ISAAC H. MORIWAKE #7141
SUMMER KUPAU-ODO #8157
EARTHJUSTICE
850 Richards Street, Suite 400
Honolulu, Hawai‘i 96813
Telephone No.: (808) 599-2436

Attorneys for:
HUI O NĀ WAI ‘EHĀ and
MAUI TOMORROW FOUNDATION, INC.

COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAI‘I

Surface Water Use Permit Applications, Integration of Appurtenant Rights and Amendments to the Interim Instream Flow Standards, Nā Wai ‘Ehā Surface Water Management Areas of Waihe‘e, Waiehu, ‘Īao, & Waikapū Streams, Maui.	)	Case No. CCH-MA15-01 WITNESS LIST

WITNESS LIST

PARTY: HUI O NĀ WAI ‘EHĀ and MAUI TOMORROW FOUNDATION, INC.

NAME/ ORGANIZATION/ POSITION	SUBJECT MATTER	EXHIBIT(S) TO BE INTRODUCED BY WITNESS
Lilikalā Kame‘eleihiwa, Ph.D./University of Hawai‘i at Mānoa Hawai‘inuiākea School of Hawaiian Knowledge/Director & Senior Professor	Māhele research	Nā Wai-3 to Nā Wai-9
Zachary Smith/Office of Hawaiian Affairs/GIS Specialist	Kīpuka Database	Nā Wai-10 to Nā Wai-17
Hōkūao Pellegrino/Hui o Nā Wai ‘Ehā/Vice-President	Burdensome process	None

Dated: Honolulu, Hawai'i, February 5, 2016.

ISAAC H. MORIWAKE
SUMMER KUPAU-ODO
Attorneys for HUI O NĀ WAI 'EHĀ and
MAUI TOMORROW FOUNDATION, INC.

COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAI‘I

Surface Water Use Permit Applications, Integration of Appurtenant Rights and Amendments to the Interim Instream Flow Standards, Nā Wai ‘Ehā Surface Water Management Areas of Waihe‘e, Waiehu, ‘Īao, & Waikapū Streams, Maui	)	Case No. CCH-MA15-01 TESTIMONY OF LILIKALĀ K. KAME‘ELEIHIWA, PH.D.; EXHIBITS “1” – “7”

TESTIMONY OF LILIKALĀ K. KAME‘ELEIHIWA, PH.D.

1. I, Lilikalā K. Kame‘eleihiwa, submit this testimony on behalf of Hui o Nā Wai ‘Ehā, Maui Tomorrow Foundation, and the Office of Hawaiian Affairs (“OHA”) to aid the Commission on Water Resource Management in determining the amount of water used on various parcels of land throughout the Nā Wai ‘Ehā region at the time these lands were converted to fee-simple title.

Summary of Opinions

2. As explained below, based on my educational background and 30 years of experience reviewing land title records from the Māhele, including a more recent analysis of Māhele records for the Nā Wai ‘Ehā region in particular, in my professional opinion:

a. Generally speaking, one cannot ascertain precise areas of cultivation based on Māhele records;

b. Māhele records nevertheless provide, with few exceptions, what was being cultivated on a particular kuleana, allowing one to reasonably estimate water use quantification at the time of fee-simple conversion;

c. Kingdom law, as well as patterns observed in Māhele records for Nā Wai ‘Ehā, give rise to certain rebuttable presumptions and guiding principles that

may be applied when estimating water use quantifications appurtenant to lands in Nā Wai ʻEhā (enumerated below, beginning at paragraph 39).

d. Applying these rebuttable presumptions and guiding principles leads to reasonably accurate estimates of water use on a particular kuleana in Nā Wai ʻEhā at the time of the parcel's conversion to fee-simple.

Experience and Qualifications

3. I am Director and Senior Professor at the Kamakakūokalani Center for Hawaiian Studies, Hawaiʻinuiākea School of Hawaiian Knowledge, University of Hawaiʻi at Mānoa, where I have taught for almost 30 years. I hold a Ph.D. in Hawaiian & Pacific History, an M.A. in Pacific Island Studies, and a dual B.A. in Hawaiian Language and Hawaiian Studies, all from the University of Hawaiʻi at Mānoa in 1986, 1982, and 1980, respectively. I have authored and co-authored numerous books, articles in refereed (peer-reviewed) journals, chapters and short articles in books, documentary scripts, and online articles, served as principal investigator for numerous fellowships, grants, and awards, and produced creative works, in both film and television. Complete lists of these publications and projects are provided in my curriculum vitae, a true and correct copy of which is attached hereto as Exhibit "1."

4. My teaching and research experience focuses on traditional Hawaiian history, literature, and land tenure practices before western contact, and changes to traditional land tenure practices during the Kingdom of Hawaiʻi. I specialize in researching land title records from the Māhele, which I have been doing for 30 years. I teach courses in Māhele land title research, including the undergraduate course Māhele Land Awards, which provides students with a practical guide to researching land awards and change in title from 1848 to the present, and the post-baccalaureate course Hawaiian Archival Research, a research seminar aimed at

familiarizing students with the rich historical primary sources existent in various archives in Honolulu.

