

PROJECT SUMMARY

DES MOINES AND RACCOON RIVERS PROJECT DES MOINES, IOWA

FINAL FEASIBILITY REPORT and ENVIRONMENTAL ASSESSMENT

SEPTEMBER 2005

STUDY INFORMATION

1. Study Authority

This report was prepared in response to a Congressional resolution, which reads as follows:

“Resolved by the Committee on Public Works of the House of Representatives, United States, that the Board of Engineers for Rivers and Harbors be, and is hereby, requested to review the reports on the Des Moines River, contained in House Document 651, 78th Congress, with particular reference to the Upper Des Moines River and the tributaries thereof, to determine the feasibility and justification of improvements for flood control and related purposes.” (Adopted July 1, 1958)

The report was also prepared in response to the provision of funds in the Energy and Water Development Appropriations Act of 1998, under the authority of Section 216 of the 1970 Flood Control Act, which reads:

“The Secretary of the Army, acting through the Chief of Engineers, is authorized to review the operation of projects the construction of which has been completed and which were constructed by the Corps of Engineers in the interest of navigation, flood control, water supply, and related purposes, when found advisable due to significant changed physical or economic conditions, and to report thereon to Congress with recommendations on the advisability of modifying the structures or their operation, and for improving the quality of the environment in the overall public interest.”

The completed project under review is Des Moines, Iowa, (also known as the Des Moines Local Flood Protection Project) which was authorized for construction by Section 10 the Flood Control Act of 1944 (Public Law 78-534) which reads:

“The project on the Des Moines River for local flood protection of Des Moines, Iowa is hereby authorized substantially in accordance with the recommendations of the Chief of Engineers in House Document Numbered 651, Seventy-eighth Congress, second session, at an estimated cost of \$270,000.”

The Letter of the Chief of Engineers, United States Army, dated December 13, 1943, included in House Document No. 651 recommends *“the construction of local improvements for flood control at the city of Des Moines, Iowa in general accordance with the plans of the district engineer as shown on the accompanying drawings at an estimated first cost to the United States of \$270,000; subject to the condition that responsible local agencies give assurances satisfactory to the Secretary of War that they will (1) provide without cost to the United States all lands, easements, and rights-of-way necessary for construction of the works, (2) bear the expense of repairs and provision of gates on existing drains and of raising the railroad bridges, (3) hold and save the United States free from damages resulting from construction of the improvements, and (4) maintain and operate all works after completion in accordance with regulations prescribed by the Secretary of War including insurance against encroachments on, and obstructions of, the flood channel which would detract from the flood-control value of the improvements;”*

2. Study Sponsor

The project sponsor is the city of Des Moines, Iowa.

3. Study Purpose and Scope

This report is an interim response to the study authority. The primary purpose of the study is to evaluate and determine the feasibility of implementing flood damage reduction improvements for the city of Des Moines. The scope of the study included eleven specific reaches of the Des Moines and Raccoon Rivers, Fourmile Creek, Leetown Creekway, and Walnut Creek within the incorporated boundaries of the city of Des Moines. This report documents Federal interest in flood damage reduction improvements and other water resources improvements within the city, covering a period of analysis of 50 years.

4. Project Location/Congressional District

The project area is within the city limits of Des Moines, Iowa. The city of Des Moines surrounds the confluence of the Des Moines and Raccoon Rivers in Polk County, in central Iowa. These rivers drain almost 10,000 square miles in northern and central Iowa and in southwestern Minnesota. Des Moines is Iowa's state capital and its largest city. The Des Moines metropolitan area had a population of 456,000 in the year 2000 census. Des Moines is in Iowa's 3rd Congressional District.

5. Prior Reports and Existing Water Projects

The following is a list of the most relevant and recent reports and existing projects in the Des Moines River Basin.

