Developing Synoptic Human Stressor Indicators for Assessing the Ecological Integrity of Freshwater Ecosystems

1st Regional Oversight Committee Meeting

Iowa/Nebraska Subcommittee
Meeting Notes

Gust Annis (MoRAP) called the meeting to order at 9:00 am. He went over the meeting agenda and covered some of the meeting logistics. Everyone attending the meeting then took some time to introduce themselves.

Gust and Scott Sowa (MoRAP) then collaboratively gave a presentation that covered the background of the project, the goal and objectives, the ideal scenario for quantifying the ecological effects of human-induced stressors, what they believed was achievable given the current state of data and technology, what the overall role of the regional oversight committee was, and what they hoped would be accomplished at today's meeting.

General Comments on the objectives and proposed end products of the project

Clay Pierce of the Iowa Coop Fish & Wildlife Research Unit and Alan Kolok from the University of Nebraska, Omaha asked what geographic units were used in the for generating the human stressor index for the Missouri Aquatic GAP Project and how they were defined.

Then Tom Isenhart from Iowa State University asked if MoRAP was planning on using a 150 ft. buffer for quantifying threats/stressors within the riparian zone. Scott Sowa said they can use any buffer we want and added that they may want to stagger the buffer width with stream size.

TomWilton from the Iowa Department of Natural Resources added that we have to recognize that many of the geospatial data MoRAP is proposing to use have limitations, especially with regard to their ability to quantify local effects. Ken Bazata from Nebraska DEQ agreed, but said this is a universal problem with all the data we have to deal with.

Clay Pierce asked if using something like an IBI, which measures resource health, somewhat circular when you're trying to empirically define human threats?
Alan Kolok asked if MoRAP was essentially freezing temporal variation? Scott Sowa and Gust Annis said yes, that accounting for temporal variations in human disturbance and ecosystem responses is not possible at this point, but that we should not simply ignore this fact and that this project will not address all issues related to accurately quantifying human threats/stressors, but they believe that it is an enormous step in the right direction.

Tom Wilton asked if there is any flexibility in using regionally specific data on stressors that are available for one region. Scott Sowa and Gust Annis replied that they envision calculating some of these data for these regions, but they will not be included in the regionwide threat/stressor index, because that would require too many qualifications on the resulting index/database. Scott Sowa also pointed out the technical and logistical challenges MoRAP faces with this project, namely time and money.

After the general comments on the project objectives and the proposed products the meeting went into a working session with the initial objectives of;

1. Identifying/producing a list of the principal human threats/stressors that potentially affect the ecological integrity of freshwater ecosystems within EPA Region 7,
2. Identifying potential data sources or ways of quantifying each threat/stressor within a GIS, and
3. Identifying potential contacts for the geospatial data needed to quantify each threat/stressor.

Identifying Principal Threats, Means of Quantification, and Data Contacts

Scott and Gust provided the committee with a list of human threats/stressors that was identified by Missouri/Kansas subcommittee at the meeting held in Kansas City, KS the previous day. All of the committee members agreed this list would serve as a useful starting point.

Stormwater Systems:
Clay Pierce asked if they would be able to look at miles of street served by stormwater systems. Ken Bazata mentioned that this type of data may not be attainable due to homeland security issues. Scott Sowa added that you may be getting this information with other measures. Tom Wilton recognized that it would be nice to have this type of data, but that it would require a huge data collection effort.

Toxic Release
Kyle Hoagland from the Water Center-University of Nebraska-Lincoln was not aware of the TRI so Scott and Gust took a moment to explain it. The committee agreed that the TRI dataset within EPA Basins would be an appropriate starting point for quantifying this potential stressor.

Salt Scars
Ken Bazata and Dave Schumacher from the Nebraska DEQ said this issue was very localized in Nebraska in the Southeast and it would be hard to get any spatial data. Most salt mines are highly localized and have since been closed for economic reasons.

Oil and Gas Wells
Kyle Hoagland mentioned the Conservation survey division of the University of Nebraska-School of Natural Resources should have spatial data for Oil and Gas Wells in NE.

Hazardous Waste Haulers and Handlers:
Ken Bazata and Dave Schumacher suggested the Nebraska DEQ waste division as a possible source, naming Dave Haldeman as a contact. TomWilton in Iowa DNR and Gail George in the GIS section of the Environmental Services Divison of Iowa DNR were also named as potential data contacts. Scott Sowa noted that just because they're hauling doesn't mean it's having an effect. Kyle Hoagland and TomWilton suggested that this category should include Agricultural Coops.