5. In 2010, the Administration for Native Americans ("ANA") awarded me a half-a-million dollar, three-year grant, as Principal Investigator, to train young Native Hawaiians in ancestral konohiki (traditional Hawaiian land stewards) knowledge of land management with a view toward food sustainability. The project, named Kamakakūokaʻāina: Ancestral Visions of ʻĀina, or "AVA Konohiki" for short, focused on two different kinds of work to achieve our long term goal to be food sustainable.

6. First, we taught young Native Hawaiians at the University of Hawaiʻi at Mānoa, from both the graduate and undergraduate levels, how to harvest, transcribe, and upload handwritten Kingdom of Hawaiʻi land documents and maps from the Hawaiʻi State Archives. Our focus was on documents that were written and produced in the 1840s and 1850s, when lands in Hawaiʻi first went into private ownership. These land records, written by our ancestors, include detailed descriptions of land management practices. Second, we provided, and continue to offer, even after the ANA grant, specific university classes in Hawaiian culture, language, history, land studies, geographic maps, and current practices, to enhance Native Hawaiian student knowledge of ancestral wisdom.

7. I have reviewed, and thus am familiar with, land title records from the Māhele for the Nā Wai ʻEhā region, including kuleana land commission awards, native registers, and native/foreign testimonies, as well as other conveyances, such as government grants, and maps produced by Wailuku Sugar Co.

Overview of the Māhele

8. In 1846, in an effort to distinguish the rights of the government, konohiki, and hoaʻāina (native tenants) with respect to all of the lands in Hawaiʻi, Kamehameha III ("Kauikeaouli") established the Land Commission. The Land Commission's first task was to ascertain and award the interests of oral land claims granted, mostly to foreigners, by Kamehameha I and Kamehameha II.

9. In 1848, Kauikeaouli and 252 konohiki divided amongst themselves the interest to large pieces of land, such as ahupuaʻa and ʻili (smaller subdivision within an ahupuʻa). These interests of the king and konohiki were recorded in the Buke Māhele, which became the basis for their claims before the Land Commission, who then issued the konohiki a Land Commission Award ("LCA") granting them life estates. If the konohiki paid a commutation—one-third of the value of the land or one-third of the land itself—to the government, they could receive the lands in fee simple, which was evidenced by the issuance of a Royal Patent ("RP").

10. Lands over which Kauikeaouli retained personal control became known as the crown lands. Kauikeaouli also gave some of his lands to the Hawaiian Kingdom Government; these lands are known as government lands. Lands the konohiki paid as a commutation also became part of the government lands.

11. After the konohiki divided their interests and extinguished the government's interest through the payment of commutation, the last remaining interest in the land belonged to the hoaʻāina (native tenants). In 1850, Kauikeaouli passed the Kuleana Act, which awarded to hoaʻāina any land located on crown, government or konohiki land that the hoaʻāina had improved, including cultivated lands and house lots ("kuleana award").

12. Attached as Exhibit "2" is a true and correct copy of the Kuleana Act of 1850, formally entitled An Act Confirming Certain Resolutions of the King and Privy Council, Passed on the 21st Day of December, A.D. 1849, Granting to the Common People Allodial Titles for Their Own Lands and House Lots, and Certain Other Privileges ("Kuleana Act").

13. Paragraph 6 of the Kuleana Act entitles hoaʻāina to only lands they were actually cultivating.

14. Paragraph 5 of the Kuleana Act limits the amount of land that could be awarded for a house lot to one quarter of an acre.

15. To obtain a kuleana award, hoaʻāina first had to register a claim describing their cultivated lands and/or house lot (known as the native register). Next, claimants under the Kuleana Act were required to provide witness testimony, usually from neighbors, supporting their claims (known as native testimony and foreign testimony). The Land Commission then appointed a land surveyor to survey the land. Based on all of this evidence, the Land Commission either awarded an LCA in the form of a kuleana award, or denied the claim. The lands awarded under the LCA were lands verified to be in cultivation or used as a house lot by the claimant. Accordingly, parcels identified in a registered claim may not be mentioned in the LCA. Generally, the LCA for a kuleana was confirmed via a Royal Patent ("RP"), known as an RP on an LCA (defined in paragraph 23); however, an RP on an LCA was not necessary to convey fee-simple title to kuleana awards.

16. Pursuant to Paragraph 4 of the Kuleana Act, government lands could be sold in fee-simple. Fee-simple title to government lands were issued via Royal Patent Grants ("RPGs"). There was no requirement that these purchased lands be in cultivation.

17. In sum, the Māhele resulted in the recognition of three types of conveyances: konohiki awards (life-estates that could be commuted to fee-simple), kuleana awards (fee-simple), and government grants (fee-simple).

Researching Māhele Records

18. Land title records from the Māhele, such as LCAs, RPs, native register, and native/foreign testimonies, all of which are defined below, are stored at the State Archives, where they may be viewed on microfilm.

19. Fortunately, records pertaining to kuleana awards for Nā Wai ʻEhā are also accessible online via three searchable databases. In addition to the AVA Konohiki database, located at avakonohiki.org, OHA offers the Kīpuka database, found at kipukadatabase.com, and the Papakilo database, accessible at papakilodatabase.com. All three databases provide digital images of the original Māhele records found at the State Archives.

20. Based on my experience with the AVA Konohiki project, and regular use of all three databases, in my opinion, these databases are reliable and efficient tools for researching Māhele records. They are especially critical for anyone doing this research who is not physically located on Oʻahu.

