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UMR Current

A publication on the Upper Mississippi River by Prairie Rivers Network
The Illinois Affiliate of the National Wildlife Federation

Volume 1, Issue 2 Spring 2007

This Issue's Focus - NESP

A government program that could reshape the UMR

One of the major government water programs contained within the Water Resource Development Act currently being considered by our federal government is the multi-billion dollar Navigation and Ecological Sustainability Program (NESP). It would dramatically affect the UMR from both the navigation and environmental perspectives for generations to come. This entire issue will be devoted to articles pertaining to NESP.

USACE rendition of an expanded 1,200 foot lock

If you would like to subscribe to the newsletter or contribute to its content please contact Brad Walker: River Restoration Program Coordinator at bwalker@prairierivers.org.❖

Inside This Issue

What is NESP?

Government agencies love to use acronyms, typically for efficiency for those in the know but often this can cause confusion and consternation for most everyone else. In the case of NESP there are legitimate reasons for the acronym because the full name is a mouthful and takes up a lot of type space; Navigation and Ecological Sustainability Program. We will use the acronym as well for the latter reason. Another advantage is if one does not use the full name they do not have to explain what the words mean. This article will talk primarily about Navigation. Detailed discussion of the Ecological portion is covered in the article titled '*Why not drop the 'N'*?' Finally, in '*Does Sustainability Mean Anything Today?'* we talk about Sustainability.

The NESP is the latest large-scale infrastructure program developed and promoted over the last decade or so by the US Corps of Engineers (Corps) for the Upper Mississippi River (UMR). It is a 50-year program intended to upgrade the Locks and Dams system constructed for barge navigation on the UMR and also to increase the level of ecological restoration work in order to repair degraded ecosystems caused largely by over 60-years of operating the navigation system.

The majority of the UMR Locks and Dams system, composed of a series of 29 dams along the 866 river system miles, was built during the 1930s and designed for about 50 years. The locks were originally built to accommodate 600-foot long barge tows, typically hauling agricultural commodities, primarily corn and soybeans, south to New Orleans and other products such as iron, fuels and chemicals north. For example, in 2000 24 million metric tons of corn was shipped on the UMR for export, down from the historical high of 61 million metric tons in 1979. In general, the combined quantity of all major agricultural products shipped on the UMR for export in 2000 were about 17 percent less than their 1981 historical high.

Since its construction the system has been maintained and rehabilitated when necessary to keep the system operational. However, the barge industry has moved to tows of 1,200 feet in length in order to increase the companies' efficiency. This has caused some delays at the 600-foot locks due to the need to split the 1,200-foot tows into two segments, what is termed a double

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lockage, and then re-coupling the segments after the barges have left the lock.

The Corps has been developing the NESP for over a decade and there have been numerous reports created to support the many aspects of the program. Within the navigation portion the emphasis is upon minimizing the barge delays.

Seven Alternatives were ultimately developed ranging from No Action to the most extensive Alternative 7 for the construction of 3 moorings, 12 new 1,200-foot locks, and the extension of 3 existing 600-foot locks to 1,200 feet. Two of the Alternatives, 2 and 3, focused upon what are called non-structural measures, including one for congestion fees that would charge lock usage fees and theoretically remove marginally profitable barge traffic from the river.

Construction of Olmsted locks at Ohio River-USACE

The Corps has historically predicted significant barge traffic increases on the UMR, which have typically not occurred. Within their initial NESP analysis they were once again predicting large increases in barge traffic that were successfully attacked by outside professional reviewers. The Corps subsequently incorporated a 5-scenario approach in their barge traffic predictions as a result of the criticism by the outside reviewers in order to include varying possible future world conditions. The Corps then used these scenarios to quantify their projections of future world grain demand and resulting barge traffic on the UMR. The next step was to determine which of the alternatives best addressed the conditions established by each of the scenarios.