NPDES
The EPA will have a separate database from the states, said Tom Wilton. The good thing about Iowa's database is that the data has a point for the outfall of the discharge, not just the facility. In Nebraska the contact would be Steve Goans, said Ken Bazata

Scott mentioned that we had talked about the fact that there are several unpermitted discharges. TomWilton said we should try to account for unsewered communities (septic systems, lagoons) and Dennis Heitman would be a Nebraska contact for Ag National Pollutant Discharge Elimination System sites. For Iowa a contact might be Kathryn Clark for any Animal Facility discharges. Also, Iowa is mapping manure application fields in a GIS.

Ken Bazata mentioned they were getting into information privacy issues for parcel specific data.

Underground Injection Controls
Ken Bazata said underground injection controls are mapped the same as NPDES in Nebraska. These are shallow injections of waste materials, such as sludge injections, he said. And, it depends upon the type of waste as to where and how it is injected, for example, does it or does it not contain metals?

Onsite Wastewater Treatment Sites
Ken Bazata named Steve Goans as the contact for Nebraska, and TomWilton said the Iowa contact would be Brent Parker in the water quality bureau.

Military Sites
Ken Bazata said Bill Gidley would be the Nebraska contact.
The group asked if this mainly pertained to contaminants? Scott Sowa and Gust Annis replied that yes, it did.

Potential New Categories
Kyle Hoagland suggested former grain storage facilities. Dave Schumacher added railroad yards and Scott Sowa added rail lines. Tom Wilton thought that perhaps state Departments of Transportation could help with these data.

Landfills
In Nebraska the contact will be Bill Gidley and in Iowa the contact is Gail George.

Airports
Most will have a discharge permit, so we may need to look at overlap with other coverages (e.g., NPDES), suggested Tom Wilton.

Road Salt Applications
Gust Annis explained that in the last meeting they talked about how this would vary by state, county, and local govt. Kyle Hoagland said in Nebraska you should contact the state department of roads.

Dispersal Barriers
Steve Schainost from the Nebraska Game and Parks Commission said there are lots of culverts and low-head dams in Nebraska but no data documenting their locations.
Kyle Hoagland suggested they should have data on dams, but Steve Schainost specified only on those that pose a potential hazard to human safety and property.

TomWilton and Clay Pierce stated that Iowa has a coverage of all the smaller impoundments. Clay Pierce went on to say the coverage also has other attributes like age. And they have data on grade stabilization structures. Tom Wilton can go to Iowa's state geospatial warehouse to get this. There may be some gaps in the data and the more recent structures are being built to not act as dispersal barriers. Hungry Canyon Alliance should have data, particularly for those constructed after 1993. Tom Isenhart, Golden Hills RC&D is another potential data source.

Water Withdrawls
Steve Schainost and Ken Bazata said all withdrawls are permitted, but they were not sure if the data is digital. They said Nebraska DNR would be the contact.
The problem is that not all permitted withdrawls document the amount of water that is actually used, said Scott Sowa. Steve Schainost was not sure how groundwater withdrawls are treated. In Iowa, Gail George would be the data contact, and these data should include all ground and surface water withdrawls

Ranging livestock
Tom Wilton asked if we could somehow remove the number of livestock that occur in CAFOs, which are captured in a separate database, from the county level livestock numbers data and then apportion the remainder to the percentage of pasture in the county? Scott and Gust stated that this issue was discussed at the previous meeting and that they would be looking into it.

Kyle Hoagland asked if our inability to accurately quantify livestock density is an issue of not being able to obtain the raw data or is it more related to how the data is compiled; Scott Sowa and Gust Annis were not sure.

Channelization
Gust Annis said that this is something we've struggled with and explained our past efforts to account for this and the general difficulties. Clay Pierce mentioned that they had had a previous project in which they needed this data. They had found that the COE had the data but they were unable to obtain the data from them. Tom Isenhart said a publication by Buckley in Iowa 1977 has all of the publicly funded project data in paper format (large streams).

Clay Pierce said their work in Wisconsin had found that channelization itself (yes vs. no) was important in determining local riverine biological assemblages, but also that the age of channelization was important.

Tom Wilton suggested that we may be able to compare stream channel distance vs. midpoint valley distance. Tom Isenhart said the COE will only have data for efforts they permitted or funded, but nothing on work done before 404 permits or small efforts. Scott talked about the problem with the age of NHD linework they are using, which was generated from aerials photos taken in the 60's, 70's, and 80's, in most instances.

Another new Threat
Tom Isenhart addressed artificial drainage, and said there are approximately 6 million acres in drainage districts mainly in Nebraska. Iowa, DNR has some info on this. States that this practice alters the variable source for the streams by removing detention storage. Kyle Hoagland added short circuits BMPs and Gust Annis mentioned that the effects are somewhat analogous to effects of impervious surface.

