since 2005. Exh. C-77; Volner, Tr. 3/23/15, p. 60, l. 4-15.

1041. Volner's testimony revealed a basic inconsistency, i.e., in 2013, HC&S had attained the goal for viability of achieving a TSA of 12.4, Volner, Tr. 3/23/15, p. 56, ll. 6-13, but simultaneously fell short of its alternate goal of 200,000 tons of sugar production. *Id.* at p. 58, ll. 6-21.

1042. Even though HC&S repeatedly failed to meet its claimed minimum viability production level of 200,000 tons of sugar annually during this period, it managed to employ its

workers, expend $115 million annually in goods and services, and inject over $172 million into the state economy. Volner Tr. 3/23/15, p. 13, l. 13 to p. 69, l. 10.

1043. HC&S concedes it does not have a minimum sugar production number to remain viable because its total bottom line is dependant on many variables (e.g., sugar pricing, other revenue streams including specialty sugar, energy, molasses, etc.), only one of which is sugar production. Volner Tr. 3/23/15, p. 59, l. 17 to p. 60, l. 3; p. 67, l. 23 to p. 69, l. 10.

1044. HC&S concedes that its claimed minimum production level of 200,000 tons of sugar per year is merely a production goal; not a minimum water need to remain viable. Volner, Tr. 3/23/15, p. 68, l. 7-12.

1045. HC&S average yield ton sugar per acre from 1986 through 2013 was 11.9 TSA - a value just shy of the 12 to 14 TSA that amounts to approximately 200,000 tons of sugar per year for HC&S remain economically viable and profitable. Volner, Tr. 3/23/15, p. 56, ll. 6-13.

1046. Ultimately, HC&S claims that "[p]roduction improvements accounted for about half of the increase in revenues" in recent years "with sugar prices accounting for the other half." HC&S Opening Br. 14.

1047. Hence, CWRM's IIFS decisions neither impeded nor aided the financial windfall that resulted from the spike in sugar prices between 2009 and 2012; the global markets were responsible for that good fortune. Exh. E-63.

1048. But it does appear that the CWRM's IIFS determinations led HC&S to optimize its "economic and efficient utilization" of a reduced surface water supply, which fostered improved agronomic practices and increased profit margins, e.g. in 2013, all the while supporting public trust purposes. Exh. C-62 at 13.

1049. Ironically, HC&S' own data demonstrates that the resulting impacts of less surface water are not as cut and dry or as financially catastrophic as HC&S claimed. *See,* Section VII.B.5.

1050. HC&S' equating of minimum need with economic viability is similarly suspect given: (1) its concession as to "the slim profit margins that can be made producing commodity sugar" and its admitted "considerable challenge of transitioning away from its heavy reliance upon the commodity sugar business in which it remains subject to fluctuations in global sugar prices over which it has no control," *Id.* at 22 (emphasis added); *see also Id.* at 40 ("One of the strategies HC&S has employed has been to diversify by producing specialty food-grade raw sugars, which yield

higher margins than commodity sugar[and] exploring further expansion of its energy related operations."); *see also* Exh. C-45, Appendix IV; as well as (2) its inclusion of "system losses that occur in the transportation and storage of the East Maui water delivered into HC&S' irrigation ditches and 36 reservoirs" as part of its calculation of needs. HC&S at 14-15.

2. Losses - Waste by HC&S

1051. This Commission is specifically empowered to and should consider system losses in weighing "the importance of the present or potential instream values with the importance of the present or potential use of water for noninstream purposes, including the economic impact of restricting such uses." *Nā Wai Ehā,* 128 Haw. at 257287 p.3d at 158, citing HRS §174C-71(2)(1).

1052. The Wailoa, Kauhikoa, and Ha`ikū Ditches have greater than 96 percent of their total lengths as tunnels. Cheng, C.L., USGS Open-File Report 2012-1115 at 13, 19, *see, also,* Abstract (not paginated).

1053. More than half of the Lowrie Ditch and Spreckels Ditch at Pāpa'a'ea are open ditches, mostly unlined. *Id.*

1054. About 70 percent of the total length of lined open ditches in the EMI diversion system is located along the Ko'olau Ditch. *Id.*

1055. About 67 percent of the total length of unlined open ditches in the EMI diversion system is located along the Lowrie Ditch. *Id.*

1056. Less than 4 percent of the EMI diversion system is partially lined open ditches, and about half of the total partially lined open-ditch length is in the Spreckels Ditch. *Id.*

1057. In September 2008 and May 2010, CWRM established interim instream flow standards for a majority of the streams in northeast Maui that are diverted by the EMI diversion system subject to a series of adaptive management strategies. CWRM Minutes (9/24/08); CWRM Minutes (5/25/10).

1058. In February 2010, this Commission requested that HC&S provide the "[a]mount of water lost from the EMI System due to system inefficiencies. If that information is unavailable, provide a timeline and estimated costs for developing a plan to address system losses." Letter from K. Kawahara to C. Benjamin (2/18/10), CWRM Compilation of Data Submissions, Part II (May 2010) at 22 (PDF).

1059. In response, HC&S provided only an estimate for EMI system loss of 10-15%, based on a typical American Water Works Association for generic municipal water systems with a

closed pipe system, or 16.3 to 24.4 MGD based on 163 MGD average diversion amounts between 1927-87. *Id.* at 27 (PDF).

1060. Although EMI reported that, through a program of regular inspection and maintenance, seepage losses in the diversion system were minimized, it was unable to provide measurements or estimates documenting the efficiency of the diversion system *Id.* at 27-28 (PDF).

1061. Instead of providing the timeline and budget for developing a plan to address system losses, HC&S stated that any attempt to measure EMI system losses would be impractical, including its estimate that such attempts would cost $15 million to install, $15 million to upkeep and maintain gauges, and $3-4 million to update and replace equipment, supposedly based on USGS estimates. *Id.* at 27-28 (PDF).

1062. The May 2010 CWRM decision included the following adaptive management strategies:

- "EMI, in coordination with the Commission and USGS [U.S. Geological Survey], shall seek to cooperatively fund and undertake a system efficiency study to accurately determine EMI system losses and/or gains;" and
- "HC&S, in coordination with the Commission and USGS, shall undertake a system efficiency study to accurately determine HC&S reservoir system losses."

CWRM Staff Submittal (5/25/10) at 26.

1063. Curiously, a mere two years later, the U.S. Geological Survey (USGS), in cooperation with CWRM and in collaboration with EMI, undertook an investigation aimed at providing measurements of losses and gains in the EMI diversion system that were necessary to address CWRM's order to evaluate system efficiency. Cheng, C.L., USGS Open-File Report 2012-1115 at 2.

1064. In 2012, the USGS reported its measured seepage losses that EMI experiences in its ditch system.[28] *Id.*; *compare,* App. B: Water Lost from the EMI System, CWRM Compilation of Data Submissions, Part II (May 2010) at 27-28 (PDF).

1065. The USGS determined seepage losses and gains for about 52 percent of the 17 miles of open ditches identified. Cheng, C.L., USGS Open-File Report 2012-1115 at 13.

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[28] The USGS measured seepage only in the open ditches of EMI's delivery system.

1066. The USGS took discharge measurements along 26 seepage-run measurement reaches[29] during relatively stable flow conditions in June, August, and September of 2011. *Id.* at 19.

1067. Seepage-loss rates in the EMI diversion system generally ranged from 0.1to 3.0 ft^3/sec/mi, and seepage-gain rates ranged from 0.04 to 5.2 ft^3/sec/mi, with two exceptions along the Ko`olau Ditch outside of the general range of seepage losses, *Id.*:

- K1 - K2 - **11 cfs** loss rate for a 0.26-mile stretch;
- K9 - K10 - **21 cfs** gain rate for a 0.20-mile stretch.

1068. *Id.* at 17.

1069. The USGS observed the heaviest seepage loss rates (>1 cfs) in stretches in the Center Ditch (C3-C4), Ko`olau Ditch (K1-K6; K11-K12), and Lowrie Ditch (L3-L4). *Id.* at 22-23.

1070. The USGS observed moderate seepage loss rates (>0.5 to $\leq$ 1.0 cfs) in stretches in the Ko`olau Ditch (K7-K8), Spreckels Ditch at Pāpa`a`ea (S1-S2; S3-S4) and Ha`ikū Ditch (H1-H2). *Id.* at 22-23.

1071. Discharge measurements in the open-ditch seepage-run measurement reaches—lined and unlined—generally indicated seepage losses, whereas measurements in the tunnel reaches generally indicated seepage gains. *Id.* at 19.

1072. Uncertainties due to possible erroneous readings in the USGS study would require additional measurements to reduce any error. *Id.* at 13. 20.

1073. In spite of this USGS study, which generated partial measurements of loss in stretches of the EMI ditch system, the Commission still has no definitive and comprehensive data on total system loss attributable to seepage covering the entire EMI's ditch system.

1074. However, this Commission concludes that, while this USGS study and EMI estimate are the best information sources available upon which to base its decision, following the precautionary principle, it must demand more definitive information on total system loss of the EMI diversion system.

1075. Separately, HC&S generated multiple, if not disparate, estimates of its plantation irrigation system losses due to seepage and evaporation from its ditches and reservoirs.

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[29] No partially lined open-ditch measurement reaches were selected, because they were limited to very short reaches at diversion intakes and repaired sections of the ditch. Cheng, C.L., USGS Open-File Report 2012-1115 at 19. Wailoa and Kauhikoa Ditches each had only one seepage-run measurement reach and both of them had seepage gains. *Id.*

1076. In one instance, in 2010, HC&S conceded that it experienced an estimated average seepage of 23-31 MGD from the 31 unlined, out of 36, reservoirs used in the irrigation of the East Maui sugar fields. CWRM Compilation of Data Submissions, Part II (May 2010) (May 2010) at 30 (PDF).

1077. Five years later, in lieu of an accurate determination of system loss in the EMI system or the HC&S reservoir as this Commission directed, HC&S' Volner merely estimated that the average annual percentage seepage, evaporation and miscellaneous drip-irrigation system losses (to both surface delivered and groundwater pumped) is 22.7% (41.77 MGD)[30] for the period from 2008 to 2013. Exh. C-137; Volner, Tr. 3/23/15, p. 29, l. 18 to p. 30, l. 9.

1078. Volner provided estimates for a period during which it reports Annual Surface Water Deliveries Averages of 41,505 MG (or 113.71 MGD). Exh. C-137.

1079. Although HC&S' Hew asserted that Volner calculated system loss by measuring input and output of water, there was no supportive documentation of methods or locations of measurements. Hew, Tr. 3/18/15, p. 203, l. 10 to p. 204, l. 12.

1080. Hew then produced a second 2015 estimate of a calculated "hypothetical" range of system losses between 18.2% (33.4 MGD) and 36.9% (67.7 MGD) for the same period 2008-13, during which it reports East Maui Annual Delivery Averages of 67,017 million gallons or 183.48 MGD average for that period. Exh. C-139; Hew WT (2/10/15) at ¶¶12-13; Hew, Tr. 3/18/15, p. 201, l. 19-24; p. 204, l. 15-25 to p. 205, l. 11 (basing calculations on National Engineering Handbook of the U.S. Soil Conservation Service for all surface water from EMI and groundwater pumped from 14 deep wells utilized by HC&S).

1081. Of the range of system loss calculated in C-139, the calculation of system loss attributable to seepage alone, exclusive of evaporation is 16.76% (30.75 MGD) to 35.46% (65.06 MGD). Exh. C-139.

1082. Hence, HC&S calculates that seepage constitutes 92%[31] to 96%[32] of its range of system losses. *Id.*

1083. Furthermore, HC&S calculations reveal that 92%[33] to 94%[34] of system losses are attributable to its unlined reservoirs. *Id.*

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[30] Based on the calculation of 15.206 MG (Col. G in Exh. C-137) divided by 364 days/yr.

[31] 30.75 ÷ 33.4

[32] 35.46 ÷ 36.9.

1084. These system losses represent only a portion of the total system (EMI and HC&S) losses and are separate and apart from EMI's seepage and evaporation losses specific to ditch system operations, which include losses "through the substrate of the ditches and reservoirs and the surface of the water" as depicted in Exhibit C-139. Volner, Tr. 3/23/15, p.31, l.17 to p. 32, l.1.

1085. Using both EMI and HC&S estimates, and the more limited 6-year period metered by HC&S/EMI (114 MGD between 2008-13), the range of combined system loss just attributable to estimated *seepage alone,* exclusive of estimated evaporation, is collectively **43.5** (1.7 + 30.75) MGD to **89.46** (19 + 65.06) MGD. CWRM Compilation of Data Submissions, Part II (May 2010) (May 2010) at 27, 30 (PDF); Exh. C-137, C-139.

1086. Contrasted with the reported 183.48 MGD average deliveries of EMI water collections and HC&S pumped groundwater between 2008-13, the system losses amount to 23.71[35] - 48.76%,[36] using EMI and HCS estimated losses. Exh. C-137; C-139.

1087. In contrast, HC&S claims that its average system loss either averages 22.7%, Exh. C-137, or ranged from 16.76 - 35.46%, or 30.75 - 65.06 MGD, Exh. C-139, in system losses from those combined water sources in the same time period.

1088. EMI/HC&S claims that it minimizes water losses with its repair and maintenance program for EMI ditches, yet acknowledges that lining or concrete could negate much of the seepage it currently experiences.

1089. HC&S estimates it would cost $43.5 million to line all 31 of its unlined reservoirs, but rejects that option because its installation with "endanger a significantly larger and more important source of water that the plantation relies upon, its underground 'reservoirs' or the underlying brackish water aquifers." Compilation of Data Submissions, Part II (May 2010) (May 2010) at 31 (PDF).

1090. In fact, Volner counseled against mitigating losses by lining reservoirs for two reasons: First, he claimed that it would be ineffective because in the summer months, water is not being put into reservoirs, but used directly for irrigation. Volner, Tr. 3/23/15, p. 35, l. 6-19;

1091. Second, without offering an iota of scientific or evidentiary foundation, Volner claimed that "any reduction in seepage from those reservoirs will severely negatively impact our

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[33] 28,451,264 ÷ 30,751,725.
[34] 60,458,936 ÷ 65,059,859.
[35] 43.5 ÷ 183.48.
[36] 89.65 ÷ 183.48.

ability to pump from the ground during the summer months," when groundwater pumping is reduced or curtailed in response to changes in sump and salinity levels. *Id.* at p. 34, l. 25 to p. 36, l. 18.

1092. Volner defends HC&S' failure to reduce its losses - whether by repairing leaky reservoirs, attending to non-existent and/or defective lining, drilling additional wells, and/or ramping up its mitigation/alternative efforts - by arguing that efficiencies will only "reduce the amount of recharge of those underlying aquifers" and, by extension, impair HC&S' ability to pump from the same aquifer. Volner, Tr. 3/23/15, p. 34, l. 25 to p. 36, l. 18.

1093. HC&S estimates its irrigation efficiency, the water that actually reaches the cane plants, at only 89% of the average 132.7 MGD of combined surface and pumped water applied to the East Maui fields from 2008 through 2013. Exh. C-137. Notably, the efficiency factor accounts for system losses between the ditch and the water the crop actually receives.

3. Wasteful use of water (Inflated Irrigation Needs)

1094. As of July 1, 2000, A&B/EMI pays the Department of Land and Natural Resources $158, 283.84 per year to divert and use water from these four areas. *Id.*; *see also*, Exh. C-131, BLNR Tr. 11/14/05, 156:15-19; Exh. C-7, Rev. Permit S-7263; Exh. C-5, Rev. Permit S-7264; Exh. C-9, Rev. Permit S-7265; Exh. C-11, Rev. Permit S-7266.

1095. Instead of valuing the lease of lands from which EMI collects water, the BLNR has been earning a virtual nominal lease amount for EMI's use of an average of 164 MGD (about 59,860,000,000 gallons/year) for the use of 33,000 acres of Crown Lands from which EMI diverts most of its system surface water. Mayer WT (12/30/14) at ¶73; Exh. E-48 at 130, Table 13-8.

1096. At that level of revenue, A&B pays about a quarter of a penny (26.7% of one cent!) per 1,000 gallons of water diverted from over 100 streams and tributaries in East Maui. Mayer WT (12/30/14) at ¶74; Mayer, Tr. 3/30/15 at 112 (14-19).

1097. In contrast, the County of Maui charges its farmer users 75 cents per thousand gallons per day for non-potable water. Mayer, Tr. 3/30/15 at 111 (6-9); Mayer WT (12/30/14) at ¶75.

1098. Thus, the rate charged to any subscriber of agricultural non-potable water for farm use is 288 times more than what A&B/EMI pays for its water from Crown Lands administered by the BLNR. *Id.* at ¶83.

