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Confluence Park, a proposal for revitalization of the Colorado riverfront in Grand Junction, Colorado

Katherine M. Portner
The University of Montana

CONFLUENCE PARK
A PROPOSAL FOR REVITALIZATION OF THE COLORADO RIVERFRONT IN GRAND JUNCTION, COLORADO

By

Katherine M. Portner

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Approved by:

Duncan S. Kenny

Chairman, Board of Examiners

E C Murray

Dean, Graduate School

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ProQuest LLC.
789 East Eisenhower Parkway
P.O. Box 1346
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ACKNOWLEDGMENTS

Every planner dreams of a project that will make a difference. I have been lucky enough to be involved in such a project. The Grand Junction Riverfront Project is an attempt to revitalize the Riverfront and south downtown area. It encompasses environmentally oriented greenbelt/riparian rejuvenation as well as the redevelopment of the commercial/industrial area.

I have been fortunate for the last two years to guide the project as coordinator for the Grand Junction Planning Department. I would like to thank Karl Metzner, Planning Director, for instilling that confidence in me and allowing me the opportunity to develop my skills as a manager. I would also like to thank the other staff members: Linda Weitzel, Terri Troutner, Mike Sutherland and Greg Flebbe for their encouragement, input and proof reading.

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CHAPTER 1

INTRODUCTION

GRAND VALLEY

Location

Mesa County is located in the Canyonlands section of the Colorado Plateau physiographic province of Western Colorado. The recent alluvial plain, consisting of broad, coalescing alluvial fans and stream floodplains, is broad and slopes very gently eastward and north- westward from Grand Junction. The plateaus and mountains of the upper Colorado River basin are products of a series of uplifted land masses deeply eroded by wind and water. The lower portions of Grand Valley are largely underlain by the marine Mancos shale and Mesaverde group of related formations. Saline alluvium from the Mancos Shale is found throughout most of Grand Valley. The southwestern part of the Valley is largely a composite of sedimentary rocks of the Jurassic and Triassic periods, and principally of the Morrison, Summerville, Entrada, Kayenta, and Wingate formations (Figure 1) (Skogerboe and Walker 1972; Colorado Water Conservation Board and U.S. Dept. of Agriculture 1965)

Physical Setting

There are three basic geological features in the Grand Valley area:

1. Wide, nearly level alluvial valleys of the Colorado and Gunnison Rivers and tributaries.
2. Gently to steeply sloping shale Badlands between Government Highline Canal and the Book Cliffs.
3. Steeper rockier country behind the Book Cliffs, along the edge of the Colorado National Monument, and near the western flanks of the Grand Mesa.

The Grand Valley is about ten miles wide, and has at the lowest terrace level an active floodplain. Most development is on the first level of terraces, 15 to 70 feet above the river bed. There are several older more dissected terraces several hundred feet above the river.

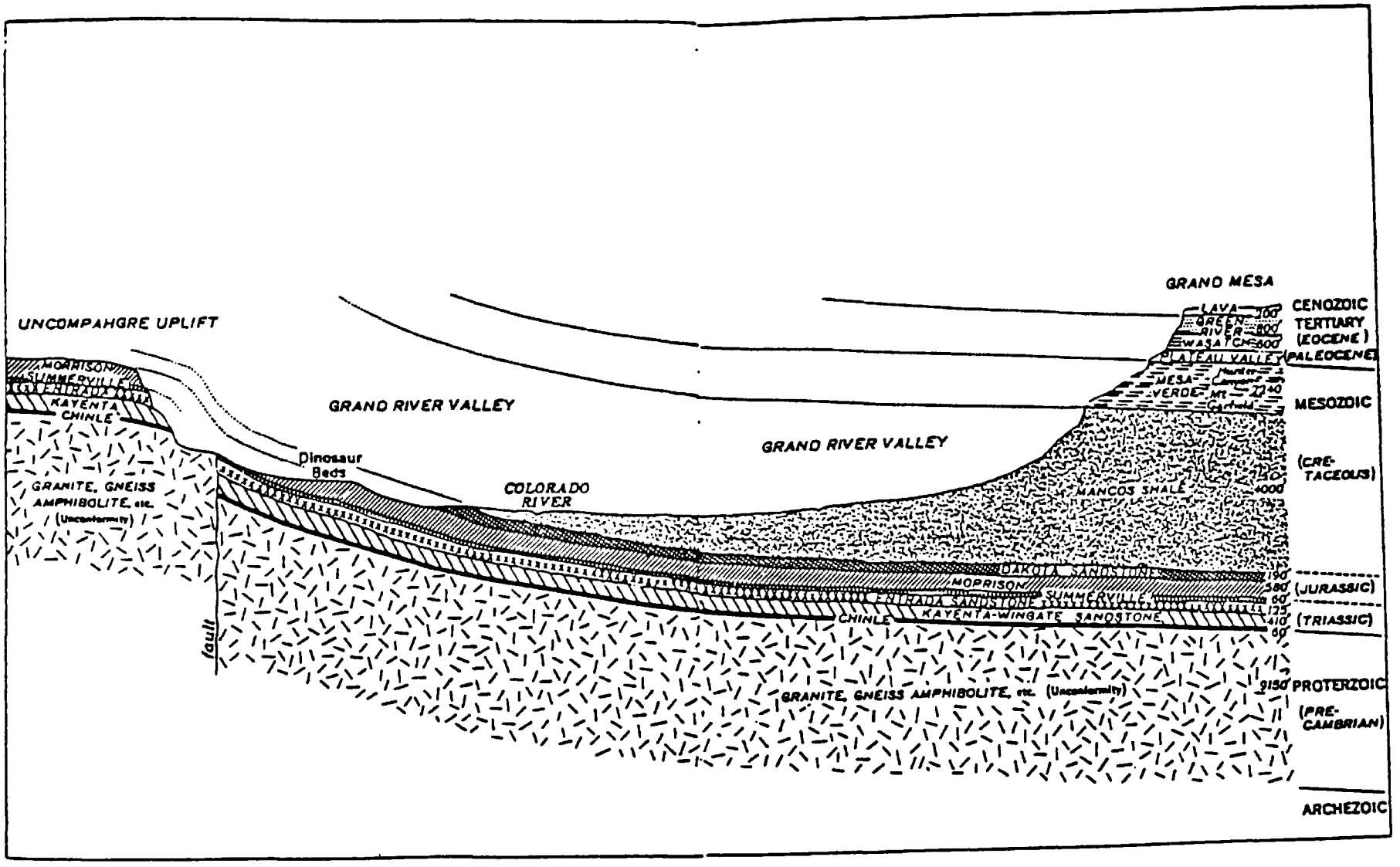

FIGURE 1--Northwest-southeast cross section of the Grand Junction Area showing the tilt caused by the Uncompahgre uplift and the principal formations giving rise to the soils.

SOURCE: Knobel, E.W. (USDA), R.K. Dansdill and M.L. Richardson (CO Agricultural Experiment Station). 1940. Soil Survey Grand Junction, CO. Series 1940, No. 19. Washington, D.C.: U.S. Government Printing Office.

Major landforms surrounding the Grand Valley include the Book Cliffs, Grand Mesa, and the Uncompahgre Plateau (Figure 2). The Book Cliffs, an eroded monocline, stretch northwest-southeast along the north boundary of the Valley. The cliffs have up to 1900 feet of relief, dominated by Mount Garfield and Mount Lincoln. The most prominent topographic feature is Grand Mesa forming the eastern border of the County. The Mesa consists of thick accumulations of tertiary sediments overlain by thick basalt flows. The highest point in the County is Leon Peak, 11,236 feet, located at the eastern end of Grand Mesa. The largest landform in the County is the Uncompahgre Plateau, a 3,500 square mile dome-shaped plateau extending from Grand County, Utah over 100 miles southeast through Mesa, Montrose, and Ouray Counties. The Plateau forms the western boundary of the County and rises to an elevation of 9,760 feet.

Climate

The climate of the area is arid to semiarid with yearly precipitation averaging from about 8" at Grand Junction to about 40" in the headwater regions of the Colorado and Gunnison Rivers. Most of the annual precipitation in the higher elevations occurs as snow, resulting in a deep snowpack. The average annual snowfall in the Valley is 22", which usually melts within a few days after it falls. The average monthly temperature ranges from 26.7 F in January to 78.8 F in July. Summer temperatures in the 90's are common, but winter temperatures below zero occur infrequently. There are an average of 188 frost-free days in the valley.

GRAND JUNCTION

History

Grand Junction, located in Mesa County, derived its name from its proximity to the junction of the Gunnison River and the Colorado River, formerly known as the Grand (Figure 3). The City was incorporated in July 1882 and by 1900 had grown to a population of over 3,500. A special census taken in April 1977 by the U.S. Bureau of the Census set the population of the Grand Junction Division at 35,800,

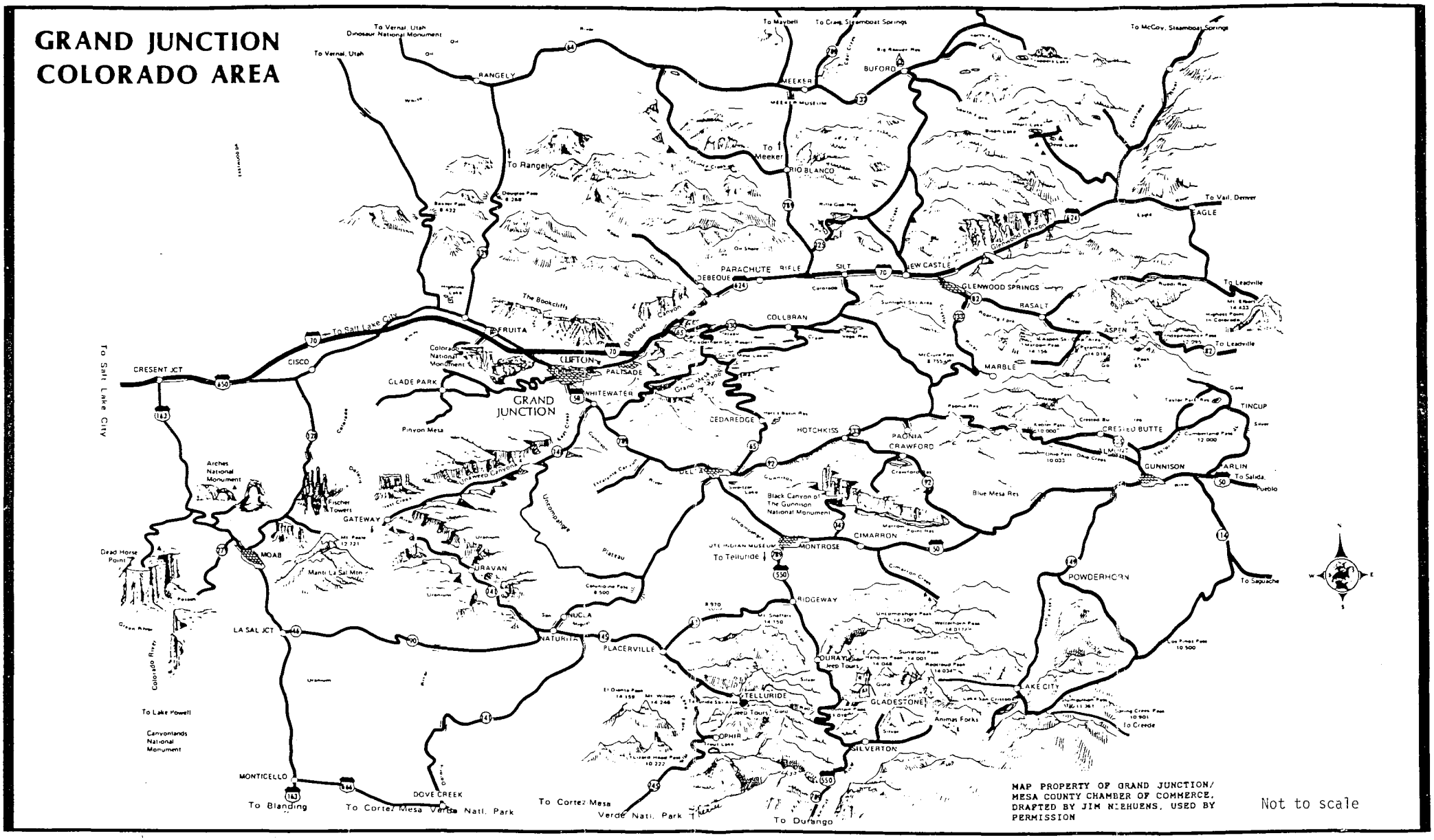
GRAND JUNCTION
COLORADO AREA
To Vernal, Utah
Dinosaur National Monument
To Vernal, Utah
RANGELY
To Maybell
To Craig, Steamboat Springs
To McCoy, Steamboat Springs
MEEKER
BUFORD
To Rangely
To Meeker
RIO BLANCO
To Vail, Denver
EAGLE
PARACHUTE
RIFLE
SILT
NEW CASTLE
DEBEQUE
GLENWOOD SPRINGS
To Leadville
RASALT
COLLBRAN
ASPEN
To Leadville
To Salt Lake City
FRUITA
CLIFTON
MARBLE
CRESENT JCT
CISCO
GLADE PARK
PALISADE
WHITEWATER
GRAND JUNCTION
TINCUP
CEDAREDGE
HOTCHKISS
PAONIA
CRAWFORD
CRESTED BUTTE
Pinyon Mesa
Arches National Monument
Fischer Towers
GATEWAY
GUNNISON
CIMARRON
MONTROSE
To Telluride
Black Canyon of The Gunnison National Monument
Blue Mesa Res
To Salida, Pueblo
Dead Horse Point
MOAB
Manti La Sal Mtn
URAVAN
POWDERHORN
To Saguache
RIDGEWAY
LA SAL JCT
NUCLA
NATURITA
PLACERVILLE
OURAY
Jeep Tours
LAKE CITY
TELLURIDE
GLADESTONE
Animas Forks
To Creede
Colorado River
To Lake Powell
Canyonlands National Monument
OPHIR
SILVERTON
MONTICELLO
To Blanding
DOVE CREEK
To Cortez Mesa Verde Natl. Park
To Cortez Mesa
Verde Natl. Park
To Durango
To Salt Lake City
MAP PROPERTY OF GRAND JUNCTION/ MESA COUNTY CHAMBER OF COMMERCE, DRAFTED BY JIM NIEHUENS, USED BY PERMISSION
Not to scale

FIGURE 2

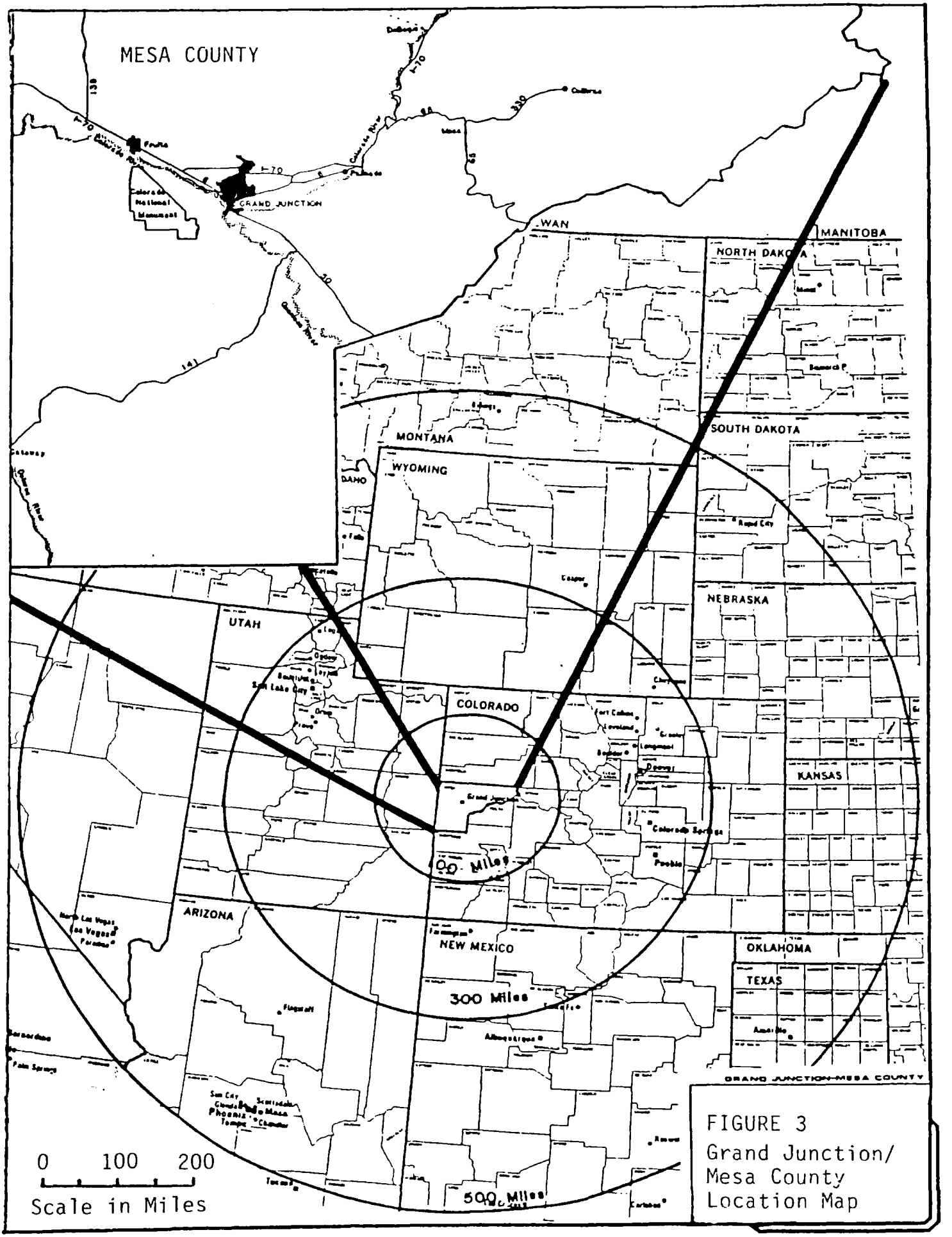

FIGURE 3
Grand Junction/
Mesa County
Location Map

Grand Junction at 25,400, and Mesa County at 66,800 (U.S. Department of Commerce, Bureau of Census, 1977). By 1980 the City population had grown to 28,144 and the County to 81,530 (Bureau of Census, 1980).

Grand Junction is the county seat of Mesa County and the largest city between Salt Lake City, Utah and Denver, Colorado. Because of location and access to highway, railway and airway facilities, it is the trade and business center for Western Colorado and Eastern Utah. It serves a regional trade area of over 200,000 people.

Economic Base

The economy of the area was originally based on mineral extraction and agriculture. Subsequently, food processing, manufacturing, trade, government, tourism, and outdoor recreation have gained in importance. The setting of the Valley lends itself naturally to outdoor recreation. Over 70% of Mesa County is public lands, including the Grand Mesa and Uncompahgre Plateau managed by the Forest Service, and much of the surrounding desert and canyons managed by the Bureau of Land Management. These attractions draw many tourists for hiking, biking, fishing, hunting and skiing. The Colorado National Monument to the west had a record number of visitor days in 1986 of over 800,000.

Historically, the area's rich mineral resources have produced boom/bust cycles. The most recent oil shale boom of the 1970's ended in bust in 1982 with the pullout of Exxon's oil shale operations. The valley was left over-built and deeply in debt. A "mass exodus" resulted. The County population peaked in the spring of 1982 with an estimated 94,000 persons and has declined to about 83,000 today (Figure 4) (City/County Data Book, 1986).

As a result of the recent "bust", the community has been intensifying its efforts towards diversified economic development. Through that effort, the Colorado Riverfront is being recognized as a neglected asset with potential for revitalization.

