APPROVED MINUTES

23rd Meeting of the NECC
September 29-30,1998
Holiday Inn – Moline, IL

by

Brad Thompson
(CEMVR-PM-MW)

Navigation Environmental Coordination Committee (NECC)

DRAFT September 29-30, 1998
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1. Welcome and Approval of Minutes of Last Meeting

The twenty-third meeting of the NECC was called to order by Ken Barr. An attendance list is provided as ***Attachment 1***. The minutes of the June 17, 1998 meeting were approved with the following revisions:

Dave Tipple stated that on page 1 under Dudley Hanson's comments the 3rd sentence should be revised to reflect that the directive issued to Dudley was to verify the quality of key study products and minimize potential impacts to the study schedule. Gretchen Benjamin clarified that on page 6 she was asking about perennial and annual emergent plants, not submerged plants. She also stated that page 7 should be spell checked.

One addition to the agenda was that Jon Duyvejonck requested that the committee revisit the issue of significance in regards to potential impacts.

2. Dave Tipple - *Study Status*

Dave Tipple updated the NECC members on the study status, since the last NECC meeting. The economic review is essentially complete and involved the following items:

- Traffic Forecast - determined that the forecast and upper and lower bounds are reasonable.
- Relative Modal Cost Shift Report - not enough evidence exists to conclude that the rate structure for rail is likely to change. This generally indicates that the planning assumption, that no change in alternative mode rates is likely, is an appropriate assumption. However, there are uncertainties in looking into a 50-year planning horizon.
- Spatial Equilibrium Model - determined that the model is adequate and it compares favorably with the Ohio River System - Tow Cost Model, when similar inputs are used. Corps believes it has validated the economic model. Both models are sensitive to the demand curves and the traffic projection information.
- Demand Curve - the model is sensitive to this input and little information is available. As a result an expert elicitation was held for grain. Following a recent briefing, the study team was directed by MG Fuhrman, the Director of Civil Works, to further evaluate demand curves for grain and other commodities.

Questions/Comments:

Jon Duyvejonck: Did I hear correctly that the Corps is not changing its economic models?

Dave Tipple: The Corps is comfortable with the economic model, but will continue to look at the inputs of traffic levels and demand curves.

Tom Pullen: Bottom line on the economic model is that, both the UMR-IWW Study and Ohio River Study models give essentially the same answers. The real issue is what inputs are used.

Steve Bartell: Will the projections vary from the earlier preliminary handoff last spring, and if so how?

Dave Tipple: They are likely to vary somewhat, but we do not know how they will vary at this time.

Ken Barr: We will not get the same numbers again. In addition to closer evaluations of traffic and demand curves, some other inputs such as the small-scale measures have changed as well.

Brad Thompson: Since I briefed this committee roughly a year ago on the small-scale measures that initially appeared to be the best, further coordination with the Nav Industry, U.S. DOT Maritime Administration, and Coast Guard has lead to some revisions. These revisions, which are primarily related to addressing safety concerns, have eliminated remote remake and resulted in requirements for larger more expensive switching boats to safely perform various operations. This new information has lead to the re-evaluation of which measures would be recommended. It now appears that the measures that save the most time involve a permanent guidewall extension in combination with either powered kevels or switchboats to extract cuts.

Steve Bartell: How will the scenarios be developed (monte carlo simulation, picking scenarios, etc.)?

Dave Tipple: This has not been finalized, but is likely to involve evaluating various scenarios.

Mark Beorkrem: Who is leading the economics now that Don Sweeney is not involved?

Dave Tipple: Don Sweeney is still involved in the economic study. However, as Dudley mentioned at the last meeting some changes in management have occurred.

Rick Nelson: When will the Corps share more information about the study schedule?

Dave Tipple: The study team has worked on revising the schedule, but nothing has been finalized or approved to date. However, it is likely that we will have some change in the overall schedule dates and completion.

Mark Beorkrem: When is the next MIST meeting?

Ken Barr: No MIST meetings are currently scheduled.

3. Ken Barr - *Independent Technical Review*

Ken Barr stated that roughly 40 environmental reports are in various stages of review. Many of these were reviewed by the NECC months ago, and are now finishing Independent Technical Review (ITR) and final revisions. Ken stated that he hopes to have more reports available in the near future. Ken stated that the cumulative impacts report is in a final draft and is out for independent technical review. However, completing the ecological portion has presented some difficulties, due to the fact that we had some trouble in getting all dredging data in a common format. This dredge information should be available in the near future, and once available the ecological portion should be finished in a few weeks. The Ecological portion will then be ITRed and made available to the NECC hopefully in the next 6 months. Ken stated that Scott Whitney had provided a listing of the products and an estimated completion date at the last meeting. Ken stated that an updated version of this summary sheet would be provided as an attachment to the minutes (***Attachment 2***).

Questions/Comments:

Jon Duyvejonck: Will the reports be provided with all ITR comments and responses?

Ken Barr: This is an issue that the Corps needs to finalize. We can provide all comments and responses to the NECC members comments, but I need to check with Office of Counsel to determine our ability to release the ITR comments. The ITR comments are basically internal quality control, since the ITR members are Corps agents or staff.

4. Jon Duyvejonck - *Coordination Act Report (CAR)*

Jon stated that he has been working to update the 1984 natural resources inventory into a common format for the entire river. The U.S. FWS contracted with the EMTC to develop this map in GIS format. The FWS conducted a series of workshops with the field biologists from the local areas to meet with them and review the maps and locate important resources. This information will then be compiled and shared with the Corps for use in evaluating potential impacts to the resources. Jon provided sample maps for committee member review. He explained that there are attribute tables that go with each map. Summaries of this data will go in the CAR, but the data base will not, since some of the data is not releasable to the general public (e.g. endangered species).

