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FIRST CAPITOL WATERSHED
Lafayette and Iowa Counties, Wisconsin

Final Environmental Impact Statement

Richard W. Akeley
State Conservationist
Soil Conservation Service

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CATALOGING - PREP.

Sponsoring Local Organization

Lafayette County Soil and Water Conservation District
Courthouse
Darlington, Wisconsin 53530

June 1974

Prepared by

United States Department of Agriculture
Soil Conservation Service
Madison, Wisconsin 53711

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USDA ENVIRONMENTAL IMPACT STATEMENT

First Capitol Watershed Project

Lafayette and Iowa Counties, Wisconsin

Prepared in Accordance with
Sec. 102(2)(C) of P.L. 91-190

Summary Sheet

- I. Final
- II. Soil Conservation Service
- III. Administrative
- IV. Description of Project Purpose and Action: A project of watershed protection, flood prevention, and fish and wildlife improvement in Lafayette County, Wisconsin, to be implemented under authority of the Watershed Protection and Flood Prevention Act (Public Law 566, 83d Congress, 68 Stat. 666), as amended
- V. Summary of Environmental Impact and Adverse Environmental Effects: The project will reduce the annual rate of erosion from cropland from 5.8 to 3.5 tons per acre per year. The amount of sediment reaching the Pecatonica River will be reduced from the present estimated rate of 14.4 to 7 acre-feet per year. Structural measures will reduce floodwater and sediment damages by 36 to 99 percent on 1,600 acres in the flood plain. Flood damages in the city of Darlington will be reduced by about 11 percent. An 18-acre lake with a maximum depth of 20 feet will have public access for incidental recreation. The project will create an additional 5 acres of wetlands. Stream fishery improvement on 1.5 miles of smallmouth bass stream should increase fish populations and provide an opportunity for an additional 2,070 recreation visits. A strip of land 8 rods wide (24 acres total) will be removed from agricultural production to protect the smallmouth bass stream improvement. This land will provide additional wildlife habitat and public access to the stream. The proposed installation of the dams, spillways and sediment pools will remove about 177 acres of agricultural land from production. Within the flood pool, an

additional 238 acres of agricultural land and associated wildlife habitat will be subjected to occasional short duration flooding. About 0.5 mile of stream will be inundated by a wet sediment pool, 2.4 miles of stream will be within dry sediment pools, and 3.4 miles of stream will be within temporary retarding pools. Pipe outlets through the earthen dams will replace 860 feet of stream. Approximately 1,300 feet of channel modification will be required below the structures to safely return the pipe flows to the existing channels.

VI. Alternatives:

1. Continuation of present trends.
2. Accelerated land treatment.
3. Accelerated land treatment, flood plain zoning, and floodproofing of existing buildings subject to flood damage.
4. Accelerated land treatment, nine floodwater retarding structures, and one multiple purpose recreation and floodwater retarding structure.
5. Accelerated land treatment, four floodwater retarding structures, one multiple purpose structure, 1.9 miles of trout stream improvement, 1.5 miles of smallmouth bass stream improvement, and recommended floodproofing and flood plain zoning in urban areas.
6. Accelerated land treatment, flood plain zoning and floodproofing in urban areas, and purchasing 1600 acres of rural flood plain.

VII. Agencies From Which Written Comments Have Been Received:

1. Department of the Army
2. Department of Health, Education, and Welfare
3. Department of the Interior
4. Department of Transportation

5. Environmental Protection Agency
6. Wisconsin Board of Soil and Water Conservation Districts
7. Wisconsin Department of Administration

VIII. Draft statement transmitted to the Council on Environmental Quality on October 19, 1973.

USDA SOIL CONSERVATION SERVICE
FINAL ENVIRONMENTAL IMPACT STATEMENT

for

First Capitol Watershed
Lafayette and Iowa Counties, Wisconsin

Installation of this project constitutes an administrative action. Federal assistance will be provided under authority of Public law 83-566, 83d Congress, 68 Stat. 666 as amended.

SPONSORING LOCAL ORGANIZATION

The Lafayette County Soil and Water Conservation District is the sponsoring local organization for the proposed project measures.

PROJECT OBJECTIVES AND PURPOSES

The objectives of the local sponsoring organization include watershed protection, flood prevention, and fish and wildlife improvement. In the process of planning to meet these objectives, the Lafayette County Soil and Water Conservation District and the Soil Conservation Service have agreed to combine land treatment and structural measures that will maintain the natural environment in a quality condition.

Watershed Protection

The goal for watershed protection is to have a minimum of 75 percent of the upland area adequately treated by the end of the 5-year installation period. This is a realistic objective based on current

-Objectives and Purposes-

treatment levels, general acceptance, and the financial ability of individual landowners to install needed practices. Approximately 13,000 acres of cropland, 10,000 acres of grassland, 2,000 acres of forest land, and 1,300 acres of other land are now adequately protected. The 75 percent goal will be achieved by applying conservation systems to adequately treat an additional 6,500 acres of cropland, 4,000 acres of grassland, 460 acres of forest land and 650 acres of other land within the 5-year project installation period. This can be accomplished through the ongoing and an accelerated technical assistance program.

The primary objective of watershed protection is to reduce gross erosion. Average sheet erosion from cropland is currently 5.8 tons per acre per year. The ultimate objective is to reduce this to an allowable soil loss 1/ averaging 3.0 tons per acre per year or less. A realistic goal within the 5-year installation period is to reduce average cropland sheet erosion to 3.5 tons per acre per year. This can be achieved by reducing soil loss to or below allowable limits on 75 percent of the cropland and by partial reduction on the remaining cropland. This goal includes comparable soil loss reduction on grassland and forest land which currently have average losses of 0.5 and 0.16 tons per acre per year, respectively.

Other objectives include a reduction in sediment movement and deposition, increased water retention for better crop production; reduced runoff to decrease frequency and severity of floods, water pollution control, and fish and wildlife habitat improvement.

Flood Prevention

The goal for flood prevention is to reduce the frequency of flooding and the area subject to flooding for different flood events. The primary objective of flood prevention is to reduce flooding on agricultural lands. The average level of protection desired is to reduce frequency from several times annually to once in five years or less. Reduction in erosion and sedimentation are related objectives.

Present and future damage reduction in the village of Belmont is an additional flood prevention objective. Flood prone areas within the village are relatively undeveloped at present, but are currently

1/ Allowable soil loss is the amount of soil that can be lost in tons per acre per year and still maintain a high level of productivity indefinitely.

being developed at an increasing rate. Existing flood damages could be reduced by floodproofing and other nonstructural measures. Flood plain zoning and other land use regulations can be implemented to minimize future flood damages.

Fish and Wildlife Improvement

The goal for fish and wildlife improvement is to improve existing fish habitat in all watershed streams and to maintain and improve upland wildlife habitat.

One objective is to install smallmouth bass stream improvement devices and provide streambank protection. Another objective is to install wildlife habitat improvement and management practices on an additional 400 acres of upland during the 5-year installation period. Other objectives include preserving and improving existing habitat by reducing erosion, sedimentation, and pollution.

The original goal for recreational development was to construct a permanent recreational lake and provide facilities for camping, boating, picknicking, swimming, and other water-based activities. It also included smallmouth bass stream improvement and trout stream improvement to provide increased opportunity for stream fishing.

This goal was modified during plan formulation and has been reduced to smallmouth bass stream improvement. The use of an 18-acre lake created by impounding water in a sediment pool to provide incidental recreational opportunity is an additional goal. Public access and sanitary facilities will be provided at the lake.

Another goal is to install smallmouth bass stream improvement which will increase recreational opportunities from about 400 to 2,500 recreation visits per year. The stream improvement goal is to provide superior smallmouth bass fishing for an estimated 30 fishermen at any one time. Public access and basic facilities consisting of parking areas and toilets are needed to facilitate this increased use.

PLANNED PROJECT

Land Treatment Measures

Resource conservation plans developed for the operating units of the 52,198-acre watershed and implemented on an individual land unit basis will provide for proper land use, adequate treatment, and proper management for the land.

A combination of land treatment measures will be applied by individual landowners or operators for the purpose of soil and water conservation, particularly in the upland areas. In order to adequately protect the watershed, the present Lafayette County Soil and Water Conservation District program will continue to stress the application and maintenance of conservation systems. This includes the use of land within its capabilities and treatment in accordance with its needs for sustained agricultural production.

An accelerated program of land treatment measures is planned during the 5-year project installation period. Seventy-five percent of the upland area will be adequately treated by the end of this period. The acceleration will follow criteria outlined in the technical guide for the area and strengthen existing programs.

Approximately 13,000 acres of cropland, 10,000 acres of grassland, 1,300 acres of other land, and 2,000 acres of forest land are now adequately protected. Within the 5-year project period, an additional 6,500 acres of cropland, 4,000 acres of grassland, 650 acres of other land, and 460 acres of forest land will be adequately treated. Remaining acreages will receive partial treatment.

Land treatment measures to be applied on cropland, grassland, and other land (building sites, roads, etc.) include: conservation cropping system, contour farming, critical area planting, diversion, grade stabilization structure, grassed waterway and outlet, minimum tillage, pasture and hayland planting and management, streambank protection, stripcropping, terracing, tree planting, and wildlife habitat improvement and management.

A conservation cropping system is growing crops in combination with needed cultural and management measures. Cropping systems include rotations that contain grasses and legumes as well as rotations in which the desired effects are achieved without the use of such crops. Cropping systems reduce soil losses. Conservation cropping systems improve water quality, enhance natural beauty, and improve fish and wildlife habitat.

Contour farming is farming sloping cultivated land in such a way that plowing, preparing land, planting, and cultivating are done on the contour. This includes following established grades of terraces, diversions, or contour strips. Tillage operations form many small ridges which increase surface storage and reduce runoff and erosion.

Critical area planting means establishing vegetation such as trees, shrubs, vines, grasses, or legumes on eroded, sediment-producing areas. This includes steep banks, roadsides, farm lanes, gullied areas, and streambanks. Critical area planting improves wildlife habitat and enhances natural beauty.

A diversion is a channel with a supporting ridge on the lower side constructed across the slope. It is designed to carry runoff from a larger area than a terrace. Diversions are frequently used to provide protection to farm buildings, feedlots, and other developments.

Grade stabilization structures are used to stabilize the channel grade and to control erosion (head cutting) in natural or artificial watercourses. They prevent the advance of gullies and reduce sedimentation.

A grassed waterway or outlet is a natural or constructed waterway or outlet shaped or graded and established in suitable vegetation as needed for the safe disposal of runoff from a field, diversion, terrace, or other structure. Grassed waterways along with other conservation practices prevent or heal gullies. They also provide field edge for year-round use by wildlife. Properly maintained waterways make good nest sites for ground nesting birds.

Minimum tillage is reducing the number of cultural operations to those needed to produce a row crop. Leaving crop residue on or near the surface increases water infiltration and reduces soil losses by reducing the impact of raindrops. Elimination of fall plowing provides winter cover and food for wildlife.

-Planned Project-

Pasture and hayland treatment includes both planting and management. Pasture and hayland planting is the establishment or reestablishment of the long term stands or adapted species of perennial, biennial, or reseeding forage plants. Proper treatment and use of pasture and hayland minimize erosion by reducing soil and water losses.

Streambank protection is stabilizing and protecting banks of streams or excavated channels against scour and erosion by vegetative or structural means. This improves fish and wildlife habitat by reducing sedimentation and by establishing vegetation on channel banks. Natural beauty is also enhanced.

Stripcropping is growing crops in a systematic arrangement of strips or bands on the contour or across the general slope to reduce water erosion. The crops are arranged so that a strip of grass or close-growing crop is alternated with a strip of clean-tilled crop or fallow, or a strip of grass is alternated with a close-growing crop. Runoff is slowed down and reduced by stripcropping. Alternate strips provide edge area and a balance between food and cover for many upland wildlife species.

A terrace is an earth embankment or a ridge and channel constructed across the slope at a suitable spacing. It has no grade (level terrace) or an acceptable grade (gradient terrace). Terraces carry water to a grassed waterway or other suitable outlet for safe disposal. Terracing breaks up long slopes into shorter slopes. It reduces erosion and increases infiltration of water into the soil.

Tree planting is planting tree seedlings or cuttings. Forest land protected from grazing and burning soaks up more rainfall and produces less erosion.

Wildlife habitat improvement and management is retaining, creating, or managing wildlife habitat. The habitat may be upland or wetland habitat. Small areas planned exclusively for wildlife use are an integral part of many conservation systems. These areas provide food and year-round cover.

A typical combination of practices on sloping cropland fields will be contour stripcropping, conservation cropping systems, diversions, and grassed waterways. On gentle slopes alternatives to contour stripcropping are the use of terraces or diversions with contour farming.



Contour Stripcropping, An Upland Treatment Measure

Pasture and hayland management is an essential practice. It will be the conservation practice applied to about 30 percent of the pasture. Diversions and erosion control practices are needed where gullies are to be controlled.

The land treatment measures are based on present and projected land uses. If the future land use differs appreciably from that expected, alternative land treatment measures that will accomplish the same purposes will be installed. These changes, if necessary, will be made during project installation and will become a part of the Lafayette County Soil and Water Conservation District's long-range program.

Proper management and appropriate land treatment measures are to be applied to 460 acres of forest land. This will principally involve the control of forest land grazing, tree planting, wildlife habitat improvement, and various cultural practices. Marking stands for improvement is a recommended practice for achieving multiple use-sustained yield management on forest lands. Guidance to landowners is to be provided through the preparation of a management plan for forest land to receive protection or treatment measures. Technical assistance is also to be provided during the installation of proposed measures.

-Planned Project-

The total cost of installing land treatment measures, including the cost of technical assistance, is estimated at \$232,590.

Structural Measures

The proposed structural measures consist of four floodwater retarding structures (FRS) and 1.5 miles of smallmouth bass stream improvement. See project map, appendix E.

The four structures will consist of earthfill dams with vegetated earth emergency spillways. Principal spillways will be reinforced concrete pressure pipe outlets with modified single-stage riser inlets. The modified inlet will permit the structures to be operated with a dry or wet sediment pool for fish and wildlife purposes.

The sediment pool is an area allocated to the storage of sediment expected to be deposited throughout the design life of the structure (100 years). Initially, this sediment pool area may be used to store water by closing a water control gate. (See appendix A.) By opening the gate, the water will flow through a bottom release pipe. This design allows the sediment pool to be operated either wet (gate closed) or dry (gate open).

The Lafayette County Soil and Water Conservation District must obtain a permit from the Wisconsin Department of Natural Resources for each floodwater retarding structure prior to construction. Operation of each sediment pool (wet or dry) will be specified in the permit. The Lafayette County Soil and Water Conservation District will be responsible for operating the sediment pools as outlined in each permit.

Structures 2, 3, and 4 will include fish migration features that will provide a minimum water depth of 6 inches and width of 8 inches through the bottom release pipe and conduit. Difference in elevation between the downstream pool level and outlet pipe will be maintained at no greater than 1 foot. The Wisconsin Department of Natural Resources will be consulted during final design of the structural works for the purpose of incorporating fish and wildlife features.

FRS No. 2 will have a maximum height of about 41 feet and a length of 1,050 feet. The site is located about 600 feet below the junction of Whiteside Branch with Cottage Inn Branch. The site is located about 1.2 miles downstream from Joy Lake, which is a

55-acre man-made lake created by an earthfill structure designed by the Soil Conservation Service. The left abutment has a gentle 5 percent slope, but the right abutment has a steep 30 to 40 percent slope. Land use is grassland with about 6 mature trees growing on the right abutment. The principal spillway and retarding storage will control the runoff from a flood occurring on the average of once in 50 years (50-year flood). The principal spillway will be 36 inches in diameter. The maximum floodwater retarding pool is 111 acres. This includes the 36-acre sediment pool. The vegetated earth emergency spillway located on the left abutment will be 300 feet wide. Landrights for the structure, spillways, pool area, and work area will require approximately 138 acres.

FRS No. 3 will have a maximum height of about 37 feet and a length of 950 feet. The site is located about 1.5 miles downstream from the village limits of Belmont on Bonner Branch. The left abutment has a gentle 6 percent slope, but the right abutment has an average slope of around 20 percent. Land use is grassland and cropland. The principal spillway and retarding storage will control the runoff from a flood occurring on the average of once in 50 years (50-year flood). The principal spillway will be 36 inches in diameter. The maximum floodwater retarding pool is 167 acres, including the 67-acre sediment pool. The vegetated earth emergency spillway located on the left abutment will be 150 feet wide. Landrights for the structure, spillways, pool area, and work area will require approximately 200 acres. Three power poles in the sediment pool will have to be moved.

FRS No. 4 will have a maximum height of about 41 feet and a length of 900 feet. The site is located in section 27, T.3N., R.2E., approximately 2,000 feet above a north-south town road on Wood Branch. The left abutment has a slope of 15 to 20 percent. The right abutment has a fairly uniform 9 percent slope. Land use is divided between cropland and grassland. The principal spillway and retarding storage will control the runoff from a flood occurring on the average of once in 50 years (50-year flood). The principal spillway will be 30 inches in diameter. The floodwater retarding pool area at emergency spillway elevation is 70 acres. This includes the 28-acre sediment pool. The vegetated earth emergency spillway located on the right abutment will be 115 feet wide. Landrights for the structure, spillways, pool area, and work area will require approximately 100 acres.

-Planned Project-

FRS No. 8 will have a maximum height of about 38 feet and a length of 840 feet. The site is located about 2 miles above Darlington on Vinegar Branch. The left abutment has an average slope of about 11 percent. The right abutment has a variable slope ranging from 10 to 25 percent. Land use is about equally divided between cropland and grassland. A few scattered trees will be affected. The principal spillway and retarding storage will control runoff from a flood occurring on the average of once in 100 years (100-year flood). The principal spillway will be 30 inches in diameter. The wet sediment pool will have a surface area of 18 acres. The floodwater retarding pool will cover an additional 21 acres at the emergency spillway elevation. The vegetated earth emergency spillway located on the right abutment will be 135 feet wide. Landrights for the structure, spillways, pool area, and work area will require approximately 62 acres. Construction will require the modification of approximately 1,100 feet of County Highway F and moving of two power poles.

The four floodwater retarding structures are briefly summarized in the following table.

FLOODWATER RETARDING STRUCTURES

Subwatershed	Site No.	Drainage Area			Storage Capacity		
		Total mi ²	Controlled mi ²	Percent Controlled	Floodwater (ac ft)	Sediment (ac ft)	Total (ac ft)
Cottage Inn Branch	2	13.9	8.36	60.1	967	292	1,259
Bonner Branch	3	20.5	9.97	48.6	1,287	481	1,768
Wood Branch	4	18.4	6.07	33.0	712	232	944
Vinegar Branch	8	4.2	2.19	52.1	287	103	390

All structures have a design life of 100 years. The four proposed structures will provide storage for 1,108 acre-feet of sediment during the 100-year evaluation period. This is equivalent to an average depth of 0.78 inches from the controlled drainage area. Floodwater storage capacity of 3,253 acre-feet is equivalent to 2.3 inches of runoff from the controlled area. These structural measures will control 26.59 square miles or 32.6 percent of the total drainage area in the First Capitol Watershed. They will also control 9.7 percent of the drainage area above the city of Darlington.

