Current and Future Studies on the Character and Performance of Mitigation

Questions and Answers

Questions about the Fennessy Study

1. Mike Rolband, Wetlands Studies and Solutions: (To Fennessy) Did you look at Carbon/Nitrogen ratio between sites, were they similar?
    - Siobhan Fennessy, Kenyon College: Yes, we looked at the Carbon/Nitrogen ratio. They were different among sites, more carbon per nitrogen in the mitigation sites than the natural sites. Nitrogen is huge problem, seems to be really limiting what that system can do in term so of developing into a fully functional ecosystem.
    - Rolband Response: We are studying that at some of our sites. Finding a similar trend as in Fennessy study, but seeing a slight upward trend. It has been suggested that if sites have the same carbon/nitrogen ratio then theoretically over time mitigation site could look like natural site, but if the ratio is not right then it may never be right.
    - Siobhan Fennessy, Kenyon College: That may be true. But, the means are also important, because if there are not enough nutrients available things can't grow as well etc.

2. Dan Spethmann, Temple-Inland: (To Fennessy) In your study it looks like you presume that Nitrogen is the limiting factor. Did you consider P?
    - Siobhan Fennessy, Kenyon College: Yes, and based on the current data it looks like nitrogen is the limiting factor. But, the new study will look more specifically at determining the limiting nutrient, and what can be done to help.

3. Mike Rolband, Wetlands Studies and Solutions: (To Fennessy) did you look at adding organics to soil in the mitigation sites?
    - Siobhan Fennessy, Kenyon College: No, but that is something that needs more work. Need to look at how can you jump start system by increasing organic matter. For example, a lot of the bank sites were in agricultural field (although they were wetlands at some point), but agriculture uses so much carbon that they are so low they might not be able to recover.
    - Rolband Response: Some states, like New Jersey, require adding organics (recommended in VA as well).

4. Dan Spethmann, Temple-Inland: (To Fennessy) is there actually the hydrology in these locations to support the development of hydro soils if they didn't exist?
    - Siobhan Fennessy, Kenyon College: The sites are ponded, so theoretically they should respond.
    - Steve Martin, Corps: But, you indicated that these sites did not the same levels of soil organic level to fuel microbial driven aneorobiosis.
    - Siobhan Fennessy, Kenyon College: yes.

5. John Ryan, Land and Water Resources, Inc.: (To Fennessy) From the pictures of your study sites it looked that the sites didn't have enough top soil. It seems unwise to create wetlands without adequate soil. For creation sites, we have found that if you bring soil down to hydric soil layer and then put adequate amount of good organic soil back in, then you find similar vegetation as sites with original hydric soils in the same hydrology. The key is to have enough, decent top soil, in the correct hydrological regime. Creation isn't always bad.

6. Ken Murin, PA DEP: (To Fennessy) In regards to ecological success, species diversity that you addressed, is there any indication of the microtopography or variation in how the wetland is created?
    - Siobhan Fennessy, Kenyon College: This was not looked at systematically, but there is some intuition about it. A lot of mitigation sites have lower microtopography. For example, one of the sites they studied had attempted to create heterogeneity in the site by digging a trench.

7. Steve Martin, Corps: (To Fennessy) Can you characterize the age of the communities in reference areas as opposed to the age of the communities in the mitigation sites?
    - Siobhan Fennessy, Kenyon College: This is hard to know, many are relatively stable, post glacial, been around for a long time, some are riverine, which are less stable.
    - Steve Martin, Corps: Do they have mineral soils or organics?
    - Siobhan Fennessy, Kenyon College: The soils are a mix, mostly mineral.

8. George Kelly, Environmental Bank and Exchange: (To Fennessy) Is there any effort to compare impacted wetlands to restored wetlands?
    - Siobhan Fennessy, Kenyon College: That would be ideal, but we don't have those data.

OH Banking Study and proposed performance standards

9. George Howard, Restoration Systems: (To Fennessy) The OH study on mitigation banks is very validating to the preference of restoration over creation, because developer sponsored, postage stamp, creation sites tend to fail. That is why they want to professionalize the banking industry. But the concern is that poor bank sites described in these studies can be considered in press and public as representative of the industry.
    - Siobhan Fennessy, Kenyon College: Should point out that the sites in this study were a mix of different methods (creation, restoration).
    - Howard Response: Why did you choose this mix of types of sites?
    - Siobhan Fennessy, Kenyon College: The mix reflects the types of methods in OH. And the banks are mostly restoration projects and they don't look substantially different from the individual sites.
    - Howard Response: Who owns the bank sites?

- Siobhan Fennessy, Kenyon College: DOT, some of them were the developer doing it themselves.
- Howard Response: These types of bank owners may not really be that concerned with the success of the bank.
- Siobhan Fennessy, Kenyon College: However, these bank owners don't think they failed. They see the sites as a success in terms of meeting the performance criteria.