Ken asked about the distribution of the database. Jon stated that the current plan is to make the database for each respective state available to that state for its use. They are also looking into making some of this data available to the public. Jon stated that they are still looking at adding data to the maps (e.g. location data on Habitat Rehabilitation and Enhancement Projects, HREP, constructed under the Environmental Management Program, EMP).

Questions/Comments:

Tom Pullen stated that he has concerns with releasing this information to the public, due to the large amount of sensitive data it contains.

Jon Duyvejonck replied that he believes the data can be shared in a consolidated format.

Gretchen Benjamin emphasized that many of the biologists who provided information were very concerned with this, and that they were reassured that the information would be protected.

Ken Barr stated that he would like to involve the Corps legal staff to verify the Corps ability to protect any sensitive information.

Dan Wilcox stated that a similar mapping effort is underway as part of the Habitat Needs Assessment. In addition, he cautioned that some of the 1989 data is not accurate, especially where changes in the land use/land covers have occurred related to recent HREP projects.

Jon Duyvejonck stated that in making some of the information available, he could follow an approach similar to EPA. Instead of providing detailed data on a point location basis, he would instead look into having the maps show symbols, which indicate resources of concern, but not state the specific location or resources.

Mark Beorkrem added that it would be good to carefully evaluate what sensitive information might get pulled into the public forum as part of a NEPA lawsuit.

Ken Barr stated that he would work with Office of Counsel on this issue.

Rick Nelson added that he would like to see the states, Corps, and FWS meet to address these issues.

Jon Duyvejonck stated that the time frame for a draft on the whole system is not until around the end of the calendar year. They are having some trouble with getting adequate staff resources to complete the effort. Ken recommended that any release be provided along with Arc Explorer (free shareware that allows querying of data).

Jon Duyvejonck, replying to a question about the symbols shown for restoration opportunities, stated these were seen as potential mitigation sites.

Ken Barr added that this was information the Corps had wanted. He also asked if this was something that resource agencies along the Ohio River were doing.

Debbie Mignogno stated that the Ohio River study is working on such a list of restoration opportunities.

Jon Duyvejonck discussed that other work going on includes fish passage and exotic species. These will be developed as separate reports, but included in the CAR.

5. Jon Duyvejonck - *Significance*

Jon stated that he wanted to resurface the issue of significance, since there is some potential to discuss it directly or indirectly during the second day of the meeting. He reminded the committee that at one time there had been discussions that in order to reduce potential biases, the issue of how to decide significance should be determined before the results are discussed. Jon asked if others were interested in doing this. Jon stated that one caveat that will remain regardless of any significance decision is that there is still concern that the information used in the models may be inadequate (based on limited data).

Ken Barr asked if Jon had any recommendations on a potential process for this effort. Jon asked if the Corps could provide a sheet summarizing all the outputs of the models. Ken stated that Steve Bartell's presentation should help considerably in understanding the outputs. However, the initial output will only show the mean values, while the actual model runs will include distributions. Jon stated that to adequately determine significance the NECC may need to separately obtain experts on all the various species and groups of organisms to review and discuss the significance of potential impacts to the particular organisms. Dan Wilcox stated the in order to complete this effort it will still be necessary to screen out any non-impacted areas and resources.

Al Fenedick highlighted that cumulative impact assessment is an area of critical importance to the U.S.EPA. The first step is to establish the potential for impacts related to a project, then significance comes into play as the potential for multiplying factors is evaluated. This also requires a look back at the baseline. Ken stated that the NECC would have a lot of information on this from the Cumulative Impacts Assessment.

Dan Wilcox stated that working to understand impacts on populations has been done for power plant entrainment. This is something we could look at as a possible example.

6. Rich Fristik - *Mitigation Planning*

Rich Fristik stated that his presentation on mitigation planning builds on the past discussions of the NECC as well as summarizes appropriate information from the National Environmental Policy Act (NEPA), Corps Planning Guidance, and U.S. FWS Policy. The NEPA-Council on Environmental Quality (CEQ) Implementation Regulations state that alternative evaluation and identification of impacts should include appropriate mitigation measures. This mitigation follows a hierarchy starting with avoiding impacts when possible to compensating for losses as a last option. Corps guidance

provides detailed information on alternative analysis, incremental cost analysis, definition of mitigation planning objectives, cost sharing, and monitoring. FWS mitigation policy focuses on mitigation of losses of habitat value and seeks to minimize project impacts, rather than reversing them. It also states that the service will make resource category determinations early in the mitigation planning process.

In terms of the Navigation Study the impact to plants, fish, mussels, and bank erosion will be evaluated in terms of determining resource significance. Rich identified a number of potential mitigation approaches for each of these resources.

Rich Fristik highlighted the potential future steps, summarized below, and closed by stating that the NECC will likely need to continue revisiting and working on this issue.

- Determination of impacts based on predicted traffic levels
- Determination of significance
- Collaborative effort to define mitigation planning goals
- Compilation of design criteria and costing of potential measures
- Importance of developing a maintenance and monitoring program, and concurrently, building in adaptive planning.

Copies of Rich's slides are provided as ***Attachment 3***.

Questions/Comments:

Ken Barr asked if the resources under consideration in the study had been placed into the FWS categories and what those categories mean.

Rick Nelson answered that they have not been placed in categories. The four categories range from category one (greatest concern) to category four (lower concern). In general impacts to category one resources require direct replacement (1 for 1).

Ken Barr stated that it seems like the study is nearing the point in the process of determining significance and mitigation where we need to start defining how the impacted species fall in these 4 categories.

Tom Pullen asked USFWS to provide a list of species with the various resource categories assigned.

