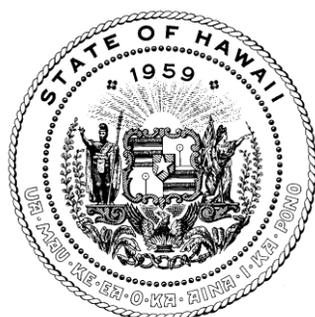


**Report to the Twenty-Fifth Legislature
Regular Session of 2010**

REPORT ON THE HAWAII DAM AND RESERVOIR SAFETY PROGRAM



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

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

October 2009

REPORT ON THE HAWAII DAM AND RESERVOIR SAFETY PROGRAM

This report is prepared pursuant to Sections 179D-29, Hawaii Revised Statutes (HRS), and covers the period July 1, 2008 through June 30, 2009.

INTRODUCTION

The Department of Land and Natural Resources (DLNR), Engineering Division administers the Hawaii Dam and Reservoir Safety Program (Program). Authorization for the Program is provided under Chapter 179D, HRS, “Hawaii Dam and Reservoir Safety Act of 2007”, and Chapter 13-190, Hawaii Administrative Rules (HAR), “Dams and Reservoirs”, which governs the design, construction, operation, maintenance, enlargement, alteration, repair, and removal of dams, reservoirs, and appurtenant works in the State of Hawaii.

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 under the Program. 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 Program.

PROGRAM

The Program enforces policies and guidelines regulating the construction, alteration, removal, and operation of regulated dams in the State. Typical duties may include conducting investigations and inspections, reviewing plans, issuing permits, emergency action planning, maintaining the inventory of dams for the State of Hawaii, establishing hazard potential classifications, conducting training and awareness for dam safety, and issuing enforcement orders as necessary for protection of public safety.

FUNDING

For the reported fiscal period, the Dam Safety Program received funding from the State of Hawaii – General Fund, Dam and Reservoir Safety Special Fund, Fiscal Year (FY) 2006-Act 118 Appropriation, the Federal Emergency Management Agency (FEMA), and the Association of State Dam Safety Officials (ASDSO).

<u>Source</u>	<u>Approximate Funding</u>
State of Hawaii – General Fund - (Dam Safety Operating Budget)	\$ 387,000
State of Hawaii – Special Fund (carry over)	\$ 639,790
State of Hawaii – Act 118, Appropriation (carry over)	\$ 898,740
FEMA – FFY2008 National Dam Safety Program Grant (SFY 2009-2010)	\$ 25,380
ASDSO – FFY2007 Training Grant (grant extended to SFY 2010)	\$ 1,000
ASDSO – FFY2008 Training Grant (SFY 2009-2010)	\$ 2,000
Total Available Funding	\$ 1,953,910

A. Use of appropriated and grant funds;
 Funds from the various sources were used as follows:

SFY 2009	General Funds** G-09-010	Dam and Reservoir Safety Special Fund S-09-328	Act 118 Emergency Funds G-06-305	Federal Funds (all sources) G-09-242	Total
Personnel Services	\$292,750	\$0	\$0	\$0	\$292,750
Consultant Services	\$0	\$0	\$684,235	\$0	\$684,235
Travel	\$3,505	\$0	\$5,399	\$14,290	\$23,194
Overhead and Equipment	\$22,812	\$171	\$267	\$2,900	\$26,150
Departmental Administrative Expense	\$0	\$1,588	\$0	\$0	\$1,588
	\$319,067	\$1,759	\$689,901	\$17,190	\$1,027,917

**Some expenses reflect the combined total for the entire Flood Control & Dam Safety Section.

Most of the general operating funds were expended on salaries. Other major general fund expenditures were for travel for DLNR dam safety inspections and to assist with statewide dam owner training seminars. Travel expenses were incurred for neighbor island inspections as well as costs for out of state training and conferences.

In Fiscal Year (FY) 2008, the new Dam and Reservoir Safety Special Fund received \$1,000,000 initial funding from the General Fund, of that approximately \$ 640,000 was carried over into FY 2009.

Most of the Act 118, Session Laws of Hawaii 2006 emergency relief funding allotment (provided in response to the March 2006 flooding events) were expended. The remaining unused balance in FY 2009 has been allocated to complete projects for inspections, emergency preparedness and training and the travel necessary to support those items. Funds for one phase II investigation were not released.

