

USACE Draft Evaluator Responses

to

Final Panel Comments

on the

**MRERP FNR Selection Process and Draft FNRs and
the FNR Baseline Assessment Methodology**

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<p>Comment 1:</p>
<p>The definition of overall project goals and objectives should be more clearly defined in a single document.</p>
<p>Basis for Comment:</p> <p>A clear description of the overall project goals and objectives is needed to ensure that the first steps taken (FNRs, KEAs, and Baseline Assessment Methods) are the correct ones. The overall project goals and the steps to get to those goals are needed. The MRERP has a very unique opportunity to develop the needed ecosystem restoration tools because of the 30-50 year plan. Some of the needed tools may take years to develop, and will require the collection of data and the development and testing of models. These models may have to be linked and operated to develop system models.</p> <p>The “roadmap” that was presented in the PowerPoint presentations during the kick off meeting at USACE Omaha District on March 4, 2010 is more of an administrative roadmap, but what is needed is a technical roadmap on how resources will be evaluated and tools will be developed to evaluate and compare projects and alternatives. To this end, the FNRs, KEAs, and Baseline Assessment Methods may be a good start, but having a clear definition of the goals and a technical roadmap describing how to get there is critical to evaluate the current “first step.” More detail is needed to define the goals and steps towards meeting the direction defined by the WRDA 2007.</p> <p>The MRERP Focal Natural Resources and MRERP Baseline Assessment Methodology documents are an excellent start and some discussion beyond the FNRs and Baseline Assessment Methods is needed; more detail on how the FNRs, KEAs, and Baseline Assessment Methods would be used could strengthen the documents. This information would assist in making these documents more complete and “stand alone.” Essentially, these documents are the technical roadmap for the next step towards implementing the rest of the project. Defining overall goals and objectives also would help in defining how the FNRs would be used to get to the goals defined by WRDA. Even though this is a technical supporting document, it is still somewhat out of context without this goal and technical framework.</p>
<p>Significance – High:</p> <p>The definition of overall project goals and objectives are critical in that it will direct much of the project henceforth; clear definitions are critical to the development of a technical “roadmap” to ensure that the first and subsequent steps on this project are on track.</p>
<p>Recommendations for Resolution:</p> <p>To resolve these concerns, the two documents would need to be revised to address the following:</p> <ol style="list-style-type: none"> 1. Recommend combining the MRERP FNR document and the Baseline Assessment Methodology documents into one complete “stand alone” document that incorporates the MRERP vision/goals that have been identified in other documents and to provide a context for understanding why FNRs are needed and how they may be used in the future.

2. Recommend a “Goals and Objectives” section in the MRERP FNR document that provides more detail than the highest-level goals as defined by WRDA. Part of the goals could be to work towards what level of restoration is needed, such as to “hold our own,” to restore to some level and maintain, or to restore to some historic level. Define the overall goal as to restore function, if so. The question of whether the goal is to restore the system to a historic condition or some other condition should be discussed, even if an exact goal has not been defined. Likely parts of the next steps are to understand the health of the ecosystem and what is reasonable to restore. It is possible that more information is needed to clearly articulate this goal, but at least describe the plan intended to get there.
3. Recommend a section in the combined document that addresses a project roadmap, both administratively and technically. It is suggested that you could merge the administrative roadmap from the PowerPoint (presented to the EER panel on March 4, 2010) with a technical roadmap to illustrate the expected direction of the project. Adaptive management and dynamics of change in these roadmaps could be discussed. Items could include the use of the FNRs to focus data collection, use of KEAs to evaluate health of the FNRs, identifying data gaps, identifying modeling gaps, and developing tools (such as models) to help evaluate systems, alternatives, and projects.
4. Recommend a section in the combined document on how FNRs and baseline data will be used to provide information that will lead to decisions on how to mitigate habitat loss, recover species, and prevent further declines in native species.
5. Recommend terming this combined document as a technical document in support of the Missouri River Ecosystem Restoration Plan and Programmatic Environmental Impact Statement (PEIS). The administrative roadmap could discuss the fact that a PEIS, Environmental Impact Statement (EIS), or Environmental Assessment (EA) could be tiered from this overall PEIS.
6. Recommend renaming the “Baseline Assessment Methodology” section in the combined document to something like “Baseline Evaluation Methods.” The term “assessment” often refers to a spatially-specific, quantitative evaluation of alternatives, and it should be made clear that these documents do not address that issue.
7. Recommend a discussion of the future FNR prioritization process in this combined document. Describe how the FNRs would be prioritized, perhaps based upon some quantitative modeling that needs to be developed. Once the data collection begins and restoration plans begin to develop, the fate of the FNRs should be discussed as to whether they will be revised as new data and thought processes warrant, or whether they will have served their purpose and will no longer be needed.
8. Recommend a statement in the introduction of the FNRs in the combined document that indicates whether the similarity in “biotic structure, composition and function” refers to current or past conditions (and how far in the past). A dedicated section that discusses FNRs may help the wide array of readers of this document understand the value of FNRs and how they are to be used.

Draft USACE Evaluator Response (#1):

Concur. The overall project goals and objectives will be compiled in chapter 1 of the Missouri River Ecosystem Restoration Plan/EIS. Development of goals is currently underway and development of objectives is slated for fall 2010. Development of objectives is informed by the baseline assessment.

Recommendations:

#1 – not adopt. It is not the intention to publish these two documents as a stand-alone product. They are intended to document the process and methodology for FNR development. These documents are part of the administrative record and a description of these elements may be published in an integrated Missouri River Ecosystem Restoration Plan/EIS document in whole or part.

#2 – adopt.

#3 – adopt.

#4 – adopt.

#5 – adopt.

#6 – adopt.

#7 – not adopt. The MRERP team does not intend to prioritize FNRs. The FNRs that will be carried through the planning process will be considered equally important. In the planning process, as we learn new information, we will revisit the FNRs. After the plan is adopted and implementation begins, the fate of the FNRs will be determined by regular adaptive management reviews and evaluations and will remain the prime component of future planning.

#8 – adopt.

Backcheck Recommendation:

Close comment.

Concur. The Panel concerns have been sufficiently addressed.

Comment 2:

A plan to develop system-wide evaluation methods – such as quantitative ecological models that incorporate the Focal Natural Resources (FNRs), Key Ecological Attributes (KEAs), baseline data, and new information – is needed to effectively evaluate existing and future conditions, restoration efforts, and project goals.

Basis for Comment:

System-Wide Evaluation Methods. The goal of system-wide evaluation methods should focus on the development of ecological models that can evaluate and integrate information across multiple or all FNRs. Any changes in a part of the system could have effects on one or many other parts of the system. For a complex and large project such as the Missouri River Ecosystem Restoration Program (MRERP), system evaluation tools will be a necessity in order to evaluate and implement the system-wide restoration. Developing these tools is perhaps the greatest challenge to MRERP. Land use changes in the terrestrial system could have effects on the riparian and aquatic systems. The evaluation of these changes is critical for determining the overall effects of a restoration effort, alternatives, or projects with other objectives. For example, if a navigation project is proposed, such as clearing snags, the entire system could be affected, including upstream and downstream areas across several FNRs. These system tools must account for interactions among FNRs and be quantitative so they can evaluate the impact of projects and alternatives on the FNRs. When there are large changes in the environment and the vegetation succeeds to different species, habitat-switching models may be needed. These models need to have the ability to evaluate the systems when multiple changes occur, particularly since riverine systems are very dynamic.

