



STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
COMMISSION ON WATER RESOURCE MANAGEMENT  
Stream Protection and Management Branch

**FIELD INVESTIGATION REPORT**  
FI2008120903 (East Maui, Waiokamilo Koolau Ditch)

<b>Date of Field Investigation:</b>	December 9, 2008	<b>Time (24-hour):</b>	1230 - 1550
<b>CWRM Staff:</b>	Ken Kawahara, Ed Sakoda, Dean Uyeno, and Chui Ling Cheng		
<b>Individuals Present:</b>	EMI - Garret Hew (Water Resources Manager), Mark Vaught (Operations Manager), Henry Robello (Field Superintendent);		
<b>Hydrologic Unit:</b>	Waiokamilo (6055)		
<b>Stream Name:</b>	Waiokamilo Stream		
<b>Findings:</b>	<p>The purpose of this field visit was to document the Koolau Ditch major and minor diversion structures on Waiokamilo Stream and its tributaries. The following lists the diversions that were visited with a brief description of each.</p> <ol style="list-style-type: none"> <li>1. Time: 1230 hours. Minor diversion (K-22a) on a tributary of Waiokamilo Stream. Water from the stream used to pond upstream of a concrete wall about 1 foot high and 6 feet wide. When the water level in the pond reached high enough, water would flow through a 6-inch aluminum and PVC pipe on the right stream bank. The pipe transported water from this stream to a tributary of East Waiokamilo Stream further East. At this field visit, about one foot of the concrete wall on the left bank was broken to allow continuous flow of water in the stream through the diversion structure. A section of the PVC pipe on the right bank was broken to sever diversion of streamflow. Based on staff's observation, minor diversion K-22a is no longer functional and not diverting water from this tributary of Waiokamilo Stream. See photos 20081209031 – 20081209042.</li> <li>2. Time: 1320 hours. Major diversion (K-22, #10 intake) on a tributary of East Waiokamilo Stream, formerly referred to as Kualani Stream. In the next field visit (refer to FI2008120904), CWRM staff confirmed that this stream is not Kualani Stream and that the headwaters of Kualani begins below Koolau Ditch. The diversion structure is concrete with a metal grate on the streambed at the left bank. Water would pond upstream from the sluice gate and flow through the metal grate into Koolau Ditch. A 6-inch PVC pipe is on the left bank. This pipe originates from the minor diversion (K-22a) on a tributary of Waiokamilo Stream as described in #1. At this field visit, the PVC pipe was broken and no water flowed in the pipe. The metal grate on the left bank was sealed with concrete. Based on staff's observation, major diversion (K-22, #10 intake), formerly referred to as Kualani Stream, is no longer functional and not diverting from this tributary of East Waiokamilo Stream. See photos 20081209043 – 20081209054.</li> <li>3. Time: 1358 hours. Minor diversion on a tributary of Waiokamilo Stream. A small PVC pipe crosscut intake that used to divert water from a tributary of Waiokamilo Stream. The diversion outfall was along the side of the service road. At this field visit, the PVC pipe was not capped and water was seen flowing out of the pipe. Based on staff's observation, the pipe is no longer diverting water from this tributary of Waiokamilo Stream. See photo 20081209055.</li> <li>4. Time: 1400 hours. Koolau Ditch major diversion (K-23, #11 intake) on Waiokamilo Stream. Water from Waiokamilo Stream used to fall down a cliff and directly into Koolau Ditch. A wooden gate was built closer to the service road in the access tunnel. At this field visit, the wooden gate was moved closer to the ditch. As a result, water from the stream fell outside of the ditch and flowed downstream through the access tunnel. Based on staff's observation, this water is no longer diverted into the ditch. However, there was a small gap between the wooden gate and the ground, allowing water from the ditch to flow through the gate and downstream in the access tunnel. EMI staff used mud and vegetation to seal the leakage temporarily. See photos 20081209056 - 20081209065.</li> <li>5. Time: 1422 hours. Water from Waiokamilo Stream flowed from above a cliff and then goes under the service road. Below the waterfall was a pond and a small PVC pipe was submerged in the pond. CWRM staff observed the other end of the pipe and it was not capped. According to EMI, this water was never diverted and that the pipe was mistakenly discarded there. Based on staff's observation, this water is not diverted into Koolau Ditch. See photos 20081209068 - 20081209076.</li> <li>6. Time: 1425 hours. Koolau Ditch major diversion (K-24, #12 intake) on Waiokamilo Stream. The diversion structure is concrete with a sluice gate mounting (head wall) that was on the service road. Water from the stream would flow down the side of the mountain and into the ditch. With the sluice gate removed and the</li> </ol>		

intake sealed with cement, water continued to flow downstream. Based on staff's observation, major diversion #12 intake (K-24) is no longer functional and not diverting water from Waiokamilo Stream. See photos 20081209077 - 20081209084.

