

National Wildlife Federation  
American Rivers  
Great Rivers Environmental Law Center  
Missouri Coalition for the Environment  
Prairie Rivers Network  
River Alliance of Wisconsin

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Via Email: [jasen.l.brown@usace.army.mil](mailto:jasen.l.brown@usace.army.mil) and [RegWorksSEIS@usace.army.mil](mailto:RegWorksSEIS@usace.army.mil)

U.S. Army Corps of Engineers  
St. Louis District  
CEMVS-EC-H  
1222 Spruce St.  
St. Louis, MO 63103-2833

RE: Scoping Comments for the Supplemental Environmental Impact Statement for the Middle Mississippi River Regulating Works Project, Public Notice 2013-744

Dear Mr. Brown:

The National Wildlife Federation, American Rivers, Great Rivers Environmental Law Center, Missouri Coalition for the Environment, Prairie Rivers Network, and River Alliance of Wisconsin (collectively, the Conservation Organizations") appreciate the opportunity to submit these comments on the scope of the Supplemental Environmental Impact Statement for the Middle Mississippi River Regulating Works Project (the SEIS).

The National Wildlife Federation (NWF) is the Nation's largest conservation education and advocacy organization. NWF has more than four million members and supporters and conservation affiliate organizations in forty-seven states and territories. NWF has a long history of interest and involvement in the programs of the U.S. Army Corps of Engineers (Corps) and the management and protection of the Mississippi River. NWF is a strong supporter of ecologically sound efforts to restore the Mississippi River and the nation's many other damaged rivers, coasts, and wetlands.

American Rivers protects wild rivers, restores damaged rivers, and conserves clean water for people and nature. Since 1973, American Rivers has protected and restored more than 150,000 miles of rivers through advocacy efforts, on-the-ground projects, and an annual America's Most Endangered Rivers® campaign. Headquartered in Washington, DC, American Rivers has offices across the country and more than 200,000 members, supporters, and volunteers. As the nation's leading river conservation organization, American Rivers has an interest in restoring and protecting the health of the Mississippi River Basin for people and wildlife.

Great Rivers Environmental Law Center is a nonprofit organization dedicated to providing free and reduced-fee public interest legal services to individuals and organizations working to protect and preserve Missouri's environment.

The Missouri Coalition for the Environment is Missouri's independent, citizens' environmental organization for clean water, clean air, clean energy, and a healthy environment. The Missouri Coalition for the Environment works to protect and restore the environment through education, public engagement, and legal action.

Prairie Rivers Network is Illinois' only statewide river conservation organization and is the Illinois affiliate of the National Wildlife Federation. We are a 501(c)(3), tax-exempt nonprofit based in Champaign, Illinois. Our mission is to protect the rivers of Illinois and to promote the lasting health and beauty of watershed communities. We use sound science and policy analysis to stand up for strong, fair laws to protect clean water and natural areas. We engage citizens, businesses, and governments across Illinois in this effort, providing them with the policy information, scientific data, technical assistance, and outreach programs needed to support effective river advocacy. A recognized leader on issues involving the implementation and enforcement of the Clean Water Act in Illinois, Prairie Rivers Network leads efforts to improve clean water standards, review pollution permits, protect wetlands, reduce polluted runoff from farms and streets, and restore natural areas along rivers and streams.

The River Alliance of Wisconsin is a statewide nonprofit river conservation organization with 2,500 individual and over 200 business and organizational members. Its interest in the Mississippi stems from the fact that the river forms about half the state's western boundary with Minnesota. Thousands of Wisconsinites recreate on the river, and the more than two dozen cities and villages along the river are concerned with how the river's management affects water levels, especially flooding.

### **General Comments**

The Conservation Organizations appreciate the Corps' decision to prepare a supplemental EIS for its Regulating Works Project. However, since this project is just one of many types of operations and maintenance (O&M) activities designed to maintain a 9 foot navigation channel in the Upper Mississippi River-Illinois Waterway Navigation System (UMR-IWW), evaluating just the Regulating Works Project would constitute an impermissible piecemeal assessment that cannot satisfy the requirements of the National Environmental Policy Act (NEPA). Instead, NEPA requires preparation of a supplemental Environmental Impact Statement that evaluates **all** O&M activities and identifies alternatives that could cause less harm to the environment.

As discussed in detail below, the Corps' O&M activities are causing significant harm to the environment, increasing flood risks for communities, and undermining the work carried out under the Corps' restoration and flood damage reduction authorities. For example, while the Corps is authorized to reduce flood damages along the river, extensive peer-reviewed science demonstrates that river training structures constructed under the Regulating Works Project have increased flood levels by up to 15 feet in some locations and 10 feet in broad stretches of the Mississippi River where these structures are prevalent.<sup>1</sup> The Corps, however, continues to deny the validity of this science.

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<sup>1</sup> Pinter, N., A.A. Jemberie, J.W.F. Remo, R.A. Heine, and B.A. Ickes, 2010. Empirical modeling of hydrologic response to river engineering, Mississippi and Lower Missouri Rivers. River Research and Applications, 26: 546-

To comply fully with NEPA and to ensure the highest level of protection to the public, the Conservation Organizations urge the Corps to:

- I. Expand the SEIS to evaluate the full suite of O&M activities for the Upper Mississippi River – Illinois Waterway navigation system. As the Corps is well aware, the Regulating Works Project is just one of a number of activities carried out by the Corps to maintain navigation on the UMR-IWW. Other O&M activities include water level regulation, dredging and disposal of dredged material, construction of revetment, and operation and maintenance of the system’s 37 locks and dams. Since all O&M activities are designed to maintain a single project, individual activities may not be evaluated in isolation. A supplemental EIS for the full suite of O&M activities would help ensure that future O&M activities comply with current law, planning criteria and policies, including the requirements established by the Clean Water Act, the Endangered Species Act, the Water Resources Development Act of 2007, and the Fish and Wildlife Coordination Act.
- II. Initiate a National Academy of Sciences study on the effect of river training structures on flood heights to inform development of the SEIS. A National Academy of Sciences review is critical for ensuring that: (a) the SEIS is based on the best possible scientific understanding of the role of river training structures on increasing flood heights; (b) the SEIS produces recommendations that will provide the highest possible protection to the public; and (c) the public will have confidence in this aspect of the evaluation and recommendations contained in the final SEIS.
- III. Impose a moratorium on the construction of new river training structures pending completion of the National Academy of Sciences Study and the SEIS. As discussed below, extensive peer-reviewed science demonstrates that river training structures have increased flood levels by up to 15 feet in some locations and 10 feet in broad stretches of the Mississippi River where these structures are prevalent. In light of these findings, it is critical that additional river training structures not be built unless, and until, the National Academy of Sciences study and comprehensive SEIS establish that such construction will not contribute to increased flood risks to communities.
- IV. Fully evaluate the impacts of all reasonable alternatives and select an alternative that protects and restores the Mississippi River. To comply with NEPA, the SEIS must (among other things) properly define the project purpose, fully evaluate project impacts, and fully review all reasonable alternatives. The project purpose is most properly defined as maintaining navigation. Impacts that must be examined include, direct, indirect, and cumulative impacts (including the cumulative impacts of climate change) of all O&M activities on the UMR-IWW

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571; Remo, J.W.F., N. Pinter, and R.A. Heine, 2009. The use of retro- and scenario- modeling to assess effects of 100+ years river engineering and land cover change on Middle and Lower Mississippi River flood stages. *Journal of Hydrology*, 376: 403-416. There is also a global consensus that river training structures can and do increase flood heights as evidenced by actions being carried out by the government of the Netherlands to modify hundreds of river training structures “as part of a nationwide effort to reduce flood risk in [the Rhine River] floodplain” at significant cost. Government Accountability Office, GAO-12-41, Mississippi River, Actions Are Needed to Help Resolve Environmental and Flooding Concerns about the Use of River Training Structures (December 2011) (GAO Study on River Training Structures) (concluding that the Corps is out of compliance with both the National Environmental Policy Act and the Clean Water Act).

ecosystems; the effect of those activities on flood heights and public safety; alternatives to those activities that could cause less harm to the environment, including alternative water level management regimes and removal and/or modification of river training structures; and mitigation for those impacts that cannot be avoided. To comply with the National Water Policy and the Corps' civil works mitigation requirements, the SEIS must ultimately select an alternative that will protect and restore the natural functions of the Mississippi River system and mitigate any unavoidable damage.

The independent external peer review that is clearly required for the SEIS should be conducted by the National Academy of Sciences, and the panel's task should explicitly include a charge to evaluate: the appropriateness of the alternative recommended by the Corps; whether the selected alternative will in fact protect and restore the functions of the Mississippi River system; whether the selected alternative includes a mitigation plan that is likely to produce ecologically successful mitigation; and whether the selected alternative includes appropriate and meaningful criteria for determining project success.