1099. The 75 cents per 1,000 gallons agricultural rate is severely discounted from even higher rates charged to Maui's homeowner customers. *Id.* at ¶75; Exh. E-85; *see, also,* Maui County's website http://www.co.maui.hi.us/index.aspx?NID=216.

1100. This unfounded subsidy removes any and all economic incentives for A&B/EMI to curb its waste and consumption of water resources, and effectively discourages proactive water conservation, such as lining HC&S' current 31 (out of 36) reservoirs. *Id.*; *see also* Mayer WT (12/30/14) at ¶¶73-75.

4. Alternatives

1101. The only short-term alternatives HC&S has looked at for supplying irrigation water are storm water recapture (conceptually) and automating its irrigation system. Volner, Tr. 3/23/15, p. 89, l. 1 to p. 90, l. 12.

1102. HC&S has not pursued with any vigor business models that rely on less surface water. Volner, Tr. 3/23/15, p. 88, l. 15-18.

1103. HC&S has looked at storm water recapture as a potential short term alternative to using diverted surface water from East Maui, i.e., when there are times of very high flows both on the plantation from storm water, from rainfall, that water could be used to recharge the aquifer or to store it for later use. Volner, Tr. 3/23/15, p. 89, l. 1-12.

1104. As of March 2015, the alternative of storm water recapture for HC&S was still in its conceptual phase and HC&S had not yet pursued a regulatory review or made any further effort to explore storm water recapture as an alternative. Volner, Tr. 3/23/15, p. 90, 1-18.

1105. HC&S also looked at automation of its irrigation system to look at trying to make better use of available water. Some automation has been installed on the plantation but HC&S did not provide specific details regarding the cost and potential water savings that could result from further automation. Volner, Tr. 3/23/15, p. 89, l. 13-25.

a. With the Closure of ML&P More Water is Available

1106. In 2005, ML&P was a party to hearings on whether Water Licenses should be issued to EMI for surface waters arising on state lands in East Maui. See DLNR File No. 01-05-MA.

1107. ML&P submitted testimony and exhibits about its use of East Maui water and the agricultural lands to which it was applied. Exh. E-107.

1108. In 2008, Maui Land and Pineapple Company (MLP) cultivated 6,000 acres of pineapple, of which over 2,800 acres are situated in east Maui and relied on EMI for irrigation water. CWRM Staff Submittal (9/24/08) at 32.

1109. ML&P operated the Nahiku Pump and Kuhiwa Well, to pump stream water into the EMI ditches.

1110. ML&P used to withdraw the amount it pumped into the EMI ditch in Nahiku – minus 10% for potential transport losses – to use on its pineapple fields located. *Id.*; Exh. E-107.

1111. ML&P has since discontinued these pineapple operations.

1112. Since ML&P has gone out of business, the Commission finds that the 4.5 MGD can be deducted from any determination of actual need for HC&S.

1113. EMI/HC&S pledged to not use water from water from Kuhiwa Well in the future. Hew, Tr. 3/18/15, p. 165, l. 19 to p. 166, l. 19.

b. HC&S Could Decrease its Dependence on East Maui Water Through Green Harvesting of HC&S Fields

1114. According to Mr. Volner, HC&S "looked at mechanical harvesting" - HC&S' version of "green harvesting" - and concluded that: (1) it "would not reduce the water needs of the crop in any way" because ratooning the crop actually requires an increase in water use; (2) any resulting reduction in soil surface evaporation (SSE) from its use of "trash blankets" or "weed mats" are inconsequential given the existing SSE efficiencies of its drip irrigation system; and (3) because only 16,000 - 17,000 (of the 28,941 "pure crop") acres were (or had the potential to be) suitable for mechanical harvesting, "economies of scale don't allow that business plan to work out." Volner, Tr. 3/23/15, p. 36, l. 19 to p. 41, l. 7.

1115. HC&S introduced no evidence, beyond Volner's conclusory statements, that mechanical harvesting is an alternative too ineffective or cost-prohibitive to mitigate its reliance on its current East Maui surface water usage.

1116. An important new development in cane growing is the replacement of pre-harvest burning by the adoption of green cane harvesting and trash blanketing. Trash blanketing is the spreading of leaves and other plant residue in a thick layer of mulch over the ground. Exhs. E-91 and E-127; Bowie WT (12/30/14) at ¶28.

1117. This practice has worked well on a large scale in growing sugar cane in Australia. It does not reduce productivity or efficiency. *Id.*

1118. The volume of cane harvested green has increased by over 200% in the past 10 years. *Id.*; Exhs. E-91 and E-127.

1119. Studies resulting from sugarcane growers utilizing green harvesting demonstrate that green harvesting does reduce irrigation requirements. Bowie WT (12/30/14) at ¶28. This should

qualify this strategy as a reasonable alternative that must be rigorously investigated. *See* Irene Bowie WT (2/4/15) the Exhibits referenced therein.

1120. HC&S currently green harvests between 4 to 6% of their fields; they have publicly stated they could increase that amount to possibly 20%. Bowie WT (12/30/14) at ¶29.

1121. Increase in green harvesting, especially near residential areas such as Pā'ia and North Kīhei, would not only improve field irrigation efficiencies and lower overall water demand, but it would also lead to better air quality from less field burning and a decrease in fugitive dust due to increased soil moisture from trash blanketing. *Id.*

1122. Because trash blankets helps to prevent evaporation of water from the soil surface and allow better water infiltration, the practice reduces irrigation requirements and produces higher cane yields in drier areas. Bowie WT (12/30/14) at ¶28.

1123. This practice could reduce the plantation's overall water demands or needs. *See,* Exh. E-91.

1124. Mr. Volner testified that HC&S internally discussed a "large reservoir" alternative back in the 1960s, an option limited to a one billion gallon reservoir occupying 3800 acre feet. Volner, Tr. 3/23/15, p. 32, l. 2 to p. 34, l. 24.

1125. HC&S provided no evidence quantifying or assessing the cost of that alternative - monetary or otherwise - or why it concluded that "the return on investment becomes very difficult to justify." *Id.*

1126. As of 1931, HC&S was able to pump 144 mgd of groundwater, or up to 45% of the total irrigation water needed to irrigate the HC&S plantation. Exh. E-92 at 121.

1127. In the County's 1990 Water Use and Development Plan, A&B Inc. described a total acreage of 35,800 in cultivation, with a water need of approximately 130 billion gallons a year (approximately 356.2 mgd). Exhs. E-83 and E-133.

1128. These irrigation needs were met "55% by surface water and 45% by ground water." Exh. E-83, County 1990 Water Use and Development Plan, p. R-2.

1129. In 1996, 55% of HC&S's water needs were met by the Wailoa Ditch System and 45% of these water needs were met by its groundwater wells. Exh. E-110, Third Amendment to Memorandum of Understanding between EMI, BWS, and others, dated January 3, 1996, p.1, HC&S-MTREQUEST-15-0011–0016.

1130. It requires electricity to pump the groundwater up from the wells. This electricity was and is produced by burning bagasse at the Pu'unene Mill. HC&S entered Power Purchase Agreements ("PPA") with Maui Electric ("MECO") to sell electricity generated from burning bagasse at the Pu'unene Mill to MECO. HC&S has found it more profitable to sell electricity to MECO than to devote this electricity to pumping groundwater to irrigate its plantation fields.

1131. As a consequence of this economic decision, HC&S pumps groundwater much less:

> From 2002 to 2004, HC&S received **71 percent** of its water supply from EMI (surface water), while the remaining **29 percent** was supplemental ground water.

Exh. E-63, IFSAR for Honomanu Stream (Sept. 2008) at 132.

1132. This diminished reliance on available but unused groundwater has affected the employees of HC&S. It led to a temporary layoff of 88% of its employees to balance costs against reduced production due to lack of water. Exh. E-111.

1133. The head of the Maui Division of the ILWU Local 142, Willie Kennison, noted that HC&S was not properly pumping its wells (which once provided 45% of their irrigation water) to relieve the irrigation water deficit brought on by drought, and thereby failed to avoid employee layoffs:

> Instead of utilizing their pumps to properly irrigate their fields, they are selling too much electricity to Maui Electric.[37]

Exh. E-111 (Emphasis added).

1134. HC&S may not even be continuing its PPA with MECO because the State of Hawaii is now approving PPAs with third parties that use a fixed price, rather than an avoided cost formula, thereby adversely affecting power revenue for the company. Exh. C-58 at 25 (Attributing a major portion of the $27.8 million loss that HC&S suffered in 2009 to a $16.6 million reduction in power revenues caused by a 50% price decrease due to a change in the formula for avoided cost for public utilities); Exh. E-112 (stating that the PPA could be replaced or renegotiated on less favorable terms and that A&B may consider "decreasing or eliminating" power sales on Maui in the future and instead using the power for field irrigation (Emphasis added.)).

[37] Newspaper Article in Star Bulletin dated December 13, 2008; Exhibit E-111.

1135. If MECO's power supply contract with HC&S ends in 2018, more ground water pumping is warranted to supply HC&S irrigation water. Bowie WT (12/30/14) at ¶26, *citing* Exh. E-90 at 12.

1136. There are an additional six (6) reservoirs located upon EMI property that have a capacity of 267 mgd which could be employed to better manage water supply. CWRM Minutes May 25, 2010, p. 38; Exh. E-60.

c. Economic Impact of Restricting Water Use

1137. HC&S contends that "[c]ontinued reliable access to surface water from East Maui streams for irrigation is critical to maintaining the economic viability of HC&S," such that "further reduction in surface water deliveries from East Maui Irrigation Company (EMI) to HC&S will result in lower sugar yields, and thus, measurably diminish HC&S' ability to achieve the profitability of its operations." HC&S Opening Brief at 3.

1138. A&B/HC&S's own evidence and testimony, which it produced in these proceedings, call into question HC&S' broad statements regarding the economic impacts of reductions in surface water deliveries from East Maui to its bottom line.

1139. For example, HC&S claimed that to remain economically viable, it needed to sustainably achieve a yield of 200,000 tons of sugar annually. Volner, Tr. 3/23/15, p. 56, ll. 6-13; p. 58, ll. 6-21.

1140. However, HC&S' own data confirms that it has obtained those yields only once in the eleven years from 2003-2013, (Exhibit C-77; Volner, Tr. 3/23/15, p. 59, l. 10-16), and that there was only a weak correlation, if any, between its TSA yield and profits because of the "many variables that contribute to [HC&S'] economic success." Volner, Tr. 3/23/15, p. 59, l. 17 to p. 60, l. 15; p. 67, l. 23 to p. 69, l. 10.

1141. One non-water variable that impacts HC&S' bottom line is the price level of sugar, which can affect the profitability of HC&S even when it has access to all the water it supposedly needs.

1142. In fact, HC&S readily admits that its profit-loss performance is intrinsically linked to sugar prices, which have been "trending downward since 2012," HC&S Opening Br. 21, as well as improved agronomic practices. *Id.* at 20.

1143. HC&S explains that their operating loss of $3.8 million in the first three quarters of 2014 (and a decrease in operating profit of $18.1 million compared to the first nine months of 2013) was "primarily due to lower sugar prices and increased cost per ton." *Id.* at 19.

1144. But the pendulum swings the other way, too, as HC&S admits "benefit[ing] from a highly providential spike in raw sugar prices extending from the last quarter of 2009 through the first quarter of 2012." *Id.* at 20-21.

1145. In fact, "[d]ue to the **increase in sugar revenues from higher** total production and **unit pricing**, coupled with the lowering of unit costs attributable to higher production, the agribusiness segment of A&B experienced a return to profitability from 2010 to 2012." *Id.* at 21 (emphases added).

1146. HC&S' estimated incremental value for reductions in water of $1,390 for every million gallons reduced was calculated based on a price of 26 cents per pound. Volner, Tr. 3/23/15, p. 49, l. 23 to p. 54, l. 8.

1147. This price is higher than the price levels in all but three years of the most recent five decade time period. Exh. E-64.

1148. U.S. raw sugar prices have remained relatively stable and flat for over thirty years except for this three-year spike in prices. Exh. C-62 at 5 (PDF).

1149. The prevailing price per pound for sugar was 23 cents per pound in 2014, down from the spike in years 2010-12 when the prices soared from historic lower levels to an artificially high range of 32.53 to 38.46 cents per pound, due to the impact of implementing the North American Free Trade Agreement in 2008. *Id.*; Exh. E-64.

1150. Thus, HC&S' profitability is greatly, if not primarily, dependent on world raw sugar prices.

1151. Improved agronomic practices implemented by HC&S "to cope with the reduced water deliveries resulting from the amended IIFS determinations" have also resulted in improved yields, and by extension improved profits, in 2010 and 2011. *Id.* at 20.

1152. Thus, HC&S enjoyed **increased profitability and productivity in spite of reductions** to their surface water supplies resulting from the prior 2008 and 2010 IIFS amendments. *See Id.* at 18-19.

1153. In other words, HC&S employed greater efficiencies to grow more with less water since the 2008 and 2010 IIFS amendments. *See infra* at 14.

1154. Moreover, HC&S CEO Volner is on record failing to establish an actual figure for what HC&S needs to irrigate its sugar crop. Volner, Tr. 3/23/15, p. 155, l. 19 to p. 157, l. 23 (admitting HC&S has no data to establish its actual need for water to operate a sugar plantation of its size).

1155. On the other hand, another significant variable independent of water availability is the revenues HC&S receives for *power generation* from its hydropower facility, which can significantly affect profitability for HC&S. Exh. C-58 at 26.

1156. For example, HC&S attributes its $12.9 million operational ***loss*** in 2008 "primarily ...to $14.9 million in lower sugar margins that were the result of lower production volumes and higher operating costs than 2007, $1.6 million in lower soil sales, $1.5 million in lower profits from other operations and $1.2 million in lower molasses sales prices, but partially offset by $6.1 million in *higher power revenues* from higher prices). Exh. C-58 at 26.

1157. In comparison, in 2009, HC&S suffered a $27.8 million ***loss*** largely attributable to an $18.8 million *reduction in power revenue* stemming from lower power prices traceable to a 50% reduction in fossil fuel costs and regulatory changes in the formula for avoided costs set by the Public Utilities Commission as well as lower volume sales. *Id.* at 25

1158. In 2010, HC&S received a $4.9 million drought emergency relief payment from the federal government, in recognition of 2008's extremely dry weather conditions, and attributes its profitability that year to this windfall. Volner, Tr. 3/23/15, p. 64, l. 22 to p. 65, l. 4, l.18-23; Volner WT at ¶14.

1159. The discrepancy between HC&S' broad conclusory statements about economic impacts clearly influenced and/or dependent on non-water related variables evidence HC&S' failure to furnish a reasoned basis for its continued use and diversion of East Maui surface water at current levels.

HC&S is Not Investing in a Sugar Plantation Future

1160. Several of HC&S' 10-K statement warn of the possibility of a plantation shutdown under certain conditions over several years. Exhs. C-56 through C-63.

1161. EMI/HC&S have had the benefit of a very cheap supply of water from East Maui. Mayer WT (12/30/14) at ¶¶70-78.

1162. Because they feel entitled to this water, instead of using their electricity to pump groundwater, they over-rely on the cheap water and sell their electricity to MECO. Mayer WT (12/30/14) at ¶¶70-78.

1163. The rock bottom charge BLNR requires EMI to pay for East Maui water distorts optimal allocation of resources by making water so cheap, A&B, EMI and HC&S have no financial incentive, and suffer no monetary penalties, for wasting water. Mayer WT (12/30/14) at ¶78; Mayer, Tr. 3/30/15, p. 127, l. 15-21.

1164. Indeed, if DWS' charges, i.e., 75 cents per 1,000 gallons for non-potable water for agricultural water (approximately 280 times higher) for the water it diverts and uses for power generation and irrigation on the plantation, applied to HC&S/EMI, it would have a huge incentive to stop wasting this public trust asset. Mayer WT (12/30/14) at ¶75. *See*, Maui County's website: http://www.co.maui.hi.us/index.aspx?NID=216

1165. Simultaneously, if the BLNR charged A&B/EMI the County's non-potable agricultural water rate for the diverted water from its Crown Lands, it could generate revenues of about $44,895,000 per year. Mayer WT (12/30/14). ¶76.

1166. Accordingly, over the past 13 years (since this case was originally filed), the State BLNR has subsidized A&B/EMI to the tune of about $581 million.

PROPOSED CONCLUSIONS OF LAW

I. OVERVIEW OF APPLICABLE LAW

A. Water as a Public Trust

1. Under article XI, sections 1 and 7 of the Hawaii Constitution, the public trust doctrine applies to all water resources without exception or distinction. Waiāhole I, 94 Haw. at 133; 9 P.3d at 445.

2. The Hawaii Constitution, in Article XI, Section 7, provides that: "The State has an obligation to protect, control and regulate the use of Hawaii's water resources for the benefit of its people."