MRERP presents a unique opportunity in that the time frame of the restoration plan is long-term (30-50 years), and allows for the development of comprehensive system tools required to manage and restore such a large watershed. Many shorter-term projects have had to forego the development of such comprehensive tools and rely on less comprehensive models and “best available” data. Other large restoration projects have eventually had to develop these tools and the MRERP could benefit by developing these system models early in the planning stage.

Integration of FNRs and KEAs into the System-Wide Evaluation. The purpose of FNRs is to focus information collecting efforts, such as the baseline assessment, towards the development of plans to restore or mitigate losses of aquatic and terrestrial habitat. A “divide and conquer” approach is appropriate for focusing data collection and beginning to understand restoration priorities, but plans should be developed to integrate this information into a more system-wide evaluation (as described above). Restoration activities will affect many FNRs in a given river reach, but activities will also likely affect FNRs in reaches located up and down river of the restoration site. Changes in management of aquatic FNRs could affect terrestrial and riparian habitat, and vice versa. It is critical at this stage of planning that a complete systems evaluation be a large part of the restoration goals

Quantitative Models. Based on the documentation, the final form of the modeling tools proposed is unclear. The current FNRs and KEAs appear sufficient for identifying areas of concern and could lead to techniques that help direct the restoration efforts. However, there seems to be no discussion about how the process extends beyond the FNRs, KEAs, and baseline

assessment. The panel believes that quantitative models will be needed to evaluate alternatives and projects. Quantitative models will provide more insight than qualitative models. Quantitative models will allow for sensitivity analyses, estimations of probability, and characterization of uncertainty.

Model Development. The biggest potential hindrance to using information gathered through the baseline assessment for model development is that although it may be possible to identify linkages among FNRs, KEAs, stresses, and their sources, quantifying those relationships may be difficult. The panel is concerned about the potential simplicity of certain aspects of the models, as well as the complexity of other aspects of the models that may be developed. The simplicity of the models (i.e., one-way connections versus a diverse web of connections) may limit how comprehensive the evaluations can be. The models may either be too general to provide much guidance, or so complex and specific that they also fail to provide correct guidance because pathways of interaction and system drivers will be unclear.

Significance – High:

The development of quantitative system-wide models, information integration approaches, and system evaluation tools is critical to evaluate alternatives and project success.

Recommendations for Resolution:

To resolve these concerns, the documents would need to be expanded to include the following:

1. A section in the MRERP Focal Natural Resources document that discusses how system-wide quantitative models will be developed and how the FNRs and KEAs provide the basis for ecological modeling decision-support tools that will be required to assess restoration alternatives and other proposed projects in the future.
 - a) The panel suggests sources of information include: www.clear.lsu.edu, <http://www.evergladesplan.org/pm/recover/cems.aspx>, and Twilley, *et al.* (2008)
 - b) Model development should anticipate the critical application of the FNRs and KEAs.
 - c) Plans to develop system-wide models should be explicit about how FNRs/KEAs are to be used in the models, linking proposed actions through changes in KEAs and thus changes to FNRs.
 - d) The FNRs/KEAs should be carefully selected to ensure that they are necessary and sufficient to serve as model endpoints or outcomes for future decisions.
 - e) Model development could start with the FNRs and KEAs as proposed (i.e., qualitative), and then data and modeling gaps could be identified. It is important to identify these data gaps early because some models may take years to develop.
 - f) In some cases, sub-system models could be developed to evaluate effects in a localized area, such as a certain reach of the river. This sub-system model may be sufficient to evaluate a small, localized project, but there always should be some integration into a system-wide model to determine the effects on the entire system, which is the overall project goal. The main reason for this integration is so cumulative effects on the entire system can be evaluated. For example, alterations to a 3-mile reach of the river could have impacts several miles upstream and downstream, but alterations to five separate 3-mile reaches could have synergistic effects (e.g., greater than just five times the effects of one 3-

mile reach).

2. A section in the Baseline Assessment Methodology document that outlines the plan to identify modeling and data gaps.

Draft USACE Evaluator Response (#2):

Concur. Current modeling efforts are focused on functional ecological models for each focal natural resource and have been developed to assist in identification of key ecological attributes. Quantitative and qualitative indicators will be developed for key ecological attributes to evaluate baseline conditions. Upon completion of the baseline assessment and interaction assessment (situation analysis), and movement towards development of action strategies, a quantitative system wide model would be beneficial to fully understand the interplay of action strategies on the entire system. A quantitative model would be especially useful to assess multiple suites of alternatives impacts on FNRs and the entire system. There are several outstanding questions about the development of quantitative system models:

- How do we handle the complexity of development?
- How do we address uncertainties in populating data needs and multiple relationships within a model of this scale?
- Given the uncertainty and complexity surrounding the data how do we develop ‘buy-in’ into the model with stakeholders? (Need for Institute for Water Resources or similar effort to develop the model with technical staff as well as stakeholders).
- How will schedule be impacted by development of a model (a quantitative model will invoke USACE model certification)?
- How do we incorporate model development into the adaptive management plan?

While there are several potential hurdles to overcome, the benefits of developing quantitative models are fully recognized by the MRERP team. The basis for the comment describes fully the benefits and needs for a quantitative model.

Recommendations:

#1 – adopt in part. Subsystem models may be an appropriate first step to begin developing portions of an overall quantitative system model but should be an iterative process throughout the development and implementation of the plan.

#2 – adopt in part. Begin to develop the methodology and basis for the model.

Backcheck Recommendation:

Close comment.

Concur. Although many questions remain with regard to developing a quantitative system model, the USACE recognizes the concerns of the Panel. Additional discussion should help the reader better evaluate how the project will proceed into the future. The Panel believes that the USACE understands that quantitative models that are "necessary and sufficient" to support the MRERP will have to be developed and a framework to manage these models will be needed.

Literature cited

Twilley, R. R., B. R. Couvillion, I. Hossain, C. Kaiser, A. B. Owens, G. D. Steyer, and J. M. Visser. 2008. Coastal Louisiana Ecosystem Assessment and Restoration Program: The Role of Ecosystem Forecasting in Evaluating Restoration Planning in the Mississippi River Deltaic Plain. American Fisheries Society Symposium 64:29-46.

Comment 3:
The selection and description of terrestrial Focal Natural Resources (FNRs) are not acceptable and need to be re-evaluated.
Basis for Comment:
<p>The terrestrial FNRs essentially circumscribe geographic planning regions, and are not recognized ecosystems at any level of resolution by a national classification system such as the National Vegetation Classification (NVC) or NatureServe's Ecological System classification ["Ecological Systems"].</p> <p>The Conservation Action Planning (CAP) process, from which the Baseline Assessment Methodology document was extracted, states that Key Ecological Attributes (KEAs) are generally drawn from the broad categories of size, condition, and landscape context of the FNRs. Planning regions thus do not fit well within the assessment process as FNRs. Furthermore, since they are composed of many disparate community elements, it will not be possible to provide straight-forward, realistic models of the FNRs as they are currently identified.</p>
Significance – High:
<p>The assessment may be impeded because the terrestrial FNRs are only geographic regions. Project success depends on appropriately defined terrestrial FNRs, since these form the basis of future assessments of viability and threats, from which flow formation of objectives and actionable strategies.</p>
Recommendations for Resolution:
<p>To resolve these concerns, the following should be considered:</p> <ol style="list-style-type: none">1. Use Ecological Systems as terrestrial FNRs. These are already mapped and described by NatureServe. <p style="text-align: center;">- OR -</p> <ol style="list-style-type: none">2. Explicitly assign prevailing historic Alliances or Associations from the NVC to typical variations in the floodplain abiotic site types (river front to bluff bottom) within the three different reaches that correspond to the current terrestrial FNRs. Then outline how conceptual models and KEAs will be defined for these groups of Alliances or Associations. <p>If #1 (above) is selected, it would be possible to limit the number of terrestrial FNRs by grouping Ecological Systems with similar abiotic habitats and processes to form FNRs instead of using the Ecological Systems directly. For example, mainly terrace deciduous forest Ecological System types, river front forest Ecological System types, and marsh and wet meadow Ecological System types could be grouped together.</p>

Finally, limit the number of FNRs by focusing on riparian and floodplain types, and treat corridor terrestrial ecosystems from bluff bottom to bluff top only as natural or semi-natural versus cultural ecosystems. This would not exclude ecosystems adjacent to the floodplain from future planning for conservation and restoration.

