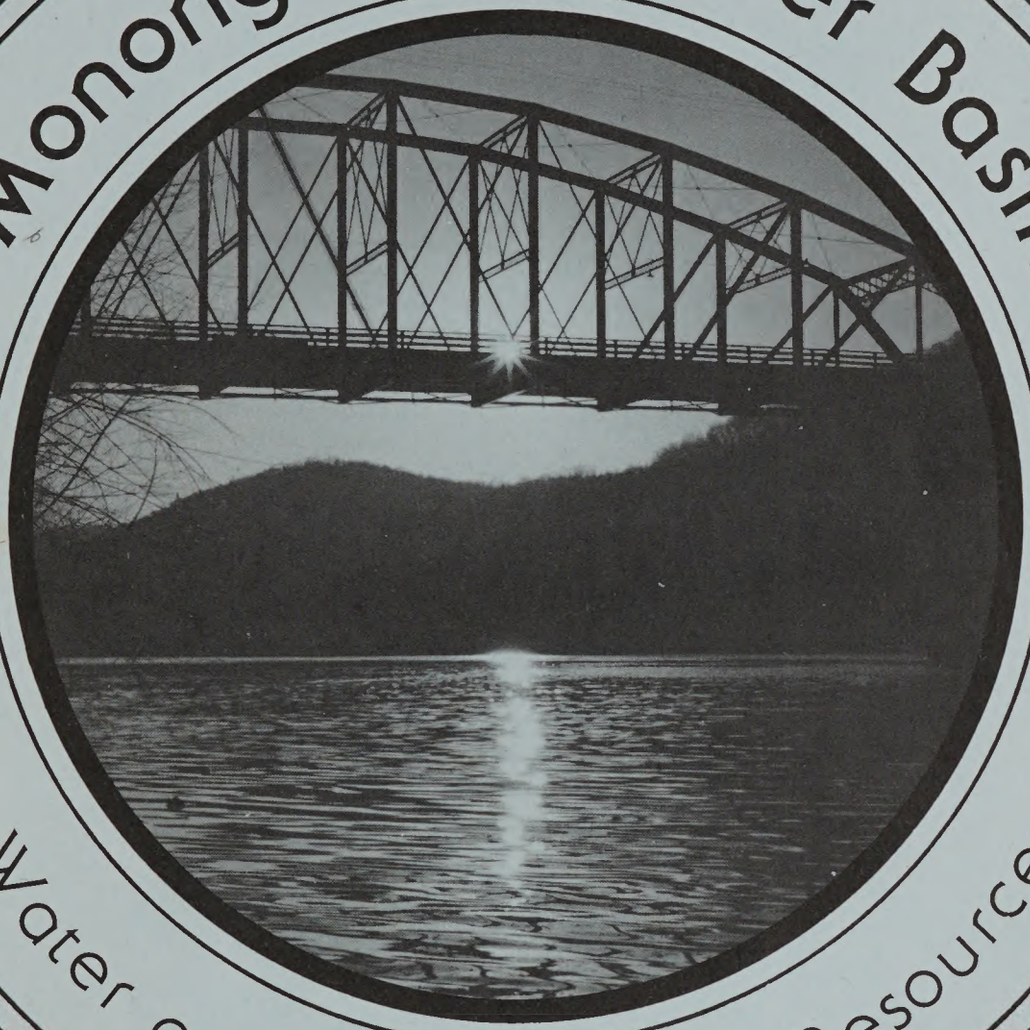
Monongahela River Basin



Water and Related Land Resources

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
ECONOMIC RESEARCH SERVICE
FOREST SERVICE

JUNE 1975

USDA EARLY ACTION PLAN

MONONGAHELA RIVER BASIN

by

U. S. DEPARTMENT OF AGRICULTURE

RIVER BASIN STAFF

MORGANTOWN, WEST VIRGINIA

June 1975

FOREWORD

The Type I Comprehensive Framework Study for the Ohio River Basin was completed and published as House Document No. 92 - 148, dated July 27, 1971. This study, authorized by the Congress of the United States, was coordinated by the Ohio River Comprehensive Survey Coordinating Committee. The Coordinating Committee was followed by the Ohio River Basin Commission, created by Executive Order 11578 on January 13, 1971, following formation and concurrence requests of the 11 Governors of the Member States and Commonwealths.

The Type I Framework Study, recommended an early and more detailed study of the Monongahela portion of the Ohio River Basin through a Type IV Comprehensive Study authorized for the West Virginia portion of the Monongahela River Basin.

The West Virginia Department of Natural Resources, and the United States Department of Agriculture are developing a four volume Type IV report for the basin. Volume I - Inventory; Volume II - Part A, Hydrology; Volume II - Part B, Economic Base; Volume III - Problems, Needs, Potential Solutions; and Volume IV - The Selected Plan. This report is a summary of the USDA inputs to the four volumes.

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INTRODUCTION

How and Why Study Was Initiated

As the Primary Water Planning Agency within the State of West Virginia, the Department of Natural Resources is required by law to make studies and develop reports for all river basins. A Type IV study was initiated by a letter from the Director of the Department of Natural Resources (November 21, 1969) to the State Conservationist for the Soil Conservation Service requesting the participation of the United States Department of Agriculture.

The study was to identify problems and needs in the 55 upstream watersheds of the West Virginia portion of the Monongahela River Basin, and to provide information including recommended and alternative solutions, which could facilitate the coordinated and orderly conservation development, use, and management of water and related land resources.

Authority for the Study

The West Virginia Division of Water Resources has authority under Chapter 20, Article 5, West Virginia Statutes, to conduct water resource studies and report the results.

The United States Department of Agriculture provided assistance under Provisions of Section 6 of the Watershed Protection and Flood Prevention Act (Public Law 566, 83rd Congress as

amended). That section authorizes the Secretary of Agriculture to cooperate with other Federal, State, and local agencies in surveys and investigations of the watersheds of rivers and other waterways to develop coordinated programs.

Objectives and Nature of Study

Objectives of USDA participation in this study include identification of water and related land resource projects and individual measures which will provide a means of solving special problems, improving economic opportunity, improving the environment, and aid in slowing or reversing the trend of population decline.

The study deals with necessary expansions in water and related land resource based goods and services consistent with the objectives in this basin and their role as integral and harmonious components in development of the Ohio River Basin and the Appalachia Region.

The West Virginia Department of Natural Resources and the USDA Agencies have coordinated their efforts with other Federal, State, and local agencies to identify projects, programs, and other needed solutions to meet both short and long-term objectives. This report provides the framework into which programs and projects for resource development can be fitted, with minimal adverse effects to the environment. A total of 55 upstream watersheds have been investigated and the results are included

within this report. The results of other studies, completed and underway, were also used to provide the basis for a comprehensive plan for the Monongahela River Basin Study area. This information can be used as a basis for planning and coordinating future water and land resource development programs and projects of other local, State, and Federal agencies.

USDA Agencies Participating in Study

Studies and surveys relative to USDA participation were carried out by the Soil Conservation Service, Economic Research Service, and Forest Service. Agency responsibility is detailed on pages 22 and 23 of the Plan of Work.

Sponsoring Agency

The West Virginia Department of Natural Resources, with leadership responsibilities vested in the Division of Water Resources, chaired the overall study. Other DNR Divisions cooperating were: Forestry, Parks and Recreation, Planning and Development, Reclamation, and Wildlife Resources.

Cooperating Agencies

Others cooperating were United States Army Corps of Engineers, Environmental Protection Agency, Federal Power Commission, and Department of Housing and Urban Development; West Virginia Department of Highways, Department of Commerce, and Geologic and Economic Survey; Ohio River Basin Commission; and West Virginia University, College of Agriculture, Division of Resource Management.

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How Study Was Made

Information from existing reports of previous studies and general data from various Federal, State, and private sources was used to the extent it was available. This included the 1970 Soil and Water Conservation Needs Inventory, Appalachian Water Resource Survey, the Ohio River Basin Comprehensive Survey, the 1969 Census of Agriculture, Water Resources of the Monongahela River Basin-West Virginia (West Virginia Department of Natural Resources 1967), Summary Report Monongahela River Mine Drainage Remedial Project (Environmental Protection Agency 1971), Statewide Comprehensive Outdoor Recreation Plan - West Virginia, and others. Information was also obtained from maps, photo studies, field reconnaissance, and surveys.

Labeled OBERS Economic Area 65, the basin was identified, through analysis of commuter patterns, as an independent economic region with the center at Clarksburg, West Virginia.

The basin was divided into four subbasins to facilitate a thorough investigation into the intensity and extent of water and related land resource problems in the 55 upstream watersheds.

A total of 25 Watershed Investigation Reports were prepared and six Appalachia Resource Studies were updated. Benefits and costs for the remaining 24 upstream watersheds were updated to a 1970 base year.

