

**Summersville and Sutton Lakes
Flow Augmentation
Modification to Operational Guidance**

**Draft
Environmental Assessment**

APRIL 2007



U.S. Army Corps of Engineers
Huntington District
Huntington, West Virginia

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1.0 INTRODUCTION

1.1 THE ENVIRONMENTAL ASSESSMENT

The U.S. Army Corps of Engineers, Huntington District (USACE) is proposing to modify the operational guidance for Summersville and Sutton Lake Flow Augmentation for the Kanawha River. The Corps is preparing an Environmental Assessment (EA) of the proposed modification. This EA documents the results of a study of the proposed modification's potential environmental impacts. The EA was prepared in accordance with the National Environmental Policy Act (NEPA) of 1969 (42 United States Code (USC) 4321 et seq.), the Council on Environmental Quality's (CEQ) regulations for implementing NEPA (40 Code of Federal Regulations (CFR) 1500-1508), and Army Regulation 200-2.

1.2 PURPOSE AND NEED

The original flow augmentation program at Summersville and Sutton Lakes was instituted according to an agreement with the West Virginia Department of Environmental Protection in order to maintain water quality standards in the Kanawha River. Recent observations determined that water quality and monitoring technology have improved since the initiation of the plan, and that the original flow augmentation procedures are not currently needed to maintain the water quality standards that they were designed for. However, a modification of the operating manual for both reservoirs would be needed to deviate from the flow augmentation procedures. This Environmental Assessment evaluates the proposed modification to the operational guidance for Summersville and Sutton flow augmentation for maintaining dissolved oxygen water quality standards.

1.3 PROJECT DESCRIPTION

Summersville and Sutton Dams and Lakes are located in the Kanawha River Basin upstream of Charleston, West Virginia. Summersville is situated on the Gauley River which joins the New River at Gauley Bridge to form the Kanawha River. It was placed into operation in March 1966. Sutton is found on the Elk River, which intersects the Kanawha River at Charleston. It was placed into operation in January 1961.

The Purpose of an Environmental Assessment (EA)

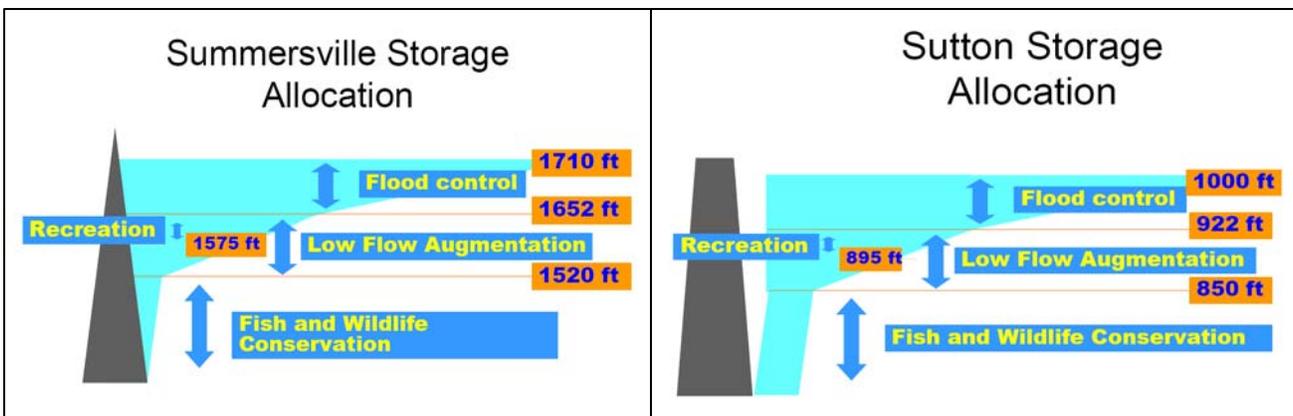
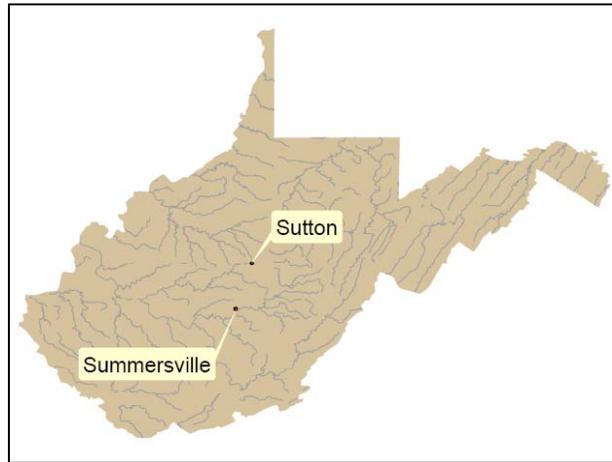
An EA is conducted by a federal agency, such as the U.S. Army Corps of Engineers, to determine whether its proposed action would significantly affect the environment. Information contained in the EA helps federal project planners and decision-makers determine whether an action should be implemented as proposed.