A. Reports and Studies

- (1) *Phase I Archaeological and Geomorphological Survey for Historic Properties, Des Moines and Raccoon Rivers Flood Control Project, Polk County, Iowa, Great Lakes Archaeological Research Center (GLARC), May 2004.* The Project area, including the mitigation site, was surveyed.
 - (2) *Regulated Frequency Curves and Pool Elevation Frequency Estimates for Des Moines and Iowa River Basins, Jun-2004 USACE.*
 - (3) *Phase I Environmental Site Assessment – HTRW, 9-Oct-2001, A. R. Syens.* The Project area, including the mitigation site, was surveyed.
 - (4) *General Reevaluation Report for Flood Control Project, Raccoon River and Walnut Creek, West Des Moines and Des Moines, Iowa, Jul-1989, USACE.* The document recommended a plan to provide 100-year protection for portions of West Des Moines and Des Moines along the Raccoon River, Walnut Creek, and Jordan Creek.
 - (5) *Detailed Project Report for Flood Control under Section 205 of the 1948 Flood Control Act, as amended, Fourmile Creek in Des Moines, Iowa, May-1975, USACE.* The Report reviewed past proposals and programs identifying flood damage reduction measures, recreation features and recommended no structural improvements or further studies be performed at that time.
 - (6) *Des Moines River Basin, Iowa and Minnesota, Jun-1975, USACE.* This report recommended 100-year flood protection for portions of West Des Moines and Des Moines along the Raccoon River, Walnut Creek, and Jordan Creek.
 - (7) *Design Memorandum No. 1, General Design Memorandum, Des Moines River at Des Moines, Iowa, Local Flood Protection, 21 Feb 1963, USACE.* The report recommended improvements to levees in Reaches 3, 4, and 5 in downtown Des Moines (also known as Des Moines Local Flood Protection Project).
- Review Report for Flood Control, Des Moines River, Iowa Interim Report, Main Report, 31-May-1953, USACE.* This report recommended construction of the Saylorville Reservoir on the Des Moines River. It also investigated potential flood control reservoir locations on the Raccoon River, but no economically justifiable site was found.
- Survey Report for Flood Control, Des Moines River, Iowa, 15 Aug 1941, USACE.* This report recommended construction of Red Rock Reservoir and construction of a system of levees and flood walls to protect the city of Des Moines. Red Rock Reservoir has been in operation since 1969 and forms a 19,000-acre lake.

B. Existing Water Projects

- (1) *Des Moines Recreational River and Greenbelt (Greenbelt), Iowa:* This project was authorized in the Supplemental Appropriations Act of 1985 (Public Law 99-88) to provide recreation facilities along the Des

Moines River. Riverfront recreation facilities are proposed in downtown Des Moines as part of the Des Moines Riverwalk project.

(2) *Raccoon River, Des Moines, Iowa*: This Federal project was authorized under Section 205 of the Flood Control Act of 1948. The project is located along the south bank of the Raccoon River and in Des Moines. It was completed in 2000. This project has been designated Reach 6 for the purposes of this study.

(3) *Des Moines River Basin, Iowa and Minnesota*: (Also known as the West Des Moines – Des Moines project) this Federal project was authorized by the Water Resources Development Act of 1986. The project is located along the Raccoon River, Walnut Creek, and Jordan Creek in the cities of West Des Moines and Des Moines. It was completed in 1998. This project has been designated Reach 8 for the purposes of this study.

(4) *Saylorville Lake, Iowa*: The project is located on the Des Moines River approximately 6 miles upstream of Des Moines. The reservoir has a conservation pool covering about 5,400 acres and a total capacity of 676,000 acre-feet.

(5) *Des Moines, Iowa*: This Federal flood protection project was authorized by the Flood Control Act of 1944. The project is located along the Des Moines River and Raccoon River in downtown Des Moines. The project was constructed in three separate reaches, designated Reaches 3, 4, and 5, which coincide with the reach designation in this report.

(6) *Red Rock Dam, Iowa*: This Federal project was authorized by the Flood Control Act of 1944. The project is located on the Des Moines River downstream of Des Moines, Iowa. The 110-foot tall dam has been in operation since 1969 and forms a 19,000-acre lake. The Red Rock Remedial Works levees were constructed along the upper portions of the lake to protect properties from flooding during high reservoir stages.