7. Time: 1435 hours. Minor diversion on Waiokamilo Stream. This is a crosscut #12 intake diversion structure with a small PVC pipe that captured seepage and transported water into Koolau Ditch. Very little water was observed. Based on staff's observation, this crosscut intake is no longer in operation. See photos 20081209085 and 20081209086.
8. Time: 1440 hours. Koolau Ditch major diversion (K-25, Kikokiko intake) on Waiokamilo Stream and the minor diversions. Water from Waiokamilo Stream would flow down a small waterfall and into the main intake structure on the left bank below the falls. A minor diversion (K-25a) is located on the left bank of the stream under the service road bridge. The diversion structure is a concrete catchment basin with a 2-inch pipe intake that would capture seepage and transported that water via a PVC pipe into another catchment basin below the service road. A second minor diversion (K-25c) begins mauka of the service road bridge on the left bank and then crossed over to the right bank. The diversion structure is a concrete catchment basin with a 6-inch pipe intake that would capture seepage and transported that water to Koolau Ditch. A third minor diversion (K-25d) is located further West along the service road. This diversion structure is a concrete catchment basin with a 4-inch PVC pipe that would capture seepage and transported that water to Koolau Ditch. A fourth minor diversion (K-25e) is located 20 feet West of minor diversion K-25d. This diversion structure is a concrete catchment basin with a 3-inch PVC pipe that would capture seepage and transported that water to Koolau Ditch. Based on staff's observation, the Kikokiko intake and the minor diversions are no longer functional because either the intakes were cemented and / or the pipes were severed. See photos 20081209088 and 20081209102.
9. Time: 1543 hours. Koolau Ditch minor diversion (K-23a) on Waiokamilo Stream. The diversion structure is a 4-inch PVC pipe intake located east of #11 intake (K-23). The outfall of the minor diversion was not capped and very little water was flowing out of the pipe. Based on staff's observation, this minor intake is no longer in operation. See photo 20081209104.
10. Time: 1548 hours. Koolau Ditch #10 crosscut minor intake (K-22d) on Waiokamilo Stream. The outfall of the minor diversion was not capped and no water was flowing out of the pipe. Based on staff's observation, this minor intake is no longer in operation. See photo 20081209105.

Staff completed documentation of the Waiokamilo diversion structures at 1550 hours. Staff continued to locate Kualani Stream from the service road. Refer to Field Investigation Report FI2008120904 (East Maui, Kualani) for more information.

**Image Listing:** (Attach PDF of image contact sheet)

<b>File Name:</b>	<b>Brief Description:</b>
20081209031	View of Keanae Valley from the service road.
20081209035	Minor diversion on a tributary of Waiokamilo Stream (K-22a). A 6-inch aluminum PVC pipe diverts water to a tributary of East Waiokamilo Stream, formerly known as Kualani Stream.
20081209037	Tributary of Waiokamilo Stream downstream of the minor diversion K-22a.
20081209038	Minor diversion on a tributary of Waiokamilo Stream (K-22a). A 6-inch aluminum PVC pipe diverts water to a tributary of East Waiokamilo Stream, formerly known as Kualani Stream.
20081209039	Concrete wall of the minor diversion on a tributary of Waiokamilo Stream (K-22a). This section of the concrete wall is broken sever diversion of water and allow continuous flow of water in the stream.
20081209040	Minor diversion on a tributary of Waiokamilo Stream (K-22a). This section of the 6-inch aluminum PVC pipe is broken sever diversion of water from the stream.
20081209041	Minor diversion on a tributary of Waiokamilo Stream (K-22a). This section of the 6-inch aluminum PVC pipe is broken sever diversion of water from the stream.
20081209042	Minor diversion on a tributary of Waiokamilo Stream (K-22a). A 6-inch aluminum PVC pipe diverts water to a tributary of East Waiokamilo Stream, formerly known as Kualani Stream.
20081209043	Tributary of East Waiokamilo Stream upstream of the Koolau Ditch major diversion #10 intake (K-22).
20081209045	Koolau Ditch major diversion (K-22, #10 intake) on a tributary of East Waiokamilo Stream. Metal grate on the left streambank has been sealed with concrete.
20081209046	Koolau Ditch major diversion (K-22, #10 intake) on a tributary of East Waiokamilo Stream.
20081209047	Koolau Ditch major diversion (K-22, #10 intake) on a tributary of East Waiokamilo Stream.
20081209049	Koolau Ditch major diversion (K-22, #10 intake) on a tributary of East Waiokamilo Stream.
20081209050	Koolau Ditch major diversion (K-22, #10 intake) on a tributary of East Waiokamilo Stream.
20081209051	Tributary of East Waiokamilo Stream downstream of the Koolau Ditch major diversion (K-22, #10 intake).
20081209052	Koolau Ditch major diversion (K-22, #10 intake) on a tributary of East Waiokamilo Stream. A 6-inch PVC pipe outfall is located on the left bank. This pipe transported water from a tributary of Waiokamilo Stream at minor diversion K-22a to this stream.
20081209054	Tributary of East Waiokamilo Stream downstream of the Koolau Ditch major diversion (K-22, #10 intake). With the diversion structure sealed shut, water was seen flowing through the sluice gate and out the side of

