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## Division of Aquatic Resources East Maui Water Permit submittal comments

The Division of Aquatic Resources (DAR) has summarized information and conducted an evaluation of 12 East Maui Streams within the Huelo complex. Information was also provided for Puakea stream, however since this stream occurs within the Nahiku complex, it was excluded from the Huelo complex stream evaluation. With these comments DAR attempts to prioritize streams based on biological recovery potential, or in other words, which stream's restoration of flow would have the greatest benefit to aquatic resources. For this evaluation indigenous aquatic species and their habitat is of great importance. These include stream species such as oopu alamoo (*lentipes concolor*), oopu nopili (*Sicyopterus stimpsoni*), oopu nakea (*Awaous guamensis*), oopu naniha (*Stenogobius hawaiiensis*), opae kalaole (*Atyoida bisulcate*), opae oehaa (*Macrobrachium grandimanus*), hihiwai (*Neritina granosa*), and endangered damselflies (*Megalagrion spp.*). Although this is an evaluation of streams, the status of an estuary is directly tied to the status of the stream that feeds it. Therefore, estuary species such as aholehole (*Kuhlia xenura*), amaama (*Mugil cephalus*), moi (*Polydactylus sexfilis*), and others are also considered of great importance. To a lesser extent prawns (*Macrobrachium lar*) are considered. Although introduced, this species serves as an important food resource, consumed by many rural communities and adds to our State's food security.

Relative to other stream systems within the region of East Maui, little is known about the 12 Huelo complex systems, therefore the best available information was used for this evaluation. Additional studies are needed to better understand these systems and re-evaluate accordingly. To evaluate these systems, we considered information from three data sources: potential habitat units, geospatial assessment of available estuary habitat types, and input from DAR's Maui Stream Biologist.

Potential habitat units relate to the amount of habitat available within a stream during natural flow conditions. This data is derived from the East Maui Habitat Evaluation Study prepared by Parham (2019). A summary table of this information was provided by CWRM to DAR.

The geospatial assessment of available estuary habitat types was conducted by DAR staff. This analysis attempted to identify the presence of estuary bays (a setting where marine water is being intruded by freshwater, usually outside the stream mouth), and riverine estuaries (a setting where a stream is being intruded by marine water, usually landward of the stream mouth). Estuary bays was primarily determined by the two-dimensional shape of the coastline and the presences of a freshwater source. Riverine estuaries were primarily determined by the underlying slope of the stream near the coastline. From an estuary perspective, systems with multiple estuary types are valued higher.

Input from DAR's Maui Stream Biologist came from Skippy Hau. With the onset of expressed interest on these streams he initiated spot checks to quickly assess the aquatic resources. Although he was able to visit only six streams, the information provided was invaluable to this

effort. Additionally, based on Skippy's knowledge and experience, recommendations on streams recommended for prioritization of natural flow restoration was provided.

Although the presence of a terminal waterfall and geographic distribution were also considered, they were not weighed as heavily as other factors described above given that terminal waterfall may have a variety of influences on the distribution of native and non-native aquatic organisms. More studies related to terminal waterfalls would help to better understand the influence of these features on aquatic resources. The Huelo complex is predominantly represented by coastal terminal waterfalls, which is reflected in DAR's recommendation. Prioritization based on geographic distribution was also considered to ensure that high priority streams have a broad distribution across the east Maui coastline to promote estuarine productivity, and habitat and population connectivity.

The following summarizes the best available information on the 12 East Maui Streams of the Huelo complex in addition to Puakea stream of the Nahiku complex and prioritized (Huelo complex only) based on restoration potential and overall contribution to the ecosystem.

### **Kolea**

#### **Restoration Priority: Medium**

Kolea stream has the potential for 5,940 habitat units, which is in the mid-range relative to other streams in this evaluation. It abruptly enters marine waters on the open coast with a terminal waterfall. The estuarine area at this site is likely to be minimal. A recent stream check in October 2020 revealed an occurrence of prawns and important local food source. Due to a mid-potential for habitat units, a relatively small estuary, confirmed presence of a resources species, and lack of knowledge on this system, Kolea stream is of medium priority (6<sup>th</sup>) relative to other streams in this evaluation.

### **Punaluu (Puaaluu)**

#### **Restoration Priority: Low**

Punaluu or Puaaluu stream has the potential for zero habitat units, which is the lowest relative to other streams in this evaluation. It abruptly enters marine waters on the open coast with a terminal waterfall. The estuarine area at this site is likely to be minimal. This stream has not been visited by DAR recently. Due to a low potential for habitat units, a relatively small estuary, and lack of knowledge on this system, Punaluu stream is of low-priority (11<sup>th</sup>) relative to other streams in this evaluation.

### **Kaiea (Kaaiea)**

#### **Restoration Priority: Medium**

Kaiea or Kaaiea stream has the potential for 28,013 habitat units, which is in the upper range relative to other streams in this evaluation. It abruptly enters marine waters on the open coast with a terminal waterfall. The estuarine area at this site is likely to be minimal. A recent stream check in October 2020 revealed an occurrence of prawns and guppies (*Poecilia reticulata*).

Although Kaiea is in the upper tier for habitat units it is ranked as medium priority (5<sup>th</sup>) due to a relatively substantial diversion in this system.

### **Oopuola**

#### **Restoration Priority: High**

Oopuola stream has the potential for 20,616 habitat units, which is in the mid-range relative to other streams in this evaluation. It gradually enters marine waters at Makaiwa Bay, with no major barriers. Estuaries within this system are represented by a riverine estuary and estuarine bay. A recent stream check in October 2020 revealed an occurrence of juvenile oopu alamoo. Although Oopuola is in the mid-range for habitat units, it does have multiple estuary types, and a recent visit confirmed presence of indigenous aquatic resources. These considerations resulted in a high priority (3<sup>rd</sup>) relative to other streams in this evaluation. Additionally, it is important to note that the inclusion of this stream within the group of streams ranked as high priority maintains the appropriate ratio of streams with terminal waterfalls to streams with no major barriers near the coastline within the Huelo complex.