In their 2004 Final NESP report the Corps recommended what they call a blending of Alternatives 4 and 6, for an estimated total cost of over $2.2 billion. Alternative 4 consists of the following items:

- Mooring facilities at 12, 14, 18, 20, 22, 24, and La Grange
- Switchboats at 20 through 25 (a total of 5 because there is no lock and dam 23)

Alternate 6 includes the following items:

- New 1,200-foot locks at 20 through 25, La Grange, and Peoria (a total of 7 because there is no lock and dam 23)
- Lock extensions at 14 through 18
- Switchboats at 11 through 13

These navigation improvements are being jointly funded by both taxpayers and the companies involved with shipping the commodities from the Inland Waterways Trust Fund.

The NESP report limits its planning period to the first 15 years and does not include all of the selected navigation improvement items listed in Alternatives 4 and 6. The lock extension at 14 through 18 and switchboats at locks 11 through 13 are excluded. The estimated total cost for the initial 15-year period was $1.82 billion in the 2004 report.

It is expected, assuming that NESP is approved in the near future as currently developed and fully funded, that completion of the lock expansions will be by about 2020. ❖

Articles in Upcoming Issues

Articles we are planning for upcoming issues of the newsletter include: EMP projects in Illinois, ecosystems of a typical UMRS pool, ecological status of the UMRS, detailed coverage of individual pools, and restoration funding. We will also include reoccurring articles on restoration issues, tourism and the status of the PRN Program.

Submission of articles by readers is also welcomed; inclusion will be subject to content and length limitations.

Calendar of Events

Quarterly UMRS Management Meetings

Rock Island, IL

May 22-24, 2007

UMRBA, NECC-ECC and EMP-CC Meetings

National Conference on Ecosystem Restoration

Hyatt Regency Crown Center, Kansas City, MO

April 23 – 27, 2007

Please advise us of important upcoming Upper Mississippi River events so we can include them in our Calendar of Events.

Does Sustainability Mean Anything Today?

One might wonder whether a project is sustainable simply because sustainability is in the title. The US Corps of Engineers' (Corps) latest big UMR project, the Navigation and Ecological Sustainability Program (NESP), is being promoted as being sustainable, both economically and ecologically. Is this a true representation of the program? What basis does the Corps use to state this assertion of sustainability?

Just what does sustainable mean? Within the context we are likely interested in, the definition of the root word sustain is defined as 'to keep in existence or maintain'. Just what we are maintaining can be a cause of confusion. It is important to understand that perspective is very important. A definition from primarily an environmental perspective will be quite different from one that incorporates or emphasizes concerns about social and economic issues.

Sustainability has been a buzz word for nearly 30 years. In 1980 the International Union for Conservation of Nature and Natural Resources (IUCN) defined sustainability as "maintaining the quality of human life while living within the carrying capacity of supporting ecosystems". The Brundland Report of 1987 defined sustainable development as meeting "the needs of the present generation without compromising the ability of future generations to meet their needs". The World Summit on Sustainability (WSOS) extended the definition of sustainability in 2002 to include the need for balance of interests:

> "Reaffirming the need to ensure a balance between economic development, social development and environmental protection as interdependent and mutually reinforcing pillars of sustainable development, "

With the WSOS definition of sustainability the key is to determine the balance between economic and social development with the level of negative impacts on the environment that we think can be endured from our development. There in lies the problem however, just how do we figure out the balance?

It can be convincingly argued that the US and most other industrialized countries have developed far from a sustainable path and have generally not even considered the issue of sustainability throughout most of their development. Fortunately there is some recent acknowledgement of this with the government beginning to at least formalize a policy on sustainability. A Corps policy guideline for sustainable development proposed in 2004 in their Draft Ecosystem Sustainability Appendix (USACE 2004C, page ECOS-1) states that sustainable development is:

> "The balance of economic, ecological, and social conditions so as to meet the current, projected, and future needs of the Upper Mississippi River System without compromising the ability of future generations to meet their needs."

Although not original it is generally consistent with the above WSOS definition.

These definitions are often graphically shown as in Figure 1 below with the sweet spot of "balance" being represented by the colored central overlapping area of Society, the Economy and the Environment.