	the mountain.
20081209055	Minor diversion on a tributary of Waiokamilo Stream. A #10 crosscut intake pipe that used to divert water from Waiokamilo Stream.
20081209056	Koolau Ditch major diversion on Waiokamilo Stream (K-23, #11 intake).
20081209059	Koolau Ditch major diversion on Waiokamilo Stream (K-23, #11 intake).
20081209060	Waiokamilo Stream downstream from Koolau Ditch major diversion #11 intake (K-23).
20081209061	Board gates of the Koolau Ditch access tunnel at #11 intake (K-23) to prevent water from flowing into the ditch.
20081209062	Waiokamilo Stream above the Koolau Ditch major diversion #11 intake (K-23).
20081209063	Waiokamilo Stream above the Koolau Ditch major diversion #11 intake (K-23). Water from the stream was falling outside of the access tunnel and flowing downstream.
20081209064	Waiokamilo Stream downstream from Koolau Ditch major diversion #11 intake (K-23) and the access tunnel.
20081209065	Ken Kawahara in front of the board gates of the Koolau Ditch access tunnel at #11 intake (K-23).
20081209068	Tributary of Waiokamilo Stream flowed from above a cliff and then under the service road.
20081209074	Tributary of Waiokamilo Stream flowed from above a cliff and then under the service road. Below the waterfall was a pond and a small PVC pipe was submerged in the pond.
20081209076	Tributary of Waiokamilo Stream flowed from above a cliff and then under the service road. Below the waterfall was a pond and a small PVC pipe was submerged in the pond.
20081209077	Seepage near the Koolau Ditch access tunnel and major diversion structure on Waiokamilo Stream (K-24, #12 intake).
20081209079	Upstream of the Koolau Ditch major diversion structure on Waiokamilo Stream (K-24, #12 intake).
20081209081	Sluice gate mounting (head wall) of the Koolau Ditch major diversion structure on Waiokamilo Stream (K-24, #12 intake).
20081209082	Water from Waiokamilo Stream flowed downstream of the Koolau Ditch major diversion structure (K-24, #12 intake).
20081209083	Downstream of the Koolau Ditch major diversion structure on Waiokamilo Stream (K-24, #12 intake).
20081209084	Akeke Springs viewed from the service road.
20081209085	Koolau Ditch #12 crosscut intake on Waiokamilo Stream.
20081209086	Downstream from the Koolau Ditch #12 crosscut intake on Waiokamilo Stream.
20081209088	Koolau Ditch Kikokiko intake structure on Waiokamilo Stream (K25). PVC pipe and catchment basin below the service road that used to capture seepage from upstream.
20081209089	
20081209090	Bridge where Waiokamilo Stream crosses the service road.
20081209091	Waiokamilo Stream upstream of the service road.
20081209092	Minor diversion K-25c on the right bank of Waiokamilo Stream at Kikokiko intake.
20081209093	Waiokamilo Stream downstream of the service road.
20081209094	Koolau Ditch Kikokiko minor intake structure on Waiokamilo Stream. PVC pipe and catchment basin below the service road that used to capture seepage from upstream. The pipe from minor diversion K-25c can be seen in this photo.
20081209096	Koolau Ditch Kikokiko minor intake structure K-25a on Waiokamilo Stream. PVC pipe and catchment basin below the service road bridge that used to capture seepage from upstream.
20081209098	Koolau Ditch Kikokiko minor intake structure K-25d on Waiokamilo Stream. PVC pipe and catchment basin further West along the service road that used to capture seepage and transport to Koolau Ditch.
20081209099	Koolau Ditch Kikokiko minor intake structure K-25e on Waiokamilo Stream. PVC pipe and catchment basin 20 feet West of minor diversion K-25d along the service road that used to capture seepage and transport to Koolau Ditch.
20081209101	Main Kikokiko 6-inch intake pipe that used to divert water from Waiokamilo Stream to Koolau Ditch.
20081209102	Main Kikokiko 6-inch intake pipe that used to divert water from Waiokamilo Stream to Koolau Ditch.
20081209104	Koolau Ditch minor diversion on Waiokamilo Stream (K-23a). The diversion structure is a 4-inch PVC pipe intake located East of #11 intake.
20081209105	Koolau Ditch #10 crosscut minor intake on Waiokamilo Stream (K-22d).