10. George Howard, Restoration Systems: Why is the word restored used for creation sites? This is an important distinction for wetland science.
    - Siobhan Fennessy, Kenyon College: The sites in the study were a mix of created and restored sites. The goal of the study was to evaluate the performance on the ground, and created and restored were tracked. Yes restored do better than created, but, surprisingly, not significantly better. So wanted to see as a unit how is mitigation performing in the state of OH.
    - George Howard, Restoration Systems: Was there any difference between professional/entrepreneurial mitigation sites and the others?
    - Siobhan Fennessy, Kenyon College: See the study, which has a detailed description of all the banks. The home builders, who have a non-for-profit arm that do the mitigation, consider themselves professionals.

11. George Howard, Restoration Systems: (To Fennessy) Were the sites in your or the OH study on-site or off-site,
    - Siobhan Fennessy, Kenyon College: It was a mix. Most of the sites were off-site.

12. Julie Sibbing, NWF: (To Fennessy) In your study there were mostly creation sites, some restoration, some on-site, off-sites. Then in OH EPA's study, these sites were compared to banks which all or most restoration. So the study compared the worst of creation sites to mitigation banks in OH, and the banks did not perform significantly better.
    - Siobhan Fennessy, Kenyon College: Yes, the banks did better than the creation sites in the vegetation data, but not in the amphibian data.
    - George Howard, Restoration Systems: But it is really important to identify the banker and make distinction between bank types in these studies.

13. Morgan Robertson, EPA: (To Fennessy) Curious about the institution setting for banks in OH, what kind of performance criteria do they generally have to meet?
    - Siobhan Fennessy, Kenyon College: Up to now it has been the standards, vegetation cover, Hydrology, non-native cover. None of new biological criteria or soils performance criteria that were proposed in the presentation were in place these banks were started.
    - Robertson Response: Did the performance criteria seem adequate from a biological standpoint, and are they meeting them?
        - Yes, they are meeting these criteria. So on paper they look successful. These criteria are not particularly ecologically relevant

or meaningful in terms of evaluating how they look relative to natural systems. That is why they developed these new performance standards

14. Michael Thabault, US FWS: (To Fennessy) Created/restored wetlands seem to be not as good from an ecological standpoint as natural wetlands, so setting the performance standards at the 25 percentile (between the natural mean and the mitigation mean for a certain criteria), as suggested in the presentation, seems to be not much above the way the mitigation is performing. This goal seems like it is a bit arbitrary. Are there tech limitations to getting above the 25 percentile?
    - Siobhan Fennessy, Kenyon College: Yes, it is a pretty conservative goal.
    - Steve Martin, Corps: There is actually some research on percent soil organic matter, soil organic carbon sites in creation sites in Virginia. (Dr. Lee Daniels at VA Tech). Looks like 5% nutrient load seems to be make or break mark.
    - Siobhan Fennessy, Kenyon College: So there is some literature to base the performance standard on, and anything like this is compromise in what seems attainable and what is ideal. The 25 percentile seemed like something that is attainable. There is one real mitigation/restoration site sits on the 25 percentile line, and that is a good site.
    - Thabault Response: So the percentile might match up with a real data point.
    - Siobhan Fennessy, Kenyon College: Yes

Questions about the Corps Study

15. Dennis Durbin, FHA: (to Martin) Were all types of mitigation at around the 90 percentile in terms of ecological performance, how did you initially select those?
    - Steve Martin, Corps: Yes, we asked districts to report what performance standards they required.
    - Dennis Durbin, FHA: But, they evaluate specific mitigation sites and came up with 90% that meet the requirements.
    - Steve Martin, Corps: We asked what performance standards are you using to evaluate mitigation sites, banks, ILFs. And the data you see is the combined national data.

16. George Kelly, Environmental Bank and Exchange: (To Martin), Do you know the ratio of districts that gave estimates for data versus those that gave hard data for use in the IWR study?
    - Steve Martin, Corps: It was probably 50/50. For some districts it was clear the data were estimated because the survey response came back in a few days. For other districts it was clear the data were specific because they gave specific numbers and/or supporting datasets.
    - Jessica Wilkinson, ELI: Example of whether you are measuring mitigation as a percentage of total mitigation required or measuring mitigation as a

percentage of total impacts. Steve Martin of the Norfolk district was able to provide these data.

17. Rich Mogensen, EarthMark's Mid-Atlantic Mitigation, LLC: (To Martin), Your snapshot in time of the use of mitigation type was from 2003, but you studied other years. Do you see trend towards more use of mitigation banks between 2003 and 2006, or any changes?
    - Steve Martin, Corps: The reported number of banks was from 2005, but usage of mitigation types was 2003. Any trend from 2003 back was derived from other datasets (ELI's data, IWR publications, thesis publications).
    - Jessica Wilkinson, ELI: The use of mitigation type changes over time. The amount of permittee responsible mitigation has decreased over time. The only differences between the new IWR and ELI studies was that there was a little more attribute to ILF in ELI's slightly more current study.
    - Steve Martin, Corps: The differences between IWR and ELI studies were not that substantial. There are regional variations in use of mitigation type.
    - Bob Brumbaugh, Corps: These differences could be due to the questionable definitions of some banks. And these studies asked the district to self-define mitigation banks.