USA Infrastructure Report Card 2009 Recap

This is a condensed version of the various charts and graphs from the *Infrastructure Report Card for the United States* done in 2009 by the *American Society of Civil Engineers* (http://www.asce.org/). You can download the full report at http://www.infrastructurereportcard.org/sites/default/files/RC2009_full_report.pdf (20 MB)

If you or your child brought these grades home what would you do?

2009 Grades

Aviation D
Bridges C
Dams D
Drinking Water D-
Energy D+
Hazardous Waste D
Inland Waterways D-
Levees D-
Public Parks and Recreation C-
Rail C-
Roads D-
Schools D
Solid Waste C+
Transit D
Wastewater D-

America's Infrastructure GPA: D

Estimated 5 Year Investment Need: $2.2 Trillion

It is important to remember that even if you don't partake of say, air or rail travel, most of our necessity to life commodities do! If any of these infrastructures fail, for any reason – *many of us are toast*!

Any failure of a few of these critical infrastructures would not only have a tremendously bad effect on our economic state, they will cause a "*domino effect*" into other areas of our national stability, as well as, the ability to sustain ourselves. **The bottom line result: Trials and Tribulations for us ALL, directly or indirectly.**

If you take the time to read the full report you will soon discover that the **# 1** reason for our unsatisfactory grades is due to the physical age of the physical components of these infrastructures.

So as you listen to the news (and its infomercials), realize that this means that NO computer program or initiative that does not address the physical components, can possibly succeed and we are still in big time trouble.

Let's not wait until a crisis happens to address these issues. We need all of our historical inventiveness and ingenuity NOW and *not after the fact*.

TABLE B ★ Estimated 5-Year Investment Needs in Billions of Dollars

CATEGORY	5-YEAR NEED (BILLIONS)	ESTIMATED ACTUAL SPENDING *	AMERICAN RECOVERY AND REINVESTMENT ACT (P.L. 111-005)	FIVE-YEAR INVESTMENT SHORTFALL
Aviation	87	45	1.3	(40.7)
Dams	12.5	5	0.05	(7.45)
Drinking Water and Wastewater	255	140	6.4	(108.6)
Energy	75	34.5	11	(29.5)
Hazardous Waste and Solid Waste	77	32.5	1.1	(43.4)
Inland Waterways	50	25	4.475	(20.5)
Levees	50	1.13	0	(1.13)
Public Parks and Recreation	85	36	0.835	(48.17)
Rail	63	42	9.3	(11.7)
Roads and Bridges Discretionary grants for surface transportation	930	351.5	27.5 1.5	(549.5)
Schools	160	125	0**	(35)
Transit	265	66.5	8.4	(190.1)
	2.122 trillion***	903 billion	71.76 billion	(1.176 trillion)
Total Need**	**$2.2 trillion**			

* 5 year spending estimate based on the most recent available spending at all levels of government and not indexed for inflation
** The American Recovery and Reinvestment Act included $53.6 billion for a State Fiscal Stabilization Fund for education, as of press time, it was not known how much would be spent on school infrastructure.
*** Not adjusted for inflation
**** Assumes 3% annual inflation

SOURCES For source information see page 150.

All living souls welcome
whatever they are ready to cope with;
all else they ignore, or pronounce to be monstrous and
wrong, or deny to be possible.
George Santayana

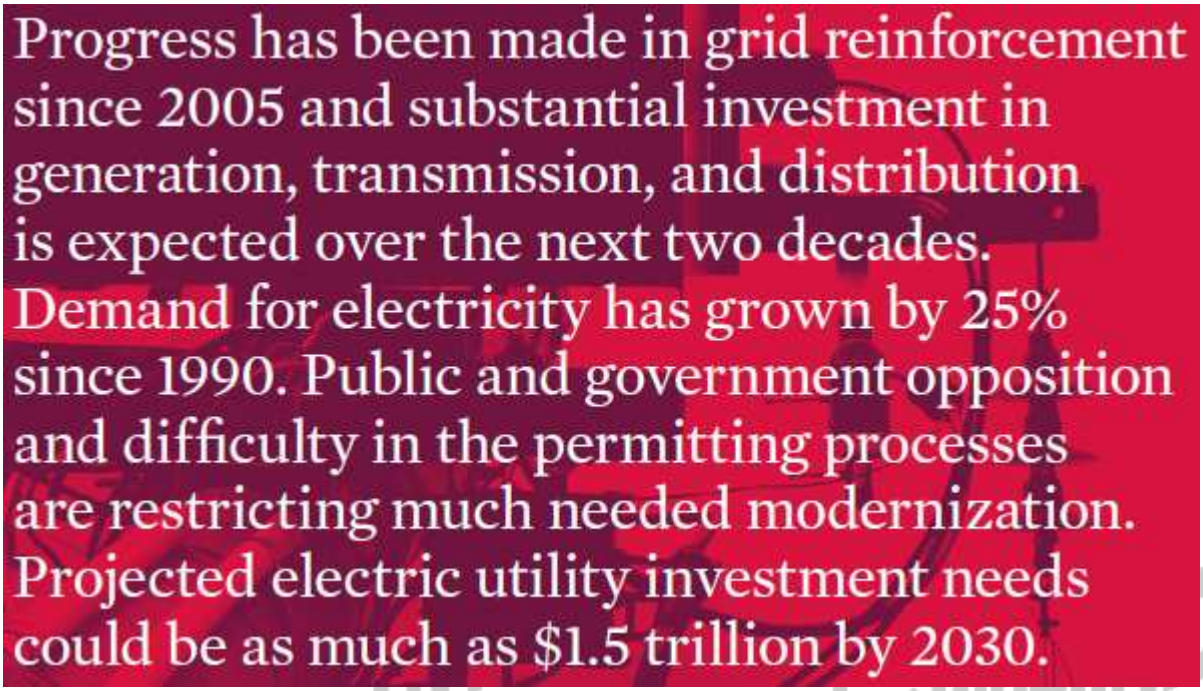
APPENDIX A ★ Previous *Report Card* Grades

SUBJECT	1988*	1998	2001	2005	2009
Aviation	B-	C-	D	D+	D
Bridges	–	C-	C	C	C
Dams	–	D	D	D	D
Drinking Water	B-	D	D	D-	D-
Energy	–	–	D+	D	D+
Hazardous Waste	D	D-	D+	D	D
Inland Waterways	B	–	D+	D-	D-
Levees	–	–	–	–	D-
Public Parks and Recreation	–	–	–	C-	C-
Rail	–	–	–	C-	C-
Roads	C+	D-	D+	D	D-
Schools	D	F	D-	D	D
Solid Waste	C-	C-	C+	C+	C+
Transit	C-	C	C-	D+	D
Wastewater	C	D+	D	D-	D-
America's Infrastructure G.P.A.	**C**	**D**	**D+**	**D**	**D**
Cost to Improve	–	–	**$1.3 trillion**	**$1.6 trillion**	**$2.2 trillion**

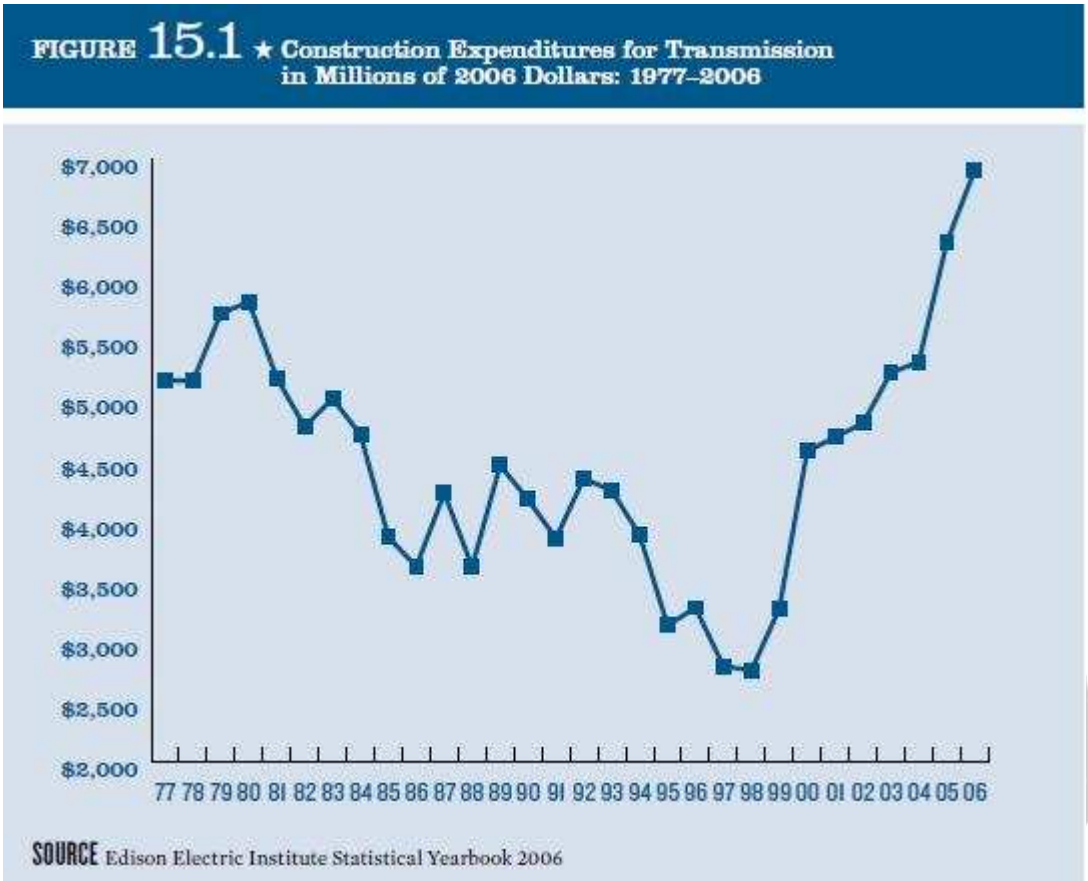
* The first infrastructure grades were given by the National Council on Public Works Improvements in its report *Fragile Foundations: A Report on America's Public Works*, released in February 1988. ASCE's first *Report Card for America's Infrastructure* was issued a decade later.

"Choice of attention –
to pay attention to this and ignore that –
is to the inner life what choice of action is to the outer.
In both cases, a man is responsible for his choice and
must accept the consequences, whatever they may be."
W. H. Auden

Energy D+

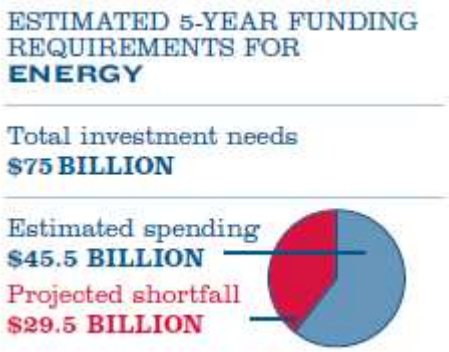


While annual investment in new transmission facilities has generally declined or been stagnant during the last 30 years, there has been an increase in investment during the past 5 years.