### Specific Comments

#### I. The Corps Should Expand the SEIS to Evaluate the Full Suite of O&M Activities

The UMR-IWW navigation system includes 1,200 miles of 9-foot navigation channel, 37 lock and dam sites, and thousands of channel training structures. This system requires "continuous regular operations and maintenance" at a cost of more than \$120 million each year.<sup>2</sup> These operations and maintenance (O&M) activities include: dredging and disposal of dredged material, water level regulation, construction of river training structures (wing dikes, bendway weirs, chevrons), construction of revetment, and operation and maintenance of the system's 37 locks and dams.

These actions must be examined in a single environmental impact statement because they are "connected actions."<sup>3</sup> Actions are connected if they:

- (i) Automatically trigger other actions which may require environmental impact statements.
- (ii) Cannot or will not proceed unless other actions are taken previously or simultaneously
- (iii) Are interdependent parts of a larger action and depend on the larger action for their justification.<sup>4</sup>

Under these standards, the full suite of O&M activities are clearly "connected actions" that must be evaluated in a single environmental impact statement (EIS). Each O&M activity is an interdependent part of a larger action – maintaining the UMR-IWW navigation system – and will not proceed unless other actions that independently would require an environmental impact statement are undertaken (for

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<sup>2</sup> USACE Brochure, Upper Mississippi River – Illinois Waterway System Locks and Dams (September 2009) available at <http://www.mvr.usace.army.mil/brochures/documents/UMRSLocksandDams.pdf>; Congressional Research Service, *Inland Waterways: Recent Proposals and Issues for Congress* (July 14, 2011) at 15.

<sup>3</sup> 40 C.F.R. § 1508.25; *e.g.*, *Thomas v. Peterson*, 753 F.2d 754, 758 (9th Cir. 1985).

<sup>4</sup> 40 C.F.R. § 1508.25(a).

example, dredging the Mississippi River, controlling water levels in the Mississippi River). There is no independent utility for constructing river training structures for navigation purposes absent the full suite of O&M activities that are required to maintain the UMR-IWW navigation system.<sup>5</sup>

All O&M activities must be reviewed under a comprehensive supplemental environmental impact statement for the same reasons that mandate preparation of the SEIS for the Regulating Works Project. A supplemental EIS must be prepared where, as here, there “are significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts” or when the agency makes “substantial changes in the proposed action that are relevant to environmental concerns.” 40 C.F.R. § 1502.9(c); 33 C.F.R. § 230.13(b).

The Supreme Court has ruled that:

If there remains ‘major Federal actio[n]’ to occur, and if the new information is sufficient to show that the remaining action will ‘affec[t] the quality of the human environment’ in a significant manner or to a significant extent not already considered, a supplemental EIS must be prepared.<sup>6</sup>

New information requires preparation of a supplemental EIS if the information “‘presents a picture of the likely environmental consequences associated with the proposed action not envisioned by the original EIS’” and “‘raises new concerns of sufficient gravity such that another, formal in-depth look at the environmental consequences of the proposed action is necessary.’”<sup>7</sup>

The Corps is not free to ignore the possible significance of new information. The Corps must “take a hard look” at any new information (*i.e.*, information that did not exist when the original environmental impact statement was prepared) to determine whether a supplemental environmental impact statement is required.<sup>8</sup> Where, as here, an EIS is “more than 5 years old,” it should be “carefully reexamined” to determine if a supplement is required.<sup>9</sup>

Despite the significant changed circumstances discussed below, the Corps continues to rely on a series of five outdated and piecemeal environmental impact statements that do not satisfy the requirements of NEPA. Four of these EISs are more than 35 years old – two were written in 1974, one in 1975, and one in 1976.<sup>10</sup> Another assessment that reviews only a portion of O&M activities carried out in one

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<sup>5</sup> See *Save the Yaak Committee v. Block*, 840 F.2d 714, 720 (9th Cir. 1988) (agency must consider both the logging road project and timber sale together because they road would not proceed absent the timber sale); *Thomas v. Peterson*, 753 F.2d 754, 757 (9th Cir. 1985) (same).

<sup>6</sup> *Marsh v. Oregon Natural Resources Council*, 490 U.S. 360, 374 (1989) (emphasis added).

<sup>7</sup> *Louisiana Wildlife Federation v. York*, 761 F.2d 1044, 1051 (5th Cir. 1985) (quoting *Wisconsin v. Weinberger*, 745 F.2d 412, 418 (7th Cir. 1984) (a supplemental EIS must be prepared when “new information provides a *seriously* different picture of the environmental landscape such that another hard look is necessary”).

<sup>8</sup> *Marsh*, 490 U.S. at 385.

<sup>9</sup> 46 Fed Reg. 18026 (March 23, 1981), as amended, 51 Fed. Reg. 15618 (April 25, 1986), Question 32; see also *Oregon Natural Resources Council v. U.S. Forest Serv.*, 445 F. Supp. 2d 1211, 1232 (D. Or. 2006) (recognizing passage of time likely warrants supplemental NEPA analysis).

<sup>10</sup> The St. Paul District prepared an EIS in 1974 for the operation and maintenance of a 9-foot channel on the Upper Mississippi River from the head of navigation to Guttenberg, Iowa. The Rock Island District prepared an EIS in 1974

Corps District was written in 1997, but that 17-year old EIS itself acknowledged a major shortcoming: “The major unresolved issue is the *cumulative impacts* of the continued operations and maintenance of the 9-foot navigation channel.”<sup>11</sup>

None of these O&M EISs evaluate the cumulative impact of the more than 1,375 river training structures<sup>12</sup> constructed by the Corps in the middle Mississippi River on flood heights or on the safety of river communities.<sup>13</sup> The Corps has never prepared a single, comprehensive environmental impact statement evaluating the full range of impacts, including the cumulative impacts, of O&M activities on the UMR-IWW system.<sup>14</sup>

In addition to the changes mandating a supplemental EIS on all O&M activities discussed below, the Conservation Organizations also understand that the Corps is dredging the Mississippi River channel to at least 11.5 feet rather than the authorized depth of 9-feet. The original EISs do not evaluate the environmental impacts of dredging the channel 2.5 feet deeper than the authorized depth. The Corps must analyze the environmental impacts of the actual dredging that it is conducting.

The failure to supplement the out of date and piecemeal environmental reviews and to develop less environmentally damaging alternatives violates the clear requirements of NEPA. The failure to examine and adopt less damaging alternatives is extremely troubling since the Corps has long been aware that alternative methods exist for maintaining the system’s navigational capacity while also improving the system’s ecological health.<sup>15</sup>

#### **A. Dramatic Decline in the Ecological Health of the System**

Since the O&M EISs were completed there has been a dramatic decline in the ecological health of the UMR-IWW that triggers the need to prepare a supplemental EIS for all O&M activities. Moreover, it is well recognized – including by the Corps itself – that the Corps’ O&M activities have completely altered

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for the operation and maintenance of a 9-foot navigation channel on the Upper Mississippi River. The St. Louis District prepared an EIS in 1975 and 1976 for the operation and maintenance of pools on the Mississippi and Illinois Rivers and the regulating works for the Mississippi River between the Ohio and Missouri River.

<sup>11</sup> The St. Paul District issued a fifth EIS in 1997 that evaluated navigation maintenance activities within that district. 1997 EIS at 1-4 (emphasis added). The 1997 EIS acknowledged that the document did not evaluate “operations” and did not examine cumulative impacts.

<sup>12</sup> GAO Study on River Training Structures.

<sup>13</sup> GAO Study on River Training Structures.

<sup>14</sup> The duty to discuss cumulative impacts in an EIS is mandatory and not within the agency’s discretion. 40 C.F.R. §§ 1502.16, 1508.7; see also *Oregon Natural Resources Council v. Marsh*, 52 F.3d 1485 (9th Cir. 1995) (holding that the Corps violated NEPA by narrowly limiting the scope of the discussion of cumulative impacts).