3. The declared policy of the State Water Code in HRS §174C-2(a) recognizes that ".... the waters of the State are held for the benefit of the citizens of the State. It is declared that the people of the State are beneficiaries and have a right to have the waters protected for their use."

4. The State "bears an **affirmative duty** to take the public trust into account in the planning and allocation of water resources, and to protect public trust resources whenever feasible." *Id.* at 141, 9 P.3d at 453 (emphasis added).

5. Co-extensive with that affirmative duty, "[t]he public trust compels the state duly to consider the cumulative impact of existing and proposed diversions on trust purposes and to implement reasonable measures to mitigate this impact, including using alternative resources," which "requires planning and decision-making from a global, long-term perspective." *Waiāhole I*, 94 Haw. at 143; 9 P.3d at 455.

6. The public trust mandate is to conserve and protect water resources as well as to use and develop them in a reasonable and beneficial manner: "(T)he State...shall conserve and protect Hawaii's...water...and shall promote the development and utilization of these resources in a manner consistent with their conservation and in furtherance of the self-sufficiency of the State." Hawaii State Constitution, Article XI, § 1.

7. "The state water resources trust thus embodies a dual mandate of 1) protection and 2) maximum reasonable and beneficial use." *Waiāhole I*, 94 Haw. at 139; 9 P.3d at 451.

8. The purposes of the water resources trust are: 1) maintenance of waters in their natural state; 2) domestic water use of the general public; 3) Native Hawaiian and traditional and

customary rights, including appurtenant rights; and 4) reservations of water for Hawaiian home lands. *Kauai Springs, Inc. v. Planning Comm'n of Kaua'i*, 133 Hawai'i 141, 172; 324 P.3d 951, 982 (2014) (*Kaua'i Springs*); *Waiāhole I*, 94 Haw. at 136-138; 9 P.3d at 448-450. *In re Wai'ola o Moloka'i, Inc.*, 103 Haw. 401, at 429, 431, 83 P.3d 664, at 692, 694 (2004) (*Wai'ola*").

9. "In short, the object is not maximum consumptive use, but rather the most equitable, reasonable, and beneficial allocation of state water resources, with full recognition that resource protection also constitutes 'use.'" *Waiāhole I*, 94 Haw. at 140; 9 P.3d at 452.

10. The public trust mandates that "any balancing between public and private purposes must begin with a presumption in favor of public use, access, and enjoyment," *Kauai Springs*, 133 Hawai'i at 173, 324 P.3d at 983, and "establishes use consistent with trust purposes as the norm or 'default' condition." *Waiāhole I*, 94 Haw. at 142, 9 P.3d at 454.

11. Under the public trust,

> [t]he continuing authority of the state over its water resources precludes any grant or assertion of vested rights to use water to the detriment of public trust purposes. This authority empowers the state to revisit prior diversions and allocations, even those made with due consideration of their effect on the public trust.

Waiāhole I, 94 Haw. at 141, 9 P.3d at 453 (citations omitted).

12. The Commission "may compromise public rights in the resource pursuant only to a decision made with a level of openness, diligence, and foresight commensurate with the high priority these rights command under the laws of our state." *Waiāhole I*, 94 Haw. at 143, 9 P.3d at 455.

13. "(W)hile the state water resources trust acknowledges that private use for 'economic development' may produce important public benefits and that such benefits must figure into any balancing of competing interests in water, it stops short of embracing private commercial use as a protected 'trust purpose" *Kauai Springs*, 133 Hawai'i at 173; 324 P.3d at 983

14. "(I)f the public trust is to retain any meaning and effect, it must recognize enduring public rights in trust resources separate from, and superior to, the prevailing private interests in the resource at any given time." *Waiāhole I*, 94 Haw. at 138; 9 P.3d at 450.

15. "(I)nsofar as the public trust, by nature and definition, establishes use consistent with trust purposes as the norm or 'default' condition...it effectively prescribes a 'higher level of

scrutiny' for private commercial uses...[which] [i]n practical terms, ... means that the burden ultimately lies with those seeking or approving such uses to justify them in light of the purposes protected by the trust." *Waiāhole I*, 94 Haw. at 142; 9 P.3d at 454; *Kaua`i Springs*, 133 Hawai'i at 173, 324 P.3d at 983.

16. An agency's decision should be reasonably clear since "clarity in the agency's decision is all the more essential . . . where the agency performs as a public trustee and is duty bound to demonstrate that it has properly exercised the discretion vested in it by the constitution and the statute." *Kauai Springs*, 133 Hawai'i at 173-74; 324 P.3d at 983-84, citing *Waiāhole I*, 94 Hawai'i at 158, 9 P.3d at 470 (quotation marks omitted).

B. Legal Context

Common Law

17. The East Maui region from which the 27 streams that are the subject of petitions for amendments to IIFS is not designated a water management area under HRS 174C-48.

18. Outside a water management area, the common law governs the allocation of available water resources and diversions are subject to the controlling common law. *Ko'olau Agric. Co. v. Comm'n on Water Res. Mgmt.*, 83 Haw. 484, 491; 927 P.2d 1367, 1374 (1996) (holding that in WMAs, the permitting provisions of the Code prevail; water rights in non-designated areas are governed by the common law); *See,* HRS § 174C-49(c) (establishing statutory power to supercede common law in a water management area once designated).

19. Diversion of surface water outside the watershed of origin will be restrained if the out-of-watershed diversion detrimentally affects superior water rights and, therefore, the diversion's "continuing use should be contingent upon a demonstration that such use will not harm the established rights of others." *Reppun v. Board of Water Supply,* 65 Haw. 531, 554; 656 P.2d 57, 72 (1982) (*Reppun*); *Robinson*, 65 Haw. at 649-50 & n.8, 658 P.2d at 295 & n.8.

20. NHLC and MT have advocated both appurtenant and riparian rights in streams that are the subject matter of the Petitions. Nā Moku Opening Brief 17-18, 29-34, 44-47.

21. The State Constitution and Water Code reaffirm and protect appurtenant rights. Haw. Const., art. XII, §7; Haw. Rev. Stat. §§174C-2(c), -63, and -101(c-d). *See also Waiāhole I*, 94 Haw. at 137 n. 34; 9 P.3d at 449, n. 34 ("The trust's protection of traditional and customary rights also extends to the appurtenant rights recognized in *Peck*.").

22. The Commission is affirmatively directed to protect appurtenant rights as a public trust purpose. *Waiāhole I*, 94 Haw. at 137 & n.34, 9 P.3d at 449 & n.34.

23. The Code expressly preserves appurtenant rights and states that nothing therein "shall be construed to deny the exercise of an appurtenant right by the holder thereof at any time." Haw. Rev. Stat. § 174C-63.

24. The Commission is mandated to "determine appurtenant water rights, including quantification of the amount of water entitled to by that right, which determination shall be valid for purposes of" the Code. Haw. Rev. Stat. § 174C-5(15).

25. The trust's protection of traditional and customary rights also extends to the appurtenant rights," *Waiāhole I*, 94 Haw. at 137 n. 34; 9 P.3d at 449, n. 34, which may be used for any purpose

> Originally the water was wanted mainly for the cultivation of kalo and more recently for cane. If land has a water right, it will not be contended that the water shall be used forever for the same crop, be it kalo or cane. It may be used for any purpose which the owner may deem for his interest, always taking care that any change does not affect injuriously the rights of others.

Peck v. Bailey, 8 Haw. 658 at 655 (1867).

26. "Appurtenant water rights are rights to the use of water utilized by parcels of land at the time of their original conversion into fee simple land." *Reppun v. Board of Water Supply*, 65 Haw. 531, 551, 656 P.2d 57, 71 (1982)."[A]ppurtenant water right[s] to taro land attached to the land when title was confirmed by the Land Commission Award and title conveyed by the issuance of Royal Patent." *McBryde*, 54 Haw. at 190, 504 P.2d at 1340; *see also Territory v. Gay*, 31 Haw. 376, 383 (1930); *Reppun v. Board of Water Supply*, 65 Haw. 531, 551, 656 P.2d 57, 71 (1982). .

27. "It is the general law of this jurisdiction that when land allotted by the Mahele was confirmed to the awardee by the Land Commission and/or when Royal Patent was issued based on such award, such conveyance of the parcel of land carried with it the appurtenant right to water for taro growing." *McBryde Sugar Co. v. Robinson*, 54 Haw. 174, 188, 504 P.2d 1330, 1339 (1973).

28. "Appurtenant water rights are incidents of land ownership," that constitute "an easement in favor of the property with an appurtenant right as the dominant estate." *Reppun*, 65

Haw. at 551, 656 P.2d at 70-71 (internal brackets omitted); *see also Peck v. Bailey*, 8 Haw. 658, 661-62 (1867).

29. "[A]ppurtenant water right[s] to taro land attached to the land when title was confirmed by the Land Commission Award and title conveyed by the issuance of Royal Patent." *McBryde*, 54 Haw. at 190, 504 P.2d at 1340; *see also Territory v. Gay*, 31 Haw. 376, 383 (1930).

30. Terms commonly used to describe kalo land include "aina kalo" and "loikalo," and cultivated land is often described as "aina mahi." *Gay*, 31 Haw. at 383.

31. Appurtenant rights attached to po'alima, or lo'i kalo that were farmed by the people for the konohiki, at the time of the Māhele. *Davis v. Afong*, 5 Haw. 216, 221 (1917); A Dictionary of Hawaiian Legal Land-Terms, p. 93; see also *Judd v. Kuanalewa*, 6 Haw. 329 (1882); *Hapai v. Brown*, 21 Haw. 499, 503 (1913).

32. Access to stream water through an `auwai is a customary Hawaiian practice under Haw. Rev. Stat. § 1-1. *Reppun*, 65 Haw. at 539, 656 P.2d at 63.

33. "[T]he right to the use of water acquired as appurtenant rights may only be used in connection with that particular parcel of land to which the right is appurtenant[.]" *McBryde Sugar Co. v. Robinson*, 54 Haw. 174, at 191, 504 P.2d 1330, at 1341 (1973); *aff'd on rehearing*, 55 Haw. 260, 517 P.2d at 1340; *see also Territory v. Gay*, 31 Haw. 376, at 383 (1930); *aff'd*, 52 F.2d 356 (9th Cir. 1931); *cert. denied*, 284 U.S. 677 (1931) ("*Territory v. Gay*").

34. "(W)hile the proper measure of those rights is indeed the quantum of water utilized at the time of the Māhele, requiring too great a degree of precision in proof would make it all but impossible to ever establish such rights." When "the same parcel of land is being utilized to cultivate traditional products by means approximating those utilized at the time of the Māhele, there is sufficient evidence to give rise to a presumption that the amount of water diverted for such cultivation sufficiently approximates the quantity of the appurtenant water rights to which that land is entitled." *Reppun*, 65 Haw. at 554, 656 P.2d at 72.

35. Appurtenant rights are "superior" to other riparian uses. *Reppun*, 65 Haw. at 551, 656 P.2d at 71.

36. Riparian water rights are protected or "assured" by the Hawaii Constitution in Article XI, Section 7.[1]

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[1] Article XI, Section 7 of the Hawaii Constitution provides, in pertinent part: "The legislature shall provide for a water resources agency which ... shall ... establish criteria for

37. Riparian rights in Hawaii are the product of the people's statutory rights to "flowing" and "running" water currently embodied in HRS 7-1 (1976). *Reppun v. Board of Water Supply*, 65 Haw. 531, 549 (1982).

38. The riparian water rights of HRS 7-1 were established to enable tenants of ahupua`a to make productive use of their lands. *Id.*

39. Thus, the water rights provided in HRS 7-1 are limited by the purposes for their establishment. *Id.* at 550.

40. Riparian water rights were not intended to be, and cannot be severed from the land in any fashion as their sole purpose is to make tenants' lands productive. Id.

41. "No riparian proprietor can lessen [appurtenant] rights." Peck, 8 Haw. at 664.

42. "[T]he continuing use of the waters of the stream by the wrongful diversion should be contingent upon a demonstration that such use will not harm the established rights of others." Reppun, 65 Haw. at 554, 656 P.2d at 72; Robinson v. Ariyoshi, 65 Haw. 641, 650 n.8, 658 P.2d 287, 295 n.8 (1982).

43. Diversion of surface water outside the watershed of origin will be restrained if the out-of-watershed diversion detrimentally affects superior water rights. Robinson, 65 Haw. at 649-50 & n.8, 658 P.2d at 295 & n.8.

44. NHLC clients have established that they continue to exercise the traditional and customary practices that their ancestors once followed by gathering the natural foods that rely on freshwater streamflow, like ʻoʻopu, ʻopae, and hīhīwai from the streams identified in Nā Moku's petitions, as well as marine foods, including fish, crustaceans, and limu from the shoreline fed by those streams.

45. Therefore, they possess constitutional and statutory rights to have the uses described above reasonably protected.

46. NHLC and MT also advocate the protection of the following uses recognized in HAR §13-169-2 as "Instream use[s]." HAR §13-169-2 defines "Instream use" as:

47. .... beneficial uses of stream water for significant purposes which are located in the stream and which are achieved by leaving the water in the stream. Instream uses include, but are not limited to:

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water use priorities while assuring appurtenant rights and existing correlative and riparian uses ...."

(1) Maintenance of aquatic life and wildlife habitats;

(2) Outdoor recreational activities;

(3) Maintenance of ecosystems and estuaries, wetlands, and stream vegetation;

(4) Aesthetic values such as waterfalls and scenic waterways;

....

(7) Maintenance of water quality; ....[and]

(8) The conveyance of irrigation and domestic water supplies to downstream points of diversion.

48. Maui Tomorrow and its supporters advocate the above listed "Instream uses" but do not advocate those that have not been listed, namely: "(5) Navigation and (6) Instream hydropower generation.

Instream Flow Standards

49. In establishing interim instream flow standards, the Water Code requires that:

> (C) A petition to adopt an interim instream flow standard under this section shall set forth data and information concerning the need to protect and conserve beneficial instream uses of water and any other relevant and reasonable information required by the commission;
> (D) In considering a petition to adopt an interim instream flow standard, the commission shall weigh the importance of the present or potential instream values with the importance of the present or potential uses of water for noninstream purposes, including the economic impact of restricting such uses;

. . .

> (F) Interim instream flow standards may be adopted on a stream-by-stream basis or may consist of a general instream flow standard applicable to all streams within a specified area;

HRS § 174C-71(2).

50. In contrast, the Code establishes the following standards for establishing *permanent* instream flow standards:

> Each instream flow standard shall describe the flows necessary to protect the public interest in the particular stream. Flows shall be expressed in terms of variable flows of water necessary to protect adequately fishery, wildlife, recreational, aesthetic, scenic, or other beneficial instream uses in the stream in light of existing and potential water developments including the economic impact of restriction of such use. (Emphasis added.) HRS §174C-71(1)(C)

> In formulating the proposed standard, the commission shall weigh the importance of the present or potential instream values with the importance of the present or potential uses of water from the stream for noninstream purposes, including the economic impact of restriction of such uses. In order to avoid or minimize the impact on existing uses of preserving, enhancing, or restoring instream values, the commission shall consider physical solutions, including water exchanges, modifications of project operations, changes in points of diversion, changes in time and rate of diversion, uses of water from alternative sources, or any other solution. HRS §174C-71(1) (E)

51. "'Instream flow standard' means a quantity of water or depth of water which is required to be present at a **specific** location in a stream system at certain specified times of the year to protect fishery, wildlife, recreational, aesthetic, scenic, and other beneficial instream uses." HRS §174C-3.

52. The IFS is the surface water corollary to the groundwater "sustainable yield" in that both "perform the function of guiding water planning and regulation by prescribing responsible limits to the development and use of public water resources." *In re Water Permit Applications*, 94 Haw. 97, at 148; 9 P.3d 409, at 460 (2000)("*Waiahole I*").

53. An instream flow standard (IFS) is a level of streamflow that must be present in the stream twenty-four (24) hours per day, seven (7) days a week, i.e., a level that must be met at the particular IIFS measuring location prior to any diversions of water for offstream use from that stream. FOFs___

54. "Interim instream flow standard" (IIFS) means "a temporary instream flow standard of immediate applicability, adopted by the commission without the necessity of a public hearing, and terminating upon the establishment of an instream flow standard." HRS §174C-3.

55. "[T]he Commission must designate IFSs as early as possible, during the process of comprehensive planning, and particularly before it authorizes offstream diversions potentially detrimental to public instream uses and values." *Waiāhole I*, 94 Haw. at 148, 9 P.3d at 460. *See also id.* at 190 n.108, 9 P.3d at 502 n.108 (emphasizing that the Commission must "investigate, plan, and provide for instream flows as soon as possible"); *Id.* at 156, 9 P.3d at 468 (affirming that the Commission must determine IFSs "first").

56. The methodology of establishing IFSs outlined by the Commission begins with investigating and evaluating instream flows first. *Id.* at 153 n.56, 9 P.3d at 465 n.56.

