



State and Federal Oversight of Dam Safety Must Be Improved

ASDSO endorses passage of legislation to create a federally administered dam rehabilitation funding program.

The Association of State Dam Safety Officials, in its January 2009 update of the report entitled, *The Cost of Rehabilitating Our Nation's Dams*, estimated that \$16 billion would be needed to repair the most critical dams over the next 12 years. Out of this, needed repairs at publicly owned dams are estimated at \$8.7 billion with the remaining \$7.3 billion needed for privately owned dams. The Association of State Dam Safety Officials, in its January 2009 report entitled "The Cost of Rehabilitating Our Nation's Dams", estimated that \$16 billion would be needed to repair the most critical dams over the next 12 years. Out of this, needed repairs at publicly owned dams were estimated at \$8.7 billion with the remaining \$7.3 billion needed for privately owned dams.

In December 2012, ASDSO revised the estimates. Current figures place the total cost of rehabilitating the nation's high-hazard potential dams at approximately \$18.2 billion (\$11.2 billion for publicly-owned and \$7 billion for privately-owned).

ASDSO calls on the Obama Administration, within its focus on infrastructure improvement and public safety, to fully fund the National Dam Safety Program.

Since the program was begun in 1996, the National Dam Safety Program had not been fully funded until 2009. DHS and FEMA leadership must recognize the need to keep this program funded to the fullest extent authorized by law. Efforts should be made to combine the DHS Dams Sector, which is under the Infrastructure Protection Directorate and the National Dam Safety Program, which is under DHS, FEMA. All efforts should be made to create a line item in the DHS budget for the important objectives in the National Dam Safety Program.

ASDSO urges all 50 states and US territories to examine the strength of their dam safety regulatory programs.

Roughly 80% of the US dams are regulated (not owned) by state governments. Most state dam safety programs are under-funded and under-staffed, and many do not have complete statutory authority to perform

critical regulatory functions such as requiring Emergency Action Plans to warn and evacuate people in the event of a dam failure. (See *statistics later in this flyer.*)

The Association of State Dam Safety Officials (ASDSO) is a national non-profit organization of more than 3,000 state, federal and local dam safety officials and private sector individuals dedicated to improving dam safety through research, education and communication. We represent the dam safety programs of the states and our goal simply is to save lives, prevent damage to property and to maintain the benefits of dams by preventing dam failures.

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Dams are an essential component of our nation’s infrastructure.

Dams provide vital benefits including flood protection, water supply, hydropower, irrigation and recreation. Imagine the impact of losing a major reservoir or flood control dam:

- Would there be catastrophic flooding? How many homes and businesses might be flooded? How many people displaced?
- Would there be adequate water for domestic use? Irrigating crops? Caring for livestock? Fighting fires?
- Are local utilities dependent on hydropower? How many lives and jobs could be affected by temporary shutdown or closure of an industry dependent on hydropower?
- How would transportation systems—roads, railroads, navigable waterways—be affected?
- How would economies and areas dependent on recreation be affected should the reservoir be lost?



But, dam failures have caused loss of life and extreme property and economic damages throughout the United States.



No one knows precisely how many lives have been lost because of dam failures, but between the catastrophic Mill River dam collapse in Massachusetts in 1874 to the fatal Ka Loko dam failure in Hawaii in 2006, at least 4,800 people in the U.S. have perished in dam break floods. A string of fatal dam failures during the 1970s killed roughly 300 people. This high human toll forced the issue of dam safety into the public eye, and resulted in immediate full funding for the National Dam Inspection Program and passage of the National Dam Safety Act in 1986.



Similarly, a firm price cannot be placed on property damages caused by dam failures, but the total is well into the billions of dollars, as evidenced by only a handful of examples:

<i>Buffalo Creek (1972)</i>	\$400 million
<i>Teton (1976)</i>	>\$1 billion
<i>Toccoa Falls (1977)</i>	\$30 million
<i>Lawn Lake (1982)</i>	\$25 million
<i>Silver Lake (2003)</i>	\$102 million

<i>Hope Mills (2003)</i>	\$8.1 million
<i>Big Bay (2004)</i>	\$4.75 million
21 dams in NJ (2004)	\$30 million
<i>Kingston (2008)</i>	>\$1 billion

When a dam is not properly maintained or upgraded, it becomes more susceptible to failure, and eventual repairs cost more.