Draft USACE Evaluator Response (#3):

Concur.

Recommendations:

#1 – adopt in part. In developing the current list of terrestrial focal natural resources (including riparian ecosystems and river corridor ecosystems), the MRERP team initially evaluated the 30+ NatureServe ecological systems that occur within the Missouri River system. While the NatureServe ecological systems provided a valuable and ecologically appropriate classification and delineation of ecological units, they presented challenges in using them as focal natural resources: there were more NatureServe ecological systems than could be efficiently handled within the MRERP process; some ecological systems present in the Missouri River system were found only marginally or minimally; and the ecological systems do not occur as a single unit in the landscape, but are multiple scattered units intermixed with other ecological system types.

#2 – adopt in part. Because of the challenges identified in part #1, the MRERP team chose to build FNRs by grouping NatureServe Alliances and Associations in a manner that reflected the ecology of the Missouri River system. The approach was similar to that described in recommendation #2, but differed in that the focal natural resources were not assembled from alliances and associations tied to typical abiotic site types. Instead, they were grouped according to their proximity to the river system and the degree to which flooding and flood frequency was key to sustaining and maintaining the alliance or association. Riparian focal natural resources included alliances and associations that were frequently flooded. River corridor focal natural resources included those that were rarely flooded. In developing functional models that describe each focal natural resource, the MRERP team will relate each focal natural resource to the appropriate alliances, associations AND ecological systems in the NatureServe classification system.

In regards to the third paragraph of recommendation #2, the MRERP team is discussing the possibility of reducing the resolution of the evaluation related to river corridor focal natural resources in order to focus on riparian/floodplain types.

Additional responses for this comment are provided in the USACE Evaluator Response for Comment #4.

Backcheck Recommendation:

Close comment.

Concur. The USACE considers the selection of geographic regions as FNRs appropriate for their use, and further asserts that the assessment process itself cannot accommodate too many FNRs as would occur if ecological systems were used directly. They have elected not to attempt to aggregate ecological systems to use them as FNRs but do not disavow their potential utility to the project in the future.

Comment 4:

Terrestrial Ecological Systems should be considered as terrestrial Focal Natural Resources (FNRs).

Basis for Comment:

Use of NatureServe's Ecological Systems classification for terrestrial FNRs would provide an existing and respected base of tools and information, including definitions, descriptions, and spatially specific maps. They are defined in the Baseline Assessment Methodology document (page 6) but are not listed as being considered as terrestrial FNRs. The terrestrial FNRs in the draft document lack these attributes and advantages.

Terrestrial Ecological Systems within or immediately adjacent to the Missouri River floodplain, compiled from quick inspection of data available on-line (reference below), include (from downstream to upstream):

- North-Central Interior Freshwater Marsh
- North-Central Interior Floodplain
- Eastern Great Plains Wet Meadow, Prairie, and Marsh
- Central Tallgrass Prairie
- Central Mixed Prairie (mainly adjacent to floodplain)
- Northwestern Great Plains Mixedgrass Prairie
- North-Central Interior Maple-Basswood Forest (mainly adjacent to floodplain)
- Western Great Plains Depressional Wetland Systems
- Northwestern Great Plains Riparian (adjacent)
- Northwestern Great Plains Floodplain
- South-Central Interior Large Floodplain
- Western Great Plains Wooded Draw and Ravine (mainly adjacent)
- Western Great Plains Open Freshwater Depression Wetland
- Western Great Plains Riparian
- Western Great Plains Closed Depression Wetland
- Western Great Plains Sand Prairie
- Western Great Plains Badlands (adjacent)
- Inter-Mountain Basins Big Sagebrush Steppe
- Inter-Mountain Basins Greasewood Flat (adjacent)
- Northern Rocky Mountain Confer Wooded Steppe (adjacent)
- Northern Rocky Mountain Ponderosa Pine Woodland and Savanna (adjacent)
- Northern Rocky Mountain Montane-Foothill Deciduous Shrubland (adjacent)
- Northern Rocky Mountain Dry-Mesic Montane Mixed Confer Forest (adjacent)
- Inter-Mountain Basins Montane Sagebrush Steppe
- Rocky Mountain Subalpine-Montane Mesic Meadow (questionable map label)

Note that there are four to six floodplain forest complex types and about four to six marsh and wet meadow types. This results in a total of about eight to twelve primary potential terrestrial FNRs if Ecological Systems are used as FNRs. Systems with similar abiotic site types and

process could possibly be grouped to reduce the number of FNRs (e.g., North Central Interior Fresh Marsh; Eastern Great Plains Wet Meadow, Prairie, and Marsh; Western Great Plains Open Freshwater Depression and Wetland; Rocky Mountain Subalpine-Montane Mesic Meadow). Ecological Systems from the NatureServe classification should be considered as terrestrial FNRs because they are mapped at 30 m spatial resolution and summary statistics (total area, patch size, landscape context) could be readily produced.

Reference

NatureServe Ecological Systems

<http://www.natureserve.org/publications/usEcologicalsystems.jsp>

Downloadable GIS data available at:

<http://www.natureserve.org/getData/USecologyData.jsp>

Significance – High:

The current terrestrial FNRs are not defined or mapped well, and could not be easily analyzed and used to support future assessment of threats, and the formation of objectives and strategies.

Recommendations for Resolution:

To address this concern, use NatureServe’s Ecological Systems or groups of systems as terrestrial FNRs as presented in the Basis for Comment should be used.

Draft USACE Evaluator Response (#4):

Concur.

Recommendation: adopt in part.

This is a combined response to Comment #3 and #4. Comment #3 recommends that the FNRs be based on the NatureServe ecological systems and Comment #4 recommends using the NatureServe ecological systems as FNRs for the planning process.

The current terrestrial ecosystem FNRs were developed and are based on both the NatureServe ecological systems and alliance classifications. The NatureServe ecological systems and the FNRs have been cross-walked and in most cases each ecological system is found within one FNR (see Appendix A for this crosswalk). The NatureServe Ecological Systems are embedded in the conceptual ecological models that are being developed for the terrestrial ecosystem FNRs, and as such provide the basis for assessing key ecological attributes. NatureServe and state heritage staff have been involved in developing the FNRs and the MRERP team is still actively incorporating information from state classifications into the FNRs circumscription and models (e.g., the March 10, 2010, release of the Terrestrial Ecological Systems and Natural Communities of Nebraska).