DESCRIPTION OF THE BASIN

Location and Size

The Monongahela River is formed by the confluence of the West Fork River and Tygart Valley River at Fairmont in Marion County. The drainage area of the basin totals 7,340 square miles, with about 57 percent, or approximately 4,150 square miles, in West Virginia, and the remaining 3,190 square miles in Pennsylvania and Maryland. The Monongahela River is 128 miles in length from its source at Fairmont to the mouth at Pittsburgh, Pennsylvania. Its length in West Virginia is approximately 37 miles. The Cheat River is the principal tributary of the Monongahela River in West Virginia. Of the 4,150 square miles in West Virginia, approximately 2,730 square miles are in the main stem of the Monongahela River Drainage area and 1,420 square miles are in the Cheat River Drainage area. Point Marion, Pennsylvania, ie confluence of the Monongahela and Cheat Rivers.

For purposes of this report, the term Monongahela River Basin area (2,624,000 acres) refers to that portion of the basin made up of 55 upstream watersheds mainly in West Virginia 1/ . See Figure 1.

1/ West Virginia Soil and Water Conservation Needs Inventory, USDA, Soil Conservation Service, Morgantown, West Virginia, 1970.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

FIGURE 1
BASE MAP
MONONGAHELA RIVER BASIN
WEST VIRGINIA

The Monongahela River Basin area lies in the Appalachian Plateaus and the Allegheny Mountain Physiographic Provinces. See Figure 2. The Appalachian Plateaus are relatively low rolling mountains drained by the main stem of the Monongahela River and its tributaries, while the Allegheny Mountains are a relatively high-relief area drained by the Cheat River and its tributaries. There is little flat land in the basin.

The entire basin is located in the East Central General Farming and Forest Land Resources Region. It is evenly distributed between the Central Allegheny Plateau and Eastern Allegheny Plateau and Mountains Major Land Resource Areas, with a small part of the southeastern corner in the Southern Appalachian Ridges and Valleys Land Resource Area. See Figure 3.

Principal tributaries of the Monongahela River and their drainage areas are as follows:

Tributary	Drainage Area (Square Miles)
Tygart Valley River at Colfax	1,366
Buckhannon River at Hall	277
West Fork River at Enterprise	759
Cheat River near Morgantown	1,380
Dry Fork at Hendricks	345
Shavers Fork at Parsons	214
Big Sandy Creek at Rockville	200