Clearing and grubbing of reservoir and structure site areas will be held to a minimum. This will provide for the least change or modification in the environment. Clearing and grubbing will generally be limited to areas subject to cut and fill and within permanent pool areas (1).

Erosion resistant grasses and legumes such as smooth brome, tall fescue, and birdsfoot trefoil, will be specified on a site-by-site basis (2). Mowing of structure sites and sediment pools will be restricted to minimize damage to nesting habitat; however, mowing will be often enough to maintain good grass cover on the structures.

All four single purpose flood retarding structures can be operated with either a wet or dry sediment pool. The Lafayette County Soil and Water Conservation District plans to operate structures 2, 3, and 4 with dry sediment pools to allow the free migration of fish. Since there will be no recreational opportunities at these sites, public access will not be provided.

Tentatively, FRS No. 8 will be operated with a wet sediment pool to increase aquatic habitat for fish and wildlife. Since the 18-acre pool will provide an opportunity for incidental recreation, public access will be provided from County Trunk Highway F. Minimum sanitation facilities which will meet state and local public health requirements will also be provided by the sponsors.

Smallmouth bass stream improvement features will be installed for a distance of 1.5 miles downstream from FRS No. 3 on Bonner Branch. Stream improvements will consist of instream devices and streambank stabilization. Instream devices, such as bank cover, boulder retards, stump cover, and cattle crossings with spawning areas incorporated are proposed. Streambank stabilization includes rock riprapping, sloping, and seeding. The entire 1.5 miles will be fenced on both sides at an average distance of 4 rods from the center of the stream. (See appendix B).

-Planned Project-

There will be public access from CTH G. The entire 1.5 miles of stream will be made accessible to the public by purchasing or acquiring perpetual easement on a strip averaging 4 rods on each side of the stream. No recreational facilities are planned. The sponsors will provide graveled parking areas for fishermen and minimum sanitary facilities which will meet State and local public health requirements.

Measures to be taken during construction to minimize soil erosion, water, air, and noise pollution are those described in the Soil Conservation Service Engineering Memorandum 66, Guidelines for Minimizing Soil Erosion and Water and Air Pollution During Construction; Soil Conservation Service Engineering Memorandum 76, Public Safety at Structural Works of Improvement; and U.S. Department of Interior Bureau of Reclamation publication, Safety and Health Regulations for Construction. Contractors will be required to adhere to strict guidelines for minimizing soil erosion and water and air pollution during construction. Construction areas will be vegetated during and immediately after construction. Diversions, debris basins, and stream crossings will be installed as needed to control pollution.

A systematic intensive surface archeological survey made by the State Historical Society of Wisconsin produced one flint scraper and four waste flakes at the four structure sites. The State Historical Society concluded that completion of the First Capitol Watershed project will not destroy any significant archeological information. If anything of historical or archeological interest is discovered during construction, the National Parks Service and the State Historical Preservation officer will be notified so that necessary salvage can be carried out.

The installation of floodwater retarding structures will result in land use changes at the sites and in the retarding and sediment pool areas. Cropland will be reduced by 47 acres. Grassland will be increased by 29 acres, 5 acres of which will become wetland. Eighteen acres of lake surface will be created. There will be no change in forest land acreage. Installation of the smallmouth bass stream improvement will result in land use changes within a corridor 8 rods wide and 1.5 miles long. Approximately 24 acres of grassland will be fenced off and used for wildlife habitat and access for fishermen and maintenance.

None of the areas determined to be of scientific or natural area significance by the Wisconsin Department of Natural Resources and the Scientific Areas Preservation Council will be affected by the proposed works of improvement.

Nonstructural Measures

The structural measures do not provide protection to the urban area in Belmont. Even though there are approximately 80 acres in Belmont subject to flooding from the 100-year storm, most of the flood plain area is as yet undeveloped. The plan does not include nonstructural project measures, but it recommends that existing improvements subject to flooding in Belmont be floodproofed to minimize future damage. Floodproofing may include protective dikes and floodwalls; waterproof seals around doors and windows; anchoring objects, such as fuel tanks, to prevent flotation; reinforcement to prevent structural damage; and, moving high risk items, such as electric motors, above anticipated flood elevations. These corrective measures, though not a part of the work plan, are recommended on a site-by-site basis. The U.S. Department of Agriculture Soil Conservation Service flood hazard study for Belmont will provide the basis for determining potential flooding of existing improvements. It is further recommended that the village adopt a flood plain ordinance which will prevent future development in the flood plain as defined by the flood hazard study.

If these corrective and preventive measures are followed as recommended, urban flood damages in the village of Belmont will be reduced and maintained at an acceptable level.

Operation and Maintenance

The Lafayette County Soil and Water Conservation District will operate and maintain all structural works of improvement after they are installed. The District has obtained commitments from the Lafayette County Board that the Board will furnish necessary funds for operation, maintenance, and replacement of all works of improvement installed under this plan. This commitment is in the form of a resolution passed by the County Board. The sponsoring local organization may enter into agreements with other entities to carry out the operation and maintenance activities.

The sponsoring local organization is responsible for the proper operation and maintenance, without cost to the Federal Government, of works of improvement which are installed in part with Public Law 566 funds and for which there will be a continuing need for operation and maintenance. They are also responsible for obtaining all necessary permits.

-Planned Project-

The structural measures for flood prevention are automatic in operation and require no manual operation to achieve the level of flood protection outlined in this plan. Operation of the gated sediment pools (either wet or dry) will be stated in agreements with the Wisconsin Department of Natural Resources when permits are applied for. Specific items necessary for the operation and maintenance of the floodwater retarding structures shall include, but are not limited to the following:

1. Periodic maintenance will be required to insure proper functioning of the structural works.
2. All structures are to be maintained by making repairs or replacements as needed.
3. Obstructions, trash, and debris are to be moved from the principal spillway inlets, outlets, and other structural works during and immediately after storm events.
4. Repairs to structures or structural features damaged by floods will be made promptly.
5. A drainage gradient will be maintained through the dry sediment pools so that no stagnant pools are formed. This must be done to eliminate potential health hazards and mosquito breeding areas.
6. Mowing of the structure sites and sediment pools will be restricted to prevent damage to nesting habitat; however, mowing will be often enough to maintain good grass cover on the structures. In addition, spot control of noxious weeds may be necessary. This will normally be accomplished by mowing but occasionally spraying of small areas may have less impact on wildlife habit. If chemicals are used, they will be carefully selected to prevent or minimize potentially undesirable effects, while doing the job for which they are intended. Specific chemicals will be selected based on the best information available at the time of use.

Stream fishery improvement features will involve replacement and frequent maintenance to insure effective operation. The Lafayette County Soil and Water Conservation District who has responsibility for operation and maintenance will enter into a separate O&M agreement with the Wisconsin Department of Natural Resources prior to the installation of stream fishery improvement features. The basis for such an agreement is documented in the minutes of the Lafayette County Soil and Water Conservation District meeting dated June 12, 1973. The Wisconsin Department of Natural Resources will operate, maintain, and replace instream devices and bank stabili-

zation measures. It will also provide vegetative control of woody plants. The Lafayette County Soil and Water Conservation District will maintain the fences and provide noxious weed control.

Specific items necessary for operation and maintenance of the stream fishery improvement features on Bonner Branch shall include, but are not limited to, the following:

1. Periodic maintenance will be required to insure proper functioning of instream devices.
2. Bank stabilization features are to be maintained by making repairs or replacements as needed.
3. Obstructions, trash, and debris are to be removed from the channel.
4. Parking facilities must be kept in usable condition.
5. Rental of sanitary facilities that will meet State and local public health requirements will be included in the operation cost.

Total annual operation, maintenance, and replacement cost of structural measures is estimated to be \$3,110. This includes \$1,140 for the four single-purpose floodwater retarding structures and \$1,970 for the 1.5 miles of smallmouth bass stream fishery improvement on Bonner Branch.

The stream fishery improvement includes \$400 for routine annual operation and maintenance, and \$300 for the annual rental of portable sanitary facilities. Average annual replacement cost of instream devices and bank stabilization measures is \$1,270.

For a period of 3 years following installation of each structural measure, the chairman of the Soil and Water Conservation District Supervisors, president of the First Capitol Watershed Association, chairman of the Highway Committee of the County Board, and a representative of the Soil Conservation Service will make a joint annual inspection. Annual inspections following the third year will be made by the chairman of the Soil and Water Conservation District Supervisors, president of the First Capitol Watershed Association, and the Chairman of the Highway Committee of the County Board. A report will be sent to the designated Soil Conservation Service representative. Inspections, including a report, will also be made after floods or after the occurrence of any situation which might adversely effect the operation of any of the structural measures. Inspections will cover all portions of each structure, the channel below, the ponded area above, and the stream fishery improvement.

-Planned Project-

The annual and severe storm maintenance inspections will include the determination of vector breeding areas. Those areas caused by the project that might pose a public health threat or nuisance to the public will be eliminated.

The installation and operation and maintenance of the planned works of improvement must meet the requirements of the Wisconsin Department of Health and Social Services and the Health, Education, and Welfare Committee of the Lafayette County Board.

Representatives of the Federal, State, and county governments shall have free access at all times to the structural works of improvement for official activities. All phases of operation and maintenance of these facilities shall comply with applicable local, State, and Federal regulations.

All operation and maintenance agreements must be executed prior to the signing of the landrights agreement or the project agreement for construction of structural measures. A separate operation and maintenance agreement will be prepared for each structural measure.

Each operation and maintenance agreement will contain a reference to the State of Wisconsin Watershed Operation and Maintenance Handbook for Projects Installed with Assistance from the Soil Conservation Service. An operation and maintenance plan will be prepared for each structural measure.

Project Costs

The total estimated installation cost is \$1,002,210, of which \$232,590 is for establishing land treatment on private land, and \$769,620 is for structural measures. Total Public Law 566 (P.L. 566) installation cost is \$672,410. The remaining \$329,800 is other cost. Construction cost for the four floodwater retarding structures is \$476,000, all of which will be paid by P.L. 566 funds. Construction cost of the smallmouth bass stream improvement, estimated at \$55,200, will be shared equally between P.L. 566 and other funds.

ENVIRONMENTAL SETTING

Physical Resources

First Capitol Watershed is in northwestern Lafayette County in southwestern Wisconsin. This watershed has an irregular, but roughly oval shape. The watershed is about 15 miles long and 6 miles

wide. Total drainage area is 52,198 acres, or 81.6 square miles, of which 52,064 acres are in Lafayette County, and 134 acres are in Iowa County.

The city of Darlington is located at the southeastern corner of the watershed. Darlington is about 40 miles northeast of Dubuque, Iowa; 50 miles northwest of Freeport, Illinois; and 60 miles southwest of Madison, Wisconsin. The village of Belmont is located in the southwest corner of the watershed. The unincorporated village of Calamine is near the east-central watershed boundary.

The rural population of the watershed is estimated to be 1,079. The village of Belmont has a population of about 688. The population of Darlington, which is partially within the watershed, is estimated to be 2,351.

The watershed is within the Rock River subregion of the Upper Mississippi River Region as delineated by the Water Resources Council. It is also within the Southeast Wisconsin Rivers Basin where an intensive study of water and related land resources is being conducted by the United States Department of Agriculture. The watershed is located in the area under the jurisdiction of the Southwestern Wisconsin Regional Planning Commission. It is also included in the Southern District of the Wisconsin Uniform State Districts.

The watershed is characteristic of the driftless area of the Upper Mississippi River Region. It is well drained with moderate to steep channel gradients resulting in the rapid movement of floodwaters. Flooding and associated erosion and sedimentation is a continual threat to flood plain improvements.

There are four major subwatersheds in First Capitol Watershed and numerous small unnamed drainage areas that enter the Pecatonica River. These four major subwatersheds and their drainage areas are Jones Branch, 5.72 square miles; Bonner Branch and its tributary, Cottage Inn Branch, 34.43 square miles; Wood Branch, 18.38 square miles; and Vinegar Branch, 4.14 square miles.

The rural areas have a long history of flood damage to crops, buildings, fences, livestock, machinery, roads, and bridges. The city of Darlington, located immediately adjacent to and partly within the watershed, suffers extensive urban damage. The village of Belmont has some urban floodwater damage and a potential for much more if flood plain development continues.



Frequent flooding occurs in rural areas.

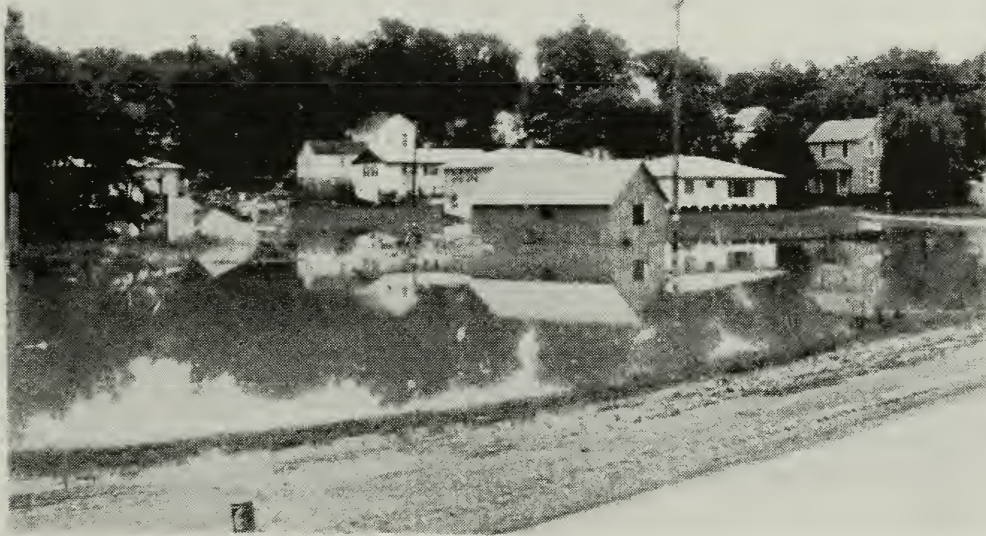
Floodwater damages during severe storm events can occur on approximately 2,510 acres of agricultural land, 100 acres of urban and built-up, and 120 acres of land with other uses, such as farmsteads and roads.

Upland sheet erosion occurs throughout the watershed. Gross erosion from cropland averages nearly 6 tons per acre per year. Sedimentation in the channels and flood plains poses a threat to fish and wildlife habitat as well as to agricultural use. It is estimated that approximately 14.4 acre-feet of sediment is delivered annually to the Pecatonica River. ^{1/}

Soils have been derived from blown silt, alluvium, colluvium, and bedrock or residuum, which have been weathered and/or biologically altered. There are six general soil associations in the watershed (3). Fifty-four percent of the watershed is covered with Dubuque and Sogn silt loams. The Sogn is dark colored and shallow. The Dubuque is light colored and moderately deep. These soils are on the

^{1/} All information and data, except as otherwise noted in the bibliography, were collected during the watershed planning investigation by the Soil Conservation Service, USDA.

limestone and dolomite ridgeland. Thirty-seven percent of the watershed is a Tama-Ashdale association of dark colored deep silt loams on the carbonate uplands. Eight percent of First Capitol Watershed has a cover of Fayette-Palsgrove. This association of light colored silt loam is found on the uplands. The remaining 1 percent consists of soils of the stream bottoms and terraces such as Arenzville, Boaz, and Huntsville silty alluvial soils; Sogn and Calamine silt loams derived from weathering of the Maquoketa Shale in the Belmont Mound area; and the Tama-Muscatine-Sable-Sogn association of silt loams near the village of Leslie on the western edge of the watershed. The major capability groupings in the watershed are classes IIe, IIs, IIw, IIIe, IVe and VIIs (4).



Serious flood hazards occur in urban areas.

Ordovician and Silurian rocks crop out in the watershed but are somewhat obscured by Pleistocene or Recent deposits of soils, alluvium, loess, and colluvium. The Ordovician rocks are mainly thick to thin bedded fossiliferous limestones and dolomites with some chert in the lowest or Oneota formation. Above the Oneota is a white to yellow-brown sandstone, the St. Peter, which is a massive quartz sandstone that lacks fossils. The St. Peter is

-Setting-

overlain by interbedded limestones, dolomites, and shales sparingly to abundantly fossiliferous--the Platteville, Decorah, Galena, and Maquoketa formations. The Edgewood formation of Silurian age, a cherty dolomite with shale partings, caps the Belmont Mound (5 and 6).

The Paleozoic formations have a regional dip of 10 to 20 feet per mile south-southwest. Superimposed on this dip are shallow folds mainly aligned in a general east-west direction.

The regional land form is in late youth or early maturity with rolling to almost flat ridgeland remnants. Slopes between the ridges and valley bottoms are usually steep and wooded with frequent outcrops of limestone, dolomite, or sandstone. The valleys have a V-shape or they are flared. Flood plains vary from 50 feet wide to more than 1,000 feet in width.

Maximum relief in the watershed is about 600 feet. The highest point is the top of Belmont Mound, 1,400 feet above mean sea level. The low point is at slightly less than 800 feet mean sea level on the Pecatonica River in the extreme southeastern corner of the watershed (7).

The watershed is within the Upper Mississippi Valley zinc-lead mining district of southwestern Wisconsin. No active mines are known to exist within the watershed. However, there are abandoned shaft and pit mines (5 and 6). Several rock quarry operations are present. The quarries are mainly in the Galena formation. The rock is used locally for road building and concrete aggregate.

First Capitol Watershed has a humid continental climate with wide extremes of temperature. The coldest month is January with an average temperature of 20 degrees Fahrenheit (F). July, the warmest month, has an average temperature of 72 degrees F. (8).

The average annual precipitation is 33 inches. This occurs mainly as rain during the growing season. The average length of the growing season is 140 days, with the first fall-killing frost in late September and last killing frost in mid-May. Winter prevailing winds are westerly while summer prevailing winds are southerly.

Precipitation in excess of 2.5 inches in a 24-hour period occurs annually. Runoff from storm events of this magnitude, or less, causes flooding in the watershed. Twenty-four hour rainfall amounts in excess of 4.25 inches will occur on an average of

once in every 10 years. Rainfall from storms having a frequency of once in 10 to 100 years (4.25 to 6.15 inches) causes extensive flood damages (9).

Adequate water supplies for existing and anticipated municipal, industrial, and rural uses are obtained from shallow dug wells in alluvium, springs, and shallow to deep wells in Ordovician sandstones, dolomites, or limestones. The water ranges from hard to very hard. The average calcium-magnesium content expressed as equivalent calcium carbonate is 335 parts per million (10).

Land use in the total watershed and flood plain areas are shown in the following table:

<u>Land Use</u>	<u>Total Watershed</u>		<u>Flood Plain Areas</u> ^{1/}	
	<u>Acres</u>	<u>Percent</u>	<u>Acres</u>	<u>Percent</u>
Cropland	26,099	50	760	28
Grassland	<u>2/</u> 17,747	34	1,680	61
Forest Land	<u>3/</u> 5,742	11	70	3
Urban and Built-up	<u>4/</u> 450	1	100	4
Other	<u>5/</u> <u>2,160</u>	<u>4</u>	<u>120</u>	<u>4</u>
Total	52,198	100	2,730	100

1/ Area inundated by a 100-year flood, not including the Pecatonica River flood plain.

2/ Includes 40 acres type 2, and 35 acres types 3, 4, 5 and 6 wetlands.

3/ Includes 5 acres type 7 wetlands.

4/ Includes 5 acres type 2 wetlands.

