

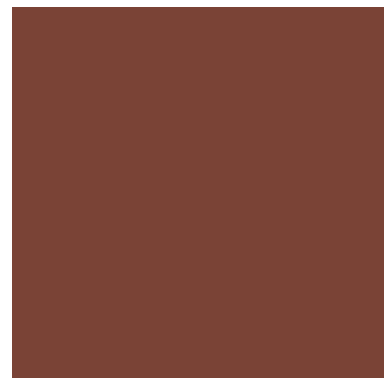
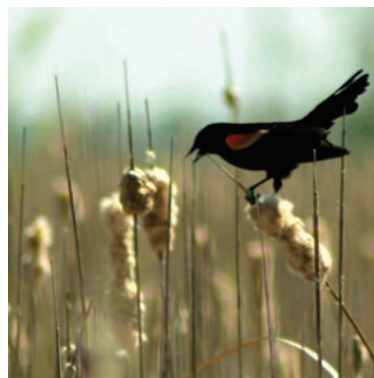
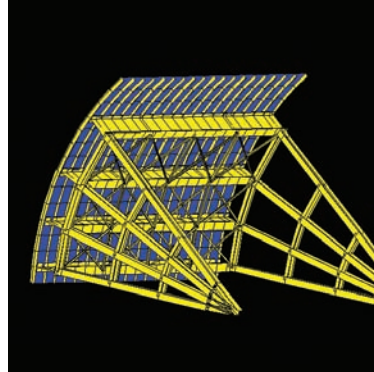
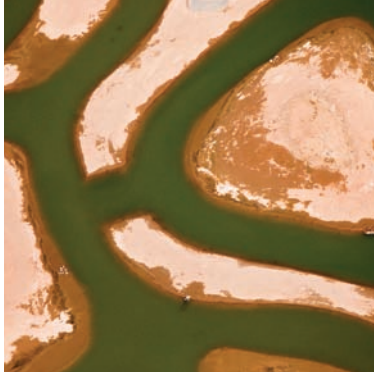


HDR

*Floodplain Management*

PREPARED

*Listen first. Solve second.*



Emergency Operations in New Orleans Following  
Hurricane Katrina | New Orleans, LA



## Life in a Floodplain

You live in a floodplain. You don't have to live along a river bank or in a coastal zone to be in a floodplain. According to guidelines developed by the Federal Emergency Management Agency (FEMA), nearly everyone in the United States lives in a floodplain.

Floodplain managers are expected to increase awareness of how rapidly an unanticipated flood event can result in widespread damage and advise people to make prudent land use decisions. Effective floodplain management is hard to measure because success is perhaps best measured by things that don't happen. As a trusted advisor to floodplain managers in all regions of the country, HDR offers integrated full-service support for comprehensive floodplain management. Our expertise encompasses the broad range of services needed by floodplain managers, from creating flood maps to providing dam and levee safety services to increasing public awareness and creating flood prediction and warning tools.

Lake Okeechobee Watershed Assessment | West Palm Beach, FL



## Understanding the Needs

Floodplain managers work to avoid or minimize damage and disruption from flood events and to protect natural floodplain resources. As development continues along with a growing awareness of the need to protect our natural resources, floodplain management in the 21st century requires a holistic approach that encompasses both the natural and built environments. Preserving and restoring floodplains contributes to the social and economic well-being of communities around the nation.

**Parnell Flood Control Impoundment, Red Lake  
Watershed District | Polk County, MN**



Floodplain management begins at the local level, but involves people and organizations across a strikingly diverse spectrum. The result is that every floodplain management program is unique. There is no one-size-fits-all approach. Floodplain managers turn to HDR for full-service, integrated guidance on floodplain related issues. We bring both nationally recognized expertise and locally based resources who understand native topography, development patterns and political structures to every project.

## Planning, Forecasting and Informing

Sustainable development depends on managing growth and focused planning that incorporates avoidance of flood-prone areas. Floodplain management also relies upon cooperative and integrated efforts from local, state and federal resources and the private sector to improve the ability to confront flood hazards.

The more people know about potential flood hazards, the more likely they are to make reasoned decisions. Property owners, public officials and citizens should have ready access to easy-to-understand information about flood hazards and associated risks within their community.