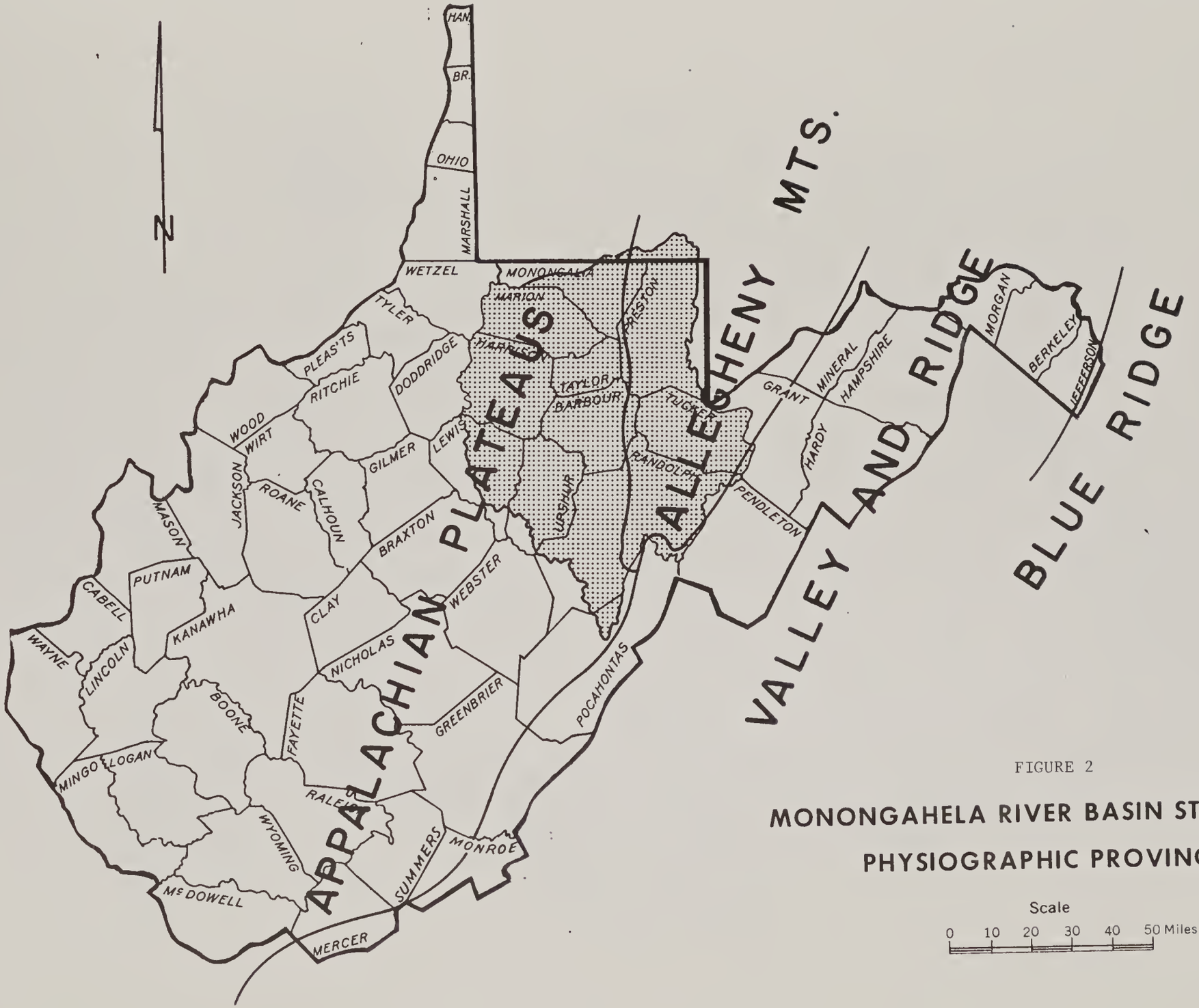

FIGURE 2

MONONGAHELA RIVER BASIN STUDY AREA

PHYSIOGRAPHIC PROVINCES

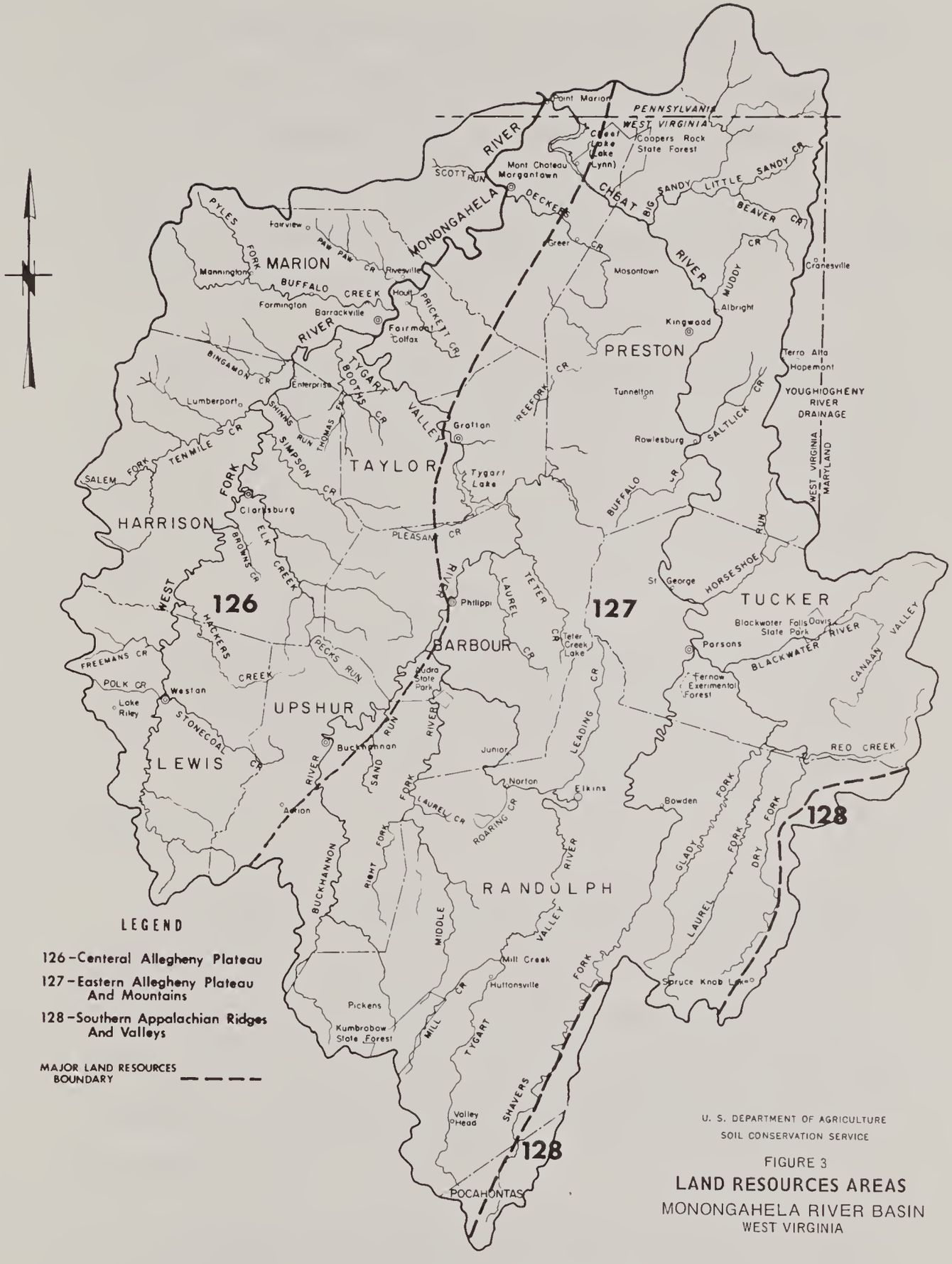

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FIGURE 3

LAND RESOURCES AREAS

MONONGAHELA RIVER BASIN
WEST VIRGINIA

The basin defined above is a little over 90 miles long and 70 miles wide. It includes all of Marion, Harrison, Taylor, Tucker, and Barbour Counties and parts of Upshur (82 percent), Randolph (92 percent), Lewis (64 percent), Preston (89 percent), Monongalia (70 percent), Pocahontas (3 percent), and Fayette Counties (Pennsylvania) (12 percent).

The basin is accessible through United States Highways 19, 33, 50, 119, 219, and 250 and Interstate Highway 79. Appalachian Corridors E and H are under construction in various sections and upon completion will make other parts of the State more accessible.

Elevations vary from 797 feet at the West Virginia-Pennsylvania State Line north of Morgantown to 4,800 feet in the headwaters of the tributaries. See Table 1 for Slope Ranges.

Climate

Precipitation averages about 50 inches, ranging from 40 to 70 inches, depending on surface altitude, terrain, and exposure. The maximum occurs along the eastern and southern edges, and the minimum occurs along the West Fork and Monongahela Rivers in the vicinity of Clarksburg in Harrison County, and Morgantown in Monongalia County.

The average annual temperature ranges from about 45 degrees F. at highest elevations to about 55 degrees F. at lower elevations.

TABLE 1 -- SLOPE BY SUBBASINS
Monongahela River Basin, West Virginia

Slope Ranges (Percent)	Monongahela	West Fork	Tygarts Valley	Cheat	Total
			(Acres)		
0 to 12	44,350	49,300	169,200	279,550	542,400
13 to 25	144,600	267,150	465,050	383,850	1,260,650
26 to 40	74,750	203,500	168,000	142,000	588,250
41 to 65	4,200	22,100	19,000	60,200	105,500
Greater than 65	100	100	200	2,600	3,000
TOTALS	268,000	542,150	821,450	868,200	2,499,800

Source: Data in this table were produced by Map Information Assembly and Display System (MIADS).

The average maximum temperatures range from about 80 to 88 degrees F. in July. The average minimum temperatures range from about 20 to 26 degrees F. in January, depending on elevation.

Water Resources

Surface water -- Average discharge of the Monongahela River at Point Marion, Pennsylvania, is about 7,500 cubic feet per second. Some 60 percent of this flow is contributed by the main stem and about 40 percent comes from the Cheat River Subbasin.

Many of the smaller streams have no flow during the summer months. Although the main stem has been very low in past years, the river now has adequate depth for year-round commercial navigation.

Except for seasonal water shortages in some upstream areas, there appears to be enough water for foreseeable needs, although the quality of water is not fully adequate for certain uses in some localities. For detailed information concerning hydrology, refer to Volume II, Part A. 2/

Water resources consist of about 7,400 acres of streams less than 1/8 mile wide and ponds and lakes of more than 40 acres in size. This acreage also includes the surface area of the three lock-and-dam navigational structures located on the Monongahela

2/ Volume II, Part A, Streamflow Characteristics of the: Monongahela River, West Virginia Department of Natural Resources, Charleston, West Virginia, 1973.

River between Fairmont, West Virginia and Point Marion, Pennsylvania. There are also two large reservoirs, Tygart Reservoir and Lake Lynn. The Tygart Reservoir located on the Tygart Valley River has a flood storage pool of 3,440 acres and a storage capacity of 286,600 acre feet and Lake Lynn, on the Cheat River has a normal pool of 1,730 acres and a storage capacity of 72,300 acre feet.

The Navigation for the Monongahela River is operated by the Corps of Engineers. Navigation is available for 128 miles, from Pittsburgh, Pennsylvania to Fairmont, West Virginia by a system of locks and dams. The reported traffic for 1971 was about 35.7 million tons which moved approximately 1,420 million ton miles. Water-borne commerce consists of about 79 percent coal, 7 percent non-metallic minerals, 5 percent petroleum and coal products, 5 percent primary metal products, and 4 percent of other commodities.

Ground water -- The ground water part of the hydrologic cycle follows a fairly normal pattern of recharge, movement in, and discharge from water-bearing rocks. Generally, shallow ground water moves from topographically high intake areas to nearby valleys, where it is discharged as seeps and springs or directly into stream channels. Variations in the permeability and structural attitude of the rocks may control or alter the

pattern of movement. Where rock formations are relatively flat, deeper lying ground water may move laterally without being influenced by the topography. The velocity of the ground water flow in most rocks is usually low, ranging perhaps from a few inches to several hundred feet per year. Thus, availability of ground water is quite variable.

Sandstone beds are generally the best aquifers, although locally limestone can be excellent sources of large amounts of water. Intergranular openings and fractures in the sandstone permit storage and movement of ground water.

Springs and seeps occur on hillsides, near valley edges, and along courses of streams. Springs usually issue from fractures in the rock, the water being diverted to the surface by rocks of low permeability beneath the water-bearing zone.

The basin does contain several areas which have large supplies of ground water available for future development. These are mainly in the eastern mountainous part.

Chemical character of ground water is variable because of its storage in and movement through rock formations of various kinds. Chemical characteristics range from soft to hard, acidic to basic, and low to high concentrations of iron and chlorides.

Deep-lying saline ground water occurs several hundred feet below stream levels through the western part. Shallow depth of saline water in some areas is attributed to upward leakage of saline water through abandoned oil and gas wells.

Mineral Resources

Coal -- Coal mining is the largest industry with respect to extraction and use of mineral resources. The rapidly expanding demand for energy and foreign markets have brought new life to the coal industry. The combination of coal reserves, transportation facilities, skilled miners, and nearness of markets has caused recent and rapid expansion of new mines and electric generating plants. Unless new sources of energy for power generation are found, this trend will continue.

Coal production in the ten counties located in part or entirely in the basin totaled 30,772,650 tons in 1973. See Table 2.

TABLE 2 -- SUMMARY OF COAL PRODUCTION (BY COUNTIES), 1973
Monongahela River Basin, West Virginia

County	Underground Mine	Surface Mine	TOTAL
		Tons	
Barbour	1,326,086	3,237,742	4,563,828
Harrison	3,206,022	778,755	3,984,777
Lewis	1,286	274,917	276,203
Marion	6,199,421	20,411	6,219,832
Monongalia	10,573,550	988,677	11,562,227
Preston	779,222	887,350	1,666,572
Randolph	156,546	756,266	912,812
Taylor	-	154,816	154,816
Tucker	-	179,709	179,709
Upshur	344,364	907,510	1,251,874
TOTAL	22,586,497	8,186,153	30,772,650

Source: Annual Report, Department of Mines, 1973, State of West Virginia, Charleston, West Virginia.

Oil and gas -- Drilling activity, particularly for oil began about the turn of the century in the western edge of the basin in the counties of Monongalia, Marion, Harrison, and Lewis. This area and the rest of the basin with potential for shallow oil or gas production has slowly decreased. The trend will probably continue unless there is interest in secondary recovery methods.