6. Federal Interest

The recommended plan has a total cost of \$10,059,000, and provides net annual benefits of \$1,036,000 (October 2004 price level), and has a benefit-cost ratio of 2.5 at a $5\frac{5}{8}\%$ interest rate. An environmental assessment was completed which resulted in a Finding of No Significant Impact (FONSI). Since flood damage reduction is a priority mission for the U.S. Army Corps of Engineers and the recommended plan is consistent with Army policy and is technically sound, economically feasible, and environmentally acceptable, it is in the Federal interest.

STUDY OBJECTIVES

1. Problems and Opportunities

The city of Des Moines has been subject to frequent flooding that impacts large numbers of residential, commercial, and industrial properties. During the Great Flood of 1993, Polk County suffered more than \$152,000,000 in flood damages, mostly in the Des Moines metropolitan area. More than 3,000 properties were damaged in this event. In addition, Des Moines was without water service for more than a week causing closure of most businesses and industries in the city.

The Birdland Park and Central Place levees on the Des Moines River failed during the 1993 flood event and do not provide reliable flood protection, placing nearly 200 homes and businesses at risk. These two non-Federal levees require reconstruction. An opportunity also exists at the Birdland Park levee to incorporate a multipurpose recreational trail with access to Riverview Park. Downtown Des Moines along both the Des Moines and Raccoon Rivers also flooded in 1993 due to incomplete installation of levee closures. These Federal levees have large numbers of closures which decreases the reliability of the

system, and increases the flood threat for hundreds of commercial, industrial, and residential structures. Improvements and reduction in the numbers of closures would not only reduce operation and maintenance costs, but would improve the system reliability. Homes and businesses along selected portions of Walnut Creek, Fourmile Creek, and Leetown Creekway are subject to frequent flash floods.

2. Planning Objectives

The project objectives are to reduce flood damage to the residential, commercial, and industrial properties in Des Moines, and to provide recreational and ecosystem restoration features when appropriate as part of the project.

3. Planning Constraints

The planning constraints identified for this study were requirements that the plan alternatives be economically and environmentally feasible and qualify for Federal interest under existing laws. Further, plan formulation must provide safe conditions in the interest of public safety and be socially acceptable to the community. Increased urbanization has led to higher land values and is encroaching on possible reservoir sites.

ALTERNATIVES

1. Plan Formulation Rationale

Early coordination efforts with the city focused on identification of specific flooding problems and opportunities for ecosystem restoration and recreation. Attempts to identify areas within the city for ecosystem restoration were unsuccessful because of a lack of local financial support. In addition, there is no incidental ecosystem restoration opportunities associated with flood damage reduction. Recreational opportunities exist at all the levees due to the extensive trail system in the surrounding Des Moines area and were evaluated with each reach that has a feasible flood damage reduction alternative.

The study team sought to develop/evaluate planning objectives and alternatives for a comprehensive flood damage reduction system in Des Moines. Systemic flood damage reduction alternatives such as storage reservoirs or channel modifications were evaluated; however, none were identified that were economically justified. In addition, while a uniform level of flood protection throughout the city was considered most desirable it was found that different levels of protection were appropriate for each reach based on the economic benefits to the city and reduction of areas to flood fight. The plan formulation strategy, therefore, evolved into one of developing optimum flood damage reduction alternatives for each reach that could be combined together into a coordinated flood damage reduction project.

Nine specific areas were identified that had either experienced substantial flooding (such as Birdland Park, Central Place, and Fourmile Creek) or where substantial flood damages were possible (such as the Downtown levees). Three areas, the Raccoon River Section 205 Project Levee (Reach 6), the Des Moines-West Des Moines Levee along the Raccoon River (Reach 8) and Leetown Creekway (Reach 11), were added for reevaluation following the finding that the Raccoon River flood discharges had increased, see map at the end of this report. This resulted in eleven areas being identified for inclusion in the study.

