Developing Synoptic Human Stressors Indices for Assessing the Ecological Integrity of Freshwater Ecosystems

2nd Regional Oversight Committee Meeting
St. Joseph, Missouri
August 10, 2006

Meeting Minutes

Gust Annis (MoRAP) called the meeting to order at 10:00 am and covered some of the meeting logistics. Attendees then went around the room and introduced themselves.

Gust then began his presentation covering the background of the project, the need/approach for this project, the datasets that are now in place, and what we hope to achieve at the oversight committee meeting. Scott Sowa (MoRAP) talked about empirical vs. relative assessments.

General Comments and Discussion

Walt Foster of the Environmental Protection Agency asked about how we are going to deal with ephemeral channels. Gust explained that we may want to address this and that the perennial/intermittent attribute in the NHD might help in this regard. Walt then asked if we had looked at the NHD Plus. Gust indicated we had not and asked Walt where we could get a copy. Walt has the data and could provide it if desired.

Scott Sowa mentioned that he was at a meeting where a presentation was given on the NHD Plus which revealed that the network, although improved from the original NHD, still contains loops and braids. These issues cause a problem for our algorithms.

Randy Sarver for the Missouri Department of Natural Resources asked if we were aware of the work by John Norman and Dave Theobald at Colorado State University. Gust and Scott indicated that they have obtained the software and training materials in addition to speaking with John Norman.

Gust then moved on to the second part of the presentation giving an overview of what we've accomplished since the first meeting. This included an overview of the data we have collected and generated as well as the methods and GIS tools we have explored.

Randy Sarver asked whether the discharge data was NPDES data. It is. Gust and Scott asked if those data contained attributes for the design flow, and Walt Foster replied that they should contain the permitted flow, but that it does not tell you what the actual flow is.

Walt Foster mentioned that the Bureau of Mines has a dataset for all the active mines in the nation.

Several people noticed gaps in the mines data, particularly for Kansas and Chris Schmitt from the United States Geological Survey indicated that he could get us data for the SE portion of that state.

Gust asked what we should do to address data inconsistencies among states. Walt Foster suggested that the inconsistencies may hinder any assessment so you may have to do the project state by state.

Gust talked about the problem with impervious surface data from the NLCD, and Walt Foster mentioned that he has a better impervious surface layer for the region.

Gust asked Randy Sarver about the gaps in the landfill data for Missouri. Randy thought the dataset may be incomplete.

Eliodora Chamberlain from the Environmental Protection Agency asked about what we are trying to quantify with the major impoundments layer and Gust and Scott explained that we will likely quantify distance downstream and upstream from a reservoir for each stream reach. Matt Combes from the Missouri Department of Conservation asked if we were going to quantify flow alterations. Scott Sowa indicated that would be a huge project in and of itself, therefore we would not be able to do this.

Matt Combes indicated that he would provide us with MDC recreation areas for Missouri. Walt Foster also has a managed area dataset for all four regions. Matt Combes said we should talk to Craig Scroggins about the dataset.

Randy Sarver asked whether recreational use is really a stressor. Everyone agreed that it is in some instances (e.g., horse trails) and not in others.

Tom Wilton from the Iowa Department of Natural Resources mentioned that he thinks Iowa has a new recreational lands dataset.

Gust complimented Iowa for their GIS data delivery site on the Internet.

Eliodora Chamberlain asked how closely road density is correlated with percent impervious surface. Gust and Scott talked about the fact that they are highly correlated in most instances, but that there are geographic anomalies where there are high road densities in rural areas.

Walt Foster mentioned that we have to be careful when using TRI and RCRIS data since they overlap/duplicate.

Gust then talked about Agricultural Chemical and livestock data from the Ag Census and asked the group how or if we should use these county-based data. Gust indicated that we might be able to multiply these values by the percent of cropland in the segment shed. Chris Schmitt agreed and provided an example of how it was used for Atrazine across the nation at a coarser level. Walt Foster then mentioned that these data are based on sales. Walt Foster mentioned that he has wet deposition data for the region, based on actual measurements from 200 stations across the region and he could get us these data.

Gust then discussed some of the tools that might be used for distance weighting.

- He discussed the FLoWS toolset and its current limitations. The main limitation is that the current algorithms won't directly address our needs, but that these might be modified to meet our needs.
- Gust then discussed other potential GIS tools and their limitations

Walt Foster felt that we should probably calculate riparian conditions locally and in the watershed for each stream reach. Scott Sowa indicated that we would, but Walt added that we may want to use this riparian data as a weighting factor.

Gust then went onto what we want to accomplish today.

- Review web survey
- Ranking/weighting stressors
- Discuss some data issues
- Tools and methods
- Obtaining monitoring data (fish and macroinvertebrates) for the possible empirical component of the project

Discussion commenced on the web survey that included discussion on weighting
The "Web Survey" was designed to have committee members rank a list of aquatic stressors, developed at the first meeting, according to their impact on each of the five principle ecological effects (physical habitat, water quality, flow regime, energy/nutrient dynamics, biotic interactions). Meeting participants received the survey results that had a mean and median score from the respondents. Discussion commenced on the best way to rank or weight the stressors.