<sup>15</sup> For example, in 1997, the Donald J. Barry, Deputy Assistant Secretary for Fish and Wildlife and Parks, U.S. Department of Interior wrote a letter to the Martin Lancaster, Assistant Secretary of the Army for Civil Works advising the Corps of the new information that has been developed by the Corps and FWS regarding the impacts of the Corps’ O&M activities on the Upper Mississippi River System and that the Corps’ activities “can be managed to achieve the goals of navigation and a healthy river system.” (Letter dated April 12, 1997). Similarly, the Upper Mississippi Water Level Management Task Force advised the Corps in 1996 that “[w]ater level management experiences from around the world amply demonstrate that opportunity exists for improving the ecological conditions of the Upper Mississippi River.” Upper Mississippi Water Level Management Task Force, Problem Appraisal Report for Water Level Management (1996) at 3-3.

the natural processes of the Upper Mississippi River and have played a major role in the dramatic decline in the ecological health of the Mississippi and Illinois Rivers and the species that rely on them.<sup>16</sup> Construction of river training structures has also resulted in significant increases in flood heights along the Mississippi River. These adverse impacts also undermine the effectiveness of work carried out under the Corps' restoration and flood protection authorities for the Mississippi River

For example, in December 1997, the Corps issued a report to Congress which concludes that "conditions at even the most healthy sites within the [Upper Mississippi River System] are at least partially artificial, non-sustainable, and in a recognized state of degradation."<sup>17</sup>

In a 1999 report on the Status and Trends of the Upper Mississippi River System, the U.S. Geological Survey concluded that the Corps' O&M activities in the UMR-IWW system were: destroying critical habitats including the rivers' backwaters, side channels and wetlands; altering water depth; destroying bathymetric diversity; causing nonnative species to proliferate; and severely impacting native species.<sup>18</sup>

The 1999 Status and Trends Report also rated the health of the Mississippi River System as follows:

1. The Lower Reach of the Illinois River is degraded for all 6 criteria of ecosystem health evaluated by the report.<sup>19</sup>
2. The Unimpounded Reach of the Mississippi River is degraded for 3 criteria, heavily impacted for 2 criteria, and moderately impacted for 1 criterion.
3. The Lower Impounded Reach of the Mississippi River (Pools 14-26) is degraded for 2 criteria, heavily impacted for 3 criteria, and moderately impacted for 1 criterion.
4. The Upper Impounded Reach of the Mississippi River (Pools 1-13) is degraded for 1 criterion and moderately impacted for 5 criteria.

The 1999 Status and Trends report further concluded that no segment of the Upper Mississippi River system was unchanged from historic conditions, or deemed to require no management action to maintain, restore or improve conditions. Equally important, no segment of the system was improving in quality.<sup>20</sup>

In May 2000, the U.S. Fish and Wildlife Service issued a Final Biological Opinion on the Corps' O&M activities which concludes that the "continued operation and maintenance of the 9-foot Navigation project will jeopardize the continued existence of the Higgins eye pearly mussel (*Lampsilis higginsii*) and the pallid sturgeon (*Sacphirhynchus albus*)."<sup>21</sup> The Biological Opinion also concludes that the Project will

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<sup>16</sup> U.S. Geological Survey, Ecological Status and Trends of the Upper Mississippi River System 1998: A Report of the Long Term Resource Monitoring Program (April 1999) (1999 Status and Trends Report).

<sup>17</sup> Rock Island District, U.S. Army Corps of Engineers, *Report to Congress, An Evaluation of the Upper Mississippi River System Environmental Management Program* (December 1997) at 2-3.

<sup>18</sup> *Id.*

<sup>19</sup> "Degraded" is the lowest possible grade issued by the report and is defined as a condition where the factors associated with the criteria "are now below ecologically acceptable levels" and where "[m]ultiple management actions are required to raise these conditions to acceptable levels." 1999 Status and Trends Report at 16-2.

<sup>20</sup> 1999 Status and Trends Report at 16-1 to 16.-2.

<sup>21</sup> U.S. Fish and Wildlife Service, Biological Opinion for the Operation and Maintenance of the 9-Foot Navigation Channel on the Upper Mississippi River System at 1.

result in the incidental take of the least tern (*Sterna antillarum*) and winged mapleleaf mussel (*Quadrula fragosa*). The Biological Opinion also concludes that the Project will likely adversely affect the bald eagle (*Haliaeetus leucocephalus*), the Indiana bat (*Myotis sodalis*), and the decurrent false aster (*Boltonia decurrens*).<sup>22</sup>

In December 2008, the U.S. Geological Survey issued a second report on the status and trends of selected resources in the Upper Mississippi River system which also found that the Corps' O&M activities were causing significant adverse impacts.<sup>23</sup> For example:

The current condition of the UMRS is heavily influenced by its agriculture-dominated basin and by the dams, channel training structures, dredging, and levees that regulate flow distribution during most of the year. Although substantial improvements in some conditions have occurred since the 1960s because of improvements in sewage treatment and land use practices, the UMRS still faces substantial challenges including

1. High sedimentation rates in some backwaters and side channels;
2. An altered hydrologic regime resulting from modifications of river channels, the floodplain, and land use within the basin, and from dams and their operation;
3. Loss of connection between the floodplain and the river, particularly in the southern reaches of the UMRS;
4. Nonnative species (e.g., common carp [*Cyprinus carpio*], Asian carps [*Hypophthalmichthys* spp.], zebra mussels [*Dreissena polymorpha*]);
5. High levels of nutrients and suspended sediments; and
6. Degradation of floodplain forests.<sup>24</sup>

The 2008 Status and Trends report also recognized that there has been “a substantial loss of habitat diversity”<sup>25</sup> in the system over the past 50 years due in large part to excessive sedimentation and erosion:

In all reaches, sedimentation has filled-in many backwaters, channels, and deep holes. In the lower reaches, sediments have completely filled the area between many wing dikes producing a narrower channel and new terrestrial habitat. Erosion has eliminated many islands, especially in impounded zones.<sup>26</sup>

These changed conditions, and the role of all the O&M practices in these changes, mandates preparation of a supplemental EIS that comprehensively examines all O&M activities.

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<sup>22</sup> *Id.*

<sup>23</sup> Johnson, B. L., and K. H. Hagerty, editors. 2008. U.S. Geological Survey, *Status and Trends of Selected Resources of the Upper Mississippi River System*, December 2008, Technical Report LTRMP 2008-T002. 102 pp + Appendixes A–B (Upper Midwest Environmental Sciences Center, La Crosse, Wisconsin) (2008 Status and Trends Report).

<sup>24</sup> *Id.* at 3.

<sup>25</sup> *Id.* at 6.

<sup>26</sup> *Id.* at 6.

## **B. Significant New Scientific Information**

Since the O&M EISs were completed there has been a deluge of new scientific studies that bear directly on the environmental impacts of the Corps' O&M activities and that trigger the need to prepare a supplemental EIS for all O&M activities.

For example, since 1976, hundreds of studies have been published addressing large river sediment transport and deposition.<sup>27</sup> As discussed above, sedimentation in the navigation pools, side channels, and backwater areas is well recognized as one of the most critical ecological problems affecting the Upper Mississippi River ecosystem.

Since 1986, at least 51 scientific studies have been published linking the construction of river training structures to increased flood heights. More than 15 studies published from 2000-2010 demonstrate the role of river training structures on flood heights in the Mississippi River. These studies show that river training structures constructed by the Corps to reduce navigation dredging costs have increased flood levels by 10 to 15 feet and more in some locations of the Mississippi River during large floods. A list of the 51 studies assessing the role of instream structures on increasing flood heights is attached to these comments at Attachment A.

Indeed, there is a global consensus that river training structures can and do increase flood heights. For example, the government of the Netherlands is expending a significant amount of resources to modify hundreds of river training structures to reduce flood risks.<sup>28</sup>

As discussed below, new science also shows significant changes in precipitation in the Mississippi River basin triggered by climate change. New science also shows that climate change may significantly exacerbate the impacts on the many migratory species that utilize the Mississippi River, Mississippi River Flyway, and the project area. As recognized by the United Nations Environment Program and the Convention on the Conservation of Migratory Species of Wild Animals, migratory wildlife is particularly vulnerable to the impacts of climate change:

“As a group, migratory wildlife appears to be particularly vulnerable to the impacts of Climate Change because it uses multiple habitats and sites and use a wide range of resources at different points of their migratory cycle. They are also subject to a wide range of physical conditions and often rely on predictable weather patterns, such as winds and ocean currents, which might change under the influence of Climate Change. Finally, they face a wide range of biological influences, such as predators, competitors and diseases that could be affected by Climate Change. While some of this is also true for more sedentary species, migrants have the potential to be affected by Climate

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<sup>27</sup> E.g., DeHaan, H.C. 1998, *Large River Sediment Transport and Deposition: An Annotated Bibliography*, U.S. Geological Survey, Environmental Management Technical Center, Onalaska, Wisconsin, April 1998, LTRMP 98-T002. 85 pp. (identifying more than 250 scientific studies addressing large river sediment transport and deposition published since 1976); Pierre Y. Julien and Chad W. Vensel, Department of Civil and Environmental Engineering Colorado State University, *Review of Sedimentation Issues on the Mississippi River*, DRAFT Report Presented to the UNESCO: ISI, November 2005 (referencing more than 100 studies published between 1979 and 2005).

<sup>28</sup> GAO Study on River Training Structures at 41.

Change not only on their breeding and non-breeding grounds but also while on migration.”

“Apart from such direct impacts, factors that affect the migratory journey itself may affect other parts of a species’ life cycle. Changes in the timing of migration may affect breeding or hibernation, for example if a species has to take longer than normal on migration, due to changes in conditions *en route*, then it may arrive late, obtain poorer quality breeding resources (such as territory) and be less productive as a result. If migration consumes more resources than normal, then individuals may have fewer resources to put into breeding . . . .”

