

REPORT SUMMARY

UPPER OHIO NAVIGATION STUDY, PA

Feasibility Scoping Meeting:	05 SEP 2007
Alternative Formulation Briefing:	30 JUN 2010
AFB Guidance Memorandum:	05 OCT 2010
Draft Report Guidance Memorandum:	03 DEC 2013
Division Engineer Transmittal:	05 SEP 2014
Received at CECW-PC:	05 SEP 2014
CWRB Briefing:	16 OCT 2014
FEIS filed with EPA:	23 OCT 2014
30-Day S&A Review start:	27 OCT 2014
S&A and FEIS review end:	11 DEC 2014
Signed Chief's Report	06 JAN 2015

STUDY INFORMATION

Study Authority.

The basic authority for the Upper Ohio Navigation Study, Pennsylvania, is contained in the resolution adopted by the Committee on Public Works of the United States Senate dated May 16, 1955:

Resolved by the Committee on Public Works of the United States Senate, that the Board of Engineers for Rivers and Harbors created under Section 3 of the River and Harbor Act, approved June 13, 1902, be, and is hereby requested to review the reports on the Ohio River published in House Document No. 306, Seventy-fourth Congress, First Session, House Committee on Flood Control Document No. 1, Seventy-fifth Congress, First Session, and related reports, with a view to determining whether any modifications in the present comprehensive plan for flood control and other purposes in the Ohio River basin is advisable at this time.

Further authority was provided through a resolution adopted by the U.S. House of Representatives Committee on Public Works and Transportation on March 11, 1982:

Resolved by the Committee on Public Works and Transportation of the House of Representatives, United States, that the Board of Engineers for Rivers and Harbors established by the Section 3 of the River and Harbor Act approved June 13, 1902, is hereby requested to review the reports on the Ohio River published as House Document No. 492, 60th Congress, First Session, and House Document No. 306, Seventy-fourth Congress, First Session, and other pertinent reports with a view to determine whether any modification in the authorized plan for modern barge navigation and other purposes on the Ohio River is advisable at this time with particular emphasis on need for improvement or replacement of Emsworth Locks and Dam, Ohio River Mile 6.1; Dashields Locks and Dam, Ohio River Mile 13.3; Montgomery Island Locks and Dam, Ohio River Mile 31.7; and other locations where obsolete or inadequate facilities impede the orderly flow of commerce.

Additional general study authority is contained in Public Law 91-611, Section 216, 1970:

The Secretary of the Army, acting through the Chief of Engineers, is authorized to review the operation of projects the construction of which has been completed and which were constructed by the Corps of Engineers in the interest of navigation, flood control, water supply, and related purposes, when found advisable due to significantly changed physical or economic conditions, and to report thereon to Congress with recommendations on the advisability of modifying the structures or their operation, and for improving the quality of the environment in the overall public interest.

Study Sponsor.

No non-federal sponsor; cost-shared (50/50) with the Inland Waterways Trust Fund.

Study Purpose and Scope.

The report is a final response to the study authority for maintaining safe, efficient, reliable, and sustainable navigation at Emsworth Locks and Dams, Dashields Locks and Dam, and Montgomery Locks and Dam on the Upper Ohio River. The study also investigated potential ecosystem restoration projects to the extent of continuing non-federal cost-share partner interest.

Project Location/Congressional District.

The study area includes the Ohio River corridor in Pennsylvania (r.m. 0.0 to 40.0), situated in Allegheny and Beaver counties of Southwest Pennsylvania. The Upper Ohio is central to the Port of Pittsburgh, the nation's second busiest inland port with 218,000 total jobs generated.



Senator Bob Casey (D)
Senator Pat Toomey (R)

PA 12 - Keith Rothfus (R)
PA 14 - Mike Doyle (D)
PA 18 - Tim Murphy (R)

Prior Reports and Existing Water Projects.

Report on Replacement, Emsworth, Dashiels and Montgomery Locks and Dams, Ohio River, Pennsylvania (1971);

Major rehabilitation reports: Emsworth (1977), Dashiels (1984), Montgomery (1982); Emsworth Dams (2001);

Ohio River Mainstem System Study, Emsworth, Dashiels, and Montgomery Locks and Dams Condition Report (2001);

Ohio River Mainstem System Study and Programmatic Environmental Impact Statement (Record of Decision, 8 July 2011).