Dan Wilcox added that this characterization could be done by guilds.

Jon Duyvejonck stated that a short cut would be to see what resources have impacts and just do those, rather than having to do it for all species when only some are impacted.

Tom Pullen mentioned innovative methods for mitigation should be considered and evaluated.

Ken Barr added that for mitigation planning the NECC needs to have a large box of potential tools/ways to mitigate any impacts.

Mark Beorkrem asked Dave Tipple whether the study had considered scheduling programs to evaluate moving commodities during slack periods.

Dave Tipple responded that various scheduling programs were considered, but they were determined to not provide significant system efficiencies to warrant their implementation. This is primarily due to the fact that currently lockmasters group boats into N-up/N-down groups, which provides some significant benefits to the system and reduces the benefits of alternative scheduling.

Rick Nelson stated that U.S.FWS efforts to work with navigation industry has resulted in the identification of some measures with both ecological and navigation industry benefits (e.g. mooring cells, etc.).

Jon Duyvejonck asked about the potential to involve experts in the determination of significance. This might also allow for more objectivity in the determination of significance.

Ken Barr stated that if the NECC would like to follow this approach he would like the committee members to provide names and get state input on this idea.

Gretchen Benjamin cautioned that experts may really need more data than just on one species (e.g. walleye impacts cannot be based simply on larval entrainment data, but also need to consider plant impacts, habitat changes, etc.)

Bill Bertrand stated that he could not think of any single experts to do this type of evaluation for the State of Illinois.

Bernie Schonhoff expressed the same concern as Gretchen, that any expert brought in to discuss a single or group of species needs to understand the whole of the study and navigation impacts.

Steve Bartell stated that determining significance and mitigation is hard for a number of groups. EPA is also working on this issue. One idea would be to get in contact with some of the people EPA has commissioned to draft a paper on significance. Steve offered to provide a copy of the significance issue papers for distribution to the NECC. This document is provided with the minutes as **Attachment 4**.

Tom Pullen stated that the Corps could put together a list of potential experts and requests that the FWS put together a table summarizing the resource categories.

Dan Wilcox pointed out that one way to gather expert opinions would be to host facilitated workshops.

Ken Barr asked how the NECC committee would be involved in the workshop process.

Tom Pullen recommended that some or all of the NECC members be involved. This would also help with continuity.

Ken Barr would like the NECC members to provide potential names and bring them tomorrow. This would allow Ken time to consider the formation of an expert panel to work these issues. (It was subsequently decided that the list could be provided shortly following the meeting and the issues of how and whether to use the expert panels would be finalized at a later date.)

Scott Estergard asked how an expert panel and the input they provide would fit with the NECC group.

Tom Pullen stated that the NECC needs to agree that an expert panel would provide the main input on significance if this approach is taken.

Decision: U.S. FWS said that they would provide USACE with Resource Categories as defined for potential direct effects by habitats of organisms or guilds (for example forage fish species habitat within the main channel).

7. Scott Estergard - *State Listed Species*

The Corps has received data from the State Natural Heritage Databases on the locations of state listed species and their habitat. Scott stated that this database is extensive and involves many areas unlikely to be effected by the Navigation study. As a result efforts have been targeted at limiting the areas and species evaluated to just those with the potential to be impacted. Screening efforts to date have involved limiting the analysis to just species occurring in the flood plain. Efforts are continuing to further narrow the list down to those most likely to be impacted. For terrestrial species, efforts are focused on the areas around the lock sites and at sites identified as actively eroding. Even with the initial screening efforts to date there are still several hundred species of plants and animals on the lists, so further evaluation is needed.

Questions/Comments:

Bill Bertrand: Are any impacts to state listed species considered significant?

Ken Barr: The Corps is assuming that will be the case, based on the comments by the NECC committee over the last few meetings.

8. Dan Wilcox and Ken Barr - *Status of Reports*

Plants - Dan Wilcox stated that the plant flume study report is done and available for the NECC members. A draft report summarizing the risk assessment modeling for plants has been completed and is out for technical review. Following this review, the report will be made available to the NECC, hopefully this will occur in the next couple months. A summary of the results from that effort will be presented at this meeting. The effect of sedimentation on plants (Robert Doyle's work) study report, which was used as input into the risk assessment modeling, is almost ready for final release.

Recreational Boating - The traffic projection report is being revised, based on comments received. Following these revisions, it will be ready for publication. These projections will be used in the next steps to assess the physical effects of recreational craft. Much of the recreational craft study effort is on hold until more of the commercial analysis is done, since many of the same WES staff members are involved in both efforts.

Cumulative Impacts - Still working on getting a draft of the ecological portion out. Kevin Landwehr has done a great job assembling the dredging data for use by the study team. This will allow for the completion of the dredge materials portion of the report. This report will then go out for ITR. Following that review, it will be available to the NECC.

Status of Hydraulic and Sediment Studies – (Ken Barr)

Hydraulic classification – information is under final review.

HIVEL Model - the users manual is complete and out for review. This is the model that shows effects of tow passage on water surface elevation and velocity change.

SED-3D - The documentation is complete and out for review.

Sediment resuspension model - the report documenting this model and has not been received, the Corps hopes to get this report in the next few weeks. This will also look at 25, 50, 75, and 100 percent traffic increases. However, it does not account for removal of sediments due to natural processes.

Sediment resuspension in the near shore zone – Nana Purchure's report is nearly complete.

9. Steve Bartell - *Biological Response Modeling and Risk Assessment (Fish)*

Ken Barr introduced Steve Bartell's fish modeling presentation by stating that the traffic levels evaluated were not based on actual economic model outputs, since this information has not been completed. Instead, the model testing was conducted evaluating 1992 traffic and hypothetical traffic

increases of 25, 50, 75, and 100 percent over that level. This was done to exercise the model and provide an indication of the range of potential outcomes.

