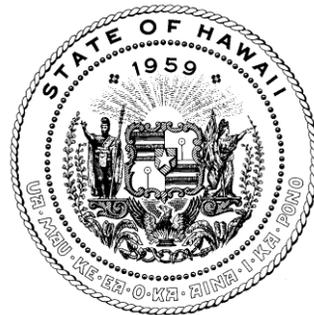


Report to the Twenty-Sixth Legislature  
Regular Session of 2011

**THE DAM AND RESERVOIR SAFETY PROGRAM  
FISCAL YEAR 2009-2010**



Prepared by the  
Department of Land and Natural Resources  
State of Hawaii

In response to  
Section 179D-29, Hawaii Revised Statutes

December 2010

## **REPORT ON THE HAWAII DAM AND RESERVOIR SAFETY PROGRAM FISCAL YEAR 2009-2010**

This report is prepared pursuant to Section 179D-29, Hawaii Revised Statutes (HRS), and covers the period July 1, 2009 through June 30, 2010.

### **INTRODUCTION**

The Department of Land and Natural Resources, Engineering Division (Department) administers the “Hawaii Dam and Reservoir Safety Act of 2007”, under Chapter 179D, HRS. This Act in conjunction with Chapter 13-190, Hawaii Administrative Rules, “Dams and Reservoirs”, governs the design, construction, operation, maintenance, enlargement, alteration, repair, and removal of dams, reservoirs, and their appurtenant works in the State of Hawaii, to protect the health, safety, and welfare of the citizens of the State by reducing the risk of failure of the dams or reservoirs.

The Department has developed a draft amendment to revise the existing dam safety administrative rules. A version of these proposed rules was sent to all owners in February 2010 for initial comments. Revisions were made to this February draft and a proposed administrative rule document was prepared and approved for public hearings in 2010.

### **BACKGROUND**

Historically, dams and reservoirs in Hawaii were predominately developed by the agriculture industry. Today, dams and reservoirs continue to be used by the agriculture industry, in addition to providing storage for drinking water, flood control, hydro electric, recreation, and other purposes.

Only dams that meet a certain size (height and volume) criteria are regulated by the Department. Regulated dams are identified as having artificial barriers, together with appurtenant works, which are 25-feet or more in height or have an impounding capacity of 50-acre-feet (~17 million gallons) or more. Dams less than 6-feet in height, regardless of storage capacity, or that have a storage capacity not in excess of 15-acre-feet (5 million gallons) regardless of height, do not fall under State of Hawaii jurisdiction, unless specified by the Department's Hawaii Dam and Reservoir Safety Program.

## PROGRAM

There are several core functions that make up the Hawaii Dam and Reservoir Safety Program:



### Regulated Dam Inventory & Dam Classifications:

The Department maintains a database of regulated structures, including classifications of each in regards to size, hazard potential, and condition. The condition classification is a new field which the Program is working on developing and obtaining necessary information to complete.

### Dam Safety Inspections:

The Department routinely inspects regulated structures statewide. The existing administrative rules specify a minimum inspection frequency of not less than once every 5 years. The Department currently inspects dams on a bi-annual frequency for higher hazard structures, and is reevaluating this frequency as it updates the existing hazard classifications for all the regulated dams statewide.

### Enforcement Actions:

The Hawaii Dam and Reservoir Safety Act of 2007 authorized the Department to take enforcement action for both emergencies and any other violations of the Act. The Department is establishing enforcement action procedures that are initiated by the following:

- Failure to remedy deficiencies identified during routine inspections
- Non-compliance with Dam Safety Permit general terms and special conditions
- Non-compliance with certificate to impound terms and conditions
- Non-compliance with owner responsibilities (Section 179D-30, HRS)
- Failure to remedy deficiencies identified by the department

The Department did not proceed with enforcement actions against any dam owners in Fiscal Year (FY) 2009- 2010.