If, based on the assessment, the agency determines that the proposed project would not have significant impacts on the environment, then it may publish a Finding of No Significant Impact (FONSI) and proceed with the action. If the proposed action would generate significant environmental impacts, then the agency must prepare and publish a detailed Environmental Impact Statement (EIS) to help it decide whether to proceed with the action or an alternative.

Draft Environmental Assessment

Summersville and Sutton Lakes Flow Augmentation Modification to Operational Guidance

The Huntington District is authorized to operate these projects for Flood control, Fish and Wildlife Conservation, Low Flow Control (Augmentation), Lake and Downstream Recreation. White Water Recreation and Hydropower production are additionally authorized at Summersville, but no lake storage is specifically allocated for these uses. Reservoir storage is allocated to provide optimal benefit to the different project purposes. When conflicts arise between project purposes, operation is based on the following prioritization of project purposes listed from highest to lowest priority: flood control, fish and wildlife conservation, low flow control (augmentation), lake and downstream recreation. White water recreation and hydropower production benefit from waters released from the dam, and the USACE tries to maximize these benefits within their discretionary authority. A summary of storage allocation is shown below.



The amount of water released through the dam is calculated using the inflow, the amount of allocated storage, and the amount of flow needed for downstream flow augmentation. Flow augmentation generally occurs in the late summer and early fall, usually during August and September. When augmentation demands are minimum, the water stored for this use is held in the lake and can maintain a higher lake elevation. This incidentally provides additional benefits for lake recreation and available release flows for whitewater rafting during seasonal drawdown in the fall, or water quality during low flow conditions.

The original flow augmentation operation criterion titled The Interim Plan directed operational releases at Summersville and Sutton for augmentation on the Kanawha River designed to prevent the dissolved oxygen (DO) content of the Kanawha River from falling below state water quality standards (3 milligrams per liters, mg/l). Since the technology to instantaneously measure dissolved oxygen was not available, the protocol was designed to augment flows based on water temperature and flow, which was developed as a mean to extrapolate dissolved oxygen. A chart

was developed which indicated the flows necessary to maintain dissolved oxygen content at given water temperatures. Flow augmentation was implemented based on this curve, with a set maximum augmentation level and pool storage level to be maintained.

Dissolved Oxygen

Oxygen is measured in streams as dissolved oxygen (DO). The stream system both produces and consumes oxygen. It gains oxygen from the atmosphere and from plants as a result of photosynthesis. Oxygen is consumed through respiration by aquatic animals, decomposition, and various chemical reactions. If more oxygen is consumed than is produced, dissolved oxygen levels decline and some sensitive aquatic species may move away, weaken, or die.

After the implementation of the Clean Water Act in the 1970s, the water quality of the Kanawha River improved noticeably due to pollutant discharge regulation. The USACE began monitoring dissolved oxygen at the Winfield stream gage, and noticed a significant improvement in dissolved oxygen. By 1991, the West Virginia Department of Environmental Protection Office of Water Resources (WVDEP OWR) (formerly West Virginia Division of Natural Resources Water Resources Section) had restricted effluent discharges into the Kanawha River to a load of 10,049.5 lbs/d during summer months and 16,953.3 lbs/d during winter months¹.

