

# Waterfront Urban Development and Disaster Countermeasures in the USA



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## River Waterfront

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## Hudson River Waterfront



- Hudson River Waterfront Walkway
- New York / New Jersey
- Planning and constructing from 1966 to present
- 18.5 miles walkway (Present 15 miles)
- Develop the abandoned industrial port lands due to the changes of shipping technologies and transportation networks

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## Hudson River Waterfront Benefits



- Additional park and recreation
- Economic development  
: retail establishments, offices and restaurants
- Enhanced urban landscape
- Historic preservation
- Alternative transportation  
: non vehicular link to transit such as foot traffic, bicycling, and roller blading

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## Hudson River Waterfront



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## Hudson River Waterfront



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## Hudson River Waterfront



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## Hudson River Waterfront



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## Providence River Waterfront



- Providence River Relocation (Riverfront Transformed)
- Providence, Rhode Island
- Constructed from 1987 to 1993
- \$40-million river relocation project
- Benefits
  - : easy traffic circulation, walkways, Waterplace park and public park, and economic development

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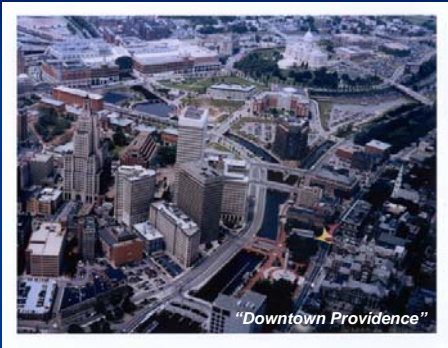
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### Providence River Waterfront



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### Providence River Waterfront



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### Providence River Waterfront



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## Portland Waterfront

- Willamette River
- Portland, Oregon
- Expressway removal  
→ Riverplace and waterfront park
- \$200 million of total cost
- Benefits  
: new community amenities, open spaces and transportation options, as well as new jobs and housing opportunities



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## Portland Waterfront

*“Before”*



*“After”*



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## Riverplace, Portland

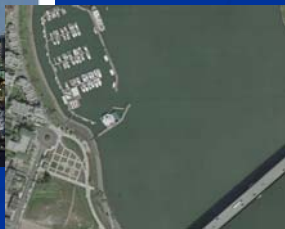


RiverPlace Area

Predevelopment of RiverPlace Area and marina, 1998.



RiverPlace was completed in 2001.



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## Portland Waterfront



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## Portland Waterfront



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## Portland Waterfront



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## Platte River Greenway, Denver



- South Platte River Greenway
- Denver, Colorado
- Completed in 2003
- In 1970s, the South Platte River was known as "blighted, degrades river-little more than an open sewer"
- 10.5 mile Riverfront
- Open space, Community Parks, Biking, Jogging, Boating, Kayaking, and Wildlife Habitat
- Flood control measures

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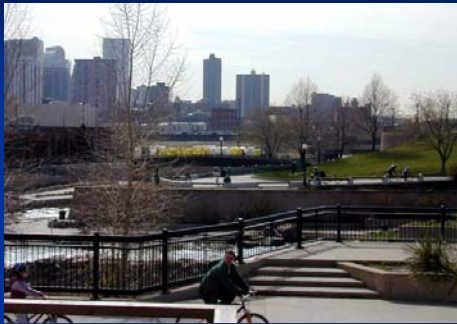
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## Platte River Greenway, Denver



"Confluence Park"

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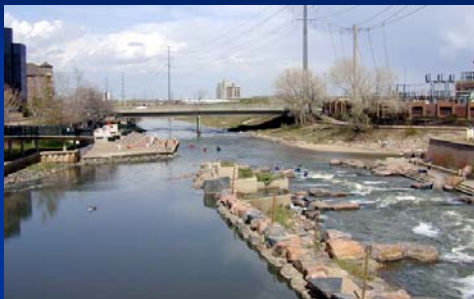
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## Platte River Greenway, Denver



"Confluence Park"

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**Platte River Greenway, Denver**



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**Platte River Greenway, Denver**



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**Bay, Harbor, and Lake  
Waterfront**

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## Baltimore Inner Harbor



- Baltimore Inner Harbor
- Baltimore, Maryland
- 96 acres size and \$2.5 billion+ cost
- Completed in 1975
- A classic urban waterfront transformation

- A rich and diverse scheme with attractions and activities centering on the tiny water body and accessed by a 35 foot wide brick promenade

- Studied by planners, developers and academics around the world because of its stunning success

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## Baltimore Inner Harbor



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## Baltimore Inner Harbor



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## Baltimore Inner Harbor



*"Baltimore National Aquarium"*



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## Baltimore Inner Harbor



*"Historic ship and power plant"*



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## Bayside Marketplace, Miami



- Biscayne Bay
- Miami, Florida
- Completed in 1987
- \$93 million
- Project type: Commercial

- Twin buildings with shed-like metal roofs
- Wide walkway along an adjoining marina
- Two-level seating areas and cafes open to the water
- Popular attraction

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## Bayside Marketplace, Miami