5/ Includes 25 acres types 2, 3, and 4 wetlands.

The few small wetland areas in the watershed are located in the flood plains of the Pecatonica River and its major tributaries. Wetlands and wetland types are defined in Wetlands of the United States Department of the Interior, Fish and Wildlife Service Circular C-39 (11). There are an estimated 110 acres of wetlands in the watershed. These include 50 acres of type 2; 30 acres of type 3; and 30 acres of types 4, 5, 6, and 7.

Approximately one-half of the watershed, or 26,099 acres, is used as cropland. There is little or no irrigation within the watershed. Cropland soils are generally adequately drained. Existing channels provide adequate outlets for the few scattered areas of poorly drained cropland. About 760 acres of cropland are located in flood-prone areas. Despite flood hazards, potentially high yields are an incentive to crop much of the flood plain in continuous corn. A common rotation in the flood plain is 6 years corn, 1 year oats, and 2 years hay.

About one-third of the watershed is grassland which is used for grazing. Nearly two-thirds of the flood plain is grassland. Grazing pressure is high on most of the 1,680 acres in the 100-year flood plain.

Small private forest lands are scattered throughout the watershed accounting for approximately 11 percent of the total land area. The 5,742 acres of forest land is located primarily in upland areas. There are only about 70 acres of forest remaining in the flood plain. Dominant forest types are mixed hardwood and oak hickory. Soil cover complexes are generally adequate to perform their hydrologic function.

The hydrologic condition of 84 percent of the forest land has a high improvement potential and 16 percent has a medium improvement potential. Hydrologic condition is defined as the relative ability of specific combinations of soil and vegetative cover to absorb precipitation and retard runoff. It expresses the interrelationship existing between the soil and forest cover, and its effect on the movement of precipitation on, into, and through the soil.

Urban and built-up areas in the flood plain include areas in the village of Belmont and on the western fringe of Darlington. Approximately 80 acres are subject to flooding in the village of Belmont. About 90 acres in the city of Darlington are subject to flooding by the Pecatonica River. Twenty acres are located within the First Capitol Watershed and 70 acres are located outside. Roads, farmsteads, and other areas occupy about 120 acres in the flood plain.

The First Capitol Watershed has a dendritic drainage pattern with perennial streams fed by numerous springs and seeps. Except for a few oxbow lakes, there are no natural lakes within the watershed. Nearly all of the 173 miles of channel are unmodified natural streams. Approximately 2 miles of channel have been modified in the village of Belmont to accommodate railroad and highway route locations.

About 56 stream miles have perennial flow. Since nearly all of the perennial streams originate from springs with year-round flow, there are practically no intermittent streams in the watershed. Ephemeral streams which accommodate flood runoff account for 117 miles of channel. The Pecatonica River, which flows along the northern and eastern boundary of the watershed, accounts for an additional 26.5 miles of perennial stream. There are numerous farm ponds and one man-made lake. Joy Lake is a private recreational development with a 555 acre-foot recreation pool and a surface area of 55 acres. It is located on Cottage Inn Branch downstream from Highway 151.

The watershed consists of four major subwatersheds and numerous small unnamed drainage areas that enter the Pecatonica River independent of one another. Bonner Branch, which is the largest subwatershed, is the only one that flows through an urban area before it enters the Pecatonica River.

Bonner Branch rises in Lafayette County in section 4, T.3N., R.1E. The stream is intermittent for about 1.5 miles. It flows in a generally easterly direction and enters Belmont about 2.5 miles downstream. After flowing about 1 mile within the village limits of Belmont, it continues on for about 10 miles before it joins the Pecatonica River near Calamine.

Jones Branch, the northwestern most subwatershed, rises in Lafayette County at Belmont Mound in the northeastern corner of section 3, T.3N., R.1E. The intermittent portion of the stream flows in a northerly direction for about 1.75 miles. The spring-fed stream becomes perennial in section 27, T.4N., R.1E., and flows in a northeasterly direction through agricultural land for about 2.7 miles. It joins the Pecatonica River approximately 22 river miles above Darlington.

Wood Branch begins in the northeastern quarter of section 30, T.3N., R.2E., and flows about 9 miles in an easterly direction before emptying into the Pecatonica River approximately 4 miles above Darlington. The stream is intermittent for nearly 3 miles before it becomes perennial. The Wood Branch subwatershed is agricultural.

Vinegar Branch, the southeastern most subwatershed, is also the smallest. It begins in the middle of section 1, T.2N., R.2E., and flows in a generally easterly direction before it empties into the Pecatonica River just inside the city limits of Darlington. This warm water stream (10) has about 1.5 miles of intermittent and 3.8 miles of perennial flow. Land use in this subwatershed is mostly agricultural with some urbanization near the mouth.

-Setting-

Surface water quality, based on samples taken by the Wisconsin Department of Natural Resources in May 1966, is shown in the following table (12).

Subwatershed Name	Total Alkalinity (mg/1.)	Specific Conductance (Umhos/cm.)	pH
Jones Branch	320	490	8.5
Bonner Branch	288	726	8.3
Wood Branch	276	590	8.4
Vinegar Branch	275	719	7.7

The Soil Conservation Service contracted with the University of Wisconsin, Stevens Point, to sample and make an analysis of Water Quality in the First Capitol Watershed. Samples were collected on March 4, 1974 during spring runoff and probably represent the worst water quality condition that could be expected on an annual basis. Test results for various water quality parameters are displayed in the following table.

Item	Unit	Site 1/								
		1	2	3	4	5	6	7	8	9
Temperature	°C	3.0	2.0	1.0	2.0	2.0	2.0	1.0	2.0	2.0
pH	-	7.43	7.44	7.37	7.40	7.37	7.38	7.44	7.56	7.64
Conductivity	uMHOS	203	207	154.7	210	205	158	203	256	230
Alkalinity	mg/l	85	83	60	74.4	64.7	66	77.8	103	96
Total hardness	mg/l	90	106	92	102	90	102	104	130	120
Ca ++hardness	mg/l	54	60	56	64	60	44	68	48	64
Dissolved Oxygen	mg/l	11.9	11.6	11.8	11.5	11.1	11.6	11.1	11.6	11.8
C.O.D.	mg/l	158	259	284	186	157	313	174	170	240
Chloride	mg/l	13.3	18.8	20.8	25.8	29.5	27.6	14.6	17.7	17.7
Ortho P	mg/l	.48	.52	.37	.32	.41	.23	.33	.55	.64
Total P	mg/l	1.60	4.80	6.00	8.22	2.44	8.00	5.00	4.00	4.88
NH ₄ Nitrogen	mg/l	1.93	1.65	1.65	1.33	1.71	1.86	1.65	1.54	1.05
NO ₃ + NO ₂ Nitrogen	mg/l	.60	1.79	2.10	2.35	2.66	2.14	1.89	2.52	1.68
Kjeldahl Nitrogen	mg/l	5.32	4.38	5.29	3.61	4.87	4.83	6.16	4.83	3.64
B.O.D.	mg/l	24.5	70	60	62	40	64	57	64	34
Fecal Coliforms	No./100 ml	1070	4000	6800	1000	3160	4800	2000	6900	7200
Dissolved solids	mg/l	162	114	116	160	142	126	92	84	168
Suspended solids	mg/l	138	1930	3224	2764	478	5126	1908	1576	2200
Total solids	mg/l	300	2044	3340	2924	620	5252	2000	1660	2368

1/ Site locations can be found on the project map, appendix E. Sites 1 and 2 are on Cottage Inn Branch at the township roads immediately above and below FRS No. 2 respectively. Site 3 is on Bonner Branch at County Trunk Highway G above the Belmont sewage treatment plant. Site 4 is on Bonner Branch at County Trunk Highway G below FRS No. 3. Sites 5 and 6 are on Wood Branch at the first township road above FRS No. 4 and at County Trunk Highway O respectively. Sites 7 and 8 are on Vinegar Branch at the first township road above FRS No. 8 and at County Trunk Highway F respectively. Site 9 is on Jones Branch at the township road crossing.

All samples were very high in biochemical oxygen demand, suspended solids, fecal coliform bacteria, soluble and organic nitrogen and phosphorous. These components tend to increase as the drainage area increases. Sample 1 and 5, being in the best condition, are located nearer the headwater of the stream or shortly after an existing impoundment as in sample 1. Samples were fairly low in hardness and alkalinity. pH was nearly neutral, but slightly basic.

Samples indicate that surface water quality in First Capitol Watershed is at least seasonally unsafe for water contact sports due to the high fecal coliform counts.

Fish and Wildlife Resources

Upland game can be found throughout the watershed. The diversified topography and vegetative cover are suitable environment for many wild animals. Wildlife residing within the watershed include whitetail deer, gray and fox squirrels, cottontail rabbits, red and gray fox, ruffed grouse, bobwhite quail, Hungarian partridge, raccoon, badger, mink, muskrat, skunk, opossum, and snakes. Over 100 species of birds visit the watershed, either as residents or migrants.

Hunting opportunities in the watershed are primarily limited to upland game. Gray and fox squirrels and cottontail rabbit hunting is good. Deer hunting is fair. Populations of game birds, such as grouse, quail, and pheasants, are limited. Most hunters are of local origin. There is no publicly owned land for hunting in the watershed.

Sport fishing opportunities are present in all perennial streams. Bonner Branch, its tributary, Cottage Inn Branch; and Wood Branch contain fair to good populations of smallmouth bass. Jones Branch is classified as trout water and is stocked annually with brown and rainbow trout. Some other common species of fish found within the watershed include stone rollers, red belly dace, bigmouth chub, creek chub, common shinner, common sucker, madton, rock bass, bullhead, and darters. Public access to the streams is limited to road crossings.

Economic Resources

Land ownership is generally private. There are about 200 acres of State-owned land managed by the Wisconsin Department of Natural Resources as a state park area. First Capitol State Park is a historic site which includes the original capitol and legislative buildings for the State of Wisconsin. Belmont Mound is a scenic attraction located less than one mile away. Although physically separated, the two areas are managed as a single park unit. Other public lands are limited to buildings, roads, and community parks.

First Capitol Watershed is heavily farmed with the sale of livestock, poultry, and their products accounting for 94 percent of the cash farm income. According to the 1970 U.S. Census of Agriculture, farms in Lafayette County had an average net cash income of \$11,300, compared to the State average of \$7,400 (13). This county average is also typical of the watershed. Agriculture is the largest single source of employment in Lafayette County and utilizes approximately 44 percent of the labor force as compared with 11 percent of the labor force in the State of Wisconsin.

A fair market exists for timber products from woodlots. This provides a small amount of income and employment through timber harvesting and timber stand improvement measures. Other intangible woodland values include public needs for recreation, wildlife, and open space.

Sixty-three percent of the farmers in the watershed are district cooperators and own 31,383 acres of land. There are 172 farm units in First Capitol Watershed. The majority of the farm units are classed as family type farms. It is estimated that only 3 farms employ more than 1.5 man-years of additional hired labor per year. The average size farm is 288 acres although one beef producer has a unit of about 4,000 acres. There is a trend toward smaller farm units being incorporated with the larger units because of rapid technical advances and mechanization in farming.

Principal crops grown are corn, oats, and hay with minor amounts of barley, soybeans, and canning peas and corn. Almost all of the feed and grain crops grown are utilized on farms within the watershed.

A common rotation in the flood plain is 6 years corn, 1 year oats, and 2 years hay. Much flood plain land is in continuous corn. Upland rotations average 2 years corn, 1 year oats, and 3 years hay.

Current flood-free yields per acre are: corn - 110 bushels; oats - 70 bushels, and hay - 4 ton. Upland yields are: corn - 95 bushels, oats - 60 bushels, and hay - 3.5 tons.

The value of agricultural land varies significantly. Average values are estimated at \$400 per acre in the flood plain and \$450 in upland areas. Land for new urban development has an average value of \$950 per acre.

First Capitol Watershed has an excellent network of Federal, State, and county trunk roads. U.S. Highway 151 crosses the watershed northeast to southwest through Belmont, located in the western portion of the watershed. State Highway 81 follows the southern boundary of the watershed west from Darlington. County Trunk Highway "G" crosses the center of the watershed in an east-west direction from Belmont to Calamine. County Trunk Highway "O" is a north-south artery which crosses the center of the watershed linking U.S. Highway 151 to Highway 81.

A spur line of the Chicago, Milwaukee, St. Paul, and Pacific Railroad crosses the central part of the watershed in an east-westerly direction along Bonner Branch from Belmont to Calamine. On December 21, 1972, the railroad filed with the Interstate Commerce Commission at Washington, D.C., an application for a certificate of public convenience and necessity permitting abandonment of this spur line. The application, which was assigned finance docket No. 26961, provided a June 12, 1972, deadline for protests. The request for abandonment is presently in Washington, D.C., awaiting approval from the Interstate Commerce Commission.

Additional town and county roads, of which many are hard surfaced, serve as good all year farm-to-market roads.

U.S. Census Bureau data show that the three rural townships of Kendall, Willow Springs, and Belmont in Lafayette County have decreased from a population of 2,015 in 1950 to 1,719 in 1970. This reduction of about 15 percent in population is a result of farm consolidation and a shortage of jobs for off-farm employment.

Recreational Resources

Existing recreational resources include a 200-acre state park development and a private lake development. The state park is located in an area of historic and scenic interest 2 miles northwest of Belmont. Facilities are limited to picnicking and hiking. There is no opportunity for water-based recreation in this park.

Joy Lake, a private lake development, consists of a 55-acre lake created by a dam controlling a 2.27 square mile drainage area on Cottage Inn Branch. The recreation pool has a maximum depth of 27 feet and an average depth of 10 feet. The area around the lake may be sold for private building sites. The development is located 3 miles northeast of Belmont.

The First Capitol Watershed has a high recreation potential in terms of topography and natural beauty. Lack of water-based recreation opportunity and public access are limiting factors.

Stream fishing opportunities are good with both trout and smallmouth bass streams located in the watershed. Public access is limited to road crossings. Water quality in the streams is generally good.

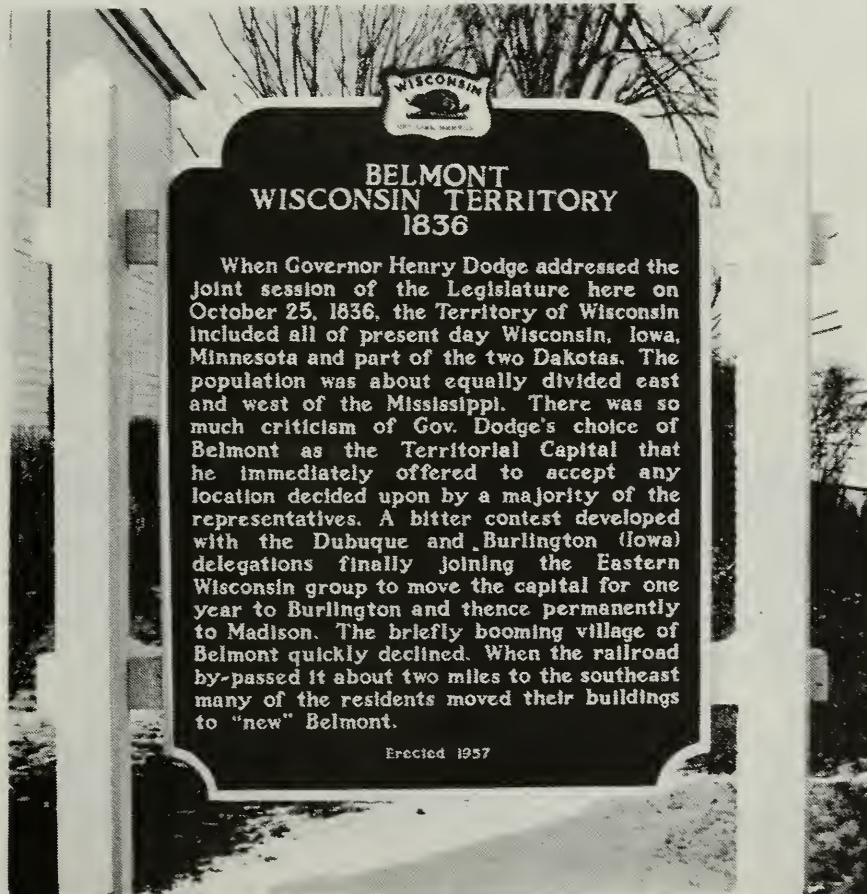
Water-based recreational opportunities near the watershed include Yellowstone Lake and Yellowstone State Park, installed by the Department of Natural Resources, and located about 10 miles northeast of Darlington. The development, which includes a 455-acre lake and a 332-acre park area, had 215,361 recreation visits in 1972. Governor Dodge State Park is located about 26 miles north of Darlington. The 5,029-acre park had 444,756 recreation visits in 1972. Both state parks provide a wide variety of recreational activities, including swimming, boating, fishing, hiking, picnicking, and camping. However, present and future needs far exceed present or planned recreational facilities. On a typical weekend during the summer, over 50 camper units are turned away by Friday night at Governor Dodge State Park. Campsites are usually not available after Friday noon.

There are an estimated 460,000 people residing within a 50-mile radius of the watershed. Over 7,500,000 people live within 150 miles of the watershed.

Archeological and Historical Resources

According to the Wisconsin State Historical Society, there are no known areas of archeological value in the watershed. The site of the first capitol and legislative buildings for Wisconsin is located in the watershed. This historic site, which is listed in the National Register of Historic Places, has been restored and is managed as a small state park.

The watershed is rich in scenic values. The rolling hills and well defined streams have much natural beauty. The most outstanding topographic feature, Belmont Mound, is managed by the Wisconsin Department of Natural Resources as a state park.



-Setting-

A natural area inventory of Lafayette County sponsored by the Wisconsin Department of Natural Resources, Bureau of Planning, and the Scientific Areas Preservation Council was completed early in 1973. Four areas delineated occurred within the First Capitol Watershed, and two of these were determined to be of State natural area significance.

Soil, Water, and Plant Management Status

Dairy and livestock farming predominates with cropping patterns of corn, oats, and hay. Present land use is nearly within its capability with no appreciable change in land use foreseen.

Watershed farmers have an active land treatment program. To date, \$401,700 has been spent on installation of land treatment measures. One hundred and seven watershed landowners are presently cooperators with the Lafayette County Soil and Water Conservation District. Ninety-four cooperators have conservation plans on 26,471 acres, or 49 percent of the watershed.

Based on land treatment goals contained in existing resource conservation plans, the percent of planned land treatment measures installed to date are as follows: contour stripcropping - 65 percent; grassed waterways and outlets - 25 percent; diversions - 25 percent; erosion control structures - 10 percent; and critical area planting - 45 percent. Conservation cropping systems are being followed on 49 percent of the cropland area.

Adequate forest fire protection is provided by the Wisconsin Department of Natural Resources in cooperation with the U.S. Forest Service under the Clarke-McNary Cooperative Forest Fire Control Program. Other current Federal-State cooperative forestry programs include: Cooperative Forest Management, Cooperative Forestation, and Cooperative Forest Pest Management.

Under existing cooperative forestry programs during the past 10 years, all 5,742 acres of forest land were adequately protected against fire. During this period 33 acres of tree planting, 47 acres of stand improvement, and 358 acres of grazing control were accomplished. Ten management plans for 145 acres were developed.