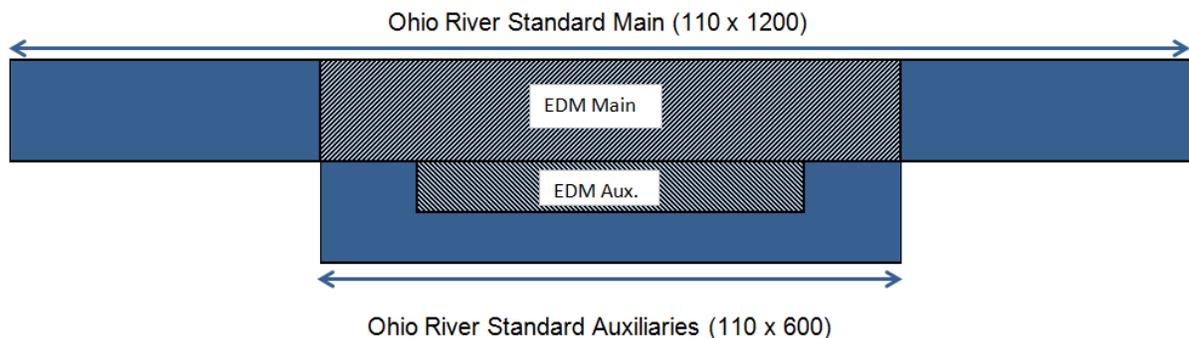
Federal Interest.

Inland river navigation. Continuation of navigation on the Ohio River; original authorization contained in the River Act of 1824. The recommended plan is the National Economic Development (NED) plan with a BCR of 2.6.

STUDY OBJECTIVES

Problems and Opportunities.

Lock condition and capacity issues. Old lock chambers at the Emsworth, Dashiels, and Montgomery navigation facilities are structurally unreliable and are the smallest on the Ohio River Mainstem. Major rehabilitations of the locks in the 1980s to extend their useful life by 20+ years have run their course. Failure of a critical component could cost up to \$200 M and close the river to traffic for two or more years. Opportunities include lock rehabilitation or replacement, new lock and dam facilities, reduction in number of facilities from 3 to 2, and low-cost features and procedures to aid navigation efficiencies.



Ecosystem degradation issues. Nine of 10 “Valued Environmental Components” identified in the *Ohio River Mainstem System Study* have sustainability concerns. Opportunities include formulation of National Ecosystem Restoration (NER) and combined plans, and

sustainability-focused redesign/operational modifications of replacement navigation facilities to ameliorate their historical impediment to riverine connectivity.

Planning Objectives.

- 1) Identify and evaluate all reasonable alternatives for maintaining safe, reliable, efficient, and sustainable **navigation** on the Upper Ohio River at Emsworth, Dashields and Montgomery Locks and Dams.
- 2) Identify and evaluate reasonable opportunities for **ecosystem restoration** projects in the study area, consistent with navigation planning and non-federal cost-sharing interest.
- 3) Assure that any recommended project is consistent with **protection of the Nation's environment**.

Planning Constraints.

- 1) No change in authorized 9-foot deep Ohio River navigation channel.
- 2) Maximum lock size considered is 110' x 1200.'

ALTERNATIVES

Plan Formulation Rationale.

Identify problem areas that can be addressed without separate authorization, i.e. define the Without-Project Condition (WOPC).

Identify alternatives to address remaining problems that require authorization (With-Project Condition) given future traffic projections, lock component reliability, lock capacity, risk, and environmental issues.

Identify potential ecosystem restoration projects, to the extent of continuing local sponsor interest in participating in a Combined (NED/NER) Plan.

Management Measures and Alternative Plans.

Major rehabilitation and low cost measures (traffic scheduling & guide/guard wall extensions) were dropped from consideration as they do not address the facilities' structural unreliability. The two-for-three replacement with pool changes and the new facility/new location alternatives were dropped from consideration due to significant structural, shoreside facility relocation, and environmental issues.

Final Array of Alternatives.

Ecosystem Restoration:

Nine in-river habitat improvement projects were considered. As NER formulation proceeded, the potential non-federal cost-sharing sponsor declined participation in a Combined Plan. The recommended plan, therefore, is the navigation NED plan.

Navigation:

Developed and evaluated alternatives of different lock sizes and construction of one or two new lock chambers. (LMA = “Lock Modernization Alternative”).