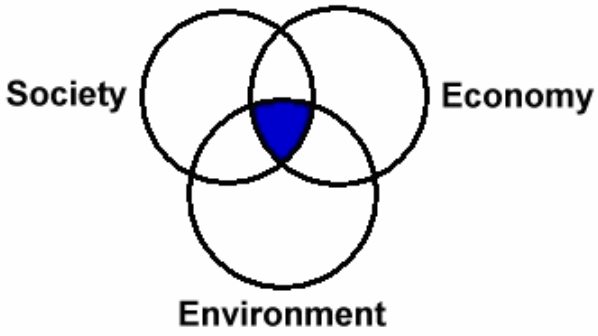

Figure 1

But is the Corps definition, as well as the WSOS definition, reasonable? In order to analyze this question we might look at a more specific example such as a river and what it actually does.

Most experts believe that the primary functions of rivers provide essential and free ecological services to all species, not just humans. Anna Brismar, in a 2002 article titled "River Systems as Providers of Goods and Services", discusses several of them.

- Transportation and dilution of pollutants in the river water
- Partial water purification by adsorption, sedimentation, assimilation, chemical transformation, or decomposition
- Riverbank stabilization by silt deposition and riparian vegetation
- Soil wetting and fertilization of floodplains and inland and coastal deltas
- Flood flow storage by soil infiltration, evapotranspiration, and groundwater recharge within floodplains
- Delta erosion control by transportation and deposition of sediments

She also lists goods provided by rivers to humans as well:

- Fresh water diverted without flow obstruction or by means of dams and weirs
- Hydroelectric power generated by run-of-

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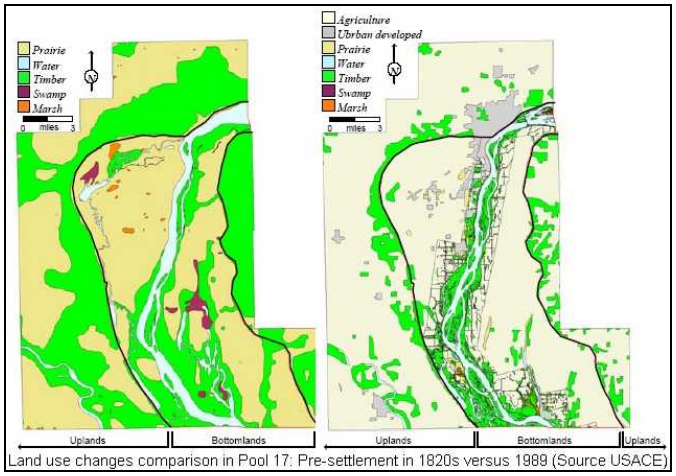
river, pumped storage, or storage plants

- Native and stocked fish

These functions and goods are provided through a very complex interconnected ecosystem, which we do not fully understand. More importantly, we really do not know how much we do not understand.

It seems that any human specific function that we desire the river to perform must be done within the context, limits and constraints of the natural processes of the river. This is because we are completely dependent upon these processes for the free services the river provides us. If we alter the natural processes of the river we may undermine the river's capability to provide the free services, ultimately requiring costly human created infrastructure to substitute for the lost or diminished free services and potentially undermining the added human specific functions. I do not think that anyone would deny that we have already seriously hampered the natural processes of the UMR and its tributaries through the layers of human demands we have placed upon the river as shown in the maps below.



Land use changes comparison in Pool 17: Pre-settlement in 1820s versus 1989 (Source USACE)

Many other questions come to mind when one thinks seriously and critically about the entire issue of sustainability and how we use this concept. For example:

Is it possible to determine this "balance" of economic, ecological, and social conditions that will allow the desired sustainability?

If so, is it possible to value them equally? If not, which of these conditions should be the priority and why? Is the choice defendable?

Are their limits to the level of environmental degradation ecosystems can endure and if so how do we determine them?

Do we know what future generations might need to meet their needs?

Have we ever done anything truly 'sustainably' that we can use as a model?

Since we really know so little about the ecosystems contained within places like the UMR can we legitimately define sustainability other than in the abstract?

If we cannot concretely define sustainability then would it not be prudent to do some re-evaluation of our past, present and proposed actions and figure out just what we really are doing to the environment before we proceed?