This reduction from the load observed in the early 1960's of 921,600 lbs/d equates to a reduction of 98.91% during the summer months and 98.16% during the winter months.

The USACE determined that the flow augmentation release procedures were potentially not necessary to maintain water quality with the improved conditions on the Kanawha River. In 1993, the USACE requested a modification to the Interim Plan with the concurrence of WVDEP-OWR. Flow augmentation releases were reduced, but the same criteria using water temperature and flow to calculate the amount of augmentation was still used. The revision, called the Modified Interim Plan, reduced the original Interim Plan flow augmentation by 500 cfs (but not below 2500 cfs) so long as the dissolved oxygen content of the Kanawha River met current water quality standards of 5.0 mg/l.

The success of this modification raised the question of why Summersville and Sutton were operated based on a temperature curve at Winfield which was originally developed as a mean to extrapolate DO. At the time the Interim Plan was developed, technology for taking real-time DO readings was not available. Improvements in technology now allow the USACE to monitor real-time dissolved oxygen content at the Winfield pool. This method is more accurate than the prescribed criteria of using water temperature, since it measures actual real time dissolved oxygen content of the water, as opposed to the estimates based on the temperature and flow curve from the original plan. With the concurrence of the WVDEP-OWR and the West Virginia Department of Natural Resources (WVDNR), and the approval of the Corps of Engineers Great Lakes and Ohio River Division (LRD), the Huntington District proposed an investigation of the viability of basing operational guidance for augmentation on a low base flow (2250 cfs at the Charleston Lock 6 Gage) as long as the DO levels remained above 5.5 mg/l (the standard 5 mg/l plus 0.5 mg/l as a margin of safety). If dissolved oxygen levels fell below 5.5mg/l, the procedures from the Modified Interim Plan would be implemented.

¹ U.S. Department of the Interior, U.S. Geological Survey, Trends in Biochemical Oxygen Demand of Effluent Discharges to the Kanawha River, West Virginia, published 1993, Table 1, pg 6

Subsequently, major deviations to the operational guidance for augmentation at Summersville and Sutton were granted to the Huntington District for the low flow years of 1999-2002, 2005 and 2006. In the course of these years, USACE was not required to return to the modified interim method of augmentation and the lower priority project purposes benefited from the extra storage.

1.4 DEFINITIONS AND TERMS

Cubic Feet/Second (cfs) – A measurement of discharge, which is the rate at which a volume of water passes a given point in a given amount of time. A cubic foot is like a box of water measuring one foot by one foot by one foot. The USGS defines cubic foot per second (cfs) as "the flow rate or discharge equal to one cubic foot of water per second or about 7.5 gallons per second."

Dissolved Oxygen - Oxygen is measured in streams as dissolved oxygen (DO). The stream system both produces and consumes oxygen. It gains oxygen from the atmosphere and from plants as a result of photosynthesis. Oxygen is consumed through respiration by aquatic animals, decomposition, and various chemical reactions. If more oxygen is consumed than is produced, dissolved oxygen levels decline and some sensitive animals may move away, weaken, or die. Dissolved oxygen, along with other water quality parameters, are monitored using multi-parameter electronic instruments which can be programmed to collect and record a number of water quality parameters on a set sampling frequency.

Flow Augmentation – Increasing the discharge of water released through the dam in order to increase the flow of water downstream. Flow augmentation can be designed to maintain stream conditions to meet water quality or aquatic habitat standards. Downstream recreation such as whitewater rafting incidentally benefits from releases during seasonal drawdown in the fall.

2.0 ALTERNATIVES

In the formulation of operating plans for augmentation, an array of alternatives ranging from the Interim Plan to elimination of augmentation as a project purpose could be considered. The proposed action was chosen during initial screening as it was the only modification that would continue to meet project objectives by maintaining water quality. The No Action alternative has been included in the analysis to provide a baseline for analysis during the decision making process.