2. Management Measures and Alternatives Plans

Both structural and nonstructural flood damage reduction measures were considered during the development of alternatives. Structural measures considered include: levees, floodwalls, improved levee closures, reservoirs, channel modifications, and bypass channels. Nonstructural measures include: flood

warning systems and a buyout of flood-prone structures. Ecosystem restoration measures were also considered. The following table summarizes measures eliminated from further analysis.

Table 1: Measures Eliminated from further Evaluation

Measure	Reason for Elimination
Reservoirs	<ol style="list-style-type: none"> 1. The Des Moines River has two large reservoirs upstream and downstream of the city 2. Much of the watershed is flat with development in remotely suitable areas
Channel Modification By-Pass Channels	<ol style="list-style-type: none"> 1. The Des Moines River contains two dams; increasing the cross-sectional area by deepening the channel is not possible. 2. Existing levees flank both banks; increasing the cross-section by widening the cross-section would mean condemning downtown real estate and rebuilding the levees. 3. Environmental mitigation would be required and would be cost prohibitive
Non Structural measures	<ol style="list-style-type: none"> 1. Flood warning system already exists 2. Flood proofing is cost prohibitive because of the large numbers of properties in Reaches 1-11. 3. Reaches 1-8 already have some type of flood control and are heavily populated; buy-out measures are not feasible. Reaches 9 & 10 have a low number of affected structures and lower flood damages that do not warrant a buy-out program. Reach 10 was the only reach with a possibility of having economic justification for a buy-out program.
Ecosystem Restoration	No opportunities were found to combine ecosystem restoration with viable flood damage reduction measures.

3. Final Array of Alternatives

Following development of alternatives, screening was performed to eliminate alternatives that do not meet project objectives and constraints. The table below presents the final array of alternatives that remained following the screening process:

Table 2: Results of the Final Array of Alternatives

Reach and Plan Top of Levee	Project Cost Estimate	Interest During Const.	Total First Costs	Annualized First Costs	Annual O & M Costs	Total Annual Costs	Total Annual Benefits	Benefit Cost Ratio	Net Annual Benefits	Residual Flood Damages
Reach 1 Birdland Park Study Area										
<i>Alignment 1</i>										
500 year	6,679,000	575,000	7,254,000	436,000	14,000	450,000	437,000	0.97	-13,000	11,000
<i>Alignment 2</i>										
100 year 803.3	3,618,000	343,000	3,961,000	238,000	14,000	252,000	255,000	1	3,000	181,000
250 year 806.3	4,048,000	372,000	4,421,000	266,000	14,000	279,000	312,000	1.1	32,000	130,000
500 year 809.5	4,984,000	437,000	5,421,000	326,000	14,000	340,000	437,000	1.3	97,000	11,000
<i>Alignment 3</i>										
500 year	6,434,000	506,000	6,940,000	417,000	14,000	431,000	437,000	1	6,000	11,000
Reach 2 Central Place Study Area										
100 year 802.3	3,156,000	240,000	3,396,000	204,000	15,000	219,000	667,000	3.1	448,000	235,000
250 year 805.3	3,420,000	258,000	3,678,000	221,000	15,000	236,000	764,000	3.2	528,000	139,000
500 year 808.7	3,839,000	287,000	4,126,000	248,000	15,000	263,000	895,000	3.4	632,000	8,000
Reach 3 Downtown East Levee										
Closure Improvements	642,000	37,000	679,000	41,000	0	41,000	156,000	3.8	115,000	252,000
500 year levee	11,440,000	1,070,000	12,510,000	752,000	10,000	762,000	113,000	0.2	-649,000	
Reach 4 Downtown West Levee										
Closure Improvements	260,000	15,000	275,000	17,000	0	17,000	74,000	4.5	57,000	160,000
500 year levee	4,943,000	529,000	5,472,000	329,000	10,000	339,000	97,000	0.3	-241,000	
Reach 5 Downtown South Levee										
Closure Improvements	31,000	2,000	33,000	2,000	0	2,000	30,000	15.3	28,000	46,000
500 year levee	6,175,000	577,000	6,752,000	406,000	10,000	416,000	29,000	0.1	-388,000	
Reach 6 Raccoon River Section 205 Levee										
Plan 1	Evaluate reliability of existing Federal levee. Levee improvement plans were eliminated during plan formulation.									
Reach 7 Des Moines Water Works Levee										
Plan 1	Evaluate reliability of existing Federal levee. Levee improvement plans were eliminated during plan formulation.									
Reach 8 Des Moines-West Des Moines Levee										
Plan 1	Evaluate reliability of existing Federal levee. Levee improvement plans were eliminated during plan formulation.									
Reach 9 Walnut Creek at Grand Avenue										
Plan 1	2,481,000	143,000	2,624,000	158,000	0	158,000	50,200	0.32	-108,000	
Reach 10 Fourmile Creek										
Plan 1 MH Park Buyout	2,150,000	124,000	2,274,000	137,000	0	137,000	47,000	0.35	-89,000	
Plan 2a Levee LB-2	3,790,000	213,000	4,003,000	241,000	3,000	244,000	13,000	0.06	-230,000	
Plan 2b Levee LB4	2,690,000	151,000	2,841,000	171,000	3,000	174,000	12,000	0.07	-162,000	
Plan 2c Levee RB3	571,000	32,000	603,000	36,000	1,000	37,000	1,000	0.03	-36,000	
Plan 2d Levee RB4 & RB5	1,420,000	80,000	1,500,000	90,000	2,000	92,000	0	0	-92,000	
Plan 2e Levee RB6	165,000	9,000	174,000	10,000	1,000	11,000	1,000	0.1	-10,000	
Reach 11 Leetown Creek										
Plan 1	Evaluate reliability of the Red Rock Remedial Works levee (see Plan Formulation Section and Hydraulics Appendix). Evaluation reported adequate reliabilities, therefore no Leetown Creekway structural improvements were assessed.									