Water Use Quantification Based on Māhele Records

21. There is no way to determine the precise area of cultivation, and, accordingly, water use, based on Māhele documents. Most Māhele records, however, particularly those pertaining to kuleana, contain a description of the crops in cultivation on a specific ʻāpana (parcel).

22. Knowing the purposes of key Māhele records associated with kuleana awards, as well as the parcel descriptors commonly utilized in these records, helps to identify what was

being cultivated on the land in question, and to achieve reasonable estimates of the areas in cultivation.

23. Māhele records associated with kuleana awards and their general purposes consist of the following:

a. **Land Commission Award**. This is the source of land title, and contains descriptions of the lands awarded, usually by ʻāpana. As an example, attached as Exhibit "3" is a true and correct of LCA No. 4429 to the claimant Kaua, which I have marked to show the typical components of a kuleana award, including but not limited to LCA number, claimant name, location of the land, ʻili in which the ʻāpana is located, total area of the ʻāpana in acres, pōʻalima (if any), location and date of the survey, and survey diagram. If any information regarding what was being cultivated on the ʻāpana is included in the LCA, it will usually be located at the beginning of each ʻāpana description, before the metes and bounds of the survey.

b. **Native Register**. This is the claim, written in Hawaiian, hoaʻāina filed to lands they improved with a house lot or cultivated, and which initiated the process of securing awards of fee-simple title from the Land Commission. Registers often included a claim number, which was affixed to all documents referring to the particular claim, and, eventually, if the claim was awarded, became the LCA number. As an example, attached as Exhibit "4" is a true and correct copy of the native register for LCA No. 4429 to Kaua.

c. **Native Testimony**. This is witness testimony, usually provided by persons residing or farming land in the same region as the claimant, written in

Hawaiian, and usually confirming or, in some instances, challenging a claim. As an example, attached as Exhibit "5" is a true and correct copy of the native testimony for LCA No. 4429 to Kaua, which I have marked to identify the typical components of native testimony, including but not limited to claim number, claimant name, date of testimony, witness name, statements describing each ʻāpana within a kuleana, statement regarding any pōʻalima (defined below in paragraph 29), statements regarding boundaries (referencing neighboring owners), and a statement regarding whether the claimant's interest in the land is disputed.

d. **Foreign Testimony**. This is witness testimony, written in English, which often, but not always, contains information identical to the native testimony. Sometimes foreign testimony appears to be an English translation of the native testimony.

e. **RP on an LCA**. This is the official document confirming an LCA. An RP on an LCA is evidence that the government interest is extinguished; however, for kuleana awards, an RP was not necessary to convey fee-simple title. In other words, it was not necessary to have an RP on an LCA to have a valid kuleana award. RPs ususally include boundaries of the land award, and rarely contain information regarding land use. (The RP for kuleana awards should not be confused with the RPG for government land sales.)

f. **Survey Notes**. This is a set of documents available on OHA's Kīpuka database. According to OHA, these documents came from the Archives and appear to be the surveyor's compilation of records, including the register,

testimony, and LCA survey. The documents included in these Survey Notes contain all or some of the previously mentioned records.

g. **Survey Boundaries**. This is another set of documents available on OHA's Kīpuka database. According to OHA, these documents came from the Department of Land and Natural Resources Survey Office, are typed copies of the LCA surveys, and therefore contain the same information as the LCA surveys. They also appear to be partially translated into English. According to OHA, based on its review of these documents, they appear to have been created in the 1920s.

24. To determine what was being cultivated on a particular kuleana, one should begin with the LCA because it is the source of land title. If the LCA is silent on what was being cultivated, one should then review other documents associated with that LCA—native register and native or foreign testimony—for land use descriptions.

25. Common terms used to describe what was being cultivated on a kuleana or an ʻāpana within a kuleana, include the following:[1]

a. **Mooaina**: a land division within an ʻili or arable portions of ʻili for the purpose of cultivation only.

b. **Moo kalo**: a section of kalo that is smaller than an ʻili but larger than a paukū.

c. **Pauku kalo**: section of loʻi kalo.

d. **Pauku loi**: section of loʻi.

[1] The following terms are spelled the way in which they are usually recorded in the original documents, without modern-day diacritical marks, *i.e.*, kahakō (macron) and ʻokina (glottal stop).

e. **Loi**: irrigated/flooded taro patch.

f. **Aina loi**: wet taro land.

g. **Aina kalo**: taro land.

h. **Kula**: non-flooded cultivated area.

i. **Moo kula**: section of kula.

j. **Hale**: house.

k. **Pa hale**: house lot.

l. **Kuleana hale**: house lot, house interest.

26. Once the land use is identified, one can apply the land use to the area for the kuleana or ʻāpana provided in the LCA. *See* Exhibit 3.

27. Māhele records sometimes provide the number of loʻi being cultivated on a kuleana or ʻāpana, but generally do not specify the size of the loʻi. Without knowing the size of the loʻi, which can vary among kuleana, the number of loʻi typically is not a useful guide for determining the area in cultivation under a particular LCA. Nonetheless, the number of loʻi is useful to indicate the existence and general extent of wetland kalo cultivation within a kuleana or ʻāpana.