57. Existing uses are not automatically "grandfathered" under the Constitution and Code. Waiāhole I, 94 Haw. at 149, 9 P.3d at 461.

58. Ultimately, "the Commission may reclaim instream values to the inevitable displacement of existing offstream uses." Id.

59. "Instream use" means beneficial uses of stream water for significant purposes which are located in the stream and which are achieved by leaving the water in the stream. Instream uses include, but are not limited to: (1) Maintenance of fish and wildlife habitats; (2) Outdoor recreational activities; (3) Maintenance of ecosystems such as estuaries, wetlands, and stream vegetation; (4) Aesthetic values such as waterfalls and scenic waterways; (5) Navigation; (6) Instream hydropower generation; (7) Maintenance of water quality; (8) The conveyance of irrigation and domestic water supplies to downstream points of diversion; and (9) The protection of traditional and customary Hawaiian rights. HRS §174C-3.

60. "Noninstream use" means the use of stream water that is diverted or removed from its stream channel and includes the use of stream water outside of the channel for domestic, agricultural, and industrial purposes. HRS §174C-3.

61. The precautionary principle requires the Commission to utilize the best information available to protect streams:

> Where scientific evidence is preliminary and not yet conclusive regarding the management of fresh water resources which are part of the public trust, it is prudent to adopt "precautionary principles" in protecting the resource. That is, where there are present or potential threats of serious damage, lack of full scientific certainty should not be a basis for postponing effective measures to prevent environmental degradation. "Awaiting for certainty will often allow for only reactive, not preventive, regulatory action." In addition, where uncertainty exists, a trustee's duty to protect the resource mitigates in favor of choosing presumptions that also protect the resource.

Waiāhole I, 94 Haw. 97, 154; 9 P.3d 409,466 (2000).

62. As the Waiāhole I Court stated:

> Uncertainty regarding the exact level of protection necessary justifies neither the least protection feasible nor the absence of protection. . . . although interim standards are merely stopgap measures, they must still protect instream values to the extent practicable.

Id. at 155, 9 P.3d at 467.

63. As the Hawai`i Supreme Court ruled:

> In furtherance of its trust obligations, the Commission may make reasonable precautionary presumptions or allowances in the public interest. The Commission may still act when public benefits and risks are not capable of exact

> quantification. At all times, however, the Commission should not hide behind scientific uncertainty, but should confront it as systematically and judiciously as possible -- considering every offstream use in view of the cumulative potential harm to instream uses and values and the need for meaningful studies of stream flow requirements. We do not expect this to be an easy task. Yet it is nothing novel to the administrative function or the legal process in general.

Id. at 159, 9 P.3d at 471.

64. Indeed, the Commission must consider providing reasonable "margins of safety" for instream trust purposes when amending IIFS. *Waiāhole I*, 94 Hawai'i at 156, 9 P.3d at 468.

65. In the instant case, the uncertainties of stream studies are due in part to the inability of the USGS to obtain the cooperation of A&B/HC&S to conduct controlled releases in the streams studied.

66. EMI has chosen to restrict the extent of its diversions with only limited and collective metering of actual flows diverted from the East Maui streams affected by EMI diversions by measuring flows in the 4 major EMI ditches on Honopou Stream representing the cumulative diverted flow from all streams to the east of those locations. [CK1]

67. Moreover, EMI refused to abide by the USGS request for controlled releases so the USGS researchers could test the accuracy of its model's natural streamflow predictions by actually observing actual streamflow in its undiverted state.

68. Consequently, this Commission gives no weight to any A&B/HC&S criticism of the Commission's reliance on USGS' modelling to amend the IIFS for the affected streams as unreliable or imprecise, because the very uncertainties of which A&B/HC&S complain are of their own making.

69. Rather, this Commission concludes that the USGS modeling predictions of what constitutes levels of undiverted natural flow in any particular stream is the best objective information available and best estimates the undiverted natural flow of each respective stream..

70. Accordingly, the Commission may rely on the USGS predicted natural flow in determining what level of streamflow restoration best meets the criteria for the protection of each of the instream values identified in HRS § 174C-71(1) and (2).

C. Traditional and Customary Rights

71. The State Constitution and Water Code reaffirm and protect traditional and customary Native Hawaiian practices. Haw. Const., art. XII, §7 ; Haw. Rev. Stat. §§174C-2(c), -63, and -101(c-d).

72. Article XII, §7 of the Hawaii Constitution expressly provides:

> The State reaffirms and shall protect all rights, customarily and traditionally exercised for subsistence, cultural and religious purposes and possessed by ahupua'a tenants who are descendants of native Hawaiians who inhabited the Hawaiian Islands prior to 1778, subject to the rights of the State to regulate such rights."

Haw. Const. art. XII, §7.

73. HRS §174C-2(c), in pertinent part, requires that: ".... adequate provision shall be made for the protection of traditional and customary Hawaiian rights, the protection and procreation of fish and wildlife, the maintenance of proper ecological balance and scenic beauty ...."

74. The Hawai'i Water Code also explicitly protects Native Hawaiian traditional and customary rights. HRS § 174C-101(c) provides:

> Traditional and customary rights of ahupua'a tenants who are descendants of native Hawaiians who inhabited the Hawaiian Islands prior to 1778 shall not be abridged or denied by this chapter. Such traditional and customary rights shall include, but not be limited to, the cultivation or propagation of taro on one's own kuleana and the gathering of hihiwai, opae, o`opu, limu, thatch, ti leaf, aho cord, and medicinal plants for subsistence, cultural, and religious purposes.

See also HRS § 174C-101(d) ("The appurtenant water rights of kuleana and taro lands, along with those traditional and customary rights assured in this section, shall not be diminished or extinguished by a failure to apply for or to receive a permit under this chapter.").

75. Indeed, Native Hawaiian traditional and customary rights are a protected public trust purpose. *See id.* at 137, 9 P.3d at 449 ("[W]e continue to uphold the exercise of Native Hawaiian and traditional and customary rights as a public trust purpose."); *see also Kauai Springs, Inc. v. Planning Comm 'n of the Cty of Kaua'i*, 2014 Haw. LEXIS 104, *94 (2014) ("[T]he public trust protects the use of water in 'the exercise of Native Hawaiian and traditional and customary rights[.]").

76. The Court "has stressed that the rights of native Hawaiians are a matter of great public concern in Hawaii." *Ka Pa'akai o Ka 'Aina v. Land Use Comm'n*, 94 Haw. 31, 42, 7 P.3d 1068, 1079 (2000) ("*Ka Pa'akai*").

77. Accordingly, "the State is obligated to protect the reasonable exercise of customarily and traditionally exercised rights of Hawaiians to the extent feasible." *PASH*, 79 Hawai'i at 450 n.43, 903 P.2d at 1271 n.43. To this end, the Commission has "an affirmative duty" to "protect these rights and to prevent any interference with the exercise of these rights." *Nā Wai 'Ehā*, 128 Hawai'i at 247, 287 P.3d at 148.

78. State agencies, including the Commission, "may not act without independently considering the effect of their actions on Hawaiian traditions and practices." *Ka Pa'akai*, 94 Hawai'i at 46, 7 P.3d at 1083 (citing *PASH*, 79 Hawai'i at 437, 903 P.2d at 1258).

79. In *Ka Pa'akai,* the Hawai'i Supreme Court introduced an analytical framework to which agencies are bound when balancing their obligation to protect traditional and customary practices against private property interests. Indeed, a government agency must -- at a minimum -- make specific findings and conclusions as to the following:

> (1) the identity and scope of "valued cultural, historical, or natural resources" in the . . . area, including the extent to which traditional and customary native Hawaiian rights are exercised in the petition area; (2) the extent to which those resources -- including traditional and customary native Hawaiian rights -- will be affected or impaired by the proposed action; and (3) the feasible action, if any, to be taken. . . to reasonably protect native Hawaiian rights if they are found to exist.

Id. at 47, 7 P.3d at 1084.

80. Thus, the *Nā Wai 'Ehā* court held that that the Commission has specific duties under *Ka Pa'akai* and is legally obligated to specifically address "the effect of the amended IIFS on the native Hawaiian practices" and/or "explain[] the feasibility of protecting the practices." *Na Wai 'Ehā*, 128 Hawai'i at 248, 287 P.3d at 149.

81. Fresh water is "fundamental to the exercise of traditional and customary practices" and "essential" to their perpetuation. FOF ____.

82. "[A]lthough interim stream standards are merely stopgap measures, they must still protect instream values to the extent practicable. . . . Notwithstanding their temporary effect, therefore, interim standards must still provide meaningful protection of instream uses." *In the*

Matter of Water Use Permit Applications, 105 Hawai`i 1, 11, 93 P.3d 643, 653 (2004) ("*Waiāhole II*")

83. Traditional and customary rights cannot be abandoned, and are guaranteed even if the practice has not been continually practiced in an area. *Public Access Shoreline Haw. v. Hawai'i Planning Comm'n*, 79 Haw. 425, at 450,903 P.2d 1246, at 1271 (1995) ("*PASH*").

84. Additionally, the Hawai'i Supreme Court has explicitly held that the exercise of traditional and customary rights "may extend beyond the ahupua`a in which a native Hawaiian resides where such rights have been customarily and traditionally exercised in this manner." *Pele Defense Fund v. Paty*, 73 Haw. 578, 620, 837 P.2d 1247, 1272 (1992); *PASH*, 79 Haw. at 448, 903 P.2d at 1269.

85. Adequate provision for taro growing, fishing, and gathering from streams, which themselves depend on annual, mauka to makai streamflow connectivity at levels sufficient to protect the resource and support a thriving biota. *See* HRS §174C-71.

86. Such provisions promote public trust purposes and must be satisfied ***before*** the weighing of instream and offstream values in the manner urged by HC&S and the County.

87. Access to stream water through an `auwai is a customary Hawaiian practice under Haw. Rev. Stat. § 1-1. Reppun, 65 Haw. at 539, 656 P.2d at 63.[CK2]

88. Pursuant to Haw. Const., Article XII, §7, the State of Hawai'i is under an obligation to protect the rights of those, like Nā Moku members, who engage in, or seek to engage in, the traditional and customary practices of their Hawaiian ancestors to gather 'o'opu, `opae, and hihiwai from streams and to fish and gather limu along the coastlines fed by those streams.

86. HC&S has not provided any contrary evidence to rebut the overwhelming evidence NHLC clients submitted to establish this reliance on traditional and customary practices for the regular sustenance of the families and communities involved.

87. The DWS has conceded that it supports the protection of East Maui streams as a matter of policy in its Opening Brief, and are open to a reduction on its current heavy reliance on surface water to supply domestic water to its Upcountry subscribers.

D. Offstream Uses

1. Reasonable - Beneficial Standard

88. The reasonable-beneficial standard incorporates the best features of both reasonable use and beneficial use and "demand[s] examination of the proposed use not only standing alone, but also in relation to other public and private uses and the particular water source in question," which includes "the public interest in stream flows." *Waiāhole I,* 94 Haw. at 160-61, 9 P.3d at 472-73.

89. The "maximum reasonable-beneficial use" mandate does not require "maximum consumptive use, but rather the most equitable, reasonable, and beneficial allocation of state water resources, with full recognition that resource protection also constitutes 'use'". *Waiāhole I,* 94 Haw. at 139-40, 9 P.3d at 451-52.

90. After an IIFS has been established, water available over the amount that must remain in the stream is available for offstream uses. However, water not actually put to reasonable-beneficial use would be wasted and must remain in the streams. *Waiāhole I,* 94 Haw. at 118, 156, 9 P.3d at 430, 468.

91. The mandate of "maximum reasonable-beneficial use" is part of the constitutional public trust doctrine. *Waiāhole I,* 94 Haw. at 138-40, 9 P.3d at 450-52.

92. The Water Code requires, inter alia, that the applicant prove that the proposed use of water is a "reasonable-beneficial use" and is "consistent with public interest." HRS § § 174C-49(a)(2) and (4) (1993).

93. "Reasonable-beneficial use" is defined in the Water Code as "the use of water in such a quantity as is necessary for economic and efficient utilization, for a purpose, and in a manner which is both reasonable and consistent with the state and county land use plans and public interest." HRS § 174C-3 (1993) (emphasis added); *Waiāhole I,* 94 Hawai`i at 161, 9 P.3d at 473. (quoting Haw. Rev. Stat. § 174C-3) (Court's emphasis). ..

94. The Commission is to "weigh competing public and private water uses on a case-by-case basis, according to any appropriate standards provided by law" and "accommodating both instream and offstream uses where feasible." *Waiāhole I,* 94 Haw. at 143; 9 P.3d at 455.

2. Actual Need

95. Offstream users must prove their actual water needs. *In re Waiāhole Ditch Combined Contested Case Hr'g,* 105 Haw. 1 at 21, 93 P.3d 643, at 663 (2004) ("*Waiāhole II*").

96. Each *offstream* user must prove that each specific use is reasonable-beneficial by providing details on "acres to be used, the crops to be planted, and the water needed as to each group." *Waiāhole II* 105 Haw. at 25, 93 P.3d at 667.

97. Absent such basic information, an offstream user cannot meet its legal burden. *Id.* at 26, 93 P.3d at 668.

86. Offstream diverters like Alexander & Baldwin ("A&B")/East Maui Irrigation ("EMI")/HC&S and the County "must still demonstrate their actual needs and, within the constraints of available knowledge, the propriety of draining water from public streams to satisfy those needs." *Waiāhole II*, 105 Hawai`i at 15-16, 93 P.3d at 657-58 (citing *Waiāhole I*, 94 Hawai`i at 162, 9 P.3d at 474).

87. In an IIFS proceeding,[3] this Commission is obligated to insist that a diverter of surface water carry its burden to prove that its use is reasonable beneficial, which required it to affirmatively demonstrate its actual water need and the absence of practicable mitigating measures, including the use of alternative sources of water. *Waiāhole II*, 105 Haw. at 15-16, 93 P.3d at 657-5; *Nā Wai Eha,* 128 Haw. at 258; 287 P.3d at 159 (holding that Commission erred when it imposed same burden as in permit proceeding on the diverting parties in the IIFS contested case hearing, where Commission instead has burden to set an IIFS to "protect instream values to the extent practicable."), *citing Waiāhole II*, 105 Hawai'i at 11, 93 P.3d at 653; HRS § 174C-71(2)(A).

88. If offstream users fail affirmatively to meet their burden of proving reasonable-beneficial use, "the Water Commission's analysis should ... cease[]." *Waiāhole II,* 105 Haw. at 16, 93 P.3d at 658.

3. Alternatives

89. Besides advocating the social and economic utility of their proposed uses, offstream users "must also demonstrate the absence of practicable mitigating measures, including the use of alternative water sources. Such a requirement is intrinsic to the public trust, the statutory instream use protection scheme, and the definition of 'reasonable-beneficial' use, and is an essential part of any balancing between competing interests. *Waiahole II*, 105 Haw. at 15; 93 P.3d at 657, *citing Waiahole I*, 94 Haw. at 161, 9 P.3d at 473 (citation omitted) (emphasis added); *Kauai Springs*, 133 Hawai'i at 173, 324 P.3d at 983.

90. An alternative is practicable if it is available and capable of being used after taking into consideration cost, existing technology, and logistics. *Waiāhole II*, 105 Haw. at 19, 93 P.3d at 661.

91. An applicant's inability to afford an alternative source of water, standing alone, does not render that alternative impracticable. *Waiāhole II*, 105 Haw. at 19, 93 P.3d at 661.

92. The Commission "is not obliged to ensure that any particular user enjoys a subsidy or guaranteed access to less expensive water sources when alternatives are available and public values are at stake." *Waiāhole I*, 94 Haw. at 165, 9 P.3d at 477.

93. Stream protection and restoration need not be the least expensive alternative for offstream users to be practicable from a broader, long-term social and economic perspective.

94. The burden is on offstream users to prove that no practical alternative sources of water exist and to make a strong showing that any reasonable alternatives are not practical. *Waiāhole II*, 105 Haw. at 11, 93 P.3d 643, 653 (2004).

95. The public trust mandates this Commission to "implement reasonable measures to mitigate the impact of offstream diversions, including the use of alternative sources of water." *Waiāhole I*, 94 Haw. at 143, 9. P.3d at 455.

96. HC&S and the County must identify the alternatives to depleting East Maui resources, and the reason each alternative is practicable or not, in light of the value of the use and any resulting harm to the resource and the public interest.[2] *Waiāhole I*, 94 Haw. at 160-61, 9 P.3d at 472-73; *see also Waiāhole II*, 105 Hawai`i at 17, 93 P.3d at 659.

97. A proper alternative-analysis determines "whether the alternative is available and capable of being utilized after considering cost, technology, and logistics in light of the overall water planning process." *Waiāhole II*, 105 Hawai`i at 19, 93 P.3d at 661.