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## Bayside Marketplace, Miami



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## Bayside Marketplace, Miami



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## Rowe's Wharf, Boston



- Boston Harbor
- Boston, Massachusetts
- 5.4 acres size and \$193 million
- Completed in 1987
- Mixed-use project on the Boston waterfront

- Hotel, office space, condominiums, small retail area, underground parking, an active dock, water taxi and marina
- Pleasant brick public walkway

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## Rowe's Wharf, Boston



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## Rowe's Wharf, Boston



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## Rowe's Wharf, Boston



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## Rowe's Wharf, Boston



"Brick walkway"

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## Lake Michigan Waterfront



- Lake Michigan
- Chicago, Illinois
- Initiated from 1890s
- Parks, marinas, museums and amusements
- Devoted to commerce and industry
- Leisure and fresh water supply

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### Lake Michigan Waterfront



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### Lake Michigan Waterfront



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### Lake Michigan Waterfront



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### Lake Michigan Waterfront



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### Lake Michigan Waterfront



*"Oak street beach"*

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### Lake Michigan Waterfront



*"Walkway"*

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## Lake Michigan Waterfront



*"Adler planetarium, Field Museum and Shedd Aquarium"*

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## Hurricane Katrina Disaster

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## Hurricane Katrina



- One of America's largest natural disasters
- Category 5 strength less than 12 hours before landfall (Category 4)
- 127MPH wind at Louisiana landfall
- Maximum surge of 28 to 30 feet along Mississippi coast
- 75% of New Orleans flooded
- 4.5 to 9 m (15 to 30 ft) storm surge
- More than 1,300 dead

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### Existing New Orleans Area Hurricane Protection



- More than 350 miles of levees in the southeast Louisiana area
- 41 miles sustained severe damage
- 128 miles of levee sustained minor damage

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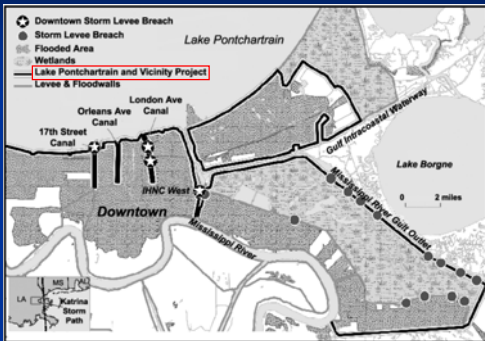
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### New Orleans Hurricane Protection with Hurricane Katrina Breaches and Flooding




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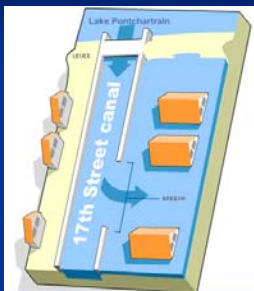
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### New Orleans: levee breakes



Graphic source: Guardian Unlimited Newspaper  
Photo source: MSNBC Newsweek

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## What did cause the levee breaches? (Post Katrina)



*Preliminary reports from the investigation team indicated that a number of different mechanisms that caused failures in the levee system.*

Scour erosion caused by overtopping, seepage, soil failure, and internal erosion (piping)

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## Repairing damage of levee breaks



Graphic source: Guardian Unlimited Newspaper  
Photo source: Associated Press (AP)

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## Lake Ponchartrain and Vicinity Hurricane Protection Project (Pre Katrina)

- Authorized in 1965 by congress
- U.S. Army Corps of Engineers
- To construct a series of control structures, concrete floodwalls, and levees to provide hurricane protection
- Expected to take about 13 years and \$85 million
- Original project design were developed based on the equivalent of a **fast-moving Category 3 hurricane** (once in 200-300 years in Louisiana region)
- In 1982, \$85 million → \$757 million and expected completion date 2008 : because of design changes caused by technical issues, environmental concerns, legal challenges, and local opposition to portion of project

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 **Southeast Louisiana Hurricane Protection** 

US Army Corps of Engineers

**ADDITIONAL IMPROVEMENTS**

The Bush Administration on Feb. 16 asked Congress to support an additional \$1.46 billion in new funding for improvements to southeast Louisiana's hurricane protection system. If approved, the proposal would pay for:

- Permanent pumps and closures for New Orleans' three outfall canals. (\$530 million)
- Two navigable closures that would prevent hurricane surge from entering the Industrial Canal area. (\$350 million)
- Storm-proofing existing interior drainage pump stations in Jefferson and Orleans Parishes. (\$250 million)
- Selective armoring for critical portions of the New Orleans levee system. (\$170 million)
- Incorporation of Plaquemines Parish west bank, non-federal levees into the federal levee system. (\$60 million)
- Restoration of critical areas of coastal wetlands and ecosystems needed to improve long-term hurricane and storm protection. (\$100 million)

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 **Southeast Louisiana Hurricane Protection** 

US Army Corps of Engineers

**ADDITIONAL IMPROVEMENTS**



Permanent Pumps & Closures



Selective Armoring



Storm-Proofing Pump Stations



Navigable Closures

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**THANK YOU!**

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