Patterns and Distinctions Observed in Māhele Records
for the Nā Wai ʻEhā Region

28. In reviewing Māhele records for Nā Wai ʻEhā, I observed patterns and nuances for documenting land use activities throughout this particular region. As explained below, these observations support certain rebuttable presumptions and guiding principles that can be applied when determining land use, and, in turn, water use, for any particular kuleana in Nā Wai ʻEhā at the time of fee-simple conversion.

Pōʻalima

29. Pōʻalima (literally translated, "Friday") was a term used throughout Hawaiʻi to identify lands farmed by hoaʻāina for the aliʻi or konohiki, usually one day a week, and generally on a Friday. A portion of the product of a pōʻalima was given to the aliʻi or konohiki as a form of taxation.

30. On occasion, pōʻalima could refer to parcels farmed in a variety of crops, not just loʻi kalo. Throughout the kuleana records I reviewed for Nā Wai ʻEhā, however, pōʻalima were usually described in two ways: as simply "poalima," or "loi poalima," "loi paahao," and "loi aupuni." (The latter two terms are described below in paragraph 34.) "Loi" are associated with kalo, and no other crop. Thus, in Māhele records for Nā Wai ʻEhā, the term "poalima" refers to lands cultivated in loʻi kalo, as opposed to any other crop. This is no surprise, given the region's reputation for maintaining the largest contiguous area of loʻi kalo cultivation in Hawaiʻi.

31. The records for Nā Wai ʻEhā also reveal a high presence of pōʻalima, which, again, is not surprising given other literary accounts documenting the extensive loʻi kalo cultivation across these four ʻahupuaʻa.

32. Another pattern in Nā Wai ʻEhā Māhele records is the use of pōʻalima as a boundary marker. As an example, the text and diagram in LCA 4429, attached as Exhibit 3, use neighboring pōʻalima as the kuleana's eastern boundary. This information is useful for determining what was in cultivation on neighboring ʻāpana, where the LCA for that neighboring ʻāpana is silent on what was being cultivated. Utilizing descriptions from neighboring ʻāpana to determinine what was in cultivation on an ʻāpana for which a description is lacking is helpful beyond the context of pōʻalima.

33. At times, an LCA might refer to more than one ʻāpana or parcel than what the native register or native/foreign testimonies discuss. For instance, the LCA might refer to two ʻāpana, but the native testimony describes the kuleana as a whole, *i.e.*, one parcel. Usually, this was because a pōʻalima, located in the middle of the parcel claimed, was not awarded to the claimant, thereby creating two separate parcels that were awarded. To identify the two "new" parcels, the LCA described two ʻāpana. LCA No. 3339 and the native testimony in support of it, true and correct copies of which are attached as Exhibit "6," demonstrate this phenomenon. Nevertheless, the descriptions of land use in the native register and native/foreign testimonies apply to the entire area surveyed.

Additional Prevalent Descriptors for, and Indicators of, Wetland Kalo

34. In addition to the common land use descriptors discussed above, the Māhele documents for Nā Wai ʻEhā utilize two additional phrases to indicate wetland kalo cultivation: "loi aupuni" and "loi paahao."

a. "Loi aupuni" commonly appeared in Māhele records for Waikapū and Wailuku. It was a descriptor for wetland kalo patches on government lands, cultivated for government servants or employees who did not have time to labor for subsistence purposes.

b. "Loi paahao" was a descriptor for wetland kalo patches cultivated for konohiki that required the tenant to pay for use of the land or else face imprisonment.

35. Māhele records for Nā Wai ʻEhā also confirm the generally accepted cultural traditions and practices of placing loʻi kalo alongside or near to streams and ʻauwai, and of grouping loʻi kalo near to each other, separate from other crops and pāhale.

Kula

36. The term "kula" generally refers to unirrigated pasture or plains. The Māhele records for Nā Wai ʻEhā, however, also use this term to refer to dryland agricultural crops.

37. Use of this descriptor in Nā Wai ʻEhā records is sparse, as compared to records for other regions throughout Hawaiʻi.

Pāhale

38. According to Māhele records for Nā Wai ʻEhā, many pāhale in this region were grouped together, and it was common for kuleana to be in cultivation entirely with no pāhale. In other words, generally speaking, lands the hoaʻāina farmed were grouped together in one area, and lands on which they lived (pāhale) were grouped together in another area. For example, in Waiheʻe, many hoaʻāina who maintained loʻi in the ʻili of Puhauolu, lived in the ʻili of Kapoho.

Rebuttable Presumptions and Guiding Principles for Interpreting Nā Wai ʻEhā Māhele Records

39. The patterns and distinctions observed in reviewing Nā Wai ʻEhā Māhele records, noted above, in addition to the 1850 Kuleana Act, support rebuttable presumptions and guiding principles for determining land and water use on kuleana awards at the time of fee-simple conversion. In my professional judgment, applying the following presumptions and guiding principles provide a reasonable and accurate way to ascertain water use on a particular kuleana award in Nā Wai ʻEhā. They comprise the best available historical and cultural information and understanding, in the absence of more details on a specific parcel due to the limitations in the historical record and the passage of time. Note that these presumptions are not applicable to all

land grants at the time of the Māhele, such as konohiki grants and royal patent grants; they only apply to kuleana awarded under the 1850 Kuleana Act.