98. The objective here is "to avoid or minimize the impact on existing uses of preserving, enhancing, or restoring instream values [by] . . . consider[ing] physical solutions, including water exchanges, modifications of project operations, changes in points of diversion, changes in time and rate of diversion, uses of water from alternative sources, or any other solution[.]" *See* HRS §174C-71(1)(E).

4. Losses

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[2] As the *Waiāhole II* Court concluded:

> [I]nasmuch as the Water Commission entered no FOFs or COLs as to whether Campbell Estate satisfied its burden of establishing that no practicable alternatives existed, we remand the matter for further proceedings relating thereto. If the Water Commission enters findings that Campbell Estate satisfied its burden, the Water Commission must clearly articulate the alternatives presented by Campbell Estate and its analysis of those alternatives in determining whether each alternative is practicable, together with proper citations to the record.

105 Hawai`i at 17, 93 P.3d at 659.

99. Even if the impact of using a public trust resource is found to be reasonable and beneficial, then in light of the cumulative impact of existing and proposed diversions on trust purposes, the applicant must implement reasonable measures to mitigate this impact. *Kauai Springs*, 133 Hawai'i at 173, 324 P.3d at 983, citing *Waiāhole I*, 94 Hawai'i at 143, 161, 9 P.3d at 455, 473.

100. Water not actually put to reasonable-beneficial use must remain in the streams to avoid unlawful waste. *Waiāhole I*, 94 Haw. at 156, 9 P.3d at 468.

101. Offstream users have the burden to prove that any system losses are reasonable-beneficial by establishing the lack of practicable mitigation measures, including repairs, maintenance, and lining of ditches and reservoirs. *Waiāhole I*, 94 Haw. at 172-73, 9 P.3d at 484-85; *Waiāhole II*, 105 Haw. at 27, 93 P.3d at 669.

102. Offstream users, and ultimately the Commission, must account for water lost or missing by adopting "provisions that encourage system repairs and limit losses." *Waiāhole II*, 105 Haw. at 27, 93 P.3d at 669.

II. RESTORATION OF STREAM FLOWS TO EAST MAUI STREAMS

103. In terms of both the sheer volume of water at issue and the economic importance of the offstream uses potentially curtailed, the interests at stake in East Maui far exceed the interests at stake in either Waiāhole or Nā Wai 'Ehā. HC&S letter to CWRM (6/10/08) in Compilation of Public Review Comments (Sep. 2008).

104. Upon taking action in September 2008, this Commission adopted various short-, mid-, and long-term adaptive management strategies to implement its IIFS decision, directing its staff in part to "assess the implementation of these strategies on an as-needed basis, as may be necessary upon consultation with the affected parties."

105. This Commission concludes on this record that various taro farmers and cultural practitioners dependent on natural streamflow did not benefit from this particular aspect of the implementation of IIFS amendments due to a lack of staff resources to adequately monitor both compliance with these amended flow standards and the failure to timely assess the adequacy of the amended IIFS as required under the adopted AMS.

106. The AMS was central and critical to the implementation of the IIFS amendments. *See, supra,* Section III.E.1.

107. The Commission notes that these omissions are critical, especially when the combined effect of flows lower than the IIFS levels seriously impacted the ability of taro farmers to grow taro and stream gatherers and fishers to benefit from the restoration of flows intended by the Commission in amending those IIFS.

A. PROTECTION OF INSTREAM VALUES

108. "Instream use" means beneficial uses of stream water for significant purposes which are located in the stream and which are achieved by leaving water in the stream. COL __, *supra.*

109. In this CCH, such beneficial uses include:

a. maintenance of fish and wildlife habitats, FOF ___;

b. maintenance of ecosystems such as estuaries, wetlands, and stream vegetation, FOF___;

c. aesthetic values such as waterfalls and scenic waterways, FOF __;

d. outdoor recreational activities, FOF __;

e. conveyance of irrigation and domestic water supplies to downstream points of diversion, FOF __;

f. protection of traditional and customary Hawaiian rights, FOF ___;

110. These are rights that are located in the streams and achieved by leaving/restoring water in the streams. COL __, *supra.*

111. Indeed, the record, including official Maui County Draft WUDP (Final Candidate Strategies Report), contains substantial evidence that establishing mauka-to-makai flow in all of the petitioned East Maui streams would support the public interest by fostering many of the statutorily-designated instream uses. *Nā Wai 'Ehā*, 128 Hawai'i at 251, 287 P.3d at 152.

112. "[G]enerally, the higher the volume of instream flow and closer the streamflow approaches its natural pre-diversion levels, the greater the support for biological processes in the stream and its ecosystem." *Waiāhole I*, 94 Haw. at 146, 9 P.3d at 458.

113. The suggestion by HC&S and EMI that IIFS be set on a regional and seasonal basis is inconsistent with the Constitution, public trust doctrine, and Code.

114. The "seasonal approach" suggested by HC&S and EMI and first proposed by CWRM in 2010 is inconsistent with the Constitution, public trust doctrine, and Code as the application of very low summer flows does not protect instream public trust purposes.

115. The "regional approach" to stream restoration which is advocated for by HC&S and EMI, contemplates choosing some but not other streams for restoration, is inconsistent with the regional approach provided for in HRS § 174C-71(2)(F), and is inconsistent with the Constitution, public trust doctrine, and Code.

116. The method of stream restoration initially proposed by DAR and supported by HC&S and EMI to restore a few handpicked streams in order to give the "greatest bang for the

buck" with limited water contradicts the Constitution, the public trust doctrine, and Code, which establish instream use protection as the presumptive priority and expressly condition offstream diversions on the requirement of maximum reasonable-beneficial use.

117. The suggestion of HC&S and EMI that only certain streams be restored without first determining the practicability of restoring all petitioned streams is inconsistent with the Constitution, public trust doctrine, and Code. *Waiahole I*, 94 Haw. at 142, 156; 9 P.3d at 454, 468; Haw. Rev. Stat. § 174C-71(4).

118. Notwithstanding the uncertainty regarding whether Makapipi, Honomanu, and Piinaau Streams can have a continuous mauka-to-makai flow, the record contains substantial evidence that maintenance of each stream's unique ecosystem, including the fish and wildlife habitats supported thereby, is consistent with the public trust doctrine and precautionary principle, such that Makapipi, Honomanu, and Piinaau stream flows should be restored to the extent practicable.

119. In the absence of more certainty regarding scientific knowledge on the level of restoration necessary for East Maui streams, the presumption in favor of instream public trust uses fully applies, and the Commission will provide a reasonable margin of safety to account for the scientific uncertainty.

120. While 100% restoration of flows is optimal, DAR's recommendation of 64% base flow based on USGS figures is the best and most credible information available regarding the minimum level of restoration adequate to sustain the East Maui ecosystems over the long term. There was no scientific dispute that stream restoration is necessary, and no other party offered any substantive alternative data or analysis to refute USGS' figures or DAR's recommendation.

121. The restoration of stream flows to 27 East Maui streams for the purposes of maintaining the waters in their natural state and supporting the full range of instream public trust uses, including the exercise of traditional and customary Hawaiian rights and appurtenant rights, is consistent with the Commission's duties under the Constitution, public trust doctrine, and Code.

1. Water Needs to Support Traditional and Customary Practices

122. Streamflows necessary to support taro growing on kuleana and other traditional and customary areas, must be accommodated over and above the 64-percent levels as amending the IIFS comes first, and other non-instream uses for which there are no common law rights, are met with the remainder. *Waiahole I*, 94 Haw. at 153, 9 P.3d at 465; COL __, *supra.*, *Reppun*, 65 Haw. at 554, 656 P.2d at 72; *Robinson*, 65 Haw. at 649-50 & n.8, 658 P.2d at 295 & n.8.

123. To exercise an appurtenant and/or traditional and customary right to cultivate kalo in traditional lo'i kalo requires an inflow of 100,000-300,000 gallons of water per acre per day, and use of East Maui stream water for this purpose and in this traditional manner is a reasonable-beneficial use, subject to any further enhancement necessary to keep irrigation water temperature under 77 degrees in any particular lo'I, and maintenance of associated 'auwai so they are kept reasonably clear of obstructions to water flow.

a Honopou Stream

124. Lurlyn Scott and her 'ohana's land in Honopou is identified as TMK 2-9-1-14, 23, and 25, amounting to 6.17 acres. Ms. Scott and her 'ohana have appurtenant, riparian, kuleana and traditional an customary rights to water to support their taro cultivation on these parcels; these rights require that the IIFS for Honopou Stream accommodate access to a minimum of 1.85 MGD of water at a minimum to satisfy their current needs and plans to open additional lo'i.

125. Reasonable margins of safety shall be included in the IIFS to protect against higher temperatures of inflowing water to Ms. Scott's lo'i.

126. Water sufficient to irrigate an additional 17.820 of agricultural land in Honopou must also be accommodated.

127. Given that the total base flow for Honopou Stream is estimated at 12 MGD, an IIFS of 64% base flow and 1.85 MGD must be accommodated. The current IIFS setting of 1.29 MGD is insufficient to support this amount of taro cultivation in addition to ensuring minimum streamflows to support instream habitat for aquatic species.

128. Because the natural flows in Honopou are uncertain, as a margin of safety, controlled releases must be conducted until CWRM Staff can determine the flows necessary to support instream habitat.

b. Palauhulu

129. Pualani Kimokeo's 'ohana's land is in Ke'anae at TMK 1-1-03-16. Her land is a kuleana parcel and she is entitled to kuleana, traditional and customary rights to support her taro farming on 0.87 acres.

130. Scott Martin, who is married to Ms. Kimokeo's niece, farms taro on land traditionally farmed by the Kimokeo family on TMKs 1-1-03-18, 1-1-03-29, and 1-1-03-49, totaling nearly 1 acre of lands entitled to appurtenant rights for taro farming.

131. Max Pichay, Ms. Kimokeo's nephew farms land on TMKs 1-1-03-15 and 1-1-03-82, comprising nearly 3.5 acres of land. These parcels are entitled to appurtenant water rights to support taro farming.

132. Wade Latham grows taro on TMKs 1-1-03-25 and 1-1-03-53, comprising just over 3 acres. These parcels are kuleana lands entitled to appurtenant rights for taro (parcel 25) and for which Mr. Latham has a kuleana right to access water for his taro cultivation (parcel 53).

133. Isaac Kanoa farms approximately 4 acres of land in kalo in Ke'anae on lands passed down to him by his grandmother and on lands leased to him by the State of Hawai'i and East Maui Irrigation.

134. Dan Clark farms taro on two lo'i on TMK 1-1-03-75 that he leases from Phyllis Kalapoa that is 0.128 acres and is a kuleana that enjoys appurtenant rights to water for taro cultivation.

135. Ms. Kimokeo also identified the following parcels as previously cultivated in lo'i but currently fallow in Plat 1-1-03: 22, 23, 37, and 42, amounting to 3.351 acres on lands that historically were cultivated in taro.

136. State owned parcels identified as TMKs 1-1-03-43 and 44 are currently cultivated in taro and amount to about 1 acre.

137. Lands identified as TMKs 1-1-03-38, 39, 45, 48, 50, 57, 83, and 89 amounting to nearly 4 acres are all Land Patent Grants issued by the Territory of Hawai'i as taro lots and therefore enjoy the right to streamflows sufficient to support taro cultivation.

138. Given the history of taro cultivation in Ke'anae, current cultivation under diverted conditions, and plans to expand cultivation, a total of 24.595 acres of taro that must be accommodated is reasonable.

139. These rights require that the IIFS for Palauhulu Stream accommodate 7.38 MGD of water above and beyond the amount necessary to support instream habitat.

140. An additional 2.6 acres of land is designated historically for agricultural use and requires sufficient flows for irrigation.

c. Waiokamilo Hydrologic Unit

141. Parcels in the Waiokamilo hydrologic unit fed in whole or in part by Waiokamilo and Kualani Streams amount to 44.474 acres of land that have appurtenant and/or riparian rights to access streamwater to grow wetland taro; these rights require that the IIFS for Waiokamilo/Kualani accommodate 5.78 MGD minimum for taro use.

142. Nā Moku President Edward Wendt farms kalo on TMK 1-1-06-23, which is a kuleana award in Wailuanui, while TMK 1-1-06-25, another kuleana award with appurtenant rights attached, is currently fallow due to lack of water. Mr. Wendt is a sixth generation resident of Wailua and is entitled to kuleana, appurtenant, and traditional and customary rights to water

sufficient to support his taro cultivation on just over half an acre of land in Wailua fed by Waiokamilo and Kualani Streams.

143. Terrance "Kai" Akuna, Jr. is also a sixth generation taro farmer in Wailuanui who farms on nearly 2 acres of land on TMKs 1-1-04-11 and -12 fed by Waiokamilo and Kualani Streams. Kai enjoys appurtenant, kuleana, and traditional rights to access water to support his taro cultivation.

144. Norman "Bush" Martin, Jr. once farmed kalo on TMK 1-1-05-18, 1-1-06-32, -34, -36, -40, -41, -43, and -45 amounting to nearly 9 acres in taro fed by Waiokamilo, Kualani, and Wailua Streams and is entitled to appurtenant, kuleana and traditional and customary rights to cultivate taro there.

145. Jerome "Junior" Kekiwi, Jr. farms taro in Wailuanui on TMKs 1-1-05-29, 30, 31, and 42, amounting to nearly 9 acres, as well as TMKS 1-1-06-49, just over half a acre on family lands historically cultivated in taro and fed by Waiokamilo and Kualani Streams.

146. Joseph "Jojo" Young's 'ohana once farmed about 15 acres of taro in Wailuanui and presently farms 3 acres on TMKs 1-1-05-17, -41, and -45 fed by Waiokamilo and Kualani Streams and would expand his cultivation to TMKs 1-1-05-25, -30, -31, and -34 if sufficient water was available. The Young 'ohana enjoys traditional and customary rights to cultivate taro in Wailuanui.

147. James Ka'a'a farms taro on TMKs 1-1-05-16, comprising 2.33 acres and he has been unable to follow through with plans to open 12 taro patches due to insufficient stream flow.

148. An additional 12.068 acres was also identified as cultivated agricultural parcels fed by Waiokamilo and Kualani Streams.

149. Given the extensive history of taro farming in Wailuanui fed by Waiokamilo and Kualani Streams, Na Moku's estimate of 22.48 acres cultivable taro is reasonable and requires 6.74 MGD above and beyond the amount necessary to support instream habitat and other values.

150. EMI/HC&S has already affirmed and committed to release all diversions within the Waiokamilo hydrologic unit and to forego any future diversion on Waiokamilo and Kualani streams.

d. Wailuanui Hydrologic Unit

151. Parcels in Wailuanui that are fed in whole or in part by Wailuanui Stream and historic evidence of taro growing at the time of the māhele amount to 22.448 acres of land that have an appurtenant and/or riparian right to access stream water to grow wetland taro; these rights require that the IIFS for Wailuanui accommodate access to 6.73 MGD of water above and beyond the amount necessary to support instream habitat.

152. An additional 7.78 acres of land in Wailuanui were designated for agricultural use historically and must be accommodated.

153. Because the current IIFS set for Wailuanui amounts to less than the minimum required for instream protection (i.e. less than 64% base flow), the current IIFS of 3.05 cf/s, 1.97 MGD is at best the minimum amount necessary to ensure instream habitat protection, leaving no margin of safety.

154. To account for current and potential kalo growing, an additional 2.92 MGD at a minimum must be accommodated above and beyond the minimum flow to maintain instream habitat (64 percent of BFQ50) to ensure sufficient stream flow downstream of the 'auwai intake in order to accommodate appurtenant/riparian rights.

155. Given that total base flow for Wailuanui is estimated at 6.1 cf/s (3.94 MGD) according to USGS, and 4.5 cfs/2.91 MGD according to CWRM, an IIFS that accommodates minimal instream protection and supports kalo cultivation would require more than the median base flows and should be fully released.

e. Puolua

156. Lucienne de Naie is a resident of Huelo on TMK (2) 2-9-7:48 who has no public supply of domestic water. Ms. de Naie is entitled to a reasonable supply of domestic water from Puolua or Hanehoi stream to support her domestic use pursuant to the Huelo License Agreemet of 1960 between EMI and the State of Hawai'i to provide sufficient waters for downstream domestic users in the Huelo License area.

157. TARO Hawai'i (Teaching and Restoring Opportunity) is a Hawai'i non-profit organization whose mission is to reestablish the knowledge of the history, cultural and importance of Taro to the Hawaiian culture and way of life and seek to grow taro on public and kuleana lands amounting to 3 acres along Puolua Stream on lands that possess kuleana, riparian and appurtenant rights, which would require approximately 900,000 gpd.