Most of the western part of the basin lies in a gas producing area. Lewis, Harrison, Upshur, and western parts of Barbour, Marion, and Monongalia Counties are all gas producing regions. Production here has been from relatively shallow sands, or down to the Upper Devonian, at depths usually ranging from 2,000-3,000 feet. Potential exists for production from deeper deposits but exploration of these deeper sediments has not been too successful.

Other areas, such as Briery Mountain Anticline in Preston County, Etam Anticline in Preston and Tucker Counties, Blackwater Anticline in Tucker County, and Middle Mountain in Randolph County were good gas producers but declined rapidly. These fields have now been developed as gas storage areas.

Recent drilling activity along Chestnut Ridge Anticline in Monongalia and Preston Counties has been fairly successful and this area could develop into a major gas field.

Industrial Rocks and Minerals -- The basin contains rocks of sedimentary origin so the only minerals found are from that source, and include sand and gravel, sandstone, clay, limestone, and salt. These materials are not exotic but they are basic needs for agriculture, and for the construction, metallurgy, chemical, glass, and steel industries. The materials are relatively abundant but bulky, and if they must be shipped over long distances, costs become unreasonable and substitutes must be found. In general, the basin is well supplied with these materials. They are available within a reasonable distance of any point in the area.

Sand and Gravel -- Alluvial sand and gravel were dredged from the Monongahela River for many years. This practice has almost ceased. Mounting costs and increased competition from limestone supplies has caused a shift in use from river gravel to crushed limestone for aggregate. Limestone plants have been installed which can crush, screen, and then blend various sizes of aggregate into the desired gradation with a constant quality of material. The only drawback being particle shape since a rounded or sub-rounded aggregate is preferred. The nearest source of river gravel is now New Martinsville on the Ohio River.

Sandstone -- Sandstone of sufficient durability for dimension stone is available basinwide but is only quarried in a few locations. Sandstone is quarried for use as glass sand, foundry sand, abrasive sand, filter sand, and aggregate.

Clay and Shale -- The principal use of clays and shale has been for production of common brick or tile for building purposes. Since nearly any clay or shale with plasticity, strength, low shrinkage, and suitable iron content can be used for this purpose, the demand for the finished product is generally more important than the availability of the raw material. Clays or shale are available within a reasonable distance from any point in the basin.

Limestone -- Limestone from the Greenbrier Limestone Formation is available throughout the Cheat River Subbasin. As with

all bulky materials, transportation costs are very important, so the southern or upper end of the basin is handicapped somewhat by the lack of this resource. The Greenbrier Limestone is a valuable resource because of its many uses. These include crushed stone for concrete aggregate, road material, railroad ballast, coal mine rock dust, sand, filler and whiting; soil-conditioner to correct soil acidity; lime for chemical and industrial use such as glass making; and raw material for the manufacture of Portland Cement.

Salt -- Much of the basin is underlain by proven rock salt deposits. This area includes Monongalia, Marion, Harrison, and western Taylor Counties. The salt lies at a depth of 2,000 to 3,000 feet. At present it is apparently not profitable to develop this resource.

Land Resources

Estimated general land use for subbasins by capability class is shown in Volume I, Pages 17 through 20.3/ A summary of the subbasin information is shown in Table 3.

3/ Volume I - Inventory, Comprehensive Survey of the: Monongahela River, West Virginia Department of Natural Resources, Charleston, West Virginia, 1973.

TABLE 3 -- ESTIMATED GENERAL LAND USE BY CAPABILITY CLASS
Monongahela River Basin, West Virginia

Land Use Capability Class	Crop	Pasture	Forest*	Other	TOTAL
			(Acres)		
I	3,800	0	600	200	4,600
II	69,800	33,300	54,300	17,400	174,800
III	79,000	72,700	115,700	24,700	292,100
IV	35,500	74,900	158,900	22,800	292,100
V	200	200	200	0	600
VI	12,800	95,900	268,000	39,300	416,000
VII	6,000	122,100	905,500	59,900	1,093,500
VIII	0	0	6,600	2,000	8,600
Federal				252,500	252,500
Urban & Built-Up				81,800	81,800
Water Area				7,400	7,400
TOTAL	207,100	399,100	1,509,800	508,000	2,624,000
Percent	8	15	58	19	

Source: West Virginia and Pennsylvania Soil and Water Conservation Needs Inventories, 1970.

* Does not include National Forest Land.

The area is about 90 percent in private and 10 percent in public ownership. Public ownership includes some 252,000 acres in the Monongahela National Forest and 9,900 acres in two state educational institutions, state parks, forests, game farms, and penal institutions. Federal land includes one fish hatchery, lands associated with navigation facilities, one penal institution, and three research facilities, amounting to a total of 500 acres.

When National Forest is included, forest land comprises nearly 70 percent of the basin area. Approximately 84 percent of this land is in private ownership. The predominant forest ecosystems are oak-hickory (various oaks and hickories), northern hardwoods (maple, beech, and yellow birch), and cove hardwoods (yellow poplar, white ash, sweet birch, and basswood). The average per acre value of the timber is approximately $92.78.

Human Resources

Basin area residents totaled 320,443 in number, as reported in the 1970 Census. 4/ In a span of 20 years, the population decreased by 48,211. Most of the loss occurred during the decade of the fifties, when population decreased from 368,654 persons in 1950 to 327,009 by 1960. The rate of population decline has slowed to the point that some projections have indicated a reversal of downward trend. 5/

A distinguishing characteristic of the population is the high proportion of rural residents. In 1970, approximately 58 percent was classified as either rural farm or rural non-farm residents. By comparison, over 90 percent of the national population is classified as urban. The significant difference emphasizes the continuing importance of rural economic forces.

Since 1950, average population density by counties decreased 13 persons per square mile (ppsm), reflecting the loss of basin population. The 1970 mean density was equal to 85 ppsm. Densities by counties ranged between 197 ppsm in the most densely populated County of Marion to 18 ppsm in Tucker County, the most sparsely populated county in the economic study area.

4/ This and following figures are based on the 10-county area used for the economic base studies for the Monongahela River Basin Comprehensive Survey.

5/ Volume II - Part B: Economic Base Study of the Monongahela River, West Virginia Department of Natural Resources, Charleston, West Virginia, 1974.

Fish and Wildlife Resources

The fish and wildlife resources are varied, and some species are abundant. The major wildlife game species are: mammals - black bear, whitetail deer, gray squirrel, cottontail rabbit, raccoon, woodchuck; birds - ruffed grouse, wild turkey, duck, woodcock; furbearers - red fox, gray fox, opossum, beaver, muskrat, bobcat, skunk, weasel, mink; and fishes - rainbow trout, brown trout, brook trout, black bullhead, channel catfish, flathead catfish, muskellunge, rock bass, green sunfish, pumpkinseed, bluegill, smallmouth bass, largemouth bass.

Nationally listed threatened species, as enumerated by the United States Fish and Wildlife Service include one mammal, the Indiana brown bat that occurs locally, in caves, in the upper basin. The Cheat Mountain salamander, bog turtle, and mountain earth snake, officially listed as "status undetermined," occur in the Cheat River subbasin.

Economic Resources

This basin is an area of Appalachia rich in deposits of bituminous coals. It was drawn into the industrial era by technological advances in the iron and steel industry centered in nearby Pittsburgh. Bituminous coals were in demand and the basin economy responded. With industrialization in high gear, the economy became dichotomous (extractive and agricultural). Prior to this time, most of the commerce was directly related to agricultural

and forestry pursuits as it had been since settlement of the area. A well developed rail and river transportation network provide basin resources a transportation advantage with respect to the nation.

Continued production of minerals, participation in the industrial age, and concentration of population have not occurred without detriment to the water and land resources. Substandard water quality, for example, is mute evidence of the industrial age and its undesirable by-products. These by-products occur as acid mine drainage, mineralized water, effluents, and sedimentation. 6/

In this basin, drainage and economic areas are influenced by the mountainous terrain. Economic activity and population are concentrated in the north central section. In the remaining areas, the topography becomes more steep and rugged. Accordingly, populations are less dense and economic activity in these rural areas is dispersed and principally related to coal, agricultural, and timber production. 7/

Four of the five most important industries were related to the location of mineral reserves. Most obvious were mining and the supporting electrical equipment (mine machinery) industries. The utilities importance reflects coal fired electrical production. Railroads reflect transportation of the surplus coal

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6/ Volume II, Part B, op.cit., Chapter II.

7/ Ibid., Chapter III.

production. The diversity of the natural resources is highlighted by lumber and wood industries. In summary, resource-related industries account for 58 percent of total export employment and 28 percent of all employment.