40. **Presumption No. 1**: If no pāhale is mentioned in a kuleana award, the entire kuleana should be presumed to be in cultivation. This presumption is consistent with the 1850 Kuleana Act, which restricted kuleana awards to lands hoaʻāina were actually cultivating or living on at the time.

41. **Presumption No. 2**: If a pāhale is referenced in the kuleana award, but no size of the pāhale is provided, the area for the pāhale should be presumed to be no more than one quarter of an acre. This presumption is based on the 1850 Kuleana Act, which limited kuleana awards for house lots to one quarter of an acre.

42. **Presumption No. 3**: If the following descriptors are used to describe kuleana or an ʻāpana within a kuleana, without referencing any other crop or pāhale, the entire parcel should be presumed to be cultivated in loʻi kalo:

a. Kalo
b. Loi
c. Loi kalo
d. Pauku kalo
e. Pauku loi
f. Moo kalo
g. Poalima
h. Loi aupuni
i. Loi paahao
j. Aina kalo

43. **Presumption No. 4**: All pōʻalima should be presumed to be cultivated in loʻi kalo.

44. **Presumption No. 5**: Where Māhele records for a particular kuleana do not specify the crop being farmed on the land or the presence of a house lot, if the kuleana includes, abuts, or is near to a stream, ʻauwai, or other lands for which loʻi kalo documentation exists, such as a pōʻalima, it should be presumed that wetland kalo was being cultivated on that kuleana.

45. **Guiding Principle No. 1**: Where Māhele records are ambiguous in describing the land use for an ʻāpana (*i.e.*, multiple uses are described without providing the location and size for each use (*e.g.*, kula and loʻi), or the land use description covers more than one ʻāpana), the land use for neighboring ʻāpana can serve as a guide.

a. For example, attached as Exhibit "7" is a true and correct copy of LCA No. 4274, the native testimony accompanying it, and the map from Kīpuka showing the locations of the parcels awarded. The native testimony describes two ʻāpana where the LCA shows three parcels were awarded. The LCA identifies "Apana 1," "Apana 2 Mahele 1," and "Mahele 2." The pertinent part of the native testimony states, in translation, "Apana 1. is a section of kalo at Puulolo, Apana 2. a section of kalo and a house lot at Puulolo and Kapoho," and does not mention any "Mahele." "Apana 1" of the LCA is clearly kalo land. The description for "Apana 2," however, is ambiguous: it is unclear whether the house lot is in Puulolo or Kapoho. And it is unclear which "Mahele" each represents.

b. Because a pattern observed across Nā Wai ʻEhā Māhele records is that loʻi were planted next to loʻi, it would be fair to presume that Apana 2's "section

of kalo" is in Puulolo, the ʻili in which the "section of kalo" of "Apana 1" is located, and that this is what the LCA designates as "Apana 2 Mahele 1." Because water was shared from the river or spring from one loʻi to the next, most LCAs adjacent to an LCA identified as a loʻi would clearly be loʻi.

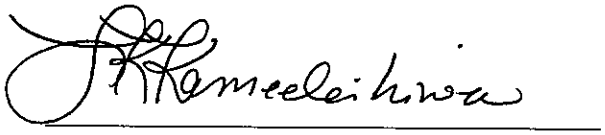
c. Because Nā Wai ʻEhā Māhele records also reveal pāhale were often grouped together, it would be fair to conclude that the house lot is "Mahele 2" in the LCA, and is located in Kapoho. This is because the parcel adjacent to "Mahele 2," awarded under LCA No. 3782, is in Kapoho, and is also a house lot.

46. **Guiding Principle No. 2**: In some instances, existing cultural land features can help to determine the location and size of the loʻi on a kuleana or ʻāpana. For example, remnants of loʻi walls and terraces still exist on some kuleana in Nā Wai ʻEhā. These land features provide evidence of the location and size of loʻi, and, accordingly, an estimate of water use at the time of the Māhele.

47. **Guiding Principle No. 3**: If the Māhele records for surrounding kuleana and the subject kuleana's current cultural land features are not helpful, there is likely no way to arrive at a reasonably accurate water use quantification for that parcel. In these instances, an equal distribution of land among the noted land uses may be the only justifiable compromise. For example, if the parcel is described as "loi and kula," fifty percent of the land should be attributed to loʻi and the other fifty percent should be attributed to kula.

I declare under penalty of law that the foregoing is true and correct.

DATED: Mānoa, O'ahu, Hawai'i, February 2, 2016.



Lilikalā Kame'eleihiwa, Ph.D.

COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAI‘I

Surface Water Use Permit Applications, Integration of Appurtenant Rights and Amendments to the Interim Instream Flow Standards, Nā Wai ‘Ehā Surface Water Management Areas of Waihe‘e, Waiehu, ‘Īao, & Waikapū Streams, Maui	)	Case No. CCH-MA15-01 TESTIMONY OF ZACHARY SMITH; EXHIBITS “1”-“8”

TESTIMONY OF ZACHARY SMITH

1. I, Zachary Smith, submit this testimony on behalf of Hui o Nā Wai ‘Ehā, Maui Tomorrow Foundation, and the Office of Hawaiian Affairs (“OHA”) to explain the creation and utility of OHA’s Kīpuka Database, available at: http://kipukadatabase.com, and to offer my professional opinion on the accuracy of Kīpuka’s maps.