The more pertinent and important question underlying both Comment #3 and Comment #4 is whether the planning for MRERP is better served by the FNRs or by using the NatureServe Ecological Systems. This can certainly be argued either way. Below are reasons presented for keeping the current FNR structure.

- The current FNRs are more commensurate with the intent and scale of the planning for MRERP. MRERP is a planning effort for a river corridor that is more than 2,000 miles long, with the intent of providing a broad guidance for restoration, recovery, and mitigation.
- The current FNRs are tightly linked to the NatureServe Ecological Systems, by being the basis of their development, incorporated in the functional ecological models and through the process of assessing key ecological attributes. Ecological systems are integrated into the planning process and will be used to identify threats and effective objectives and strategies.
- The current FNRs better allow the integration of key ecological attributes across ecological systems (e.g., fire across prairies and woodland systems, hydrologic regime across riparian and floodplain forests) and an understanding of landscape context than addressing each ecological system separately.
- In most cases, each NatureServe Ecological System is found within one FNR. Therefore, the mapping of the ecological systems within FNRs can be accomplished relatively easily.
- The current FNRs are a more efficient, both in terms of number and the integration across ecological systems, approach of planning at the scale of MRERP.

In summary, the EER has raised several important questions that highlight the

importance of linking the FNRs with the NatureServe ecological systems and using these ecological systems in the full extent of the planning process. The NatureServe ecological systems (and their alliances) have been integrated into the development and use of the FNRs, and NatureServe data, mapping and other tools related to the ecological systems will be utilized to the fullest extent possible in future steps of the planning process. This needs to be better communicated in the development and implementation of the MRERP.

Backcheck Recommendation:

Close comment.

Concur. The USACE knows which ecological systems may occur within the study area in theory, although it is not clear that they have actually summarized the current ecological systems that are mapped within the study area using GIS methods. They assert that the NatureServe classification was integral to the development of the original terrestrial FNRs, which is not apparent from the documentation, and future work will take this classification and mapping into consideration.

DRAFT

Comment 5:
The justification associated with the species-based Focal Natural Resources (FNRs) is questionable.
Basis for Comment:
<p>The MRERP FNR document lacks discussion associated with whether or not species-based FNRs are appropriate. If an ecosystem is maintained or restored, then the species that depend on the system will most likely be maintained or restored. For example, establishing flows such that sandbar habitats are created and maintained will be beneficial for a variety of species, including all of the current species-based FNRs. It appears as though there are two foci embedded in MRERP: one focus is on the function of ecosystems in the basin and the other is focused on conservation of the “three species.” These two foci have obvious differences in philosophy and approach. Although the document describes how species-based FNRs are required when a species has habitat and (or) life history needs that are not met through restoration of the ecosystem-based FNRs, justification for the species-based FNRs presented in the document is tenuous. For instance, although very little is known about factors influencing the population dynamics of pallid sturgeon, even less is known about other fishes constrained to the Missouri River basin (e.g., sicklefin chub, sturgeon chub). It is unclear as to why the species cannot be simply included as key nested species within the ecosystem-based FNRs. Such an approach would not only alleviate the disconnect between ecosystem- and species-level restoration efforts, but it would allow for more focused attention on restoring systems rather than the distraction of endangered species.</p> <p>The criteria associated with selecting species-based FNRs based on vulnerability may not be appropriate for two reasons. First, whether or not a species is federally listed as threatened or endangered is a legal criterion that may not be appropriate in an ecological evaluation. Second, sufficient information is lacking on most species to fully evaluate whether or not they should be formally recognized with a global or federal conservation rating. Therefore, this criteria set is likely too restrictive.</p> <p>It is unclear from the document whether other “species-based” FNRs were considered. For example, guild-based FNRs could serve as an alternative to species-based FNRs. For instance, one guild could be “benthic fishes” that includes species such as pallid sturgeon, shovelnose sturgeon, sicklefin chub, blue sucker, sturgeon chub, and flathead chub. A similar guild could be developed to include avian communities dependent on sandbar habitats. This approach is similar to the approach used for terrestrial FNRs that are more-or-less based on groups of vegetation with similar ecology. Guilds could also replace or supplement individual species as key nested elements within FNRs.</p>
Significance – High:
Adequate justification of FNRs is critical for the success of the project.

Recommendations for Resolution:

To resolve these concerns, the MRERP FNR document would need to be expanded to include:

1. Additional discussion on why species would not be covered as part of the ecosystem-based FNRs and, therefore, require separate characterization as a species-based FNR.
2. Additional discussion justifying the use of vulnerability criteria.
3. Discussion focused on whether additional “species-based” approaches (e.g., habitat guilds) were considered.

DRAFT

Draft USACE Evaluator Response (#5):

Concur.

We concur based on discussions with the EER Panel that more explanation within the document to support utilization of species will provide a sufficient justification.

It is correct to say that there are two foci embedded in MRERP: ecosystems and species. These two foci are driven, in part, by WRDA 2007 instructions to the USACE to “recover federally listed species” and “restore the ecosystem”. By specifying species and ecosystem focal natural resources, MRERP is targeting the resource elements that WRDA 2007 directed the USACE to address. The other rationale for the dual focus is based on the coarse-filter/fine-filter approach to conservation or restoration planning that is established in the community of practice (TNC 2010; CMP 2007). This approach emphasized the use of coarse filters (ecosystems) and fine filters (species) as focal elements for conservation and restoration planning because they allow for complimentary and comprehensive planning. Planning for coarse scale elements (ecosystems) assumes that if an ecosystem is maintained or restored, then the species that depend on the system will most likely be maintained or restored. Complimentary planning for a limited list of fine scale elements (species) ensures that those species with special requirements are not overlooked and their unique needs are fully addressed.

The selection of MRERP species FNRs is based on vulnerability, distribution relative to the Missouri River system, and requirements. Species that are listed as imperiled have certain needs or conditions that need to be met that may not be captured by restoration of the habitat alone. An example may be where the species population numbers are so low that genetic bottleneck issues come into play and they need certain management measures aimed directly at that species to ensure they recover or at least maintain a viable population. Additionally with federally listed species, federal agencies have responsibilities toward recovery of the species. Specific management measures will need to be formulated to meet these responsibilities. The difference between species FNRs and a key nested species is that species FNRs get carried through the whole planning process and have planning objectives and management measures specifically for them. As FNRs, they receive greater emphasis and planning attention than they would as key nested species. Key nested species are only carried through the planning process through the development of key ecological attributes to make a determination of whether the needs of key nested species are adequately covered by the key ecological attributes of the ecosystem FNRs. Planning objectives and management measures will not be specifically directed toward the key nested species. Thus, species with special requirements, vulnerabilities, or management needs cannot be fully addressed through the planning process as key nested species; they require status as a focal natural resource in order to be properly evaluated.

Key assemblages (or guilds) nested within each ecosystem focal natural resource will be evaluated in the same manner as key nested species in the MRERP planning process. If it is determined that the key ecological attributes for a particular functional assemblage are so unique that they are not adequately covered by the key ecological attributes of the ecosystem FNR, then the assemblage will be considered for FNR status. Specific criteria

have been developed for identifying key nested species and assemblages and for including a key nested species or assemblages as FNRs.