The Program thus used all the funding available to support the following program areas:

1. Dam Safety Inspections:
 - a. Phase I Inspections by Consultants: Consultants were contracted to complete Phase I Dam Safety Inspections of all state regulated dams from 2007 – 2008. Over 75% of the reports were completed in FY 2009 and the remaining reports will be completed in FY 2010.
 - b. DLNR Inspections: The Program implemented in-house inspections for all regulated dams and is working on an approximate 18-month cycle to complete inspections for all state regulated dams. The Program completed over 95% of the inspections for the past year and is on pace and planning to continue inspections at a 95 – 100% pace for future years.
 - c. Phase II Inspections – by DLNR: As HAR are adopted and further requirements are in place, the staff inspections will be integrated with future Phase I and Phase II inspections.

2. Statewide Dam Inventory:
 - a. Dam Inventory and Database (Database) - Oceanit: The Program contracted to develop a dam inventory database system for dams in the State of Hawaii in FY 2007. All regulated dams received a field inspection to verify location and for data collection. Use of the inventory dam database system was implemented in FY 2008, and the Program continued to debug and develop the inventory system in FY 2009. The Database is continuing to be expanded to include the storage of inspection reports, permitting documents and the tracking of other Program needs.
 - b. Unregulated Dam Inventory and Report to Legislature: Non-regulated dams are being evaluated and inventoried as part of the Database development. The Database incorporates the unregulated dams data identified to date into the database system and the Program is working to develop a report to the Legislature on the findings regarding Unregulated Dams.
 - c. Dam Safety Program Management Tool (DSPMT) reporting interface for national reporting: The Database was used to collect data for DSPMT state data call and will be enhanced for easier use in future reporting for various federal and state requirements.
 - d. Database access for Emergency Use: Various portions of the Database will be developed for emergency manager, owner and public use. Full implementation use of the Database program is expected in the next two years, however as designed, additional modules can be incorporated and sections enhanced as the Program itself matures and develops.

3. Emergency Preparedness and Hazard Assessment:
 - a. Pacific Disaster Center (PDC) – Dam Break Study – Phase I and II: The Program completed the modeling of sunny day dam-break scenarios for all regulated dams in 2006 – 2007.
 - b. PDC – Evacuation Maps: The results of the Dam Break Study are being used to assist the emergency response agencies in the development of evacuation maps that will be incorporated in dam specific emergency action plans (EAPs).

- c. PDC – Hazard Classifications: The Dam Break Study results were used to update the dam hazard classifications. After a quality assurance/quality control review is completed the classification update will be made.
 - d. DLNR EAP template and implementation: In FY 2009 a Draft EAP was modeled, presented, exercised and tested at the 2009 Hawaii Dam Safety Seminars. After the EAP exercise concluded, the EAP template was restructured and streamlined for each of the four Counties in the State. The Program is working to implement the new standard EAP format and have owners either convert their existing or create new EAPs in the new format.
 - e. DLNR Training Seminars: Training and testing workshops of the EAP plans were conducted statewide and additional workshops are being proposed in the future.
 - f. DLNR and State and County emergency response plans: The Program is also working with the State and County Emergency response agencies to coordinate, test and train responding to dam safety emergencies and to enhance the Program's ability to respond.
4. Owner/Operator Training and Public Outreach:
- a. The Program hosted Hawaii Dam Safety Seminars in October 2009.
 - b. Dam Safety Seminars 2010 or 2011: The Program will continue to host Dam Safety Seminars across the State and provide technical training as well as supporting emergency response plan program needs.
 - c. On-line dam safety program information: The Program is working to enhance the on-line information for owners, operators, consultants, emergency response agencies and the public.
 - d. EAP Template: As the dam specific EAPs are developed and implemented for use, the Program will work with the owners and emergency responders on various public information programs, flyers, fact sheets and other media to provide awareness for dam safety.
 - e. HAR for the Program being updated and revised, and the Program plans on holding informational sessions prior to the formal public hearing process within the next year.
5. Dam Safety Permit Processing:
- a. Dam Safety Permit reviews: The Program continues to review and process dam safety permits for new construction, enlargement, alteration, repair or removal of dam facilities as owners choose to upgrade and improve their facilities or remove them from use. The Phase I Dam Safety Reports from the 2007 – 2008 inspections are being completed and as deficiencies are documented, owners are working to remediate those deficiencies. There will be numerous rehabilitation projects greater than routine operations and maintenance, and in need of a dam safety permit. The follow up in-house inspections are also providing an opportunity to follow up the Phase I inspections and assist the owners in understanding what projects need dam safety permits versus being general operations and maintenance work.

