

# R D BAILEY LAKE WEST VIRGINIA

## MASTER PLAN UPDATE



**August 2011 Final**



**US Army Corps  
of Engineers**  
Huntington District

Huntington, West Virginia

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## Table of Contents

<b>1.0</b>	<b>Introduction and Background .....</b>	<b>1-1</b>
1.1	Project Authorization .....	1-1
1.2	Authorized Project Purposes.....	1-2
1.2.1	Flood Risk Management.....	1-2
1.2.2	Recreation .....	1-2
1.2.3	Water Quality Control.....	1-3
1.2.4	Fish and Wildlife Management.....	1-4
1.3	Prior Master Plans.....	1-4
1.4	Application of Public Laws .....	1-4
1.4.1	Recreation .....	1-4
1.4.2	Water Resource Protection and Flood Risk Management .....	1-6
1.4.3	Fish and Wildlife Resources .....	1-7
1.4.4	Forest Resources .....	1-8
1.4.5	Cultural Resources .....	1-8
1.4.6	Leases, Easements, and Rights-of-Way.....	1-9
1.4.7	Executive Orders.....	1-10
1.5	Purpose of the Master Plan .....	1-12
1.6	Scope of the Master Plan .....	1-13
1.7	Project Description.....	1-13
1.7.1	Location .....	1-13
1.7.2	History of the Project.....	1-14
1.7.3	Land Acquisition History.....	1-17
1.7.4	Federal Areas and Recreational Facilities.....	1-17
1.7.5	Outgrants.....	1-17
1.7.6	Project Data/Lake Operations .....	1-19
1.7.7	Lake Operation.....	1-24
1.7.8	Visitation Data .....	1-25
<b>2.0</b>	<b>Public Involvement, Coordination, and Partnerships .....</b>	<b>2-1</b>
2.1	Public Meeting.....	2-1
2.2	Identified Key Issues.....	2-1
2.3	Consistency of Goals with Relevant Planning Documents.....	2-2
2.4	Coordination and Partnerships.....	2-3
<b>3.0</b>	<b>Resource Analysis .....</b>	<b>3-1</b>
3.1	Physical Environment .....	3-1
3.1.1	Surface Water.....	3-1
3.1.1.1	Existing Conditions.....	3-1
3.1.1.2	Implications of Surface Water Resources for Project Development .....	3-9
3.1.2	Wetlands .....	3-13
3.1.2.1	Existing Conditions.....	3-13
3.1.2.2	Implications of Wetland Resources for Project Development.....	3-14
3.1.3	Groundwater .....	3-14
3.1.3.1	Existing Conditions.....	3-14
3.1.3.2	Implications of Groundwater Resources for Project Development .....	3-17
3.1.4	Physiology / Topography .....	3-17
3.1.4.1	Existing Conditions.....	3-17

3.1.4.2	Implications of Physiology / Topography Resources for Project Development.....	3-18
3.1.5	Geology, Soils, and Minerals.....	3-21
3.1.5.1	Existing Geology and Soil Conditions.....	3-21
3.1.5.2	Existing Minerals Conditions .....	3-29
3.1.5.3	Implications of Geology, Soils, and Mineral Resources for Project Development.....	3-29
3.1.6	Prehistoric and Historic Resources .....	3-33
3.1.6.1	Existing Conditions.....	3-33
3.1.6.2	Implications of Prehistoric and Historic Resources for Project Development.....	3-34
3.1.7	Scenic Qualities .....	3-35
3.1.7.1	Existing Conditions.....	3-35
3.1.7.2	Implications of Scenic Qualities for Project Development.....	3-36
3.2	Biological Environment .....	3-36
3.2.1	Vegetation .....	3-36
3.2.1.1	Existing Conditions.....	3-36
3.2.1.2	Implications of Vegetative Resources for Project Development.....	3-42
3.2.2	Terrestrial Wildlife.....	3-44
3.2.2.1	Existing Conditions.....	3-44
3.2.2.2	Implications of Terrestrial Resources for Project Development.....	3-45
3.2.3	Aquatic Resources .....	3-46
3.2.3.1	Existing Conditions.....	3-46
3.2.3.2	Implications of Aquatic Resources for Project Development.....	3-47
3.2.4	Threatened and Endangered Species .....	3-47
3.2.4.1	Existing Conditions.....	3-47
3.2.4.2	Implications of Threatened and Endangered Species on Project Development.....	3-50
3.2.5	Critical Habitat.....	3-50
3.2.5.1	Existing Conditions.....	3-50
3.2.5.2	Implications of Critical Habitat for Project Development.....	3-50
3.2.6	Environmentally Sensitive Areas.....	3-51
3.2.6.1	Existing Conditions.....	3-51
3.2.6.2	Implications of Environmentally Sensitive Areas for Project Development.....	3-51
<b>4.0</b>	<b>Recreation Program Analysis .....</b>	<b>4-1</b>
4.1	Overview of the Project Areas.....	4-1
4.1.1	Below Dam Recreational Area .....	4-5
4.1.2	Visitor Center and Dam Overlook Area .....	4-7
4.1.3	Long Branch Overlook .....	4-10
4.1.4	Big Branch Day Use Area.....	4-10
4.1.5	Guyandotte Point .....	4-12
4.1.6	Guyandotte Campground.....	4-14
4.1.6.1	Reedy Creek Campground.....	4-15
4.1.6.2	Locust Branch Campground .....	4-16
4.1.6.3	Primitive Campground.....	4-17
4.1.6.4	Sugar Camp and Smith Bend Campgrounds (Closed).....	4-18

4.1.7	Wildlife Management Area (WMA).....	4-19
4.1.8	R.D. Bailey Lake.....	4-20
4.1.9	Wyoming County Board of Education .....	4-21
4.2	Current Recreational Activities and Visitation.....	4-22
4.2.1	Outdoor Recreational Activities .....	4-22
4.2.2	Visitation by Recreation Area.....	4-23
4.2.3	Activity Distribution .....	4-24
4.3	Area of Influence .....	4-24
4.3.1	Identifying the Area of Influence.....	4-24
4.3.2	Demographic Characteristics of the Area of Influence.....	4-25
4.3.2.1	Primary Area of Influence .....	4-26
4.3.2.2	Secondary Area of Influence .....	4-29
4.3.2.3	Tertiary Area of Influence .....	4-29
4.4	Outdoor Recreational Opportunities at Comparable Facilities.....	4-29
4.5	Trends in Outdoor Recreational Activities .....	4-37
4.5.1	Age.....	4-37
4.5.2	Fishing and Hunting.....	4-37
4.5.3	Summer Activities .....	4-38
4.6	Identifying Potential Recreational Opportunities .....	4-39
4.7	Recreational Demand Analysis.....	4-41
4.7.1	Impact of Comparable Facilities.....	4-41
4.7.2	Impact of Trends in Participation Rates in Recreational Activities.....	4-42
4.7.3	Impact of Demographic Changes.....	4-42
4.7.4	Projected Number of Visits by Activity.....	4-43
4.7.5	Lake Carrying Capacity .....	4-45
4.8	Implications of Projected Future Demand on Recreational Activities .....	4-47
4.8.1	Boating.....	4-47
4.8.2	Camping.....	4-48
4.8.3	Fishing.....	4-49
4.8.4	Hunting .....	4-49
4.8.5	Other Activities.....	4-50
4.8.6	Picnicking .....	4-50
4.8.7	Sightseeing.....	4-51
4.8.8	Swimming.....	4-51
4.8.9	Water Skiing .....	4-51
<b>5.0</b>	<b>Resource Use Objectives.....</b>	<b>5-1</b>
5.1	Resource Use Objective 1 .....	5-1
5.1.1	Measures to Achieve Objective .....	5-1
5.1.2	Justification.....	5-1
5.2	Resource Use Objective 2.....	5-2
5.2.1	Measures to Achieve Objective .....	5-2
5.2.2	Justification.....	5-2
5.3	Resource Use Objective 3.....	5-2
5.3.1	Measures to Achieve Objective .....	5-2
5.3.2	Justification.....	5-3
5.4	Resource Use Objective 4.....	5-3
5.4.1	Measures to Achieve Objective .....	5-3

5.4.2	Justification .....	5-3
5.5	Resource Use Objective 5 .....	5-4
5.5.1	Measures to Achieve Objective .....	5-4
5.5.2	Justification .....	5-4
5.6	Resource Use Objective 6 .....	5-4
5.6.1	Measures to Achieve Objective .....	5-4
5.6.2	Justification .....	5-4
5.7	Resource Use Objective 7 .....	5-5
5.7.1	Measures to Achieve Objective .....	5-5
5.7.2	Justification .....	5-5
<b>6.0</b>	<b>Land Allocation and Classification .....</b>	<b>6-1</b>
6.1	Land Allocation .....	6-1
6.2	Land Classification .....	6-1
6.2.1	Project Operations .....	6-2
6.2.2	Recreation – Intensive Use .....	6-3
6.2.3	Mitigation .....	6-3
6.2.4	Environmentally Sensitive Areas .....	6-3
6.2.5	Multiple Resource Management .....	6-3
6.2.6	Easement Lands .....	6-5
<b>7.0</b>	<b>Resource Plan .....</b>	<b>7-1</b>
<b>8.0</b>	<b>Special Programs .....</b>	<b>8-1</b>
8.1	Proposed Water Treatment Plant .....	8-1
8.1.1	Proposed Concept and Features .....	8-1
8.1.2	Alternative Sites .....	8-2
8.1.3	Lake Suitability .....	8-10
8.1.4	Conclusion .....	8-11
8.2	All Terrain Vehicle (ATV) Use .....	8-11
8.2.1	Proposed Concept .....	8-11
8.2.2	Land Use Compatibility and Site Suitability .....	8-12
8.3	Proposed Hydroelectric Plant .....	8-13
8.3.1	Alternatives Considered .....	8-14
8.3.2	Site Suitability .....	8-16
8.4	Major Utility Corridor Considerations at the R.D. Bailey Lake Project .....	8-20
8.4.1	Land Use Compatibility and Site Suitability Considerations .....	8-20

### List of Tables

Table 1-1:	Federal Recreation and Outgrant Areas .....	1-19
Table 1-2:	R.D. Bailey Dam Structures .....	1-24
Table 1-3:	R.D. Bailey Lake Seasonal Pool Characteristics .....	1-24
Table 1-4:	Visitation Data, FY 2000-2009 .....	1-25
Table 2-1:	Common Recreation and Environmental Conservation Goals .....	2-4
Table 3-1:	Drainage Areas of the Guyandotte River and Principal Tributaries .....	3-2
Table 3-2:	Project Impacts Based on Lake Elevation .....	3-10
Table 3-3:	Wetlands Present in Project Area .....	3-13
Table 3-4:	Soils in Order of Predominance .....	3-27

Table 3-5: Land Cover in the R.D. Bailey Lake Project.....	3-37
Table 3-6: Native and Stocked Fish Species in R.D. Bailey Lake .....	3-46
Table 3-7: Listed Rare, Threatened, and Endangered Species Potentially Occurring in Mingo and Wyoming Counties .....	3-48
Table 4-1: Primary Areas of the Project and the Managing Entities .....	4-1
Table 4-2: Recreational Activities at the Project .....	4-22
Table 4-3: Distribution of Visits by Primary Recreation Area 2007-2010 Average .....	4-24
Table 4-4: Number of Participants for Each Recreational Activity.....	4-24
Table 4-5: Population in Subareas of Influence.....	4-26
Table 4-6: Age Distribution of Population by Area of Influence .....	4-26
Table 4-7: Median Household Income in Areas of Influence.....	4-26
Table 4-8: Comparable Recreational Facilities.....	4-33
Table 4-9: Recreational Activities at R.D. Bailey Lake and Comparable Facilities .....	4-35
Table 4-10: Recreation Activities at the Project .....	4-40
Table 4-11: Baseline and Projected Users by Activity and Subarea of Influence .....	4-44
Table 4-12: Space Assumptions for Safe and Enjoyable Boating .....	4-45
Table 4-13: R.D. Bailey Lake Carrying Capacity.....	4-46
Table 4-14: R.D. Bailey Lake 2020 Boat Usage .....	4-47
Table 4-15: Variables used to Calculate Boat Ramp Facility Requirements.....	4-48
Table 6-1: Land Classification and Designated Project Areas .....	6-2
Table 7-1: Resource Plan for the R.D. Bailey Lake Project .....	7-3

### **List of Figures**

Figure 1-1: Location of the R.D. Bailey Lake Project.....	1-15
Figure 1-2: Recreational Areas and Outgrants in the R.D. Bailey Lake Project .....	1-21
Figure 3-1: R.D. Bailey Lake Project Watershed .....	3-3
Figure 3-2: Surface Waters within the R.D. Bailey Lake Project.....	3-7
Figure 3-3: Inundation Areas between Summer Pool Elevation and Flood Control Pool Elevation .....	3-11
Figure 3-4: NWI-Delineated Wetlands.....	3-15
Figure 3-5: Groundwater Well Locations .....	3-19
Figure 3-6: Topography Suitability for Project Development.....	3-23
Figure 3-7: Soils Suitability for Project Development .....	3-25
Figure 3-8: Gas Well Locations and Mineral Ownership Status .....	3-31
Figure 3-9: Vegetation and Land Cover .....	3-39
Figure 4-1: Existing Recreational Areas and Major Facilities.....	4-3
Figure 4-2: Area of Influence .....	4-27
Figure 4-3: Comparable Recreation Facilities .....	4-31
Figure 6-1: Land Classification Map .....	6-7
Figure 7-1: Below Dam Recreation Area .....	7-7
Figure 7-2: Winter Boat Ramp Area Proposed Marina Site .....	7-9
Figure 7-3: Big Branch Day Use Area.....	7-11
Figure 7-4 Guyandotte Campground .....	7-13
Figure 8-1: Water Reallocation Study .....	8-3
Figure 8-2: Proposed Hydroelectric Project .....	8-15
Figure 8-3: Proposed Hydroelectric Power Project .....	8-17
Figure 8-4: Potential Utility Corridors.....	8-25

## List of Photos

Photograph 1-1	R.D. Bailey Dam .....	1-19
Photograph 3-1	R.D. Bailey Lake from Visitor Center .....	3-4
Photograph 3-2	View from Visitor Center.....	3-36
Photograph 4-1	Below Dam Area/Spillway .....	4-5
Photograph 4-2	Below Dam Recreation Area and Parking .....	4-6
Photograph 4-3	Picnic Area .....	4-6
Photograph 4-4	Winter Boat Ramp.....	4-7
Photograph 4-5	R.D. Bailey Visitor Center .....	4-8
Photograph 4-6	Picnic Shelter No. 3 across from Visitor Center .....	4-9
Photograph 4-7	Visitor Center and Dam Overlook Area Playground .....	4-9
Photograph 4-8	Long Branch Overlook.....	4-10
Photograph 4-9	Big Branch Day Use Area.....	4-10
Photograph 4-10	Picnic Shelter No. 1.....	4-11
Photograph 4-11	Guyandotte Point 3-lane Boat Ramp.....	4-12
Photograph 4-12	Guyandotte Point Boat Ramp and Restroom .....	4-13
Photograph 4-13	Guyandotte Point Upper Area Picnic Shelter.....	4-14
Photograph 4-14	Guyandotte Campground .....	4-14
Photograph 4-15	Tunnel near Guyandotte Campground .....	4-15
Photograph 4-16	RV Campsite .....	4-16
Photograph 4-17	Campground Bath House .....	4-17
Photograph 4-18	Primitive Campground .....	4-18
Photograph 4-19	Smith Bend Boat Ramp.....	4-19
Photograph 4-20	R.D. Bailey Rifle Range.....	4-20
Photograph 4-21	R.D. Bailey Lake.....	4-21
Photograph 8-1	Proposed Hydroelectric Project at Outlet Structure .....	8-16

## List of Appendices

- Appendix A: Acronyms and Abbreviations
- Appendix B: Bibliography
- Appendix C: Results of Scoping Meetings
- Appendix D: Agency Correspondence

**List of Project Design Memoranda**

<b>Number</b>	<b>Title</b>	<b>Date</b>
1	Site Selection	October 1964
2	Hydrology and Hydraulic Analysis	March 1965
3	General Design Memorandum	February 1967
6	Real Estate Phase I Railroad Relocation	March 1967
6A	Real Estate Reservoir Lands – Railroad Relocation Part II	November 1967
	Real Estate Supplement to DM 6A – Access Road to Dam	April 1968
	Real Estate Second Supplement to DM 6A - Railroad Right-of-way	April 1970
	Real Estate Third supplement to DM 6A – Below Dam Fisherman Access	December 1971
6B	Real Estate Phase III Railroad Relocation and Isolated Land – Big Branch	November 1967
	Supplement to DM 6B, Real Estate Lizard Branch Spoil Area	May 1968
	Lizard Branch Spoil Area	February 1969
6C	Real Estate Reservoir Lands – Part IV Railroad Relocation	January 1970
	Real Estate Reservoir Lands, Part IV, Little Cub Creek Area	November 1970
	Second Supplement to DM 6C, Real Estate Relocation of State Route 9/2 in the Little Cub Creek Area	September 1971
6D	Real Estate – Upper Leatherwood Creek	December 1970
7A	Outlet Works	September 1968
7B	Dam and Spillway	October 1970
7C	Instrumentation	September 1970
8	Relocations – State Highway	August 1967
	Relocations – State Highway (Supplement)	February 1969
9A	Preliminary Master Plan	March 1968
	Supplement to the Master Plan	June 1972
	Supplement 2 to the Master Plan	
	Supplement 3 to the Preliminary Master Plan DM 9A	
10	Relocations – Utilities	July 1969

**List of Project Design Memoranda**

<b>Number</b>	<b>Title</b>	<b>Date</b>
12	Concrete Aggregates	December 1968
13	Relocations – Schools	January 1971
14	Test Quarries and Test Fills	November 1968
15	Public Use Plan	March 1970
	Supplement to the Public Use Plan	
	Supplement 4 to the Public Use Plan DM 15	
	Supplement 5 to the Public Use Plan DM 15	

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## **1.0 INTRODUCTION AND BACKGROUND**

This updated Master Plan provides guidance for the use and development of natural and manmade resources at the R.D. Bailey Lake Project in Mingo and Wyoming Counties of southern West Virginia (WV). R.D. Bailey Lake was impounded by the United States Army Corps of Engineers (USACE) in 1980. The USACE manages approximately 19,000 acres including the lake, and the area is used for recreation and wildlife management purposes. The R.D. Bailey Lake Project, which includes project operation, recreation, and wildlife management areas, is referred to as “the Project” for the purposes of this document.

This Master Plan is intended to guide the USACE in achieving their goal of managing, conserving, and enhancing natural resources while providing quality opportunities for outdoor recreation to the public. This Master Plan was developed in response to regional and local needs, resource capabilities and suitability, and expressed public interests consistent with authorized Project purposes and relevant legislation and regulations.

The Master Plan provides a summary of the purposes and history of the Project; the applicable Federal laws and directives that govern its use; resource objectives; and a detailed analysis of existing natural resources, recreational resources, and land uses. The Master Plan includes projections of future demands for recreational use of the area and a resource use plan so that the Project will continue to meet USACE goals of promoting awareness of the natural environment, adhering to sound environmental stewardship principles, and providing outdoor recreation opportunities for current and future generations in an effective and efficient manner. The Master Plan proposes actions for modifying recreational facilities and wildlife management approaches that are consistent with USACE’s established purposes. An Environmental Assessment (EA) has been prepared to address the potential impacts of the proposed actions.

To facilitate reading this document, Appendix A contains a list of acronyms, Appendix B contains a bibliography of references used during the planning process, Appendix C contains the results of the Scoping Meetings, and Appendix D contains agency correspondence.

### **1.1 Project Authorization**

The R.D. Bailey Lake Project was authorized by the Flood Control Act of 1962, (Public Law [PL] 87-874) for flood risk management, general recreation, and water quality control purposes. By PL 90-46 dated 4 July 1967, the 90<sup>th</sup> Congress changed the Project name from Justice Reservoir to R.D. Bailey Lake.

## **1.2 Authorized Project Purposes**

The R.D. Bailey Lake dam was constructed on the Guyandotte River, a tributary of the Ohio River, to serve several purposes. Its primary purpose is flood risk management, with secondary purposes being recreation, water quality, and wildlife management.

### **1.2.1 Flood Risk Management**

The Flood Control Act of 1936 recognized that flood risk management was “a proper activity for the Federal Government in cooperation with states, their political subdivisions, and localities thereof.” Congress gave responsibility for Federal flood projects to the USACE. One year later, in 1937, one of the most damaging floods along the Ohio River occurred resulting in part of Cincinnati remaining under water for more than 2 weeks and damage costs exceeded \$20 million (Ohio Historical Society, 2010).

In the years following passage of the law, the USACE built, pursuant to congressional authorization and appropriation, close to 400 reservoirs whose primary benefit was flood risk management. The series of flood risk management reservoirs subsequently constructed by USACE is estimated to have prevented over \$19 billion in flood damages in the Ohio River Basin since the 1930s. Flood risk management was cited in subsequent Acts including the Flood Control Act of 1962 (PL 87-874), which authorized a number of additional reservoirs, including the R.D. Bailey Lake Project.

### **1.2.2 Recreation**

Section 4 of the Flood Control Act of 1944 authorized the Chief of Engineers to construct, maintain, and operate public parks and recreational facilities in reservoir areas under the control of the Department of the Army, and to permit the construction, maintenance, and operation of such facilities. The Flood Control Act of 1962 broadened the 1944 authority to include all water resources projects. The USACE has since recognized long-term recreational development as a full-scale project purpose on an equal basis with other established purposes of water resources development.

The traditional policy of the USACE has been to encourage non-Federal participation in the administration of recreation opportunities provided at USACE projects. Since 1944, the USACE has entered into leases which permit state and local development and administration of recreation areas at Civil Works projects. The policies were reaffirmed by the Congress through the passage of the Federal Water Project Recreation Act of 1965 (PL 89-72). This Act directs “. . . that . . . in

investigating and planning any Federal navigation, flood control, reclamation, hydroelectric, or multipurpose water resource project, full consideration shall be given to the opportunities, if any, which the project affords for outdoor recreation." The Act further defined the basis for sharing the financial responsibilities in joint Federal-non-Federal development, enhancement, and management of recreation and fish and wildlife resources of Federal water projects. However, there are a substantial number of recreation areas which were developed prior to implementing the cost sharing principles of PL 89-72 that continue to be operated directly by the USACE.

Non-consumptive recreation opportunities available at the Project and operated and maintained by the USACE include camping, boating, picnicking, and hiking. The Project also provides opportunities for consumptive recreation, through a license with the State, including fishing and hunting. Recreation areas vary from undeveloped forested land to developed public use areas.

The Water Resource Development Act of 1988 (PL 100-676) authorized whitewater recreation and recreation enhancements at R.D. Bailey Lake. The Project is not operated for these purposes because the need has not been identified.

### **1.2.3 Water Quality Control**

Section 102(b) of PL 92-500, the Federal Water Pollution Act Amendments of 1972, stipulates that in the planning of any USACE reservoir, consideration should be given to including storage for regulating stream flow.

The water quality control system at R.D. Bailey Lake was designed with the understanding that the lake would be stratified during summer with warm, oxygenated water on the surface and cold water at the bottom with no oxygen; therefore, a system of selective withdrawal inlets at various water depths was installed in the intake structure. The selective withdrawal system consists of two wet wells, with a total of five gated inlets. In addition to the selective withdrawal system, there are two main sluice gates and one controlled outlet located at the bottom of the intake structure. The system allows withdrawal of water simultaneously from any combination of inlets. Therefore, choices over a considerable range of outflow rates and environmental parameters are available.

Water quality control objectives for R.D. Bailey Lake consist of two facets: low-flow control and downstream flow augmentation. Prior to the construction of the R.D. Bailey dam, downstream summer flows in the Guyandotte River would recede to near zero, creating stagnant or near stagnant conditions. These conditions created a poor environment for fish and food chain organisms and also the affected local water supply. Based on a study conducted by the Federal Water Pollution Control Administration (later changed to the Environmental Protection Agency),

the State of West Virginia requested and was granted a continuous minimum flow from R.D. Bailey Lake. A minimum flow of 45 cubic feet per second (cfs) is maintained for fisheries and stream augmentation at all times, even during closure of the outlets for flood control.

#### **1.2.4 Fish and Wildlife Management**

The Fish and Wildlife Coordination Act of 1958 (PL 85-624) provides authority to the USACE to modify projects to conserve fish and wildlife resources. The Endangered Species Act of 1973 (PL 93-205) provides additional authority for operating projects to protect threatened or endangered fish and wildlife. PL 89-72, the Federal Water Project Recreation Act-Uniform Policies, requires consideration of opportunities for fish and wildlife enhancement in planning water resources projects. Non-Federal bodies are encouraged to operate and maintain the fish and wildlife enhancement facilities of the Project. If non-Federal bodies agree in writing to administer the facilities at their expense, the fish and wildlife benefits are included in the project benefits and project cost allocated to fish and wildlife. Fees may be charged by the non-Federal interests to repay their costs. If non-Federal bodies do not so agree, no facilities for fish and wildlife may be provided. Fish and wildlife management at R.D. Bailey Lake is provided by the West Virginia Division of Natural Resources (WVDNR) who has a license to manage 17,188 acres at the Project.

### **1.3 Prior Master Plans**

The original R.D. Bailey Preliminary Master Plan was approved in March 1968 as Design Memorandum (DM) 9A. The Master Plan was updated in 1968 and 1972. This document updates the existing 1972 Master Plan.

### **1.4 Application of Public Laws**

Development and management of Federal reservoirs are regulated by a number of Public Laws (PL) and Executive Orders (EO). The following sections provide a summary of relevant PLs and EOs.

#### **1.4.1 Recreation**

Each PL and policy discussed below addresses development and management of recreation facilities on public lands and is pertinent to USACE project lands in southern West Virginia:

- PL-78-53, *Flood Control Act of 1936* (22 June 1936), authorizes the construction of civil engineering projects such as dams, levees, dikes, and other flood risk management measures through the USACE.

- PL 78-534, *Flood Control Act of 1944* (22 December 1944), authorizes the Chief of Engineers to provide facilities in reservoir areas for public use, including recreation and conservation of fish and wildlife.
- PL 79-526, *Flood Control Act of 1946* (24 July 1946), amends PL 78-534 to include authority to grant leases to non-profit organizations at recreation facilities in reservoir areas at reduced or nominal charges.
- PL 83-780, *Flood Control Act of 1954* (3 September 1954), further amends PL 78-534 and authorizes the Secretary of the Army to grant leases to Federal, State, or governmental agencies without monetary considerations for use and occupation of land and water areas under the jurisdiction of the Department of the Army for park and recreation purposes when in the public interest.
- *Joint Land Acquisition Policy for Reservoir Projects* (Federal Register [Volume 27, 22 February 1962]) allows the Department of the Army to acquire additional lands necessary for the realization of potential outdoor recreational resources of a reservoir.
- PL 88-578, *Land and Water Conservation Fund Act of 1965* (1 September 1964), prescribes conditions under which the USACE may charge for admission and use of its recreation areas.
- PL 89-72, *Federal Water Project Recreation Act of 1965* (9 July 1965), requires sharing of financial responsibilities in joint Federal and non-Federal recreation and fish and wildlife resources with no more than half of the first cost being borne by the Federal Government.
- PL 90-480, *Architectural Barriers Act of 1968* (12 August 1968), requires access for persons with disabilities to facilities designed, built, altered, or leased with Federal funds.
- PL 100-676, *Water Resource Development Act* (17 November 1988), authorized whitewater recreation and recreation enhancement to a select number of reservoirs.
- PL 101-336, *Americans with Disabilities Act (ADA)* (26 July 1990) as amended by the *ADA Amendments Act of 2008* (PL 110-325), prohibits discrimination based on disabilities in, among others, the area of public accommodations and requires “reasonable accommodation” to persons with disabilities.
- PL 102-580, *Water Resources Development Act of 1992* (31 October 1992), authorizes the USACE to accept contributions of funds, materials, and services from non-Federal public and private entities to be used in managing recreation facilities and natural resources.

- PL 103-66, *Omnibus Budget Reconciliation Act–Day Use Fees* (10 August 1993), contains provisions by which USACE may collect fees for the use of developed recreation sites and facilities, including campsites, swimming beaches, and boat launching ramps.
- PL 104-333, *Omnibus Parks and Public Lands Management Act of 1996* (12 November 96), creates a nine-member advisory commission to review the current and anticipated demand for recreational opportunities at lakes and reservoirs managed by the Federal Government, and to develop alternatives to enhance the opportunities for such use by the public.

#### **1.4.2 Water Resource Protection and Flood Risk Management**

A number of public laws address water resources protection and flood risk management and the integration of these goals with other project purposes such as recreation. The following are pertinent to USACE project lands in southern West Virginia:

- PL 74-738, *Flood Control Act of 1936* (22 June 1936), declares flood risk management to be a proper Federal activity.
- PL 78-534, *Flood Control Act of 1944* (22 December 1944), specifies the rights and interests of the States in water resource development and requires cooperation and consultation with State agencies in planning for flood risk management.
- PL 85-500, *Water Supply Act of 1958* (3 July 1958), authorizes the USACE to include municipal and industrial water supply storage in multiple-purpose reservoir projects.
- PL 87-88, *Federal Water Pollution Control Act Amendments of 1961* (20 July 1961), requires Federal agencies to address the potential for pollution of interstate or navigable waters when planning a reservoir project.
- PL 89-80, *Water Resources Planning Act of 1965* (22 July 1965), provides for the optimum development of the Nation’s natural resources through coordinated planning of water and related land resources.
- PL 89-298, *Flood Control Act of 1965* (27 October 1965), authorizes the Secretary of the Army to design and construct navigation, flood risk management, and shore protection projects if the cost of any single project does not exceed \$10 million.
- PL 95-217, *Clean Water Act of 1977* (15 December 1977), amends PL 87-88 and requires the United States Environmental Protection Agency (USEPA) to enter into written agreements with the Secretaries of Agriculture, the Army, and the Interior to provide maximum utilization of the laws and programs to maintain water quality.

- PL 99-662, *Water Resource Development Act of 1986* (17 November 1986), establishes cost sharing formulas for the construction of harbors, inland waterway transportation, and flood risk management projects.

### 1.4.3 Fish and Wildlife Resources

A number of public laws address protection and maintenance of fish and wildlife resources and the following are pertinent to USACE project lands in southern West Virginia:

- PL 79-732, *Fish and Wildlife Coordination Act* (10 March 1934), provides authority for making project lands available for management by interested State agencies for wildlife purposes.
- United States Code 668-668d, 54 Statute 250, *Bald and Golden Eagle Protection Act of 1940* (8 June 1940) as amended, prohibits anyone, without a permit issued by the Secretary of the Interior, from taking bald eagles, including their nests or eggs.
- PL 85-624, *Fish and Wildlife Coordination Act* (12 August 1958), states that fish and wildlife conservation will receive equal consideration with other project purposes and be coordinated with other features of water resources development programs.
- PL 91-190, *National Environmental Policy Act of 1969* (NEPA) (1 January 1970), establishes a broad Federal policy on environmental quality stating that the Federal government will “...assure for all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings...preserve important historic, cultural, and natural aspects of our national heritage, and maintain, wherever possible, an environment which supports diversity and variety....”
- PL 93-205, *Conservation, Protection, and Propagation of Endangered Species* (28 December 1973), requires that Federal agencies will, in consultation with the U.S. Fish and Wildlife Service, further conservation of endangered and threatened species and ensure that their actions are not likely to jeopardize such species or destroy or modify their critical habitat.
- PL 95-632, *Endangered Species Act Amendments of 1978* (10 November 1978), specifies a consultation process between Federal agencies and the Secretaries of the Interior, Commerce, or Agriculture for carrying out programs for the conservation of endangered and threatened species.
- PL 101-233, *North American Wetland Conservation Act* (13 December 1989), directs the conservation of North America wetland ecosystems and requires agencies to manage their lands for wetland/waterfowl purposes to the extent consistent with missions.

- PL 106-147, *Neo-tropical Migratory Bird Conservation Act* (20 July 2000), promotes the conservation of habitat for neo-tropical migratory birds.

#### **1.4.4 Forest Resources**

The following public law pertains to management of forested lands and is pertinent to USACE project lands in southern West Virginia:

- PL 86-717, *Protection and Improvement of Natural Resources* (6 September 1960), provides for the protection of forest cover in reservoir areas and specifies that reservoir areas of projects developed for flood risk management or other purposes that are owned in fee and under the jurisdiction of the Secretary of the Army and the Chief of Engineers will be developed and maintained so as to encourage, promote, and ensure fully adequate and dependable future resources of readily available timber. Timber production can be implemented through sustained yield programs, reforestation, and accepted conservation practices.

#### **1.4.5 Cultural Resources**

A number of public laws mandate the protection of cultural resources on public lands and the following are pertinent to USACE project lands in southern West Virginia:

- PL 59-209, *Antiquities Act of 1906* (8 June 1906), applies to the appropriation or destruction of antiquities on federally owned or controlled lands and has served as the precedent for subsequent legislation.
- PL 74-292, *Historic Sites Act of 1935* (21 August 1935), declares that it is a national policy to preserve for public use historic sites, buildings, and objects of national significance for the inspiration and benefit of the people of the U.S.
- PL 86-523, *Reservoir Salvage Act of 1960* (27 June 1960), provides for the preservation of historical and archaeological data which might otherwise be lost as the result of the construction of a dam and attendant facilities and activities.
- PL 89-665, *National Historic Preservation Act of 1966* (NHPA) (15 October 1966), establishes a national policy of preserving, restoring, and maintaining cultural resources. It requires Federal agencies to take into account the effect an action may have on sites that may be eligible for inclusion on the National Register of Historic Places (NRHP).
- PL 93-291, *Archaeological and Historic Preservation Act of 1974* (24 May 1974), amends PL 86-523 and provides for the Secretary of Interior to coordinate all Federal survey and recovery

activities authorized under this expansion of the *Reservoir Salvage Act of 1960*. The Federal construction agency may expend up to 1 percent of project funds on cultural resource surveys.

- PL 96-95, *Archaeological Resources Protection Act of 1979* (31 October 1979), updates PL 59-209 and protects archaeological resources and sites on public lands and fosters increased cooperation and exchange of information among governmental authorities, the professional archaeological community, and private individuals.
- PL 101-601, *Native American Graves Protection and Repatriation Act* (16 November 1990), requires Federal agencies to return Native American human remains and cultural items, including funerary objects and sacred objects, to their respective peoples.

#### **1.4.6 Leases, Easements, and Rights-of-Way**

A number of public laws and regulations govern the granting of leases, easements, and rights-of-way on Federal lands; and the following are pertinent to USACE Project lands in southern West Virginia:

- 10 United States Code (U.S.C.) § 2667, *Leases: Non-excess Property of Military Departments and Defense Agencies* (10 August 1956) authorizes the lease of land at water resource projects for any commercial or private purpose not inconsistent with other authorized project purposes.
- 16 U.S.C. § 460d authorizes use of public lands for any public purpose, including fish and wildlife, if it is in the public interest.
- 16 U.S.C. § 470h-3, *NHPA*, for historic property.
- 16 U.S.C. § 663 *Impoundment or Diversion of Waters* (10 March 1934), for wildlife resources management in accordance with the approved general plan.
- 16 U.S.C. § 2601-13 supports Project Partnership Agreements or other cost share agreements.
- U.S.C. Titles 10, 16, 30, 32, and 43 address easements and licenses for project lands.
- 30 U.S.C. 18 §§ 1-263, *Mineral Leasing Act of 1920* (25 February 1920), promotes the mining of coal, oil, and gas on the public domain and specifies conditions of leasing agreements.
- 30 U.S.C. §§ 351-359, *Mineral Leasing Act for Acquired Lands* (7 August 1947), provides that minerals subject to the Mineral Leasing Act of 1920 that are located on acquired Federal lands are subject to the Federal mineral leasing system.
- PL 91-631, *Mining and Minerals Policy Act* (28 April 1971), specifies the Federal policy for economically sound development of domestic mining.

- PL 91-646, *Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970* (2 January 1971), establishes a uniform policy for fair and equitable treatment of persons displaced as a result of Federal or federally assisted programs.
- PL 94-579, *Federal Land Policy and Management Act of 1976* (FLPMA) (21 October 1976), establishes a policy that the Federal Government receive fair market value for the use of the public lands and their resources unless otherwise provided for by statute. It provides for the inventory of public land and land use planning and establishes the extent to which the Executive Branch may withdraw lands without legislative action.
- PL 95-87, *Surface Mining Control and Reclamation Act* (SMCRA) (3 August 1977), regulates surfacing mining and requires permits and inspections.

#### **1.4.7 Executive Orders**

Occasionally the President of the United States will issue an EO; the following are pertinent to USACE project lands in southern West Virginia:

- EO 11514, *Protection and Enhancement of Environmental Quality* (5 March 1970), outlines the responsibilities of Federal agencies in consonance with NEPA. EO 11514 was amended by EO 11991 in 1977.
- EO 11593, *Protection and Enhancement of Cultural Environment* (13 May 1971), outlines the responsibilities of Federal agencies in consonance with NHPA, NEPA, the Historic Sites Act, and the Antiquities Act.
- EO 11644, *Use of Off-Road Vehicles on Public Lands* (8 February 1972), establishes a uniform Federal policy regarding the use of vehicles such as trail bikes, snowmobiles, dune buggies, and others on public lands.
- EO 11988, *Flood Plain Management* (24 May 1977), requires Federal agencies to take actions to reduce the risk of flood loss and to restore and preserve the natural and beneficial functions of floodplains.
- EO 11989, *Off-Road Vehicles on Public Lands* (24 May 1977), amends EO 11644 and authorizes Federal agencies to close areas or trails to off-road vehicles that cause adverse effects to soil, vegetation, wildlife, wildlife habitat, and cultural or historical resources.
- EO 11990, *Protection of Wetlands* (24 May 1977), restricts Federal agencies from taking actions that would destroy or modify wetlands when there is a practicable alternative.

- EO 11991, *Relating to Protection and Enhancement of Environmental Quality* (24 May 1977), amends EO 11514 by directing the Council of Environmental Quality (CEQ) to issue guidance to Federal agencies for implementing procedural provisions of NEPA.
- EO 12088, *Federal Compliance with Pollution Control Standards* (12 October 1978), requires all Federal agencies to be in compliance with environmental laws and fully cooperate with EPA, State, interstate, and local agencies to prevent, control, and abate environmental pollution. EO 12088 was amended by EO 12580 in 1987. EO 12088 was amended by EO 12777 in 1991, EO 13016 in 1996, and EOs 13286 and 13308 in 2003.
- EO 12962, *Recreational Fisheries* (7 June 1995), directs Federal agencies to improve the quantity, function, sustainable productivity, and distribution of U.S. aquatic resources for increased recreational fishing opportunities. EO 12962 was amended by EO 13373 in 2008 and EO 13474 in 2008.
- EO 13112, *Invasive Species* (3 February 1999), directs each Federal agency to prevent the introduction of invasive species, to detect and respond rapidly to and control populations of invasive species in a cost-effective and environmentally sound manner, to monitor invasive species populations accurately and reliably, and to provide for restoration of native species and habitat conditions in ecosystems that have been invaded.
- EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds* (10 January 2001), directs Federal agencies, pursuant to its Memorandum of Understanding with the U.S. Fish and Wildlife Service, to support the conservation intent of migratory bird conventions by integrating bird conservation principles, measures, and practices into agency activities and by avoiding or minimizing, to the greatest extent practicable, adverse impacts on migratory bird resources.
- EO 13327, *Federal Real Property Asset Management* (4 February 2004), promotes the efficient and economical use of Federal real property resources in accordance with their value as national assets and in the best interest of the nation. EO 13327 was amended by EO13423 in 2007.
- EO 13423, *Strengthening Federal Environmental, Energy, and Transportation Management* (24 January 2007), instructs Federal agencies to conduct their environmental, transportation, and energy-related activities under the law in support of their respective missions in an environmentally, economically and fiscally sound, integrated, continuously improving, efficient, and sustainable manner.

- EO 13514, *Federal Leadership in Environmental, Energy, and Economic Performance* (5 October 2009), expands on the energy reduction and environmental performance requirements for Federal agencies identified in EO 13423 and requires Federal agencies to make reductions in greenhouse gas emissions (GHG).

## **1.5 Purpose of the Master Plan**

The purpose of this Master Plan is to provide guidance for the preservation, conservation, restoration, maintenance, management, and development of Project lands, waters, and associated resources. The Master Plan is intended to aid responsible stewardship of Project resources for the benefit of present and future generations.

The Master Plan evaluates the present use and future potential of Project resources and recommends strategies for the future management and development of Project resources. Because this Master Plan is conceptual in nature, it identifies conceptual types and levels of activities, not designs and exact locations.

The Master Plan is based on responses to regional and local needs, resource capabilities and suitability, and expressed public interests that are consistent with authorized Project purposes and pertinent legislation and regulations. The Master Plan provides a USACE district-level policy consistent with national objectives and other State and regional goals and programs. Future actions by the USACE and by the agencies and individuals granted leases or licenses for use of Project lands must be consistent with the Master Plan. The Master Plan is distinct from the project-level implementation emphasis of the Operational Management Plan (OMP). Policies in the Master Plan are guidelines that will be implemented through provisions of the OMP, specific Design Memoranda, and other planning mechanisms.

The broad intent of this Master Plan is to:

- Determine appropriate uses and levels of development for Project resources;
- Provide a framework within which the OMP and other planning mechanisms can be developed and implemented; and
- Establish a basis on which outgrants and recreational development proposals can be evaluated.

## **1.6 Scope of the Master Plan**

This Master Plan includes guidance for appropriate uses, development, enhancement, protection, and conservation of the natural, cultural, and built resources of the Project. The Master Plan has eight sections and three appendices:

- Section 1 – Introduction and Background
- Section 2 – Public Involvement, Coordination, and Partnerships
- Section 3 – Resource Analysis
- Section 4 – Recreation Program Analysis
- Section 5 – Resource Use Objectives
- Section 6 – Land Allocation and Classification
- Section 7 – Resource Plan
- Section 8 – Special Programs
- Appendix A: Acronyms and Abbreviations
- Appendix B: Bibliography
- Appendix C: Results of Scoping Meeting
- Appendix D: Agency Correspondence

## **1.7 Project Description**

The description of the Project includes location, history of the project land acquisition history, Federal areas, recreation facilities, outgrants, Project data, lake operations, lake regulation, and visitation data.

### **1.7.1 Location**

R.D. Bailey Lake is located in Mingo and Wyoming Counties, WV, on the Guyandotte River, a tributary to the Ohio River. The majority of the Project lies within Wyoming County. The Guyandotte River meanders through southern and southwest WV for approximately 167 miles before joining the Ohio River at River Mile 305 just upriver of Huntington, WV. The Project area is in southern WV in the heart of the coal mining region. The Project Office is approximately 0.5 miles north of the town of Justice in Wyoming County.

The Visitor Center and Dam Overlook for the R.D. Bailey Lake Project can be accessed from State Route (SR) 52. SR 97 crosses the Project boundary and provides access to the campground, shooting range, and little league fields located within the Project. Figure 1-1 shows the location of the Project in the State of West Virginia as well as major highways in the Project area.

Communities within a 1-hour drive of R.D. Bailey Lake are Justice, Hanover, Gilbert, Logan, Oceana, Pineville, Williamson, and Welch, WV. The Project is approximately 1.5 hours west from the City of Beckley, WV and 2 hours south from the City of Charleston, WV.

### **1.7.2 History of the Project**

The Guyandotte River has a history of significant flooding about every two years. Population centers located along its banks, such as Justice, Gilbert, Man, and especially Logan, WV, have been severely impacted by the flooding. Damages caused by the record-high 1963 flood totaled \$8 million in the Logan area alone.

Planning for the Project began in 1964. Originally named the Justice Reservoir during the planning stages, the 90<sup>th</sup> Congress changed its name in 1967 in honor of the late Judge R.D. Bailey, a lawyer, State senator, prosecuting attorney, and leader in Wyoming County education. Judge Bailey also served as a circuit judge of Wyoming and Mingo counties during the 1920's bloody coal mine wars.

Initially, the Project was to be located on the Guyandotte River at river mile 117, three miles east of Justice, WV. The original site would have provided flood control for a drainage area of 512 square miles and 174,000 acre-feet of flood control storage. DM No. 1, Site Selection, dated October 1964, suggested an alternate site for the location of the dam approximately 5.3 miles downstream from the original site. The final site of the R.D. Bailey Project was selected as river mile 113 in January 1965; and this location provided an opportunity to maximize benefits by increasing the drainage area to 540 square miles and the flood control storage to 181,700 acre-feet.

Excavation of the abutment and outlet works began in 1972, followed by the excavation of the dam and spillway in 1973. Construction of the dam and spillway structures began in 1974 and was completed in 1978. The work on the dam and spillway was accepted in 1980 when it was placed in operation. Construction of the recreational facilities began in 1976 with Guyandotte Point (specifically, the boat launching facilities) and the remaining recreational facilities were completed in 1983 (refer to Table 1-1 in Section 1.7.5 for listing of Project facilities).