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“Key factors that are likely to affect all species, regardless of migratory tendency, are changes in prey distributions and changes or loss of habitat. Changes in prey may occur in terms of their distributions or in timing. The latter may occur though differential changes in developmental rates and can lead to a mismatch in timing between predators and prey (“phenological disjunction”). Changes in habitat quality (leading ultimately to habitat loss) may be important for migratory species that need a coherent network of sites to facilitate their migratory journeys. Habitat quality is especially important on staging or stop-over sites, as individuals need to consume large amounts of resource rapidly to continue their onward journey. Such high quality sites may [be] crucial to allow migrants to cross large ecological barriers, such as oceans or deserts.”<sup>29</sup>

Migratory birds are at particular risk from climate change. Migratory birds are affected by changes in water regime, mismatches with food supply, sea level rise, and habitat shifts, changes in prey range, and increased storm frequency.<sup>30</sup>

This new scientific information mandates preparation of a supplemental EIS that comprehensively examines all O&M activities.

### C. Significant Changes in Precipitation and Stream Flow

Since the O&M EISs were completed there have been documented changes in precipitation and stream flow within the Mississippi River basin that trigger the need to prepare a supplemental EIS for all O&M activities.<sup>31</sup> For example:

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<sup>29</sup> UNEP/CMS Secretariat, Bonn, Germany, *Migratory Species and Climate Change: Impacts of a Changing Environment on Wild Animals* (2006) at 40-41 (available at [http://www.cms.int/publications/pdf/CMS\\_CimateChange.pdf](http://www.cms.int/publications/pdf/CMS_CimateChange.pdf)).

<sup>30</sup> *Id.* at 42-43.

<sup>31</sup> The Corps is required as a matter of law to evaluate the cumulative impacts of climate change. See *Center for Biological Diversity v. Nat’l Hwy Traffic Safety Administration*, 538 F.3d 1172, 1217 (9th Cir. 2008) (holding that analyzing the impacts of climate change is “precisely the kind of cumulative impacts analysis that NEPA requires agencies to conduct” and that NEPA requires analysis of the cumulative impact of greenhouse gas emissions when deciding not to set certain CAFE standards); *Center for Biological Diversity v. Kempthorne*, 588 F.3d 701, 711 (9th Cir. 2009) (NEPA analysis properly included analysis of the effects of climate change on polar bears, including

- In March 2005, the U.S. Geological Survey released a study showing upward trends in rainfall and stream flow for the Mississippi River.<sup>32</sup>
- In 2009, the U.S. Global Change Research Program issued a report showing that the Midwest experienced a 31% increase in very heavy precipitation events (defined as the heaviest 1% of all daily events) between 1958 and 2007.<sup>33</sup> That study also reports that during the past 50 years, “the greatest increases in heavy precipitation occurred in the Northeast and the Midwest.”<sup>34</sup> Models predict that heavy downfalls will continue to increase:

Climate models project continued increases in the heaviest downpours during this century, while the lightest precipitation is projected to decrease. Heavy downpours that are now 1-in-20-year occurrences are projected to occur about every 4 to 15 years by the end of this century, depending on location, and the intensity of heavy downpours is also expected to increase. The 1-in-20-year heavy downpour is expected to be between 10 and 25 percent heavier by the end of the century than it is now. . . . Changes in these kinds of extreme weather and climate events are among the most serious challenges to our nation in coping with a changing climate.<sup>35</sup>

- In March 2012, Midwest regional assessments were issued that provide important technical input into the National Climate Assessment.<sup>36</sup>
- In 2013, Regional Climate Trends and Scenarios were issued for the Midwest U.S. showing that for the Midwest region, annual and summer trends for precipitation in the 20<sup>th</sup> century are upward and statistically significant; the frequency and intensity of extreme precipitation in the region has increased, as indicated by multiple metrics; and models predict increases in the number of wet days (defined as precipitation exceeding 1 inch) for the entire Midwest region, with increases of up to 60%.<sup>37</sup>

Notably, climate change could significantly exacerbate the public safety impacts of O&M activities because climate change-induced variability in the Upper Mississippi River Basin will likely lead to more extreme weather and higher flows than have been experienced in the past.

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“increased use of coastal environments, increased bear/human encounters, changes in polar bear body condition, decline in cub survival, and increased potential for stress and mortality, and energetic needs in hunting for seals, as well as traveling and swimming to denning sites and feeding areas.”).

<sup>32</sup> USGS Fact Sheet 2005-3020, Trends in the Water Budget of the Mississippi River Basin, 1949-1997.

<sup>33</sup> Global Climate Change Impacts in the United States, Thomas R. Karl, Jerry M. Melillo, and Thomas C. Peterson, (eds.). Cambridge University Press, 2009, at page 32 (available at <http://nca2009.globalchange.gov/>).

<sup>34</sup> *Id.*

<sup>35</sup> *Id.*

<sup>36</sup> The Midwest regional assessment can be accessed at [http://glisa.msu.edu/great\\_lakes\\_climate/nca.php](http://glisa.msu.edu/great_lakes_climate/nca.php) (visited January 22, 2014).

<sup>37</sup> Kunkel, K.E, L.E. Stevens, S.E. Stevens, L. Sun, E. Janssen, D. Wuebbles, S.D. Hilberg, M.S. Timlin, L. Stoecker, N.E. Westcott, and J.G. Dobson, 2013: Regional Climate Trends and Scenarios for the U.S. National Climate Assessment. Part 3. Climate of the Midwest U.S., NOAA Technical Report NESDIS 142-3, 95 pp. (available at <http://scenarios.globalchange.gov/regions/midwest>).

These documented changes in precipitation and stream flow trigger the need to prepare a supplemental EIS for all O&M activities.

#### **D. Significant Changes in Applicable Law and Policy**

Since the O&M EISs were completed there have been significant changes to the laws and policies applicable to the Corps' O&M practices that trigger the need to prepare a supplemental EIS for all O&M activities. For example:

- (1) **New Executive Orders:** Executive Orders issued in 1977 direct agencies to protect wetlands and floodplains. Executive Order 11990 (Protection of Wetlands) directs each federal agency to provide leadership and take action to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values in carrying out agency policy. Executive Order 11988 (Floodplain Management) directs each federal agency to avoid, to the extent possible, the long and short-term adverse impacts associated with the occupancy and modification of floodplains; to avoid direct and indirect support of floodplain development wherever there is a practicable alternative; and "to restore and preserve the natural and beneficial values served by flood plains in carrying out its responsibilities."
- (2) **NEPA Implementing Regulations:** In 1978, the Council on Environmental Quality promulgated regulations for implementing NEPA. The Corps' own regulations implementing NEPA were promulgated in 1988.
- (3) **Clean Water Act Regulations:** In 1980, the Clean Water Act's Section 404(b)(1) guidelines were promulgated. These guidelines must be followed for the Corps' civil works activities. In 1990 the Corps and EPA signed a Memorandum of Agreement on mitigation that establishes priorities and procedures to be used in implementing mitigation under the Clean Water Act § 404. In 2008, the Corps and EPA issued new mitigation requirements applicable to the Clean Water Act § 404 program. Corps civil works projects are subject to these new mitigation requirements (and to the mitigation requirements established by the Water Resources Development Act of 2007, discussed below). 33 U.S.C. § 2283(d). These mitigation requirements must be satisfied for both new projects and existing projects that are reevaluated under NEPA. *Id.*
- (4) **Water Resources Development Acts:** The Water Resources Development Act (WRDA) of 1986 authorizes the Corps to modify existing water resources projects and operations to improve the quality of the environment. WRDA 1990 changed the Corps' fundamental mission to "include environmental protection as one of the primary missions of the Corps of Engineers in planning, designing, constructing, operating, and maintaining water resources projects." 33 U.S.C. § 2316. WRDA 2007 created a new federal water policy that requires all Corps projects to protect and restore the environment and imposes new and important mitigation requirements for Corps projects, including existing projects that are re-evaluated through an EIS or supplemental EIS. 33 U.S.C. § 2283(d).

These significant changes in law and policy trigger the need to prepare a supplemental EIS for all O&M activities.

## **II. The Corps Should Initiate A National Academy of Sciences Study on the Effect of River Training Structures on Flood Heights to Inform Development of the SEIS**

The Conservation Organizations call on the Corps to initiate a National Academy of Sciences study on the effect of river training structures on flood heights to inform development of the SEIS. A National Academy of Sciences study is needed to provide important guidance on this significant public safety issue, and to ensure that the Corps fully accounts for the flood height inducing effects of river training structures when planning and carrying out future O&M activities. To date, the Corps has denied the existence of this flood-height inducing effect, ignoring extensive peer-reviewed science and global recognition of this impact.