Employment and Income -- Employment declined sharply during the mid-fifties and sixties, mostly in response to decreased mining activity. People left for jobs in more prosperous areas. A high proportion of the labor force was unemployed in the depressed labor market. In recent years, fewer persons were unemployed and the employment to population ratio was at a 20 year high in 1970. The improved situation is due to the structural change of the economy. In 1950, 32 percent of all jobs were in mining, agriculture, and forestry. By 1970, only 10 percent of the 105,000 employed persons were in these categories. Manufacturing replaced mining as the employment leader, followed by education, retail trade, mining, and services. As evidenced, the economy is more diversified and stable. Employment projections range from 133,000 to 186,000 by 2020. Gains will be concentrated in manufacturing, trade and services, and public administration.8/

Primary wood-using industries (sawmills, etc.) presently employ approximately 1,100 people at 83 dispersed mills. These facilities produce nearly 117 million board feet of lumber each year. Most of this output is derived from the processing of mixed hardwood logs.

8/ Volume II - Part B, Chapter V, Economic Base Study of the Monongahela River, West Virginia Department of Natural Resources, Charleston, West Virginia, 1974.

Secondary wood-using industries (those using primary products) employ approximately 1,280 persons at 57 plants. These plants process about 53 million board feet of lumber annually, producing such things as cabinets, furniture, pallets, millwork, and novelties.

In contrast to decreased employment and population, total income measures have increased since 1950. The rise of per capita income and earnings per worker was not illusory. On a 1950 population basis, income levels were nearly equal, an indication that real gains were made. In 1970 the average per capita income was $2,900 and earning per worker was $8,900. Recent data indicate that earnings per worker were only 15 percent lower than the national average. This gap is projected to decrease to 7 percent by 2020.

Earnings per worker have been historically higher than the per capita income that recently was 30 percent less than the national average. 9/ The disparity between per capita income and earnings per worker is attributable to a higher ratio of people to breadwinners and lower ratios of participation among women in the labor force. The latter characteristic is common to the basin and reflects physically demanding jobs, lack of employment in rural areas, the traditional role of a woman in the household, and larger rural families. However, per capita incomes are also projected to rise and be within 16 percent of the national average by 2020. 10/

9/ Volume II - Part B, op.cit., Chapter IV, Selected Characteristics of Population.

10/ Ibid.

Natural and Scenic Resources

Blackwater Falls -- Amber waters plunge over a 57-foot ledge to form magnificant, inspiring falls - one of West Virginia's most popular outdoor attractions. Below the falls the Blackwater River drops turbulently through a deep narrow canyon. Snowfall exceeds 100 inches, and the high elevation gives climate more like Canada than south of the Mason-Dixon line.

Canaan Valley -- With an annual snowfall that reaches 140 inches, and the alpine-like vegetation the valley is easily one of the finest winter attractions in eastern America. The natural valley surrounded by gently sloping land and girded by mountains provides flora and fauna features unique to this area. The beauty and diversity of plant communities, some of which are near their southern most range, hold an attraction for many people who enjoy the study of nature.

Dolly Sods -- This scenic area has long been considered a special spot by many people. Located in the highlands of the Allegheny Plateau above Laneville, West Virginia, the area contains unusual scenery and vegetation, upland bogs, and windswept plains in the 4,000 feet elevation range. Many plants are found here which live in the Canadian life zone, including some which can be traced to the Artic Circle.

Sinks of Gandy -- This geologic wonder is located in the scenic highlands of the Appalachian Plateau in the headwaters of Gandy Creek. The "Sinks" have attracted tourists and avid cavers for many years because of its ability to engulf and later release a sizeable mountain stream. Percolating ground waters and Gandy Creek have carved a 1-1/2 mile water course under Yokum knob through the Fredonia portion of the lower union limestone of the Greenbrier Series.

OBJECTIVE AND COMPONENT NEEDS

This section arrays all of the current and projected water and related land resource problems and needs that were identified in the overall study. This process considered the ideas of planners, local people, and units of industry and government.

Problems addressed are as follows:

1. Erosion on 1,314,500 acres.
2. Improper land use on crop and pasture land on 176,600 acres.
3. Flooding from 100-year event on 32,000 acres of flood plain lands.
4. Internal drainage on 44,000 acres of agricultural land.
5. Shortage of municipal and industrial water supply of 163.2 million gallons per day.
6. Shortage of land for general public outdoor recreation of 123,200 acres to provide 10,366,700 activity-days.
7. Shortage of public access for streamside recreation.
8. Critical erosion on National Forest lands, gully, 27 miles; abandoned roads and trails, 66 miles; and streambanks, 27 miles.
9. Deterioration of natural and scenic resources in four areas due to overuse and lack of mineral rights ownership.
10. Deterioration of geological resource (Sinks of Gandy).
11. Deterioration of water quality due to acid discharge from coal operations affecting 1,300 miles of streams and 3,400 acres of impoundments.

Two specific objectives were addressed. These were National Economic Development (NED) and Environmental Quality (EQ). Component needs of the NED objective included provisions for the

following: (1) erosion control to increase output of food and fiber, (2) agricultural water management to increase output of food and fiber, (3) reducing flood and sediment damage to cultural developments, (4) improving or increasing water supplies for consumptive uses, (5) increasing opportunities for generalized public outdoor recreation activities, and (6) preservation of land for specific purposes. Component needs of the EQ objective included provisions for the following: (1) management, protection, enhancement or creation of areas of natural beauty, (2) management, preservation, or enhancement of valuable biological resources, (3) enhancement of quality aspects of water, land, and air, and (4) management, preservation or enhancement of valuable geological, archeological, and historical resources. See the following tabular summary for objectives and detailed specific component needs.

OBJECTIVE AND COMPONENT NEEDS
Monongahela River Basin, West Virginia

Objectives	Components	Component Needs
National Economic Development	Provision of erosion control to increase output of food and fiber.	Limit erosion and increase production. Cropland-137,900 ac.; pasture - 309,000 ac.; State & private forest - 950,900 ac.; National Forest - 36,400 ac.
		Land use adjustment to proper capability class-cropland 54,500 acres; Pasture 122,100 acres.
	Provision of agricultural water management to increase output of food and fiber.	Drain 44,000 ac. of agricultural land.
	Provision of flood free agricultural land.	Reduce annual flood stages on 32,000 ac. and reduce annual flood damages by $180,800.
	Provision for reduction of flood and sediment damage to cultural developments.	Reduce average annual damages to residences $2,440,300; industry & commercial $2,314,200; sediment $1,564,900; transportation & utilities $1,241,400. This includes 24 communities identified for flood hazard analysis.
	Provision for consumptive water uses.	Rural 8.2 m.g.p.d, Municipal 31.9 m.g.p.d., mining 18.1 m.g.p.d., Power 105.0 m.g.p.d.

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OBJECTIVE AND COMPONENT NEEDS
Monongahela River Basin, West Virginia

Objectives	Components	Component Needs
National Economic Development	Provision of opportunities for generalized public outdoor recreation activities.	Increase annual recreation units for boating by 5,993 acres; Camping 1,675 sites; Hiking 87 miles of trails; Horseback riding 586 miles of trails; Picnicking 842 tables; outdoor games and sports 1,495 acres; Hunting 127,170 acres; Fishing 1,404 acres; Swimming 165 Pools or Beaches.
		Increase fisherman access at 50 sites.
		Public access on 80 miles of streams.
		Increase National Forest land by 50,000 ac.
		Expand public hunting areas by 26,000 ac.
	Provision for preservation of land for Specific Purposes.	Land Preservation Industrial Site 2,000 ac. Home sites 94,200 ac.
		Improved highways - Reconstruction 121 miles; Relocation 28 miles; widen 25 miles.

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OBJECTIVE AND COMPONENT NEEDS
Monongahela River Basin, West Virginia

Objectives	Components	Component Needs
Environmental Quality	Management, protection, enhancement or creation of areas of natural beauty.	1. Preserve 241 miles of scenic rivers in the basin including: Shavers Fork of Cheat 74 miles; Cheat River (Parsons to Lake Lynn) 54 miles; Dry Fork (Mouth of Laurel Fork)downstream 13 miles; Tygart ValleyRiver 30 miles; Laurel Fork (Rt.33 to Mouth) 8 miles; Blackwater River (Rt.32 bridge) downstream 10 miles; Big Sandy (Bruceton Mills) downstream 8 miles; Teter Creek (below lake) 17 miles; Laurel Creek (Barbour Co.) 13 miles; Middle Fork (Audra Park) downstream 14 miles. 2. Protect and preserve 8,000 acres of Dolly Sods by extension of National Forest proclamation boundary, 7,000 acres of Canaan Valley, 400 acres at mouth of Otter Creek, and 30,000 acres of Shavers Fork as unique scenic areas. 3. Enhance the appearance of 446,900 acres of farmland and 987,300 acres of forest land in the basin. 4. Restore natural beauty to about 58,200 acres of surface mines, solid waste disposal areas, highways, and streambanks in the basin. 5. Enhance the appearance of streams in the basin by improving water quality on 1,300 miles and reducing channel alterations.