Our experts include atmospheric scientists who help clients predict the unpredictable. By understanding how summer floods in the Midwest, drought in the Southeast and wildfires in the Southwest are interrelated, communities can develop tools to help allocate resources and develop priorities. HDR has expertise in mitigation planning, awareness initiatives and scientifically demonstrated forecasting. Whether your community needs help with public involvement or completing a flood mitigation plan, HDR is your trusted advisor.

**Sacramento River East Bank Levee Remediation |  
Sacramento, CA**



**Missouri River Habitat Restoration |  
IA, KS, MO, NE**



**Structural Inspection of a Navigational Lock Gate at John Day Lock and Dam | USACE Portland District, OR**



**Brazos River Authority, De Cordova Bend Dam, Spillway Gate and Hoist Improvements Project | Granbury, TX**



**Dworshak Dam, Radial and Regulating Outlet Gate Inspection and Testing | USACE Walla Walla District, WA**



## Dams and Hydraulic Structures

There are an estimated 75,000 dams in the United States. Whether large or small, public or private, dams can provide a sense of security that leads to development in areas otherwise considered prone to flood damage. That security can be quickly undermined in the event of an unsafe dam or a dam failure. Programs to ensure the safety of dams, including modification and removal, are essential components of protecting both property and natural resources.

The impact of extreme weather events on dam safety is an area of increasing concern. HDR pioneered the development of an Extreme Precipitation Analysis Tool, or EPAT. Colorado is using the EPAT to develop dam-specific responses to extreme precipitation events to enhance public safety. New Mexico has launched an initiative to implement statewide use of EPAT.

HDR's staff includes professionals with extensive experience in the design, rehabilitation, inspection and operation and maintenance services for dams, reservoirs and hydraulic structures. Our services include:

- Structural Inspections
- Retrofit Analysis and Design
- Failure Risk Assessments and Dam Break Analysis
- Intake and Fish Screen Design
- Dam Removal
- Federal Energy Regulatory Commission (FERC) Licensing, Relicensing and Inspections
- Emergency Action Plans and Site-Specific Precipitation Analysis
- Constructability Reviews and Construction Management

Endangered Chinook Salmon benefit from the many HDR fish passage projects aimed at increasing their numbers in the Pacific Northwest.



## Stream Restoration Planning and Design

In every region, the natural ecosystem of streams and rivers supports multiple uses, from drinking water to wildlife habitat, recreation and agriculture. Streams and rivers are nourished by local watersheds creating natural defenses for flood prevention and erosion control. In some areas, unchecked development has led to ecosystem degradation from excess sedimentation and nutrient loading. The need for stream corridor restoration is essential to sustain healthy and livable communities.

HDR uses its integrated resources to provide multi-disciplinary solutions that are technically sound and practical yet conform to the best in environmental science. Our services include:

- Restoration Planning and Management
- Basin and Watershed Master Planning
- Bank Stabilization and Bioengineering
- Sediment Transport and Geomorphology
- Fisheries and Fish Passage Design
- Stakeholder Outreach and Agency Coordination
- Jurisdictional Delineations
- Environmental Permitting and Studies
- Grant/loan Applications
- Construction Services and Monitoring

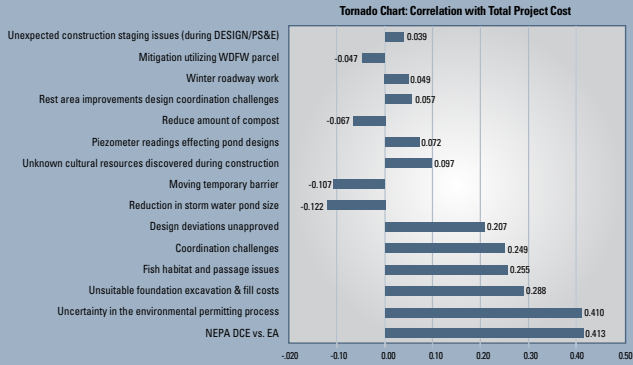
Restored Backwater Slough at Lower Hamburg Bend Mitigation Site | MO