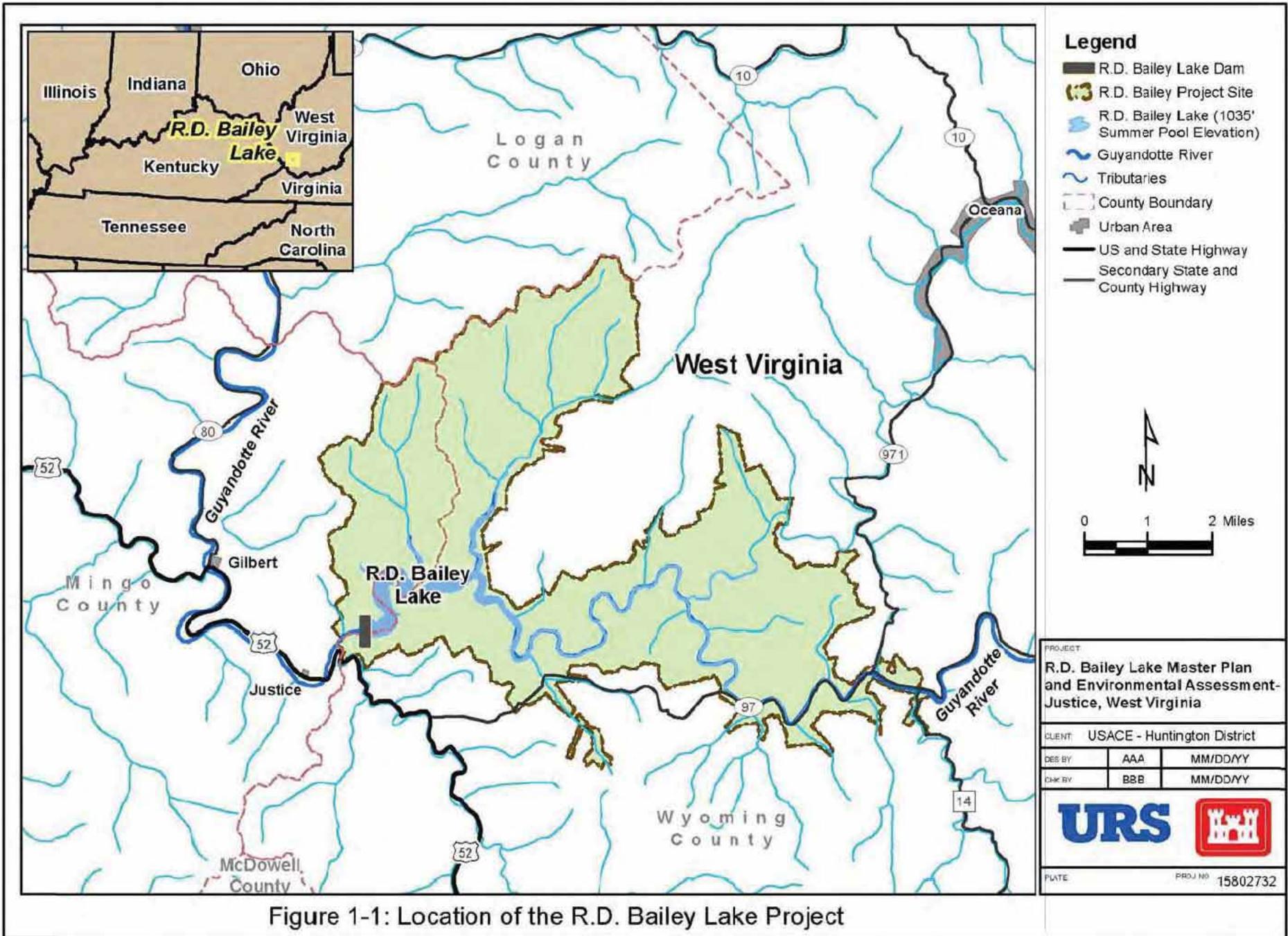


Figure 1-1: Location of the R.D. Bailey Lake Project

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### **1.7.3 Land Acquisition History**

The Federal Government purchased the land and fully funded the construction and operation of the Project. The acquisition criteria for R.D. Bailey Lake were based on the minimum requirements as prescribed by the 1962 Joint Land Acquisition Policy. This policy called for a 300-foot horizontal guide-acquisition limit. The upper guide taking line established for flooding effects, including 5 feet of freeboard, is at elevation 1,160 feet National Geodetic Vertical Datum (NGVD). NGVD is the standard that was developed in 1929 for measuring vertical distances. The taking line included all lands required for construction sites, borrow and work areas, reservoir lands, and certain large areas of lands that would have been isolated due to highway and railroad relocations. Acquisition limits for the Project were recommended in the USACE DM No.1, 2 and 4, and 6A through 6D. DM No.1 recommended the Project site and the type of dam. DM No.3 recommended general design of Project features. DM No. 7B recommended development of the dam site and construction area. DM No. 6A through 6D recommended the purchase of the remaining Project lands.

The methodology regarding acquisition of mineral rights is described in the Real Estate Design Memorandums. Estate acquisition documents must be reviewed on an individual basis to understand the rights of private mineral ownership and government rights. R.D. Bailey Project is also unique in the fact that a memorandum of understanding (MOU) exists regarding private mineral ownership and government rights.

### **1.7.4 Federal Areas and Recreational Facilities**

The Project features multiple recreation areas managed by the USACE: the Below Dam Recreational Area, the Visitor Center and Dam Overlook, Guyandotte Point, Big Branch Day Use Area, Long Branch Overlook, and Guyandotte Campground. Table 1-1 in Section 1.7.5 provides information for each of these recreational areas, including acreage, management entity, and type of facility at the R.D. Bailey Lake Project.

### **1.7.5 Outgrants**

An outgrant is the written interest granted to an entity or individual that allows that entity or individual to make use of government property through lease, easement, or permit. Outgrants typically establish a timeframe, conditions, and restrictions on the use of the property.

Some outgrants are issued through lease agreements, which are contracts between the USACE and another party. One outgrant for recreation and one outgrant for a fish and wildlife license have been established at the R.D. Bailey Lake Project through lease and license agreements:

- **Wyoming County Board of Education:** The Wyoming County Board of Education has a 25-year (2005 through 2030) lease (DACW69-1-06-1024 [30 January 2006]) for educational and recreational purposes only. The tracts, leased to the Wyoming County Board of Education, are divided into four areas: Areas A through D. Area A includes the little league ball fields; Area B includes Mountain Heart Head Start Building; Area C is used for overflow parking; and Area D is the old Baileysville High School football and baseball fields. Lease DACW69-1-06-1024 grants permission to the Wyoming County Board of Education to construct a primitive campground. Currently, there are no plans to construct the primitive campground. These areas can be accessed via SR 97.

Although in close proximity, the Baileysville Elementary School is not on project property but is included in flowage easement only. The Baileysville Community Center is not on project property nor included in a flowage easement area.

Other outgrants are established by licenses that grant authority to an agency to enter or use land for a specific purpose without having ownership in it.

- **West Virginia Wildlife Management Area:** The vast majority of the land surrounding R.D. Bailey Lake was licensed to the WVDNR beginning in July 1982. The acreage that is under WVDNR responsibility has been amended since the initial outgrant license. The license dated 18 November 1987 set the current area of WVDNR responsibility to 17,188 acres of land surrounding and including the lake, which is known as the R.D. Bailey Wildlife Management Area (WMA). The license allows WVDNR to manage forest, fish, and wildlife within the area. The license also provides the WVDNR with the authority to utilize their expertise to provide protection and improvement of the natural resources characteristic of the R.D. Bailey Project lands. WVDNR county natural resource police officers patrol R.D. Bailey Lake to enforce State laws and regulations. A WVDNR special natural resource police officer, in cooperation with USACE Park Rangers, patrols the WMA to enforce laws and regulations. The WVDNR is responsible for submitting to USACE an annual R.D. Bailey Wildlife Management Area – Advanced Management Plan, which assures the USACE that the agreed upon wildlife management measures are being upheld. This plan outlines budget, personnel, planting plans, soil erosion prevention plans, fire prevention methods, and plans for patrolling the Project (WVDNR, 2009).

Additional minor outgrants include garden licenses, easements and rights-of-way for roads, power lines, railroads (Norfolk Southern Railroad), and gas lines.

Table 1-1 is a list of the Federal recreation and outgrant areas at the Project. The location of each of the Federal recreation and outgrant areas is shown on Figure 1-2.

**Table 1-1: Federal Recreation and Outgrant Areas**

Name of Area	Acreage	Managed By	Type(s) of Facility
Below Dam Recreational Area	5	USACE	Fishing, picnicking
Visitor Center and Dam Overlook	1	USACE	Visitor Center, picnicking, hiking, scenic overlook, playground
Guyandotte Point	5	USACE	Boat launch, courtesy dock, picnicking, playground
Big Branch Day Use Area	13	USACE	Picnicking, playground, fishing
Long Branch Overlook	1	USACE	Scenic overlook
Guyandotte Campground (includes Primitive, Reedy Creek, Locust Branch, Sugar Camp, and South Bend Campground areas)	46	USACE	Camping, picnicking, fishing, playground, launch ramp
Wyoming County Board of Education Area	7	Wyoming County Board of Education	Ball field (Little League) and parking
Wildlife Management Area (includes R.D. Bailey Shooting Range and garden leases)	17,188	WVDNR	Hunting, fishing, wildlife conservation, trails, shooting range, and garden leases

### 1.7.6 Project Dam / Lake Operations

The R.D. Bailey Lake dam (Photograph 1-1) is an earthen and rock fill structure with a concrete face. The R.D. Bailey Dam was the first concrete-faced dam built by the USACE. A layer of steel-reinforced concrete was placed on the upstream face (on the lakeside) to reduce seepage through the rock. This massive structure was constructed with 5.7 million cubic yards of rock, 6.4 million pounds of steel, and 240,000 bags of cement.



**Photograph 1-1: R.D. Bailey Dam**

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The R.D. Bailey Dam is 1,400 feet long by 310 feet high. The top elevation of the dam is 1,200 feet NGVD and the stream bed elevation at the dam is 892 feet NGVD. The crest of the dam is 32 feet wide and the crest length is 1,397 feet. There is a service road along the length of the dam that is 22 feet wide.

The R.D. Bailey outlet works are located in the left valley wall of the reservoir and include an approach channel intake structure, tunnel transition, tunnel, stilling basin, outlet channel, and service bridge.

- The intake structure is a concrete, wet-well type, with a total structure height of 319 feet, the top of which is 1,200 feet NGVD and includes a service platform at elevation 1,040 feet NGVD. There are two 6-foot by 12-foot sluices, each controlled by a single hydraulically operated slide-type gate and a crane operated emergency gate.
- Selective withdrawal is accomplished by a dual well system with five 10-foot by 8-foot low flow inlets. The left well has one inlet at 1,020 feet NGVD and a lower inlet at elevation at 1,000 feet NGVD. The right well system has three inlets at elevations: 1,020 feet NGVD, 966 feet NGVD, and 986 feet NGVD.
- The tunnel is an 18-foot diameter, circular concrete-lined pipe that is 1,849 feet long.
- The service bridge provides access to the intake structure and is a two-span, 267-foot-long concrete deck bridge that has a single 9-foot roadway with safety curbs and guardrails.
- The spillway has a concrete sill at elevation 1155 feet NGVD. The sill is 40 feet wide by 300 feet long. The bedrock is composed of sandstone and shale. The stilling basin is 88 feet long and 40 feet wide with walls 25 feet high.

Table 1-2 presents information regarding Project structures.

**Table 1-2: R.D. Bailey Dam Structures**

<b>Dam - Earth Fill</b>	
Type	Rock and random fill with concrete face
Length of Crest	1,397 feet
Crown Width	32 feet
Streambed Elevation	892 feet NGVD
Elevation, Top of Dam	1,200 feet NGVD
<b>Spillway</b>	
Type	Broad-crested saddle, unlined
Elevation of Crest	1,155 feet NGVD
Length	1,000 feet
Width	300 feet
<b>Outlet Works</b>	
Type/Size	Concrete wet-well, 319 feet high
Sluices	2, each 6 feet by 12 feet
Gates	Each sluice controlled by a single hydraulically operated slide gate and an overhead travelling crane for operating the emergency gate.
Inlet and invert elevations in left well	One 10-foot by 8-foot inlet, 1,020 feet NGVD One 10-foot by 8-foot inlet, 1,000 feet NGVD
Inlet and invert elevations in right well	One 10-foot by 8-foot inlet, 1,020 feet NGVD One 10-foot by 8-foot inlet, 986 feet NGVD One 10-foot by 8-foot inlet, 966 feet NGVD

Source: USACE, 2008

### 1.7.7 Lake Operation

During the months of April through October (summer pool), the target surface elevation of the lake is 1,035 feet NGVD. At this elevation, the surface area of the lake is 630 acres. Actual lake levels fluctuate constantly. The pool is lowered to elevation 1,012 feet NGVD by the end of November to allow additional storage of flood waters. During periods of flooding at any time of the year, the elevation of the lake can reach 1,195 feet NGVD, the maximum pool elevation; however, at 1,155 feet NGVD, water flows into the uncontrolled spillway. Current pool of record is 1,111.39 feet NGVD on 9 May 1984.

Table 1-3 shows how the surface area and length of the lake changes as elevation changes.

**Table 1-3: R.D. Bailey Lake Seasonal Pool Characteristics**

Lake Surface Level Description	Surface Elevation (feet NGVD)	Surface Area (acres)	Lake Length (miles)
Minimum	1,012	440	5
Summer Pool (April – October)	1,035	630	7
Maximum Flood Control Pool	1,155	2,850	22

Source: USACE, 2008

### 1.7.8 Visitation Data

USACE uses the Visitor Estimation Reporting System (VERS) to report the annual number of visits to recreation areas in the Project area. In 1991, magnetic loop counters were installed at the Project for counting visitor vehicles. These counters were located at the Visitor Center, Long Branch Overlook, Guyandotte Point, Guyandotte Campground, Big Branch Day Use Area, and the Below Dam Area.

A model developed by the USACE estimates the number of visits made to the Project by estimating the number of people in each vehicle that traverses the counters and the number of vehicles that traverse the counters but are not at the Project for recreational purposes.

Assumptions about the number of people in each vehicle are based on research conducted both at this Project and nationally. Generally, the number of people in each vehicle is greater during the summer months than during the spring and fall months (Rezek and Grado, 2009).

Table 1-4 presents visitation data estimates to the Project area from 2000 to 2009. A visit represents the entry of one person into a recreation area. As shown in Table 1-4, visitation during this period was highest in 2000, when there were an estimated 762,300 visitors to the Project area. The number of visitors subsequently decreased in 2001 and then spiked in 2002. Since 2003, the estimated number of visitors has continued to decrease. Approximately 322,000 visits were made during FY 2009 to the Project area.

**Table 1-4: Visitation Data, FY 2000 – 2009**

<b>Fiscal Year</b>	<b>Project Visitation</b>	<b>Fiscal Year</b>	<b>Project Visitation</b>
FY 2000	762,300	FY 2005	457,526
FY 2001	541,495	FY 2006	469,075
FY 2002	718,999	FY 2007	410,312
FY 2003	589,986	FY 2008	351,627
FY 2004	547,085	FY 2009	321,861

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## **2.0 PUBLIC INVOLVEMENT, COORDINATION AND PARTNERSHIPS**

Public involvement is critically important to the success of the overall master planning effort. The public involvement effort related to developing this Master Plan occurred in August 2009, providing the public, stakeholders, and public agencies opportunities to participate in defining the Project needs and study objectives.

### **2.1 Public Meeting**

A public meeting and two stakeholder meetings were held on 4 August 2009 during the scoping phase of the Master Plan. The White House Council on Environmental Quality defines scoping as "...an early and open process for determining the scope of issues to be addressed and for identifying the significant issues related to a proposed action" (Title 40 Code of Federal Regulations [CFR] 1501.7). The scoping process is used to invite public participation, identify issues, and obtain public comment in the Master Plan formulation process. The public meeting conducted at the Larry Joe Harless Community Center (202 Larry Joe Harless Drive, Gilbert, WV) contributed to the understanding of key project issues and needs as well as formulating the resource objectives presented in Section 5. Two stakeholder meetings were also held on 4 August 2009 at the Larry Joe Harless Community Center. The results of the three meetings are summarized below and a detailed summary of comments provided by the public and invited stakeholders is included as Appendix C.

### **2.2 Identified Key Issues**

The following summarizes the key issues identified for consideration in the master planning process based on the scoping process, including the public meeting and two stakeholder meetings. Based on inputs from these meetings, the following issues related to recreational use at the Project will be considered in this report:

- A new marina with boat slips. The previous marina located in the Guyandotte Point area was closed due to various constraints, although the demand is still present for that type of facility.
- Improved and better maintained campgrounds, including improved sanitary sewer capabilities.
- Improved maintenance. Specifically, increased cutting of weeds and removal of litter.
- 24-hour illumination in the tunnel.

- Lower campground fees.
- Access to additional hunting areas through removal of gates along access roads.
- Enhanced fish and wildlife management activities include stocking the lake and tailwaters.
- Provision of increased regulation enforcement relating to hunting and fishing.
- Other recreational facilities, including basketball courts.
- ATV trail access to the Hatfield and McCoy trail system.

Comments also included discussion of the following topics related to the Project:

- Potential for utilization of the lake for water supply to the community of Hanover.
- There is a significant oil and gas extraction operation ongoing at R. D. Bailey Lake with plans for new drilling activity in the future.
- Advanced Hydro Solutions has filed pre-application documents for installation of a hydro-power plant at R. D. Bailey Lake.

### **2.3 Consistency of Goals with Relevant Planning Documents**

The goals and objectives of the USACE for recreation at the Project are consistent with those of other agencies that provide or plan for recreation in the area based on a review of existing planning documents prepared by the State of West Virginia and all applicable Federal agencies, as follows:

- *West Virginia Statewide Comprehensive Outdoor Recreational Plan (SCORP)* developed by the West Virginia Development Office (West Virginia Development Office, 2009).
- *Pathways to the Future: The West Virginia Statewide Trail Plan 2002-2005* developed by the West Virginia Trail Plan Committee (West Virginia Trail Plan Committee, 2002).
- *West Virginia Wildlife Conservation Action Plan* developed by the West Virginia Division of Natural Resources – Wildlife Resources Section (WVDNR, 2005).
- *USEPA Recreational Fishery Resources Conservation Plan Agency Action Plan* (USEPA, 1996).

- The U.S. Department of Agriculture (USDA) *Conservation Education Strategic Plan to Advance Environmental Literacy* (USDA, 2007).
- USDA Forest Service 2000 *Renewable Resources Planning Act (RPA) Assessment of Forest and Range Lands* (USDA, 2000).
- The National Park Service (NPS) *Rivers, Trails and Conservation Assistance Program Strategic Plan* (NPS, 2005).

Shared goals among these plans and agencies include:

- Provision of high quality recreational opportunities such as a system of hiking trails as encouraged by the *Pathways to the Future: The West Virginia Statewide Trail Plan 2002-2005*.
- Good stewardship of the land.
- Restoration of ecological corridors and natural habitats for conservation of wildlife.
- Preservation of cultural, natural, and historical resources.
- Shared goals also include approaches for achieving desired ends, including: monitoring outcomes, encouraging public involvement, coordination among government entities, and developing partnerships with public, private, and non-profit entities to develop, manage, and maintain resources. Given the commonalities in goals established by State and Federal agencies, the USACE will continue to work in concert with these State and Federal agencies, stakeholders, local government, the public, and other interested parties to enhance recreational opportunities and to support wildlife management and protection goals.

## **2.4 Coordination and Partnerships**

The WVDNR is responsible for the wildlife management on a 17,188 acre licensed area of the R.D. Bailey Lake Project. The WVDNR is also responsible for maintaining the shooting range, providing law enforcement for fish and game violations, maintaining equipment, and other miscellaneous activities.

The WMA, including water areas, is patrolled by WVDNR county natural resource and special natural resource police officers who enforce Chapter 20 laws and regulations on the lake and in the WMA (WVDNR, 2009).

Depending upon the situation that threatens public safety, Project staff should contact the Wyoming County Emergency Response Center, Wyoming County Sheriff's Department, or the West Virginia State Police.

Table 2-1 lists some of the goals stated in plans developed by other agencies that are consistent with the Project's purposes.

**Table 2-1: Common Recreation and Environmental Conservation Goals**

Goals	Enhance recreation opportunities	Stewardship of the land	Restoration of ecological corridors	Restoration of habitats	Preservation of natural, historical, and cultural resources
West Virginia Statewide Comprehensive Outdoor Recreational Plan (WV Development Office, 2009)	✓				✓
Pathways to the Future: The West Virginia Statewide Trail Plan 2002-2005 (WV Trail Plan Committee, 2002)	✓	✓			✓
West Virginia Wildlife Conservation Action Plan (WVDNR, 2005)		✓	✓	✓	
Recreational Fishery Resources Conservation Plan Agency Action Plan (USEPA, 1996)		✓		✓	✓
Conservation Education Strategic Plan to Advance Environmental Literacy (USDA, 2007)	✓				✓
2000 Renewable Resources Planning Act Assessment of Forest and Range Lands (USDA, 2000)		✓			✓
Rivers, Trails and Conservation Assistance Program Strategic Plan (NPS, 2005)					✓

## **3.0 RESOURCE ANALYSIS**

This section of the Master Plan contains the results of an analysis of the existing conditions of the natural resources in the physical and biological environments at the Project. The information discussed in this section is provided to facilitate a better understanding of the natural resource capabilities, suitability, and constraints relative to future Project development and natural resource-related management activities. This analysis provides key information for development of the resource objectives and subsequent land classification decisions.

### **3.1 Physical Environment**

The discussion of the physical environment of the Project area includes the following natural resources:

- Surface water
- Wetlands
- Groundwater
- Physiography and topography
- Geology, soils and minerals
- Historic and pre-historic resources
- Scenic elements

These natural resources are discussed in the subsections below. The existing conditions of each resource are presented and are followed by a brief discussion of the suitability of that resource for Project development.

#### **3.1.1 Surface Water**

Surface water pertains to water that is available at the ground surface and includes streams, R.D. Bailey Lake, (See Photograph 3-1) and the tailwater area.

##### **3.1.1.1 Existing Conditions**

###### ***Streams***

The approximately 19,000 acre R.D. Bailey Lake Project is located in Mingo and Wyoming Counties in West Virginia on the Guyandotte River, which is a tributary of the Ohio River. The Guyandotte River, formed from Stonecoal Creek and Winding Gulf near the Raleigh-Wyoming

county line, meanders through southwest West Virginia for approximately 167 miles. Eventually, the Guyandotte River drains into the Ohio River near Huntington, West Virginia. The Project area is approximately 113 miles upstream from the confluence of the Guyandotte River with the Ohio River (See Figure 3-1).

The R.D. Bailey Dam is the only USACE dam on the Guyandotte River which provides flood risk management and controls the downstream flow. The dam is located at river mile 113 and the lake receives runoff from a 540 square mile drainage basin. The dam is located in Mingo County, but the majority of the lake lies within Wyoming County (See Figure 3-1).

The entire Guyandotte River basin drains approximately 1,680 square miles of land and generally flows northwest. The drainage areas of the Guyandotte River and its principal tributaries are presented in Table 3-1.

**Table 3-1: Drainage Areas of the Guyandotte River and Principal Tributaries**

Stream	Location	River Mile	Area (square miles)
Slab Fork	Mouth	157.7	35.4
Guyandotte River	Below mouth of Slab Fork	157.7	131.0
Pinnacle Creek	Mouth	143.6	57.2
Guyandotte River	Below mouth of Pinnacle Creek	143.6	260.0
Guyandotte River	Baileysville gage	130.8	306.0
Indian Creek	Mouth	129.4	42.7
Guyandotte River	Below mouth of Indian Creek	129.4	352.0
Clear Fork	Mouth	122.8	129.0
Guyandotte River	Below mouth of Clear Fork	122.8	498.0
<b>Guyandotte River</b>	<b>R.D. Bailey Dam</b>	<b>113.1</b>	<b>540.0</b>
Buffalo Creek	Mouth	93.3	45.3
Guyandotte River	Man gage	93.0	762.0
Guyandotte River	Logan, WV	81.0	833.0
Island River	Mouth	79.7	105.0
Guyandotte River	Branchland, WV	35.3	1,224.0
Mud River	Mouth	7.1	359.0
Guyandotte River	Below mouth of Mud River	7.1	1,667.0
Guyandotte River	Mouth	0	1,679.0

### ***R.D. Bailey Lake***

R.D. Bailey Lake is formed by the dam, the topographical features of the area, and the tributaries, creeks and streams that discharge into the Guyandotte River above the dam and within the Project boundary. The surface of R.D. Bailey Lake measures approximately 630 acres and it is approximately 7.1 miles long with a mean breadth of 732 feet in the main portion of the lake during the normal summer pool elevation of 1,035 feet NGVD. The lake also has two shorter

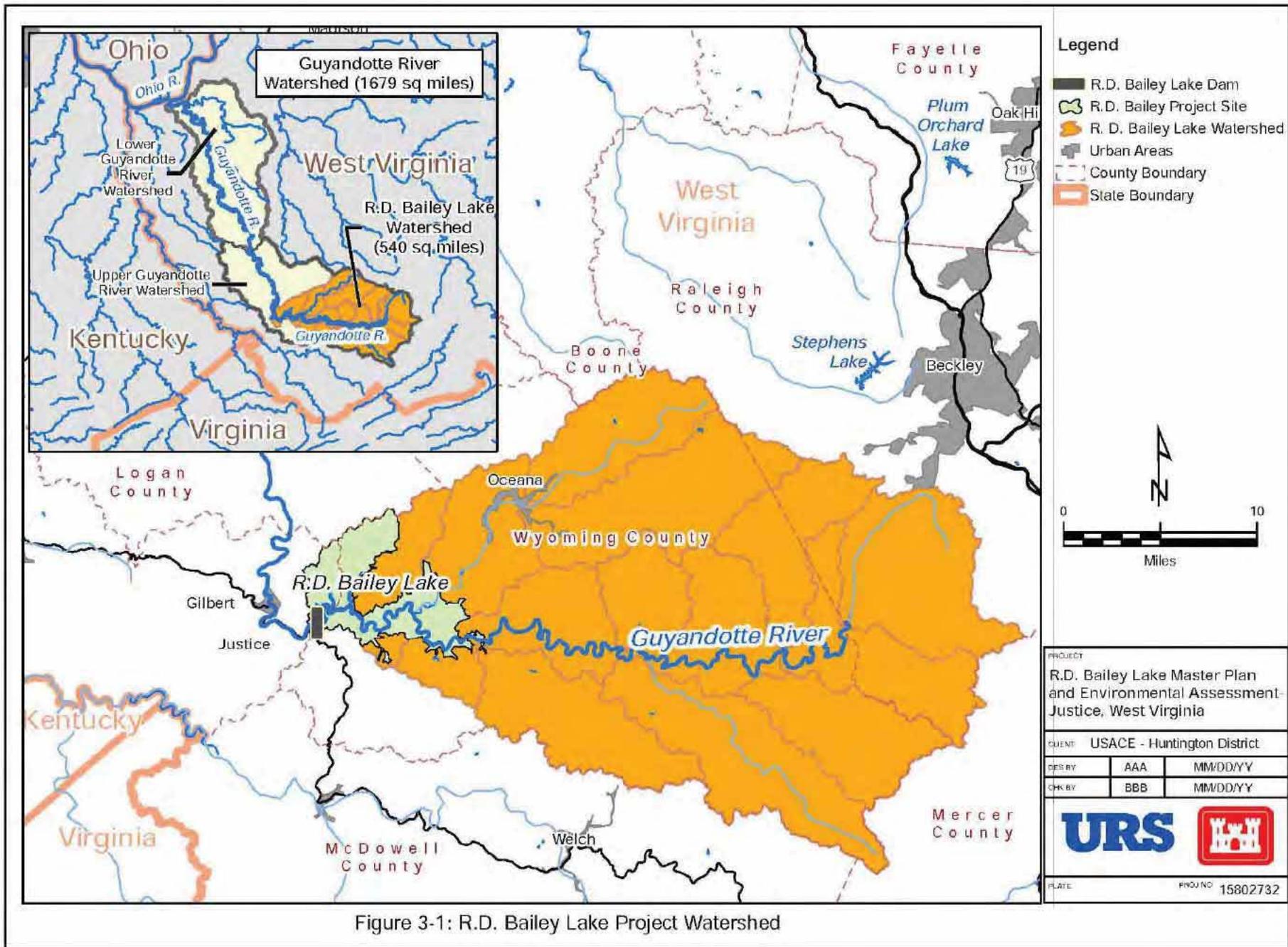


Figure 3-1: R.D. Bailey Lake Project Watershed

arms that extend approximately 1.7 miles up Cub Creek and 1.0 mile up Leatherwood Creek. The topography of the area provides panoramic views of the lake.



**Photograph 3-1: R.D. Bailey Lake from Visitor Center**

Approximately 530 acres of the lake are designated for unrestricted boat speeds and approximately 100 acres are restricted to idle speed. The lake is relatively narrow, but creates many coves at junctions with tributaries; these features result in a shoreline that is over 16 miles long during summer months. The majority of the coves are designated as idle speed zones. The average depth of the lake is about 54 feet with a maximum depth of approximately 145 feet. Figure 3-2 delineates the surface waters within the Project area and delineates the idle speed zone areas. The lake shoreline generally consists of steep rocky slopes that are well vegetated above the summer pool elevation.

Water is also released from the dam for the purpose of augmenting the flow of the Guyandotte River so that the desired total flow is maintained to meet the needs of the downstream aquatic habitat with regard to temperature, dissolved oxygen, and sediment. The flow rate that provides benefits to the downstream area, but does not exceed the maximum acceptable drawdown was determined to be 45 cfs. This rate is maintained at all times, even during a flood event except during winter, when the rate is reduced to approximately 28 cfs. Additionally, allowable ranges in temperature for the outflow have been developed with coordination between the USACE and the WVDNR Division of Fish and Game.

### ***Tailwater Area***

The tailwater area is located immediately downstream of the dam where the outflow from the lake is discharged. Water is released from the lake through an intake structure and passes through a tunnel to emerge as outflow. This system allows withdrawal from various water depths and offers choices over a considerable range of outflow rates and water parameters, including temperature. The WVDNR also stocks brown and rainbow trout in the tailwater area, providing increased recreational fishing opportunities at the Project (Kleinshchmidt, 2008).

### ***Water Quality***

Upstream land use activities, such as coal mining, logging, agriculture, and land development lead to sedimentation, which diminishes the clarity of streams within the Guyandotte River watershed. Erosion and destabilized stream banks also release sediment into waters.

West Virginia water quality standards are based on levels of fecal coliform, pH, iron, aluminum, manganese, and/or biological impairment. Rivers and streams that do not meet the state standards are identified on the statewide 303(d) list. Failing septic systems and illicit discharges of untreated household wastewater are the primary contributors to the high fecal coliform levels in the Guyandotte River. Previous coal mining operations and forestry/logging practices in the Project area have also contributed to the presence of iron, aluminum, and manganese in the Guyandotte River (Upper Guyandotte Watershed Association [UGWA], 2006).

Section 303(d) requires a list of waters, deemed impaired, for which effluent limitations or other controls are not sufficient to meet water quality standards. Data collected to determine water quality is obtained from various sources including: the Environmental Protection Agency's STORET database, West Virginia Department of Environmental Protection (WVDEP) Division of Water and Waste Management (DWWM), WVDEP Division of Mining and Reclamation (DMR), and sampling efforts (USEPA, 2004).

According to the 2010 Draft West Virginia 303(d) List, which identifies previously listed waters, the Upper Guyandotte River was identified in 2004 for contamination with aluminum, fecal coliform, and iron (USEPA, 2010). R.D. Bailey Lake was identified as an impaired water body on the 2010 Draft West Virginia 303(d) List of impaired streams for contamination with polychlorinated bi-phenols /PCBs (Kleinschmidt, 2008). The conditions recorded at the lake are within a range that triggered listing with regards to the amount of fish that can be safely consumed on a monthly basis. However, the levels are relatively low and do not impact the lake for suitability for swimming and other water recreation activities.

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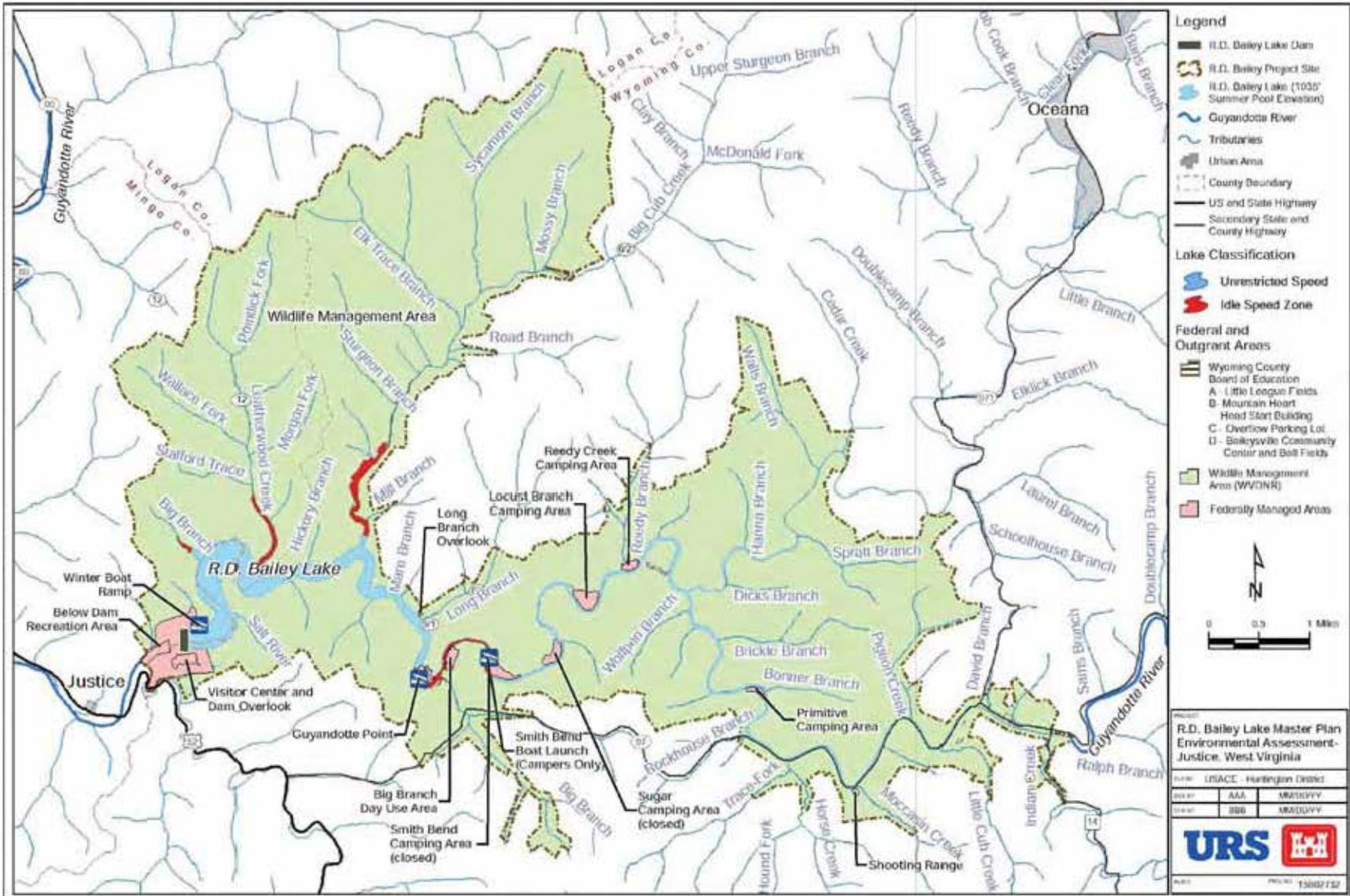


Figure 3-2: Surface Waters Within the R.D Bailey Lake Project

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A Total Maximum Daily Load (TMDL) is a plan of action developed to clean water bodies that are not meeting water quality standards. The plan of action also includes identifying the source of contamination and developing strategies for reduction or elimination of the contamination. TMDLs are developed for water bodies that have been identified on the 303(d) list. In 2004, the Metals, Fecal Coliform and pH TMDLs for the Guyandotte River Watershed were developed by the USEPA. The projected TMDL year for R.D. Bailey Lake is 2018, which indicates the latest year in which the WVDEP plans to develop a TMDL for the lake (WVDEP, 2007).

### **3.1.1.2 Implications of Surface Water Resources for Project Development**

Due to the size and depth of the lake, along with suitable water quality for recreation purposes, the lake is well suited for motorized and non-motorized (canoes and kayaks) boating and associated water recreation activities, such as water skiing. Larger, wider expanses of the lake are more suitable for motorized boats, while coves and narrower reaches of the lake lend themselves to non-motorized boating activities.

While the lake water quality was noted as suitable for swimming, access to swimming along the shoreline is limited due to the steep rocky slopes and vegetation adjacent to much of the shoreline. There are no designated swimming areas at the R.D. Bailey Lake Project area. However, there are day use areas and campgrounds located along the Guyandotte River leading into the lake. Access to the lake for swimming is primarily from watercraft.

Due to suitable water quality, size, and depth of the lake, as well as the over 16 miles of shoreline present during normal summer pool elevation and the numerous coves and supporting tributaries, the lake and tailwater area together support a diverse population of aquatic life and fish that create a quality fishing opportunity.

While there are variations in lake levels throughout the year, the USACE is generally able to maintain a relatively consistent summer pool elevation that is suitable and conducive to recreational boating. Summer inundation of the land above the recreational summer pool elevation of 1,035 feet NGVD does occur, but the majority of inundation instances occur during the winter and spring months. The 5-year flood frequency elevation is estimated at 1,100 feet NGVD.

As one of the primary authorized purposes of the R.D. Bailey Lake Project is flood risk management, the Project area around the lake is designed to store floodwaters to reduce flood risk downstream. Figure 3-3 shows inundation areas between the summer pool elevation of 1,035 feet NGVD and the maximum flood control pool elevation of 1,155 feet NGVD. Based on

Figure 3-3, the majority of the recreation areas are subject to inundation with the exception of the Below Dam Recreation Area and the Visitor Center and Dam Overlook. When these recreational areas are inundated, silt and debris removal is an issue relative to resuming operations.

Table 3-2 presents the impacts of various lake elevations to the recreation areas within the Project boundary. As indicated in the table, impacts become apparent 5 feet above the summer pool elevation of 1,035 feet NGVD. The lake is closed for public use above elevation 1,040 feet NGVD.

**Table 3-2: Project Impacts Based on Lake Elevation**

<b>Elevation (feet NGVD)</b>	<b>Project Impacts</b>
1,030 (below)	R.D. Bailey Marina Boat Launches unusable/dry docked
1,033 (below)	Guyandotte Campground Smith Bend launch ramp unusable
<b>1,035</b>	<b>Summer Pool Elevation</b>
1,040 (above)	R.D. Bailey Lake closed for public use
1,048	Guyandotte Point Parking Lot inundated
1,052	Big Branch Day Use Area access road inundated
1,055	Smith Bend and Sugar Camp areas evacuated <sup>1</sup>
1,059	Smith Bend Launch Ramp inundated
1,060	Smith Bend Access Road inundated <sup>1</sup>
1,070	Sugar Camp Comfort Station inundated <sup>1</sup>
1,072	Smith Bend Comfort Station inundated <sup>1</sup>
1,075	Guyandotte Campground evacuated
1,080	Big Branch Day Use area comfort station inundated Sugar Camp area access road inundated <sup>1</sup> Locust Branch access road inundated
1,085	Reedy Creek camp area inundated
1,099	Locust Branch Comfort Station inundated
1,105	Reedy Creek Comfort Station inundated
1,115	Railroad Tunnel begins to flood
1,120	Primitive Campground floods
1,139	Sewage Treatment Plant at Locust Branch begins to flood
1,155	Water Treatment Plant at Locust Branch begins to flood

Note: (1) Smith Bend and Sugar Camp Campgrounds are currently closed for use.

According to Section 2.2.1 of the USACE Engineer Manuals (EM) 1110-1-400 (2004), a good general guideline for planning purposes is to construct lakeside development above the 5-year flood frequency level where possible. As illustrated in Figure 3-3, areas adjacent to Cub Creek, Leatherwood Creek, and the Guyandotte River experience substantial inundation at maximum flood control pool limiting project development opportunities in these areas.

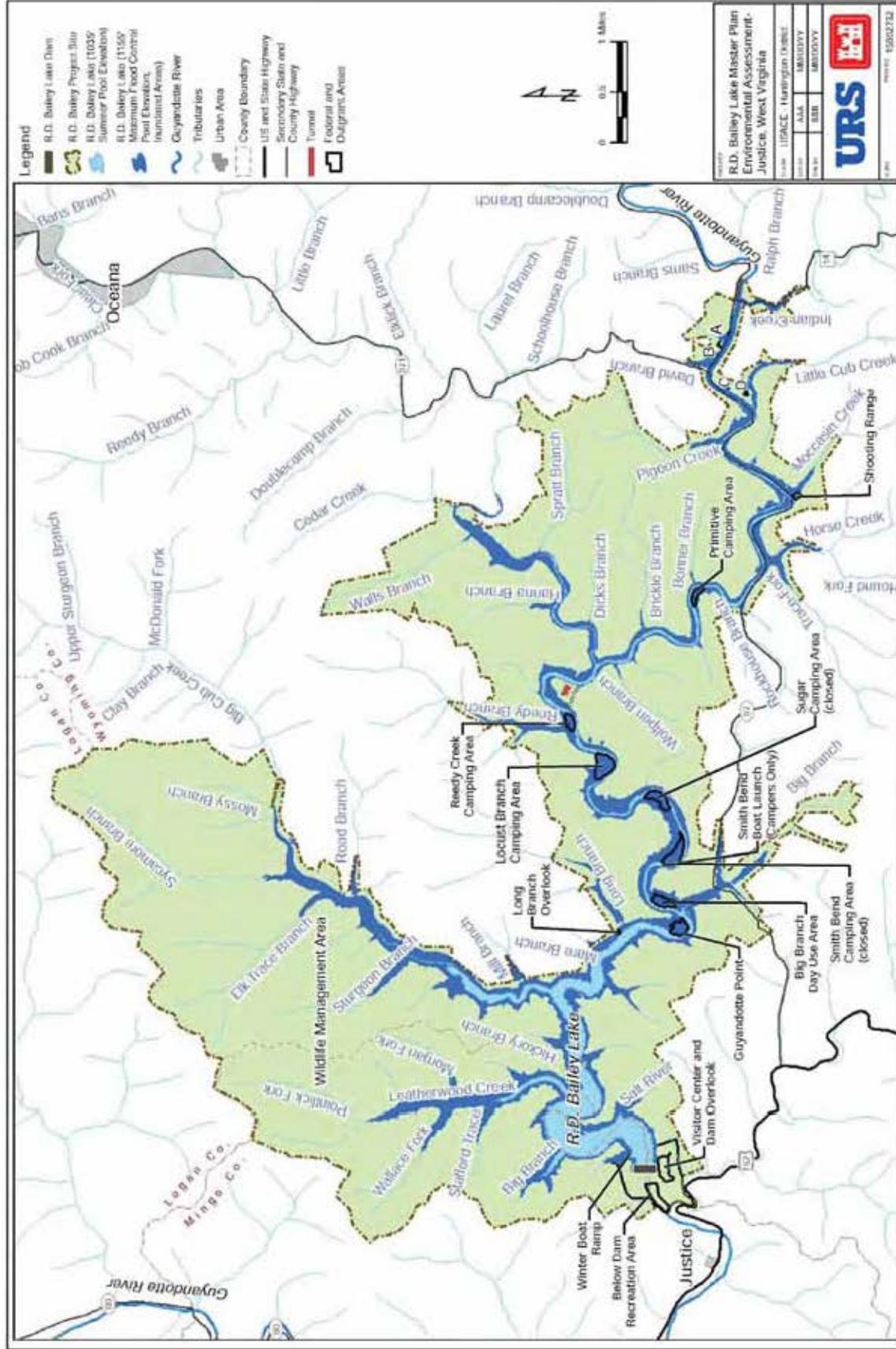


Figure 3-3: Inundation Areas between Summer Pool Elevation and Flood Control Pool Elevation

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### 3.1.2 Wetlands

In Section 404 of the Clean Water Act (33 U.S.C. § 1344), wetlands are defined as "...those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas." Wetlands typically include diverse vegetation that attracts a variety of wildlife species, especially when standing water is present. Some wildlife species are dependent on wetland ecology for food, water, and shelter and cannot survive in other environments. The wildlife attracts predators, including hunters. Because of the link between upland and aquatic systems, wetlands attract and support many species from adjacent ecosystems. Wetlands are important in part because they hold and slowly release floodwater and snow melt. Wetlands filter impurities out of surface water, recycle nutrients, trap sediment, and provide recreational opportunities for bird watching, hunting, wildlife observation, and possibly fishing, canoeing, and kayaking.

#### 3.1.2.1 Existing Conditions

According to U.S. Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) maps, approximately 6 acres of wetlands exist within the Project area. The NWI maps are a generalized series of maps that give approximate locations of wetland areas based on previous surveys such as soil surveys, previous recordings, and observations. The wetlands mapped in the Project area tend to occur mainly in relation to streams and the lake and are isolated and scattered, consisting of relatively small areas typically averaging less than 3 acres (USFWS, 2010a). In total, there are approximately 6 acres of potential jurisdictional wetlands in association with the Project area. Based on this evaluation there are very limited wetlands within the project area. Figure 3-4 shows the locations of wetlands at the Project site and Table 3-3 provides information about the different types of wetlands.

**Table 3-3: Wetlands Present in Project Area**

Wetland Type	Abbreviation	Number of Sites	Approximate Total Acreage
Palustrine, emergent, persistent, seasonally flooded wetland (diked/impounded)	PEM1Eh	3	1.44
Palustrine, forested, broad-leaved deciduous, seasonally flooded wetland (diked/impounded)	PFO1Ch	3	3.72
Palustrine, scrub-shrub, broad-leaved deciduous, temporarily flooded wetland	PSS1A	1	1.06

### **3.1.2.2 Implications of Wetland Resources for Project Development**

These wetlands provide specialized habitat for select flora and fauna that would otherwise not thrive at the Project. Under EO 11990, the USACE is tasked with the responsibility to preserve and enhance wetland resources. Wetlands can be considered both a constraint and an opportunity relative to project development. They are a constraint because they are a sensitive environmental resource which should be preserved; and this requirement may limit development opportunities for high intensity/density recreational activities. In the case of this Project area, due to the sparse and isolated nature of the wetlands, they should be able to be preserved with minimal impact to project development opportunities. Wetlands can provide potential recreational opportunity due to the diverse habitat and wildlife associated with them, such as wildlife viewing, bird watching, and interpretive and educational activities. Wetlands can also support target game species and waterfowl, thereby supporting associated consumptive recreational uses.

The relatively small existing wetland areas identified within the Project area have the potential to attract migrating waterfowl; however, due to their size and quality, they have only limited potential to support waterfowl hunting. Due to the relatively limited amount of wetlands at the Project, potential recreational opportunities as noted above associated with wetlands appear to be minimal.