Recommendations:

- #1 – adopt in part. The description above explains why some species need to be characterized as species FNRs separate from the ecosystem FNRs. The USACE will develop additional documentation within the methods document to justify the rationale.
- #2 – adopt. Of the three criteria that were used to select the species FNRs, only one was “special status” (e.g., whether the species was federally listed or listed in the natural heritage species status ranking system). Species with populations so low as to be federally listed often have unique issues (e.g., genetic bottlenecks, isolated populations, population augmentation, etc.) that require management measures in order to maintain or recover the species to a viable population level. WRDA specifically mandated that the MRERP recover federally listed species. Additional clarifying language will be added to the methods document to make clear the justification for including this criterion.
- #3 – adopt. The consideration of habitat or functional guilds has been added in more detail since the EER documents were prepared and is now included within the key nested species methodology. Assemblages identified during the key nested species process will be evaluated to determine if their key ecological attributes are so unique that they should be elevated to an FNR.

References:

- CMP (Conservation Measures Partnership). 2007. Open Standards for the Practice of Conservation. http://www.conservationmeasures.org/CMP/Site_Docs/CMP_Open_Standards_Version_2.0.pdf
- Haufler, J. B., C. A. Mehl, and G. J. Roloff. 1996. Using a coarse filter approach with a species assessment for ecosystem management. *Wildl. Soc. Bull.* 24:200-08.
- Parrish, J. D., D. P. Braun, R. S. Unnasch. 2003. Are We Conserving What We Say We Are? Measuring Ecological Integrity within Protected Areas. *BioScience* 53: 851–860.
- TNC (The Nature Conservancy). 2010. Conservation Action Planning. http://conserveonline.org/workspaces/cbdgateway/cap/index_html

Backcheck Recommendation:

Close comment.

Concur. The Panel's concerns have been sufficiently addressed.

Comment 6:

The selection of aquatic Focal Natural Resources (FNRs) requires further justification.

Basis for Comment:

Aquatic FNRs were selected based on North American freshwater ecoregions, as well as the work by Stagliano (2005) and an unpublished data analysis conducted by the Missouri Resource Assessment Partnership (MoRAP). The panel identified several concerns associated with this process.

The data used to identify FNRs do not appear to be available to the scientific community. The only source provided is a phone and email conversation between MoRAP and someone with The Louis Berger Group. Later in the document, the text indicates that a non-metric multidimensional scaling analysis was conducted. Not only are the data not available, but the analysis is also not available for scrutiny (correct distance measures used, number of axes interpreted, etc.). Multivariate analyses can be very subjective, particularly with regard to simply identifying patterns—as was evidently done for this effort. It is unclear whether the data and results of the data analysis were made available to the technical teams tasked with identifying FNRs. The work of Stagliano (2005) is available to the scientific community, but it does not appear to have been subject to extensive peer review. Because these analyses resulted in splitting an FNR into two FNRs, additional justification and discussion is warranted.

Another concern is an apparent lack of temporal consistency. Specifically, the discussion associated with restoration of aquatic FNRs seems to focus on historic conditions, but the data used to define the FNRs are contemporary. For instance, large scale factors (e.g., geomorphology) and broad-scale patterns in fish assemblage structure were used to identify FNRs. These patterns are typically considered within an historical context. However, much of the data used to further define FNRs (i.e., Stagliano 2005 and the MoRAP database) are based on recent fish or macroinvertebrate assemblage information. Thus, current conditions (i.e., current assemblages) are contributing to the development of FNRs. While this is not necessarily bad, there seems to be a disconnect with using information on altered assemblages to define restoration units. Along these lines, it is unclear whether other classification systems were considered that embrace the altered nature of the Missouri River. A logical categorization could be based on water development activities. One example would be to categorize the river's composition as the coldwater reaches in Montana, reaches upstream of Lake Sakakawea, the extensively impounded reaches through the Dakotas, the unchannelized reach from Gavins Point to Sioux City, and the channelized reach from Sioux City to St. Louis. An argument could be made that conditions within these reaches are more similar to each other than conditions within reaches in the currently defined aquatic FNRs.

It is unclear whether additional data sources were considered during the development of aquatic FNRs. Specifically, the Missouri River Benthic Fishes project conducted in the late 1990s by several universities (i.e., University of Idaho, Montana State University, South Dakota State University, Iowa State University, Kansas State University, and University of Missouri) would be an obvious source of excellent information to consider when identifying FNRs.

Significance – Medium:
Additional discussion is needed to justify development of aquatic FNRs.
Recommendations for Resolution:
To resolve these concerns, the FNR document would need to be expanded to include: <ol style="list-style-type: none">1. Additional justification on the use of the MoRAP data and Stagliano (2005) to delineate FNRs.2. Additional discussion of using contemporary fish and invertebrate information to identify FNRs3. Additional discussion and consideration of other data, particularly data from the Missouri River Benthic Fishes Project, and why FNRs were not based on water development activities.

DRAFT

Draft USACE Evaluator Response (#6):

Concur. Additional rationale and justification for the selection of aquatic system FNRs can be provided. The goal in defining aquatic ecosystem FNRs was to identify units along the length of the Missouri River that are ecologically and biologically distinctive. These units were intended to represent natural ecological systems that require mitigation, restoration, or recovery. As such, delineations of FNRs would be based on historical information or information from non-altered river reaches. Because of the limited amount of data and information describing the historical biological and ecological nature of the river along a longitudinal gradient, the MRERP team drew from available sources, including Stagliano and the MoRAP dataset. They provided the best available information on which to base a delineation of FNRs. The delineation of FNRs rested in part on the recommendations of technical experts and their knowledge and experience regarding the Missouri River ecosystem, but it was informed by the data/information provided by Stagliano 2005 and MoRAP.

Additional data/information that were evaluated in the development of this framework included Missouri River habitat classification frameworks (e.g., MoRAP 2009; Welker and Drobish 2009; Peters and Parham 2008; Fetters et al. 1989); Mississippi River biological and physical classification frameworks (e.g., EPA 2008; Knights et al., 2008; O'Hara et al. 2007; Barko et al. 2005, 2004; USACE 2000a, 2000b); as well as more generalized approaches to characterization of riverine ecological units (e.g., Seelbach et al. 1997; Maxwell et al. 1995). Benthic fishes study data, particularly as reported in Galat (2005) and included in the MoRAP dataset, and the NRC 2002 framework (from USGS) were also reviewed and considered in development of the FNR aquatic ecosystem development framework.

Recommendations:

- #1 – adopt. Additional details on the rationale for using Stagliano (2005) and the MoRAP dataset will be developed.
- #2 – adopt. Additional discussion on the validity of using contemporary fish and invertebrate data will be developed.
- #3 – adopt. Additional discussion on the use of the Benthic Fishes Study dataset and delineation frameworks based on water development activities will be included.

References:

Barko, V. A., B. S. Ickes, D. P. Herzog, R. A. Hrabik, J. H. Chick, and M. A. Pegg. 2005. Spatial, temporal, and environmental trends of fish assemblages within six reaches of the Upper Mississippi River System. U.S. Geological Survey, Upper Midwest Environmental Sciences Center, La Crosse, Wisconsin, February 2005. Technical Report LTRMP 2005-T002. 27 pp. (DTIC ADA-431398).

Barko, V. A., M. W. Palmer, D. P. Herzog, and B. Ickes. 2004. Influential environmental gradients and spatiotemporal patterns of fish assemblages in the unimpounded Upper Mississippi River: *American Midland Naturalist*, v. 151, no. 4, p. 369–385.