Comprehensive Everglades Restoration Program | FL

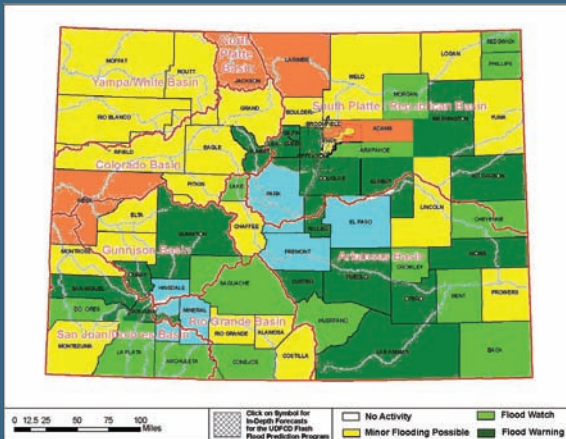


## HDR economists help manage project risks.



**Emergency Response: hazard identification and computer products to help FEMA identify areas vulnerable to flash floods, mudslides and landslides | San Diego, CA**

## Flash Flood Prediction Program | Denver, CO



## Mapping and Risk Assessment

Population growth joins with regional stormwater flow to present floodplain managers with an ever-changing array of challenges. Thoughtful and informed data management and access to advanced modeling can help floodplain managers protect both property and the natural environment. Having access to updated flood maps is one way to help communities develop proactive floodplain management programs. Since 2003, HDR has completed more than 2,000 preliminary digital flood insurance rate map (DFIRM) panels across a three-state region of the Southwest. This is just one of many examples of how HDR supports the FEMA Map Modernization Program through multiple, ongoing contracts.

HDR uses some of the most advanced geographic information systems (GIS) and employs highly skilled GIS specialists to give clients data tailored to their specific needs. We can overlay features on digital maps or create 3-D views of project areas to increase understanding and awareness of geographic features. We use advanced modeling software to develop mitigation strategies that reduce the severity of flood damage and other extreme events that can stress a watershed or floodplain.

Our experience includes rapid response to update FEMA data related to flash flood, mudslide and landslide hazards in the aftermath of major fire events. HDR has worked alongside burn-area emergency response teams to identify hazard areas and enhance public safety. Our disaster recovery map products include automated procedures and geo-referenced database applications.

We complement our services with a group of in-house economists and social scientists who can develop defensible risk analyses to help clients make informed decisions. Our risk analysis work has been used in projects small and large, including key support for the New Orleans Hurricane Storm Damage and Risk Reduction System.



Sacramento River East Bank Levee Remediation Project - Pocket Area | Sacramento, CA

## Levee Systems

Levees have provided defense from flooding for hundreds of years. Evaluating the flood protection capabilities of thousands of miles of constructed levees is just one part of HDR's advanced expertise in levee systems. Our engineers know how to design levees that surpass the latest federal guidance and offer advanced protection for communities threatened by aging systems or challenged infrastructure.

Our comprehensive levee services include:

- Certification Services
- Geotechnical and Seismic Investigations
- Stability and Seepage Analysis
- Development of Levee Design and Encroachment Criteria
- Formulation of Levee Repair Alternatives
- Environmental Documentation
- Construction Services and Management
- Infrastructure Impacts and Relocation Designs



Bear River Levee, Pump Station #2 | Yuba County, CA



New Orleans Hurricane Protection and Ecosystem Restoration | New Orleans, LA



HDR is committed to reducing our environmental impact through increased use of recycled post-consumer materials. This brochure is offset printed with soy-based inks on paper that is Process Chlorine Free and uses 100% post-consumer waste.

**F**ounded in 1917, HDR is an architectural, engineering and consulting firm that excels at complex projects and improving quality of life. With locations across North America and abroad, we deliver more than 50 different design and scientific disciplines.

Your community matters to HDR. After all, it's HDR's community too. HDR's operating philosophy is to be an expertise-driven international firm, which delivers tailored solutions through a strong local presence.

Service is what differentiates HDR from firms of similar size. Repeat business stands at 80 percent, a clear indication of client satisfaction and confidence. Professional publications consistently rank HDR among the leading consulting and design firms. You'll have confidence knowing that HDR is an international firm with a small-firm-service approach and a reputation for exceeding clients' expectations.

No matter what industry HDR clients are in, they operate in an increasingly complex world. In addition to traditional architecture and engineering services, HDR offers up-front services such as feasibility studies, siting, permitting, public involvement and economics.

Cover Photo: Tuolumne River; the largest southern tributary to the Sacramento/San Joaquin Delta; Received the 2003 ASCE Outstanding Section/Branch Project Award (Sacramento) | Turlock, CA