Prior to the implementation of any proposed actions, such as recreational development of an area, wetland delineations would need to be conducted, the potential impacts on any wetlands would need to be evaluated, and water quality certification would need to be obtained, if necessary.

### **3.1.3 Groundwater**

Groundwater is subsurface water in geologic units called aquifers, which are recharged by precipitation and infiltration of surface waters. Groundwater supplies wells and springs and is generally pumped by wells for public and private use. Groundwater is a vital, natural resource that is susceptible to contamination from a variety of activities. Contaminated groundwater can be difficult to remediate.

#### **3.1.3.1 Existing Conditions**

According to the Water Resources Protection Act Water Use Survey of 2006, Mingo County's groundwater withdrawal averages 25 million gallons a month; Wyoming County withdraws an average of 45 million gallons a month. Within the Upper Guyandotte watershed, there is o

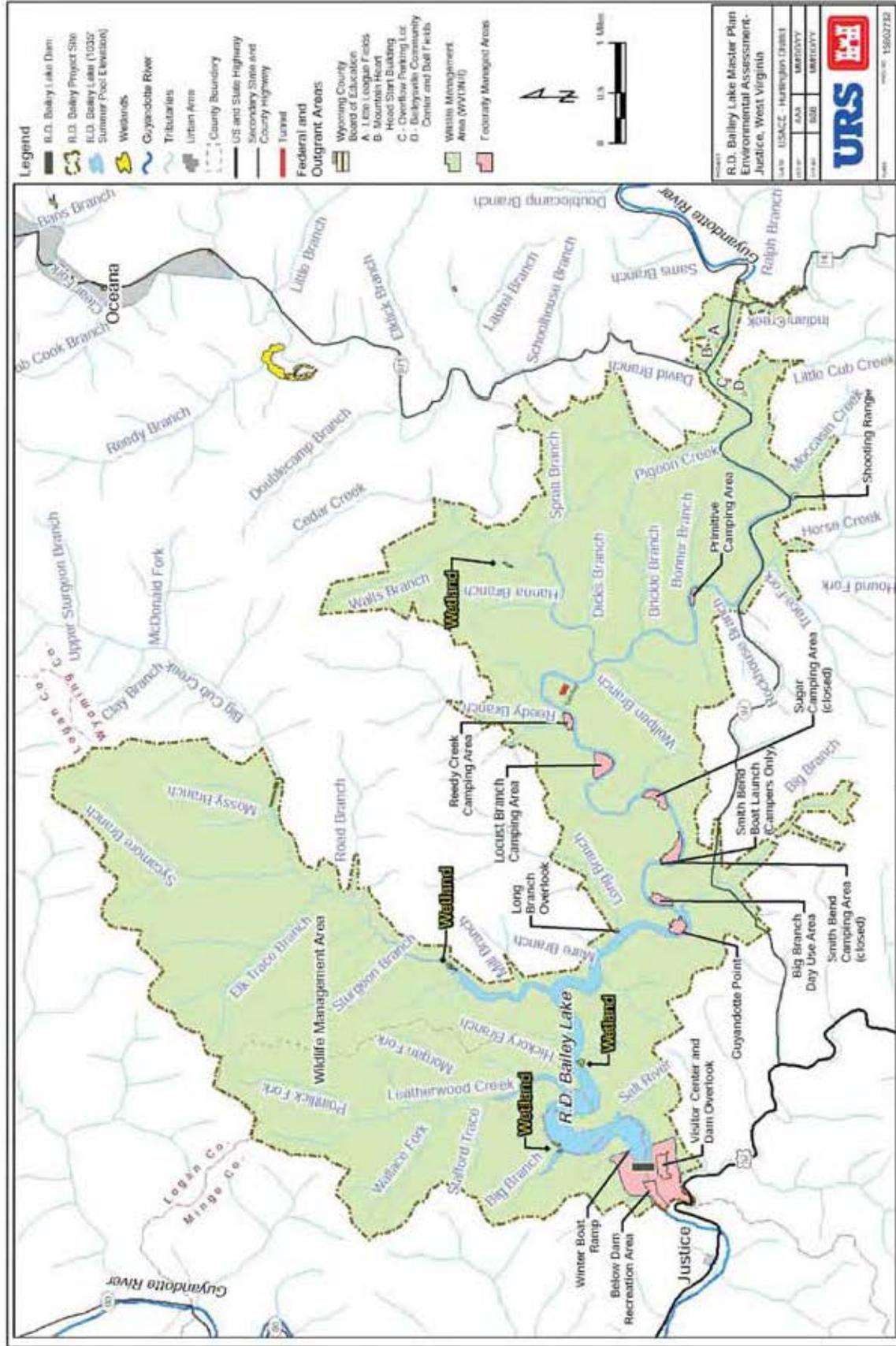


Figure 3-4: NWI-Delineated Wetlands

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groundwater well in Mingo County north of Gilbert and many intakes throughout Wyoming County. Within the Project area in Wyoming County, there is one groundwater well west of the R.D. Bailey Dam and four groundwater wells east of R.D. Bailey Lake; however not all of these groundwater wells are in use. The approximate location of the groundwater wells within the Project area is presented on Figure 3-5.

Groundwater resources are currently used at the Project with the water processed at a water plant on the Project site. There are three groundwater wells currently in use at the Project, each with a water plant that treats the water and pumps it to a storage holding tank for use. The three wells are located at the Visitor Center, the Big Branch Day Use area, and in the Campground area.

Groundwater can be affected by industrial waste disposal, coal mining, oil and gas drilling, agriculture, domestic or municipal waste disposal, transportation, and rural development. The groundwater in the Upper Guyandotte River Basin was analyzed in 2006 and contained “background levels of pesticides, hydrocarbons, volatile organic compounds, and other chemicals that were tested and occur at concentrations far below action levels set by groundwater quality standards” (WVDEP Division of Water and Waste Management Ground Water Program, 2006).

### **3.1.3.2 Implications of Groundwater Resources for Project Development**

No constraints were identified that would limit the use or quantity of groundwater that could be used for development opportunities. Groundwater appears to be a viable source of water for enhancing or developing additional wetlands and providing potable water for Project development in remote areas.

### **3.1.4 Physiology / Topography**

The physical features of the earth’s surface are described in terms of physiography (landforms) and topography (elevation, slope, and orientation).

#### **3.1.4.1 Existing Conditions**

The R.D. Bailey Lake Project is in the Upper Guyandotte River Basin near the Kanawha Section of the Appalachian Plateau Province. The sedimentary strata is made from the Kanawha and New River Formations, part of the Pottsville Group, and includes sandstone, shale, clay, coal, and limestone. The Appalachian Plateau is known for its abundance of minable coal and natural gas (Kleinschmidt, 2008).

The terrain around the R.D. Bailey Lake is rugged. The land is characterized by narrow valleys and steep slopes. Elevations around the lake vary from 1,080 feet to 2,200 feet. About 92 percent of the land in Wyoming County has slopes of 25 percent or greater.

Many locations within the Project area have limited development capability as per USACE Publication EM 1110-1-400, which recommends avoiding development in areas with greater than 15 percent slope.

#### **3.1.4.2 Implications of Physiography/Topography Resources for Project Development**

The overall topography of the Project poses development constraints and opportunities. Generally, the site topography provides significant scenic quality that enhances many of the recreational experiences at the R.D. Bailey Lake Project.

Areas with slopes less than 15 percent have the highest development potential relative to topography and provide opportunities for higher intensity recreational development. Slopes between 15 percent and 30 percent have more limited project development potential, but can provide interesting and challenging opportunities for hiking, mountain biking, hunting, and wildlife or scenic viewing, as well as other opportunities if properly integrated with site topography. Areas with slopes in excess of 30 percent typically have very limited Project development potential, but do provide wildlife habitat, visual buffers, and add scenic quality to the overall Project.

Based on information provided in Figure 3-6, Topography Suitability for Project Development, a large portion of the project area has very limited project development potential with slopes greater than 30 percent. The most suitable areas for Project development are in the narrow valleys and flood plains adjacent to the Guyandotte River and its tributaries as emphasized by the fact that the majority of existing recreation areas are located directly adjacent to the river/lake with slopes less than 15 percent; however, inundation of those gently sloping areas adjacent to the Guyandotte River and tributaries may be a limiting factor (refer to Figure 3-3).

Another factor to consider relative to Project development is that the cost of construction increases as the grade increases, thus development of higher density recreational facilities are typically directed to the more gently sloping areas where possible. Erosion is another key constraint in locations with steep slopes and it is discussed in greater detail in Section 3.1.5.

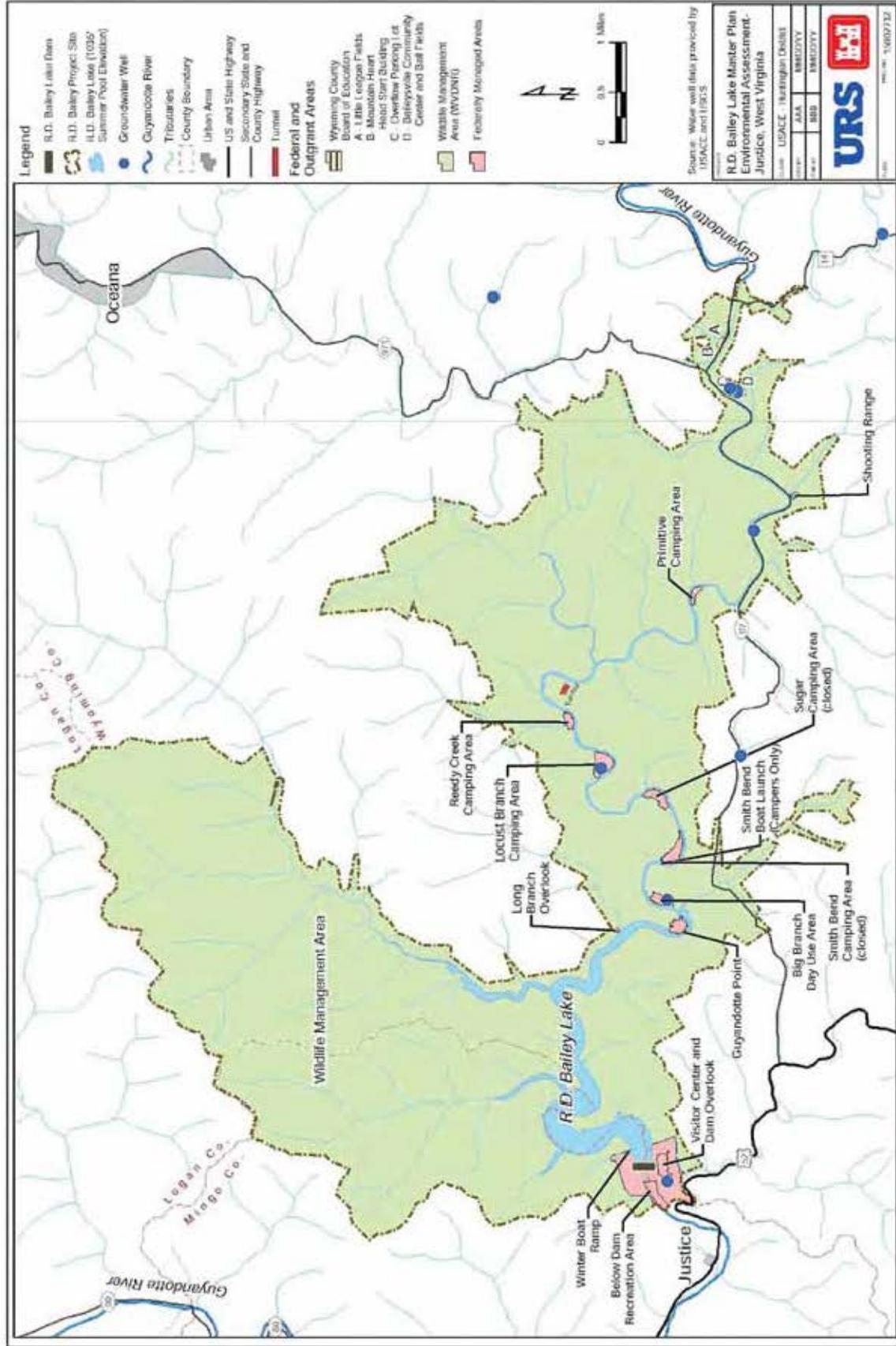


Figure 3-5: Groundwater Well Locations

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### **3.1.5 Geology, Soils, and Minerals**

The Upper Guyandotte River basin is formed from sedimentary strata of the Pennsylvanian period, which was created about 280 to 310 million years ago. The western two-thirds of the State are located in this geological area and consists of flat-lying rocks (Kleinschmidt, 2008).

#### **3.1.5.1 Existing Geology and Soil Conditions**

Weathering of the Kanawha Formation created most of the soils in Logan, Mingo, and Wyoming counties. In small areas, the Guyandotte River and the Tug Fork River have eroded structural highs, exposing the New River Formation. In the central and northwestern parts of the two counties, high ridges over low areas are capped by soils weathered from the Allegheny and Conemaugh Formations. The bedrock is made of interbedded sandstone, siltstone, shale, and coal. Material weathered from the Pennsylvanian-age rock created Berks, Matewan, Highsplint, Guyandotte, and Pineville soils. Surface mining coal created Fiveblock soils from disturbed materials (US Department of Agriculture [USDA] and National Resources Conservation Service [NRCS], 1988 and 2003).

According to the 2002 Soil Survey of Logan and Mingo Counties, West Virginia (USDA and NRCS, 2003) and the 1988 Soil Survey of Wyoming County, West Virginia (USDA and NRCS, 1988), 25 different groupings of soils often occur together at the Project. Fourteen of these soil groupings occupy less than 1 percent of the area. Due to the limited presence of these groupings, they are excluded from further discussion. The remaining eleven soil groupings are listed in Table 3-4, which also indicates suitability and limitations of these soil types and slopes for recreational development. Figure 3-7 categorizes the soil types identified in Table 3-4 into two groups: 1) limited project development potential, and 2) least suitable for project development.

Based on the information from Table 3-4, the Chagrin Loam and Sandy Loam, Gilpin and Lilly, and Monongahela loam soil units provide the best opportunity for development because they are the only units classified as “limited suitability.” These soil units occur in narrow strips along the Guyandotte River and several of its tributaries. The prime farmlands, which include Chagrin (Ch) soil type, located along the Guyandotte River, may provide opportunity for meadow habitat or open field to support and encourage the diversity of wildlife (USDA, NRCS, 1988 and 2003).

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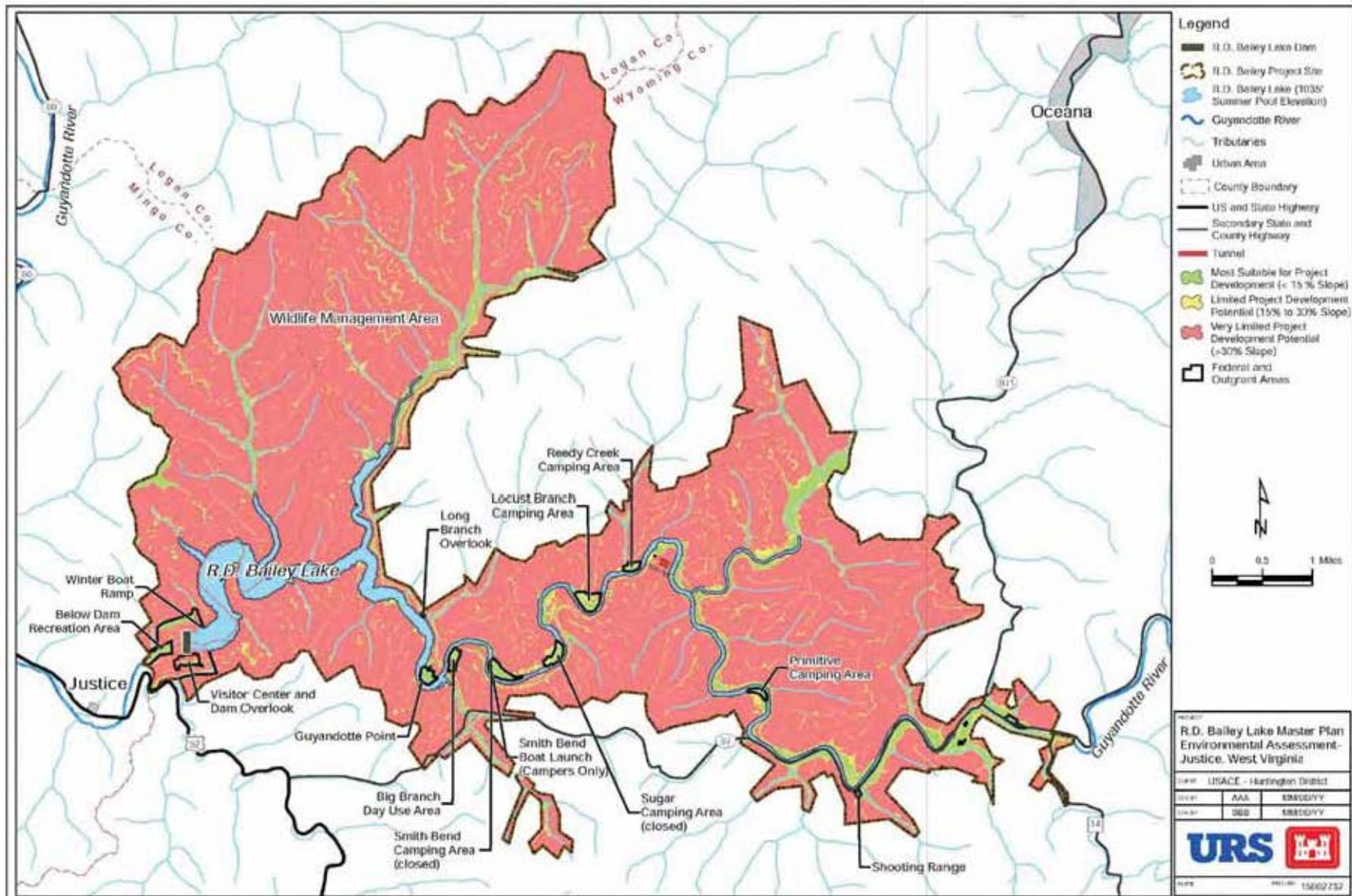


Figure 3-6: Topography Suitability for Project Development

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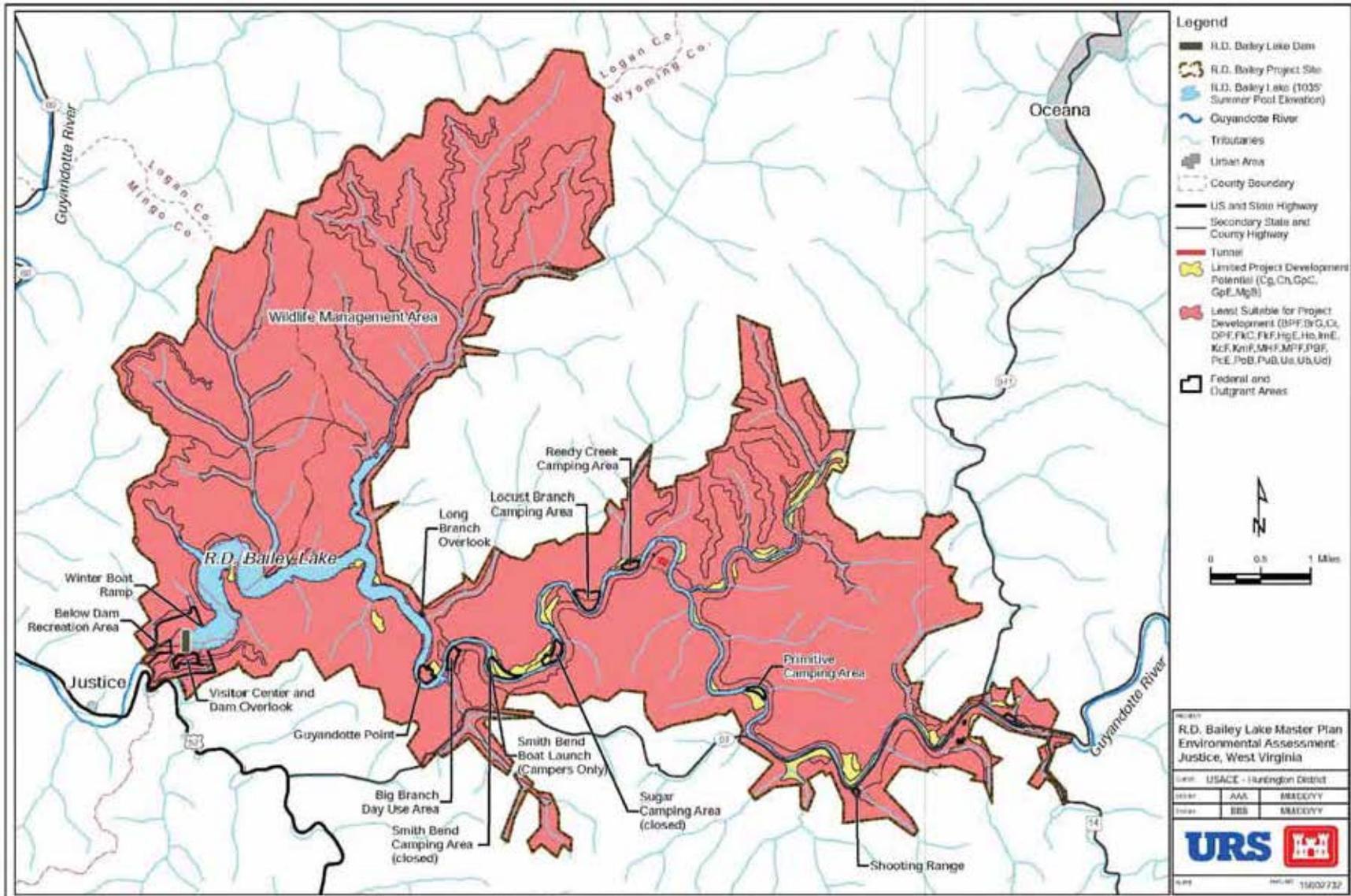


Figure 3-7: Soils Suitability for Project Development

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**Table 3-4: Soils in Order of Predominance in the Project Area**

Symbol	Soil Type	Typical Slopes (%)	Description	Suitability Based on Slope and Soil Type
MHF	Matewan-Highsplint-Guyandotte	35-80%	Occurs on narrow ridge tops and on side slopes. Soils are well drained. Soils are derived from sandstone and colluvium. Depth to bedrock is about 40 to 60 inches. Areas covered in this soil unit are mostly woodlands.	<b>Least suitable for Project Development.</b> Unsuitable (too steep) for lawn or landscaping; for trails or golf fairways; for camping, picnicking, or playground areas; for small buildings; or for septic tank absorption field. Unsuitable for roads due to slope and severe potential for erosion.
MPF	Matewan-Pineville-Guyandotte	35-80%	Occurs on narrow ridge tops and on side slopes. Soils are well drained. Soils are derived from sandstone and colluvium. Rocky outcrops and stones cover 15 to 50 percent of soil surface. Depth to bedrock is about 40 to 60 inches. Areas covered in this soil unit are mostly woodlands.	<b>Least suitable for Project Development.</b> Unsuitable (too steep) for lawn or landscaping; for trails or golf fairways; for camping, picnicking, or playground areas; for small buildings; or for septic tank absorption field. Unsuitable for roads due to slope and severe potential for erosion.
PBF/ BpF	Pineville-Berks / Berks-Pineville	35-80%	Occurs on mountains. Soils are well drained. Depth to bedrock is about 40 to 60 inches.	<b>Least suitable for Project Development.</b> Unsuitable (too steep) for lawn or landscaping; for trails or golf fairways; for camping, picnicking, or playground areas; for small buildings; or for septic tank absorption field. Unsuitable for roads due to slope and severe potential for erosion.
HMF	Highsplint-Matewan-Cloverlick	35-65%	Occurs on narrow ridge tops and on side slopes. Soils are well drained. Soils are derived from sandstone and colluvium. Rocky outcrops and stones cover 15 to 50 percent of soil surface. Depth to bedrock is about 40 to 60 inches. Areas covered in this soil unit are mostly woodlands.	<b>Least suitable for Project Development.</b> Unsuitable (too steep) for lawn or landscaping; for trails or golf fairways; for camping, picnicking, or playground areas; for small buildings; or for septic tank absorption field. Unsuitable for roads due to slope and severe potential for erosion.

**Table 3-4: Soils in Order of Predominance in the Project Area**

Symbol	Soil Type	Typical Slopes (%)	Description	Suitability Based on Slope and Soil Type
DpF	Dekalb-Pineville-Guyandotte	25-80%	Occurs on ridge tops and on side slopes. Soils are well drained. Channery sandy loam forms the surface layers. Rocky outcrops are on ridge tops and upper side slopes. Depth to bedrock is 20 to 60 inches. Areas covered in this soil unit are mostly woodlands.	<b>Least suitable for Project Development.</b> Unsuitable (too steep) for lawn or landscaping; for trails or golf fairways; for camping, picnicking, or playground areas; for small buildings; or for septic tank absorption field. Unsuitable for roads due to slope and severe potential for erosion.
KcF	Kaymine-Cedar creek-Dekalb	35-80%	Occurs on mountain side slopes. Soils are well drained. Channery sandy loam and channery loam form the surface layers. Soil formed in material from surface mining coal. Depth to bedrock is 30 to 60 inches. Areas covered in this soil unit are mostly woodlands.	<b>Least suitable for Project Development.</b> Unsuitable (too steep) for lawn or landscaping; for trails or golf fairways; for camping, picnicking, or playground areas; for small buildings; or for septic tank absorption field. Unsuitable for roads due to slope and severe potential for erosion.
Cg/Ch	Chagrin Loam/ Chagrin Sandy Loam	0-3%	Occurs in low and high floodplains along the Guyandotte River and tributaries. Soils well drained. Soil formed from sandstone and shale. Depth to bedrock is greater than 60 inches.	<b>Limited Project Development Potential.</b> Limited suitability (frequent flooding) for lawn or landscaping; for trails or golf fairways; for camping, picnicking, or playground areas; for small buildings; or for septic tank absorption field. Limited suitability for roads due to flooding.
GpC/ GpE	Gilpin and Lily	3-15% / 15-35%	Occurs on terraces or ridge tops. Soils are well drained. Soil formed from shale, siltstone, and sandstone. Depth to bedrock is 20 to 40 inches.	<b>Limited Project Development Potential.</b> Limited suitability (moderate slope) for lawn or landscaping; trails or golf fairways; camping, picnicking, or playground areas; for small buildings; or septic tank absorption field. Limited suitability for roads due to slope and depth to bedrock.
MgB	Monongahela Loam	3-8%	Occurs on terraces along the Guyandotte River and tributaries. Soils are moderately well drained. Soil formed from sandstone and shale. Depth to bedrock is greater than 60 inches.	<b>Limited Project Development Potential.</b> Limited suitability (wetness) for lawn or landscaping; trails or golf fairways; camping, picnicking, or playground areas; for small buildings; or septic tank absorption field. Unsuitable for roads due to wetness and severe potential for erosion.

### **3.1.5.2 Existing Minerals Conditions**

The R.D. Bailey Lake Project area is located in a productive coal and natural gas field, which contains valuable reserves of these resources. Gas well locations are presented on Figure 3-8.

Coal and natural gas are the most important minerals in the Project area. In 2006, the Guyandotte River Basin was estimated to have more than 10 billion tons of recoverable coal reserves by the West Virginia Office of Miners' Health Safety and Training (Region 1 Planning and Development Council, 2008 and West Virginia Geological Survey, 2006).

Although the Upper Guyandotte River Basin is an important area for coal and natural gas production in West Virginia, there are currently no active coal mines within the R.D. Bailey Project area. As of May 2010, there are 77 active natural gas wells under license and one non-active natural gas well. Additionally, there are three active natural gas wells that are not under license because they were drilled prior to the USACE acquisition of Project land.

On the west side of the Project, north of the Lake, there is a portion of an abandoned surface mine site located within the Project area.

In locations where the government does not own all minerals, estate acquisition documents must be reviewed on an individual basis to understand the rights of private mineral ownership and government rights. R. D. Bailey is also unique in the fact that a Memorandum of Understanding (MOU) exists regarding private mineral ownership rights and government rights.

### **3.1.5.3 Implications of Geology, Soils, and Mineral Resources for Project Development**

#### ***Geology and Soils***

Many of the soils within the Project area, along with the steep sloping terrain on which they are found, are generally prone to severe erosion and have very limited development potential for construction of roadways, trails, or small buildings or for development of camping, picnicking, playground areas or lawns. Maintaining these areas, specifically those on very steep terrain, in a forested condition, should help to minimize erosion potential. Some soils indicated with limited development potential may be suitable for lower and/or higher intensity recreation use such as hiking trails, picnicking, camping, and playgrounds. Based on the soil data, the locations for limited project development are in locations with soil types Cg/Ch, GpC/GpE or MgB. Based on Figure 3-7, these soil associations are relatively sparse within the Project area, with the largest concentrations of these areas occurring along the Guyandotte River and its tributaries. A concern with development on these soils is frequent flooding. In general, the majority of the

Project area is comprised of soils with very limited development potential due to steepness of slopes and erosion potential.

To more thoroughly evaluate Project development potential, soil suitability, topography (steepness of slope), inundation frequency, and access should all be considered together with environmental factors. It should also be noted that although less than 2 percent of the Project area soils are classified as prime or unique soils for farmlands, the potential utilization of these areas for open fields or meadow habitat could be considered for diversification of habitat and wildlife, thereby providing the capability to support recreation activities such as hunting and wildlife viewing.

### ***Minerals***

It is anticipated that favorable market conditions for demand of energy including coal, oil, and gas will continue in the future resulting in the potential of new extraction operations for minerals within the Project. Coal, oil and gas are leasable minerals governed by the Mineral Leasing Acts of 1920 and 1947. There are significant mineral resources at the Project area; however, the government does not own all of the mineral rights for Project lands. To lease minerals where the government owns all mineral rights on the Project, an expression of interest must be submitted by private interest to the Bureau of Land Management (BLM) and a NEPA evaluation with the USACE as a cooperating agency must be performed. Based on the evaluation, the USACE either gives consent to proceed or does not give consent. If the USACE gives consent, all restrictions are incorporated into the lease which is generally for 10 years.

Where the government does not own the mineral rights, the USACE must allow access to minerals. There are substantial Project lands for which the government does not own all or some of the mineral rights. Many of the recreation areas are located on or in close proximity to the Project lands for which the government does not own the mineral rights. In locations where the government does not own all minerals, estate acquisition documents must be reviewed on an individual basis to understand the rights of private mineral ownership and government rights. R.D. Bailey is also unique in the fact that a MOU exists regarding private mineral ownership rights and government rights. Both documents must be fully reviewed to understand mineral development issues.



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Potential impacts of mining activities include the direct footprint of the mineral extraction site, as well as construction and operation of access roads to the extraction site. Extraction of minerals within the Project boundary could infringe on general recreation areas or on fish and wildlife-related recreation either directly or from pollutants from extraction operations. The USACE has limited control on mineral extraction operations at the Project, specifically on lands for which the government does not own the minerals. Requirements for access roads are primarily the responsibility of the state; however the USACE can comment on access roads.

Based on the USACE's limited control of mineral extraction operations on Project lands where the government does not own the mineral rights, there is concern about potential impacts to recreation, cultural, and natural resources at the Project. Implications on Project development may include limiting and/or avoiding development on Project lands for which the government does not own all minerals. However, over time the USACE has taken a more proactive approach based on lessons learned and prior experience. Some methods utilized to avoid and minimize impacts include:

- Working closer with and open communication with mineral extraction companies;
- Project resource managers and rangers holding pre-construction meeting in the field to review access options; and
- Working with logging companies who typically construct access roads to mark areas for access, have foresters tag merchantable timber, and designate staging areas for merchantable timber.

### **3.1.6 Prehistoric and Historic Resources**

A historic property, as defined by the Advisory Council on Historic Preservation, is a prehistoric or historic district, site, building, structure, or object included in or eligible for inclusion in the National Register of Historic Places (NRHP). A historic property includes artifacts, records, and remains that are related to and located within these National Register properties.

#### **3.1.6.1 Existing Conditions**

A Historic Properties Management Plan (HPMP) was completed for the Project area in 1994. The HPMP provides a summary of six archeological sites that have been identified within the reservoir between 1971 and 1994. Sites were mainly identified through surveys completed for the USACE as part of the initial reservoir studies. Previous surveys are mainly limited to salvage excavations and account for a very small percentage of the reservoir. Identified sites are

all prehistoric with dates ranging from the Early Archaic (4000- 1000 B.C.) through the Late Prehistoric (A.D. 1000-1750) temporal periods.

The Project area has been evaluated on a very limited basis. In 1971, the WVGES examined areas that were to be impacted by reservoir construction and subsequent road and railroad relocations. This survey identified five prehistoric sites within the Project area. The sites include one petroglyph (46Wm15), two rock shelters (46Wm7 and 46Wm14), and two campsites (46Wm13 and 46Wm20).

In 1973, the five sites were subject to salvage excavations. It was determined that Site 46Wm14 had been destroyed and Site 46Wm15 did not require further study. Fieldwork at Site 46Wm7 resulted in the excavation of twelve cultural features and the recovery of numerous lithic materials, including projectile points and ceramics. Fieldwork at Sites 46Wm13 and 46Wm20 resulted in very limited cultural materials. The 1973 salvage excavations recommended no further work for any of the five recorded sites. None of the sites are considered eligible for the NRHP.

Only two additional known surveys have been conducted within the Project area since 1973. The first survey is a 2008 bridge replacement survey. This survey did not encounter any cultural resources aside from the bridge, which has since been replaced. The second survey is a 2010 USACE survey of proposed upgrades at the Reedy Creek and Locust Branch Campsites within the Guyandotte Campground. This survey encompassed the entire campsite boundaries and did not encounter cultural resources.

The only additional cultural resources that have been identified within the Project area are three grist mills. One is located at David Branch and two at Clear Fork. All three were included in the 1989 Master Plan, but none have been evaluated.

### **3.1.6.2 Implications of Prehistoric and Historic Resources for Project Development**

The Project area has been subjected to very limited study. Site distribution tendencies have not been ascertained. It is assumed that since the Project area is an upland reservoir with comparatively narrow floodplains, and steeply sloping terrain, that few NRHP eligible sites would be expected. Sites should be limited to rock shelter occupations, small camp sites, and possibly small mounds.

Proposed development actions in areas not previously surveyed will require coordination with the District archeologist to determine if a cultural resource survey is required. The District is

currently unsure of the number and boundary limits of previously evaluated real estate actions that have been cleared at the District level (i.e. pipelines, etc.). These smaller projects need to be catalogued and mapped to ensure areas are not subject to repeated surveys. In the absence of mapping, coordination with the District archeologist will ensure that real estate actions are not subject to unnecessary resurveying. Cultural resource research, evaluation, and reporting must comply with all applicable federal laws and regulations.

### **3.1.7 Scenic Qualities**

Scenic qualities refer to the quality of the environment as perceived through visual senses.

#### **3.1.7.1 Existing Conditions**

As described previously, the topography of the Project area is characterized by hilly and mountainous terrain dissected by steep V-shaped valleys. This, in combination with the lake and forested landscape, create an overall scenic environment with opportunities for scenic vistas and viewsheds. View distances range from relatively confined views to panoramic views that fade out of sight. The forests have a combination of mature growth trees and understory trees (such as redbud and dogwood), creating a visually appealing environment. The vegetation of the Project offers changes in color, texture, and size that vary by topography, vegetation type, and season. Fall foliage forms a colored collage which is pleasing to sightseeing. River birch, willow, and sycamore trees flourish in lowlands adjacent to streams and the lake, providing an attractive contrast in color to that of the vegetation on adjacent slopes, ridges, and ravines such as white oak, Virginia pine, red oak, hemlock, and hickory trees.

The R.D. Bailey Lake Project affords excellent views of the lake at the Visitor Center and the Long Branch Overlook. The shorelines on both banks of the Guyandotte River can rise abruptly with gradients of 8 percent to vertical and are very rugged, in some cases with exposed rock vertical cliffs. With a shoreline of about 16 miles and the nature of the terrain, there are panoramic views of the lake from various locations throughout the park.

The Visitor Center and Dam Overlook area is 200-feet above the crest of the dam. It provides a 155-degree panoramic view of the tailwater area, the dam and intake structure, spillway, and lake. The Visitor Center has a deck that overlooks the dam and lake. Photograph 3-2 illustrates the panoramic view from the Visitor Center.



**Photograph 3-2: View from Visitor Center**

### **3.1.7.2 Implications of Scenic Qualities for Project Development**

The Project area has significant scenic qualities, including scenic overlooks, quality vegetation with good fall color, and interesting topographic features and rock formations. This provides scenic qualities for sightseeing throughout the Project, including scenic drives, and aesthetically pleasing recreation areas along with the designated scenic overlooks. However, enjoyment of the scenic qualities can be limited because of accessibility and obstruction of the views by vegetation. Constraints to developing additional viewsheds include topography, soils condition, and vegetation, all of which must be evaluated prior to creating opportunities for additional scenic vistas.

## **3.2 Biological Environment**

The biological environment section provides a summary of the biological features of the Project area and planning constraints. The biological environment includes vegetation, terrestrial wildlife, aquatic resources, threatened and endangered species that may inhabit the Project, and critical and sensitive wildlife habitat.

### **3.2.1 Vegetation**

The types of plants and the percentage of coverage in the Project area are discussed.

#### **3.2.1.1 Existing Conditions**

West Virginia is mostly rural and vastly forested. In fact, according to the West Virginia Division of Forestry, West Virginia is 76 percent forested, or 12 million acres of forests. The majority of the timber, approximately 98 percent, is classified as commercial or merchantable timber. The yellow-poplar (*Liriodendron tulipifera*) and the white oak (*Quercus alba*) are the most prevalent species in the state.

About 90 percent of the Project area is forested (NatureServe, 2007). Land cover in the R.D. Bailey Lake Project area (See Figure 3-9) includes forest, grasslands, herbaceous vegetation, and

open water. Table 3-5 identifies land cover types within the R.D. Bailey Lake project site, their acreage, and the percentage of the project area they encompass. Variation in topography also contributes to the diverse forest ecosystems in southwest WV.

**Table 3-5: Land Cover in the R.D. Bailey Lake Project**

<b>Land Cover</b>	<b>Percent of Project Area</b>
Allegheny-Cumberland Dry Oak Forest and Woodland	85.8%
South-Central Interior Mesophytic Forest	3.7%
Open Water	3.4%
Successional Shrub/Scrub	2.5%
Developed open space	2.4%
Developed other (High, Medium, and Low Intensity)	1.2%
Southern and Central Appalachian Cove Forest	0.3%
Appalachian (Hemlock)-Northern Hardwood Forest	0.2%
South-Central Interior Small Stream and Riparian	0.2%
Pasture/Hay	0.2%
Cultivated Crops	0.1%
Cumberland Acidic Cliff and Rockhouse	0.1%
Southern Appalachian Montane Pine Forest and Woodland	0.1%

Source: NatureServe, 2007

The following is a description of the most dominant land cover types.

Allegheny-Cumberland Dry Oak Forests and Pine Woodlands are typically dominated by white oak (*Quercus alba*), southern red oak (*Quercus falcata*), chestnut oak (*Quercus prinus*), and scarlet oak (*Quercus coccinea*), with lesser amounts of red maple (*Acer rubrum*), pignut hickory (*Carya glabra*), and mockernut hickory (*Carya alba*). Small stands of shortleaf pine (*Pinus echinata*) or Virginia pine (*Pinus virginiana*) may occur, particularly adjacent to escarpments or following fire. In the absence of fire, eastern white pine (*Pinus strobus*) may be prominent, occurring in a variety of situations, including on nutrient-poor or acidic soils (NatureServe, 2007).

South-Central Interior Mesophytic Forests are highly diverse and predominantly deciduous. They occur on deep and enriched soils enhanced by the presence of limestone or related base-rich geology, in non-mountainous settings, and usually in somewhat protected landscape positions such as coves or lower slopes. Dominant species include sugar maple (*Acer saccharum*), American beech (*Fagus grandifolia*), yellow poplar (*Liriodendron tulipifera*), American basswood (*Tilia americana*), red oak (*Quercus rubra*), cucumber tree (*Magnolia acuminata*), and black walnut (*Juglans nigra*). Eastern hemlock (*Tsuga canadensis*) may be present in some stands. Trees may grow very large in undisturbed areas and many examples of this type of forest are bisected by small streams (NatureServe, 2007).

Successional Shrub/Scrub and Pasture/Hay are characterized by laurels (*Lauraceae*), rhododendrons (*Rhododendron* spp.), blueberries and huckleberries (*Vaccinium*), pin cherry (*Prunus pensylvanica*), and heath (*Erica*, *Cassiope*, *Daboecia*, *Calluna vulgaris*, etc). The reverting fields are characterized by blackberries (*Rubus*), hawthorn (*Crataegus*), sumacs (*Rhus*), greenbrier (*Smilax*), and various seedling trees. Pasture classification includes pastureland, hayfields, fields, abandoned farms, and other herbaceous land cover (United States Department of Interior [USDOI] and United States Geologic Survey [USGS], 2002).

The Grassy Lick timber stand just east of the Leatherwood Creek is comprised of approximately 150 acres. There is some correspondence and a timber cruise that was conducted in the 1970s that suggests a relatively old stand of mature timber with no evidence of harvesting; however, it has not been positively proven the stand is ‘old growth’ timber. The stand is definitely a unique feature and all efforts should be made to protect the area from any type of development or activity.

No known timber management activities have taken place at the R.D. Bailey Lake Project site since the WVDNR took over management of the area. WVDNR is currently considering instituting some timber management initiatives for wildlife management purposes. This management would involve the removal of some timber to introduce diversity of habitats and successional areas for wildlife use. However, at this time no definitive plan has yet to be developed. Key initiatives of WVDNR include oak regeneration and creating diversity.

### ***Invasive Plant Species***

As with any comprehensive forestry management approach, a primary goal is to manage the forest to yield a healthy sustainable forest. A key issue is controlling invasive species. Invasive species are problematic because they compete with native flora and fauna for the same resources. By definition, invasive species are species that are foreign to a particular region that out-compete native species for the same resources. If these species are not monitored and managed, they may affect the native ecology. Often the undesirable species can be managed chemically, mechanically, and/or physically.

In West Virginia, 28 percent, or 633 species, of vascular plants outside of cultivation are non-native. Often, non-native plants are introduced into environments disturbed by human activities, such as road and trail building, timbering, mining, and other activities that disturb the soil or change the amount of moisture and sunlight the ground receives. Typically, these invasive

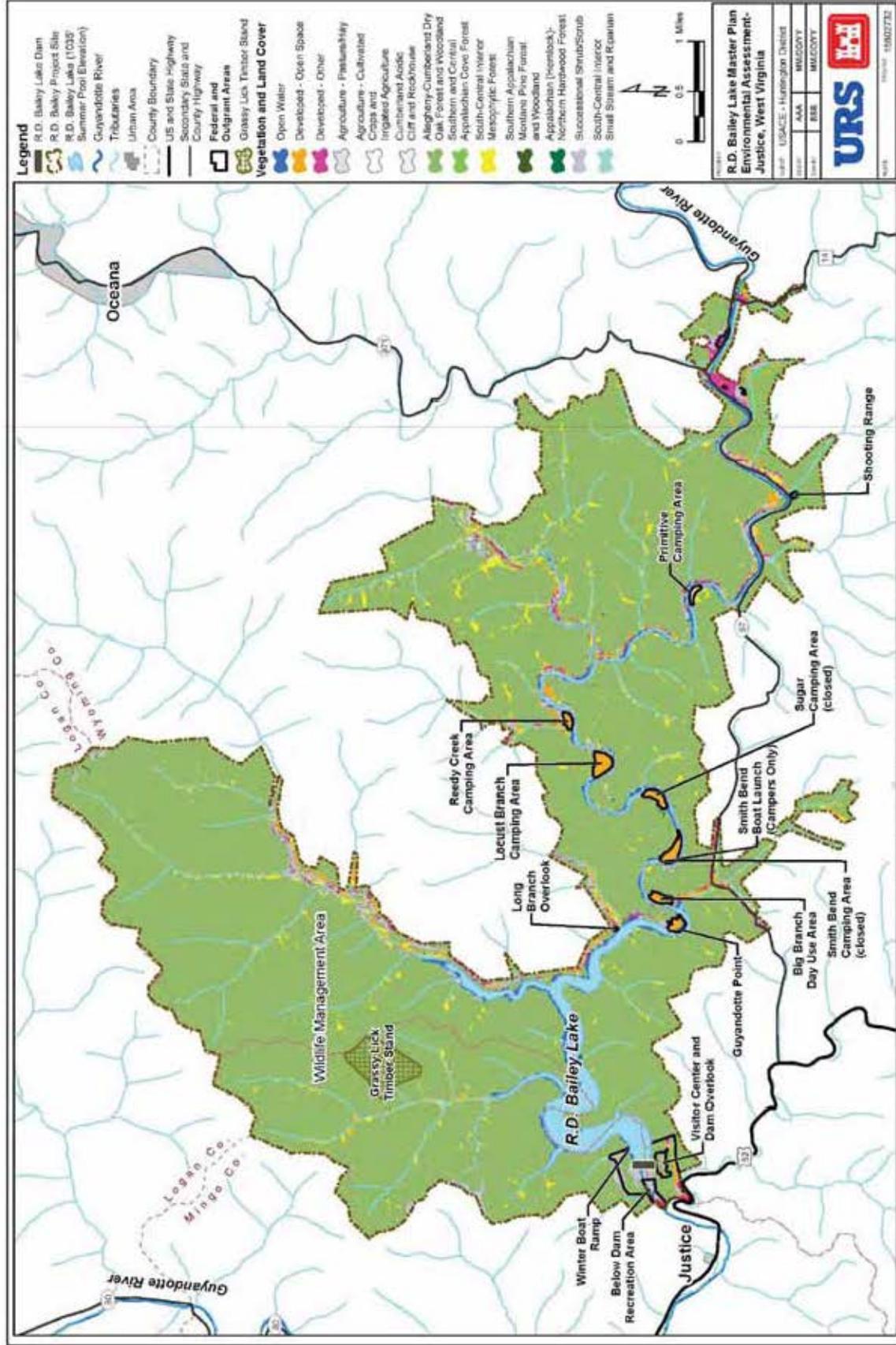


Figure 3-9: Vegetation and Land Cover

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species dominate the edge of the disturbed area and quickly reproduce and multiply to inhibit the growth of the native species (Virginia's Department of Conservation and Recreation, 1998).