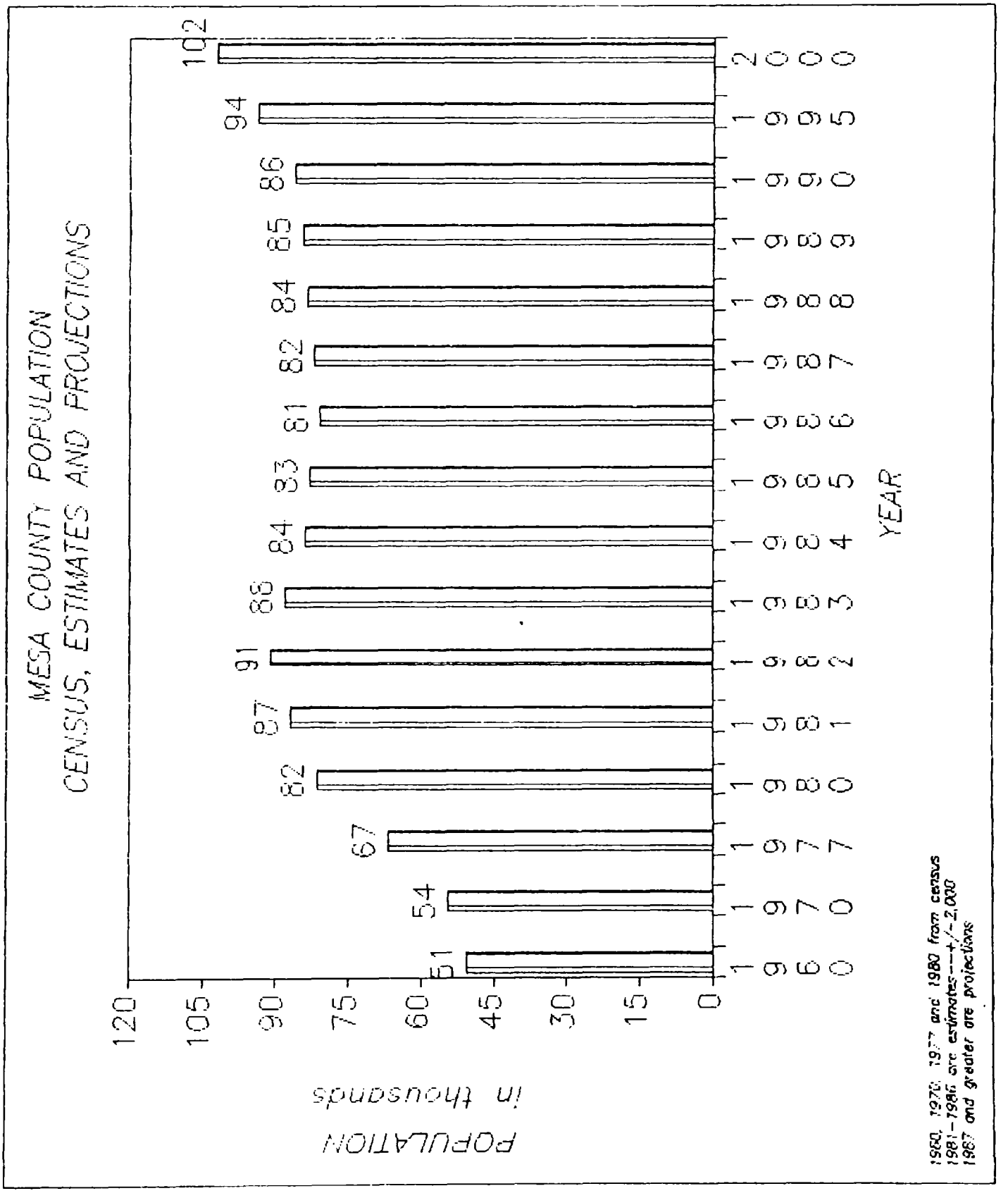

FIGURE 4

Source: The Data Book

RIVERFRONT REVITALIZATION

National Trends

Water plays a fundamental role in our psychology. This fundamental need for water has drawn populations to the banks of rivers and the shores of lakes and oceans. Historically, development has occurred along rivers. The waterways were the lifeline of settlements, providing transportation and fertile valleys for agriculture.

This very movement of people toward the water can also destroy the water. Roads, freeways and industries have destroyed water edges and have made waterways undesirable and virtually inaccessible.

However, the image of rivers as natural sewers is fading. Instead, many cities are realizing the importance of their waterfronts as a potential resource for the community. The revitalization of waterfronts has become a trend for cities of all sizes.

There are many notable waterfront success stories. One of the greatest appeals of San Antonio, Texas is the vital banks of the San Antonio River. That community showed amazing foresight decades ago by commissioning a landscape architect to design the framework for the River as it is today. In the 1960's the economic benefits of the attractive corridor were realized. A River Walk Commission was established, resulting in the preparation of a community comprehensive general plan. A public/private partnership developed which guided the cooperative effort to create a viable riverfront (San Antonio Convention and Visitors Bureau).

The State of New York has become very active in waterfront revitalization. The State offers assistance to communities attempting to revitalize river corridors and lakes. An example is a stream management program initiated by the City of Troy on the Wynantskill River. The study examined the physical and social resources of the corridor and made far reaching recommendations. Many of those recommendations have been implemented. A nature trail system has been constructed and development in the corridor is strictly regulated. Many similar stream management programs have been implemented in the State to pro-

tect fisheries and enhance other viable resources (City of Troy, 1976).

Closer to home, riverfront projects are beginning to emerge. Several projects have been started in the State of Colorado. The Platte River/Arapahoe Greenway project in the Denver area is the largest. It has been very successful through the efforts of the Platte River Greenway and the South Suburban Park Foundation. The South Suburban Park Foundation, a nonprofit organization, used a public/-private partnership, calling on all sectors of the metro community to participate in a pilot project. This pilot project was very successful, creating more interest and funding to keep the project going (Shoemaker, 1981).

The Steamboat Springs/Yampa River Park was started by a group of kayakers to enhance the whitewater movement of the River. The money for the stream and bank enhancement came through a panel of citizens overseeing a fund set up for the City by the Steamboat Ski Corporation. Most of the work was done by volunteers, resulting in tremendous cost savings to the community (Daily Sentinel, 1986).

The Greenway and Nature Center of Pueblo is a consolidation of the Pueblo Greenway Foundation and the Nature Center of Pueblo. The center and trail are used for educational and recreational purposes by a large segment of the community. The success of the project is attributed to many volunteers, government agencies, foundations, individual donors and dedicated staff members (Pueblo Greenway and Nature Center).

The Boulder Creek project started as an attempt by a University of Colorado biology professor to reestablish the fishery of Boulder Creek. Much of the initial funding came from the City of Boulder. That money was augmented by two grants and lottery funds. Also, new private developments which front on the Boulder Creek corridor are required to build part of the bike trail (City of Boulder pamphlet, undated).

Grand Junction Riverfront

The Colorado River, the largest river system in Colorado, stretches from the headwaters in Rocky Mountain National Park to Mexico (Figure 5). The mighty River evokes strong feelings and images to many people. It has a rich history and today offers a haven for hunting, fishing, boating and hiking enthusiasts as well as wildlife. Unfortunately, this image of the majestic River does not hold true within the segment through Grand Junction, where the Colorado meets the Gunnison River. The heavy recreational use of the Colorado upstream near Glenwood Springs and downstream in Ruby and Westwater Canyons is currently not possible through the Grand Junction segment.

The legacy of Grand Junction's relationship to its two rivers is much the same as other cities' in America. The rivers have gone from being the "lifeline" of the communities to being the dumping grounds for all the communities' wastes. The urbanized riverfront habitat consists of junk cars, old tires and trash. It is a national landmark in need of rejuvenation.

Land uses along the Colorado reflect the past century of human settlement of the Grand Valley. Water from the Colorado and Gunnison Rivers has been diverted through a system of irrigation canals constructed at the turn of the century to allow farming in the valley. The urban waterfront throughout Mesa County is typified by industrial uses, railyards, sewage plants and gravel pits.

The Grand Junction Riverfront is virtually inaccessible. Over the years it has been lined with junkyards, chemical storage facilities and other undesirable uses (Figure 6). The 5th Street bridge, the main southern entrance into the City, allows a "bird's eye" view of the "trashed-out" river, creating an undesirable image of the community. Some folks jokingly refer to Grand Junction as "Grand Junkyard". The Riverfront area is a major industrial zone of the City, but because of its condition, it is not very attractive to new, clean industry.

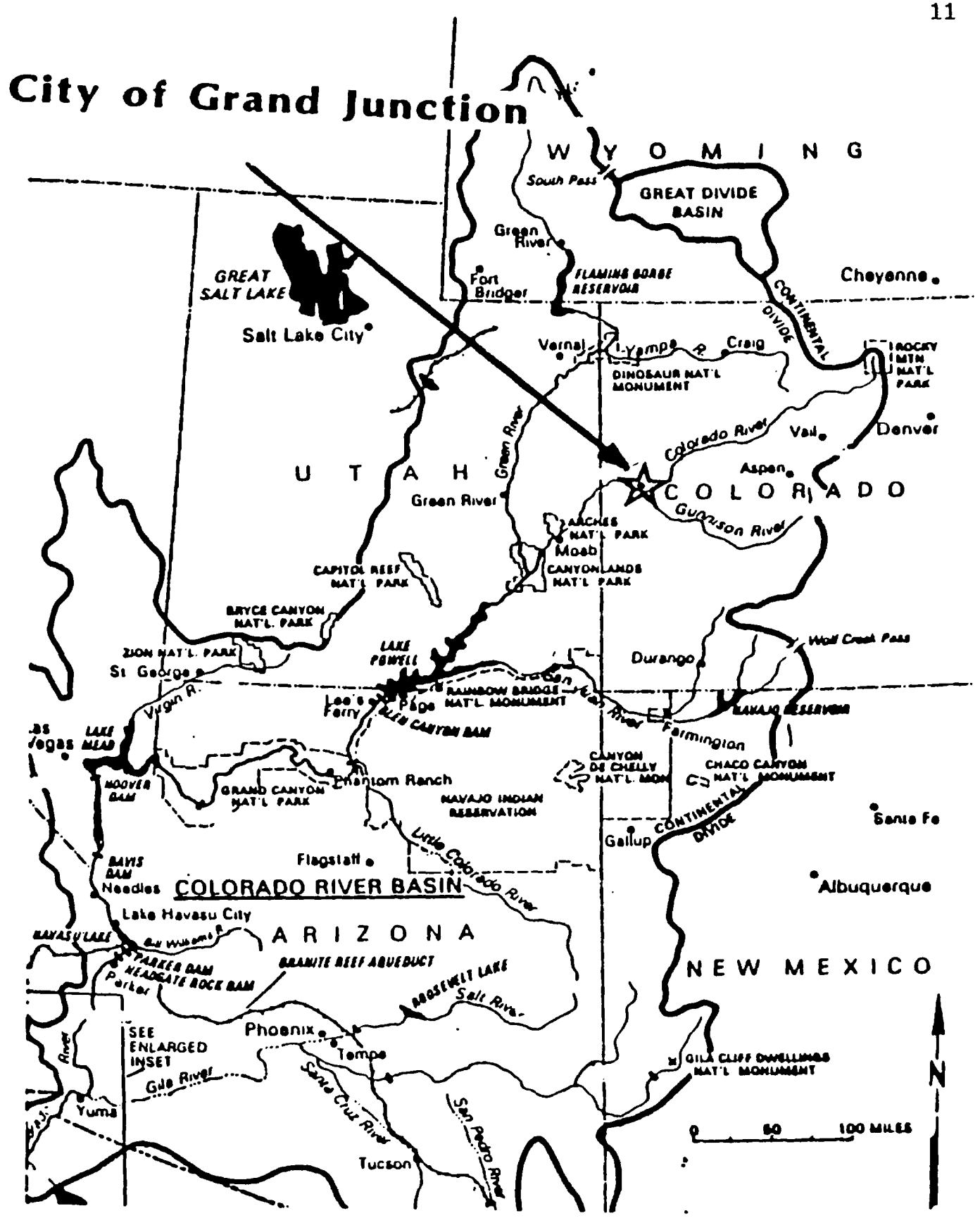

FIGURE 5--Colorado River Basin

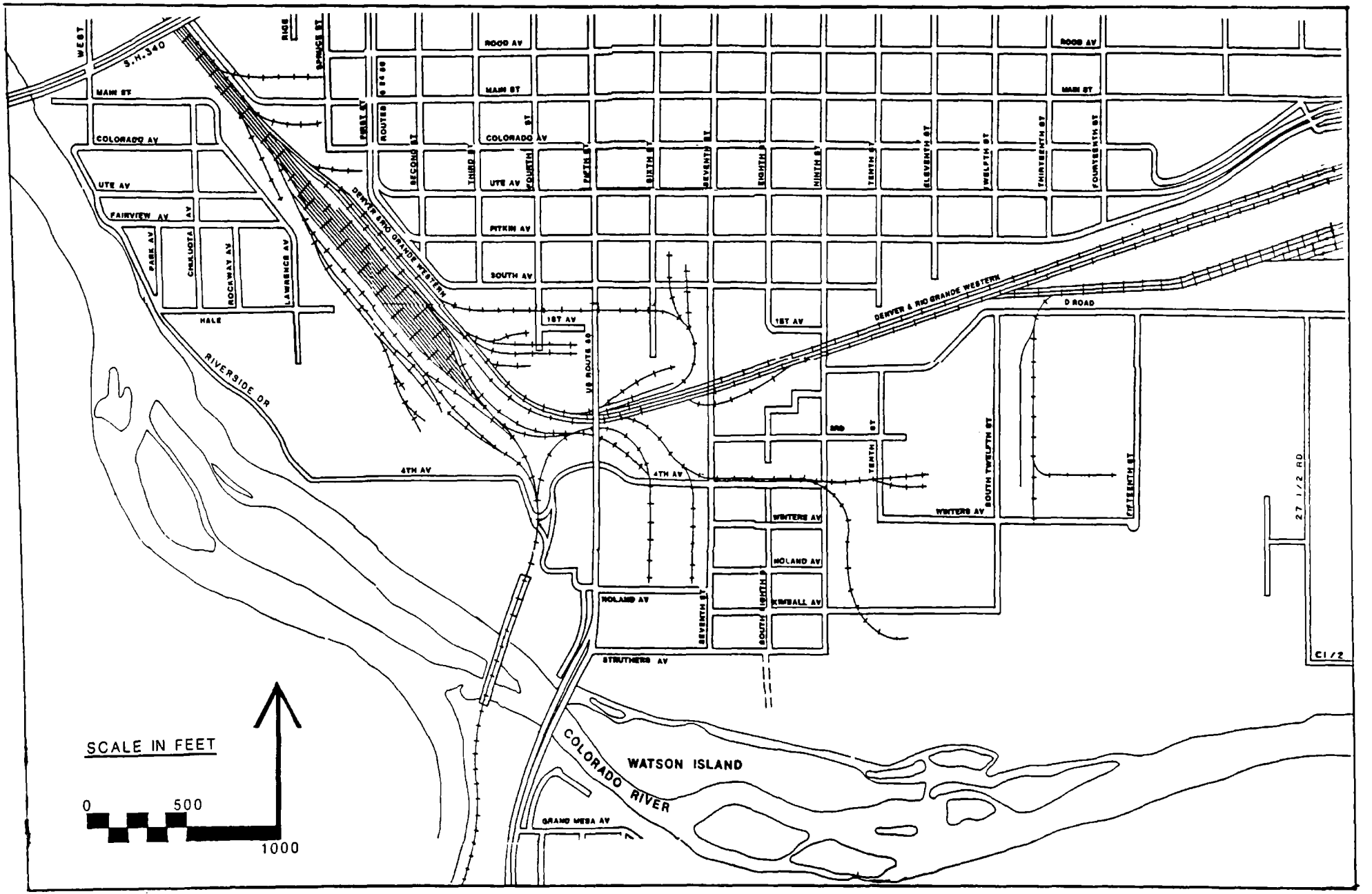

FIGURE 6--Grand Junction Urbanized Riverfront

However, like other cities, Grand Junction is starting to realize the potential for the Riverfront as an amenity for economic, social and recreational activities.

Goals and Objectives of Grand Junction's River Project

In 1985 the Grand Junction City Council identified its 3 top goals as:

1. Improving the image of city entrances.
2. Developing a high quality industrial park to stimulate economic development.
3. Encouraging use and clean up of the Colorado River.

The City saw the opportunity to use the Colorado Riverfront as a focus to achieve these goals. The Planning Department was given the task of researching the potential for revitalization.

Overall Goals

The overall goals of Confluence Riverfront Project are:

1. To visually improve the appearance of the River corridor, especially in proximity to the urban core. This would involve removal or screening of junk and trash and landscaping of visually critical areas.
2. Provide increased recreational opportunities by developing Riverside hike/bike trails, picnic areas, and boating access points as well as retaining a majority of the River environment in a natural state.
3. Reduce public and private losses caused by flooding. Through proper design, dikes can be integrated into the project to protect development areas from floods while still maintaining a viable river environment.
4. Create an attraction that would foster redevelopment of adjacent industrial and business areas and compliment the objectives of the Enterprise Zone designation. Provide a focus and strong ties to the downtown area. The presence of an attractive, usable Riverfront can be a positive factor in encouraging development and redevelopment of desirable land uses.

The conceptual project has been broken down into three phases. Phase I is now completed and we have started Phase II. The goals and accomplishments are as follows:

PHASE I

Goal: To generate support for the project and collect the necessary base data.

Accomplishments:

1. Background information was gathered on zoning, existing land uses, property configurations, ownerships and existing infrastructure.
2. A river trip was arranged for City Council and Planning Commission.
3. The landscape architect's rendition of Confluence Industrial Park was completed.
4. A workshop and presentation by three riverfront revitalization experts was held to foster support for the project.
5. A river corridor resource inventory was completed.

Goal: To refine the original project concepts and develop specific alternatives for the Colorado Riverfront area, working with available funding sources and coordinating with department/agency projects.

Accomplishments:

1. Refinement of development concept and specific transportation recommendations.
2. Opened the lines of communication with other groups and agencies for technical and financial support.
3. Coordination of timelines and priorities with the Department of Energy.
4. Submittal of a request for assistance from the National Park Service.
5. Initiated annexation of unincorporated portion of the study area.
6. Investigated specific grants available that may be applicable.
7. Requested the Corps of Engineers' section 205 study be re-opened.
8. A revised rendition of Confluence Riverfront project showing a compatible mix of land uses for the Riverfront.

PHASE II

Goals:

1. Establish private sector involvement. Set up a steering committee, nonprofit foundation or similar organization of people committed to the project and willing to devote time, effort and energy in doing it.
2. Develop property acquisition and aggregation strategy.
3. Designate, build and maintain a demonstration project that will act as a foundation and impetus for future projects.

PHASE III

Goal: Implement land acquisition and development.

We are in the very initial stages of Phase II. Strategies will be discussed in the appropriate chapters.

SUMMARY

In the past there have been other attempts to create a greenbelt along the Colorado River. These attempts failed, not for lack of enthusiasm, but for lack of cooperative efforts and timing. By all indications the timing is now right. The City sees a unique opportunity to follow through on the Riverfront project. As a result of the economic downturn, land prices are depressed. The Department of Energy's (DOE) mill tailings removal project could be used to our advantage to clean up the junk along the River as well as the tailings. Mesa County is a designated community to receive concentrated development assistance from the Department of Local Affairs. The Riverfront area is located in an Enterprise Zone. Grand Junction has a very good chance of being selected to receive assistance through the National Park Service's State and Local River Conservation program. The State Trails money will probably be available to Mesa County again this year to extend the hike/bike trail started in the Connected Lakes area. There are also other governmental grants available now that may not be funded in the future.

By reclaiming the Riverfront area and making it attractive, useful and inviting, Grand Junction hopes to capitalize on a neglected resource to revitalize downtown, enhance diversification, improve the appearance of the south entrance into town and provide open space and recreational amenities.

CHAPTER II

RIVER CORRIDOR INVENTORY

LOCATION AND CONSTRAINTS OF FLOODPLAIN

Most of the Grand Junction area is drained by the Colorado River. The northern part of the Grand Valley is drained by many washes or arroyos that flow southwestward into the Colorado.

Much of the study area is located within the 100 year floodplain of the Colorado River (Figure 7). The Riverside community, south of the State Highway 340 bridge and railroad tracks, is almost entirely within the 100 year floodplain. The 500 year floodplain extends north to the railroad grade. Between Lawrence Avenue and the 5th Street bridge, the floodplain narrows to about 400 to 500 feet from the river. East of the tracks to 9th Street, again, the 100 year floodplain broadens out, extending as far north as 4th Avenue. East of 9th Street, the floodplain disappears because of the presence of the uranium mill tailings pile adjacent to the River. Watson Island, a potential focal point in the study area, is in the annual floodway.

Annual Floodway

The annual floodway is considered part of the River and is subject to annual flooding. The only realistic use in this zone is natural open space and low intensity recreation such as hike/bike trails and playing fields.

100 Year Floodplain

The 100 year floodplain is important, not only because of the obvious natural hazards, but also because of man-made constraints. The Federal Emergency Management Agency (FEMA) will disallow flood insurance in this zone unless the first floor elevations of residential, commercial or industrial structures are at or above the 100 year flood level. By artificially constricting the 100 year floodplain through diking or other obstructions, flooding is worsened elsewhere.