ALTERNATIVES				ACRONYM
[Same application at each - Emsworth, Dashields, & Montgomery]				
No new chambers	Existing chambers - Advance Maintenance			<i>AMA</i>
One new chamber dimensions:	110' x	600'	Retain old main chamber Advance Maintenance	<i>LMA 4</i>
		800'		<i>LMA 5</i>
		1200'		<i>LMA 6</i>
	110' x	600'	Retain old main chamber Reactive Maintenance	<i>LMA 7</i>
		800'		<i>LMA 8</i>
		1200'		<i>LMA 9</i>
Two new chambers New main dimensions:	110' x	600'	New auxiliary chamber dimensions: 110' x 600'	<i>LMA 1</i>
		800'		<i>LMA 2</i>
		1200'		<i>LMA 3</i>

Comparison of Alternatives.

All Lock Modernization Alternatives (LMAs) are superior to Advanced Maintenance and WOPC, in that no multi-year closures are required for plan implementation.

Principles & Guidelines (P&G) System of Accounts:

- NED – National Economic Development,
- RED – Regional Economic Development,
- EQ – Environmental Quality,
- OSE – Other Social Effects.

ALTERNATIVES				ACRONYM	Principles & Guidelines System of Accounts			
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		800'		<i>LMA 2</i>				
		1200'		<i>LMA 3</i>				

LMA 7 is the NED alternative, but LMA 1 and LMA 9 rank highest in the other three Accounts.

P&G Evaluation Criteria (Completeness, Effectiveness, Efficiency, & Acceptability):

ALTERNATIVES [Same application at each - Emsworth, Dashields, & Montgomery]			ACRONYM	Principles & Guidelines Evaluation Criteria			
				Efficiency	Effectiveness	Completeness	Acceptability
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		800'		<i>LMA 2</i>			
		1200'		<i>LMA 3</i>			

The NED alternative, LMA 7, ranks highest in the efficiency account, but LMA #s 1 & 9 rank higher than LMA 7 under the other Criteria. LMA 1 (new twin 600' chambers) ranks highest in the majority of P&G Accounts and Criteria, but no waiver from the NED Account was approved.

Key Assumptions.

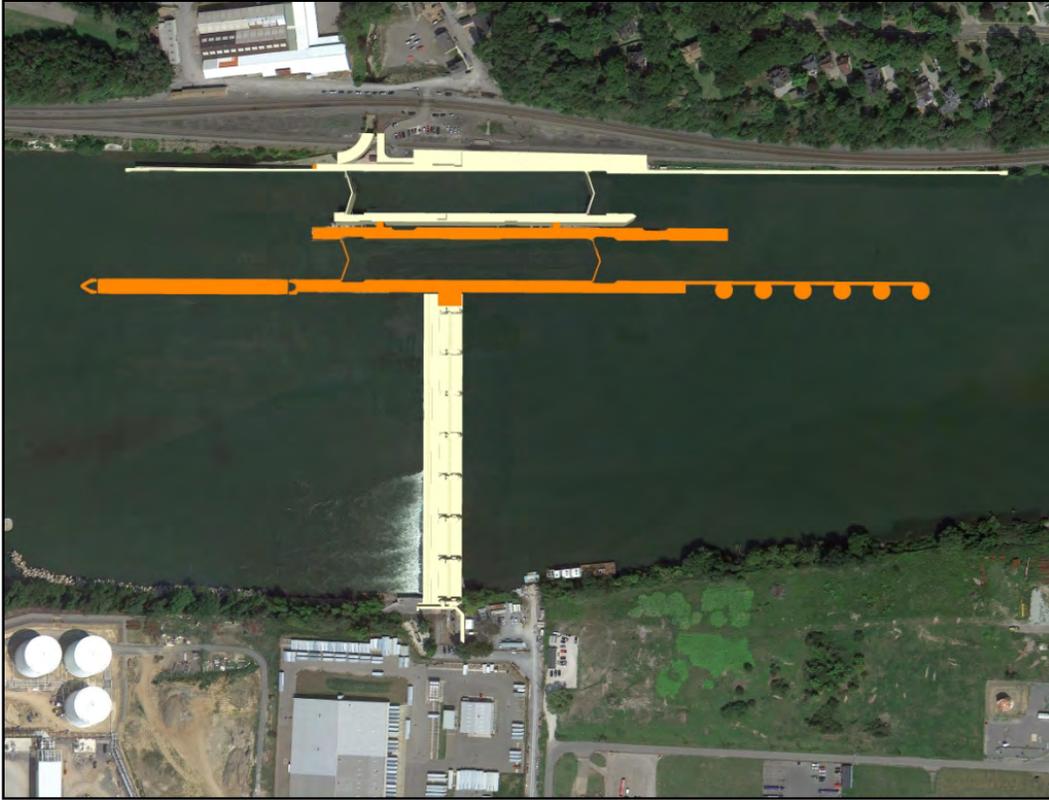
The canalized Ohio River Mainstem and tributaries will remain canalized.