Maybe before we can productively move toward a reasonable definition of sustainability we need to address a likely fundamental misconception about the idea of locating the "balance" area shown in Figure 1. Some well-versed experts would change this diagram to look like Figure 2 below:

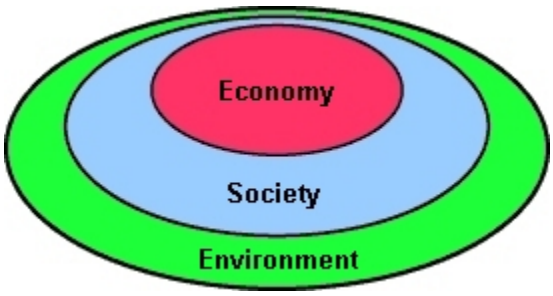


Figure 2

The basis for this view is that human society is totally dependent upon the environment for all essential natural resources. Further, the economy is in reality an activity that is a part of human society. This diagram, though still highly simplistic, conveys the important point that there are limits that need to be addressed, both within the human society for the economy and within the environment for human society. The goals would then be to establish and maintain our activities within these limits.

As far as large-scale activities such as the UMR what we are essentially doing is real-life, real-time experimentation upon our support systems without completely understanding how they work, what the possible unintended consequences might be, and how far we can push the level of environmental degradation without a total functional failure.

In 1986 scientists (Peter Vitousek, Paul R. Ehrlich, Anne H. Ehrlich and Pamela Matson, "Human Appropriation of the Products of Photosynthesis" - 1986) estimated that humans had appropriated up to 40 percent of the world's terrestrial net primary production (NPP). Since 1986 the human population has increased by about a third and many countries' per capita consumption has also increased. We may currently be using around 50 percent of the terrestrial NPP. Is this sustainable, especially since our trend is

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to continue to appropriate even more NPP with a population moving towards 9 billion by 2050? Should we not seriously be considering other species in the analysis and definition of sustainability?

It seems presumptuous to believe that we know how to reach sustainability at this point and extremely presumptuous to include the term within the name of a major infrastructure program. This is especially true when one considers that the navigation system is largely the cause of the environmental problems within the UMR and that the ecological restoration work has never been funded adequately to begin repairing the degradation. Even the proposed increased level of restoration funding in NESP is still far from what is likely necessary to begin restoring the river.

So, what is actually being sustained in NESP? Does anyone believe that the UMR will be self-sustainable after NESP is complete? Might sustainability within the context of NESP actually mean that we will sustain the increasingly costly, artifical environment we have created within the UMR as long as there are adequate funds available and political will to spend it.❖

Workshops, Government Style

Commentary by Brad Walker

I recently attended a 2-day workshop organized by the US Corps of Engineers (Corps) on the Navigation Economic Technologies Program (NETS) for the Navigation and Ecological Sustainability Program (NESP) in St. Louis.

The focus of the workshop was to introduce the latest Global Grain Forecast Model that the Corps intends to use to support their proposed expansion of the Upper Mississippi River (UMR) lock system. The developer of the model provided details about how they approached the model design, its scope, its objectives, its assumptions and generally how it works. The model is a massive undertaking, essentially trying to model and then forecast world grain production and consumption over a 50-year period. However, the primary objective of the model is to determine if there will be a consistent and adequate surplus of corn produced each year in the US that will find its way to the UMR barge system for export shipment from New Orleans. Without a surplus there will be no justification for the expansion of the lock system on the UMR.

The Corps utilizes these types of publicly accessible meetings to at least in part satisfy their public outreach and comment requirements. Attendees are regarded as stakeholders and the results are considered as serious and important input from the public.

The workshop attendance was, as is typical I believe with most Corps publicly accessible meetings, largely Corps employees along with barge industry and corn growers associations and other agricultural related representatives. A smattering of other people also attended including several outside consultants who are on the Independent Review Committee for the project, a representative from the Institute for Agriculture & Trade Policy and me representing Prairie Rivers Network. There were between 30 and 40 people in total attending.

The first day was devoted to the model presentation and discussions of its inner workings, limitations, results and potential problems. It was a lengthy presentation with several question and answer sessions. The day was facilitated pretty well by the Corps and I believe all participants were allowed to have their comments heard, responded to and then recorded for inclusion in a Corps report to be made public at some later date.