As discussed in Section I.B. above, an extensive body of peer-reviewed scientific literature demonstrates that river training structures constructed by the Corps to help maintain the 9 foot navigation channel are significantly increasing the risks of floods for riverside communities and floodplain lands.<sup>38</sup> These structures, constructed by the Corps to reduce navigation dredging costs, have increased flood levels by up to 15 feet in some locations and 10 feet in broad stretches of the river where these structures are prevalent.<sup>39</sup> Independent scientists have determined that the more than 40,000 feet of “wing dikes” and “bendway weirs” constructed by the Corps in the Mississippi during the 3 years prior to the great flood of 1993 contributed to record crests in 1993, 1995, 2008, and again in 2011. Indeed, there is a global consensus that river training structures increase flood risks as evidenced by the costly work being carried out by the government of the Netherlands to modify hundreds of river training structures to reduce flood risks.<sup>40</sup>

In the face of the overwhelming scientific consensus on the role of river training structures in increasing flood levels and the resulting significant risks to public safety, the Corps should not construct new structures without a detailed and comprehensive analysis of this issue by the National Academy of Sciences. The costs associated with a National Academy study are far outweighed by the public benefits, including public confidence in a final decision regarding construction of new river training structures.

## **III. The Corps Should Impose A Moratorium on the Construction of New River Training Structures**

In light of the public safety implications discussed above, and the fact that navigation can in fact continue without the construction of new river training structures, the Conservation Organizations urge the Corps to impose a moratorium on the construction of new river training structures pending completion of the requested National Academy of Sciences study and the SEIS. New river training structures should not be built unless the National Academy of Sciences study and a comprehensive and

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<sup>38</sup> See Attachment A listing 51 peer reviewed studies linking instream structures to increased flood heights.

<sup>39</sup> Pinter, N., A.A. Jemberie, J.W.F. Remo, R.A. Heine, and B.A. Ickes, 2010. Empirical modeling of hydrologic response to river engineering, Mississippi and Lower Missouri Rivers. *River Research and Applications*, 26: 546-571; Remo, J.W.F., N. Pinter, and R.A. Heine, 2009. The use of retro- and scenario- modeling to assess effects of 100+ years river engineering and land cover change on Middle and Lower Mississippi River flood stages. *Journal of Hydrology*, 376: 403-416.

<sup>40</sup> GAO Study on River Training Structures at 41.

legally adequate SEIS establish that such construction will **not** contribute to increased flood risks to communities.

The moratorium should apply to all new river training structures in the Mississippi River, whether they are for navigation or other purposes, including the extensive field of chevrons proposed as a restoration project for the Herculaneum Reach of the Mississippi River. Absent such a moratorium, construction of new river training structures will certainly continue without the much-needed comprehensive assessment of public safety and environmental impacts. For example, the Corps is currently seeking approval for at least the following additional projects that would add a significant number of new training structures to the river:

- The Grand Tower project which would add 2 new chevrons, 3 new S-dikes, 3 new weirs, 1 dike extension, and additional new revetment.
- The Dogtooth Bend project would add 8 new bendway weirs and 1 new dike.
- The Eliza Point project which would add 4 new bendway weirs and 1 new rootless dike.
- The Moosenthein Ivory project which would add 1 new rootless dike and 2.2 miles of new revetment.
- The Herculaneum Reach project which would add 12 new chevrons in a narrow, 3.5 mile stretch of the Mississippi River (creating the River's largest concentration of chevrons).

These, and any other structures constructed by the Corps during the SEIS review period, would add to the more than 1,375 wing dikes, bendway weirs, chevrons, and similar structures already in the 195 miles that constitute the Middle Mississippi River.<sup>41</sup> Independent scientists who have studied the effects of river training structures report that as of 2001, the Corps had constructed 1.5 miles of river training structures for each mile of the Middle Mississippi River (river miles 180 to 37). The Conservation Organizations understand that between 1980 and 2009, the Corps built at least 380 new river training structures in the Middle Mississippi, including 40,000 feet of wing dikes and bendway weirs between 1990 and 1993. The Corps built at least 23 chevrons between 2003 and 2010.

The potentially significant risks to public safety, the fact that navigation can in fact continue without the construction of new river training structures, and the current lack of a legally adequate environmental review, warrant the adoption of a moratorium on the construction of new river training structures pending completion of the requested National Academy of Sciences study and the SEIS.

#### **IV. The SEIS Must Fully Evaluate the Impacts of All Reasonable Alternatives and Select an Alternative that Protects and Restores the Mississippi River**

To comply with NEPA, the SEIS must properly define the project purpose, fully evaluate project impacts, and fully review all reasonable alternatives. To comply with the National Water Policy and the Corps' civil works mitigation requirements, the SEIS must select an alternative that protects and restores the natural functions of the Mississippi River system and that mitigates any unavoidable damage.

The independent external peer review that is clearly required for the SEIS should be conducted by the National Academy of Sciences, and the panel's task should explicitly include a charge to evaluate: the

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<sup>41</sup> GAO Study on River Training Structures at 9-10.

appropriateness of the alternative recommended by the Corps; whether the selected alternative will in fact protect and restore the functions of the Mississippi River system; whether the selected alternative includes a mitigation plan that is likely to produce ecologically successful mitigation; and whether the selected alternative includes appropriate and meaningful criteria for determining project success.

#### A. Properly Define Project Purpose

It is critical that the SEIS properly define the purpose and need for the proposed project as this determines the universe of reasonable alternatives that must be evaluated.<sup>42</sup> The project purpose drives the evaluation of alternatives because all reasonable alternatives that accomplish the project purpose must be examined in an environmental impact statement, while alternatives that are not reasonably related to the project purpose do not have to be examined.<sup>43</sup>

Because the evaluation of alternatives is “the heart of the environmental impact statement,”<sup>44</sup> an overly narrow project purpose defeats the very purpose of NEPA:

“One obvious way for an agency to slip past the strictures of NEPA is to contrive a purpose so slender as to define competing “reasonable alternatives” out of consideration (and even out of existence). . . . If the agency constricts the definition of the project’s purpose and thereby excludes what truly are reasonable alternatives, the EIS cannot fulfill its role. Nor can the agency satisfy the Act. 42 U.S.C. § 4332(2)(E).”<sup>45</sup>

As a result, the courts have made it clear that an agency may not define a project so narrowly that it “forecloses a reasonable consideration of alternatives.”<sup>46</sup> An agency also may not define the project’s purpose so narrowly that it makes the final EIS “a foreordained formality.”<sup>47</sup>

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<sup>42</sup> *Citizens Against Burlington v. Busey*, 938 F.2d 190, 195 (D.C. Cir. 1991) (the project purpose and need “delimit[s] the universe of the action’s reasonable alternatives.”) *See also Wyoming v. U.S. Dep’t of Agric.*, 661 F.3d 1209, 1244 (10th Cir. 2011) (“how the agency defines the purpose of the proposed action sets the contours for its exploration of available alternatives.”).

<sup>43</sup> *Methow Valley Citizens Council v. Regional Forester*, 833 F.2d 810, 815-16 (9th Cir. 1987).

<sup>44</sup> 40 C.F.R. § 1502.14.

<sup>45</sup> *Simmons v. United States Army Corps of Eng’rs*, 120 F.3d 664, 666 (7th Cir. 1997); *City of Carmel-by-the-Sea v. United States Dep’t of Transp.*, 123 F.3d 1142, 1155 (9th Cir. 1997) (“an agency cannot define its objectives in unreasonably narrow terms”); *Citizens Against Burlington, Inc. v. Busey*, 938 F.2d 190, 195-96 (D.C. Cir. 1991), *cert. denied*, 502 U.S. 994 (1991) (“an agency may not define the objectives of its action in terms so unreasonably narrow that only one alternative from among the environmentally benign ones in the agency’s power would accomplish the goals of the agency’s action”); *City of New York v. United States Dep’t of Transp.*, 715 F.2d 732, 743 (2d Cir. 1983), *cert. denied*, 456 U.S. 1005 (1984) (“an agency will not be permitted to narrow the objective of its action artificially and thereby circumvent the requirement that relevant alternatives be considered”).

<sup>46</sup> *Fuel Safe Washington v. Fed. Energy Regulatory Comm’n*, 389 F.3d 1313, 1324 (10<sup>th</sup> Cir. 2004) (quoting *Davis v. Mineta*, 302 F.3d 1104, 1119 (10<sup>th</sup> Cir. 2002); *Citizens’ Comm. To Save Our Canyons v. U.S. Forest Serv.*, 297 F.3d 1012, 1030 (10<sup>th</sup> Cir. 2002); *Simmons v. United States Army Corps of Eng’rs*, 120 F.3d 664, 666 (7th Cir. 1997); *City of New York v. United States Dep’t of Transp.*, 715 F.2d 732, 743 (2d Cir. 1983), *cert. denied*, 456 U.S. 1005 (1984) (holding that “an agency may not narrow the objective of its action artificially and thereby circumvent the requirement that relevant alternatives be considered”); *Citizens Against Burlington, Inc. v. Busey*, 938 F.2d 190, 196 (D.C. Cir. 1991), *cert. denied* 502 U.S. 994 (1991).