Resiliency

"The national electric grid currently lacks a significant degree of resilience. Utilities are generally prepared for local and regional responses; however, the national electric grid as a whole lacks a significant degree of resilience should a much broader response be required. Future investments in the system must improve system robustness, redundancy, and rapid recovery. Additionally, new technologies and behavioral changes focused on reduction and increased efficiency are necessary. True system resilience will require a national effort to modernize the electric grid to enhance security and the reliability of the energy infrastructure and facilitate recovery from disruptions to energy supply, from both natural and man-made hazards. "



Conclusion

"The "information economy" requires a reliable, secure, and affordable electric system to grow and prosper. *Unless substantial amounts of capital are invested over the next several decades in new generation, transmission, and distribution facilities, service quality will degrade and costs will go up*. These investments will involve new technologies that improve the existing electric system and possibly advanced technologies that could revolutionize the electric grid. While much is still left to be accomplished, recent efforts have raised the grade to a "D+" in the 2009 Report Card."

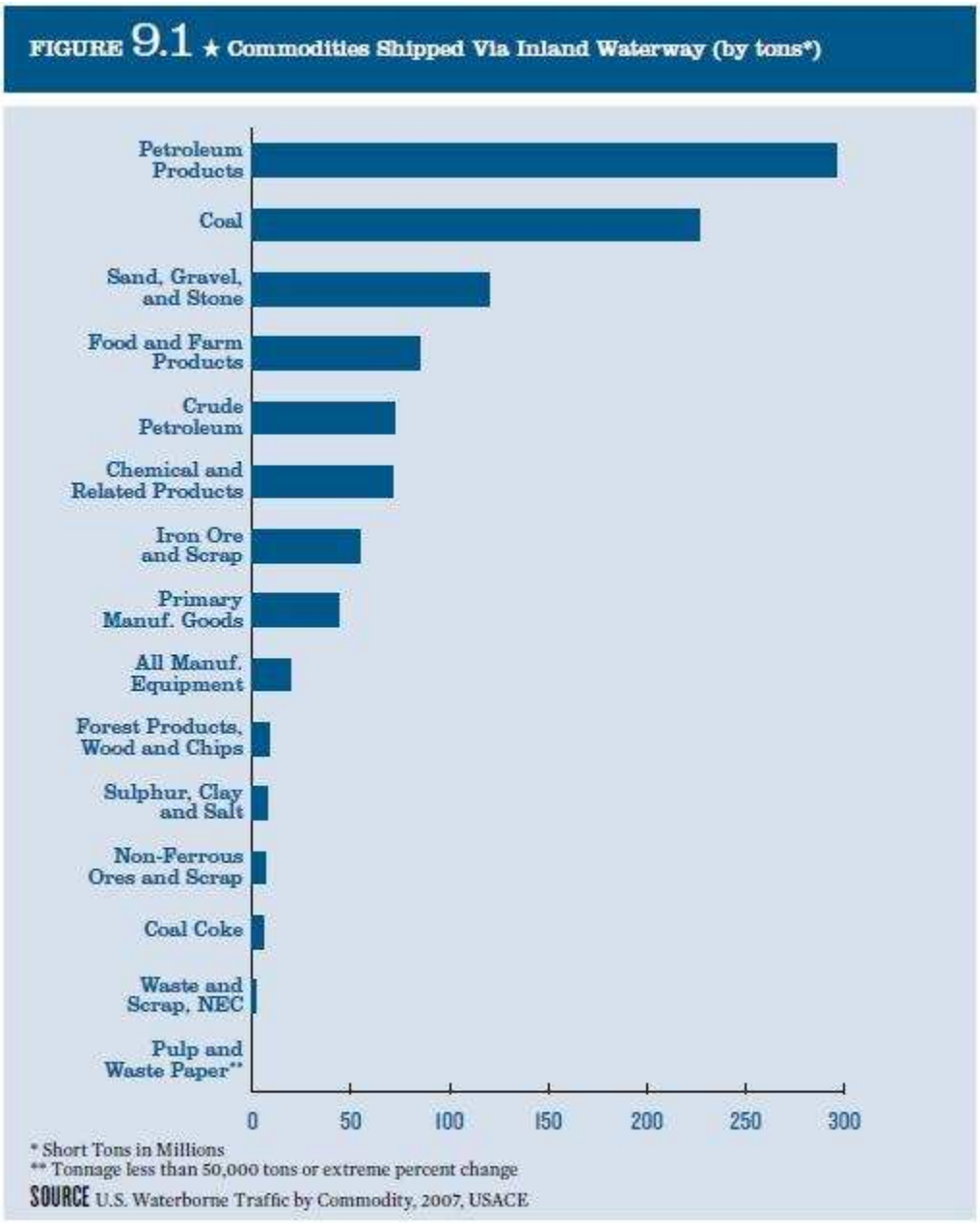
Inland Waterways D-

The average tow barge can carry the equivalent of 870 tractor trailer loads. Of the 257 locks still in use on the nation's inland waterways, 30 were built in the 1800s and another 92 are more than 60 years old. The average age of all federally owned or operated locks is nearly 60 years, well past their planned design life of 50 years. The cost to replace the present system of locks is estimated at more than $125 billion.

Because of their ability to move large amounts of cargo, the nation's inland waterways are a strategic economic and military resource. A recent analysis by the U.S. Army War College concluded that "the strategic contributions of these inland waterways are not well understood. The lack of adequate understanding impacts decisions contributing to efficient management, adequate funding, and effective integration with other modes of transportation at the national level. Recommendations demonstrate that leveraging the strategic value of U.S. inland waterways will contribute to building an effective and reliable national transportation network for the 21st century."

The U.S. inland waterway system consists of 12,000 miles of navigable waterways in four systems—the Mississippi River, the Ohio River Basin, the Gulf Intercoastal Waterway, and the Pacific Coast systems.

"There is no recognized engineering specialty to comprehensively address the current and future waterways systems challenges."



"*Forty-one states*, including all states east of the Mississippi River and 16 state capitals, are served by commercially navigable waterways. The U.S. inland waterway system consists of 12,000 miles of navigable waterways in four systems—the Mississippi River, the Ohio River Basin, the Gulf Intercoastal Waterway, and the Pacific Coast systems—that connect with most states in the U.S. The system comprises 257 locks, which raise and lower river traffic between stretches of water of different levels.

Three-quarters of the nation's inland waterways, or approximately *9,000 miles, are within the Mississippi River system*. The next largest segment is the *Ohio River system with 2,800 miles*. The *Gulf Coast Intercoastal Waterway system comprises 1,109 miles* and the *Columbia River system*, the shortest of the four major systems, *is only 596 miles long*."

TABLE 9.1 ★ The Nation's Busiest Inland Ports

INLAND PORT	DOMESTIC TONS*	DOMESTIC % INCREASE**	FOREIGN TONS*	FOREIGN % INCREASE**	TOTAL TONS*	TOTAL % INCREASE**
Huntington-Tristate, WV	76.5	-0.9	0	0	76.5	-0.9
Duluth-Superior, MN & WI	31.4	-3.5	15.1	4.7	46.5	-1.0
Pittsburgh, PA	38.1	-9.3	0	0	38.1	-9.3
St. Louis, MO & IL	32.1	2.6	0	0	32.1	2.6
Chicago, IL	21.1	-6.3	3.4	6	24.5	-4.8
Memphis, TN	18.8	-1.4	0	0	18.8	-1.4
Indiana Harbor, IN	14.5	-7.5	0.5	6	15	-7.0
Detroit, MI	11.4	-12	3.5	-19.4	14.9	-13.9
Two Harbors, MN	13.1	-2.2	0.6	942.7	13.7	1.9
Cincinnati, OH	13.2	-0.9	0	0	13.2	-0.9
Cleveland, OH	10.4	-9.5	2.4	-35	12.8	-15.8
Toledo, OH	4.5	95.3	8	-9.9	12.5	11.7
Presque Isle, MI	7	0.8	1.8	-15.7	8.8	-3.1
Gary, IN	7.9	-6.4	0.2	-73.6	8.1	-11.5
Louisville, KY	7.8	6.4	0	0	7.8	6.4

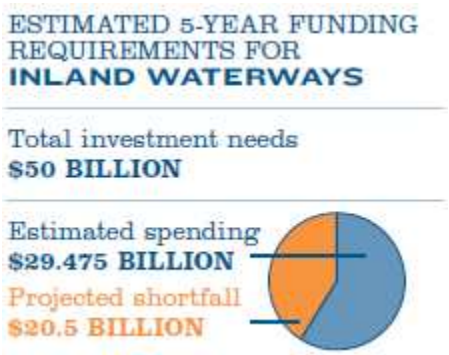
* Short Tons in Millions
** Percent Increase 2006–2007

SOURCE Leading U.S. Ports—Inland Waterways (Including Great Lakes), USACE, 2007

"The nationwide network includes *nearly 11,000 miles* of waterways *funded by federal user fees through an excise tax on fuel.* Commercial waterway operators on these designated waterways pay a fuel tax of 20 cents per gallon, which is deposited in the Inland Waterways Trust Fund (IWTF). The IWTF, which was created in 1978, funds half the cost of new construction and major rehabilitation of the inland waterway infrastructure.

Forty-seven percent of all locks maintained by the U.S. Army Corps of Engineers were classified as functionally obsolete in 2006. Assuming that no new locks are built within the next 20 years, by 2020, another 93 existing locks will be obsolete—rendering more than 8 out of every 10 locks now in service outdated.

Currently, the Corps has $180 million per year available for lock repairs—half comes from the IWTF revenues and half comes from congressional appropriations. With an average rehabilitation cost of $50 million per lock, the current level allows the Corps to fully fund only two or three lock projects each year."



Resiliency

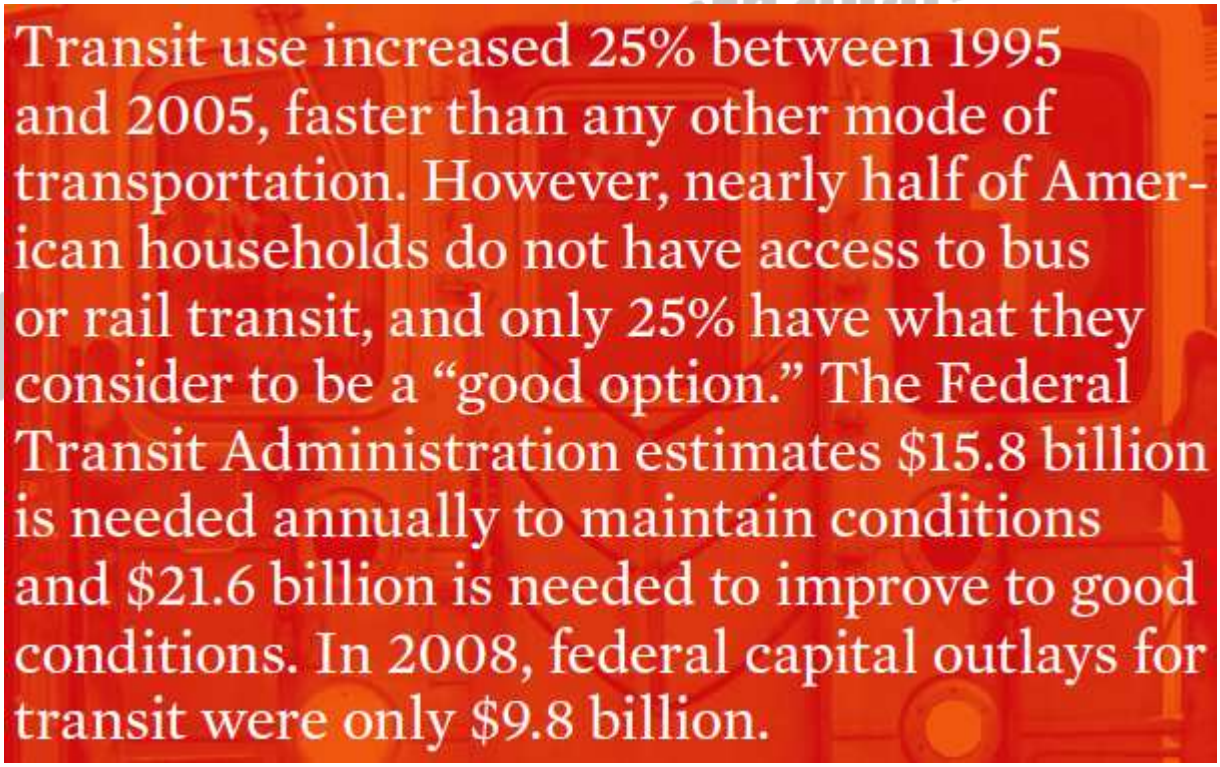
"The current system of inland waterways lacks resilience. Waterway usage is increasing, but facilities are aging and many are well past their design life of 50 years. Recovery from any event of significance would be negatively impacted by the age and deteriorating condition of the system, posing a direct threat to the American economy."