#### Dam Safety Construction Permits:

A Dam Safety Permit from the Board of Land and Natural Resources (Board) is required for all dam construction, alteration, enlargement, modifications or removal work. Dams are uniquely engineered structures that require knowledge and experience in dam safety, particularly, how to safely handle water flows in and out of the structure as well as water passing through the dam embankment itself. Dams are often under sustained hydrostatic water loads, which if not properly designed can rapidly result in a failure of the dam. Dam Safety Permits allow the Department to review and check proposed improvements for concurrence with dam safety practices and guidelines. Work that is not considered routine maintenance will require prior approval from the Board. The Department has interim guidelines for minimum permit requirements and is working to finalize these guidelines update soon. The guidelines supplement the detailed permit requirements proposed in the dam safety administrative rules.

#### Certificate of Approval to Impound:

A certificate of approval to impound water was initiated in the Dam and Reservoir Safety Act of 2007. Issuance of this certificate will be dependent on owners ensuring their structures are remedied of critical deficiencies and meet minimum operational criteria. The Department is currently developing guidelines and procedures for this certificate and did not issue any certificates of approval to impound in FY 2009-2010. The Department has been working with dam owners to educate them on this new certificate as well as notifying them of observed and/or possible deficiencies at their facilities.

#### Emergency Preparedness:

The Department assists in providing technical assistance to dam owners and emergency management officials and agencies both prior to dam safety emergencies and during critical events. The Department developed guidelines and emergency action plan templates for owners to utilize in formulating and executing a plan of action should a possible threat occur on the dam facilities.

#### Training and Outreach:

The Department provides technical assistance to the dam owners, operators and consultants, as well as to the broader community of hazard mitigation partners and agencies. The Department works closely with the Association of State Dam Safety Officials (ASDSO) to collaborate on public outreach and national awareness of the importance of dam safety programs.

**FUNDING**

The Department’s Dam and Reservoir Safety Program is funded under the State LNR 810 Program – “Prevention of Natural Disasters” and receives operational funding from two state special funds and a federal grant from the Federal Emergency Management Agency (FEMA).

The following is a breakdown of incoming funds to the Department for its dam safety activities in FY 2010:

<u>Source</u>	<u>Approximate Funding</u>
State of Hawaii – Operating Special Fund	\$ 297,552
State of Hawaii – Dam and Reservoir Safety Special Fund (includes carry over)	\$ 849,196
FEMA – FFY2008 National Dam Safety Program Grant (SFY 2009-2010)	\$ 22,244
<b>Total Available Funding</b>	<b>\$ 1,168,992</b>

Funds from the various sources were used as follows:

	Operating Special Fund	Dam and Reservoir Safety Special Fund	Federal Funds	Total
Personnel Services	\$237,042	\$0	\$0	\$237,042
Consultant Services	\$40,460	\$190,000	\$0	\$230,460
Travel (Inspection costs)	\$11,500	\$0	\$8,785	\$20,285
Other Expenses (Supplies, Operating & Equipment)	\$8,550	\$0	\$3,629	\$12,179
B&F Management Fee	\$0	\$59,447	\$0	\$59,447
	\$297,552	\$249,447	\$12,414	\$559,413

The personnel and other expenses reflect reductions due to furloughs and other spending restrictions imposed as a result of the tough economic climate. Some expenses reflect the combined total for the entire LNR 810 Program, which includes both Flood Control and Dam Safety Programs. The Dam and Reservoir Safety Special Fund was intended to maintain a funding balance should be a dam safety emergency arise. Unfortunately, due to the economic conditions, the targeted \$700,000 balance was not attainable and only approximately \$270,000 will be maintained. That amount is insufficient to fund one round of dam safety inspection statewide let alone provide any funds for remediation efforts. The Hawaii Dam and Reservoir Safety Act of 2007 initially allocated \$2,000,000 to the Department’s Dam and Reservoir Safety Program, however only \$1,000,000 was released to the Department.

The majority of operating special funds was expended on salaries. Other major expenditures were for consultant contracts and travel. Travel expenses were incurred mainly from neighbor island inspections costs, however also included the costs for out of state training of dam safety personnel.

**DAM SAFETY ACTIVITIES:**

- A. Approvals of plans and specifications for the construction of dam and reservoirs and for alterations, modifications, repairs, removals, and enlargements of any dams and reservoirs;

During FY 2010, four (4) new permit applications were received and three (3) dam safety alteration permits were issued.