**GPS Listing:**

**Shapefiles:** (List file names of all shapefiles created and a brief description of each)

**File Name:**

East\_Maui\_POI.shp

**Brief Description:**

Points of interest (POI) recorded with the GPS unit during the field visit. The file includes POI recorded from all the East Maui field investigations.

**Waypoints:** (List all waypoints in decimal degrees and provide a brief description of each)

<b>WP No.</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Brief Description:</b>
62	20.826608	-156.148956	EMI Diversion Intake K-22a
63	20.825728	-156.148713	EMI Diversion Intake K-22
64	20.825253	-156.152109	EMI Diversion Intake K-23a
65	20.825189	-156.152246	EMI Diversion Intake K-23
66	20.825028	-156.153359	Tributary to Waiokamilo Stream
67	20.824967	-156.153979	EMI Diversion Intake K-24
68	20.825016	-156.156391	EMI Diversion Intake K-25
69	20.82667	-156.149231	EMI Diversion Intake K-22d
70	20.826736	-156.149705	EMI Diversion Intake K-22e
71	20.826463	-156.1502	EMI Diversion Intake K-22f
72	20.826265	-156.150514	EMI Diversion Intake K-22g

**Attachments:**

**Brief Description:**

1. Image Contact Sheet

**Recommendations:**

# IMAGE CONTACT SHEET



**20081209031.JPG**



**20081209035.JPG**



**20081209037.JPG**



**20081209038.JPG**



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**20081209040.JPG**



**20081209041.JPG**



**20081209042.JPG**



**20081209043.JPG**



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# IMAGE CONTACT SHEET



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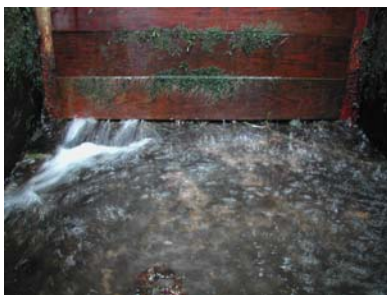
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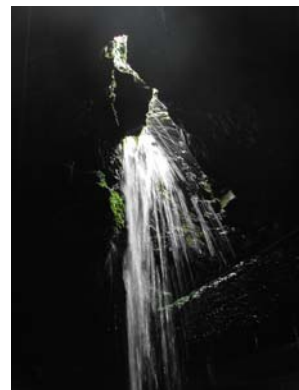
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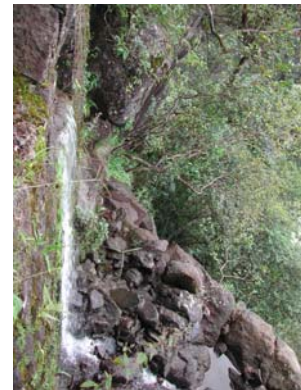
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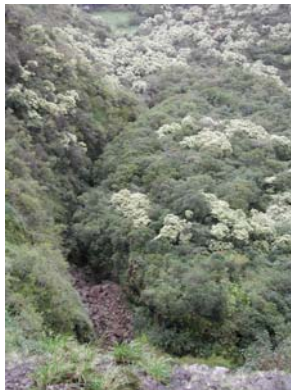
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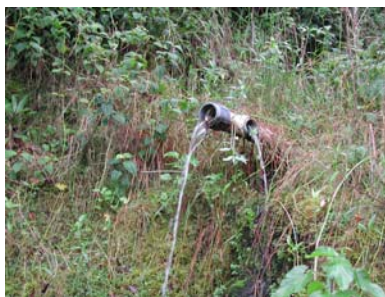
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