Conclusion

"Inland and intracoastal waterways directly serve 38 states including the states on the Atlantic seaboard, the Gulf Coast, and the Pacific Northwest. Shippers and consumers in these states depend on the inland waterways to move approximately 630 million tons of cargo valued at more than $73 billion annually. States on the Gulf Coast and throughout the Midwest and Ohio Valley especially depend on the inland and intracoastal waterways. Texas and Louisiana each ship more than $10 billion worth of cargo annually, while Illinois, Pennsylvania, West Virginia, Kentucky, Mississippi, Alabama, and Washington State each ship between $2 billion and $10 billion annually. Another 8 states ship at least $1 billion annually.

This system provides an average transportation savings of $10.67 per ton over the cost of shipping by alternative modes. This translates into more than $7 billion annually in transportation savings to the U.S. economy. Future investment must focus on life-cycle maintenance, system interdependencies, redundancy, security, and recovery from natural and man-made hazards."

Transit D



Indicating an increase in service demand, 23 of 32 (72%) of local ballot initiatives for public transportation—or initiatives with a public transit component—were passed in 2008, authorizing nearly $75 billion in expenditures.

TABLE 12.1 ★ Traffic Delay Reduction Due to Public Transportation

POPULATION GROUP AND NUMBER OF AREAS	AVERAGE ANNUAL PASSENGER-MILES OF TRAVEL IN MILLIONS	HOURS OF DELAY IN MILLIONS	PERCENT OF BASE DELAY	DOLLARS SAVED IN MILLIONS
Very Large	37,691	430	1,700%	$8,091
Large	5,459	64	700%	$1,193
Medium	1,665	15	400%	$270
Small	287	1	300%	$26
Other	6,324	31	500%	$574
National Urban Total	**51,426**	**541**	**1,300%**	**$10,154**

SOURCE *Urban Mobility Report*, Texas Transportation Institute, 2007

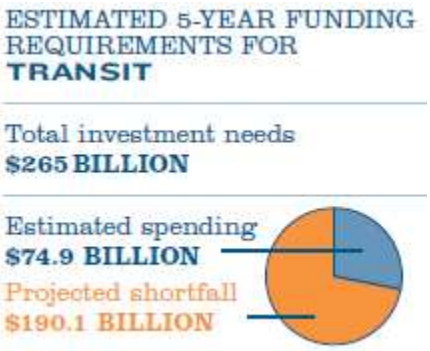
While mass transit can be an affordable and environmentally friendly travel alternative to automobiles, the American Public Transportation Association (APTA) estimates that approximately half of Americans do not have access to reliable transit systems.

TABLE 12.2 ★ Revenue Sources for Transit Financing in Millions of Dollars: 2004

	FEDERAL	STATE	LOCAL	TOTAL	%
General Fund	1,391	2,043	2,692	6,126	16%
Fuel Tax	5,564	505	148	6,217	16%
Income Tax		187	98	285	1%
Sales Tax		2,106	4,765	6,871	17%
Property Tax		63	490	553	1%
Other Taxes		1,044	784	1,828	5%
Other Public Funds		1,844	4,682	6,526	17%
Total Public Funds	**6,955**	**7,792**	**13,659**	**28,406**	**72%**
Passenger Fares			9,114	9,114	23%
Other Revenue			1,979	1,979	5%
System-General Revenue			**11,093**	**11,093**	**28%**
Totals	**6,955**	**7,792**	**24,752**	**39,499**	**100%**

Resiliency

"Transit systems are key contributors to a region's economic vitality and emergency preparedness. And when properly implemented, transit systems offer significant environmental benefits. The current U.S. transit system is not highly resilient because of a lack of integrated systematic planning, security mitigations, and adequate funding. While underground transit systems typically perform well during natural hazards, they remain vulnerable to terrorist attacks. Despite these vulnerabilities, transit systems are often called upon to move people in times of disaster. Those vulnerabilities must be overcome to ensure that transit systems will perform well when needed."



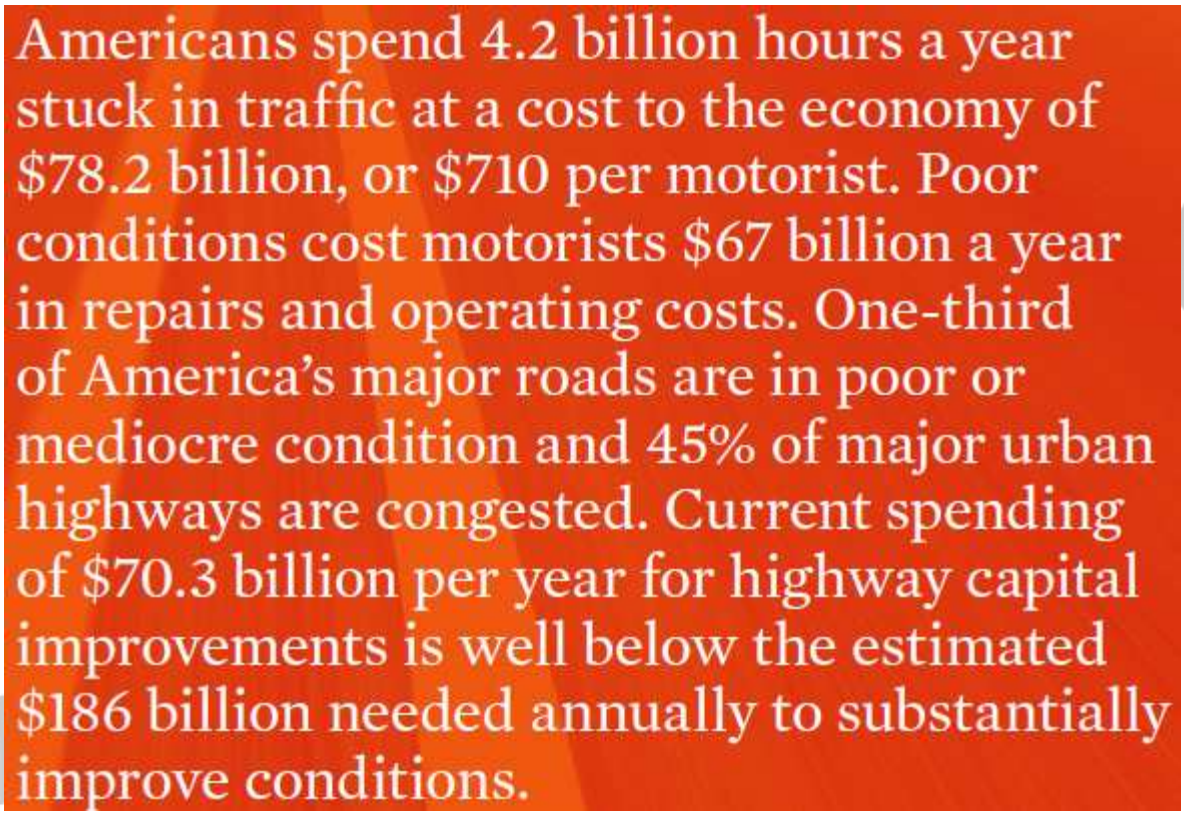
Conclusion

"The increased ridership on transit systems across the country and local support for new and expanding systems is a clear sign that Americans want transit to take a larger role in the country's surface transportation system. Yet years of underfunding and unreliable service threaten the economic and environmental benefits that transit can provide.

Transit systems must become an integrated part of any community's transportation planning process and receive adequate funding to encourage further growth. Greater emphasis must be placed on connecting rural and suburban areas through transit to ease congestion, provide assistance to Americans with limited mobility, and develop local economies.

Current conditions, coupled with an uncertain economic climate, raise concerns for transit. Future investments must focus on additional, systemwide travel options; technological innovations; lifecycle funding; modernization to support future growth; increased network redundancy and connectivity; and improved design and construction standards to withstand both natural and man-made extreme conditions."

Roads D-



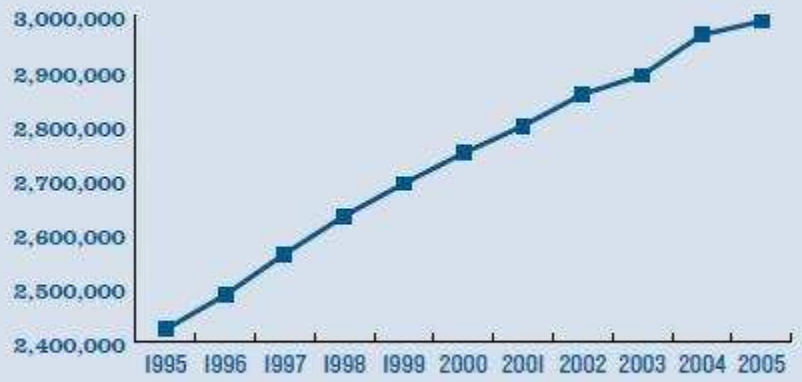
The average daily percentage of vehicle miles traveled (VMT) under congested conditions rose from 25.9% in 1995 to 31.6% in 2004, congestion in large urban areas exceeding 40%.

TABLE 11.1 ★ Top 10 Most Congested Cities in the U.S.

RANK	CITY	HOURS OF DELAY PER TRAVELER
1	Los Angeles/Long Beach-Santa Ana, CA	72
2	San Francisco-Oakland, CA	60
2	Washington, DC-VA-MD	60
2	Atlanta, GA	60
5	Dallas-Fort Worth-Arlington, TX	58
6	Houston, TX	56
7	Detroit, MI	54
8	Miami, FL	50
9	Phoenix, AZ	48
10	Chicago, IL-IN	46

SOURCE *Urban Mobility Report*, Texas Transportation Institute, 2007

FIGURE 11.1 ★ Highway Vehicle Miles Traveled: 1995–2005



SOURCE *Transportation Statistics Annual Report: 2007*, U.S. Department of Transportation, Bureau of Transportation Statistics, 2008

Resiliency

"The Interstate Highway System was constructed as part of the nation's strategic homeland defense, illustrating the important role of transportation in mitigation, defense and recovery.

The ability of our transportation system to withstand threats from hazards of all types, both natural and human-caused, and to restore service promptly following such events, is known as resilience.

Building disaster-resistant roads and highways reduces hazard mitigation costs, limits exposure, and maintains operational continuity. A multi hazard approach utilizing next-generation codes, standards, and practices is necessary to minimize the extent of a disaster."