The second day was devoted to the stakeholders providing feedback and input, primarily on the models' assumptions and variables, which will be used to develop scenarios for the model. This was accomplished through two breakout groups of about 9 or 10 people each. The work product of the workgroups was the real focus of the meeting. Two of the members in the group, who were Corps employees, took the roles of facilitator and recorder and were not actually contributors. The process was fairly well organized, civil and somewhat productive. Time constraints limited lengthy discussions and the ability to go deeply into any detail.

There were four major problems with the workshop process I believe.

1. Skewed public representation: The issue lists were developed by each group through a round robin activity. After a discussion period to allow explanation and clarification of the issues, the issues were voted on by the group's contributors to establish priorities using what seems to be very democratic process where each person is allowed to place four sticky dots on their preferred issues. However, with each of the two groups made up of about seven Corps or industry representatives and one "outside interest" representative there is an obvious 28 to 4 sticky dot disparity. I am not impugning those seven individuals but they all have varying levels of vested interests in the lock expansion project proceeding.

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2. Model developer influence: The modeler attempted to influence the attendees efforts on specific model variables rather than letting the groups develop their own range of focus. Several times during the presentation he specifically told the group that a specific variable or issue was something they should focus upon when providing input. He went as far as to provide a handout for each attendee with his top seven variables. To be fair, he was likely trying to tell the group, which of the variables he believed were most important and that he would like direct input from the attendees on these variables. There were also time restraints but I believe the modeler's influence constrained the focus of the efforts and may have limited people's desire to go beyond the list.
3. Lack of attendee broad expertise: The model includes over 20,000 variables covering some very complex issues including corn yields, cropland area, ethanol production, world trade and US transportation system operation. I do not believe the expertise of the attendees rose to a professional level on more than one or two of the major variables. Much of the discussion was opinion, though some of it appeared well-informed. Also, with the skewed representation discussed above, a more diverse group might have contained people with expertise that could have been useful.
4. Pre-determined outcome: There is a definite feeling that the process is simply a legally-required means to an already determined end. The attitude of the attendees, except for the "outside interest" representatives and hopefully the Independent Review Committee, seemed to be that the lock expansions should go forward regardless of the study results. Many of the industry people see the expansion as essential to their survival and quite likely a government obligation. Also, the project is what the Corps does and excels at; large-scale infrastructure construction. They want to go out and build it.

There are also some general problems I believe with the model, most of which were noted during the workshop.

The model did not adequately consider an alternative for the government investing an equivalent amount of taxpayer's money in other modes of commodity transportation. It is almost exclusively focused upon UMR infrastructure managed by the Corps. Investment in other transportation modes could serve a larger range of industries and provide a greater benefit to the public.

I believe the most important calculation the model performs, at least regarding the US grain industry, is the amount of grain produced. This is dependent upon two variables, available cropland area and crop yields, whose product represents this amount of grain. The model as presented was much too optimistic regarding the available area over the 50-year period. Essentially it holds the available corn cropland steady but does include the possibility for area growth through the addition of land currently in Conservation Reserve Programs (CRP). There are at least two problems with this. First, historically the US is losing about 800,000 to 1,000,000 acres of farmland each year through conversions to other land uses; about half of it is prime farmland, much where corn and soybeans typically grow best.

Competition for cropland between crops, as well as competition for land conversion to other land uses, must be properly considered by the model. Also, land is placed into the CRP for a reason. These are highly erodible soil due to slope or other physical problems and it can be used to create land buffers in watershed areas to alleviate sediment and pollution problems. In most cases the CRP land is not as productive as other cropland.

Second, the projection of continually increasing crop yields could be over-estimated. Because of the group bias this is likely to be expected. However, the model does not appear to consider several highly likely impacts to yields, which include increasing competition for diminishing quantities of petroleum, decreasing water availability in cropland areas, and the continuing degradation of most agricultural lands through erosion and other human impacts.

The model, largely though the influence of the agribusiness industry, seems to rely upon the holy grail of biotech to overcome all of the above mentioned degradation issues. I believe this is unlikely and ultimately a dangerous assumption.