Timely maintenance is the key to avoiding insurmountable repair costs and potential disaster. At best, putting off repairs will likely cost the dam owner five to ten times as much, fifteen years down the road; at worst, it kills people. Well over a third of our nation’s dams are already fifty years old; in another ten years, nearly 70% of dams in the U.S. will have reached the half-century mark.

While the estimated cost of rehabilitating our nation’s dams is high—well over \$53 billion, including more than \$18 billion for high-hazard potential non-federal dams—the collective cost of deferring maintenance on these structures is staggering.

Dams in the United States

States regulate the vast majority of US dams...

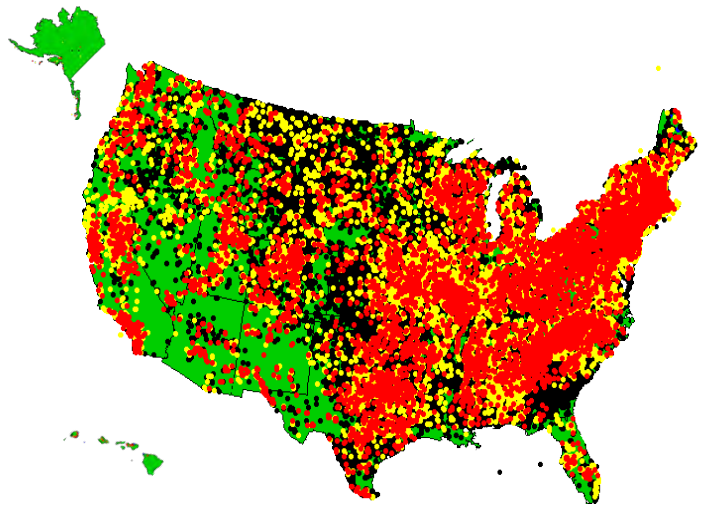
Number of Dams in the National Inventory of Dams (2010)84,133

Number of NID-Size Dams under State Regulation (2010).....67,308

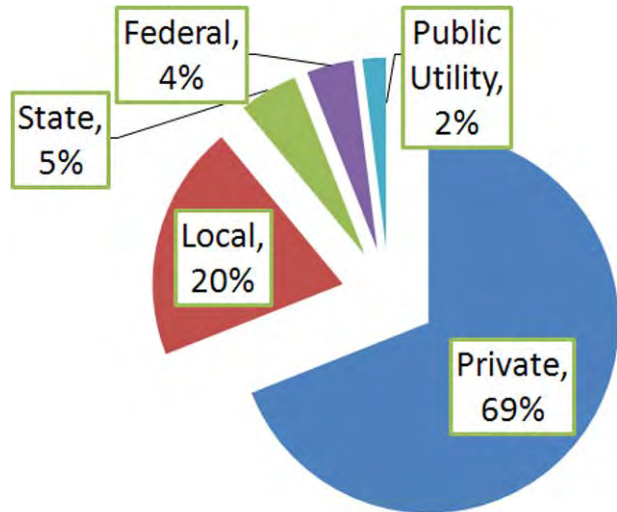
Number of NID-Size High-Hazard Potential Dams reported to be State-Regulated (2010) 10,961

Number of Deficient State-Regulated High-Hazard Potential Dams reported in 2010*1,424

*2010 data from NID condition assessment with only 66% of State Regulated HHP dams being reported



Dam Ownership in the U.S.



Red Dots = High-hazard potential dam, typically defined as a dam whose failure or mis-operation will cause loss of human life and significant property destruction.

Yellow Dots = Significant-hazard potential dam, typically defined as a dam whose failure or mis-operation will cause significant property destruction.