Steve Bartell began by reviewing that ecological risk assessment is the process to standardize or formalize the analysis of risk. Steves' slides are provided as ***Attachment 5***. The U.S. EPA supports risk assessment applications in NEPA analyses and in 1998 published new guidelines. Risk assessment accounts for variability in both the exposure and effects associated with ecological impacts. This process allows for a characterization of the risk and assists in moving towards management alternatives.

Ecological risk methods used to estimate risks of larval fish entrainment included evaluating the exposure to entrainment (tow configuration, direction, vessel speed, propeller type, stage height). In all 108 potential combinations of towboat characteristics were included. In addition, assessing exposure requires an understanding of existing and future traffic. Understanding the effects of different types of towboats and the relative numbers of these boats allows for the development of an exposure profile (calculation of the pool volume entrained in each month).

Questions/Comments:

Bernie Schonhoff asked does the vessel draft affect entrainment?

Steve Bartell replied that the draft does not directly get used in the entrainment equation. Draft is primarily used for the physical effect components, sediment resuspension, drawdown, etc. It only affects the entrainment study to the extent that vessels with different draft (loaded/unloaded) change the total volume entrained.

The ecological effects looks at the conditional entrainment and mortality, which is the fraction of initial population killed by entrainment, assuming no other causes of mortality. This includes a number of assumptions related to the accuracy of data used to develop parameters, instantaneous redistribution, and uniformity of natural mortality . The model evaluated the mortality for larval, young-of-year, and adult with a range of values from of 0 (no impacts) to 1 (100% mortality). The model does have some bias towards overestimating impacts (e.g. does not account for volume of water in backwaters and side channel areas). The losses in larval fish are then developed into equivalent adult losses, recruitment foregone (adult losses including factors for survival and production), and production foregone (biomass). Production foregone may be good for estimating impacts on forage fishes. Steve emphasized that all these models are sensitive to a number of factors.

In addition, to estimating entrainment volumes the other key piece of information is the larval fish densities. Sources of density data included new information collected for this study, power plant data, Leslie Holland-Bartel efforts, etc. Steve highlighted that in many cases the larval fish density information for a particular species varies from study to study. If there were multiple values, the highest level was used in an effort to not understate the impacts. Tom Pullen asked how much these larval densities vary over time and location. Steve stated that they are extremely variable. Based on available data, Steve and Kym developed densities for each species, each pool, and each month. They where able to gather some data on the density for 24 of the 30 species being evaluated. Species they could not find information on included paddlefish, pallid sturgeon, lake sturgeon, shovelnose sturgeon, blue catfish, or flathead catfish. A location factor was also included with the larval densities with a range from 0 (not present in the main channel) to 1 (distributed equally in the navigation channel as to the rest of the main channel/channel boarder).

Risk characterization is the end result of this analysis. From the exposure and potential for entrainment and mortality, Steve developed estimates of larval fish entrained. The initial results indicate that tow related entrainment in the baseline condition (1992 data) results in 1 to 16 percent mortality of larval fish. However, the more important numbers for this study are the incremental impacts as traffic increases. Due to the nature of the equations, the impacts are essentially linear. As more tows use the system, the impacts grow linearly. This is based on the fact that study data to date show relatively quick mixing of water in the channel following a tow passage. This results in each tow traveling through water with essentially the same larval density. Results of mixing studies show that tows would have to travel roughly 1 km behind one another to entrain unmixed water.

Questions/Comments:

Jon Duyvejonck asked if the impacts to adults shown were for the whole project, one year, etc.

Steve Bartell stated that the tables showed impacts for just the month shown.

Steve explained that once larval fish mortality was calculated, formulas where used to estimate equivalent adults lost and recruitment forgone. These calculate similar information. The equivalent adult loss formula looks primarily at how the loss of larval fish to entrainment mortality reduces the fish reaching a certain age (young of the year). The recruitment foregone model looks at the losses of fish more at the size and age the fish would be recruited into the fishery, and also incorporates growth rates. Steve stated that there is some concern that these two models make a similar type of projection, but provide very different outputs. Steve stated that this is something the reviewers will be evaluating. However, both models have been used in estimating how losses of larval fish effect the adult populations.

Questions/Comments:

Tom Pullen stated that it would help others to understand the results, if they were shown in some graphic form, etc.

Al Fenedick asked if Steve had taken this model and looked at what the ongoing impacts would be from taking the impacts from each year and applying them to the next year.

Steve Bartell stated that this was considered, but can not be easily done. Many of the calculations require the assumption that the population is at equilibrium. In addition, due to data limitations, especially in regards to populations, further extrapolation would probabally not be meaningful.

Ken Barr added it might help if he restated the context for this work. Initially, we thought even what we have done was beyond the state-of-the-art. So just getting to this point represents a great accomplishment; based on this its likely that there simply is not enough information to push this analysis further.

Al Fenedick emphasized that for him the key to the impact assessment is that the study needs to look at the potential cumulative impacts. He will push this point very strongly on behalf of the EPA.

Dan Wilcox stated that one thing that also needs to be better understood and accounted for is compensatory reserve. Only 1 in 10,000 larval on average survive to adulthood. Based on this it is very hard to say what level of impacts is likely to result in changes in populations. There is some chance that small percentage changes in larval entrainment would not result in any noticeable change in populations (much smaller that the estimates we have prepared). We simply do not have the data on populations, recruitment, and densities that would allow us to understand year to year changes.

Ken Barr stated that the Corps would look at the impacts in combination with the information from the cumulative impacts assessment. We will look at what is going on in the pools that may also impact these species. For example, if plan form changes are occurring which may also impact a species, the study team would look at these areas as possible restoration opportunities (backwater dredging, island creation, etc.).