WVDNR sampled vegetation plots in the R.D. Bailey WMA and documented the following invasive species: Japanese stiltgrass (*Microstegium vimineum*), Morrow's honeysuckle (*Lonicera morrowii*), Tall fescue (*Lolium arundinaceum*), Small carpgrass (*Arthraxon hispidus*), Ground Ivy (*Glechoma hederacea*), Common velvet grass (*Holcus lanatus*), and Tall buttercup (*Ranunculus acris*) (WVDNR, 2010). Four of these species have been identified on the West Virginia's "worst of the worst" invasive plants. These include the Japanese stilt grass (*Microstegium vimineum*), Morrow's honeysuckle (*Lonicera morrowii*), Tall fescue (*Lolium arundinaceum*), and Small carpgrass (*Arthraxon hispidus*) (WVDNR, 2010).

These four "worst of the worse" invasive species are described below. Data for these invasive plant species was gathered from Virginia's Department of Conservation and Recreation and the USDA Plant Materials Program.

Japanese stiltgrass, also known as eulalia or Nepalese browntop, is an annual grass that forms sprawling, dense mats. The reclining stems can grow up to 40-inches long and may root at the stem nodes. The lime green leaves taper at both ends and can grow between 4 and 5 inches in length and one-half-inch wide. In late summer, slender stalks of tiny flowers are produced followed by dry fruits called achenes. Japanese stiltgrass is accustomed to low light conditions, which threaten native species in open to shady and moist to dry locations. Japanese stiltgrass can be found in various habitats, including floodplain forests, wetlands, uplands, fields, thickets, paths, clearings, roadsides, ditches, utility corridors, and gardens. White-tail deer facilitate the growth of this plant by feeding on the native plant species, and avoiding the Japanese stiltgrass. A variety of control methods are available for stiltgrass. Methods are selected based on extent of infestation, type of habitat, and availability of labor and other resources (Plant Conservation Alliance, 2008 and Virginia's Department of Conservation and Recreation, 1997).

Morrow's honeysuckle is an upright, deciduous shrub that ranges from 6 to 15 feet in height. The leaves are somewhat oval and grow to 1 to 2.5 inches long. Pairs of fragrant, tubular flowers less than 1-inch long are borne along the stem in the leaf axils. Morrow's honeysuckle is fairly shade-intolerant and can typically be found at the forest edge, in abandoned fields, in pastures, along roadsides, and in other open, upland habitats. Morrow's honeysuckle is able to invade bogs, fens, lakeshores, sand plains, and various other uncommon habitats.

Morrow's honeysuckle is capable of rapidly invading an area, forming a dense shrub layer that crowds and shades native plant species. It also compensates for changing light conditions by depleting soil of moisture and nutrients. Control methods should be initiated prior to seed dispersal, late summer through early fall, to minimize reinvasion of treated habitats (USDA, accessed March 2010).

Tall fescue is a coarse perennial grass that grows in dense clumps with short creeping rootstocks, which form thick mats. The flowering stems can reach up to 5 feet. The leaf blades grow low on the stem and vary from 4 to 24 inches in length. Leaf surfaces are smooth on the underside and rough on the upper side. Tall fescue is adapted to cool and humid climates and to most soils with a pH of 5.5 to 7.0. Although tall fescue will grow fairly well on soils low in fertility, it is better adapted to fertile conditions. Tall fescue will produce top growth when soils are as cold as 40 degrees Fahrenheit and it continues growth into late fall in the south.

A variety of control methods are available for tall fescue. Mechanical (hand pulling or mowing) are deemed useless because of the thick root system and re-sprouting qualities. The most effective method of control is burning early in the growing season in conjunction with the use of spot-applied glyphosate herbicide (Virginia's Department of Conservation and Recreation, 1999).

Small carpgrass, or jointhead grass, is a low-growing, creeping annual grass that can grow to a height of 1.5 feet. The ovate leaf blades are 0.75 to 2.75 inches in length and 0.2 to 0.6 inches in width. Flowers appear from September to October. Small carpgrass can be found in sunny, moist habitats, typically in moist pastures and fields, shaded upland woods, floodplain forests, stream banks, along shorelines, and roads and trails that remain moist. A variety of control methods are available for small carpgrass including hand pulling or mowing before seed production, use of herbicides approved for wetlands, and biological control (USDA, accessed March 2010).

### **3.2.1.2 Implications of Vegetative Resources for Project Development**

Vegetative resources have capabilities to enhance and support project development and recreational opportunities at the Project. The forests and vegetated areas enhance the scenic quality of the overall Project area as well as the camping and picnicking experience for visitors by providing a quality, aesthetically pleasing natural setting and landscape buffer. The forest and associated open fields provide habitat for a variety of wildlife, affording opportunities for wildlife viewing and eco-tourism. The forest also provides suitable habitat for target game

species including deer and wild turkey. Areas of forest where the canopy is dense and unbroken provide a rapidly diminishing resource that attracts a number of neo-tropical birds, some of which are in decline. Neo-tropical birds such as the Baltimore oriole (*Icterus galbula*), the tangers (*Piranga* spp.), the purple martin (*Progne subis*), and wood thrush (*Hylocichla mustelina*) are a few neo-tropical migrant birds that nest and breed in the area. During the summer, over 50 percent of the breeding birds in West Virginia are neo-tropicals. Conservation in areas like this Project area provides for the added capacity to attract birdwatchers, thereby enhancing the possibility for eco-tourism at the Project area.

Tree roots also slow storm water runoff providing erosion control capabilities, especially on areas with steep slopes surrounding the lake and tributaries; and this in turn helps to maintain the quality and clarity of the water in the streams and lake. Better water quality provides a more suitable resource for swimming, water skiing, boating, and fishing.

The Project has significant timber resources with nearly 90 percent of the project area forested. As a management consideration, systematic harvesting of timber could yield a more balanced forest in terms of desirable habitat to support target game and non-game species, as well as diversity of wildlife.

Bottomland hardwood habitats are becoming more scarce, and consequently more valuable. Loss of this valuable habitat continues due to changes in land use and an increase in development. It is USACE policy to protect bottomland hardwoods because these forest systems support a variety of plant and animal species that can adapt to both flood conditions and dry periods and support wildlife that does not thrive in other environments. Prudent management of these areas should yield a high quality habitat for wildlife that is also beneficial for many recreation activities, including hunting and wildlife viewing. At the project site, bottomland hardwood habitat appears to be very limited, occurring in a few small pockets adjacent to the waterways. Most of the potential habitat area, for example, along Cub Creek and Leatherwood Creek, has been cleared and are currently open fields.

The Project features a relatively small amount of open areas, such as meadows and clearings. Both open areas and more densely vegetated areas are needed to provide adequate habitat for more and diverse wildlife species. Proactive management of these two differing ecological structures should strive for a balance that is essential in successfully managing the Project's forest resources for wildlife and recreational usage.

As previously discussed, exotic and invasive plant species are a part of the existing ecosystem in the Project area. These plants have the ability to rapidly distort and dominate the landscape if not aggressively managed, dominating the competition with the native species for space, water, and sunlight. Through time, the native plant species will be replaced and the ecology altered. Additionally, the interdependence and connectivity between the flora and fauna will be out of balance, and the fauna will move to find the native vegetative resource required for preferred food, shelter, or habitat structure. Typically, once the habitat structure and the vegetative composition of an area changes and the fauna seek out alternative niches, it becomes increasingly difficult to reintroduce these species back into previously inhabited areas. The consequences of such changes in habitat structure and floral and faunal composition result in negative impacts for recreational opportunities.

### **3.2.2 Terrestrial Wildlife**

Terrestrial wildlife is defined as the animals that are found on land and in the air and includes amphibians, birds, mammals and reptiles.

#### **3.2.2.1 Existing Conditions**

The R.D. Bailey Wildlife Management Area (WMA) provides habitat for a variety of upland wildlife species. The land immediately surrounding R.D. Bailey Lake is primarily forested. Common wildlife species that are found in the forested habitats typical of the Project area include a variety of reptiles and amphibians; small woodland mammal species such as mice, shrews, eastern chipmunk (*Tamias striatus*), eastern cottontail (*Sylvilagus floridanus*), striped skunk (*Mephitis mephitis*), Virginia opossum (*Didelphis virginiana*), woodchuck (*Marmota monax*), beaver (*Castor canadensis*), raccoon (*Procyon lotor*), mink (*Neovison vison*), muskrat (*Ondatra zibethicus*), otter (*Lontra Canadensis*), various bat species, gray fox (*Urocyon cinereoargenteus*) and red fox (*Vulpes vulpes*); and larger game species including white-tailed deer (*Odocoileus virginianus*) and black bear (*Ursus americanus*).

A great variety of birds utilize the Project area. Commonly observed birds include ruffed grouse (*Bonasa umbellus*), blue jay (*Cyanocitta cristata*), hairy woodpecker (*Picoides villosus*), common crow (*Corvus brachyrhynchos*), wild turkey (*Meleagris gallopavo*), ovenbird (*Seiurus aurocapillus*), red-bellied woodpecker (*Melanerpes carolinus*), white-breasted nuthatch (*Sitta carolinensis*), tufted titmouse (*Baeolophus bicolor*), Carolina chickadee (*Poecile carolinensis*), eastern phoebe (*Sayornis phoebe*), eastern wood-pewee (*Contopus virens*), Acadian flycatcher (*Empidonax virens*), and numerous species of warbler, vireo, and other songbirds. A number of raptors are also known to occur in the project vicinity, including red-tail hawks (*Buteo*

*jamaicensis*), red-shouldered hawks (*Buteo lineatus*), broad-winged hawks (*Buteo platypterus*), barred owl (*Strix varia*), and great horned owl (*Bubo virginianus*). Neo-tropical birds such as the oriole (*Icterus galbula*), the tangers (*Piranga* spp.), the purple martin (*Progne subis*), and the wood thrush (*Hylocichla mustelina*) are common visitors during the breeding season.

The riparian zone is the area of land and water interface and is critical to a healthy ecosystem. This vegetative area provides cover for many species, and also allows for quick access to the water resource. The riparian area provides ideal habitat for fur-bearing mammals, such as mink (*Mustela vison*), muskrat (*Ondatra zibethicus*), and beaver (*Castor canadensis*), as well as resident and migratory waterfowl. Riparian areas also provide potential breeding habitat for the northern dusky salamander (*Desmognathus fuscus fuscus*) and the northern slimy salamander (*Plethodon glutinosus*), as well as other amphibian and reptile species such as box turtles (*Terrapene carolina carolina*), fence lizards, frogs, and several species of snake. These species of snake include copperheads (*Agkistrodon contortrix mokasen*), timber rattlesnakes (*Crotalus adamanteus*), eastern ribbon snakes (*Thamnophis sauritus sauritus*), eastern hognose snake (*Heterodon platirhinos*), northern ringneck snake (*Diadophis punctatus edwardsii*), and black rat snakes (*Elaphe obsoleta obsoleta*) (Kleinschmidt, 2008; WVDNR, 2005; and WV Department of Commerce, accessed June 2010).

The region surrounding the Project area has the highest potential for diverse wildlife habitat for numerous reasons including: (1) lower human densities; (2) limited road systems; (3) lower amount of acreage in agricultural crops; and (4) habitat suitability based on West Virginia GAP land cover analysis. The lack of open areas was identified as the primary limiting habitat factor, particularly related to elk restoration.

### **3.2.2.2 Implications of Terrestrial Wildlife for Project Development**

Terrestrial wildlife resources support both consumptive and non-consumptive recreational activities at the Project. White-tailed deer and wild turkey are popular game species, but doves, waterfowl, and various small game species also provide opportunities for hunters at the Project.

Non-consumptive recreational activities which could be supported by terrestrial wildlife at the Project include wildlife viewing and birding (neo-tropicals and year-round species). Terrestrial wildlife also provides potential opportunities for eco-tourism. To maximize Project development potential, resources should be managed with diversity as a key objective.

The WVDNR is in the process of developing habitat management techniques to implement at the Project to improve and foster wildlife habitat. These include timber management to create varied habitat types in order to promote a greater diversity of vegetation types in the area.

Elk restoration throughout the eastern United States, including WV, has been in development since the 1970's. In 2005, the WVDNR performed a Biological Assessment to evaluate elk habitat suitability in WV. Three large core regions were identified including the Monongahela Region, the Ohio Hills region, and the Southern Coal Fields region which includes the Project area. The southern Coal Fields region was selected for the Elk Management Area. Counties in the region are heavily forested; however, open grassland habitat is the limiting cover type. The final report also noted that the close proximity of Kentucky's elk restoration area made this region a viable consideration. Key impacts to development associated with the Elk Management Program will include development of open grassland habitat at the Project.

### 3.2.3 Aquatic Resources

Aquatic resources refer to the animal life in surface waters including streams, wetlands, and the lake.

#### 3.2.3.1 Existing Conditions

Damming the Guyandotte River at R.D. Bailey created changes to the aquatic ecology of the river. Species went from living in lotic (moving) water to lentic (still) water. The Guyandotte River and R.D. Bailey Lake support an extensive warm-water fishery. Native species found in the lake are listed in Table 3-6.

**Table 3-6: Native and Stocked Fish Species in R.D. Bailey Lake**

<b>Common Name</b>	<b>Scientific Name</b>
largemouth bass	<i>Micropterus salmoides</i>
smallmouth bass	<i>Micropterus dolomieu</i>
spotted bass	<i>Micropterus punctulatus</i>
crappie	<i>Pomoxis nigromaculatus</i>
channel catfish	<i>Ictalurus punctatus</i>
gizzard shad	<i>Dorosoma cepedianum</i>
bluegill	<i>Lepomis macrochirus</i>
redbreast sunfish	<i>Lepomis auritus</i>
redeer sunfish	<i>Lepomis microlophus</i>
hybrid striped bass	<i>Morone saxatilis</i>
walleye	<i>Stizostedion vitreum</i>

WVDNR, 2005

The WVDNR also stocks brown trout (*Salmo trutta*) and rainbow trout (*Oncorhynchus mykiss*) in the tailwaters below the dam (Kleinshmidt, 2008 and WVDNR, 2005).

Aquatic species, including fish, reptiles, amphibians, and other animals that rely on this resource, prefer a fairly stable pool level. Water resources are critical and are often a limiting factor for a healthy WMA. Studies conducted by the WVDNR Fisheries Department show a correlation between the pool stability and the success rate of black bass spawning. Most spawning occurs from mid to late April and extends through June, with the exception of the walleye, bluegill, and channel catfish. Bluegill and channel catfish continue to spawn through July because they require warmer water.

The lake provides habitat for many species. There are submerged brush sites that provide habitat for spawning, foraging and cover for many aquatic species. The adjacent riparian habitats and shallow water areas provide additional spawning areas, as well as hunting areas for predator birds and other wildlife. Submerged brush piles and cover also provide places for fish to hide from predators. The natural physiology also provides for structure conducive to a healthy aquatic system. Existing structures like rocky bottoms, sandy bottoms, pooling areas, rock outcrops, and grassy areas all work together to provide habitat for aquatic life.

### **3.2.3.2 Implications of Aquatic Resources for Project Development**

Aquatic resources support recreational fishing at the Project, including both the lake and the tailwater area. These resources are generally healthy and can support a high level of recreational fishing pressure. As such, the aquatic resources are not considered a constraint, but an opportunity when planning for development activities.

### **3.2.4 Threatened and Endangered Species**

Threatened, endangered, and species of special concern are sensitive and protected biological resources, including plants and animals, that are listed for protection by the USFWS or the state of WV. Under the Federal Endangered Species Act of 1973 (16 U.S.C. §§ 1531-1544), an endangered species is defined as any species in danger of extinction throughout all or a significant portion of its range. A threatened species is defined as any species likely to become an endangered species in the foreseeable future.

#### **3.2.4.1 Existing Conditions**

USFWS maintains lists of rare plants and wildlife known to occur in each county of the United States. Because WV does not have State threatened and endangered species legislation, the

species listed as either threatened or endangered in the State are found on the USFWS list of federally threatened and endangered species. This list is based on historical site records and existing preferred habitats.

There are no known federally-protected species in Mingo and Wyoming Counties, although threatened and endangered species may occur in the Project area. Threatened or endangered species that may occur in the R.D. Bailey Lake Project area are shown in Table 3-7, along with their Federal and State status (USFWS, 2010b and WVDNR, 2007). The letter received from the WVDNR Wildlife Resources Section is included within Appendix D.

**Table 3-7: Listed Rare, Threatened and Endangered Species Potentially Occurring in Mingo and Wyoming Counties, WV**

<b>Taxonomic Group</b>	<b>Common Name</b>	<b>Scientific Name</b>	<b>Federal Status</b>	<b>State Status</b>
Freshwater Mussels	Fanshell	<i>Cyprogenia stegaria</i>	Endangered	Endangered
Birds	Peregrine Falcon	<i>Falco peregrinus</i>	Delisted	Rare
Birds	Bald Eagle	<i>Haliaeetus leucocephalus</i>	Delisted	Rare
Vascular Plants	Tubercled blossom	<i>Epioblasma torulosa torulosa</i>	Endangered	Believed extirpated
Mammals	Eastern Cougar	<i>Puma concolor cougar</i>	Endangered	Endangered
Mammals	Allegheny Woodrat	<i>Neotoma magister</i>	—	Concern
Mammals	Southern Bog Lemming	<i>Synaptomys cooperi</i>	—	Rare
Mammals	Golden Mouse	<i>Ochrotomys nuttalli</i>	—	Rare
Mammals	Indiana Bat	<i>Myotis sodalis</i>	Endangered	Endangered

Source: USFWS, Threatened and Endangered Species in West Virginia, 2010.

The fanshell mussel (*Cryptogenic stegaria*), the Eastern Cougar (*Puma concolor cougar*), and the Indiana bat (*Myotis sodalist*) are federally listed as endangered and have the potential to inhabit the Project area. The three species are discussed below:

The fanshell mussel is a freshwater mussel that is found in medium to large streams and rivers with moderate to strong current, in coarse sand and gravel, and at a depth ranging from shallow to deep. The fanshell mussel is rounded, with numerous pustules, elevated growth lines, and broken green rays (NatureServe, 2009). The fanshell mussel has been found in the Kanawha River and Ohio River, but has not been confirmed in the Project Area (WVDNR, accessed 2010).

Eastern Cougar are presumed extinct in the wild, but remain protected. The eastern cougars' primary prey was white-tail deer, porcupines, and other small animals. With no enemies, humans hunted and trapped the eastern cougar and their habitat was eliminated through deforestation (USFWS, 2010b).

The Indiana bat is a mammal that is found in the eastern United States, from Oklahoma to New Hampshire to northern Florida (USFWS, 2010b). The species hibernates in caves, with the most important hibernating caves, including one cave in Pendleton County, well north of the project area. There are no known potential caves in close proximity to R.D. Bailey Lake (WVDNR, accessed 2010).

The State of WV, under the WV Natural Heritage Program and Global Ranks by NatureServe, identifies rare species. Rare species are defined by the WVDNR as “species at the edge of their global ranges, species that appear to be declining on a regional basis, and species that require unique habitats, such as shale barrens, wetlands, or high-elevation spruce forests. Due to changes in global and state rarity, the rare, threatened, and endangered species lists are dynamic.” Three rare species have been recorded as potentially occurring in the two-county area and include three small mammal species: the southern bog lemming (*Synaptomys cooperi*), the golden mouse (*Ochrotomys nuttalli*), and the Allegheny woodrat (*Neotoma magister*). These mammals are briefly described below.

The southern bog lemming is a small, grey-brown North American lemming. These lemmings are found in mixed forests, wetlands, and grasslands. Their diet includes grasses, fungi, mosses, and other green vegetation. They are nocturnal and are active year round.

The golden mouse is golden-brownish in color and 5 to 8 inches long. The golden mouse lives in woodlands, swampy areas, and within small trees and shrubs. It eats mostly seeds and acorns. They are nocturnal and are active year round.

The Allegheny woodrat is a brownish-gray, medium-sized rodent with a long, hairy tail. An adult woodrat weighs approximately 1 pound and is 15 to 19 inches in length from the end of its nose to the tip of its tail. Allegheny woodrats live almost exclusively in rocky areas, such as caves, deep crevices, and large boulder fields. Most woodrat dwellings are located in or around hardwood forests that have an abundance of oaks and other mast-bearing trees. Woodrats are primarily nocturnal. They rely almost exclusively on plant materials for their food (WVDNR, accessed 2010).

### **3.2.4.2 Implications of Threatened and Endangered Species on Project Development**

As no federally listed threatened or endangered species have been identified as living or hibernating within the Project area, threatened or endangered species should not limit development of recreational activities at the Project. Nevertheless, habitat for these species should be preserved. One state listed species, the bald eagle, has been identified in the Project area. Recognition and preservation of sensitive or critical habitat in the Project area for bald eagles may result in constraints as well as opportunities, when planning for development activities. The National Bald Eagle Management Guidelines (USFWS, 2007) notes that depending on the type of structure and visibility from the nest, new construction should be restricted within 330 to 660 feet from a nest. Timber operations (e.g., clear cutting, removal of overstory trees) should be avoided within 330 feet of a nest at any time and avoided within 660 feet of the nest during breeding season. For the following activities, no buffer is necessary around nests outside the breeding season and should be avoided with 330 feet of the nest during breeding season: (1) use of off-road vehicles, (2) use of motorized watercraft (including jet skis and personal watercraft), and (3) non-motorized recreation and human entry (e.g., hiking, camping, fishing, and hunting). Loud, intermittent noises such as blasting should be avoided within 0.5 mile of active nests.

### **3.2.5 Critical Habitat**

In Section 7 of the Endangered Species Act (16 U.S.C § 1536), critical habitat is defined as an area that is essential to the conservation of a species, although the area need not actually be occupied by the species when it is designated.

#### **3.2.5.1 Existing Conditions**

The loss of critical habitat is one of the most common problems facing threatened and endangered species. There is no designated critical habitat under section 7 of the Endangered Species Act present within the Project area. The Nature Conservancy of West Virginia (NCWV) has not identified any nature preserves in the R.D. Bailey Lake Project area (NCWV, 2010).

#### **3.2.5.2 Implications of Critical Habitat for Project Development**

As no critical habitat has been identified at the Project area, project development should not be impacted by this resource.

### **3.2.6 Environmentally Sensitive Areas**

Environmentally sensitive areas are typically areas that are designated as special status or protected by Federal or State statutes or legislation. Extremely rare or unique natural resource features may also be considered as potential environmentally sensitive areas.

#### **3.2.6.1 Existing Conditions**

Examples of environmentally sensitive areas include protected critical habitat, threatened and endangered species, Section 106 cultural resources, and wetlands.

Environmentally sensitive resources identified at the R.D. Bailey Lake Project include wetlands and Section 106 archeological and historic resources. Additionally, the USACE has maintained an approximately 150 acre stand of old growth timber in the Grassy Lick area of Leatherwood Creek. A previous timber survey was conducted in the 1970s on this stand.

The Project area contains these other unique species and habitats that could not be clearly located based on available data, but that may also be considered as sensitive environmental areas:

- Bottomland hardwood areas;
- The rapidly declining eastern hemlock stands found along shady riparian zones and their associated unique microenvironment; and
- Areas of forest where the canopy is dense and unbroken, which provide a rapidly diminishing resource and habitat for the cerulean warbler.

The precise locations of these unique habitats should be field identified and delineated and included in this data set in the future.

#### **3.2.6.2 Implications of Environmentally Sensitive Areas for Project Development**

Preservation of these areas and significant development restrictions may apply to these resources; however, they may provide interpretative, educational, or eco-tourism opportunities.

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## 4.0 RECREATION PROGRAM ANALYSIS

This section contains the results of an analysis of the recreation program at the Project. The intent of the analysis was to identify the current and future recreational demands that may affect the resources at the Project. Changes in population, preferences, and alternative recreational facilities may change the demand for the recreational activities in the region.

This section begins with the information that was used as a baseline for the analysis. Section 4.1 is an overview of the Project areas, Section 4.2 is a summary of the recreational activities currently available to visitors and the number of visitors, Section 4.3 defines the recreational area of influence, and Section 4.4 describes comparable activities that occur in the area of influence.

The results of the analysis are presented in the remainder of Section 4.0. The results consist of recreational trends (Section 4.5), potential recreational activities at the Project (Section 4.6), projected demand for recreational activities at the Project (Section 4.7), and the implications of the projected demand (Section 4.8).

### 4.1 Overview of the Project Areas

The Project comprises several areas that are managed by Federal, State, and local entities (see Figure 4-1). This section describes the primary areas, subareas, and existing amenities. The primary areas and the managing entities are listed in Table 4-1. Table 1-1 lists the acreages of each area and the major facilities and activities (not including R.D. Bailey Lake).

**Table 4-1: Primary Areas of the Project and the Managing Entities**

<b>Primary Area</b>	<b>Managing Entity</b>
Below Dam Recreation Area	USACE
Visitor Center and Dam Overlook Area	USACE
Long Branch Overlook	USACE
Big Branch Day Use Area	USACE
Guyandotte Point	USACE
Guyandotte Campground	USACE
Wildlife Management Area (WMA)	WVDNR
R.D. Bailey Lake	USACE
Education and Recreation Areas	Wyoming County Board of Education

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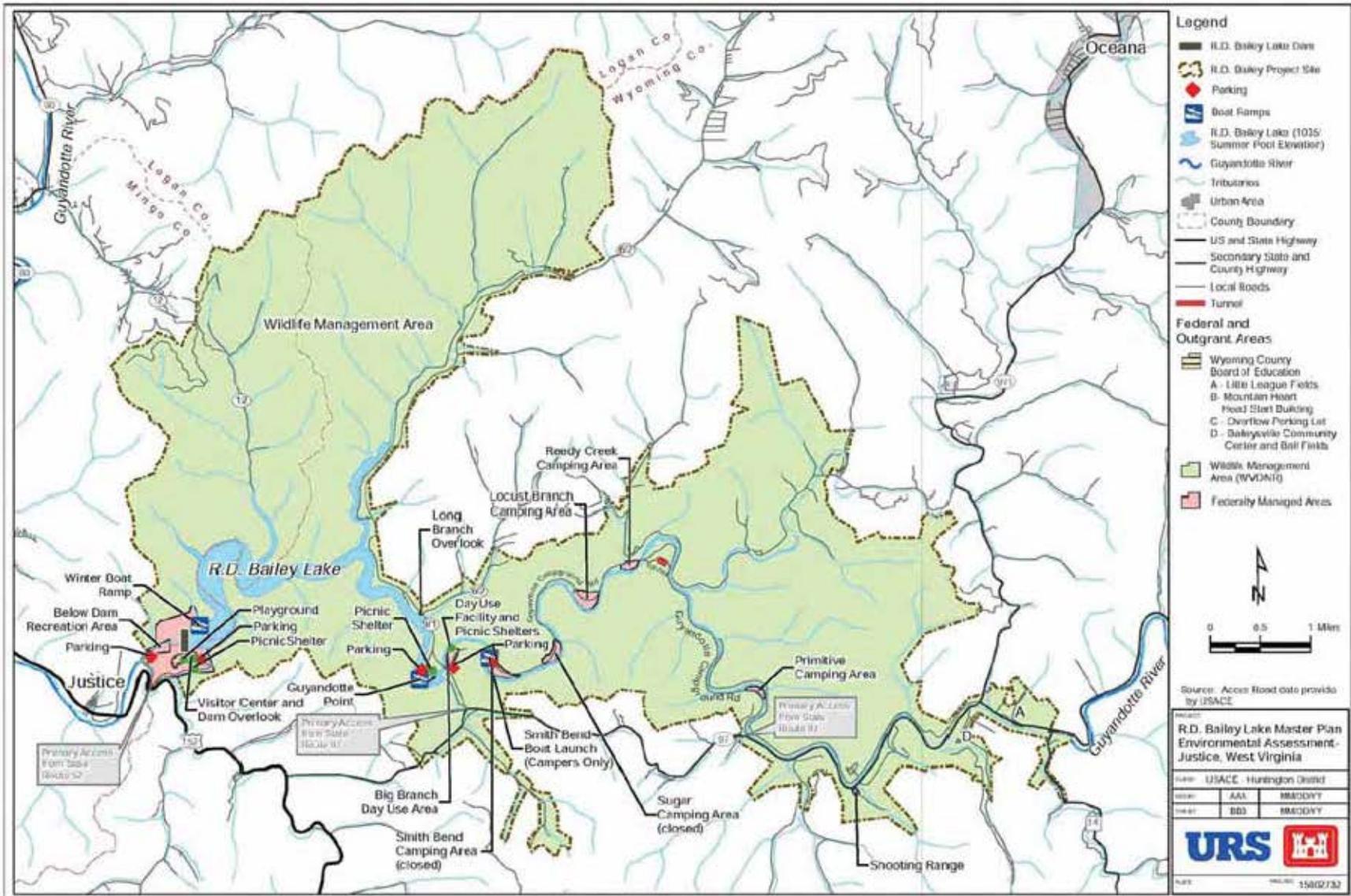


Figure 4-1: Existing Recreational Areas and Major Facilities

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#### **4.1.1 Below Dam Recreation Area**

The terrain of the Below Dam Recreation Area is gently sloping compared to the surrounding areas. On the far side of the dam, a large open recreation area with small trees provides a nice opportunity for viewing the dam and access to fishing platforms along the dam outlet. Locally, this area is known as the “spillway” and is a popular and well-maintained area of the Project. The Below Dam Recreation Area offers many opportunities for open recreation, hiking, fishing, and picnicking. The area is highly utilized during fish stocking periods, but with moderate use otherwise.

The amenities in the area that support these activities include an informational bulletin board, six 6-foot long wooden picnic tables; one 8-foot long accessible wooden picnic table; seven trash receptacles; three-foot wide sidewalks leading to both sides of the outlet water for fishing; three aluminum benches for fishermen; one accessible portable toilet; two small charcoal grills; and the Justice Hiking Trail. The Justice Trail begins in the Below Dam Area and follows an old railroad right-of-way for 0.5-miles downriver.

Parking at the Below Dam Area is a gravel lot that can accommodate approximately 40 passenger vehicles; 26 of the spaces are defined with wheel stops.



**Photograph 4-1: Below Dam Area/Spillway**



**Photograph 4-2: Below Dam Recreation Area and Parking**



**Photograph 4-3: Picnic Area**

The Below Dam Area also provides access to the winter boat ramp. This boat ramp is only open during the winter. The boat ramp is accessed via a one-mile long gravel road traversing the emergency spillway. The single-lane gravel road widens to 60 feet at the boat ramp area, which includes a single-lane concrete ramp with guard rails.

The winter boat ramp is one of the debris collection areas for the lake. Note the debris that has accumulated on the lake in this vicinity in Photograph 4-4. Large turning radii provide for ease of movement when hauling a trailer. There is one trash receptacle and parking for the area is limited and lacks signage. There are no defined spaces and the road leading to the ramp has a significant grade.



**Photograph 4-4: Winter Boat Ramp**

#### **4.1.2 Visitor Center and Dam Overlook Area**

The Visitor Center can be easily accessed from US Highway 52. Visitors travel through a small residential area before seeing the entry to the Visitor Center and Dam Overlook Area on the right. The entry drive leading to this area is quite steep; however, the drive is scenic and well maintained. The dam overlook area is located on an excavated site near the abutment of the dam.

The overlook area provides views downstream and upstream of the dam. Viewing scopes are provided to enhance visitors' views.

The Visitor Center provides public restrooms, exhibits, and the R.D. Bailey Lake Project offices. Inside the center, many exhibits can be found about R.D. Bailey (dam and lake namesake), the dam design and construction, and the local wildlife and attractions. The back deck of the Visitor Center is cantilevered over the slope leading down to the dam. It provides views of the dam and the lake and has two permanently mounted long distance viewing scopes for visitors' use.

A 35 car parking lot is available at the Visitor Center with two accessible spaces. The open area surrounding the Visitor Center has a water fountain; a picnic table on a concrete pad; a rock waterfall; an informational bulletin board; two aluminum benches; and three trash receptacles.



**Photograph 4-5: R.D. Bailey Visitor Center**

Picnic Shelter No. 3 is located across the parking lot from the Visitor Center. It is a wooden structure with a concrete base. It contains eight 6-foot long picnic tables; one water spigot; one small grill; one large grill; and two trash receptacles. There is no electricity provided to this structure, although water is available. The picnic shelter is adjacent to a viewing area and the Salt River Trail. The small picnic area adjacent to Picnic Shelter No. 3 contains one 8-foot long picnic table; one 6-foot long picnic table; and one set of horse shoe pits with back stops.

An accessible playground area is provided at the Visitor Center. The playground offers one large play structure, one small play structure, four spring mounted rides, one carousel, one back-hoe ride, slides, one swing set with two regular swings, two toddler swings, and one accessible swing. This area also has two vinyl covered benches and one trash receptacle.



**Photograph 4-6: Picnic Shelter No. 3 across from Visitor Center**

One hiking trail is also provided at the Visitor Center and Dam Overlook Area. The Salt River Trail is a two-mile trail that is gently sloping, clear, and well maintained. The path offers nice views of the surrounding cliff line and the lake below. The trail is well signed and begins near the Visitor Center. Overall, this area has moderate utilization and adequate parking. It is frequently used by local residents for photographs because of the scenic vistas.



**Photograph 4-7: Visitor Center and Dam Overlook Area Playground**

### 4.1.3 Long Branch Overlook

Long Branch Overlook, a small turn-out area, provides views of Guyandotte Point and R.D. Bailey Lake and is approximately one mile from the junction of Co 1 Mountain Road and State Route 91.



**Photograph 4-8: Long Branch Overlook**

### 4.1.4 Big Branch Day Use Area

Located off of County Road 9/1, the Big Branch Day Use Area offers many recreational opportunities. The area is well signed, easily accessible, and frequently used. The day use area provides a scenic setting along the Guyandotte River and is located near a tall railroad bridge.



**Photograph 4-9: Big Branch Day Use Area**

The day use area provides a 120-car parking lot with two accessible spaces, each equipped with an access ramp leading to a four-foot wide sidewalk. Within the picnic area are picnic shelters, restrooms, one drinking water fountain, grills, an informational bulletin board, and picnic tables. Three picnic shelters serve this area, although only one shelter can be reserved.

The picnic shelter that can be reserved (Picnic Shelter No. 1) is the largest of the three. The shelter has eight 6-foot long wooden picnic tables; one large charcoal grill; one small charcoal grill; and four trash receptacles. There are no lights provided to this facility; however, there is electricity and water.

The first small shelter has one 8-foot long permanently mounted wooden picnic table; one 6-foot long wooden picnic table; one small charcoal grill; and two trash receptacles. The second small shelter contains one 8-foot long wooden picnic table; one small charcoal grill; and one trash receptacle.



**Photograph 4-10: Picnic Shelter No. 1**

The playground was recently installed in early 2010 and includes one swing set with four regular swings and two toddler swings; three vinyl coated metal benches; a slide; a set of monkey bars; and four trash receptacles.

The open recreation areas can accommodate a large number of visitors and varying types of activities with the following amenities: three wooden benches situated along the river for passive viewing; twenty-one 6-foot long wooden picnic tables; 14 trash receptacles; two water fountains;

and 21 standing small charcoal grills to serve picnicking activities. Additional recreation activities at the day use area include three horse shoe pits, a basketball court with one goal, and a mulched volleyball court. Both the volleyball court and basketball court have one 6-foot long aluminum bench for spectators. A single dumpster is located between the two courts.

#### **4.1.5 Guyandotte Point**

Guyandotte Point, located on a park access road off of County Road 9/1 across from the Big Branch Day Use Area, has a three lane boat ramp for boat access to the lake. Guyandotte Point is well maintained, easily accessible, and provides views of the exposed rock face across the lake. Guyandotte Point is essentially divided into an upper and lower area based on the terrain and various activities. The lower area has restrooms, a three lane boat ramp, a small picnic shelter, one bench, four trash receptacles, 100 parking spaces for trucks/trailers (six are accessible), and 80 parking spaces for vehicles only (three are accessible). The upper area has a playground, picnic shelter, and associated parking.

The boat ramp area is designed with a three-lane ramp at the summer pool elevation of 1,035 feet NGVD. The ramp tapers down to a single lane at elevation 1,028 feet NGVD. This area is closed during winter pool due to siltation.



**Photograph 4-11: Guyandotte Point 3-lane Boat Ramp**

A small picnic shelter is located in the lower area of Guyandotte Point. This shelter has one charcoal grill, two 6-foot long wooden picnic tables, and one trash receptacle. The structure is convenient to the lower parking lot area and has nice views and a small open recreation area.

The Guyandotte Point restroom is centrally located near the main parking lot and is constructed of concrete block. The men's restroom has two toilets, three sinks, two urinals, one duplex receptacle and one trash receptacle. The women's restroom contains four toilets, three sinks, one duplex receptacle and two trash receptacles. On the outside of the facility there is one water fountain and one water spigot.



**Photograph 4-12: Guyandotte Point Boat Ramp and Restroom**

The upper area playground includes three spring mounted rides, one swing set, a slide, and three vinyl covered benches. Parking for this area is an asphalt parking lot containing 19 total parking spaces. A secondary parking lot serving the picnic shelter (Picnic Shelter No. 2) provides three well-siged accessible spaces. The picnic shelter can be reserved and has four 15-foot picnic tables, one large charcoal grill, two trash receptacles, electricity and water, and a boardwalk to an overlook area. Three additional six-foot picnic tables and one trash receptacle can be found adjacent to this picnic shelter. Overall, this area has moderate utilization on weekends and low utilization during the week.



**Photograph 4-13: Guyandotte Point Upper Area Picnic Shelter**

#### **4.1.6 Guyandotte Campground**

Although the area for camping is limited by the topography of the region, the camping areas are covered with mixed stands of red maple, hickory, sycamore, sour wood, hemlock, beech, river birch, dogwood, tulip poplar and red oak. Vertical sandstone cliffs up to 200 feet in height accentuate the rugged nature of the region. The R.D. Bailey Lake campsites are spread along a scenic six-mile stretch of the Guyandotte River.

Guyandotte Campground is well signed and easy to locate from SR 97. The campers encounter the gate house upon arrival at the camping area. When leaving the campground, campers drive through an old railroad tunnel.



**round**

The camping area is divided into five segments, but only three segments are currently open for use. Reedy Creek, Locust Branch, and the Primitive Campgrounds are the three areas open for use, while the Smith Bend and Sugar Camp Campgrounds are closed due to frequent flooding. There are no current plans to reopen these two campgrounds. Reedy Creek and Locust Branch camping areas have a total of 94 camp sites with 50-ampere electrical hookups and the Primitive Campground has 12 campsites for tent-only camping.



**4-15 Photograph: Tunnel near Guyandotte Campground**

#### **4.1.6.1 Reedy Creek Campground**

Reedy Creek is the first RV camping area. This area has 31 secluded camp sites situated along the river in a beautiful, natural setting. Each site has 50-, 30- and 20-ampere services and includes an asphalt parking pad, a six-foot wooden picnic table, and one fire ring/grill. Most of the sites are flat and easily accessible for RVs.

The Reedy Creek bath house is a concrete-block building with a shingle roof and includes a parking area for four vehicles, including one accessible space. There are two trash receptacles, one water fountain, and one water spigot on the exterior of the bath house. The men's bath house contains the following amenities: two showers, two toilets, one urinal, two sinks, one trash receptacle, and one electric hand dryer. The women's bath house contains the following amenities: two showers, three toilets, two sinks, one trash receptacle, two duplex receptacles, and one electric hand dryer.

Other amenities provided at the Reedy Creek campground include: an informational bulletin board; one horse shoe pit with back stops; one accessible play structure; one swing set with two regular swings, two toddler swings, and a slide; two vinyl coated metal benches; a single sanitary dump station; and one dumpster that serves both open camping areas.



**Photograph 4-16: RV Campsite**

#### **4.1.6.2 Locust Branch Campground**

Locust Branch is the second RV camp area. This area has 63 secluded campsites situated along the Guyandotte River. Each site has 50-, 30- and 20-ampere service and includes an asphalt parking pad, a six-foot wooden picnic table, and one fire ring/grill. Most of the sites are flat and easily accessible for RVs.

The Locust Branch bath house is a concrete-block building with a single roof and includes parking for seven vehicles, including one accessible space. There is one trash receptacle, one water fountain, and one water spigot on the exterior of the bathhouse. The men's bath house contains the following amenities: three showers, three toilets, two urinals, three sinks, one trash receptacle, and two electric hand dryers. The women's bath house contains the following amenities: three showers, five toilets, three sinks, one trash receptacle, two duplex receptacles, and two electric hand dryers.

Other amenities provided at the Locust Branch campground include an informational bulletin board; one horse shoe pit with back stops; one play structure with a slide and monkey bars; one swing set with two regular swings and two toddler swings; two vinyl coated metal benches; a single sanitary dump station; and one dumpster that serves both open camping areas. Multiple camp sites are accessible.



**Photograph 4-17: Campground Bath House**

In general, the campground has a moderate utilization during the recreation season and is typically at capacity during the major holiday weekends including the Memorial Day and the Fourth of July weekends.

#### **4.1.6.3 Primitive Campground**

There are 12 primitive camping sites located along the river with plenty of overflow space for additional campers. The Primitive Campground is not open during the recreation season, but can be utilized during the spring and fall hunting seasons. There is one portable chemical toilet serving this area during the spring and fall hunting season. Each of the sites includes one 6-foot long wood picnic table, one fire ring/grill, and two parking spaces. The tent sites are ground pads; however, they are not well defined. The camp sites are approximately 20 feet apart, but there is enough plant material in between sites to provide some separation. There are also four trash receptacles serving the area.



**Photograph 4-18: Primitive Campground**

#### **4.1.6.4 Sugar Camp and Smith Bend Campgrounds (Closed)**

Sugar Camp Campground had 56 camp sites and the Smith Bend Campground had 18 sites, but both have been closed due to flooding. These areas are currently overgrown and in disrepair, with no scheduled maintenance activities. Although these areas offered the same amenities as the open camping areas, most of the amenities have been removed. However, a few sites still have a fire ring/grill and picnic tables. There are many downed trees and evidence of flooding in the area.

Smith Bend Campground also has a single-lane, concrete boat ramp that is open for use. Ease of accessibility is provided by a 120-foot diameter cul-de-sac which provides access to the boat ramp. An asphalt parking lot with 40 truck and trailer parking spaces serves the area; however, there is no passenger vehicle parking. Also located near the boat ramp are a paved single basketball court and one 6-foot wooden bench.



**Photograph 4-19: Smith Bend Boat Ramp**

#### **4.1.7 Wildlife Management Area (WMA)**

Fish and wildlife management at R.D. Bailey Lake is provided by West Virginia Division of Natural Resources (WVDNR), which is licensed to manage 17,188 acres at the Project. This area is known as the R.D. Bailey WMA. The license allows WVDNR to manage forest, fish, and wildlife within the area. The license also provides WV DNR with the authority to utilize their expertise to provide protection and improvement of the natural resources characteristic of the R.D. Bailey Project lands. WVDNR county natural resource police officers patrol R.D. Bailey Lake to enforce State laws and regulations. A WVDNR special natural resource police officer, in cooperation with USACE Park Rangers, patrols the WMA to enforce laws and regulations.

The WMA is a designated hunting area that is well used during hunting season. The WMA provides opportunities for hunting small game, such as squirrels, rabbits, grouse, and turkey. Hunting for white-tailed deer is archery-only. Trapping is also permitted for fox, bobcat, skunk, opossum, mink, and muskrat. River otters were introduced to the Project in 1996 and have thrived in the habitat. Trapping river otters will be permitted in Fall 2011. The WMA at R.D. Bailey Lake is located in part of Wyoming and Mingo Counties.

The WMA contains a system of fire access roads and gas well access roads that can also serve as multi-use access for hunting and hiking. However, some of these access roads are in very poor condition and are gated. It should also be noted that Project resource managers have expressed that the utilization of these access roads for hiking within the WMA is very limited. There are no facilities at any of the access points.

The WVDNR also manages a shooting range, located south of Route 97 in the eastern portion of the Project. The shooting range provides targets at a distance of 300 yards. The shooting range is noted to have high utilization during the summer.



**Photograph 4-20: R.D. Bailey Rifle Range**

#### **4.1.8 R.D. Bailey Lake**

R.D. Bailey Lake is used for boating, fishing, and swimming, although most users participate in fishing. The lake ecosystem supports a healthy fish and wildlife population. The WVDNR stocks hybrid-stripe bass and blue catfish in the lake. The lake is well utilized for boating and fishing. The views of the lake are very good, both on and off the lake. The forest and vegetation around the lake are healthy and offer great opportunities for fall leaf and wildlife viewing.

The summer pool of the lake is approximately 630 acres, but it drops to 440 acres during the winter. With many winding channels, the lake is a popular boating destination. The lake is used primarily by motorized boats, with relatively few non-motorized boats. Approximately 100 acres of the lake (during the summer) are designated as single speed zones.

Boat access to the lake is provided by two boat ramps in the summer and one boat ramp in the winter. The two summer ramps are Guyandotte Point, which has a three lane ramp and Smith Bend, which has a single ramp. The winter ramp includes a single lane ramp in the Below Dam Area.

The lake has three coves in which standing timber was not removed prior to impoundment: Big Branch Cove, Leatherwood Cove, and Cub Creek Cove. These coves provide excellent fish cover and provide quality fishing opportunities. These coves are signed as “idle speed zones.” Fishing for black bass, walleye, channel catfish, crappie, hybrid-striped bass, blue catfish, and panfish is common in R.D. Bailey Lake.