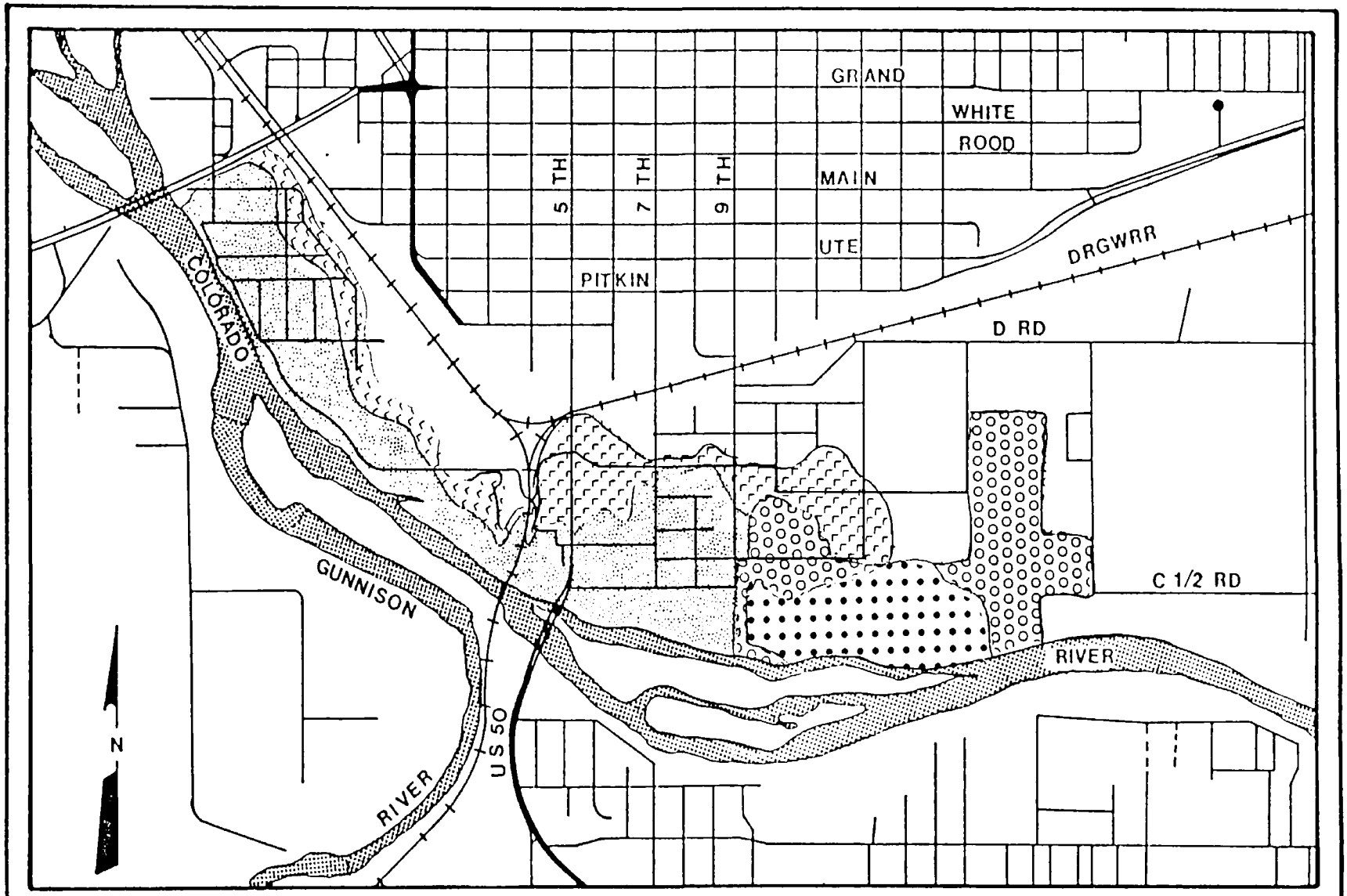

FIGURE 7
Existing Constraints Along
Grand Junction's Riverfront

500 Year Floodplain

FEMA restrictions do not apply in the area of the 500 year floodplain adjacent to and above the 100 year flood boundary.

Limitations

Intense development within the floodplain should be avoided. The preservation of natural drainages as open space is desirable. Other possible uses are parking areas, parks and playgrounds, farming, livestock grazing, woodlands and sand and gravel mining.

Diking is a possibility to protect some of the study area from flooding. However, there are trade-offs. The closer the dike is to the River, more land area will be developable, but also the dike will be higher and more expensive. It may be more feasible to build the dike back from the River, thereby reducing the costs, while leaving the floodable area in front of the dike for recreational uses.

SOILS AND GEOLOGIC HAZARDS

Soil Types

The terrain of the Valley is varied and complex. Most of the Valley is influenced by the extensive Mancos shale formation, 3,908 to 4,150 feet in thickness. To the north and northeast the shale is capped by the Book Cliffs. The Book Cliffs belong to the Mesaverde group. The soils of the Persigo and Chipeta series have developed in place on Mancos shale, and the gray alluvium washed from this shale has contributed to the Billings soils.

Overlying the Mesaverde group are the Plateau Valley, Wasatch and Green River formations, which successively rise to the lava-capped deposits on Grand Mesa. Grand Mesa consists of igneous, sandstone and shale formations and is the source of the older alluvial deposits on Orchard Mesa, south of the River, and of the younger alluvium on the Colorado River floodplain (Figure 8).

The virgin soils in the area are similar to those in arid valleys in southwest Colorado and eastern Utah. Because of the sparse vegetation, there is little organic matter in the soil and, therefore, a very low nitrogen content. The soils have a high content of lime car-

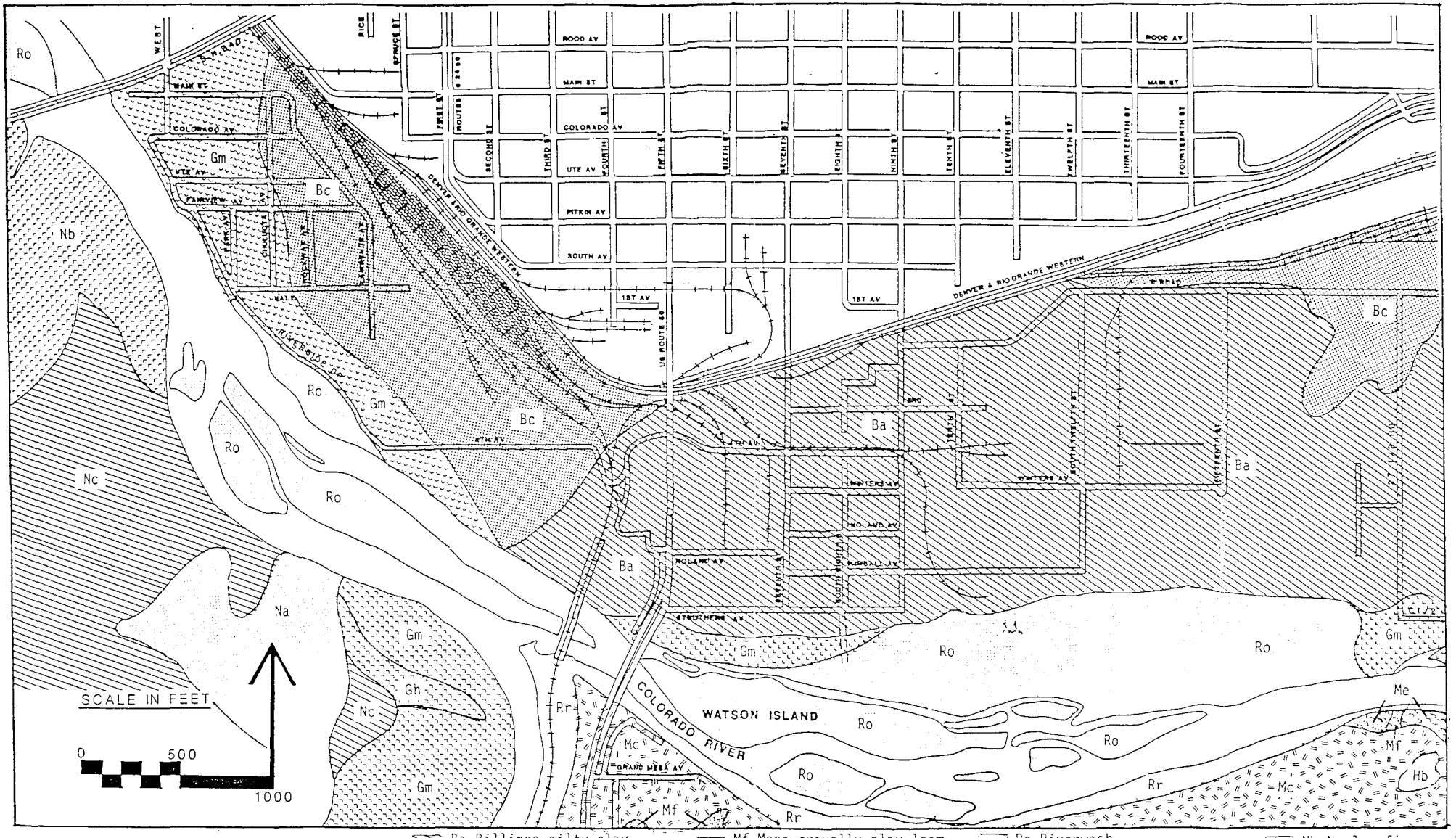

FIGURE 8--RIVERFRONT STUDY AREA SOILS

Source: Knobel, E.W. (U.S. Dept. of Agriculture) R.K. Dansdill & M.L. Richardson (CO Agricultural Experiment Station). Soil Survey Grand Junction CO, series 1940, No. 19. Washington, D.C.: U.S. Government Printing Office.

Ba-Billings silty clay 0 to 2% slopes

Nc-Navajo silty clay, 0 to 2% slopes

Bc-Billings silty clay loam, 0 to 2% slopes

Mc-Mesa clay loam 0 to 2% slopes

Mf-Mesa gravelly clay loam, 5 to 10% slopes

Me-Mesa gravelly clay loam, 2 to 5% slopes

Hb-Hinman clay loam, 0 to 2% slopes

Na-Naples clay loam, 0 to 2% slopes

Ro-Riverwash, 0 to 2% slopes

Rr-Rough broken land, Mesa, Chipeta & Persayo soil materials

Gh-Green River clay loam deep over gravel, 0 to 2% slopes

Gm-Green River very fine sandy loam, deep over gravel, 0 to 2% slopes

Nb-Naples fine sandy loam, 0 to 2% slopes

bonate, gypsum and salts of sodium, potassium, magnesium and calcium. Irrigation has caused salinity problems in many areas. The calcareous soils are all light colored. Some of the older soils have a reddish tinge in the upper subsoil caused by dehydrated iron oxides.

Soils on the lower lying alluvial fans and floodplains are recent with no definite concentration of lime or clay in the subsoil. On the higher terraces and mesas, the soils have weathered a long time in place, resulting in high concentrations of lime. This in-situ weathering may also result in a subsoil being finer textured than the surface soil (Knobel, Dansdill, Richardson, 1955).

River Floodplain Soils

The soils of the River floodplains included in the study area are: Riverwash, 0 to 2% slopes (Ro); Rough broken land, Mesa, Chipeta and Persayo soil materials (Rr); Green River clay loam, deep over gravel, 0 to 2% slopes (Gh); and Green River very fine sandy loam, deep over gravel, 0 to 2% slopes (Gm).

Riverwash consists of fine sand, gravel, cobblestones and water-worn stones lying 4 to 8 feet above the normal water level of the River. Rough broken land of Mesa, Chipeta and Persayo soil materials characterizes the steep bluffs on the River's south bank. It contains large amounts of stones, cobbles or gravel.

The members of the Green River series parent materials are derived from igneous and sedimentary rock formations. Textures of the surface soils range from silty clay loam to very fine sandy loam. Subsoils become increasingly coarse-textured with depth. Normally at depths of about 6 to 8 feet they are underlain by thick beds of porous gravelly and cobbly sand. There is considerable salt accumulation in these soils because of the high water table and some seepage from the substratum of the Billings soils (Knobel, Dansdill, Richardson, 1955) (Table 1).

These soils have severe limitations for local roads and streets, shallow excavations, and dwellings without basements, except Gh which has moderate limitations for shallow excavations and dwellings without

RIVERFRONT STUDY AREA

SOIL CHARACTERISTICS

Map Symbol	Soil	Surface Soil	Subsoil	Parent Material	Depth	Available Water Holding Capacity	Erosion Hazard	Workability	Natural Fertility	Present Use
Ba	Billings silty clay 0 to 2% slopes	Gray, lt brownish gray, or olive gray; hard; massive; calcareous	Gray to olive-gray loam, silty clay loam, or silty clay; hard; massive; calcareous	Gray, lt-gray, or olive-gray alluvium from Mancos shale deposited over Mancos shale	Deep	High	None to slow	Very difficult	Moderate	About 75% in crops: small grains, sugar beets, alfalfa, corn, pinto beans; native cover of greasewood, bassia, and saltgrass
Bc	Bayajo silty clay, 0 to 2% slopes	Pale brn to lt reddish brn; very hard; calcarious	Pale brn to lt reddish-brn silty clay or clay; very hard; calcareous	Calcareous reddish-brn clay alluvium largely of shale origin	Deep	Moderate	None to slight	Very difficult	Moderate	Practically all in crops: alfalfa, small grains and sugar beets; native cover of saltgrass
Bc	Billings silty clay loam, 0 to 2% slopes (adobe)	Gray, lt brownish-gray, or olive-gray; hard; massive; calcareous	Gray to olive-gray loam, silty clay loam, or silty clay; hard; massive; calcareous	Gray, lt-gray, or olive-gray alluvium from Mancos shale deposited over Mancos shale	Deep	High	None to slight	Difficult	Moderate	Largely in crops: alfalfa, corn, beans, sugar beets, small grains and some orchard fruits; native cover of greasewood, bassia, saltbrush, ryegrass and saltgrass
Mc	Mesa clay loam, 0 to 2% slopes	Lt-brn, pale-brn, and very pale brn; slightly hard; calcareous	Lt-brn to reddish-yellow clay loam; veined and mottled with white lime accumulation; slightly hard; blocky	Calcareous clay loam alluvium over porous gravelly and cobbly alluvium of mixed igneous and sedimentary rock origin, which rests on Mancos shale	Deep to moderately deep	Moderate to high	Slight	Easy	High	Largely in crops: alfalfa, corn, beans, small grains, and truck crops; native cover of shadscale, rabbitbrush, hopsage and some buffalograss
Mf	Mesa gravelly clay loam, 5 to 10% slopes	Lt-brn, calcarious	Very pale-brn to reddish-yellow gravelly and cobbly clay loam becoming white with lime, weakly cemented locally.	Calcareous clay loam alluvium over porous gravelly and cobbly alluvium of mixed igneous and sedimentary rock origin, which rests on Mancos shale	Deep to moderately deep	Moderate	High	Difficult	Moderate	Approximately 62% in crops: chiefly peaches, but some alfalfa, corn, beans, truck and garden crops; native cover of shadscale, rabbitbrush, hopsage, and some buffalograss
Me	Mesa gravelly clay loam, 2 to 5% slopes	Lt-brn; calcareous	Very pale-brn to reddish-yellow gravelly and cobbly clay loam becoming white with lime; weakly cemented locally	Calcareous clay loam alluvium over porous gravelly and cobbly alluvium of mixed igneous and sedimentary rock origin, which rests on Mancos shale	Deep to moderately deep	Moderate	Moderate	Moderate	Moderate	Largely in crops: peaches, alfalfa, corn, beans, small grains and truck crops; native cover of shadscale, rabbitbrush, hopsage and some buffalograss
Hb	Hinman clay loam, 0 to 2% slopes	Pale brn to lt brn; slightly hard; calcareous	Very pale brn to reddish-yellow heavy calcareous clay loam; hard; lime veined; medium blocky	Very pale brn to yellow calcareous gray clay loam; alluvium of mixed rock origin deep over porous gravel strata deposited on Mancos shale	Deep	High	None to Slight	Moderate	High	Largely in crops; alfalfa, red clover, corn, orchard fruits, pinto beans, small grains, and truck and garden crops
Na	Naples clay loam, 0 to 2% slopes	Lt brn; slightly hard; calcareous	Interstratified lt-brn loam to very pale-brn loamy fn sand; calcareous	Calcareous alluvium of sandstone origin	Deep	Low	None to Slight	Easy	High	Production of crops: alfalfa and small grains and corn
Ro	Riverwash, 0 to 2% slopes	Very pale brn sand, gravel and stone	Loose strata of cobblestones and stones	Sand, gravel, and cobblestone river alluvium of mixed rock origin	Variable	Very low	High because of flooding	Very difficult to impractical	Very low	Little used agriculturally; practically no crops; scattered growth of willows and cottonwood trees in places; source of building materials
Rr	Rough broken land, Mesa, Chipeta, and Persayo soil materials	Very pale brn; cobbly; calcareous	Absent	Very pale-brn, calcareous alluvium of mixed rock origin overlaying Mancos shale	Variable	Very low	Severe geologic erosion	Very impractical to impractical	Very low	Periodic grazing; native cover of saltbush, shadscale, rabbitbrush, hopsage, greasewood, ryegrass, and Indian wheatgrass
Gh	Green River clay loam deep over gravel, 0 to 2% slopes	Pale brn to lt brownish gray; slightly hard; calcareous	Pale brn to light brownish-gray clay loam; some mottling	Calcareous sandy alluvium of mixed rock origin over deep porous gravel strata	Deep	High	None to slight	Easy	Moderate	Practically all in crops: peaches, small grains, and truck crops; native cover of saltgrass, willows and greasewood
Gm	Green River very fine sandy loam, deep over gravel, 0 to 2% slopes	Pale brn to lt brownish gray; slightly hard; calcareous	Pale brn or lt brownish-gray very fine sandy loam that is mottled with lt brn with increased depth	Calcareous sandy alluvium of mixed rock origin over deep porous gravel strata	Deep	Moderate	None to slight	Easy	Moderate	More than 65% in crops: truck and garden crops, field crops, orchard crops, and small fruits; native cover of saltgrass, willows and greasewood
Nb	Naples fine sandy loam, 0 to 2% slopes	Lt brn, pale brn, or very pale brn; soft; calcareous	Lt brn, pale brn, or very pale brn interstratified loam to loamy fine sand and sandy loam;	Calcareous alluvium of sandstone origin	Deep	Moderate to low	None to slight	Easy	Moderate	Production of crops: alfalfa, beans, corn and truck and garden crops

TABLE 1

Source: Knobel, E.W.(USDA), R.K. Dansdill and M.L. Richardson (Co Agricultural Experiment Station). 1940. Soil Survey Grand Junction, CO. Series 1940, No. 19. Washington, D.C.: U.S. Government Printing Office.

basements. All have severe limitations for septic tank filter fields and sewage lagoons. The Green River series corrosivity is moderate to high for uncoated steel and low for concrete, which should be a consideration for building materials. All have severe limitations for camp areas due to high water tables or steep slopes. The Green River series
has moderate limitations for picnic areas, playgrounds, paths and trails due to high water table (Table 2).

Most of the Riverfront area proposed for recreational uses contains soils of the River floodplains. Special design for trails, picnic areas and playing fields will be necessary to compensate for the high water table.

Soils of the Recent Alluvial Fans and Local Stream Floodplains

The soils of the recent alluvial fans and local stream floodplains occupy gentle slopes just above and extending back from the recent floodplain of the Colorado River. Soils from this group included in the study area are: Naples fine sandy loam, 0 to 2% slopes (Nb); Naples clay loam, 0 to 2% slopes (Na); Billings silty clay loam, 0 to 2% slopes (Bc); Billings silty clay, 0 to 2% slopes (Ba); and Navajo silty clay, 0 to 2% slopes (Nc).

These soils formed on alluvium derived largely from Mancos shale and to a lesser extent from fine-grained sandstone rocks of the Mesaverde formation. They are in an intermediate position between the higher lying soils of the Mesas and the lowest lying soils of the floodplains. The soils are on a deep broad mantle of alluvial sediments that overlie Mancos shale. They have gentle slopes and are dominantly light gray to light brownish gray. They are of moderately fine to fine textured calcareous soils. Broad lower lying areas are often poorly drained and alkali due to irrigation (Knobel, Dansdill, Richardson, 1955) (Table 1).