Problem areas remain on forest land where grazing has deteriorated watershed and timber values. About 34 percent of the forest land is adequately protected.

WATER AND RELATED LAND RESOURCE PROBLEMS

The principal problem is floodwater and sediment damage to agricultural and nonagricultural properties. Crops and pasture, livestock, equipment, buildings, highways, roads, bridges, public utilities, urban, and other properties are damaged or destroyed by flooding.

Land and Water Management

Land treatment needs include the orderly removal of surface runoff, control of all forms of erosion to reduce undesirable sediment accumulation, preservation of soil fertility, and increased infiltration of water to maintain a desirable soil-water relationship. Landowners are generally financially capable of installing needed land treatment



Poor land treatment results in serious erosion and sediment damage.

-Problems-

measures. Although low fertility is not yet a serious problem, topsoil depths are shallow and cropland sheet erosion rates must be reduced from the present 5.8 tons per acre per year to maintain productivity. One of the greatest needs is to achieve reductions in cropland sheet erosion through land use adjustments and management practices.

Floodwater Damage

Floodwater damage within First Capitol Watershed is the primary problem. Streamflow records for the Pecatonica River at Darlington (14) show that many floods of major proportions have occurred over the period of record. Since 1948, roads have been barricaded and traffic rerouted more than 20 times because of floods. In some years, flood plain land has been inundated several times. Past floods have destroyed crops and pasture; washed out roads, bridges, and fences; damaged equipment; drowned livestock; and deposited debris on crop and grassland. Fish and wildlife habitat has also been damaged by floodwater.



Flood damage to agricultural land.

The flood plain area subject to inundation from a 100-year flood is approximately 2,730 acres, involving approximately 54 farm units. This does not include the Pecatonica River flood plain. Frequent and severe flooding reduces crop and pasture yields and makes efficient management difficult. Interviews have established that flood plain land has changed from cropland to pasture because of frequent flooding. It is estimated that small frequent floods up to a 10-year frequency account for 78 percent of the total average annual damages.

The key flood studied occurred June 29-30, 1969. A flood of this size can be expected to occur on the average of once every 25 years. Flooding caused damage to 14 homes and 65 commercial establishments. About 1,570 acres of crop and grassland were inundated. In addition, fairgrounds, public utilities, Belmont village park, streets, roads, bridges, and railroads were damaged. Damage to both agricultural and nonagricultural properties for a future storm of this magnitude would be approximately \$1,000,000.

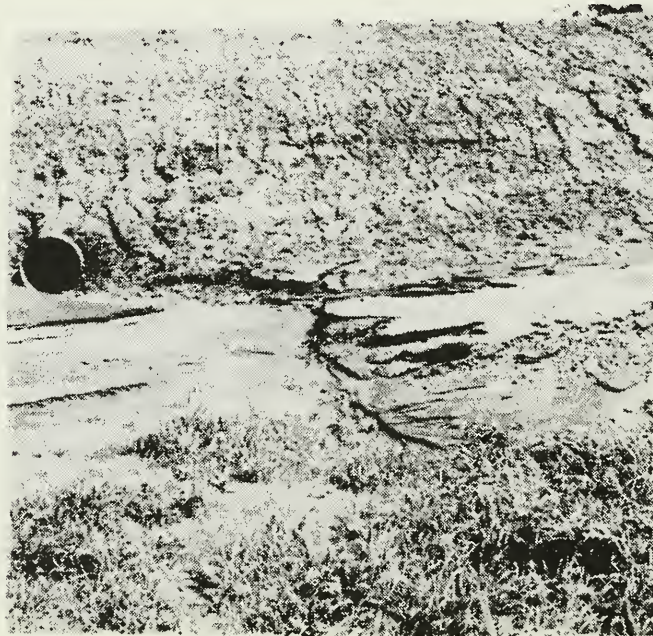
The city of Darlington, which is partially within the watershed and immediately downstream, is subject to flooding from the project area runoff. About 30 percent of the total drainage area above Darlington is in the First Capitol Watershed. The approximate value of private and public property subject to floodwater damage is \$4,870,000.

The U.S. Army Corps of Engineers stated in a survey report dated February 14, 1962, that the average annual flood damage to Darlington is about \$77,200. The report also indicated that the average annual property damage to rural property along the Pecatonica River from Calamine to about 4 miles south of Darlington was estimated at \$66,300.

One of the most severe floods of record occurred in July 1950. A flood of the magnitude of the July 1950 event is expected to occur, on the average, once every 60 years. Property damaged by this flood was estimated at \$1,015,800.

Erosion Damage

The topography of the watershed varies from gentle slopes to very steep hillsides. Gully erosion has been significant in the past but is no longer a serious problem. Roadside erosion in the watershed ranks 25th in severity among the 72 counties of the state. The watershed road cuts and ditches are usually well vegetated with an occasional break in the cover and some small shows of washed soils, sand, silt, and gravel in the ditches. Ninety percent of roadside erosion is on town roads. This type of erosion is unsightly and increases highway maintenance costs, particularly on town roads. Most of the resulting sediment is trapped in road ditches and other structures before it reaches the major drainage system.



Roadside erosion destroys the aesthetics and is a source of sediment.

Channel erosion in upstream areas is variable and lateral bank cutting is generally less than 0.075 foot per year. Downstream the rate increases, but again has a rather wide range varying from about 0.025 to 0.12 foot per year. Several main channel banks may have a lateral bank cut as high as 0.15 of a foot per year. Sediment resulting from channel erosion which is estimated to be about 10 percent of the total sediment load in the streams, contributes to water quality problems by adding nutrients and organic matter.

No separate monetary value was determined for the gully, roadside, or streambank erosion.

Upland sheet erosion in the watershed is by far the most serious form of erosion in terms of tons of soil loss. The gross erosion rate on some cropland is presently as high as 16 tons per acre per year. The watershed average for cropland is about 5.8 tons per acre per year. Sheet erosion loss on grassland is estimated at 0.5 ton per acre per year or less. The average loss on forest land is 0.16 tons per acre per year. On a portion of the forest land the absence of management attention and domestic livestock grazing have caused a greater susceptibility to surface runoff and erosion.

Upland sheet erosion not only reduces fertility and increases management costs, but it shortens the productive life of agricultural lands. Deposition of sediment eroded from the uplands causes additional damages to fish and wildlife habitat and agricultural lands. Average annual monetary erosion damages were not calculated as a separate item.

Sediment Damage

Sheet erosion from cropland is the principal contributor of sediment in the watershed. Gully, streambank, and roadside erosion are also sediment sources. Excess runoff transports sediments from the uplands to downstream areas of deposition. Sediment deposited by floodwater causes crop damage and decreases water infiltration.

In urban areas sediment is deposited inside homes, and commercial and public buildings. This causes extensive damage to stored goods, carpets, electric appliances and motors, and furniture. A large amount of time and money is spent removing sediment and cleaning floors, drapes, and building furnishings. Sediment is deposited on lawns and on driveways, thus discouraging yard

-Problems-

beautification. Sediment deposited on parks, roads, highways, and on other public properties must be removed by the State, county, or communities affected.

Sediment-laden floodwater damages automobiles and farm machinery. Normal farm operations are disrupted by the dismantling and repair of machinery damaged by sediment. Fish and wildlife habitat has been damaged and destroyed by floodwater and sediment.

The sediment delivered annually to the Pecatonica River from the watershed is estimated at 31,200 tons or 14.4 acre-feet.

Sediment damages caused by the June 1969 storm were evaluated in conjunction with floodwater damages. Although evaluated as inseparable, a reasonable estimate of damages attributable to sediment would be about 26 percent of the total.



Sediment damage to cropland

Recreation Problems

Water based recreational opportunity within the watershed is limited to a 55-acre private lake, a few small oxbow lakes, and the stream system. The streams provide sport fishing opportunities, but flooding and lack of proper land management seriously jeopardize existing fisheries. Chemical water quality is generally good.

The village of Belmont is the only point source of municipal and industrial waste in the watershed. In the past some impairment of chemical water quality in Bonner Branch has resulted from this source. There are no significant point sources of agricultural pollution. Jones Branch is a spring-fed cold water stream of moderate gradient which supports limited natural reproduction of brown trout. Other major streams in the watershed are warm water seepage streams which generally provide good habitat for smallmouth bass. There are no sources of thermal pollution in the watershed.

The major water quality problem is physical impairment because of sedimentation. Suspended and bottom sediments are reducing the quality of fish habitat. Very high fecal coliform counts observed in water samples taken during spring runoff indicates that all major streams in the watershed are at least seasonally unsafe for water contact sports. Nitrogen and phosphorous levels were also observed to be very high in these samples. Indications are that improved farm animal waste handling and treatment facilities would vastly improve surface water quality.

Perennial streams average about 6 feet in depth and 40 feet wide. Gradients vary from less than 2 feet per mile to more than 34 feet per mile. Channel substrate is typically gravel, but increasing amounts of silt are being deposited near the mouth and in other low gradient reaches of the streams. Most of the watershed is agricultural. Urban development is limited to the village of Belmont located on the upper portion of Bonner Branch. Cover conditions along perennial streams are mostly crop and pasture. Very little woodland remains along the streams except on Jones Branch (10).

Access to existing water resources is controlled by private ownership. There is not only a need for additional water-based recreation of all types within the immediate area, but there is also a need for public access to the existing resources.

-Problems-

Local interest in developing recreational resources is divided. The need for more recreational areas is recognized. However, a difference of opinion exists over the size or extent of recreational developments. Small community type developments along with enhancement of fishing opportunities are locally supported.

A majority of local residents were opposed to the proposed extensive park and recreational development on Jones Branch. The outcome of an advisory referendum was 487 for and 515 against the Jones Branch development.

Fish and Wildlife Resource Problems

Game fish currently inhabit the streams, but flooding and sedimentation are a threat to their habitat. There is a need to protect the existing fishery resource from flooding, erosion, and sedimentation damage. Populations of most upland game species are low because of limited nesting and winter cover. The destruction of farm and roadside hedgerows has reduced prime habitat for a number of species. Waterfowl production is negligible because of a limited amount of suitable water areas. Lack of prime habitat limits the potential numbers and distribution of upland wildlife species. Additional habitat for nesting and cover is needed to increase wildlife populations. Hunting and fishing pressure indicates the need for increased fish and wildlife resources. This can be accomplished in part by increasing and improving existing habitat.

According to information provided by the Wisconsin Department of Natural Resources, there are no known rare or endangered animal species residing in the First Capitol Watershed (15). The Arctic Peregrine falcon may be an infrequent migrant.

Economic and Social Problems

All but three of the 172 farm units in the watershed are classed as family type farms. Many of the farmers are dependent on off-farm employment to supplement their farm income. Shortage of such jobs has contributed to an outmigration to seek employment elsewhere. Three townships in the watershed experienced a 15 percent decrease in population between 1950 and 1970. Nearly all of the area subject to flooding is on family farms.

There is a need for rural community development in and around the watershed. Additional employment opportunity, along with increased operating efficiency, is needed to provide incentives for the younger adults to remain on the family farm. Increased employment opportunities would also be an asset to the city of Darlington.

ENVIRONMENTAL IMPACTS

Conservation land treatment will reduce erosion and the resultant sediment damage, maintain and improve soil fertility, improve water intake into the soil, and allow farmers to more efficiently use and manage farmlands.

Installation of the proposed land treatment measures will reduce cropland sheet erosion from 5.8 to 3.5 tons per acre per year. The 2.3 tons per acre per year reduction is a 40 percent decrease in the average annual rate on cropland. Erosion will also be reduced on other agricultural land.

The reduction in erosion will be accompanied by a corresponding reduction in sedimentation. This reduction will be supplemented by the trap efficiency of the four floodwater retarding structures. It is estimated that sediment reaching the Pecatonica River from the watershed will be reduced by 45 to 55 percent of the present estimated rate of 14.4 acre-feet per year.

Sediment reduction because of land treatment measures will reduce the cost of maintaining the four floodwater retarding structures, the 1.5 miles of smallmouth bass stream improvement, and roads and bridges.

Land treatment measures such as terraces, diversions, and contour strips will reduce floodwater and sediment damages by about 3 percent.

Installation of forest land treatment measures and intensified multiple-use management will enhance recreation and wildlife values and contribute substantially to beautification, esthetic appeal, environmental quality, and future use of the woodland resources.

Wildlife habitat will be protected and enhanced by a reduction in erosion and sedimentation. Wildlife habitat improvement practices, such as ponds and odd area plantings of trees and shrubs for food and cover, will improve and increase existing habitat.

-Impacts-

Proposed land treatment measures to be installed during the 5-year project will increase the land adequately treated from 26,300 to 37,910 acres. The total area to be treated, 11,610 acres, is about 22 percent of the 52,198 acres in the First Capitol Watershed.

Structural works of improvement to supplement land treatment measures will protect 1,600 of the 2,730 flood plain acres in the watershed. Structural measures will reduce floodwater and sediment damages by amounts ranging from a minimum of 36 percent to a maximum of 99 percent in the flood plain area below the structures.

Damage reduction in the city of Darlington, which is partially within the watershed area, will be incidental to the project. Complete protection of the city is not possible because the watershed area includes less than one-third of the total drainage area above the city. Remaining damages will be minimized if the U.S. Army Corps of Engineers constructs a local flood control project in Darlington as authorized by Congress in the Flood Control Act of 1962. Structural measures will also provide incidental flood damage reduction in a portion of the Pecatonica River flood plain adjacent to the watershed.

Structural measures will provide minimum levels of flood protection ranging up to a 20-year frequency flood. Reach a on Cottage Inn Branch from FRS No. 2 to the first downstream tributary will be protected from a 20-year frequency flood or greater. Reach b from the end of reach a to the confluence with Bonner Branch will have minimum protection from a storm expected to occur on the average of once every two years. Reaches c and d on Bonner Branch from FRS No. 3 to the Pecatonica River will receive annual or greater protection. Reach e on Wood Branch from FRS No. 4 to about 2 miles downstream will receive 2-year frequency flood protection or greater. Annual or greater protection will be provided for reaches f and g on Wood Branch from the end of reach e to the Pecatonica River. Reach h on Vinegar Branch from FRS No. 8 to the Pecatonica River will receive protection from a 2-year frequency flood or greater.

The above levels of protection are minimums. Many portions of the reaches discussed will have a much higher level of protection. In areas immediately below the proposed structures, 50-year to 100-year levels of protection will be approached.

Structural measures will reduce flood peaks by varying amounts throughout the watershed depending on the proximity of structures, percent of control, and magnitude of the storm.

PEAK DISCHARGES IN CUBIC FEET PER SECOND

	100 Year		5 Year	
	Without	With	Without	With
<u>Bonner Branch</u>				
Cottage Inn Site	5,900	160	2,400	130
Bonner Branch (Belmont Arm)	4,420	155	1,825	130
Confluence of Cottage Inn and Bonner Branches	8,700	5,420	3,510	2,000
At Pecatonica River Confluence	7,360	4,150	2,960	1,640
<u>Wood Branch</u>				
Site	2,925	110	1,160	95
At Pecatonica River Confluence	6,200	5,445	2,450	2,100
<u>Vinegar Branch</u>				
Site	1,630	85	670	68
At Pecatonica River Confluence	2,080	1,640	825	585

-Impacts-

The four structures will control 32.6 percent of the watershed and about 9.7 percent of the total drainage area above the city of Darlington. The depth of flooding and area flooded will be reduced on approximately 1,600 acres of flood vulnerable land within the watershed. Reductions in area flooded below structures for 24-hour duration storms are shown in the following table.

<u>Storm</u>	<u>Area Flooded Below Structures (Acres)</u>	
	<u>Without Project</u>	<u>With Project</u>
2-Year	725	140
5-Year	1,185	670
10-Year	1,360	900
100-Year	1,600	1,295

For the key flood studied, a 25-year frequency storm, the area flooded within the watershed will be reduced from about 1,440 acres to 1,010 acres with the installation of the project measures. About 33 rural landowners will be directly benefited by the project. Overall, the estimated damages for the key flood will be reduced \$127,000.

Additional significant damage reduction will occur outside the watershed in the agricultural flood plain of the Pecatonica River from Calamine downstream to about 4 miles below Darlington.

Approximately 35 rural landowners will benefit from crop, pasture, and rural property damage reduction on about 1650 acres of agricultural land in the Pecatonica River flood plain. In addition about 12 residences, 62 retail businesses, a county fairgrounds, city fire station, transformer station and railroad yard in the city of Darlington will receive benefits from flood peak reductions. It is estimated that damages will be reduced 11 percent.

The project will reduce flood flows at 12 bridge locations. Road and bridge repairs, bridge replacement costs, and the frequency of road closures will be reduced. Structural measures will reduce floodwater and sediment damages to roads and bridges by about 71 percent. Water supply and waste disposal systems, public utilities, etc., will also be protected from flooding.

During construction there will be an unavoidable increase in air and noise pollution and stream sedimentation. These will be minimized as discussed under Planned Project. Following construction, the sediment deposition and turbidity will be reduced below the proposed floodwater retarding structures.

The project will reduce average annual flood damages by \$46,050. It is estimated that average annual damages below the structures within the watershed will be reduced about 67 percent. In addition, average annual damages in the Pecatonica River flood plain and in the city of Darlington will be reduced by about 11 percent.

The smallmouth bass stream improvement features to be installed on 1.5 miles of stream should increase fish populations and provide additional recreational opportunities for fishermen. Following installation, recreation visits are expected to increase from 400 to about 2,470 annually. The primary use season extends from May through November with the greatest use occurring during July and August.

Twenty-four acres of grassland adjacent to the smallmouth bass stream improvement will be removed from agricultural production and used for wildlife habitat and public access.

The installation of the floodwater retarding structures will affect approximately 6.7 miles of perennial streams and 415 acres of agricultural land along with the associated upland game habitat.

About 860 feet of stream will be replaced with pipe, 1,300 feet will be modified below the structures, 0.5 mile will be inundated by a wet sediment pool, 2.4 miles will be located within the dry sediment pools and 3.4 miles will be located within the floodwater retarding pools. Land use will change from 118 acres of cropland and 297 acres of grassland to 71 acres of cropland, 326 acres of grassland which includes 5 acres of wetland, and 18 acres of water. The sediment pools over a period of 100 years will gradually fill with sediment.

-Impacts-

The streams located in the floodwater retarding pools will also be subject to sediment deposition. Most of the earthfill material required for the construction of the dams will come from within the structure, sediment and retarding pool areas, but some additional borrow areas may be needed.

The table on the following page summarizes the impact of each flood-water retarding structure.

The floodwater retarding structures will temporarily impound flood peaks and release them over a period of 10 days or less. Some of the nutrients contained in the surface runoff will be trapped with the sediment in the sediment pools. Peak nutrient loads released downstream will be reduced, but the duration of above average nutrient levels will probably be increased. The small change in duration and levels of nutrients will have no measurable impact on downstream water quality and aquatic ecosystems.

The wet sediment pool at site 8 will be surrounded with a wetland fringe supporting aquatic vegetation which will provide habitat for fish and wildlife. Much of the area in the dry sediment pools will develop plant cover providing wildlife habitat and permitting limited livestock grazing. Land use in the retarding pool areas can remain unchanged except that the flood damage risk will be greater.

The First Capitol Watershed will gain 5 acres of wetlands and 18 acres of lake surface as a result of the project. Approximately 1.5 miles of smallmouth bass fishery will be directly improved by the project. The fishery in all streams below structures will be improved as the result of decreased floodwater and sediment damage.