All locks and dams other than EDM are modeled as operating at full capacity (no unscheduled closures due to major component failures).

All authorized Ohio River improvements are included in all analyses (Olmsted L/D, & J.T. Myers & Greenup extensions).

Recommended Plan.

“**Lock Modernization Alternative 7**” (LMA 7) is the recommended NED plan. This plan includes one new lock chamber (110' x 600') at each of the EDM facilities. The existing riverside auxiliary chambers and a section of each dam would be sacrificed to construct the new chambers riverward of the existing main chambers. Each facility would retain the existing land-side main chamber as the auxiliary in a Reactive Maintenance mode (fix-as-fails).



**Emsworth Locks showing overlay of new 110' x 600' chamber
in place of existing 56' x 360' auxiliary chamber;
Dashields and Montgomery facilities have similar replacement patterns.**

Systems / Watershed Context.

Emsworth, Dashields, and Montgomery Locks and Dams are single purpose navigation facilities, but also provide important water quality, water supply, and recreational benefits to Pittsburgh. There is continuing interest in developing non-federal hydropower projects at these facilities. The U.S. Coast Guard is a Cooperating Agency in the study, but has had minimal involvement. U.S. EPA did not respond and the U.S. Geological Survey declined invitations to cooperate.

Environmental Operating Principles.

The recommended plan supports the Principles to the extent of existing authorities.

Peer (Agency Technical) Review.

Three separate Agency Technical Reviews (ATR) were conducted on the draft report, Hazardous, Toxic, and Radioactive Waste (HTRW) Phase II studies, and mitigation plan calculations. Independent External Peer Review (IEPR) was conducted concurrent with public review of the *Draft Feasibility Report and Integrated Environmental Impact Statement*. All ATR comments were resolved. One of 17 IEPR comments remains unresolved – Comment #7 taking issue with the Corps definition of the Without Project Condition as the most likely future condition without an authorized navigation project.

EXPECTED PROJECT PERFORMANCE

Project Costs.

The total project cost at October 2014 price levels is \$2.3 billion with each of the three projects accounting for about one-third of the total.

Cost Summary
Upper Ohio Navigation Study, PA
(October 2014 Price Levels)

Project/Facility	Cost (x \$1,000)
Total	\$2,320,082
Emsworth	737,141
Dashields	800,691
Montgomery	782,250

Equivalent Annual Costs and Benefits.

The plan recommended for authorization provides incremental annual benefits of \$248.7 million at an incremental annual cost of \$97.5 million, both at October 2014 price levels and at a 3.5 percent interest rate. Therefore the incremental net benefits of the recommended plan are \$151.2 million and the incremental Benefit to Cost Ratio is 2.6.

Cost Sharing.

General Funds of the U.S. Treasury (50%) and Inland Waterways Trust Fund (50%).

Project Implementation.

No non-federal sponsor.

Operation, Maintenance, Repair, Rehabilitation, and Replacement (OMRR&R).

Fully federal.

Key Social and Environmental Factors.

The primary social and environmental benefits of the recommended plan are the continuation of safe and reliable river navigation, and avoidance of potentially severe impacts from prolonged river closure and/or pool loss due to structural failure. The region's heavy industry and electric power industry are dependent upon efficient river transportation of coal and other bulk commodities. If the facilities' main chambers were to experience lengthy closure for major repairs, river traffic would experience significant delays waiting on passage through the very small auxiliary chambers as well as cause significant environmental impacts from queuing. Transfer of materials to truck and rail transportation modes would also cause significant infrastructure and air quality impacts over river transportation.

Construction of new lock chambers at existing facilities will confine environmental impacts to the lock footprint and land-based construction support areas. Land impacts are minimized by selection of former construction support areas or previously industrialized sites.

Mitigation actions are limited to land restoration, and for aquatic impacts, placement of fish habitat structure in a protective embayment environment. Monitoring and adaptive management activities are the minimum necessary to verify mitigation success.

The Corps' *Ohio River Mainstem Systems Study* (ORMSS) and its US Fish and Wildlife Service and state natural resource agency participants identified the navigation system's historical impact on river connectivity as a major detriment to the recovery and sustainability of certain big river fish and native mussel species. A modernized system with new locks designed to serve commercial traffic will effectively perpetuate the system's historic impediment to connectivity. The ORMSS study committed the Upper Ohio Study to evaluate and, if feasible, construct fish passage strategies. The Pittsburgh District found conceptual fish passage designs to be structurally infeasible at the existing dams, and to be so costly as to have no justifiable construction authority.