158. Ernest Schupp farms land approximately 1 acre in size designated as TMK (2) 2-9-8:15 and is entitled to kuleana, riparian, and appurtenant water rights to Puolua Stream. Mr. Schupp estimated that the continuous mauka-makai water flow needed in Puolua Stream, past New Haiku Ditch diversion, would be one-million gallons per day (1,000,000 gpd). This would be based on having 300,000 gpd for 1-acre of healthy kalo and another 700,000 gpd to restore stream flows and convey domestic water to downstream users.

159. Huelo Community Pipeline is a pipe that serves the water needs of some members of the Huelo community that has no public supply of domestic water. The pipeline diverts water

from a small pool above the Lowrie Ditch diversion on East Hanehoi Stream. At least 30 Huelo residences depend on water from Hanehoi stream.

160. Christa A. Morf owns property identified as TMK (2) 2-9-7:64 in Huelo that possesses domestic water right to surface water from Hanehoi Stream through a pipe either from a ditch or stream as secured by Deed to support their domestic uses.

161. Michael D'Addario is a resident of Huelo and land manager of Hale Akua Garden Farm and Agricultural Education Center and manages TMKs (2) 2-9-7-56 and -57 which total 7.6 acres of which over 3.5 acres is in active farming. The land is entitled to appurtenant rights to Hanehoi Stream through a "pipe" from an EMI ditch by Deed. The property has received water from State of Hawai'i Registered Stream Diversion 538.6 on TMK 2-9-14:9 ("Huelo Community pipe). The farm would need approximately 10,000 gpd to support its current potential capacity for agriculture.

162. Neola Caveny is the owner of a parcel of land that is 2.219 acres in size, designated as TMK No. (II) 2-9-11:14. Ms. Caveny estimates the amount of flow needed in the stream at her property to be at least three-hundred and fifty-thousand gallons per day (350,000 gpd.) This would provide for her needs and allow enough water to remain in the stream to satisfy other instream uses like the natural pools, popular with community residents. Caveny WT.

163. Solomon Lee, Jr. wants to cultivate wetland kalo, fruit trees, vegetables, plants and livestock on each of the three kuleana parcels (TMKs. (2) 2-9-008:034; TMK No. (2) 2-9-008:035 and TMK No. (2) 2-9-008:007) in Huelo, with a total acreage for kalo approximating three acres. Healthy taro will not grow unless there is enough water to move fast enough to supply cooler water that is no higher than 77 degrees. To grow healthy taro on one acre of land, Solomon Lee, Jr. must have 300,000 gallons per day of water available on a regular basis to be available for our kalo lo'i. The IIFS for Hanehoi Stream below the New Haiku Ditch would need to be set at .9 MGD to meet Solomon Lee, Jr.'s needs.

B. NON-INSTREAM USES

164. "Noninstream use" means the use of stream water that is diverted or removed from its stream channel and includes the use of stream water outside of the channel for domestic, agricultural, and industrial purposes. COL __, **supra**.

165. In this CCH, noninstream uses include:

a. domestic purposes, FOF ___;

b. agricultural purposes, FOF ___;

c. industrial purposes, FOF ___.

166. In this CCH, the Commission makes a collective finding on the reasonableness of these noninstream uses in order to meet its duty of weighing instream and noninstream uses to establish the IIFS. FOF __, *supra.*

167. The Hawai`i Supreme Court has "rejected the idea of public streams serving as convenient reservoirs for offstream private use." *Waiāhole I*, 94 Haw. at 155, 9 P.3d at 467.

168. Moreover, it is clear that private commercial uses enjoy no public trust protection and are secondary to common law and statutory rights to water. *See Waiāhole I*, 94 Hawai`i at 142, 160, 9 P.3d at 454, 472; *In re Kukui*, 116 Hawai`i at 508, 174 P.3d at 347; *In Re Wai`ola*, 103 Hawai`i at 429, 83 P.3d at 692.

169. In this area not designated a water management area, EMI and DWS can only take surface surface water from streams being diverted subject to the rights of appurtenant and riparian right holders and any other common law protections. *Id.* at 178-79; 9 p3d at 490-91; *See, Ko'olau Agric.*, 83 Haw. at 491; 927 P.2d at 1374.

1. Maui County

170. The County of Maui has supported the establishment of "appropriate" amended interim instream flow standards for East Maui streams and endorsed the concept of "mauka to makai" flow. Exhs. E-123 at 22, 122 (printed pages in excerpt)l E-147 at 22.

171. Yet, it still argues that it need not need advocate for any particular level of surface water use, leaving the same to the intervenors in this proceeding to establish the appropriate level of surface water use authorized. DWS Rebuttal Br. 7; Taylor .

172. DWS even goes so far as to support *increased* surface water supplies for its domestic water system in Upcountry. DWS Opening Br. 16-17 (citing economic benefits).

173. DWS has expressed ambiguity in presenting evidence of actual need, both supporting stream restoration and still resting on the negative impacts from the reduction of surface water if it was restricted by IIFS amendments to urge for less, or even an increase in, surface water diversions. Compare, *Id.* and County Opening Br. 16-17, citing Exh. B-16 at 17, Fig. 4, 19, Table 15.

174. The State recognizes "domestic water use as a purpose of the state water resources trust" to include individual and household uses "such as drinking, bathing, heating, cooking, noncommercial gardening and sanitation." *Id.* at 7-8; *see also Waiahole I,,* 94 Hawai`i at 137, 9 P.3d at 449; HRS §174C-2.

175. The Water Code requires "adequate provision" for "waters of the State for municipal uses [and] public water supply." HRS §174C-3(c).

176. Even domestic uses, however, may not "materially diminish the supply of water or render useless its application by others" possessing superior rights. *See Peck v. Bailey*, 8 Haw. 658, 662 (1867); *see also Carter v. Territory*, 24 Haw. 47, 66 (1971) (recognizing the distinction between "natural" and "artificial" uses and affirming, "we have no doubt that such is the law in [Hawai'i]").

177. As the Restatement explicitly provides:

> **The preference for domestic use does not extend to withdrawals by a municipality,** water company or public district **that supplies the domestic needs of inhabitants of a city or other service area.** These large public and commercial users receive no preference and are subject to liability if the taking of their supplies unreasonably causes harm to other reasonable use of riparians.

Id. §850A cmt. c (emphases added).

178. The Commission has not lost sight of the public trust's original intent, and its constitutional duties, including "acknowledging the general public's need for water," but also first "preserving the rights of native tenants during the transition to a western system of private property." *Waiāhole I,* 94 Haw. at 137; 9 P3d at 449.

179. This Commission need not accommodate all of DWS' municipal uses, including domestic uses of surface waters, especially outside the watershed of origin, to the detriment of those objectives for which the public trust was intended. *Id.*

180. The Commission concludes that it must evaluate DWS' water demands with these limitations in mind and maintain its focus on providing protection for other public trust uses, as even DWS appears to grudgingly acknowledge. *See,* DWS Opening Br. 12 (misreporting that DWS has identified strategies that involve a combination of stream restoration, incremental basal well development, expansion of raw storage capacity, and conservation).

a. Claimed "Use" v. Actual Need

181. The failure of several witnesses for DWS to acknowledge this position casts unacceptable uncertainties in the evidence it presented because it begs certain questions about the clarity of the claimed actual need for Upcountry subscribers to the DWS system.

182. This Commission concludes that DWS' submissions of evidence of its actual need for surface water are not entirely credible, in view of its apparent failure to consider the impacts of its explicit support for stream restoration in its own land use plans and Draft WUDP.

183. Accordingly, this Commission cannot discern what accommodation in reduced water supply delivered by EMI that DWS is committed to make to implement its formal position in support of an "appropriate" level of stream restoration due to IIFS amendments.

184. This Commission concludes that given the small percentage of surface water dedicated to the DWS (8.2 MGD, or about 5%) relative to the average 164 MGD EMI transports, and the potential for the DWS' planned mitigation of surface water reduction, and the absence of contrary evidence, DWS should be able to tolerate potential reductions in surface water on which it currently relies due to IIFS amendments with a combination of increasing system efficiencies through demand side management[4] and implementation of the mitigation measures outlined in the Draft WUDP.

185. Although it argues that economic harm would occur with such reductions, DWS has not provided clear evidence that the cited harms alone could not be ameliorated with careful planning and implementation of its Draft WUDP so practical alternatives may be utilized instead of surface water.

186. The Commission concludes that DWS should not rely on stream resources as a less expensive water source to continue its subsidy to Upcountry water users, especially for projected future population growth[5].

187. The Commission concludes that the DWS practice and policy of charging Upcountry subscribers less than its costs of providing water that water is not reasonable beneficial, since it is neither "economical" nor "efficient," because such pricing undervalues, thereby discouraging conservation of, this precious public trust resource. HRS § 174C-3.

188. This Commission concludes that this subsidy amounts to an inefficient use, while the simultaneous harms suffered by those denied use of that same water, who enjoy superior rights to that water, continues.

189. Because the DWS current 7.9 MGD water demand does not incorporate sufficient potential demand side management measures that could encourage conservation by its Upcountry subscribers, this Commission concludes that the DWS has not provided the Commission with reasonable evidence of actual need.

190. In addition, this Commission concludes that the DWS projections for water demand appear based more on the primary objective to lower the current waiting list for water meters by whatever means necessary, rather than a deliberate policy to compel the most economic and efficient use of water by Upcountry DWS subscribers.

b. Alternative Sources

191. The County evaluates, albeit incompletely, the costs to employ alternative sources of water, but largely ignores the harm that arises from dewatering the 27 streams upon East Maui community residents and their cultural practices.

192. In doing so, the County turns a blind eye to how its present and proposed uses harm the larger public interest. *See infra* Section VII.A.

193. DWS apparently has identified a *feasible* set of alternatives for the need to tap East Maui streams throughout the year, by identifying alternative scenarios for constructing reservoirs which presumably can store sufficient water to supply upcountry Maui subscribers during drier months of the year (i.e., May – September):

> DWS merely is setting forth the costs and *feasibility* of alternatives, as required by the Supreme Court in the Waiahole I and Nā Wai Eha decisions. Neither of these decisions, nor any section of the Water Code, require DWS to make any final determination whether to adopt or dismiss an alternative. The only requirement is to present evidence as to feasibility, not to champion or chose a specific alternative. DWS has done so.

DWS Rebuttal Br. 7.

194. In contrast, DWS has been aware for 5 years that this Commission had sought from DWS a definitive transition plan to move the Upcountry water system from 85% dependence on surface water to a more even balance between surface and groundwater, specifically including a "timeline, estimated costs, and possible funding sources for implementation of such [a] plan." Compilation of Data Submissions, Part II (May 2010) at 98 (PDF).

195. This Commission concludes that the evidence of a wavering commitment to support stream restoration presented by DWS is equivocal at best and troubling at the least, given this Commission's prior data request, should stream restoration require such a reduction in surface water delivered to DWS.

196. Viewed from "a global, long-term perspective" of the "cumulative impact of existing and proposed diversions on trust purposes," like protecting stream resources and traditional and customary practices, this Commission is troubled by the failure of DWS, a public entity subject to the public trust doctrine, to affirmatively address this concern with clear planning objectives and policies in place. *Waiāhole I,* 94 Haw. at 143; 9 P.3d at 455.

197. Being concerned about the general public interest in assuring that DWS can continue to supply domestic water to its existing customers, a public trust purpose, this Commission previously requested in 2010 an "outline of the possible actions that Maui DWS would take if [HC&S] was to cease operation, which would directly affect surface water delivery from the [EMI] System to Maui DWS." *Id.*

198. DWS appears to have no such possible actions in place, merely content to declare that it is not equipped to take over the surface water delivery system from EMI should it no longer operate.

199. HRS § 174C-31(a)(2) mandates the adoption by ordinance of a WUDP "setting forth the allocation of water to land use ... ." *See, also,* HRS 174C-31(f) (specifying the content of the WUDP required).

200. HRS § 174C-31((b)(6) restricts eligibility for state appropriations for county water projects to those counties with an "acceptable" and timely approved WUDP.

201. HRS § 174C-31(q) requires the incorporation of the current and foreseeable development and use needs of the Department of Hawaiian Home Lands in the WDUP, the state water projects plan, the water resources protection plan, and the water quality plan.

202. In accordance with the State Water Code, each county is required to prepare, periodically update and adopt its WUDP by ordinance. Exh. E-147 at 9.

203. The Commission must then adopt the WUDP as part of the Hawaii State Water Plan. *Id.*

204. The WUDP as approved would then contain the range of source alternatives identified so that current and future users of water will have a common information base that lays out all possible water source on which current demand and future growth can be based.

205. DWS is a public stakeholder in the contemplated transition away from reliance on surface water for the Upcountry water system and should be more aggressively planning for concrete actions in response to protecting stream resources, an objective it has already officially endorsed.

206. This Commission concludes that by affirmatively implementing these planning steps to protect stream habitats for traditional gathering, fishing, and food growing, DWS would promote thoughtful planning consistent with constitutional objectives to develop and utilize water resources "in a manner consistent with their conservation and in furtherance of the self-sufficiency of the State." Haw. Const., Art. XI, § 1.

207. In this vein, DWS should necessarily be proactively moving promptly to seek this Commission's approval of an updated Maui WUDP, including the adoption of a concrete transition plan to move away from reliance on East Maui surface water needed by those pursuing lifestyles incorporating food self-sufficiency.

208. This Commission concludes that by failing to incorporate the analysis in this Upcountry WUDP as part of his expert report, the DWS' expert witness, civil engineer Craig

Lekven, provided an incomplete assessment of the full range of alternatives to tapping surface water for future expansion of water demand for Upcountry that are available to the DWS.

209. Moreover, DWS failed to incorporate the Freedman analysis in its presentation of alternatives as part of the Water Use and Development Plan for Upcountry that it is still formulating.

210. Accordingly, the Commission concludes that Mr. Lekven's and Mr. Taylor's analyses of alternatives are also incomplete and do not provide the Commission with crucial and credible information to inform its determination of alternatives for Maui County DWS.

211. Although this Commission has not approved an updated WUDP for Maui, it must proceed in this proceeding with the best information available to it under the precautionary principle to amend the IIFS for the various streams involved in this docket, with reasonable margins of safety to assure protection of public trust purposes.

212. Accordingly, in the absence of such an approved WUDP, the Commission concludes that the alternatives analysis contained in the Draft WDUP, Exh. E-147, and, in particular, its Appendix C is the most credible evidence of what alternatives to reduced surface water deliveries to its Upcountry water system due to amended IIFS are reasonably available to the DWS. Exh. E-130.

213. This Commission concludes, based on the Draft WDUP and its Appendix C that, when faced with less than a 30 MGD reduction in Wailoa base flow, constructing a raw water storage reservoir to service the Kamole WTP is a cost effective strategy, and thereby a practicable alternative relying on diverting water during dry periods of the year, to mitigate that level of Wailoa Ditch base flow reductions as a result of amended IIFS. *Id.*; E-123 at 44, 47.

214. Above 30 MGD, DWS can still rely on the use of increased pumping by its basal water wells, and the development of more basal well capacity, even if it involves higher costs to deliver this alternative water source to its Upcountry subscribers, since nothing presented to this Commission indicates such higher charges are unreasonable or impracticable, "taking into consideration cost, existing technology, and logistics." *Waiāhole II*, 105 Haw. at 19, 93 P.3d at 661.

215. While DWS may have interests in having affordable domestic water available, merely charging for water already more costly to deliver than for other Maui residents does not entitle them to enjoy "a subsidy or guaranteed access to less expensive water sources," like surface water, when alternatives like those from raw water storage and pumped groundwater are available and public values like protecting traditional and customary practices are at stake. *Waiāhole I*, 94 Haw. at 165, 9 P.2d at 477.

216. In either case, this Commission concludes that the two raw water storage and basal well options are practicable alternatives to continued reliance on surface water being diverted from East Maui streams. *See*, HRS § 174C-71(1)(E) (including consideration of physical solutions in implementing permanent instream flow standards).

217. Rather than present vague options that are at best ambiguous as to how it will accommodate current and future Upcountry water demand, this Commission concludes that DWS as a public utility, should be planning for ultimate stream restoration in the same manner this Commission must, i.e., "with a level of openness, diligence, and foresight commensurate with the high priority these [legally protected water] rights command under the laws of our state." *Waiāhole I*, 94 Haw. at 143, 9 P.3d at 455.

218. Accordingly, DWS must promptly update its Draft WUDP and seek approval of it from this Commission so it will have officially and clearly identified the source alternatives for various levels of stream restoration, which it is already on record supporting.

219. An updated WUDP will also minimize confusion and uncertainty by providing a common base for meeting current and future upcountry water demands.

c. Losses

220. The leakage resulting from the former dilapidated Wakamoi Flume was a loss of stream water than is now available for DWS use that was not previously used for domestic purposes.

221. This Commission rejects the notion, as the DWS argued, that there was no water waste since some, if not most of the past leaks from the flume ultimately ends up returning to the stream "either through direct spills or seepage through the soil." DWS Responsive Brief, relying on Taylor WT (1/3/15) at ¶5.