Public access to both the wet sediment pool at FRS No. 8 and the smallmouth bass stream improvement below FRS No. 3 is already available from two public highways. Parking facilities at both locations will consist of a minimal gravel surfaced off-street parking area immediately adjacent to the public highway. Sanitary facilities at both sites will be required to meet state and local public health requirements. The use of portable, self-contained rental units is anticipated. Pedestrian access to the water's edge will be controlled by trails and landscape plantings where necessary to protect the environment. No other facilities are planned. When properly installed and maintained, these facilities are expected to have an insignificant impact on water quality.

Structure Site No.	Stream Replaced By Pipe Through Dam (Feet)	Channel Modified Below Structure (Feet)	Stream In Sediment Pool (Mile)	Stream In Retarding Pool (Mile)	Area Required For Dam and Spillway (Acres)	Land Use In Sediment Pool Area		Land Use in Retarding Pool Area	
						Before Installation (Acres)	After Installation (Acres)	Before Installation (Acres)	After Installation (Acres)
2	235	200	1.0	1.4	10-Grassland	36-Grassland	No Change	75-Grassland	No Change
3	210	450	0.8	1.0	2-Cropland 4-Grassland	67-Grassland	No Change	50-Cropland 50-Grassland	No Change
4	225	400	0.6	0.7	4-Cropland 2-Grassland	28-Cropland	28-Grassland	21-Cropland 21-Grassland	No Change
4 5 8	190	250	0.5	0.3	3-Cropland 3-Grassland	10-Cropland 8-Grassland	18-Water 1/ 8-Grassland	21-Grassland	No Change 2/ No Change 2/
TOTALS	860	1,300	2.9	3.4	9-Cropland 19-Grassland	38-Cropland 111-Grassland	18-Water 1/ 131-Grassland	71-Cropland 167-Grassland	No Change 2/ No Change 2/

1/ The wet sediment pool will replace 18 acres of cropland and grassland with an 18-acre lake surface. The water will gradually be replaced by sediment during the 100-year design life of the structure.

2/ Five acres of grassland in the retarding pool will become wetland, but land use is not expected to change.

-Favorable Effects-

No known rare or endangered animal species will be affected by the project. Some rare species of plants could exist in two areas determined to be of State natural area significance. These areas will not be affected by the construction of the proposed structural measures.

There are no archeological, historical, or scientific sites, properties, or similar values which will be affected by the project. The site of the first capitol and legislative buildings for Wisconsin, which is listed in the National Register of Historic Places, will not be affected by the project.

The quality of man's environment will be improved with the reduction of flood damages. His economic well-being will also be improved.

See appendix C for a summary of annual project costs, benefits, and benefit-cost ratio.

FAVORABLE ENVIRONMENTAL EFFECTS

Sheet erosion on cropland will be reduced by 2.3 tons per acre per year. Sediment reaching the Pecatonica River will be reduced from about 14.4 to 7 acre-feet per year.

Floodwater and sediment damages will be reduced by 67 percent on 1,600 acres, by 11 percent in the city of Darlington, and by 71 percent to roads and bridges.

Flood peaks will be reduced throughout the watershed and in the Pecatonica River flood plain.

Additional recreational opportunities will be provided by installation of the smallmouth bass stream improvement features and by the 18-acre wet sediment pool. Recreation visits by smallmouth bass fishermen will be increased from 400 to 2,470 annually. Public access will be provided to the lake and stream.

-Favorable Effects-

Food and cover will be provided by land treatment measures. Stream habitat will be improved for 1.5 miles. Twenty-four acres of grassland adjacent to the stream improvement will be fenced and allowed to develop into diversified wildlife habitat by natural succession and selective planting. An 18-acre lake and an additional 5 acres of wetlands will be created by the project. Floodwater and sediment damage to fish and wildlife habitat will be reduced.

ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED

Agricultural and associated wildlife use will be lost on 47 acres of cropland and 130 acres of grassland by the construction of the four floodwater retarding structures, spillways, and sediment pools. Agricultural and associated wildlife use of 71 acres of cropland and 167 acres of grassland will be periodically interrupted by floodwater in the flood pools of the four structures. Approximately 24 acres of grassland along the 1.5 mile smallmouth bass stream improvement will be lost from agricultural production.

Approximately 0.5 mile of stream will be inundated by the wet sediment pool. Sediment deposition will occur in 2.4 miles of stream within the dry sediment pool and 3.4 miles of stream in the flood pools. About 860 feet of stream will be replaced by pipe flow through the structures. Approximately 1,300 feet of channel modification will be required below the structures to safely return the pipe flows to the existing channels.

There will be an unavoidable increase in air and noise pollution and stream sedimentation during construction.

ALTERNATIVES

The project objectives which represent the wishes of the local people are to establish land treatment and structural measures which will contribute directly toward watershed protection and flood prevention. A major goal is to get adequate land treatment on 75 percent of the upland by the end of the 5-year project period. This would require land treatment practices on an additional 11,150 acres. The primary objective is to reduce floodwater, erosion and sediment damages to crops, pasture, equipment, on-farm facilities, roads, bridges, and in Darlington. A 2-to 10-year level of flood protection is desired in the rural areas of the watershed. The maximum practical level of protection is desired for Darlington. Other objectives include the improvement of fish and wildlife resources, and the development of water and land-based recreational facilities.

Various combinations of structural and nonstructural measures were considered, including those suggested by interested agencies, groups, and individuals. The more significant alternatives considered were:

1. Continuation of the present trends .
2. Accelerated land treatment .
3. Accelerated land treatment, flood plain zoning and flood proofing of existing buildings subject to flood damage .
4. Accelerated land treatment, nine floodwater retarding structures, and one multiple purpose recreation and floodwater retarding structure .
5. Accelerated land treatment, four floodwater retarding structures, one multiple purpose structure, 1.9 miles of trout stream improvement, 1.5 miles of smallmouth bass stream improvement and recommended flood proofing and flood plain zoning in urban areas .
6. Accelerated land treatment, flood plain zoning and flood proofing in urban areas, and purchasing 1600 acres of rural flood plain .

Continuation of the present trends in the use of the watershed will result in part of the land treatment being installed .

With the ongoing rate of applying land treatment measures continuing at about half of the accelerated rate, the average cropland erosion rate will be reduced from 5.8 to 4.7 tons per acre per year . Land treatment will reduce flood damages by about one percent or \$500 annually . Cost of installing land treatment at the present rate for the next five years is estimated at \$112,000 . All monetary benefits from continued agricultural production and reduced erosion resulting from land treatment have not been evaluated . If the project is not installed, it is estimated that \$13,210 of net average annual benefits would be foregone .

Eliminating all structural measures from the plan and installing only ongoing and accelerated conservation land treatment would reduce the annual rate of erosion from cropland from 5.8 to 3.5 tons per acre per year, which is essentially the same as for the planned project . Floodwater and downstream sediment damages would be reduced by less than 3 percent or about \$1,230 annually . Cost of installing land treatment measures at the accelerated rate during the 5-year installation period is estimated at \$232,590 . Net average annual benefits foregone would be \$13,210 .

-Alternatives-

A program including accelerated land treatment, flood plain zoning and flood proofing of existing improvements was considered. Accelerated conservation land treatment would have the same effect as discussed in the last alternative.

Flood plain zoning would reduce future damages by restricting development in areas subject to flooding. Only uses subject to minimal flood damages such as day-use recreational areas and environmental corridors should be allowed. This is especially effective in preventing damages in potential urban areas. Although flood plain zoning can reduce damages in rural areas, it is generally less effective because of the extensive land use involved. Except at great expense for relocation, roads and bridges in the flood plain will continue to sustain damage. Without prohibitive land use restrictions, agricultural use and associated damages will continue as a calculated risk.

A flood hazard study for the Village of Belmont prepared by the Soil Conservation Service has been completed. This study will be used to establish a flood zoning ordinance based on criteria outlined in chapter NR 116 of the Wisconsin Administrative Code. The city of Darlington has adopted a flood zoning ordinance.

Flood proofing of two homes and four businesses is recommended as the most practical means of reducing existing flood damages in Belmont. Most of the homes and many of the businesses in Darlington are not readily adaptable to floodproofing.

The cost of this alternative is estimated to be \$302,000. Net average annual benefits foregone would be approximately \$13,000.

Installation of accelerated conservation land treatment supplemented by nine floodwater retarding structures and one multiple purpose recreation and flood retarding structure would provide maximum reduction in floodwater and sediment damages in the rural areas of the watershed. They would provide 100-year flood protection in the village of Belmont and provide approximately 12 percent average annual damage reduction in the city of Darlington. Floodwater and sediment damages would be reduced by about 70 percent in the flood plain below the structures. The multiple purpose structure and facilities would provide an opportunity for water-based recreational activities. The facilities would provide about 34,800 recreation visits annually. Improvement of fish and wildlife resources would be incidental.

Agricultural and associated wildlife use would be lost on 85 acres of cropland, 200 acres of grassland, and 6 acres of woodland by the construction of the ten structures, spillways, and sediment pools. Agricultural and associated wildlife use of 103 acres of cropland and 265 acres of grassland would be periodically interrupted by floodwater in the flood pools of the ten structures.

The estimated cost of installing this combination of structural measures is \$2,150,000. The benefit-cost ratio is estimated to be 0.8 to 1.0.

Installation of accelerated conservation land treatment supplemented by four floodwater retarding structures, one multiple purpose structure, 1.9 miles of trout stream improvement, 1.5 miles of smallmouth bass stream improvement, and recommended flood proofing and flood plain zoning would provide 2- to 20-year flood protection. Floodwater and sediment damages would be reduced by 65 percent in the flood plain below the structures. Damages in Belmont would be reduced through flood plain zoning and flood proofing. Average annual floodwater and sediment damages to the city of Darlington and the Pecatonica River flood plain outside of the watershed would be reduced about 11 percent. The multiple purpose structure and facilities would provide an opportunity for water-based recreational activities. The State and county would purchase additional land for future expansion and a park. This area would become a state park by combining it with the two existing state parks. The 1.9 miles of trout stream improvement and 1.5 miles of smallmouth bass stream improvement would improve the fishery resource of the watershed. Excluding the expanded park area, the multiple purpose structure and facilities and the stream improvements would provide about 35,900 recreation visits annually.

Agricultural and associated wildlife use would be lost on 47 acres of cropland, 184 acres of grassland, and 5 acres of woodland by the construction of the five structures, spillways, and sediment pools. Agricultural and associated wildlife use of 71 acres of cropland and 178 acres of grassland would be periodically interrupted by floodwater in the flood pools of the five structures.

Approximately 24 acres of grassland along the 1.5 mile smallmouth bass stream improvement and 1 acre of cropland, 21 acres of grassland, and 8 acres of woodland along the 1.9 mile trout stream improvement would be removed from agricultural land use. The estimated cost of installing this combination of structural measures is \$1,536,030. The benefit-cost ratio would be 1.1 to 1.0. This alternative was rejected on the basis of the outcome of an advisory referendum which was 487 votes for and 515 votes against the recreation development.

Installation of accelerated conservation land treatment supplemented by flood plain zoning and flood proofing in urban areas, and the purchase of 1600 acres of rural flood plain was considered. Conservation land treatment would provide the same protection to the uplands as the planned project. Flood plain zoning for urban areas would reduce future increases in urban flood damages. Flood proofing in Belmont would reduce flood damages to two homes and four businesses.

Purchasing the 1600 acres of rural flood plain would eliminate \$21,920 average annual agricultural damage. Road and bridge damage of \$9,720 annually would remain essentially the same. An additional \$21,940 of average annual urban and rural flood reduction benefits along the Pecatonica River would be foregone. Loss of 1600 acres of agricultural land from production would reduce net farm income by \$37,360 per year. The tax base would be reduced. Reduced farm income would reduce the demand for goods and services creating an adverse economic impact on the entire community. Increases in wildlife and recreational lands would have a favorable impact on the environment.

Purchasing the 1600 acres of rural flood plain would involve 33 landowners. It is estimated that 10 landowners would suffer minor severance damages in the form of inconvenience and disrupted operations. The remaining 23 owners would suffer major severance damages in terms of access and general operating efficiency. As many as five sets of farm buildings would have to be relocated. Several farm units would become economically marginal and a few may become uneconomic.

It is estimated that the average cost of acquiring the flood plain would be a minimum of \$800 per acre. This includes severance and relocation costs. The total direct cost of acquiring the 1600 acres of flood plain would be \$1,280,000. Total project cost including land treatment would be \$1,512,590. Amortized at 5 1/2 percent interest the average annual implementation cost becomes \$83,586. Average annual flood damage reduction benefits would be \$23,150. This includes \$21,920 of agricultural damage eliminated by purchasing the 1600 acres of flood plain and \$1,230 from land treatment. The benefit-cost ratio would be 0.3 to 1.0. This analysis does not include indirect costs such as reduced business activity and loss of tax base, nor does it include annual maintenance cost for fencing, weed control, etc.

SHORT TERM VS. LONG TERM USE OF RESOURCES

Watershed lands are used primarily for agricultural production and are not expected to change materially in the future. No changes in land use are proposed which will significantly restrict options for future use or limit productivity. The structural measures are evaluated for a 100-year period. They are assumed to remain in use for the evaluation period. Structures, reservoirs, and borrow areas will preclude optional use of 0.8 percent of the watershed. On the remaining 99.2 percent, opportunities for productive use will be maintained or enhanced.

The land treatment measures will provide for preservation of the soil and water resources over the long term and allow reasonable use through time. The project provides flood protection to agricultural lands and reduces flood damages in the city of Darlington.

Long term effects of the project will be to improve agricultural efficiency and to provide a more stable economic base in this rural area. Direct flood damage reduction to the city of Darlington will reduce business expense and help stimulate economic activity and employment. Greater agricultural returns will result in greater purchasing power and improved economic stability in the urban and rural communities.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

Approximately 28 acres of cropland and grassland will be committed to dams and spillways with the installation of the project. Vegetative cover will change to grassland. Use will be limited to wildlife habitat.

About 18 acres of cropland and grassland will be committed to the wet sediment pool on Vinegar Branch. About 131 acres of crop and grassland will be committed to the remaining three sediment pools tentatively planned to be operated dry. Approximately 50 man-months of labor will be expended in the construction of the project. Approximately one man-month of labor will be expended annually for inspection, operation, and maintenance of the structures. Twenty-four acres of grassland adjacent to the smallmouth bass stream improvement will be removed from agricultural production and committed to public access and wildlife habitat.

CONSULTATION AND REVIEW WITH APPROPRIATE AGENCIES AND OTHERS

General

The application for project assistance, which was submitted to and approved by the State of Wisconsin Board of Soil and Water Conservation Districts (formerly the State Soil and Water Conservation Committee) representing the Governor of Wisconsin was received in October 1965. Planning priority was established in December 1966 by the State of Wisconsin Board of Soil and Water Conservation Districts. A preliminary investigation report was prepared in August 1967. Planning authority for development of a Watershed Work Plan was issued by the Administrator of the Soil Conservation Service in March 1969. At that time the following agencies were notified of planning intentions and requested to furnish any comments or suggestions they might have concerning the project: U.S. Army Corps of Engineers, Rock Island, Illinois; U.S. Department of Health, Education and Welfare, Chicago, Illinois; U.S. Bureau of Mines, Pittsburgh, Pennsylvania; U.S. Fish and Wildlife Service, Twin Cities, Minnesota; Federal Water Pollution Control Administration, Chicago, Illinois; Wisconsin Department of Natural Resources; Wisconsin Department of Transportation; Wisconsin Board of Soil and Water Conservation Districts; University of Wisconsin-Extension; U.S. Forest Service; USDA, Agricultural Stabilization and Conservation Service; and USDA Farmers Home Administration. Subsequently, the U.S. Environmental Protection Agency, the Wisconsin Departments of Administration and Health and Social Services, the State Historical Society, and the Southwestern Wisconsin Regional Planning Commission were asked for input and suggestions.

The plan was developed in consultation with federal, state, and local agencies and groups expressing interest. Nineteen organizational and informational meetings were held with the sponsors, watershed residents, and other interested agencies up to the time that the preliminary investigation report was presented. Throughout the planning process an additional 21 meetings were held. The primary purposes of these meetings were to exchange information and keep up to date on local developments. A special attempt was made to keep landowners, watershed residents, special interest groups, the general public, and cooperating agencies fully informed about the planning process. As planning progressed, newspaper articles, a brochure, spot radio announcements, and newsletters kept the public informed.

Discussion and Disposition of Each Comment on
Draft Statement

Comments were requested from the following agencies:

Department of the Army
Department of Commerce
Department of Health, Education, and Welfare
Department of the Interior
Department of Transportation
Environmental Protection Agency
Advisory Council on Historic Preservation
Federal Power Commission
Wisconsin Board of Soil and Water Conservation Districts
Wisconsin Department of Administration
Wisconsin Department of Natural Resources
Southwestern Wisconsin Regional Planning Commission

The Department of Commerce, Advisory Council on Historic Preservation, Federal Power Commission, Southwestern Wisconsin Regional Planning Commission, and the Wisconsin Department of Natural Resources did not reply.

Summary of Comments and Responses

Each issue, problem, or objection is summarized and a response given on the following pages. Comments are serially numbered to correspond with the original letters. The original letters of comment appear in appendix D.

Department of the Army

(1) Comment: The draft environmental statement is considered satisfactory. We foresee no conflict with any projects or current proposals of this office.

Response: None.

Department of Health, Education and Welfare

(1) Comment: We have no comments to offer on the draft Environmental Impact Statement for the First Capitol Watershed, Wisconsin.

Response: None.

Department of the Interior - Comments were received on both the environmental impact statement and watershed work plan.

E.I.S. Comments

(1) Comment: The draft statement is generally adequate in its discussion of fish and wildlife values. This is true both with respect to existing values and those changes anticipated with the project. However, we believe the initial sentence of the last paragraph on page 44 is too optimistic. Not all wildlife habitat will be enhanced. It may be true for wetland habitat, but upland habitat will likely be decreased largely due to the loss of grassland-cropland interface located in the floodwater storage areas.

Response: Concur. The subject sentence has been deleted. The revised paragraph can be found on page 47.

(2) Comment: We have noted that the proper State agencies have been consulted with regard to archeological, historical, and natural values (pp. 28 and 29) and that no known values will be affected by the project (p. 42). While we appreciate the attention shown to cultural (historic, archeological, architectural) resources in the statement, it is evident that the assertion that no such values exist in the affected area is based solely on correspondence and inference. There has been no direct, interdisciplinary investigation of the area to determine with assurance whether or not cultural resources will be affected. While no cultural values may be now known in the project area, undiscovered resources of significance may, in fact, exist there. To assure an adequate investigation of the environment and

a complete environmental statement, the area should be directly examined by a professional archeologist and other professionals trained to locate, identify, and evaluate cultural resources. The results of the interdisciplinary investigation should be sufficient to provide a substantive description of affected cultural resources, analyze expected effects, and develop an appropriate program to avoid or mitigate adverse effects. Without a full and direct examination of the affected environment, treating all parts of the human environment, we cannot agree that the environmental statement is complete.

Response: The State Historical Society of Wisconsin has conducted archeological studies at the structure sites. Results of these studies are discussed in the third paragraph on page 12.