Conclusion

"A significant problem in determining the condition of the nation's schools is the lack of reliable information. No comprehensive, authoritative data have been collected in 10 years. Spending on school construction and modernization, for which data do exist, has trended positive for much of the last 10 years, increasing from $17 billion in 1998 to a peak of $29 billion in 2004. The trend since 2004, however, has reversed and was down to $20.7 billion in 2007. Barring dramatic change in economic conditions, this downward trend will likely continue, coupled with the known needs of 10 years ago and increasing student enrollments, gives little hope for improvement."

Bridges C

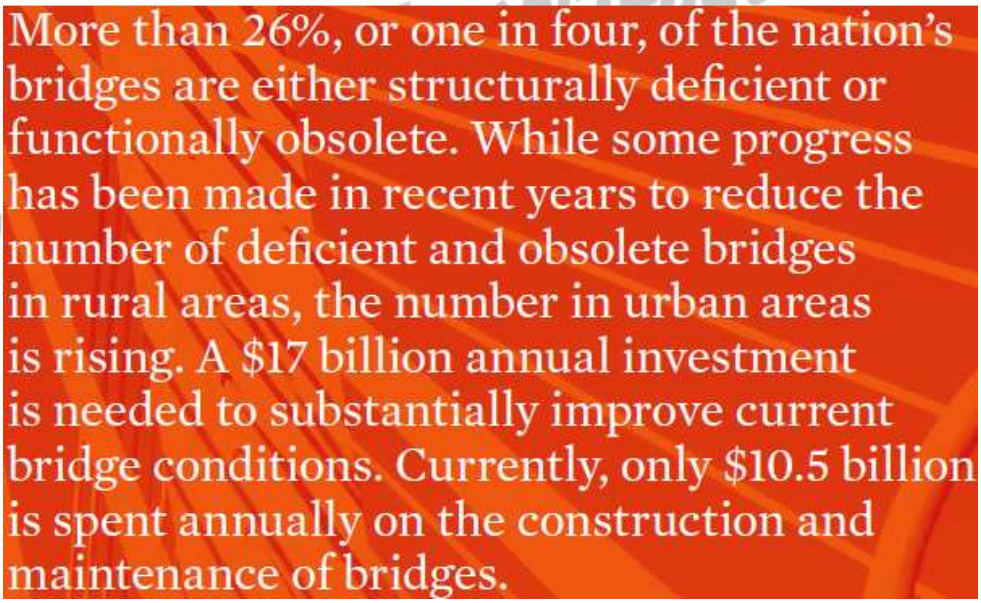


TABLE 8.1 ★ U.S. Bridge Statistics

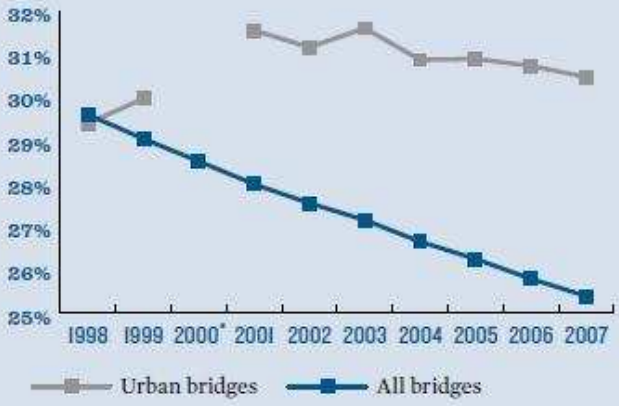
	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
All Bridges	**582,976**	**585,542**	**589,674**	**589,685**	**590,887**	**591,940**	**593,813**	**595,363**	**597,340**	**599,766**
Urban	128,312	130,339	133,384	133,401	135,339	135,415	137,598	142,408	146,041	151,171
Rural	454,664	455,203	456,290	456,284	455,548	456,525	456,215	452,955	451,299	448,595
Structurally Deficient Bridges, Total	**93,072**	**88,150**	**86,692**	**83,595**	**81,261**	**79,775**	**77,752**	**75,923**	**73,784**	**72,520**
Urban	14,073	12,967	NA	12,705	12,503	12,316	12,175	12,600	12,585	12,951
Rural	78,999	75,183	NA	70,890	68,758	67,459	65,577	63,323	61,199	59,569
Functionally Obsolete Bridges, Total	**79,500**	**81,900**	**81,510**	**81,439**	**81,537**	**80,990**	**80,567**	**80,412**	**80,317**	**79,804**
Urban	27,588	26,095	29,398	29,383	29,675	29,886	30,298	31,391	32,292	33,139
Rural	51,912	52,835	52,112	52,056	51,862	51,104	50,269	49,021	48,025	46,665

NA = Not Available

SOURCE *Transportation Statistics Annual Report*, U.S. Department of Transportation, Bureau of Transportation Statistics, 2008

In 2008, approximately one in four rural bridges were deficient, while one in three urban bridges were deficient. The urban impact is quite significant given the higher level of passenger and freight traffic.

FIGURE 8.1 ★ Percent of Deficient Bridges in the United States



* 2000 data not available

SOURCE *State Transportation Statistics: 2007*, U.S. Department of Transportation, Bureau of Transportation Statistics, 2008

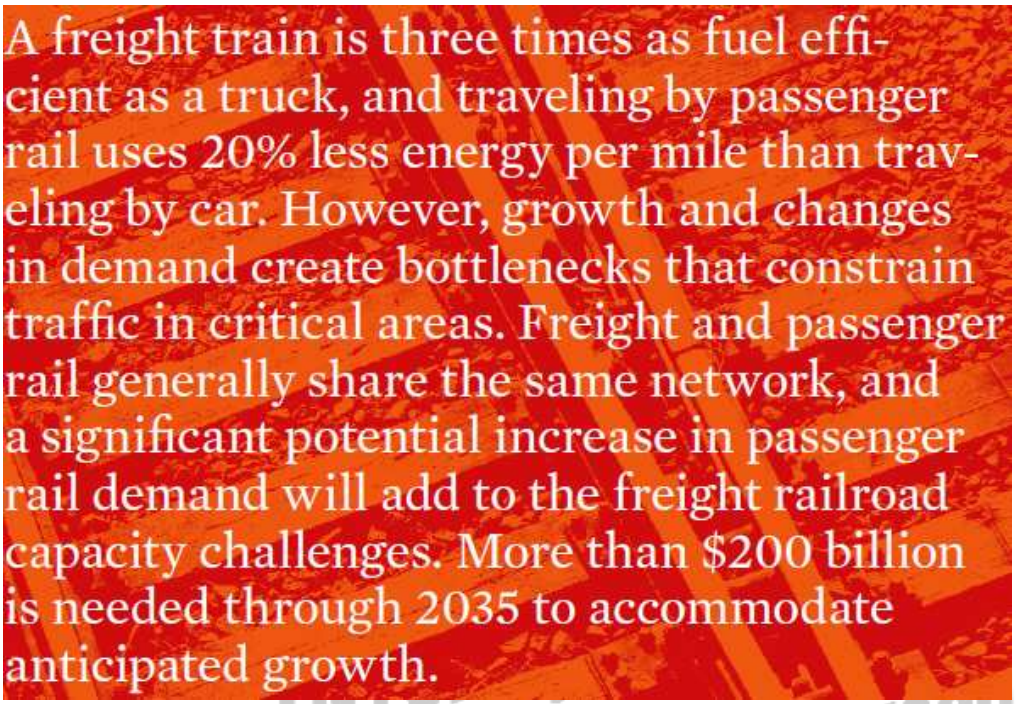
"The reliable and efficient flow of people, commodities, and emergency services within our roadway system relies on the nation's bridge system, which overall is highly resilient. The keys involve three components: system redundancy and workarounds; recovery measures, including rapid restoration ability, security, and robustness against hazards—both natural and man-made; and individual bridges' structural redundancy. Interstate bridges are usually built in pairs so that if one is taken out of service, the companion bridge can carry traffic in both directions temporarily. Also, in most urban areas, there are a number of bridges that can provide suitable alternate routes for traffic. Those key bridges that lack redundancy make it extremely difficult to establish convenient workarounds should the bridge be closed. Increasing congestion means that any rerouting caused by a significant bridge closure could result in major traffic delays.

Bridges are designed to account for the likely loads and forces that the span could expect to encounter during its service life. Structurally, today's bridges are highly redundant, and incorporate multiple girder systems that can compensate for the failure of a single member. There are exceptions for example, fracture-critical bridges, which require more frequent monitoring to ensure that they remain capable of handling their designed traffic loads. Resiliency should be part of the evaluation criteria in a risk-analysis to justify and prioritize bridge investment. That investment includes activities that range from nonstructural measures to the structural and from the design of new bridges to the rehabilitation and replacement of old bridges."

Conclusion

"While some progress has been made recently in improving the condition of the nation's rural bridges, there has been an increase in the number of deficient urban bridges. At the same time, truck traffic over the nation's bridges is on the rise—a matter of great concern as trucks carry significantly heavier loads than automobiles and exact more wear and tear on bridges. The investment gap is accelerating and the failure to invest adequately in the nation's bridges will lead to increased congestion and delays for motorists, wasted fuel, the further deterioration of bridge conditions, and increased safety concerns. Once Congress works to address these problems in the 2009 authorization of the Surface Transportation Program, it should establish a goal that less than 15% of the nation's bridges be classified as structurally deficient or functionally obsolete by 2013 and should provide the funding needed to accomplish that."

Rail C-



Freight Rail

"The U.S. freight rail system is comprised of three classes of railroad companies based on annual operating revenues: *Class I* freight railroad systems; 30 *Class II* regional or short-line railroads; and 320 *Class III* or local line-haul carriers.

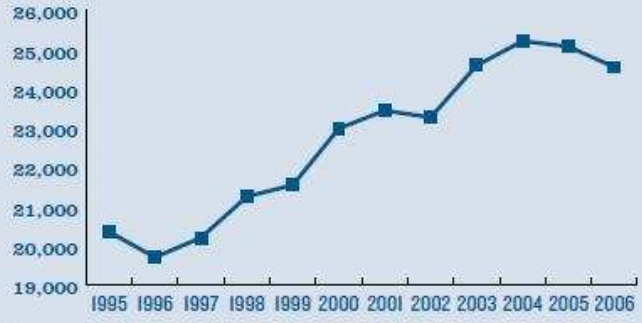
Approximately 42% of all intercity freight in the United States travels via rail, including 70% of domestically manufactured automobiles and 70% of coal delivered to power plants. As of 2006, Class I railroads owned and operated 140,249 miles of track. However, most traffic travels on approximately one-third of the total network, which totals 52,340 miles."

Corridor services linking major cities less than 500 miles apart, such as Milwaukee-Chicago, Sacramento-San Francisco-San Jose and the Northeast Corridor, are experiencing the fastest growth.

Passenger Rail

"Amtrak, the nation's only intercity passenger rail provider, carried 28.7 million riders in fiscal year 2008, an 11.1% increase from fiscal year 2007. Further, the 2007 ridership represented a 20% increase from the previous five years. Corridor services linking major cities less than 500 miles apart, such as Milwaukee-Chicago, Sacramento-San Francisco-San Jose and the Northeast Corridor, are experiencing the fastest growth."

