Supplemental Expert's Report/Declaration of Michael Kido
February 27, 2020

Since submitting my Declaration in October 2019, I have reviewed James Parham's Assessment of the Environmental Impact of Stream Diversions on 33 East Maui Streams using the Hawaiian Stream Habitat Evaluation Procedure (HSHEP) Model (June 8, 2019), including the appendices that were omitted from Alexander & Baldwin's Draft Environmental Impact Statement.

Parham recognizes that stream diversions cause "the loss of instream habitat from constriction or diversion of stream flow, creation of barriers to stream animal upstream movement and entrainment of downstream drifting larvae." He notes: "The diversions and aqueduct system were built to capture 100% of normal low flow plus some smaller amount of storm runoff." For the 13 streams that were not subject to the 2018 CWRM decision, Parham concludes: " Under the Full Diversion Scenario only 15% of the habitat units remain than compared to the Natural Flow Scenario in this group of streams. The loss of habitat was both from loss of instream habitat to water diversion and to passage and entrainment issues at each diversion." Although Parham's quantified the harm, his overall conclusion is no different than mine. The quantification Parham provides is particularly important because native aquatic organisms do not return to the same stream from where they emerged; thus the impact is cumulative across a broad geographic region.

During the period of February 25-27, 2020, I visited EMI diversion sites on Hoolawa Nui, Hoolawa Ili, Hoalua, Hanehoi, Oopuola, Waikamoi (Alo Tributary), Puohokamoa, Kolea, Waiohue, East Kopiliula, West Kopiliula and East Wailuaiki Streams. The site visit confirmed my prior conclusion regarding the negative impacts that EMI stream diversions are having on native Hawaiian amphidromous stream fish and macroinvertebrates that require continuous streamflow connection from mauka watersheds to the ocean. Post larval individuals recruiting into streams from the ocean aggressively migrate to preferred habitat locations along the stream continuum from mountain-to-sea. Depending upon species, reproductively mature adults must also migrate from these preferred mauka habitat locations to downstream locations to spawn and newly hatched larvae must enter the ocean in order complete their development.

Major diversion structures observed typically incorporated a steel grate over a concrete-line channel embedded to bisect the streambed itself which directed captured flow into a particular ditch system depending on location. Water diversion was observed into the Wailoa, New Hamakua, Center, Spreckles, and Koolau Ditches at various elevations depending upon stream and elevation. In every case this type of diversion structure was impassible by upstream migrating native fish and macroinvertebrates which would fall through the grate into the ditch and be transported into the irrigation system. Similarly, downstream migrating reproductively-mature adults seeking preferred low elevation spawning habitat (like the 'o'opu-nakea) would be captured and transported away from the stream. Any larvae hatching in a stream location above a diversion structure would similarly be captured by the ditch system.

In stream diversion locations where 100 % of flow is captured (e.g. Hoolawa Ili and Hoolawa Nui Streams at New Hamakua Ditch) the streambed was observed to be dry to varying distances below the diversion. The dry stream channel obviously acts as an effective type of physical barrier to migrating native fish and macroinvertebrates.

Other examples of problematic features of diversion structures observed include pipe culverts that extend beyond the wall barriers and water flow-over barriers which create spaces not in contact with wall structures both of which upstream migrating native stream animals cannot negotiate to pass to upstream stream reaches.

On February 25, 2020, I was able to observe the overall effects of water diversion on Hoolawa Stream, including three of its tributaries, at various elevations by the Wailoa, New Hamakua and Haiku Ditches. The EMI ditch system effectively disconnected flow to the ocean at several elevations along the natural stream continuum. At Hoolawa Nui (Intake W-19) the diversion structure took 100% of the water in the stream. The same was true for one branch of Hoolawa Nui at intake W-20. These conditions made it virtually impossible for native fish and macroinvertebrates to make it past diversion structures (either swimming upstream, or downstream) to reach preferred habitat as well as make any existing populations more vulnerable to capture by the intersecting ditches. Below both intakes, stagnant pools of water created provide opportune mosquito breeding grounds. In the section of Hoolawa Stream historically diverted by the Haiku Ditch (near the old Hana Highway) water was allowed more recently to flow past the diversion structure creating flowing stream habitat which presumably reaches the ocean. In this flow-restored reach I observed one juvenile ‘o’opu-nakea which I assumed fairly recently had recruited in from the ocean.

In all stream reaches dewatered below by EMI diversion structures, I conducted limited visual reconnaissance in shallow water above diversions when possible walking along the stream bank with polarized glasses. I observed no native stream fish or macroinvertebrates in good habitat where high population densities should exist. In these reaches, underwater visual census (UVC) should be conducted at some future time to determine the extent to which populations of native stream animals exist.

Therefore, direct observation of stream diversion by the EMI ditch system conducted on select East Maui streams (2/25-2/27/20) substantiate my belief that the diversion structures deployed have: 1) severely disrupted natural flow regimes; 2) degraded ecological habitat making conditions conducive to alien aquatic species and; 3) limited the mountain-to-sea connectivity required by native stream fish and macroinvertebrates. The result over time has been to severely degrade the biological integrity of East Maui streams which is characterized by the absence of robust populations of native fish and macroinvertebrates expected along the stream continuum from mountain-to-sea.

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