Position at OHA

2. I am the sole Geographic Information Systems Specialist at OHA, and have been serving in this capacity since 2013.

3. Geographic Information Systems (“GIS”) utilize data with a spatial component to create an analysis or a visualization of a particular geography. There are many forms of GIS, including data collection, manipulation, and display that can be applied in fields as diverse as hydrography, utilities, or military intelligence.

4. As the GIS Specialist, I am responsible for administering all of the GIS data for the organization, which includes visualizing geographic data for multiple projects. Often, I am called upon to produce maps for publication and/or internal use. The Kīpuka Database, for instance, is a publicly available web map application that was created using digitized features from a variety of hard copy map sources, as explained in further detail below.

Qualifications

5. In 2015, I was accepted as an expert in the field of GIS by the Circuit Court of the First Circuit, State of Hawai‘i, Gary W.B. Chang presiding, in the case of Ching v. Ailā, Civ. No. 14-1-1085-04 GWBC.

6. I hold a 2011 Certificate in GIS from the University of Washington Extension School, completing courses such as *GIS Project Planning and Implementation* and *Advanced GIS Analysis and Application*. I am currently pursuing a master's degree in GIS from Lund University, and have already completed all of the coursework in that program, including 12 advanced courses in theoretical and applied GIS instruction.

7. In 2005, I received a bachelor's degree in Natural Resources and Environmental Management from the University of Hawai‘i at Mānoa with a minor in Geography. During my undergraduate studies, I completed the following courses in GIS: *GIS for Resource Managers*, *Map & Aerial Photo Interpretation*, and *GIS Data Visualization*.

8. My experience with GIS also includes a 2010 internship collecting and visualizing geographic data with Winrock International, a nonprofit organization dedicated to empowering disadvantaged communities.

Creation of the Kīpuka Database

9. When I started working for OHA in 2011, I was charged with overseeing the Kīpuka project. I am familiar with all aspects of the database's creation and maintenance.

10. OHA created Kīpuka to assist its Native Hawaiian beneficiaries and the general public, especially those living on the neighbor islands who cannot access records at the State Archives on O‘ahu, with Māhele research. Kīpuka provides intuitive access to a database of

Māhele records, primarily kuleana records, accompanied by maps identifying the location, shape, and size of the parcels discussed in those records.

11. Kīpuka was designed to provide all information known to be available for each kuleana Land Commission Award ("LCA") or Government Grant, in one central database, thereby enabling more efficient title research. In addition to the LCA, the records associated with kuleana awards, and which are available in the database, include: Native Register, Native Testimony, Foreign Register, Foreign Testimony, Royal Patent, Survey Notes, and Survey Boundaries.[1]

12. Kīpuka incorporates digitized data that was already available on another OHA online database, Papakilo, available at: http://www.papakilodatabase.com. Papakilo is referred to as a "database of databases," consisting of varied collections of data pertaining to historically and culturally significant places, events, and documents in Hawai'i's history. In addition to the Māhele records noted above, Papakilo houses, among other things, a collection of maps, newspapers, and historic sites inventories.

13. Kīpuka acts as a complementary tool with Papakilo, adding a spatial context to land research. By using GIS, Kīpuka provides a geographic visualization of the LCAs and Government Grants, showing where they were awarded relative to other land awards.

14. OHA launched the Kīpuka application publicly in 2013 and the land award mapping for Maui was completed in 2015. Kīpuka is an ongoing project, as OHA works to

---

[1] Two types of records—Survey Notes and Survey Boundaries—are not the official names for these records, but, rather, are categories I created. The contents of these two sets of records are explained in further detail below in Paragraphs 31 and 32.

complete the mapping of all land awards in Hawai‘i, but only minor corrections are expected for Maui Island.

15. Completing the spatial mapping for Maui consisted of a multi-part process: georeferencing historic maps, digitizing land award features from those maps, data quality control and quality assurance, linking features to associated records, and uploading into the Kīpuka database.

16. The first step in setting up the Kīpuka database involved scanning and indexing records, including all of the Māhele records noted above in Paragraph 11, as well as registered maps, including Wailuku Sugar Co. maps, obtained from the Land Survey Division of the State Department of Accounting and General Services.

17. The next step required georeferencing the available maps for an area. The process of georeferencing a digital map, or “raster,” uses confident anchor points to tie the raster to a projection of the Earth’s surface. This references the map to other data with an identical projection and coordinate system. Once a raster is georeferenced, the data on the map can be digitized and utilized as information.

18. Digitization of the map data resulted in the creation of shapes for each parcel of land referenced in the records. Each shape, known as a “feature,” was created by tracing the feature on the georeferenced map and assigning attributes to the feature based on the map itself and historical records. Using diagrams provided in these source materials served as a verification process, to ensure that the digital shapes produced were accurate based on the original surveys.

19. Upon completing the digitization of the land awards, the digital images of the Māhele records, referenced in Paragraph 11 above, were joined to the feature and incorporated into the Kīpuka application, to serve as a one-stop searchable database by award number, patent number, or claimant name.

20. One of the key features of the Kīpuka application is the map overlays. With this feature, the user is able to manipulate the layers to concurrently view the boundaries of an LCA parcel in relation to current Tax Map Key ("TMK") parcel boundaries, and vice-versa (boundaries of a TMK parcel in relation to the LCA map).