Chris Schmitt suggested we look at the standard error. This would give insight into whether there was consensus or whether the participants were sharply divided.

Tom Wilton (IDNR) and Clay Pierce from the Iowa Cooperative Fish & Wildlife Research Unit noted that the survey results will, in part, reflect what people were thinking about and their respective areas of expertise.

Tom Wilton inquired whether we were going to create individual Human Stressor Indices (HSI's) for each principal ecological effect or whether we were going to combine them. Gust indicated that we could probably do both. Tom thought that this might be best. Clay Pierce thought that by weighting individual stressors we may be

losing information about the ones weighted the least. Essentially, the high weighted stressors may drown out the ones weighted less.

Several people were wondering if it may be best to just use the top five rated stressors. Walt Foster also thought that this may be best. However, after further discussion Walt decided that it would be best to use them all.
Randy Sarver and Chris Schmitt indicated that any reasonable ranking method may be fine and that the raw data are the most important thing. Any rankings could be altered in the future if desired. Tom Wilton felt that ranking assumes a "normal distribution". Discussion continued on this topic. Chris Schmitt suggested we look at a cumulative frequency distribution.

Weighting Discussion
There was no consensus on how to do the weighting, although three potential methods were suggested:

- Use mode
- Use actual rankings
- Use "top 5" and multiply by some factor

Most people agreed that we should include all factors in order to recognize all the potential threats within. Chris Schmitt made the point that we shouldn't worry about the details of the weighting, because the tool is more important than the actual indices created, provided the users recognize the caveats and assumptions. For normalizing the data we may want to rank values within a stressor based on each records position on the cumulative frequency distribution.

There was a long discussion on how to account for channelized streams
The point was brought up by Gust that we do not have a good data layer for channelization. Different ways of getting at this were discussed none of which offered a perfect solution. Walt Foster indicated that the NHD Plus might have better attributes for channels/ditches than the old NHD has.

Steve Schainost from Nebraska Game and Parks Commission said that he has a table for Nebraska that lists streams that have been channelized, but that the specific portions of those streams can not be identified.

Scott Sowa stated that we should probably not use channelization because of the lack of consistent data. Many agreed, but others did not since it came out as the most important factor in terms of influence on physical habitat (from the Web Survey). Walt Foster and others thought that we should really use something for channelization because it was ranked so high by the web survey participants especially according to Physical habitat. Meeting participants thought we should try to use all three data sources, NHD, NWI, straightness index to get the best channelized streams layer possible. We just need to indicate what we did, then discuss limitations of the data in the project metadata and report.

Randy Sarver wondered how we could account for primary vs. secondary affects. Many agreed that primary vs. secondary affects probably won't be able to be accounted for.

Discussion turned to some data issues. Tom Wilton wondered if we could modify row crop calculations by slope. Scott and Gust stated that they have done this kind of thing in the past for other projects. We may want to only calculate mean slope for row crop land in each segment shed. Scott indicated that there are other issues like soil type (erosivity) to also consider. This kind of information is available in STATSGO soils; we could not use SSURGO because of the large area and the size of the datasets.

Randy Sarver thought that whatever we do to just document why we chose to do it that way. Some things will not be technically feasible, therefore just state this.

Gust suggested that we run a bunch of metrics and then be ready to review them at the next meeting, since we are having difficulty discussing the details of how to quantify some of these threats. The devils in the details.

Tom Wilton indicated that he would like to see an improvement in how we quantify animal impacts; what is possible with the county data. Tom felt that sometimes animal distributions beyond CAFO's are worse than the CAFO's in terms of their impacts on aquatics.

Discussion turned to how/where we could obtain monitoring data for a possible empirical component (fish and macro invertebrate data)

- Go to Central Plains Center for Bioassessment to get the Region 7 EMAP data.
- Wadeable Streams Assessment (WSA) data from the Corvallis EPA Office of Research and Development lab. Susan Holdsworth is a possible contact for this data.
- Tom Wilton indicated that we may want to use the existing data as a verification of our metric and do this state by state to avoid dealing with trying to calibrate these data across states.
- Chris Schmitt added that we may want to look at contaminant levels in fish in relation to some of the metrics you are calculating; but this data is spotty.
- Matt Combes indicated that there is also bed sediment metals and contaminants data in the WSA database.
- Scott Sowa asked everyone if they would send him or Gust emails with instructions on how to get some of these data.

Closing comments

Gust and Scott indicated that they would send out the meeting minutes as soon as they were compiled and synthesized. The meeting minutes and presentation will be

made available through the project web site and participants will receive an email when things were posted. Everyone was thanked for their time and participation. The meeting was called to a close at 3:00 pm.