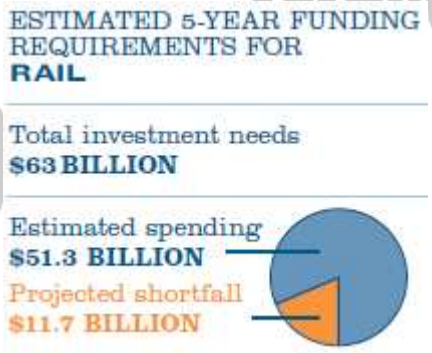
FIGURE 10.1 ★ Number of Amtrak Passengers (in thousands): 1995–2006



SOURCE *Transportation Statistics Annual Report: 2007*, U.S. Department of Transportation, Bureau of Transportation Statistics, 2008

Resiliency

"Because of its efficiency and reduced energy consumption, rail is an important component of the nation's transportation network, supporting the economy through both commerce and tourism. But due to a lack of adequate investment, limited redundancy, intermodal constraints, and energy system interdependencies, the rail system is not resilient. Current rail security strategies are risk-based as determined by corridor assessments, corporate security reviews, intelligence analyses, and objectively measured risk metrics. To improve resilience, future investments must address life-cycle maintenance, rapid recovery, multi hazard threats and vulnerabilities, and technological innovations."



Conclusion

"Rail is increasingly seen as a way to alleviate growing freight and passenger congestion experienced by other modes of transportation. In addition, rail is a fuel efficient alternative for moving freight long distances.

Anticipated growth over the coming decades, as well as demographic shifts, will tax a rail system that is already reaching capacity in some critical bottlenecks. A substantial investment in rail infrastructure will maximize efficiencies and ultimately reap broad benefits for passengers, shippers, and the general public."

Aviation D

Despite surging oil prices, volatile credit markets, and a lagging economy, the Federal Aviation Administration predicts 3% annual growth in air travel. Travelers are faced with increasing delays and inadequate conditions as a result of the long overdue need to modernize the outdated air traffic control system and the failure to enact a federal aviation program.

TABLE 7.1 ★ Top 10 U.S. Passenger Airports, 2006–2007

RANK	LOCATION	AIRPORT
1	Atlanta, GA	Hartsfield–Jackson Atlanta International
2	Chicago, IL	Chicago O'Hare International
3	Los Angeles, CA	Los Angeles International
4	Fort Worth, TX	Dallas/Fort Worth International
5	Denver, CO	Denver International
6	New York, NY	John F. Kennedy International
7	Las Vegas, NV	McCarran International
8	Phoenix, AZ	Phoenix Sky Harbor International
9	Houston, TX	George Bush Intercontinental/Houston
10	Newark, NJ	Newark Liberty International

SOURCE U.S. Department of Transportation, Bureau of Transportation Statistics, 2008

TABLE 7.2 ★ Top 10 U.S. Cargo Airports, 2006–2007

RANK	LOCATION	AIRPORT
1	Anchorage, AK	Ted Stevens Anchorage International
2	Memphis, TN	Memphis International
3	Louisville, KY	Louisville International
4	Miami, FL	Miami International
5	Los Angeles, CA	Los Angeles International
6	Indianapolis, IN	Indianapolis International
7	New York, NY	John F. Kennedy International
8	Chicago, IL	Chicago O'Hare International
9	Newark, NJ	Newark Liberty International
10	Oakland, CA	Metropolitan Oakland International

SOURCE U.S. Department of Transportation, Bureau of Transportation Statistics, 2008

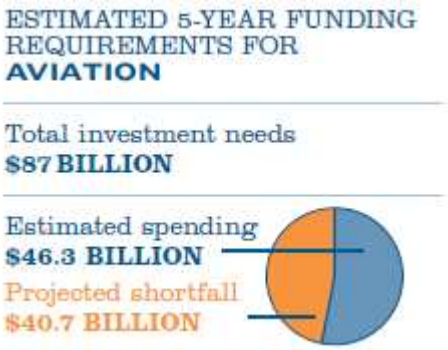
FIGURE 7.1 ★ Cause of National Aviation System Delays

	% OF DELAYS
Weather	67.98
Volume	22.74
Equipment	0.95
Closed Runway	5.81
Other	2.52

SOURCE U.S. Department of Transportation, Bureau of Transportation Statistics, 2008

Resiliency

"Aviation's rapid movement of goods and services, as well as its support of tourism, is critical to the economic vitality of the nation, and air travel is often chosen over other modes of transportation on the basis of convenience, time, and cost. Thus, the consequence of failure is severe. Additionally, shifts in demand corresponding to threats, delays, and fuel pricing contribute to the volatility of the industry. I n a highly complex system like aviation, resilience is not simply a matter of technical or facility upgrades. Future investments must consider dynamic system changes, security, capacity, life-cycle facility maintenance, technology innovations, and redundancy."



Conclusion

"Just as the industry was recovering from the events of September 11, 2001, it was dealt another blow from the impact of surging oil prices, volatile credit markets, and a lagging economy. In the face of recent FAA estimates that predict an annual 3% growth in air travel, the continuing delays in reauthorization of federal programs and updating of the outdated air traffic control system threaten the system's ability to meet the needs of the American people and economy. To remain successful, the nation's aviation systems need robust and flexible federal leadership, a strong commitment to airport infrastructure, and the rapid deployment of NexGen."

Dams D

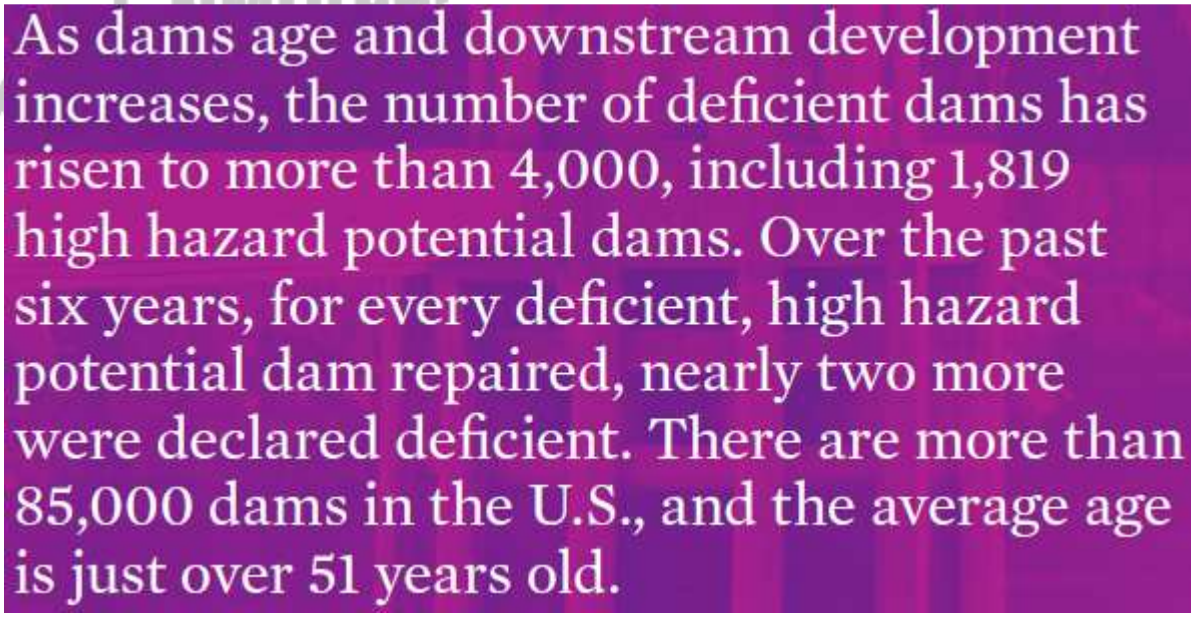


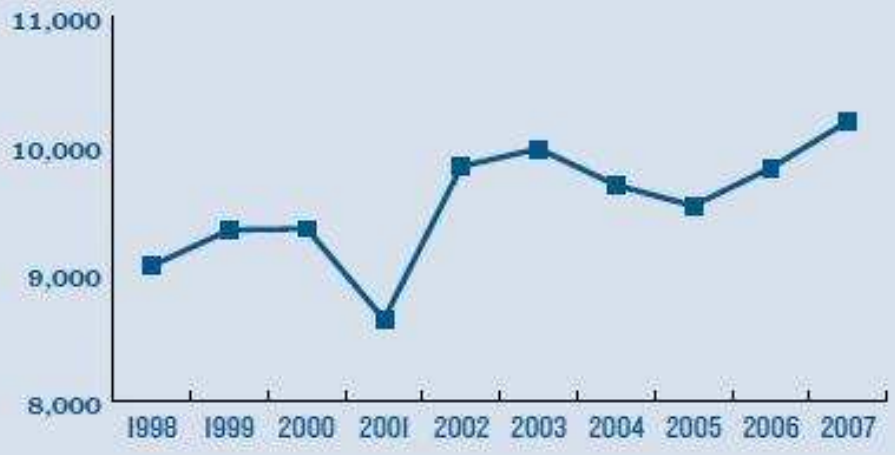
TABLE 1.1 ★ Number of Deficient Dams in United States by Repair Status

YEAR	# OF DEFICIENT DAMS	# OF HIGH HAZARD DEFICIENT DAMS	# OF HIGH HAZARD REPAIRED DAMS	# OF HIGH HAZARD DAMS NEEDING REPAIR
2001	1,348	488	124	364
2002	1,536	646	163	483
2003	2,004	648	120	528
2004	3,000	979	100	879
2005	3,271	1,367	138	1,229
2006	3,346	1,308	139	1,169
2007	4,095	1,826	83	1,743

SOURCE Association of State Dam Safety Officials

Many state dam safety programs do not have sufficient resources, funding, or staff to conduct dam safety inspections, to take appropriate enforcement actions, or to ensure proper construction by reviewing plans and performing construction inspections.

FIGURE 1.1 ★ Number of High Hazard Dams in the United States



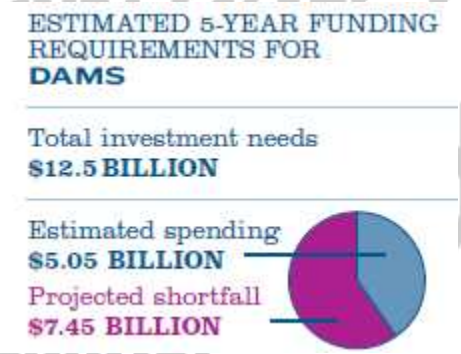
SOURCE Association of State Dam Safety Officials

Resiliency

"Dams are generally not very resilient because few have redundant structures, many have regional impacts, and only 50% of high hazard dams have EAPs.

The U.S. Department of Homeland Security, through the *Office of Infrastructure Protection*, has started addressing this important issue in collaboration with the dam safety and dam security communities, federal and state agencies, and the entire spectrum of owners and operators.

Given the large number of dams and their broad range of resiliency levels, efforts are being made to develop a rational prioritization approach for coordinating protection programs and resiliency enhancements. Important physical and functional characteristics of dams—such as the consequence of failure and loss of critical benefits—are considered the basis for identifying which dams would have the most severe and long lasting impact if service was lost (drinking water, hydropower, flood damage reduction, inland navigation, etc.). By considering the impact on all sectors—public safety, local commerce, service suppliers, etc.—in the risk evaluation process, strategies that target increased resilience and improved security can be effectively identified."



Conclusion

"Despite some successes, the overall condition of the nation's dams has not improved in recent years. This is evidenced by the rising numbers of dams— especially high hazard dams—that are deficient and in need of repair as well as by the limited number of dams that are actually repaired each year. In order to make significant improvements in the nation's dams—a matter of critical importance to public health, safety and welfare— Congress, the administration, state dam safety programs, and dam owners will have to develop an effective inspection, enforcement and funding strategy to reverse the trend of increasingly deteriorating dam infrastructure."