The Billings soil series covers most of the area north of the River proposed for industrial/commercial redevelopment. High water table and clayey soils with poor traffic supporting capacity and high

RIVERFRONT STUDY AREA

DEGREE OF LIMITATION AND
MAJOR SOIL FEATURES AFFECTING SELECTED USE

Map Symbol	Soil	Local Roads and Streets	Shallow Excavations	Dwellings w/o Basements	Reservoir Area	Reservoir Embankment	Septic Tanks Filter Fields	Sewage Lagoons	Picnic Areas	Playgrounds	Trails	Suitability as a Resource Material: Topsoil	Sand	Gravel	Roadfill	Physical Properties: Depth to bedrock	Depth to high water table	Flood hazard
Ba	Billings silty clay, 0 to 2% slopes	Severe—poor traffic supporting capacity moderate to high water table common	Moderate—depth to water table	Moderate—high shrink swell potential; slow internal drainage; subject to water table	Low seepage; moderate to high water table	Low permeability; erosive; high shrink swell potential	Severe—slow permeability; high water table	Slight 1/	Severe—moderate to high water table; clayey surface	Severe—moderate to high water table; clayey surface texture	Moderate—moderate to high water table; clayey surface	Poor; high clay content	Unsuited	Unsuited	Poor; high shrink swell	>60"	<40"	None
Nc	Navajo silty clay, 0 to 2% slopes	Severe; poor support; water table	Moderate—depth to water table	Severe—floods; water table; high shrink swell	Water table	Susceptible to piping; high shrink swell	Severe—floods; water table	Severe—floods; water table	Moderate—floods; clayey surface	Moderate—floods; clayey surface	Moderate—floods; clayey surface	Poor—clayey surface	Unsuited	Unsuited	Poor—high shrink swell	>60"	20"	Common
Bc	Billings silty clay loam, 0 to 2% slopes	Severe—poor traffic supporting capacity; moderate to high water table common	Severe—depth to water table	Moderate—high shrink swell potential; slow internal drainage; subject to water table	Low seepage; moderate to high water table	Low permeability; erosive; high shrink swell potential	Severe—slow permeability; high water table	Slight 1/	Severe—moderate to high water table; clayey surface soil	Severe—moderate to high water table; clayey surface texture	Moderate—moderate to high water table; clayey surface	Poor—high clay content	Unsuited	Unsuited	Poor—high shrink swell	>60"	<20"	Rare
Mc	Mesa clay loam, 0 to 2% slopes	Moderate—moderate shrink swell	Moderate—gravelly below 40"	Moderate—moderate shrink swell	Rapid permeability below 40"	Low compressability	Slight 1/	Slight—severe if excavated below 40"	Moderate—clayey surface texture	Moderate—clayey surface texture	Moderate—clayey surface texture	Fair—clayey texture	Unsuited	Unsuited—poor below 40"	Poor—good below 40"	>60"	>60"	None
Mf	Mesa gravelly clay loam, 5 to 10% slopes	Slight	Slight	Slight	Rapid permeability	Moderate—cracks when dry	Slight 1/	Moderate—moderate permeability	Moderate—clayey surface; stone content	Moderate—clayey surface; stone content	Moderate—clayey surface	Fair—clayey texture; small stones	Unsuited	Poor	Fair—small stones	>60"	>60"	None
Me	Mesa gravelly clay loam, 2 to 5% slopes	Slight	Slight	Slight	Rapid permeability	Low compressability; rapid permeability	Slight 1/	Moderate—moderate permeability	Moderate—stone content	Moderate—stone content	Slight	Poor—small stones	Unsuited	Poor—clayey texture	Good	>60"	>60"	None
Na	Naples clay loam, 0 to 2% slopes (fans and stream floodplains)	Severe—floods	Slight	Severe—floods	Rapid permeability	Low compressability	Severe—floods	Severe—flooding; rapid permeability	Moderate—clayey surface; floods	Moderate—clayey surface; floods	Moderate—clayey surface	Fair—clayey surface	Poor	Poor	Good	>60"	40"	Common
Ro	Riverwash 0 to 2% slopes	Severe—high water table; floods	Severe—high water table; banks slump	Severe—high water table; floods	Severe—floods; high seepage	Rapid permeability	Severe 1/ high water table; floods	Severe 1/ high water table; floods	Severe—high water table; floods	Severe—high water table; floods	Severe—floods; erosion hazard	Unsuited	Variable—generally good	Variable—generally good	Good	>60"	<10"	Common
Pr	Rough broken land, Mesa, Chipeta & Persayo soil materials	Severe— steep slope	Severe—steep slope; depth to shale	Severe—steep slope	Severe—steep slope	Severe—steep slope	2/	Severe—steep slope	Severe—steep slope; erosion hazard	Severe—steep slope; erosion hazard	Moderate—steep slope; erosion hazard	Unsuited	2/	2/	Poor—steep slopes	2/	>60"	Rare
Gh	Green River clay loam, deep over gravel, 0 to 2% slopes	Severe—moderately high water table; poor traffic supporting capacity, subject to frost heave	Moderate—moderately high water table, moderate shrink swell potential	Moderate—moderately high water table; moderate shrink swell potential	High seepage potential	Moderate permeability; moderate shrink swell	Severe—seasonal high water table	Severe—rapid permeability below 24" moderately high water table	Moderate—moderately high water table; clayey surface	Moderate—moderately high water table; clayey surface	Moderate—moderately high water table; clayey surface	Fair—moderate clay content	Fair: good below 4'	Fair—good below 4'	Fair—good below 4'	>60"	<20"	Common
Gl	Green River very fine sandy loam, deep over gravel, 0 to 2% slopes	Severe—moderately high water table; poor traffic supporting capacity; subject to frost heave	Severe—moderately high water table; low soil cohesion; subject to slump and caving	Severe—flooding; high water table	High seepage; high water table	Moderate permeability; erosive	Severe—seasonal high water table; flooding	Severe—rapid permeability; water table flooding	Moderate—water table; floods	Moderate—water table; floods	Moderate—water table	Good to 30"	Fair: below 4'	Fair below 4'	Fair below 4'	>60"	<20"	Common
Nb	Naples fine sandy loam, 0 to 2% slopes (fans & stream floodplains)	Severe—floods	Slight	Severe—floods	Rapid permeability	Susceptible to piping	Severe—floods	Severe—floods; rapid permeability	Moderate—floods	Moderate—floods	Slight	Good	Fair	Poor	Good	>60"	40"	Common

TABLE 2

Source: Knobel, E.W.(USDA), R.K. Dansdill and M.L. Richardson (CO Agricultural Experiment Station). 1940. Soil Survey Grand Junction, CO. Series 1940, No. 19. Washington, D.C.: U.S. Government Printing Office.

NOTES: 1/ May cause pollution of ground water
2/ Highly variable, requiring on-site investigation

shrink/swell potential create special concerns for road and building construction. The soils are very corrosive to uncoated steel; a consideration for building materials. All construction must be properly engineered to withstand the adverse soil conditions (Table 2).

Mesa Soils

The soils of the mesas in the study area occur on Orchard Mesa on the south side of the River. The soil types include: Mesa clay loam, 0 to 2% slopes (Mc); Hinman clay loam, 0 to 2% slopes (Hb); Mesa gravelly clay loam, 2 to 5% slopes (Me); Mesa gravelly clay loam, 5 to 10% slopes (Mf).

These soils occupy relatively high positions and have weathered a long time. The surface soils and subsoils range from very pale brown to light reddish brown. When moist, the soils are redder. These highly calcareous soils have moderate to strong accumulations of lime in the subsoil. Salinity is usually not a problem. These soils are well suited for orchard crops (Knobel, Dansdill, Richardson, 1955) (Table 1).

The Mesa soils have fewer limitations than the others, having less clay content and not being prone to high water table or flooding (Table 2).

EROSION AND MASS MOVEMENT HAZARDS

Soils with high sensitivity to water erosion are generally the fine-textured soils (clay loam, clay and silty clays) occurring on slopes greater than 15%. The majority of the study area has slopes of 0 to 2%; therefore, erosion potential is very low. There is, however, a high erosion potential on the steep bluffs south of the River.

Man's activities can influence the rate and extent of erosion. Therefore, the process can be reduced and controlled by surface drainage management, revegetation of disturbed lands, controlling stream carried-eroded material in catchment basins, and riprapping of erosion-prone stream banks. Riprapping will be necessary to protect any riverbank development such as trails and other developed recreation sites (Shelton and Prouty, 1979).

Much of Orchard Mesa south of the River has been identified as a slump and creep area. Soil creep is common on steep slopes with a thin soil cover over bedrock. It can be an indicator of more serious failures in the future, especially if the area is disturbed. Even though the Riverfront study area is on the north bank, activities there can affect the south bank (Figure 9).

Of major concern is a rotational landslide identified by the Colorado State Geologist in the Lamplight Park Subdivision. The slide is located on the south bluffs across from Watson Island. Several houses on the bluff have already been condemned due to cracking foundations and settling. Activities on the north bank that force the River towards the south bank may result in further excavation of the toe of the slide, accelerating its rate of movement.

URANIUM MILL TAILINGS

In 1951, Climax Uranium Company began milling uranium ore in Grand Junction to produce yellowcake for sale exclusively to the federal government. The mill, located at the east edge of the study area, was shut down in 1970 (Figure 7). Approximately 1.9 million tons of uranium mill tailings were left exposed to the environment in a large pile covering about 57 acres. These tailings were also used in foundations and for fill material throughout the City, including extensive use in the Riverfront area.

The Colorado State Health Department has determined that long term exposure to the resulting levels of radiation may be hazardous to human health. The Department of Energy (DOE) has been authorized to clean up the pile site as well as contaminated vicinity properties. New development is prohibited without a radon survey and subsequent cleanup, if necessary, prior to any construction.

GRAVEL RESOURCES

Mesa County's Mineral Extraction Policy #29 (Mesa County, 1985) recognizes the importance of mineral resources to the County and the affects extraction can have on surrounding development. Applicants

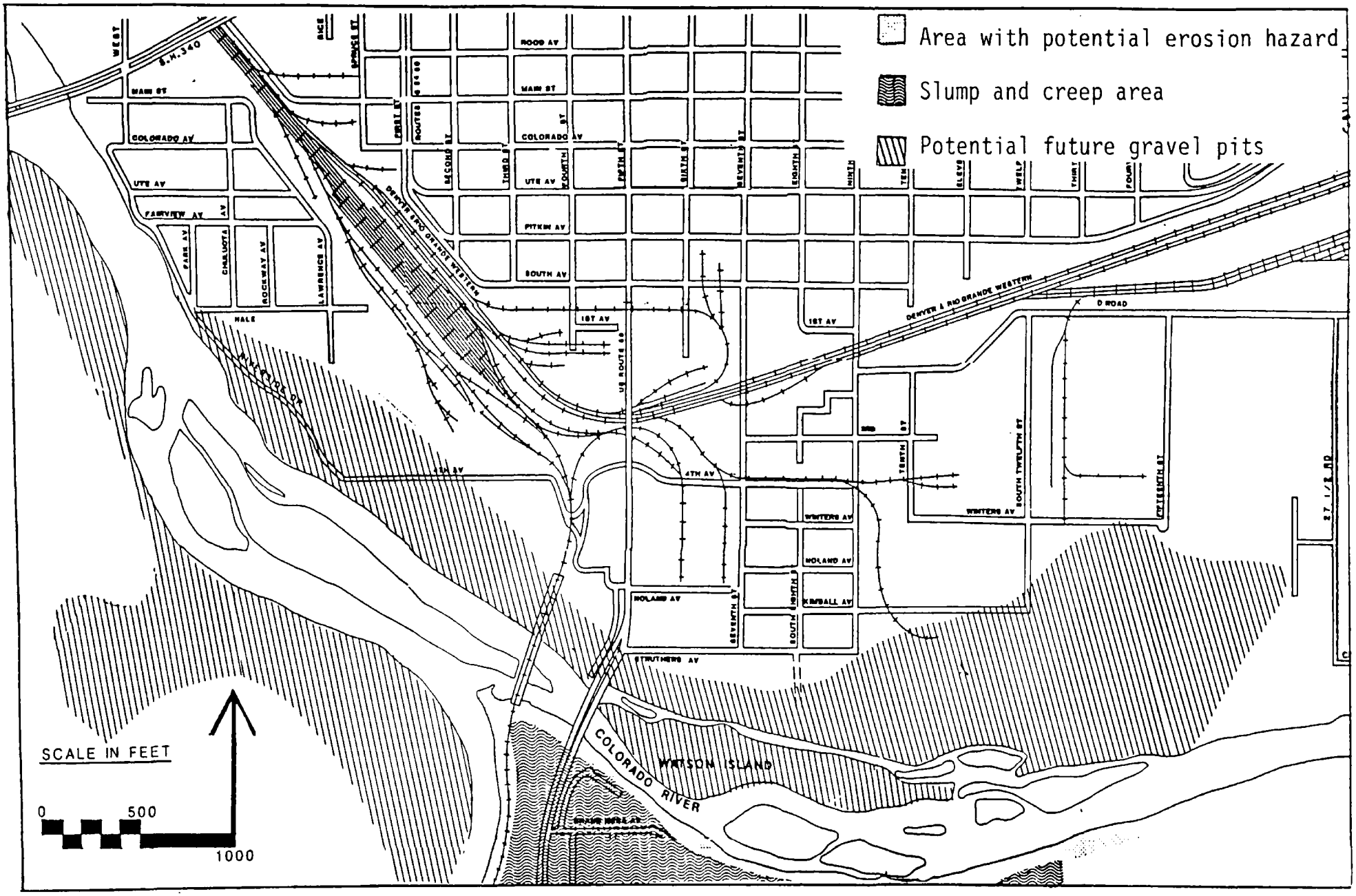

FIGURE 9--Geologic Hazards and Gravel Deposits

Source: "Colorado River Corridor Inventory"
Mesa County Planning

must prove that a proposed development will not interfere with mineral extraction. "Land development within a mineral resource boundary must be restricted for the duration necessary to remove a resource or to mitigate potential impacts that will affect future extraction." Access to commercially valuable mineral deposits is also protected.

The City has a similar policy to protect natural resources, especially mineral resources (Grand Junction Zoning and Development Code 5-4-8). If development is proposed in an area of known mineral deposits, the developer must provide an estimate of the economic value prepared by a registered engineer prior to approval of development. If the City Council determines removal of the resource is economically feasible, development approval may be delayed until extraction has been accomplished or protection provided within the design of the development.

The alluvial deposits within the Colorado River's 100 year floodplain have the potential for future gravel pits (Figure 9). Any redevelopment of the study area will have to consider the economic potential of the gravel resource.

BIOLOGICAL RESOURCES

Riparian

Riparian vegetation occurs along the Colorado and Gunnison Rivers, and occasionally extends as a narrow band into the small streams that drain into the Rivers. Agriculture and urban activities have reduced the extent of this vegetation type and modified the structure and species composition. Today, riparian forests of various age and with a variable shrub and herbaceous composition occur on the floodplain, islands, and old oxbows of the Colorado and Gunnison Rivers. Plains cottonwood and Rio Grande cottonwoods, the dominant species, often are associated with various shrubby species. These shrub species colonize recently disturbed sites and occur as under-story species, along with numerous weedy forbs and grasses.

Aquatic habitats support waterfowl, wading birds, and migratory shorebirds, as well as fish and leopard frogs. The Colorado and

Gunnison Rivers attract breeding, wintering, and migrating waterfowl. Wintering bald eagles hunt along the Rivers, feeding on fish, waterfowl, and carrion. Other aquatic waterfowl include Mallard ducks, Canada geese, and rarer species such as black-crowned night heron, great blue heron, sandhill cranes, white-faced ibis, and double-crested cormorant (U.S. Dept. of the Interior, Bureau of Reclamation, 1976).

Almost all of the study area proposed for recreational uses has been identified as a major riparian, aquatic, and waterfowl habitat. However, most of the area has been disturbed by urban activities. In 1974 the Soil Conservation Service (SCS), in cooperation with the Colorado Division of Wildlife (DOW), conducted a biological inventory of the River corridor. The plant list includes: Trees--Cottonwood, Willow, Tamarisk, Russian Olive, and Elm; Shrubs--Tall Rabbitbrush, Skunkbush, and Greasewood; Forbs--Aster, Bindweed, Field or European Sunflower, Mustard, Salisfy, Wild Lettuce, Russian Thistle, Kochea, Dock, Arrowgrass, Asparagus, Cocklebur, and Cattail; Grasses, Cheatgrass, Basin Wildrye, Indian Ricegrass, Sand Dropseed, Inland Saltgrass, Sandlove grass, Foxtail, Sedges, Slender Wheatgrass, Reedgrass, and Barnyard grass (Table 3).

Typical birds in riparian habitats include raptors such as golden eagles, sharp-shinned and Cooper's hawks, red-tailed hawks, American kestrels, western screech owls, great horned owls, and long-eared owls; and a wide variety of small birds. A complete listing of birds observed in the study area follows on Table 4.

The structural and compositional diversity of the cottonwoods and tall shrubs of the riparian area affords cover, nesting sites, and feeding sites for a variety of mammals. These areas are used by mule deer, small predators such as gray fox, striped skunks, spotted skunks, and raccoons, and rodents such as rock squirrels, golden-mantled ground squirrels, least chipmunks, and deer mice (U.S. Dept. of Interior, Bureau of Reclamation, 1976).

COLORADO RIVER
RIPARIAN RIVERBOTTOM
PLANT LIST

TREES

Cottonwood
Willow
Tamarisk
Russian Olive
Elm

SHRUBS

Tall Rabbitbrush
Skunkbush
Greasewood

FORBS

Aster
Bindweed
Field or European Sunflower
Mustard
Salisfy
Wild Lettuce
Russian Thistle
Kochia
Dock
Arrowgrass
Asparagus
Cocklebur
Cattail

GRASSES

Cheatgrass
Basin Wildrye
Indian Ricegrass
Sand Dropseed
Inland Saltgrass
Sandlove grass
Foxtail
Sedges
Slender Wheatgrass
Reedgrass
Barnyard grass

TABLE 3

Source: U.S. Soil Conservation Service and Colorado Division of Wildlife.

COLORADO RIVER BIRD CHECKLIST

Pied-billed Grebe
Western Grebe
Eared Grebe

White PELICAN

Great Blue HERON
Snowy Egret
Black-crowned Night Heron

Canada GOOSE

DUCKS
Mallard
American Widgeon
Cm. Merganser
Gadwall
Pintail
Green winged Teal
Blue-winged Teal
Cinnamon Teal
Shoveler
Redhead
Ring necked Duck
Canvasback
Lesser Scaup
Cm. Goldeneye
Bufflehead
Ruddy Duck
Hooded Merganser

Turkey Vulture
Red-tailed HAWK
Sparrow Hawk
Cooper's Hawk
Bald EAGLE
Golden Eagle
Marsh Hawk
Osprey
American COOT

SHOREBIRDS
Killdeer
Common Snipe
Spotted Sandpiper
Greater Yellowlegs
Lesser Yellowlegs
Baird's Sandpiper
Least Sandpiper
Long-billed Dowitcher
Semi-palmated Sandpiper
Western Sandpiper
Sanderling
American Avocet
Wilson's Phalarope

Ring-billed GULL
Franklin's Gull
Forster's Tern

Rock DOVE
Mourning Dove

Screech OWL
Great Horned Owl

NIGHTHAWKS AND SWIFTS
(2 species)

HUMMINGBIRDS (2 species)

Belted KINGFISHER

WOODPECKERS (3 species)

FLYCATCHERS (4 species)

Horned LARK

SWALLOWS (6 species)
JAYS, MAGPIES, CROWS (5 species)

NUTHATCHES, CREEPERS
(4 species)

WRENS (3 species)

MOCKINGBIRDS AND CATBIRDS
(2 species)

THRUSHES AND BLUEBIRDS
(2 species)

GNATCATCHERS AND KINGLETS
(2 species)

PIPITS AND WAXWINGS
(2 species)

SHRIKES, STARLINGS
(2 species)

Warbling VIREO

WARBLERS (9 species)

House Sparrow

MEADOWLARKS, BLACKBIRDS,
ORIOLES (5 species)

TANAGERS, GROSBEAKS
(4 species)

BUNTINGS, FINCHES, TOWHEES
(7 species)

SPARROWS
(12 species)

TABLE 4

Source: Colorado Division of Wildlife and the Western Colorado Audubon Society, 1974.

The Colorado River supports three species of fish which are of special concern: the razorback sucker, bonytail chub, and Colorado squawfish, which are all endangered species.

LAND USE

Existing General Uses

South of the Colorado River, below the confluence, the land use is predominantly residential and cultivated lands. Orchard Mesa, between the Colorado and Gunnison Rivers, is predominantly residential, with scattered commercial nodes and industrial uses along the Gunnison River. The east half of Orchard Mesa is predominantly cultivated lands in orchards.

The Grand Junction area just north of the Colorado River has industrial uses, including junkyards, railyards and several heavy industrial uses. There are residential nodes at Riverside and north of Struthers Avenue, as well as scattered residences throughout the industrial area (Figure 10).

Existing Businesses and Landowners

Most of the property south of Struthers Avenue east of the 5th Street bridge is owned by Frank Dunn and Tom Lewis (Figure 10). Dunn leases his property as an auto salvage yard. Lewis' property along Struthers Avenue has rental housing. His land closer to the River, including Watson Island, is used as an auto graveyard.

North of Struthers Avenue is a mix of landowners and businesses. Along 5th Street is Van Gundy's AMPCO car crushing and salvage yard operation. East of Van Gundy's is property leased by McKesson Chemical Company. Dunn also owns property north of Struthers bordered by Elam Construction. The County Road Department covers several blocks on 9th Street. There are other small businesses interspersed with residential uses.

The majority of the property west of the 5th Street bridge is owned by Bill Jarvis who operates American Auto Salvage, a very large auto salvage yard. Other businesses include asphalt plants and Layton Drum, a recycling operation.