Tom Wilton thought there was no real data for this, and suggested an alternative might be to calculate the distance of the stream channel to row crop, assume those close to row crop have higher probability of having tile drains. But no one knew how to capture this. Tom Isenhart explained that what they have done is looked at soil class as a surrogate. For example: for this land to support row-crop with these poorly drained soils would require tile lines. Tom Isenhart said he would provide us with the attributes they are using to identify areas with artificial drainage.

Upland Mines
Scott Sowa and Gust Annis summarized what was discussed in the MO/KS meeting. Kyle Hoagland noted that one of the two uranium mines in the US is in Nebraska. Then there was discussion on underground vs. surface mining, but no real consensus on which one poses a greater threat.

Tom Wilton said we should also considered whether it is an active mine or inactive and the degree of reclamation.

Kyle Hoagland and Alan Kolok informed everyone that all coal mines in Nebraska are closed.

Instream Sand and Gravel
The group discussed that Iowa and Nebraska have off-channel mines within the alluvium not within the channel. Clay Pierce talked about a study in Iowa that found in one instance the deep section of a river created by an instream mine was used for overwintering.

Flow Diversions
Dave Schumacher and Kyle Hoagland mentioned that irrigation return flow is a big problem in Nebraska, because of the high concentrations of nutrients/contaminants they contain. The committee then discussed the potential use of models to account for this. In particular they discussed two models; COHYST and MODFLOW.
COHYST: Modeled flows throughout drained areas of Nebraska. Dwayne Woodward is contact for these data. Western 2/3 of Platte River Basin was modeled using MODFLOW.

Recreational Use
Kyle Hoagland said that park visitation data, should be available from the Nebraska Game and Parks and Steve Schainost added that the Nebraska Game and Parks Commission web site would have the proper contacts listed.

Clay Pierce suggested there may be a coverage of boat ramps on the IRIS web site. Tom Wilton said Iowa has a public areas GIS coverage that contains federal, state, and county parks. Scott Sowa and Clay Pierce stated that these data are likely from the Iowa GAP stewardship coverage.

Navigation
Reviewed what was discussed in MO/KS meeting.

Introduced Species
Scott Sowa stated that we can't account for local introductions, but that we should try to categorize exotics into a range of categories from highly invasive to benign.
Steve Schainost offered a list of species considered to be exotic?

Kyle Hoagland and Steve Schainost also wondered if we would be able to consider the effects exotic plants are having on wetlands. Steve Schainost pointed out that the USDA has a noxious weed data base that may be useful, and Tom Wilton added that in Iowa the person to contact would be Kim Bogenshutz. Tom Wilton asked if we have considered using a greeness index, but Scott Sowa thought it might cause more problems and said the data is not widely available.

Cropland
Kyle Hoagland said the FSA is mapping all crop cover. Tom Isenhart brought up the issue of accounting for ag with tile vs. not tile.

Other discussion items

Categorizing the relative influence of each threat/stressor on the list on each of the elements of biological integrity

Gust explained that for a relative measure of human stress we would like develop separate indices for each element of biological integrity; water quality, flow regime, physical habitat, energy/nutrient sources and cycling, and biological interactions. He further stated that we would like to account for the different magnitude of effects among all of the identified threats/stressors by using some sort of weighting and one way to do this is to apply a categorical weighting value for each stressor/response combination. The group agreed that we should probably use a 4 value system of ranking; none, 1, 2, and 3, where a 3 represents a very strong influence of that stressor on the particular element of biological integrity.

Clay Pierce suggested that we did not have the time to do this at the meeting and that it may be better to have each committee member apply their own rankings separately and then to compile a tally. The committee agreed and Gust stated that he would put something together to be sent out to the committee via e-mail or over the web.

Alan Kolok had a cautionary note and said that population density is a secondary variable (as opposed to impervious surface), that can be viewed from various perspectives, which could lead to very subjective and highly variable categorizations of this factor. The group agreed and stated that this measure is likely correlated with a number of the threats/stressors that have already been discussed. Tom Wilton stated that we will certainly want to be careful in how this factor is used, if it is used as part of a human threat/stressor index. The committee then discussed the possibility of dividing population density into rural vs. urban population densities to account for other factors like density of septic systems or lagoons. The group agreed this would be helpful, but it does not fully address the subjectivity issue.

Relative vs. Empirical Approaches

The group agreed that an empirical approach to developing human threat/stressor indices across the region would be most desirable. However, they also agreed that it would be more difficult, time consuming and costly. They also agreed that both relative and empirical approaches have their merits and that both should be pursued, if possible. The group also stated that the empirical approach is ideally suited for a graduate student project.

Closing comments

Gust and Scott stated that they would send out the meeting minutes as soon as they got them synthesized and that each of the committee members would be hearing from them in order to schedule the next meeting. Gust then called the meeting to a close at 3:10 pm.