6. HAR:
 - a. HAR revisions and update: The Program has been working in FY 2009 to revise and update the current administrative rules to match and support the Chapter 179D, HRS, with a projected completion date in 2010. A draft is close to being ready for pre-consultation with the owners before going through the public hearing process and the Program is planning on holding informational sessions for discussion on the proposed rules.
7. Certificate to Impound:
 - a. Certificate to Impound process and procedures: Chapter 179D, included a new Certificate to Impound requirement for dam owners. The Program has been working to develop the framework and criteria for a Certificate to Impound and incorporation into the HAR.
 - b. Certificate to Impound implementation: After the Administrative Rules are promulgated, the Program will work on implementing the certificate to impound requirement for all regulated dams.
8. Dam Safety Program Staff Development:
 - a. Dam Safety Staff training: Staff will continued to attend trainings and conferences to learn and improve their ability to conduct inspections, review and evaluate design proposals, evaluate hydraulic and hydrologic models, review geotechnical evaluations, development and implementation of emergency action plans and to support other technical concerns regarding dam safety. Staff will continue to develop its use of Geographic Information System (GIS) to aid in program management and for emergency response and move to automating the library of information for the facilities.

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;

Four new permit applications were submitted to the Program in FY 2009. Two of the applications were requests for exemptions and are under review and consideration, while the other two projects are proceeding with the review and comment process. There are several other projects that continue with the review and comment process and two projects were approved by Board of Land and Natural Resource FY 2009. See Attachment A for details.

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

In FY 2009, DLNR staff conducted 79 inspections for dam safety. The program previously contracted in FY 2008 for private consultants to conduct formal Phase I Visual Dam Safety Inspections of 134 regulated dams and is continuing on an

approximate 18-month schedule to follow up on those Phase I inspections and for continued monitoring of the dams in Hawaii. See Attachment B for details.

C. Rules adopted or amended;

The Program is currently in the process of updating HAR, Title 13, Subtitle 7, Water and Land Development, Chapter 190 to effectuate the amendments made to Chapter 179D, HRS. The Program expects to hold public hearings as soon as the draft rules are completed.

D. Enforcement orders and proceedings;

The Program did not start or have any continued enforcement orders in FY 2008.

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

There were no know dam failures in FY 2008, however there were a couple of serious dam incidences.

As a result of heavy rains in December 2008, the downstream embankment of (HI00045) Helemano 16 Reservoir suffered sliding and collapsing. The Reservoir is continuing to be maintained in an empty state until such repairs or removal of the dam can be implemented. The previously unregulated Helemano 11 Reservoir also suffered major sliding and erosion of the downstream embankment after the dam overtopped in the December 2008 heavy rains. Although previously unregulated the Helemano 11 Reservoir is being added to the DLNR inventory for regulated facilities and is being maintained in an empty condition until removal or remediation of the embankment can be completed. DLNR is working closely with the owner to remediate these structures and has partnered with the United States Geological Survey to install water level gages on these reservoirs.

F. Any other available data regarding the effectiveness of the Program.

The Program is working with dam owners to complete EAPs 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 DLNR for all classifications:

Number of Dams with EAPs			
FY 2004	FY 2007	FY 2008	FY 2009
12	55	91	91

The Program conducted Statewide EAP training and exercises during October 2008. Based on feedback provided from those training workshops, the Program developed a standard template acceptable to the specific county emergency management agencies and emergency responders. In FY 2010 the Program will require those dams with existing

EAPs' to convert their EAP's to this new format. For those dams that do not have EAPs', owners will need to develop one in the new format. Additionally the Program has conducted mapping dam break inundation areas for all regulated structures and is assisting the county emergency management agencies in using these inundation areas to create evacuation maps, which will be included in the new EAPs.