21. Another key feature is the identification of pōʻalima awards. The mapping of pōʻalima awards was accomplished using the 1937 Wailuku Sugar Co. Title Map, and Registered Map No. 1261, which is a certified copy of an 1882 map surveyed by Monsarrat. True and correct copies of these two maps are attached hereto as Exhibits "1" and "2," respectively. To confirm the presence and character of the pōʻalima awards depicted in these two maps, we also consulted the boundaries and drawings found in LCA, Survey Boundary, and Royal Patent records.

Using Kīpuka

22. Attached hereto as Exhibit "3" is a true and correct copy of the page on which one would commence a search by LCA or TMK number in Kīpuka.[2] When users initiate the search,

---

[2] Due to a months-long upgrade process, the interface of Kīpuka will change later this month. Therefore, the web pages seen in the exhibits attached hereto will no longer look the same. The information stored on Kīpuka and the process for using Kīpuka, however, will remain unchanged.

a map appears showing the boundaries for that parcel. As an example, attached hereto as Exhibit "4" is a true and correct copy of the page that appears upon a search for LCA No. 460.

23. The user is then able to click on any point on the map to access all available information associated with that specific point. As an example, attached as Exhibit "5" is a true and correct copy of the window that appears when the user clicks on the map. As seen in Exhibit 5, this window shows information for the Land Award, Tax Map Key Parcel, and Ahupuaʻa/Moku/Mokupuni.

24. The Tax Map Key Parcel information includes the TMK number and owner of the parcel.

25. The Ahupuaʻa/Moku/Mokupuni information provides the names of the divisions of land in which the parcel falls.

26. The Land Award information includes the type of award—LCA or Government Grant—the claimant's name, and the Government Grant or LCA number, including, if applicable, the ʻāpana number, which follows a colon after the LCA number. This window essentially provides a summary to guide the user through the records and maps.

27. It should be noted that the ʻāpana number used in the Land Award information is, for the most part, the ʻāpana number from the LCA. On some occasions, however, we found discrepancies between the ʻāpana numbers in the LCA and the ʻāpana numbers in the Royal Patent. In these instances, we used the ʻāpana number in the Royal Patent.

28. The Land Award box is also an active hyperlink that takes the user to a "details page" for that award. Attached as Exhibit "6" is a true and correct copy of the details page for LCA No. 460. As Exhibit 6 shows, the hyperlinks to all associated records are located toward

the bottom of the details page. For a typical kuleana award, these will include: "Land Commission Award," "Native Register," "Native Testimony," "Royal Patent Grant," "Survey Boundaries," and "Survey Notes."

29. In compiling the records and naming the hyperlinks, we differentiated between Government Grants and Royal Patents on an LCA. For Government Grants, the hyperlink "Government Grant" would be used, and there would be no further hyperlinks, as it is my understanding that none of the records associated with an LCA exists for Government Grants. Attached as Exhibit "7" is a true and correct copy of a details page for Government Grant No. 3042.

30. Most of the hyperlinks described in Paragraph 28 above are self-explanatory. They lead the user to digitized copies of that official record. Two of the labels—"Survey Boundaries" and "Survey Notes" were names I came up with for what is included in those records.

31. "Survey Boundaries" refers to records we obtained from the Department of Land and Natural Resources Survey Office, which include typewritten transcriptions and English translations of LCAs and Grants. We do not know the source of the transcriptions and English translations or the exact year they were produced, although they appear to have been created in the 1920s. I included these records in the database because they provide legible and English translations of the text of LCAs and clear drawings of parcels, and are generally helpful when the LCA itself is illegible, which can sometimes be the case with the original Māhele records. Some of the LCAs were transcribed more than once, and, in some instances, provide different information. In these cases, I included all typewritten versions in the "Survey Boundaries."

32. "Survey Notes" refers to records we obtained from the State Archives. I do not know the original source of the records, nor who compiled and organized the records in the boxes in which we found them. The records were organized by LCA, usually in folders, and appear to be the surveyor's compilation of records, including the register, testimony, and LCA survey. Some of the folders also contain what appear to be the surveyor's handwritten notes. The entirety of each folder, even when they contain duplicates, has been included in the Kīpuka database.

33. Some kuleana awards contain additional hyperlinks, "Native Register-Continued," "Native Testimony-Continued," "Foreign Register-Continued," and/or "Foreign Testimony-Continued" These are the next, sequential pages of the "Native Register," "Native Testimony," "Foreign Register," and "Foreign Testimony," respectively. Due to the unsequenced nature of the registers and testimonies, they often continued on different pages.

Professional Opinion

34. Based on my education and experience with GIS, the Kīpuka maps provide reasonably accurate locations, shapes, and sizes of kuleana and TMK parcels. In other words, if one searches the database by LCA or TMK number, the map that appears is producing a reasonably accurate location, shape, and size of that particular parcel.