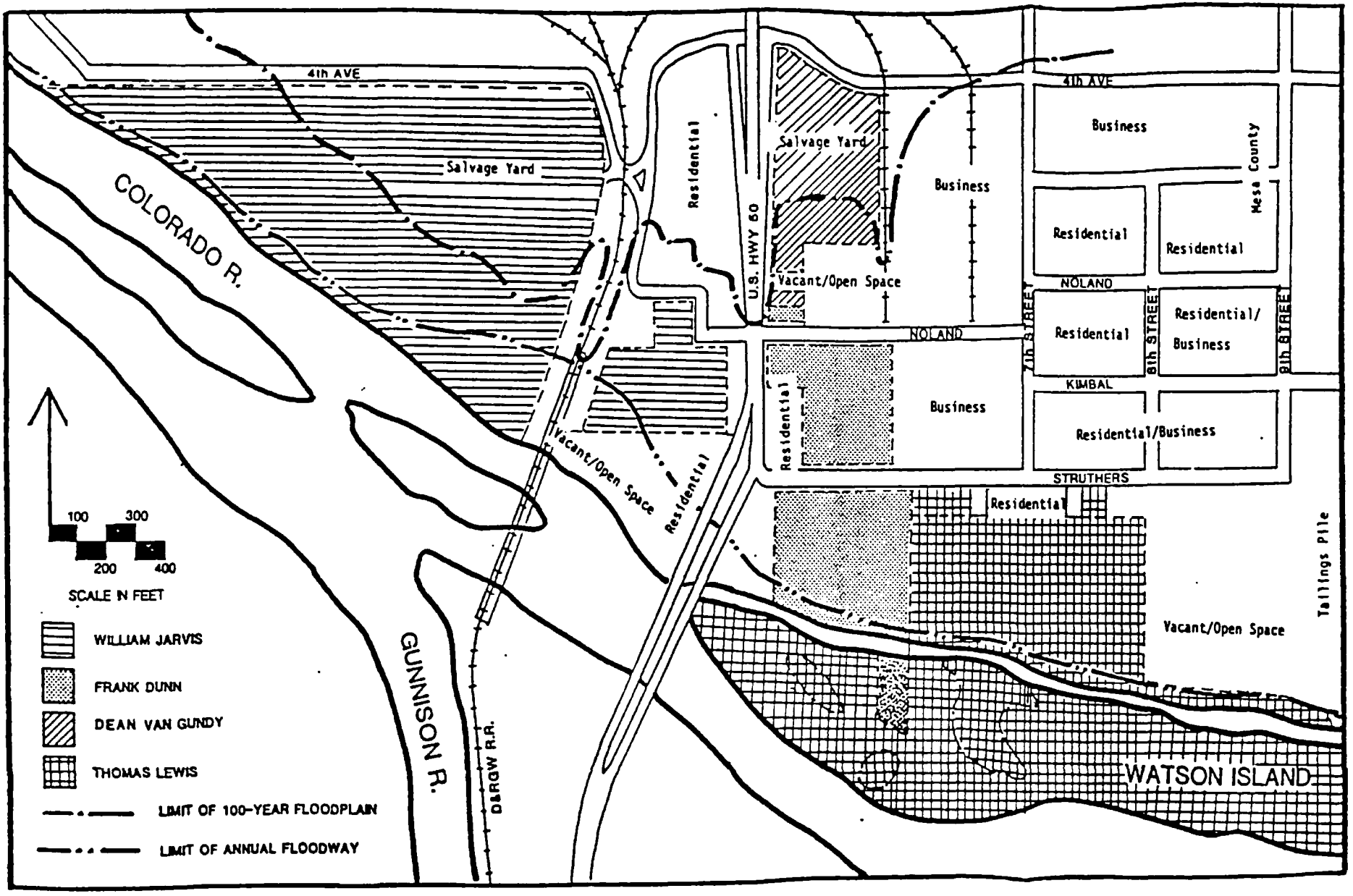

FIGURE 10 --Major Landowners and General Land Uses in the Riverfront Area

ZONING

Existing

Orchard Mesa, between the two Rivers, is zoned low and medium density residential with some commercial and business zoning along HWY 50 and industrial zoning along the Gunnison River.

North of the Colorado River is a major industrial zone for the City. The houses in that area are nonconforming uses which prohibits any similar redevelopment or expansion. Likewise, the existing salvage yards in the area are also nonconforming uses. Under new regulations, salvage yards are prohibited in the floodplain and must meet conditional use requirements for screening; therefore, expansion of the existing junkyards would not be allowed. These nonconforming uses have been "grandfathered" into this area.

Proposed

Any areas remaining in the floodplain should be zoned as open space/recreational. Land behind the proposed dike will remain in industrial zoning. As redevelopment of the industrial area occurs, the City should recommend Planned Industrial and Commercial zones be used.

PUBLIC ACCESS

There is currently no public access on this stretch of the River.

SUMMARY

The river corridor inventory is a necessary base study for the revitalization of the Grand Junction Riverfront. The inventory identifies constraints and opportunities for development. It will provide the basis for design and decision-making.

CHAPTER III

RELATED PROJECTS AND AGENCIES

A major ingredient in the future success of the Grand Junction Riverfront Project will be the coordination between all the groups and entities involved. There are several other major projects going on in the Valley which could work to the benefit of the River revitalization. The community needs to take advantage of those projects to use the money and work being done to everyone's advantage.

FEDERAL AGENCIES

Department of Energy

In 1951, Climax Uranium Company began milling uranium ore in Grand Junction to produce yellowcake for sale exclusively to the federal government. The mill located in the eastern edge of the Riverfront study area (Figure 7), was shut down in 1970. Approximately 1.9 million tons of uranium mill tailings were left exposed to the environment in a large pile covering about 57 acres.

The U.S. Congress has authorized the Department of Energy to clean up the Grand Junction site, along with 23 others nationwide, as part of its Uranium Mill Tailings Remedial Action (UMTRA) Program. This includes a program of assessment and remedial action at the sites.

The purpose of remedial action is to stabilize and control the tailings and other residual radioactive materials located on the inactive uranium processing sites in a safe and environmentally sound manner and to minimize or eliminate potential radiation health hazards (Colorado Department of Health, Feb. 1987). Commercial and residential properties in the vicinity of designated processing sites (vicinity properties) which are contaminated with material from the sites are also eligible for remedial action.

There are three separate tailings projects in Grand Junction. Almost completed is the Grand Junction Remedial Action Program (GJRAP) which was handled by the State Health Department. By the Fall of

1987, approximately 600 residential sites will have been cleaned up through this program. It has concentrated on abating high levels of radon gas detected within residences due to tailings deposits in fill or foundations.

Clean up of individual properties, other than those in the GJRAP, is now being conducted under the auspices of the UMTRA Project vicinity properties program. DOE estimates that approximately 4000 properties will qualify for remedial action. The vicinity properties process consists of a radiological assessment of land and structures thought to contain uranium mill tailings, the design of an individual clean up plan, and the performance of remedial action.

The final EIS on the mill site tailings pile removal was released in February 1987. This project will involve relocating and stabilization of 1.8 million cubic yards of uranium mill tailings as well as reclamation of the mill site. All work must be completed by 1992. The total costs of the projects will be in the 100's of millions of dollars, funded 90% by the federal government and 10% by the State.

The DOE clean up is a major impetus for the Riverfront Project. The City sees a unique opportunity to coordinate efforts with the DOE to accomplish the entire clean up effort.

The City has been involved in the EIS commenting process on the pile removal. The site is located at the eastern edge of the study area, and includes the 40 acre State repository and the 100 acre mill site. DOE has indicated that the site will be reclaimed in accordance with local Riverfront plans. The 100 acre mill site will be acquired by the State and, along with the 40 acre repository, will probably be turned over to the City at the completion of the project.

The original plan for the millsite recommended it be reclaimed to a natural state. The clean up would require the removal of up to 10 feet below grade of contaminated material. The City proposed the excavations be left as natural lakes. However, that may not be possible because of the potential high level of contamination in the ground water.

In the reclamation, the DOE will have to provide some kind of flood protection for the site. The City is now asking that flood protection be permanent, leaving the mill site out of the floodplain and developable. The reclamation should also include clean fill, river edge tree planting, a pedestrian trail, reseeding, and landscaping. This will provide the community with another link for the greenbelt as well as a large parcel of land to be sold for industrial redevelopment.

The vicinity properties clean up also has potential for assisting in the Riverfront Park development. The DOE has identified all of the study area to have some level of tailings contamination. Tailings were used as fill in the Riverfront properties, as well as being windblown from the pile. Detailed radiological surveys to determine the extent of contamination will be completed by the Spring of 1988. Engineering work will begin in the Summer of 1988 and actual construction (removal) will begin in the Fall of 1989.

The DOE and their contractors, UNC, have agreed to work with the community on the overall clean up. They are obliged to return properties to their original state. That means, with the junkyards, clean up would involve relocating junk cars, removing the tailings on the ground, washing the cars if wind blown tailings are present, and returning the cars to their original position. However, if at the time the engineering work begins, the City has acquired the junkyards or has an agreement with owners to relocate permanently, DOE can save money by removing the junk cars completely or relocating the businesses only once. The community would benefit by the total clean up of the Riverfront and the DOE would save money in the process. This is a unique opportunity for the local and federal governments to work together to everyone's advantage.

Corps of Engineers

For the redevelopment of the industrial area to occur, properties north of Struthers Avenue must be flood protected. The City has requested assistance from the Corps of Engineers. The Corps' section

205, Small Flood Control, provides for local protection from flooding by the construction or improvement of flood control work such as levees, channels, and dams. Non-structural alternatives are also considered and may include measures such as installation of flood warning systems, raising and/or flood proofing of structures, and relocation of flood prone facilities. In addition, up to 10% of flood control costs can be allocated for recreational improvement and development (Corps of Engineers, 1986)

There are 5 stages of a 205 study:

1. Request for Assistance (letter to the district office).
2. Initial Appraisal Study--to see if further study is warranted. This takes 1 to 2 months and is funded by the Corps.
3. Reconnaissance Study--a planning step to identify specific problems and opportunities, evaluate preliminary cost estimates and environmental impacts, and assess local support. This takes 6 to 12 months and is funded entirely by the Corps.
4. Detailed Project Study--confirms tentative recommendations of the Reconnaissance Study through development of detailed engineering, economic, environmental, and design criteria. This takes 9 to 18 months and a 50% match is required from the local entity.
5. Plans and Specifications and Construction--plans and specification preparation takes 1 to 3 months. The actual construction may take 1 to 2 construction seasons and involves cost-sharing by the local sponsor of not more than 50% and usually about 25%. 5% of the cost-share must be upfront cash. The rest of the required match can be the acquisition of lands, easements, right-of-ways, relocations and other in-kind services. The match must be non-federal money (Corps report).

A Reconnaissance Report "Colorado River Flood Problem--Grand Junction, Mesa County, Colorado", was completed in 1979. The preliminary study showed a need for diking on the north bank, just east of the 5th Street bridge and along the Riverside area. On the south bank, diking was suggested to protect the Rosevale area (Figure 11). The study resulted in a benefit-cost ratio of about 1.2 to 1. It was determined there would be no serious environmental impacts. It was concluded that the potential for developing an economically and environmentally acceptable plan to solve the flood problem appeared favorable and warranted further investigation.

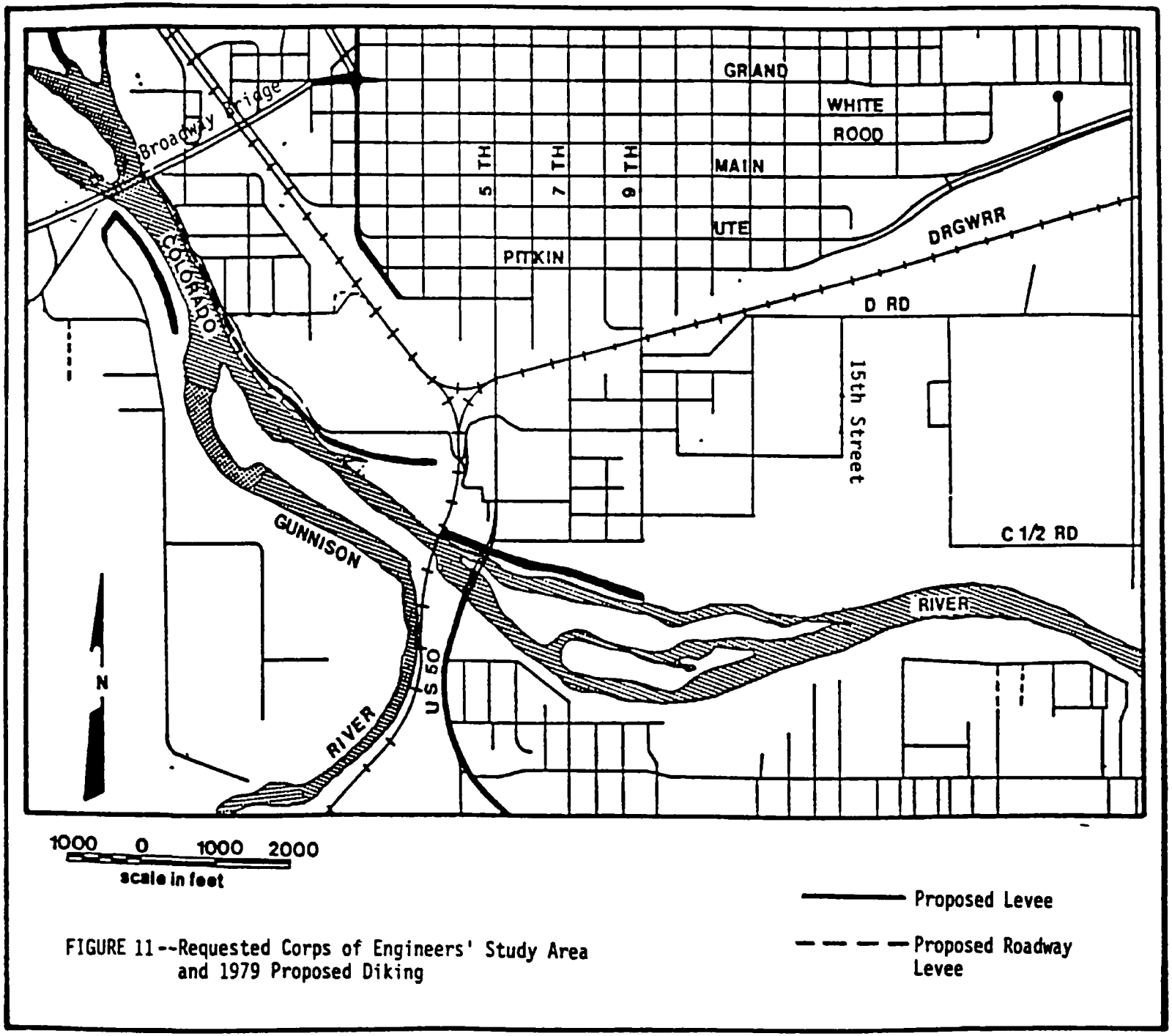

FIGURE 11--Requested Corps of Engineers' Study Area and 1979 Proposed Diking

The study was terminated after the Reconnaissance phase at which point local money was required to continue. The City based their decision not to continue on the local cost share estimate of $1.6 million and the federal share of $670,000. However, the City's share should have only been 50% of the total cost of the project.

The City has requested the study be reopened. Because of the unavailability of resources to finance all of the suggested construction in the 1979 study, the City has asked the Corps to target the north bank of the River from 15th Street west to the 5th Street railroad bridge (Figure 11). Costs would be further reduced by the dike being set back from the River to Struthers Avenue.

Bureau of Reclamation

The Colorado River Basin Salinity Control Act of 1974 (Public Law 93-320) provides for lining or placing in pipe irrigation canals and laterals to reduce seepage and consequently the amount of water that moves through the saline substrata and picks up salt. The purpose of the Grand Valley Unit of the Colorado River Basin Salinity Control Project is to decrease salt loading to the Colorado River. Major impacts of the project include reduction of salinity in the Colorado River, improving the efficiency of irrigation systems, and reducing wetlands associated with seepage from canals and laterals.

Public Law 98-569, October, 1984 amends Title II provisions and requires concurrent habitat replacement for the Grand Valley Salinity Control Project. The findings of the EIS--Stage 1 and 2 include:

> Wildlife measures, including acquisition of 2,090 acres of land along the Colorado River, would be included to compensate for wild life habitat losses that could be expected to result from the canal and lateral improvements for the entire Grand Valley Unit (Bureau of Reclamation, 1986 p. S-3).

The most obvious area for replacement wetlands acquisition is along the Colorado River. If the Bureau of Reclamation funding continues, portions of riparian habitat all along the River corridor could be purchased through the salinity program.

National Park Service

The National Park Service's State and Local River Conservation Assistance program offers technical assistance to local communities for the reclamation and revitalization of free-flowing streams. The Grand Junction Riverfront project has been approved and budgeted for this program.

A representative from the Denver office is available to assist the City in community consensus building for a Riverfront plan and in fund raising. This program encourages public meetings, surveys, fund raising, and the formation of an advisory committee and task forces.

Army Reserves

The local Reserve could provide community service that may benefit the proposed Riverfront project. The engineering unit in Grand Junction has 100 people available one weekend per month. They have the capability of building roads and bridges, as well as major earth moving and hauling. The unit has trained operators and a variety of heavy equipment, including dump trucks, dozers and loaders.

The Reserve could make a major contribution to the project, resulting in significant cost savings to the community. The City would pay only for materials and fuels.

STATE AGENCIES

Department of Local Affairs

Mesa County was selected to receive concentrated community development assistance through the Department of Local Affair's (DLA) Rural Community Assistance Program from May, 1986 through May, 1987. The Riverfront was one of the projects targeted. The program offered technical assistance from the DLA and interns. The City had interns prepare conceptual drawings for the future Riverfront plans as well as research junkyard removal/relocation and conduct a transportation study.

Division of Wildlife

The Division of Wildlife (DOW) has technical expertise to offer the Riverfront Project. Local staff will conduct a complete species

inventory of the study area and identify sensitive areas. The local Division can advise the City on potential funding sources available to their agency that may further the Riverfront project.

Enterprise Zone

A state Enterprise Zone is an area of Colorado designated by the State to receive special tax incentives to encourage businesses to expand and locate in order to create new jobs and investment in economically distressed regions. The program was created by the Colorado legislature as of July 1, 1986, and lasts until July 1, 1990 (Senate Bill 95-CRS 39-30).

The Riverfront study area, north of Struthers Avenue, is within a Mesa County designated Enterprise Zone. This will be another incentive to encourage redevelopment of the commercial/industrial area.

State Highways

The northbound 5th Street bridge is scheduled for replacement in 1988-89. This offers the opportunity to combine the State's work and resources with the Riverfront development.

The federal Highway Act of 1976 authorizes the use of federal aid highway funds for construction of bicycle and pedestrian facilities in conjunction with highway projects, and, within limits, for financing construction of bikeway facilities as independent projects. Assistance may include:

1. Cost of grading/drainage, paving, barriers and structures necessary for the facility.
2. Cost of supplementary facilities--shelters, parking, bicycle storage and comfort station.
3. Cost of traffic control devices including signs, signals, pavement markers.
4. Cost of fixed source lighting where appropriate.
5. Cost of curb cut-out ramps on new and existing facilities.
6. Cost of land acquisition and independent bikeway projects.
7. Cost of walks, barriers, and additional width and length on bridges.
8. Cost of bikeways and gradeway separation. (Mayer, 1978)

Future trail extension along the north bank of the River will require access under the 5th Street Bridges. The City has requested that a bench be provided under the north end of the bridge for a trail. A bikeway/walkway is also needed along the bridge, separated from motorized traffic. The State might also investigate the feasibility of a boat launch site near the reconstructed bridge.

LOCAL AGENCIES

Downtown Development Authority

The Downtown Development Authority (DDA) is an autonomous governmental body charged with the revitalization of downtown Grand Junction. The DDA currently services a 60 block area comprising the central core of the City. This downtown development district receives targeted attention from the DDA designed to stimulate growth and development. Created by downtown property owners and businesses in 1977, the Authority's efforts entail economic development planning, attracting developers, investors, and new businesses to the downtown, and packaging unique financing mechanisms.

The Riverfront study area is contiguous to the DDA's boundaries. Currently the Authority's southern boundary is South Avenue (Figure 12). They are considering annexing to the River, starting with the 5th and 7th Streets corridors. With the expansion into the Riverfront, the DDA could be instrumental in assisting in the commercial/industrial redevelopment. The DDA is also exploring the possibility of becoming a Redevelopment Authority. Among other powers, this would give them the power of condemnation of property that could then be used for private as well as public development.