**Photograph 4-21: R.D. Bailey Lake**

#### **4.1.9 Wyoming County Board of Education**

The Wyoming County Board of Education has a lease with the US ACE for four tracts of land. The lands are used for educational and recreational purposes and are located in the far east portion of the Project. The four areas include little league ball fields, Mountain Heart Head Start, an overflow parking area, and the old Baileysville High School football and baseball fields. These lands are currently utilized and leased through 2030.

## 4.2 Current Recreational Activities and Visitation

This section identifies the recreational activities that are currently available and the number of visitors who participate in these activities.

### 4.2.1 Outdoor Recreational Activities

The Project provides the opportunity to enjoy a wide range of recreational activities. Table 4-2 lists the recreational activities that are available at the Project, locations, and facilities. The recreational activities are grouped by the major activities available at the Project. Figure 4-1 shows the locations of the recreation areas at the Project.

**Table 4-2: Recreational Activities at the Project**

Recreational Activity	Location	Facilities
Boating	Below Dam Area	<ul style="list-style-type: none"> <li>• Winter boat ramp (single-lane)</li> <li>• Parking area for vehicles and trailers</li> </ul>
	Guyandotte Point	<ul style="list-style-type: none"> <li>• Boat ramp with three lanes</li> <li>• Courtesy loading dock</li> <li>• Parking for vehicles and trailers</li> </ul>
	Guyandotte Campground	<ul style="list-style-type: none"> <li>• Single-lane boat ramp at Smith Bend</li> <li>• Parking for vehicles and trailers</li> </ul>
	R.D. Bailey Lake	<ul style="list-style-type: none"> <li>• 600 acres for boating</li> </ul>
Camping/Overnight	Guyandotte Campground	<ul style="list-style-type: none"> <li>• 94 RV campsites with electricity, at two camping areas</li> <li>• Bath house for each camping area</li> <li>• 12 Tent camping sites</li> <li>• Playground equipment</li> </ul>
Fishing	Below Dam Area	<ul style="list-style-type: none"> <li>• Fishing platforms and benches along river</li> <li>• Access to the winter boat ramp</li> <li>• The dam tailwaters are stocked for fishing</li> </ul>
	Guyandotte Campground	<ul style="list-style-type: none"> <li>• Shore fishing</li> <li>• Smith Bend boat ramp</li> </ul>
	Guyandotte Point	<ul style="list-style-type: none"> <li>• Shore fishing</li> <li>• Boat ramp with three lanes</li> </ul>
	R.D. Bailey Lake	<ul style="list-style-type: none"> <li>• Access available from shore, docks, or boat</li> </ul>
Hunting	Wildlife Management Area	<ul style="list-style-type: none"> <li>• 17,188 acres of designated hunting</li> </ul>

**Table 4-2: Recreational Activities at the Project**

<b>Recreational Activity</b>	<b>Location</b>	<b>Facilities</b>
Other Activities (hiking, horseback riding, etc.)	Wildlife Management Area	<ul style="list-style-type: none"> <li>• Fire and gas well access roads (non-motorized hunting access, hiking)</li> </ul>
	Below Dam Area	<ul style="list-style-type: none"> <li>• Justice Trail</li> </ul>
	Visitor Center and Dam Overlook Area	<ul style="list-style-type: none"> <li>• Salt River Trail</li> <li>• Visitor Center offers exhibits that focus on R.D. Bailey, dam design and construction, and local wildlife</li> </ul>
Picnicking	Below Dam Area	<ul style="list-style-type: none"> <li>• Multiple picnic tables</li> </ul>
	Big Branch Day Use Area	<ul style="list-style-type: none"> <li>• Picnic shelter</li> <li>• Multiple picnic tables</li> <li>• Playground equipment</li> </ul>
	Guyandotte Point	<ul style="list-style-type: none"> <li>• Picnic shelter</li> <li>• Multiple picnic tables</li> <li>• Playground equipment</li> </ul>
	Visitor Center and Dam Overlook Area	<ul style="list-style-type: none"> <li>• Picnic shelter</li> <li>• Playground equipment</li> </ul>
Sightseeing	Visitor Center and Dam Overlook Area	<ul style="list-style-type: none"> <li>• Viewing area</li> </ul>
	Long Branch Overlook	<ul style="list-style-type: none"> <li>• Viewing area of lake</li> </ul>
	Wildlife Management Area	<ul style="list-style-type: none"> <li>• Viewing areas adjacent to access roads</li> </ul>
Swimming/ Waterskiing	R.D. Bailey Lake	<ul style="list-style-type: none"> <li>• Approximately 530 acres suitable for waterskiing</li> <li>• Entire lake available for swimming</li> </ul>

**4.2.2 Visitation by Recreation Area**

The Project reports visitation data through the VERS program. Visits are a “head count” of visitors to a project based on a count of vehicles and a statistical analysis of the number of people in a vehicle. It represents the entry of one person into a recreation area or site to carry on one or more recreation activities.

Project visitation statistics reflect estimates of the number of visits to each major recreation area. Table 4-3 shows the estimated annual average number of visits made to the recreation areas.

**Table 4-3: Distribution of Visits by Primary Recreation Area 2007 – 2010 Average**

Recreation Area	Visitation Average	Visitation Percentage
Guyandotte Campground	86,380	23%
Guyandotte Point	70,640	19%
Below Dam Area	66,720	18%
Visitor Center and Dam Overlook	51,130	14%
Long Branch Overlook	44,790	12%
Big Branch Day Use Area	26,740	7%
Wildlife Management Areas	23,940	7%
<b>Total</b>	<b>370,340</b>	<b>100%</b>

### 4.2.3 Activity Distribution

Table 4-4 shows the estimated annual number of visits by recreational activity or activity distribution. As people often engage in more than one activity while in the Project area, participation exceeds visitation. For example, if an individual participates in both fishing and picnicking activities during a one day visit, it is counted as participation in two activities on one visit.

**Table 4-4: Number of Participants for Each Recreational Activity**

Recreational Activity	Number of Participants
Boating	18,440
Camping	56,900
Fishing	86,080
Hunting	14,840
Other Activities	7,870
Picnicking	22,020
Sightseeing	165,840
Swimming	1,570
Water Skiing	1,160
<b>Total</b>	<b>374,720</b>

## 4.3 Area of Influence

The area of influence is defined as the area where the majority of the people who visit the Project live. Determining the area of influence and evaluating the demographic characteristics of the area is an important part of projecting the future demand for recreational facilities at the Project.

### 4.3.1 Identifying the Area of Influence

Based on the nature of the recreational activities provided at the Project, the vast majority of the visitors to the Project will reside within a two-hour driving distance (see Figure 4-2). Therefore,

this distance was used to define the area of influence; this distance is also consistent with the area of influence identified in the 1975 Master Plan. There are three subareas of interest, described below.

- *Primary* - within a 30-minute drive of the Project. Due to their proximity, residents in the primary area of influence are expected to make the Project a destination for all of the recreational opportunities available at the Project.
- *Secondary* - between a 30- and 60-minute drive of the Project. Residents in the secondary area of influence are expected to visit the Project for specific reasons; however, they are not expected to make the Project a destination solely for general day-use activities, such as picnicking, that are also available in their local area.
- *Tertiary* - between a 1- and 2-hour drive of the Project. Residents in the tertiary area of influence are expected to make the Project a destination for activities that are unique, provide a high-quality recreational experience, or are significantly different from those available in their local area (e.g., boating and fishing) or for overnight activities (e.g., camping).

As indicated on Figure 4-2, the primary and secondary areas of influence are entirely in WV. The tertiary area of influence includes portions primarily in West Virginia, but also includes two counties in Kentucky and two counties in Virginia.

#### **4.3.2 Demographic Characteristics of the Area of Influence**

Demographic data (population and age) were compiled from data reported by the U.S. Census Bureau and regional and State data centers. These data were analyzed to determine the population within the area of influence and how that population is projected to change by 2020. The populations of the counties in the area of influence are projected to decrease at different rates. The projected percentage change was determined for each area of influence based on the change in the estimated population in each county.

There are two counties within the primary area of influence, two counties within the secondary area of influence, and eight counties within the tertiary area of influence.

#### 4.3.2.1 Primary Area of Influence

The primary area of influence consists of Wyoming and Mingo Counties in WV. The estimated populations for the primary, secondary, and tertiary areas of influence are displayed in Table 4-5. The population in the primary area of influence is projected to decrease by 7.5 percent by 2020.

**Table 4-5: Population in Areas of Influence**

Area of Influence	2000 Population	2010 Population Estimate	2020 Projection	Projected Growth 2010–2020
Primary	53,961	49,246	45,558	-7.5%
Secondary	65,039	57,721	53,830	-6.7%
Tertiary	342,733	335,908	331,118	-1.4%

Changes in the percentage of the population in each age group were based on projected changes at the county level. The analysis estimated the percent change in each age group for each area of influence, as shown in Table 4-6. Within the primary area of influence, the percentage of people 19 and under will decrease from 26.1 percent in 2000 to 25.0 percent by 2020. The percentage of people over 65 is projected to increase from 13.2 percent in 2000 to 14.4 percent by 2020. Age distribution across other age groups is projected to remain fairly constant.

**Table 4-6: Age Distribution of Population by Area of Influence**

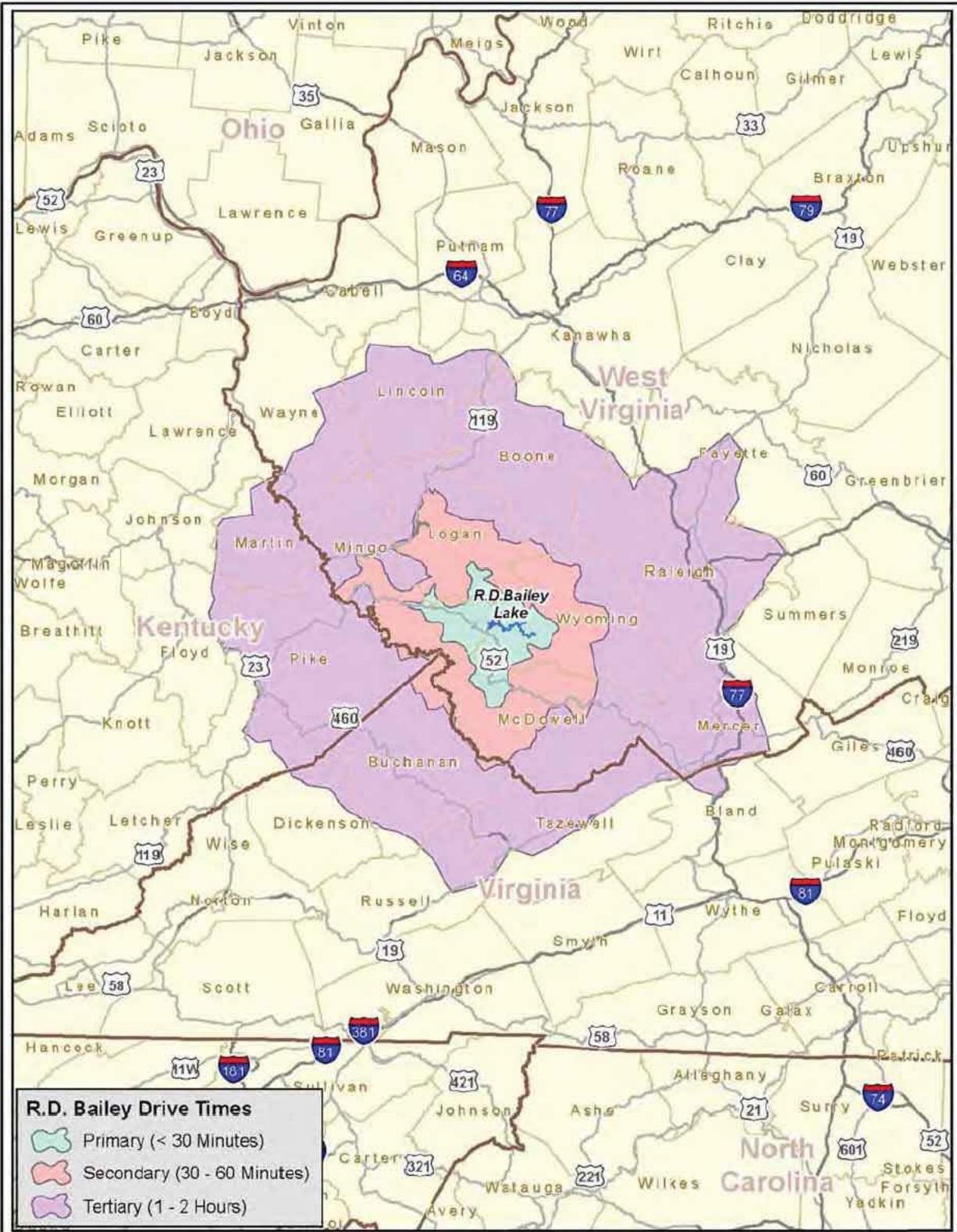
Age Group	Primary			Secondary			Tertiary		
	2000	2010	2020	2000	2010	2020	2000	2010	2020
<5	5.8%	5.5%	5.7%	6.2%	6.0%	5.7%	5.3%	5.3%	5.3%
5-19	20.3%	19.7%	19.3%	18.7%	18.0%	17.7%	18.0%	17.7%	17.5%
20-44	34.7%	33.6%	34.9%	31.3%	31.2%	32.0%	28.7%	29.9%	30.1%
45-64	26.1%	26.1%	25.8%	30.3%	29.9%	29.3%	28.3%	27.3%	27.1%
≥65	13.2%	15.1%	14.4%	13.5%	14.9%	15.3%	19.6%	19.8%	20.0%

The median incomes of the households in the areas of influence were estimated using a weighted average of the average 2008 median incomes of the counties in the area of influence and are shown in Table 4-7. The median household income in the primary subarea of influence was \$29,418, compared to the median household income of \$37,528 for WV.

**Table 4-7: Median Household Income in Areas of Influence**

Area of Influence	2008
Primary	\$ 29,418
Secondary	\$ 28,690
Tertiary	\$ 31,848
State of West Virginia	\$37,528
National	\$52,029

Source: Developed from data obtained from the U.S. Census Bureau



CLIENT: USACE - Huntington District			PROJECT: R.D. Bailey Lake Master Plan and Environmental Assessment-Justice, West Virginia	
			DES BY: AAA MM/DD/YY	PLATE: _____
PROJ NO: 15802728		CHK BY: BBB MM/DD/YY	DATE: _____	

Figure 4-2: Area of Influence

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#### **4.3.2.2 Secondary Area of Influence**

The secondary area of influence includes portions of Logan and McDowell Counties in WV. The population in the secondary area of influence is projected to decrease 6.7 percent by 2020. Within the secondary area of influence, the percentage of people 19 and under will decrease from 24.9 percent in 2000 to 23.4 percent by 2020. The percentage of people over 65 is projected to increase from 13.5 percent in 2000 to 15.3 percent by 2020. Age distribution across other age groups is projected to remain fairly constant. The median household income in the secondary subarea of influence was \$28,690 (see Tables 4-5, 4-6, and 4-7).

#### **4.3.2.3 Tertiary Area of Influence**

The tertiary area of influence includes portions of eight counties located in three different states. Four counties are in West Virginia, two are in Kentucky, and two are in Virginia. The population in the tertiary area of influence is projected to decrease 1.4 percent by 2020. Population distribution across age groups is projected to remain fairly constant. The median household income in the tertiary subarea of influence was \$31,848 (see Tables 4-5, 4-6, and 4-7).

### **4.4 Outdoor Recreational Opportunities at Comparable Facilities**

Recreational opportunities provided at other comparable facilities within a two-hour drive of the Project were identified and reviewed to understand the recreational opportunities available to people living within the area of influence (see Figure 4-3). Table 4-8 lists these facilities, their locations within the areas of influence, the owner of each facility, and the approximate size of each facility. A total of 21 facilities were identified (one in the primary area of influence, five in the secondary area, and 15 in the tertiary area).

There have been recent improvements at Twin Falls State Park; however, there are no other significant changes to the recreational activities at comparable facilities within the area of influence anticipated in the near future. The types of changes investigated include the addition or removal of an existing recreational activity, or the construction of an entirely new facility.

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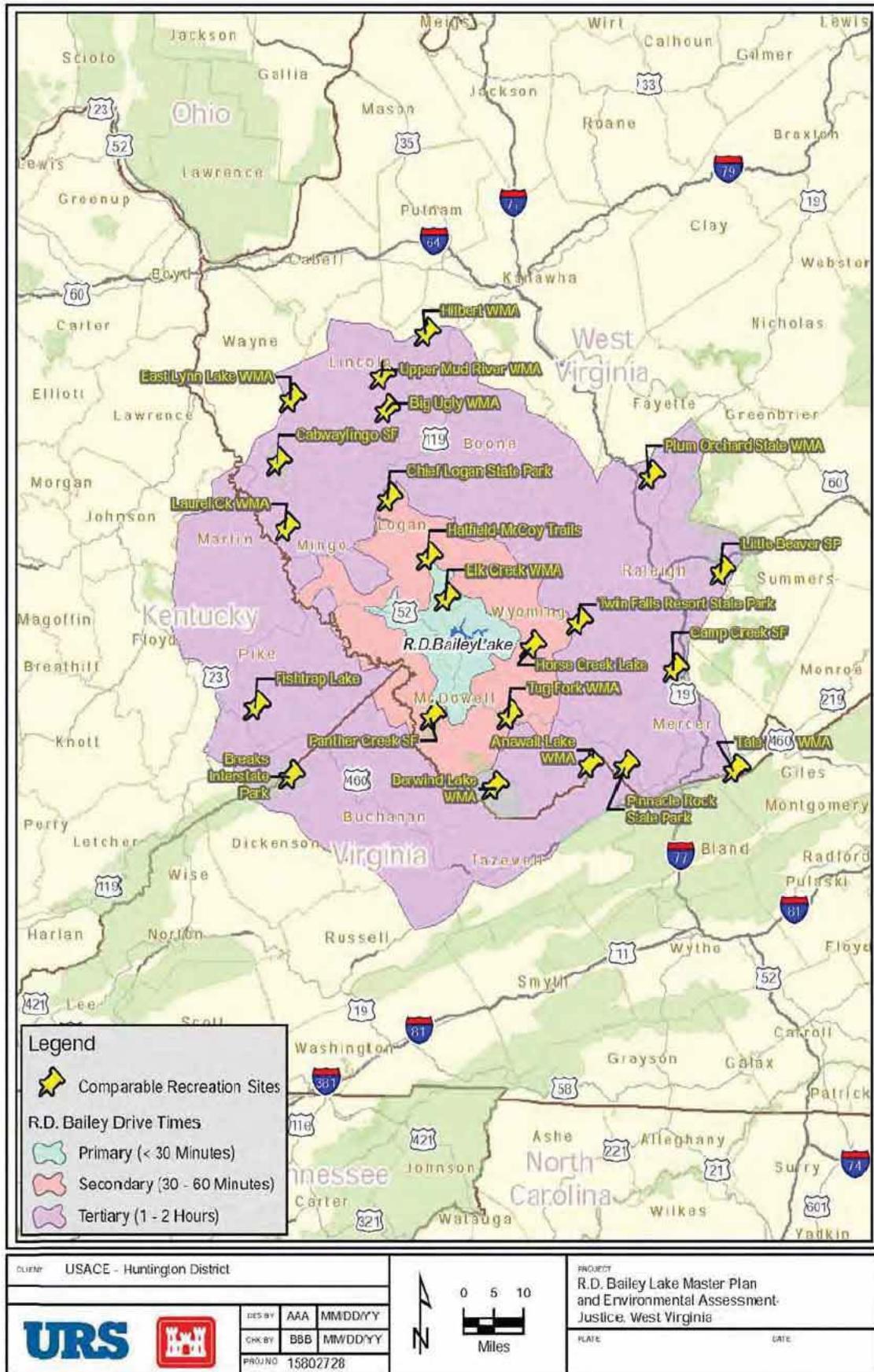


Figure 4-3: Comparable Recreation Facilities

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**Table 4-8: Comparable Recreational Facilities**

Name	Area of Influence	State	Operating Agency	Approximate Size of Facility (acres)
Anawalt Lake WMA	Tertiary	WV	WVDNR	1,800
Berwind Lake WMA	Tertiary	WV	WVDNR	18,000
Big Ugly WMA	Tertiary	WV	WVDNR	6,000
Breaks Interstate Park	Tertiary	KY/ VA	Private	4,600
Cabwaylingo State Forest	Tertiary	WV	WVDNR	8,100
Camp Creek State Forest	Tertiary	WV	WVDNR Dept of State Parks	5,300
Chief Logan State Park	Secondary	WV	WVDNR	4,000
East Lynn Lake WMA	Tertiary	WV	USACE and WVDNR	24,800
Elk Creek WMA	Primary	WV	WVDNR	6,000
Fishtrap Lake	Tertiary	KY	USACE and KYDFWR	15,550
Hatfield-McCoy Trails	Secondary	WV	Hatfield Mc- Coy Regional Trail Authority	500 miles of trails
Hilbert WMA	Tertiary	WV	WVDNR	300
Laurel Lake WMA	Tertiary	WV	WVDNR	12,900
Little Beaver State Park	Tertiary	WV	WVDNR Dept of State Parks	560
Panther WMA	Secondary	WV	WVDNR	7,820
Pinnacle Rock State Park	Tertiary	WV	WVDNR Dept of State Parks	400
Plum Orchard State WMA	Tertiary	WV	WVDNR	3,200
Tate Lohr WMA	Tertiary	WV	WVDNR	500
Tug Fork WMA	Secondary	WV	WVDNR	2,170
Twin Falls Resort State Park	Secondary	WV	WVDNR Dept of State Parks	3,780
Upper Mud River WMA	Tertiary	WV	WVDNR	1,430

KYDFWR = Kentucky Department of Fish and Wildlife Resources  
WVDNR = West Virginia Division of Natural Resources

The Hatfield-McCoy All Terrain Vehicle (ATV) Trail is listed in Table 4-8 because it has probably impacted visitation at R.D. Bailey Lake, although it is not a comparable facility. The Hatfield-McCoy and other ATV trails in the region are continuously improving and are now attracting users from across the eastern U.S., and thereby becoming a significant attraction to those local residents that find ATVs appealing. The four year moving average of total visitation indicates a 22% decline in visitation from 2007 to 2010 at the Project. The ATV trails may be

impacting visitation, but quantifying that impact is difficult. A declining and aging population is also a factor in the decline, but the extent of the decline indicates that the recreational preferences of the population are changing. These ATV trails are not comparable facilities to R.D. Bailey Lake because they offer a different type of outdoor recreation and they will not appeal to the entire population that has been using R.D. Bailey Lake. Since time and resources are limited for any population, the investment of time and money into ATVs by the local population can be expected to reduce visitation at R.D. Bailey Lake. However, this change in recreational patterns will not continue indefinitely, because not everyone will find ATV recreation enjoyable. Therefore, the percentage of the local population participating in recreational activities at R.D. Bailey Lake is expected to stabilize within several years.

The recreational facilities listed in Table 4-8 support a variety of recreational activities similar to those offered at the Project. Table 4-9 lists recreational activities, summarized from activities listed in the West Virginia SCORP, offered at the Project and the comparable facilities. In addition to the recreational activities listed in the West Virginia SCORP, other amenities were reviewed. Amenities are services or features that can increase the enjoyment of visitors. The following amenities were reviewed:

- High-speed internet access
- Lodge and/or cabins
- Marina
- On-site restaurant
- Outdoor theater

**Table 4-9: Recreational Activities at R.D. Bailey Lake and Comparable Facilities**

Name	Amenities																						
	Boating	Camping & Canoeing	Equestrian	Extreme Sports	Fishing & Hunting	Golf	Ice Skating	Picnics & BBQ's	Court Games	League Sports	Shooting & Archery	Nature Viewing & Bird watching	Swimming	Gardening	Playgrounds	Trails (Walking, hiking, and/or bicycling)	Skiing	High Speed Internet Access	Lodge and/or Cabins	Marina	On-site Restaurant	Outdoor Theatre	
R.D. Bailey Lake	✓	✓	✓		✓			✓	✓	✓	✓	✓	✓		✓	✓							
Anawalt Lake WMA					✓											✓							
Berwind Lake WMA	✓	✓	✓		✓							✓	✓			✓							
Big Ugly WMA					✓						✓												
Breaks Interstate Park	✓	✓	✓		✓			✓				✓	✓		✓	✓			✓		✓	✓	✓
Cabwaylingo State Forest		✓			✓			✓	✓			✓	✓		✓	✓			✓				
Camp Creek State Forest		✓	✓		✓			✓	✓			✓			✓	✓							
Chief Logan State Park		✓						✓	✓			✓	✓		✓	✓		✓	✓		✓	✓	✓
East Lynn Lake WMA	✓	✓	✓		✓			✓			✓	✓	✓		✓	✓				✓			
Elk Creek WMA					✓																		
Fishtrap Lake	✓	✓	✓		✓			✓	✓			✓	✓		✓	✓				✓			
Hatfield-McCoy Trails				✓																			
Hilbert WMA					✓											✓							
Laurel Lake WMA					✓			✓					✓		✓	✓							
Little Beaver State Park		✓			✓			✓				✓			✓	✓							
Panther WMA		✓	✓		✓			✓	✓				✓		✓	✓			✓				
Pinnacle Rock State Park					✓			✓				✓			✓	✓							
Plum Orchard State WMA	✓	✓			✓			✓			✓	✓			✓	✓							
Tate Lohr WMA	✓				✓			✓			✓	✓			✓	✓							
Tug Fork WMA					✓											✓							
Twin Falls Resort State Park		✓			✓	✓		✓				✓			✓	✓			✓		✓	✓	✓
Upper Mud River WMA	✓				✓			✓		✓		✓			✓								

**\* NOTES**

Nature Viewing & Bird watching

Includes those activities that involve observing or photographing wildlife, nature, or historic areas located within a site, whether walking or driving.

Boating

Includes if a site has boat ramps, boating activities, waterskiing.

Camping

Includes backpack camping, camping at a campsite without electricity or water, camping with electricity and water (RV).

Court Games

Includes activities that require a court setup, including (but not limited to): basketball, tennis, and volleyball.

Golfing

Includes golf courses and/or driving ranges.

Trails

Includes hiking, walking, bicycling, and exercising on a fitness trail.

Equestrian

Includes if a site accommodates horseback riding, through trails or designated areas, regardless if horses are provided.

Lodges and/or Cabins

Areas for overnight stay that provide more than basic shelter, such as electricity, plumbing, furnishings, etc.

## **4.5 Trends in Outdoor Recreational Activities**

There has been much speculation in recreation literature that participation in all nature-based activities is declining due to a decrease in free time and increased level of technology in people's everyday life. However, a study on the trends in outdoor recreation concluded that while the national interest in nature and outdoor activities has been changing over the last 60 years, overall it is not declining (Cordell, 2008).

The discussion on participation trends in this section focuses on identifying changing preferences for recreational activities. Changing preferences for recreational activities as a whole were identified by reviewing literature on the general trends that are occurring in West Virginia, surrounding states, and across the country. Changing preferences for specific activities at the Project were identified through discussions with resource managers.

### **4.5.1 Age**

Age can influence the preference for recreational activities. For example, as the population ages, there is a greater demand for RV camping and lodging and less demand for tent camping. In addition, older populations transition from active sports to less strenuous activities such as walking (Virginia Department of Conservation and Recreation, 2007).

### **4.5.2 Fishing and Hunting**

The 2009 West Virginia SCORP notes that hunting and fishing are very popular activities in West Virginia, particularly in the southwestern coalfields region of the state. The survey performed for the West Virginia SCORP separated activity preferences, those activities the respondents enjoyed the most or wanted to participate in the most, from activity participation, those activities in which respondents actually participated. The West Virginia SCORP further separated activity participation into daily or weekly participation and seasonal or monthly participation. The R.D. Bailey Lake area of influence includes portions of Regions 1, 2, and 3 in the West Virginia SCORP, as well as a portion of the Southwest Coalfields Region. Within these regions, 42.5 percent of respondents in Region 1 indicated that they participated in fishing/hunting on a seasonal or monthly basis. This was the only region in which fishing/hunting ranked in the top three of actual participation rates. However, fishing/hunting ranked in the top three activity preferences in Regions 1 and 3 and the Coalfields Region. This indicates that the population in the area of influence enjoys hunting and fishing, but cannot participate as often as they would like for various reasons. The West Virginia SCORP also suggests that West Virginia is a popular hunting destination for residents of other states, due to the state's "attractive bag limits and license fees" (West Virginia Development Office, 2009).

The USFWS found that nationwide participation in fishing decreased by about 16 percent and hunting decreased by about 11 percent between 1991 and 2006 (USFWS, 2006). The decreasing trend in fishing and hunting is further supported by a study produced by the USDA Forest Service, *Outdoor Recreation in American Life: An Assessment of Demand and Supply Trends* (Cordell, 1999). A section of the USFWS study looks at projections of outdoor recreation participation through the year 2050 and accounts for increases in participation due to population growth. The study projects fishing visits will increase by 36 percent through 2050, but this is marginally less than the projected population growth of 44 percent; therefore, the participation rate is actually projected to decrease over the next 40 years. The study projects national visits for hunting will decrease by 11 percent over this time period.

The West Virginia SCORP asserts that “West Virginia’s hunting participation levels and economic returns remain high compared to other states and national trends” (West Virginia Development Office, 2009). The SCORP goes on to say that in the rural areas, “fishing and hunting remain dominant, sustained by fewer sportsmen spending more money” and “future participation in the fishing and hunting sports here may decline as it has elsewhere due to increased suburbanization of buffer zones and riverine areas” (West Virginia Development Office, 2009). This implies that, although hunting and fishing participation rates have not declined as much in West Virginia as they have in other areas of the country, fewer people are participating in these activities and this trend is expected to continue.

#### **4.5.3 Summer Activities**

According to the West Virginia SCORP, the combination of walking/hiking/jogging is the most popular daily/weekly activity in 11 out of the 12 West Virginia SCORP Regions and is pursued by one third to one half of the local population. The USDA Forest Service projects that participation in hiking and horseback riding will increase marginally faster than the population (Bowker, 1999). The West Virginia SCORP states that “easy slopes and short trails for a majority of residents would seem more pleasant and be less stressful, difficult, or confusing” for residents and may attract more users (West Virginia Development Office, 2009).

The West Virginia SCORP shows that lawn and garden related activities are the most popular seasonal/monthly activities, and are also either the first or second most popular daily/weekly activities, in all 12 of the SCORP Regions.

Swimming is in the top three seasonal/monthly activities for all four of the SCORP Regions in the R.D. Bailey area of influence, with 30 to 40 percent of the population participating.

Canoeing/camping is in the top three seasonal/monthly activities for Regions 2 and 3 and the

Coalfields Region, also with 30 to 40 percent of the population participating. Bicycle riding is in the top three daily/weekly activities in all four SCORP Regions, with approximately 10 percent of the population participating.

The USDA Forest Service found that the rate of participation in picnicking, swimming, camping, boating, and waterskiing has been steady (Bowker, 1999). While the participation rate for camping in general is steady, there is an increasing trend for camping in an RV with electricity and water, as opposed to camping in tents. The USDA Forest Service is projecting primitive camping will increase at a slower rate than population growth, and therefore, will experience a decreasing rate of participation. However, developed camping is projected to increase at a greater rate than the population growth (Bowker, 1999). The West Virginia SCORP stated that camping demand increased at all 32 of West Virginia's state parks in 2007 and 2008.

Observing nature has been increasing and is expected to continue to increase. The USDA Forest Service projects participation to increase in non-consumptive wildlife activities, including bird watching, photography, and other forms of wildlife viewing (Bowker, 1999). The number of participants is anticipated to increase more rapidly than the population for these activities. Similar to non-consumptive wildlife activities, sightseeing and visiting historic places are projected to grow.

#### **4.6 Identifying Potential Recreational Opportunities**

Identifying recreational opportunities at the Project is an important consideration relative to future project development and investment. The following section examines recreational opportunities available at the Project and those opportunities that may be a viable option in the future for the Project.

The rate of participation in a particular activity may not correlate with the value people place on the activity. For example, people may place great value on camping, but it requires a large time commitment and typically people can only participate a few weekends a year. Camping can be considered as having high value, but a low participation rate. Alternatively, people may play tennis more often because it requires much less time per event and can be enjoyed in the local neighborhood. Tennis can be considered as having a lower value, but a high participation rate. This is evident based on the different responses for activity preferences and activity participation in the West Virginia SCORP. Therefore, although ranking the activities by rate of participation provides a general guide to the value people place on certain activities, the activities need to be evaluated carefully when planning for current and future recreational activities at the Project.

The resources available at the Project provide visitors with opportunities to participate in many of the activities identified in the West Virginia SCORP. However, some of the activities may not be consistent with Project resource capabilities or USACE water and outdoor resource-based recreation policy. Therefore, the activities have been categorized as follows:

- *Available* – resources and supporting facilities for these activities are currently available at the Project.
- *Potential* – facilities for these activities are not currently available at the Project, but they are consistent with planning goals and may be considered as potential future activities. Facilities for these activities may be cost shared by the USACE or constructed wholly by a non-federal entity.
- *Inconsistent* – facilities for these activities are not currently available at the Project and are inconsistent with future planning goals. These activities are in conflict with USACE policy and environmental conservation goals.

Table 4-10 is an alphabetical list of activities identified in the West Virginia SCORP and identifies the activities as currently available, potential as a future activity, or inconsistent with planning goals.

**Table 4 - 10: Recreation Activities at the Project**

Activity	Available	Potential	Inconsistent
Bicycling		✓	
Boating	✓		
Camping & Canoeing	✓		
Equestrian		✓	
Extreme Sports (ATV's, Skateboarding, etc.)			✓
Fishing & Hunting	✓		
Gardening		✓	
Golf		✓	
Ice Skating		✓	
Picnics & BBQ's	✓		
Play Court Games (BB, VB, Tennis)	✓		
Play in League Sports	✓		
Shooting & Archery	✓		
Skiing		✓	
Swimming	✓		
Visit Natural Areas, Birdwatching	✓		
Visit Playgrounds	✓		
Walking, Hiking, Jogging	✓		

The activities listed as potential are consistent with USACE policy and environmental conservation goals and could be provided at the Project. The potential activities could be formally developed by a local sponsor, but a determination on the suitability of the activity would be done on an individual basis.

## **4.7 Recreational Demand Analysis**

The recreation demand analysis reviewed several factors that can change the demand for recreational activities at a particular facility. Changes to the following factors could result in a shift in demand for recreational activities at the Project or affect the number of visitors:

- Change in the opportunities available to participants, such as the development of new comparable facilities near the Project;
- Change in preferences for activities, such as national and State participation trends showing an increase in nature viewing; and
- Change in the demographic characteristic in the area of influence, including a change in overall population and a change in the median age of that population. Such changes can affect the preferred activities (e.g., older visitors may prefer RV camping to tent camping).

### **4.7.1 Impact of Comparable Facilities**

The Project and the comparable facilities in the area of influence have been open and operating for many years. As noted earlier, no significant planned changes are anticipated at the comparable facilities, and no new comparable facilities are anticipated. Therefore, the effect of the comparable facilities is not expected to change the existing demand for recreational activities at the Project. The Hatfield-McCoy ATV Trail System discussed earlier is not a comparable facility, and its impact upon visitation at R.D. Bailey Lake is expected to stabilize, as discussed in Section 4.4.

In 2008 there was a change in the opportunities available to participants at R.D. Bailey Lake when the marina at Guyandotte Point closed and was removed. The marina included approximately 40 boat slips and fuel sales. It was reported that approximately 30 boat slips were occupied during the recreational boating season. The marina closure has left an unmet demand for boat slips, fuel, and concessions at the Project. It has also resulted in a reduction in utilization of the lake for boating and fishing. Night-time fishing was popular and is now very limited due to the closure of the marina. There are no marinas within a one-hour drive of the Project and only two identified within the entire area of influence.

#### **4.7.2 Impact of Trends in Participation Rates in Recreational Activities**

Trends in recreation were reviewed to identify potential changes in demand for recreational activities at the Project. In general, the rate of participation in consumptive resource uses, such as hunting and fishing, has been declining and is anticipated to continue declining, although the decline in West Virginia has not been as substantial as the decline in other states. However, the rate of participation for non-consumptive resource uses, such as nature trails and sightseeing, has been increasing. Based on these trends, the following assumptions were used to forecast future activities and participation:

- The participation rate for “other” recreational activities will increase 5 percent between 2010 and 2020;
- The participation rate for fishing and hunting will decrease 3 percent between 2010 and 2020;
- The participation rate for camping will increase 3 percent, and there will be an increased preference for camping in an RV as opposed to a tent;
- As a population ages, there will be a shift to less physical activities, such as walking; and
- The participation rate for sightseeing, including observing nature and visiting historic places, will increase 5 percent between 2010 and 2020.

#### **4.7.3 Impact of Demographic Changes**

The population change in the area of influence over the next decade is projected to be small—an overall decrease of 2.8 percent. However, the larger population declines are expected in the primary and secondary areas of influence, from which the Project draws most of its visitors. In addition to population change, the age of the population is projected to increase. Based on the projected population, change in the demographics, and observations at the Project, the following assumptions were used to forecast future activities and participation:

- The population in the primary area of influence is projected to decrease by 7.5 percent between 2010 and 2020;
- The population in the secondary area of influence is projected to decrease by 6.7 percent between 2010 and 2020;
- The population in the tertiary area of influence is projected to decrease by 1.4 percent between 2010 and 2020;

- The demand for RV-accessible campsites will increase because of preferences for RV camping as opposed to tent camping among older campers; and
- The shift to an older population will create a demand for shorter walking and hiking trails that are easy to traverse.

#### **4.7.4 Projected Number of Visits by Activity**

A multi-step approach was used to project the number of visits for each recreational activity at the Project. The approach accounts for anticipated changes in the rate of participation in specific activities and the estimated change in population in each area of influence. In the first step, the rate of participation for the current visitors engaged in the activities was adjusted to estimate the impacts of preference changes on the current users. In the second step, the estimated number of visitors was adjusted to account for projected population changes within each area of influence. The rate of participation of the current population was assumed to be representative of the rate of the participation for people remaining in the area after the population declines (e.g., if 15 percent of the current population participates in camping, it is assumed that 15 percent of the remaining population in the area would participate in camping). The current population engaged in the activities was divided among the three areas of influence based on the assumption that 60 percent of visitors live in the primary area of influence; 30 percent live in the secondary area of influence; and 10 percent live in the tertiary area of influence.<sup>1</sup> The projected rate of participation in each activity was applied to the projected population to estimate the number of visitors that would participate in an activity in 2020. Table 4-11 shows the baseline and projected number of visitors for each of the primary activities, sorted by area of influence.

As indicated in Table 4-11, overall visits to the Project are expected to decrease by 17,520 visits (approximately 4.7 percent) by 2020. Additionally, the activities undertaken by the visitors are anticipated to change.

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1) Comparable facilities have a greater impact on the recreational destination to those living farther from the Project, such as in the tertiary area of influence.

**Table 4-11: Baseline and Projected Users by Activity and Area of Influence**

Activity	Area of Influence	Baseline Visits	Projected Visits For 2020	Change in Visits
Boating	Primary	11,070	10,320	-750
	Secondary	5,530	5,120	-410
	Tertiary	1,840	1,820	-20
	<b>Subtotal</b>	<b>18,440</b>	<b>17,260</b>	<b>-1,180</b>
Camping	Primary	34,140	32,520	-1,620
	Secondary	17,070	16,400	-670
	Tertiary	5,690	5,780	90
	<b>Subtotal</b>	<b>56,900</b>	<b>54,700</b>	<b>-2,200</b>
Fishing	Primary	51,650	46,340	-5,310
	Secondary	25,820	23,370	-2,450
	Tertiary	8,610	8,230	-380
	<b>Subtotal</b>	<b>86,080</b>	<b>77,940</b>	<b>-8,140</b>
Hunting	Primary	8,900	7,990	-910
	Secondary	4,450	4,030	-420
	Tertiary	1,480	1,420	-60
	<b>Subtotal</b>	<b>14,830</b>	<b>13,440</b>	<b>-1,390</b>
Other	Primary	4,720	4,620	-100
	Secondary	2,360	2,290	-70
	Tertiary	790	810	20
	<b>Subtotal</b>	<b>7,780</b>	<b>7,720</b>	<b>-150</b>
Picnicking	Primary	13,210	12,330	-880
	Secondary	6,610	6,110	-500
	Tertiary	2,200	2,170	-30
	<b>Subtotal</b>	<b>22,020</b>	<b>20,610</b>	<b>-1,140</b>
Sightseeing	Primary	99,510	97,480	-2,030
	Secondary	49,750	48,320	-1,430
	Tertiary	16,580	17,170	590
	<b>Subtotal</b>	<b>165,840</b>	<b>162,970</b>	<b>-2,870</b>
Swimming	Primary	940	880	-60
	Secondary	470	440	-30
	Tertiary	160	160	0
	<b>Subtotal</b>	<b>1,570</b>	<b>1,480</b>	<b>-90</b>
Water Skiing	Primary	700	650	-50
	Secondary	350	320	-30
	Tertiary	120	110	-10
	<b>Subtotal</b>	<b>1,170</b>	<b>1,080</b>	<b>-90</b>
	<b>Total</b>	<b>374,720</b>	<b>357,200</b>	<b>-17,520</b>

#### 4.7.5 Lake Carrying Capacity

It is projected that the number of people participating in fishing could decrease by 9.5 percent, and boating could decrease by 6.3 percent by 2020. The decrease in boating could lead to an overall decrease in the number of boats using R.D. Bailey Lake. The carrying capacity of R.D. Bailey Lake for boating was analyzed to determine whether the lake capacity is adequate for current and future demand. Carrying capacity refers to the number of boats that might use the lake at one time. If the number of boats exceeded the carrying capacity of the lake, boaters would not experience a reasonable level of satisfaction in the boating experience or a reasonable level of safety.

Because of shallow water, narrow portions of the lake, docks, and other constraints, 5 percent of R.D. Bailey Lake is estimated to be unsuitable for boating. The analysis begins with the summer pool lake acreage of 630 acres at elevation 1,035 NGVD.

$$\text{Acres Available for Boating} = 630 - (0.05 \times 630) = 600 \text{ acres}$$

Non-motorized boats (e.g., canoes and rowboats) require less lake space than motorboats for safety, and motorboats require more space than non-motorized boats for boating enjoyment. Based on observations by resource managers, it is estimated that the distribution of boats on the lake at any one time is one percent non-motorized boats and 99 percent motorboats.

According to the resource manager at R.D. Bailey Lake, approximately 90 percent of boats on the lake are high powered (greater or equal than 10 horsepower, [HP]) and approximately 10 percent of boats are low power (less than 10 HP).

For this analysis, carrying capacity is estimated for three different scenarios: high, medium, and low density of boats. As consistent with the USACE Walla Walla District Lucky Creek Peak Plan, density assumptions are shown in Table 4-12.

**Table 4-12 Space Assumptions for Safe and Enjoyable Boating**

Type of Boat	Low Density Scenario Acres	Medium Density Scenario Acres	High Density Scenario Acres
Low Power Boats	2.5 acres	1.3 acres	0.5 acres
High Power Boats	20 acres	10 acres	5 acres

Source: USACE, 2006

Using these assumptions, algebraic equations are used to estimate the number of boats of each type that might comfortably fit on the lake at any one time for each scenario. These variables and equations are presented below.

T = Total number of boats

L = Number of Low Power Boats = 0.10 x T

M = Number of High Power Boats = 0.90 x T

Low Density Scenario:

L low power boats x 2.5 acres/low power boat + M high power boats x 20 acres/high power boat  
= 599 acres

Medium Density Scenario:

L low power boats x 1.3 acres/low power boat + M high power boats x 10 acres/ high power boat  
= 599 acres

High Density Scenario:

L low power boats x 0.5 acres/low power boat + M high power boats x 5 acres/high power boat  
= 599 acres

Table 4-13 displays the results for the number of low power and high power boats that fit on the lake for each scenario.

**Table 4-13: R.D. Bailey Lake Carrying Capacity**

Type of Boat	Low Density	Medium Density	High Density
Low Power Boats	3	7	13
High Power Boats	30	59	118
Total Boats	33	66	132

The estimates for the numbers of boats that might fit comfortably on the lake under the low, medium, and high density scenarios were compared to the 2020 projections of the number of boats using the lake each month to determine if the lake will operate above carrying capacity.

Projected participation in 2020 is estimated at 2,675 boating visits per month. To estimate the number of boating visits to the number of boats on the lake at any one time on a summer weekend day in 2020, additional assumptions were made. In addition to using the assumption that 60.5 percent of boaters use the lake on weekends, the number of boaters per boat was assumed to be an average of 2.5. The duration of a boat trip was assumed to be 6 hours. That is, as the length of a summer day is assumed to be 12 hours, each boat was assumed to be on the lake for half of a day. Table 4-14 shows the results of this analysis.

**Table 4-14: R.D. Bailey Lake 2020 Boat Usage**

<b>Projected Number of Boating Visits per Month in 2020</b>	<b>Number of Boats per Month 2020<sup>1</sup></b>	<b>Number of Boats using the lake on a weekend day<sup>2</sup></b>	<b>Number of Boats at any one time<sup>3</sup></b>
2,675	1,070	74	37

Notes: (1) Assumes 2.5 people per boat  
 (2) Assumes 60.5 percent of visits and 8.7 weekend days per month  
 (3) Assume each boat is on the lake for 1/2 of a 12-hour day (6 hours)

The analysis thus estimates a total of 37 boats using the lake at any one time in 2020.

## **4.8 Implications of Projected Future Demand on Recreational Activities**

Based on previously discussed trends and changing demographics, demand for recreational activities at the Project are expected to change over the next 10 years. The following section describes the implications of the trend and demand analysis on recreational activities at the Project.

### **4.8.1 Boating**

Boating is a popular activity at the Project. The analysis of the carrying capacity of R.D. Bailey Lake indicates that the current use falls between the low- and moderate-density scenarios and the density scenario is anticipated to remain in this range.