5-5/8% Discount Rate, 50-Year Evaluation Period

4. Comparison of Alternatives

The alternatives shown in the table above were evaluated for economic feasibility and the alternatives with the greatest net benefits were selected for inclusion in the Recommended Plan. The Recommended Plan meets the project planning objectives and constraints.

Key risks associated with the flood damage reduction alternatives included the risk of residual flood damages from floods that exceed the height of the levees and floodwalls. All alternatives would reduce,

but not eliminate, the possibility of flooding, especially during the extreme flood events. However, implementation of the Recommended Plan would provide protection from a repeat of the flooding caused by the Great Flood of 1993. There is also risk associated with flooding prior to completion of the Recommended Plan.

5. Key Assumptions

The No Action Alternative assumes that the community would continue to rely on the existing levees, emergency flood fighting, and would require flood insurance.

6. Recommended Plan

The recommended plan is the alternative meeting the project objectives and constraints that has the greatest Net Annual Benefits. Following is a description of the recommended plan:

Reach 1, Birdland Park

- Reconstruct 7,700 feet of levee to a 0.002 probability of exceedance (500-year level) with gated closure at Saylor Road and reconstruct existing asphalt bike trail on levee
- Construct a new multipurpose recreational trail from the Neal Smith Trail to Riverview Park (12 ft wide and 2,200 ft long)
- Environmental mitigation would include 4.6 acres of wetland restoration, 0.4 acres of bottomland forest restoration, 3.8 acres of open water habitat restoration, and 2.6 acres of upland forest restoration

Reach 2, Central Place

- Reconstruct approximately 5,900 feet of levee to a 0.002 probability of exceedance (500-year level), and construct outlet pipes and gatewells from 3 existing pump stations
- Environmental mitigation would include 1.2 acres of bottomland forest restoration and 3.2 acres of upland forest restoration

Reach 3, Downtown East

- Four levee closures permanently closed, six levee closures modified to reduce the closure size and improved pedestrian gate closures at Simon Estes Amphitheater

Reach 4, Downtown West Closures

- One levee closure permanently closed, and five levee closures modified to reduce the closure size

Reach 5, Downtown South Closures

- Two levee closures permanently closed

7. Systems / Watershed Context

The study area was limited to the Des Moines city limits. Within this context, the study team sought to develop/evaluate planning objectives and alternatives for comprehensive flood damage reduction, ecosystem restoration, and recreation system in the study area; however, no systemic alternatives were identified that were economically justified or supported by the sponsor. The recommended plan as formulated has no significant impacts to the watershed. Iowa DNR and U.S. Fish and Wildlife Service

CECW-PC

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helped determine the environmental impacts and provided input to the mitigation plan. No formal agency partnerships were created as part of this study.