June 1975

OBJECTIVE AND COMPONENT NEEDS
Monongahela River Basin, West Virginia

Objectives	Components	Component Needs
Environmental Quality	Management, preservation, or enhancement of valuable biological resources.	1. Enhance fishery and aquatic habitat on 1,300 miles of streams by reducing water quality problems. 2. Preserve flora and fauna of Dolly Sods, Sinks of Gandy, and Canaan Valley. 3. Preserve unique habitat and breeding area. Cheat Mountain 50,000 acres for bear and 7,000 acres in Canaan Valley for woodcock. 4. Fish and wildlife improvement on National Forest Waterfowl habitat potholes — 70 No. Seeding & planting wildlife food — 500 acres Forage plant release — 675 acres Wildlife openings — 2,580 No. Stream fish habitat structures — 1,180 No. Fish stream surveys — 552 miles Erosion control on National Forest Gulley stabilization — 27 miles Rehabilitate abandoned roads and trails — 66 miles Streambank stabilization — 27 miles

OBJECTIVE AND COMPONENT NEEDS
Monongahela River Basin, West Virginia

Objectives	Components	Component Needs
Environmental Quality	Management, preservation, or enhancement of valuable biological resources. (cont'd)	5. Inventory quantity and quality of riparian habitat and preserve valuable riparian habitat areas. 6. Inventory and determine the status of threatened and endangered plants and animals in the basin. 7. Enhance wildlife habitat by instituting habitat management practices for 1,289,900 acres of farmland in the basin.

June, 1975

OBJECTIVE AND COMPONENT NEEDS
Monongahela River Basin, West Virginia

Objectives	Components	Component Needs
Environmental Quality	Enhancement of quality aspects of water, land, and air.	1. Enhance water quality by reduction of mine acid water in 1,300 miles of streams and 3,400 acres of impoundments. 2. Enhance quality of land and water by stabilizing 28,400 acres of surface mine spoils; 7,000 acres of urban construction; and 22,800 acres of rural home sites and associated roads. 3. Protect water quality on Shavers Fork and Otter Creek by purchase of mineral rights on 4,000 acres and 18,000 acres respectively. 4. Enhance water quality by the installation of domestic sewage facilities for 35 communities. 5. Improve quality of land by installation of conservation treatment on 446,900 acres of farmland and 987,300 acres of forest land. 6. Protect the quality of land and water by adoption of county land use regulations. 7. Enhance water quality of Cheat River and West Fork River through low flow augumentation.

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OBJECTIVE AND COMPONENT NEEDS
Monongahela River Basin, West Virginia

Objectives	Components	Component Needs
Environmental Quality	Management, preservation, or enhancement of valuable geological, archeological, and historical resource.	1. Preservation of the Sinks of Gandy by acquisition of 9,000 acres by a combination of fee purchase and scenic easement. 2. Inventory and determine the significance of all geological, archeological, and historical resources in the basin.

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FINDINGS AND CONCLUSIONS

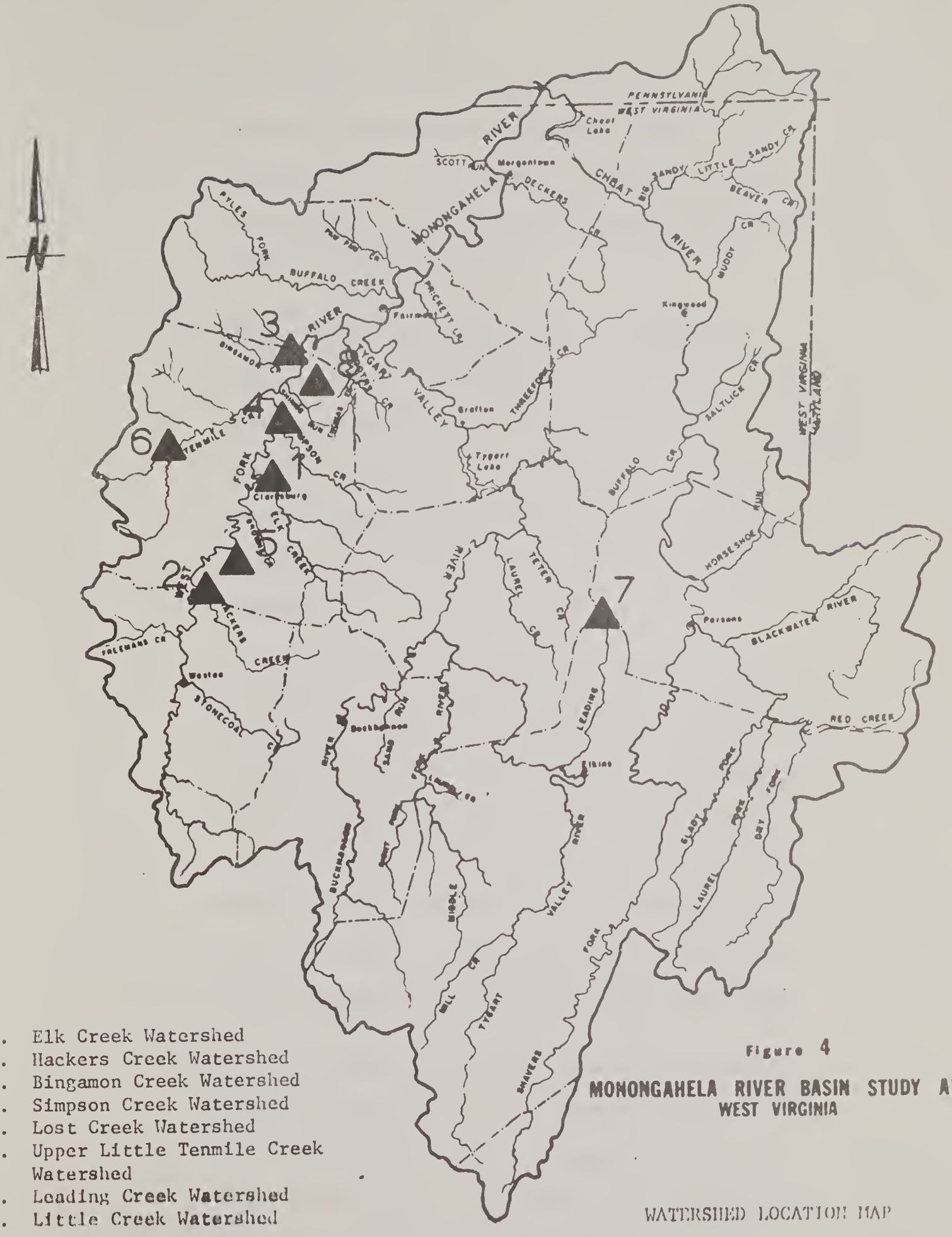
Early Action Plan

The Early Action Plan was selected to satisfy component needs for the next 10 to 15 years. This plan and plan elements represent the capability of existing USDA Programs to satisfy the component needs. Remaining needs can be satisfied by the appropriate jurisdictions shown under program opportunities.

Plan selection processes led to recommending 8 of the 55 upstream watersheds for the USDA Early Action Plan, along with other recommendations that are listed in the Capability of USDA Early Action Plan tabulation. The watersheds are shown on Figure 4 and are listed as follows with a brief description of each:

1) Elk Creek Watershed, located in Harrison, Barbour, and Upshur Counties, West Virginia, has a drainage area of 121.7 square miles or 77,860 acres. The recommendations to solve the problems include flood insurance and flood plain zoning in the city of Clarksburg, 30,920 acres of land treatment, 12 single-purpose floodwater retarding dams, one multiple-purpose dam with flood and recreation storage, and 7,050 feet of stream channel work.

2) Hackers Creek Watershed, located in Lewis, Upshur, and Harrison Counties, West Virginia, has a drainage area



1. Elk Creek Watershed
2. Hackers Creek Watershed
3. Bingamon Creek Watershed
4. Simpson Creek Watershed
5. Lost Creek Watershed
6. Upper Little Tenmile Creek Watershed
7. Leading Creek Watershed
8. Little Creek Watershed

Figure 4

MONONGAHELA RIVER BASIN STUDY AREA
WEST VIRGINIA

WATERSHED LOCATION MAP

of 57.4 square miles or 36,733 acres. The recommendations to solve the problems include 30,000 acres of land treatment, one multiple-purpose floodwater retarding and municipal and industrial water supply dam, and 3.1 miles of stream channel work.

3) Bingamon Creek Watershed, located in Harrison and Marion Counties, West Virginia, has a drainage area of 29,600 acres or 46.3 square miles. To solve the watershed problems 9,170 acres of land treatment, four single-purpose floodwater retarding dams, and one multiple-purpose floodwater retarding and recreation dam are recommended.