Although the overall capacity of the lake can accommodate the current and future boaters, the number of boat ramps was reviewed to determine if they were sufficient for the number of boaters. R.D. Bailey Lake currently has one boat ramp with three boat lanes and one boat ramp with a single lane that can be utilized during the summer. Since there is currently no marina at R.D. Bailey Lake, boaters must use boat ramps in order to utilize the lake. Based on 2009 visitation data, there are an estimated 187 boating visits on a weekend day. Based upon 74 boats using the lake as shown in Table 4-14, there would be 185 boating visits on an in-season weekend day in 2020, as shown in Table 4-15, which is an insignificant change from the 2009 visitation.

In order to determine the demand for boat lanes, formulas based on the USACE Institute for Water Resources (IWR), Estimating Recreational Facility Requirements, Volume IV (IWR Research Report 74-R1) (USACE, 1974b) were used. To compute the necessary number of boat lanes, the number of daily boaters was divided by the boat lane turnover rate multiplied by the average party size. In accordance with the IWR Research Report 74-R1, the maximum boat turnover rate was assumed to be 40, based upon 9 minutes to launch or retrieve a boat, meaning that one ramp will allow a maximum of 40 boats per day to access the lake. The average party

size was assumed to be 2.5 based on observations at other Huntington District sites and as noted in the Ohio Department of Natural Resources' Boating on Ohio's Waterways Survey which includes lakes in the Huntington District. Table 4-15 displays the formula and variables used to derive boat ramp requirements.

**Table 4-15: Variables used to Calculate Boat Ramp Facility Requirements**

<b>Boat Lanes for deriving facility requirements= (Db)/(S x Rb)</b>		
<b>Variable</b>	<b>Symbol</b>	
Number of daily boaters	Db	185
Turnover rate per boat ramp	Rb	40
Average Party Size	S	2.5
<b>Boat Lanes</b>		<b>2</b>

Source: USACE, 1974b

The required number of boat ramp lanes for the projected amount of daily boat visits is calculated to be two. There are currently four boat lanes at R.D. Bailey Lake open during the summer season. Also, the park staff has indicated that the existing boat ramps are sufficient.

As noted in Section 4.7.1, the previous marina at R.D. Bailey Lake closed in 2008 and has been removed. Based on previous utilization, it is estimated there is demand for approximately 30 seasonal boat slips for privately owned boats, for slips for transient boat use (temporary overnight docking), and for rental boat use, resulting in a need for a 35 to 40-slip marina. A new marina would also provide services and supplies that would improve the boating experience.

#### **4.8.2 Camping**

Currently, R.D. Bailey Lake has a total of 106 campsites that are open including 94 campsites with electrical hookups and 12 primitive campsites, which appears adequate to meet future demand.

R.D. Bailey Lake has a relative high occupancy rate; however, camping facilities at the Project operate at capacity only during peak season holiday weekends. No new campsites are necessary because current utilization is not consistently at capacity and the projected usage indicates a slight decline in camping visits due to the declining population in the area of influence, despite an increasing participation rate. Although no new campsites are required, improvements should be considered at the existing facilities because the trend in camping is expected to shift away from tent camping towards developed RV-accessible campsites with electricity, water, sanitary sewer, and internet services. Recent improvements were made to the electrical capabilities; however, the campsites do not have access to potable water and sanitary sewer connections.

Providing water and sewer connections along with internet access would likely attract more campers. These features along with accepting reservations would add convenience, improve the overall recreation experience, and particularly appeal to older campers with RVs.

#### **4.8.3 Fishing**

Fishing is a popular activity at the Project, but projections indicate a decrease in fishing visits at the Project primarily due to the declining population in the area of influence. The West Virginia Department of Natural Resources states that R. D. Bailey Lake may be the best lake for hybrid striper fishing in the state. Hybrid stripers are stocked because they provide excellent recreational fishing, but they cannot reproduce.

Fishing occurs at R.D. Bailey Lake primarily from boats due to the steep and rugged shoreline along much of the lake. While shoreline fishing is possible at some of the recreational areas along the lake headwaters and the Guyandotte River, there is no dedicated accessible shoreline fishing area or pier.

R.D. Bailey Lake has a healthy fish population and is able to support annual fishing tournaments during the fishing season. The number of fishing tournaments held at the lake has increased, which can be attributed to the diversity of fishing habitat available in the lake and in the river, both upstream and downstream of the Project. The stocked tailwater area provides quality opportunities for fishing for rainbow and brown trout and other cold water species. The tailwater area experiences high utilization by fishermen during the spring and fall stocking periods and has an accessible walkway for shoreline fishing. Based on the projected decrease in fishing visits, facilities that support fishing activities appear to be adequate with the exception of the potential need for a dedicated accessible shoreline fishing area or pier.

#### **4.8.4 Hunting**

WVDNR manages approximately 17,188 acres of the approximate 19,000 acre Project for wildlife management purposes. For safety reasons, hunting is prohibited at the Guyandotte Campground, but is allowed elsewhere at the Project. Deer hunting is limited to archery and muzzleloader firearms. Other targeted species include wild turkey, doves, waterfowl, and small game such as squirrel, rabbit, and grouse. Hunting has been identified as an activity in which the participation rate is decreasing slightly, and there is a projected reduction in hunting activity, primarily due to the declining population in the area of influence. There has been an expressed desire to improve access to some of the more remote areas of the WMA for hunting.

#### **4.8.5 Other Activities**

The projected use for other activities such as walking and hiking is forecast to remain relatively stable. This is due to projected higher participation rates for these activities moderated by a declining population. There are two designated hiking trails at the Project including the Salt River Trail at the Visitor Center and the Justice Trail at the Below Dam Area. Utilization of these trails has been classified as relatively low. The WMA also has access roads that can be utilized for trails for hunting access and hiking; however, hiking activities in the WMA have been noted as low use. Some of the WMA access roads are gated and in poor condition, limiting the use of these facilities.

While facilities to support these activities appear adequate, interpretative improvements along a short section of the Salt River Trail near the Visitor Center could enhance the recreational experience in this area. This potential improvement is consistent with growing trends for sightseeing and shorter walks and could extend the interpretative exhibits from the Visitor Center to the natural environment. There is also an expressed desire to improve access in the WMA which could result in improved opportunities for hiking and hunting.

#### **4.8.6 Picnicking**

Existing facilities include picnic tables at the Visitor Center/Dam Overlook Area, Big Branch Day Use Area, Guyandotte Point, Guyandotte Campground, and the Below Dam Area. The current number of picnic tables can accommodate over 300 picnickers at a time. Based on 2009 visitation data, there are an estimated 187 picnic visits to R.D. Bailey Lake on a summer weekend day. The current supply of picnic tables at R.D. Bailey Lake is sufficient to meet the projected 2020 demand. Group picnic shelters that can be rented are in high demand during the recreation season and are reserved almost every weekend. Other group picnic shelters are also well used during the recreation season. There are only two recreation areas that are not subject to inundation from fluctuations in lake levels: the Visitor Center/Dam Overlook Area and the Below Dam Area. The Below Dam Area currently does not have a group picnic shelter and the group picnic shelter near the Visitor Center does not have electricity. Consideration should also be given to an additional large group picnic shelter in the Big Branch Day Use Area.

Providing a group picnic shelter in the Below Dam Area and electricity at the Visitor Center Area shelter along with a new group picnic shelter in the Big Branch Day Use Area would better meet the demand for picnicking at the Project.

#### **4.8.7 Sightseeing**

The highest percentage of visits to R.D. Bailey Lake is for sightseeing, and sightseeing activity is projected to be stable in the future. While significant new facilities for sightseeing may not be warranted based on these projections, there are some opportunities to enhance the recreational experience. These include periodically updating exhibits at the Visitor Center and providing specific information on locations of scenic resources that are specifically geared toward sightseeing visitors.

#### **4.8.8 Swimming**

There is currently no swimming beach at R.D. Bailey Lake and swimming activity is low and projected to remain relatively stable with a slight decline. However, visitation data indicates that visitors do swim from boats. There does not appear to be a need for new facilities related to swimming.

#### **4.8.9 Waterskiing**

Waterskiing takes place on R.D. Bailey Lake during the summer months, but it is not a significant recreational activity in relation to other activities. Based on the lake carrying capacity analysis in Section 4.7.5, the lake is sufficient for current and future waterskiing demand.

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## **5.0 RESOURCE USE OBJECTIVES**

The objectives for the use of Project resources, both manmade and natural, are presented in this section. The objectives are used to guide development in the Project area and also guide resource management to obtain the greatest possible benefit through meeting the needs of the public and protecting and enhancing the environment. In the development of the objectives, the following were considered: authorized Project purposes, applicable Federal laws and directives, regional needs, resource capabilities, and expressed public desires. The information in Sections 2, 3, and 4 form much of the basis for the resource use objectives.

While implementing the following objectives, opportunities to increase efficiencies, cost effectiveness, and innovation at the Project should be considered. Consistent with EO 13514, specific measures to pursue include energy efficiencies, reduction of water consumption, reduction of carbon emissions and reduction of operations and maintenance costs.

### **5.1 Resource Use Objective 1**

*Increase and enhance boating and fishing.*

#### **5.1.1 Measures to Achieve Objective**

1. Provide marina and/or concessionaire with supporting amenities.
2. Provide designated fishing opportunities.
3. Improve winter boating access.
4. Improve small boat access.

#### **5.1.2 Justification**

There has been historical demand for recreational fishing and boating at the Project. However, there has been a reduction in boating and fishing activity at R.D. Bailey Lake since the closure of the marina. Results from the public scoping meeting indicate a desire for a new marina, with concessions, fuel, and boat slips. Additionally, the carrying capacity analysis of the lake indicates that it can support additional recreational boating activities while maintaining a quality recreational boating and fishing experience. Current lake utilization, according to the lake carrying capacity analysis is low to moderate. Regionally, there are no marina facilities within a 1-hour drive of R.D. Bailey Lake and only two marinas within a 2-hour drive.

The lake has significant aquatic resources and the capability to support fishing. The tailwater is stocked with trout in the spring and fall and is heavily fished during that period. The lake is stocked with hybrid striped bass and blue catfish, and fishing is the primary activity on the lake. Due to the terrain of the Project, there is limited opportunity for shoreline fishing in the lake. Although certain areas may lend themselves to shoreline fishing, there are no areas designated and accessible for this activity.

## **5.2 Resource Use Objective 2**

*Improve camping.*

### **5.2.1 Measures to Achieve Objective**

1. Provide water and sanitary sewer connections at existing improved campsites.
2. Provide amenities such as cellular service and internet capabilities (e.g., wireless internet) throughout the campground.
3. Accommodate overflows.
4. Reduce operations and maintenance costs.

### **5.2.2 Justification**

The recreation program analysis indicates a shift away from tent camping toward RV camping. It also indicates a shift in the area of influence to an aging population that desires an upgraded RV camping experience, such as water and sanitary sewer connections and internet capability to enhance their camping experience. Additionally, campers have expressed a desire for the security of a reserved campsite, especially during peak recreational periods and holiday weekends.

## **5.3 Resource Use Objective 3**

*Manage natural habitat.*

### **5.3.1 Measures to Achieve Objective**

1. Maintain a healthy and diverse forest.
2. Improve hunter access.
3. Protect against the introduction of invasive species and, where present, control and monitor in a cost effective and environmentally sound manner.

4. Identify and delineate the location and size of protected or unique ecosystems, such as wetlands, bottomland hardwoods, old growth forests, etc.
5. Protect and/or enhance ecologically sensitive areas.

### **5.3.2 Justification**

Justification includes supporting the policies and EOs on wetlands and invasive species as well as environmental stewardship programs described in Section 1.0. The WMA is utilized for hunting and hunters have expressed public desire to improve access to hunting areas. There is currently no timber management program at the WMA, which has a very high percentage of forested lands (approximately 90%). The WVDNR has expressed interest in implementing timber management initiatives at the Project with the intent to create a diversity of habitats, which in turn will improve the hunting experience.

## **5.4 Resource Use Objective 4**

*Enhance opportunities for sightseeing, environmental education, and interpretative opportunities.*

### **5.4.1 Measures to Achieve Objective**

1. Periodically update existing visitor displays at the Visitor Center to provide enhanced environmental education and interpretive opportunities.
2. Increase interpretive features.
3. Develop a vegetative management plan for existing scenic overlooks.

### **5.4.2 Justification**

The Project is host to interesting topography, vegetation, scenic resources, and abundant wildlife that provide a quality environment for sightseeing and associated eco-tourism activities.

Nationally, there is a trend toward increased participation in sightseeing activities, including viewing interpretive displays. Resource managers have stated that existing exhibits at the Visitor Center need to be updated and modernized. There is also a trend towards shorter trails with educational and interpretive features.

Sightseeing is the most popular recreational activity at the Project based on the recreation program analysis. The Project offers spectacular views of the lake's scenic viewsheds.

## **5.5 Resource Use Objective 5**

*Support unique, environmentally sensitive, and culturally sensitive areas.*

### **5.5.1 Measures to Achieve Objective**

1. Manage habitat to support a selected number of regionally important neotropical migrant species.
2. Identify and delineate the location, size, and type of wetlands.
3. Enhance existing wetlands and/or create new wetlands.
4. Protect and interpret environmentally unique ecosystems including the Grassy Lick Timber Stand.
5. Protect cultural resources unique to the Project including: Old Homestead masonry chimneys, the campground railroad tunnel, and railroad mileage posts.

### **5.5.2 Justification**

In addition to supporting the laws and EOs described in Section 1.0 that require the conservation of wildlife and plant species and prohibit the destruction of wetlands, there are opportunities at the Project to provide support for environmentally sensitive areas. A comprehensive delineation of the wetlands at the Project has not been completed since the construction of R.D. Bailey Lake dam. Conservation of the natural habitat within the Project would maintain the rich ecological diversity of the area and also attract visitors to the Project.

## **5.6 Resource Use Objective 6**

*Enhance day-use facilities.*

### **5.6.1 Measures to Achieve Objective**

1. Provide electrical service to all group picnic shelters.
2. Encourage the development of hiking and bicycle trails.
3. Provide additional picnic shelters to meet demand.

### **5.6.2 Justification**

Group picnic shelters with electricity and the capability to be reserved are in high demand and utilized nearly every weekend during the recreation season. Enhancing existing group shelters by providing electricity will allow additional shelters to be reserved during the recreational season for which there is a strong demand. There are two recreation areas that are not subject to flooding due to fluctuations in lake levels; and they are the Below Dam Area and the Visitor

Center/Dam Overlook Area. The Below Dam Area does not have a group picnic shelter and the Visitor Center group picnic shelter does not have electrical service.

According to the West Virginia SCORP, the combination of walking/hiking/jogging is the most popular daily/weekly activity in 11 out of the 12 West Virginia SCORP Regions and is pursued by one third to one half of the local population. The USDA Forest Service forecasts that participation in hiking will increase faster than the population. Bicycle riding is in the top three daily/weekly activities in all four of the SCORP Regions relevant to the Project, with approximately 10 percent of the population participating.

## **5.7 Resource Use Objective 7**

*Identify state-of-the-art technology and methods to access and extract minerals within the Project that would avoid or minimize impacts to sensitive environmental, natural, and recreational resources.*

### **5.7.1 Measures to Achieve Objective**

1. Develop lessons learned and best management practices (BMP) guidance for access and extraction of minerals at the Project.
2. Identify technologies, such as directional drilling that may reduce impacts for inclusion in the BMP guidance.
3. Establish protocol for communication and exchange of ideas between Project Resource Managers, resource agencies, and mineral extraction entities.

### **5.7.2 Justification**

There are significant natural gas resources at the Project and there is anticipated future demand for these reserves. There are currently plans for new gas exploration activities at the Project. There are significant tracts of land within the Project for which the Federal Government does not own the mineral rights and private owners have a right to access their minerals. Significant lessons have been learned relative to methods and strategies associated with previous gas extraction operations that can help mitigate impacts.

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## **6.0 LAND ALLOCATION AND CLASSIFICATION**

This chapter presents the land allocation and classification for Project lands. Land allocation and land classification provide for the orderly development, use, and management of Project lands and waters. Land allocation and classification categories are established for USACE Projects based on ER 1130-2-550, Recreation Operations and Maintenance Policies.

### **6.1 Land Allocation**

Land allocations identify the authorized purposes for which project lands were acquired. The entire Project has a land allocation of Operations. Operations lands are those lands acquired to provide safe, efficient operation of the project for its authorized purposes. The Project purposes include flood risk management, recreation, water quality, and wildlife management. No separable lands for recreation, fish and wildlife, or mitigation were acquired for the Project.

### **6.2 Land Classification**

Allocated R.D. Bailey Lake Project lands are further classified to provide for development and resource management consistent with the authorized Project purposes and the provisions of NEPA and other Federal laws. The classification process refines the land allocation to fully utilize Project lands and considers public desires, legislative authority, regional and Project-specific resource requirements, and suitability. General land classification categories as defined in ER 1130-2-550 include:

1. Project Operations
2. Recreation
3. Mitigation
4. Environmental Sensitive Areas
5. Multiple Resource Management
  - a) Recreation – Low Density
  - b) Wildlife Management General
  - c) Vegetative Management
  - d) Inactive and/or Future Recreation Areas
6. Easement Lands

Table 6-1 identifies land classifications per ER 1130-2-550 and the R.D. Bailey Lake Project lands included in those classifications with their associated acreage. Following Table 6-1 is a description of each land classification and the Project areas included in that classification as shown in Figure 6-1.

**Table 6-1: Land Classification and Designated Project Areas**

	<b>Land Classification</b>	<b>Project Areas Included</b>	<b>Acreage</b>
1	Project Operations	Visitor Center and Dam Overlook	1
		Below Dam Area & Winter Boat Launch	15
		Other portion of dam site area not included above	196
		<b>Total</b>	<b>212</b>
2	Recreation  (Intensive Use)	Guyandotte Point	5
		Big Branch Day Use Area	13
		Guyandotte Campground (Reedy Creek, Locust Branch, and Primitive Campground overflow area))	46
		Wyoming County Board of Education	-----
		<b>Total</b>	<b>64</b>
3	Mitigation	No applicable lands	0
4	Environmental Sensitive Areas	Grassy Lick Timber Stand	150
5	Multiple Resource Management		
	a) Recreation - Low Density	Long Branch Overlook	1
	b) Wildlife Management General	Wildlife Management Area	17,038
	c) Inactive and/or Future Recreation Areas	Sugar Camp	15
		Smith Bend	19
	<b>Total</b>		<b>17,073</b>

### 6.2.1 Project Operations

This classification includes lands required for the dam and associated structures, operations center, administrative offices, maintenance compounds, and other areas that are used to operate and maintain the R.D. Bailey Lake Project. Where compatible with operational requirements, Project operations lands may be used for wildlife habitat management, recreational use, or agricultural activities. Licenses, permits, easements, or other outgrants are issued only for uses that do not conflict with operational requirements.

At the Project, the Dam Site Area including the Visitor Center and the Below Dam Area have been identified as operational areas. The Below Dam Area includes the winter boat launch, which is only open to the public during the winter season due to lack of other available lake access. The Below Dam Area was constructed after the institution of PL 89-72 with 100%

Federal funding because it is an operational area; however, it cannot be further developed without a non-Federal, cost-sharing partner.

### **6.2.2 Recreation – Intensive Use**

These lands are designated for intensive levels of recreational use to accommodate and support the recreational needs and desires of project visitors. They include lands on which existing or planned major recreational facilities are located and allow for developed public recreation facilities, concession development, and high-density or high-impact recreational use.

In general, no uses of these lands are allowed which would interfere with public recreation opportunities. Low-density recreation and wildlife management activities compatible with intensive recreation use are acceptable, especially on an interim basis. No agricultural uses are permitted on those lands except on an interim basis for maintenance of scenic or open space values. Permits, licenses, and easements are not issued for non-compatible manmade intrusions such as pipelines; overhead transmission lines; and non-project roads, except where warranted by the public interest. Project areas under this land classification include the Wyoming County Board of Education outgrant area, Guyandotte Point, Big Branch Day Use Area, and the Guyandotte Campground facilities.

### **6.2.3 Mitigation**

This classification only includes land acquired or designated specifically for mitigation. No mitigation lands exist at the Project.

### **6.2.4 Environmentally Sensitive Areas**

This classification consists of areas where scientific, ecological, cultural, or aesthetic features have been identified. Development of public use on lands within this classification is normally limited or prohibited to ensure that the sensitive areas are not adversely impacted. Agricultural or grazing uses are not permitted on lands with this classification. The project area under this classification is the Grassy Lick Timber Stand.

### **6.2.5 Multiple Resource Management**

This classification includes lands that are managed for one or more of the following sub-categories: (a) low density recreation, (b) wildlife management, (c) vegetative management, and (d) inactive and/or future recreation. However, management of these lands is not limited to these activities to the extent that they are compatible with the primary allocation(s).

### **A. Multiple Resource Management: Recreation - Low Density**

These lands are designated for dispersed and/or low-impact recreation use. Development of facilities on these lands is limited. Emphasis is on providing opportunities for non-motorized activities such as walking, fishing, hunting, or nature study. Site-specific, low-impact activities such as primitive camping and picnicking are allowed. Facilities may include boat ramps, boat docks, trails, parking areas and vehicle controls, vault toilets, picnic tables, and fire rings.

Manmade intrusions, including power lines, non-project roads, and water and sewer pipelines, may be permitted under conditions that minimize adverse effects on the natural environment. Vegetation management, including agricultural activities that do not greatly alter the natural character of the environment, are permitted for a variety of purposes, including erosion control, retention and improvement of scenic qualities, and wildlife management. Where not in conflict with the safety of visitors and project personnel, hunting and fishing are allowed pursuant to tribal or State fish and wildlife management regulations. At the Project, the Long Branch Overlook has been identified as a low density recreation area.

### **B. Multiple Resource Management: Wildlife Management General**

These lands are designated for wildlife management. They contain valuable wildlife habitat components that are maintained to yield habitat suitable for a designated wildlife species or group of species. These lands may be administered by other public agencies under a lease, license, permit, or other formal agreement. The WVDNR has a license for wildlife management activities at the Project. Private use of wildlife lands is prohibited except for agricultural activities undertaken to improve wildlife habitat. Licenses, permits, and easements are not normally allowed for such manmade intrusions as pumping plants, pipelines, cables, transmission lines, or non-project roads. However, because of the MOU with the mineral rights owners that exists at R.D. Bailey Lake, this will occur at the Project. Exceptions to this policy are also allowable where necessary for the public interest. Wildlife lands are available for sightseeing, wildlife viewing, nature study, and hiking. Consumptive uses of wildlife, including hunting, fishing, and trapping, are allowed when compatible with the wildlife objectives for a given area and with Federal and State fish and wildlife management regulations.

### **C. Multiple Resource Management: Vegetative Management**

Management activities in these areas focus on the protection and development of forest resources and vegetative cover. There are no lands designated at the Project under this land classification.

#### **D. Multiple Resource Management: Inactive and/or Future Recreation Areas**

This sub-classification consists of lands for which recreation areas are planned for the future or lands that contain existing recreation areas that have been temporarily closed. There are two areas with this classification on the R.D. Bailey Project: Sugar Camp and Smith Bend, which have been temporarily closed.

##### **6.2.6 Easement Lands**

Lands in this sub-category include all lands for which the USACE holds an easement interest, but no fee title. Planned use and management of easement lands will be in strict accordance with the terms and conditions of the easement estate acquired for the Project.

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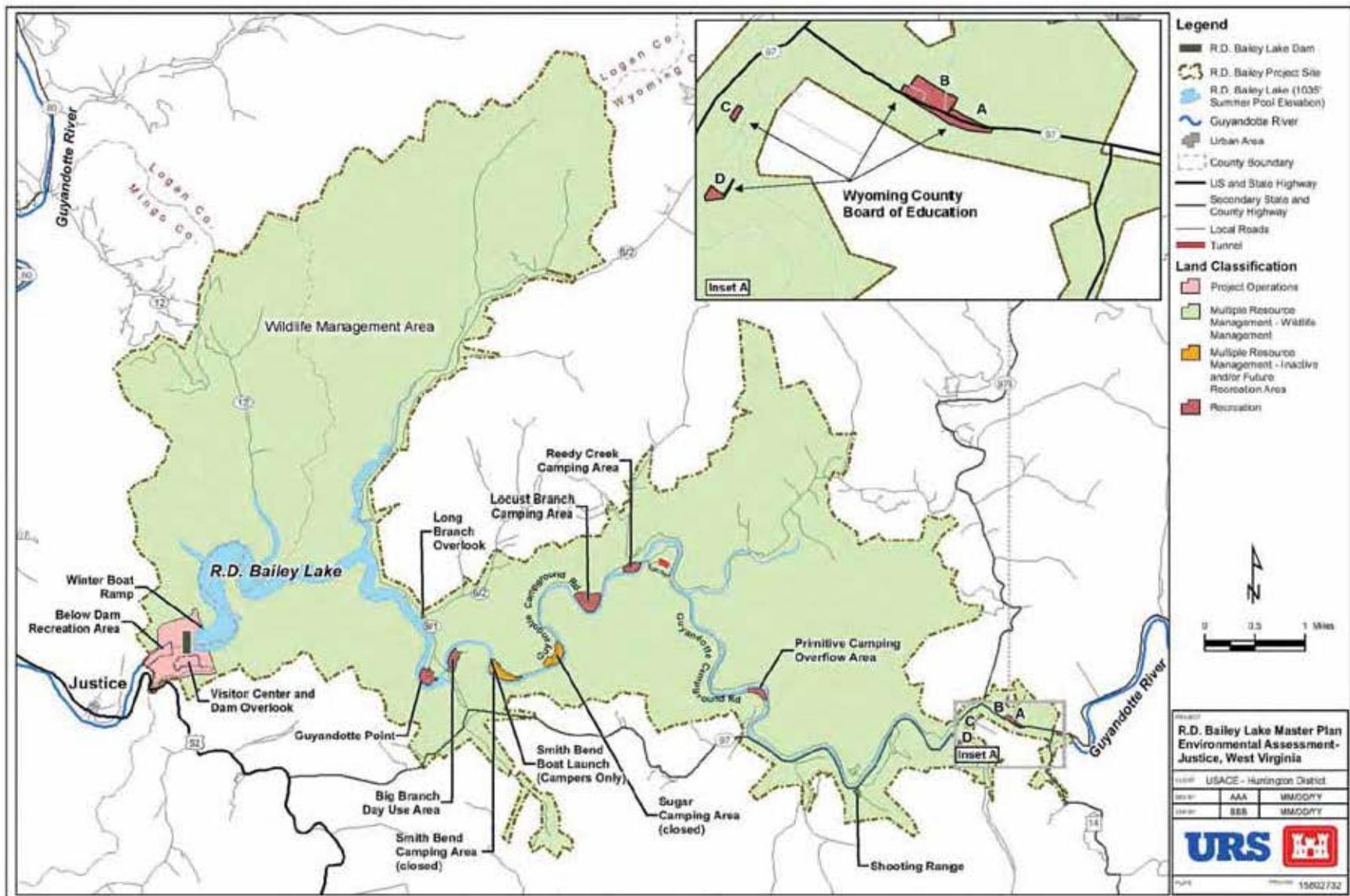


Figure 6-1: Land Classification Map

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## 7.0 RESOURCE PLAN

This section presents the plan for resource use and development at the R.D. Bailey Lake Project. The plan includes the identified key issues and the recommended actions or strategies to address each issue. The issues and recommended actions are presented in Table 7-1. Table 7-1 contains the following information for each Project area:

- **Land Classification** – Land use classification. See Section 6.0 for more information on land classifications.
- **Management Agency** – Agency or agencies directly responsible for managing a Project area.
- **Issues** – Identified issues which are based on input from the public and interested agencies. Each issue relates to a resource use objective (RUO) listed in Section 5.0.
- **Recommendations** – Proposed actions or strategies to address the identified key issues. Recommendations are conceptual in nature and will be translated into operational terms in greater detail in the Operational Management Plans. Prior to the implementation of any development activity, additional environmental studies and economic analysis may be conducted if necessary. The recommendations relate to the Project-specific measures that are intended to achieve the RUO listed in Section 5.0.

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Table 7-1 Resource Plan for the R.D. Bailey Lake Project

Project Area	Land Classification	Management Agency	Issue	Recommendations
Visitor Center and Dam Overlook	Project Operations	USACE	The Visitor Center provides interpretive and educational opportunities to enhance awareness of Project features, purposes, and benefits, but the information is outdated. (RUO 4)	<ul style="list-style-type: none"> <li>Update visitor displays in the Visitor Center. Displays should include Project description, site ecology, area history, cultural resources, and other management objectives.</li> <li>Provide interpretive signage along approximately the first 1,000 feet of the Salt River Trail as an outdoor extension of the interpretive displays in the Visitor Center. Information regarding native vegetation, wildlife, and geologic features could be highlighted.</li> <li>Provide electrical service to the group picnic shelter located across the parking lot from the Visitor Center.</li> </ul>
			Group picnic shelters are popular at the Project and the group picnic shelter at the Visitor Center is the only one not subject to inundation from fluctuations in lake pool level. It does not have electrical service. (RUO 6)	
Below Dam Recreation Area	Project Operations	USACE	The USACE cannot implement recreational improvements within the Below Dam Area without a non-Federal sponsor. This area is one of the only recreational areas within the Project that does not flood due to fluctuations in the lake pool level during flood events. (RUO 6)	<ul style="list-style-type: none"> <li>Actively seek a non-Federal cost-sharing partner to develop and manage this area. Potential sponsors may include the state, local municipalities, and public-private partnerships with industry.</li> <li>Develop recreation-related facilities, such as a group picnic shelter, associated parking, and playground in the Below Dam Area. The group picnic shelter should have electrical service, a grill, trash receptacles, and be available for reservations. (See Figure 7-1).</li> </ul>
			The Below Dam Area has high intensity use during trout stocking in the Spring and Fall and is a popular fishing area. (RUO 1). Group picnic shelters are in demand at the Project; however, no group picnic shelters exist in the Below Dam Area. This is one of the few recreation areas that is not subject to flooding from fluctuations in lake levels. This area is also in relative close proximity to population centers compared to other day use recreation areas. (RUO6)	
Winter Boat Ramp Area	Project Operations	USACE	The marina at Guyandotte Point was closed in 2008. The closure has left an unmet demand for boat slips, fuel, and concessions at the Project. It has also resulted in a reduction in utilization of the lake for boating and fishing. Night-time fishing was popular and is now very limited due to the closure of the marina. Substantial fluctuations in lake levels, accumulation of debris, sedimentation, and swift currents due to flood events are impediments to marina development at Guyandotte Point and contributed to the closure of the marina. Based upon these issues, sustainability of marina development is limited at Guyandotte Point.	<ul style="list-style-type: none"> <li>Seek a non-Federal partner or private developer to develop a marina at the Winter Boat Ramp site. Improvements should include approximately 30-35 seasonal boat slips for privately owned boats, 2-3 additional boat slips for transient use, and 2-3 boat slips for rental boats. (See figure 7-2)</li> <li>Supporting marina services should include fuel sales, concessions, and/or a possible restaurant.</li> <li>Develop parking for vehicles and trailers and provide adequate boat ramp capacity with supporting courtesy docks. Utilities including potable water, sanitary sewer service, and electrical service will also need to be provided. (See Figure 7-2)</li> </ul>
			The Winter Boat Ramp site is not subject to significant sedimentation issues and rapid current associated with flood events relative to marina development compared to Guyandotte Point. The site is also on a much wider expanse of the lake providing a more desirable location for boating activities. This site provides a more sustainable location for marina development. This area is also in closer proximity to population centers compared to Guyandotte Point. (RUO 1)	
Guyandotte Point	Recreation (Intensive Use)	USACE	The marina at Guyandotte Point was closed in 2008. The closure has left an unmet demand for boat slips, fuel, and concessions at the Project. It has also resulted in a reduction in utilization of the lake for boating and fishing. Night-time fishing was popular and is now very limited due to the closure of the marina. Substantial fluctuations in lake levels, accumulation of debris, sedimentation, and swift currents due to flood events are impediments to marina development at Guyandotte Point and contributed to the closure of the marina. Based upon these issues, sustainability of marina development is limited at this site. (RUO 1)	<ul style="list-style-type: none"> <li>Pursue development of a marina at the Winter Boat Ramp Site. (See Winter Boat Ramp Area)</li> <li>Maintain current facilities at Guyandotte Point in the interim. However, if a new marina is developed at the Winter Boat Ramp Area, the boat ramp should be maintained, but parking could be reduced to approved levels.</li> </ul>

Table 7-1 Resource Plan for the R.D. Bailey Lake Project

Project Area	Land Classification	Management Agency	Issue	Recommendations
Big Branch Day Use Area	Recreation (Intensive Use)	USACE	<p>The Big Branch Day Use Area has relatively high use on weekends during the recreation season. The large group picnic shelter is the most popular shelter and is rented basically every weekend. During this time period, the two smaller shelters are also popular, but lack electrical service, which is desirable for group events. (RUO 6)</p>	<ul style="list-style-type: none"> <li>• Develop an additional group picnic shelter.</li> <li>• Provide electrical service to the two smaller group picnic shelters. (See Figure 7-3)</li> </ul>
			<p>Fishing is one of the most popular activities at the Project. The steep rocky shoreline of the lake significantly limits the opportunities for bank fishing and no specific areas have been designated for accessible shoreline fishing. The area near the entrance to the Big Branch Day Use Area provides a gently sloping site on the lake for accessible shoreline fishing opportunities. (RUO 1)</p>	<ul style="list-style-type: none"> <li>• Develop a universally accessible fishing pier near the entrance to the Big Branch Day Use Area with associated accessible parking. (See Figure 7-3).</li> </ul>
Guyandotte Campground	Recreation (Intensive Use)	USACE	<p>The Sugar Camp and Smith Bend campgrounds have been closed due to frequent inundation, are overgrown, and in poor condition. Providing sewer and water connections to these two campground areas would require a three mile water line extension and new restrooms.</p> <p>Open campgrounds including Locust Branch and Reedy Creek have had adequate capacity to meet demand for camping however, they do operate near capacity on holiday weekends during the recreation season.</p> <p>The Primitive Camping Area near the campground entrance is not subject to frequent inundation, is closer to potable water service and a more sustainable location for camping use than the Sugar Camp and Smith Bend Campgrounds. (RUO2)</p>	<ul style="list-style-type: none"> <li>• Permanently close Sugar Camp and Smith Bend campgrounds and use the primitive campground for overflow camping. ( See Figure 7-4)</li> </ul>
			<p>There is a national shift toward RV camping versus tent camping, and an associated demand for upgraded facilities to support RV camping. Demographics within the area of influence also indicate an aging population who desire upgraded RV camping facilities. (RUO 2)</p> <p>The RV campsites at Guyandotte Campground currently do not provide water and sanitary sewer connections or internet service, which many RV campers desire.</p> <p>There is no current process in place to reserve campsites in advance at R. D. Bailey Lake campgrounds. The remoteness of the area appears to be a deterrent during peak recreation season without the ability to reserve camping sites. (RUO 2)</p>	<ul style="list-style-type: none"> <li>• Provide water and sanitary sewer connections at individual campsites at Locust Branch Campground and Reedy Creek Campground.</li> <li>• Provide wireless internet service throughout the campground. Wireless internet is an amenity that has been growing in popularity and would be used by a wide variety of visitors.</li> <li>• Implement a process to accept campsite reservations especially for the peak recreation season utilizing the Federal website <a href="http://www.recreation.gov">www.recreation.gov</a>.</li> </ul>
Long Branch Overlook	Multiple Resource Management (Low Density Recreation)	USACE	<p>Sightseeing is the most popular activity at the Project. The Long Branch Overlook provides a scenic vista of the lake and Guyandotte Point, but overgrown vegetation partially obstructs the view. (ROU 4)</p>	<ul style="list-style-type: none"> <li>• Establish a vegetative management plan to enhance and maintain the views from this existing overlook.</li> <li>• Provide educational or interpretive signage regarding the lake and surrounding ecosystem for sightseers.</li> </ul>

Table 7-1 Resource Plan for the R.D. Bailey Lake Project

Project Area	Land Classification	Management Agency	Issue	Recommendations
Wildlife Management Area	Multiple Resource Management, Wildlife Management General	WVDNR	The Project area has a high percent of forested land, but no timber management program has been in place, limiting diversity of habitat and successional growth areas. (RUO 3)	<ul style="list-style-type: none"> <li>Implement a timber management program to aid in creating diversity of habitat and age classes; potentially including clear cuts, thinning, successional habitats, and wildlife clearings. Also promote regeneration of oak forest.</li> </ul>
			The Project includes steep topography and rough terrain making access to some areas of the WMA difficult. Many current access roads are gated due to lack of maintenance and are in poor condition. (RUO 3)	<ul style="list-style-type: none"> <li>Where possible, coordinate development of timber management and gas well access roads to support improved hunting access to remote areas of the WMA and select ridge tops.</li> </ul>
			The locations and extent of unique and sensitive ecosystems are not well defined, which hinders the ability to provide effective management. (RUO 3)	<ul style="list-style-type: none"> <li>Conduct a baseline study that identifies the location and size of old growth forest, wetlands, bottomland hardwoods, and hemlock stands throughout the Project and develop a monitoring program. Knowing the amount and range of the habitats would allow losses or gains to be tracked.</li> </ul>
			The Project area includes unique habitats that are in regional decline such as old growth forest, wetlands, and bottomland hardwoods, some of which support neo-tropical migratory birds. (RUO 3 and RUO 5)	<ul style="list-style-type: none"> <li>Adapt management activities to conserve and protect unique habitats at the Project.</li> </ul>
			Entrance signage and boundary markers for the Wildlife Management Area are in poor condition. (RUO 3)	<ul style="list-style-type: none"> <li>Replace and upgrade entrance signs to the Wildlife Management Area and provide informational kiosks with hunting regulations.</li> </ul>
			There is currently no designated area for non-motorized small boat access in the headwaters area on the Guyandotte River within the Wildlife Management Area. (RUO 1)	<ul style="list-style-type: none"> <li>Develop a non-motorized small boat access point in the headwaters area of the Guyandotte River within the Wildlife Management Area.</li> </ul>
Wyoming County Board of Education	Recreation (Intensive Use)	Wyoming County Board of Education	No issues were identified for this outgrant area.	<ul style="list-style-type: none"> <li>Maintain existing facilities at this location.</li> </ul>
Project Wide	Not Applicable	Multiple Agencies	Invasive species are present on site and may potentially threaten existing natural ecosystems. (RUO 3)	<ul style="list-style-type: none"> <li>Implement an invasive species plan to prevent the introduction of invasive species and control and monitor invasive species already present at the Project area in a cost effective and environmentally sound manner.</li> </ul>
			There are significant gas reserves within the Project area with substantial ongoing production and planned new exploration. The Federal Government does not own oil and gas mineral rights on a large segment of the Project. Impacts associated with development of new gas well sites and associated access impacts are major concerns. The USACE has not had adequate input on well site location and access road alternatives to be able to define the least damaging alternative and techniques utilized. (RUO 7)	<ul style="list-style-type: none"> <li>Develop guidance from lessons learned and on BMPs specific to R.D. Bailey Lake for oil and gas exploration and production activities.</li> <li>Implement on-site field meetings to review alternatives and strategies to avoid and minimize impacts to resources.</li> <li>Develop desired protocol for communication between the oil and gas/mining concerns, the USACE, and the WVDNR.</li> <li>Investigate and promote the use of new drilling technologies to minimize impacts to sensitive environmental, natural, and recreational resources.</li> <li>Promote utilization of existing access roads or disturbed corridors when possible or reasonable. When new access roads are necessary, promote designs and construction techniques so as to minimize impacts to natural, cultural, and recreational resources, while providing for timber management and wildlife management access.</li> </ul>

WVDNR = West Virginia Division of Natural Resources  
 USACE = U.S. Army Corps of Engineers

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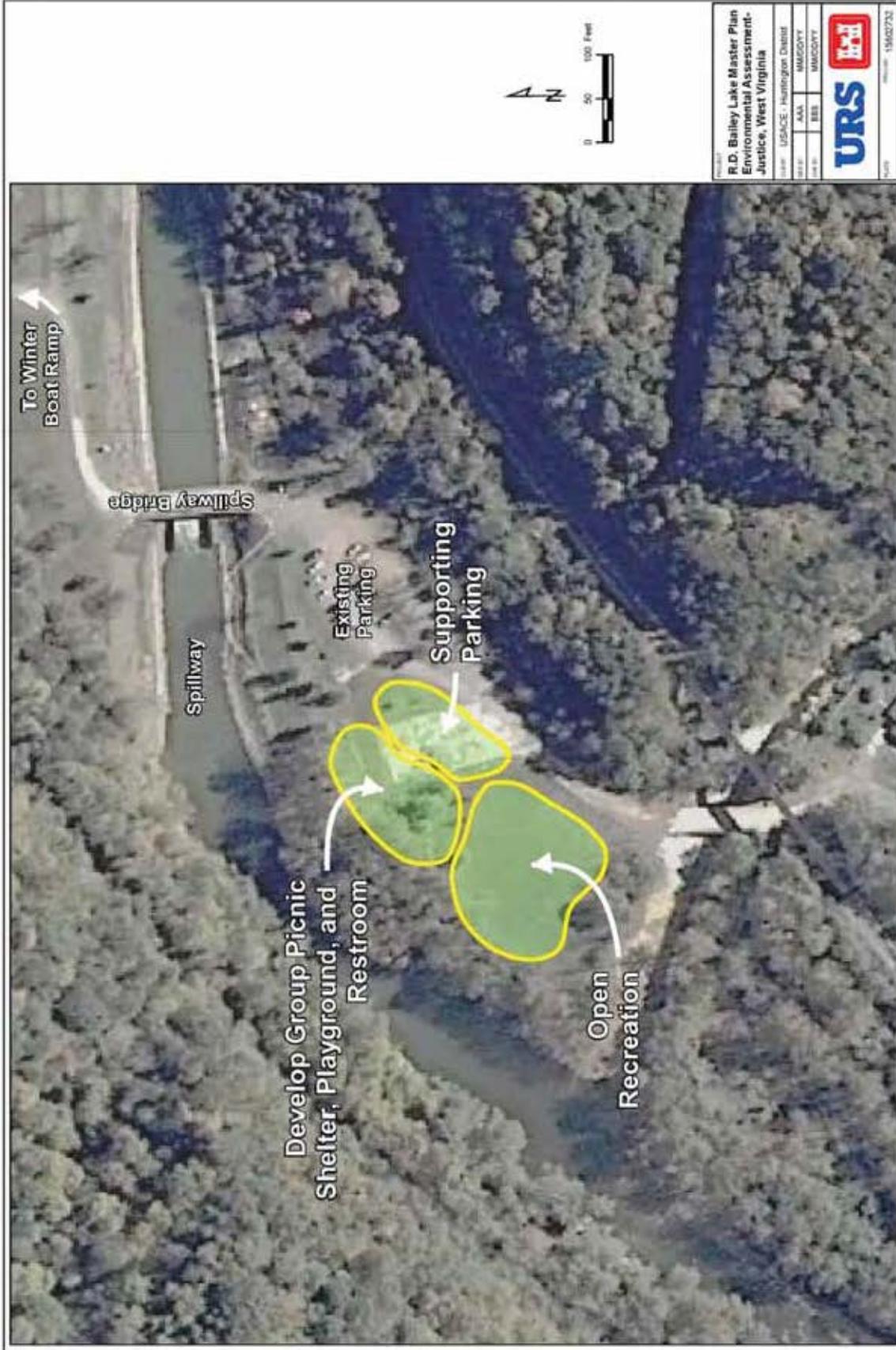


Figure 7-1: Below Dam Recreation Area

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Figure 7-2: Winter Boat Ramp Area Proposed Marina Site

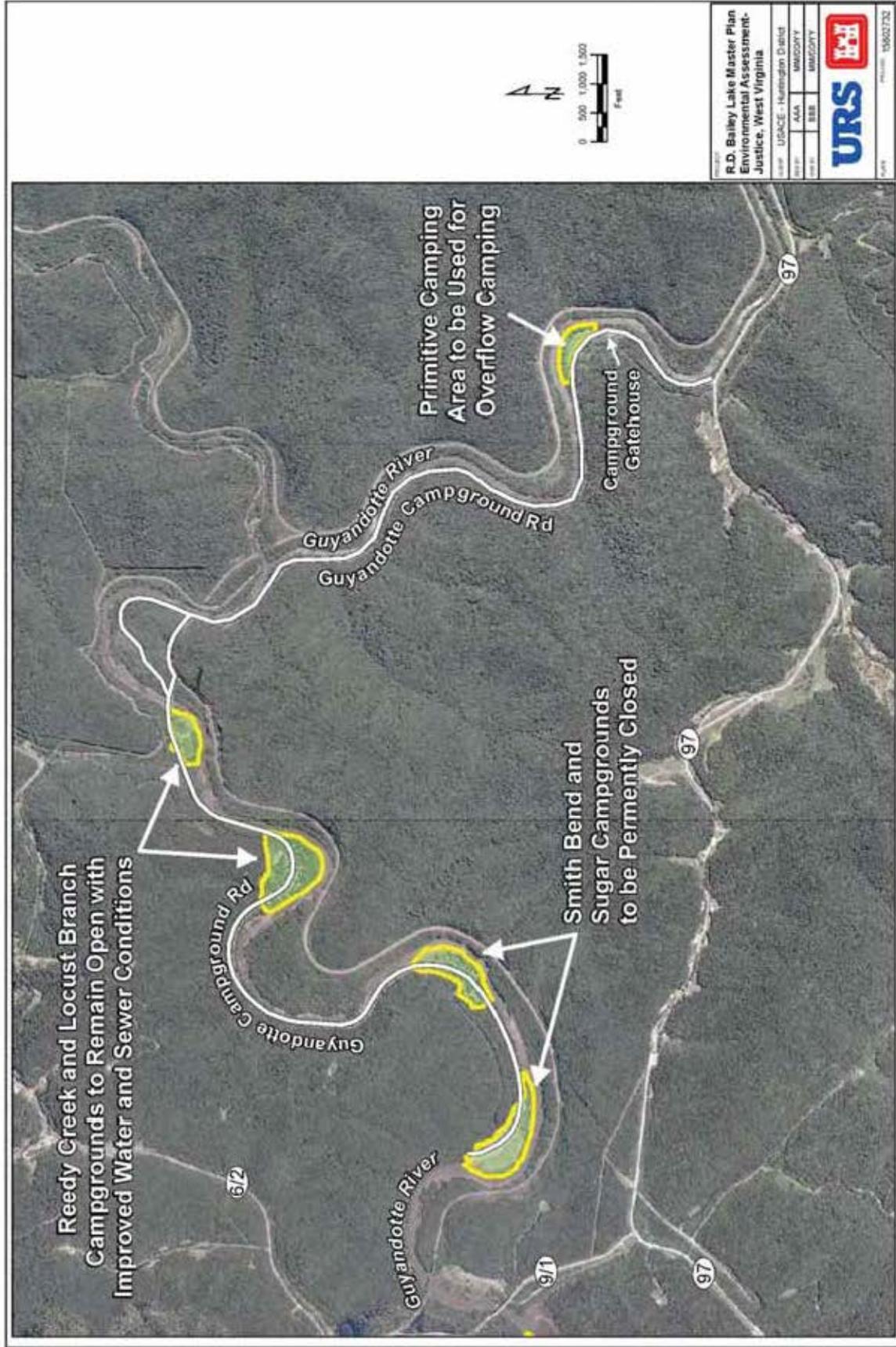
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R.D. Bailey Lake Master Plan  
 Environmental Assessment-  
 Justice, West Virginia  
 USACE - Huntington District  
 AAJ WACOBY  
 BEB WACOBY  
**URS**  
 10007732

Figure 7-3: Big Branch Day Use Area

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PROJECT  
**R.D. Bailey Lake Master Plan  
 Environmental Assessment-  
 Justice, West Virginia**

STATE: USACE - Huntington District  
 DISTRICT: AAA  
 COUNTY: MORGAN  
 PROJECT: 888  
 DRAWING: MORGAN

**URS**

DATE: 05/02/2023

Figure 7-4: Guyandotte Campground

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## **8.0 SPECIAL PROGRAMS**

According to EP 1130-2-550, Recreation Operations and Maintenance Guidance and Procedures (USACE, 1996a), special programs are programs or situations that should be identified and discussed in a Master Plan, but are not covered in other sections of the plan. Four special programs were identified during the public scoping process. These special programs are:

- Proposed water treatment plant for local communities potable water supply;
- Use of all terrain vehicles (ATV);
- Proposed hydroelectric development; and
- Consideration of utility corridors at the Project.