According to the Public Notice (Public Notice 2013-744), the long-term goal of the Regulating Works Project “is to reduce or eliminate the amount of annual maintenance dredging and the occurrence of vessel accidents through the construction of river training structures to provide a sustainable navigation channel and reduce federal expenditures.” Public Notice at 2. If the Corps were to adopt this stated goal as the project purpose, it would be too narrow to allow consideration of reasonable alternatives as it would preclude consideration of measures for maintaining channel depth that did not include additional river training structures. A more appropriate project purpose would be **“to maintain navigation in the Middle Mississippi River”** or for the expanded SEIS requested by the Conservation Organizations **“to maintain navigation in the UMR-IWW.”** The Conservation Organizations urge the Corps to adopt this as the project purpose for the SEIS.

The SEIS should also evaluate, and demonstrate in the purpose and need statement, that there is in fact a need for new navigation structures (*e.g.*, dikes, weirs, chevrons, and revetment). This is critically important because the current O&M regime is clearly able to maintain a reliable navigation channel while projects constructed under the Regulating Works Project have been implicated in significant increases in flood risks for communities and floodplain lands.

The SEIS should also clearly document whether any actions proposed in the SEIS can be carried out under the existing authorization, or whether new authorization from Congress would be required. According to the 1976 EIS for the “Mississippi River Between the Ohio and Missouri Rivers (Regulating Works)”, prepared by the Corps’ St. Louis District, the Regulating Works Project is authorized by the Rivers and Harbors Act of 1910, the Rivers and Harbors Act of 1927 and the Rivers and Harbors Act of 1930. Each of these Acts authorizes activities recommended in a Chief of Engineers Report prepared prior to enactment of each Act. These Chief of Engineers Reports, however, are not readily accessible to the public and the text of the reports was not provided in the 1976 EIS.

It is of course possible that these Chief of Engineers reports recommend an ongoing program of river training structure construction, or authorize construction for a more than 100 year period. However if, as is more likely, these reports recommend a more limited scope of construction, new Congressional authorization would likely be required to carry out any additional construction of river training structures that might be recommended in the final SEIS.<sup>48</sup> The public and decision makers should have a clear understanding of the precise activities currently authorized (including any limitations on those activities) and whether new authorization would be required.

#### **B. Rigorously Evaluate All Reasonable Alternatives and Ultimately Select an Alternative that Protects and Restores the Mississippi River**

The consideration of alternatives is “the heart of the environmental impact statement” and to satisfy the requirements of NEPA, the SEIS must “[r]igorously explore and objectively evaluate all reasonable alternatives.” 40 C.F.R. § 1502.14. “[T]he existence of reasonable but unexamined alternatives renders

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<sup>47</sup> *City of Bridgeton v. FAA*, 212 F.3d 448, 458 (8<sup>th</sup> Cir. 2000) (quoting *Citizens Against Burlington, Inc. v. Busey*, 938 F.2d 190, 196 (D.C. Cir. 1991), *cert. denied* 502 U.S. 994 (1991); citing *Simmons v. U.S. Army Corps of Eng’rs*, 120 F.3d 664, 666 (7<sup>th</sup> Cir. 1997)).

<sup>48</sup> It is also possible that the numerous river training structure projects currently being proposed by the Corps also exceed the existing authorization, and thus cannot be constructed without new Congressional authorization.

an EIS inadequate.”<sup>49</sup> “Reasonable alternatives include those that are practical or feasible from a technical and economic standpoint and using common sense, rather than simply desirable from the standpoint of the applicant.”<sup>50</sup>

The National Water Policy established by Congress in 2007 requires the Corps to operate and maintain the UMR-IWW navigation system to protect the Mississippi River and its floodplain. That policy states that “all water resources projects” shall “protect[] and restor[e] the functions of natural systems and mitigat[e] any unavoidable damage to natural systems.” 33 U.S.C 1962-3 (established by § 2031(a) of the Water Resources Development Act of 2007, and immediately applicable to all water resources projects).<sup>51</sup> As a result, the SEIS must evaluate alternatives that would protect and restore the natural functions of the Mississippi River, and must ultimately select an alternative that achieves these objectives.

Critically, the alternative ultimately recommended by the SEIS must also comply with the full suite of federal laws and policies designed to protect the environment. These include, the Endangered Species Act, the Clean Water Act, the Migratory Bird Treaty Act, and the mitigation requirements applicable to Corps civil works projects that were established by § 2036(a) of the Water Resources Development Act of 2007. These mitigation requirements must be satisfied, among other times, whenever the Corps will be recommending a project alternative in an EIS. 33 U.S.C. § 2283(d). The alternative ultimately recommend by the SEIS must also obtain a Clean Water Act water quality certification from the appropriate Mississippi River states.

The Public Notice proposes the consideration of only two alternatives: (1) continuing with the Regulating Works Project at the current pace; and (2) not building new dikes, weirs, or revetments but maintaining existing structures. While we agree that these two alternatives should be evaluated, such a truncated alternatives analysis would violate the Corps’ duty under NEPA to fully review “all reasonable alternatives.”<sup>52</sup>

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<sup>49</sup> *Ctr. for Biological Diversity v. United States Dep't of the Interior*, 623 F.3d 633, 642 (9th Cir. 2010); *Westlands Water Dist. v. U.S. Dep't of Interior*, 376 F.3d 853, 868 (9th Cir. 2004); *Morongo Band of Mission Indians v. Fed. Aviation Admin.*, 161 F.3d 569, 575 (9th Cir. 1998); *Oregon Natural Desert Ass'n v. Bureau of Land Management*, 531 F.3d 1114, 1121 (9th Cir. 2008).

<sup>50</sup> Forty Most asked Questions Concerning CEQ’s NEPA Regulations, 46 Fed. Reg. 18,026 (March 23, 1981).

<sup>51</sup> Enhancement of the environment has been an important federal objective for water resources programs for decades. Corps regulations in place since 1980 state that: “Laws, executive orders, and national policies promulgated in the past decade require that the quality of the environment be protected and, where possible, enhanced as the nation grows. . . . Enhancement of the environment is an objective of Federal water resource programs to be considered in the planning, design, construction, and **operation and maintenance of projects**. Opportunities for enhancement of the environment are sought through each of the above phases of project development. Specific considerations may include, but are not limited to, **actions to preserve or enhance critical habitat for fish and wildlife; maintain or enhance water quality; improve streamflow**; preservation and restoration of certain cultural resources, **and the preservation or creation of wetlands.**” 33 C.F.R. § 236.4. (emphasis added).

<sup>52</sup> Evaluations of alternative configurations of river training structures cannot satisfy the requirement to evaluate all reasonable alternatives because each alternative would have the same end result – construction of river training structures in the project area. *State of California v. Block*, 690 F.2d 753, 767 (9th Cir. 1982) (holding that an inadequate range of alternatives was considered where the end result of all eight alternatives evaluated was development of a substantial portion of wilderness).

Additional alternatives that should be examined include, but are by no means limited to:

- Removing and/or modifying existing river training structures to reduce flood risks and restore backwater, side channel, and braided habitat.
- Maintaining the authorized navigation channel through alternative approaches, including such things as alternative water level management regimes, alternative dredging strategies, and/or removing sediment dredged from the river rather than pumping dredged sediment back into the river adjacent to the main channel.
- Minimizing the use of new structures, including by placing restrictions on the number and/or types of structures that can be utilized in a given reach based on a robust scientific assessment of the cumulative impacts of the various types of river training structures.

Each alternative **must** include mitigation for any unavoidable adverse impacts as required by 33 U.S.C. § 2283(d) and the Clean Water Act.

The SEIS should also provide the construction and full life cycle maintenance costs of each alternative to assist the public and decision makers in assessing the full impact of each alternative.

### **C. Fully Analyze Direct, Indirect, and Cumulative Impacts**

In comparing and analyzing potential alternatives, the SEIS must examine, among other things, the direct, indirect, and cumulative environmental impacts of alternatives, the conservation potential of those alternatives, and the means to mitigate adverse environmental impacts that cannot be avoided. 40 C.F.R. § 1502.16. This assessment is essential for determining whether less environmentally damaging alternatives are available.

Direct impacts are caused by the action and occur at the same time and place as the action. Indirect impacts are also caused by the action, but are later in time or farther removed from the location of the action. 40 C.F.R. § 1508.8. Cumulative impacts are:

“the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.”

40 C.F.R. § 1508.7. The cumulative impacts analysis ensures that the agency will not “treat the identified environmental concern in a vacuum.”<sup>53</sup>

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<sup>53</sup> *Grand Canyon Trust v. FAA*, 290 F.3d 339, 346 (D.C. Cir. 2002).

The cumulative impacts analysis must examine the cumulative effects of federal, state, and private projects and actions.<sup>54</sup> The cumulative impacts analysis must also evaluate the cumulative impacts of climate change.<sup>55</sup> This evaluation is extremely important as:

“Climate change can increase the vulnerability of a resource, ecosystem, or human community, causing a proposed action to result in consequences that are more damaging than prior experience with environmental impacts analysis might indicate . . . [and] climate change can magnify the damaging strength of certain effects of a proposed action.”