EPA (U.S. Environmental Protection Agency). 2008. Great Rivers Study (web site). Accessed online, February 3, 2010. Available: <http://www.epa.gov/emap2/greatriver/>

Feters, E. J., R. S. Holland, M. A. Callam, and D. L. Bunnell. 1989. Platte River suitability criteria-habitat utilization, preference and suitability index criteria for fish and aquatic invertebrates in the Lower Platte River: Lincoln, Nebraska Game and Parks Commission, Nebraska Technical Series 17.

Galat, D. L., C. R. Berry, W. M. Gardner, J. C. Hendrickson, G. E. Mestl, G. J. Power, C. Stone, and M. R. Winston. 2005. Spatiotemporal patterns and changes in Missouri River fishes. Pages 1–82. In: J. N. Rinne, R. M. Hughes, and R. Calamusso (editors). Historical Changes in Fish Assemblages of Large American Rivers. American Fisheries Society.

Knights, B. C., B. S. Ickes, and J. N. Houser. 2008. Fish assemblages in off-channel areas of the Upper Mississippi and Illinois Rivers: Implications for habitat restoration at management-relevant scales. U.S. Geological Survey, Upper Midwest Environmental Sciences Center, La Crosse, Wisconsin. Completion report 2007APE07 submitted to the U.S. Army Corps of Engineers, Rock Island, Illinois, 53 pp.

Maxwell et. al. 1995. A Hierarchical Framework of Aquatic Ecological Units in North America (Nearctic Zone). General Technical Report NC-176.

MoRAP (Missouri Resource Assessment Partnership). 2009. Missouri River Aquatic GAP Project. Accessed online, May 2009. Available: <http://www.cerc.usgs.gov/morap/Projects.aspx?ProjectId=42>

National Research Council (NRC). 2002. The Missouri River Ecosystem: Exploring the Prospects for Recovery. Committee on Missouri River Ecosystem Science.

O'Hara, M., B. S. Ickes, E. Gittinger, S. DeLain, T. Dukerschein, M. Pegg, and J. Kalas. 2007. Development of a life history database for Upper Mississippi River fishes. U.S. Geological Survey, Upper Midwest Environmental Sciences Center, La Crosse, Wisconsin. LTRMP 2007-T001. 10 pp. + Appendices.

Peters, E. J., and J. E. Parham. 2008. Ecology and Management of Sturgeon in the Lower Platte River, Nebraska, in Nebraska Technical Series. Nebraska Game and Parks Commission: Lincoln, Nebraska. 232 pp.

Seelbach, P. W., M. J. Wiley, J. C. Kotanchik and M. E. Baker. 1997. A landscape-based ecological classification system for river valley segments in lower Michigan (MI-VSEC version 1.0).

USACE (U.S. Army Corps of Engineers). 2000a. Final Report. Upper Mississippi River and Illinois Waterway Cumulative Effects Study. Volume 1: Geomorphic Assessment. Army Corps of Engineers, Rock Island District. Rock Island, Illinois. 244 pp.

USACE. 2000b. Final Report. Upper Mississippi River and Illinois Waterway Cumulative Effects Study. Volume 2: Ecological Assessment. Army Corps of Engineers, Rock Island District. Rock Island, Illinois. 295 pp.

Welker and Drobish. 2009. Missouri River Standard Operating Procedures for Fish Sampling and Data Collection, Volume 1.4. US Army Corps of Engineers, Omaha District, Yankton, SD.

Backcheck Recommendation:

Close comment.

Concur. The expanded explanation and clarification of data sets used to characterize fish assemblages, and additional discussion focused on the validity of using contemporary data addresses the Panel's concerns. Discussion of the benthic fishes study will also be useful for evaluating the aquatic FNRs.

Literature cited

Stagliano, D. M. 2005. Aquatic Community Classification and Ecosystem Diversity. In: Montana's Missouri River Watershed. Report to the Bureau of Land Management. Montana Natural Heritage Program, Helena, Montana. 65 pp. plus appendices. <http://www.mtnhp.org/reports.asp#Ecology>

Comment 7:
The criteria for adding or removing larger ecosystem-based Focal Natural Resources (FNRs) should be discussed.
Basis for Comment:
<p>A critical component of any planning process is to ensure that the framework maintains sufficient flexibility such that new information is easily incorporated into the process—particularly when using an adaptive management approach.</p> <p>The Baseline Assessment Methodology document indicates that FNRs may be added or removed, but the discussion is limited to tributaries and species. Discussion on the criteria and process for adding, deleting, or merging FNRs is absent.</p> <p>Since this project is expected to span 30-50 years (possibly longer), there is an excellent opportunity to incorporate new information into the project. The approach for handling these changes should be discussed early in the process.</p>
Significance – Medium:
<p>Understanding that FNRs can be added or deleted, and the process for modifying FNRs is important for understanding how the project will address new information as it becomes available.</p>
Recommendations for Resolution:
<p>To resolve these concerns, the Baseline Assessment Methodology document would need to be expanded to include:</p> <ol style="list-style-type: none">1. A description of criteria that might be used to determine whether an FNR needs to be added or removed from the project.2. A description of the process that would be used to evaluate whether or not proposed changes to FNRs meet criteria (e.g., evaluation by technical teams).

Draft USACE Evaluator Response (#7):

Concur. During the development of a MRERP adaptive management plan and protocols (slated for 2012–2013), criteria for revising/adding/or deleting FNRs, as well as the timing and frequency of reviews of FNRs and associated current condition assessment data (based on the baseline assessment framework) will be developed. In addition, based on the recommendations provided here, during the planning process the MRERP team intends to have a formal reevaluation of the FNRs after the interaction assessment and after objectives are complete. The criteria for reevaluation will be reviewed with the project team. The MRERP Team welcomes your input on developing criteria.

Recommendations:

#1 – adopt. Criteria for revisions to the FNRs will be developed through the design and development of the adaptive management plan that will be embedded in the final MRERP.

#2 – adopt. A process and schedule for reevaluation (including addition or removal) of the FNRs will be developed as part of the adaptive management plan development. The adaptive management plan will also include a process and schedule for updating data and evaluations embedded in the baseline assessment; revising baseline and situation diagrams; and updating current condition ratings.

Backcheck Recommendation:

Close comment.

Concur. No additional comments.

Comment 8:
The panel recommends that the public scoping meetings be incorporated into the Focal Natural Resources (FNR) and Baseline Assessment Methodology documents.
Basis for Comment:
Because scoping meetings have been conducted, any applicable comments from these meetings should be incorporated into these documents. The panel assumes that these documents were developed as technical support documents for an eventual Environmental Impact Statement (EIS)/Feasibility report.
Significance – Low:
The inclusion of information from the public meetings may provide support for the technical credibility of this document and provide additional value for future applications of this document.
Recommendations for Resolution:
To resolve these concerns, the FNR and Baseline Assessment Methodology documents would need to be expanded to include: <ol style="list-style-type: none"> 1. The FNR document would need a section that mentions the public meetings and what public comments, if any, were incorporated into this document at this point. 2. If the public comments had influence on the Baseline Assessment Methodology document then that should be stated there as well.
Draft USACE Evaluator Response (#8):
<p>Concur. Recommendations: #1 – adopt. During public scoping meetings held in 2009, the public was asked the following:</p> <ul style="list-style-type: none"> • What specific natural resources should be addressed? • What social, economic, and cultural issues should be considered? <p>Public comments were considered in developing the FNR list. The MRERP team will continue to consider public comment throughout the planning process. #2 – adopt. The public did not comment on the baseline assessment methodology.</p>
Backcheck Recommendation:
<p>Close comment. Concur. No additional comments.</p>

