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

FIELD INVESTIGATION REPORT

FI2009021103 (East Maui, Huelo IIFS Site A)

Date of Field Investigation: February 11, 2009 **Time** (24-hour)**:** 1000 - 1200	
CWRM Staff:	Ed Sakoda, Dean Uyeno, and Chui Ling Cheng
Individuals Present:	Ernie Schupp, Garret Hew
Hydrologic Unit:	Hanehoi (6037)
Stream Name:	Puolua (Huelo) Stream

Findings:

At 1000 hours, CWRM staff met with Ernie Schupp at IIFS Site A on Puolua (Huelo) Stream. Staff prepared the site for flow measurement. Flow measurement was completed in one hour. Gage height readings were not recorded as a reference point was not established during the field investigation on October 23, 2008 (refer to Field Investigation Report FI2008102303 for more information). CWRM staff recorded water temperature and weather conditions. The water temperature was 21 degrees Celsius and the weather was sunny. As computed back in the Honolulu Office, the flow at IIFS Site A was 0.380 cubic feet per second (0.246 million gallons per day). This is the highest flow staff has recorded during all field visits.

Following the adoption of IIFS, EMI had expressed interests in lowering the sluice gate so that the ditch could capture high flows during high rainfall events. Although not originally planned in the field visit schedule, CWRM staff decided to allow the adjustment of the Haiku Ditch bypass sluice gate on Puolua (Huelo) Stream during this field visit instead of scheduling an entirely separate trip. Similar to the previous field visits, CWRM staff was present to document the adjustment of the sluice gate. Staff had to ensure that the height of the sluice gate opening after adjustment would allow enough flow to pass through, and satisfy the IIFS at the selected site further downstream on Puolua (Huelo) Stream. In other words, no water from the stream can be diverted unless the IIFS is met.

CWRM staff measured the dimensions of the sluice gate opening to be 2.0 x 1.13 feet (W x H). The depth of water at the sluice gate on the left bank was 0.5 feet.

As previously measured, discharge at the IIFS Site A on Puolua (Huelo) Stream was 0.380 cubic feet per second (0.246 million gallons per day). Since the adopted IIFS of 0.89 cubic feet per second (0.57 million gallons per day) was not attained, no water from the stream could be be diverted. However, the sluice gate could be lowered to a height that, during average flow conditions, allows enough flow bypass the sluice gate to satisfy the IIFS at the selected site further downstream on Puolua (Huelo) Stream. For simplicity, the bypass sluice gate was lowered to the height of the water at approximately 0.50 feet.

The final height of the sluice gate opening after adjustment was 0.50 feet. CWRM staff used fluorescent yellow flagging tape to mark the height of the sluice gate opening.

CWRM staff videotaped the event.

Staff left the IIFS Site A on Puolua (Huelo) Stream at approximately 1200 hours, and continued to Honopou Stream to take flow measurements. Refer to Field Investigation Report FI2009021104 (East Maui, Honopou IIFS Site A) for more information.

Image Listing: (Attach PDF of image contact sheet)

File Name:	Brief Description:
20090211031	CWRM staff Ed Sakoda taking flow measurement at IIFS Site A on Puolua (Huelo) Stream.
20090211032	Puolua (Huelo) Stream upstream from IIFS Site A.
20090211033	Puolua (Huelo) Stream downstream from IIFS Site A.
20090211034	Haiku Ditch bypass sluice gate at Puolua (Huelo) Stream.
20090211035	Haiku Ditch at Puolua (Huelo) Stream.
20090211036	Puolua (Huelo) Stream downstream from Haiku Ditch bypass sluice gate.
20090211039	Ernie Schupp and Garret Hew at the Haiku Ditch bypass sluice gate on Puolua (Huelo) Stream.
20090211040	Ernie Schupp and Garret Hew at the Haiku Ditch bypass sluice gate on Puolua (Huelo) Stream.
20090211042	Haiku Ditch bypass sluice gate on Puolua (Huelo) Stream.