**Dam Safety Permit Applications Received:**

<b>Dam Name</b>	<b>Dam Owner(s)</b>	<b>Island</b>	<b>Description of Improvements</b>	<b>Est. Const. Costs</b>
Omao Reservoir	A& B Properties McBryde Sugar Co., Ltd Eric A. Knudsen Trust	Kauai	Dam removal	\$440,000
Manuhonuhonu Reservoir	Kukuiula Dev. Company	Kauai	Spillway channel improvements	\$55,000
Upper Kapahi Reservoir	State of Hawaii, Dept. of Land & Natural Res.	Kauai	Gate and Catwalk Repairs	\$660,000
Wailua Reservoir	State of Hawaii, Dept. of Land & Natural Res.	Kauai	Gate and Catwalk Repairs	\$660,000

**Dam Safety Permits Issued:**

<b>Dam Name</b>	<b>Dam Owner(s)</b>	<b>Island</b>	<b>Description of Improvements</b>	<b>Est. Const. Costs</b>
Kapalaalaea Reservoir	East Maui Irrigation	Maui	Outlet works Sinkhole repair	\$62,827.00
Upper Kapahi Reservoir	State of Hawaii, Dept. of Land & Natural Res.	Kauai	Gate and Catwalk Repairs	\$660,000
Wailua Reservoir	State of Hawaii, Dept. of Land & Natural Res.	Kauai	Gate and Catwalk Repairs	\$660,000

Additionally, the Department assisted many owners in the review of preliminary designs and proposed work.

- B. A listing of dam and reservoir safety inspections made;

In FY 2010, Department staff conducted 77 visual dam safety inspections. See Appendix A for a detailed listing of the dams inspected.

C. Administrative rules adopted or amended;

The Department is in the process of updating the Hawaii Administrative Rules, Title 13, Subtitle 7, Water and Land Development, Chapter 190, to effectuate the amendments made to Chapter 179D, HRS. In February 2010, the Department sent a copy of these draft rules to all owners of regulated dams for their initial review and comments. The Department has since compiled these comments and prepared a proposed rule set which is set to be presented at statewide public hearings in 2010, and decision making to be followed at a subsequent Board Meeting.

D. Enforcement orders and proceedings;

The Dam and Reservoir Safety Program did not have any enforcement activities in FY 2010.

E. Dam and reservoir failures and department evaluations of the reasons for the failure, if known;

There were no known dam failures or incidents in FY 2010.

F. Other available data regarding the effectiveness of the State's Dam and Reservoir Safety Program.

The Program is working with dam owners to complete Emergency Action Plans (EAP) for their facilities. EAPs are required by statute for only high and significant hazard potential classifications of dams. Out of the 138 regulated dams, 126 are classified high or significant. The following is a summary of EAPs on file with the Department for all classifications:

Number of Dams with EAPs			
FY 2004	FY 2007	FY 2008	FY 2010
12	55	91	121

Appendix A  
Dam Safety Inspections in FY 2009-2010

Hawaii Inspections

State ID	Dam Name	Inspection Date
HA-0040	Waikoloa Reservoir No. 1	November 30, 2009
HA-0122	Waikoloa Reservoir No. 2	November 23, 2009
HA-0136	Waikoloa Reservoir No. 3	November 30, 2009

Kauai Inspections

State ID	Dam Name	Inspection Date
KA-0003	Puu Opae Reservoir	December 14, 2009
KA-0006	Waiakia Reservoir	April 13, 2010
KA-0007	Kepani Reservoir	April 13, 2010
KA-0008	Waikoloa Reservoir	April 13, 2010
KA-0009	Kaawanui Reservoir	April 13, 2010
KA-0013	Upper Kapahi Reservoir	September 11, 2009
KA-0060	Wailua Reservoir	September 11, 2009
KA-0061	Lower Kapahi Reservoir	September 10, 2009
KA-0063	Aahoaka Reservoir	September 10, 2009
KA-0100	Kapa Reservoir	May 20, 2010
KA-0105	Elima Reservoir	May 20, 2010
KA-0109	Ipuolono Reservoir	May 20, 2010
KA-0116	Mau Reservoir	May 20, 2010
KA-0117	Elua Reservoir	May 20, 2010
KA-0135	Hanamaulu Field 21	September 10, 2009
KA-0145	Kauai Lagoons	October 26, 2009