<p>Comment 9:</p>
<p>The “coarse filter-fine filter” approach needs to be better described.</p>
<p>Basis for Comment:</p> <p>The description of the coarse filter-fine filter approach is brief and somewhat confusing to those not familiar with the approach. The idea of “filters” insinuates that a large candidate pool of FNRs, ecosystems, et cetera, is exposed to a set of criteria (i.e., filters). Further consideration of an FNR or ecosystem would then be contingent on successfully meeting those criteria (i.e., passage through the filter). For someone unfamiliar with the approach, it appears that the ecosystem-based FNRs were simply identified by experts, discussed, and consensus was reached. Additionally, it appears that coarse and fine filters are nothing more than two different levels of biological organization: coarse filter elements are ecosystems and fine filter elements are species. In contrast, the species-based FNRs appear to have been subjected to different criteria such that a large number of species-based FNRs were winnowed down to a smaller number of FNRs.</p> <p>The following description is provided by The Nature Conservancy (2007), “The coarse filter/fine filter approach is a useful framework for selecting focal conservation targets. Coarse filter targets are those ecological systems or community types or occasionally species that, when conserved, also conserve a larger suite of species within the project area. The species and natural communities that would be conserved by protecting a coarse filter target can be described as nested targets. The fine filter is composed of species and communities that are not well captured by coarse filter targets and require individual attention. These targets may be rare, face unique threats or require unique strategies”</p>
<p>Significance – Low:</p> <p>A clarification of the coarse filter-fine filter approach would provide the reader with a better understanding of how FNRs were selected.</p>
<p>Recommendations for Resolution:</p> <p>To resolve these concerns, the FNR document would need to address the following:</p> <ol style="list-style-type: none"> 1. Additional discussion of the “coarse filter-fine filter” approach and how the technique was ultimately integrated into the process of identifying FNRs. 2. If the concept of coarse and fine filters is not needed, remove the terminology from the document. 3. Provide discussion on how filters would be applied if additional FNRs are incorporated into the project.

Draft USACE Evaluator Response (#9):

Concur. Further description of the coarse filter/fine filter approach would be helpful and can be included in the document.

Recommendations:

#1 – adopt. Definition of the coarse filter/fine filter approach provided in TNC 2007 will be incorporated into the document.

#2 – do not adopt. The concept of coarse and fine filters is needed and will be included in the document.

#3 – adopt. Discussion of the process and methods for incorporating additional FNRs will be included in the document.

References:

CMP (Conservation Measures Partnership). 2007. Open Standards for the Practice of Conservation.

http://www.conservationmeasures.org/CMP/Site_Docs/CMP_Open_Standards_Version_2.0.pdf

Haufler, J. B., C. A. Mehl, and G. J. Roloff. 1996. Using a coarse filter approach with a species assessment for ecosystem management. *Wildl. Soc. Bull.* 24:200-08.

Parrish, J. D., D. P. Braun, R. S. Unnasch. 2003. Are We Conserving What We Say We Are? Measuring Ecological Integrity within Protected Areas. *BioScience* 53: 851–860.

TNC (The Nature Conservancy). 2010. Conservation Action Planning.

http://conserveonline.org/workspaces/cbdgateway/cap/index_html

Backcheck Recommendation:

Close comment.

Concur. Additional explanation and description of the filter approach will enable the reader to better evaluate the process used to select and define FNRs.

The Nature Conservancy. 2007. Conservation Action Planning Handbook.

http://conserveonline.org/workspaces/cbdgateway/cap/practices/index_html, Accessed April 16, 2010, page 17.

Comment 10:
Additional detail on the literature and data sources used to identify the Focal Natural Resources (FNRs) should be provided.
Basis for Comment:
While terrestrial and aquatic ecologists are likely familiar with the data sources associated with their respective disciplines, aquatic ecologists are probably unfamiliar with terrestrial data sources and terrestrial ecologists are likely unfamiliar with aquatic data sources and classification techniques. Non-ecologists are probably unfamiliar with all of the data sources and literature used to justify the development of FNRs. The document lacks adequate descriptions of the literature and data sources used to identify FNRs. For example, the document indicates that the U.S. National Vegetation Classification (USNVC), standards and alliances of the USNVC, plant communities of the Midwest, and plant community classifications in each Missouri River state were used to develop and evaluate potential terrestrial FNRs. With regard to aquatic FNRs, a North American freshwater ecoregional classification, a classification for the Missouri River basin streams and rivers, and fish community database were used to evaluate potential FNRs.
Significance – Low:
Understanding the type of data provided in each data source is necessary to fully evaluate the derivation and adequacy of FNRs.
Recommendations for Resolution:
To resolve these concerns, include a brief description of the different data sources. For example, describing the USNVC and how the technique characterizes vegetation types would provide context for how the data source may have been used to establish FNRs.
Draft USACE Evaluator Response (#10):
Concur. Description of the data sources for non-ecologists would be helpful and can be included in the documentation. Recommendation: adopt. Additional descriptions of the data sources will be provided.
Backcheck Recommendation:
Close comment. Concur. No additional comments.

Comment 11:
The fish assemblage description for the Aquatic Rocky Mountain Transitional Ecosystem should be clarified.
Basis for Comment:
The description for the fish assemblage characteristics of the Aquatic Rocky Mountain Ecosystem is awkward. Specifically, the document states that the Focal Natural Resource (FNR) includes both coldwater and warmwater fishes. The text, as written, leads the reader to believe that there is an equal mixture of both types of fishes. Although a few introduced coolwater species have been illegally introduced to reservoirs within the bounds of the FNR (e.g., walleye in Canyon Ferry Reservoir), the fish assemblage is dominated by coldwater species from Three Forks to Holter Dam.
Significance – Low:
A clarification would provide the reader with a more accurate characterization of the fish assemblage.
Recommendations for Resolution:
To resolve these concerns, the FNR document would need to be expanded to include a statement indicating that the FNR is dominated by coldwater species and that the FNR transitions into a zone dominated by warmwater species.
Draft USACE Evaluator Response (#11):
Concur. Corrections to the fish assemblage descriptions will be made. Recommendation: adopt. Recommended revisions will be included in the FNR document.
Backcheck Recommendation:
Close comment. Concur. No additional comments.

Comment 12:
The description of the Focal Natural Resources (FNRs) should be improved.
Basis for Comment:
<p>The descriptions of the terrestrial FNRs in the MRERP FNR document are not as uniform and complete in terms of content as they should be. For example, the list of Alliances that occur within each FNR is not complete and the description of types is sometime incorrect. Specific comments include:</p> <ul style="list-style-type: none"> • Page 33 – It appears that some words may be missing from the first sentence of the second paragraph starting with, “Group that includes” • Page 39 – The current status refers only to the forested elements within the region but not all of the elements within the FNR are forested. Also, no Alliances are given for this FNR, but Alliances are given for others (but not always comprehensively). • Page 42 – The current status states that the ecosystem is degraded or extirpated but then goes on to state that the bluffs are largely intact; this may result from trying to lump too many elements within one FNR. • Page 45 – The description starting on this page is inaccurate. About half of this FNR bisects the Ozark Border ecoregion, so the bottomland to bluff top section is developed over limestone or dolomite, which is entirely missing from the description. The FNR is not generally underlain by alluvium in any section. Few terraces are part of the FNR (rather glacial till upstream and Ozarks geology downstream are the norm). American basswood is rarely a component of the woodlands (rather they found in “drier” woodlands and forests generally). Few prairies existed in historic times. Grazing (at least by large ungulates) was not generally an important historical disturbance. Fire was important for some but not all of the communities. Finally, examples of the FNR within the area of the Ozarks are common and they are not rare upstream, and these communities are generally in relatively good ecological condition. <p>In addition, the aquatic and terrestrial FNRs circumscribe different reaches of the river and readers cannot easily evaluate how they overlap with each other.</p>
Significance – Low:
The quality of the document would be improved with more accurate and complete descriptions of the FNRs.
Recommendations for Resolution:
<p>To resolve these concerns, the FNR document would need to be expanded to include:</p> <ol style="list-style-type: none"> 1. A tabular list of Alliances or Ecological Systems by geographically-defined FNR, with an indication of abiotic habitat (e.g., river front, levee, terrace, oxbow) and prevalence (e.g., matrix, large patch, small patch, linear) would improve the document. This