Bill Bertrand stated that the recruitment forgone misses some data in that it only shows the loss of the adult. In actuality it will result in further losses by not being available to reproduce, etc.

Ken Barr added that the mitigation strategy the Corps would look into would compensate for significant losses by the year they occur.

Mark Beorkrem asked how much time and cost would be involved in determining the population of channel catfish in pool 4.

Dan Wilcox stated that this is one area that we have relatively good data, based on monitoring by Central States Power and Minnesota DNR. However, it is extremely costly to survey populations.

Steve highlighted the following conclusions that came out of the initial analysis:

- Entrainment mortality of 1-10 percent of total larval production may occur over the spawning season with a doubling of traffic.
- There is generally a linear relationship between traffic increase and impacts
- Considerable species specific differences in impacts exist.
- Further evaluations will occur once the actual without project traffic data becomes available.

There are a considerable number of uncertainties. These include the traffic projections, estimates of tow speed, larval fish abundance and distribution, and fish model assumptions and limitations (population at equilibrium, sensitivity to parameters, survival probabilities, only a first severity of losses, not a long term indicator). However, rather than looking at a single value, for the actual model runs Steve will develop distributions for a number of the factors. This can be looked at in addition to the expected values.

Steve also highlighted that the model is sensitive to a number of inputs. The sensitivity analysis he conducted shows that the greatest variability in estimates is associated with the estimate of larval fish density (44%), entrainment rate (22.5%,), vessel speed, etc. Dan Wilcox stated that even more sampling may not reduce the variability. This is due to the fact that in actuality the densities are highly variable. This appears to be the case, so even 100 % sampling year after year would have great variability.

Steve stated the preliminary results of the analysis have been documented and put into report format for ITR. Once this effort is finalized Steve and Kym will have approximately a month to respond to the comments. Shortly after they complete the responses/revisions to the report, it will be released to the NECC members.

Steve stated that he is looking into putting the data that come out of this bio-response models into GIS coverages. This would allow the information to be summarized by pool, river reach, etc. In addition, the initial runs looked at worst case scenarios. Steve would now like to go back and look at the best estimates. Steve would also like to look at the information on pool volume and larval densities. There might be opportunities to improve the accuracy, since larval density in most cases is very patchy and not uniform as the model indicates.

10. Kym Campbell - *Plant Study*

Ken Barr reviewed that like the fish study, early on in the Navigation Study we did not know if it would be possible to develop a bio-response model to evaluate plant impacts. While considerable limitations remain, a model has been developed. Like the fish model testing, the plant model was run analyzing 1992 traffic and hypothetical traffic increases of 25, 50, 75, and 100 percent over that level. This was done to exercise the model and provide an indication of the range of potential outcomes.

Kym Campbell explained that the plant model effort looked at two primary areas of impact, physical breakage and decreased growth and reproduction. Kyms' slides are provided as ***Attachment 6***. She explained that to determine the potential for plant breakage a rules based approach was used. It identifies areas of potential impact using two main rules: current velocities of ≥0.75 m/s and waves ≥0.2 m (NOTE wave height only matters if current velocity is ≥0.75 m/s). If either one of these factors is present in an area there is the potential for plant breakage or uprooting. An additional rule is that plants generally do not occur in depths of 1.5 meters or greater, so these areas were not evaluated. The analysis set out to determine the effects of commercial traffic on submerged aquatic plants.

The evaluation looked at 3 stage levels (high, medium, and low) and 3 sailing lines (left or the sailing line, center or the sailing line, and right of sailing line). Results of the initial screening analysis for physical effects indicated that less than 1.5 percent of the cells with depth of less than or equal to 1.5 meters (high stage) exceeded the physical screening criteria that would cause breakage in submerged aquatic plants.

Ken stated that one caveat to the results shown for pool 8 was that the data for that pool was provided in feet, but was used as meters. This will be corrected and rerun, once the actual traffic data is available. [Subsequent to the meeting it was also discovered that some of the input data into the NAVEFF model, which provides input on main channel sediment resuspension (fall times) for the plant model, had not been updated with the latest information. It is not anticipated that this will effect plant modeling for pools 4 and 13. Updated values will be used for mussel modeling and other plant work.]

The other effect evaluated was the potential for reduced photosynthesis due to the decrease in available underwater light. These effects could be in the form of decreased plant growth and reproduction resulting from vessel passage or due to increased suspended sediments. This analysis used the output of the NAVEFF and NAVSED models to look at sediment resuspension related to tow passage. The plant growth models allow for a comparison between the baseline conditions and increases related to additional vessel passage. The main output to the plant growth model is the light extinction coefficient (reduced light reaching plants that therefore reduces photosynthesis), due to resuspension associated with tows. The increase in the light extinction coefficient means that less light penetrates into the water column (ie. becomes "extinct" faster.

Data on weather conditions (light period, cloudiness, etc.) serves as input to the plant growth models . A time series for each pool, each traffic scenario, and each month was developed (this filtered out night time hours). As traffic increases the period of time between tows (period without sediment resuspension decreases), until the point where it is cut in half with a 100% increase in traffic. Just like the fish study the analysis looked at the potential 108 different tow types. The study also had to evaluate the sediment resuspension time series of hourly sediment concentrations. These concentrations are generally higher in the lower pools. During vessel passage, sediment concentrations would exhibit spikes of many times the ambient level.

The results indicate light extinction increases of 1 to 7percent in pool 4 and 1.5 to 14 percent increase in pool 13, depending on the traffic level increase and month. These increases are not linear.

Questions/Comments:

Mark Beorkrem asked why one of the numbers was not direct in relationship between tow increases and light extinction.