RAISING THE GRADES
CASE STUDIES

SANDOVAL COUNTY, NM ★ NRCS Rehabilitated Dam

Just outside of Albuquerque, New Mexico, the Piedra Liza Dam today protects seven times as many people as when it was built in the early 1950s. Analyses in the early 2000s showed deficiencies within the dam and should it fail, as many as 1,700 residents in the area and 43,000 commuters on Interstate 25 could be adversely affected. Sandoval County applied to the NRCS Small Watershed Rehabilitation Program for assistance in 2005 and by 2007 repairs had been completed. *Photo courtesy of the U.S. Natural Resources Conservation Service.*

Levees D-

More than 85% of the nation's estimated 100,000 miles of levees are locally owned and maintained. The reliability of many of these levees is unknown. Many are more than 50 years old and were originally built to protect crops from flooding. With an increase in development behind these levees, the risk to public health and safety from failure has increased. Rough estimates put the cost at more than $100 billion to repair and rehabilitate the nation's levees.

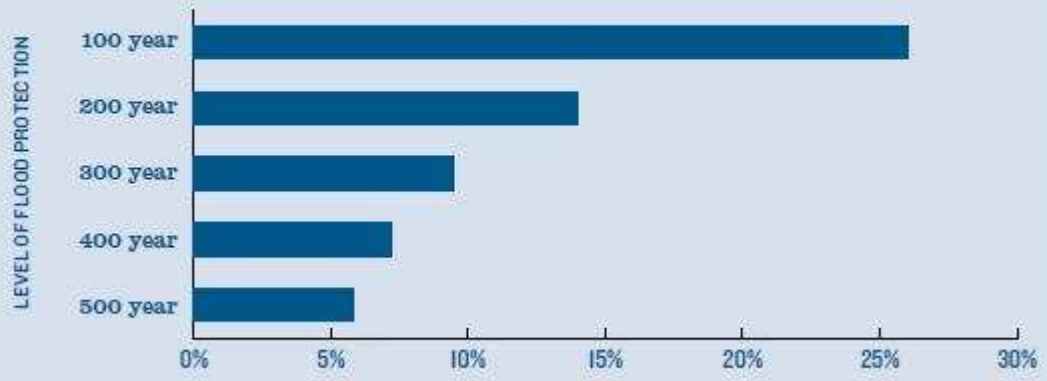
There is no definitive record of how many levees there are in the U.S., nor is there an assessment of the current condition and performance of those levees.

TABLE 4.1 ★ Damages from Flooding in Levee-Related Areas

LOCATION/YEAR	DAMAGES IN DOLLARS
Midwest 1993	$272,872,070
North Dakota/Minnesota 1997	$152,039,604
Hurricane Katrina 2005	$16,467,524,782
Midwest 2008	$583,596,400

SOURCE National Committee on Levee Safety

FIGURE 4.1 ★ Likelihood of Levee Failure/Flooding Over a 30-Year Residential Mortgage

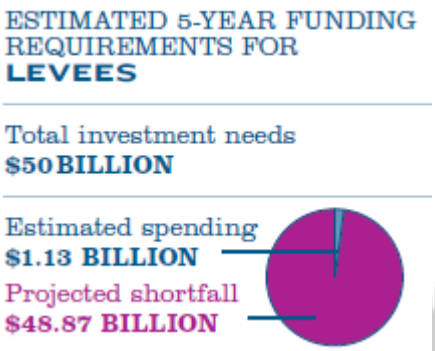


SOURCE National Committee on Levee Safety

Resiliency

"Levees serve to protect the public and critical infrastructure and to prevent flooding. With increasing development behind existing levees, the risk to public health and safety from failure has increased.

To address the current lack of resilience in the nation's levee system, DHS has included levees within the critical infrastructure protection program in an attempt to identify those levees that present the greatest risk to the nation. DHS has also funded research to increase the robustness of levees—for example, armoring the slopes to resist erosion should floodwaters exceed the design elevation— and technologies are currently under study to rapidly repair any breaches that may occur in a levee. To ensure system integrity, future investments must also focus on life-cycle maintenance, research, development of emergency action plans for levee-protected areas, and security."



Conclusion

"Much is still unknown about the condition of the nation's tens of thousands of miles of levees. The residual risk to life and property behind such structures cannot be ignored. Due to their impact on life and safety issues, and the significant consequences of failure, as well as the financial burden of falling property values behind levees that are not safe and are being decertified, the nation must not delay addressing levee issues."

Drinking Water D-

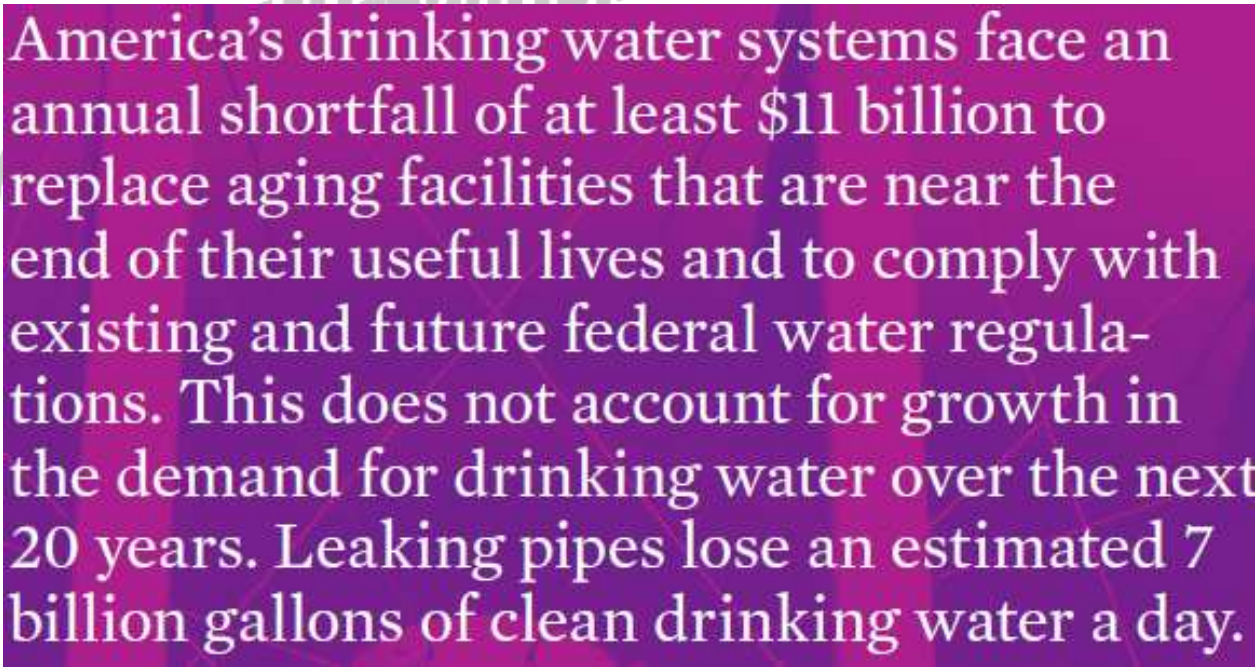


TABLE 2.1 ★ Design Life of Drinking Water Systems

COMPONENTS	YEARS OF DESIGN LIFE
Reservoirs and Dams	50–80
Treatment Plants—Concrete Structures	60–70
Treatment Plants—Mechanical and Electrical	15–25
Trunk Mains	65–95
Pumping Stations—Concrete Structures	60–70
Pumping Stations—Mechanical and Electrical	25
Distribution	60–95

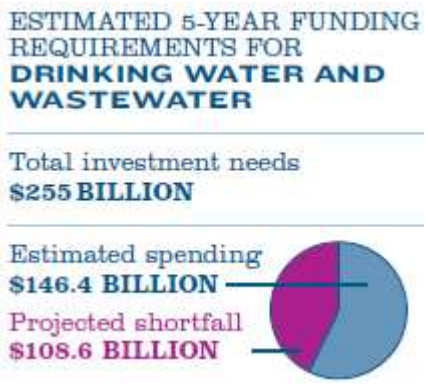
SOURCE US EPA Clean Water and Drinking Water Infrastructure Gap Analysis Report, September 2002

The question is not whether the federal government should take more responsibility for drinking water improvements but how it should take more responsibility.

Resiliency

"Drinking water systems provide a critical public health function and are essential to life, economic development, and growth. Disruptions in service can hinder disaster response and recovery efforts, expose the public to water-borne contaminants, and cause damage to roadways, structures, and other infrastructure, endangering lives and resulting in billions of dollars in losses.

The nation's drinking-water systems are not highly resilient; present capabilities to prevent failure and properly maintain or reconstitute services are inadequate. Additionally, the lack of investment and the interdependence on the energy sector contribute to the lack of overall system resilience. These shortcomings are currently being addressed through the construction of dedicated emergency power generation at key drinking water utility facilities, increased connections with adjacent utilities for emergency supply, and the development of security and criticality criteria. Investment prioritization must take into consideration system vulnerabilities, interdependencies, improved efficiencies in water usage via market incentives, system robustness, redundancy, failure consequences, and ease and cost of recovery."



Conclusion

"Despite some successes, the overall condition of the nation's dams has not improved in recent years. This is evidenced by the rising numbers of dams— especially high hazard dams—that are deficient and in need of repair as well as by the limited number of dams that are actually repaired each year. In order to make significant improvements in the nation's dams—a matter of critical importance to public health, safety and welfare— Congress, the administration, state dam safety programs, and dam owners will have to develop an effective inspection, enforcement and funding strategy to reverse the trend of increasingly deteriorating dam infrastructure."

TABLE 2.2 ★ Water Usage: 1950 and 2000

	1950	2000	PERCENT CHANGE
Population (Millions)	93.4	242	159%
Usage (Billions of Gallons per Day)	14	43	207%
Per Capita Usage (Gallons per Person per Day)	149	179	20%

SOURCE US EPA Clean Water and Drinking Water Infrastructure Gap Analysis Report, September 2002

Wastewater D-

Aging systems discharge billions of gallons of untreated wastewater into U.S. surface waters each year. The Environmental Protection Agency estimates that the nation must invest $390 billion over the next 20 years to update or replace existing systems and build new ones to meet increasing demand.

Sanitary sewer overflows, caused by blocked or broken pipes, result in the release of as much as 10 billion gallons of raw sewage yearly, according to the EPA.

TABLE 6.1 ★ Design Life of Water Systems

COMPONENTS	YEARS OF DESIGN LIFE
Collections	80–100
Treatment Plants—Concrete Structures	50
Treatment Plants—Mechanical and Electrical	15–25
Force Mains	25
Pumping Stations—Concrete Structures	50
Pumping Stations—Mechanical and Electrical	15
Interceptors	90–100

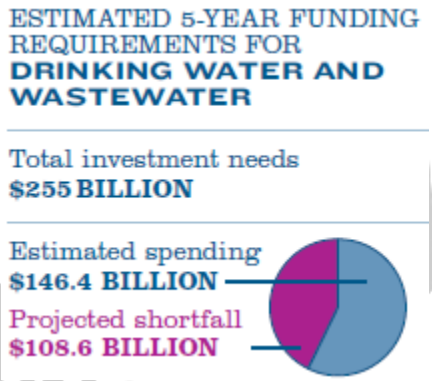
SOURCE Clean Water and Drinking Water Infrastructure Gap Analysis Report, p. 11, EPA 816-R-02-020, September 2002

Resiliency

"Construction, operation and maintenance, and reconstitution of service of wastewater infrastructure is expensive, and the monetary and societal costs incurred when this infrastructure fails are high. Aging, underdesigned, or inadequately maintained systems discharge billions of gallons of untreated wastewater into U.S.surface waters each year.