Black Dots = Low-hazard potential dam, typically defined as a dam whose failure or mis-operation will cause minimal property destruction.

Source: The National Inventory of Dams (NID). NID data is submitted by each state & federal dam safety agency to the NID, administered by the US Army Corps of Engineering Topographic Engineering Center.

The National Inventory of Dams (NID)

The NID is administered by the US Army Corps of Engineers Topographic Engineering Center and is updated every other year. It includes both state and federally regulated dams that:

- Are classified as having High or Significant hazard potential or,
- Are classified as having Low Hazard potential but equal or exceed 25 feet in height AND 15 acre-feet storage or,
- Are classified as having Low Hazard potential but equal or exceed 50 acre-feet storage AND 6 feet height.

State-Regulated Dams

States have the enormous challenge of regulating about 80% of the dams in the US, leaving a relatively small percentage under federal ownership and regulation. State dam safety programs submit biennial statistics on dams that they regulate to the NID. Other state program performance statistics are submitted annually to ASDSO.

The Potential for Catastrophic Dam Failures Is Increasing.

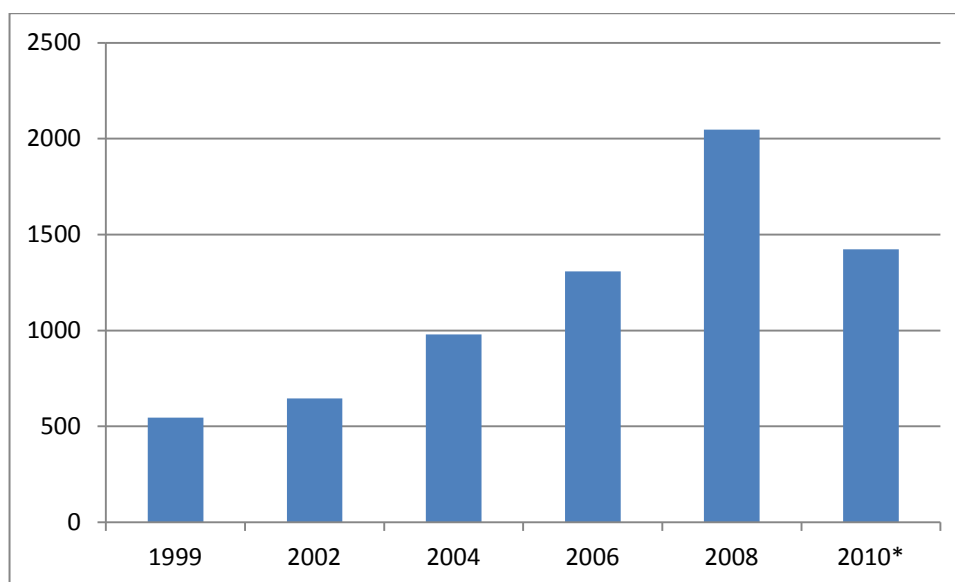
Between 1999 and 2008, the recorded number of state-regulated deficient dams (those with structural or hydraulic deficiencies leaving them susceptible to failure) more than tripled—from 1,427 to 4,404. Eliminating this backlog requires that the number of repairs consistently outstrips the number of identified deficient dams, but for the past several years statistics show that for every high-hazard-potential dam repaired, nearly two more dams have been declared deficient.

The latest complete national data on deficient dams is from 2008*. At that time:

- 4,404 state-regulated dams were in need of remediation.
- 2,047 of these deficient dams were classified as high-hazard-potential dams, and 1,119 were classified as significant-hazard-potential dams.

(*In 2009 the NID began collecting condition rating data on high hazard potential dams and this information will be used to record state-regulated deficient dams in the future. For the 2010 NID update 66% of state-regulated high hazard potential dams were rated and 1424 were rated Poor or Unsatisfactory, those considered in need of remediation. States voluntarily submit this data and the number of dams not rated continues to decrease.)