222. This Commission concludes that the resulting water saving is additional water that DWS now utilizes, in an amount made uncertain only because the DWS failed to gauge its intakes and leakages as contemplated by its agreements with HC&S.

223. It did not matter whether DWS directly monitored or quantified the amount of water lost due to leaks in the flume, nor tracked where the water goes when it leaks for this Commission to find that the losses constitute a waste of water.

224. The Commission concludes that the DWS should have assured accurate metering of intakes into and leaking from the flume, and taken prior steps to protect this public trust resource with timely repairs to the flume system.

225. It should also have timely pursued any other conservation measures it could have implemented to avoid waste, including installing meters to enable the measurement system losses.

226. This Commission concludes there is a critical need for data and information related to DWS water use practices that must be addressed to achieve better management of the stream water resources it utilizes and this Commission is charged with regulating and managing.

227. Since the DWS had no mechanisms for quantifying water levels either at the intake or discharge sites of the Waikamoi Flume to accurately measure system losses, this Commission is now compelled estimate the extent of the past waste now saved, and potential conservation from leaky intakes for its Upper and Lower Kula water systems, in determining what alternative water sources are available to the DWS. Exh. B-15 ¶ 1(k).

228. This Commission concludes that, since DWS estimated system loss as high as 40% during high flows in the Waikamoi Flume before the DWS' recently completed upgrade, DWS has added an estimated 600,000 GD to its Olinda water system.

229. Furthermore, in view of its apparent breach of its agreement with A&B to monitor stream flow intakes, this Commission concludes that the County must install and maintain an accurate gauge for each of its intakes at Honomanū, Haipuaena, Waikamoi and Puohokamoa Streams to measure the amount of stream diversions for the DWS Lower and Upper Kula water systems.

230. In addition, this Commission concludes that the DWS should be more accountable for measuring any leakage or seepage from its water diversions so it can better manage its water system.

231. Similarly, DWS demand side management measures only partially address the potential conservation achievable amongst Upcountry water users on the DWS system.

232. This Commission concludes that DWS must clearly plan for a transition away from its current heavy reliance on surface water delivery to its WTPs, beginning with the incorporation of aggressive water conservation measures to smoothen this transition to alternative sources of water for its Upcountry subscribers.

233. Finally, DWS failed to supply evidence of a proper cumulative impacts assessment of its reliance on EMI's diversion. *See, supra,* Section VII.C.1.

d. Economic Impact of Restricting Offstream Use

234. DWS and its customers did not reveal the economic impact of restricting their offstream uses, which this Commission must consider in setting an IIFS. HRS 174C-71(2)(D).

235. The two county analyses offered into evidence attempted to show that restricting use of the surface water results in severe negative economic impacts for the County of Maui.

236. However, the Lekven analysis makes not mention of the possible mitigation measures that could reduce the financial consequences of the increase in delivery costs if the DWS were required to resort to its basal wells to replace surface water sources.

237. Moreover, the County's Maui Island Plan now in effect for Maui County has a policy that states:

> Protect baseline stream flows for perennial streams, and support policies that ensure adequate streamflow to support Native Hawaiian aquatic species, traditional kalo cultivation and self-sustaining ahupua'a.

Tr. 3/17/15 p. 28, l. 19 to p. 29, l. 1.

238. DWS must account for how implementation of this policy would yield positive effects to offset any short-term negative financial consequences to the cost of delivering water to Upcountry DWS subscribers, by assessing "the most equitable, reasonable, and beneficial allocation of state water resources, with full recognition that resource protection also constitutes 'use'." *Waiāhole I,* 94 Haw. at 140, 9 P.3d at 452.

239. For his part, Brewbaker was unaware of this element of County policy when he conducted his economic impact analysis, thereby limiting the value of his conclusions, since it failed to account for the economic benefits relevant to evaluating the economic impacts of reducing offstream uses of water. *Id.* at 28, l. 19 to 29, l. 5.

240. Without the consideration of the economic benefits of stream restoration as a part of the overall economic impacts of surface water reallocation, any claims of the partial economic impacts of restricting offstream uses, even if presumed to be accurate, are speculative and unfounded at best.

241. For example, Paul Brewbaker's assumptions of the economic impacts of reduced surface water flow to DWS ignore "full recognition that resource protection also constitutes 'use,'" by omitting consideration of economic benefits that accrue to those who would enjoy the benefits to taro farmers, gatherers of stream animals, and fishers.

242. This Commission concludes that such restoration would result in positive economic benefits to those who would rely on the restoration of stream flow and the ecological improvements to the restored habitats of stream animals and marine species dependent on freshwater inflow into the ocean.

243. In addition, because Brewbaker's analysis did not even consider the Freedman conclusion that a reduction of up to 30 MGD could be mitigated by the construction and

utilization of reservoirs to supply surface water for DWS Upcountry subscribers, Brewbaker's conclusions of the economic impact of such reductions are without foundation.

244. This Commission concludes it need not address the propriety of Brewbaker's notion of drastic declines in housing values supposedly caused by the reduction in surface water flow to the DWS Kamole Weir WTP caused by amended IIFS.

245. This Commission concludes that Brewbaker's faulty if not incomplete impact analyses do not capture the full economic impacts of restricting offstream water use and would not be helpful to this Commission's evaluation under HRS 174C-71(2)(D), regardless of whether his assumptions about the steep drop in housing values is accurate or not.

2. EMI/HC&S

246. In this IIFS proceeding, this Commission is obligated to insist that HC&S demonstrate that its use of East Maui stream water to irrigate sugar cane on its East Maui Fields is reasonable beneficial, which required HC&S to affirmatively demonstrate its actual water need and the absence of practicable mitigating measures, including the use of alternative sources of water.

247. HC&S failed to accomplish is to show, as it must as an offstream diverter, that it has "in light of the cumulative impact of existing and proposed diversions on trust purposes, ... implement[ed] reasonable to mitigate [the] impact" of its use of stream water, "[e]ven if the impact of using a public trust resource is found to be reasonable and beneficial." *Kauai Springs*, 133 Hawai'i at 173, 324 P.3d at 983, citing *Waiāhole I*, 94 Hawai'i at 143, 161, 9 P.3d at 455, 473.

248. Specifically, neither this Commission nor HC&S/EMI initially produced any estimates of HC&S/EMI's stream-by-stream additions to its diversions, as it might cumulatively impact natural stream habitats and traditional and customary practices of Hawaiians. Uyeno, Tr. 3/5/15, p. 18, l. 22 to p. 23, l. 4. *See, supra* Section VII.B.

249. This determination largely relied on the accuracy of USGS projections of what would be the natural undiverted streamflow in the affected streams.

250. The USGS had to employ those projections in its study of potential restored habitats from stream restoration, because of EMI's failure to meter actual diversions from individual streams. Section III.C; *see, also,* Section IV.A.1.

251. As a result, the USGS researchers were compelled to model streams other than the 5 intensively monitored streams for which they actually took observed measurements. *Id.*.

252. The flow prediction based on regression analysis that the USGS generated was subject to a level of possible error because it did not have access to observed metered data of actual stream-by-stream diversions by EMI, and the USGS could neither compel nor convince EMI to conduct controlled releases of streamflow to verify its flow prediction. *See*, Section IV.A.1; Uyeno, Tr. 3/5/15, p. 33, l. 7 to p. 35, l. 2; *see, also,* Section I.B.2.

253. This limitation was reflected in the confusion during the contested case hearing over the absence of measured flow data reflecting what the potential incremental restoration to, and thereby, the resulting reduction of diversions from, streams that are affected by this proceeding. Uyeno, Tr. 3/5/15, p. 23, l. 5 to p. 32, l. 23.

254. This Commission concludes that there is a need for both controlled releases to verify the accuracy of the model predictions, as well as more detailed metering of diverted flow at each stream diversion point to minimize errors based on projections of what EMI would be diverting with any given level of IIFS established. *See,* Section I.B.2.

255. This Commission also concludes that it must still proceed with the best information available, i.e., the USGS modeling to predict the effect of restored streamflow and DAR research to arrive at IIFS levels based on the best information available.

256. This Commission is mindful of its public trust responsibility to view any private use of water for economic development as secondary to public rights in trust resources as the "default condition," and requires "a higher level of scrutiny." *Kaua`i Springs,* 133 Haw. at 173, 324 P.3d at 983.

257. HC&S or EMI must not harbor thought of any entitlements to water in view of long-standing conditions with which it has always had to abide.

258. HRS § 171-58(d) reserves the right of the State to require a lessee/permittee of state water rights, like A&B/EMI, to respect superior rights, including "...such water as is used for domestic purposes (including the watering of livestock), ..., and the irrigation of kuleanas entitled to the same." *See, e.g.,* Huelo License, General Lease 3578, Exh. E-96.

259. In 2000 and 2001, the BLNR indicated that the contemplated lease it intended to extend to A&B/EMI would be conditioned upon the State's right to withdraw water under the lease for "[c]onstitutionally protected water rights, instream flow standards, reservations needed to meet the Department of Hawaiian Home Lands rights ..., as well as other statutory or judicially recognized interests relating to the right to withdraw water for the purposes and in accordance with the provisions of Section 171-58(d) ... ." *See,* Exh. E-120 at 4-5; Exh. E-121.

a. Claimed vs. Actual "Need"

260. The Commission must issue "reasonably clear findings" on the actual water needs of stream diverters in its findings of fact, *Waiāhole I*, 94 Hawai`i at 157, 9 P.3d at 469.

261. Accordingly, it is imperative for the offstream diverter to make clear what its actual water needs are -- at a very minimum, the discrete quantity necessary for its offstream use -- and why it cannot do with less. *Id.* at 161, 9 P.3d at 473.

89. Viewed from "a global, long-term perspective" of the "cumulative impact of existing and proposed diversions on trust purposes," like protecting stream resources and traditional and customary practices, this Commission is troubled that HC&S reports only on how gains and reductions in its East Maui surface water supply impacts its bottom-line, with little regard for the diversions' consequent resource and societal impacts and the available methods capable of reducing or eliminating harmful impacts. *See*, *supra,* Section VII.B.1; *Waiāhole I*, 94 Haw. at 143; 9 P.3d at 455.

262. First, HC&S defines the discrete quantity necessary to meet its minimum needs not in terms of the "amount of water required just to keep the cane plant alive" but "the amount of water needed to sustain a viable sugar plantation at HC&S." HC&S Opening Br. at 13.

263. It mentions nothing about "its "**actual needs** and, within the constraints of available knowledge, the propriety of draining water from public streams to satisfy those needs." *Waiāhole II*, 105 Hawai`i at 15-16, 93 P.3d at 657-58 (emphasis added).

264. In short, rather than applying the test in *Waiāhole II*, HC&S' proffered "minimum need" is based on an assumption to perpetuate the status quo of subsidies and guaranteed access to cheap water no matter the public values at stake. Nā Moku Opening Br. at 5, 9-11.

265. HC&S' financial situation is not material, as this Commission "is not obliged to ensure that any particular user enjoy a subsidy or guaranteed access to less expensive water sources when alternatives are available and public values are at stake." *Waiāhole II*, 105 Haw. at 19, 93 P.3d at 661.

266. In fact, HC&S readily admits that its profit-loss performance is intrinsically linked to sugar prices, which have been "trending downward since 2012," HC&S Opening Br. 21, as well as improved agronomic practices. *Id.* at 20.

267. Conversely, HC&S explains that their operating loss of $3.8 million in the first three quarters of 2014 (and a decrease in operating profit of $18.1 million compared to the first

nine months of 2013) were "primarily due to lower sugar prices and increased cost per ton." *Id.* at 19.

268. In contrast, HC&S admits it "benefited from a highly providential spike in raw sugar prices extending from the last quarter of 2009 through the first quarter of 2012." *Id.* at 20-21.

269. In fact, "[d]ue to the **increase in sugar revenues from higher** total production and **unit pricing**, coupled with the lowering of unit costs attributable to higher production, the agribusiness segment of A&B experienced a return to profitability from 2010 to 2012." *Id.* at 21 (emphases added).

270. Curiously, improved agronomic practices implemented by HC&S "to cope with the reduced water deliveries resulting from the amended IIFS determinations" improved yields in 2010 and 2011. *Id.* at 20.

271. Thus, HC&S enjoyed **increased profitability and productivity in spite of reductions** to their surface water supplies resulting from the prior 2008 and 2010 IIFS amendments. *See id.* at 18-19.

272. In other words, HC&S employed greater efficiencies to grow more with less water since the 2008 and 2010 IIFS amendments. *See infra* at 14.

273. Without objective analysis of actual need that in fact correlates to HC&S' economic performance, statements that it needs all the water it takes from East Maui and more to generate 200,000 tons of sugar annually - the supposed yield necessary to remain economically viable - are utterly baseless.

274. HC&S' multiple representations of its per acre ***use*** of water compounds the doubts raised by its exclusive reliance on plantation viability in place of its actual **need** for water.

275. Additionally, although it has data **that would indicate the actual water needs** of sugarcane on the East Maui Fields, **and would also show the volume of irrigation water that was applied in excess of actual irrigation needs**, HC&S did not produce that data.

276. It is "a well-accepted principle of law" that "[w]hen a party has relevant evidence in his control which he fails to produce, that failure gives rise to an inference that the evidence is unfavorable to him." *Singh v. Gonzales*, 491 F.3d 1019, 1024 (9th Cir. 2007) (citations omitted).

277. HC&S' diversion of approximately 130 MGD from East Maui streams to irrigate its East Maui Fields is not reasonable-beneficial because, among other things, it is far more than is necessary for economic and efficient utilization.

278. Public trust water is not "available" for private commercial use simply because the delivery infrastructure exists to exploit it. *See* FOF _____.

279. HC&S' diversion of anywhere from 127 to 165 MGD on average from East Maui streams to irrigate its East Maui Fields substantially and unjustifiably interferes with the purposes protected by the water resources trust, including the maintenance of East Maui streams in their natural state and the exercise of traditional and customary Hawaiian rights and appurtenant rights.

280. The fact that HC&S has historically deprived East Maui downstream users of as much as ____ billion gallons of water annually does not negate those downstream users' interest in the water, especially for those holding appurtenant rights, which may not be abandoned. *Nā Wai 'Ehā*, 128 Hawai'i at 242, 287 P.3d at 143, HRS § 174C-63.

281. HC&S' failure to quantify the actual [or future] irrigation requirements of its cane fields deprives the Commission of its ability to reasonably estimate offstream demands in order to properly discharge its duty to establish IIFS that protect instream values to the extent practicable and protect the public interest. *Nā Wai 'Ehā,* 128 Hawai'i at 253-55, 287 P.3d at 154-56.

282. The Commission concludes that it is at a seriously disadvantage without accurate diverted water flow information because HC&S has not installed and does not maintain accurate gauges for each of its intakes at East and West Makapipi, Hanawi, Kapa`ula, Waia`aka, Pa`akea, Wai`ohue, Puaka`a, Kopili`ula, East Wailuaiki, West Wailuaiki, East and West Wailuanui, Palauhulu, Pi`ina`au, Nua`ilua, Honomanū, Kolea, Haipuaena, East, Middle, and West Puohokamoa, Wahinepe`e, Waikamoi, Alo, Hanehoi, Puolua, and Honopou Streams to accurately measure the amount of stream diversions at those points for the EMI water diversion system.

283. This absence of data has severely restricted the ability of this Commission and other stakeholders who required accurate data on which to base their requirements for water downstream of the EMI diversions, and cast a cloud over proposed actions to restore flows to meet constitutional and statutory objectives for protecting stream and estuarine resources that the Constitution and Water Code seek to protect and manage.

284. Under these circumstances, this Commission concludes that there is insufficient evidence on record that HC&S has established a level of actual water need that is a reasonable beneficial use of surface water it needs to effectively irrigate its crops.

285. Stated another way, this Commission concludes it is free to reduce HC&S' allocation of water in favor or increasing the current IIFS to protect instream uses and the kalo

irrigation water rights of farmers facing challenges to maintaining or expanding their crop cultivation levels due to the lack of water from those streams still being diverted by EMI.

b. Alternative Sources

286. HC&S' 36 reservoirs on its plantations, which carry a total maximum capacity of approximately 860 MGD, are practicable alternatives to the 165 MGD it diverts from East Maui streams to irrigate its East Maui fields. HC&S Resp. Br. at 6; Ex. C-71, Appendix C at C-1.

287. HC&S failed to demonstrate to this Commission that its 15 groundwater wells with a capacity to deliver 228 MGD that it has pumped for more than half a century to irrigate its fields, is not a practicable alternative source for the irrigation water necessary for economic and effective irrigation of those fields.

288. HC&S's purported concerns about increasing the salinity in [the specific well name(s)] are unsubstantiated, and its failure to produce records in its possession regarding the salinity of same during the periods when it was pumped gives rise to an inference that those records would not support HC&S's contention.