20090211044	Haiku Ditch bypass sluice gate on Puolua (Huelo) Stream after adjustment.
20090211045	Haiku Ditch bypass sluice gate on Puolua (Huelo) Stream after adjustment.
20090211046	Haiku Ditch bypass sluice gate on Puolua (Huelo) Stream after adjustment.

GPS Listing:

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

File Name:	Brief Description:

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

20090211031.jpg

20090211032.jpg

20090211033.jpg

20090211034.jpg

20090211035.jpg

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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 DDu

Sta. No. Huelo IIFS Site A

Sta. Name Huelo (Puolua) Stream, IIFS Site A

Date 2/10, 20 09 Party Dean, Ed, (M) Chui

Width 3.4 Area 2.09 Vel. .18 G.H. _____ Disch. .380 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	@ 10	15		
	Finish	REW	@ 1114			
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. _____ °C at _____

Water Temp. 21 °C at 1116

Check bar/chain found _____

Changed to _____ at _____

Correct _____

Wading, cable, ice, boat, upstr., downstr., side bridge, 5 ft. mi. upstr., downstr. of ~~gage~~ control.

Measurement rated excellent (2%), good (5%), fair (8%), poor (> 8%); based on following conditions: Flow: Fairly uniform overall, with a little angled flow @ edges

Cross section: Cobbles, pebbles, small rocks, fairly uniform, fairly flat and even.

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: 8 feet upstream of auwai. Constructed with rocks & boulders back in October when Matt was with CWRM.

Remarks: _____

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

Sheet No. _____ of _____ sheets

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	@	1015										.80
												.85
vertical wall build w/ rock →	1.85	.125	.15					0		.019		
	2.1	.175	.33			40		.53		.058	.031	
	2.2	.10	.39			40		.56		.039	.022	.90
	2.3	.10	.43			40		.43		.043	.018	.92
	2.4	.10	.72			40		.41		.072	.030	
	2.5	.10	.74			40		.27		.074	.020	.94
	2.6	.10	.75			40		.21	.361	.075	.016	.96
	2.7	.10	.79			40		.18		.079	.014	.97
	2.8	.10	.79			40		.21		.079	.017	.98
	2.9	.10	.80			40		.27		.080	.022	.99
	3.0	.10	.80			40		.20	.679	.080	.016	.206
	3.1	.10	.78			40		.20		.078	.016	
⊙	3.2	.10	.78			40		.22		.078	.017	1.00
	3.3	.10	.75			40		.25		.075	.019	
	3.4	.10	.77			40		.19	.967	.077	.015	.273
	3.5	.10	.77			40		.13		.077	.010	.99
	3.6	.10	.77			40		.13	1.01	.077	.010	.98 .293
	3.7	.10	.75			40		.10		.075	.008	.97
	3.8	.10	.74			40		.10	1.29	.074	.007	.96 .308
	3.9	.10	.71			40		.11		.071	.008	
	4.0	.10	.70			40		.09		.070	.006	.94
	4.1	.10	.70			40		.10	1.501	.070	.007	.92 .329
	4.2	.10	.70			40		.10		.070	.007	.90
	4.3	.10	.65			40		.12	1.636	.065	.008	.344
	4.4	.10	.62			40		.10		.062	.006	
	4.5	.10	.60			40		.11		.060	.007	.85
	4.6	.10	.59			40		.07		.059	.004	.361
	4.7	.10	.55			40		.09	1.872	.055	.005	.366
												.80

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	
										1.872	.366	.80
	4.8	.10	.43			40		.10	~~.915~~	.043	.004	.370
	4.9	.10	.42			40		.09	~~1.957~~	.042	.004	.85 .374
	5.0	.10	.40			40		.07	~~1.997~~	.040	.003	.377
	5.1	.125	.39			40		.07		.049	.003	
	5.25	.075	.32					0		.024		.90
												.92
	3.4	3.4					AVE=	.18		2.09	.380	
												.94
REW	@	1114										.96
												.97
												.98
												.99
⊙												1.00
												.99
												.98
												.97
												.96
												.94
												.92
												.90
												.85
												.80

.61 mgd