Ken Barr said the mitigation process includes avoid-minimize-compensate in kind, compensate out of kind.

Steve Bartell stated that his is just part of the variability in the models. The model randomly selects the inter-arrival times, time of vessels, and type of vessels. So it is possible given the random selection that even if tows increase slightly in number the light extinction may not be increased directly or at all. However, in general as traffic increases light extinction would increase.

For testing of the plant growth models, the cells with highest impact were selected (left of the main sailing line). For wild celery the total biomass change as a result of the potential traffic increases was limited in pool 4 and increased to have the greatest reductions in pool 13. Biomass changes ranges from relatively no change in pool 4 with a 25% increase in traffic to up to approximately a 30% decrease in biomass in pool 13 with a 100 percent increase in traffic. However, the model simulation did not indicate any effect on wild celery tuber production.

Questions/Comments:

Dan Wilcox stated that input indicated that reduced light results in reduced biomass, but plants put effort into tuber growth.

Gretchen Benjamin questioned this finding, based on the assumption that over time this could weaken the plants to non-sustainable level.

Steve Bartell stated that this would be something that will be looked into in greater detail.

Kym stated that sago pondweed biomass changes were less severe and ranged from roughly 1 percent in Pool 4 for a 25 percent traffic increase to 8 percent for pool 13 with a 100 percent traffic increase. Pool 8 showed much higher biomass reductions of over 20 percent with a 100 percent traffic increase, but the results are suspect due to the fact that the data for pool 8 was used as meters, but was actually provided in feet. Sago pondweed had some reduction in tuber production anticipated at 1 to 3 percent (Pool 4 and 13 data).

A list of the parameters used in the plant growth models is included in the report along with the sources of the data. Uncertainties include the traffic projections, ambient suspended sediment concentrations, and moving from a change in suspended sediment concentrations to light extinction

The report is currently out for ITR. Following this review and the resolution and incorporation of comments it will be provided to the NECC.

Questions/Comments:

Ken Barr emphasized that the data on impacts shown associated with reduced photosynthesis was only for the most susceptible cells. Many areas with plants would have much less to no impacts.

Gretchen Benjamin asked if the cells being evaluated have plants or just could have plants.

Kym Campbell stated that the evaluation just looks at where they could occur, potential areas for plants. Many areas shown as having potential for impacts, may not currently have any plants at all.

11. Steve Bartell - *Status of Mussel Study*

Steve Bartell summarized that the other model that is being looked at is the mussel bioenergenics model. This model is being put together at the University of Illinois. Current efforts are to convert the model to a different computer language (FORTRAN) to allow full integration with other model outputs. The model will be used to assess the risk for approximately 10 mussel beds. They are also working to gather data to test the outputs. This model uses an approach similar to the plant bio-response model.

12. Agency Reports:

Mark Beorkrem said he keeps hearing the Corps use the terms compensation and mitigation, but sees that the charge to the study is to avoid impacts.

Ken Barr said the mitigation process includes avoid-minimize, compensate in-kind, and compensate out-of-kind.

Bernie Schonhoff asked if he could get the minutes in an electronic format. He also asked about:

- Agency briefing for the states have been discussed, when can these occur.
- He still has big concerns with the multiplication of errors as we move out from an uncertain starting point.
- What is being evaluated with the zebra mussels?
- Do we want comments on the reports distributed at the meetings. After looking at them, he did not feel all the comments he knew about were addressed.

Ken Barr stated he would like to provide the minutes in a non-modifiable form, but will look into options for distribution.

Dave Tipple added that there is still the desire to meet with the state agencies to bring them up to speed on the Navigation study. The study team will know more in the next few weeks in regards to study schedule.

Ken Barr stated that Steve Bartell's efforts to put the study in a risk based frame work and allow us to understand what factors are driving the analysis. This is similar to what we are struggling with on the economics; we can't lose site of the uncertainties.

The zebra mussel issue is being researched. We are looking at a multi-disciplinary study sponsored by WES and conducted through EMTC. In addition, Scott Whitney is working on a brief report as part of the cumulative impacts study to evaluate zebra mussels. He could come and update the group on this at the next meeting.

Bill Bertrand asked if the effects of O&M or ability to use O&M to reduce the potential impacts of zebra mussels was being considered.

The different zebra mussel initiatives were discussed and it was pointed out that the Nav. Study is most focussed on traffic related distribution.

Tom Pullen said he appreciated the progress being made, but the challenge remains to work on determining significance.

Ken Barr emphasized that the information we are getting is helping to show what types of impacts that are likely. Using this information, we need to develop avoid, minimize, and mitigation measures.

Jon Duyvejonck said that the Fish and Wildlife Service believes the Corps may need to address increased traffic associated with Mel Price lock as part of the without project.

Tom Pullen questioned whether the level of traffic increases anticipated in the forecasts, when the project was planned, have actually occurred.

Steve Johnson reminded the Corps study team that there will likely be a need to brief new state participants, since likely to have a new Governors Liaison Committee following the election of new Governors in some states this fall..

Bernie Schonhoff stated that in regards to the plant study, the Corps many need to look more closely at the potential impacts of increased traffic, especially in pool 13, where plants may be at the limits of there sustainability.

Dan Wilcox stated that people need to continue to think about compensatory reserve as it relates to the fish study.

13. Next Meeting -

The next meeting was tentatively set for 11-12 January in the Quad Cities.