2.1 NO ACTION ALTERNATIVE

For the No Action alternative, the Corps would continue to maintain flow augmentation according to the Modified Interim Plan. This would require flow augmentation to continue according to the original criteria of the water temperature and flow curve for the Winfield pool in order to maintain dissolved oxygen levels in the Kanawha River.

2.2 PROPOSED ALTERNATIVE

The proposed alternative is to modify the operational guidance for Summersville and Sutton Lakes to eliminate the flow augmentation procedures when the dissolved oxygen content of the

Kanawha River remains within state water quality standards, and to use instantaneous dissolved oxygen measurements to monitor water quality. The proposed modification to operational guidance for Summersville and Sutton Lake Augmentation for the Kanawha River at Charleston is detailed as follows:

When measurements of dissolved oxygen at the Winfield pool are above 5.5 mg/L, augmentation would be implemented only to maintain flow levels for the Kanawha River, with no releases in regard to dissolved oxygen. When dissolved oxygen levels approached the regulatory standards of 5.5 mg/L, flow augmentation would be implemented according to the Modified Interim Plan.

3.0 EXISTING CONDITIONS AND ENVIRONMENTAL EFFECTS

This section is intended to provide a description of the environment of the project and surrounding areas and how the associated environmental, socio-economic, and cultural resources may be impacted either beneficially or adversely by the proposed project. Only those resources that were determined to pertain to the project area are summarized in this assessment. However, other resources were considered but were excluded from analysis because they were not a part of the project environment.

3.1 WATER RESOURCES

Federal and state laws that regulate the quality of surface waters in West Virginia include the Federal Clean Water Act, the West Virginia Legislative Rules governing Water Quality Standards, Section 401 Water Quality Certifications, and the National Pollution Discharge Elimination System (NPDES).

West Virginia water quality standards, Title 46 of the Legislative Rules, establish minimum water quality requirements for all surface waters in the state. Specific numerical limits are applied to surface waters within the state based on the water body's designated use and biological criteria are provided to directly measure attainment of the water body's designated use. Water quality is evaluated in terms of degree of support for designated uses including water supply, contact recreation, aquatic life, and agriculture. Designations are made for "Fully Supporting" (good water quality and indicates minor or no water quality problems), "Partially Supporting" (impaired or fair water quality) or "Non-Supporting" (poor water quality).

The main stem of the Kanawha River is listed as impaired or only partially supporting for fish consumption. For the lower Kanawha, a "Do Not Eat" advisory is in effect for flathead catfish, channel catfish, carp, hybrid striped bass, and suckers due to dioxin, mercury, and PCBs. For the upper Kanawha a "Not to Exceed Two Meals per Month" advisory is in effect for channel catfish due to PCBs and mercury. The Kanawha River is also listed as impaired for Human Health due to dioxin and for aquatic life due to zinc.

Dissolved oxygen levels are typically above the state standard of 5.0 mg/l which indicate that the biological oxygen demand on the system is no longer at a level to cause problems with dissolved oxygen.

3.1.1 PROPOSED ALTERNATIVE EFFECTS

There would be no significant negative effects to water resources from the proposed project. The proposed alternative would continue to have significant beneficial effects on water resources at times when biological oxygen demands are high or the river can not absorb oxygen from the air. Dissolved oxygen levels would be maintained within regulatory standards, and flows would be maintained within the normal regimes. These benefits would be maximized during drought or low flow conditions, when the additional storage could be used for late season flow augmentation.

3.1.2 NO ACTION ALTERNATIVE EFFECTS

There would be no change to water resources as a result of the No Action alternative, the project would continue to be maintained according to current guidance.