The recommended project would enhance watershed purposes by protecting urban areas and reducing contamination of the river via flooding of industrial and commercial properties. The project would have no negative impacts on the watershed ecosystem.

8. Environmental Operating Principles

The feasibility study was conducted in accordance with the Environmental Operating Principles. Alternatives were developed with a thorough consideration of impacts to the environment and society while meeting project objectives and constraints. Impacts to the environment were minimized through coordination with appropriate Federal, state, and local agencies. The levee alignments were adjusted to minimize impacts to wetlands and forests. Impacts to society were minimized through extensive public involvement and coordination with the city and stakeholders. Comments received through the public involvement process were considered for implementation and addressed as appropriate. Selection of the Recommended Plan balanced economic feasibility with potential environmental and societal impacts.

9. Independent Technical Review

The independent technical (ITR) review was performed by the St Paul USACE District and formally concluded in March 2005. The ITR resulted in 111 comments, all of which have been resolved and closed. Primary ITR issues were related to analysis of failure probability of existing levees, analysis of levee closure reliability, and design details of the Birdland Park levee in the vicinity of Riverview Park.

EXPECTED PROJECT PERFORMANCE

It is estimated that there is a greater than 95 percent probability that the Birdland Park and Central Place levee segments would protect adjacent areas from a flood which has a 0.2 percent chance of occurring in any year (500-year flood). These levee segments would reduce expected annual flood damage in the Birdland Park and Central Place areas by more than 98 percent. The selected plan would substantially increase the reliability of closure structures in the downtown levee system for floods which have less than a 1 percent chance of occurrence in any year (greater than a 100-year flood).

1. Project Costs

Table 3: Project Costs

Project First Costs

Des Moines and Raccoon Rivers Project (Oct 2004 Price Level)

Project Totals

Lands and Damages (Fed)	89,000
Lands and Damages (Non Fed)	756,000
Relocations (Non Fed)	119,000
Levees and Floodwalls	6,068,000
Pump Stations	952,000
Recreational Facilities	196,000
Planning, Engineering & Design	1,197,000
Construction Mangement	681,000
Totals	10,059,000

50-year period of evaluation

2. Equivalent Annual Costs and Benefits

Table 4: Project Costs and Benefits of Recommended Plan

ECONOMIC COSTS AND BENEFITS OF RECOMMENDED PLAN ¹ (1000 \$DOLLARS)			
Item	Flood Damage Reduction	Recreation	Total Costs
Investment Cost			
Project Cost est.	9,815	244	10,059
Interest During Construction ¹	783	15	798
Total	10,598	259	10,857
Average Annual Cost			
Interest and Amortization ²	639	15	654
OMRR&R ³	29	1	30
Subtotal	668	16	684
Average Annual Benefits			
Monetary (FDR) & (Recreation)	1,602	117	1,719
Net Annual Benefits	936	100	1,036
Benefit-Cost Ratio	2.4	7.1	2.5
FDR Benefit-Cost Ratio (at 7%) ⁴	2.0	5.9	2.1

¹ Two year period of construction² Based on October 2004 price levels, 5 ⁵/₈ percent rate of interest, and a 50-year period of analysis³ Operation, Maintenance, Repair, Replacement, and Rehabilitation⁴ Per Executive Order 12893