289. This practice demonstrates that HC&S use of these wells is a practicable alternative to exploiting or draining East Maui streams.

290. HC&S has not yet conducted or produced any credible cost benefit analysis on its "alternative" fields and water sources to determine which of its identified options would be the most cost-effective if its access to East Maui surface water is restricted.

291. This Commission has already deemed this cost range, faced by other farmers and MDWS customers, practicable. *See, e.g., In re Waiāhole Ditch Combined Contested Case Hr'g*, Case No. CCH-OA65-1, Findings of Fact, Conclusions of Law, and Decision and Order (July 13, 2006), at 50 (observing that current price of water from Waiāhole Ditch is $0.40 per thousand gallons); and at 56 (concluding that a new well, with combined construction and operating costs of $0.74 per thousand gallons, including eight percent cost for borrowing money, "is a reasonable alternative to Ditch waters on the basis of cost, existing technology, and logistics"); *see, also, Waiāhole II,* 105 Hawai`i at 19, 93 P.3d at 661.

292. To prove impracticability based on cost, it is not enough for HC&S to show that using its 15 brackish wells would cost it more than using water diverted from East Maui streams.

293. "Stream protection and restoration need not be the least expensive alternative for offstream users to be 'practicable' from a broader, "long-term social and economic perspective" and the Commission "is not obliged to ensure that any particular user enjoys a subsidy or guaranteed access to less expensive water sources when alternatives are available and public values are at stake." *Waiāhole I,* 94 Haw. at 165, 9 P.3d at 477.

294. In this instance, HC&S has provided no expert testimony on the additional cost of pumping any of its 15 brackish water wells to serve as a substitute for EMI surface water.

295. Accordingly, in view of the higher scrutiny this Commission must give to this private commercial use of water, the Commission must presume these wells can provide this groundwater, even though more expensive, as a practicable alterative to surface water.

296. In view of the alternatives which appear to be reasonably available to offstream users who have no explicit rights to water, and the excessive uses that HC&S is apparently making of its current diverted surface water, without justification, this Commission is empowered and authorized to revise existing levels of IIFS to protect instream uses, especially those protected by constitutional and statutory provisions, by scaling back the current level of reliance on surface water by HC&S.

c. Losses

297. The Commission concludes that much of what HC&S provided for losses of water from its system is unjustified under the governing law.

298. While Volner's calculation of average system loss (22.7%, or 41.77 MGD) appear high without any attempt to line HC&S reservoirs, the range of seepage loss, the primary reason for HC&S waste, is especially alarming with Hew's calculated high estimate of system loss (36.9%), which is equivalent to 67.7 MGD.

299. The picture is made even more egregious when considering that even a conservative estimate of the ***combined*** EMI and HC&S system losses, using HC&S' lowest estimates, ranges from 49.7 to 89.46 MGD.

300. The magnitude of that HC&S-calculated system loss is massive, in relation to the annual average surface water delivery to HC&S between 2008-13 (113.7 MGD), when compared to the modest total restoration for the 6 streams identified to meet taro farmer irrigation water needs, i.e., likely under 20 MGD. Section V.B; *see, also, Nā Wai 'Ehā*, 128 Hawai'i at 256-57, 287 P.3d at 157-58 (labeling as "massive" the acknowledged system loss potential from seepage from Waiale Reservoir and unlined ditches totaling 13-16 MGD to the irrigation water need for kuleana taro growers of half that amount - 6.84 MGD - and restoration amounts for projected IIFS levels and commending Commission order that HC&S line the reservoir).

301. Similarly, that potential system loss is particularly stunning when considered in comparison to the need for the amount estimated by the USGS for BFQ_{64} (44 MGD).[3] *Id.;* Gingerich letter (10/31/14).

302. HC&S made only a feeble attempt to demonstrate that it is not practicable to mitigate the estimated average seepage of 23-31 MGD from the 31 reservoirs used in the irrigation of the East Maui Fields, which it projected in 2010. Compilation of Data Submissions, Part II (May 2010) at 29-32 (PDF).

303. Similarly, it provided no information or plan to improve its latest excessive range of evaporation and seepage, resulting in combined surface and groundwater system losses of 18.2 to 36.9 percent, for the period 2008-13. *See,* Section VII.B.2.

304. The loss of 34.4 to 67.7 MGD is unacceptable under the public trust and the reasonable-beneficial use standard for an for an irreplaceable public trust resource that would otherwise be used to support beneficial instream uses. *Waiāhole II*, 105 Haw. at 27, 93 P.3d at 669 (urging conservation measures and other "provisions that encourage system repairs and limit losses," including lining ditches and reservoirs").

305. This Commission hereby rejects HC&S's contention that its system losses are not wasteful because they result in recharge that might support the long-term viability of the plantation by pumping of wells as an irrigation water source, since such a practice merely prolongs the ability to pump from marginal wells, which is not a reasonable-beneficial use, particularly when public trust purposes are being frustrated by excessive waste of water.

d. Economic Impact of Restricting Use

306. This Commission concludes that HC&S' economic viability is affected by many factors of which water is only one. Volner, Tr. 3/23/15, p. 58, ll. 16-21; p. 156, ll.

307. HC&S once claimed that reductions in its use of East Maui water may result in the shutdown of its entire plantation, with grave economic impacts on HC&S, Maui County, and the State.

308. These arguments were unsupported by any evidence or analysis, and are facially implausible given that East Maui water is used to irrigate only 62% percent of HC&S's cultivated acreage during the 2008-13 time period. Exh. C-137.

309. HC&S identified a range of scenarios and options for mitigating the effects of reduced availability of East Maui surface water, but nonetheless provided dubious estimates of their potential costs. *See,* Section

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[3] This total, provided by the USGS, is partially inclusive of the taro farmer needs mentioned earlier. Gingerich WT (10/31/14), p. 5 (PDF).

310. Given the lack of reliable information or reasoned analysis, the Commission has limited information available to attempt to weigh the economic impacts of reducing HC&S's access to East Maui water. In fact, all that the Commission can conclude is that the price of sugar is the real determinant of HC&S' viability.

311. Nevertheless, the most dire economic impact to HC&S if this Commission amended the IIFS by setting the median base flow for 23 of the 27 streams targeted by Nā Moku's petitions at 64% of the natural undiverted flow projected by the USGS would be that HC&S would experience zero flow in the Wailoa Ditch only 5 days out of a typical year. *See*, Section VII.B.1.

312. In those instances, HC&S could tap its alternative brackish well sources that have a "true instantaneous" capacity to pump 120 million gallons each day.

313. HC&S has not demonstrated based on its evidence that it cannot sustain plantation operations with this alternative source.

314. Also, as HC&S reported to its shareholders for 2013, it achieved a higher crop yield using less water than in 2012. Exh. C-62 at 13.

315. It is contrary to the public trust principles for the Commission to accommodate HC&S' surface water needs, at the expense of East Maui water resources serving Nā Moku and other East Maui residents, in order to keep HC&S afloat in an industry in which it has lost its competitive edge, while failing to account for its unnecessary and irresponsible system losses.[4]

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[4] As the *Nā Wai `Ehā* Court recognized, "the water code indicates that a diverter's system losses **may factor into the Commission's estimations of noninstream uses** when it sets an IIFS." 128 Hawai`i at 257, 287 P.3d at 158 (holding that the Commission did not err in considering losses) (emphasis added). The Court further noted that "[t]he value of diverting water, only to lose the water due to avoidable or unreasonable circumstances, is unlikely to outweigh the value of retaining the water for instream uses." *Id* (emphasis added). In other words, including system losses in an IIFS analysis is not meant to reward a diverter where such losses could be avoided.

Given the explicit mandates of the public trust doctrine and the demonstrated immediate needs of Nā Moku and the East Maui community, the CWRM should not consider system losses as part of HC&S' actual water **need**, *see Waiāhole II,* 105 Hawai`i at 15-16, 93 P.3d at 657-58, and it is disingenuous for HC&S to characterize it as such. The public trust doctrine prescribes a higher level of scrutiny for private commercial uses and imposes a burden on those seeking uses which impact public trust resources and instream values to **justify** their uses in light of the purposes protected by the trust. *See Waiāhole I*, 94 Hawai`i at 142, 160, 9 P.3d at 454, 472; *In re Kukui*, 116 Hawai`i at 508, 174 P.3d at 347; *In Re Wai`ola*, 103 Hawai`i at 429, 83 P.3d at 692. No such justification is provided here. Thus, weighing HC&S' system losses with the importance of instream values offends the public trust.

316. This accommodation also takes the form of the BLNR's pricing of water under its arrangement to authorize the use of water at an unconsciously low rate that discourages affirmative conservation measures that might otherwise operate to make more efficient use of water. *See,* Section VII.B.1

317. In fact, such actions also discourage HC&S from implementing measures to improve its system inefficiencies and agronomic practices, Mayer 12/30/14 WT ¶¶ 73-75, as it was forced to do in 2010-11.

318. Hence, instead, the Commission is left with nothing on this record but HC&S' aspirational production goal to remain profitable, with no agronomic or other scientific basis for what would constitute a minimum water need of the plantation. *See,* Section VII.B.1.

ORDER

On the basis of the foregoing findings of fact and conclusions of law, in view of the scope of the EMI diversions and its cultural impacts laid bare in these proceedings, and given the long delays in implementing the stream protection measures now long overdue, this Commission hereby orders that:

1. HC&S and/or A&B and/or EMI shall:
   a. Within 90 days of this order, pay an initial deposit of $500,000 into an East Maui IIFS Implementation Fund administered by the CWRM for the costs of purchasing, installing, and maintaining temperature and flow meters in streams and waterways for which an IIFS is established by this Commission subject to an expeditious installation.
   b. Within 90 days of this order, release a minimum of 64% of median base flow (BFQ_{50}) in each of the diverted streams plus an additional 10% to ensure a margin of safety and any additional flows necessary to satisfy appurtenant and/or contractual or riparian rights, based on the projections of the USGS for the stream stretch closest to the IIFS stations previously established by this Commission's staff. These entities shall jointly assure that the following median base flows shall be restored to the identified streams.
   c. For those streams for which the base flows are still uncertain, CWRM Staff shall, within 90 days of this order, report back to the CWRM its best estimate of median base flows based on the best information available.
   d. Within 180 days of this order, remove all diversion works diverting water from the following hydrologic Units: Wailuanui, Waiokamilo, Hanehoi and Honopou.
   e. Within 180 days of this order, remove all diversion works diverting water from Palauhulu Stream.
   f. Within 90 days of this order, working with Commission staff, submit a plan to this Commission outlining all steps and a timetable of no less than an additional 180 days necessary to assure that each of the 27 streams which are diverted by EMI has in place:
      i. a bypass feature, approved by the Department of Land and Natural Resources Division of Aquatic Resources (DAR) to allow migration of stream animals upstream during their reproductive cycle; and

ii. appropriate modification of EMI diversion structures to allow for transport of native larval ʻōpae, ʻoʻopu and hihwai downstream during appropriate times in their life cycles to minimize or eliminate entrainment into EMI ditches.

iii. Expected biological improvements with different options for a range of modifications of diversion structures.

g. Within 120 days of this order, release an additional amount of the currently diverted flow back into Makapipi, East and West Wailuanui, Palauhulu, Hanehoi, Puolua, and Honopou Streams, without resort to water sources from streams other than the stream to which the water is being restored so as to avoid entrainment of any stream animal, that will assure the maintenance of water temperature below 77 degrees, as measured by temperature gauges A&B/HC&S/EMI shall bear the costs of installing and maintaining under contract with the USGS and this Commission;

h. Within 360 days of this order, under a contract with the USGS, install and maintain an accurate gauge for all of its intakes at East and West Makapipi, Hanawi, Kapa`ula, Waia`aka, Pa`akea, Wai`ohue, Puaka`a, Kopili`ula, East Wailuaiki, West Wailuaiki, East and West Wailuanui, Palauhulu, Pi`ina`au, Nua`ilua, Honomanū, Kolea, Haipuaena, East, Middle, and West Puohokamoa, Wahinepe`e, Waikamoi, Alo, Hanehoi, Puolua, and Honopou Streams to accurately measure the amount of stream diversions at those points for the EMI water diversion system;

2. Maui County DWS shall:

a. Within 90 days of this order, pay and initial deposit of $75,000 into an East Maui IIFS Implementation Fund administered by the CWRM for the costs of purchasing, installing, and maintaining temperature and flow meters in streams and waterways for which an IIFS is established by this Commission subject to expeditious installation, so as to supplement any costs being born by HC&S/EMI to protect the interests of downstream water users who may be affected by water being diverted into the Ko`olau and Wailoa, or the Upper and Lower Kula, Ditches.

b. Within 90 days of this order, present a plan and timetable for the installation and maintenance of an appropriately sized raw water storage reservoirs, and/or provision of additional groundwater from well pumping, to replace surface water now supplied to the Kamole Weir WTP and the Piʻiholo WTP as a result of this decision and order, or, with prior approval by this Commission, a proposed schedule for submitting this plan;

c. Within 120 days of this order, present a plan to this Commission on how it will install and maintain an accurate gauge for all of its intakes at Honomanū, Haipuaena, Waikamoi and Puohokamoa Streams to accurately measure the amount of stream diversions at those points for the DWS Lower and Upper Kula water systems;

d. Within 180 days of this order, submit for approval with this Commission its updated WUDP to identify source alternatives for is current and projected future growth as required under HRS 174C-31;

e. Within 360 days of this order, under a contract with the USGS, install and maintain an accurate gauge for all of its intakes at Honomanū, Haipuaena, Waikamoi and Puohokamoa Streams to accurately measure the amount of stream diversions at those points for the DWS Lower and Upper Kula water systems;

3. Both the DWS and HC&S shall file progress reports every quarter with this Commission and the parties in this proceeding for the next year following the date of this order, and every 180 days thereafter until further order of this Commission, to detail steps taken to achieve each of the terms stated above.

4. Nothing in this order shall be construed to override or change any other reporting requirement which currently applies to the DWS or HC&S.

5. No later than 60 days prior to the expiration of any of the deadlines above, if applicable, any party may file motions to extend any of the above deadlines documenting any and all reasons why these deadlines cannot be met and an appropriate proposed alternate schedule for meeting the deadlines, based on sworn declarations.

6. The Commission staff shall:

   a. Monitor A&B/HC&S/EMI's placement of the temperature gauges in taro lo`i to assure that appropriate readings can be taken on a continuous real-time basis at the point at which the appropriate auwai or flume introduces water to the lo`i being irrigated by stream water and one or more points where the water exits the lowest elevation lo`i to flow back into a stream, auwai, or other water body.

      i. The Commission shall initially approve the placement of these temperature gauges within 90 days of this order unless extended by agreement of the parties.

      ii. The Commission may, from time to time, approve adjustments to the placement of these gauges to meet practical considerations that justify their

movement within a complex of lo`i, upon request by an affected taro farmer.

b. Within 60 days of this order shall develop a protocol to outline the steps any taro farmer or cultural practitioner affected by this decision or its implementation may immediately report any problem with inadequate streamflow affecting his/her ability to pursue cultural practices or to grow taro in the tradition of the ancient Hawaiians.
    i. The Commission shall approve the protocol developed by its staff at the Commission meeting immediately following the submission of the proposed protocol;
    ii. The Commission may, from time to time, adjust the protocol to meet unanticipated consequences, costs, or other obstacles to enforcement of water rights
c. Within 30 days of the submission of any complaint that the lack of water is preventing a taro farmer from growing taro in a manner consistent with those traditions of ancient Hawaiians who once grew taro, investigate the complaint, contact EMI to determine what obstacles prevent the supply of more water, and report back to the complaining farmer what steps will be taken to address the problem.
    i. In the event a taro farmer cannot get the immediate relief he or she seeks from CWRM Staff to remedy a problem of inadequate streamflow, he or she may seek informal resolution from the Commission, pursuant to HRS § 174C-10, or file a citizen's complaint with the Commission, pursuant to HRS § 174C-13.
    ii. The Commission staff shall immediately investigate the merits of the complaint and file a report with the Commission and the complainant within 30 days of the complaint being made.
    iii. The Commission shall hear the complaint by the next regularly scheduled meeting of the Commission unless the deputy director certifies reasons for not being able to schedule the complaint for disposition at that meeting. In such an instance, the Commission shall hear and consider the complaint no later than its next regularly scheduled meeting following any extension granted by the deputy director, but no later than 120 days after the complaint was filed.

iv. If the complaint of inadequate streamflow is found to be justified, the Commission may assess the costs of compliance and any appropriate penalty against the responsible party.

DATED: Honolulu, Hawai'i, October 2, 2015.

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CERTIFICATE OF SERVICE

I hereby certify that a copy of the foregoing document was served upon the following parties in the manner indicated at their last known address:

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