PRIVATE ORGANIZATIONS

Colorado River Greenway Group

This is a newly formed, nonprofit organization dedicated to promoting hike/bike trails throughout Mesa County with a focus along the Colorado River. Their primary purpose is to encourage development and use of trails but not necessarily to manage the system.

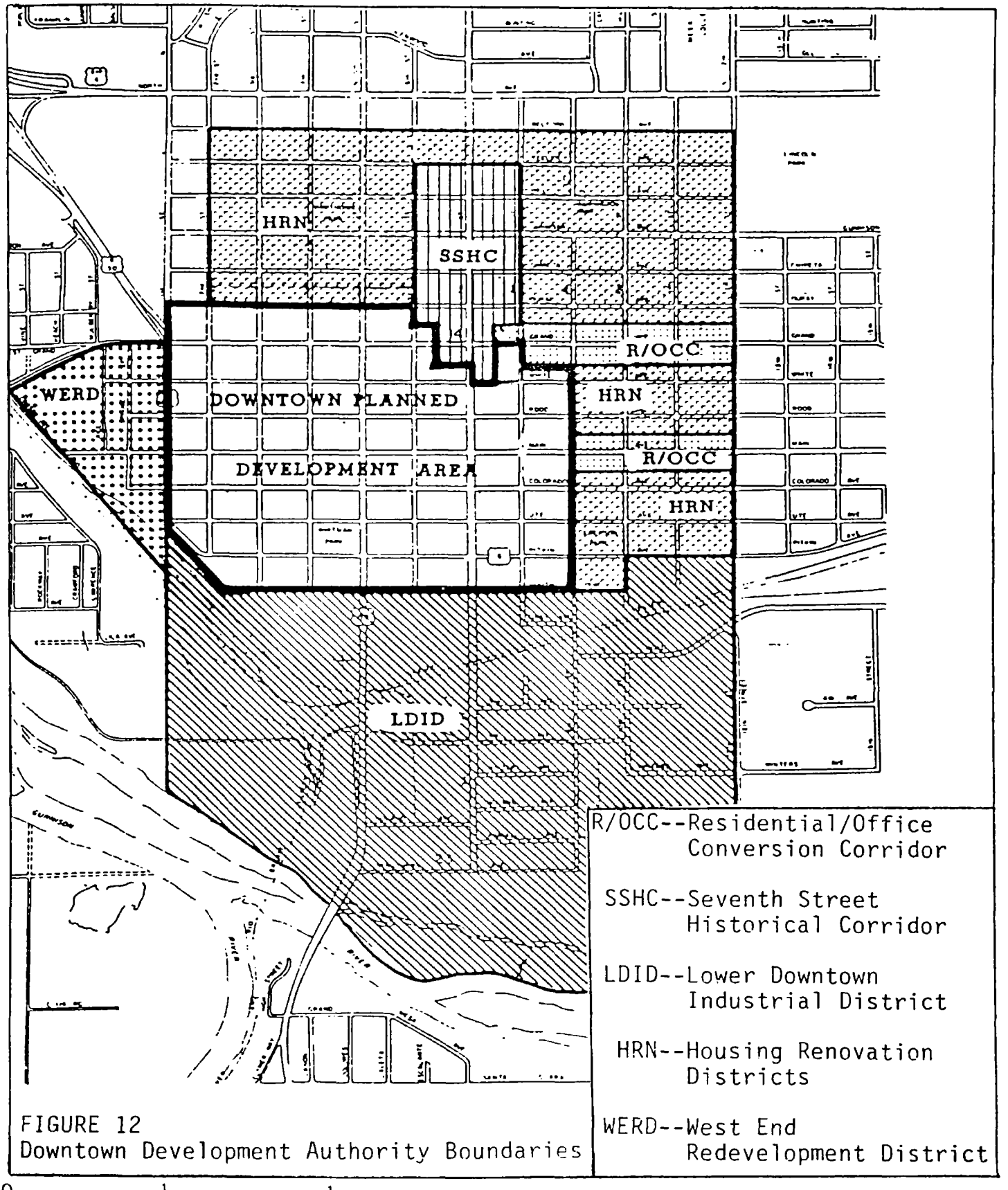

FIGURE 12
Downtown Development Authority Boundaries

The group originally formed as an offshoot of the local Audubon Society chapter to oversee the construction and management of the County's trail system. It has evolved into an activist group, and is not necessarily a management organization.

Trust for Public Land

The Trust for Public Land (TPL) is a national, nonprofit land conservation organization staffed by professionals in real estate negotiations, tax law and community organizing. TPL has worked with both public and private sectors in a wide variety of situations in order to arrange for the permanent protection of endangered natural areas and other important open space (Diehl, 1984).

TPL helped set up the Mesa County Land Conservancy primarily for agricultural land protection. The group has shown an interest in the River project. They are available to offer technical advice and to assist in land negotiations.

CHAPTER IV

THE PLANNING PROCESS

ROLE OF GOVERNMENT

According to the Zoning and Development Code "Grand Junction is authorized by law to regulate zoning, planning, subdivision of land, and building..." (Grand Junction Zoning and Development Code, sec. 1-2). It, therefore, follows that the City should play an integral role in any river revitalization and/or planning. In fact, all levels of government should be involved in this project.

Overall community development should occur within the framework of a local comprehensive plan and planning process. This process should include the private development community, public agencies and the general public. Adherence to a comprehensive plan is often required for public funding of projects (APA, 1986).

The purpose of a comprehensive plan is to identify community development goals and devise a coordinated program of public and private actions needed to achieve those goals. The plan should be officially adopted. It should guide formulation and amendment of land use regulations, coordination of public facility and infrastructure development, and coordination of private development decisions with community development objectives. Regulation should be consistent with the comprehensive plan and other tools devised for implementation.

Specific area plans, such as a river corridor plan, may supplement the comprehensive plan. An area plan should be consistent with the comprehensive plan and may include: text and maps of land uses, proposed capital facilities development standards, and standards for the conservation, development and utilization of natural resources. It may also include a program of implementation measures, including regulation programs, public works projects and necessary financing measures (Kunofsky and Jacobson, 1985).

Local government planning can create the catalyst necessary for development to occur. Regulatory processes for riverfront development

can be well lined out and streamlined for the developer (Wrenn, et. al., 1983). The City's capital programming should focus on infrastructure in the riverfront area, thereby, guiding development to the riverfront. Other public improvements might include boat ramps, access to the river and public amenities along the corridor such as trails, landscaping, and parks. A City's decision to locate public buildings and facilities on a waterfront also encourages private development (Wrenn, et. al., 1983). Many developers will not consider going into a major development project unless the city is demonstrably behind it. Further, some lenders consider local government willingness to back a project as one of the key factors in their risk assessment (Urban Land Institute, 1983).

Most river projects were started by governmental agencies and, later, turned over to private foundations. However, that initial spark and support was needed. A governmental entity can stimulate demand for private development by instituting recreational and cultural programs that will attract people to a waterfront location. Private development on waterfronts in Toronto and Baltimore probably would not have been successful if done before implementation of cultural programs. The negative images of the waterfronts had first to be overcome by attracting people there for positive, rewarding experiences (Wrenn, et. al., 1983).

The involvement of the planning department and elected officials also provides other benefits. There is an intricate network inherent in local government. Staff provides insight into the political arena. Professional staff working closely with elected officials has a good feel for how things work and what the political climate is in regard to specific issues. The staff also provides continuity as elected officials change.

Established departments may already have ties with other agencies and departments that may be involved in the project. These inside tracks are important when working within a bureaucracy. Public records and other information are readily available within the public

system. A means of information dissemination is well established as is the means of creating public forums.

Although the planner's role is important, it should be limited to that of central receiver and coordinator. The department should provide expertise and guidance to elected or appointed decision makers.

Part of that role is to prepare information from which choices can be made, present options and alternatives and support the ability of decision makers to make sound choices and understand the impacts and ramifications of one choice over another. The role is also to propose plans and policies, prepare programs and to recommend actions. Planners also act as program implementators and managers and are, therefore, concerned with budgets, ordinances and legislative guidelines (APA, 1986).

> Local governments must play a vital, specific role in sustaining and improving small-town economies. Only the local government can initiate zoning changes to accommodate appropriate development, seek public and private grants and loans for community infrastructure improvements, designate a local development corporation or authority, exercise a variety of financing powers to upgrade community facilities or aid business expansion--however, they should not work alone. (National Center for Small Communities, 1985, preface)

RIVERFRONT COMMISSION

The important element of success for river projects in other jurisdictions has been the public/private partnership. In many cases, the public sector may have initiated the project and offered technical assistance, but it was the private sector that really got the project off the ground and kept the momentum going. If the group or foundation formed is independent of local government, it can be a third party using funds from a number of different sources.

An advisory board or steering committee should be quasi-official, established by the mayor or other top official. This allows the committee to work within the bureaucracy without its debilitating procedures and restraints. It requires a diverse mix of people in touch with and sympathetic to the public's concerns, especially those closest to the river (Shoemaker, 1981). The committee should be chaired by an active "mover and shaker" who is politically sharp, able to work

with diverse elements and has connections with state and local governments.

The primary functions of an advisory committee are:

> --To provide direction to the river revitalization effort by assisting in decision-making.
> --To inform the groups that committee members represent about the progress of the effort.
>
> --To lend their skills to the effort, in the form of technical expertise, political support, financial assistance, or other voluntary contributions. (National Park Service).

Grand Junction also saw the need for a separate entity to oversee the riverfront project. The Grand Junction/Mesa County Riverfront Commission was formed to guide not only the 5th Street Bridge revitalization, but the redevelopment of the entire river corridor throughout the Valley. The members were appointed jointly by the City Council and County Commissioners. The Commission consists of a diverse group of community leaders with many areas of expertise. All have an interest in cleaning up the river corridor and are able and willing to invest time and energy to get things done.

A necessary outgrowth of a steering committee is a nongovernmental, tax exempt foundation to receive donations. The Riverfront Commission incorporated into the Grand Junction/Mesa County Riverfront Foundation. The Foundation's board of directors are the Commission members.

PLANNING PROCESS

> It is not the techniques used to preserve a landscape, but rather the process that one goes through to develop a strategy that is most important. The process is political. It must be sensitive to the land; to the people that own, use, and govern it; to the issues that relate to it; and to those programs and techniques available for preserving it. So in the end, it's not a matter of citizen participation in a governmental program, but governmental participation--assistance--in meeting the needs of citizens as the citizens perceive them. (Corbett, 1983, 80)

The basic essence of a planning process is to allow the community to decide what's best for them. Professional staff is there to guide and offer alternatives, but the plan belongs to the people.

Some type of plan is absolutely essential to guide the development of an urban waterfront. The plan can be whatever the community wants it to be, from a basic policy plan to detailed site designs. The best plans are specific enough to provide a framework for development yet flexible enough to respond to dynamic factors influencing project implementation (Wrenn, et. al., 1983).

There are varying philosophies as to the type of plan needed. The San Antonio River project revolved around a land use plan derived from a community comprehensive general plan. This resulted in planning districts' recommendations and a capital improvement program for development, both public and private. The plan was used to successfully "sell" the idea to private developers (New York State Department of Environmental Conservation, 1986).

On the other hand, the Platte River Committee did not spend alot of time on grandiose plans. A negative attitude had developed about plans that had been done in the past with no concrete results. Therefore, the committee felt compelled to come up with a project from which the largest number of people could benefit and have it built (Shoemaker, 1981)

A compromise between these two positions may be appropriate. A simple planning process can be followed for the entire river corridor while still proceeding with specific projects.

The National Park Service's State and Local River Conservation Program follows a basic planning process in assisting communities with river corridor plans. The process includes six elements:

1. resources
2. issues
3. public involvement
4. goals
5. alternatives
6. actions

Figure 13 illustrates a flow chart for those steps.

Resource Inventory

An inventory of the existing natural, cultural and/or recreational resources facilitates well-informed decision-making. The values placed on resources are based upon people's perceptions and at

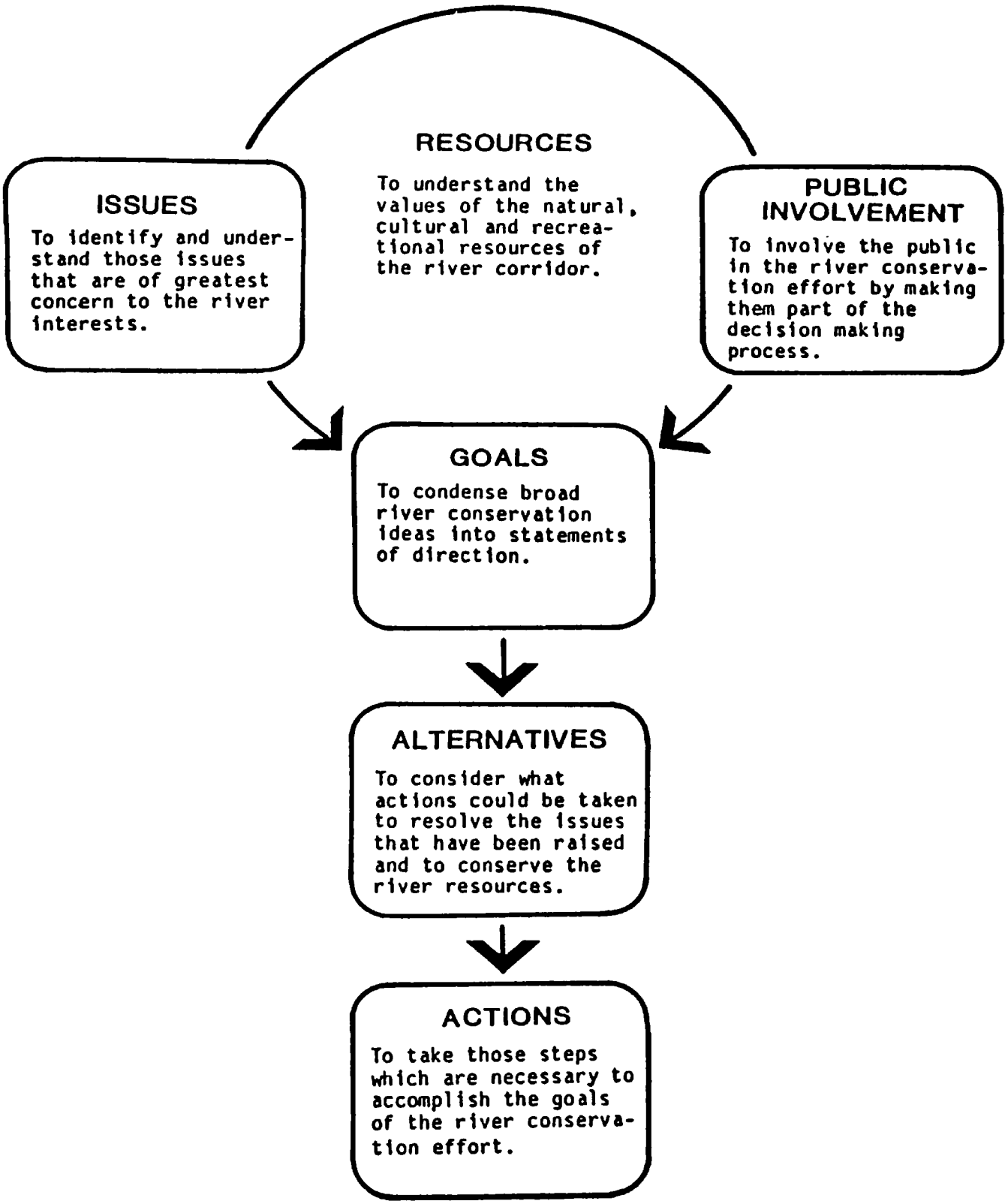

FIGURE 13

Source: U.S. Department of the Interior, National Park Service, "Riverwork Book", Mid-Atlantic Regional Office, Division of Park and Resource Planning, pg. viii

titudes, therefore, it's important to understand the river in the context of its community.

Information from the resource inventory should be used to evaluate constraints to growth and development in the planning area such as floodplains, critical wildlife habitats, high soil erosion potential, historical landmarks, scenic vistas, high ground water table, wetlands, and existing businesses (New York State Department of Environmental Conservation, 1986).

Issue Identification

Issues are those matters whose solutions are of public concern and which involve some difference of opinion as to how they should be resolved. Issues should be identified by involving as many people as possible and trying to understand their attitudes. Techniques may include brainstorming, key informant interviews and newspaper analysis. Related issues should be grouped together to construct the broadest set possible.

Issues then need to be analyzed to determine their elements, immediacy and causes and effects. They should then be prioritized.

Public Involvement

Perhaps the most important element of the planning process is public involvement. It is a means of building support and developing a constituency for your case. A strong support base can be built by involving as many community groups as possible and keying in on their special interests. Elected officials and community leaders should also be involved.

To be successful you need an attitude of open cooperation, flexibility and understanding for the varying points of view and interests. If the community relations process is ignored, an atmosphere of mistrust, hostility and confrontation may result in which no solutions are possible (Corbett, 1983).

People will react negatively to a decision they perceive as being made behind their back, even if they agree to the substance of the decision. They want to feel they've been involved in the process and

their concerns have been heard and addressed. It is especially important to involve opponents in the decision making process. An opponent who refuses to participate will lose credibility with the community. In addition, citizen support is a necessity to maintain funding in changing political climates. As long as the public is concerned, elected officials will be concerned also. This requires citizen participation and public education (Martin, 1986).

There are many techniques to elicit public participation. A typical public involvement strategy includes a series of meetings. There are many different types of meetings to serve a variety of purposes. Other techniques include surveys, personal interviews, media, newsletters, posters, and flyers. Information dissemination and hearing public issues and concerns are the main objectives.

Goals

A goal is defined as the end toward which effort is directed. Goals are a means of guiding you toward specific accomplishments and keeping you on track as you proceed. Issues identified earlier in the process can be transformed into positive goal statements.

The advisory committee should work with the community to develop goals. Goals should be brief, general statements establishing a direction for the plan. Such statements may be developed at public workshops to achieve maximum citizen involvement in the decision-making process.

Alternatives

Once all the data collection and fact finding has been completed, alternatives should be identified to achieve the stated goals. This provides a wide range of options to choose from in the decision making process. The alternatives should then be evaluated and the most appropriate actions chosen and prioritized.

Actions

Chosen actions should be given an agenda and a responsible group identified. Actions should be continually monitored to measure success or failure and the strategy modified accordingly.

SUMMARY

The Platte River Committee attributes its success to:

1. Being able to work outside the bureaucracy and get things done, but also understanding how the bureaucracy worked.
2. Being a diverse group acting as intermediaries between government and citizens.
3. Staying small and flexible.
4. Having no rigid, grandiose plan--rather, a well-thought-out concept plan.
5. Creating a series of demonstration projects.
6. Always allowing public participation.
7. Good timing with the fitness craze and energy crisis.
8. Seeing more than a utilitarian purpose for the river. Instead, seeing a cultural/recreational side--the river as an amenity. (Shoemaker, 1981)

Governmental involvement in the Riverfront Project is inevitable. All levels are currently involved in some way. To accomplish the goals, the City must take an active role. However, the Riverfront Commission and community also play a vital role. The formula for success is not in laws, policies, regulations and governmental programs--but the real elements are people, ideas and dedication. (Shoemaker, 1981).

CHAPTER V

LAND ACQUISITION AND CONTROL TECHNIQUES

The Riverfront Project includes two separate facets, amenity development and commercial/industrial redevelopment. To guide the revitalization, the City needs to look at various land control techniques including acquisition and planning procedures and regulations. What follows is a description of the many options available to a governmental entity. Some may be more appropriate for the greenbelt development, while others are innovative methods of encouraging private redevelopment.

FEE-SIMPLE ACQUISITION

The best method of controlling land for a public purpose is through fee-simple purchase. This is an outright purchase of land with all the development rights. It is the most desirable alternative, but, unfortunately, also the most unrealistic alternative for communities with limited budgets.

Condemnation

Condemnation or eminent domain is one method of fee-simple acquisition. A governmental entity may take land for a public purpose but is required to make just compensation. Public purpose may include parkland, flood protection and/or protection of wildlife and water supply (Kunofsky and Jacobson, 1985). The power of eminent domain can be a very useful tool for local governmental entities redeveloping a riverfront. Land prices tend to escalate when governmental interest is rumored. This power allows the entity to negotiate a "fair" price for the land. There are, however, negative aspects of condemnation. It tends to create poor public relations and, therefore, elected officials are reluctant to resort to this technique.

Quick-take by eminent domain is a mechanism that allows immediate public possession. Final disposition of the action is accomplished after the taking, either by negotiation or by court-determined compensation. This technique reduces the time needed to assemble and de

velop property. A redevelopment agency is able to negotiate an agreement with a developer and commit itself to a delivery date before assembly of land (Wrenn, et. al., 1983).

Urban Renewal Powers of a city or redevelopment agency may also be important to a massive redevelopment project. One very important aspect of urban renewal is that it allows condemnation and acquisition of properties that may be resold to private investors for development.

