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

FIELD INVESTIGATION REPORT

FI2008120802 (East Maui, West Wailuanui Koolau Ditch)

Date of Field Investigation: December 8, 2008 **Time** (24-hour)**:** 1140 - 1330	
CWRM Staff:	Ken Kawahara, Ed Sakoda, Dean Uyeno, and Chui Ling Cheng
Individuals Present:	EMI - Garret Hew (Water Resources Manager), Mark Vaught (Operations Manager), Henry Robello (Field Superintendent); DOCARE officers
Hydrologic Unit:	Wailuanui (6056)
Stream Name:	West Wailuanui Tributary

Findings:

At 1140 hours, everyone arrived at the Koolau Ditch bypass sluice gate on West Wailuanui tributary. CWRM staff measured the dimensions of the sluice gate opening to be 2.8 x 3.0 feet (W x H). The depth of water at the sluice gate was 0.30 feet.

CWRM staff inspected the stream reach upstream of the sluice gate and did not find a location suitable for measuring streamflow. Approximately 400 feet upstream of the sluice gate is a waterfall. The stream reach downstream of the sluice gate is inaccessible. Staff decided to take flow measurements just 2 feet upstream of the sluice gate. The right bank of the channel is concrete lined. The left bank had minor seepage from ponded water downstream of the weir. EMI staff gathered banana stalks and large rocks, and placed them on the left bank to decrease the seepage.

CWRM staff prepared the site for flow measurement. The site was not flagged because this location was not intended to be an IIFS site. Staff completed the entire flow measurement in 40 minutes. Staff also recorded air temperature, water temperature and weather conditions. As computed back in the Honolulu Office, the flow was 1.235 cubic feet per second (0.798 million gallons per day), with no gage height readings.

The recorded flow measurement is an estimate of the discharge in West Wailuanui tributary. Staff compared this flow with the discharge in East Wailuanui tributary (refer to FI2008120801) and that at the IIFS Site on Wailuanui Stream (refer to FI2008120803) to assess flow gains or losses in the stream reach between Koolau Ditch and the IIFS Site. This is discussed in Field Investigation Report FI2008120803 (East Maui, Wailuanui IIFS Site).

Staff left West Wailuanui tributary at approximately 1330 hours, and proceeded to measure streamflow at the IIFS Site on Wailuanui Stream. Refer to Field Investigation Report FI2008120803 (East Maui, Wailuanui IIFS Site) for more information.

Image Listing: (Attach PDF of image contact sheet)

File Name:	Brief Description:
20081208014	Koolau Ditch bypass sluice gate in West Wailuanui tributary.
20081208015	Koolau Ditch bypass sluice gate in West Wailuanui tributary.
20081208016	CWRM staff conducting flow measurement 2 feet upstream of the Koolau Ditch bypass sluice gate in West Wailuanui tributary.
20081208017	CWRM staff conducting flow measurement 2 feet upstream of the Koolau Ditch bypass sluice gate in West Wailuanui tributary.
20081208019	Weir upstream of the Koolau Ditch bypass sluice gate in West Wailuanui tributary.
20081208020	Seepage upstream of the Koolau Ditch bypass sluice gate in West Wailuanui tributary.
20081208021	Ponded water downstream of the weir at the Koolau Ditch bypass sluice gate in West Wailuanui tributary.
20081208022	CWRM staff conducting flow measurement 2 feet upstream of the Koolau Ditch bypass sluice gate in West Wailuanui tributary.
20081208023	CWRM staff conducting flow measurement 2 feet upstream of the Koolau Ditch bypass sluice gate in West Wailuanui tributary.
20081208024	CWRM staff conducting flow measurement 2 feet upstream of the Koolau Ditch bypass sluice gate in West Wailuanui tributary.
20081208026	CWRM staff conducting flow measurement 2 feet upstream of the Koolau Ditch bypass sluice gate in West Wailuanui tributary.

GPS Listing:

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

File Name:	Brief Description:
East_Maui_POI.shp	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)

WP No.	Latitude	Longitude	Brief Description:

Attachments:

Brief Description:

1. Image Contact Sheet
2. Discharge Measurement and Gage Inspection Notes

Recommendations:

IMAGE CONTACT SHEET

20081208014.JPG

20081208015.JPG

20081208016.JPG

20081208017.JPG

20081208019.JPG

20081208020.JPG

20081208021.JPG

20081208022.JPG

20081208023.JPG

20081208024.JPG

20081208026.JPG

Form 9-275F
(Apr. 2001)

U.S. DEPARTMENT OF THE INTERIOR
U.S. Geological Survey
WATER RESOURCES DIVISION
DISCHARGE MEASUREMENT AND GAGE INSPECTION NOTES

Meas. No. _____

Comp. by Chui

Checked by DDW

Sta. No. W. Wailuanui

Sta. Name W. Wailuanui Str, 2ft upstream from sluice gate

Date 12/8, 2008 Party Dean(M) Ed, Chui, Ken

Width 3.55 Area 1.232 Vel. 1.00 G.H. _____ Disch. 1.235 CFS

Method Wading No. secs. 40 G.H. change _____ in _____ hrs.

Method coef. _____ Horiz. angle coef. _____ Susp. _____ Tags checked _____

Meter Type _____ Meter No. _____ Meter _____ ft. above bottom of wt.