The nation's wastewater systems are not resilient in terms of current ability to properly fund and maintain, prevent failure, or reconstitute services. Additionally, the interdependence on the energy sector contributes to the lack of system resilience that is increasingly being addressed through the construction of dedicated emergency power generation at key wastewater utility facilities.

Future investments must focus on updating or replacing existing systems as well as building new ones to meet increasing demand; on improved operations processes, including ongoing oversight, evaluation, and asset management on a system wide basis; and watershed approaches to look more broadly at water resources in a coordinated systematic way."



Conclusion

"If the nation fails to meet the investment needs of the next 20 years, it risks reversing public health, environmental, and economic gains of the past three decades.

The case for increased federal investment is compelling. Needs are large and unprecedented; in many locations, local sources cannot be expected to meet this challenge alone and, because waters are shared across local and state boundaries, the benefits of federal help will be disseminated throughout the nation. Clean and safe water is no less a national priority than are national defense, an adequate system of interstate highways, and a safe and efficient aviation system. Many other highly important infrastructure programs enjoy sustainable, long-term sources of federal backing, often through the use of dedicated trust funds; under current policy, water and wastewater infrastructure do not."

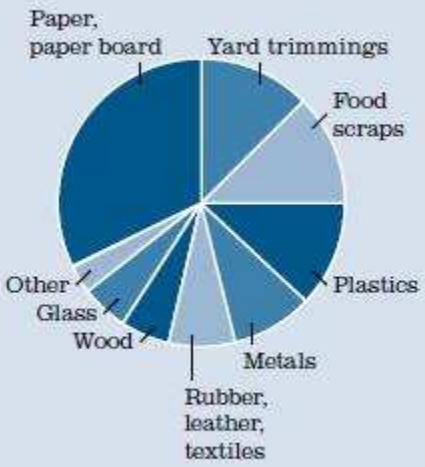
Solid Waste C+

In 2007, the U.S. produced 254 million tons of municipal solid waste. More than a third was recycled or recovered, representing a 7% increase since 2000. Per capita generation of waste has remained relatively constant over the last 20 years. Despite those successes, the increasing volume of electronic waste and lack of uniform regulations for disposal creates the potential for high levels of hazardous materials and heavy metals in the nation's landfills, posing a significant threat to public safety.

Of the 254 million tons of solid waste generated in 2007, 85 million tons, or 33%, were recycled or composted compared to 30.1% in 2000; 32 million tons, or 13%, were burned in waste-to-energy (WTE) plants; and 137 million tons, or 54%, went into landfills compared to 55.3% in 2000.

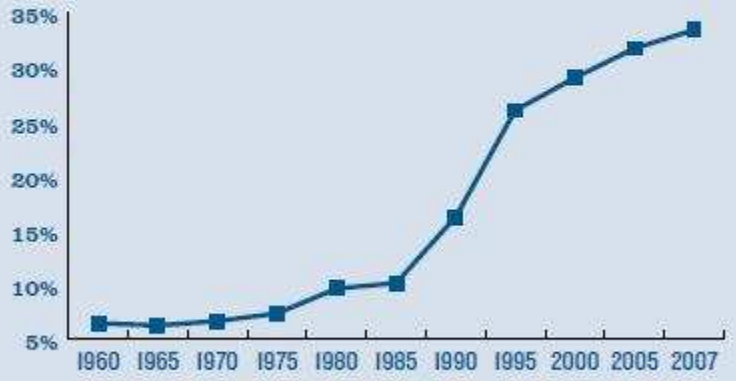
FIGURE 5.2 ★ Components of Municipal Solid Waste (254 million tons generated in 2007)

	% OF MSW
Paper, paper board	32.7
Yard trimmings	12.8
Food scraps	12.5
Plastics	12.1
Metals	9.2
Rubber, leather, textiles	7.6
Wood	5.8
Glass	5.3
Other	3.2



SOURCE EPA Facts and Figures About Municipal Solid Waste, 2008

FIGURE 5.1 ★ Percent of Municipal Solid Waste that is Recycled: 1960–2007



SOURCE EPA Facts and Figures about Municipal Solid Waste, 2008

Resiliency

"Although landfills are dependent on energy and road infrastructure, as a system, solid waste disposal facilities remain resilient. However, the impacts of such landfill failures as air and groundwater pollution on surrounding neighborhoods are apparent but not well quantified, and the time required for restoration is often lengthy and costly. Additionally, landfills can play an important role during recovery operations, but without adequate disposal options cleanup and recovery efforts may be hindered.

Future investments must consider new technologies and behavioral changes focused on energy conversion, recycling, waste reduction, and increased efficiency. "

Conclusion

"Innovative technologies and recycling efforts have been successful in improving the safety, sustainability, and efficiency of the nation's waste disposal systems. The lack of long term strategies to deal with increased amounts of electronic waste and under-use of waste to energy practices, however, indicates the need for continued research and development of new policies and management practices."

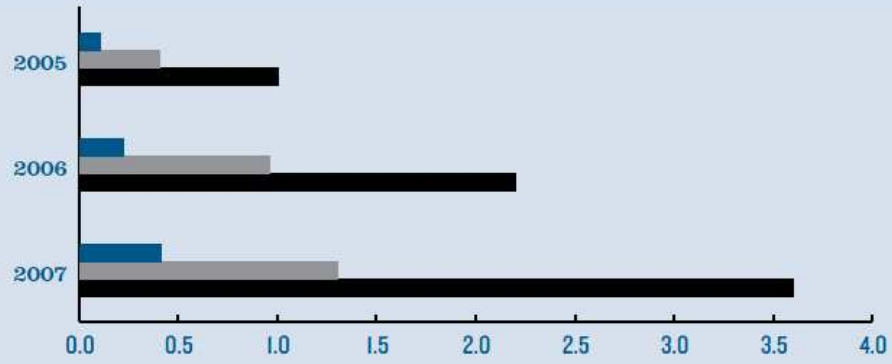
Hazardous Waste D

Redevelopment of brownfields sites over the past five years generated an estimated 191,338 new jobs and $408 million annually in extra revenues for localities. In 2008, however, there were 188 U.S. cities with brownfields sites awaiting cleanup and redevelopment. Additionally, federal funding for "Superfund" cleanup of the nation's worst toxic waste sites has declined steadily, dropping to $1.08 billion in 2008, its lowest level since 1986.

More than 150 cities had successfully redeveloped 1,578 brownfield sites, returning more than 10,000 acres to economic productivity in 2007. These actions resulted in $408 million in new municipal revenues in 62 cities and more than 191,338 jobs—a dramatic increase from $90 million and 83,000 jobs in 2004.

The pace of cleanups is slowing. For much of the 1990s the EPA averaged more than 70 construction-complete sites per year. However, since 2000 the number of newly completed sites has decreased dramatically.

FIGURE 3.1 ★ Tax Revenue from Brownfields Redevelopment in Billions of Dollars



The nation's mayors estimate that with additional funding for brownfields redevelopment, far more tax revenues could be realized.

SOURCE US Conference of Mayors, Recycling America's Land: 2008 Brownfields Redevelopment Report

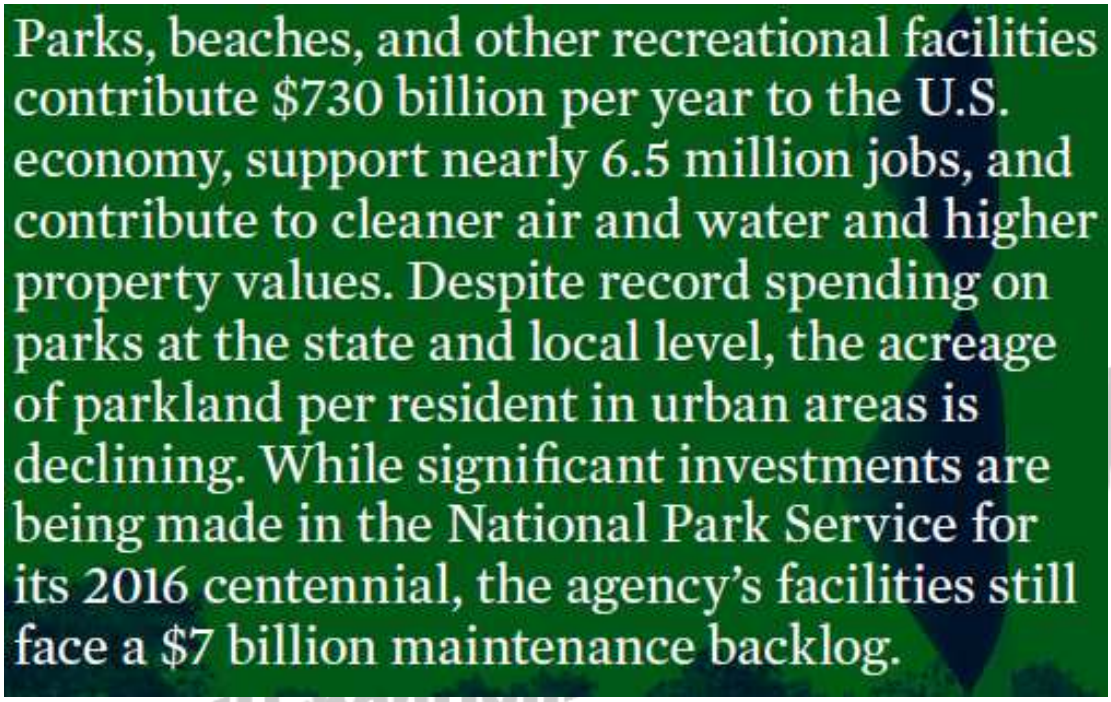
Resiliency

"In order to be resilient, brownfield sites must be sustainable, ensuring that needs of both current and future generations are met. Future investments must address innovative technologies, security, and lifecycle maintenance of the sites. A resilience strategy that addresses both disposal and cleanup of existing sites can help improve public perception in accepting the creation and location of new waste disposal facilities."

Conclusion

"Hazardous waste sites across the country hold enormous potential for economic growth and community redevelopment. However, we risk losing access to those benefits if funding is not increased and the pace of remediation is not accelerated. To restore these sites to a safe and usable condition, both public and private organizations must work together."

Public Parks and Recreation C-



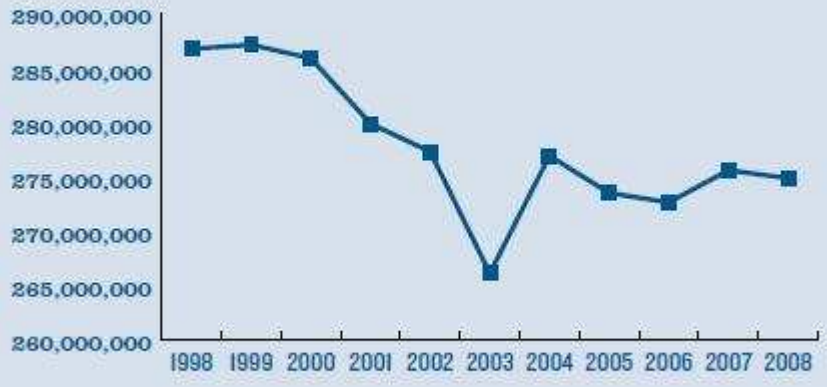
Parks spending may be an easy target for budget hawks, but in reality state spending on parks represents a miniscule part of overall expenditures—0.231% on average.