(3) Comment: Among the recommended measures to protect the Belmont urban area from flood damage are certain structural measures such as protective dikes and floodwalls. However, the recommended locations of any such structures do not appear to be included in the draft environmental statement, nor are the merits of building such structures to protect Belmont discussed in the statement.

Response: The section entitled Nonstructural Measures on page 13 has been revised.

(4) Comment: The environmental impact of the project on water resources of the area seems to be adequately evaluated. However, the stated erosion rate (p. 31) of 5.8 tons per acre (3,712 tons per square mile) seems excessive. It is about ten times the figures published in the U.S. Geological Survey Hydrologic Atlas HA-376.

Response: The 5.8 tons per acre per year gross erosion rate, which is mentioned repeatedly in the EIS (see summary, also pages 2, 18, 32, 35, and 39) refers to erosion from cropland only. Since erosion rates are lower for other agricultural land uses (page 2),

and cropland only accounts for 50 percent of the basin area (page 21) the average erosion rate per composite acre would only be 3.2 tons per acre per year or 2,050 tons per square mile per year instead of 3,712 tons. The figures published in the U.S.G.S. Atlas HA-376 are sediment yields based on suspended sediment load samples and do not account for the fact that less than 20 percent of the eroded materials ever reach the sampling stations. (see Sediment Delivery Ratio Curve, Soil Conservation Service National Engineering Handbook, Section 3, Sedimentation, pages 6-14).

- (5) Comment: First Capitol Watershed is located within the Upper Mississippi Valley zinc-lead district, and this is mentioned in the work plan and statement. The two active mines in the district are outside of the project area. Also mentioned are the active rock quarry operations within the area. Implementation of the project should have little, if any, adverse effect on mineral resources.

Response: Concur.

Work Plan Comments

- (1) Comment: An extremely wide range of land-treatment measures is proposed, including conservation cropping, contour farming, critical-area planting, diversions, grade-stabilization structures, etc. These measures are proposed for a total area of nearly 20 square miles, but little indication is given to the relative priorities of the various measures, the specific areas that would be treated by each means, or the specific types of terrain or land use to which the various measures are most applicable. Since these measures would be applied largely by individual landowners or operators (p. 4), we suggest the work plan provide an explanation of how these individuals are informed of recommended land treatment measures, how progress toward project goals is monitored, and what specific reference material is available to aid individuals in applying project objectives to their respective land areas.

Response: Landowners and operators are informed through education programs of the Soil and Water Conservation District, Extension Service, Soil Conservation Service, and others. Technical assistance for implementing land treatment measures is available through the Soil and Water Conservation District. Accomplishments are recorded by the various agencies involved in providing assistance for the application of land treatment measures. Technical guides, pamphlets, bulletins, and other reference materials are locally available.

(2) Comment: The second paragraph on page 91 is in error. The official report of the Fish and Wildlife Service was submitted to the State Conservationist on April 16, 1970, not September 1967, as noted.

Response: Concur. The date has been corrected.

Department of Transportation

(1) Comment: The Department of Transportation has reviewed the material submitted. We have no comments to offer nor do we have any objection to the project.

Response: None.

Environmental Protection Agency - Comments were received on both the environmental impact statement and watershed work plan.

E.I.S. Comments

(1) Comment: The water quality data given on page 23 of the Draft EIS should be expanded to include such parameters as BOD, suspended solids, nutrient levels, etc.

Response: Concur. This section (page 24) has been expanded to include test results of water samples taken on March 4, 1974. These samples were taken during a period of maximum spring runoff and probably represents the seasonal high level of nutrient inflow.

-Response-

- (2) Comment: Agricultural runoff will probably contain high levels of nutrients. Since the Floodwater Retarding Structures (FRS) will impound this water and eventually release it, we believe the EIS should discuss the effects of these releases on downstream water quality and aquatic ecosystems.
- Response: Concur. The third paragraph on page 24 has been added.
- (3) Comment: Sanitary facilities, access roads, parking lots, and other public facilities should be described and the impacts of these facilities on water quality should be discussed.
- Response: Concur. Proposed facilities are described in the first paragraph on page 12. Impacts of these facilities on water quality have been included in the impacts section, page 44, last paragraph.
- (4) Comment: The EIS indicates that weed control could be accomplished by spraying. Chemicals used in this operation should be listed and their potential effects discussed.
- Response: It is assumed that the comment refers to item 6 on page 14. An additional statement has been added for clarification. It should be noted that chemical weed control is only recommended for occasional spot control of noxious weeds. Occasional spraying of small areas may have less impact on wildlife habitat than mowing. Specific chemicals will be selected based on existing circumstances.
- (5) Comment: The EIS should describe the impacts of the proposed FRS, particularly FRS No. 8, upon downstream water quality. In addition to nutrients, changes in base flows and water temperatures should be addressed.
- Response: FRS No. 2, 3 and 4 are essentially through flow structures and will have no impact on base flow or water temperatures. The 18-acre wet sediment pool at FRS No. 8 may decrease base flow by a small amount because of increased evaporation

potential. Vinegar Branch is a warm water stream with a fishery resource consisting primarily of forage minnows. The wet sediment pool will not significantly increase water temperatures, but will cause the higher temperatures to persist for a longer period of time. The effect on nutrients was previously discussed (see response to comment No. 2).

- (6) Comment: The discussion of the 1.5 miles of stream fishery improvement for smallmouth bass should be expanded. Since this portion of the project is designed to improve the fishery, the EIS should indicate why provisions for public access have not been included. Also the EIS should discuss any plans for channel modifications, alteration of the stream's gradient, removal and reestablishment of riparian vegetation, and increases of cropland to the 1.5 mile segment.

Response: Concur. The paragraph on page 12 has been expanded to explain that public access will be provided. There will be no agricultural land use within the 8-rod wide strip along the 1.5 mile of stream channel. There are no plans for channel modifications, alteration of the stream's gradient, or removal and reestablishment of riparian vegetation other than what might occur incidentally during the installation of instream devices and streambank stabilization.

- (7) Comment: The EIS should discuss the location of the proposed fencing in relation to the streambank, the amount of clearing required, and the effects of clearing upon erosion, temperature, wildlife, and aquatic communities.

Response: Concur. A sentence has been added to the last paragraph on page 11. There is no clearing required.

- (8) Comment: According to the EIS, there are 110 acres of wetlands along the Pecatonica River. The effect of the proposed FRS upon the wetland ecosystems should be discussed.

-Response-

Response: Less than 10 percent of the drainage area above wetland areas on the Pecatonica River are controlled by the FRS. Effects on nutrient levels, sediment deposition, flow characteristics, etc. because of the structures would have a negligible impact on the wetland ecosystems.

Work Plan Comments

(1) Comment: Physical Data - Water quality data presented on page ten should be expanded to include parameters such as nutrient levels, BOD, solids levels, etc., in order to convey a clearer understanding of present conditions. Ground water quality data should be included.

Response: Concur. This comment is similar to Comment No. 1 on the EIS and has been handled similarly. Page 10a has been added to the work plan. Available ground water quality data is included on page 8 of the work plan.

(2) Comment: Environmental Considerations - Paragraph No. 2 of this section states that attention was given to planning features which would reduce or eliminate adverse impacts of the project. It seems however, that the potential adverse effects of the smallmouth bass fishing improvements have not been considered. Use of the proposed structural measures could likely result in increased bank erosion, or conversely, buildup of mud banks. Problems might also be created at fisherman access points and fence lines. Further discussion and additional planning features seem prudent at this time.

Response: These are good points and were considered during planning and evaluation. Although some adverse effects may result, based on observations and experience in similar areas, the adverse effects are expected to be minor and can be handled through proper maintenance. The third paragraph on page 41 has been modified to more clearly explain planned features of the stream fishery improvement.

(3) Comment: The work plan does not discuss potential effects of the proposed project on water quality in the area. Any alteration of base flow could have a considerable impact upon water quality especially at points of municipal discharges such as at Darlington. Changes in base flow, should be completely discussed in the plan. Another major point of concern in relation to water quality is the potential for quality degradation behind FRS No. 8. Dissolved oxygen levels, nutrient build-up, and sedimentation should be of major concern.

Response: Refer to the response to EPA Environmental Impact Statement Comment No. 5.

(4) Comment: Structural Measures - Paragraphs No. 3 and 4 on page 38 indicate that all four FRS and their principal spillways will be constructed using foundation materials of less than optimum quality. What maintenance problems are foreseen because of this inadequacy, and what are the potential impacts?

Response: These structures will be built on yielding vs. nonyielding foundations. This is not an engineering deficiency, since individual design features will compensate for existing foundation conditions. A sentence has been added to the third full paragraph on page 38 of the work plan.

(5) Comment: Further explanation of all construction activities for the project should be included. Little mention is made of access roads and sites, sanitary facilities, etc.

Response: Documents governing construction procedures including items specifically mentioned in the comment are set forth in the last paragraph on page 41 and the first two paragraphs on page 42 of the work plan.

(6) Comment: Alternatives - One practical alternative that merits consideration would be a program of land treatment, flood plain zoning, evacuation, flood proofing of remaining flood prone structures and purchase, for recreational or other public purposes, of

flood prone land. This alternative is based on the principle that it is far more desirable to reduce or eliminate flood losses by preventing development in the flood plain rather than relying upon structural measures for protection. In many cases such measures simply invite further development of the flood plain.

Response: Concur. This alternative has been added. See the alternatives section, page 34a of the work plan, and page 51 and 52 of the environmental impact statement.

Wisconsin Board of Soil and Water Conservation Districts

(1) Comment: We are pleased to give full approval to the work plan and environmental impact statement as submitted.

Response: None.

Wisconsin Department of Administration (with concurrence of the Wisconsin Department of Natural Resources).

(1) Comment: Reduction of gross erosion is identified as the primary objective of watershed protection in the DES, page 2. However, the WWP on page 1 identifies floodwater damage as the principle problem. Priorities in the two documents should be better defined, ranked according to importance, and consistent between the two documents.

Response: The two documents are consistent when read in context. Floodwater damage is the principal (economic) problem; therefore there is a need for flood prevention. There is also a need for protecting the soil resource of the watershed. Within the context of this need, the primary objective is to reduce gross erosion.

(2) Comment: The long term goals of the district include provision of a more stable economic base and stimulation of economic activity and employment. If these are goals of the district, it would seem

that programs other than building flood retarding structures could give a higher return. Programs in support of economic development should be identified, or the goals restated to reflect what can be reasonably expected from the programs.

Response: Page 53 of the EIS states "Long term effects of the project will be to improve agricultural efficiency and to provide a more stable economic base in the rural area. Direct flood damage reduction to the city of Darlington will reduce business expense and help stimulate economic activity and employment". These are stated as desirable effects of project action and not primary goals. The program of flood retarding structures and land treatment is in keeping with the sponsor's objectives as stated on pages 1-3 of the EIS. Other programs contributing directly to the stimulation of economic activity and employment are beyond the authority of PL-566 and should be identified and implemented under other State and Federal programs.

(3) Comment: Use of the floodplain for agricultural development could be risky even with some reduction in flooding due to structure, and these risks should be spelled out in terms of economic, agricultural production and environmental protection. Key to floodplain use is the identification of those particular types of agricultural development that will minimize the risks involved.

Response: The impacts section of the EIS (page 40-42) explains the minimum levels of flood protection provided by the FRS. Individual agriculturalists are aware of the risk factors involved and will manage their operations to minimize remaining risks. It is not anticipated that agricultural land use will be changed significantly, consequently the 67 percent damage reduction below structures is based on existing land use in the floodplain. In terms of environmental protection, agricultural land use, especially pasture and woodland, is one of the most compatible uses of a flood prone area.

(4) Comment: Of the 52,198 acres in the watershed, 14,288 acres are not now adequately protected and will receive only partial land treatment measures. A more complete explanation of the soil resource, its problems and the adequacy of various levels of treatment would be of considerable help in showing the thoroughness of the plan for the whole watershed and the appropriateness of treatment for selected areas.

Response: Considering that implementation is strictly voluntary, it is commendable that landowners in First Capitol Watershed have already adequately protected over 50 percent of the soil resource. During the 5-year implementation period of the plan it is impossible to get the remaining 50 percent of the resource completely protected through a voluntary implementation program. Complete protection of 11,610 acres of land is a realistic goal. Continuing efforts will be made during and after the 5-year implementation period to get adequate treatment on the remaining acreage. Level and type of treatment required to curtail erosion, conserve nutrients, and improve water quality, is a function of many variables which characterize a selected area. The "Planned Project" section of the EIS (pages 4-7) details some of the major practices applicable to the watershed in general. Various combinations of these practices will be recommended on an acre-by-acre basis to achieve adequate protection.

(5) Comment: Some way of guaranteeing that the land treatment measures will actually be implemented would be appropriate. This is especially important at this time since some land treatment measures that have been in existence, such as stripcropping and contour farming, are being abandoned in order to increase yields. Further discussion of the minimum tillage type of land treatment also seems warranted, since it decreases yields per acre.

Response: As long as land treatment remains a voluntary program, there is no way to guarantee or enforce implementation. However, based on existing land treatment levels in the watershed and past experience in other "PL-566 Watersheds" in Wisconsin, the 75 percent treatment goal by the end of the installation period is not only obtainable, it will probably be substantially exceeded. Minimum tillage is one of the least costly, yet most effective methods of conserving the soil resource. (Up to 90% reduction in soil loss is possible). It is a popular misconception based on limited field trials that crop yields are reduced. Subsequent field trials have proven that this is not a valid assumption. In fact, with experience and the proper selection of crop varieties and hybrids, it has been demonstrated that crop yields can actually be increased while realizing a substantial economic savings!

(6) Comment: We would question the building of expensive flood and sedimentation control structures without a greater effort to implement programs related to the amount and method of land used for agricultural production.

Response: The land treatment phase of the plan (pages 4-8) is a direct effort to implement a program related to the method of land use for agricultural production. In fact, the structural phase of the plan cannot even be implemented until land treatment requirements have been satisfied.

Beyond recommending that certain areas should not be used for specific agricultural purposes because of erosion and/or water quality problems, there is no authority to regulate the amount of land used for agricultural production.

(7) Comment: Three of the structures being planned are for flood retardation and an additional one is proposed to have a recreational purpose. However, the WWP on page 2, identifies all four as single purpose. The uniqueness of FRS No. 8 because of its size (100-year flood storage) and its use (recreation) warrants further examination in these documents.

Response: All four structures are single purpose flood retarding structures (pages 8, 10, etc.) The EIS does not state recreation as a purpose for FRS No. 8, however, unevaluated incidental recreation benefits may occur. All four FRS are similar in design, and all four could be operated with wet sediment pools if desired (page 8).

(8) Comment: Further discussion also is needed on the amount of flood control to be supplied by the structural improvements. The standard (on page 45) for rural areas is protection for a two to ten year level of flood, which is quite low. Furthermore, seven of the eight stream reaches will receive protection only up to the two year flood level--barely the minimum according to the standard.

Response: Levels of protection stated by reach on page 39 of the EIS are minimums. Average levels, which would be significantly higher, were not quoted since they would be misleading to residents in the lower, least protected part of the stream reach. All magnitude of flooding will be greatly reduced. Even though the structures will not eliminate flooding at the 5-, 10-, 50-, or 100-year frequency level, they will reduce damages significantly. For example, a 5-year flood may currently cause complete loss of a crop, but with structures in place, flooding may be reduced to a mere nuisance level. Overall, the FRS will reduce average annual floodwater and sediment damages by 67 percent on the agricultural land protected, and by 71 percent to roads and bridges (pages 39-44).

(9) Comment: Floodproofing and floodplain ordinances are seen as land treatment measures suitable for rural as well as urban areas. Discussion of the Lafayette County floodplain zoning ordinances, its implementation, enforcement, and adequacy, should be included in the analysis of this project.

Response: Lafayette County has adopted a general Flood Plain-Shoreland Protection Ordinance which applies to all unincorporated areas. There is no real enforcement procedure but the health and sanitary codes prevent construction contrary to the ordinance. The ordinance is potentially very adequate but agriculture, except for farm homes, is quite exempt from restrictions. As a result it is not very effective in reducing flood damages in rural agricultural areas.

(10) Comment: Conversion of flood-vulnerable lands to cropland could bring greater damage when floods do occur. Risks in converting land should be identified.

Response: Maximum risks are identified in terms of residual flood frequency by reach (page 40). There is 100 acres or more of grassland currently subject to flooding several times per year which will be protected from the 5-to 10-year flood with structures installed.

(11) Comment: Project costs should be discussed in relation to the major problems and objectives of the project. It is viewed with some concern that 77 percent of the costs are to be spent on structural measures although the major problem identified for maintaining agricultural production is halting upland sheet erosion from cropland.

Response: "The principal problem is floodwater and sediment damage to agricultural and non-agricultural properties". (page 31). The four FRS provide over 88 percent of the benefits compared to only 77 percent of the costs (appendix C). Halting upland sheet erosion from cropland is the primary

objective of the watershed protection phase of the plan. To meet the flood prevention objective it is necessary to install measures to reduce flood damages.

- (12) Comment: Why are only 63 percent of the farmers, covering 60 percent of the land in the watershed, listed as district cooperators? In this area where the steep gradient produces rapid water movement, it should be expected that awareness of conservation cropping problems would be higher. Also, the extent of actual practice of conservation cropping by these cooperators should be examined in order to obtain a better idea of how resource use is lessening or exacerbating resource problems.

Response: To be a district cooperator, one must enter into an agreement with the soil and water conservation district. There are many farmers who have not entered into such an agreement (and therefore are not considered cooperators) but who have, and are installing land treatment practices. Virtually all land-owners, through the efforts of the SWCD supervisors, have been contacted and are aware of conservation cropping problems. Conservation measures practiced in the watershed are reviewed and reported annually.

- (13) Comment: Trout streams are significant resources in Wisconsin, especially in southern Wisconsin, and need special consideration in any watershed program. Protection for the Jones Branch trout fishery should receive more consideration regarding land use and water quality.

Response: Enhancement and improvement of the trout fishery in Jones Branch by structural means was considered but omitted from the final plan when the sponsors decided to delete the upstream structure which would have protected the improvements. Land treatment in Jones Branch will reduce land use and water quality problems.

(14) Comment: Why is reach "a" below FRS No. 2 to receive protection from a 20-year flood, and all other reaches in the watershed to receive protection from only a one year or two year flood? These differences in protection for certain lands and certain landowners appear to need further explanation.

Response: As previously discussed, the levels of flood protection shown on page 39 are the minimums for each reach. Reach a (see appendix E) is a relatively short reach immediately below FRS No. 2. There is very little uncontrolled inflow entering this section of the stream and therefore the level of protection provided by the dam remains high even at the lower end of the reach. However, in reach b (and the other reaches) considerable uncontrolled drainage area is picked up along the way and the flood free protection at the lower end of the reach is reduced to a 2-year level.

(15) Comment: Another item in need of further discussion is the status of the present ecological community and the potential effect of this project on the community. Is wildlife predation on crops a concern in this area? Additional expertise is available from the University of Wisconsin and the Department of Natural Resources to supplement staff of the district and the service in these studies if necessary.

Response: Status of the ecological community is discussed in the "Environmental Setting" section. Potential effect of the planned project on the ecological community is discussed in the "Environmental Impacts" section. Wildlife predation on crops is not a major concern in the area, although significant damages by deer and rodent population do occur occasionally. State and Federal agencies along with other interested groups and individuals were requested to provide inputs to the preliminary draft of the environmental impact statement.