\* \* \*

“Agencies should consider the specific effects of the proposed action (including the proposed action’s effect on the vulnerability of affected ecosystems), the nexus of those effects with projected climate change effects on the same aspects of our environment, and the implications for the environment to adapt to the projected effects of climate change.”<sup>56</sup>

Notably, climate change could significantly exacerbate the public safety impacts of the Regulating Works Project because climate change-induced variability in the Upper Mississippi River Basin will likely lead to more extreme weather and higher flows than have been experienced in the past. The Conservation Organizations urge the Corps to **begin** its assessment of climate change impacts by evaluating the studies and analyses referred to in Section I.C. above.

The SEIS must provide “quantified or detailed information” on the impacts, including the cumulative impacts, so that the courts and the public can be assured that the Corps has taken the mandated hard look at the environmental consequences of the Project.<sup>57</sup> **If information that is essential for making a reasoned choice among alternatives is not available, the Corps must obtain that information unless the costs of doing so would be “exorbitant.”** 40 C.F.R. § 1502.22 (emphasis added).

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<sup>54</sup> The requirement to assess non-Federal actions is not “impossible to implement, unreasonable or oppressive: one does not need control over private land to be able to assess the impact that activities on private land may have” on the project area. *Resources Ltd., Inc. v. Robertson*, 35 F.3d 1300, 1306 (9th Cir. 1993).

<sup>55</sup> See *Center for Biological Diversity v. Nat’l Hwy Traffic Safety Administration*, 538 F.3d 1172, 1217 (9th Cir. 2008) (holding that analyzing the impacts of climate change is “precisely the kind of cumulative impacts analysis that NEPA requires agencies to conduct” and that NEPA requires analysis of the cumulative impact of greenhouse gas emissions when deciding not to set certain CAFE standards); *Center for Biological Diversity v. Kempthorne*, 588 F.3d 701, 711 (9th Cir. 2009) (NEPA analysis properly included analysis of the effects of climate change on polar bears, including “increased use of coastal environments, increased bear/human encounters, changes in polar bear body condition, decline in cub survival, and increased potential for stress and mortality, and energetic needs in hunting for seals, as well as traveling and swimming to denning sites and feeding areas.”).

<sup>56</sup> Council on Environmental Quality, *Draft NEPA Guidance on Consideration of the Effects of Climate Change and Greenhouse Gas Emissions* (February 18, 2010). The CEQ guidance makes it clear that analyzing the impacts of climate change is not restricted to evaluating whether a project could itself exacerbate global warming. The magnifying and additive effects of global warming also must be evaluated.

<sup>57</sup> *Neighbors of Cuddy Mountain v. U. S. Forest Service*, 137 F.3d 1372, 1379 (9th Cir. 1998); *Natural Resources Defense Council v. Callaway*, 524 F.2d 79, 87 (2d Cir. 1975).

Importantly, as CEQ has made clear, in situations like those in the Mississippi River where the environment has already been greatly modified by human activities, it is **not** sufficient to compare the impacts of the proposed alternative against the current conditions. Instead, the baseline must include a clear description of how the health of the resource has changed over time to determine whether additional stresses will push it over the edge.<sup>58</sup>

#### **D. Types of Impacts That Must Be Examined**

The SEIS should examine the direct, indirect, and cumulative impacts of all reasonable alternatives on at least the impacts discussed below. Importantly, the SEIS should also carefully examine such impacts for each different type (e.g., bendway weir, chevron, wing dike, S-dike, rootless dike) and configuration of structures that would be utilized in each alternative since different types and configurations of river training structures have different impacts on the environment.

- **Impacts on hydrology, including the impacts on flood heights; impacts on channel morphology; and impacts on stream flow (including deviations from the historical water levels and natural flood pulse).**

As part of this analysis, the SEIS must review and incorporate the findings of the extensive body of peer-reviewed science demonstrating that river training structures are causing significant increases in flood heights in the Middle Mississippi River. As noted above, the Conservation Organizations urge the Corps to initiate a National Academy of Sciences study to evaluate this issue.

Since 1986, at least 51 scientific studies have been published linking the construction of river training structures to increased flood heights. More than 15 studies published from 2000-2010 demonstrate the role of river training structures on flood heights in the Mississippi River. These studies show that river training structures constructed by the Corps to reduce navigation dredging costs have increased flood levels by 10 to 15 feet and more in some locations of the Mississippi River during large floods. Independent scientists have also determined that the more than 40,000 feet of “wing dikes” and “bendway weirs” constructed by the Corps in the Mississippi during the 3 years prior to the great flood of 1993 contributed to record crests in 1993, 1995, 2008, and again in 2011. A list of the 51 studies assessing the role of instream structures on increasing flood heights is attached to these comments at Attachment A. We request that these studies be included in the record for this project.

The SEIS should also evaluate and incorporate the global consensus that river training structures can and do increase flood heights. For example, the government of the Netherlands is expending a significant amount of resources to modify hundreds of river training structures to reduce flood risks.<sup>59</sup> In light of this global consensus on the potentially deadly impacts of river training structures, the Corps should be required to prove that such structures are safe and effective *before* building any additional structures.

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<sup>58</sup> Council on Environmental Quality, Considering Cumulative Effects Under the National Environmental Policy Act at 41 (January 1997).

<sup>59</sup> GAO Study on River Training Structures at 41.

As part of this analysis, the Corps should also analyze the potential increased risk of levee failures due to higher flood levels (both in terms of general risks due to overall higher flood levels, and in terms of risks to individual levees upstream or nearby specific fields of river training structure), including the cumulative impacts on such risks from climate-change induced increases in precipitation and extreme weather events.

In carrying out its hydrologic analysis the Corps must utilize the most up-to-date modeling to evaluate the potential impacts of each alternative such as by using state of the art two-dimensional and three-dimensional hydrodynamic models with inputs that recognize the current conditions in the river system. The Corps should abandon its use of micro models to evaluate the impacts of river training structures (including the Corps' Hydraulic Sediment Response or HSR model which is a small-scale physical sediment transport model used by the St. Louis District) as such models cannot be relied upon to provide accurate planning information as they lack "predictive capability".<sup>60</sup> A study published in the Journal of Hydraulic Engineering concludes that because of the "lack of predictive evidence, the micromodel should be limited to demonstration, education, and communication." A copy of this study is attached to these comments at Attachment B.

- **Impacts on fish and wildlife.** The SEIS must examine the impacts of the alternatives on the species that utilize the Mississippi River, including the impacts to fish, waterfowl, birds, mammals, reptiles, amphibians, and mussels. The Mississippi River is used by an astounding array of wildlife, including 360 species of birds, 260 species of fish, 145 species of amphibians and reptiles, 98 species of mussels, and 50 species of mammals.

Forty percent of North America's waterfowl migrate through the Mississippi River flyway. The impacts on the critical array of migratory species that utilize the Mississippi River and Mississippi River flyway must also be analyzed, including the cumulative impacts of climate change on these species. As discussed in Section I.B. above, migratory wildlife is particularly vulnerable to the impacts of climate change.

An accurate assessment of fish and wildlife impacts will require an accurate assessment of impacts to the full range of habitats that these species rely on. A meaningful assessment would also include an evaluation of the impacts of each alternative on the ability of the fish and wildlife that utilize the river and flyway to withstand the adverse impacts of climate change (*i.e.*, the species' resiliency to climate change).

- **Impacts on endangered species.** The SEIS should pay particular attention to the impacts on threatened and endangered species and any critical habitat. This should include an analysis of impacts to recently listed species (for which there currently is no biological opinion) and to species covered by the "Tier 1 Biological Opinion for the Operation and Maintenance of the 9-Foot Navigation Channel in the Upper Mississippi River System." The Conservation Organizations urge the Corps to reinitiate formal consultation under the Endangered Species Act and demonstrate full compliance with all conditions established in the Tier I biological opinion.

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<sup>60</sup> Stephen T. Maynard, Journal of Hydraulic Engineering, Evaluation of the Micromodel: An Extremely Small-Scale Movable Bed Model (April 2006).