3.2 PROJECT OPERATION

The Huntington District operates the Summersville and Sutton projects for Flood Control, Fish and Wildlife Conservation, Low Flow Control (Augmentation), Lake and Downstream Recreation. The USACE is authorized to accommodate white water recreation and hydropower production at Summersville, but no storage is specifically allocated for these purposes. Reservoir storage is allocated to provide optimal benefit to the different project purposes. When conflicts arise between project purposes, operation is based on the following prioritization of project purposes listed from highest to lowest priority: flood control, fish and wildlife conservation, low flow control (augmentation), lake and downstream recreation, white water recreation, and hydropower production. Augmentation for the Kanawha River only conflicts with Fish and Wildlife Conservation when Summersville and Sutton lake elevations fall to the Low Limiting Rule level, which limits the lowest pool elevation that needs to be maintained for aquatic resources at the lake. When this happens, augmentation can not exceed flows which would draw down lake elevations below these limits.

3.2.1 PROPOSED ALTERNATIVE EFFECTS

There would be no impacts to flood control, fish and wildlife conservation or hydropower production, and positive benefits to recreation from the proposed project. The lakes would be maintained according to current guidelines regulating the pool levels necessary to maintain all project purposes. The proposed project would have incidental beneficial effects on recreation. Lake recreation would benefit by the additional storage waters in the lake that might not be utilized for augmentation. Whitewater recreation would also benefit from additional storage available for seasonal releases.

3.2.2 NO ACTION ALTERNATIVE EFFECTS

For the No Action alternative, the project would continue to operate flow augmentation according to the Modified Interim Plan. There would be no negative impacts to the project operation; however several incidental beneficial effects would not be realized. For the No Action alternative, benefits to lake and whitewater recreation would not be achieved.

3.3 BIOLOGICAL RESOURCES

Biological resources that could potentially be impacted by the proposed project include aquatic life downstream of the Summersville and Sutton projects. These include fish, mussels, benthic macroinvertebrates and other aquatic species. The primary focus of the project would be the maintenance of dissolved oxygen levels, which are critical to aquatic ecosystems. Depletions in dissolved oxygen can cause stress to species and create major shifts in the kinds of aquatic organisms found in water bodies.

3.3.1 PROPOSED ALTERNATIVE EFFECTS

There would be no significant effects to biological resources as a result of the proposed project. Proposed changes in project operation guidance would maintain water quality through a more efficient use of lake storage. Although flow augmentation would be decreased in general, dissolved oxygen levels would continue to be maintained through augmentation when necessary. Flow regulation would continue according to existing guidance for all other aspects.

3.3.2 NO ACTION ALTERNATIVE EFFECTS

There would be no significant effects to biological resources as a result of the No Action alternative. Flow augmentation would continue to maintain water quality standards according to current guidance.

3.3.3 THREATENED OR ENDANGERED SPECIES

There are three Federally listed mussel species that could potentially be impacted by the proposed project. The Pink Mucket, Northern Riffleshell and Clubshell mussels are all listed as endangered, and occur on the Elk River downstream of the Sutton Dam.

3.3.3.1 PROPOSED ALTERNATIVE EFFECTS

No significant impacts to threatened or endangered species would be expected from the proposed project. Flows at both projects would still be regulated to maintain summer and winter pool levels, and for fish and wildlife requirements as before. Coordination with the US Fish and Wildlife service confirms that since flows would remain within normal regimes, there would be no significant effects to endangered mussels downstream of the Sutton Dam.

3.3.3.2 NO ACTION ALTERNATIVE EFFECTS

The No Action alternative would involve no change to project operation, and would have no effect on threatened or endangered species.

3.4 ECONOMICS AND RECREATION

The Summersville and Sutton projects provide economic effects most directly through recreation. Both lake and whitewater rafting recreation businesses benefit from the lakes and their operation. Augmentation releases at times when inflows are low can deplete the storage in Summersville and Sutton lakes which in turn lowers the lake level and decreases the lake recreation and fall white water releases. The Summersville marina closes when the lake elevation drops more than 8 feet below summer pool. Also, significant augmentation releases during the year could reduce seasonal releases that benefit white water recreation in duration,

volume, and days available. Whitewater rafting is one of the cornerstones of West Virginia tourism. The West Virginia Department of Natural Resources estimates that there were over 210,000 whitewater rafting visitors in the state for 2005, with almost 90% of those taken on the Gauley and New Rivers. It has been estimated that a white water day is worth between \$500,000 and \$1,000,000 dollars to the local community.