Specific comments and inputs concerning the status of the present ecological community and the potential effect of the project on the community have been incorporated. There were no comments about the adequacy of the presentation.

- (16) Comment: The first three alternatives--"a," "b," and "c"--can all be given more explanation, including a cost benefit ratio. It would also be more understandable to have annual costs and benefits expressed in dollars.

For the first two alternatives presented, continuation and acceleration of land treatment measures should have some benefits for continued agricultural production. Benefits from the reduction of erosion should also be listed in addition to the effects of floodwater damage.

Alternative "c" needs more information on zoning of flood prone areas for compatible use. The concept of floodplain zoning is intended to apply to rural as well as urban land, and it is conceivable that agricultural damages can be reduced.

Response: Concur. The "alternatives" section has been revised to reflect these comments.

- (17) Comment: If reduction in agricultural damages is the prime objective of this project, one more alternative should be considered. The entire 1,600 acres of floodplain to be benefited by the structure could probably be purchased for less than the cost of the structures. When a project to provide partial protection costs more than the land to be benefited, this alternative should be carefully considered. This method has been, and is being, implemented at other locations (Prairie du Chien and La Crosse, for example) to provide greater flood damage reduction at a lower cost than would be possible through structural measures.

Response: This alternative has been added to the "alternatives" section.

LIST OF APPENDIXES

- Appendix A - Typical Floodwater Retarding Structure Showing
Inlet Works for Wet or Dry Sediment Pool Operation
- Appendix B - Smallmouth Bass Stream Improvement Features
- Appendix C - Comparison of Benefits and Costs for Structural
Measures
- Appendix D - Letters of Comment Received on the Draft
Environmental Impact Statement
- Appendix E - Project Map

Approved by

Richard W. Akeley
Richard W. Akeley
State Conservationist

Date

October 22, 1974

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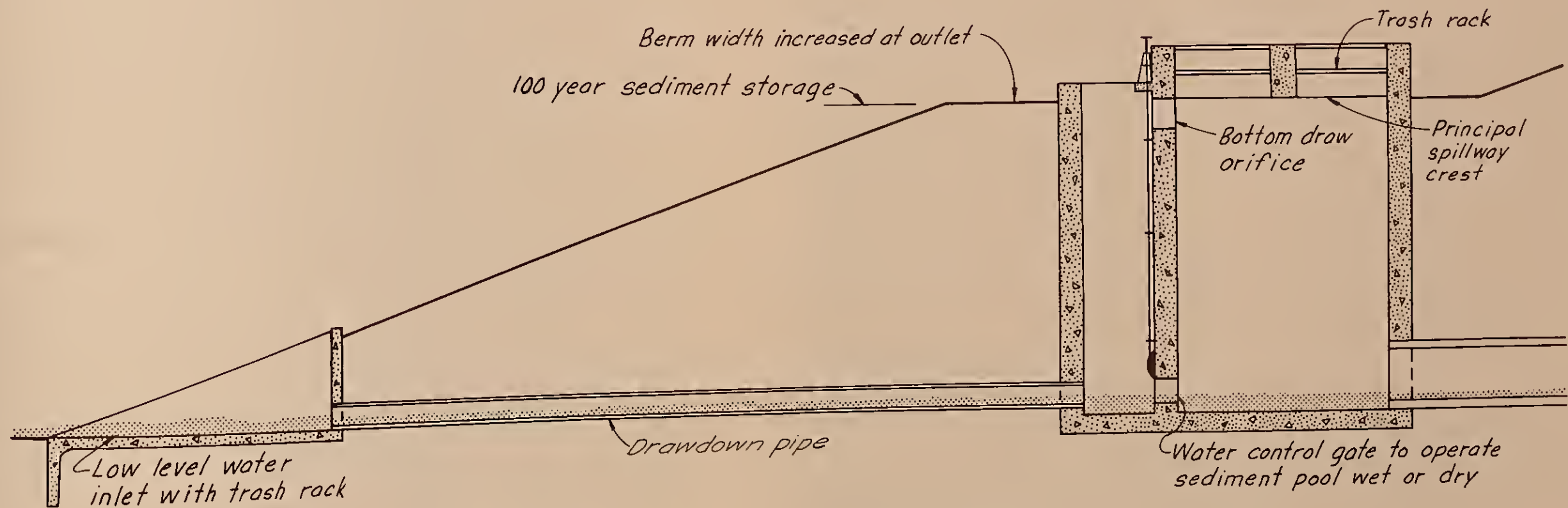
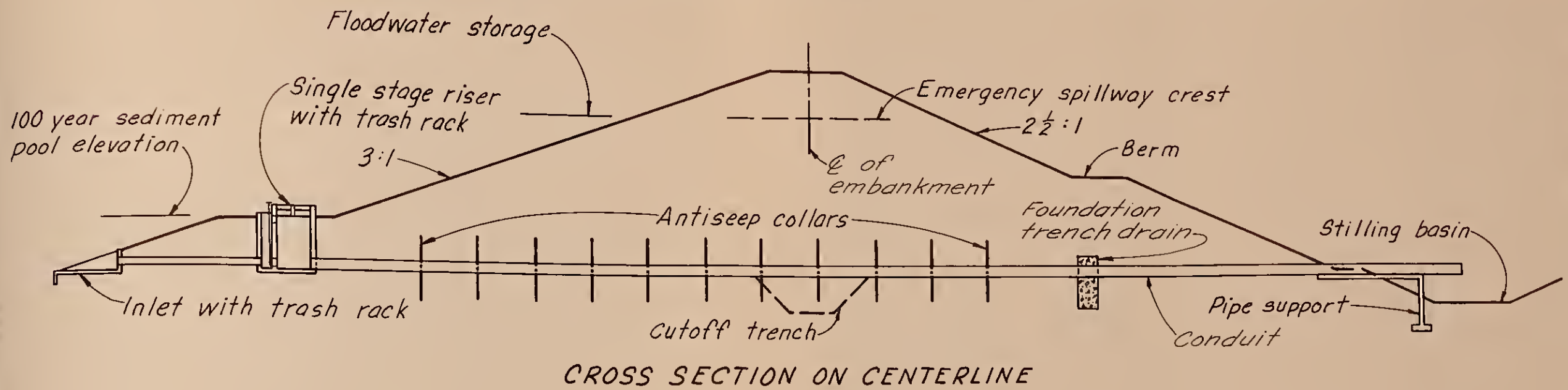
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APPENDIX A

TYPICAL FLOODWATER RETARDING STRUCTURE
SHOWING INLET WORKS FOR WET OR DRY
SEDIMENT POOL OPERATION

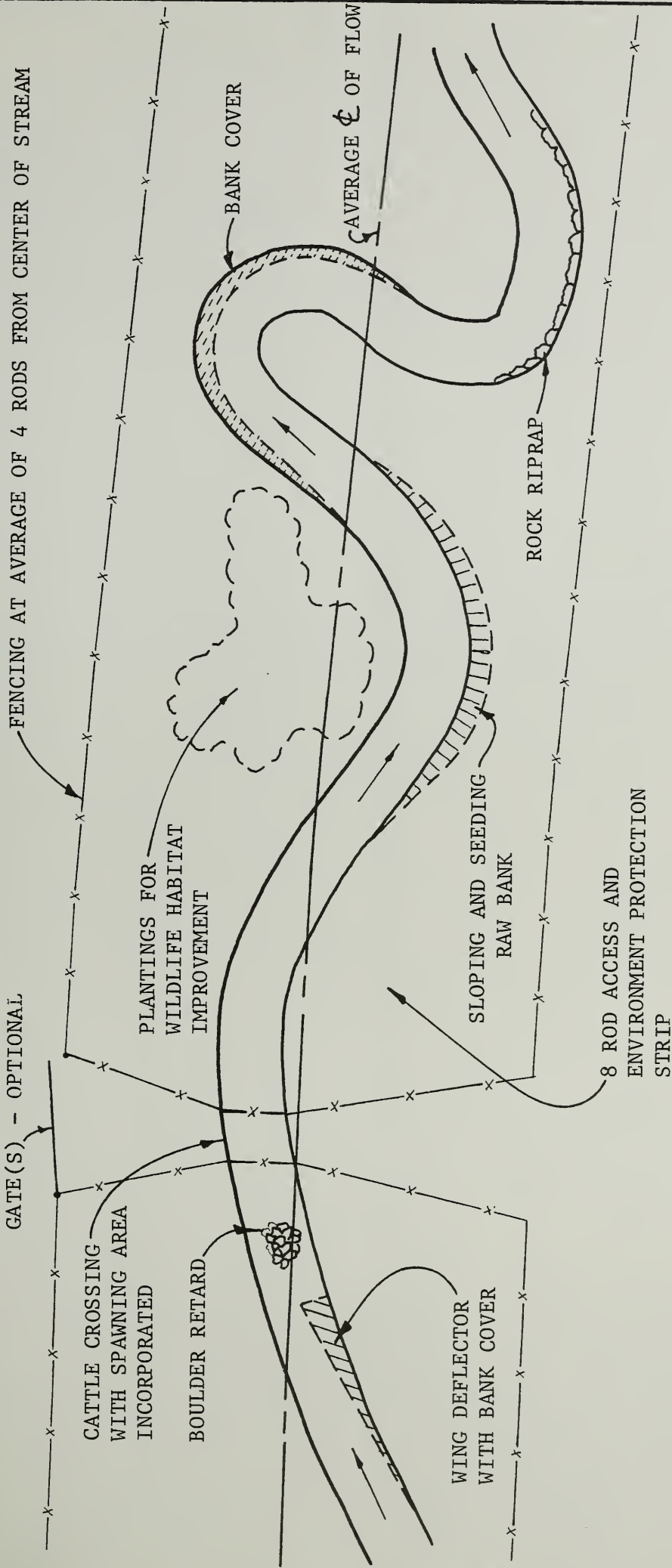
APPENDIX A - TYPICAL FLOODWATER RETARDING STRUCTURE



INLET WORKS SHOWING WET OR DRY SEDIMENT POOL OPERATION

APPENDIX B
SMALLMOUTH BASS STREAM
IMPROVEMENT FEATURES





THIS SKETCH SHOWS TYPICAL STREAM IMPROVEMENT FEATURES, INCLUDING INSTREAM DEVICES FOR IMPROVEMENT OF FISH HABITAT, STREAMBANK STABILIZATION FOR IMPROVING WATER QUALITY, PLANTINGS FOR WILDLIFE HABITAT IMPROVEMENT, AND FENCING FOR PUBLIC ACCESS AND ENVIRONMENTAL PROTECTION.

APPENDIX B - SMALLMOUTH BASS STREAM IMPROVEMENT FEATURES



APPENDIX C

COMPARISON OF BENEFITS AND COSTS
FOR STRUCTURAL MEASURES



TABLE 6 - COMPARISON OF BENEFITS AND COSTS FOR STRUCTURAL MEASURES

First Capitol Watershed, Wisconsin

(Dollars)

Evaluation Unit	AVERAGE ANNUAL BENEFITS <u>1/</u>				Total	Average Annual Cost <u>3/</u>	Benefit Cost Ratio
	Damage Reduction <u>2/</u>	Changed Land Use Agr.	Fish and Wildlife	Secondary			
Floodwater Retarding Structures 2, 3, 4, and 8 and Smallmouth Bass Stream Improvement	44,820	2,120	6,200	5,700	58,840	41,070	1.4
Project Administration						4,560	
GRAND TOTAL	44,820	2,120	6,200	5,700	58,840	45,630	1.3

1/ Adjusted normalized prices for agricultural damages and current prices for nonagricultural damages.

2/ In addition, it is estimated that land treatment will provide flood damage benefits of \$1,230 annually.

3/ From Table 4.



APPENDIX D

LETTERS OF COMMENT RECEIVED ON THE
DRAFT ENVIRONMENTAL STATEMENT




R. W. Akeley, SCS, Madison, Wisconsin

DEPARTMENT OF THE ARMY

WASHINGTON, D.C. 20310

31 JAN 1974



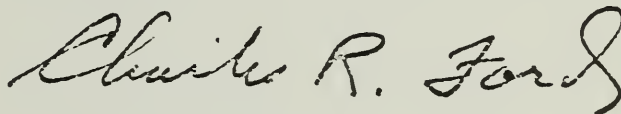
Honorable Robert W. Long
Assistant Secretary of Agriculture
Washington, D. C. 20250

Dear Mr. Long:

In compliance with the provisions of Section 5 of Public Law 566, 83rd Congress, the Administrator of the Soil Conservation Service, by letter dated 26 November 1973, requested comments on the Watershed Work Plan and Draft Environmental Statement for the First Capitol Watershed, Wisconsin.

We have reviewed the work plan and foresee no conflict with any projects or current proposals of this office. However, the U. S. Army Engineer District, Rock Island plans to incorporate this study as a feature of a Basin-Mix plan in their Phase I, Interim I, Report of the Pecatouica River Basin, which is a part of the survey scope study of the Rock River Basin above Rockton, Illinois. The draft environmental statement is considered satisfactory.

Sincerely,



Charles R. Ford
Chief
Office of Civil Functions





DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

OFFICE OF THE SECRETARY

WASHINGTON, D.C. 20201

January 17, 1974

Department of Agriculture
Soil Conservation Service
Washington, D. C. 20250

ATTENTION: Jim Bean
Room 5229

Dear Mr. Bean:

Pursuant to our telephone conversation of January 16, I am forwarding a copy of this Department's comments on the draft Environmental Impact Statement on Leona River Watershed, Texas which were sent out on October 31, 1973.

Also, I was informed by our Regional Environmental Officer in Chicago that he has no comments to offer on the draft Environmental Impact Statement on First Capital Watershed, Wisconsin.

I apologize for any delays that this may have caused you, and appreciate your cooperation in this matter.

Thank you.

Sincerely,

A handwritten signature in cursive script that reads "Madeline Pospur".

Madeline Pospur
Office of Environmental Affairs

Enclosure



United States Department of the Interior

OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

ER-73/1397

JAN 14 1974

Dear Mr. Grant:

Thank you for the letter of October 19, 1973, requesting our views and comments on a watershed work plan and draft environmental statement for the First Capitol Watershed, Lafayette and Iowa Counties, Wisconsin.

Implementation of the proposed work plan for the First Capitol Watershed will have relatively minor impacts on wildlife resources. Wetland oriented wildlife species may be slightly benefited while upland oriented species may suffer some minor adverse effects. This is essentially due to the loss of grassland-cropland interface in the flood pools of the retarding structures.

The proposed project will benefit fishery resources of the watershed. The only adverse impact would be the loss of stream area at damsites. This loss is minor and would be offset by the improvement in conditions on 1.5 miles of smallmouth bass stream and the creation of an 18-acre pond which will sustain good fish populations.

It is encouraging to note that the proposed land treatment program plans to treat and improve about 75 percent of the watershed area located above structure sites. We strongly support such an enlarged program.

An extremely wide range of land-treatment measures is proposed, including conservation cropping, contour farming, critical-area planting, diversions, grade-stabilization structures, etc. These measures are proposed for a total area of nearly 20 square miles, but little indication is given to the relative priorities of the various measures, the specific areas that would be treated by each means, or the specific types of terrain or land use to which the various measures are most applicable. Since these measures would be applied largely by individual landowners or operators (p. 4), we suggest the



work plan provide an explanation of how these individuals are informed of recommended land treatment measures, how progress toward project goals is monitored, and what specific reference material is available to aid individuals in applying project objectives to their respective land areas.

The second paragraph on page 91 is in error. The official report of the Fish and Wildlife Service was submitted to the State Conservationist on April 16, 1970, not September 1967, as noted. In a letter of April 16, 1973, the Bureau of Sport Fisheries & Wildlife commented on the final draft work plan and preliminary draft environmental statement.

We have completed our review of the draft environmental statement which accompanied the work plan for the First Capitol Watershed and submit the following comments for your consideration and use.

The draft statement is generally adequate in its discussion of fish and wildlife values. This is true both with respect to existing values and those changes anticipated with the project. However, we believe the initial sentence of the last paragraph on page 44 is too optimistic. Not all wildlife habitat will be enhanced. It may be true for wetland habitat, but upland habitat will likely be decreased largely due to the loss of grassland-cropland interface located in the floodwater storage areas.

We have noted that the proper State agencies have been consulted with regard to archeological, historical, and natural values (pp. 28 and 29) and that no known values will be affected by the project (p. 42). While we appreciate the attention shown to cultural (historic, archeological, architectural) resources in the statement, it is evident that the assertion that no such values exist in the affected area is based solely on correspondence and inference. There has been no direct, interdisciplinary investigation of the area to determine with assurance whether or not cultural resources will be affected. While no cultural values may be now known in the project area, undiscovered resources of significance may, in fact, exist there. To assure an adequate investigation of the environment and a complete environmental statement, the area should be directly examined by a professional archeologist and other professionals trained to locate, identify,

and evaluate cultural resources. The results of the interdisciplinary investigation should be sufficient to provide a substantive description of affected cultural resources, analyze expected effects, and develop an appropriate program to avoid or mitigate adverse effects. Without a full and direct examination of the affected environment, treating all parts of the human environment, we cannot agree that the environmental statement is complete.

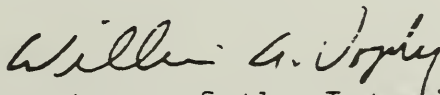
Among the recommended measures to protect the Belmont urban area from flood damage are certain structural measures such as protective dikes and floodwalls. However, the recommended locations of any such structures do not appear to be included in the draft environmental statement, nor are the merits of building such structures to protect Belmont discussed in the statement.

The environmental impact of the project on water resources of the area seems to be adequately evaluated. However, the stated erosion rate (p. 31) of 5.8 tons per acre (3,712 tons per square mile) seems excessive. It is about ten times the figures published in the U.S. Geological Survey Hydrologic Atlas HA-376.

First Capitol Watershed is located within the Upper Mississippi Valley zinc-lead district, and this is mentioned in the work plan and statement. The two active mines in the district are outside of the project area. Also mentioned are the active rock quarry operations within the area. Implementation of the project should have little, if any, adverse effect on mineral resources.

In closing, we trust the foregoing information will assist you in processing this report to the Congress and request that the enclosed report and letter of the Fish and Wildlife Service accompany this work plan when it is forwarded to the Congress.

Sincerely yours,



Acting Deputy Assistant

Secretary of the Interior

Mr. Kenneth E. Grant
Administrator
Department of Agriculture
Soil Conservation Service
Washington, D.C. 20250

Enclosure



DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD

MAILING ADDRESS:
U. S. COAST GUARD (G-WS)
400 SEVENTH STREET SW.
WASHINGTON, D. C. 20590
PHONE: (202) 426-2262

• 17 DEC 1973

Mr. Kenneth E. Grant
Soil Conservation Service
Department of Agriculture
Washington, D. C. 20250

First Capitol Watershed, Wisconsin

Dear Mr. Grant:

This is in response to your letter of October 19, 1973 addressed to Admiral Bender concerning the environmental impact statement for the Watershed Work Plan for LaFayette and Iowa Counties, Wisconsin.

The Department of Transportation has reviewed the material submitted. We have no comments to offer nor do we have any objection to the project.

The opportunity to review this impact statement is appreciated.