Land Banking

Land banking can be a useful acquisition technique. Local government may acquire and assemble land suitable for development and hold it until an appropriate user is identified. The drawbacks are it requires a large capital outlay and may not be well accepted politically. It may, however, be feasible for small scale acquisitions (Wrenn, et. al., 1983). This may be an appropriate technique in Grand Junction to take advantage of depressed land prices.

Another method of land banking is through purchase with retention of life interest. An agency or land trust pays for the property in advance with the provision that the property be turned over upon the death of the owner.

Land Exchange

Land exchange is a method of fee-simple acquisition without large capital outlays. Reorganizing land ownerships has been used successfully for river redevelopment projects in Boston, Toledo, and New Orleans (Wrenn, et. al., 1983). The land used for the exchange may be surplus governmental property, donated lands, or lands purchased at a low price. In the exchange, the entity acquires key properties for the riverfront development. At the same time, restrictions can be attached to the exchanged property to guide its development.

Donations

Donations of land is another possibility for governmental entities with a limited budget. Donations offer tax advantages to the donor. There are many variations on donations. A bargain sale is land obtained for less than fair market value. The seller receives cash

value plus a charitable contribution tax break for the price difference.

Donations with reserved life estate allows the owner to retain possession and use of the land for his or her lifetime and/or the life of the family members. This may allow a tax deduction for the owner during his or her lifetime.

A donation of undivided interest of land is one in which the owner shares interests or rights with a public entity. A donation in a will provides tax advantages to the heirs (Harris and Hepner, 1983).

Public entities might also look to tax delinquent properties for acquisition. Key properties may be acquired for back taxes to be used in future land exchanges or to sell or lease for additional income.

LESS THAN FEE-SIMPLE ACQUISITION OR CONTROL

Less than fee title is another alternative to outright purchase. An organization, individual, or government agency can pay money in exchange for certain rights or restrictions in the title of the landowner (Corbett, 1983).

Easements

Conservation easements are considered negative easements. They limits the landowner's right to construct new buildings or use the land in destructive ways. The amount paid for an easement is in proportion to the potential loss of income. Conservation easements may be appropriate along the rural River corridor.

An affirmative easement requires the private land owner to institute or allow certain activities to take place on the land. It may allow trails, access or other recreational uses on private land. It often includes language that names a responsible party or agency to provide clean up and maintenance (Corbett, 1983).

Trails easements may be an excellent alternative to outright acquisition of riverfront properties. It allows a public agency to acquire usage of a strip of land while allowing private development on the rest of the property. The cost is substantially reduced for acquisition and the private landowner realizes tax benefits.

Transfer of Development Rights

A modification of land rights acquisition is Transfer of Development Rights (TDR). With this, a landowner is allowed to sell "development rights or credits" assigned to his or her land by local government. Credits may be purchased and used by an owner of land in an area where local government is prepared to allow development at increased densities over what would otherwise be permitted (Kunofsky and Jacobson, 1985).

Some of the benefits of TDR are:

--It preserves land where development is undesirable.

--It compensates owner of such land with the sale of his rights.

--It reduces the impact community police power can have on landowners.

--There is minimal loss of revenue to the community. The total economic base doesn't change and tax revenues remain at same level.

--There is no loss of new development to the community. (Iervolino and Lane, 1981)

However, this technique depends on the demand for such development rights. It may not be applicable in a depressed economy such as Grand Junction's.

There are many other options for acquisition and/or land controls that are appropriate for financially strapped communities, including:

--Saleback/Leaseback--Governmental or land preservation group buys a property and sells or leases it back to the original owner or to another party with built in restrictions on development. The restrictions apply to any new owner.

--Lease Purchase--An agency or organization leases a parcel of land for a specified use with an option to buy at a later date at an agreed upon price. It is a method of tying up the land until funding is available to purchase.

--Options--Gives the group with the option the rights of first refusal for the purchase price. It is a useful tool to tie up properties until funding is located for acquisition. It "buys" time (Kunofsky and Jacobson, 1985).

ALTERNATIVES FOR URBAN RENEWAL

Urban renewal techniques may be appropriate for the redevelopment of the commercial/industrial area of the Riverfront. These are in-

novative options for a city or other development authority. Many of these options require investments by the local community to be paid back in the future through the success of the new development.

Land Writedowns

Land Writedowns are purchases of blighted properties by local government, clearance of dilapidated structures at public expense and resale of the land to private development interests. The incentive for redevelopment is that the land can be sold by the local government below the purchase price for land and improvements. This may provide leverage with the developer in providing amenities such as public access, open space and trails.

The payback to the community is in the amenities provided and the tax revenues generated by new development. Theoretically, these increased revenues should cover the public's investment expense (Wrenn, et. al., 1983).

Ground Leases

Ground Leases are another alternative for urban renewal. The local government purchases property for development and then leases it to private interests. It allows local government to encourage and control development. Lease agreements are usually for a base payment plus a percentage of income (Wrenn, et. al., 1983).

These urban renewal techniques could be very effective in the commercial/industrial redevelopment of the Colorado Riverfront. However, both a philosophical and financial commitment on the part of the City are required. The City may want to consider deferring these responsibilities to the Downtown Development Authority (DDA) or some other development entity.

LAND USE CONTROLS

Stream corridor regulations can be structured to protect the public interest. Regulations can require easements along the waterfront to ensure public access. Height and bulk controls can be designed to protect and enhance views of the river. Finally, regulations can en

sure appropriate uses will be developed in specific areas (Ince, 1987).

Subdivision Regulations

Subdivision regulations are an existing tool to fashion development in defined ways and by prescribed methods to regulate use of private land in the public interest. Subdivision regulations have become increasingly broadened to include timing of development, wetlands and floodplain protection, reservation of land for recreational use and dedication of open space and protection against environmental degradation (New York State Department of Environmental Conservation, 1986).

Zoning

Zoning may be a useful technique for river corridor conservation and redevelopment. The fundamental purpose of zoning is to protect the public interest. It is a tool to implement the community comprehensive plan. However, the traditional focus has been to encourage development to increase local tax bases.

Standard zoning is not sensitive to the environmental constraints of the land. It is uniformly applied with no regard for steep hillsides, scenic vistas, erosive sites or natural drainage (New York State Department of Environmental Conservation, 1986). Many areas are abandoning standard Euclidian zoning for the more innovative performance zoning.

Performance zoning is ideal for a river corridor because of its sensitivity to the environment. Environmentally oriented land-use regulations' goal is to maintain or preserve natural processes as land undergoes change for man's use.

Performance standards mandate the end result, not the means to get there. Specific standards of Euclidian zoning require the framers to think of every conceivable alternative. Performance standards allow innovation. Types of performance zoning includes: planned unit developments, floating zones, special use permits, market feasibility studies and industrial performance standards.

Environmental performance standards more accurately implement the goal of preserving natural processes. The emphasis is shifted from the particular uses of the land to the way the land functions or performs. Functions of the land which provide important public benefits are identified and regulations are designed to protect these functions (Thurow, et. al., 1977).

Environmental performance standards identify natural processes closely associated with public health, safety and welfare and provide benefits, i.e. runoff, erosion, groundwater infiltration, floods, droughts, water quality. Specific levels at which these functions should operate are established as the standards development must maintain. The developer can choose his or her own system of guaranteeing natural processes continue to operate.

Further, environmental performance standards are an attempt to preserve or maintain a performance of the land already there as opposed to performance standards for building codes of industrial zoning which attempt to create a performance level from man's use of the land. Environmental performance standards offer many advantages. They tend to encourage innovation to improve the compatibility of development with natural functions of the land. This option also eliminates the need for the drafters of the code to know about and test all available methods of development. The burden of proof is on the developer. Finally, it more accurately separates uses that are compatible with the natural systems from those that are not.

Environmental performance standards do not replace standard zoning procedures. Rather, they parallel or supplement them by providing regulations to maintain environmental systems (Thurow, et. al., 1977).

Planned Unit Developments

Planned Unit Developments (PUD's), a type of performance zoning, are becoming more common. A PUD designation permits variation in many traditional controls related to density, land use, setbacks, open space and other design elements. It is easily amenable to any mixture of uses and not subject to any underlying zoning (New York State De-

partment of Environmental Conservation, 1986).

The Grand Junction Zoning and Development Code allows for PUD's through the Planned Development Zoning. This type of zoning may be very appropriate for any major redevelopment of the commercial/industrial area of the Riverfront.

Incentive Zoning

Incentive zoning may be tied into PUD's. Incentives are used as a means of securing public benefits in exchange for some type of concession given to a developer. It encourages innovative development and creative urban design. For example, a bonus provision may grant additional densities or increased floor areas in exchange for public benefit such as a dedicated open space or provision for public access. The type and amount of public benefits and private incentives available for bargaining are established in the zoning ordinance (Wrenn, et. al., 1983).

Planning Districts

A waterfront or river corridor as a special district or area plan is an important first step to controlling the development. Including it in an adopted master plan provides legal standing as part of standard zoning. However, even without site-specific zoning designation, the goals and objectives in a special area plan can be a basis for community action (Wrenn, et. al., 1983).

After recognizing a special waterfront planning area in a master plan, communities may find it useful to adopt a waterfront zone as part of the ordinance. Criteria and performance standards should be developed pertaining to waterfront characteristics. Special purpose waterfront zones and districts allow innovative land development controls. Further, they provide essential flexibility required to respond to changing market conditions that occur as areas become redeveloped (Wrenn, et. al., 1983).

Chesapeake Bay is under state regulated land management. Maryland has designated a strip extending 1,000 feet from the Bay waters and tributaries as critical areas and has enacted strict criteria for

its use. This occurred despite opposition from real estate and development lobbies and some legislators. This is a very strong statement for the importance of protecting a fragile environment (Martin, 1986).

Overlay Zones

Stream Conservation Districts can be achieved through overlay zones. Overlay zones or special purpose zones are typically tied to a physical condition. They are applied in addition to the basic zoning designation and can cross basic zones (Kunofsky and Jacobson, 1985). This technique may delineate a stream conservation district through mapping and superimpose a set of regulations or standards and requirements on existing zoning (New York State Department of Environmental Conservation, 1986).

Overlay zones allow for implementation flexibility. They "float" over the community and are placed in specific locations where and when they are deemed appropriate by local government. It may contain regulatory provisions concerning use, height, and bulk as in standard zoning or may have unique features for specific purposes such as an industrial park or mixed-use development (Wrenn, et. al., 1983).

Toledo, Ohio has created the Maumee Riverfront Overlay District. This special zoning classification is used to provide public amenities and facilitate development of a wide variety of compatible land uses along the riverfront. It allows for increased public access to the water, improved scenic and aesthetic controls, improved transportation, and better coordination of recreation, commercial and industrial land uses. Several locations are identified as prime residential, park and water-oriented recreation sites. These areas are to have a "superior" level of public access, convenience, comfort and amenity (Wrenn, et. al., 1983).

Floodplain regulations are a type of overlay zone that designates flood-prone areas and limits uses to those compatible with the degree of risk. These regulations do several things.

1. Prevent new development in flood-prone areas that could result in loss of life and excessive damage to property, or reduce the potential for such losses and damages.

2. Protect unwary buyers from purchasing in flood-prone areas.

3. Prevent encroachments that decrease the flood-carrying capacity of floodplains, increase flood heights, or otherwise aggravate flood problems.

4. Reduce need for future expenditures for construction, operation and maintenance of reservoirs, levees and other flood control measures.

5. Preserve natural floodplain values, including water quality (U.S. Water Resources Council, 1981).

Districting

Districting is used by local government to provide goods or services to a particular area within a community. A district has defined boundaries and is managed by elected or appointed officials. Special service districts are the most common. They provide services such as sewer, water and power.

Special development districts may include economic redevelopment or renewal districts. They are established by local ordinance on the recommendation from planning or development entities. An overall development program is created for a defined area. This plan may include public/private development and mixed-use.

Development districts usually have extensive governmental powers, such as eminent domain, urban renewal authority, taxation powers and controls over planning, management and urban design. Implementation of an area-wide plan establishes public purpose required for use of eminent domain. Development districting can be integrated with other redevelopment tools such as tax deferrals and tax increment financing (Wrenn, et. al., 1983).

SUMMARY

The success of Grand Junction's Riverfront Project will depend on the ability to use innovative combinations of techniques for acquisition and control. The development of amenities and the redevelopment of the commercial/industrial areas are two distinct issues, but may go hand-in-hand. Amenity development will spur private redevelopment. Likewise, private redevelopment may be used to provide public

amenities. It's important for the community to know what it wants and what the options are for achieving those goals.

CHAPTER VI

FUNDING SOURCES AND TECHNIQUES

Funding sources for large-scale public projects are becoming increasingly difficult to find. Federal money has been drastically cut by Congress, putting more financial burden on local entities. Therefore, local communities must carefully weigh priorities. They must decide what they want, how to get it done, and how to fund it. Funding for the Platte River Greenway in Denver came from all levels. Federal funding included: Land and Water Conservation Funds, Community Development Funds and the Highway Urban Systems Funds. Support from the State of Colorado included: the Conservation Trust Fund, the Centennial-Bicentennial Commission, the State Parks Board, the State Trails Committee, and the Auraria Higher Education Board. Private funding included grants from the Gates and Boettcher Foundations, the Fishback Foundation Trust, 1st National Bank of Denver and many individual contributors. Volunteers were also a tremendous resource, from the National Guard to local service clubs. On April 26, 1975 over 1,100 volunteers showed up for a "Keep Colorado Beautiful Campaign" to clean up the river (Shoemaker, 1981).

Grand Junction must tap as many funding sources as possible. The success of the project will depend on the ability to use innovative financing techniques to maximize funding.

FEDERAL PROGRAMS

Although federal money is not as plentiful as it was ten years ago, there are some funding programs left. The Community Development Block Grant (CDBG) program may be appropriate for the redevelopment of the south downtown area. CDBG money is segmented for three different types of projects: housing, economic development and public facilities.

Housing funds may be available to relocate residents from the substandard housing in the floodplain. The excess housing stock in Grand Junction, especially HUD homes, could be used in the reloca

tions. The economic development and public facilities funds may be harder to justify. Economic development money must be used in projects directly creating jobs. Public facilities applications for road and infrastructure improvements would be competing with projects directly affecting health and safety of a community, such as new sewer or water systems.

The U.S. Economic Development Administration (EDA) provides funding to distressed communities for infrastructure and facilities improvements. The main objective is to provide services for new business or industry. The EDA prefers funding concrete projects, not speculative land development. However, a representative did express some interest in a project to improve the access on 4th Avenue across the railroad tracks to Jarvis' property.

Planning and design assistance may be available through the National Endowment for the Arts (NEA). The NEA's Design Advancement program offers assistance to communities showing innovation in tackling a problem. The City of Grand Junction has applied for a grant to fund a panel of nationally known river revitalization experts to consider the potential for the Colorado River. The panel would offer diverse backgrounds to jointly "design" the urban Riverfront.

The Land and Water Conservation Fund is federal money administered through the State Parks and Outdoor Recreation Department. The money can be used for land acquisition, capital improvements and park development, and must be matched by the local community. Amenities development in the Riverfront area may qualify for this money; however, the fund has been drastically reduced in the past few years and is scheduled to be terminated by 1990.

Dingle/Johnson and Pittman/Robertson Funds are both federal programs managed by the state's Division of Wildlife. Pittman/ Robertson funds are used primarily for habitat development. Dingle/Johnson funds may be used 90% for fish habitat enhancement and 10% for public access to fishing opportunities. These funding sources should be investigated for the greenbelt development.

STATE PROGRAMS

Although State funding is also tight, the City has already received assistance through three programs: the Metropolitan Planning Organization, State Trails and Energy Impact Assistance.

The local Metropolitan Planning Organization (MPO), funded by the State, allocates money to be used for transportation planning. This planning may include non-motorized transportation systems. A detailed Riverfront Transportation plan was funded through the MPO. The City is also investigating the potential for funding trail systems.

The Colorado State Trails program provides funding for trails through the lottery revenues. The City has received a grant through this program to extend an existing trail under the HWY 340 bridge to Riverside Park. Funding is provided on a 50/50 match basis. This program may provide an ongoing source of funding for River trail segments.

The State's Energy Impact Assistance fund uses energy related revenues to assist communities impacted by energy "booms or busts". Grand Junction has been eligible for these funds due to the oil shale bust of 1982. The City has received a $200,000 grant to assist in land acquisition in the Riverfront area. Targeted property is owned by Tom Lewis and includes Watson Island and approximately nine acres between the River and Struthers Avenue. It is unlikely this funding will be available in the future due to the decline in energy exploration and production.

A new program through the Colorado Division of Wildlife is "Fishing Is Fun". This was set up to provide funding to improve fish habitat and fishing access throughout the State. Money is generated by taxes on fishing equipment and revenues from licenses. Projects that may be eligible include: boat launches, habitat improvements, handicap access and parking areas. This may be a viable option for funding of small, specific projects on the River.

The Colorado State Parks and Outdoor Recreation Department may prove to be a valuable ally in the River redevelopment. A study was

conducted in 1974 on the feasibility of a Colorado River State Park (CO Department of Natural Resources, 1974). The results of that study included a finding of "no Statewide significance" of the Colorado River. Instead, the study concluded the River was only of local interest. Since then, times, personnel and philosophies have changed. State Parks is now proposing linear parks for the expansion of the system. The Department sees river corridors and park development near urban centers as the wave of the future.

State Parks has declared its support of the Colorado Riverfront Project. In a letter to the City of Grand Junction, Ron Holliday, the current director, acknowledged the "Statewide significance" of the resource. Assistance through the Department may include technical expertise and actual management of appropriate segments of the River.

LOCAL PROGRAMS

Ultimately the bulk of the financing must come from local sources. The local community must support the project, both philosophically and financially. Local support may include cash, in-kind services and tax incentives.

Cash commitments from local government are very important in the eyes of outside contributors and investors. It proves a strong desire on the part of the City to see the project through. The City has committed $80,000 cash to the Watson Island project. The five year capital improvements budget should include infrastructure improvements in the Riverfront area, a match for the proposed Corps of Engineers' flood control study, and other money to directly support the efforts of the revitalization.

Much of what the City contributes could be in the form of in-kind services. City staff has already invested considerable time in the project. City crews could be used in engineering and construction work on the proposed greenbelt.

Taxation Incentives

Many less-than-fee land acquisition techniques provide tax incentives to private land owners. Government entities may provide addi-

tional tax incentives to encourage land preservation. Tax exemptions may be applied to owners who retain their land for public benefit such as scenic vistas in a stream corridor, public access, etc. Another alternative is preferential assessment. Through this, land may be assessed at current open space values so as to remove tax pressure on owners to sell at a speculative price for profit.

Local entities can encourage waterfront development through their taxation policies. Property tax incentives are a common method. However, the taxing entity must determine if the benefits of the new development will exceed the revenues the city would have received through taxes.

Tax abatement programs are project specific. The program may include tax stabilization, tax freeze or a tax exemption for a limited period of time. Laclede's Landing Development Corporation in St. Louis was granted a tax abatement package. For the first ten years it was taxed on the original property value. For the next 15 years the land and improvements were taxed at 50%. After 25 years full taxes will be assessed. This policy has been instrumental in the St. Louis redevelopment effort (Wrenn, et. al., 1983).

Special taxation districts may be developed. The goal is to stimulate private investment in specific areas by reducing the tax burden on existing properties. It may offer incentives for new development, expansion of existing development or redevelopment. Tax revenues generated are used to retire bonds issued by the city or district to pay for the improvements and services in the district.

Tax increment financing is a method of temporarily using increased assessed values to provide funds for redevelopment projects. It isolates the additional property tax revenues produced by redeveloping and upgrading deteriorated properties and uses those revenues to repay the development costs. Revenues may also be used to retire municipal bonds sold to finance construction of public facilities. This method was used very effectively in Portland's downtown and riverfront redevelopment. The city sold tax increment bonds for public improve-

ments to spur private development (Wrenn, et. al., 1983).

Tax increment projects are designed to enhance the economic vitality of depressed central city commercial areas. This method can be especially useful for revitalizing deteriorating waterfronts located near older commercial/industrial areas. Those who benefit directly from the public investment pay the majority of the costs. This type of financing is good in times of tight budgets and antitaxation sentiments.

Other Public Assistance

Public financing can be used to leverage loans, grants, or equity funds from other sources. An agency may issue bonds to pay for services or facilities. The objective of public assistance is to stimulate private investment.

If a public agency is unable to directly aid site acquisition, they may assist private developers assemble waterfront properties. It may take the form of loans and grants to relocate existing users.

Another option is direct loans from the public sector at below market interest rates. The public sector can borrow money at a lower interest rate because the interest paid is tax exempt. This method encourages redevelopment and gives the local government control over development. These loans may have to go through an economic development corporation. A revolving loan program is one alternative (Wrenn, et. al., 1983).