Rating used _____ Spin test before meas. _____ ; after _____

Meas. plots _____ % diff. from rating no. _____ Indicated shift _____

GAGE READINGS						
Time					Inside	Outside
	Start	LEW	@	1224		
	Finish	REW	@	1309	~	40 min
Weighted MGH						
GH correction						
Correct MGH						

Samples collected: water quality, sediment, biological, other _____

Measurements documented on separate sheets: water quality, aux./base gage, other _____

Rain gage serviced/calibrated ____

Weather: sunny

Air Temp. 23 °C at 1225

Water Temp. 19 °C at 1307

Check bar/chain found _____

Changed to _____ at _____

Correct _____

Wading, cable, ice, boat, upstr., downstr., side bridge, 2 ft, mi. upstr., downstr. of gage. sluice gate

Measurement rated excellent (2%), good (5%), fair (8%), poor (> 8%); based on following conditions: Flow: parts laminar, not very uniform, multiple seepages

Cross section: bedrock, cobble, dirt, fairly uniform, 1 ft upstream of measureng site the channel is at angle, multiple seepages, straight channel

Gage operating: _____ Record Removed _____

Battery voltage: _____ Intake/Orifice cleaned/purged: _____

Bubble-gage pressure, psi: Tank _____, Line _____ ; Bubble-rate _____ /min.

Extreme-GH indicators: max _____, min _____.

CSG checked: _____ HWM height on stick _____ Ref. elev. _____ HWM elev. _____

HWM inside/outside: _____

Control: _____

Remarks: banana stalks & boulders placed on left bank to decrease seepage ; measured from top of nail to water surface = 0.39 inches ft.

GH of zero flow = GH _____ - depth at control _____ = _____ ft., rated _____

Sheet No. _____ of _____ sheets

.0 .10 .20 .30 .40 .50 .60 .70 .75

River at -

	ANGLE COEFFICIENT	DIST. FROM INITIAL POINT	WIDTH	DEPTH	OBSERVATION DEPTH	REVOLUTIONS	TIME IN SECONDS	VELOCITY AT POINT	VELOCITY MEAN IN VERTICAL	ADJUSTED FOR HOR. ANGLE OR	AREA	DISCHARGE	
		LEW	@	1224									.80
													.85
		1.05	.025	0.30					0		.008	0	
		1.1	.075	0.32			40		0.18		.024	.004	
		1.2	.1	0.33			40		0.21		.033	.007	.90
		1.3	.1	0.40			40		0.22		.040	.009	.92
		1.4	.1	0.39			40		0.34		.039	.013	
		1.5	.1	0.39			40		0.30	.183	.039	.012	.94 .045
		1.6	.1	0.38			40		0.44		.038	.017	.96
		1.7	.1	0.35			40		0.44		.035	.015	.97
		1.8	.1	0.33			40		0.62		.033	.020	.98
		1.9	.1	0.32			40		0.70	.321	.032	.022	.99 .119
		2.0	.1	0.35			40		0.83		.035	.029	
		2.1	.1	0.36			40		0.75		.036	.027	
⊙		2.2	.1	0.37			40		0.80	.429	.037	.030	1.00 .205
		2.3	.1	0.39			40		0.74		.039	.029	
		2.4	.1	0.38			40		0.84		.038	.032	
		2.5	.1	0.36			40		0.90		.036	.032	.99
		2.6	.1	0.33			40		1.15	.575	.033	.038	.98 .336
		2.7	.1	0.33			40		0.96		.033	.032	.97
		2.8	.1	0.33			40		1.08		.033	.036	.96
		2.9	.1	0.33			40		1.12		.033	.037	
		3.0	.1	0.34			40		1.23	.708	.034	.042	.94 .483
		3.1	.1	0.35			40		1.26		.035	.044	.92
		3.2	.1	0.35			40		1.30		.035	.046	.90
		3.3	.1	0.33			40		1.43		.033	.047	
		3.4	.1	0.33			40		1.26		.033	.042	
		3.5	.1	0.33			40		1.23	.877	.033	.041	.85 .703
		3.6	.1	0.34			40		1.28		.034	.044	
		3.7	.1	0.35			40		1.12		.035	.039	
		3.8	.1	0.36			40		1.21		.036	.044	.80 .93
		3.9	.1	0.38			40		1.21	1.02	.038	.046	.876

.0 .10 .20 .30 .40 .50 .60 .70 .75

River at -

ANGLE COEF. FICIENT	DIST. FROM INITIAL POINT	WIDTH	DEPTH	OBSERVATION DEPTH	REVOLUTIONS	TIME IN SECONDS	VELOCITY AT POINT	VELOCITY MEAN IN VERTICAL	ADJUSTED FOR HOR. ANGLE OR	AREA	DISCHARGE	
	4.0	.1	0.37			40		1.38	1.057	.037	.051	.927
	4.1	.1	0.35			40		1.55		.035	.054	.85
	4.2	.1	0.34			40		1.73		.034	.059	
	4.3	.1	0.31			40		2.04	1.157	.031	.063	1.103
	4.4	.1	0.30			40		2.19		.030	.066	.90
	4.5	.1	0.30			40		2.21	1.217	.030	.066	.92
	4.6	.05	0.30							.015		.94
	3.55	3.55					AVE =	1.00		1.232	1.235	
												.96
	REW	@	1309									.97
												.98
												.99
⊙												1.00
												.99
												.98
												.97
												.96
												.94
												.92
												.90
												.85
												.80