AT

TACHMENT 1

Attendence List

NECC Meeting 17 June 1998
Plaza One Hotel, Rock Island, IL

Name	Affiliation	Address	Phone	E-mail
Ken Barr	CEMVR-PD-E	P.O. Box 2004, Clock Tower Bldg. Rock Island, IL 61204-2004	(309) 794-5349	Kenneth.A.Barr@usace.army.mil
Steve Bartell	Cadmus Group	136 Mitchell Rd. Oak Ridge, TN 37830	(423) 425-0401	sbartell@cadmusgroup.com
Gretchen Benjamin	WI DNR	3550 Mormon Coulee Rd. La Crosse, WI 54601	(608) 785-9982	benjag@dnr.state.wi.us
Mark Beorkrem	MRBA	807 E. 1st Street Galesburg, IL 61401	(309) 343-7021	mbeorkrem@hotmail.com
Bill Bertrand	IL DNR	P.O. Box 149, 2106 Southeast Third Aledo, IL 61231	(309) 582-5611	dnrbrp@netins.net
Ken Brummett	MO DNR	Box 428 Hannibal, MO 63401	(573) 248-2530	brummk@mail.conservation.state.mo.us
Kym Campbell	SENES	102 Donner Drive Oak Ridge, TN 37830	(423) 483-6111	kym@senes.com
Jon Duyvejonck	USFWS	4469 48th Ave. Ct. Rock Island, IL 61201	(309) 793-5800	Jon_Duyvejonck@fws.gov
Scott Estergard	CEMVR-PM-R	P.O. Box 2004, Clock Tower Bldg. Rock Island, IL 61204-2004	(309) 794-5697	Scott.K.Estergard@usace.army.mil
Al Fenedick	USEPA	77 West Jackson Boulevard Chicago, IL 60604	(312) 886-6872	Fenedick.Al@usepamail.epa.gov
Rich Fristik	CEMVR-PM-R	P.O. Box 2004, Clock Tower Bldg. Rock Island, IL 61204-2004	(309) 794-5308	Richard.Fristik@usace.army.mil
Steve Johnson	MN DNR	500 Lafayette Road St. Paul, MN 55155-4032	(612) 296-4802	Steve.Johnson@dnr.state.mn.us
Kevin Landwehr	CEMVR-ED-HH	P.O. Box 2004, Clock Tower Bldg. Rock Island, IL 61204-2004	(309) 794-5578	Kevin.J.Landwehr@usace.army.mil
Deb Mignogno	USFWS	Cookeville, TN	(931) 528-6481	
Rick Nelson	USFWS	4469 48th Ave. Ct. Rock Island, IL 61201	(309) 793-5800	Rick_Nelson@fws.gov
Tom Pullen	CEMVD	P.O. Box 80 Vicksburg, MS 39181-0080	(601) 634-5851	Tom.M.Pullen@usace.army.mil
Don Swensson	QCCA	2621 4th Ave. Rock Island, IL 61201	(309) 788-5912	QCCA@aol.com
Bernard Schonoff	IA DNR	3390 Hwy. 22 Muscatine, IA 52761	(319) 263-5062	fishiowa@muscanet.com
Brad Thompson	CEMVR-PM-MW	P.O. Box 2004, Clock Tower Bldg.	(309) 794-5256	Bradley.E.Thompson@usace.army.mil

		Rock Island, IL 61204-2004		
Dave Tipple	CEMVR-PM-MW	P.O. Box 2004, Clock Tower Bldg. Rock Island, IL 61204-2004	(309) 794-5399	David.A.Tipple@usace.army.mil
Lauri Walters	USFWS	4469 48th Ave. Ct. Rock Island, IL 61201	(309) 793-5800	Lauri_Walters@fws.gov
Dan Wilcox	CEMVP-PE-M	190 Fifth Street East St. Paul, MN 55101-1638	(612) 290-5276	Daniel.B.Wilcox@usace.army.mil