PRIVATE PROGRAMS

"Public/Private Partnerships" is the buzz-phrase of the 1980's. Private investment has become a necessity for major public projects to succeed. Many private groups have already expressed interest in the Riverfront project.

A major contributor to the Riverfront project is the Grand Junction Lions Club. Each year this service club distributes Carnival revenues to worthy projects. The Club has committed $100,000 over three years to the Watson Island demonstration project. This money will be matched by $200,000 from the State Energy Impact fund and

$150,000 from the City for the purchase and development of the Lewis property.

Many other service clubs have shown an interest in the project. There is no lack of volunteer labor in Grand Junction. The local Audubon chapter and newly formed Colorado River Greenway have agreed to maintain the Audubon section of the Colorado River Trail for five years. This type of assistance will be important in future trail development.

Private foundations could be a continuing source of funding for specific projects. It's important to choose an appropriate project for each foundation. Initial contacts have been made with the Coors, Gates, Boettcher, Goodwin, Bacon and Cox foundations.

Much of the commercial/industrial redevelopment will probably be accomplished by private developers. There has already been some interest shown by developers in the Riverfront project. The City needs to put together some potential packages for interested investors. Amenity development may be a part of the private projects.

SUMMARY

Despite the limited funding available, there are many opportunities for the City to combine resources. Each funding source may be used to leverage the next. As projects are completed the credibility of the organization increases, resulting in additional funding. It is important to identify as many sources as possible and decide how to best use them to achieve project goals.

CHAPTER VII

ISSUES AND RECOMMENDATIONS

ISSUES

There are many issues involved in the revitalization of the Grand Junction Riverfront. The Riverfront Commission identified just a few of the most important issues at a work session on August 24, 1987.

Natural Constraints

Many issues revolve around the natural constraints of the River environment. Chapter two describes some of the natural conditions existing in the River corridor. The location of the 100-year floodplain is, perhaps, the most restrictive component. Some type of flood control is necessary for the commercial/industrial redevelopment to occur. If the stream corridor is left in an undeveloped state, the stream will have more room to meander. This improves the chances for maintaining a greater level of equilibrium and stability between the stream, its gradient, its aquatic resources and adjacent shorelines (Klein, 1979).

Water Quality

Water quality is another concern. To date, the only component of water quality to be fully addressed has been salinity. However, with increased development, other water quality issues will surface.

Impervious surfaces are probably the greatest contributors to urban waterway degradation. The creation of extensive impervious land areas brought about by urbanization, contribute to increased flooding and diminished groundwater supplies, which reduces the base flow of a stream. Both impair fisheries habitat. Severe degradation to a fishery occurs when 30 to 70% of the watershed is covered by impervious surfaces. Stream quality impairment is initially evidenced when watershed imperviousness due to urbanization reaches 15% (Klein, 1979).

With proper management, a stream corridor can serve as a buffer zone to filter the sediment and pollution produced by urbanization and other land use activities. It can also provide a margin of safety

from flood and erosion hazards to adjacent properties. A buffer strip or greenbelt functions to filter sediment and other substances; maintain stream integrity by retaining the natural vegetated corridor; enhance the recreational use of the stream; preserve vegetation which shades the stream, helping to maintain lower water temperatures; inhibit stream bank erosion and meandering; and restore degraded fish and wildlife habitat (New York State Department of Environmental Conservation, 1986).

Coordination

Coordination of all entities involved is another important issue. The timing of many of the aspects of the project needs to correspond with that of the DOE's tailings removal. Funding sources and innovative combinations of sources also falls under the massive coordination effort.

Existing Land Uses

Existing businesses versus proposed redevelopment is also of concern. For the most part, businesses in the area should be allowed to remain. However, the salvage yards are a problem that needs to be addressed. Some alternatives include screening, relocation or purchase.

The existing housing in the Riverfront area also poses a problem to the proposed redevelopment. The housing, for the most part, is substandard and in the floodplain. However, to the residents, it offers low cost housing which is all many of them can afford.

Infrastructure

Infrastructure improvements in the area will be required to accommodate new development. Innovative ways of financing those improvements must be identified.

Management and Maintenance

Perhaps the most difficult issue facing the community is the ongoing management and maintenance of the Riverfront redevelopment area. Alternative organizational structures may be considered as a managing entity.

The business/industrial redevelopment would be most appropriately managed by the DDA or a similar development entity. Of more concern to the City is the management and maintenance of any publicly owned lands, which would include the amenities development.

A major concern that has been voiced is that of public safety. Many safety issues can be addressed through proper design techniques such as grade separation, landscaping and natural buffering, and fences or gates (Ince, 1987). Liability can be alleviated by adequate signage and public education as to the hazards of a natural amenity.

Another safety concern is the problem with transients in the Riverfront area. However, as the area attracts more recreational users the transients will move elsewhere. A certain level of policing will be necessary to discourage vandalism and loitering. Other communities have found police patrol on foot, bicycles, or horseback to be very effective along trails. It not only discourages crime, but also promotes good public relations.

Another effective deterrent to vandalism is to involve potential vandals in the project from the beginning, giving them a sense of pride in ownership. Natural barriers such as yucca or thorny bushes may also discourage vandalism (Shoman, 1971).

Maintenance is always a difficult issue. A project should not be built if it can not be maintained. The Platte River Greenway created the highly successful Trail Rangers program. The Greenway uses interest from a $300,000 trust fund to provide maintenance and patrol along the trail system. The Rangers augment the City Parks' employees by riding the ten mile trail system keeping it clean, doing routine maintenance, reporting on the trail's condition, and answering questions (Shoemaker, 1981).

Good maintenance is a must and should be a priority. Preventative maintenance will save money in the long run. Vandalized facilities should be fixed quickly and quietly.

RECOMMENDATIONS

Intense development within the floodplain should be avoided. As much of the floodplain as possible should be preserved as open space to allow the natural expansion of the River in flood and enhance water quality and wildlife habitat.

Development in the Riverfront area (impervious surfaces and pollutants) must be sensitive to its effects on the stream ecology.

Land use plans and regulations should provide protection of environmentally critical areas and be responsive to the physical conditions of the stream corridor planning area.
The City should work with the Corps of Engineers in identifying and implementing flood control alternatives.

The City should continue coordinating with the Department of Energy's projects to ensure that the work done compliments the plans for the Riverfront area.

The City should encourage the State Highway Department to include hike/bike trails in the 5th Street Bridge replacement project.

A River Corridor Policy Plan should be conceived and implemented to guide development and the decision making process.

A public process should be implemented to foster community support and consensus.

The City should remain involved in the project to the extent necessary to expedite the redevelopment effort.

Riverfront landowners should be made a part of the process.

City Planning should investigate the feasibility of a Riverfront overlay zone which would be sensitive to the environment and require public amenities, easements and improvements, as land develops.

New development should be encouraged to use Planned Development zoning.

Land acquisition and control techniques should be reviewed and the most appropriate techniques identified for specific areas.

Alternatives should be identified for the salvage yard owners. Alternatives may include acquisition, screening, relocation or conversion to a warehouse-type business.

The City's five year capital improvements plan should include infrastructure improvements in the Riverfront area, such as flood control, road realignments and amenities. Road improvements should include the Riverside Park area and the 4th Avenue railroad crossing (Figure 14).

City and County lottery funds should be made available for the amenities development through a public forum to allocate the funds.

Public and private property should be identified that could potentially be used for land trades.

Potential funding sources should be identified and creatively packaged for specific projects.

Existing funding should be leveraged for additional funds.

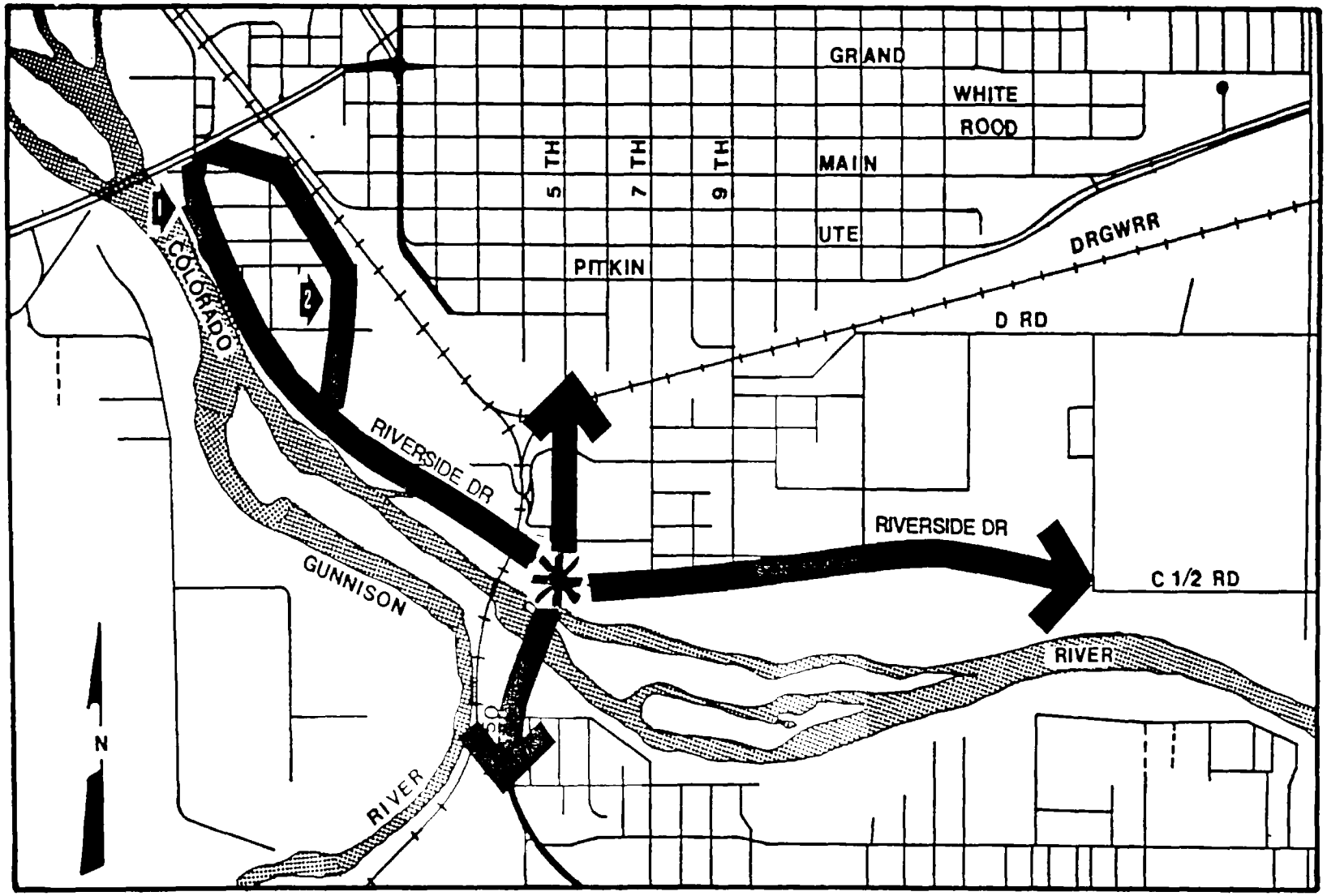

FIGURE 14
Proposed Transportation Routes for the Riverfront Area

Source: Haase, William R., "Riverfront Transportation Plan, Grand Junction, CO", August, 1986.

The Downtown Development Authority (DDA), Mesa County Economic Development Council and the City should become intimately involved in the development and promotion of the commercial/industrial area.

The DDA should pursue the annexation of the south downtown area into their district and designation as a redevelopment authority.

The City and DDA should complete informational packets for potential developers of the Riverfront area.

The Riverfront Commission should provide the overall coordination of the Riverfront project, but should create subcommittees to address each separate issue. The subcommittees may involve people outside of the Commission.

The Riverfront Commission should foster the political support and coordination necessary for the project to come to fruition.

The Riverfront Commission should recognize that while public participation and the planning process is important to develop overall strategies for the Riverfront, there are priorities that need immediate attention. Strategy planning and action can be going on simultaneously.

The Riverfront Commission should move forward toward some goal. If there's substantial resistance, they should go to another project and try again later.

To maintain project momentum, festivals or special events should be held along the Riverfront when activity is slow.

A technique of build, demonstrate and celebrate should be used.

Standards should be developed for any of the amenities, such as trails, signage and furniture.

Public facilities, such as the museum and jail, should be encouraged to be located in the Riverfront area.

Wherever possible, existing businesses should be allowed to remain.

Residents of the redevelopment area should be allowed to remain as long as possible. Housing relocation assistance should be made available for any residents required to move.

Developed parks should be maintained by the City Parks Department. A trail ranger program should be developed for trail maintenance.

The general concept plan, shown in Figure 15, should be used as a guide and revised as specific plans evolve.

CONCLUSION

Increased demand for downtown office space and central city housing, interest in revitalizing and expanding downtown retailing, increased demand for recreation and recreation facilities have made urban riverfront development more attractive economically (Ince, 1987). Aesthetically pleasing waters add to the quality of human experience. It may enhance values of adjoining properties or it may provide a fo

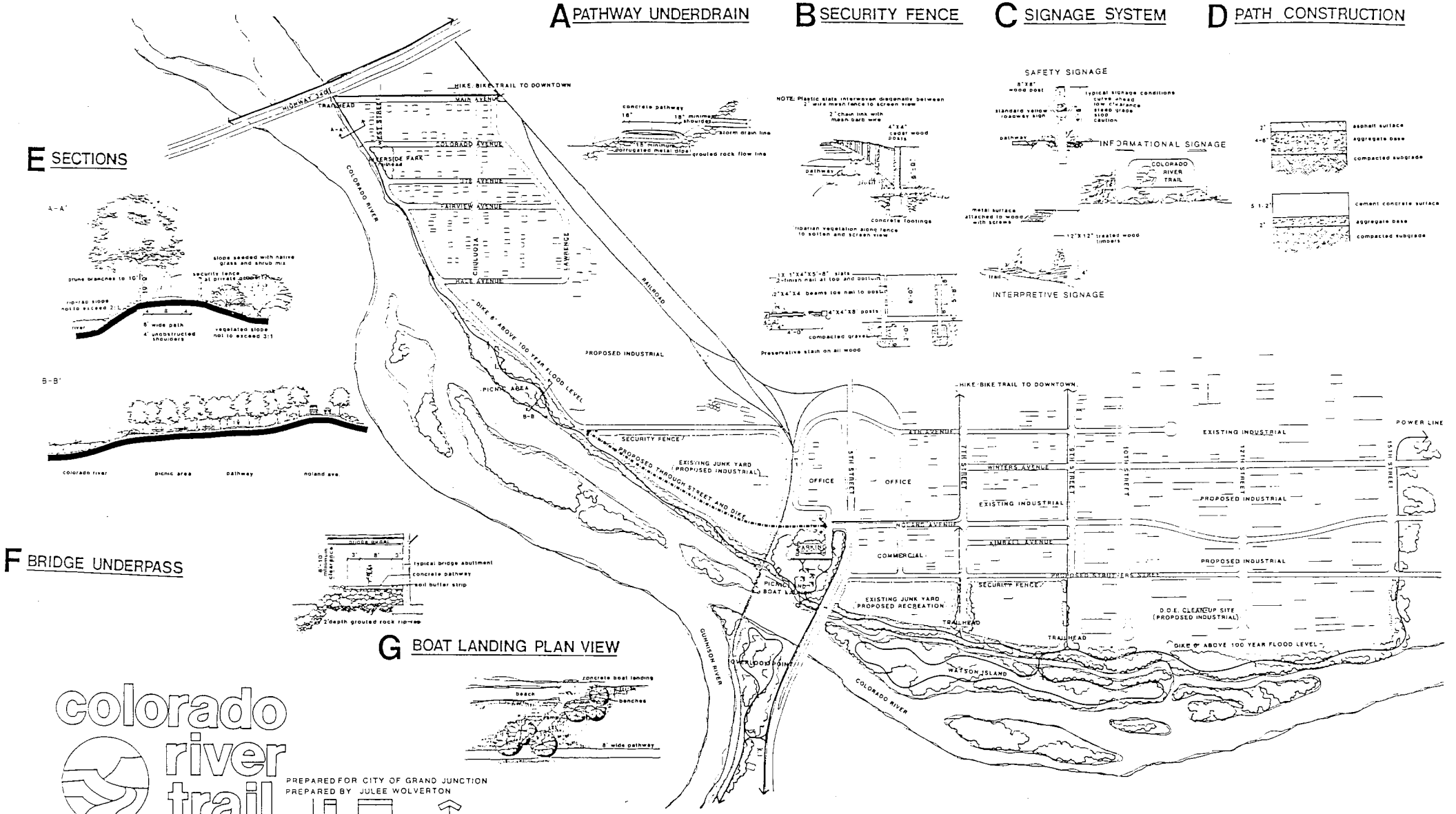
A PATHWAY UNDERDRAIN
B SECURITY FENCE
C SIGNAGE SYSTEM
D PATH CONSTRUCTION
E SECTIONS
F BRIDGE UNDERPASS
G BOAT LANDING PLAN VIEW
SAFETY SIGNAGE
INFORMATIONAL SIGNAGE
INTERPRETIVE SIGNAGE
HIKE-BIKE TRAIL TO DOWNTOWN
HIGHWAY 32(d)
TRAILHEAD
MAIN AVENUE
COLORADO AVENUE
RIVERSIDE PARK
KIA AVENUE
PATHVIEW AVENUE
CHIPETA
LAWRENCE
HALE AVENUE
WEST STREET
COLORADO RIVER
RAILROAD
DIKE 8' ABOVE 100 YEAR FLOOD LEVEL
PROPOSED INDUSTRIAL
PICNIC AREA
SECURITY FENCE
EXISTING JUNK YARD (PROPOSED INDUSTRIAL)
PROPOSED THROUGH STREET AND DIKE
OFFICE
OFFICE
4TH AVENUE
5TH STREET
7TH STREET
WINTERS AVENUE
EXISTING INDUSTRIAL
NORAND AVENUE
COMMERCIAL
KIMBALL AVENUE
PROPOSED INDUSTRIAL
PARKING
PICNIC AREA
BOAT LANDING
SECURITY FENCE
EXISTING JUNK YARD
PROPOSED RECREATION
TRAILHEAD
D.O.E. CLEANUP SITE
(PROPOSED INDUSTRIAL)
DIKE @ ABOVE 100 YEAR FLOOD LEVEL
GUNNISON RIVER
WATSON ISLAND
COLORADO RIVER
POWER LINE
EXISTING INDUSTRIAL
PROPOSED INDUSTRIAL
10TH STREET
12TH STREET
15TH STREET
concrete pathway
storm drain line
grouted rock flow line
concrete footings
cedar wood posts
compacted gravel
Preservative stain on all wood
asphalt surface
aggregate base
compacted subgrade
cement concrete surface
slopes seeded with native grass and shrub mix
security fence at private property line
prune branches to 10' ht.
riprap slope not to exceed 2:1
8' wide path
4' unobstructed shoulders
vegetated slope not to exceed 3:1
colorado river
picnic area
pathway
noland ave.
typical bridge abutment
concrete pathway
soil buffer strip
2' depth grouted rock riprap
concrete boat landing
beach
benches
8' wide pathway
colorado river trail
CONCEPT PLAN
PREPARED FOR CITY OF GRAND JUNCTION
PREPARED BY JULEE WOLVERTON
0 200 400 700 1200
SCALE: 1"=200'
JANUARY 21, 1987

FIGURE 15

cal point of interest in which a community can take pride (Klein, 1979).

Greenbelts adjacent to natural water bodies can reduce sedimentation, encourage land preservation, reduce the need for expensive flood control projects and lessen flood damage, provide recreational opportunities and improve community appearance. Favorable community image of greenery and open areas are incentives for people and businesses to locate and remain in the community. The present tax base is maintained and expansion is encouraged by the presence of open space and the quality of life associated with it (Harris and Hepner, 1983).

Open space enhances the value of adjacent property. A 1977 study in Chicago concluded that property prices were $1,000 higher for parcels within one block of an urban park as compared to similar parcels further away (Vaughn, 1977). In the Philadelphia area, Hammer (1974) estimated that for each acre of public park adjacent to a stream, surrounding private property values would increase an average of $2,600.

Urban open land should be argued on the basis of socioeconomic benefits rather than on economics alone. Some natural environments may have an economic value far greater than any assumed in cost-benefit ratios because of their irreplaceability (Shomon, 1971). In a desert environment, such as Grand Junction's, the River is a precious resource with immeasurable value. The social benefits of a river include recreation, education and aesthetics.

Grand Junction is no longer the regional center it used to be, nor can it rely on energy development any longer. The City needs a new focus. That focus can be the Colorado Riverfront. We need to ignite the "prairie fire" that will carry the revitalization of the Riverfront area, providing recreational access, redeveloping the commercial/industrial area, improving the image of the City and enhancing the River's natural environment.

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