### **8.1 Proposed Water Treatment Plant**

The Region One Planning and Development Council of West Virginia, acting through its project sponsor, Ravencliff-McGraws-Saulsville Public Service District (RMSPSD), has made a request to the USACE to provide the necessary amount of water to meet the future demands of a three county water service expansion area that is proposed as part of the R.D. Bailey Regional Water Project. The forecasted maximum amount of water supply required for the proposed regional public water system is 6.0 million gallons per day (MGD) in the year 2051.

Currently, a water reallocation study is being conducted by the USACE Huntington District to determine hydraulic impacts, potential costs, and environmental impacts to Federal land. The USACE will have to add municipal and industrial water supply as an authorized use at R.D. Bailey Lake. The USACE has the authority to reallocate storage capacity if the reallocation does not severely affect other authorized purposes and will not involve major operational or structural changes. The Commander of the USACE has discretionary authority to reallocate 50,000 acre-feet or 15 percent of the total authorized storage, whichever is less. Reallocation above the discretionary authority limits requires the approval of Congress.

#### **8.1.1 Proposed Concept and Features**

The RMSPSD proposes to utilize R.D. Bailey Lake as a dependable raw water supply source for the R.D. Bailey Regional Water Project. The proposed reallocation of R.D. Bailey Lake water would: 1) provide safe potable water to areas not currently served by a public water system in the region; 2) retain the current population in the region; and 3) have the potential to grow population within the region (Pentree, 2009).

An intake structure would be constructed immediately adjacent to R.D. Bailey Lake with two raw water intake lines extending out to the lake. In addition, raw water line construction (20-inch diameter) and associated easements on Federal land would be required for transmission lines connecting the intake structure to the proposed regional water treatment plant. The water treatment plant would not be located on USACE land. The right of access for water line easements and structures that are constructed on USACE property would have to be granted to the non-Federal sponsor by the USACE.

There are two alternatives, Option A and Option B, that are further detailed in Section 8.1.2. Although not located on Federal land, the proposed regional water treatment plant would require additional utility infrastructure that would include: electrical service for both the intake structure and water treatment plant; telephone service: telecable/internet service (land line or satellite service); radio telemetry for a communication system to remotely control and monitor the water system infrastructure; and a small waste water system at the treatment plant site.

### **8.1.2 Alternative Sites**

#### ***Option A: Intake, Distribution, and Water Treatment Plant***

As shown in Figure 8-1, Option A begins within USACE Federal land at a proposed intake structure located on the east side of R.D. Bailey Lake. The proposed raw water line is located parallel to, and on the west side of, County Route 6/2, which is also known as Coal Mountain Road. Preliminary design indicates that the raw water line would be constructed within the existing roadway right-of-way. The raw water line would continue south through the R.D. Bailey Lake Long Branch Overlook, which is located near Long Branch Road. The Norfolk Southern Railroad is located on the east side of Coal Mountain Road in this area. It would then follow County Route 9/1.

The raw water line would diverge from County Route 9/1 through the Guyandotte Point Boat Ramp and Marina. The alignment would then cross the Guyandotte River and continue along a Park Access Road that is used to reach the Big Branch Day Use Area. The raw water line alignment would cross to the south side of SR 97, cross the Norfolk Southern Railroad, and continue east to the proposed water treatment plant location on non-Federal land.

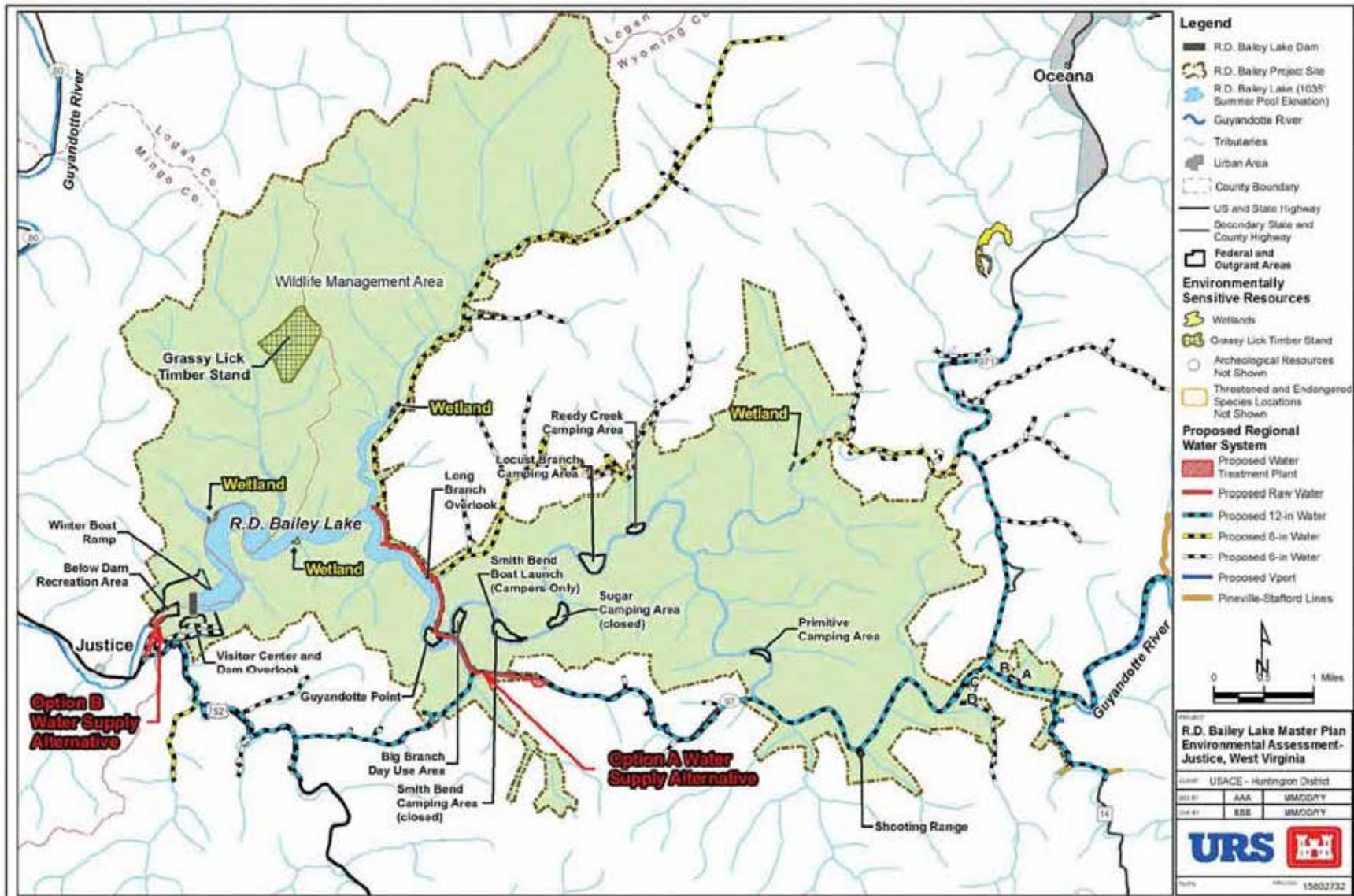


Figure 8-1: Water Reallocation Study

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In the draft study, Option A is identified as the preferred alternative due the location of its proposed intake structure near the large volume of water that is pooled above the dam.

The environmental impacts associated with Federal land for Option A from the Draft R.D. Bailey Lake Water Reallocation Study (USACE, 2011) are summarized below.

- Long-term impacts of project construction – There would be no long-term impacts of Option A to any environmental resource, including, but not limited to: prime farmland, floodplains, water quality, stream crossings, vegetation, terrestrial wildlife, aquatic resources, threatened and endangered species, noise, and aesthetics. As a result, Option A would have no long-term adverse impacts on the USACE authorized project purposes for R.D. Bailey Lake (i.e., flood risk management, recreation, water quality control, and fish and wildlife management).
- Short-term impacts of project construction - Construction of Option A would generate temporary, short-term adverse impacts on some environmental resources, as described below. Potential mitigation measures to reduce the level of these impacts are further described in the Draft R.D. Bailey Lake Water Reallocation Study.
  - Water Quality - Work on or near stream banks and on the lake shoreline could generate adverse impacts on water quality due to temporary increases in turbidity.
  - Wetlands and Stream Crossings - These impacts are anticipated to be minimal since the use of directional drilling under stream beds would reduce construction related impacts. Shorelines and banks would still be disturbed as part of clearing operations and mobilization of necessary equipment.
  - Vegetation - Under Option A, approximately 28,000 linear feet of raw water line would be constructed, all within USACE Federal land boundaries. Based on a rough, simplified estimate of trench width, Option A would result in approximately 6.4 acres of land disturbed for raw water line construction, which would include primarily vegetated land, but also non-vegetated land such as driveways, rocky slopes, and roadway surfaces. An additional 0.5 acre would be disturbed for intake structure installation. These estimates do not include construction staging areas or additional work areas that may be dictated by terrain conditions. The loss of existing vegetation as a result of project construction, followed by re-vegetation with different species post construction, would not generate adverse impacts.

- Terrestrial Wildlife - Construction activities would likely force wildlife to temporarily relocate to other suitable habitat in adjacent areas of the park. However, it is expected that this would be a short-term impact confined to the construction period and no unique or critical wildlife habitat would be affected by construction of Option A.
- Aquatic Resources - Construction operations to install the water intake on R.D. Bailey Lake under Option A would generate disturbances that could have some minor impacts on aquatic wildlife, but these effects would be temporary and confined to the construction period.
- Threatened and Endangered Species - Correspondence from the WVDNR dated October 9, 2009 indicated that a mussel survey would be required for the Guyandotte River crossing under Option A unless directional drilling is used due to the possible presence of the Federally-listed endangered fanshell mussel (*Cyprogenia stegaria*) (Pentree, 2009). At this time, it appears that directional drilling would be used, thus avoiding potential adverse effects on this species.
- Noise - Much of the proposed alignment of Option A would be constructed in undeveloped areas with minimal or no human use where the temporary increase in noise levels due to construction operations would have no adverse effects on any potentially noise-sensitive receivers or sites. However, there are three recreational areas frequented by park visitors on or near the proposed Option A alignment that would be impacted by elevated construction noise levels. These recreational areas include: Long Branch Overlook, Big Branch Day Use Area, and Guyandotte Point.

The Long Branch Overlook is assumed to be closed while raw water line construction proceeds in the immediate vicinity of the overlook area. The area might also be closed longer term if used as a construction staging area for work throughout or beyond the vicinity. Consequently, no recreational users would be exposed to the highest levels of construction noise. If the Overlook site is opened to the public while construction occurs nearby, recreational users may experience construction noise levels ranging from approximately 70 dBA to 85 dBA, depending on the proximity of the active work site. Exposure to these levels of noise would constitute an adverse impact on recreational users, but would be mitigated by the temporary nature of these impacts, since any users of the Overlook site would remain in this area for only short periods. Construction noise may be perceived by users primarily as a nuisance that interferes with the aesthetic experience of the site visit during these short stopovers.

The Big Branch Day Use Area is situated more than 1,000 feet to the east of the proposed raw water line alignment on the opposite side of the Guyandotte River and at substantially higher elevation. Users of this site would be able to hear the construction equipment in operation in the distance, but the noise levels would likely be in the range of 50 dBA to 60 dBA. While noise levels in this range would be elevated compared to the normal background noise levels at this site, such levels would not constitute an adverse noise impact and would be at worst, more of a temporary nuisance to some site users. Construction noise would be temporary and the level of noise impact would be lessened as construction progressed farther from the area.

The playground and picnic area at Guyandotte Point could potentially experience adverse impacts from construction noise in the area. The playground and picnic area may experience construction noise levels of approximately 85 dBA to 88 dBA, which would constitute an adverse impact from the standpoint of absolute noise level, as well as the change from the existing ambient noise level. It is assumed that these areas would be closed to public access when construction operations occur in close proximity. Consequently, at times when access is allowed, construction operations would likely be taking place further away from the playground and picnic area vicinity; and the construction noise levels at these sites would be reduced from the levels mentioned above, although they may still be elevated.

- Aesthetics - The intake structure for Option A is located at the juncture of Sycamore Branch and R.D. Bailey Lake. This area consists of a 200-foot slope covered with native vegetation including sycamore, tulip poplar, and a few pines. A portion of this vegetation would be cleared from the water's edge to the road for construction of the intake structure and raw water line (a 20-inch underground pipe). Construction activities, including the removal of trees, would be highly visible to park visitors near the lake. These impacts would be temporary and confined to the construction period. Following construction, the cleared area would be seeded for erosion control. A narrow cleared strip would be visible post construction.

### ***Option B: Intake, Distribution, and Water Treatment Plant***

As shown in Figure 8-1, Option B begins within USACE Federal land at a proposed intake structure located on the south west side of R.D. Bailey Lake, in the Below Dam Area. From the intake structure, the proposed raw water line would traverse through USACE Federal land for a very short distance (less than 1,000 feet), through an existing parking lot for the Below Dam

Area and continue south. Once outside of USACE Federal land, the raw water line would be constructed along an existing gravel residential road to the water treatment plant. The raw water line would cross the Norfolk Southern Railroad in this area.

Based on the draft study, Option B is not the preferred alternative due the location of its proposed intake structure in the Below Dam Recreation Area.

The environmental impacts associated with Federal land for Option B from the Draft R.D. Bailey Lake Water Reallocation Study are summarized below.

- Long-term impacts of project construction - There would be no long-term impacts of Option B to any environmental resource, including, but not limited to: prime farmland, floodplains, water quality, stream crossings, vegetation, terrestrial wildlife, aquatic resources, threatened and endangered species, noise, and aesthetics. As a result, Option B would have no long-term adverse impacts on the USACE authorized project purposes for R.D. Bailey Lake (i.e. flood risk management, recreation, water quality control, and fish and wildlife management).
- Short-term impacts of project construction - Construction of Option B would generate temporary, short-term adverse impacts on some environmental resources, as described below. Potential mitigation measures to reduce the level of these impacts are further described in the Draft R.D. Bailey Lake Water Reallocation Study.
  - Water Quality - Work on or near stream banks and on the lake shoreline could generate adverse impacts on water quality due to temporary increases in turbidity.
  - Wetlands and Stream Crossings - These impacts are anticipated to be minimal since the use of directional drilling under stream beds would reduce construction related impacts. Shorelines and banks would still be disturbed as part of clearing operations and mobilization of necessary equipment.
  - Vegetation - Under Option B, approximately 2,500 linear feet of raw water line would be constructed, 60 percent of which (approximately 1,500 linear feet) would be within USACE Federal land boundaries. Based on a rough, simplified estimate of trench width, Option B would result in approximately 0.6 acre of land disturbed for raw water line construction, which would consist of primarily vegetated land, but also non-vegetated, previously disturbed land such as driveways, concrete walks, and other paved or graveled areas. An additional 0.5 acre would be disturbed for intake structure installation near the Below Dam Area shoreline. These estimates do not include

construction staging areas or additional work areas that may be dictated by terrain conditions. The grassed land in the Below Dam Area may be re-seeded following construction with grass species similar to what presently exists such that it would be difficult to distinguish the vegetation of the water line corridor from the existing grassed area.

- Terrestrial Wildlife - Most of the proposed corridor for the Option B raw water line has been modified for recreational use with high levels of human activities that limit habitat potential for terrestrial wildlife. Consequently, construction activities under Option B would not have significant impacts on wildlife, and any impacts generated by these activities would be short term and confined to the construction period. No unique or critical wildlife habitat would be affected by construction of Option B.
- Aquatic Resources - Construction operations to install the water intake on Little Huff Creek under Option B would generate disturbances that could have some minor impacts on aquatic wildlife, but these effects would be temporary and confined to the construction period.
- Threatened and Endangered Species - Based on correspondence from the WVDNR dated October 9, 2009 and the US Fish and Wildlife Service dated September 29, 2009, construction of Option B would not affect Federally-listed threatened or endangered species and is not expected to affect state-listed rare, endangered, and threatened species (Pentree, 2009).
- Noise - A portion of the proposed alignment of Option B would be constructed in undeveloped areas with minimal or no human use where the temporary increase in noise levels due to construction operations would have no adverse effects. However, a larger proportion of the alignment of Option B would traverse sites frequented by park visitors that would be impacted by increased construction noise levels compared to Option A. At the northernmost section of Option B, the proposed alignment of the raw water line would traverse the Below Dam Area that is used by park visitors for fishing, picnicking, and casual walking along a concrete walkway near the water's edge. All of these activities would be adversely impacted by construction noise, although the magnitude of the impact would be related to the distance from the work area.

Based on the analytical assumptions presented in the Draft R.D. Bailey Lake Water Reallocation Study, the Below Dam Area may experience maximum construction-

related noise levels ranging from approximately 80 dBA to 90 dBA, which would constitute an adverse impact on recreational users of this area from the standpoint of absolute noise level as well as from the standpoint of increase above the existing ambient noise level. Some users that might otherwise have pursued passive recreational activities in the Below Dam locale such as walking and picnicking may avoid this area and seek these opportunities elsewhere in the park during the construction period. Users who pursue fishing or other active recreational activities in this area may continue to use the site for these pursuits in spite of the construction activities. Adverse construction noise impacts would be temporary in nature and would decrease as construction activities shift southward along the proposed project alignment.

- Aesthetics - The Option B intake structure would be located in the outfall canal just below the dam with the proposed raw water line extending from the intake structure along Lost Branch Road southward. Due to the location of the intake structure and proposed raw water line in the Below Dam Area, an area that is already cleared and developed, there would be no loss of native vegetation cover and the views would only be affected during the construction process. After construction is completed, the disturbed areas would be seeded and would visually blend into the surrounding maintained grass areas, thus minimizing visual impacts.

### **8.1.3 Lake Suitability**

The HEC-ResSim model for R.D. Bailey Lake was used to determine the impact of water withdrawals for public water supply. The impacts of five withdrawal levels, ranging from 2,000,000 gallons per day (2 MGD) to 10 MGD were reviewed, based upon monthly data since the R.D. Bailey Dam was placed into operation in 1980. The complete results of this analysis are shown in the Water Withdrawal Alternative Analysis Report (USACE, 2010). A summary of the impacts to the winter and summer pool are described below.

- The maximum impact of withdrawing 6 MGD is 0.3 feet of the winter pool level (1,012.0 feet NGVD to 1,011.7 feet NGVD). The reallocation of storage capacity based upon the winter pool level is most appropriate because flood risk management is the primary purpose of the R.D. Bailey Reservoir.
- The summer pool level is established to provide water quality for recreation, with less storage capacity for flood risk management. The summer pool level is drawn down more

than the winter pool by the withdrawals, from 135.0 feet to 134.2 feet; however, recreation would not be not impacted.

#### **8.1.4 Conclusion**

Based on the Draft R.D. Bailey Lake Water Reallocation Study, long-term impacts of the proposed project build alternatives on Project area environmental resources are anticipated to be negligible or nonexistent. In regard to short-term, construction-related impacts, appropriate mitigation would reduce the magnitude of any substantial adverse effects to acceptable levels under both build alternatives, with the exception of potential construction-generated noise impacts. Adverse noise impacts may occur at some locations where implementation of reasonable mitigation measures may not be possible. It is likely that recreational users of the Project would avoid areas where construction activities are underway and most intense, and where noise levels are likely to be highest.

In summary, with the exception of short-term adverse noise impacts that may not be capable of mitigation by reasonable measures, neither of the project build alternatives would generate significant adverse environmental impacts during construction that could not be reduced to acceptable levels through mitigation.

Additionally, the project does not appear to significantly impact the authorized Project purposes. The impacts to flood risk management are minimal and the necessary downstream discharge of 45 cfs can be maintained. Although some recreational areas may be impacted by noise, the impacts would be temporary and short-term with no anticipated significant long-term impacts. Water quality may be impacted during construction near the shoreline, but appropriate mitigation measures should limit the impact associated with these activities. Short-term construction-related activities would generate localized temporary impacts on terrestrial and aquatic wildlife, but, post construction, no vestiges of these effects would remain in any of the areas affected by project construction.

### **8.2 All Terrain Vehicle (ATV) Use**

During the scoping meetings held prior to the Master Plan update, attendees discussed the possibility of allowing the use of ATVs on Project lands. ATV use is not currently permitted.

#### **8.2.1 Proposed Concept**

Interest in ATV use in the region is increasing, and one of the requests from the scoping meeting included providing access to the Hatfield and McCoy trails on Project lands. Currently, there are

six Hatfield and McCoy trails that comprise over 500 miles of trails in nine counties in WV. The Rockhouse Trail, located north of Gilbert, WV is in close proximity to R.D. Bailey Lake. The Rockhouse Trail consists of 89.3 miles of trail and offers recreation opportunities for ATVs, utility vehicles, dirt bikes, mountain bikes, hikers, and horseback riders. Additionally, some nonprofit groups have expressed an interest in developing a project called “sKYward trails” in Kentucky. Although the promoters of “sKYward trails” have no immediate plans to move this project forward, the proposals include developing over 2,000 miles of ATV trails along the mountains of eastern Kentucky. The “sKYward trails” would consist of a multi-use trail system and accommodate off-highway motorcycle and ATV users, four-wheel drivers, equestrians, mountain bicyclists, hikers, and other trail users. Trails developed under this project would extend into mountainous regions in southern WV to connect with the existing privately operated Hatfield and McCoy trail system. Promoters of this project have indicated that trails would be developed on private property, and there are no plans to develop or use trails on properties designated as National Forests or Federal lands.

USACE guidance on the use of off-road vehicles on civil works projects states that prior to designation of areas or trails for off-road use, a full and careful assessment of site resources needs to be performed and consideration should be given to the possible effects of this use on the area (USACE, 1996 a[Chapter 10, EP 1130-2-550]). The guidance recommends consideration of impacts to air, water, soil, vegetation, fish and wildlife, noise, safety, and aesthetics before permitting ATV use on projects.

### **8.2.2 Land Use Compatibility and Site Suitability**

Although the Project would offer interesting terrain, potentially numerous existing access roads/trail systems, and significant undeveloped remote areas potentially appealing for ATV use, ATV use is incompatible with existing land use and Project purposes. Existing land use includes a Wildlife Management Area which encompasses a significant portion of the Project with intermittent recreational areas along the lake in the central portion of the Project area, near the dam site area, and the tailwater area.

The central portion and the dam site of the R.D. Bailey Lake Project host several popular recreational areas: the Visitor Center/Dam Overlook Area, Below Dam Recreation Area, Guyandotte Point, Big Branch Day Use Area; and Locust Branch, Reedy Creek, and Primitive Campgrounds. ATV use in these areas would likely reduce the quality of the recreational experience of visitors. If ATV use were permitted near these recreational areas, air quality would likely deteriorate from dust, and noise levels near campgrounds, campsites, and picnic

areas would increase significantly. For this reason, ATV use near the existing recreational areas does not appear to be consistent with current recreational uses in these areas.

Another consideration is use of the WMA and associated access roads for ATV use or development of new ATV trails in the WMA. Most of the existing access roads are for gas well or fire access. Many of these access roads are gated and in very poor condition. They traverse steep slopes and are not well maintained. Based on soil classifications within the Project and steep topography, the land is very susceptible to soil erosion. ATV use would likely further disrupt vegetation and the top soil layer, leading to increased run-off and siltation of streams and surface waters, which could affect water-based recreational activities and fishing. If ATV trails were allowed in the WMA, there is the potential to adversely affect breeding grounds, drumming grounds, migration routes, and nesting areas of the many species that inhabit the area. Due to the incompatibility of ATV use with current recreational and wildlife management uses at the Project, allowing Project lands to be used for ATV use is not consistent with project purposes, resource use objectives, and land classification for the Project. It should also be recognized that the existing Hatfield and McCoy trail system and other potential projects off Federal lands can accommodate the demand for recreational ATV use in the Project area of influence.

### **8.3 Proposed Hydroelectric Project**

The Federal Power Act of 1920 (16 U.S.C. 791-828c; Chapter 285, June 10, 1920; 41 Stat. 1063) provided for the co-operation between the Federal Energy Regulatory Commission and other Federal agencies in licensing and relicensing power projects on Federal lands. Subsequently, the USACE issued various regulations and guidelines regarding power projects on Federal land, including the following:

- ER 1105-2-100. Planning Guidance
  - Chapter 4, Section V
  - Chapter 6, Sections V, XIII (paragraph 6-169), XV (paragraph 6-213 to 6-215)
- ER 1110-2-1155. Dam Safety Assurance Program - 12 September 1997
- ER 1110-2-4401. Clearances for Electric Power Supply Lines and Communication Lines Over Reservoirs - 30 May 1997
- ER 1130-2-510. Hydroelectric Power Operations and Maintenance Policies - 12 December 1996
- ER 385-1-31. The Control of Hazardous Energy, Engineering Form 1924, Engineering Form 1925, Engineering Form 1927-R, Engineering Form 1928 - 1 August 1994

- ER 1110-2-1463. Hydrological Engineering for Hydropower - 30 May 1992
- ER 1110-2-1454. Corps Responsibilities for Non-federal Hydroelectric Power Development under the Federal Power Act - 15 July 1983
- ER 1110-2-1. Provisions for Future Hydropower Installations at Corps of Engineers Projects - 28 January 1982
- ER 1165-2-114. Use of Excess Power Revenues to Assist in Repayment of Irrigation Costs - 25 June 1964
- EP 1130-2-510. Hydroelectric Power Operations and Maintenance Guidance and Procedures - 13 December 1996
- EP 1165-2-317. Hydropower: The Role of the U.S. Army Corps of Engineers Flood Proofing Regulations - 1 November 1987
- EP 1165-2-316. Rules and Regulations Governing Public Use of Corps of Engineers Water Resource Development Projects - 1 May 1986

Three Guys Hydroelectric Company, LLC of Fairlawn, Ohio is proposing to install a powerhouse in the Below Dam Area of the R.D. Bailey Lake Project. The powerhouse would house a turbine generating system with a head of 124 feet. The electricity generated would be sold at wholesale prices to public or municipal utility companies, aggregators, or other wholesale purchasers of electric generation (Kleinschmidt, 2008). Construction was noted to begin in 2012 and would take nine months to complete.

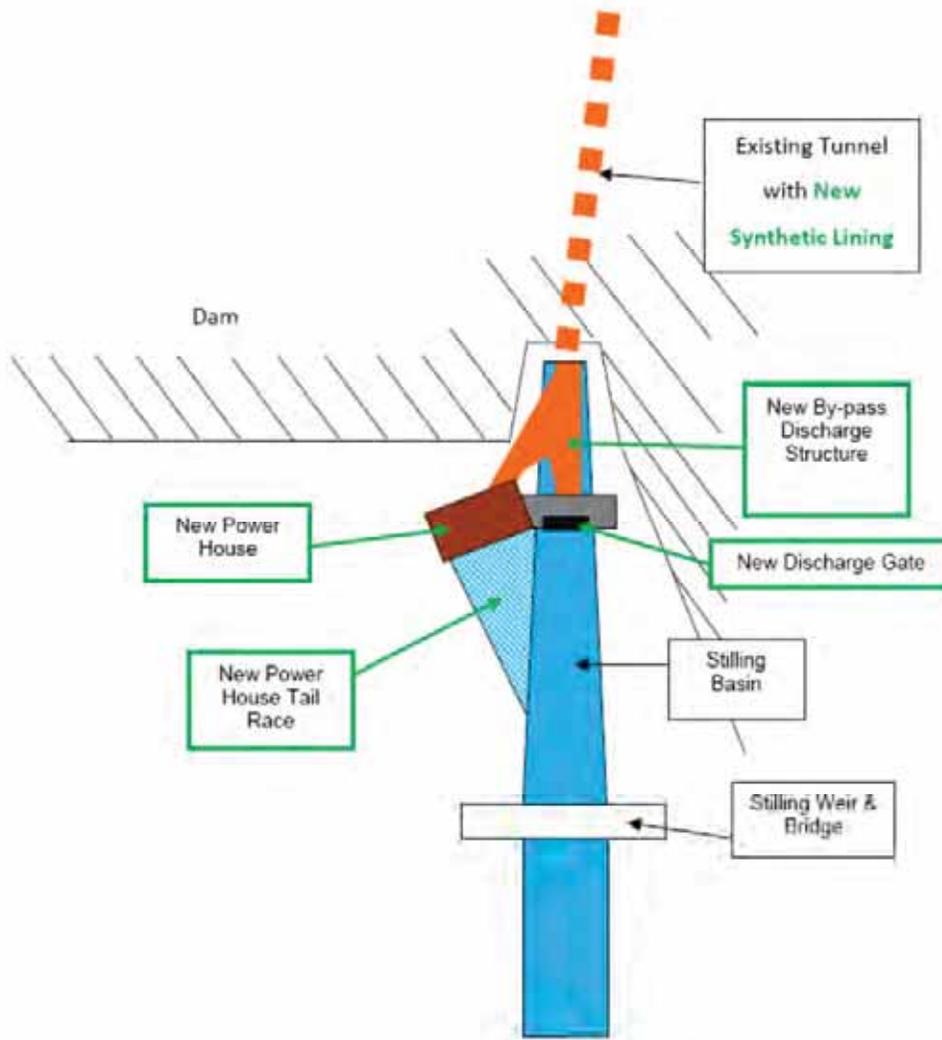
The Below Dam Recreation Area is one of the more popular recreation areas at the Project, and provides opportunities for open recreation, fishing, and picnicking. Amenities such as picnic tables, sidewalks for access to the Guyandotte River, benches, and charcoal grills support the activities in this recreation area. Additionally, fish are regularly stocked by the WVDNR in the tailwater area.

### **8.3.1 Alternatives Considered**

The proposed hydroelectric project at the R.D. Bailey Lake Project includes a powerhouse that would be located on USACE property and a 2.5 to 3.5 mile long 46 kilovolts transmission line right-of-way that would be located on Federal land and privately owned property. Additionally, the existing 18-foot diameter tunnel, that is 1,800 feet long, would need to be lined with a synthetic lining to meet USACE pressurized tunnel design criteria and safety standards. The proposed powerhouse, located on Federal land on the west bank of the Guyandotte River and

approximately 50 feet downstream of the dam outlet, would contain two turbines with hydraulic capacities of 300 cfs and 700 cfs. The 700 cfs turbine would operate under higher flow conditions and the 300 cfs would operate under lower flow conditions. The proposed project is illustrated in Figure 8-2.

**Figure 8-2**  
**Proposed Hydroelectric Project**



Source: *R.D. Bailey Hydroelectric Project (FERC Project No. 12683) Pre-Application Document*. (Kleinschmidt, 2008).

The proposed transmission line would connect the powerhouse to a sub-station in Gilbert, WV. There are two proposed alternatives for the transmission line right-of-way: one alternative would

follow the Guyandotte River downstream to Gilbert for 3.5 miles or the other alternative would pass through undeveloped land for 2.5 miles (Kleinschmidt, 2008). The locations of the powerhouse and the two transmission line alternatives are presented on Figure 8-3. Simulated Photograph 8-1 presents the outlet structure with the proposed hydroelectric project in place.

### **Simulated Photograph: 8-1 Proposed Hydroelectric Project at Outlet Structure**



Source: *R.D. Bailey Hydroelectric Project (FERC Project No. 12683) Pre-Application Document*. (Kleinschmidt, 2008).

The sub-station would not be located on USACE land. The right of access to transmission line easements and structures that are constructed on USACE property would have to be granted to the non-Federal sponsor by the USACE.

### **8.3.2 Site Suitability**

According to ER 1110-2-1454, the construction and development of hydroelectric power facilities on USACE property must be compatible with the authorized project purposes. The USACE has the authority to allow the development of hydropower projects if the development does not adversely impact the original project authorizations.

As identified in the R.D. Bailey Hydroelectric Project (FERC Project No. 12683) Pre-Application Document (Kleinschmidt, 2008), the proposed project is not anticipated to affect the water quality as mandated by the low-flow control or the downstream flow augmentation. Additionally, the proposed project would not affect the storage capacity of R.D. Bailey Lake, as no change to operating pool levels are required as related to the flood risk management authorization. Changes to water temperature are not anticipated because the water flows quickly

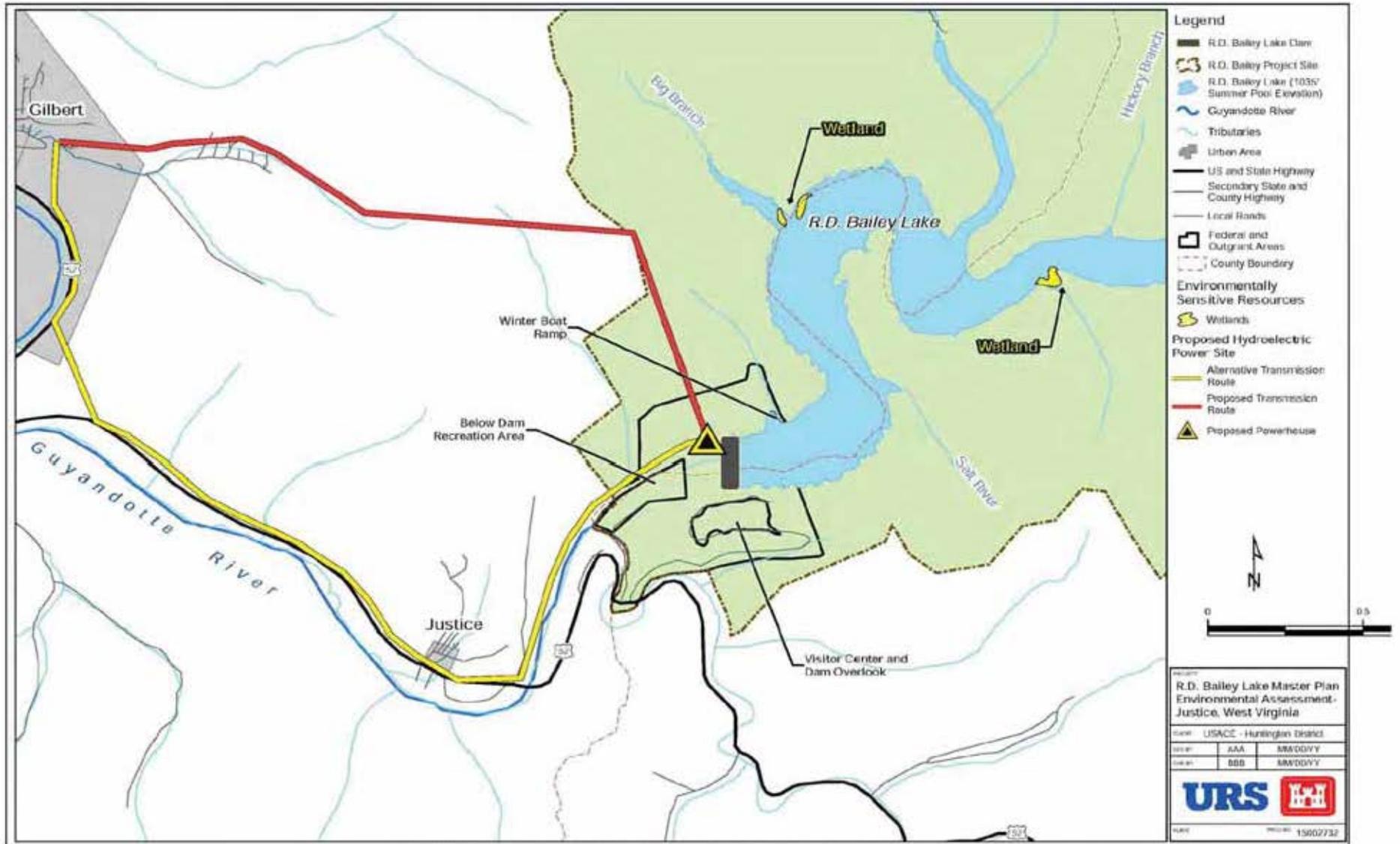


Figure 8-3: Proposed Hydroelectric Power Project

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through the turbine; therefore, there is little contact time to transfer heat to the water. The new by-pass discharge structure should help minimize any impact to aquatic wildlife. Due to anticipated minimal impacts to water quality, temperature, flow, aquatic wildlife, and access, recreational fishing in the Below Dam Area should be minimally impacted long term.

Day use and picnicking activities in the Below Dam Area would not be directly impacted; however, the views of the dam and the aesthetics of the overall Below Dam Area would be impacted by the turbine equipment and the transmission line. This could result in some reduction to the overall quality of the recreational experience of the area.

The two transmission line alternatives (refer to Figure 8-3) will likely have visual impacts on the Below Dam Area. The alternative that parallels the river will impact the view along the tailwater and down river from the Below Dam Area. Some vegetation removal will be required; however, much of the area is open green space with minimal trees.

The Alternative 2 transmission line alignment would proceed north from the Below Dam Area across the winter boat ramp access road, eventually turning west and proceeding off of the USACE Federal lands. This alternative would require removal of vegetation from forested lands with steep slopes and erosive soils. Erosion impacts, especially during construction could be an issue. Long term, this area should be re-vegetated with different vegetation types to minimize erosion. Another concern is the impact to the view shed from the scenic vista at the Visitor Center.

Short term construction impacts associated with the power house bypass structure and new discharge gate could include erosion and siltation in the tailwater area, which would temporarily affect water quality and fishing. Noise during construction is another possible impact to the Below Dam Recreation Area affecting day use activities. Construction of the transmission line would result in removal of vegetation, erosion, and noise impacts. These impacts would be temporary, except for clearing of forested areas, which would be replaced with lower growth vegetation for erosion control.

As noted in Section 7.0, one of the recommendations is to seek a non-Federal sponsor to operate and maintain the Below Dam Recreation Area and implement improvements such as a non-motorized boat ramp, fish cleaning tables, a group picnic shelter, and restrooms. The proposed hydroelectric facilities and associated visual impacts may limit non-Federal interest in further developing this recreation area. However, a potential consideration is a public-private

partnership with the developer of the hydroelectric project to assume the role as the non-Federal partner in the further recreational development of this area.

## **8.4 Major Utility Corridor Considerations at the R.D. Bailey Lake Project**

The Energy Policy Act of 2005 (PL 109-58) directed the Secretaries of Agriculture, Commerce, Defense, Energy, and Interior to identify corridors for oil, gas, and hydrogen pipelines and electrical transmission and distribution facilities on Federal lands; and to schedule prompt action to identify, designate, and incorporate the corridors into the applicable land use plans.

Subsequently, the USACE issued a Non-Recreational Outgrant Policy on 30 March 2009 (USACE, 2009a), which states that the primary rationale for authorizing any future non-recreational outgrant request for use on USACE lands or waters will be one of two reasons: there is no viable alternative to the activity or structure being located on Civil Works land or waters; or, there is a direct benefit to the government. Public utilities, including power lines and gas and fuel pipelines, are past examples of outgrant requests received by the USACE.

Designated corridors are defined as, “A parcel of land with fixed boundaries that has been identified in the Project Master Plan or operational management plan as being the preferred location for future outgrants or proposed modifications to existing outgrants suitable to accommodate compatible types of outgrants.”

Although there is currently no proposal for either a major regional underground or aboveground oil, gas, or hydrocarbon pipeline or electrical transmission line through the R.D. Bailey Lake Project, it is important for the USACE to consider that such proposals may be put forth in the future for major transmission lines. The proposed hydroelectric project discussed in Section 8.3 is site specific and electrical transmission line access to that specific location must be authorized on an individual basis.

### **8.4.1 Land Use Compatibility and Site Suitability Considerations**

Developing an alignment for a major utility transmission line is a complex undertaking and must take into account numerous engineering and environmental issues, as well as acquisition of rights-of-way and easements. The focus of this section is to evaluate the R.D. Bailey Lake Project area relative to resource suitability, recreational uses, and presence of sensitive environmental resources to identify constraints and criteria to designate utility corridor(s) that minimize impacts on environmental and recreational resources.

As noted above, the focus is on major regional oil, gas, and hydrocarbon pipelines and electrical transmission facilities. Local utilities such as potable water and sanitary sewer service are not the focus of this evaluation.

If there are no reasonable and feasible alternatives to avoid Project lands, initial considerations should include existing disturbed corridors such as existing highways and utility corridors.

### Existing Roadways

Roadways are present throughout the Project to provide access to the Project and allow residents to traverse through the area (Figure 8-4). These roadways have already been removed from recreational use and have disturbed/impacted the natural environment. Placing utility corridors adjacent to primary existing roadways, i.e., state and county arterial and collector roads, not small access roads within Project recreational areas, could potentially decrease the recreational and environmental impacts to the Project.

The primary roadway corridors, US Highway 52 and SR 97, generally traverse the Project in an east-west direction paralleling the southern perimeter of the Project and sections of the Guyandotte River. This roadway corridor is proposed to be utilized for water line utilities as part of the R.D. Bailey Regional Water Supply Project. While this roadway corridor does traverse some segments of the Project, it is generally oriented south of Project lands.

The other primary roadway corridor which traverses the Project is County Road 9/1 and 6/2 which runs generally north-south and parallels R.D. Bailey Lake and Big Cub Creek. This roadway corridor extends directly adjacent to the Long Branch Overlook, Guyandotte Point, and the Big Branch Day Use Area. This corridor is proposed as an alternative for the R.D. Bailey Regional Water Supply Project discussed in Section 8.1 for raw and potable water line utilities. This route traverses a substantial distance on Project lands.

### Existing Utility Corridors

The use of existing utility corridors should be evaluated to determine whether the proposed utilities can be placed along the same corridor. Using an existing corridor could cause less disruption to Project lands than constructing a new corridor. Grouping utilities into an existing utility corridor could reduce the recreational and environmental impacts.

There is an apparent abandoned utility corridor (see Figure 8-4) that traversed the northwestern portion of the Project and extends through the southeastern segment of the Project, terminating near an apparent electrical sub-station. The corridor still appears relatively open in some

locations; however, other areas appear to have successional growth. Due to the direct alignment of the corridor and previously disturbed nature, it appears to be a reasonable alignment for future consideration.

#### Intensive-Use Recreation Areas and Recreational Facilities

One of the primary objectives of the Project is recreational use. Development of a utility corridor through recreational areas could disrupt the use and enjoyment of the Project by visitors. The southern portions of the Project along the Guyandotte River have the highest intensity recreational use along with the Visitors Center/Dam Overlook Area and the Below Dam Area. Avoidance of recreation areas should be a prime consideration in identifying utility corridors.

In addition to direct impacts on recreational use, utility corridors may affect the natural beauty of the Project lands. Even if a utility corridor does not cross an intensive-use recreation area, it may impact visitors using the recreation areas. For example, an overhead transmission line crossing the lake may impair the viewshed. Therefore, the visual impacts to areas that have recreational use should be evaluated.

#### Environmentally or Culturally Sensitive Areas

A number of environmental and potential cultural sensitive areas are located throughout the Project including wetlands and archeological resources (Figure 8-4). These areas are unique and should be maintained; therefore, potential utility corridors should avoid these areas.

The Grassy Lick timber stand represents a unique resource in the Project area due to the age of the timber in the stand as compared to the surrounding forest. Avoidance of this forested habitat should be given strong consideration when selecting a potential utility corridor due to the unique qualities of this habitat in the region. While this area is not designated as critical habitat for threatened and endangered species, the uniqueness of the habitat in the Project area increases the potential for any threatened and endangered species in the area to utilize this habitat. Before any utility related corridor work is undertaken a survey of the potentially impacted area should be performed to verify the absence of any threatened and endangered species as well as cultural resources.

#### Footprint on Project Lands

The width of the Project varies throughout the Project area (Figure 8-4). If a proposed utility corridor alignment cannot avoid Project lands, options that minimize the footprint on Project lands should be a strong consideration.

The location of the footprint is also important in relation to topography, soils, and stream/waterway crossings within the Project area. The steep slopes of the Project combined with the high erodibility of some of the soils in the Project area pose a difficult challenge in selecting areas for potential utility corridors. This is also important in terms of stream crossings and riparian zones. Stream crossings should be avoided and/or minimized where possible. In the event that a stream cannot be avoided a buffer of vegetation should be left in the riparian zone to reduce the potential for erosion and increased sediment in the water body.