ATTACHMENT 2

Miss-IWW Navigation Study Technical Reports

Indicates ITR commitment has been satisfied

Study Leader	Report No.	TITLE	Primary Author	ITR Reviewers		NECC Review
KEEVIN	1	*Computer model for transport of larvae between barge tows in rivers.*	HOLLEY	MAYNORD	SCHNEIDER	YES
	2	*Effects of propeller entrainment on riverine ichthyoplankton.*	KILLGORE	CADA	VANWINKLE	YES
	3	*Inflow zone and discharge through propeller jets.*	MAYNORD	MARTIN	GARCIA	YES
	4	*Shear stress on the hull of shallow draft barges.*	MAYNORD	MARTIN	GARCIA	YES
	5	*Hull shear mortality of eggs and larval fish.*	MAYNORD	CADA	GARCIA	YES
	6	*Physiological effects on freshwater mussels (Family: Unionidae) of intermittent exposure to physical effects of navigation traffic.*	PAYNE	CUMMINGS	WATTERS	YES
				DOWNING		
	7	*Determination of the fate of fish displaced from low-velocity habitats at low temperatures.*	SHEEHAN	THOMERSON	SCHAEFFER	YES
	8	*Determination of the tolerance of fish in low-velocity habitats to hydraulic disturbance at low temperatures.*	SHEEHAN	THOMERSON	SCHAEFFER	YES
	9	*Effects of pressure changes induced by commercial navigation traffic on mortality of fish early life stages.*	KEEVIN	CADA	MAYNORD	YES
	10	*Stranding potential of young fishes.*	ADAMS	CADA	THOMERSON	YES
	11	*Mortality of fish early life stages resulting from hull shear associated with passage of commercial navigation traffic.*	KEEVIN	CADA	VANWINKLE	YES
	12	*Abundance of fishes in the navigation channels of the Mississippi and Illinois Rivers, and estimation of entrainment mortality caused by towboats*	GUTREUTER	SCHAEFFER	VANWINKLE	NO
				JENSEN		
	13	*Mortality of animals due to highway and railroad collisions*	SCHAEFFER	GEHRT		YES
	14	*Effects of commercial Traffic on Freshwater Mussels in the Upper Mississippi River System. (STELLA MODEL)*	SCHAEFFER	Will be Incorporated into Rpt. 18		YES
	15	*Water velocities behind wing dams (Flume Study)*	MAYNORD	Awaiting Revised Report		YES
	16	*Water velocities behind wing dams (Field Study)*	MAYNORD	Study not Started		NO
	16B	*Ecological Models and Approach to Risk Assessment*	BARTELL	JENSEN	CADA	NO
				KIMBER	CARPENTER	
				WHITNEY	WATTERS	
	17	*Ecological risk assessment of the effects of the incremental increases of commercial navigation traffic on larval fish entrainment*	BARTELL	JENSEN	CADA	NO
	18	*Ecological risk assessment of the effects of the incremental increases of commercial navigation traffic on mussels*	BARTELL	Awaiting Report		NO
P O	19	*Definitions, Boundary Delineations, and Measurements of Attributes for the Hydraulic Classification of Aquatic Areas*	NICKELS	POKREFKE	GAUGUSH	NO
	20	*Application of UNET Model to Vessel Drawdown in Backwaters of Navigation Channels*	MAYNORD	MARTIN	SOONG	YES
	21	*Comparison of NAVEFF Model to Field Return Velocity and Drawdown Data*	MAYNORD	MARTIN	SOONG	YES
	22	*Hydraulic Classification Analysis (Appendix to Classification Definitions Report)*	POKREFKE	BIEDENHARN	GAUGUSH	YES
	23	*Users Manual for Application of HIVEL Hydrodynamic Model on the Upper Mississippi River*	STOCKSTILL	BERNARD	HUDDLESTON	NO
	24	*A two-dimensional flow model for vessel-generated currents*	STOCKSTILL	BERNARD	HUDDLESTON	YES
	25	*Entrainment and Transport of Sediments by Towboats in the Upper Mississippi River and Illinois Waterway, Numerical Model Study*	COPELAND	HOLLEY	MACARTHUR	NO

	26	*Wave-Induced Sediment Resuspension Near the Shorelines of Upper Mississippi River Study*	**PARCHURE**	**MEHTA**	**GAILANI**	**NO**
	27	*Wave height predictive techniques for commercial tows on the UMRS*	**MARTIN**	**MAYNORD**	**KIMBER**	**YES**
	28	*Data collection methodology for bathymetry and sediment data used in navigation feasibility studies*	**ROGALA**	**AIDALA**	**GAUGUSH**	**YES**
	28B	*Physical Forces Near Commercial Tows*	**MAYNORD**	**POKREFKE**	**GARCIA**	
WILCOX	**29**	*Effects of Sediment Resuspension and Deposition on Plant Growth and Reproduction*	**DOYLE**	**KIMBER**	**BEST**	**YES**
	30	*Effects of Recreational Boating: Traffic Allocation and Forecasting Model*	**CARLSON**	**WARD**	**CARR**	**NO**
	31	*Ecological risk assessment of the effects of the incremental increase of commercial navigation traffic on submerged aquatic plants.*	**BARTELL**	**KIMBER**	**CARPENTER**	**NO**
BECKERT	**32**	*Cumulative Impacts*	**WEST**	**POKREFKE** **BAYLEY**	**BARKO** **THORTON**	**NO**
COMPLETED REPORTS	**C1**	*Flume study investigations of the direct impacts of navigation-generated waves on submersed aquatic macrophytes in the Upper Miss. River.*	**STEWART**	**MADSEN**	**SKOGERBOE**	**YES**
	C2	*Rates of net fine sediment accumulation in selected backwater types of Pool 8, Upper Mississippi River.*	**ROGALA**	**SOONG**		**YES**
	C3	*Physical Forces Study, Kampsville, Illinois Waterway*	**MAYNORD**	NA - Data Report		**YES**
	C4	*Prediction of vessel-generated waves with reference to vessels common to the Upper Miss. River System.*	**SORENSEN**	NA - Literature Review		**YES**
	C5	*Physical Forces Study, Clarks Ferry, Upper Mississippi River*	**MAYNORD**	NA - Data Report		**YES**
	C6	*Upper Mississippi River navigation and sedimentation field data collection summary report.*	**PRATT**	NA - Data Report		**YES**
	C7	*Site Specific Habitat Assessment*	**FRISTIK**	**BURKS**	**SCHROEDER**	**YES**
	C8	*Bank Erosion Field Survey Report of the Upper Mississippi River and Illinois Waterway*	**ISWS/IIHR**	**HAGERTY**	**MELLEMA**	**YES**
	C9	*Identification of Potential Commercial Navigation Related Bank Erosion Sites*	**LANDWEHR**	**CHAMBERLAIN**	**MAYNORD**	**YES**

Attachment 3

Mitigation Planning

23st Meeting of the NECC
September 29-30,1998

by

Rich Fristik
US Army Corps of Engineers – Rock Island District
Environmental Analysis Branch

Attachment 4

Ecological Risk Assessment Issue Papers

23st Meeting of the NECC
September 29-30,1998

Issue Paper

Prepared Assessment Forum
U.S. Environmental Protection Agency

Distributed by

Steve Bartell
The Cadmus Group, Inc.

Attachment 5

Biological Response Modeling and Risk Assessment (Fish)

23st Meeting of the NECC
September 29-30,1998

Presented by

Steve Bartell
The Cadmus Group, Inc.

Attachment 6

Ecological Risk Assessment – Effects of Commercial Navigation on Submerged Aquatic Plants

23st Meeting of the NECC
September 29-30,1998

Presented by

Kym Campbell
SENES Oak Ridge, Inc.