State-Regulated High-Hazard Potential Dams Identified to be in Need of Remediation



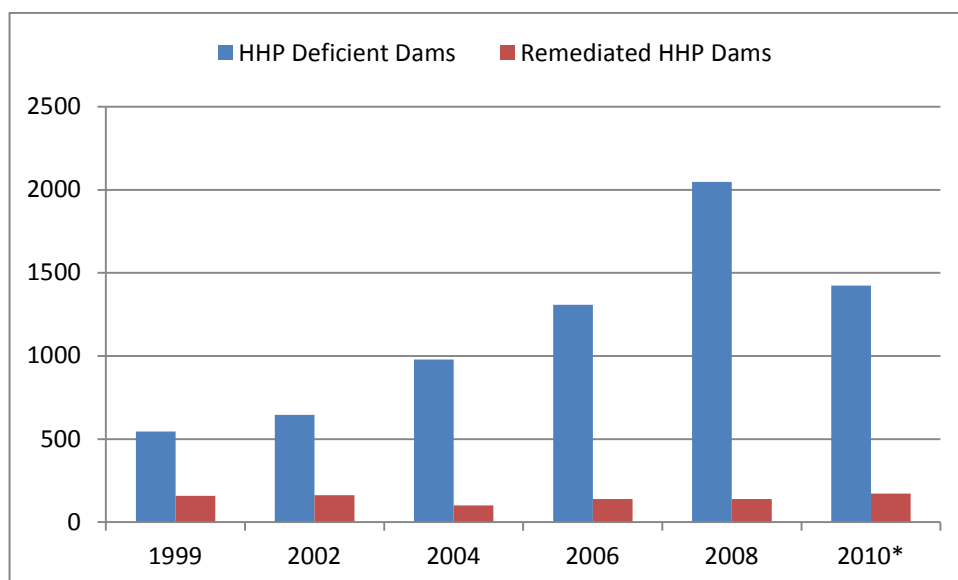
STATE-REPORTED DATA	1999	2002	2004	2006	2008	2010*
Total Deficient Dams	1427	1536	3009	3349	4404	NR
HH-Potential Deficient Dams	546	646	979	1308	2047	1424
HH-Potential Dams- Remediation Complete	159	163	10	139	140	172

*2010 data from NID condition assessment with only 66% of State Regulated HHP dams being reported

“Remediation” is defined as a solution to remove the dam safety problem. This can include solutions such as the addition of a larger spillway, repair of the structure, or removal of the dam.

“Deficient” is defined as a dam that is not capable of performing safely under all required design pool and loading conditions. Note: Each state may have different definitions and standards.

Remediation Needs: High-Hazard-Potential Dams



*2010 data from NID condition assessment with only 66% of State Regulated HHP dams being reported

The Number of High-Hazard Potential Dams Is Increasing



The number of high-hazard-potential dams (dams whose failure would cause loss of human life) is increasing. Since 1998, the number of state-regulated high-hazard-potential dams has increased from 9,300 to more than 10,800 now. The cause of this increase is due to a combination of new dam construction and reclassification of existing dams from lower hazard-potential classifications to high-hazard-potential as a result of population encroachment.

State-Regulated High-Hazard-Potential Dams, 1998-2010*

1998	2001	2003	2004	2005	2006	2007	2008	2010
9,057	8,316	9,566	8,544	9,525	9,806	9,850	10,993	11,202

**As reported by state dam safety programs. Regulators determine a dam's hazard potential classification based on the downstream consequences of a dam failure or incident, such as overtopping or mis-operation.*

Hazard potential classification has absolutely nothing to do with a dam's condition or safety. A high-hazard potential classification does NOT mean the dam is deficient.