Sincerely,

R. I. PRICE
Captain, U. S. Coast Guard
Deputy Chief, Environmental
Environment and Systems
By direction of the Commandant

10/19/73
12/17/73
12/17/73





UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY
REGION V
1 NORTH WACKER DRIVE
CHICAGO, ILLINOIS 60606

JAN 10 1974

Mr. Kenneth Grant
Administrator
Soil Conservation Service
U.S. Department of Agriculture
Washington, D.C. 20250

Dear Mr. Grant:

As requested in your letter of October 19, 1973, we have reviewed the Draft Environmental Impact Statement (EIS) and the Watershed Work Plan for the First Capitol Watershed in Lafayette and Iowa Counties, Wisconsin.

In accordance with our guidelines we have classified our comments as Category LO-2. Specifically, this means we have no objections to the proposal but we believe more information should be provided in the EIS to fully assess the environmental impacts of the project on water quality. This classification and the date of our comments will be published in the Federal Register in accordance with our responsibility to inform the public of our views on Federal actions under Section 309 of the Clean Air Act.

It would be quite helpful if some of the construction practices and data sources of the SCS would be briefly explained in the texts of the Work Plans and EIS. Data which can be obtained only at SCS or State offices should be summarized or furnished as a separate document in order for us to make an objective appraisal of the project. We will return such data upon completion of our review.

Separate comments on the EIS and the Work Plan are attached. We appreciate the opportunity to review these documents.

Sincerely yours,

A handwritten signature in dark ink, appearing to read "Valdas V. Adamkus".

Valdas V. Adamkus
Acting Regional Administrator

Attachment

COMMENTS ON THE DRAFT
ENVIRONMENTAL IMPACT STATEMENT
FOR THE FIRST CAPITOL WATERSHED

The water quality data given on page 23 of the Draft EIS should be expanded to include such parameters as BOD, suspended solids, nutrient levels, etc.

Agricultural runoff will probably contain high levels of nutrients. Since the Floodwater Retarding Structures (FRS) will impound this water and eventually release it, we believe the EIS should discuss the effects of these releases on downstream water quality and aquatic ecosystems.

Sanitary facilities, access roads, parking lots, and other public facilities should be described and the impacts of these facilities on water quality should be discussed.

The EIS indicates that weed control could be accomplished by spraying. Chemicals used in this operation should be listed and their potential effects discussed.

The EIS should describe the impacts of the proposed FRS, particularly FRS No. 8, upon downstream water quality. In addition to nutrients, changes in base flows and water temperatures should be addressed.

The discussion of the 1.5 miles of stream fishery improvement for smallmouth bass should be expanded. Since this portion of the project is designed to improve the fishery, the EIS should indicate why provisions for public access have not been included. Also the EIS should discuss any plans for channel modifications, alteration of the stream's gradient, removal and reestablishment of riparian vegetation, and increases of crop land to the 1.5 mile segment.

The EIS should discuss the location of the proposed fencing in relation to the stream bank, the amount of clearing required, and the effects of clearing upon erosion, temperature, wildlife, and aquatic communities.

According to the EIS, there are 110 acres of wetlands along the Pecatonica River. The effect of the proposed FRS upon the wetland ecosystems should be discussed.

Review comments on USDA SCS Draft Work Plan for First Capitol Watershed, Lafayette and Iowa Counties, Wisconsin.

Physical Data - Water quality data presented on page ten should be expanded to include parameters such as nutrient levels, BOD, solids levels, etc., in order to convey a clearer understanding of present conditions. Ground water quality data should be included.

Environmental Considerations - Paragraph No. 2 of this section states that attention was given to planning features which would reduce or eliminate adverse impacts of the project. It seems however, that the potential adverse effects of the smallmouth bass fishing improvements have not been considered. Use of the proposed structural measures could likely result in increased bank erosion, or conversely, buildup of mud banks. Problems might also be created at fisherman access points and fence lines. Further discussion and additional planning features seem prudent at this time.

The Work Plan does not discuss potential effects of the proposed project on water quality in the area. Any alteration of base flow could have a considerable impact upon water quality especially at points of municipal discharges such as at Darlington. Changes in base flow, should be completely discussed in the Plan. Another major point of concern in relation to water quality is the potential for quality degradation behind FRS No. 8. Dissolved oxygen levels, nutrient build-up, and sedimentation should be of major concern.

Structural Measures - Paragraphs No. 3 and 4 on page 38 indicate that all four FRS and their principal spillways will be constructed using foundation materials of less than optimum quality. What maintenance problems are foreseen because of this inadequacy, and what are the potential impacts?

Further explanation of all construction activities for the project should be included. Little mention is made of access roads and sites, sanitary facilities, etc.

Alternatives - One practical alternative that merits consideration would be a program of land treatment, flood plain zoning, evacuation, flood proofing of remaining flood prone structures and purchase, for recreational or other public purposes, of flood prone land. This alternative is based on the principle that it is far more desirable to reduce or eliminate flood losses by preventing development in the flood plain rather than relying upon structural measures for protection. In many cases such measures simply invite further development of the flood plain.

STATE OF WISCONSIN
BOARD OF
SOIL AND WATER CONSERVATION DISTRICTS

1815 UNIVERSITY AVENUE
MADISON, WISCONSIN 53706
TEL. (608) 262-2634

February 11, 1974

Mr. Kenneth Grant, Administrator
Soil Conservation Service
U. S. Department of Agriculture
Washington, D. C. 20250

RECEIVED
FEBRUARY 11 1974
SOIL CONSERVATION SERVICE

Dear Mr. Grant:

The State Board of Soil and Water Conservation Districts at it's official meeting on February 11, 1974 reviewed the work plan for Watershed Protection and Flood Prevention as authorized under PL 83-566 as amended in the First Capitol Watershed, Lafayette County, Wisconsin.

The staff of the Board of Soil and Water Conservation Districts has worked closely with the sponsoring Soil and Water Conservation District, the Watershed Association which has provided excellent leadership, and other State and Federal Agencies from the inception of the project.

Our review indicates benefits will accrue to agricultural and non-agricultural properties by approximately 65 percent in the benefited area of the watershed with 11% damage reduction to the city of Darlington and the Pecatonica River flood plain. The project will impact the environment by substantially reducing erosion, sedimentation and floodwater damages. Wildlife habitat will be increased. The State Department of Natural Resources has agreed to assist in improving 1.5 miles of the stream below Structure No. 3 on Bonners Branch for small mouth bass fisheries. Fishery habitat, streambank stabilization and access facilities will be included.

Therefore, in accordance with Chapter 92.04 Wisconsin Statutes, which delegates supervisory responsibilities for PL 83-566 as amended in the state of Wisconsin and the Board of Soil and Water Conservation Districts, we are pleased to give full approval to the work plan as submitted from your office.

Sincerely



Milton Stellrecht
Chairman

MS/ss





State of Wisconsin \ DEPARTMENT OF ADMINISTRATION

STATE BUREAU OF PLANNING AND BUDGET
HARRY J. SCHMIDT, DIRECTOR
1 WEST WILSON STREET
MADISON, WISCONSIN 53702
(608) 266-1736

December 18, 1973

RECEIVED MAIL ROOM
1973 DEC 28 PM 12:13
SOIL CONSERVATION DISTRICT
WASHINGTON 10-11-11

Mr. Kenneth E. Grant, Administrator
Soil Conservation Service
United States Department of Agriculture
Washington, D.C. 20250

Dear Mr. Grant:

In reply to your letter to Governor Lucey of October 24, 1973, we are transmitting the attached comments for incorporation into the First Capitol Watershed work plan and draft environmental impact statement.

One particular item that calls for state involvement is of some concern. The 1.5 miles of small mouth bass stream improvement identifies the State Department of Natural Resources as having a major role. It is our understanding that the Department of Natural Resources does not have any plans to acquire or maintain recreational facilities associated with this project. The exact nature of state involvement will depend on arrangements to be worked out with the district. Clarification of this point would be appreciated.

If a long term goal of the project is to improve agricultural efficiency and provide a more stable economic base that will stimulate economic activity and employment, it would seem that economic development programs other than the building or flood retarding structures could give a higher return.

If the goal of the project is long term agricultural economic stability, much more attention needs to be given to controlling erosion, especially the sheet erosion from cropland. Too little attention is given to this problem in the watershed plan to insure that the resource (soil) is going to be around in the long term.

Yes, the issue is complex. It involves private land and public programs; long term conservation of resources and short term profit; land use controls and individual rights; gratification of present landowners and the standard of living for future generations. These issues are difficult to resolve, but we believe that they can be approached at the local level, represented, in this case, by the Lafayette County Soil and Water Conservation District. Structure systems and consequent development of the floodplain may be in the best short term interests of present landowners. But, this may not be in the best long term interests of sound, overall development.

Mr. Kenneth E. Grant
Page two
December 18, 1973

We hope that our enclosed comments will be helpful to you in addressing some of these concerns in the First Capitol Watershed project. Thank you for the opportunity to comment.

Respectfully,



Roger L. Schrantz
Deputy Director

RLS:pw

Enclosure

cc: Farnum Alston, Governor's Office
Richard W. Akeley, State Conservationist, Soil Conservation Service
Eugene Savage, Executive Secretary, State Board of Soil & Water Cons. Dists.
James Huntoon, Department of Natural Resources
Byron Berg, LaFayette County Soil & Water Conservation District
Donald Rosenbrook, Southwestern Wisconsin Regional Planning Commission

omments on the "Watershed Work Plan," First Capitol Watershed, of June, 1973, and its Accompanying "Draft Environmental Statement," dated August, 1973.

Objectives and Purposes (pp. 1-3)*

reduction of gross erosion is identified as the primary objective of watershed protection in the DES, page 2. However, the WWP on page 1 identifies floodwater damage as the principle problem. Priorities in the two documents should be better defined, ranked according to importance, and consistent between the two documents.

Short Term vs. Long Term Use of Resources (p. 48)

The long term goals of the district include provision of a more stable economic base and stimulation of economic activity and employment. If these are goals of the district, it would seem that programs other than building flood retarding structures could give a higher return. Programs in support of economic development should be identified, or the goals restated to reflect what can be reasonably expected from the programs.

Land Treatment Measures (pp. 4-8)

Use of the floodplain for agricultural development could be risky even with some reduction in flooding due to structure, and these risks should be spelled out in terms of economic, agricultural production and environmental protection. Key to floodplain use is the identification of those particular types of agricultural development that will minimize the risks involved.

Of the 52,198 acres in the watershed, 14,288 acres are not now adequately protected and will receive only partial land treatment measures. A more complete explanation of the soil resource, its problems and the adequacy of various levels of treatment would be of considerable help in showing the thoroughness of the plan for the whole watershed and the appropriateness of treatment for selected areas.

Some way of guaranteeing that the land treatment measures will actually be implemented would be appropriate. This is especially important at this time since some land treatment measures that have been in existence, such as stripcropping and contour farming, are being abandoned in order to increase yields. Further discussion of the minimum tillage type of land treatment also seems warranted, since it decreases yields per acre.

One would question the building of expensive flood and sedimentation control structures without a greater effort to implement programs related to the amount and method of land used for agricultural production.

*All page numbers refer to the "Draft Environmental Statement" (DES), unless specifically identified as the "Watershed Work Plan" (WWP)

Structural Measures (pp. 8-12)

Three of the structures being planned are for flood retardation and an additional one is proposed to have a recreational purpose. However, the WWP, on page 2, identifies all four as single purpose. The uniqueness of FRS No. 8 because of its size (100-year flood storage) and its use (recreation) warrants further examination in these documents.

Further discussion also is needed on the amount of flood control to be supplied by the structural improvements. The standard (on page 45) for rural areas is protection for a two to ten year level of flood, which is quite low. Furthermore, seven of the eight stream reaches will receive protection only up to the two year flood level--barely the minimum according to the standard.

Nonstructural Measures (pp. 12-13)

Floodproofing and floodplain ordinances are seen as land treatment measures suitable for rural as well as urban areas. Discussion of the Lafayette County floodplain zoning ordinances, its implementation, enforcement, and adequacy, should be included in the analysis of this project.

Land Use Changes (p. 13)

Conversion of flood-vulnerable lands to cropland could bring greater damage when floods do occur. Risks in converting land should be identified.

Project Costs (p. 16)

Project costs should be discussed in relation to the major problems and objectives of the project. It is viewed with some concern that 77 percent of the costs are to be spent on structural measures although the major problem identified for maintaining agricultural production is halting upland sheet erosion from cropland.

Economic Resources (pp. 25-26)

Why are only 63 percent of the farmers, covering 60 percent of the land in the watershed, listed as district cooperators? In this area where the steep gradient produces rapid water movement, it should be expected that awareness of conservation cropping problems would be higher. Also, the extent of actual practice of conservation cropping by these cooperators should be examined in order to obtain a better idea of how resource use is lessening or exacerbating resource problems.

Recreation Problems (pp. 36-37)

Trout streams are significant resources in Wisconsin, especially in southern Wisconsin, and need special consideration in any watershed program. Protection for the Jones Branch trout fishery should receive more consideration regarding land use and water quality.

Environmental Impacts (pp. 38-44)

Why is reach "a" below FRS No. 2 to receive protection from a 20-year flood, and all other reaches in the watershed to receive protection from only a one year or two year flood? These differences in protection for certain lands and certain landowners appear to need further explanation.

Another item in need of further discussion is the status of the present ecological community and the potential effect of this project on the community. Is wild-life predation on crops a concern in this area? Additional expertise is available from the University of Wisconsin and the Department of Natural Resources to supplement staff of the district and the service in these studies if necessary.

Alternatives (pp. 45-48)

The first three alternatives--"a," "b," and "c"--can all be given more explanation, including a cost benefit ratio. It would also be more understandable to have annual costs and benefits expressed in dollars.

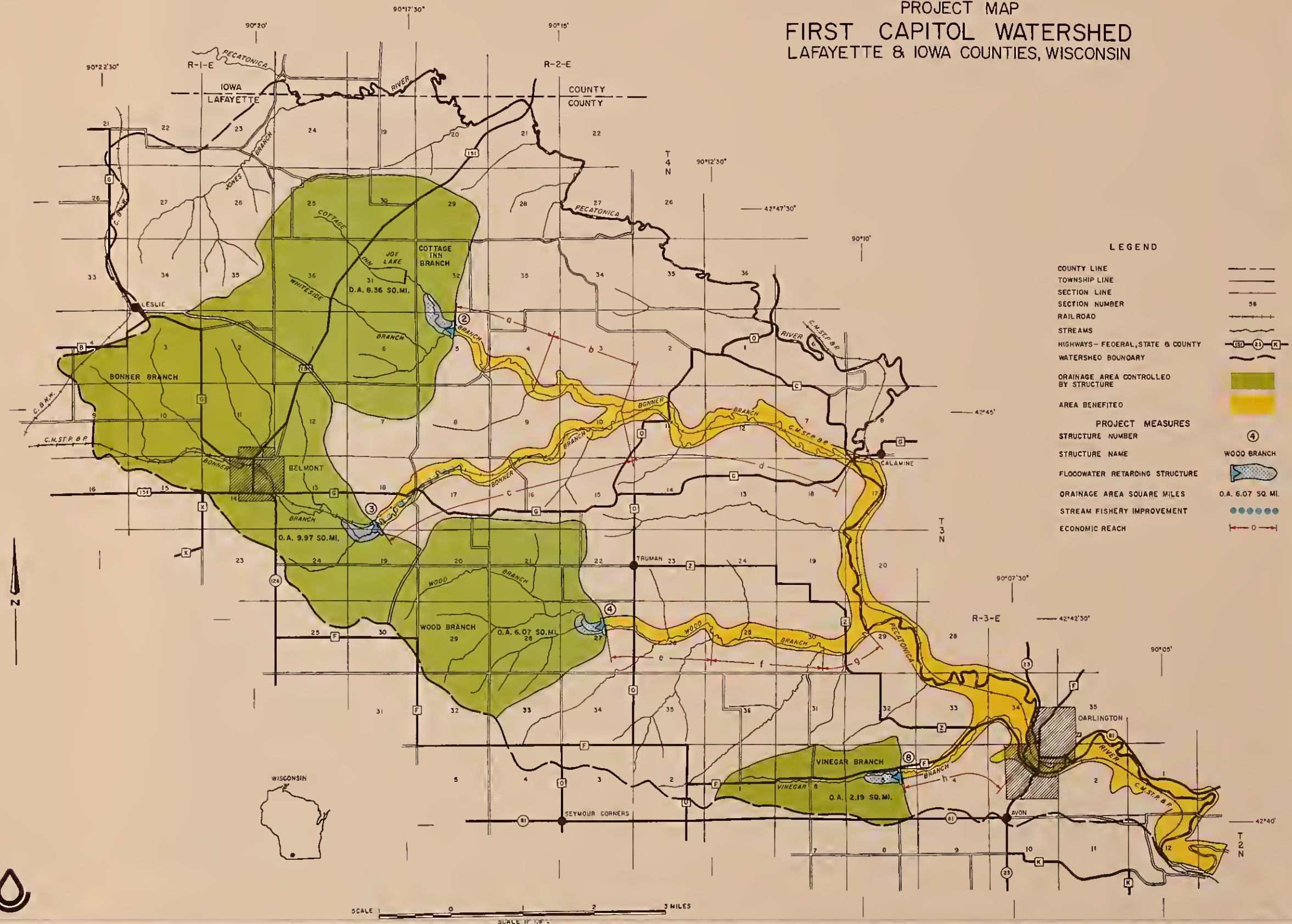
For the first two alternatives presented, continuation and acceleration of land treatment measures should have some benefits for continued agricultural production. Benefits from the reduction of erosion should also be listed in addition to the effects of flood water damage.

Alternative "c" needs more information on zoning of flood prone areas for compatible use. The concept of floodplain zoning is intended to apply to rural as well as urban land, and it is conceivable that agricultural damages can be reduced.

If reduction in agricultural damages is the prime objective of this project, one more alternative should be considered. The entire 1,600 acres of floodplain to be benefited by the structure could probably be purchased for less than the cost of the structures. When a project to provide partial protection costs more than the land to be benefited, this alternative should be carefully considered. This method has been, and is being, implemented at other locations (Prairie du Chien and La Crosse, for example) to provide greater flood damage reduction at a lower cost than would be possible through structural measures.

APPENDIX E
PROJECT MAP

APPENDIX E PROJECT MAP FIRST CAPITOL WATERSHED LAFAYETTE & IOWA COUNTIES, WISCONSIN



LEGEND

COUNTY LINE	---
TOWNSHIP LINE	----
SECTION LINE	-----
SECTION NUMBER	56
RAILROAD	—+—+—+—
STREAMS	~~~~~
HIGHWAYS— FEDERAL, STATE & COUNTY	—(151)—(126)—(81)—
WATERSHED BOUNDARY	—o—o—o—
DRAINAGE AREA CONTROLLED BY STRUCTURE	■
AREA BENEFITED	■
PROJECT MEASURES	④
STRUCTURE NUMBER	④
STRUCTURE NAME	WOOD BRANCH
FLOODWATER RETARDING STRUCTURE	⊞
DRAINAGE AREA SQUARE MILES	O.A. 6.07 SQ. MI.
STREAM FISHERY IMPROVEMENT	●●●●●
ECONOMIC REACH	—o—o—o—

SOURCES: SCS BASE 9,5-31,026 AND DATA FURNISHED BY FIELD TECHNICIANS

POLYCONIC PROJECTION