However, in order to "foster sustainability as a way of life" (EOP 1) and incorporate sustainability planning into project's areas of influence (an ORMSS environmental commitment), the District recommended "environmentally sustainable design" measures for the new lock construction. The purpose of these measures would be to evaluate and implement potential lock design modifications to improve native fish passage (i.e. "connectivity") through normal lock operations. These measures are not proposed or authorized as either mitigation or ecosystem restoration. The Environmental Operating Principles provide no authority to increase project costs for environmentally sustainable design measures or evaluation of their success through monitoring and adaptive management. Therefore, environmentally sustainable design measures will be pursued only to the extent that they do not increase project costs.

Stakeholder Perspectives and Differences.

Navigation. The navigation industry supports the recommended NED plan. Their preference, however, is for 1200' chambers as provided at all other Ohio River facilities, or for two reliable chambers per facility, whether two new 600' chambers (the Regional Economic Development Plan) or a new main chamber with advance maintenance measures on the existing main chambers.

Ecosystem Restoration. The Western Pennsylvania Conservancy initially indicated interest in a project in the Montgomery embayment, but as formulation proceeded and questions arose as to timing and long-term responsibilities, they declined further participation in a restoration and Combined Plan.

Environmental. Pittsburgh District created an Interagency Working Group of federal agencies, state agencies, academia, and resource organizations for the study. During the study formulation period (2008-10) Pittsburgh convened quarterly meetings of the Group, which allowed communication of District studies and exchange of ideas regarding impact analysis and mitigation. The study of native fish passage strategies was a significant focus of the Group and had the support of all agencies. The study concluded, however, that fish passage structures are structurally infeasible at the existing dams, and that the Corps has no existing authorities under which a fish passage project could be justified.

Environmental Compliance.

The draft environmental impact statement (DEIS) was circulated for review between 18 April–02 June 2014. A draft Record of Decision will be circulated with the FEIS during State and Agency review. Three responses were received from navigation stakeholders supporting the recommended plan but expressing preference for 1200’ chambers or two reliable 600’ chambers. The US Environmental Protection Agency was the only federal agency providing comments. They rate the DEIS as EC-2 (Environmental Concerns/Insufficient Information). They find the recommended plan inadequate as it does not address the “long-standing cumulative impact to certain fish species and mussel species, and recommends the project not proceed until suitable mitigation for fish passage be included in the proposed project plans.” They also cite inadequacy of the Environmental Justice evaluation.

The Pennsylvania Fish and Boat Commission commented that fish passage at the locks and dams is critical to the recovery of the Ohio River and that this has been a topic of debate. They recommend “assisted fish lockages” be incorporated into the operation schedule of the proposed locks. They also make constructive recommendations regarding the in-river mitigation plan and the potential for in-river disposal of certain materials, provided it is consistent with federal and Commonwealth regulations, to improve aquatic habitat.

The Pennsylvania Department of Environmental Protection commented on the lack of sufficient information to demonstrate air quality emissions are below *de minimus* levels and exempt from General Conformity.

In response to the fish passage issue, the District responded that we have no authority to construct fish passage as mitigation or ecosystem restoration for long-standing cumulative impacts of the navigation system, nor did the ORMSS commitment to evaluate and, if feasible, construct fish passage strategies at EDM provide any authority. The practice of assisted fish lockages successfully used at other District’s navigation facilities may be evaluated, but is generally targeted towards low-use facilities.

In-river mitigation was incrementally justified and cannot be supplemented or substituted without a demonstrated additional need or justification. In-river disposal of suitable materials will be evaluated in the future as a District commitment to consider beneficial use of disposal materials to the extent that it does not increase project costs. With respect to environmental justice, air quality, and other issues raised in comments, the District supplemented the Final EIS with additional information to address these issues.

State and Agency Review

[to be inserted by HQUSACE following S&A review period]

Certification of Peer and Legal Review.

Legal certification – 28 February 2014

ATR Certification – 06 May 2011

IEPR Certification – 14 Jul 2014

Cost (TCX) Certification – August 2014

HTRW Phase II ATR – 28 September 2012, 18 June 2013, & 16 July 2013

Mitigation Calculations ATR – 29 April 2014

Policy Compliance Review.

HQUSACE OWPR PGM – 03 December 2013, & 03 April 2014