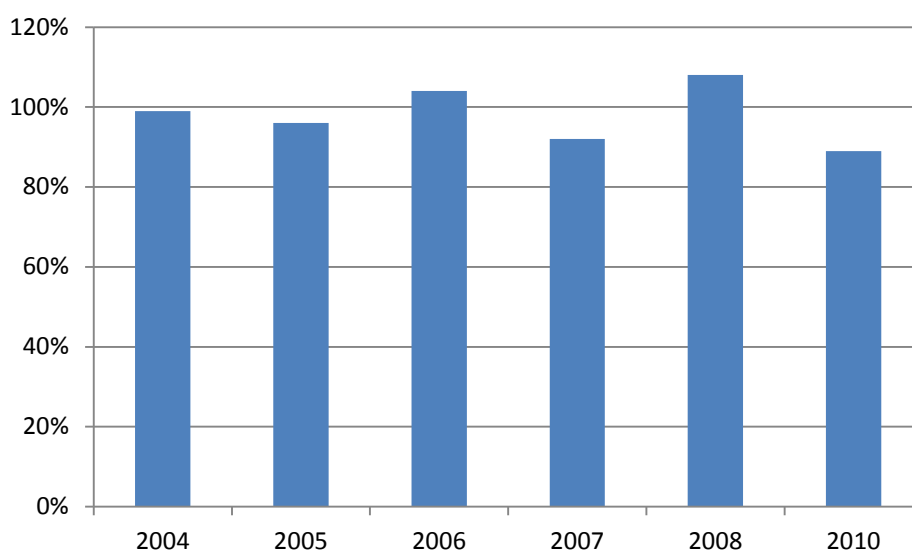
Dams that have a high hazard rating are supposed to meet very stringent standards so that they can withstand all credible extreme events such as floods and earthquakes; yet states have determined that many high-hazard potential dams are deficient, proving that—in many instances—the stringent standards are not being met.

The Good News

Although much remains to be done, efforts are underway to improve dam safety in the US. Organizations such as ASDSO and the American Society of Civil Engineers (ASCE), with the National Dam Safety Program at FEMA, advocate strong state and federal programs, promote awareness of the need for improvement of the nation's infrastructure, and support federal legislation to launch a dam rehabilitation financing program.

State inspection of high hazard potential dams remains strong. The national average for the inspection of high hazard potential dams has remained relatively steady over the reporting period of 1998 to 2010.

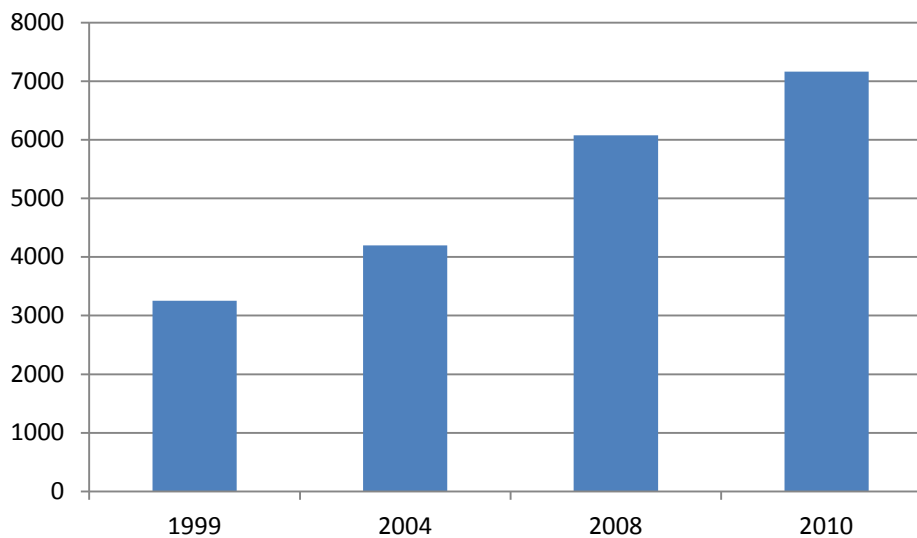
Percentage of Scheduled High Hazard Potential Inspections Completed*



*Inspection percentages vary above and below 100% for any given year based on a state's inspection frequency and scheduling.

States are reducing the risk to the public by increasing the number of current emergency action plans (EAPs) on high-hazard potential dams.