Attachment A - FY 2009 Dam Safety Permit Reviews for the Approvals of Plans and Specifications for Dam and Reservoir Construction, Alteration, Modification, Repair, Removal and Enlargement

Permit ID	Date Rec'd	Dam ID	Dam Name	Dam Owner	Island	Description of Improvements	BLNR appr date	Status / Comments
19	10/21/02	141	Kahalani (Wailuku Proj. Dist.) Retention Basin	Wailuku Agribusiness Co., Inc.	Maui	New Construction		Under Construction
20	4/1/06	98	Alexander Dam	Kauai Coffee Company	Kauai	Emergency Spillway Repairs/Vegetation removal	10/12/07	As-built plans under review
21	3/22/07	28	Puu Ka Ele Reservoir	Jurassic Kahili Ranch LLC	Kauai	Dam Removal by lowering embankment		Design / Planning / review phase
22	4/3/07	18	Opaeula Reservoir No. 1	Kamehameha Schools	Oahu	Emergency Repairs to existing Spillway Tunnel	06/13/08	
23	5/7/07	112	Aepoeha Reservoir	A&B Properties, Inc.	Kauai	Reconstruction of embankment and spillway.		Construction work completed, submitting after the fact permit.
24	5/26/06	37	Reservoir 510	Kamehameha Schools	Oahu	Dam Removal		Owners revising project plans, program waiting for updated plans.
25	5/26/06	38	Reservoir 530	Kamehameha Schools	Oahu	Dam Removal		Owners revising project plans, program waiting for updated plans.
26	5/26/06	39	Reservoir 545A	Kamehameha Schools	Oahu	Dam Reconstruction		Owners revising project plans, program waiting for updated plans.
27	1/1/07	135	Field 21 Reservoir	DLNR - Land Division	Kauai	Emergency Repairs to Spillway		Emergency - 2006 Floods emergency remediation - completed
28	6/13/07	141	Kahalani (Wailuku Proj. Dist.) Retention Basin	Wailuku Agribusiness Co., Inc.	Maui	Enlargement of Reservoir		Expands the Detention Basin still under construction under Permit 19
29	7/16/07	29	Morita Reservoir	Joyce Doty	Kauai	Removal of Existing Breached Emb		Dam is currently breached as a result of unsafe conditions following Kaloko dam failure
30	9/11/07	122	Waikoloa Reservoir No. 2	Hawaii County - Department of Water Supply	Hawaii	Reservoir remediation - 2006 earthquake damage	08/22/08	
31	1/18/08	26	Lalakea Reservoir	Kamehameha Schools	Hawaii	Dam removal	09/12/08	As-built plans under review
32		117	Elua Reservoir Dam					Permit not officially submitted, in discussions with the owner
33	4/29/08	147	Ponoholo Ranch Stockwater Pond	Ponoholo Ranch, Ltd.	Hawaii	New Dam		Comments to owner in Dec, 2008.
34	6/12/08	18	Opaeula Reservoir No. 1	Kamehameha Schools	Oahu	Dam Improvements		Design / Planning / review phase
35	7/10/08	27	E-13 Reservoir	Kamehameha Schools	Hawaii	Exemption request		Request for exemption based on 13-190-3, item 3
36	7/10/08	20	Opaeula Reservoir 15	Kamehameha Schools	Oahu	Exemption request		Request for exemption based on size and volume. Under review
37	8/28/08	19	Opaeula Reservoir No. 2	Kamehameha Schools	Oahu	Dam Improvements		Design / Planning / review phase
38	2/20/09	94	Kapalaalaea Reservoir	East Maui Irrigation	Maui	Sinkhole repair		Design / Planning / review phase