4) Simpson Creek Watershed, located in Barbour, Harrison, and Taylor Counties, West Virginia, has a drainage area of 46,550 acres or 72.7 square miles. Recommendations to solve the problems include 23,000 acres of land treatment, eight single-purpose floodwater retarding dams, one multiple-purpose floodwater retarding and recreation dam, and two multiple-purpose floodwater retarding municipal and industrial water supply dams.

5) Lost Creek Watershed, located in Harrison and Lewis Counties, West Virginia, has a drainage area of 12,622 acres or 19.7 square miles. Recommendations to solve the problems include 4,743 acres of land treatment and two single-purpose flood prevention dams.

6) Upper Little Tenmile Creek Watershed, located in Harrison County, West Virginia, has a drainage area of 9,700 acres or 15.2 square miles. Recommendations to solve the problems include 4,012 acres of land treatment, three single-purpose floodwater retarding dams, one multiple-purpose floodwater retarding and recreation dam, and one multiple-purpose floodwater retarding municipal and industrial water supply dam.

7) Leading Creek Watershed, located in Randolph County, West Virginia, has a drainage area of 38,860 acres or 60.71 square miles. Recommendations to solve the problems include 16,264 acres of land treatment, six single-purpose floodwater retarding dams, one multiple-purpose floodwater and recreation dam, one multiple-purpose floodwater retarding municipal and industrial water supply dam, and 1.65 miles of channel work.

8) Little Creek Watershed, located in Marion County, West Virginia, has a drainage area of 3,270 acres or 5.1 square miles. Recommendations to solve the problems include 1,015 acres of land treatment and a single-purpose flood retarding dam to be installed under the authority of RC&D.

USDA Early Action Plan would provide: flood damage reduction on 1,600 acres and annual damage reduction of $1,499,700; six type 15 flood insurance studies; 8 flood hazard analysis; erosion control on 395,900 acres; land use change on 176,600 acres; agricultural water management (drainage) on 7,800 acres; municipal and industrial water supply of 1.3 MGD, and provide generalized public outdoor recreation on 51,700 acres, 28 sites, and 80 miles of streams for public access. All of the foregoing components are for short range need (1975-1990).

Application of conservation treatment measures would effectively reduce runoff, conserve moisture, prevent excessive soil loss, and minimize erosion problems on surface mined areas, roadbanks, and new construction areas.

The land treatment measures would help to improve water quality and fish production in Monongahela River and its tributaries by reducing sediment and turbidity. Reduction of turbidity would increase light penetration and thus increase the food production of photosynthetic algae for bottom fauna. The reduction of sediment concentrations would increase the survival of fish eggs and fry, increase aquatic insect fauna, and improve the shelter damaged by sedimentation. Food supplies of water-associated mammals and birds (e.g. muskrat, mink, raccoon, waterfowl, herons, etc.) would improve.

Conservation land treatment would increase the production of timber, forage, hay, and crops and would improve fish and wildlife

habitat, water quality, the aquatic ecosystem, and aesthetics. Many of the land treatment measures would enable landowners to adopt sound land management practices to increase production.

Land treatment would help restore and maintain soil productivity by adding or holding plant nutrients, and where appropriate, reduce the intensity of land use. The degradation of surface waters by nitrogen, phosphorous, pesticides, or other agricultural pollutants, attached to soil particles, would be reduced by the utilization of proper fertilization methods and by erosion control through land treatment.

The implementation of the USDA Early Action Plan would create additional lakes of 1,700 acres with an undetermined number of beaches and miles of shoreline, and prevent 78,800 tons of sediment from reaching basin streams. Critical erosion control measures include 28,400 acres of surface mines and gob piles, 7,000 acres of urban construction, 22,800 acres of rural home sites and associated roads, 27 miles of gulley stabilization, 66 miles of rehabilitated abandoned roads and trails, and 27 miles of streambank stabilization.

The plan will protect areas of natural beauty including 8,000 acres on Dolly Sods, 18,400 acres on Otter Creek, and 34,000 acres in Shavers Fork.

Fish and wildlife improvement on the National Forest is an important part of the environmental quality for the Monongahela

River Basin. USDA Early Action Plan includes 500 acres of seeding and planting for wildlife food, 70 waterfowl habitat potholes, 675 acres of forage plant release, 2,580 wildlife openings, 1,180 stream fish habitat structures, and 552 miles of fish stream surveys.

Preservation of valuable geological, archeological, and historical resources includes purchase and easement Sinks of Gandy 9,000 acres.

Coordination and Programs for Further Development

Coordination of programs by all units of government will be necessary if the remaining component needs in the basin are to be satisfied. For a detailed listing of program opportunities refer to the Capability of USDA Early Action Plan tabulation.

CAPABILITY OF USDA EARLY ACTION PLAN

TO SATISFY COMPONENT NEEDS

Monongahela River Basin, West Virginia

Objective	Description	Component Needs 1/		USDA Early Action Plan		Program Opportunities	
		Unit	Quantity	Provide 2/	Remaining Needs 1/	USDA Early Action	Remaining Needs 1/
National Economic Development	1. Flood Damage Reduction	Acres	32,000	1,600	30,400	7 PL-566 Watersheds and 1 RC&D Measures Plan; with FmHA loans	County; State; C of E; USDA
		$ Annual Damage	7,741,600	1,499,700	6,241,900		
	2. Type 15 Flood Insurance Studies	No.	24	6	18	FIA	C of E; County; State; HUD; USGS
	3. Flood Hazard Analysis	No.	8	8	0	RB-09	
	4. Erosion Control	Acres	1,314,500	395,900	918,600	PL-46; ACP; with FmHA loans	County; CES; State; USDA
	5. Land Use Change	Acres	176,600	176,600	0	7 PL-566 Watersheds; 1 RC&D with FmHA loans; and National Forest Annual Appropriation Fund.	
	6. Agricultural Water Management (Drainage)	Acres	72,600	7,800	64,800	Clarke-McNary Act of 1924, Cooperative Forest Management Act of 1950, Agricultural Act of 1956, Title IV, and General Forestry Assistance under Annual Appropriation Act	
	7. Municipal and Industrial Water Supply	M.G.P.D.	163.2	1.3	161.9	4 PL-566 Watersheds with FmHA loans	Public Service Districts; State; County; City; USDA; C of E

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CAPABILITY OF USDA EARLY ACTION PLAN

TO SATISFY COMPONENT NEEDS

Monongahela River Basin, West Virginia

Continued

Objective	Description	Component Needs 1/		USDA Early Action Plan		Program Opportunities	
		Unit	Quantity	Provide 2/	Remaining Needs 1/	USDA Early Action	Remaining Needs 1/
National Economic Development	8. Provide Generalized Public Outdoor Recreation	Acres	123,200	51,700	71,500	5 PL-566 Watersheds with FmHA loans; Land & Water Conservation Fund Act; RC&D	WV-DNR; BOR; C of E; County; USDA
		Activity Days	10,366,700	725,700	9,641,000		
		Access Sites	28	28	0	RC&D	
		Public Access on Streams Miles	80	80	0	RC&D	

1/ For both short and long range needs.
2/ For short range needs, 1975-1990

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CAPABILITY OF USDA EARLY ACTION PLAN

TO SATISFY COMPONENT NEEDS

Monongahela River Basin, West Virginia

Objective	Description	Component Needs 1/		USDA Early Action Plan		Program Opportunities	
		Unit	Quantity	Provide 2/	Remaining Needs 1/	USDA Early Action	Remaining Needs 1/
Environmental Quality	1. Create Additional Lakes	Acres	Not Quantified	1,700	Not Quantified	7 PL-566 Watersheds and 1 RC&D with FmHA loans	
	2. Critical Erosion Control						
	Surface Mines & Gob Piles	Acres	28,400	28,400	0	6 PL-566 Watersheds; PL-46: 1 RC&D; with FmHA loans. ACP	
	Urban Construction	Acres	7,000	7,000	0		
	Rural Home Sites and Associated Roads	Acres	22,800	22,800	0		
	Gulley Stabilization	Miles	27	27	0	National Forest Annual Appropriation Fund.	
	Rehabilitate Abandoned Roads and Trails	Miles	66	66	0		
	Streambank Stabilization	Miles	27	27	0		
	3. Protect Areas of Natural Beauty						
	Dolly Sods	Acres	8,000	8,000	0	PL-93-622; Land and Water Conservation Fund Act.	
	Otter Creek	Acres	18,400	18,400	0		