Oahu Inspections

State ID	Dam Name	Inspection Date
OA-0001	Nuuanu Dam No. 4	January 13, 2010
OA-0017	Wahiawa Dam	October 21, 2009
OA-0037	Oahu Reservoir 510	April 12, 2010
OA-0038	Oahu Reservoir 530	April 12, 2010
OA-0039	Oahu Reservoir 545A	April 14, 2010

Maui Inspections

State ID	Dam Name	Inspection Date
MA-0041	Kualapuu Reservoir	July 14, 2009
MA-0046	Waikamoi Dam No. 2	July 28, 2009
MA-0047	Piiholo 50 MG Reservoir	July 28, 2009
MA-0048	Olinda Reservoir	July 28, 2009
MA-0054	Horner Reservoir	July 21, 2009
MA-0055	Wahikuli Reservoir	August 6, 2009
MA-0056	Hanakaoo Reservoir	July 21, 2009
MA-0057	Kahoma Reservoir	August 6, 2009
MA-0058	Honokowai Reservoir	August 5, 2009
MA-0059	Reservoir 140	August 5, 2009
MA-0068	HC&S Reservoir 14	January 21, 2010
MA-0069	HC&S Reservoir 15	January 21, 2010
MA-0070	HC&S Reservoir 20	January 20, 2010
MA-0071	HC&S Reservoir 21	January 21, 2010
MA-0072	HC&S Reservoir 22	January 20, 2010
MA-0073	HC&S Reservoir 24	January 20, 2010
MA-0074	HC&S Reservoir 25	January 20, 2010
MA-0075	HC&S Reservoir 30	February 25, 2010
MA-0076	HC&S Reservoir 33	February 25, 2010
MA-0077	HC&S Reservoir 40	February 25, 2010
MA-0078	HC&S Reservoir 42	February 25, 2010
MA-0079	HC&S Reservoir 52	January 21, 2010
MA-0080	HC&S Reservoir 60	January 20, 2010
MA-0081	HC&S Reservoir 61	January 20, 2010
MA-0082	HC&S Reservoir 70	February 25, 2010
MA-0083	Reservoir 73	October 14, 2009
MA-0084	Reservoir 74	October 14, 2009
MA-0085	HC&S Reservoir 80	January 21, 2010
MA-0086	HC&S Reservoir 81	February 10, 2010
MA-0087	HC&S Reservoir 82	February 10, 2010
MA-0088	HC&S Reservoir 84	January 21, 2010
MA-0089	HC&S Reservoir 90	February 10, 2010
MA-0090	HC&S Reservoir 92	February 10, 2010
MA-0091	Peahi Reservoir	October 28, 2009
MA-0092	Papaaaea Reservoir	October 28, 2009
MA-0093	Kaupakalua Reservoir	October 27, 2009

### Maui Inspections

State ID	Dam Name	Inspection Date
MA-0094	Kapalaalaea Reservoir	October 28, 2009
MA-0095	Haiku Reservoir	October 27, 2009
MA-0096	Pauwela Reservoir	October 27, 2009
MA-0097	Kolea Reservoir	September 3, 2009
MA-0126	Kahana Nui Dam	July 22, 2009
MA-0127	Napili 4-5 Desilting Basin	July 22, 2009
MA-0128	Napili 2-3 Desilting Basin	July 22, 2009
MA-0130	Honokowai - Structure #8	July 21, 2009
MA-0132	Upper Field 14 Reservoir	August 5, 2009
MA-0133	Puu Koa Reservoir	July 29, 2009
MA-0134	Kaopala Basin	July 22, 2009
MA-0138	Kahakapao Reservoirs	July 28, 2009
MA-0139	Maui Field 290 Reservoir	July 29, 2009
MA-0141	Kehalani Basin	February 10, 2010
MA-0142	Middle Field 14 Reservoir	August 5, 2009
MA-0143	Kaili Ili Reservoir	July 29, 2009
MA-0144	Maui County Water West	August 6, 2009