TABLE 13.1 ★ Acres of Protected Land

REGION	TOTAL ACRES PROTECTED	PROTECTED ACRES PER CAPITA	% OF REGION PROTECTED
Mid-Atlantic	10,304,151.6	0.18	9.2%
Midwest	30,139,330.5	0.45	6.3%
New England	4,839,352.7	0.34	12.0%
Rocky Mountain	95,015,799.3	9.06	29.0%
Southeast	28,960,508.7	0.44	9.7%
Southwest	37,250,994.8	1.04	10.3%
West	267,143,832.8	5.21	41.5%
Total	**473,653,970.5**	**1.57**	**20.5%**

SOURCE National Trust for Public Land, Conservation Almanac

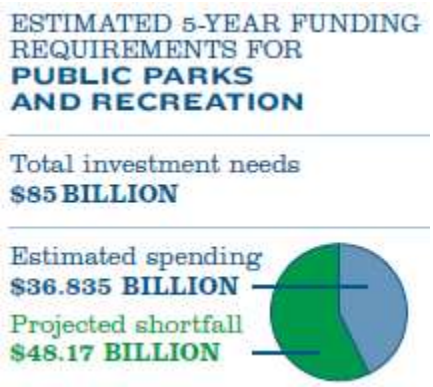
FIGURE 13.1 ★ Visits to National Parks



SOURCE National Park Service

Resiliency

"Parks are an important asset to the nation's economy and environment. With limited funds available, little or no attention is currently paid to the resilience of the national park system. Balancing site security with access is taxing and often unsuccessful. A failure to protect these national treasures will strongly affect the heritage and identity of future generations. Future investments must address life-cycle maintenance, security, risk management, and system robustness."



Conclusion

"Parks serve many roles in the lives of Americans, providing recreation opportunities, jobs, and economic development as well as increased property values for adjacent private properties. Yet funding sources are inconsistent, and park facilities in many areas suffer from neglect— especially in times of tight budgets—even as their popularity and demand soars. Our federally funded national parks are not immune to these problems, suffering from deferred maintenance despite the rising numbers of visitors. At the state and local level, dedicated sources of revenue for parks and open spaces need to be identified to ensure quality facilities for future generations. The National Park System should continue its Centennial Initiative to increase investment in park improvements leading up to the 100th anniversary in 2016. In addition, parks at all levels will benefit from a comprehensive assessment of usage and needs by an independent commission."

Schools D

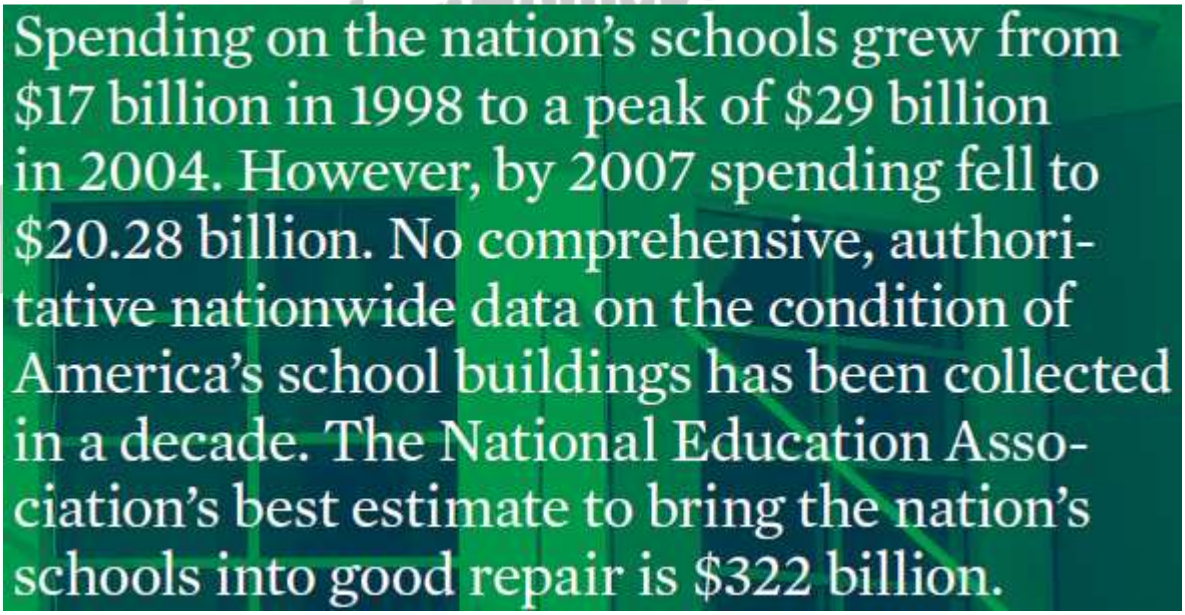
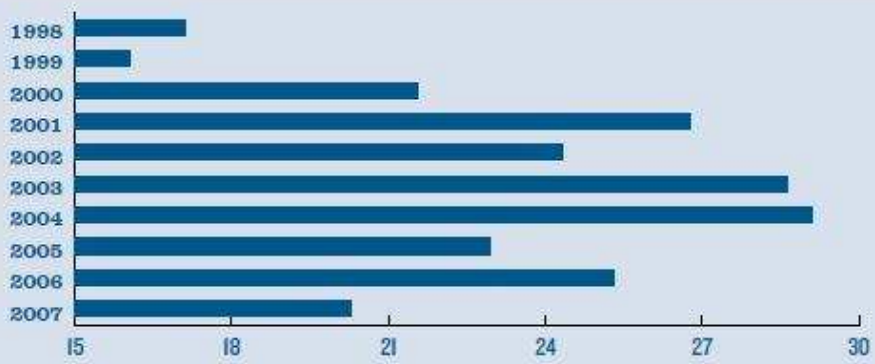


FIGURE 14.1 ★ School Construction in Billions of Dollars: 1998–2007

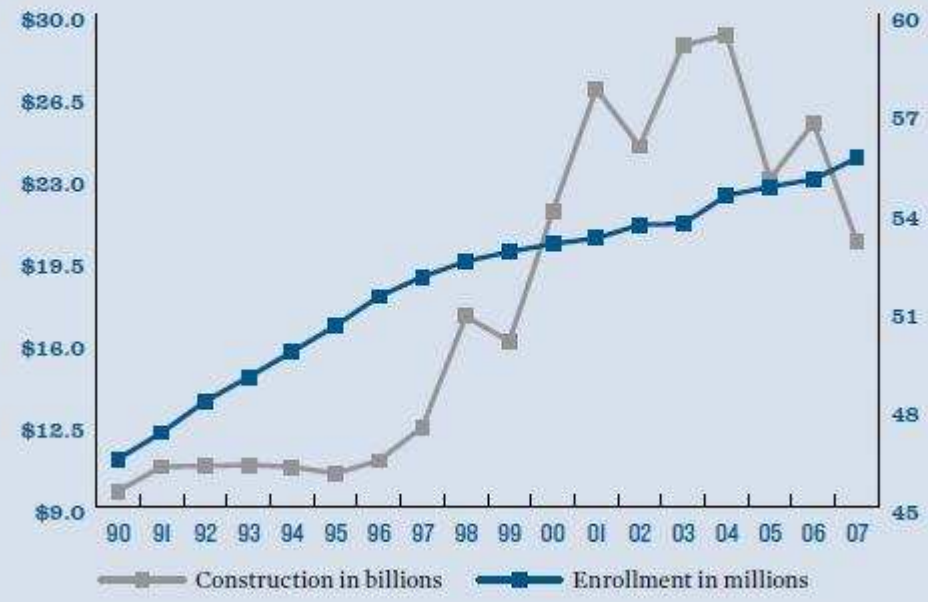


SOURCE 34th Annual Official Education Construction Report

The following facts illustrate the scope of the nation's K–12 public school enterprise. In the 2008–2009 school year:

- ★ 49.8 million students are enrolled in public elementary and secondary schools;
- ★ Public schools employ about 3.3 million teachers;
- ★ There are 14,200 public school districts containing about 97,000 public schools;
- ★ Expenditures for public elementary and secondary schools are about $519 billion;
- ★ The national average spending per student in the 2005–2006 school year is about $10,418, up from $9,154 per student.[6]

FIGURE 14.2 ★ School Construction vs. Enrollment: 1990–2007



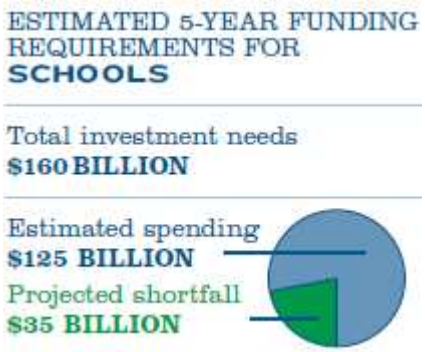
SOURCE 34th Annual Official Education Construction Report

Resiliency

"The nation's schools serve as pillars of local communities and often serve a dual purpose as disaster-relief shelters. As local governments hold the prime responsibility for funding schools, the economic downturn has had a negative impact on rehabilitation, modernization, and security improvements.

School facilities are not currently considered resilient because of decreased funding and increased capacity, the failure of designs to adapt to the ever changing learning environment, and the lack of system redundancy.

In order to achieve continuous assurance of service, future investments should consider life-cycle maintenance, rapid recovery, alternative services, security, and condition and risk assessment."



Conclusion

"A significant problem in determining the condition of the nation's schools is the lack of reliable information. No comprehensive, authoritative data have been collected in 10 years. Spending on school construction and modernization, for which data do exist, has trended positive for much of the last 10 years, increasing from $17 billion in 1998 to a peak of $29 billion in 2004. The trend since 2004, however, has reversed and was down to $20.7 billion in 2007. Barring dramatic change in economic conditions, this downward trend will likely continue, coupled with the known needs of 10 years ago and increasing student enrollments, gives little hope for improvement."

"A mountain is composed of tiny grains of earth. The ocean is made up of tiny drops of water.
Even so, life is but an endless series of little details, actions, speeches, and thoughts.
And the consequences whether good or bad of even the least of them are far-reaching."
Sivananda

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Arizona Report Card

California Report Card
- Bay Area Report Card
- Inland Empire Report Card
- Kern County Report Card
- Los Angeles County Report Card
- Northern California Levee Report Card
- Orange County Report Card
- Sacramento Infrastructure Report Card
- San Diego County Report Card
- San Francisco Report Card

Colorado Report Card

Delaware Report Card

Florida Infrastructure Report Card

Georgia Report Card

Illinois Report Card

Indiana Report Card
- Kentuckiana Report Card

Kentucky Report Card
- Kentuckiana Report Card

Maine Infrastructure Report Card

Maryland Infrastructure Report Card

Michigan Infrastructure Report Card

Missouri
- St. Louis Report Card

Nevada Infrastructure Report Card

New Hampshire Report Card

New Jersey Infrastructure Report Card

New Mexico Report Card

North Carolina Infrastructure Report Card

Ohio Infrastructure Report Card

Pennsylvania Report Card

Tennessee Infrastructure Report Card

Texas Report Card

Virginia Report Card
  Hampton Roads Transportation Report Card

Wisconsin Report Card

"Most of us can read the writing on the wall;
we just assume it's addressed to someone else."
Ivern Ball

TNT