- **Impacts on key habitats – including backwater, side channel, mid-channel bars, braided river habitat, riverine wetlands, and floodplain wetlands.** The large-scale loss of backwater and side channel habitat is one of the most significant problems caused by the O&M activities. The Mississippi River and its floodplain have also suffered astounding wetland losses. The loss of these vital habitats has cascading negative impacts on fish and wildlife, public safety, recreation, and economies that rely on healthy river and floodplain systems. The SEIS must carefully evaluate and quantify the potential for additional losses – or gains – of backwater areas, natural side channels, crossover habitat, mid-channel bars, riverine wetlands and floodplain wetlands. The cumulative impacts of historical losses to these key habitats must also be fully evaluated and accounted for in any final recommended alternative.
- **Impacts on sedimentation.** Sedimentation is one of the most significant problems caused by O&M activities. The SEIS must carefully evaluate and quantify the impacts of each alternative on: increasing sedimentation in vital habitats; relocating sedimentation problems (*i.e.*, shifting the loci of sedimentation which could eventually lead to even more river training structure construction and dredging); and altering sediment transport downstream, including any resulting impacts on coastal wetland losses and/or coastal wetland restoration.
- **Impacts on water quality, including nutrient composition.** The Mississippi River remains plagued by water quality problems, including excess nutrients that have both local and ecosystem wide impacts (including, for example, yearly development of the Gulf of Mexico dead zone). The SEIS must carefully evaluate and quantify the impacts of each alternative on water quality in the river, including the potential water quality impacts caused by loss of backwater habitats and wetlands and increased sedimentation.
- **Cumulative impacts of climate change.** As discussed above, the SEIS must assess the cumulative impacts of climate change, including climate-change induced increases in precipitation and extreme weather events, on the direct and indirect impacts of each alternative. Of critical concern are the additive and magnifying effect of climate change on increased flood risks and on harm to migratory species.
- **Impacts on restoration and flood damage reduction efforts.** The Corps, other federal agencies, states, non-governmental organizations, and members of the public are engaged in significant efforts to restore the Mississippi River and its floodplain and to reduce flood damages to communities and floodplain lands. The Regulating Works Project and many of the Corps' other O&M activities work against these efforts, including through increasing flood levels and destroying vital habitats. The SEIS should carefully assess the impacts of each alternative on these other vital efforts. The SEIS should also evaluate the ability of each alternative to comply with the National Water Policy which requires that all water resources projects protect and restore the functions of natural systems and mitigate any unavoidable damage to natural systems. 33 U.S.C 1962-3.
- **Impacts on ecosystem services provided by a healthy Mississippi River and floodplain.** "Ecosystem services" are the goods and services produced by ecosystems that benefit humankind. These services include (but are by no means limited to) such things as carbon

sequestration, wildlife habitat, nutrient retention, and erosion reduction. While these services have traditionally been undervalued because they often fall outside of conventional markets and pricing, society is increasingly recognizing the essential link between healthy ecosystems and human welfare and significant progress has been made in the science of ecosystem services evaluation. The SEIS should carefully assess the impacts of each alternative on ecosystem services. The Conservation Organizations refer the Corps to the three ecosystem services valuations attached at Attachment C of these comments for information on preparing a meaningful ecosystem services valuation and for examples of ecosystem services valuations carried out in the Mississippi River Valley.

- **Impacts on recreational fishing and tourism industries that rely on a healthy Mississippi River and floodplain.** Mississippi River tourism generates approximately \$2 billion annually. Recreational opportunities, including recreational fishing, are vitally important to the public. The SEIS should fully evaluate the impacts of each alternative on these important activities.
- **Impacts on navigation.** The Conservation Organizations have been advised that river training structures can create difficulties for safe navigation. The SEIS should examine the impacts of each alternative on the ability of barges to safely navigate the Mississippi River and reaches within the Mississippi River that are particularly dangerous or that have large concentrations of river training structures.

#### **E. Actions that Must be Evaluated in the Cumulative Impacts Analysis**

The SEIS must meaningfully evaluate the cumulative impacts of past, present, and reasonably foreseeable future actions that affect the Mississippi River on each alternative evaluated in the SEIS. The actions that must be examined include those carried out by the Corps, other federal agencies, state agencies, and members of the public.

With respect to the Corps' activities, it is critical that the Corps evaluate the cumulative impacts of the full suite of past, present, and reasonably foreseeable future O&M activities for the Mississippi River navigation system. As the Corps is of course aware, O&M activities carried out by the Corps to maintain navigation on the 1,200 miles of the UMR-IWW, including dredging and disposal of dredged material, water level regulation, construction of revetment, construction of river training structures, and operation and maintenance of the system's 37 locks and dams. Impacts from major rehabilitation efforts and reasonably foreseeable new construction must also be evaluated.

As discussed above, the Corps has already constructed more than 1,375 wing dikes, bendway weirs, chevrons, and similar structures in the 195 miles that constitute the Middle Mississippi River. The Corps constructed at least 150 of the bendway weirs between 1990 and 2000, and constructed 23 chevrons in this portion of the river between 2003 and 2010.<sup>61</sup> Reasonably foreseeable future projects<sup>62</sup> include at least the following:

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<sup>61</sup> GAO Study on River Training Structures at 9-10.

<sup>62</sup> These projects should not be constructed unless (and until) the SEIS and the requested National Academy of Sciences study demonstrate that they will not pose a threat to public safety and that they are otherwise in the public interest and appropriate for construction.

- The Grand Tower project which would add 2 new chevrons, 3 new S-dikes, 3 new weirs, 1 dike extension, and additional new revetment.
- The Eliza Point project which would add 4 new bendway weirs and 1 new rootless dike.
- The Moosenthein Ivory project which would add 1 new rootless dike and 2.2 miles of new revetment.
- The Herculaneum Reach project which would add 12 new chevrons in a narrow, 3.5 mile stretch of the Mississippi River (creating the River's largest concentration of chevrons).

The cumulative impacts analysis should incorporate the significant body of scientific evidence, much of which was prepared with the Corps' input, which demonstrates that the Corps' O&M activities are a significant cause of the severe decline in the ecological health of the UMR-IWW system and have completely altered the natural processes in the Upper Mississippi River. A number of these studies are discussed in Sections I.A. and I.B. above.

In addition, the cumulative impacts analysis must evaluate the cumulative impacts of work carried out by the Corps under its flood damage reduction authority, including the construction and maintenance of Mississippi River levees and reasonably foreseeable future flood damage reduction projects. The cumulative impacts analysis should also evaluate such things as past, present, and reasonably foreseeable future: (a) lock and dam construction; reservoir and dam operations that affect the Mississippi River and its floodplain – including for such facilities located in areas outside of the Mississippi River; (b) residential and commercial development, including road construction, that affects the Mississippi River and its floodplain; and (c) agricultural practices that have affected and will continue to affect floodplain wetlands and Mississippi River water quality.

In analyzing the cumulative effects of the activities discussed above, the Corps must compare the impacts to the historical, non-disturbed, Mississippi River and not compare the impacts to the current condition of the river. This includes both the historic ecological condition and the historical flow and flood level conditions. If this information is not currently available, the Corps must obtain this information unless the costs of doing so would be "exorbitant." 40 C.F.R. § 1502.22. To establish the proper baseline, the SEIS should document and evaluate the historical changes in the Mississippi River with respect to at least the following indicators:

- Historical flows and flood levels;
- Acres of river and floodplain wetlands lost;
- Acres of native upland habitats lost;
- Miles of streambed lost or modified;
- Changes in stream flows;
- Changes in ground water elevations;
- Changes in the concentrations of indicator water quality constituents;
- Changes in the abundance, distribution, and diversity of indicator fish, waterfowl, bird, mammal, reptile, amphibian, and mussel communities;
- Changes in rainfall, and reasonably foreseeable future changes.

## Conclusion

The Conservation Organizations appreciate the opportunity to provide these comments and look forward to working with the Corps to ensure that the SEIS fully evaluates environmental impacts, complies with NEPA and the nation's other vitally important environmental laws, and identifies and selects an alternative that will protect and help restore the Mississippi River.

Sincerely,



Melissa Samet  
Senior Water Resources Counsel  
National Wildlife Federation  
83 Valley Road  
San Anselmo, CA 94960  
415-762-8264  
[sametm@nwf.org](mailto:sametm@nwf.org)



Brad Walker  
Rivers and Sustainability Director  
Missouri Coalition for the Environment  
3115 S. Grand Blvd, Ste. 650  
St. Louis, MO 63116  
(314) 727-0600  
[www.moenviron.org](http://www.moenviron.org)



Eileen Fretz  
Director, Flood Management Policy  
American Rivers  
1101 14<sup>th</sup> St, NW, Suite 1400  
Washington, DC 20005  
202-347-7075  
[efretz@americanrivers.org](mailto:efretz@americanrivers.org)



Elliot Brinkman  
Habitat Conservation Specialist  
Prairie Rivers Network  
1902 Fox Drive, Suite G  
Champaign, IL 61820  
(217) 344-2371  
[ebrinkman@prairierivers.org](mailto:ebrinkman@prairierivers.org)



Bruce A. Morrison  
Great Rivers Environmental Law Center  
705 Olive Street, Ste. 614  
St. Louis, MO 63101  
(314) 231-4181  
[bamorrison@greatriverslaw.org](mailto:bamorrison@greatriverslaw.org)



Denny Caneff  
Executive Director  
River Alliance of Wisconsin  
306 East Wilson Street, Suite 2W  
Madison, WI 53703  
608-257-2424  
[dcaneff@wisconsinrivers.org](mailto:dcaneff@wisconsinrivers.org)

Attachments