3.4.1 PROPOSED ALTERNATIVE EFFECTS

There would be no negative impacts to economics or recreation, and incidental beneficial effects. The proposed project would reduce the release of water stored for augmentation. This means more of this water is maintained in the reservoir, and thus is incidentally available for lake recreation during late summer and fall, and increased whitewater releases during seasonal drawdown when storage allocations are adjusted. This would benefit businesses that cater to outdoor recreation, as well as local service businesses such as restaurants, hotels, etc.

3.4.2 NO ACTION ALTERNATIVE EFFECTS

The No Action alternative would continue operation under the Modified Interim plan, which would have no significant negative economic effects, but would not achieve the potential positive benefits associated with the proposed alternative.

3.5 ENVIRONMENTAL JUSTICE

Executive Order 12898 states that Federal agencies shall not cause disproportionate adverse effects to minority or low-income populations.

3.5.1 PROPOSED AND NO ACTION ALTERNATIVE EFFECTS

The proposed project and the No Action alternative relate to flow augmentation releases which mainly affect lake and downstream recreation opportunities, and would not have any disproportionate effects on minority or low-income populations.

3.6 AIR QUALITY

The US EPA has designated six criteria pollutants which are monitored to determine air quality. These include ozone, particulate matter, carbon monoxide, nitrogen dioxide, sulfur dioxide and lead. Summersville and Sutton Lakes are located in Braxton, Webster and Nicholas counties which are considered in attainment for all six criteria pollutants monitored by the US EPA.

3.6.1 PROPOSED AND NO ACTION ALTERNATIVE EFFECTS

Neither the proposed action nor the No Action alternative would have any impact on air quality in the region. Flow augmentation regulates streams within their normal flow regime, and would not have any appreciable effect on any air pollution sources.

3.7 FLOODPLAIN MANAGEMENT

Executive order 11988, Floodplain Management directs federal agencies to “avoid to the extent possible the long and short term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct or indirect support of floodplain development.”

3.7.1 PROPOSED AND NO ACTION ALTERNATIVE EFFECTS

The proposed project and No Action alternative concern the flow augmentation that regulates the Kanawha River within its typical flow regime. Neither alternative would impact the use or development of the floodplain.

3.8 CULTURAL RESOURCES

No cultural resources would be impacted by the propose action or the No Action alternative. There are no cultural or historical resources that would be associated with the proposed project.

3.9 HUMAN HEALTH AND SAFETY

Human health and safety issues for the proposed project are primarily associated with water quality. Both projects are operated by guidance designed to maintain water quality standards by maintaining flow levels adequate to support the pollution discharge permitted by the WVDEP. Flow augmentation has also been operated to maintain dissolved oxygen levels, however these are important to aquatic life but do not directly affect human health and safety.

3.9.1 PROPOSED ALTERNATIVE EFFECTS

There would be no significant effects to human health or safety as a result of the proposed action. Flow would continue to be operated to maintain quality stream conditions necessary to protect human health.

3.9.2 NO ACTION ALTERNATIVE EFFECTS

There would be no impacts to human health or safety as a result of the No Action alternative. The Summersville and Sutton projects would continue to be operated according to current guidance designed to protect human health.

4.0 STATUS OF ENVIRONMENTAL COMPLIANCE

Statute / Executive Order	Compliance		
	Full	Partial	N/A
National Environmental Policy Act	X		
Fish and Wildlife Coordination Act	X		
Endangered Species Act		X	
Clean Water Act	X		
Wild and Scenic Rivers Act	X		
Clean Air Act	X		
National Historic Preservation Act	X		
Archeological Resources Protection Act	X		
E. O. 11988 Floodplain Management	X		
E. O. 11990 Protection of Wetlands			X

5.0 PUBLIC COORDINATION

The Draft Environmental Assessment will be made available to the Federal and state natural resource agencies, the general public and other interested groups for a thirty day review period. Comments received during the review period will be considered in the Final Environmental Assessment.