### **Puehu**

#### **Restoration Priority: Low**

Puehu stream has the potential for zero habitat units, which is in the lowest relative to other streams in this evaluation. It abruptly enters marine waters on the open coast with a terminal waterfall. The estuarine area at this site is likely to be minimal. This stream has not been recently visited by DAR staff. Due to a low potential for habitat units, relatively small estuary, and lack of knowledge on this system, Puehu stream is of low priority (10<sup>th</sup>) relative to other streams in this evaluation.

### **Nailiilihaele**

#### **Restoration Priority: High**

Nailiilihaele stream has the potential for 275,924 habitat units, which is the most relative to other streams in this evaluation. It abruptly enters marine waters at Kailua Bay with a terminal waterfall. An estuarine bay is found at the coastline of this system. A recent stream check in October 2020 revealed an occurrence of oopu nakea, opae kalaole, guppies, prawns, and swordtails (*Xiphophorus helleri*). This stream has a high potential for habitat units, an identified estuary, and a recent confirmed presence of indigenous aquatic resources. These considerations resulted in a high priority ranking (1a<sup>st</sup>) for Nailiilihaele relative to other streams in this evaluation. It is important to note that Nailiilihaele ends in the same bay as Kailua, which was also evaluated as a high priority stream. This should be considered in determining which streams to restore flows in order to ensure a broader distribution of restoration efforts within the Huelo complex. In other words, either Nailiilihaele or Kailua should be restored, not both, due to their adjacent proximity. This is why both Nailiilihaele and Kailua received similar (1a<sup>st</sup>) ranking.

**Kailua****Restoration Priority: High**

Kailua stream has the potential for 130,209 habitat units, which is in the upper range relative to other streams in this evaluation. It abruptly enters marine waters at Kailua Bay with a terminal waterfall. An estuarine bay is found at the coastline of this system. A recent stream check in October 2020 revealed an occurrence of prawns. This stream has a high potential for habitat units, an identified estuary, and recent confirmed presence of a resource species. These considerations resulted in a high priority ranking (1b<sup>st</sup>) for Kailua relative to other streams in this evaluation. It is important to note that Kailua ends in the same bay as Nailiilihaele. Nailiilihaele is also ranked as high priority. This should be considered in determining which streams to restore flows in order to ensure a broader distribution of restoration efforts within the Huelo complex. In other words, either Nailiilihaele or Kailua should be restored, not both, due to their adjacent proximity. This is why both Nailiilihaele and Kailua received similar (1b<sup>st</sup>) ranking.

**Hanahana (Hanawana)****Restoration Priority: Medium**

Hanahana or Hanawana stream has the potential for 2,633 habitat units, which is in the lower range relative to other streams in this evaluation. It gradually enters marine waters at Hanawana Bay, with no major barriers. Estuaries within this system are represented by a riverine estuary and estuarine bay. This stream has not been recently visited by DAR staff. Due to the combination of multiple estuaries, low potential for biological units, and limited biological information Hanahana stream received a medium priority ranking (7<sup>th</sup>).

**Hoalua****Restoration Priority: Medium**

Hoalua stream has the potential for 24,959 habitat units, which is in the mid-range relative to other streams in this evaluation. It enters marine waters at Hoalua Bay with no major barrier. An estuarine bay is found at the coastline of this system. This stream has not been recently visited by DAR staff. Due to the presence of an estuarine bay and limited biological information Hoalua stream received a mid-priority ranking (4<sup>th</sup>).

**Waipio****Restoration Priority: Low**

Waipio stream has the potential for 3,211 habitat units, which is in the mid-range relative to other streams in this evaluation. It abruptly enters marine waters at Waipio Bay with a terminal waterfall. An estuarine bay is found at the coastline of this system. This stream has not been recently visited by DAR staff. With a medium potential for habitat units and limited biological information, Waipio stream received a low priority ranking (8<sup>th</sup>).

**Mokupapa****Restoration Priority: Low**

Mokupapa stream has the potential for zero habitat units, which is the lowest relative to other streams in this evaluation. It enters marine waters on the open coast with no major barrier. The estuarine area at this site is likely to be minimal. This stream has not been recently visited by staff from DAR. Due to a low potential for habitat units, a relatively small estuary, and lack of knowledge on this system, Mokupapa stream is of low priority (9<sup>th</sup>) relative to other streams in this evaluation.

**Hoolawa****Restoration Priority: High**

Hoolawa stream has the potential for 225,737 habitat units, which is in the upper range relative to other streams in this evaluation. It abruptly enters marine waters at Hoolawa Bay, with a terminal waterfall. Estuaries within this system are represented by a riverine estuary and estuarine bay. A recent stream check in October 2020 revealed an occurrence guppies, prawns, and swordtails. This stream has a high potential for habitat units, multiple estuary types, and recent confirmed presence of a resource species. These considerations resulted in a high priority ranking (2<sup>nd</sup>) for Hoolawa relative to other streams in this evaluation.

**Puakea****Restoration Priority: Not Included in Ranking**

Puakea stream has the potential for 17,270 habitat units. It gradually enters marine waters at a bay with no major barriers. Estuaries within this system are represented by a riverine estuary and estuarine bay. This stream has not been recently visited by DAR staff. Puakea stream is part of the Nahiku complex, located quite a distance away from the Huelo complex. Due to the large distance from the other streams described above, it was omitted from the Huelo complex stream evaluation and was not prioritized.