In theory I do believe that the workshop process is a sound approach to dealing with these types of complex problems. However it must be inclusive of all views. If much of the public does not participate the process will almost certainly provide a skewed result. This workshop was held during the work hours of a week day. The large majority of the public cannot take off from work to attend. Of course this is a difficult obstacle for the Corp to overcome but the current scheduling does not seem to work, at least for the majority of the general public. At a minimum the Corps must acknowledge that the work product was by no means produced by a representative sample of the UMR stakeholders but has been produced almost exclusively by stakeholders with a

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vested interest in proceeding with the construction of the lock expansion project. ❖

Why not drop the 'N'?

The second component of the Navigation and Ecological Restoration Program (NESP) is Ecological restoration work resulting primarily from the human mismanagement of the Upper Mississippi River (UMR).

During the more than 60 year period since the construction of the UMR dams, along with other river structures and levee systems, the UMR has been altered from a naturally flowing large floodplain river to a series of confined slow flowing lakes. This alteration has had a dramatic and detrimental impact upon the river ecosystems seriously degrading their ability to provide natural services to humans and other species. The Environmental Management Program (EMP) has since 1986 been the only true formal ecological restoration program on the UMR. EMP, initiated as more of a research and experimental restoration program, has however had limited overall impact on the river restoration. The river has continued to degrade significantly during the period of EMP.

The NESP includes ecological restoration activities for "island building, fish passage, floodplain restoration, water level management, backwater and side channel restoration, wing dike alteration, and island shoreline protection." Again the USACE (Corps) developed a series of alternatives organized by varying levels of restoration that equate essentially to the number of restoration projects in each alternative covering a 50-year period. Five Alternatives were ultimately developed ranging from No Action to the most extensive Alternative E for the construction 1,202 projects costing about $8.42 billion (2003 dollars) and addresses about 83 percent of the estimated total restoration measures.

The Corps selected Alternative D, which includes 1,009 projects with an estimated cost of $5.19 billion (2003 dollars) and addresses 70 percent of the estimated total restoration measures.

Again, due to the limited 15-year planning period less than 25 percent of the total 1,009 projects are being initially pursued at an estimated cost of $1.462 billion. This would be an average of about $100 million per year for the 15-year period.

One might question why these two separate components, navigation improvements and ecological restoration, are included within the same program. Neither is directly dependent upon the other. In fact, the need for the ecological restoration component is largely the result of the impacts from the construction and operation of the original navigation system, which the Corps acknowledges.

The Corps' stated reasoning for combining them is that their "goal is to achieve an environmentally sustainable navigation system for the Upper Mississippi River and Illinois Waterway" and they "believe the needs for navigation efficiency and ecosystem restoration should be pursued in a single joint purpose plan that addresses both purposes." Further they have stated that "The Corps believes that this approach provides a synergy and efficiency between the navigation and ecosystem restoration purposes….. This allows economic and environmental interests to unite in support of single project and helps assure that navigation will be environmentally sustainable by providing that any project funding will be used both to improve navigation efficiency and restore environmental quality including addressing the cumulative impacts of the existing 9-foot channel."

Unfortunately, there is no concrete justification or logic for combining these components contained within the Corps' reasoning. By combining them the status quo will simply continue; ecological restoration will remain secondary to navigation. In essence, it cynically uses the leverage of potential ecological restoration projects to persuade environmentalists to support NESP creating rifts between environmental groups.

A more sensible and appropriate approach might be to separate the navigation portion from the ecological portion and require each portion to be justified on its own merits. There is no doubt that meaningful and adequately funded ecological restoration is essential for the future health of the UMR. Likewise, ecological restoration would benefit millions of people living along the river. However, there are serious questions on the validity for the justification for the navigation expansion.

So, as naive as it sounds, why not simply drop the 'N'; it seems an ESP would be a natural extension of the EMP. We could go one step further and remove ecological restoration projects from the work scope of the Corps, a discipline area that they are institutionally likely not the best agency to perform. This could then allow Congress to place the ecological restoration projects on the UMR under a more appropriate government agency such as the US Fish & Wildlife Service.

NESP was included in the recent unapproved Water Resources Development Act (WRDA) of 2005 that failed to be enacted in the 109th Congress. A new WRDA that includes NESP is currently being pushed through the 110th Congress.❖

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