June 1975

CAPABILITY OF USDA EARLY ACTION PLAN

TO SATISFY COMPONENT NEEDS

Monongahela River Basin, West Virginia

Continued

Objective	Description	Component Needs 1/		USDA Early Action Plan		Program Opportunities	
		Unit	Quantity	Provide 2/	Remaining Needs 1/	USDA Early Action	Remaining Needs 1/
Environmental Quality	**3. Protect Areas of Natural Beauty (continued)**						
	Shavers Fork (fee simple)	Acres	30,000	30,000	0	PL-93-622; Land and Water Conservation Fund Act.	
	Shavers Fork (mineral rights)	Acres	4,000	4,000	0		
	4. Create Rest Area for Migratory Water Fowl and Habitat for Warm Water Fish	Acres	Not Quantified	1,700	Not Quantified	7 PL-566 Watersheds and 1 RC&D with FmHA loans.	
	5. Preservation of Valuable Biological Resources						
	Dolly Sods flora and fauna	Acres	8,000	8,000	0	PL-93-622; Land and Water Conservation Fund Act.	
	Waterfowl habitat potholes	No.	70	70	0	National Forest Annual Appropriation Fund	
	Seeding & planting wildlife food	Acres	500	500	0		
	Forage plant release	Acres	675	675	0		
	Wildlife openings	No.	2,580	2,580	0		
	Stream fish habitat structures	No.	1,180	1,180	0		
	Fish stream surveys	Miles	552	552	0		

CAPABILITY OF USDA EARLY ACTION PLAN

TO SATISFY COMPONENT NEEDS

Monongahela River Basin, West Virginia

Continued

Objective	Description	Component Needs 1/		USDA Early Action Plan		Program Opportunities	
		Unit	Quantity	Provide 2/	Remaining Needs 1/	USDA Early Action	Remaining Needs 1/
Environmental Quality	6. Sediment Reduction from 55 Upstream Watersheds by 13 Percent Annually	Tons	604,300	78,800	525,500	7 PL-566 Watersheds; 1 RC&D; PL-46; ACP; with FmHA loans. Clarke-McNary Act of 1924, Cooperative Forest Management Act of 1950, Agricultural Act of 1956, Title IV, and General Forestry Assistance under Annual Appropriation Act	County; State; USDA
	7. Preservation of Valuable Geological, Archeological and Historical Resources						
	Purchase and easement Sinks of Gandy	Acres	9,000	9,000	0	Land and Water Conservation Fund Act.	

1/ For both short and long range needs.
2/ For short range needs, 1975-1990.

June 1975

USDA EARLY ACTION PLAN
ECONOMIC DEVELOPMENT ACCOUNT
Monongahela River Basin, West Virginia

Components	Measures of effects (Average Annual $) 1/
Beneficial effects:	
A. The value to users of increased goods and services:	
1. Flood prevention	1,665,700
2. Land treatment systems 2/	
3. Recreation	1,378,700
4. Consumptive water uses	190,800
5. Utilization of unemployed and underemployed labor resources	
a. Project construction & OMR	542,300
b. Land treatment construction	Not Quantified
6. Additional wages and salaries accruing from implementation of the plan to the region.	
a. Utilization of hired labor associated with water supply	Not Quantified
b. Recreation service sector	132,000
c. Project OM&R	38,400
B. The value of output resulting from external economics (Secondary)	278,900
Total beneficial effects	4,226,800

Components	Measures of effects (Average Annual $) 1/
Adverse effects:	
A. The value of resources required for a plan:	
1. Floodwater retarding structure and multiple-purpose reservoirs and recreation facilities	
Project installation	1,953,600
OM&R	392,400
2. Stream access & easements	
Project cost	6,400
OM&R	5,100
3. National Forest	
Project cost	810,600
OM&R	17,500
4. Project Administration	186,400
B. Losses in output resulting from external diseconomics 3/	
1. Indirect activities from multipurpose reservoir take area	0
2. Increased transportation costs as a result of road relocations	0
C. Loss of assistance payments from sources outside to otherwise unemployed or underemployed resources 3/	
1. Loss of welfare payments	0
Total adverse effects	3,372,000
Net beneficial effects	854,800

1/ Price base 1974 for two watersheds-1970 for all others.
2/ Land treatment benefits were not evaluated. LT costs for Economic Development are $4,019,000 annually.
3/ Quantified only for Elk Creek and Hackers Creek Watersheds because these are in detail Planning.

June 1975

USDA EARLY ACTION PLAN
SOCIAL WELL-BEING ACCOUNT
Monongahela River Basin, West Virginia

Beneficial and adverse effects:

A. Population distribution	Create 2,015 permanent, semi-skilled jobs; 9 permanent, skilled jobs; 61 skilled jobs for 7 years and 12 for 2 years; and 24 semi-skilled jobs for 7 years.
B. Life, health, and safety	Provide 1 percent level of flood protection for 526 homes.
C. Recreational opportunities	Create 725,700 generalized public recreational visitor-day activities.
D. Relocation	Relocate 450 people in 135 residences in decent, safe, and sanitary housing in a flood free area.

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USDA EARLY ACTION PLAN
ENVIRONMENTAL QUALITY ACCOUNT
Monongahela River Basin, West Virginia

COMPONENTS	MEASURES OF EFFECTS
Beneficial and adverse effects:	
A. Areas of Natural Beauty	1. Project output will make available regional funds and resources that can be used to enhance the physical appearance on 1,746 farms. Application of conservation land treatment measures will stabilize and vegetate critical areas and surface mined areas, and will reduce erosion and increase production of grassland, cropland, and forest land.
	2. Create 1,700 surface acres of impounded water, including about 400 surface acres for recreation, with undetermined miles of shoreline.
	3. Inundate undetermined number of acres of meadow, pasture, forest and miles of free flowing streams.
	4. Replace 5.3 miles of natural stream channel with a concrete or rock-lined channel.
	5. Stabilize 28,400 acres of surface mine areas, 7,000 acres of urban construction, and 22,800 acres of rural home sites and associated roads.
	6. Provide public access to 28 sites and 80 miles of stream.

ENVIRONMENTAL QUALITY ACCOUNT (Continued)

COMPONENTS	MEASURES OF EFFECTS
Beneficial and adverse effects:	
	7. Disruption in tranquility of rural environment by 975,700 generalized public recreation visitor-days annually.
	8. Protect Dolly Sods (8,000 acres); Otter Creek (18,400 acres); and Shavers Fork (30,000 acres) areas of natural beauty.
	9. Temporarily disrupt aesthetic values during construction periods.
B. Quality consideration of water, land, and air resources	1. Reduce sediment from 55 upstream watersheds by 13 percent annually.
	2. Improve water quality by reducing the sediment yield by 78,800 tons annually.
	3. Temporarily increase sediment concentrations, air, and noise pollution during construction periods.
	4. Induce a change in flood plain land use from low intensity agriculture and idle, to residential and commercial.
	5. Improve use of watershed lands by managing them within their capabilities. Plan measures will accelerate the conversion of improper land use to proper land, for example - 54,500 acres of cropland and 122,100 pastureland should be in other use.

ENVIRONMENTAL QUALITY ACCOUNT (Continued)

COMPONENTS	MEASURES OF EFFECTS
Beneficial and adverse effects:	
	6. Improve erosion control by gulley stabilization (27 miles); rehabilitate abandoned roads and trails (66 miles); and streambank stabilization (27 miles).
C. Biological Resources and Ecosystems	1. Create 1,700 acres of warm water fish habitat and waterfowl resting area.
	2. Enhance wildlife habitat on 454,100 acres by reducing erosion and improving habitat and cover through land treatment measures.
	3. Improve fish stream habitat by reducing sediment concentrations and acidity levels.
	4. Preservation of 8,000 acres of valuable biological resources (Dolly Sods flora and fauna).
	5. Fish and wildlife improvement by waterfowl habitat potholes (70); seeding and planting wildlife food (675 acres); forage plant release (675 acres); wildlife openings (2,580); stream fish habitat structures (1,180); and fish stream surveys (552 miles).
	6. Temporarily reduce fish food production by increasing turbidity during construction periods.

ENVIRONMENTAL QUALITY ACCOUNT (Continued)

COMPONENTS	MEASURES OF EFFECTS
Beneficial and adverse effects:	
D. Geological, Archeological, and Historical Resources	1. Acquisition by a combination of fee simple and scenic easement Sinks of Gandy (9,000 acres).
	2. Purchase by National Forest (fee simple) 30,000 acres on Shavers Fork and 4,000 acres additional for mineral rights.
E. Irreversible or Irretrievable Commitments	1. Conversion of undetermined number of acres of grassland and forest land to undetermined number of acres of earth embankments, emergency spillways, and borrow areas.
	2. Commitment of 42,400 acres of scenic and natural areas to public ownership.
	3. Increased demand on public utilities.

June, 1975