State-Regulated High-Hazard-Potential Dams with EAPs



2010 Statistics on State Dam Safety Regulation
Association of State Dam Safety Officials – www.damsafety.org

November 2011

State	NID Dams <i>(Includes all NID-sized dams regulated by state or federal agencies)</i>	State Regulated Dams		Budget	Staff	
		Total	HH		FTEs	Dams/FTE
Alabama	2,228	0	NA	\$0	0	NA
Alaska	96	83	19	\$271,024	2	41.5
Arizona	346	244	102	\$476,000	5.5	44.4
Arkansas	1,229	1256	152	\$374,200	4.8	261.7
California	1,468	1254	690	\$10,632,827	60	20.9
Colorado	1,822	2180	367	\$1,475,019	13	167.7
Conn.	726	3381	240	\$750,000	8	422.6
Delaware	86	49	44	\$391,500	1.5	32.7
Florida	892	882	72	\$1,508,625	22	40.1
Georgia	4,606	492	492	\$760,136	7.5	65.6
Hawaii	138	145	130	\$665,000	5	29
Idaho	443	596	114	\$243,076	2	298
Illinois	1,504	1576	209	\$355,000	4.7	335.3
Indiana	1,142	1081	241	\$430,000	5	216.2
Iowa	3,374	3767	90	\$274,777	2.25	1674.2
Kansas	6,087	6518	219	\$366,321	9.18	710
Kentucky	1,050	NA	NA	\$1,550,420	5	NA
Louisiana	557	562	34	\$845,611	5.2	108.1
Maine	647	618	30	\$58,900	2.5	247.2
Maryland	340	406	73	\$547,244	5.75	70.6
Mass.	1,602	1520	303	\$1,250,151	4.7	323.4
Michigan	927	1018	88	\$321,240	3.6	282.8
Minnesota	1,021	1107	24	\$378,000	5.2	212.9
Mississippi	3,533	3743	255	\$270,690	4	935.8
Missouri	5,099	677	462	\$584,470	5	135.4
Montana	2,917	2895	102	\$620,947	7.65	378.4
Nebraska	2,368	2524	133	\$351,455	10	252.4
Nevada	516	662	152	\$204,500	2.25	294.2
New Hamp	653	831	135	\$771,485	8.5	97.8
New Jersey	804	1696	214	\$1,254,000	13	130.5
New Mexico*	519	351	159	\$544,322	6	58.5
New York	1,982	5171	394	\$1,340,000	11.15	463.8
N Carolina	3,382	4639	1129	\$1,205,710	18	257.7
N. Dakota	869	1188	30	\$275,720	4.5	264
Ohio	1,577	1568	370	\$1,420,600	13.5	116.1
Oklahoma	4,758	4682	364	\$182,218	5.6	836.1
Oregon	958	1330	130	\$244,000	2.93	453.9
Penn.	1,546	3319	777	\$2,502,295	28	118.5
Puerto Rico	32	36	35	\$400,000	4	9
Rhode Isl.	215	669	97	\$189,966	1.6	418.1
S Carolina	2,421	2277	152	\$0	2.38	956.7
S Dakota	2,520	2348	46	\$0	3	782.7
Tennessee	1,216	640	150	\$372,200	8	80
Texas	7,173	7211	1023	\$2,250,170	38	189.8
Utah	818	601	197	\$743,100	13	46.2
Vermont	367	454	39	\$226,000	2	227
Virginia	1,642	1580	223	\$617,404	7	225.7
Wash.	763	1022	177	\$1,412,824	9.8	104.3
W. Virginia	562	362	255	\$607,903	6	60.3
Wisconsin	1,163	953	188	\$752,000	6.25	152.5
Wyoming	1,429	1529	81	\$222,028	5.28	289.6
Total	84,133	83,693	11,202	\$43,491,078	430.77	Av. 194.3

FTE = Full Time Equivalent Staff HH = High-Hazard Potential Dam SH = Significant-Hazard Potential Determined Dam