Once a formal proposal is received, an evaluation should be conducted using the factors above to identify potential impacts and alternatives to minimize impacts. Recommendations for alternative utility corridor locations should be based on the evaluation.

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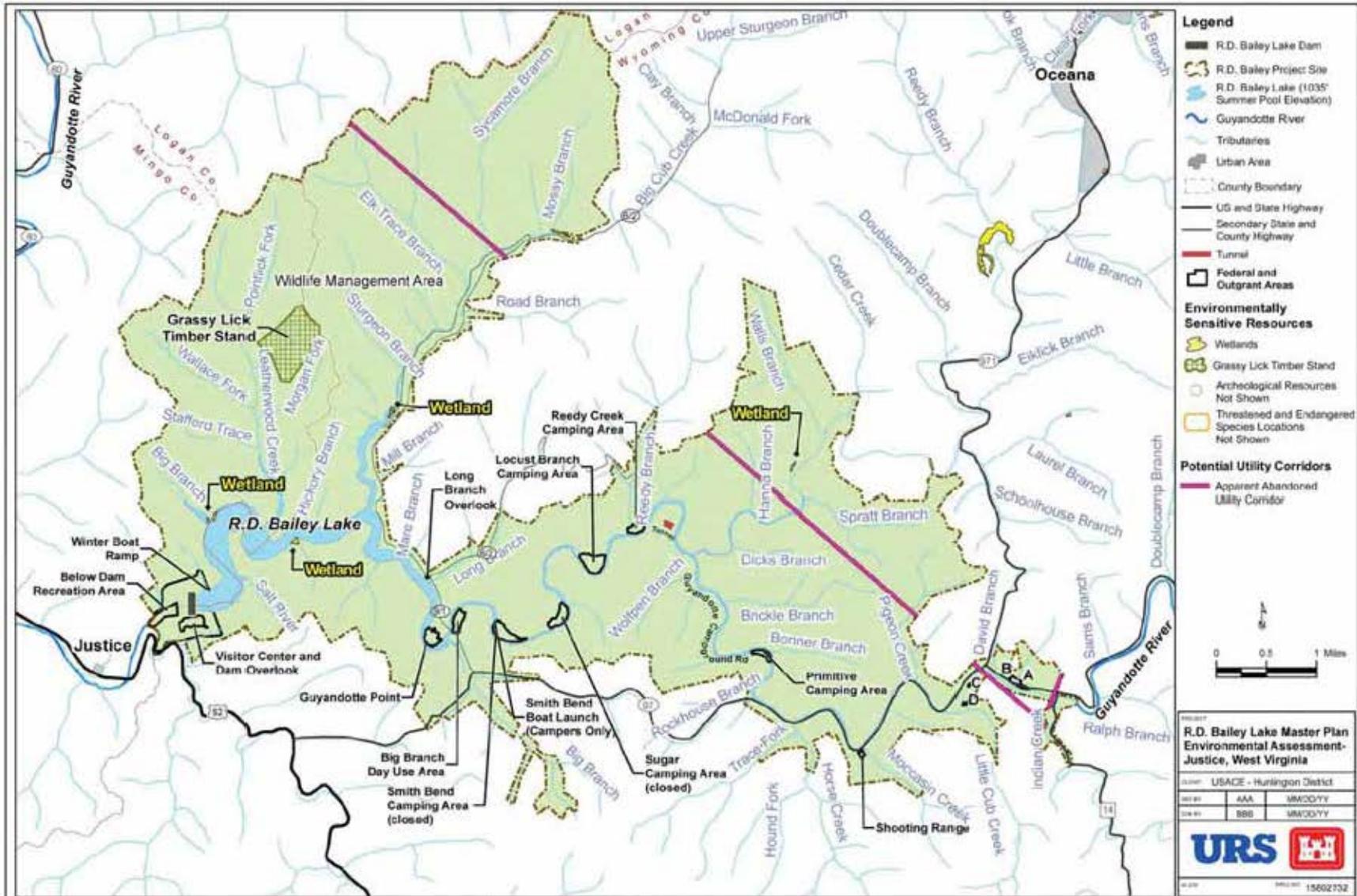


Figure 8-4: Potential Utility Corridor Considerations

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# **Appendix A: Acronyms and Abbreviations**

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ADA	Americans with Disabilities Act
ATV	All Terrain Vehicle
BLM	Bureau of Land Management
BMP	Best Management Practice
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CFS/cfs	Cubic Feet per Second
DM	Design Memorandum
DMR	Division of Mining and Reclamation
DWWM	Division of Water and Waste Management
EA	Environmental Assessment
EM	Engineering Manual
EO	Executive Order
EP	Engineering Pamphlet
EPA	Environmental Protection Agency
ER	Engineering Regulation
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FLPMA	Federal Land Policy and Management Act
GHG	Greenhouse Gas Emissions
GIS	Geographic Information System
HP	Horsepower
HPMP	Historic Properties Management Plan
IWR	Institute for Water Resources
NCWV	Nature Conservancy of West Virginia
NEPA	National Environmental Policy Act
NGVD	National Geodetic Vertical Datum
NHPA	National Historic Preservation Act
NPS	National Park Service
NRCS	National Resources Conservation Service
NRHP	National Register of Historic Places
NRRS	National Recreation Reservation Service
NWI	National Wetlands Inventory
MGD	Million Gallons per Day
MOU	Memorandum of Understanding
OMP	Operational Management Plan
PL	Public Law
RPA	Renewable Resources Planning Act
RMSPSD	Ravencliff-McGraws-Saulsville Public Service District
RUO	Resource Use Objective
RV	Recreational Vehicle
SCORP	Statewide Comprehensive Outdoor Recreation Plan
SMCRA	Surface Mining Control Reclamation Act
SR	State Route
TMDL	Total Maximum Daily Load
UGWA	Upper Guyandotte Watershed Association

USACE	United States Army Corps of Engineers
U. S. C.	United States Code
USDA	United States Department of Agriculture
USDOI	United States Department of the Interior
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geologic Survey
VERS	Visitor Estimation Reporting System
WMA	Wildlife Management Area
WV	West Virginia
WVDEP	West Virginia Department of Environmental Protection
WVDNR	West Virginia Division of Natural Resources
WVGES	West Virginia Geological and Economic Survey

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# **Appendix C:**

## **Results of Scoping Meetings**

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## Scoping Meetings Notes

R.D. Bailey Public Meeting Minutes

Tuesday, August 4, 2009

---

### Attendees:

Jay Van Hoose, U.S. Army Corps of Engineers, Huntington District  
Sam Harlan, U.S. Army Corps of Engineers, Huntington District  
Kelley Poff, U.S. Army Corps of Engineers, Huntington District  
Dan Bock, U.S. Army Corps of Engineers, Huntington District  
Kim Barnett, U.S. Army Corps of Engineers, Huntington District  
Alison Rogers, U.S. Army Corps of Engineers, Huntington District  
Toby Wood, U.S. Army Corps of Engineers, Huntington District, R.D. Bailey Lake  
Aca Ramy, U.S. Army Corps of Engineers, Huntington District, R.D. Bailey Lake  
Brian Morgan, U.S. Army Corps of Engineers, Huntington District, R.D. Bailey Lake  
Kelly Stoll, URS  
Jagadish Prakash, URS  
Jack Bunja, URS

### COMMENTS/ISSUES

#### Flood Damage Reduction (1 comment)

Flood control is working - 1

#### Recreation (51 comments)

1. Replace/move marina – 13
2. Campground improvements (electrical and sewer) - 10
3. Add basketball courts on site - 6
4. Cut weeds in the camping areas - 6
5. Cost reduction for camping - 6
6. Leave lights in tunnel on - 6
7. More primitive campsites - 1
8. Open camping all year - 1
9. Add Hatfield & McCoy trail access - 1
10. Add attendant at entrance – 1

#### Fish & Wildlife (9 comments)

1. Take down gates - 5
2. More fish - 2
3. Increase regulations enforcement - 1
4. Extend summer pool months – 1
- 5.

#### Water Quality (10 comments)

1. Increased litter control enforcement - 6
2. Providing community water to Hanover – 4

**Other** (3 comments)

1. Make announcement in the paper bigger - 1
2. Bridge repairs - 1
3. Better emergency communications (no cell service in areas) - 1

**Key Issues**

1. The addition of a marina. This could be moved to a new location near the spillway or in its current location.
2. Campground improvements to include sewer and water at each camp site.
3. Additional mowing in the campground areas to keep weeds and small brush low between the campsites.
4. Additional recreation facilities – basketball courts.
5. Additional access to wildlife management areas – removing gates.
6. Improved lighting in the railroad tunnel.
7. More enforcement of the trash and litter regulations and better patrols to pick up the trash.

R.D. Bailey Stakeholder Meeting Minutes

Tuesday, August 4, 2009, AM Meeting

---

**Attendees:**

Vicki Dugan, EQT  
George Puskas, North Coast  
Forrest Thomas, North Coast  
Mark Davis, North Coast  
Samuel Morgan, North Coast  
Jay Van Hoose, U.S. Army Corps of Engineers, Huntington District  
Sam Harlan, U.S. Army Corps of Engineers, Huntington District  
Kelley Poff, U.S. Army Corps of Engineers, Huntington District  
Dan Bock, U.S. Army Corps of Engineers, Huntington District  
Kim Barnett, U.S. Army Corps of Engineers, Huntington District  
Alison Rogers, U.S. Army Corps of Engineers, Huntington District  
James Allmon, U.S. Army Corps of Engineers, Huntington District  
Toby Wood, U.S. Army Corps of Engineers, Huntington District – R.D. Bailey Lake  
Aca Ramy, U.S. Army Corps of Engineers, Huntington District – R.D. Bailey Lake  
Brian Morgan, U.S. Army Corps of Engineers, Huntington District, R.D. Bailey Lake  
Kelly Stoll, URS  
Jagadish Prakash, URS  
Jack Bunja, URS

**KEY POINTS:**

**Project purpose of R.D. Bailey Lake as authorized:**

1. Flood damage reduction
2. General Recreation
3. Fish and Wildlife Enhancement
4. Water Quality

## **The R.D. Bailey Lake Master Plan looks at 3 key items:**

1. Regional Need
2. Resource Management
3. Local Input

## **COMMENTS/ISSUES**

### **EQT**

1. Four to eight new wells planned for 2010
2. Terrain – the cost of getting into locations for drilling Currently 85 wells on R.D. Bailey
3. May drill 50-60 new wells in the next 10-20 years

### **North Coast**

1. Terrain – the cost of getting into locations for drilling
2. Timber industry is a big problem – destroying access roads to wells
3. Currently eight wells on R.D. Bailey
4. Potential for development in Elk Creek in 2010
5. May drill two to five wells in the future

## **QUESTIONS/DISCUSSIONS**

1. EQT and North Coast exploring the use of horizontal drilling to reduce footprint of well sites/number of well sites
  - Allows for four well sites in one location
  - Requires slightly larger pipeline (four to six inches)
  - Vertical wells cost ~\$500,000 to drill/horizontal wells cost ~\$1 million
  - Greater production from vertical wells
2. The sites EQT is exploring require larger equipment and take longer to drill – roads will be permanently rocked in and EQT will have constant, visible presence in the area.
3. Seismic activity readings are the primary means of determining drill sites
  - No three dimensional imaging is planned near R.D. Bailey
  - Geologists can assist in determining mining areas
4. In the past there have been issues with gas extraction from USACE land. This is handled through the Bureau of Land Management.
  - potentially, millions of dollars of gas leakage from USACE property has gone into private wells
5. USACE will examine issues such as endangered species and sensitive habitats in Master Plan

6. Cultural and historical resources will also be documented
  - Explore adding the stone fireplace on the property to the National Registry of Historic Places
7. The USACE is working with a DNR forester who evaluates work sites and coordinates tree removal
  - Many timber companies do not adhere to quality standards for their roads
  - The USACE encourages minimizing black lines and deforesting areas
8. The Corps requested maps of the current pipelines to add to the GPS mapping effort

## **KEY ISSUES**

1. All recreation areas are in a flood zone
2. Any new development on the project must be cost-shared

R.D. Bailey Stakeholder Meeting Minutes

Tuesday, August 4, 2009, PM Meeting

---

### **Attendees:**

M. Clifford Phillips, Advanced HydroSolutions  
Michael Gallimore, UGWAWV  
Ashley Jones, UGWAWV  
Jay Van Hoose, U.S. Army Corps of Engineers, Huntington District  
Sam Harlan, U.S. Army Corps of Engineers, Huntington District  
Kelley Poff, U.S. Army Corps of Engineers, Huntington District  
Dan Bock, U.S. Army Corps of Engineers, Huntington District  
Kim Barnett, U.S. Army Corps of Engineers, Huntington District  
Alison Rogers, U.S. Army Corps of Engineers, Huntington District  
James Allmon, U.S. Army Corps of Engineers, Huntington District  
Toby Wood, U.S. Army Corps of Engineers, Huntington District, R.D. Bailey Lake  
Aca Ramy, U.S. Army Corps of Engineers, Huntington District, R.D. Bailey Lake  
Brian Morgan, U.S. Army Corps of Engineers, Huntington District, R.D. Bailey Lake  
Kelly Stoll, URS  
Jagadish Prakash, URS  
Jack Bunja, URS

### **KEY POINTS:**

#### **Project purpose of R.D. Bailey Lake as authorized:**

1. Flood Damage Reduction
2. General Recreation
3. Fish and Wildlife
4. Water Quality

## **The R.D. Bailey Lake Master Plan looks at 3 key items:**

1. Regional Need
2. Resource Management
3. Local Input

## **COMMENTS/ISSUES**

### **HydroSolutions**

1. Sharing a discharge tunnel at the dam
2. Will need to man the site with two employees
3. May need to redesign the Stoney Basin at dam site
4. Electric transmission line placement
5. Conduct multiple studies
6. Estimating 2012 as a completion date

### **UGWAWV**

1. Focuses on the headwaters of Guyandotte River
2. Testing waters for pollutants
3. Looking to expand into R.D. Bailey and test water quality on streams there
4. Mainly volunteer organization

## **QUESTIONS / DISCUSSIONS**

1. Advanced Hydro Solutions has filed pre-application documents in February and hosted a scoping meeting
  - Additional studies are required – fish and discharge levels
  - RTE will be done for transmission line route
  - Mussel survey and micro-invertebrate study are complete
  - Hydro-electric process will not change water level or discharge ability
  - Want to work with USACE and WVDNR on right studies
2. Two studies for water usage may impact Advanced HydroSolutions' plans
3. Transmission lines will not follow any road
4. Construction is estimated for 2012 and will take nine months
5. The Upper Guyandotte Watershed Association is concerned with water quality in the area from acid mine run off
  - Working with communities to build water treatment plants
  - Routinely conducts mussel studies and fecal chloroform tests

## **KEY ISSUES**

1. All recreation areas are in a flood zone.
2. Any new development on the project must be cost-shared

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# **Appendix D: Agency Correspondence**

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**DIVISION OF NATURAL RESOURCES**  
Wildlife Resources Section  
Operations Center  
P.O. Box 67  
Elkins, West Virginia 26241-3235  
Telephone (304) 637-0245  
Fax (304) 637-0250

Joe Manchin III  
Governor

Frank Jezioro  
Director

March 9, 2010

Ms. Stephanie Piranio Guillot  
URS Corporation  
3500 North Causeway Boulevard, Suite 900  
Metairie, LA 70002-3527

Dear Ms. Guillot:

We have reviewed our files for information on rare, threatened and endangered (RTE) species, and for non-native/invasive species for the R.D. Bailey Lake project area in Wyoming and Mingo counties, WV.

We have three rare small mammal records for this area: southern bog lemming (*Synaptomys cooperi*), golden mouse (*Ochrotomys nuttalli*) and Allegheny woodrat (*Neotoma magister*). We have no records of RTE plants occurring within the project area.

Attached are listings of invasive plant species occurring in Wyoming and Mingo counties. Vegetation plots were conducted within the Wildlife Management Area and the following invasive species were documented: Japanese stiltgrass (*Microstegium vimineum*), Morrow's honeysuckle (*Lonicera morrowii*), tall fescue (*Lolium arundinaceum*), small carpgrass (*Arthraxon hispidus*), ground ivy (*Glechoma hederacea*), common velvetgrass (*Holcus lanatus*) and tall buttercup (*Ranunculus acris* var. *acris*). Also attached is a listing of the "worst of the worst" invasive plants state-wide. We have no information on non-native/invasive animals from within the project area.

The information provided above is the product of a database search and retrieval. This information does not satisfy other consultation or permitting requirements for disturbances to the natural resources of the state. If your project will directly impact the waters of the state or cause a "take" of fish and/or wildlife, consultation may be required. Requests for WV wildlife agency consultation should be directed to Mr. Roger Anderson at the address given in the letterhead or by email at [rogeranderson@wvdnr.gov](mailto:rogeranderson@wvdnr.gov). Database requests for information on RTE species and sensitive habitats should still be directed to me.

Thank you for your inquiry, and should you have any questions please feel free to contact me at the above number, extension 2048. Enclosed please find an invoice.

Sincerely,

  
Barbara Sargent  
Environmental Resources Specialist  
Wildlife Diversity Unit

enclosures

S:\Monthly\Barb\Invoices\URS.doc

## Checklist of The Vascular Flora of West Virginia

WV CDS Current Print-out

February 25, 2010

West Virginia Wildlife Diversity and Natural Heritage Program  
West Virginia Division of Natural Resources, Wildlife Resources Section

Flora West Virginia Committee and Associates of the West Virginia Curatorial Database System

Paul J. Harmon and Donna Ford-Wernitz, Eds.

### Invasive Plant Species Known from Wyoming County

Current Name	Common Name	Origin	Family	Name In Flora of WV	Page No.	RIWI	Cons.	Threat
<i>Acer platanoides</i> L.	NORWAY MAPLE	E	Aceraceae	(same)	616		27	3
<i>Agrostis scabra</i> Willd.	VELVET BENT GRASS	N	Poaceae	<i>Agrostis hymnalis</i> (Walt.) B.S.P., in part	110	FAC	18	2
<i>Ailanthus altissima</i> (Mill.) Swingle	TREE OF HEAVEN	E	Simaroubaceae	(same)	590	FACU-	38	1
<i>Albizia julibrissin</i> Durazzini	MIMOSA, SILK-TREE	E	Fabaceae	(same)	544	Known	23	2
<i>Alliaria petiolata</i> (Bieb.) Cavara & Grande	GARLIC MUSTARD	E	Brassicaceae	<i>Alliaria officinalis</i> Andrz.	428	FACU-	42	1
<i>Arctium minus</i> (Hill) Bernh.	COMMON BURDOCK	E	Asteraceae	(same)	1006	FACU-	41	1
<i>Artemisia vulgaris</i> L. var. <i>vulgaris</i>	COMMON MUGWORT	E	Asteraceae	(same)	1000	Known	27	2
<i>Arthraxon hispidus</i> (Thunb.) Makino	JOINTED GRASS	E	Poaceae	(same)	1043	FAC*	42	1
<i>Bromus inermis</i> Lays. ssp. <i>inermis</i> var. <i>inermis</i>	SMOOTH BROMEGRASS	E	Poaceae	(same)	142	Known	26	1
<i>Carduus acanthoides</i> L.	PLUMELESS THISTLE	E	Asteraceae	(same)	1008		13	4
<i>Carduus nutans</i> L. ssp. <i>macrolepis</i> (Petersen) Kazmi	MUSK THISTLE	E	Asteraceae	(same)	1006		10	1
<i>Celastrus orbiculata</i> Thunb.	ORIENTAL BITTERSWEET	E	Celastraceae		*	FACU	29	1
<i>Centaurea biebersteinii</i> DC.	SPOTTED KNAPWEED	E	Asteraceae	<i>Centaurea maculosa</i> Lam.	1012	Known	32	1
? <i>Cerastium fontanum</i> Baumg. ssp. <i>vulgare</i> (Hartman) Greuter & Burdet	COMMON MOUSE-EAR CHICKWEED	E	Caryophyllaceae	<i>Cerastium vulgatum</i> L.	366	FACU-	41	2
? <i>Chamaesyce nutans</i> (Lag.) Small	EYEBANE	N	Euphorbiaceae	<i>Euphorbia maculata</i> L. [misapplied]	602	FACU-	45	?
<i>Chenopodium ambrosioides</i> L. var. <i>ambrosioides</i>	MEXICAN TEA	E	Chenopodiaceae	(same)	342	FACU	34	3
? <i>Chenopodium berlandieri</i> Moq. var. <i>bushianum</i> (Aellen) Cronq.	VILLAGE GOOSEFOOT	E	Chenopodiaceae	<i>Chenopodium bushianum</i> Aellen	346		8	4
<i>Cichorium intybus</i> L.	CHICORY, BLUE SAILORS	E	Asteraceae	(same)	1012	Known	48	3
<i>Cirsium vulgare</i> (Savi) Ten.	COMMON THISTLE	E	Asteraceae	(same)	1008	FACU-	37	2
<i>Comarostaphylis communis</i> L. var. <i>communis</i>	ASIATIC DAY-FLOWER	E	Commelinaceae	(same)	210	FAC-	47	2
<i>Conium maculatum</i> L.	POISON HEMLOCK	E	Apiaceae	(same)	688	FACW	31	3
<i>Convolvulus arvensis</i> L.	FIELD BINDWEED	E	Convolvulaceae	(same)	762	Known	17	4
<i>Coronilla varia</i> L.	CROWN VETCH	E	Fabaceae	(same)	556	Known	39	1
<i>Dactylis glomerata</i> L. ssp. <i>glomerata</i>	ORCHARD GRASS	E	Poaceae	(same)	128	FACU	37	2

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**Invasive Plant Species Known from Wyoming County**

Current Name	Common Name	Origin	Family	Name in Flora of WV	Page No.	R1W1	Col.	Threat
<i>Daucus carota</i> L.	QUEEN ANNE'S LACE, WILD CARROT	E	Apiaceae	(same)	698	Known	54	3
<i>Dipsacus fullonum</i> L.	COMMON TEASEL	E	Dipsacaceae	<i>Dipsacus sylvestris</i> Huds.	904	Known	40	2
<i>Duchesnea indica</i> (Andr.) Focke	INDIAN STRAWBERRY	E	Rosaceae	(same)	497	FACU-	21	2
<i>Eichium vulgare</i> L.	VIPER'S BUGLOSS, BLUETHISTLE, BLUEDEVIL	E	Boraginaceae	(same)	778	Known	32	1
<i>Elaeagnus umbellata</i> Thunb. var. <i>parviflora</i> (Royale) Schneid.	AUTUMN OLIVE	E	Elaeagnaceae	(same)	660	Known	54	1
<i>Euphorbia cyparissias</i> L.	CYPRESS SPURGE, GRAVEYARD WEED	E	Euphorbiaceae	(same)	598		18	4
<i>Galinsoga quadriradiata</i> Ruiz & Pavin	DEVIL'S DELIGHT, RACEWEED	E	Asteraceae	<i>Galinsoga ciliata</i> (Raf.) Blake	994	Known	43	4
<i>Geranium columbinum</i> L.	LONG-STALKED CRANESBILL, DOVE'S FOOT	E	Geraniaceae	(same)	584		31	4
<i>Hesperis matronalis</i> L.	DAME'S ROCKET, MOTHER-OF-THE-EVE NING	E	Brassicaceae	(same)	430	FACU-	33	1
<i>Hieracium austriacum</i> L.	ORANGE HAWKWEED, DEVIL'S PAINTBRUSH	E	Asteraceae	(same)	1024	Known	10	2
<i>Hieracium cespitosum</i> Dumort.	FIELD HAWKWEED	E	Asteraceae	<i>Hieracium pratense</i> Tausch,	1026	Known	41	2
<i>Hieracium pilosella</i> L. var. <i>pilosella</i>	MOUSE-EAR HAWKWEED	E	Asteraceae	(same)	1024		21	2
<i>Hieracium xfloribundum</i> Wimm. & Grab.	SMOOTH HAWKWEED	E	Asteraceae	<i>Hieracium floribundum</i> Wimm. & Grab.	1026		17	2
<i>Holcus lanatus</i> L.	VELVET GRASS	E	Poaceae	(same)	116	FACU	39	1
<i>Humulus japonicus</i> Sieb. & Zucc.	JAPANESE HOP	E	Cannabaceae	(same)	314	FACU	15	3
<i>Hypericum perforatum</i> L.	COMMON ST. JOHN'S-WORT	E	Clusiaceae	(same)	629	Known	39	4
<i>Ipomoea hederacea</i> Jacq.	IVY-LEAVED MORNING-GLORY	E	Convolvulaceae	<i>Ipomoea hederacea</i> (L.) Jacq.	760	FACU	23	4
<i>Ipomoea purpurea</i> (L.) Roth	MORNING-GLORY	E	Convolvulaceae	(same)	760	UPL	25	4
<i>Kummerowia stipulacea</i> (Maxim.) Makino	KOREAN BUSHCLOVER	E	Fabaceae	<i>Lespedeza stipulacea</i> Maxim.	568	FACU	32	2
<i>Kummerowia striata</i> (Thunb.) Schindl.	JAPAN BUSHCLOVER	E	Fabaceae	<i>Lespedeza striata</i> (Thunb.) H. & A.	566	FACU	21	3
<i>Lactuca saligna</i> L.	WILLOW LETTUCE	E	Asteraceae	(same)	1020	UPL	28	4
<i>Lactuca scariola</i> L.	PRICKLY LETTUCE, COMPASS PLANT	E	Asteraceae	<i>Lactuca scariola</i> L.	1018	FAC-	27	4
<i>Lamium amplexicaule</i> L.	HENBIT	E	Lamiaceae	(same)	806		30	2
<i>Lamium purpureum</i> L. var. <i>purpureum</i>	PURPLE DEAD-NETTLE	E	Lamiaceae	(same)	806		35	2
<i>Lapsana communis</i> L.	NIPPLEWORT	E	Asteraceae	(same)	1012	NI	17	2
<i>Lathyrus latifolius</i> L.	EVERLASTING PEA, PERENNIAL PEA	E	Fabaceae	(same)	570		26	4
<i>Lepidium campestre</i> (L.) Ait. f.	FIELD CRESS	E	Brassicaceae	<i>Lepidium campestre</i> (L.) R. Br.	422		45	2

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**Invasive Plant Species Known from Wyoming County**

Current Name	Common Name	Origin	Family	Name in Flora of WV	Page No. RIWI	Cons. Threat
<i>Lespedeza cuneata</i> (Dum.-Cours.) G. Don	SERICEA	E	Fabaceae	<i>Lespedeza cuneata</i> Michx.	566 FACU-	43 1
<i>Leucanthemum vulgare</i> Lam.	OX-EYE DAISY	E	Asteraceae	<i>Chrysanthemum</i> <i>leucanthemum</i> L.	1000 Known	55 2
<i>Linaria vulgaris</i> Mill.	TOADFLAX, BUTTER-AND-EGGS	E	Scrophulariaceae	(same)	842 Known	41 2
<i>Lolium pratense</i> (Huds.) S. J. Darbyshire	MEADOW FESCUE	E	Poaceae	<i>Festuca elatior</i> L.	140 FACU-	36 2
<i>Lonicera japonica</i> Thunb.	JAPANESE HONEYSUCKLE	E	Caprifoliaceae	(same)	892 FAC-	49 1
<i>Lonicera morrowii</i> Gray	MORROW'S HONEYSUCKLE	E	Caprifoliaceae	<i>Lonicera morrowii</i> Gray	892 FACU	47 1
<i>Lysimachia nummularia</i> L.	MONEYWORT	E	Primulaceae	(same)	732 FACW-	42 1
<i>Lythrum salicaria</i> L.	SPIKED LOOSESTRIFE, PURPLE LOOSESTRIFE	E	Lythraceae	(same)	662 FACW+	34 1
<i>Malva moschata</i> L.	MUSK MALLOW	E	Malvaceae	(same)	632 UPL	14 2
<i>Malva neglecta</i> Wallr.	COMMON MALLOW, CHEESES	E	Malvaceae	(same)	632	29 2
<i>Medicago lupulina</i> L.	BLACK MEDIC	E	Fabaceae	(same)	552 Known	45 2
<i>Medicago sativa</i> L. ssp. sativa	ALFALFA	E	Fabaceae	(same)	552	36 4
<i>Melilotus officinalis</i> (L.) Lam.	YELLOW SWEETCLOVER, WHITE SWEETCLOVER	E	Fabaceae	(same)	552 FACU-	52 2
<i>Mentha spicata</i> L.	SPEARMINT	E	Lamiaceae	(same)	824 FACW+	32 3
<i>Mentha x piperita</i> L.	PEPPERMINT	E	Lamiaceae	<i>Mentha piperita</i> L.	824 FACW+	40 3
<i>Microstegium vimineum</i> (Trin.) A. Camus	EULALIA, JAPANESE STILT GRASS	E	Poaceae		* FAC	38 1
<i>Morus alba</i> L.	WHITE MULBERRY	E	Moraceae	(same)	312 Known	29 4
<i>Najas minor</i> All.	EUTROPHIC WATER-NYMPH	E	Najadaceae	(same)	60 OBL	18 4
<i>Nepeta cataria</i> L.	CATNIP	E	Lamiaceae	(same)	802 FACU	43 2
<i>Nicandra physalodes</i> (L.) Gaertn.	APPLE OF PERU, SHOO-FLY PLANT	E	Solanaceae	<i>Nicandra physalodes</i> (L.) Pers.	834	14 4
<i>Paulownia tomentosa</i> (Thunb.) Sieb. & Zucc. ex Steud.	PRINCESS-TREE, IMPERIAL-TREE	E	Scrophulariaceae	<i>Paulownia tomentosa</i> (Thunb.) Steud.	846 Known	20 2
<i>Perilla frutescens</i> (L.) Brit.	BEEFSTEAK PLANT	E	Lamiaceae	(same)	828 FACU+	24 1
<i>Phalaris arundinacea</i> L.	REED CANARY GRASS	N	Poaceae	(same)	100 FACW	38 1
<i>Pheum pratense</i> L.	TIMOTHY GRASS	E	Poaceae	(same)	108 FACU	49 2
<i>Poa compressa</i> L.	CANADA BLUEGRASS	E	Poaceae	(same)	132 FACU	47 1
<i>Polygonum caespitosum</i> Blume var. longisetum (de Bruyn) A.N. Steward	ASIATIC WATER PEPPER	E	Polygonaceae	<i>Polygonum caespitosum</i> Blume	334 FACU-	43 1
<i>Polygonum cuspidatum</i> Sieb. & Zucc.	JAPANESE KNOTWEED	E	Polygonaceae	(same)	338 FACU-	51 1
<i>Polygonum orientale</i> L.	PRINCE'S FEATHER	E	Polygonaceae	(same)	334 FACU-	15 3
<i>Populus alba</i> L.	WHITE POPLAR, SILVERLEAF POPLAR	E	Salicaceae	(same)	284	38 3
<i>Potentilla recta</i> L.	UPRIGHT CINQUEFOIL	E	Rosaceae	(same)	494 Known	44 4
<i>Pueraria montana</i> (Lour.) Merr.	KUDZU VINE	E	Fabaceae	<i>Pueraria lobata</i> (Willd.)	574	35 1

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**Invasive Plant Species Known from Wyoming County**

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var. lobata (Willd.) Maesen & S. Almeida				Ohio				
Ranunculus acris L. var. acris	TALL BUTTERCUP, MEADOW BUTTERCUP	E	Ranunculaceae	(same)	384	FAC+	24	2
Robinia hispida L.	ROSE ACACIA	I	Fabaceae	(same)	554		19	4
* Rorippa nasturtium-aquaticum (L.) Hayek.	WATERCRESS	I	Brassicaceae	Nasturtium officinale R. Br.	434	OBL	21	2
Rosa multiflora Thunb. ex Murr.	RAMBLER ROSE, MULTIFLORA ROSE	E	Rosaceae	(same)	532	FACU	52	1
* Rubus phoenicolasius Maxim.	WINEBERRY, WINE RASPBERRY	E	Rosaceae	(same)	508	Known	25	1
Rumex acetosella L.	SHEEP SORREL, FIELD SORREL	E	Polygonaceae	(same)	328	Known	50	1
Rumex obtusifolius L.	BROADLEAF DOCK, BITTER DOCK	E	Polygonaceae	(same)	328	FACU-	39	4
Saponaria officinalis L.	SOAPWORT, BOUNCING BET	E	Caryophyllaceae	(same)	372	FACU-	45	2
Setaria faberi Herrm.	GIANT FOXTAIL-GRASS	E	Poaceae	Setaria faberii Herrm.	96	UPL	24	3
Setaria glauca (L.) Beauv.	YELLOW FOXTAIL, PEARL MILLET	E	Poaceae	(same)	96		47	3
Silene latifolia Poir. ssp. alba (P. Mill.) Greuter & Burdet	WHITE CAMPION	E	Caryophyllaceae	Lychnis alba P. Mill.	368	Known	25	4
Sisymbrium officinale (L.) Scop.	HEDGE MUSTARD	E	Brassicaceae	(same)	430		26	3
Solanum dulcamara L. var. dulcamara	BITTERSWEET	E	Solanaceae	(same)	830	FAC-	26	2
Sonchus asper (L.) Hill ssp. asper	SPINY SOW THISTLE	E	Asteraceae	(same)	1016	FAC	34	2
Stellaria graminea L.	LESSER STITCHWORT	E	Caryophyllaceae	(same)	364	FACU-	28	2
Stellaria media (L.) Vill. ssp. media	COMMON CHICKWEED	E	Caryophyllaceae	Stellaria media (L.) Cyrillo	362	Known	34	1
Symphoricarpos orbiculatus Moench	CORALBERRY, INDIAN CURRANT	N	Caprifoliaceae	(same)	894	Known	37	3
Tragopogon dubius Scop.	LARGE GOAT'S BEARD	E	Asteraceae	Tragopogon major Jacq.	1016		21	3
Trifolium arvense L.	RABBITFOOT CLOVER	E	Fabaceae	(same)	548		17	2
Trifolium aureum Pollich.	YELLOW HOP CLOVER	E	Fabaceae	Trifolium agrarium L.	550	Known	33	2
Trifolium repens L.	WHITE CLOVER	E	Fabaceae	(same)	548	FACU-	48	2
Tussilago farfara L.	COLTSFOOT	E	Asteraceae	(same)	1002	FACU	54	2
Ulmus pumila L.	SIBERIAN ELM	E	Ulmaceae			*NI	14	2
Verbascum blattaria L.	MOTH MULLEIN	E	Scrophulariaceae	(same)	840	Known	41	4
Verbascum thapsus L.	GREAT MULLEIN	E	Scrophulariaceae	(same)	838	Known	49	2
Veronica arvensis L.	CORN SPEEDWELL	E	Scrophulariaceae	(same)	856	UPL	36	2
Veronica officinalis L. var. officinalis	COMMON SPEEDWELL, GYPSYWEED	E	Scrophulariaceae	(same)	854	FACU-	43	2
Vicia sativa L. ssp. nigra (L.) Ehrh.	COMMON VETCH	E	Fabaceae	Vicia angustifolia Reichard	568		17	2
Vicia villosa Roth ssp. varia (Host) Corb.	HAIRY-FRUIT VETCH	E	Fabaceae	Vicia dasycarpa Ten.	570		18	2
Vinca minor L.	PERIWINKLE, MYRTLE	E	Apocynaceae	(same)	750		41	1

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4

## Checklist of The Vascular Flora of West Virginia

WV CDS Current Print-out

February 25, 2010

West Virginia Wildlife Diversity and Natural Heritage Program  
West Virginia Division of Natural Resources, Wildlife Resources Section

Flora West Virginia Committee and Associates of the West Virginia Curatorial Database System

Paul J. Harmon and Donna Ford-Wernitz, Eds.

### Invasive Plant Species Known from Mingo County

Current Name	Common Name	Origin	Family	Name in Flora of WV	Page No.	RIWI	Com.	Threat
<i>Ailanthus altissima</i> (Mill.) Swingle	TREE OF HEAVEN	E	Simaroubaceae	(same)	590	FACU-	38	1
<i>Albizia julibrissin</i> Durazzini	MIMOSA, SILK-TREE	E	Fabaceae	(same)	544	Known	23	2
<i>Alliaria petiolata</i> (Bieb.) Cavarn & Grande	GARLIC MUSTARD	E	Brassicaceae	<i>Alliaria officinalis</i> Andr.	428	FACU-	42	1
<i>Artemisia biennis</i> Willd. var. <i>biennis</i>	BIENNIAL WORMWOOD	A	Asteraceae	(same)	1000	FACU-	2	4
<i>Arthraxon hispidus</i> (Thunb.) Makino	JOINTED GRASS	E	Poaceae	(same)	1043	FAC*	42	1
<i>Broussonetia papyrifera</i> (L.) L'Hér. ex Vent.	PAPER MULBERRY	E	Moraceae	<i>Broussonetia papyrifera</i> (L.) Vent.	312		16	2
7 <i>Cerastium fontanum</i> Baumg. ssp. <i>vulgare</i> (Hartman) Greuter & Burdet	COMMON MOUSE-EAR CHICKWEED	E	Caryophyllaceae	<i>Cerastium vulgatum</i> L.	366	FACU-	41	2
<i>Cerastium glomeratum</i> Thuill.	STICKY CHICKWEED	E	Caryophyllaceae	<i>Cerastium viscosum</i> L.	366	UPL.	23	2
7 <i>Chamaecybe nutans</i> (Lag.) Small	EYEBANE	N	Euphorbiaceae	<i>Euphorbia maculata</i> L. [misapplied]	602	FACU-	45	7
<i>Chenopodium album</i> L. var. <i>album</i>	LAMB'S QUARTERS	E	Chenopodiaceae	(same)	344	FACU+	33	3
<i>Cirsium arvense</i> (L.) Scop.	CANADA THISTLE	E	Asteraceae	(same)	1010	FACU	41	2
<i>Commelina communis</i> L. var. <i>communis</i>	ASIATIC DAY-FLOWER	E	Commelinaceae	(same)	210	FAC-	47	2
<i>Coronilla varia</i> L.	CROWN VETCH	E	Fabaceae	(same)	556	Known	39	1
<i>Cynodon dactylon</i> (L.) Pers.	BERMUDA GRASS	E	Poaceae	(same)	120	FACU	12	2
<i>Daucus carota</i> L.	QUEEN ANNE'S LACE, WILD CARROT	E	Apiaceae	(same)	698	Known	54	3
<i>Duchesnea indica</i> (Andr.) Focke	INDIAN STRAWBERRY	E	Rosaceae	(same)	492	FACU-	21	2
<i>Elaeagnus umbellata</i> Thunb. var. <i>parviflora</i> (Royale) Schneid.	AUTUMN OLIVE	E	Elaeagnaceae	(same)	660	Known	54	1
<i>Galinsoga quadriradiata</i> Ruiz & Pavon	DEVIL'S DELIGHT, RACEWEED	E	Asteraceae	<i>Galinsoga citrata</i> (Raf.) Blake	994	Known	43	4
<i>Ipomoea purpurea</i> (L.) Roth	MORNING-GLORY	E	Convolvulaceae	(same)	760	UPL.	25	4
<i>Kummerowia striata</i> (Thunb.) Schindl.	JAPAN BUSHCLOVER	E	Fabaceae	<i>Lespedeza striata</i> (Thunb.) H. & A.	566	FACU	21	3
<i>Lespedeza bicolor</i> Turcz.	JAPANESE BUSHCLOVER	E	Fabaceae	(same)	564		23	1
<i>Lespedeza cuneata</i> (Dum.-Cours.) G. Don	SERICEA	E	Fabaceae	<i>Lespedeza cuneata</i> Michx.	566	FACU-	43	1
<i>Leucanthemum vulgare</i> Lam.	OX-EYE DAISY	E	Asteraceae	<i>Chrysanthemum leucanthemum</i> L.	1000	Known	55	2
<i>Lonicera japonica</i> Thunb.	JAPANESE	E	Caprifoliaceae	(same)	892	FAC-	49	1

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### Invasive Plant Species Known from Mingo County

Current Name	Common Name	Origin	Family	Name in Flora of WV	Page No.	R1W1	Co.	Threat
HONEYSUCKLE								
<i>Mentha spicata</i> L.	SPEARMINT	E	Lamiaceae	(same)	824	FACW+	32	3
<i>Microstegium vimineum</i> (Trin.) A. Camus	EULALIA, JAPANESE STILT GRASS	E	Poaceae			* FAC	38	1
<i>Miscanthus sinensis</i> Anders.	SILVERGRASS, EULALIA	E	Poaceae	(same)	72	FACU	20	2
<i>Paulownia tomentosa</i> (Thunb.) Sieb. & Zucc. ex Steud.	PRINCESS-TREE, IMPERIAL-TREE	E	Scrophulariaceae	<i>Paulownia tomentosa</i> (Thunb.) Steud.	846	Known	20	2
<i>Phleum pratense</i> L.	TIMOTHY GRASS	E	Poaceae	(same)	108	FACU	49	2
<i>Phragmites australis</i> (Cav.) Trin. ex Steud.	REED	I	Poaceae	<i>Phragmites communis</i> Trin.	134	FACW	23	1
<i>Polygonum cuspidatum</i> Sieb. & Zucc.	JAPANESE KNOTWEED	E	Polygonaceae	(same)	338	FACU-	51	1
<i>Polygonum persicaria</i> L.	LADY'S THUMB, HEARTS EASE	E	Polygonaceae	(same)	334	FACW	38	2
<i>Populus alba</i> L.	WHITE POPLAR, SILVERLEAF POPLAR	E	Salicaceae	(same)	284		38	3
<i>Potentilla recta</i> L.	UPRIGHT CINQUEFOIL	E	Rosaceae	(same)	494	Known	44	4
<i>Pueraria montana</i> (Lour.) Merr. var. <i>lobata</i> (Willd.) Maesen & S. Almeida	KUDZU VINE	E	Fabaceae	<i>Pueraria lobata</i> (Willd.) Ohwi	574		35	1
<i>Rumex acetosella</i> L.	SHEEP SORREL, FIELD SORREL	E	Polygonaceae	(same)	328	Known	50	1
<i>Sonchus asper</i> (L.) Hill ssp. <i>asper</i>	SPINY SOW THISTLE	E	Asteraceae	(same)	1018	FAC	34	2
<i>Sorghum halepense</i> (L.) Pers.	JOHNSON GRASS	E	Poaceae	(same)	72	FACU	43	1
<i>Stellaria graminea</i> L.	LESSER STITCHWORT	E	Caryophyllaceae	(same)	364	FACU-	28	2
<i>Trifolium campestre</i> Schreb.	LOW HOP CLOVER	E	Fabaceae	(same)	550		43	2
<i>Trifolium pratense</i> L.	RED CLOVER	E	Fabaceae	(same)	548	FACU-	51	3
<i>Tussilago farfara</i> L.	COLTSFOOT	E	Asteraceae	(same)	1002	FACU	54	2
<i>Verbascum thapsus</i> L.	GREAT MULLEIN	E	Scrophulariaceae	(same)	838	Known	49	2
<i>Veronica officinalis</i> L. var. <i>officinalis</i>	COMMON SPEEDWELL, GYPSYWEED	E	Scrophulariaceae	(same)	854	FACU-	43	2
<i>Vincetoxicum L.</i>	PERIWINKLE, MYRTLE	E	Apocynaceae	(same)	750		41	1

\*F\* = needs further field work, per P. J. Harmon  
 \*T\* = tracked (or under consideration for being tracked) by WV Natural Heritage Program ('State Rare')  
 \*\* = not within Strausbaugh & Core 1977  
 \*R1W1\* = Region 1 Wetland Indicator Code (Porter 1988)  
 \*T\* = needs further systematic work, per P. J. Harmon

### Worst of the Worst Invasive Plant Species – West Virginia

Common Name	Scientific Name
Norway Maple	<i>Acer platanoides</i>
Tree-Of-Heaven	<i>Ailanthus altissima</i>
Garlic Mustard	<i>Alliaria petiolata</i>
Small Carpgrass	<i>Arthraxon hispidus</i>
Japanese Barberry	<i>Berberis thunbergii</i>
Cheatgrass	<i>Bromus tectorum</i>
Spotted Knapweed	<i>Centaurea biebersteinii</i>
Asian Bittersweet	<i>Celastrus orbiculata</i>
Purple Crown-Vetch	<i>Coronilla varia</i>
Chinese Yam	<i>Dioscorea oppositifolia</i>
Autumn Olive	<i>Elaeagnus umbellata</i> var. <i>parvifolia</i>
Winged Euonymus, Winged Spindletree	<i>Euonymus alata</i>
Winter Creeper	<i>Euonymus fortunei</i>
Yellow Iris	<i>Iris pseudacorus</i>
Chinese Bushclover	<i>Lespedeza cuneata</i>
European Privet	<i>Ligustrum vulgare</i>
Tall Fescue	<i>Lolium arundinaceum</i>
Japanese Honeysuckle	<i>Lonicera japonica</i>
Amur Honeysuckle	<i>Lonicera maackii</i>
Morrow's Honeysuckle	<i>Lonicera morrowii</i>
Perennial Ryegrass	<i>Lolium perenne</i> ssp. <i>multiflorum</i>
Meadow Ryegrass	<i>Lolium pratense</i>
Tatarian Honeysuckle	<i>Lonicera tatarica</i>
Purple Loosestrife	<i>Lythrum salicaria</i>
Japanese Stiltgrass	<i>Microstegium vimineum</i>
Reed Canarygrass	<i>Phalaris arundinacea</i>
Common Reed	<i>Phragmites australis</i>
Cork Tree	<i>Phellodendron japonicum</i>
Canada Bluegrass	<i>Poa compressa</i>
Japanese Knotweed	<i>Polygonum cuspidatum</i>
Asiatic Tearthumb	<i>Polygonum perfoliatum</i>
Kudzu	<i>Pueraria montana</i> var. <i>lobata</i>
Bradford Pear	<i>Pyrus calleryana</i>
Multiflora Rose	<i>Rosa multiflora</i>
Wine Raspberry	<i>Rubus phoenicolasius</i>
Stonecrop	<i>Sedum sarmentosum</i>
Johnson Grass	<i>Sorghum halepense</i>
Lesser Periwinkle	<i>Vinca minor</i>

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