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

# FIELD INVESTIGATION REPORT

**FI2008120902 (East Maui, Wailuanui IIFS Site)**

| | |
|---|---|
| **Date of Field Investigation:** December 9, 2008 | **Time** (24-hour)**:** 1000 - 1110 |
| **CWRM Staff:** | Ken Kawahara, Ed Sakoda, Dean Uyeno, and Chui Ling Cheng |
| **Individuals Present:** | |
| **Hydrologic Unit:** | Wailuanui (6056) |
| **Stream Name:** | Wailuanui Stream |

**Findings:**

At 1000 hours, CWRM staff arrived at the Hana Highway bridge that crosses Wailuanui Stream. CWRM staff hiked down from the bridge to the stream via a small trail that begins on the right bank of the stream, on the downstream side of the bridge. The trail condition was hazardous because of the loose rocks and large boulders on the hill. The IIFS site is below the Hana Highway bridge.

While Ken, Ed, and Chui prepared the site for flow measurement, Dean set up a reference point 3 feet downstream of the IIFS site to record changes in gage height (if any) during the flow measurement. Dean used a hammer drill to install an anchor bolt on the left stream bank. Then, he used orange spray paint and orange flagging tape to mark the location. Flow measurement was completed in 30 minutes. Staff also recorded air temperature, water temperature and weather conditions. Weather was overcast with no rain. As computed back in the Honolulu Office, flow at the IIFS site was 2.392 cubic feet per second (1.546 million gallons per day), with gage height at 2.46 feet.

Staff left Wailuanui IIFS Site at approximately 1110 hours, and proceeded to document Koolau Ditch diversion structures on Waiokamilo Stream. Refer to Field Investigation Report FI2008120903 (East Maui, Waiokamilo Koolau Ditch) for more information.

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

| File Name: | Brief Description: |
|---|---|
| 20081209018 | CWRM staff conducting flow measurement at IIFS site on Wailuanui Stream. |
| 20081209020 | CWRM staff conducting flow measurement at IIFS site on Wailuanui Stream. |
| 20081209021 | CWRM staff conducting flow measurement at IIFS site on Wailuanui Stream. |
| 20081209022 | Reference point on the left bank of Wailuanui Stream, downstream of Hana Highway. |
| 20081209023 | CWRM staff conducting flow measurement at IIFS site on Wailuanui Stream. |
| 20081209024 | CWRM staff conducting flow measurement at IIFS site on Wailuanui Stream. |
| 20081209025 | CWRM staff conducting flow measurement at IIFS site on Wailuanui Stream. |

**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: |
|---|---|---|---|
| 0 | 20.832394 | -156.138458 | IIFS Site Flow Measurement on Wailuanui Stream |
| 4 | 20.833606 | -156.13696 | Parking area near IIFS Site on Wailuanui Stream |

**Attachments:**

**Brief Description:**

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

**Recommendations:**

# IMAGE CONTACT SHEET

*20081209018.JPG*

*20081209020.JPG*

*20081209021.JPG*

*20081209022.JPG*

*20081209023.JPG*

*20081209024.JPG*

*20081209025.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 DDM

Sta. No. Wailuanui IIFS site

Sta. Name _____

Date 12/9 , 20 08 Party Dean (M) Chui, Ed, Ken

Width 10.6 Area 9.468 Vel. .25 G.H. 2.46 Disch. 2.392 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 @ 1037 | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | Finish | REW @ 1102 | | | ~ | 30 mm |
| | | | | | | |
| 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: Overcast

Air Temp. 21 °C at 1040

Water Temp. 19 °C at 1103

Check bar/chain found _____

Changed to _____ at _____

Correct _____

Wading, cable, ice, boat, upstr., downstr., side bridge, 60 (ft), mi. upstr., downstr. of gage: waterfall

Measurement rated excellent (2%), good (5%), fair (8%), poor (> 8%); based on following conditions: Flow: parts laminar, flow angles after section of measurement

Cross section: bedrock, uneven

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: _____

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 | @ | 1037 | | | GHT | = 5 - | 2.54 = | 2.46 | | | .80 |
| | | | | | | | | | | | | .85 |
| | 2.25 | .125 | 0 | | | | | | | 0 | | |
| | 2.5 | .375 | 0.6 | | | 40 | | .04 | | .225 | .009 | |
| | 3.0 | .50 | 0.97 | | | 40 | | .01 | | .485 | .005 | .90 |
| | 3.5 | .50 | 1.10 | | | 40 | | .07 | | .550 | .039 | .92 |
| | 4.0 | .50 | 1.10 | | | 40 | | .14 | | .550 | .077 | |
| | 4.5 | .50 | 1.00 | | | 40 | | .26 | | .500 | .130 | .94 |
| | 5.0 | .50 | 1.08 | | | 40 | | .16 | 2.86 | .540 | .086 | .96 .346 |
| | 5.5 | .50 | 1.07 | | | 40 | | .36 | | .535 | .193 | .97 |
| | 6.0 | .50 | 1.15 | | | 40 | | .30 | | .575 | .173 | .98 |
| | 6.5 | .50 | 1.22 | | | 40 | | .20 | | .610 | .122 | .99 |
| | 7.0 | .50 | 0.98 | | | 40 | | .23 | | .490 | .113 | |
| | 7.5 | .50 | 1.00 | | | 40 | | .44 | 5.56 | .500 | .220 | 1.167 |
| ⊙ | 8.0 | .50 | 1.10 | | | 40 | | .35 | | .550 | .193 | 1.00 |
| | 8.5 | .50 | 1.14 | | | 40 | | .25 | | .570 | .143 | |
| | 9.0 | .50 | 0.89 | | | 40 | | .38 | | .445 | .169 | |
| | 9.5 | .50 | 0.80 | | | 40 | | .39 | | .400 | .156 | .99 |
| | 10.0 | .50 | 0.60 | | | 40 | | .33 | 7.925 | .300 | .099 | .98 1.927 |
| | 10.5 | .50 | 0.68 | | | 40 | | .31 | | .340 | .105 | .97 |
| | 11.0 | .50 | 0.66 | | | 40 | | .32 | 8.495 | .330 | .106 | .96 2.138 |
| | 11.5 | .50 | 0.60 | | | 40 | | .28 | | .300 | .084 | |
| | 12.0 | .50 | 0.70 | | | 40 | | .29 | | .350 | .102 | .94 |
| | 12.5 | .425 | 0.76 | | | 40 | | .21 | | .323 | .068 | .92 |
| | 12.85 | .175 | 0 | | | | | | | 0 | | .90 |
| | 10.6 | 10.6 | | | | | AVE = | .25 | | 9.469 | 2.392 | |
| | | | | | | | | | | | | .85 |
| | REW | @ | 1102 | | | | | | | | | |
| | | | | | | | | | | | | .80 |