<p>assumes that the current terrestrial FNR list is retained.</p> <ol style="list-style-type: none">2. Addressing the changes suggested above on pages 39, 42, and 45 in the MRERP FNR Selection Process and Draft FNRs document would improve overall quality of the document.3. A figure illustrating the overlap among all FNRs would be helpful to the reader.
<p>Draft USACE Evaluator Response (#12):</p> <p>Concur. Detailed lists of alliances included within each FNR can be provided in documents (FNR functional models not included in the review process) that further detail the ecological composition, structure and function of the FNR.</p> <p>Recommendations:</p> <ul style="list-style-type: none">#1 – adopt.#2 – adopt. Refer to USACE Evaluator Response #4.#3 – adopt. Graphics illustrating the longitudinal and lateral distribution of the FNRs have been developed and will be included in future versions of this document.
<p>Backcheck Recommendation:</p> <p>Close comment.</p> <p>Concur. The USACE will provide materials that address issues related to clarifying the documents and better describing the terrestrial FNRs.</p>

Comment 13:
The technical quality of the Baseline Assessment Methodology document could be improved by adding figures from the “MRERP Focal Natural Resources Selection Process” (March 4, 2010) PowerPoint presentation to the documents.
Basis for Comment:
The PowerPoint presentation “Present3_FNRsPlanning_2120.03.03jb-2” contains several images that may make the Baseline Assessment Methodology document easier to understand. For example, slide 5 or slide 9 might be an effective way to illustrate text on pages 1 and 2.
Significance – Low:
The addition of figures would more clearly convey the project background information, and set the technical work into context.
Recommendations for Resolution:
To resolve these concerns, the Baseline Assessment Methodology document would need to be expanded to insert one or more images and adding text that better conveys information to the reader. This will aid in establishing the context for the following information presented in the documents.
Draft USACE Evaluator Response (#13):
Concur. Graphics will be added to the document to improve the technical quality of the material. Recommendation: adopt. Additional graphics and text will be added to better convey information to the reader.
Backcheck Recommendation:
Close comment. Concur. The graphics described will help clarify the documents.

Appendix A: Crosswalk of NatureServe Ecological Systems and MRERP Terrestrial Focal Natural Resources

The identification and delineation of the Focal Natural Resources has, from its initiation, been based on NatureServe classifications. The process started with Ecological Systems and then shifted to Alliances to identify ecological units more specific to the river corridor, both for wide ranging Ecological Systems that only partially overlap with the Missouri River corridor (r.g., Northwestern Great Plains Shrublands) or very broad Ecological Systems where we needed more detailed vegetation units (e.g., South Central Interior Large Floodplain). Alliances were also the units best understood by the technical team and to relate to the ecological literature. The latest synthesis of information in the conceptual ecological models illustrates how the USACE is now integrating both levels of the classification.

Northern Great Plains Riparian Forests and Prairies

- Northwestern Great Plains Riparian
- Northwestern Great Plains Floodplain

Northern Great Plains River Corridor Woodlands, Shrublands and Prairies

- Central Mixed Prairie
- Northwestern Great Plains Mixed-grass Prairie
- Western Great Plains Shortgrass Prairie (not included in the EER list)
- Western Great Plains Tallgrass Prairie (not included in the EER list)
- Western Great Plains Sand Prairie
- Inter-Mountain Basins Big Sagebrush Steppe
- Western Great Plains Open Freshwater Depression Wetland
- Western Great Plains Wooded Draw and Ravine
- Northern Rocky Mountain Montane-Foothill Deciduous Shrubland
- Northwestern Great Plains Shrublands (not included in the EER list)
- Rocky Mountain Lower Montane-Foothill Shrubland (not included in the EER list)
- Northwestern Great Plains – Black Hills Ponderosa Pine Woodland and Savanna (recently added by technical team)
- Western Great Plains Dry Bur Oak Forest and Woodland (not included in the EER list)
- Inter-Mountain Basins Greasewood Flat (only one alliance from this ecosystem type occurs in the Missouri River system; had not included this, but will explore)
- Western Great Plains Badlands (had not included this, but will explore)

These Ecological Systems approach but are further west or southwest, or outside of the river corridor and thus are not included in the Focal Natural Resources. The planning area of this project ends at Three Forks, Montana, where the Missouri River by name ends.

- Inter-Mountain Basins Montane Sagebrush Steppe
- Northern Rocky Mountain Confer Wooded Steppe
- Northern Rocky Mountain Ponderosa Pine Woodland and Savanna
- Northern Rocky Mountain Dry-Mesic Montane Mixed Confer Forest

- Western Great Plains Closed Depression Wetland
- Western Great Plains Depressional Wetland Systems (not in the classification used)
- Western Great Plains Riparian (not in the classification used)

Loess Hills Riparian Forests and Prairies

- Eastern Floodplain Wetland (not included in EER list)
- Eastern Great Plains Wet Meadow, Prairie, and Marsh

Loess Hills River Corridor Forests, Woodlands and Prairies

- Eastern Upland Oak Bluff Forest (not included in EER list, but includes North-Central Interior Maple-Basswood Forest; using more recent Nebraska classification)
- Eastern Dry-Mesic Bur Oak Forest and Woodland (not included in EER list)
- Eastern Mixed Grass Prairie or Loess Hills Mixed Grass Prairie (developed to recognize an unique system in this FNR – really eastern extension of mixed-grass prairie)
- Central Tallgrass Prairie (Mesic Tallgrass Prairie)

Midwestern Riparian and Bottomland Forest Complex

- South-Central Interior Large Floodplain

These Ecological Systems are not included in this Focal Natural Resource because they are distributed north of the river corridor in glaciated regions of the North-Central Midwest.

- North-Central Interior Floodplain
- North-Central Interior Freshwater Marsh

Midwestern River Corridor Forests and Prairies

- Central Tallgrass Prairie (Mesic Tallgrass Prairie)
- Ozark Prairie and Woodland (not included in EER list)
- Central Interior Highlands Calcareous Glade and Barrens (not included in EER list)
- Ozark-Ouachita Dry Oak Woodland (not included in EER list)
- Ozark-Ouachita Dry-Mesic Oak Woodland (not included in EER list)
- Ozark-Ouachita Mesic Hardwood Forest (not included in EER list)
- Ozark-Ouachita Shortleaf Pine-Bluestem Woodland (not included in EER list)
- Ozark-Ouachita Shortleaf Pine-Oak Forest and Woodland (not included in EER list)