Attachment B - FY 2009 Dam Safety Inspections

County of Hawaii		
Lalakea Reservoir	HA-0026	18-Jun-09
E-13 Reservoir	HA-0027	24-Mar-09
Waikoloa Reservoir No. 1	HA-0040	23-Jul-08
Waimea 60 MG Reservoir	HA-0042	5-Feb-09
Puukapu Watershed Dam R-1	HA-0043	24-Mar-09
Keaiwa Reservoir	HA-0049	5-May-09
Hawi No. 3 Reservoir	HA-0050	25-Mar-09
Hawi No. 5 Reservoir	HA-0051	25-Mar-09
Kehena Reservoir	HA-0052	25-Mar-09
Waikoloa Reservoir No. 2	HA-0122	23-Jul-08
Puu Pulehu Reservoir	HA-0123	5-Feb-09
Paauiilo Reservoir	HA-0131	24-Mar-09
Waikoloa Reservoir No. 3	HA-0136	23-Jul-08
County of Kauai		
Puu Lua Reservoir	KA-0002	25-Sep-08
Puu Opaie Reservoir	KA-0003	25-Sep-08
Kitano Reservoir	KA-0004	25-Sep-08
Mana Reservoir	KA-0005	25-Sep-08
Waikaia Reservoir	KA-0006	26-Aug-08
Kepani Reservoir	KA-0007	26-Aug-08
Waikoloi Reservoir	KA-0008	26-Aug-08
Kaawanui Reservoir	KA-0009	26-Aug-08
Waiakalua Reservoir	KA-0010	12-Aug-08
Aii Reservoir	KA-0011	1-Oct-08
Kapaia Reservoir	KA-0012	1-Oct-08
Upper Kapahi Reservoir	KA-0013	18-Sep-08
Okinawa Reservoir	KA-0014	1-Oct-08
Kaneha Reservoir	KA-0015	20-Aug-08
Mimino Reservoir	KA-0016	20-Aug-08
Kalihiwai Reservoir	KA-0024	12-Aug-08
Puu Ka Ele Reservoir	KA-0028	17-Sep-08
Wailua Reservoir	KA-0060	18-Sep-08
Lower Kapahi Reservoir	KA-0061	18-Sep-08
Twin Reservoir	KA-0062	24-Jun-09
Aahoaka Reservoir	KA-0063	18-Sep-08
Field 2 Kealia Reservoir	KA-0064	19-Aug-08
Upper Anahola Reservoir	KA-0065	19-Aug-08
Lower Anahola Reservoir	KA-0066	19-Aug-08
Field 1 Kealia Reservoir	KA-0067	19-Aug-08
Alexander	KA-0098	23-Jun-09
Waita Reservoir	KA-0099	30-Sep-08
Kapa Reservoir	KA-0100	18-Dec-08
Hukiwai Reservoir	KA-0101	23-Jun-09

Ioleau Reservoir	KA-0102	23-Jun-09
Aepo Reservoir	KA-0103	22-Apr-09
Huinawai Reservoir	KA-0104	22-Apr-09
Elima Reservoir	KA-0105	18-Dec-08
Kumano Reservoir	KA-0106	22-Apr-09
Puu O Hewa Reservoir	KA-0107	30-Sep-08
Kaupale Reservoir	KA-0108	22-Apr-09
Ipuolono Reservoir	KA-0109	18-Dec-08
Aepoalua Reservoir	KA-0110	22-Apr-09
Aepoekolu Reservoir	KA-0111	22-Apr-09
Aepoeha Reservoir	KA-0112	22-Apr-09
Omao Reservoir	KA-0113	23-Apr-09
Piawai Reservoir	KA-0114	23-Apr-09
Pia Mill Reservoir	KA-0115	30-Sep-08
Mau Reservoir	KA-0116	18-Dec-08
Elua Reservoir	KA-0117	18-Dec-08
Manuhonuhonu Reservoir	KA-0118	23-Apr-09
Mauka Reservoir	KA-0119	30-Sep-08
Papuaa Reservoir	KA-0120	30-Sep-08
Halenanahu Reservoir	KA-0121	30-Sep-08
Hanamaulu Field 21	KA-0135	18-Sep-08
Halaula Reservoir	KA-0146	23-Jun-09
City and County of Honolulu		
Nuuanu Reservoir No. 4	OA-0001	25-Nov-08
Opaeula 01 Reservoir	OA-0018	29-Jan-09
Opaeula 02 Reservoir	OA-0019	29-Jan-09
Opaeula 15 Reservoir	OA-0020	29-Jan-09
Kemoo 5 Reservoir	OA-0021	15-Jan-09
Upper Helemano Reservoir	OA-0022	15-Jan-09
Helemano 16 Reservoir	OA-0023	15-Jan-09
Ku Tree Reservoir	OA-0025	12-Nov-08
Oahu Reservoir 510	OA-0037	11-Aug-08
Oahu Reservoir 530	OA-0038	11-Aug-08
Oahu Reservoir 545A	OA-0039	22-Sep-08
Helemano 6 Reservoir	OA-0045	15-Jan-09
Kaneohe Dam	OA-0124	15-Oct-08
Waimanalo 60 MG Reservoir	OA-0129	14-Apr-09
Oahu Reservoir 155	OA-0137	12-Feb-09