3. Cost Sharing

Table 5: Costs Sharing Totals

Estimated Implementation Costs: (October 2004 price level)	
Federal	
Corps of Engineers – flood damage reduction (65%)	\$6,380,000
Corps of Engineers – recreation (50%)	\$122,000
Corps of Engineers – total	\$6,502,000
 Non-Federal	
City of Des Moines – flood damage reduction (35%) ¹	\$3,435,000
City of Des Moines – recreation (50%)	\$122,000
City of Des Moines – total	\$3,557,000
Total	\$10,059,000

¹ \$963,000 of this amount is LERRD credit and the remainder is cash

4. Project Implementation

The non-Federal sponsor for project implementation is the city of Des Moines, Iowa. The non-Federal sponsor's responsibilities will be defined in a Project Cooperation Agreement. There are no institutional arrangements with the state or other partners in this project.

5. Operation, Maintenance, Repair, Rehabilitation, and Replacement (OMRR&R)

The city of Des Moines will operate and maintain the project in accordance with the procedures and schedules set forth in an Operation and Maintenance manual. The total estimated annual cost of operation, maintenance, repair, rehabilitation, and replacement for the Recommended Plan is \$30,000, which includes both flood control and recreation features. Maintenance would consist of annual inspections of and repairs to the project permanent levees, interior drainage facilities, and recreation facilities. Operation would include the operation of pumping stations and gates and the servicing of all project structures. No major rehabilitation or replacement of project features during the 50 year period of analysis is anticipated.

6. Key Social and Environmental Factors

Much of the city is located within the floodplain of the Des Moines and Raccoon Rivers. There were likely many upland and bottomland forests and emergent wetlands in the area prior to European settlement. Wetlands would be impacted at Birdland through creation of a new levee alignment at the northern end and a widening of the levee at the southern end. These wetland impacts would be mitigated through creation of wetlands at a mitigation site outside of the city.

The upland forests that have developed on the existing levees at Birdland Park and Central Place were likely not originally found in that area, since it would have been too wet to support an upland forest community. The upland forest would be mitigated through planting of trees and shrubs at Central Place and the Chichaqua mitigation site, northeast of Des Moines.

The cumulative natural resource impacts associated with the downtown closure structures are expected to be minimal since they are located in already highly developed areas.

Construction of the Recommended Plan would have beneficial effects by reducing flood damages and would not significantly affect the quality of the human environment. An EIS is not required and a FONSI has been issued.

7. Stakeholder Perspectives and Differences

The Des Moines and Raccoon Rivers Feasibility Study was conducted as a partnership between the city and the District. This partnership included extensive coordination with numerous groups including Federal, state, county, and city agencies; neighborhood associations; businesses; landowners; the media; and the unaffiliated public. These groups also were included on the study's distribution list of approximately 300 interested parties.

Public outreach and coordination activities conducted as part of this study include:

- Study Newsletters: Feb 2000; Jan and Dec 2002; March 2004
- Study website: <http://www.mvr.usace.army.mil/DesMoinesFP/>
- Public Open House Meetings: Jan 2003 and May 2005
- Formal environmental coordination with Federal, State, and Local Resource Agencies

Environmental coordination activities resulted in the identification of potential project impacts and mitigation sites. Public involvement activities resulted in identification of several local concerns that influenced development of alternatives and selection of the Recommended Plan.

All stakeholder concerns have been resolved with the exception of some remaining concerns that Kiwanis Club members have regarding impacts to proposed recreational use of Riverview Park which is owned by the city of Des Moines. The park was proposed by the Kiwanis to be a passive and active recreation area for the residents of Des Moines. Additional coordination to minimize impacts to Riverview Park would occur during final design. This approach is endorsed by the city.

8. State and Agency Review

The State and Agency Review for the final report began 20 October 2005 and ended 21 November 2005. In a letter dated 18 November 2005, the Department of Interior did not object to the proposed project and had no comments to offer. In an email dated 1 December 2005, the Environmental Protection Agency had no comments with the feasibility report and EA. In a letter dated 9 December 2005 the State of Iowa Department of Natural Resources had no comments with the feasibility report and EA.

Des Moines and Raccoon Rivers Feasibility Study Recommended Plan