35. The Kīpuka application, as with any other GIS application, has its limitations. These limitations, however, are negligible in my professional opinion. Specifically, there is an inherent distortion with satellite imagery or any projected map or data due to the curvature of the Earth's surface. There are also errors in the source maps used due to the survey techniques of the time. A small distortion also occurs in the georeferencing process known as the root-mean-

square deviation that is minimized through standard practices. Due to these limitations, users may notice that the TMK and LCA map layers do not always coincide completely. The boundaries for one map may be slightly off from the boundaries for the other, although the location, shape, and size of that parcel is, in actuality, the same. A true and correct copy of an example of this phenomenon is attached hereto as Exhibit "8."

36. Despite the potential inconsistency between the maps' boundaries, the Kīpuka visualization is based on the best technology available and, in my professional opinion, provides a reasonably accurate spatial representation of LCA and TMK parcels and their relation to one another.

I declare under penalty of law that the foregoing is true and correct.

DATED: Honolulu, Hawai'i, February 4, 2016.

Zachary Smith

COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAI‘I

Surface Water Use Permit Applications, Integration of Appurtenant Rights and Amendments to the Interim Instream Flow Standards, Nā Wai ‘Ehā Surface Water Management Areas of Waihe‘e, Waiehu, ‘Īao, & Waikapū Streams, Maui	)	Case No. CCH-MA15-01 TESTIMONY OF HŌKŪAO PELLEGRINO

TESTIMONY OF HŌKŪAO PELLEGRINO

1. I submit this testimony to object to the financial and logistical hardships the Commission on Water Resource Management has imposed on pro-se community applicants for Nā Wai ‘Ehā surface water use permits, including the most egregious violation to date: requiring, in Minute Order No. 3, that applicants serve paper copies of every filing in this contested case on over one hundred other applicants.

2. I am Vice-President of Hui o Nā Wai ‘Ehā (“the Hui”), a party to this contested case, along with Maui Tomorrow Foundation (collectively, “the Community Groups”).

3. I, along with many of the kuleana water users in Nā Wai ‘Ehā are also individual parties to this contested case, having submitted surface water use permit applications (“SWUPAs”) in 2009. Many of these applicants are Hui members, as well as beneficiaries of the Office of Hawaiian Affairs (“OHA”).

4. For years, I have actively participated in the Community Groups’ and OHA’s legal fight to uphold the public trust and restore the waters of Nā Wai ‘Ehā. I also directly assisted many pro se applicants in completing their SWUPAs in 2008-2009, and in preparing updated testimonies for this contested case.

5. Through these experiences, and as a life-long resident of Waikapū with ʻohana across Nā Wai ʻEhā, I personally know almost every SWUPA applicant in Waikapū, and many more SWUPA applicants from the other three ʻahupuaʻa. Based on this personal knowledge, I confirm the following:

a. These applicants have engaged in good faith in the SWUPA process, which has dragged on for more than seven years, during which time many applicants have become frustrated with the process and some have even passed away.

b. These applicants are not represented by attorneys, and, if not for the repeated kōkua of the University of Hawaiʻi's William S. Richardson School of Law's Environmental Law Clinic, which devoted countless hours of volunteer legal assistance to these applicants in 2008-2009, and again in 2015-2016, these applicants would not have been able to submit their SWUPAs, or update their testimonies with the requirements imposed by the Commission in this contested case.

c. These applicants do not have the financial or logistical means to comply with the service process outlined in Minute Order No. 3, and they fear the consequences of their failure to comply. For example, I have been informed that one ʻohana is being forced to choose between paying their medical insurance premium or paying for the costs of service, including photocopying and mailing, that Minute Order No. 3 now imposes.

d. Due to the protracted history of this case, and the Commission's oppressive procedural requirements, many applicants are contemplating abandoning the contested case and their SWUPAs altogether. In fact, some of my own

relatives who filed SWUPAs back in 2009 have already become so frustrated with this process that they are no longer participating and will not be filing supplemental materials by February 5, 2016.

6. I attended the two prehearing conferences for this contested case on August 11, 2015 and November 5, 2015. As Minute Order No. 2 confirms, at the August meeting, "methods for reducing the burden of each applicant having to provide documents to all parties was discussed." Minute Order No. 2 further states that for those without "technical capability," "paper documents would be distributed and also converted to electronic files *by the Commission staff*." I, along with the other community applicants, took this to mean that we would not be required to serve other applicants by paper, but that the Commission would accept paper copies from, serve electronic copies on behalf of, and serve paper copies on, those who did not have the means to participate in the process electronically.

7. At the November prehearing conference, the service issue was raised again, and the Hearings Officer stated that he would not require applicants to serve a hundred other applicants by paper. I and other SWUPA applicants left that prehearing conference with the understanding that we would not be required to serve paper copies.

8. In an alarming about face, Minute Order No. 3, which came out over two months after the November prehearing conference, and just three weeks before the opening filing deadline, now requires paper service on those who have not opted for electronic service. According to the revised certificate of service posted just two days ago, by my calculation, applicants are required to serve over 80 applicants by mail.

9. These onerous service requirements could be easily rectified by implementing an "opt in" to paper service, as opposed to an "opt out" of paper service. In other words, the default should have been electronic service, unless an applicant requested paper.

10. Fortunately, the Environmental Law Clinic is assisting us with the filing of our opening testimonies, including preparing the two-hole punched original and the five three-ring-binder copies for the Commission, which, in and of itself is unduly burdensome and costly.

11. As for the service requirement, however, I along with every other pro-se applicant I know will not be able to comply with that part of Minute Order No. 3.