6.0 CONCLUSION

There would be no significant effects to human health or the environment for the proposed action or the No Action alternative. The proposed action would result in positive benefits to lake and whitewater recreation by indirectly providing additional storage for late season recreation and seasonal drawdown. There would be no significant impacts to water quality, since the flow augmentation procedures would continue to be operated to maintain water quality, and would only be altered when dissolved oxygen levels were within state regulator standards. Overall, the proposed project would change operational procedures so that storage was used more efficiently to the benefit of other project purposes, and is therefore the recommended action.

Appendix A

Draft Finding of No Significant Impact

DRAFT FINDING OF NO SIGNIFICANT IMPACT
Summersville and Sutton Lakes
Flow Augmentation
Modification to Operational Guidance

1. Members of my staff have conducted an environmental assessment, in the overall public interest, concerning the proposed modification to operational guidance for flow augmentation at Summersville and Sutton lakes. The proposed action would modify the flow augmentation designed to maintain dissolved oxygen levels on the Kanawha River to more efficiently use lake storage while still meeting project objectives.
2. The possible consequences of the proposed action have been studied for environmental, cultural, and social well-being affects. The assessment produced the following pertinent conclusions:
 - a. Environmental Considerations. The Huntington District has taken reasonable measures to assemble and present the known or foreseeable environmental impacts of the proposed action in the Environmental Assessment. The proposed action is not anticipated to create significant, negative environmental impacts on the natural and human communities.
 - b. Social Well-Being considerations. No significant economic or social well-being impacts that are both adverse and/or unavoidable are foreseen as a result of the proposed action. The human community will benefit from the increase in recreational activities that result from additional lake storage. The proposed action will not have any impacts on sites of significant archeological or historical importance.
 - c. Coordination with Resource and Other Agencies. Pursuant to the Fish and Wildlife Coordination Act (FWCA) of 1958 as amended, coordination with the U.S. Fish and Wildlife Service has been conducted throughout the study. Also, in accordance with the Endangered Species Act of 1970 as amended, the proposed action may affect, but is not likely to adversely affect the federally listed Pink Mucket, Norther Riffleshell and Clubshell mussels present on the Elk River.
 - d. Other Pertinent Compliance. No prime or unique Farmland under the Farmland Protection Policy Act (FPPA) will be involved. The proposed action is also in compliance with the National Historic Preservation Act (NHPA), (Section 10632 CFR 300), Executive Order (EO) 11988 (Floodplain Management), EO 11990 (Protection of Wetlands) and EO 13045 (Protection of Children from Environmental Health Risks and Safety Risks).
 - e. Other Public Interest Considerations. There has been no opposition to the proposed action expressed by the state or local governments, or organized environmental groups, and there are no unresolved issues regarding the implementation of the project.

- f. Section 176 (c) Clean Air Act. The proposed action has been analyzed for conformity applicability pursuant to regulations implementing Section 176 (c) of the Clean Air Act. It has been determined that the proposed action will not exceed de minimis levels of direct emissions of a criteria pollutant or its precursors and are exempted by 40 CRF Part 93.153.
 - g. Section 401/404 Clean Water Act. No permits would be required pursuant to Section 401 or 404 of the Clean Water Act (CWA).
3. I find the proposed action has been planned in accordance with current authorization as described in the Environmental Assessment. The proposed action is consistent with National policy, statutes and administrative directives. This determination is based on thorough analysis and evaluation of the proposed action and the alternative course of action. In conclusion, I find the proposed modification to flow augmentation at Summersville and Sutton lakes will have no significant adverse effect on the quality of the human and/or natural environment.

Date

Dana R. Hurst
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